



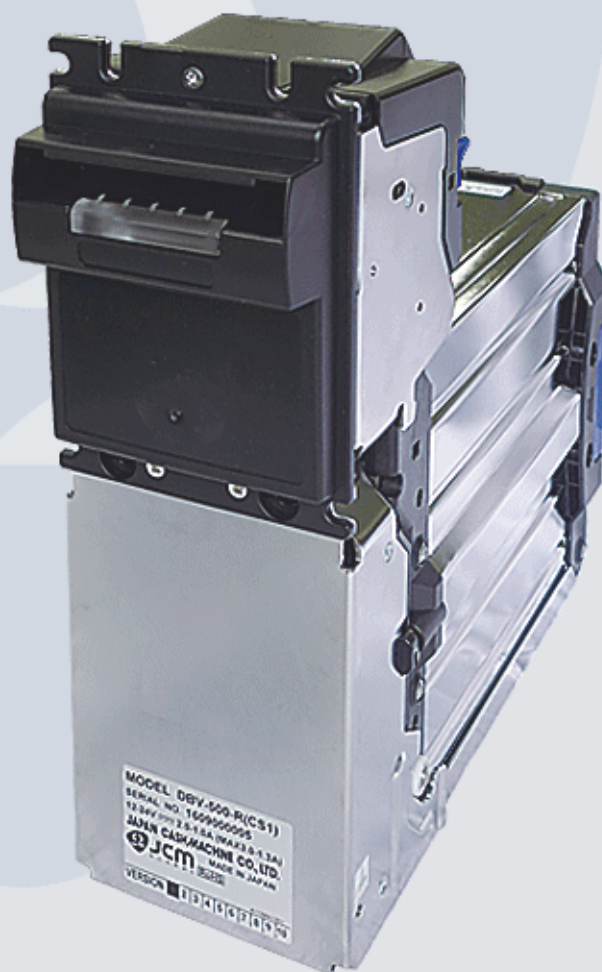
Website: <http://www.jcmglobal.com>

# DBV<sup>®</sup> Series

## DBV-500-S

### Banknote Validator

*Operation and Maintenance  
Manual*  
(Revision A)



P/N 960-000191R



REVISION HISTORY			
Rev No.	Date	Reason for Update	Comment
A	7-12-17	Initial Version	

### International Compliance

- RoHS Directives  or  or  or 
- UL & c-UL Marks  File No.857947001 E142330 V2:Sec14
- CE Mark 
- FCC & IC Directives

### Electrical Current Symbol

Direct Current:  indicates Direct Current values on product labels.

**FCC NOTICE:**

Note: This equipment has been tested and found to comply with the limits for a Class B 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 instruction manual, 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 "B" Digital Apparatus complies with Canadian ICES-003.  
Cet appareil numerique de la Classe "B" est conforme a la norme NMB-003 du Canada.

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# DBV® Series

## DBV-500-S Banknote Validator

### Table of Contents

	Page
<b>1 GENERAL INFORMATION .....</b>	<b>1-1</b>
<b>DBV-500-S Unit.....</b>	<b>1-1</b>
<b>Product Descriptions.....</b>	<b>1-2</b>
Model Descriptions.....	1-2
Type Descriptions .....	1-2
Software Descriptions .....	1-2
<b>Precautions.....</b>	<b>1-3</b>
User Cautions .....	1-3
Installation Cautions.....	1-3
Mounting, Dismounting & Transportation.....	1-3
Placing Foreign Objects into the Unit.....	1-3
Preventive Maintenance .....	1-3
Banknote Fitness Requirements .....	1-4
<b>Primary Features.....</b>	<b>1-4</b>
<b>Component Names .....</b>	<b>1-5</b>
<b>Specifications.....</b>	<b>1-6</b>
Technical Specifications.....	1-6
Environmental Specifications .....	1-7
Electrical Specifications .....	1-7
Structural Specifications.....	1-7
<b>Unit Dimensions.....</b>	<b>1-8</b>
Entire Unit Outside Dimensions .....	1-8
Bezel Type A Dimensions .....	1-9
Bezel Type B Dimensions .....	1-9
DBV-500-S Installation/Maintenance Space Requirements.....	1-10
<b>Technical Contact Information .....</b>	<b>1-11</b>
Americas .....	1-11
JCM American .....	1-11
Europe, Middle East, Africa & Russia .....	1-11
JCM Europe GmbH.....	1-11
UK & Ireland.....	1-11
JCM Europe (UK Office) .....	1-11
Asia and Oceania.....	1-11
JCM Gold (HK) Ltd.....	1-11
JAPAN CASH MACHINE CO., LTD. (HQ).....	1-11
<b>2 INSTALLATION .....</b>	<b>2-1</b>
<b>Installation Procedure .....</b>	<b>2-1</b>
Entire Unit Installation .....	2-1
Panel Bracket Installation.....	2-1
Lock Dimension Reference .....	2-2
Lock Installation .....	2-2
Plastic Latch Installation .....	2-2
Metal Lock Installation .....	2-3
Frame Lock Installation.....	2-3

# Table of Contents

	Page
<b>DIP Switch Configurations</b> .....	<b>2-4</b>
DIP Switch Block 1 .....	2-4
DIP Switch Block 2 .....	2-4
<b>Connector Pin Assignments</b> .....	<b>2-5</b>
Photo-Coupler Isolation Connector Pin Assignments .....	2-5
RS232C Connector Pin Assignments .....	2-6
TTL Connector Pin Assignments .....	2-7
USB Connector Pin Assignments .....	2-8
ID-044 Connector Pin Assignments .....	2-9
Option Connector Pin Assignments .....	2-10
<b>Preventive Maintenance</b> .....	<b>2-11</b>
Retrieving Banknotes .....	2-11
Clearing a Banknote Jam .....	2-11
Cleaning Procedure .....	2-12
Sensor and Roller Cleaning Procedure .....	2-12
Sensor and Roller Locations .....	2-13
<b>Standard Interface Circuit Schematics</b> .....	<b>2-15</b>
Standard Interface Circuit Schematics (Continued 1) .....	2-16
Standard Interface Circuit Schematics (Continued 2) .....	2-17
Standard Interface Circuit Schematics (Continued 3) .....	2-18
Standard Interface Circuit Schematics (Continued 4) .....	2-19
Standard Interface Circuit Schematics (Continued 5) .....	2-20
<b>Operational Flowcharts</b> .....	<b>2-21</b>
Operational Flowchart (Continued 1) .....	2-22
Operational Flowchart (Continued 2) .....	2-23
<b>3 COMMUNICATIONS</b> .....	<b>3-1</b>
Americas .....	3-1
JCM American .....	3-1
Europe, Middle East, Africa & Russia .....	3-1
JCM Europe GmbH .....	3-1
UK & Ireland .....	3-1
JCM Europe (UK Office) .....	3-1
Asia and Oceania .....	3-1
JCM Gold (HK) Ltd. ....	3-1
JAPAN CASH MACHINE CO., LTD. (HQ) .....	3-1
<b>4 DISASSEMBLY/REASSEMBLY</b> .....	<b>4-1</b>
<b>Tool Requirements</b> .....	<b>4-1</b>
<b>Main Board Removal</b> .....	<b>4-1</b>
<b>Side Sensor Board Removal</b> .....	<b>4-2</b>
<b>Main Frame/Upper Guide Removal</b> .....	<b>4-3</b>
<b>Transport Motor/Stacker Motor Removal</b> .....	<b>4-3</b>
<b>Inside Sensor Board Removal</b> .....	<b>4-3</b>
<b>Centering Home Sensor Board Removal</b> .....	<b>4-3</b>
<b>Centering Motor Removal</b> .....	<b>4-4</b>
<b>Outside Sensor Board Removal</b> .....	<b>4-4</b>



# Table of Contents

	Page
<b>5 WIRING DIAGRAMS .....</b>	<b>5-1</b>
<b>System Wiring Diagram.....</b>	<b>5-1</b>
<b>6 CALIBRATION AND TESTING .....</b>	<b>6-1</b>
<b>Tool Requirement.....</b>	<b>6-1</b>
<b>Installation Procedures .....</b>	<b>6-1</b>
Application Software Installation .....	6-1
Driver Installation Procedure.....	6-2
<b>JCM Tool Suite Standard Edition Mode.....</b>	<b>6-3</b>
<b>Download Procedures .....</b>	<b>6-3</b>
Software Program Download .....	6-3
<b>Calibration .....</b>	<b>6-5</b>
When to Calibrate .....	6-5
Placing the Reference Paper .....	6-5
Calibration Preparation .....	6-6
Sensor Calibration .....	6-6
Serial Number Setting.....	6-8
White Level Test .....	6-9
<b>Performance Tests.....</b>	<b>6-9</b>
Performance Test Items using a PC .....	6-9
Performance Test Preparation.....	6-10
Feed Motor Test.....	6-10
Stacking Movement Test .....	6-11
Sensor Test.....	6-11
DIP SW1/SW2 Test .....	6-12
LED Test.....	6-13
Centering Movement Test.....	6-13
Performance Test without a PC .....	6-14
Aging Test.....	6-14
Sensor Test.....	6-15
Acceptance Test .....	6-15
LED Test .....	6-16
Other Performance Tests.....	6-16
<b>7 EXPLODED VIEWS &amp; PARTS LISTS .....</b>	<b>7-1</b>
<b>DBV-500-S Entire Unit Exploded View .....</b>	<b>7-1</b>
DBV-500-S Entire Unit Parts List .....	7-2
<b>DBV-500-S Main Unit Exploded View .....</b>	<b>7-3</b>
DBV-500-S Main Unit Parts List.....	7-4
<b>DBV-500-S Upper Guide Exploded View.....</b>	<b>7-5</b>
DBV-500-S Upper Guide Parts List.....	7-6
<b>DBV-500-S Main Frame Exploded View .....</b>	<b>7-8</b>
DBV-500-S Main Frame Parts List.....	7-9
<b>DBV-500 Series Box Frame Exploded View.....</b>	<b>7-10</b>
DBV-500 Series Box Frame Parts List.....	7-11
<b>DBV-500 Series Cash Box Exploded View .....</b>	<b>7-12</b>
DBV-500 Series Cash Box Parts List.....	7-14

# Table of Contents

	Page
<b>DBV-500 Series Cash Box Option Parts Exploded View .....</b>	<b>7-16</b>
DBV-500 Series Cash Box Option Parts List .....	7-17
<b>DBV-500-S Harness Parts List .....</b>	<b>7-17</b>
<b>8 INDEX.....</b>	<b>8-1</b>
<b>A TROUBLESHOOTING .....</b>	<b>A-1</b>
Introduction .....	A-1
Troubleshooting Overview .....	A-1
Fault Table Listings .....	A-1
Adjustment Error.....	A-2
Communication Error.....	A-3
LED Indication Conditions.....	A-3
LED Flash Error Code Conditions .....	A-3
LED Flash Reject Code Conditions .....	A-6
Maintenance Equipment .....	A-8
DBV-500-S Maintenance Equipment.....	A-8
Reference Paper Handling .....	A-8
<b>B GLOSSARY.....</b>	<b>B-1</b>

# DBV® Series

## DBV-500-S Banknote Validator

### List of Figures

		Page
Figure 1-1	DBV-500-S Unit .....	1-1
Figure 1-2	Precautionary Symbols .....	1-3
Figure 1-3	Unacceptable Banknotes .....	1-4
Figure 1-4	Automatic Centering Mechanism .....	1-4
Figure 1-5	DBV-500-S Component Names .....	1-5
Figure 1-6	DBV-500-S Unit with Standard Cash Box Outside Dimensions .....	1-8
Figure 1-7	DBV-500-S Unit with 177mm Cash Box Outside Dimensions .....	1-8
Figure 1-8	DBV-500-S Bezel Type A Outside Dimensions .....	1-9
Figure 1-9	DBV-500-S Bezel Type B Outside Dimensions .....	1-9
Figure 1-10	DBV-500-S with Standard Cash Box Installation and Maintenance Space Requirement .....	1-10
Figure 1-11	DBV-500-S with 177mm Cash Box Installation and Maintenance Space Requirement .....	1-10
Figure 2-1	Chassis Side Reference Dimensions 1 .....	2-1
Figure 2-2	Thread Studs Location .....	2-1
Figure 2-3	Chassis Side Reference Dimensions 2 .....	2-1
Figure 2-4	Panel Bracket Fix .....	2-2
Figure 2-5	Threaded Studs Location .....	2-2
Figure 2-6	Lock Dimension Reference .....	2-2
Figure 2-7	Plastic Latch Installation 1 .....	2-2
Figure 2-8	Plastic Latch Installation 2 .....	2-2
Figure 2-9	Metal Lock Installation 1 .....	2-3
Figure 2-10	Metal Lock Installation 2 .....	2-3
Figure 2-11	Frame Lock Installation 1 .....	2-3
Figure 2-12	Frame Lock Installation 2 .....	2-3
Figure 2-13	Frame Lock Installation 3 .....	2-3
Figure 2-14	Frame Lock Installation 4 .....	2-4
Figure 2-15	Frame Lock Installation 5 .....	2-4
Figure 2-16	Retrieving Banknotes 1 .....	2-11
Figure 2-17	Retrieving Banknotes 2 .....	2-11
Figure 2-18	Retrieving Banknotes 3 .....	2-11
Figure 2-19	Jam Clear 1 .....	2-11
Figure 2-20	Jam Clear 2 .....	2-11
Figure 2-21	Jam Clear 3 .....	2-11
Figure 2-22	Jam Clear 4 .....	2-12
Figure 2-23	Jam Clear 5 .....	2-12
Figure 2-24	Jam Clear 6 .....	2-12
Figure 2-25	General Cleaning Image .....	2-12
Figure 2-26	DBV-500-S Sensor and Roller Cleaning Locations .....	2-13
Figure 2-27	DBV-500-S Photo-Coupler Interface Schematic Diagram .....	2-15
Figure 2-28	DBV-500-S RS232C Interface Schematic Diagram .....	2-16
Figure 2-29	DBV-500-S TTL Interface Schematic Diagram .....	2-17
Figure 2-30	DBV-500-S USB Interface Schematic Diagram .....	2-18

# List of Figures

	Page
Figure 2-31 DBV-500-S ID-044 PULSE Interface Schematic Diagram .....	2-19
Figure 2-32 DBV-500-S ID-044 SERIAL Interface Schematic Diagram .....	2-20
Figure 2-33 DBV-500-S Operational Flowchart (Initializing) .....	2-21
Figure 2-34 DBV-500-S Operational Flowchart (Validation) .....	2-22
Figure 2-35 DBV-500-S Operational Flowchart (Stacking) .....	2-23
Figure 4-1 Cash Box Removal .....	4-1
Figure 4-2 Bezel Removal .....	4-1
Figure 4-3 Base Plate Removal .....	4-1
Figure 4-4 CPU Protective Sheet Removal .....	4-2
Figure 4-5 Main Board Removal .....	4-2
Figure 4-6 Connector Removal .....	4-2
Figure 4-7 Side Sensor Board Removal .....	4-2
Figure 4-8 Upper Guide Removal .....	4-3
Figure 4-9 Transport Motor/Stacker Motor Removal .....	4-3
Figure 4-10 Inside Sensor Board Removal .....	4-3
Figure 4-11 Upper Cover Removal .....	4-3
Figure 4-12 Connector Removal .....	4-3
Figure 4-13 Centering Home Sensor Board Removal .....	4-4
Figure 4-14 Centering Motor Removal .....	4-4
Figure 4-15 Lower Guide Removal .....	4-4
Figure 4-16 Upper Guide 2 Removal .....	4-4
Figure 4-17 Upper Guide 1 Removal .....	4-4
Figure 4-18 Seal Sponge Removal .....	4-4
Figure 5-1 DBV-500-S System Wiring Diagram .....	5-1
Figure 6-1 Tool and Harness Connections .....	6-1
Figure 6-2 USB Cable Type Requirement .....	6-1
Figure 6-3 Setup.exe File Location .....	6-1
Figure 6-4 InstallShield Wizard Screen .....	6-1
Figure 6-5 Destination Folder Screen .....	6-2
Figure 6-6 Current Settings Confirmation .....	6-2
Figure 6-7 Installation Completion Screen .....	6-2
Figure 6-8 Hardware Update Wizard Screen 1 .....	6-2
Figure 6-9 Hardware Update Wizard Screen 2 .....	6-2
Figure 6-10 Normal Mode Selection .....	6-3
Figure 6-11 Test Mode Selection .....	6-3
Figure 6-12 Normal Upgrade Setting .....	6-3
Figure 6-13 Initial Download Setting .....	6-3
Figure 6-14 Normal Upgrade Screen .....	6-3
Figure 6-15 Initial Download Screen .....	6-4
Figure 6-16 JCM Tool Suite Standard Edition Screen Pull-Down Menu .....	6-4
Figure 6-17 Browse Screen Button Location .....	6-4
Figure 6-18 DBV-500 Software Program Selection .....	6-4
Figure 6-19 Download Progress Screen 1 .....	6-4
Figure 6-20 Download Completed Screen 1 .....	6-4
Figure 6-21 KS-091 and KS-096 Reference Papers .....	6-5

# List of Figures

	<b>Page</b>
Figure 6-22 Placing Reference Paper 1 .....	6-5
Figure 6-23 Placing Reference Paper 2 .....	6-5
Figure 6-24 Placing Reference Paper 3 .....	6-5
Figure 6-25 DIP SW1 Setting .....	6-6
Figure 6-26 Launching JCM Tool Suite Standard Edition Screen .....	6-6
Figure 6-27 Sensor Adjustment Selection .....	6-6
Figure 6-28 Sensor Calibration Screen 1 .....	6-6
Figure 6-29 Sensor Calibration Screen 2 .....	6-6
Figure 6-30 Non-Paper Calibration Screen .....	6-6
Figure 6-31 Non-Paper Calibration Completion .....	6-7
Figure 6-32 Placing Reference Paper Message .....	6-7
Figure 6-33 Reference Paper Calibration .....	6-7
Figure 6-34 Removing Reference Paper Message .....	6-7
Figure 6-35 Second Non-Paper Calibration .....	6-7
Figure 6-36 Serial Number Change Dialogue .....	6-7
Figure 6-37 Serial Number Setting .....	6-8
Figure 6-38 Serial Number Setting .....	6-8
Figure 6-39 Calibration Result .....	6-8
Figure 6-40 Serial Number Setting Button .....	6-8
Figure 6-41 Set Serial Number Screen .....	6-8
Figure 6-42 Serial Number Setting Completion .....	6-8
Figure 6-43 White Level Test Button .....	6-9
Figure 6-44 White Level Test Start Button .....	6-9
Figure 6-45 White Level Test Completion .....	6-9
Figure 6-46 DIP SW1 Setting .....	6-10
Figure 6-47 JCM Tool Suite Standard Edition Initial Screen .....	6-10
Figure 6-48 Performance Test Main Screen .....	6-10
Figure 6-49 Feed Motor Test Selection .....	6-10
Figure 6-50 Feed Motor Test Start Button .....	6-10
Figure 6-51 Feed Motor Test Stop Button .....	6-10
Figure 6-52 Stacking Movement Test Selection .....	6-11
Figure 6-53 Stacking Movement Test Start Button .....	6-11
Figure 6-54 Stacking Movement Test Stop Button .....	6-11
Figure 6-55 Sensor Test Selection .....	6-11
Figure 6-56 Sensor Test Start Button .....	6-12
Figure 6-57 Sensor Test Stop Button .....	6-12
Figure 6-58 DIP SW1/SW2 Test Selection .....	6-12
Figure 6-59 DIP SW Test Start Button .....	6-12
Figure 6-60 DIP SW Test Stop Button .....	6-12
Figure 6-61 LED Test Selection .....	6-13
Figure 6-62 LED Test Start Button .....	6-13
Figure 6-63 LED Test Stop Button .....	6-13
Figure 6-64 Centering Test Selection .....	6-13
Figure 6-65 Centering Test Start Button .....	6-13
Figure 6-66 Centering Test Stop Button .....	6-13

# List of Figures

	<b>Page</b>
Figure 6-67 Aging Test DIP SW1 Setting .....	6-14
Figure 6-68 Aging Test DIP SW2 Setting .....	6-14
Figure 6-69 DIP SW1 #8 OFF .....	6-14
Figure 6-70 DIP SW1 #6 and #7 ON .....	6-14
Figure 6-71 Sensor Test DIP SW1 Setting .....	6-15
Figure 6-72 Sensor Test DIP SW2 Setting .....	6-15
Figure 6-73 Sensor Test DIP SW1 #8 OFF .....	6-15
Figure 6-74 Acceptance Test DIP SW1 Setting .....	6-15
Figure 6-75 Acceptance Test DIP SW2 Setting .....	6-15
Figure 6-76 DIP SW1 #8 OFF .....	6-15
Figure 6-77 LED Test DIP SW1 Setting .....	6-16
Figure 6-78 LED Test DIP SW2 Setting .....	6-16
Figure 6-79 LED Test DIP SW1 #8 OFF .....	6-16
Figure 6-80 Other Tests DIP SW1 Setting .....	6-16
Figure 6-81 Other Tests DIP SW2 Setting .....	6-16
Figure 7-1 DBV-500-S Entire Unit Exploded View Diagram .....	7-1
Figure 7-2 DBV-500-S Main Unit Exploded View .....	7-3
Figure 7-3 DBV-500-S Upper Guide Exploded View .....	7-5
Figure 7-4 DBV-500-S Main Frame Exploded View .....	7-8
Figure 7-5 DBV-500 Series Box Frame Exploded View .....	7-10
Figure 7-6 DBV-500 Series Standard Cash Box Exploded View .....	7-12
Figure 7-7 DBV-500 Series 177mm Cash Box Exploded View .....	7-13
Figure 7-8 DBV-500 Series Cash Box Option Parts Exploded View .....	7-16
Figure A-1 Additional Maintenance Equipment Requirements .....	A-8

# DBV® Series

## DBV-500-S Banknote Validator

### List of Tables

		Page
Table 1-1	DBV-500-S Model Number Specifications .....	1-2
Table 1-2	DBV-500-S Cash Box Type Number Specifications .....	1-2
Table 1-3	DBV-500-S Unit Type Number Specifications.....	1-2
Table 1-4	DBV-500-S Software Number Specifications.....	1-2
Table 1-5	DBV-500-S Technical Specifications .....	1-6
Table 1-6	DBV-500-S Environmental Specifications.....	1-7
Table 1-7	DBV-500-S Electrical Specifications .....	1-7
Table 1-8	DBV-500-S Structural Specifications .....	1-7
Table 2-1	DIP Switch Block 1 Settings.....	2-4
Table 2-2	DIP Switch Block 2 Settings.....	2-4
Table 2-3	DBV-500-S Photo-Coupler Isolation Unit Side Connector Pin Assignments.....	2-5
Table 2-4	DBV-500-S Photo-Coupler Interface Pin Assignments.....	2-5
Table 2-5	DBV-500-S RS232C Unit Side Connector Pin Assignments .....	2-6
Table 2-6	DBV-500-S RS232C Interface Pin Assignments.....	2-6
Table 2-7	DBV-500-S TTL Unit Side Connector Pin Assignments.....	2-7
Table 2-8	DBV-500-S TTL Interface Pin Assignments.....	2-7
Table 2-9	DBV-500-S USB Unit Side Connector Pin Assignments.....	2-8
Table 2-10	DBV-500-S USB Interface Pin Assignments.....	2-8
Table 2-11	DBV-500-S ID-044 Unit Side Connector Pin Assignments .....	2-9
Table 2-12	DBV-500-S ID-044 Interface Pin Assignments .....	2-9
Table 2-13	DBV-500-S Option Connector Pin Assignments .....	2-10
Table 2-14	DBV-500-S Sensor Type Cleaning Methods.....	2-13
Table 6-1	Performance Test Items using a PC .....	6-9
Table 6-2	Sensor Test Items.....	6-11
Table 6-3	Performance Test Items and DIP Switch 1 Settings .....	6-14
Table 6-4	Aging Test Interval Timing Settings .....	6-14
Table 6-5	Sensor and LED Condition.....	6-15
Table 7-1	DBV-500-S Entire Unit Parts List .....	7-2
Table 7-2	DBV-500-S Main Unit Parts List.....	7-4
Table 7-3	DBV-500-S Upper Guide Parts List.....	7-6
Table 7-4	DBV-500-S Main Frame Parts List.....	7-9
Table 7-5	DBV-500 Series Box Frame Parts List.....	7-11
Table 7-6	DBV-500 Series Cash Box Parts List.....	7-14
Table 7-7	DBV-500 Series Cash Box Option Parts List .....	7-17
Table 7-8	DBV-500 Series Cash Box Unit with option .....	7-17
Table 7-9	DBV-500-S Harness Parts List.....	7-17
Table A-1	General Fault Conditions .....	A-1
Table A-2	Adjustment Fault Conditions .....	A-2
Table A-3	Communication Fault Conditions .....	A-3
Table A-4	LED Flash Error Codes .....	A-3
Table A-5	LED Flash Reject Codes.....	A-6
Table A-6	Additional Maintenance Equipment Parts List.....	A-8

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# DBV® Series

## DBV-500-S Banknote Validator

### Section 1

## 1 GENERAL INFORMATION

This section provides a general overview of the DBV® Series Banknote Validator Unit (DBV-500-S), pictured in Figure 1-1. This section is designed to help the user navigate through this guide with ease. It includes the following information:

- DBV-500-S Unit
- Product Descriptions
- Precautions
- Primary Features
- Component Names
- Specifications
- Unit Dimensions
- Technical Contact Information

In order to make operating this device and navigating within this manual easier, the following illustrations are used:

- **Safety Instructions** need to be observed in order to protect the operators and the equipment; these are identified with **Bold** text and the following pictographs: ⚠️ ⚡️
- **Special Notes** affect the use of the Banknote Validator; these are identified with *italic* text and the following pictograph: 🖱️
- **Steps** require the operator to perform specific actions; these are identified with sequential numbers (1, 2, 3, etc.).

## DBV-500-S Unit




Figure 1-1 DBV-500-S Unit

# Product Descriptions

## Model Descriptions

Table 1-1 lists the product model number descriptions.

**Table 1-1** DBV-500-S Model Number Specifications

No.	 DBV-5 * * - * - (*) **/(**) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 (1) (2)(3)(4) (5) (6)
(1)	Model Name
(2)	Validation Sensor 0 = Type A (Standard World Wide)
(3)	Transport Unit Type 0 = Standard (World Wide/Centering Type)
(4)	Sensor Type S = Standard
(5)	Intake Part Unit (Optional) None = Standard
(6)	Stacker Type* SD = Downward Stacking (Standard) SU = Upward Stacking (Standard)

\*. When using the SD and the SU Types compatibly depends on the Bezel Type, the Stacker Type is indicated as "SD/SU".

## Type Descriptions

Table 1-2 lists the Cash Box type number descriptions.


**Table 1-2** DBV-500-S Cash Box Type Number Specifications

No.	Type: * * * * * (1)(2)(3)(4)(5)
(1)	Cash Box Capacity* S = Small size, 500 notes (New Banknote) M = Medium size, 1000 notes (New Banknote) L = Large size, 1400 notes (New Banknote) For 177mm Specification: S = Small size, 500 notes (New Banknote) M = Medium size, 900 notes (New Banknote) L = Large size, 1300 notes (New Banknote)
(2)	Cash Box Door Lock 0 = No Lock 1 = Plastic Latch 2 = Metal Lock without Lock and with Tang 3 = Metal Lock with Lock and Tang (Designated) 4 = Metal Lock with Lock and Tang (Undesignated)
(3)	Cash Box Handle 0 = No Handle (Standard) 1 = Handle Type A
(4)	Cash Box Frame Lock 0 = No Lock (Standard) 1 = Frame Lock without Key 2 = Frame Lock with Lock and Key (Designated) 3 = Frame Lock with Lock and Key (Undesignated)
(5)	Cash Box Acceptable Banknote Length 0 = 120mm-160mm (Standard) 1 = 133mm-177mm (177mm specification)

\*. The number of stacked Notes depends on the Banknote's condition.

Table 1-3 lists the Unit type number descriptions.

**Table 1-3** DBV-500-S Unit Type Number Specifications

No.	 0000000000 DBV-5 * * - * - (*) **/(**) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 (1)(2)(3)(4)(5)(6)(7)(8)
(1)	Bezel 1 = Bezel Type A (SD/SU Compatible, CC Shape Bezel, 78mm, Black) 2 = Bezel Type B (SD/SU Compatible, CC Shape Bezel, 71mm, Black) 3 = Reserved
(2)	Sleep Mode 0 = No 1 = Yes (Standard)
(3)	Memory 0 = 32M bit (Standard) 1 = 64M bit
(4)	Optional Board 0 = None (Standard)
(5)	External Connection Harness A* (For CN12 = 18-Pin Connection) 0 = None 1 = Standard Harness 2 = USB Interface Harness
(6)	External Connection Harness B* (For CN16 = 6-Pin Connection) 0 = None 1 = Standard Harness
(7)	Panel Bracket* 0 = None 1 = Type A (CC Installation)
(8)	Reserved

\*. Refer to Section 7 "Exploded Views & Parts Lists" on page 7-1 for the part's EDP number.

## Software Descriptions

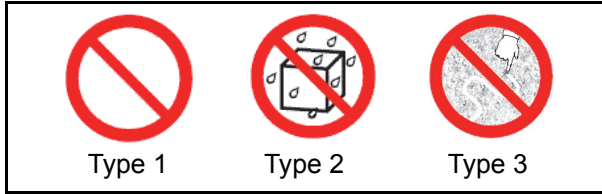
Table 1-4 lists the product type number descriptions.

**Table 1-4** DBV-500-S Software Number Specifications

No.	Software: DBV-500-SD/SU * * * - * * * - V * **-** No. (A) (B) (C) (D)
(A)	Software Model Name
(B)	Denomination (Country Code)*
(C)	Interface Protocol Name
(D)	Software Version

\*. The Country Code is indicated following the ISO 3166-1 standard.

## Precautions



**Figure 1-2** Precautionary Symbols

Symbols in Figure 1-2 are defined as follows:

1. (Type 1) Do not insert a torn, folded, or wet Banknote; it may cause a jam inside the unit.
2. (Type 2) Do not expose the unit to water. The unit contains several precision electronic devices that can be damaged if water or any liquid is sprayed or spilled into the unit.
3. (Type 3) Do not install the unit in a dusty environment. Dust may affect/degrade the sensor's performance.

## User Cautions

Careful measures were taken in the design of this product to ensure its quality; however, the following cautions pertain to all users and should be followed for safe operation.

## Installation Cautions

The Installation Cautions are defined as follows:

1. This unit is not designed for outdoor installation. Be sure the Host Machine contains enough protection to avoid wet or dusty conditions when installing it in both open-air and indoor spaces.
2. Be sure the Host Machine is designed with careful consideration for retrieving a Banknote and/or clearing a Banknote jam.
3. Be careful not to use excessive outside pressure on the Unit Frame when removing the Cash Box from the Unit.
4. Avoid exposing the Banknote Insertion Slot to direct Sunlight and/or Incandescent Lamp illumination having a Gradient Angle of 15 Degrees or more, and an illumination index of 3000 Lux or less. Ensure that the Host Machine is also designed to avoid exposing the Banknote Insertion Slot to direct Sunlight or incandescent light.
5. Do not allow the Validator to endure a range of temperature and humidity beyond the environmental limits specified (See "Environmental Specifications" on page 1-7.).
6. Do not use the Validator in environments that may be subject to extreme temperature changes.
7. Do not use the Validator where it may be exposed to airborne evaporated or sporadic chemicals.
8. Clean and maintain the Validator regularly when located in an excessively smoke filled environment.

## Mounting, Dismounting & Transportation

Methods for mounting, dismounting and transporting the unit:

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 installing the Transport Unit, ensure that the Transport is properly replaced in its correct original location and will not move forward by pulling.
3. Be sure to carry the Unit by both hands when transporting. Holding the Unit by one hand may cause personal injury if the Unit accidentally becomes disassembled and drops away.
4. Be careful not to use excessive outside pressure on the Unit, or subject it to excessive vibration during transportation.
5. Do not throw or pound hard on the Unit. Improper handling may cause personal injury and/or damage to the equipment.

## Placing Foreign Objects into the Unit

Observe the following precautions when placing foreign objects into the Unit:

1. Do not insert anything except Banknotes into the Insertion Slot. Inserting Receipts, Stapled Tickets, Rubber Bands, or Credit Cards into the Unit may damage the Banknote Transport path.
2. Do not inject liquids into the Banknote Insertion Slot. Injecting water, oil or cleaning agents may damage the Sensors within the Banknote Transport path.

## Preventive Maintenance

The preventive maintenance requirements are defined as follows:

1. When closing the Upper Tray of the Validator, ensure that it clicks firmly into place.



**Caution: Be careful to avoid personal injury to your fingers when closing the Upper Guide Section.**

2. Do not redesign or disassemble the DBV-500-S Validator. Unauthorized use by inadequately trained personnel, or use outside the original manufacturer's intent for operation voids the warranty.



**WARNING: Do not inject water or liquid agents of any kind into the Validator, as this may cause extreme damage to the Unit.**

3. Perform routine cleaning and maintenance at least once a month to keep the DBV-500-S Unit's performance stable.
4. Use a soft, lint-free cloth, cotton swab or compressed air spray to clean dust and debris from the Rollers.



**WARNING:** To minimize risk of damage to internal printed circuit boards, never allow excess fluid (e.g., from a wet cleaning cloth) to drip or leak into the device. Internal printed circuit boards may be damaged. Do not use any alcohol, citrus based cleaners, solvents or scouring agents that can damage the plastic surfaces of the device.

5. If the Unit is exposed to water or liquids, use a clean, dry Micro-fiber cloth to wipe off and absorb excess liquids immediately. Any remaining liquids may affect and degrade the Sensors and Validation component performance.



**Caution:** Make sure Interface Harness connections to the Host Machine are shorter than 9.84 Feet (3 Meters) in length. Cut off all unused portions of the Interface Harness wiring to avoid static electrical effects or short circuit possibilities that could cause damage to the Unit.



**WARNING:** This Unit is designed for use with a Limited Power Source! Design the Host Cabinet space to meet all local related safety standards.

### Banknote Fitness Requirements

The following Banknote types may not validate correctly, or worse, can cause a jam and/or damage to the unit's Transport Path. Banknotes exhibiting the following conditions illustrated in Figure 1-3 should be avoided:

- torn
- excessive folds or wrinkles
- dirty
- curled
- wet
- containing foreign objects and/or oil

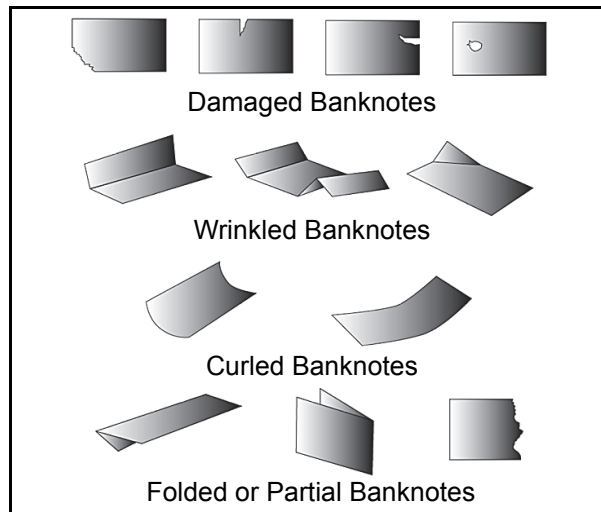


Figure 1-3 Unacceptable Banknotes

### Primary Features

This DBV-500-S Series Banknote Validator Unit contains the following primary features:

- **Automatic Centering** – The Centering Mechanism (Figure 1-4) allows the unit to read Banknotes without using special Banknote Guides. It improves the overall acceptance rate.
- **High-Speed Processing** – The validation processing speed is less than two seconds by the precision high performance validation sensors.

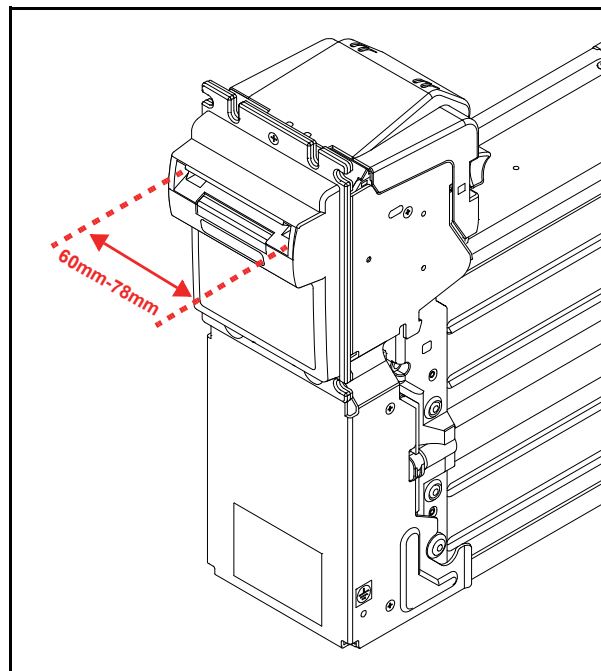
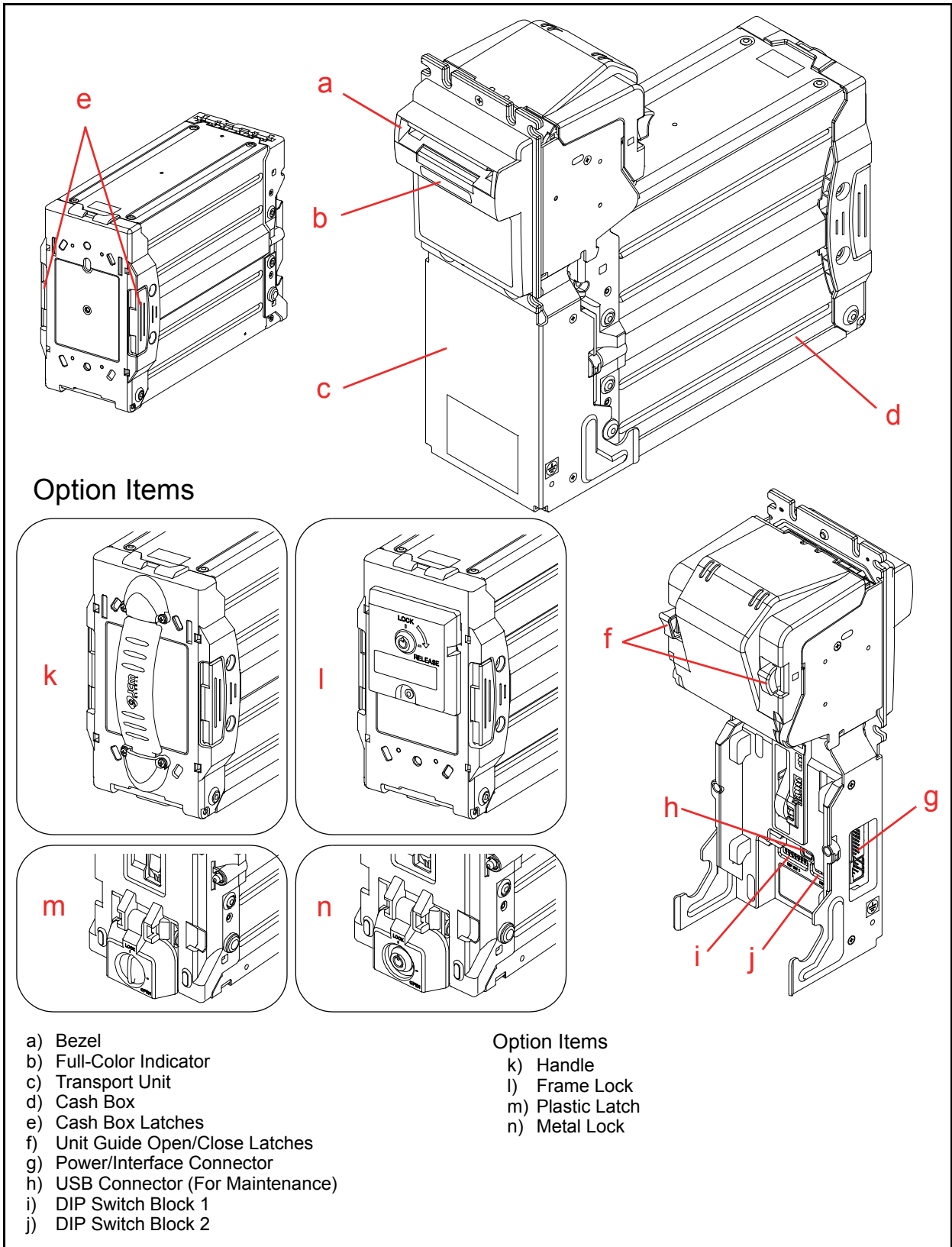


Figure 1-4 Automatic Centering Mechanism

# Component Names

Figure 1-5 illustrates the DBV-500-S component names and locations.



## Option Items

- a) Bezel
- b) Full-Color Indicator
- c) Transport Unit
- d) Cash Box
- e) Cash Box Latches

- ### Option Items
- k) Handle
  - l) Frame Lock
  - m) Plastic Latch
  - n) Metal Lock

Figure 1-5 DBV-500-S Component Names



## Specifications

This section provides specifications of the DBV® Series Banknote Validator Unit (DBV-500-S).

### Technical Specifications

**Table 1-5 DBV-500-S Technical Specifications**

Acceptance Rate* :	98% or greater The following Banknote types are excluded: <ul style="list-style-type: none"> <li>• Banknotes with excess or unclear graphics</li> <li>• Double (dual) Notes</li> <li>• Worn, dirty, wet, stained, torn or excessively wrinkled Banknotes</li> <li>• Banknotes having folded corners or edges</li> <li>• Banknotes having the wrong cut dimensions or printing displacement</li> <li>• Returned Banknotes because of incorrect or failed insertion.</li> </ul>
Banknote Types Accepted:	<ul style="list-style-type: none"> <li>• Long side: 120-160mm (4.72-6.29 in.) (Standard) 133-177mm (5.23-6.97 in.) (177mm specification)</li> <li>• Short side: 60-78mm (2.36-3.07 in.)</li> </ul>
Insertion Direction:	Four-Way†
Processing Speed‡:	Less than 2 seconds (from Banknote insertion to next Banknote insertion)
Validation Method:	Optical Sensor (Light, Transmissive/Reflection)
Diagnostic Indicators:	Bezel Insertion Slot Display
Escrow:	1 Note
Anti-stringing Mechanism:	Optical Detection and Internal Cash Box Lever
Cash Box Capacity** :	For Standard Approximately 500 notes (new Banknotes) Approximately 1000 notes (new Banknotes) Approximately 1400 notes (new Banknotes)
	For 177mm Specification Approximately 500 notes (new Banknotes) Approximately 900 notes (new Banknotes) Approximately 1300 notes (new Banknotes)
Cash Box Access:	Rear Access
Interface††:	Photo-Coupler isolation TTL RS232C Pulse interface USB [USB Specification Rev.2.0 Full Speed Transfer (12Mbps)]

\*. Refer to the specific Country's "Software Information Sheet" for each Country's particular Banknote acceptance rate.

†. Insertion Direction may be reduced when using multiple denominations. Refer to the specific Country's "Software Information Sheet" for each Country's particular Banknote insertion direction.

‡. Excluding Host Communication time lag (Condition [Power Supply: +12V DC ±1%, Temperature: 23° C ±3° C, Humidity: 40%-65%RH, Standard US dollars]).

\*\* .The number of Notes stacked depends on the Banknote's condition and denomination.

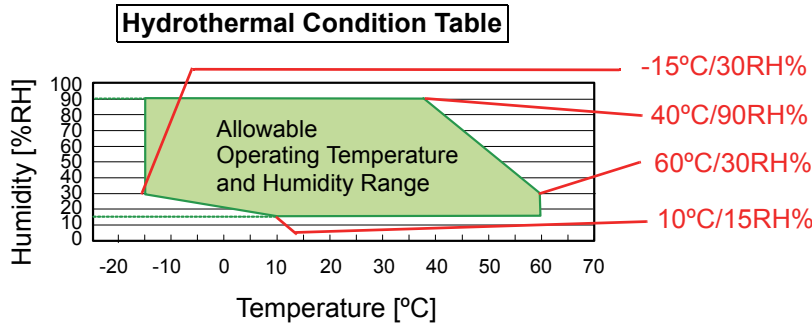
††.The Interface Harness connecting to the Host should be less than 3m (9.84 ft).

## Environmental Specifications

**Table 1-6 DBV-500-S Environmental Specifications**

Operating Temperature:	-15°C to +60°C (5°F to 140°F)*
Storage Temperature:	-20°C to +60°C (-4°F to 140°F)*
Relative Operating Humidity:	15% to 90% RH (non-condensed)
Relative Storage Humidity:	30% to 65% RH (non-condensed)
Visible Light Sensitivity:	Avoid contact with direct sunlight (Interior lighting must be incandescent with a Radiant Angle of 15 Degrees or more having an Illumination index of 3000 Lux or less)
Installation:	Semi-indoor

\*. Depends on hydrothermal conditions.



## Electrical Specifications

**Table 1-7 DBV-500-S Electrical Specifications**

Supply Voltage* :	12V DC ±5% (Greater than 4.0A/50W) - 24V DC ±5% (Greater than 2.0A/50W)	
Current Consumption:	12V DC <ul style="list-style-type: none"> <li>Standby = 200mA</li> <li>Operation = 2.3A</li> <li>Peak = 3.0A</li> </ul> Maximum Current Limitation Mode† <ul style="list-style-type: none"> <li>Standby = 200mA</li> <li>Operation = 1.4A</li> <li>Peak = 2.0A</li> </ul>	24V DC <ul style="list-style-type: none"> <li>Standby = 120mA</li> <li>Operation = 1.2A</li> <li>Peak = 1.4A</li> </ul> Sleep Mode‡ <ul style="list-style-type: none"> <li>Mode A = 35µA (Typ)</li> <li>Mode B = 95µA (Typ)</li> </ul>

\*. Use a Limited Power Source. The power supply should be in its own fire proof enclosure. Do not place the DBV-500-S unit in the same fire proof enclosure with the power supply.

†. The maximum current can be limited to less than 2.0A by DIP Switch settings. The specification would be 12V DC/2.0A. This option allows the DBV-500-S to operate with a lower current power supply, however the number of banknotes stacked will be reduced.

‡. Power saving mode while in standby. The two Sleep Mode options (Mode A [Host Wakeup Mode]/Mode B [Entrance Sensor Wakeup Mode]) are set by DIP Switch settings. When Mode A and Mode B are set at a same time, a larger current (150µA) is applied and the DBV-500-S activates when commands from the Host are received.

## Structural Specifications

**Table 1-8 DBV-500-S Structural Specifications**

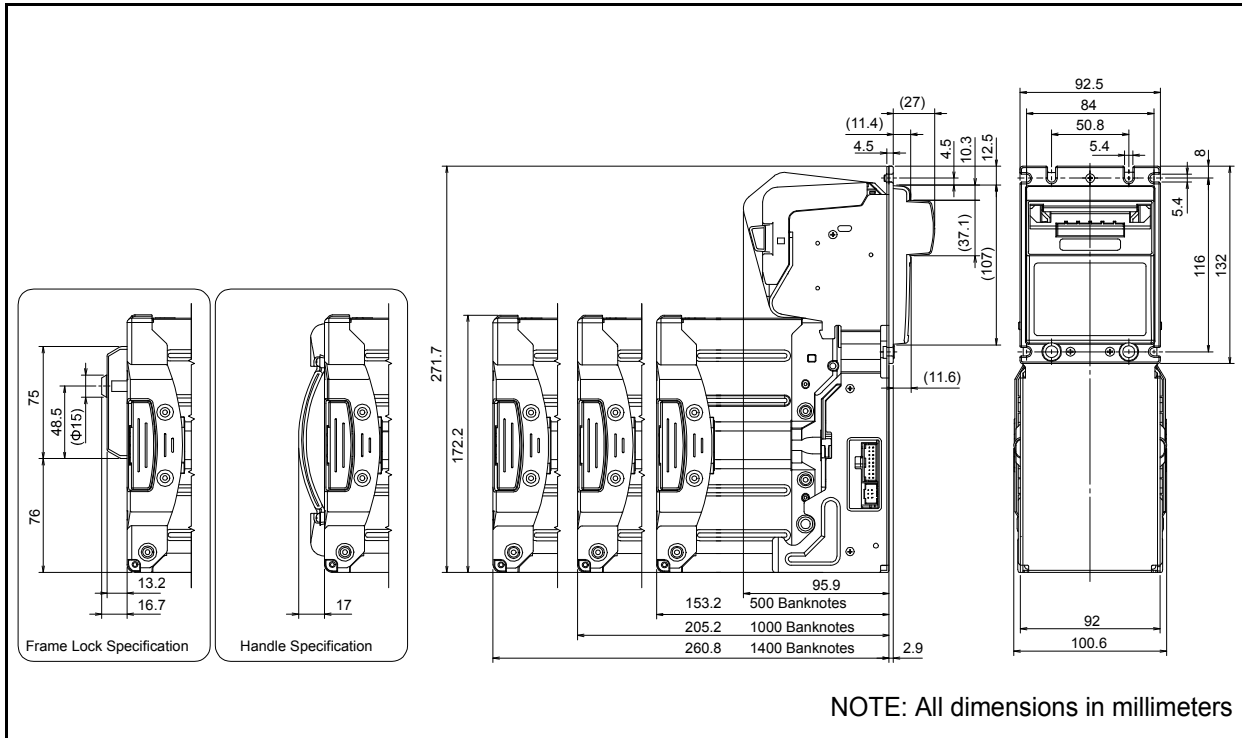
Weight:	Unit with Bezel: Approximately 1.4kg (3.09lbs.) Standard 500 note Cash Box: Approximately 0.8kg (1.76lbs.) Standard 1000 note Cash Box: Approximately 1.0kg (2.20lbs.) Standard 1400 note Cash Box: Approximately 1.2kg (2.64lbs.) 177mm Specification 500 note Cash Box: Approximately 0.8kg (1.76lbs.) 177mm Specification 900 note Cash Box: Approximately 1.1kg (2.42lbs.) 177mm Specification 1300 note Cash Box: Approximately 1.3kg (2.86lbs.)
Mounting:	Horizontal, 0 degrees, ±0 degrees angle (See "Entire Unit Installation" on page 2-1 for the installation.)
Outside Dimensions:	See "Entire Unit Outside Dimensions" on page 1-8.

## Unit Dimensions

This section provides unit dimensions of the DBV® Series Banknote Validator Unit (DBV-500-S).

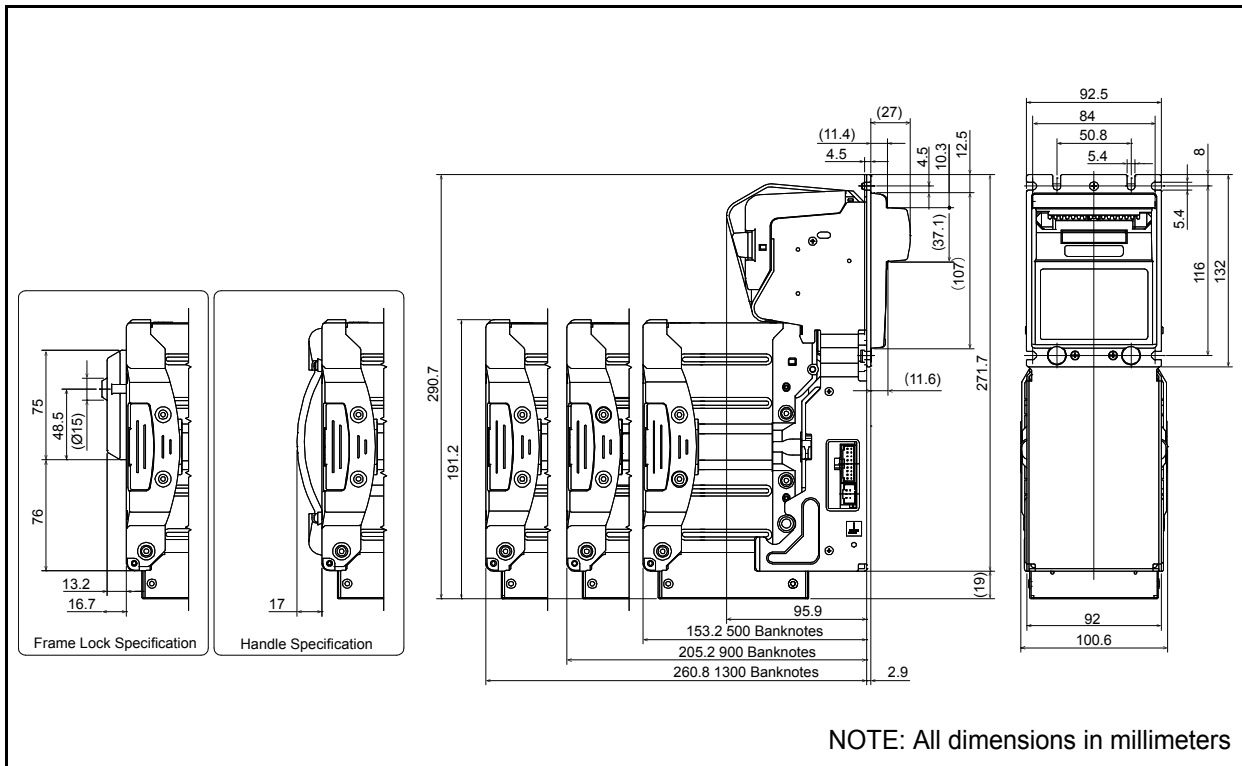
### Entire Unit Outside Dimensions

Figure 1-6 illustrates the DBV-500-S Unit with Standard Cash Box Outside Dimensions.



**Figure 1-6** DBV-500-S Unit with Standard Cash Box Outside Dimensions

Figure 1-7 illustrates the DBV-500-S Unit with 177mm Cash Box Outside Dimensions.



**Figure 1-7** DBV-500-S Unit with 177mm Cash Box Outside Dimensions



### Bezel Type A Dimensions

Figure 1-8 illustrates the DBV-500-S Bezel Type A Outside Dimensions.

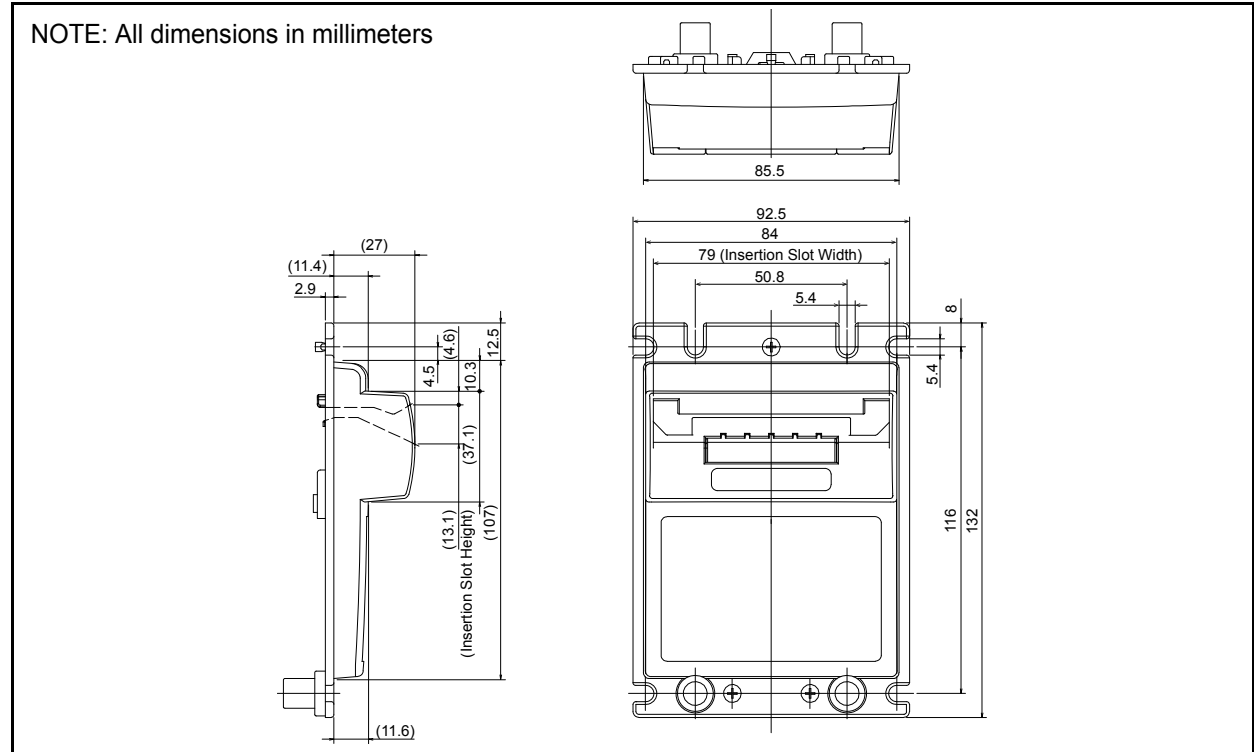


Figure 1-8 DBV-500-S Bezel Type A Outside Dimensions

### Bezel Type B Dimensions

Figure 1-9 illustrates the DBV-500-S Bezel Type B Outside Dimensions.

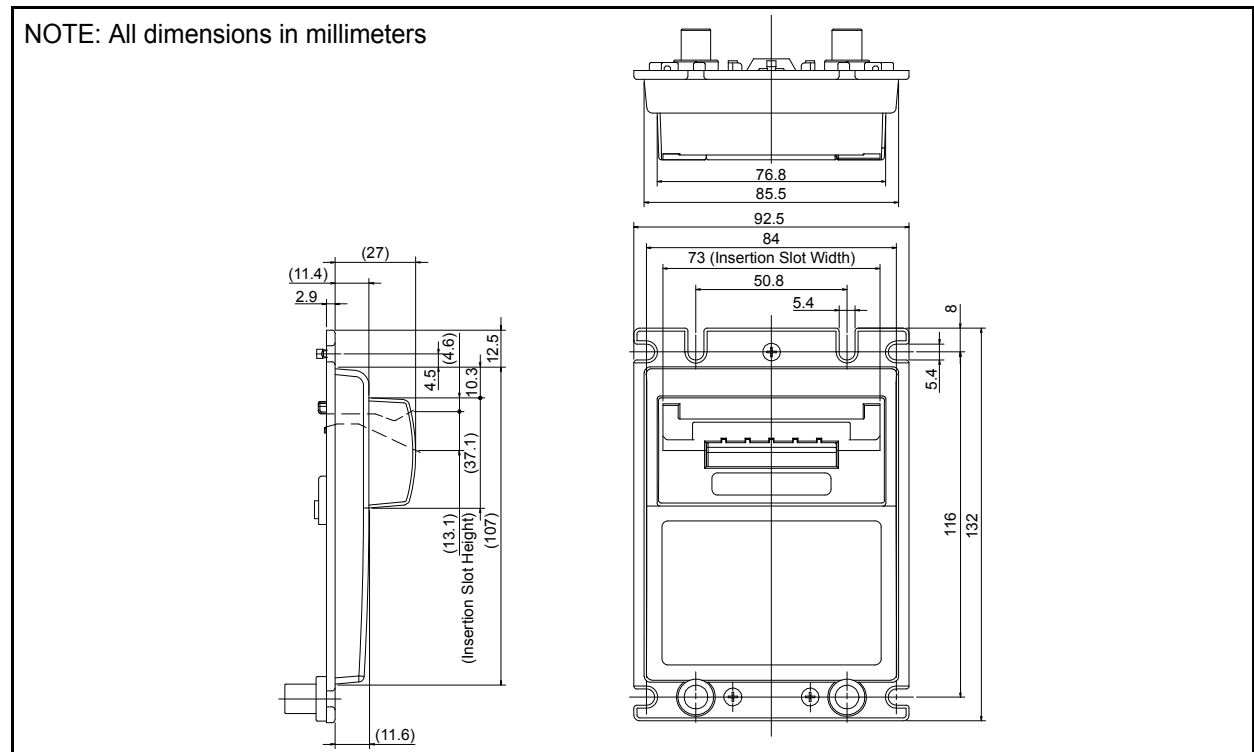
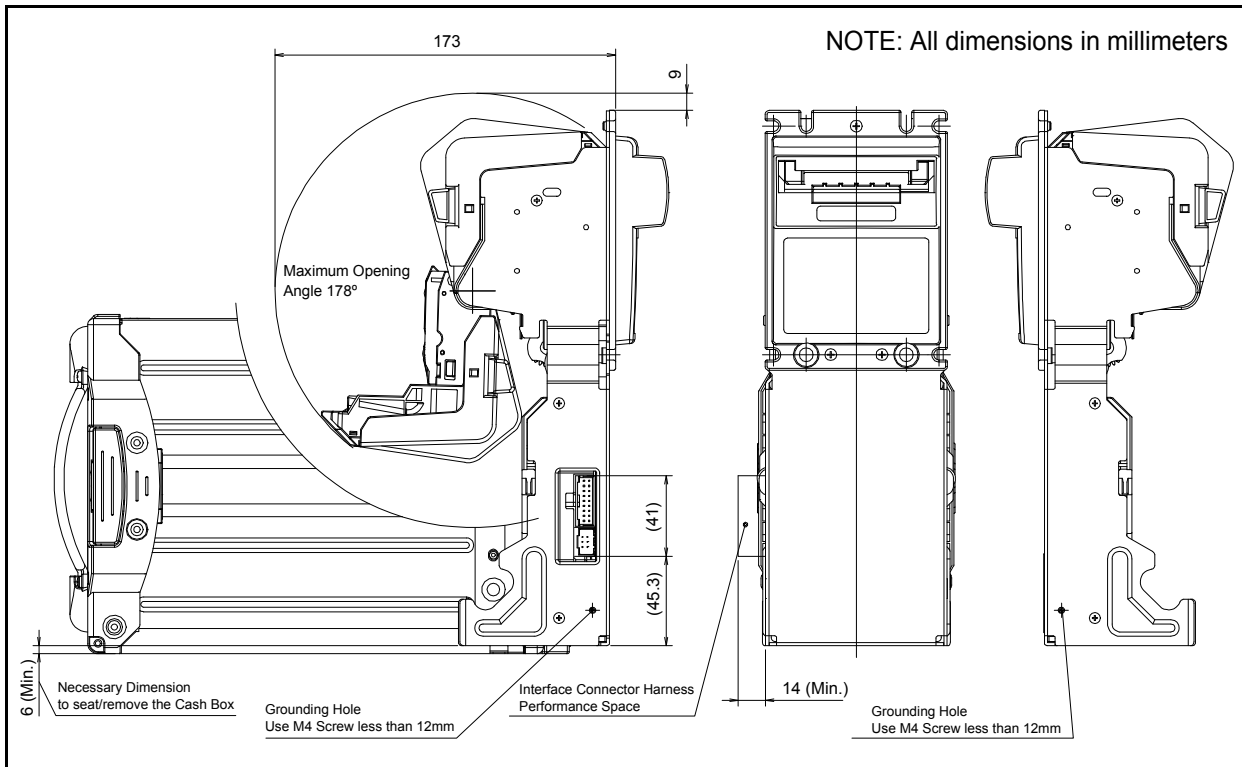


Figure 1-9 DBV-500-S Bezel Type B Outside Dimensions

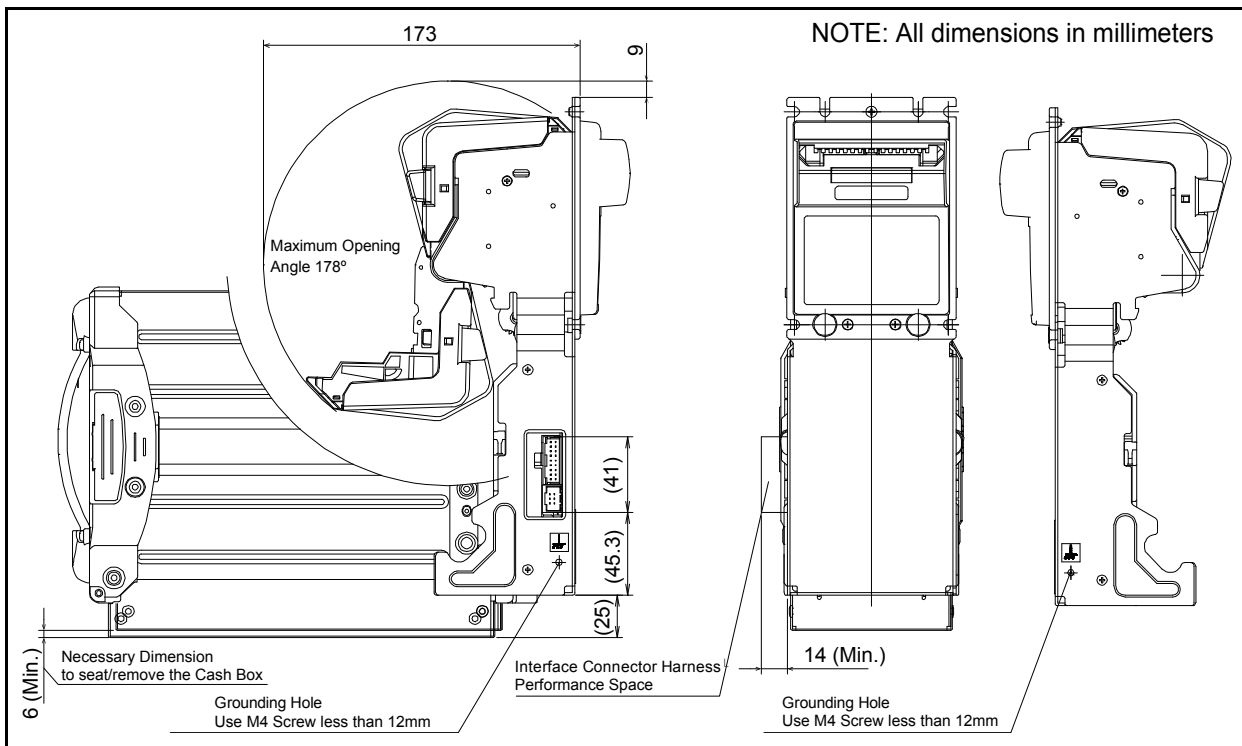
### DBV-500-S Installation/Maintenance Space Requirements

Figure 1-10 illustrates the DBV-500-S Unit with Standard Cash Box installation and maintenance space requirement.



**Figure 1-10** DBV-500-S with Standard Cash Box Installation and Maintenance Space Requirement

Figure 1-11 illustrates the DBV-500-S Unit with 177mm Cash Box installation and maintenance space requirement.



**Figure 1-11** DBV-500-S with 177mm Cash Box Installation and Maintenance Space Requirement

## Technical Contact Information

To obtain further technical information regarding the DBV-500-S Unit, please contact the nearest location listed below:

### Americas

#### JCM American

Phone: +1-702-651-0000

Fax: +1-702-644-5512

925 Pilot Road, Las Vegas, NV 89119

E-mail: [support@jcmglobal.com](mailto:support@jcmglobal.com)

### Europe, Middle East, Africa & Russia

#### JCM Europe GmbH

Phone: +49-211-530-645-60

Fax: +49-211-530-645-85

Mündelheimer Weg 60

D-40472 Düsseldorf Germany

E-mail: [support@jcmglobal.eu](mailto:support@jcmglobal.eu)

### UK & Ireland

#### JCM Europe (UK Office)

Phone: +44 (0) 190-837-7331

Fax: +44 (0) 190-837-7834

Unit B, Third Avenue

Denbigh West Business Park

Bletchley, Milton Keynes,

Buckinghamshire MK1 1DH, UK

E-mail: [support@jcmglobal.eu](mailto:support@jcmglobal.eu)

### Asia and Oceania

#### JCM Gold (HK) Ltd.

Phone: +852-2429-7187

Fax: +852-2929-7003

Unit 1-7, 3/F., Favor Industrial Centre

2-6 Kin Hong Street, Kwai Chung,

N.T. Hong Kong

E-mail: [asiasupport@jcmglobal.com](mailto:asiasupport@jcmglobal.com)

#### JAPAN CASH MACHINE CO., LTD. (HQ)

Phone: +81-6-6703-8400

Fax: +81-6-6707-0348

2-3-15, Nishiwaki, Hirano-ku, Osaka 547-0035  
JAPAN

E-mail: [Shohin@jcm-hq.co.jp](mailto:Shohin@jcm-hq.co.jp)

The JCM Website for all locations is:

<http://www.jcmglobal.com>

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# DBV® Series

## DBV-500-S Banknote Validator


### Section 2


## 2 INSTALLATION


This section provides installation and operating instructions for the DBV® Series Banknote Validator Unit (DBV-500-S). The information within this section contains the following features:

- Installation Procedure
- DIP Switch Configurations
- Connector Pin Assignments
- Preventive Maintenance
- Standard Interface Circuit Schematics
- Operational Flowcharts

### Installation Procedure

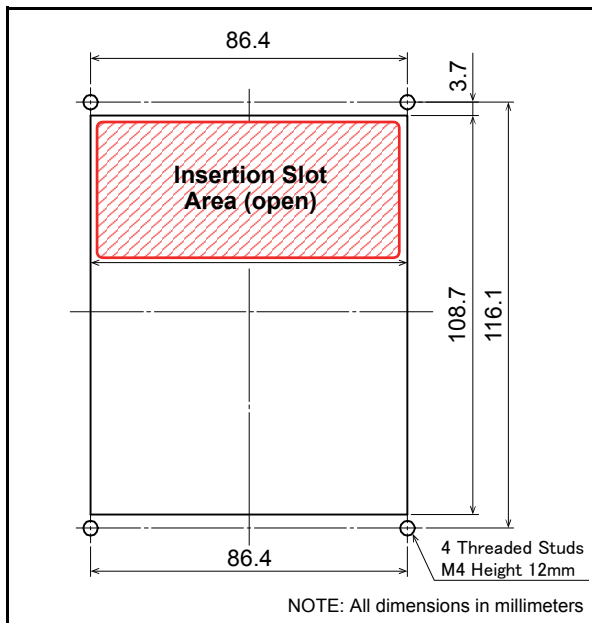
 **NOTE:** For a SU stacker installation, invert the following instructions.

 **NOTE:** Make sure the DBV-500-S Unit is installed horizontally at 0 degrees on a flat surface

 **NOTE:** Securely tighten the DBV-500-S Unit mounting nuts to prevent loosening from vibration.

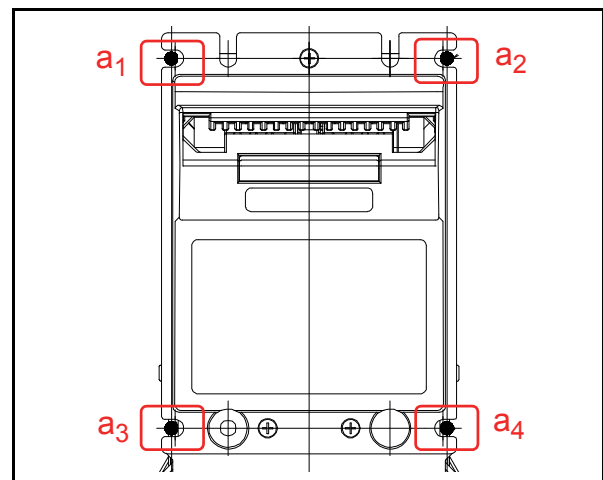
### Entire Unit Installation

The DBV-500-S Frame Unit provides installation grooves on its surface. Perform the following steps to install the DBV-500-S Series Unit:



**Figure 2-1** Chassis Side Reference Dimensions 1

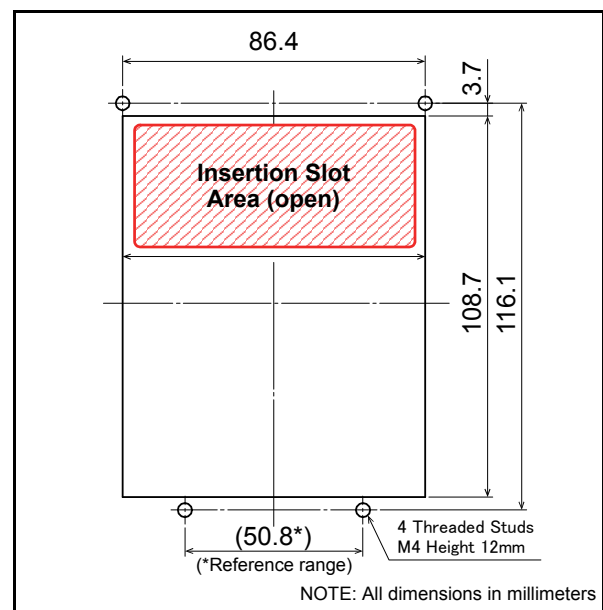
1. Place the DBV-500-S Unit Frame cut outs (Figure 2-2 a<sub>1</sub> through a<sub>4</sub>) on to the Threaded Studs on the chassis.
2. Secure the rear side of the DBV-500-S Frame to the chassis with four (4) nuts (Figure 2-2 a<sub>1</sub> through Figure 2-2 a<sub>4</sub>).



**Figure 2-2** Thread Studs Location

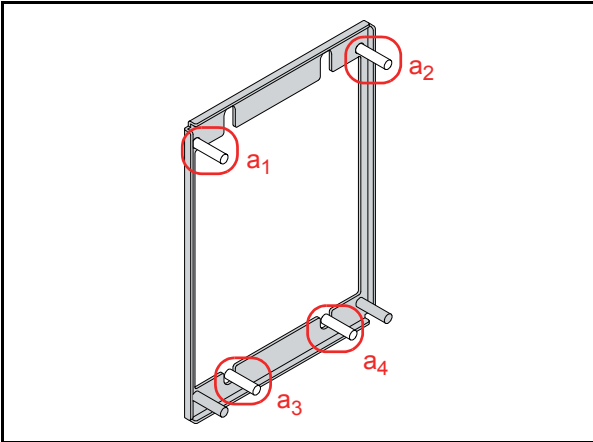
### Panel Bracket Installation

The Panel Bracket is necessary to install the chassis having specific stud locations when normal installation is not adopted. Perform the following steps to install the DBV-500-S Series Unit with the Panel Bracket:



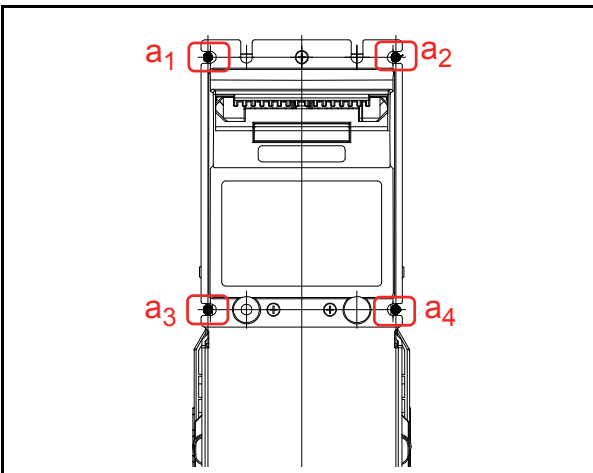
**Figure 2-3** Chassis Side Reference Dimensions 2

1. Place the Panel Bracket cutouts (Figure 2-4 a<sub>1</sub> through a<sub>4</sub>) onto the Threaded Studs on the chassis.



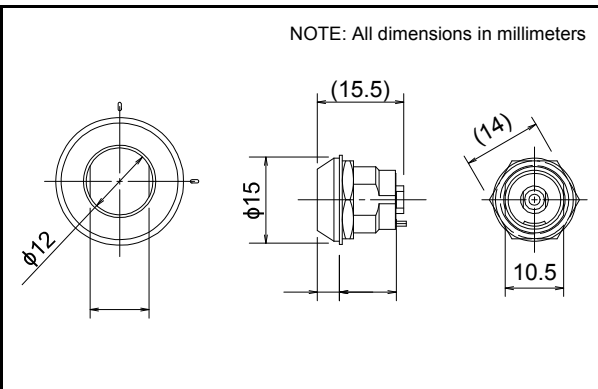
**Figure 2-4 Panel Bracket Fix**

2. Fix the Panel Bracket to the chassis by the four (4) M4 Nuts.
3. Place the DBV-500-S Unit Frame cutouts (Figure 2-5 a<sub>1</sub> through a<sub>4</sub>) onto the Threaded Studs on the chassis.



**Figure 2-5 Threaded Studs Location**

**Lock Dimension Reference**



**Figure 2-6 Lock Dimension Reference**

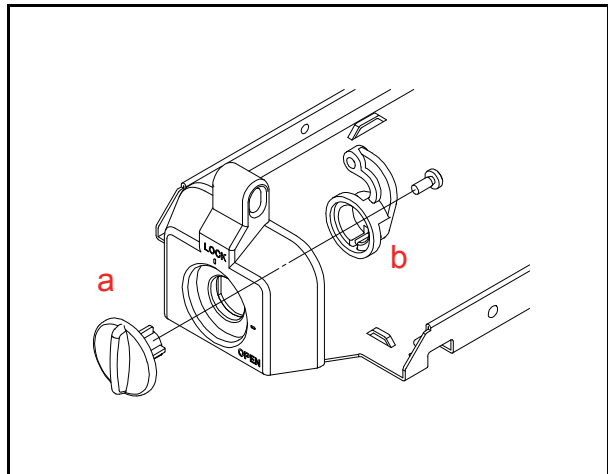
**Lock Installation**

There are two (2) Cash Box Locks and single (1) Frame Lock available for securing the DBV-500-S Unit.

**Plastic Latch Installation**

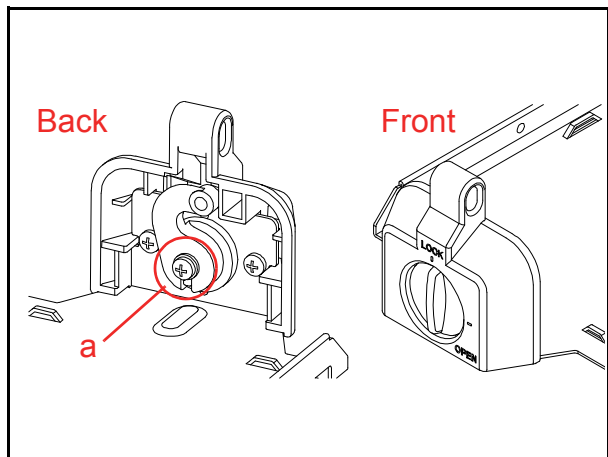
To install the Plastic Latch onto the DBV-500-S Cash Box, perform the following steps:

1. Insert the Door Lock A (Figure 2-7 a) from the front side of the lock installation hole.
2. Install the Door Lock B (Figure 2-7 b) from the inside of the lock installation hole while confirming that the Door Lock A Tab is in the vertical direction.



**Figure 2-7 Plastic Latch Installation 1**

3. Retain the Door Lock A and the Door Lock B by installing the single (1) 2.6x8 Phillips, Self-Tapping, Binding Head Screw (Figure 2-8 a).



**Figure 2-8 Plastic Latch Installation 2**

### Metal Lock Installation

To install the Metal Lock onto the DBV-500-S Cash Box, perform following steps:

1. Install the Cylinder (Figure 2-9 a) from the front side of the lock installation hole.
2. Install the Cylinder attachments (Figure 2-9 b<sub>1</sub> & b<sub>2</sub>) and the Door Lock Tang (Figure 2-9 c) from the inside of the lock installation hole while confirming that the Cylinder direction is correct.

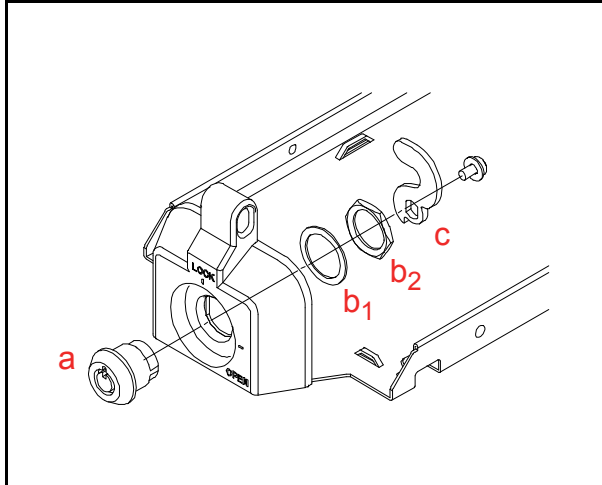


Figure 2-9 Metal Lock Installation 1

3. Retain the Cylinder and the Door Lock Tang by installing the single (1) Screw provided with Cylinder (Figure 2-10 a).

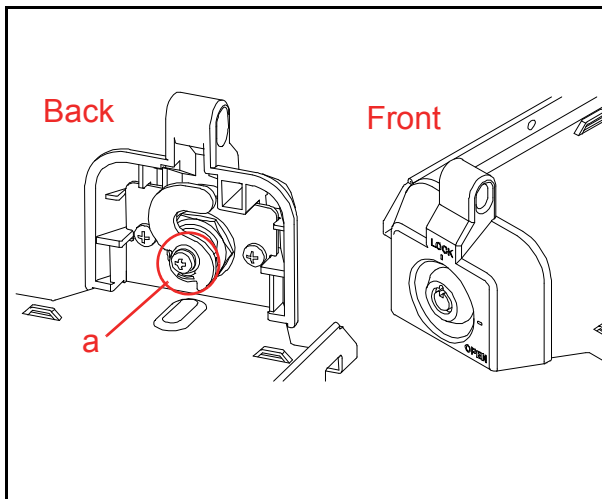


Figure 2-10 Metal Lock Installation 2

### Frame Lock Installation

To install the Frame Lock onto the DBV-500-S Cash Box, perform following the steps:

1. Insert the Cylinder (Figure 2-11 a) from the front side of the lock installation hole.
2. Install the Cylinder attachments (Figure 2-11 b<sub>1</sub> & b<sub>2</sub>) and the Door Lock Tang (Figure 2-11 c) from the inside of the lock installation hole while confirming that the Cylinder direction is correct.

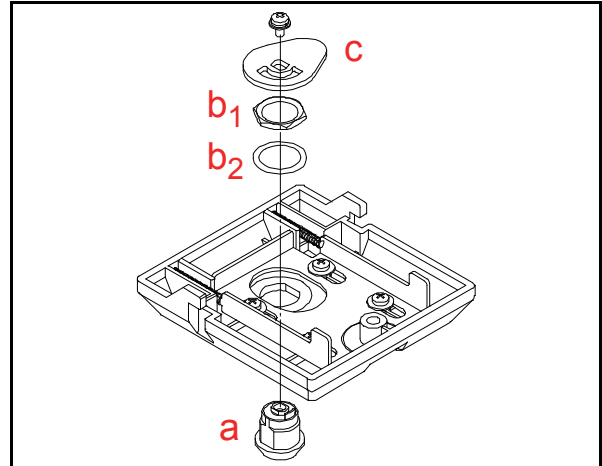


Figure 2-11 Frame Lock Installation 1

3. Retain the Cylinder and the Door Lock Tang by installing the single (1) Screw provided with the Cylinder (Figure 2-12 a).

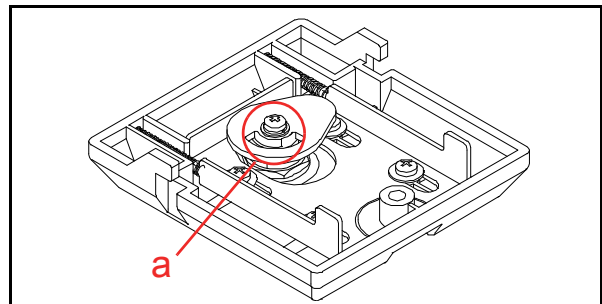


Figure 2-12 Frame Lock Installation 2

4. Place the Frame Lock assembly on the rear side of the Cash Box. Be sure that both sides of the Frame Lock Tabs are inserted into the Tab holes of the Cash Box (Figure 2-13).

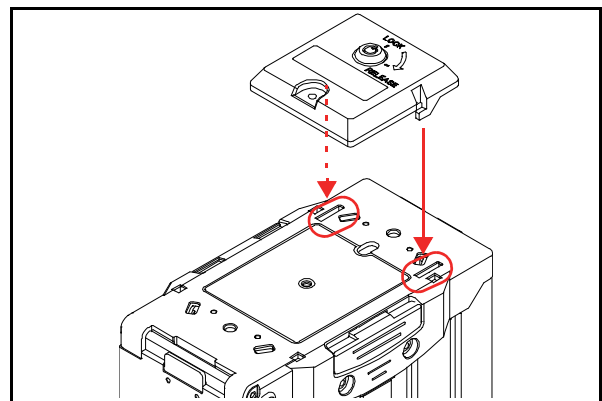
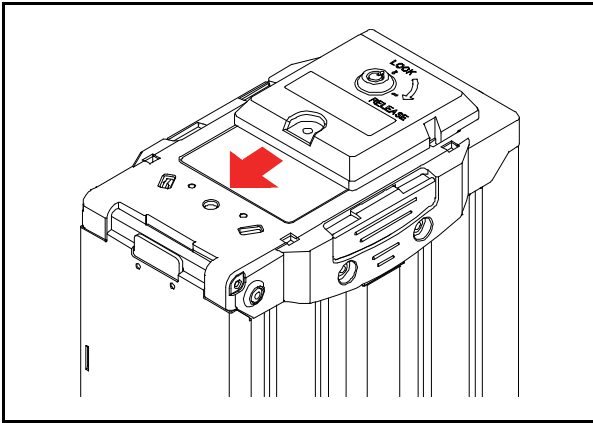


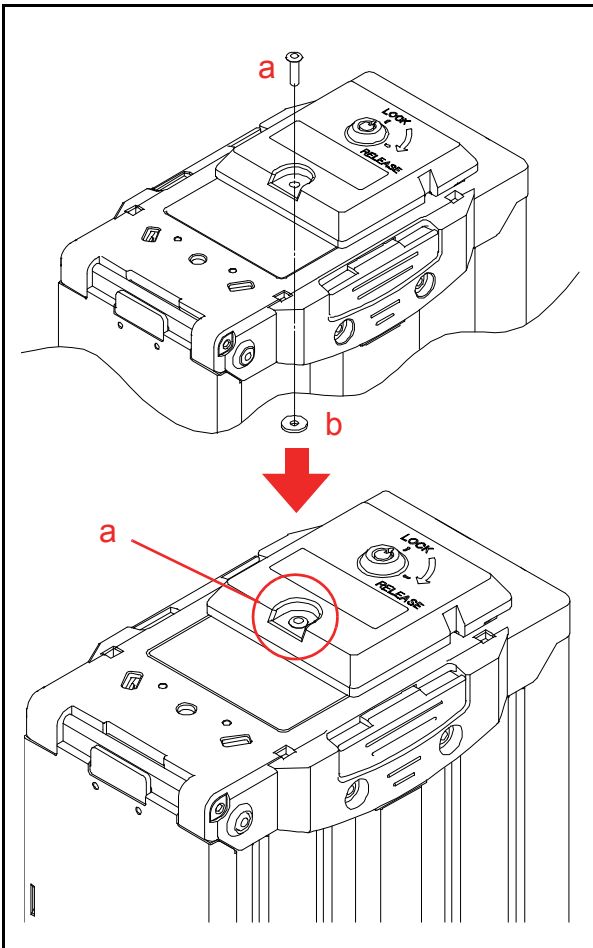
Figure 2-13 Frame Lock Installation 3

- Slide the Frame Lock assembly down to firmly latch it onto the Cash Box (Figure 2-14).



**Figure 2-14** Frame Lock Installation 4

- Retain the Frame Lock assembly to the Cash Box by installing the single (1) Blind Rivet (Figure 2-15 a) with the  $\phi 10$  Washer (Figure 2-15 b).



**Figure 2-15** Frame Lock Installation 5


## DIP Switch Configurations

This section provides the DIP Switch Block 1 (DS1) and 2 (DS2) Settings for the DBV-500-S Unit.

### DIP Switch Block 1

DIP Switch Block 1 is used to Accept (enable) or Inhibit (disable) acceptance of each Banknote denomination.


**Table 2-1** DIP Switch Block 1 Settings

 <b>DS1</b>		
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	OFF	OFF

### DIP Switch Block 2

DIP Switch Block 2 is used to set various functions.

**Table 2-2** DIP Switch Block 2 Settings

 <b>DS2</b>		
Switch No.	Switch ON	Switch OFF
1	Refer to the "Software Information Sheet" for details of DIP Switch Block 2 Settings	
2		
3		
4		
5		
6		
7		
8		



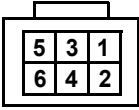
## Connector Pin Assignments

This section provides connector pin assignments of the DBV® Series Banknote Validator Unit (DBV-500-S).

### Photo-Coupler Isolation Connector Pin Assignments

Table 2-3 lists the DBV-500-S Photo-Coupler Isolation Unit Side Connector Pin Assignments.

**Table 2-3** DBV-500-S Photo-Coupler Isolation Unit Side Connector Pin Assignments

	<b>CN16: Power Source/MDB Connector</b> Connector (Transport Unit Side): 74164-0006 (MOLEX) Recommended Housing: 50-57-9303 (MOLEX) Recommended Terminal: 16-02-0082 (AWG24-30), 16-02-0087 (AGW22-24) (MOLEX) Recommended Clip: 15-04-5061 (MOLEX) Recommended Wire: UL1061 AWG22-24 (Power Source), AWG24-28 (other)		
Pin No.	Signal Name	I/O*	Function
1	+12V/+24V (Power)	-	+12V/24V DC Power Supply†
2	GND (Power)	-	Power Supply (0V DC)†
3	WAKEUP0	I/O	Wake Up Signal Line (+5V to 12V)‡
4	MASTER RECEIVE	O	Output Signal Line from Validator to Controller
5	MASTER TRANSMIT	I	Input Signal Line from Controller to Validator
6	COMMON		COMMON Connection

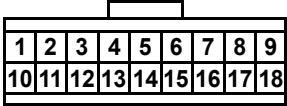
\*. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

†. Recommended wire larger than AWG24 and a total length of less than 1m to the Power Source for +12V/24V (Power) and GND (Power).

‡. No connection when Pin #3 is not used.

Table 2-4 lists the DBV-500-S Photo-Coupler Interface Pin Assignments.

**Table 2-4** DBV-500-S Photo-Coupler Interface Pin Assignments\*

	<b>CN12: Interface Connector</b> Connector (Transport Unit Side): 5-103166-7 (TECONNECTIVITY) Recommended Housing: 5-102393-7 (AWG26-30) (TECONNECTIVITY) Recommended Front Cover: 102536-7 (TECONNECTIVITY) Recommended Rear Cover: 102681-4 (TECONNECTIVITY) Recommended Wire: UL1061 AWG26-28		
Pin No.	Signal Name	I/O†	Function‡
1-18	-	-	Reserved

\*. Interface Setting by DIP Switch is required.

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

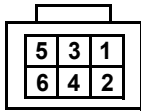
‡. Do NOT make connections for signals that are not being used.

## RS232C Connector Pin Assignments

Table 2-5 lists the DBV-500-S RS232C Unit Side Connector Pin Assignments.

**Table 2-5** DBV-500-S RS232C Unit Side Connector Pin Assignments

Pin No.	Signal Name	I/O*	Function
1	+12V/+24V (Power)	-	+12V/24V DC Power Supply†
2	GND (Power)	-	Power Supply (0V DC)†
3	-	-	Reserved
4			
5			
6			



**CN16: Power Source/MDB Connector**  
 Connector (Transport Unit Side): 74164-0006 (MOLEX)  
 Recommended Housing: 50-57-9303 (MOLEX)  
 Recommended Terminal: 16-02-0082 (AWG24-30), 16-02-0087 (AGW22-24) (MOLEX)  
 Recommended Clip: 15-04-5061 (MOLEX)  
 Recommended Wire: UL1061 AWG22-24 (Power Source), AWG24-28 (other)

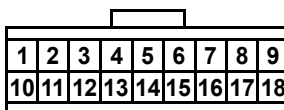
\*. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

†. Recommended wire larger than AWG24 and a total length of less than 1m to the Power Source for +12V/24V (Power) and GND (Power).

Table 2-6 lists the DBV-500-S RS232C Interface Pin Assignments.

**Table 2-6** DBV-500-S RS232C Interface Pin Assignments\*

Pin No.	Signal Name	I/O†	Function‡
1	-	-	Reserved
2			
3			
4	GND (I/F)	-	Signal Ground (0V DC)
5	-	-	Reserved
6			
7			
8			
9			
10			
11			
12			
13	RXD (RS232C)	I	Serial Communication Input Signal Line
14			
15	-	-	Reserved
16	TXD (RS232C)	O	Serial Communication Output Signal Line
17	-	-	Reserved
18	-	-	Reserved



**CN12: Interface Connector**  
 Connector (Transport Unit Side): 5-103166-7 (TECONNECTIVITY)  
 Recommended Housing: 5-102393-7 (AWG26-30) (TECONNECTIVITY)  
 Recommended Front Cover: 102536-7 (TECONNECTIVITY)  
 Recommended Rear Cover: 102681-4 (TECONNECTIVITY)  
 Recommended Wire: UL1061 AWG26-28

\*. Interface Setting by DIP Switch is required.

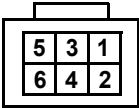
†. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

‡. Do NOT make connections for signals that are not being used.

### TTL Connector Pin Assignments

Table 2-7 lists the DBV-500-S TTL Unit Side Connector Pin Assignments.

**Table 2-7** DBV-500-S TTL Unit Side Connector Pin Assignments

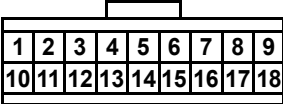
 <p><b>CN16: Power Source/MDB Connector</b>                  Connector (Transport Unit Side): 74164-0006 (MOLEX)                  Recommended Housing: 50-57-9303 (MOLEX)                  Recommended Terminal: 16-02-0082 (AWG24-30), 16-02-0087 (AGW22-24) (MOLEX)                  Recommended Clip: 15-04-5061 (MOLEX)                  Recommended Wire: UL1061 AWG22-24 (Power Source), AWG24-28 (other)</p>			
Pin No.	Signal Name	I/O*	Function
1	+12V/+24V (Power)	-	+12V/24V DC Power Supply†
2	GND (Power)	-	Power Supply (0V DC)†
3	-	-	Reserved
4			
5			
6			

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

†. Recommended wire larger than AWG24 and a total length of less than 1m to the Power Source for +12V/24V (Power) and GND (Power).

Table 2-8 lists the DBV-500-S TTL Interface Pin Assignments.

**Table 2-8** DBV-500-S TTL Interface Pin Assignments\*

 <p><b>CN12: Interface Connector</b>                  Connector (Transport Unit Side): 5-103166-7 (TECONNECTIVITY)                  Recommended Housing: 5-102393-7 (AWG26-30) (TECONNECTIVITY)                  Recommended Front Cover: 102536-7 (TECONNECTIVITY)                  Recommended Rear Cover: 102681-4 (TECONNECTIVITY)                  Recommended Wire: UL1061 AWG26-28</p>			
Pin No.	Signal Name	I/O†	Function‡
1	-	-	Reserved
2			
3			
4	GND (I/F)	-	Signal Ground (0V DC)
5	-	-	Reserved
6			
7			
8			
9			
10	TXD (TTL)	O	Serial Communication Output Signal Line (+5V)
11			
12	-	-	Reserved
13			
14			
15	RXD (TTL)	I	Serial Communication Input Signal Line (+5V)
16			
17	-	-	Reserved
18			

\*. Interface Setting by DIP Switch is required.

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

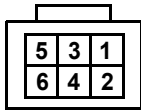
‡. Do NOT make connections for signals that are not being used.

## USB Connector Pin Assignments

Table 2-9 lists the DBV-500-S USB Unit Side Connector Pin Assignments.

**Table 2-9** DBV-500-S USB Unit Side Connector Pin Assignments

Pin No.	Signal Name	I/O*	Function
1	+12V/+24V (Power)	-	+12V/24V DC Power Supply†
2	GND (Power)	-	Power Supply (0V DC)†
3	-	-	Reserved
4			
5			
6			



**CN16: Power Source/MDB Connector**  
 Connector (Transport Unit Side): 74164-0006 (MOLEX)  
 Recommended Housing: 50-57-9303 (MOLEX)  
 Recommended Terminal: 16-02-0082 (AWG24-30), 16-02-0087 (AGW22-24) (MOLEX)  
 Recommended Clip: 15-04-5061 (MOLEX)  
 Recommended Wire: UL1061 AWG22-24 (Power Source), AWG24-28 (other)

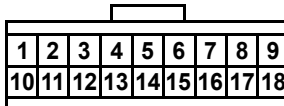
\*. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

†. Recommended wire larger than AWG24 and a total length of less than 1m to the Power Source for +12V/24V (Power) and GND (Power).

Table 2-10 lists the DBV-500-S USB Interface Pin Assignments.

**Table 2-10** DBV-500-S USB Interface Pin Assignments\*

Pin No.	Signal Name	I/O†	Function‡
1	-	-	Reserved
2			
3			
4			
5			
6	VBUS	-	USB Communication VBUS Signal Line (+5V)
7	USBDM	I/O	USB Communication Input/Output Signal Line
8	USBDP	I/O	USB Communication Input/Output Signal Line
9	GND	-	USB Communication Ground (0V DC)
10	-	-	Reserved
11			
12			
13			
14			
15			
16			
17			
18			



**CN12: Interface Connector**  
 Connector (Transport Unit Side): 5-103166-7 (TECONNECTIVITY)  
 Recommended Housing: 5-102393-7 (AWG26-30) (TECONNECTIVITY)  
 Recommended Front Cover: 102536-7 (TECONNECTIVITY)  
 Recommended Rear Cover: 102681-4 (TECONNECTIVITY)  
 Recommended Wire: UL1061 AWG26-28

\*. Interface Setting by DIP Switch is required.

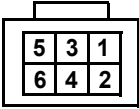
†. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

‡. Do NOT make connections for signals that are not being used.

### ID-044 Connector Pin Assignments

Table 2-11 lists the DBV-500-S ID-044 Unit Side Connector Pin Assignments.

**Table 2-11** DBV-500-S ID-044 Unit Side Connector Pin Assignments

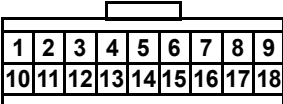
 <p><b>CN16: Power Source/MDB Connector</b>                  Connector (Transport Unit Side): 74164-0006 (MOLEX)                  Recommended Housing: 50-57-9303 (MOLEX)                  Recommended Terminal: 16-02-0082 (AWG24-30), 16-02-0087 (AGW22-24) (MOLEX)                  Recommended Clip: 15-04-5061 (MOLEX)                  Recommended Wire: UL1061 AWG22-24 (Power Source), AWG24-28 (other)</p>			
Pin No.	Signal Name	I/O*	Function
1	+12V/+24V (Power)	-	+12V/24V DC Power Supply†
2	GND (Power)	-	Power Supply (0V DC)†
3	-	-	Reserved
4			
5			
6			

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

†. Recommended wire larger than AWG24 and a total length of less than 1m to the Power Source for +12V/24V (Power) and GND (Power).

Table 2-12 lists the DBV-500-S ID-044 Interface Pin Assignments.

**Table 2-12** DBV-500-S ID-044 Interface Pin Assignments\*

 <p><b>CN12: Interface Connector</b>                  Connector (Transport Unit Side): 5-103166-7 (TECONNECTIVITY)                  Recommended Housing: 5-102393-7 (AWG26-30) (TECONNECTIVITY)                  Recommended Front Cover: 102536-7 (TECONNECTIVITY)                  Recommended Rear Cover: 102681-4 (TECONNECTIVITY)                  Recommended Wire: UL1061 AWG26-28</p>			
Pin No.	Signal Name	I/O†	Function‡
1	NC	-	No Connection
2	RTS/FULL	O	Serial Communication Output Signal Line (+5V)
3	-	-	Reserved
4	GND (I/F)	-	Power Supply for Interface (0V DC)
5	-	-	Reserved
6			
7			
8			
9			
10	ABN	O	Serial Communication Output Signal Line (+5V)
11	/DATA, /VEND	O	Serial and Pulse Communication Output Signal Line (+5V)
12	D/E	I	Serial and Pulse Communication Input Signal Line (+5V)
13	LED-POWER	-	LED Power
14	/BUSY	O	Serial Communication Output Signal Line (+5V)
15	-	-	Reserved
16	/CTS	I	Serial Communication Input Signal Line (+5V)
17	-	-	Reserved
18	SOFT-R	I	Serial Communication Input Signal Line (+5V)

\*. Interface Setting by DIP Switch is required.

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

‡. Do NOT make connections for signals that are not being used.

## Option Connector Pin Assignments

Table 2-13 lists the DBV-500-S Option Connector Pin Assignments.

**Table 2-13** DBV-500-S Option Connector Pin Assignments

CN2 Connector (Transport Unit Side) Option Connector B10B-ZR-3.4 (JST)			
Pin No.	Signal Name	I/O*	Function†
1	-	-	Reserved
2	-	-	Reserved
3	-	-	Reserved
4	-	-	Reserved
5	-	-	Reserved
6	-	-	Reserved
7	-	-	Reserved
8	-	-	Reserved
9	-	-	Reserved
10	-	-	Reserved

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

†. Do NOT make connections for signals that are not being used.

## Preventive Maintenance

This section provides preventive maintenance instructions for the DBV® Series Banknote Validator Unit (DBV-500-S). The information within this section contains the following features:

- Retrieving Banknotes
- Clearing a Banknote Jam
- Cleaning Procedure

### Retrieving Banknotes

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

1. Press the Cash Box Latches (Figure 2-16 a) located on both sides of the Cash Box then pull the Cash Box out in the direction indicated by the Red arrow.

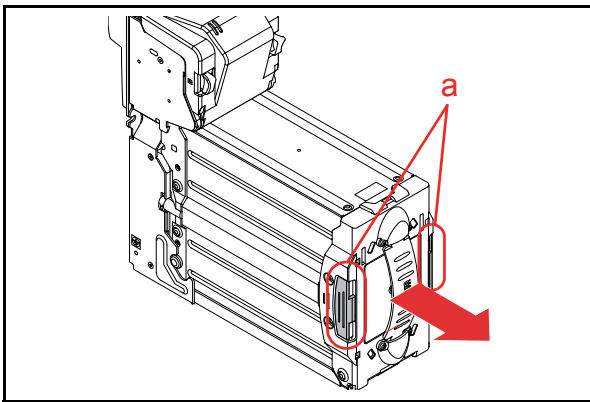


Figure 2-16 Retrieving Banknotes 1

2. Rotate the Plastic Latch or the Metal Lock clockwise until in the “OPEN” position and the lock releases (Figure 2-17).

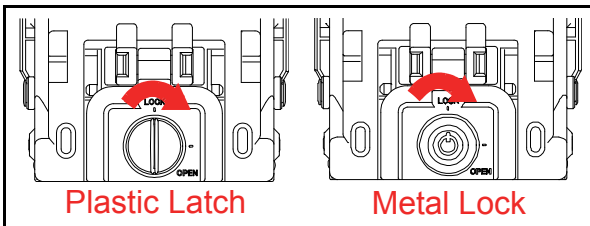


Figure 2-17 Retrieving Banknotes 2

3. Open the Cash Box Door (Figure 2-18 a) and retrieve the Banknotes.

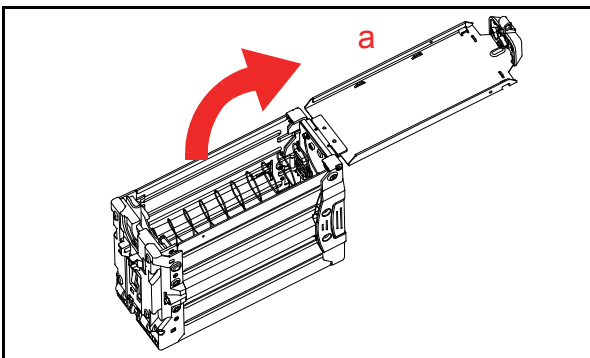


Figure 2-18 Retrieving Banknotes 3

### Clearing a Banknote Jam

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

1. Press the Unit Guide Open/Close Latches (Figure 2-19 a).

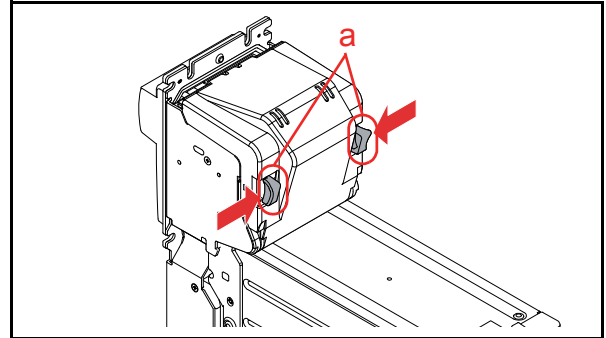


Figure 2-19 Jam Clear 1

2. Rotate the entire Upper Guide in the direction indicated by the red arrow (Figure 2-20 A).

*NOTE: The Upper Guide can be rotated open to 75° maximum when the Cash Box is seated.*

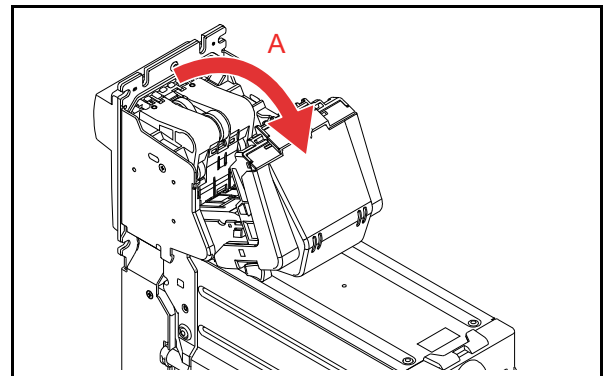


Figure 2-20 Jam Clear 2

3. When a jammed Banknote is not visible, press the Cash Box Latches (Figure 2-21 a) located on both sides of the rear Cash Box and pull the Cash Box out of the Frame Housing.

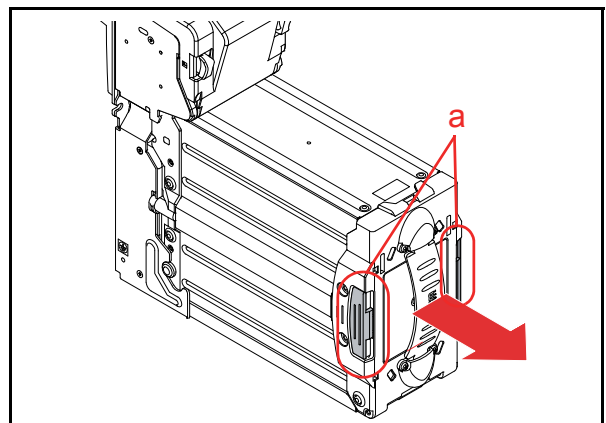

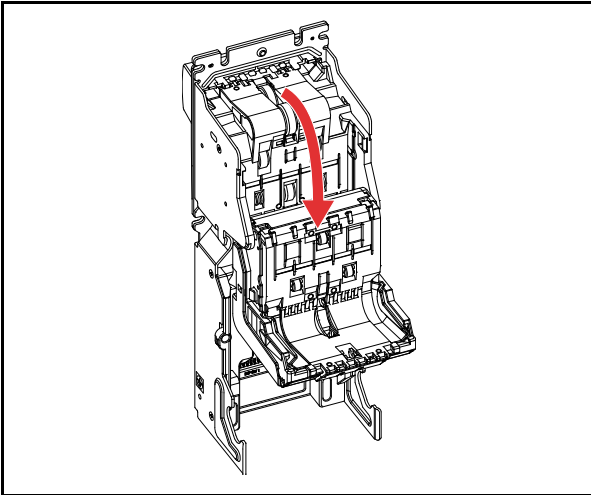


Figure 2-21 Jam Clear 3

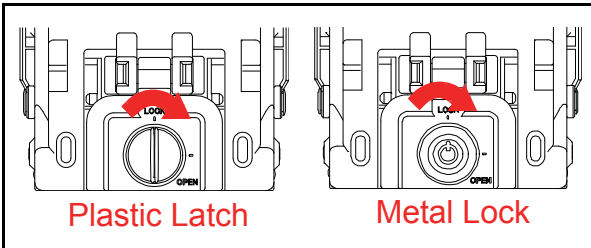
- Press the Unit Guide Open/Close Latches and rotate the entire Upper Guide in the direction indicated by the red arrow (Figure 2-22).

 **NOTE:** The Upper Guide can be rotated open to 178° maximum after removing the Cash Box.



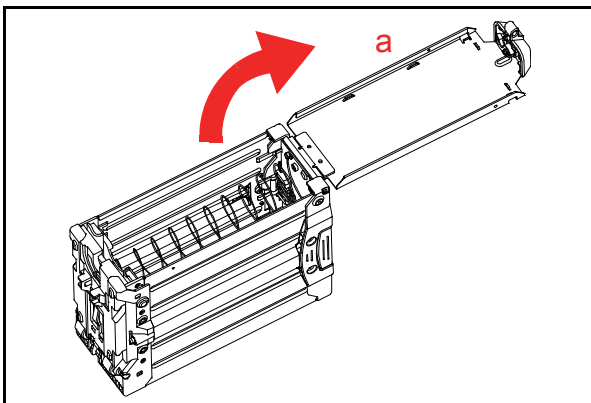
**Figure 2-22** Jam Clear 4

- When a jammed Banknote is not visible, rotate the Plastic Latch or the Metal Lock clockwise until in the “OPEN” position and the lock releases (Figure 2-23).



**Figure 2-23** Jam Clear 5

- Open the Cash Box Door (Figure 2-24 a) and remove a jammed Banknote.



**Figure 2-24** Jam Clear 6

**Cleaning Procedure**


To clean the DBV-500-S Validation Section, use a soft dry or slightly damp with water lint-free Micro-fiber Cloth.

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

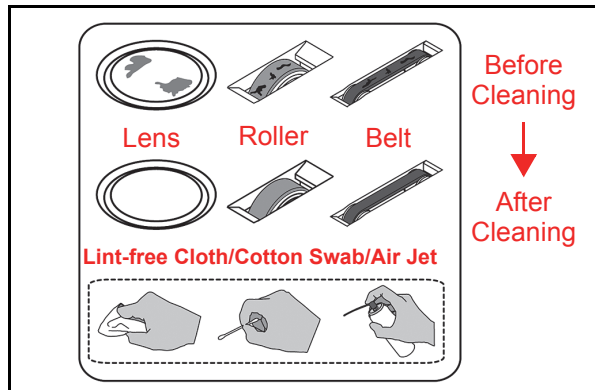
**Sensor and Roller Cleaning Procedure**

To clean the DBV-500-S Unit’s Sensors and Rollers, proceed as follows:

- Turn the power **OFF** on both DBV-500-S and the Host Machine.
- Open the DBV-500-S Units Front and Rear Guide.
- Clean the appropriate path and Lens of each Sensor.

 **Caution:** Do not use alcohol, thinner or Citrus based products for cleaning any Banknote Transport Sensors or surfaces. The lenses can become clouded by chemical residue that may cause acceptance errors.

 **Caution:** Be sure to use non-flammable compressed air only.

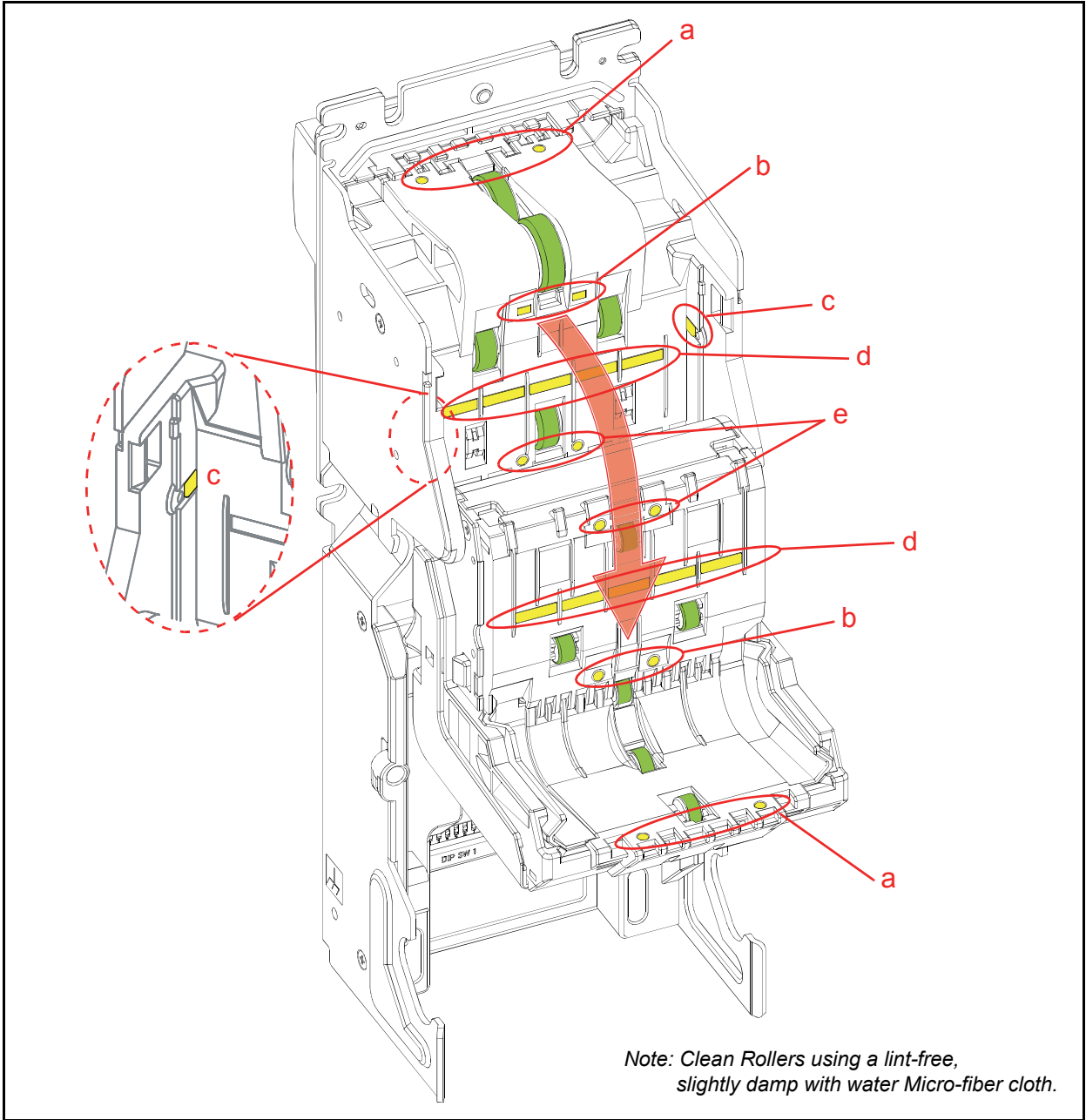


**Figure 2-25** General Cleaning Image



**Sensor and Roller Locations**

Figure 2-26 illustrates the various DBV-500-S Unit’s sensor and roller cleaning locations. Table 2-14 lists the DBV-500-S sensor type cleaning methods.



**Figure 2-26** DBV-500-S Sensor and Roller Cleaning Locations

**Table 2-14** DBV-500-S Sensor Type Cleaning Methods

Sym.	Sensor	Cleaning Method
a	Entrance Sensor	Wipe clean using a soft lint-free cloth or blow clean using compressed air.
b	Centering Start Sensor	
c	Side Sensor	
d	Validation Sensor (Through-beam and Reflective)	
e	Exit Sensor	

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### Standard Interface Circuit Schematics

This section provides standard interface schematic diagrams of the DBV® Series Banknote Validator Unit (DBV-500-S). Figure 2-27 illustrates the DBV-500-S Photo-Coupler Interface Schematic Diagram.

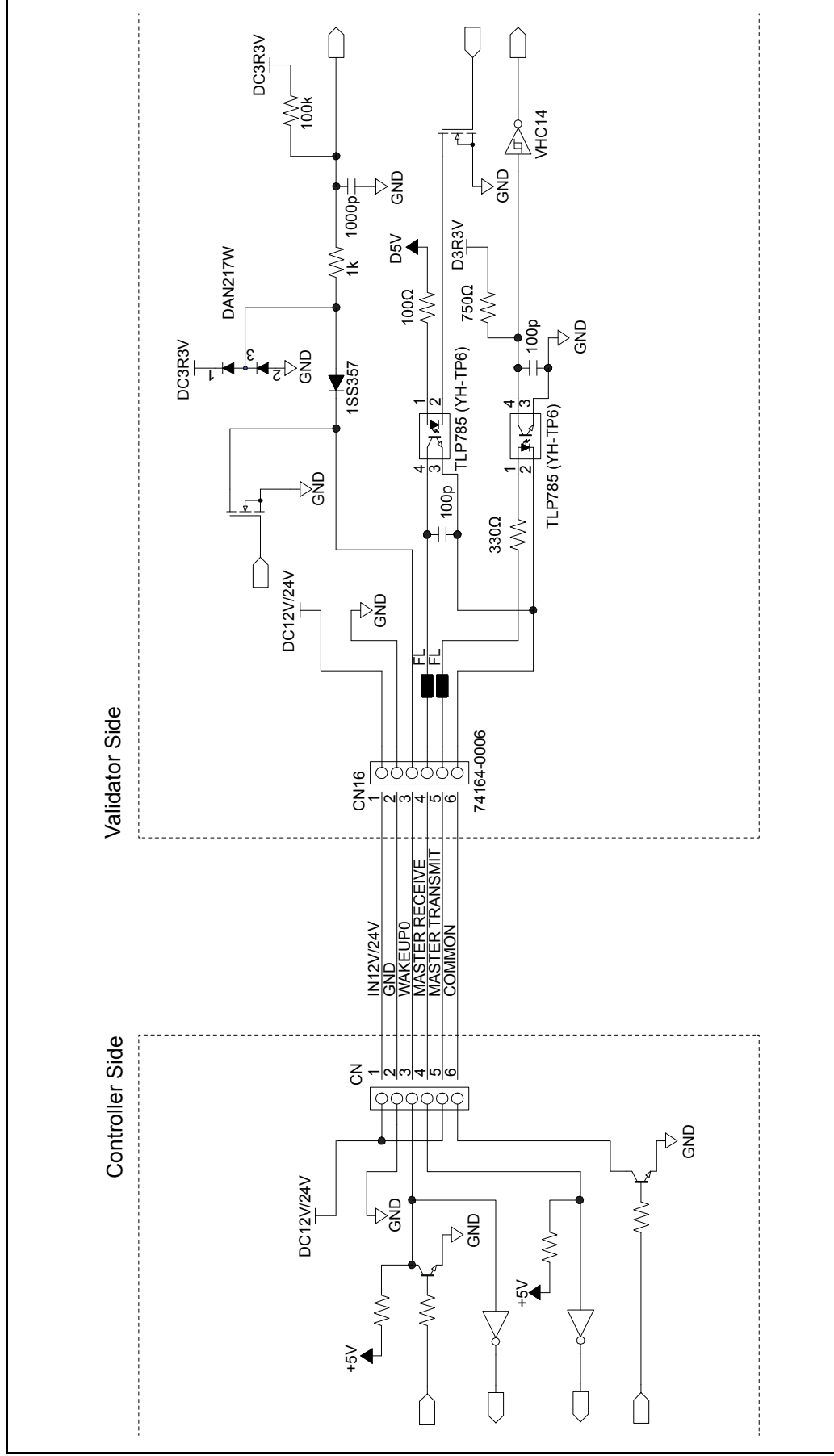


Figure 2-27 DBV-500-S Photo-Coupler Interface Schematic Diagram

### Standard Interface Circuit Schematics (Continued 1)

Figure 2-28 illustrates the DBV-500-S RS232C Interface Schematic Diagram.

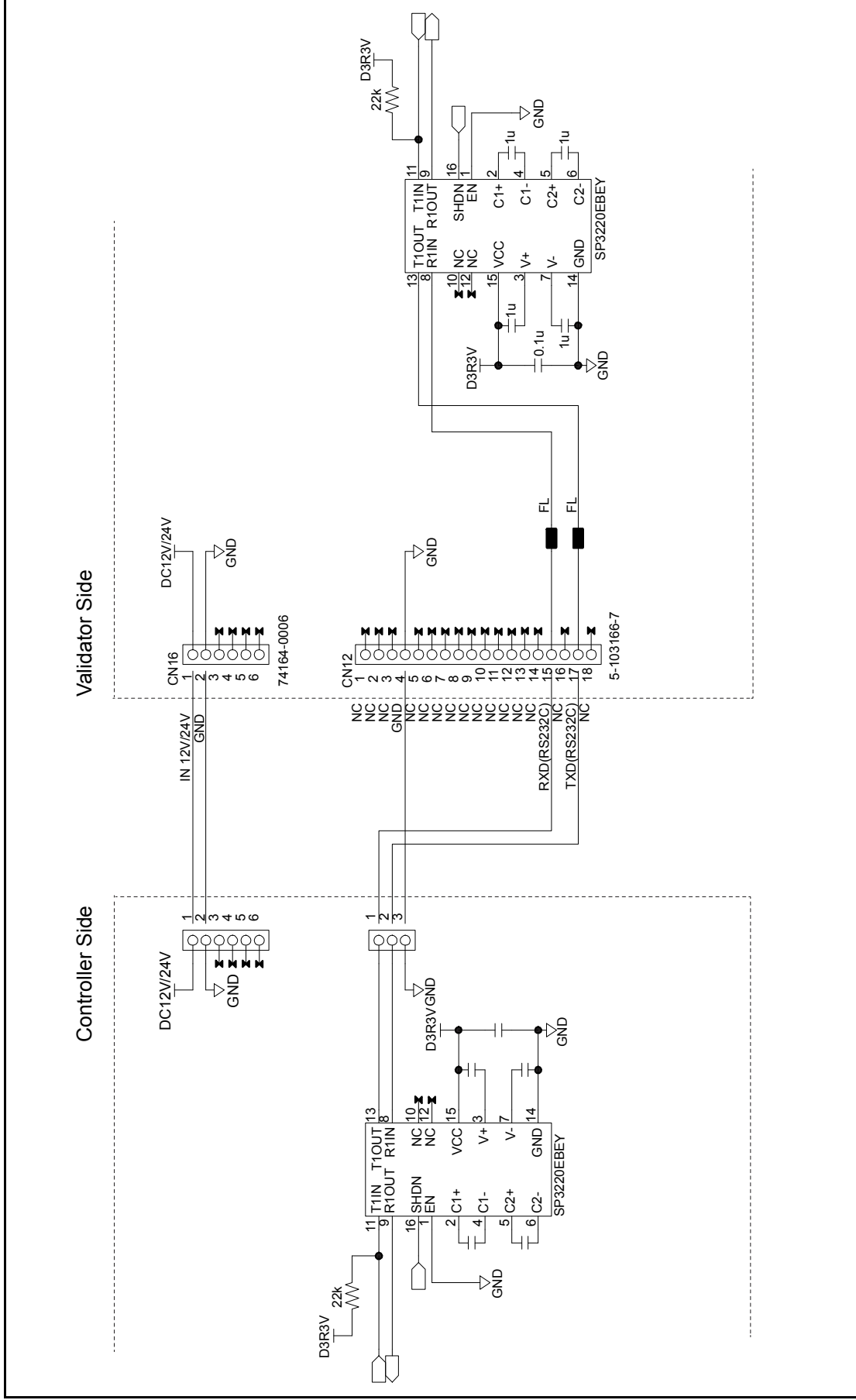


Figure 2-28 DBV-500-S RS232C Interface Schematic Diagram

### Standard Interface Circuit Schematics (Continued 2)

Figure 2-29 illustrates the DBV-500-S TTL Interface Schematic Diagram.

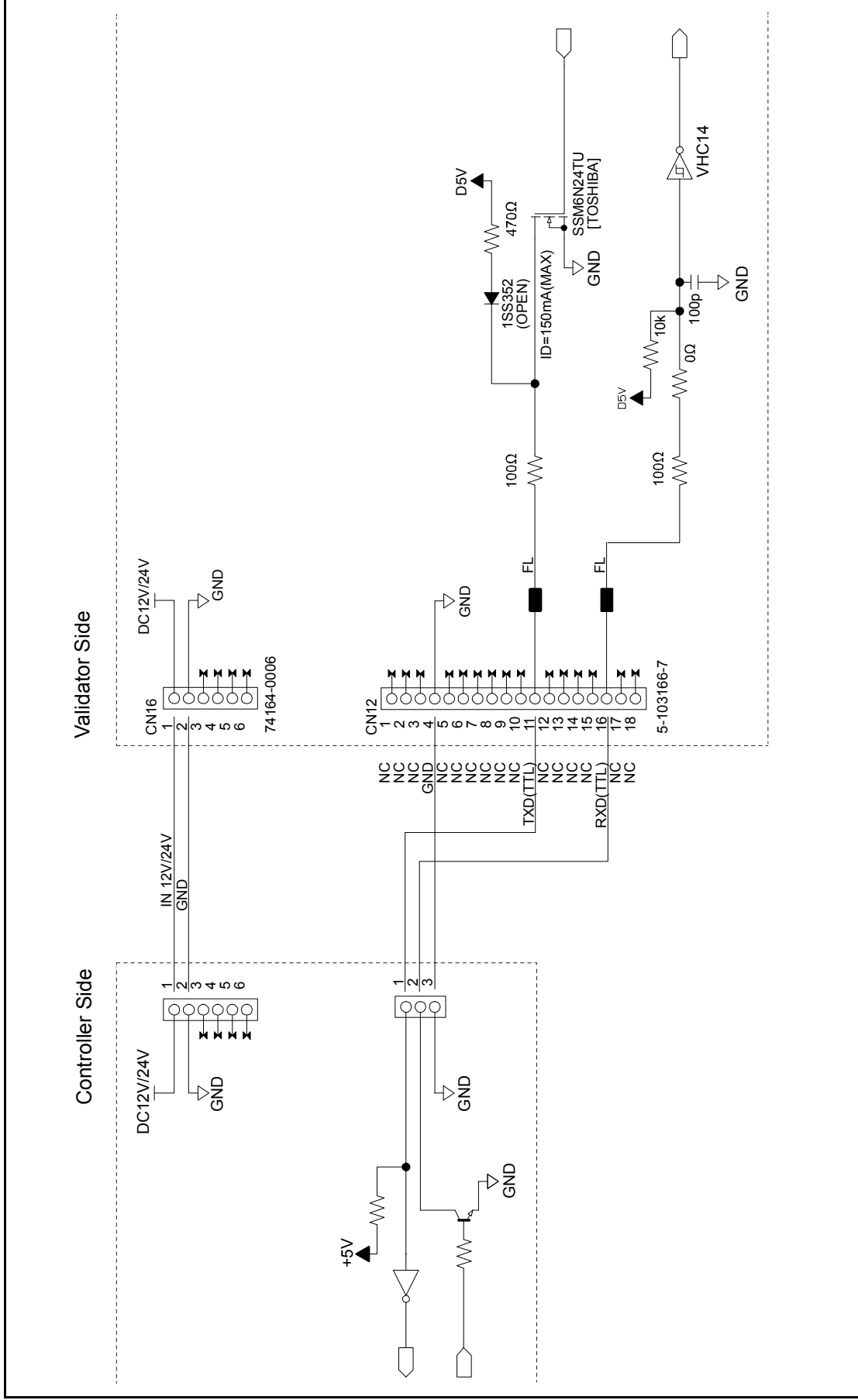


Figure 2-29 DBV-500-S TTL Interface Schematic Diagram

### Standard Interface Circuit Schematics (Continued 3)

Figure 2-30 illustrates the DBV-500-S USB Interface Schematic Diagram.

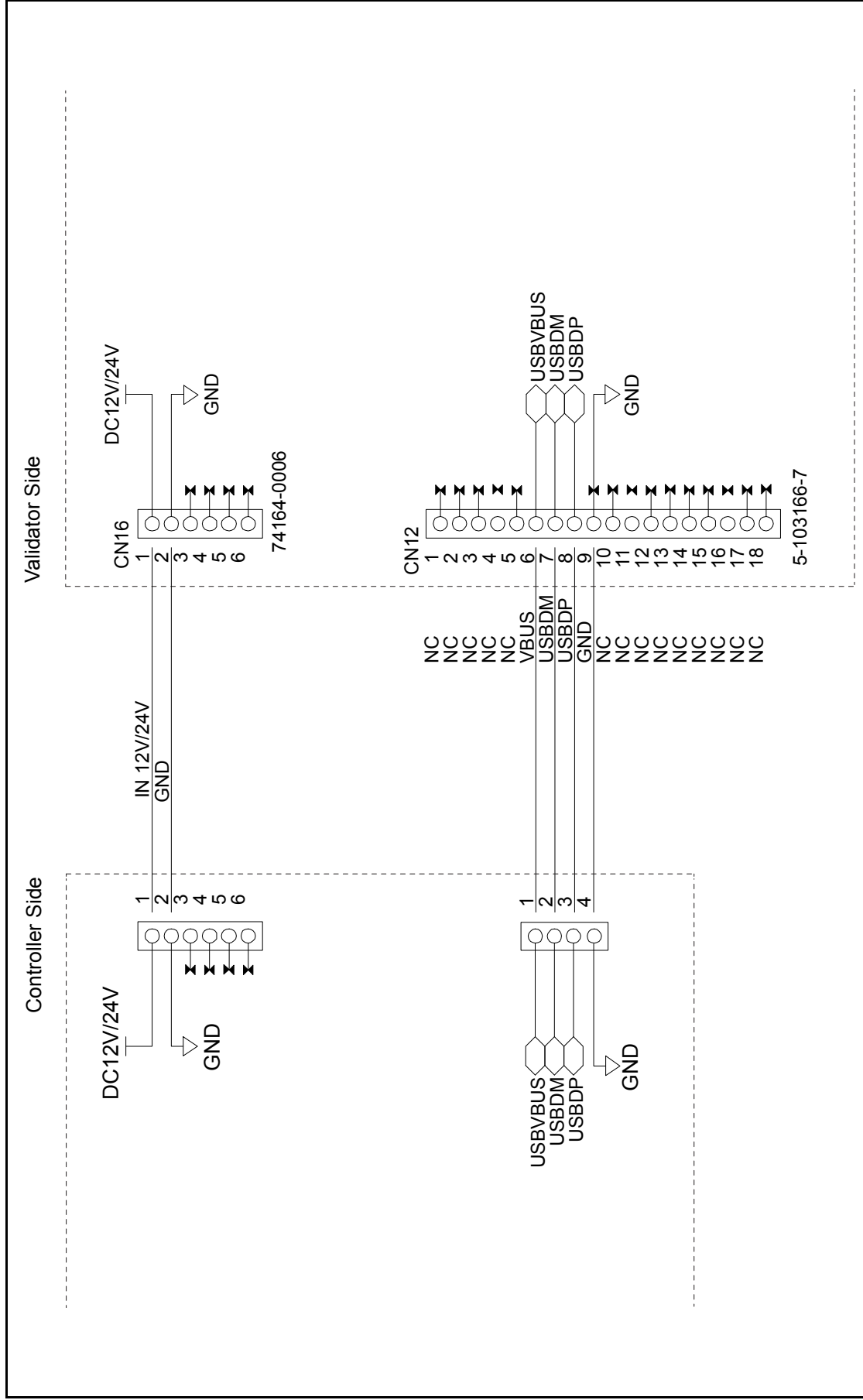


Figure 2-30 DBV-500-S USB Interface Schematic Diagram

### Standard Interface Circuit Schematics (Continued 4)

Figure 2-31 illustrates the DBV-500-S ID-044 PULSE Interface Schematic Diagram.

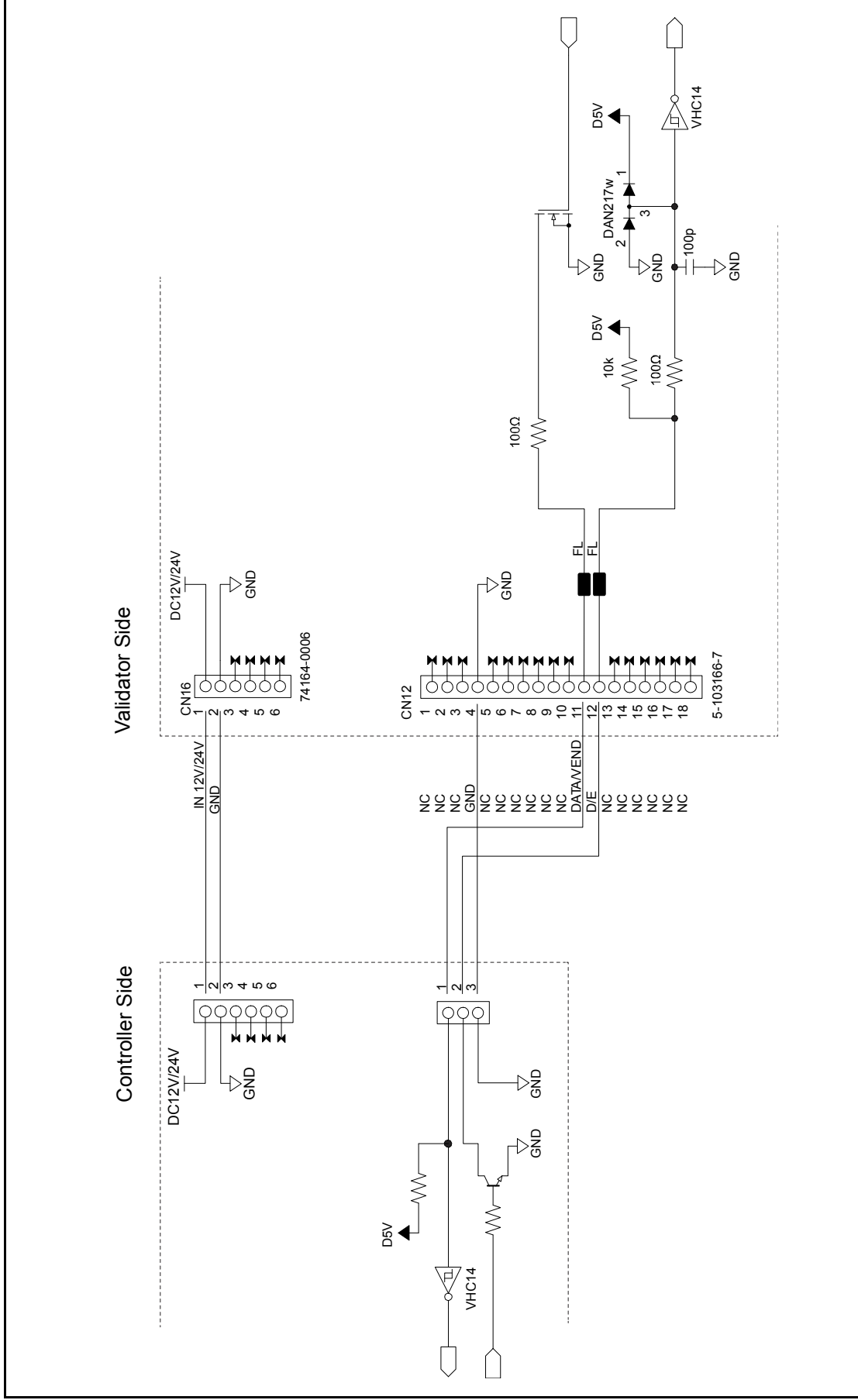


Figure 2-31 DBV-500-S ID-044 PULSE Interface Schematic Diagram

### Standard Interface Circuit Schematics (Continued 5)

Figure 2-32 illustrates the DBV-500-S ID-044 SERIAL Interface Schematic Diagram.

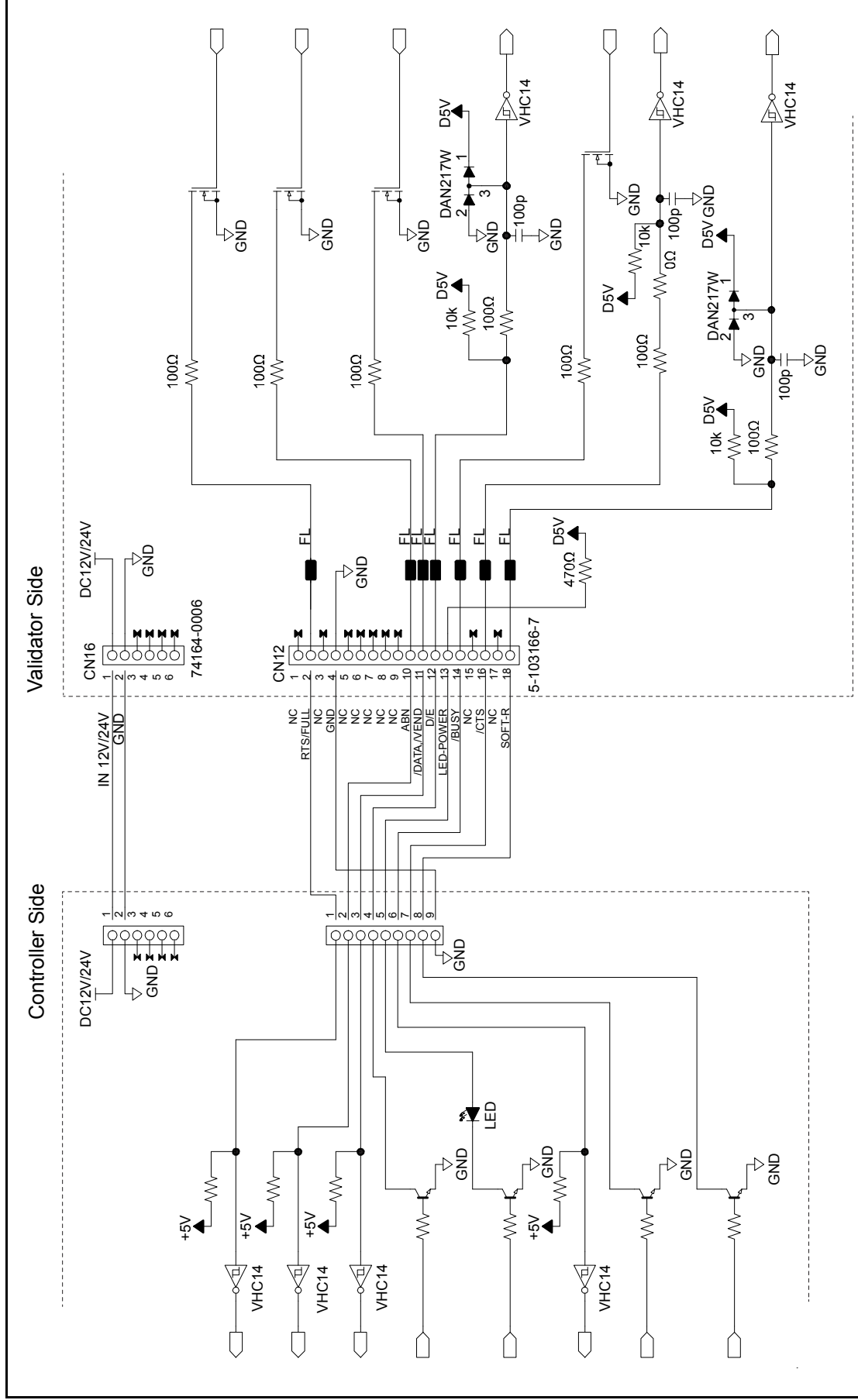


Figure 2-32 DBV-500-S ID-044 SERIAL Interface Schematic Diagram



### Operational Flowcharts

This section provides operation flowcharts of the DBV® Series Banknote Validator Unit (DBV-500-S). Figure 2-33 depicts a typical DBV-500-S Initialization Banknote acceptance flow process.

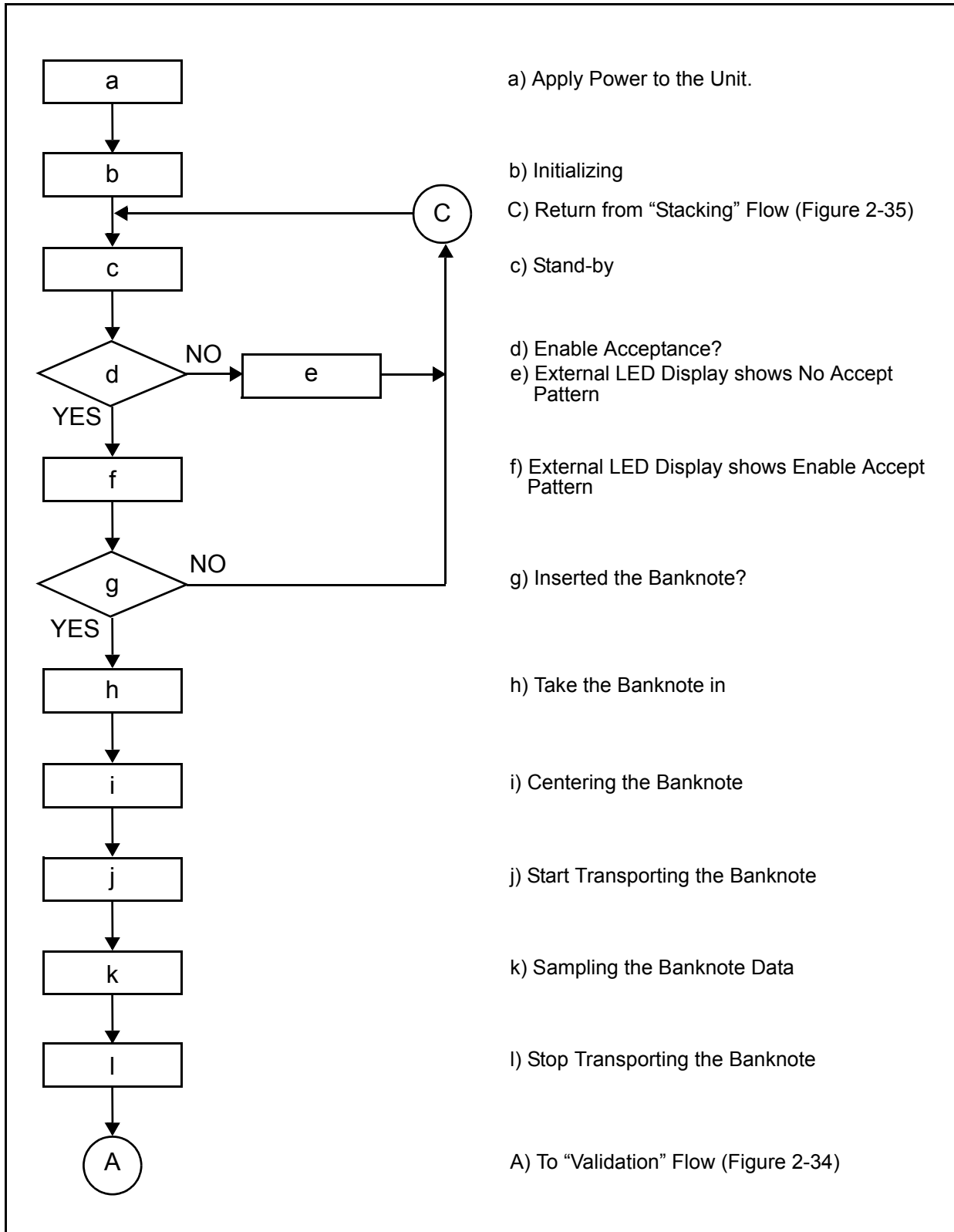
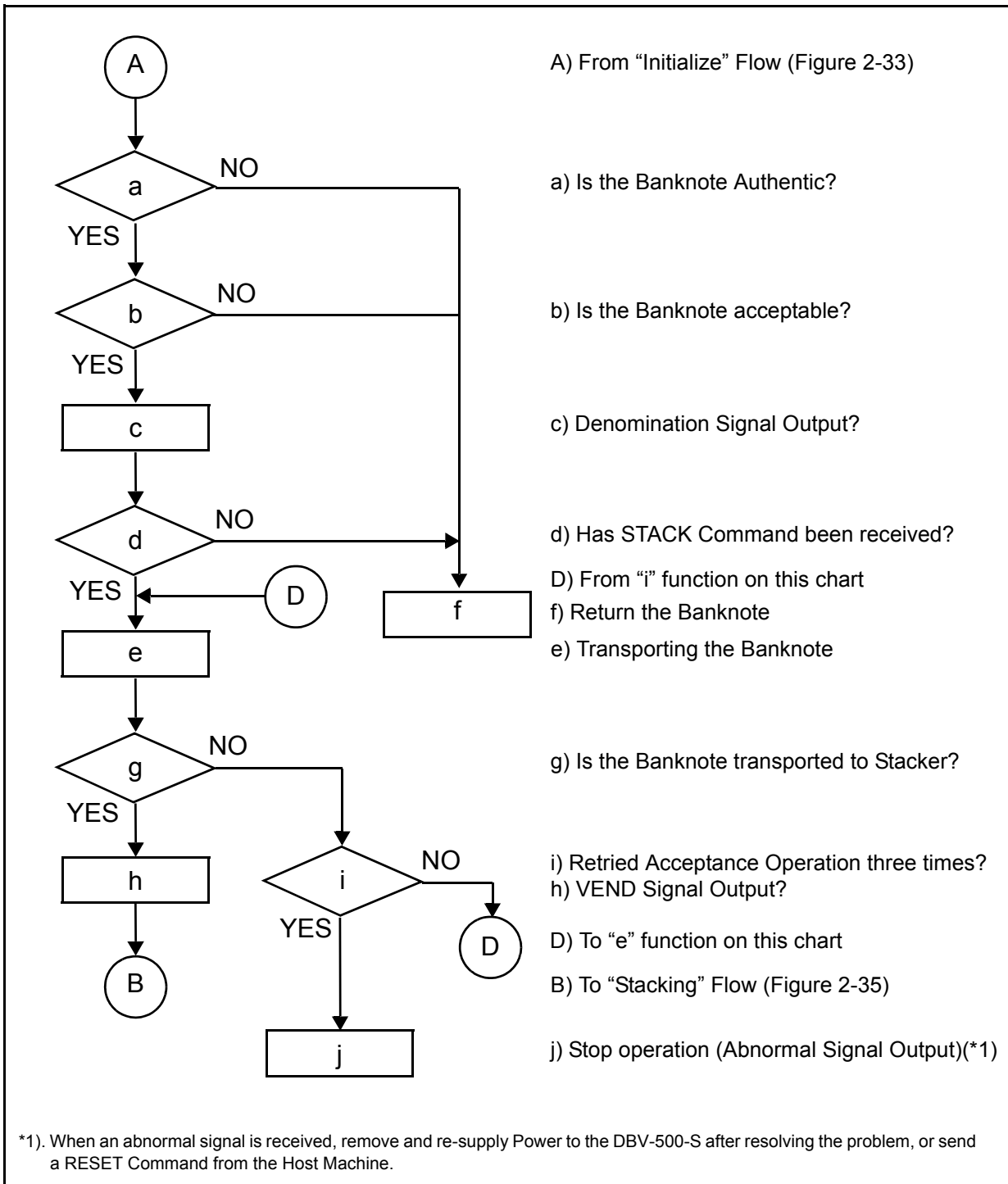


Figure 2-33 DBV-500-S Operational Flowchart (Initializing)

**Operational Flowchart (Continued 1)**

Figure 2-34 depicts a typical DBV-500-S Validation Banknote acceptance flow process.



**Figure 2-34** DBV-500-S Operational Flowchart (Validation)

### Operational Flowchart (Continued 2)

Figure 2-35 depicts a typical DBV-500-S Stacking Banknote acceptance flow process.

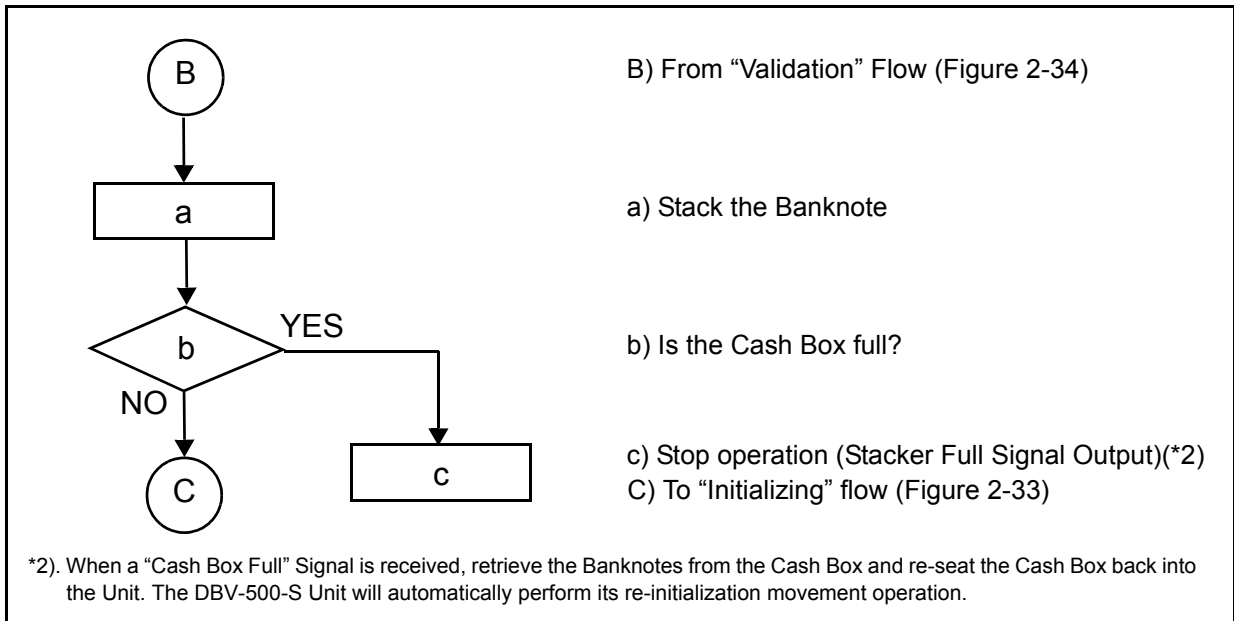


Figure 2-35 DBV-500-S Operational Flowchart (Stacking)

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# **DBV® Series**

## **DBV-500-S Banknote Validator**

### Section 3

### **3 COMMUNICATIONS**

**This section was intentionally left out due to a Non-Disclosure Agreement requirement.**

**If this information is required, please contact the closest office location listed below:**

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The JCM Website for all locations is:

<http://www.jcmglobal.com>

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# DBV® Series

## DBV-500-S Banknote Validator

### Section 4

#### 4 DISASSEMBLY/REASSEMBLY

This section provides disassembly and reassembly instructions for the DBV® Series Banknote Validator Unit (DBV-500-S). This section contains the following information:

- Tool Requirements
- Main Board Removal
- Side Sensor Board Removal
- Main Frame/Upper Guide Removal
- Transport Motor/Stacker Motor Removal
- Inside Sensor Board Removal
- Centering Home Sensor Board Removal
- Centering Motor Removal
- Outside Sensor Board Removal



**NOTE:** Refer to Section 7 “Exploded Views & Parts Lists” on page 7-1 for each part’s EDP number.

#### Tool Requirements

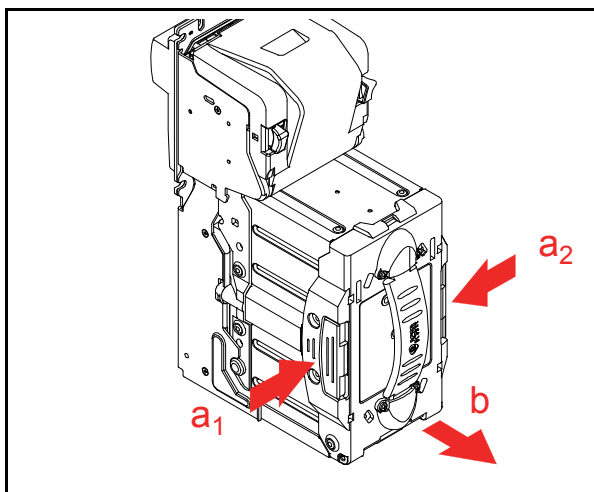
The following tools will be required to perform DBV-500-S disassembly and reassembly.

- #1 & #2 Phillips Screwdriver
- Flat-blade Screwdriver

#### Main Board Removal

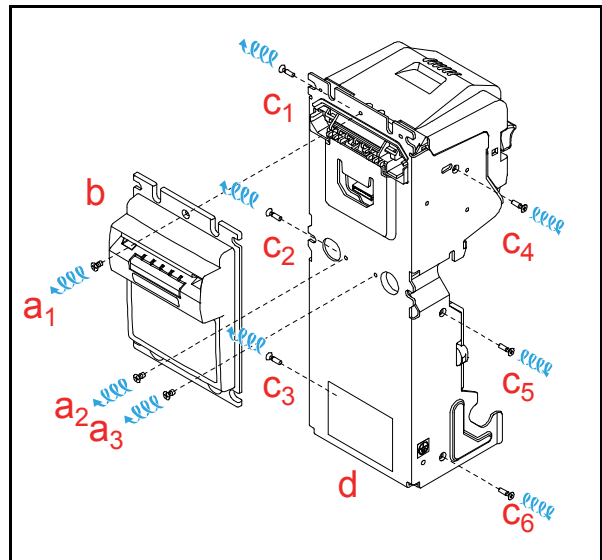
To remove the Main Board, proceed as follows:

1. Press the Latch Button B (Figure 4-1 a<sub>1</sub> & a<sub>2</sub>) located on both sides of the Cash Box and remove the Cash Box from the Unit (Figure 4-1 b).



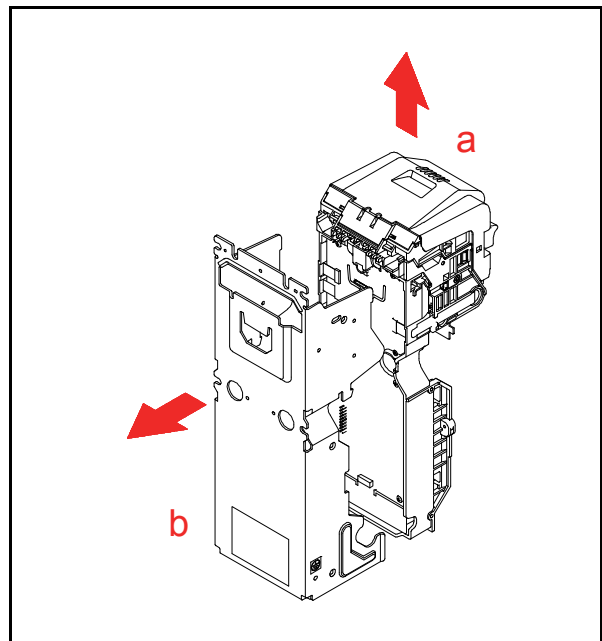
**Figure 4-1** Cash Box Removal

2. Remove the three (3) screws (Figure 4-2 a<sub>1</sub>, a<sub>2</sub> & a<sub>3</sub>) securing the Bezel (Figure 4-2 b) and remove the Bezel.
3. Remove the six (6) screws (Figure 4-2 c<sub>1</sub> through c<sub>6</sub>) securing the Base Plate (Figure 4-2 d).



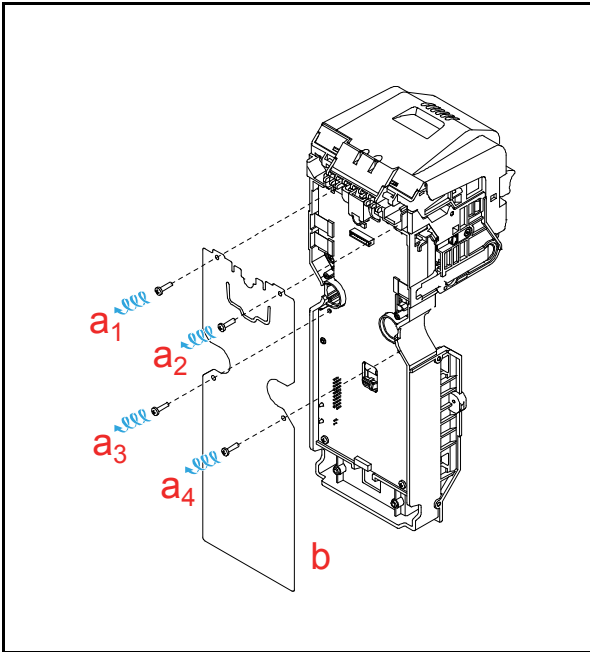
**Figure 4-2** Bezel Removal

4. While sliding the Unit upward (Figure 4-3 a), slide the Base Plate (Figure 4-3 b) forward and remove the Base Plate from the Unit.




**Figure 4-3** Base Plate Removal

- Remove the four (4) screws (Figure 4-4 a<sub>1</sub> through a<sub>4</sub>) securing the CPU Protective Sheet (Figure 4-4 b) and remove the CPU Protective Sheet from the Unit.

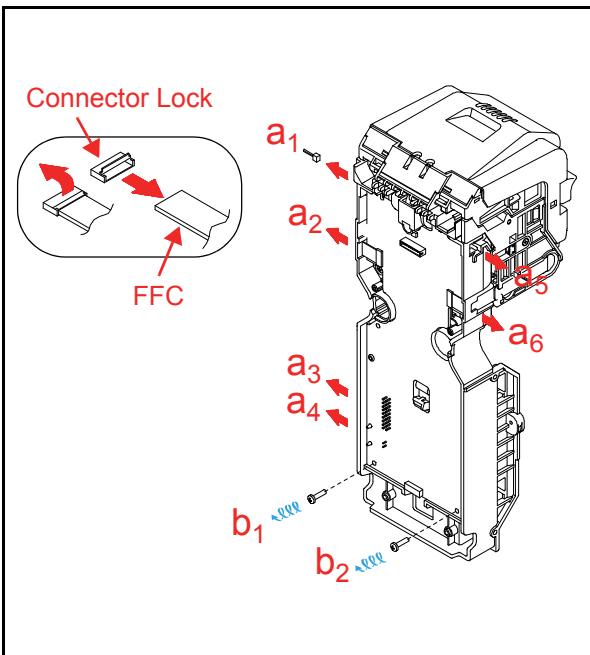


**Figure 4-4 CPU Protective Sheet Removal**

- Disconnect the five (5) connectors (Figure 4-5 a<sub>1</sub> through a<sub>6</sub>).

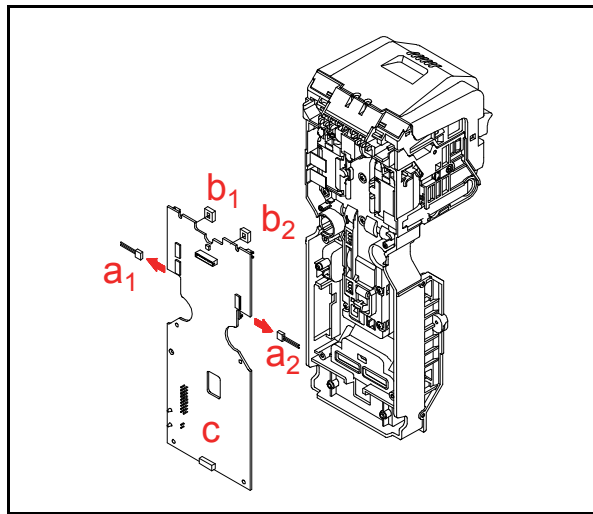
 **NOTE:** Release the Connector Lock before removing the FFC (Figure 4-5)

- Remove the two (2) screws (Figure 4-5 b<sub>1</sub> & b<sub>2</sub>) securing the Main Board (Figure 4-5 c), and then remove the Main Board from the Unit.





**Figure 4-5 Main Board Removal**

- Disconnect the two (2) connectors (Figure 4-6 a<sub>1</sub> & a<sub>2</sub>) and remove the two (2) LED Sponges (Figure 4-6 b<sub>1</sub> & b<sub>2</sub>) from the Main Board (Figure 4-6 c).



**Figure 4-6 Connector Removal**

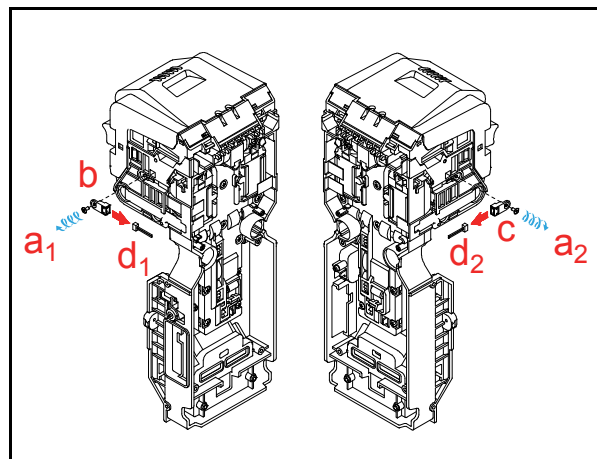
 **NOTE:** When replacing the Main Board, be sure to change the LED Sponges at the same time. The LED Sponge adhesive loses strength once removed from the Main Board and may fall off while in operation.

 **NOTE:** The LED Sponge is a separate part from the Main Board. When replacing the Main Board, the LED Sponges need to be ordered and installed as independent parts.

### Side Sensor Board Removal

To remove the Side Sensor Board, proceed as follows:

- Remove the two (2) screws (Figure 4-7 a<sub>1</sub> & a<sub>2</sub>) securing the two (2) Side Sensor Boards (Figure 4-7 b & c) and disconnect the two (2) connectors (Figure 4-7 d<sub>1</sub> & d<sub>2</sub>).



**Figure 4-7 Side Sensor Board Removal**



### Main Frame/Upper Guide Removal

To remove the Main Frame and the Upper Guide, proceed as follows:

1. Remove the two (2) screws (Figure 4-8 a<sub>1</sub> & a<sub>2</sub>) securing each Light Guide (Figure 4-8 b & c).
2. Remove the three (3) screws (Figure 4-8 d<sub>1</sub>, d<sub>2</sub> & d<sub>3</sub>) securing the Upper Guide (Figure 4-8 e) and remove the Upper Guide from the Unit.

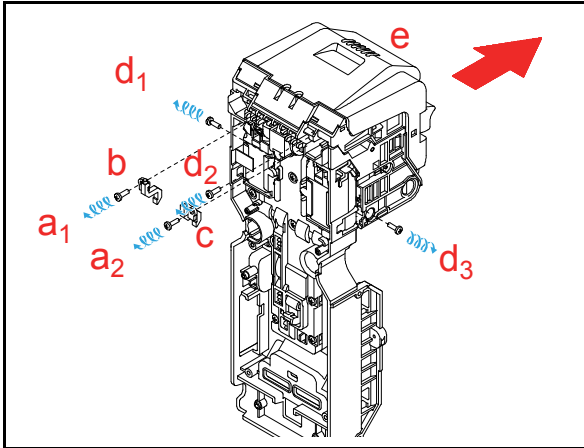


Figure 4-8 Upper Guide Removal

### Transport Motor/Stacker Motor Removal

To remove the Transport Motor and the Stacker Motor, proceed as follows:

1. Remove the ten (10) screws (Figure 4-9 b<sub>1</sub> through b<sub>10</sub>) securing the Transport Motor Cover (Figure 4-9 a) and remove the Transport Motor Cover from the Unit.
2. Remove the Transport Motor (Figure 4-9 c) and the Stacker Motor (Figure 4-9 d) from the Unit.

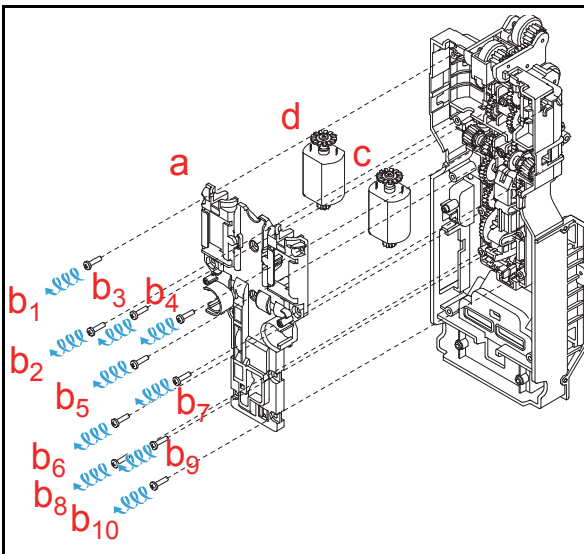


Figure 4-9 Transport Motor/Stacker Motor Removal

### Inside Sensor Board Removal

To remove the Inside Sensor Board, proceed as follows:

1. Remove the three (3) screws (Figure 4-10 c<sub>1</sub>, c<sub>2</sub> & c<sub>3</sub>) securing the Inside Sensor Board (Figure 4-10 a) and the Shield Plate (Figure 4-10 b).
2. Remove the Inside Sensor Board and remove the Inside Sensor FFC (Figure 4-10 d).  
*NOTE: Release the Connector Lock before removing the FFC (Figure 4-10).*
3. Remove the Seal Sponge (Figure 4-10 e) from the Head Unit.

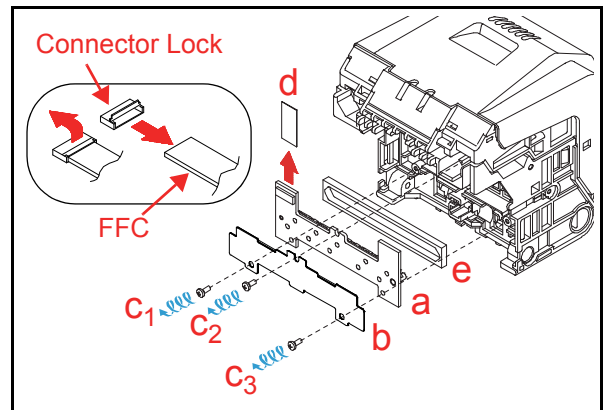


Figure 4-10 Inside Sensor Board Removal

### Centering Home Sensor Board Removal

1. Release the four (4) Tabs (Figure 4-11 a<sub>1</sub> through a<sub>4</sub>) on the Upper Cover (Figure 4-11 b) by using a flat-blade screwdriver, and take the Upper Cover off the Upper Guide.

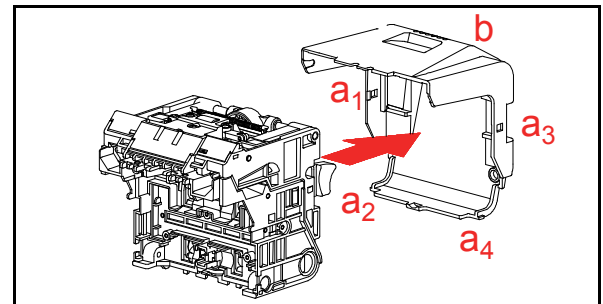


Figure 4-11 Upper Cover Removal

2. Disconnect the two (2) connectors (Figure 4-12 a & b).

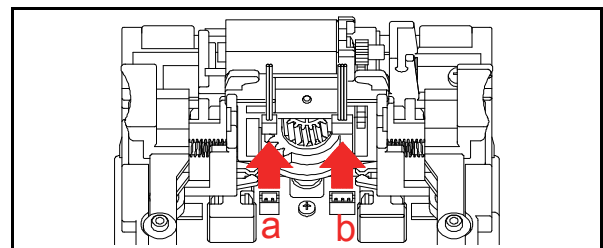
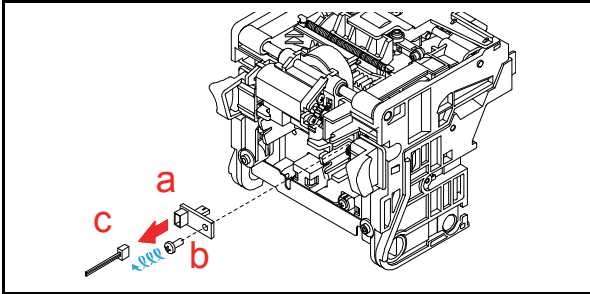


Figure 4-12 Connector Removal

3. Remove the single (1) screw (Figure 4-13 a) securing the Centering Home Sensor Board (Figure 4-13 b) and remove the Centering Home Sensor Board.
4. Disconnect the single (1) connector (Figure 4-13 c).

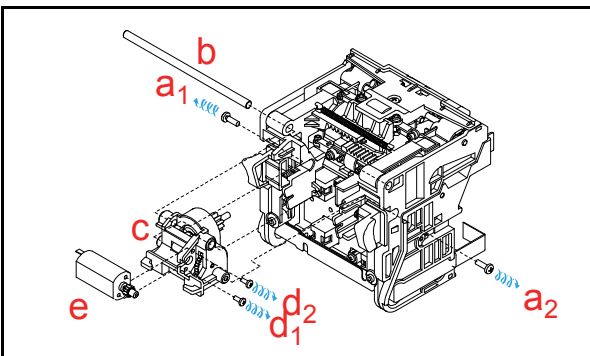


**Figure 4-13** Centering Home Sensor Board Removal

### Centering Motor Removal

To remove the Centering Motor, proceed as follows:

1. Remove the two (2) screws (Figure 4-14 a<sub>1</sub> & a<sub>2</sub>) and pull the Centering Shaft B (Figure 4-14 b) out of the Head Unit.
2. Remove the Centering Bracket (Figure 4-14 c).
3. Remove the two (2) screws (Figure 4-14 d<sub>1</sub> & d<sub>2</sub>) securing the Centering Motor (Figure 4-14 e) and remove the Centering Motor.

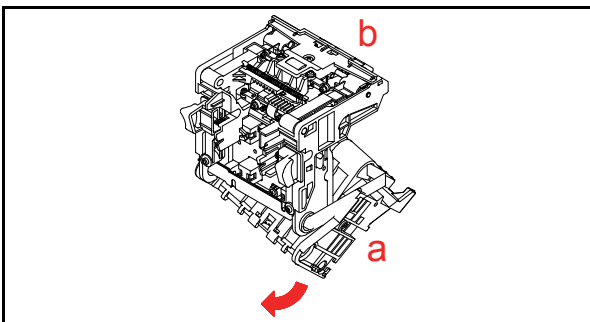


**Figure 4-14** Centering Motor Removal

### Outside Sensor Board Removal

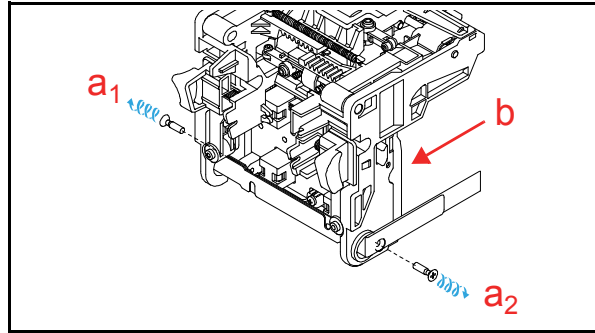
To remove the Outside Sensor Board, proceed as follows:

1. Take the Lower Guide (Figure 4-15 a) off the Upper Guide (Figure 4-15 b).



**Figure 4-15** Lower Guide Removal

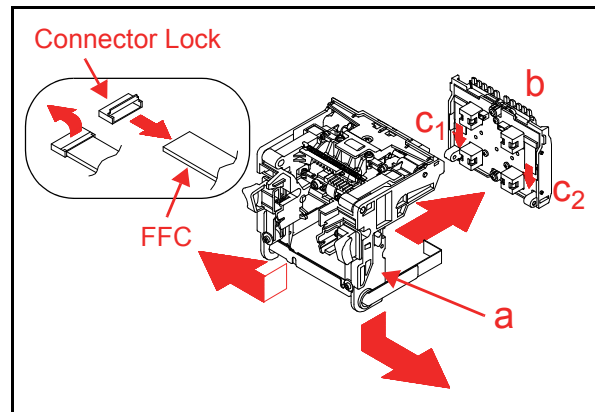
2. Remove the two (2) screws (Figure 4-16 a<sub>1</sub> & a<sub>2</sub>) securing the Upper Guide 2 (Figure 4-16 b).



**Figure 4-16** Upper Guide 2 Removal

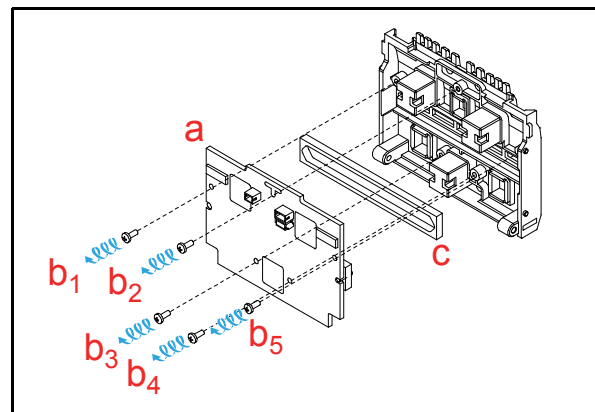
3. To remove the Upper Guide 2 (Figure 4-17 a), expand the Upper Guide 1 (Figure 4-17 b) by pushing gently outward on the sides as indicated by the arrows.
4. Remove the two (2) Outside Sensor FFCs (Figure 4-17 c<sub>1</sub> & c<sub>2</sub>).

*NOTE: Release the Connector Lock before removing the FFCs (Figure 4-17).*



**Figure 4-17** Upper Guide 1 Removal

5. Remove the five (5) screws (Figure 4-18 b<sub>1</sub> through b<sub>5</sub>) securing the Outside Sensor Board (Figure 4-18 a), and remove the Outside Sensor Board.
6. Remove the Seal Sponge (Figure 4-18 c).



**Figure 4-18** Seal Sponge Removal

# DBV® Series

## DBV-500-S Banknote Validator

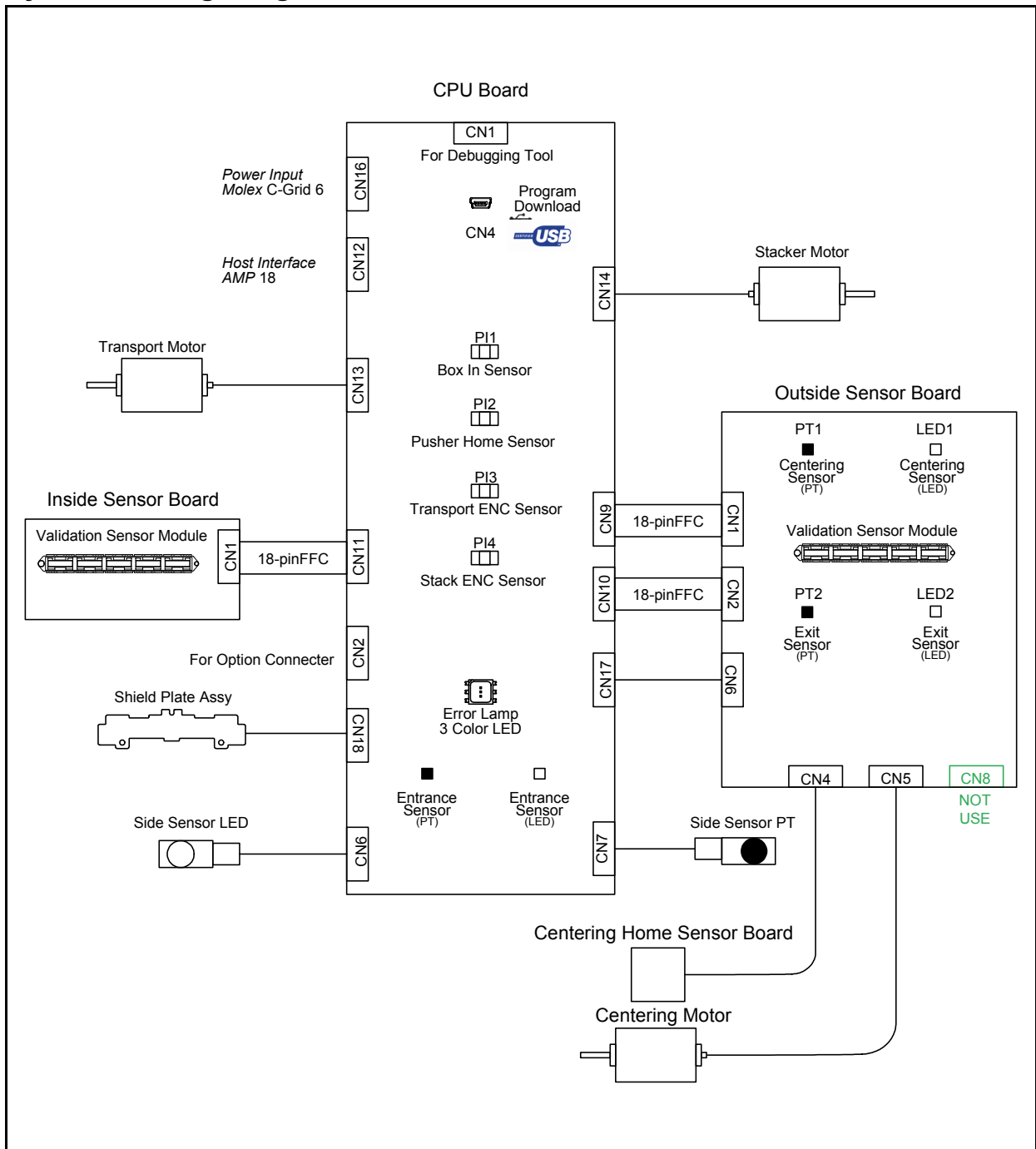
### Section 5

#### 5 WIRING DIAGRAMS

This section provides the DBV® Series Banknote Validator Unit (DBV-500-S) Wiring Diagrams for the following items:

- System Wiring Diagram.

#### System Wiring Diagram



**Figure 5-1** DBV-500-S System Wiring Diagram

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# DBV® Series

## DBV-500-S Banknote Validator

### Section 6

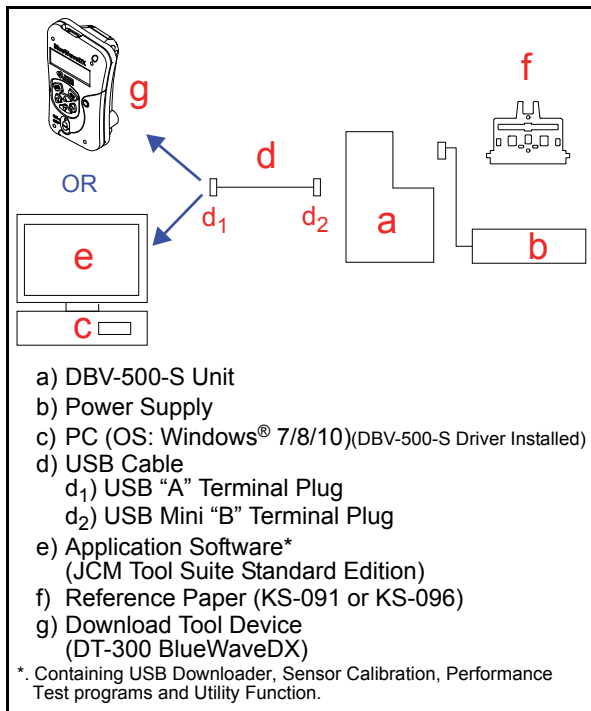
## 6 CALIBRATION AND TESTING

This section provides Calibration and Performance Testing instructions for the DBV® Series DBV-500 Banknote Validator Unit and contains the following information:

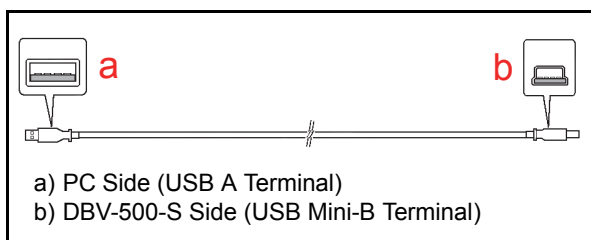
- Tool Requirement
- Installation Procedures
- JCM Tool Suite Standard Edition Mode
- Download Procedures
- Calibration
- Performance Tests

### Tool Requirement

Figure 6-1 illustrates and identifies the tools and equipment interconnects necessary to download and install the DBV-500-S Unit.



**Figure 6-1** Tool and Harness Connections



**Figure 6-2** USB Cable Type Requirement

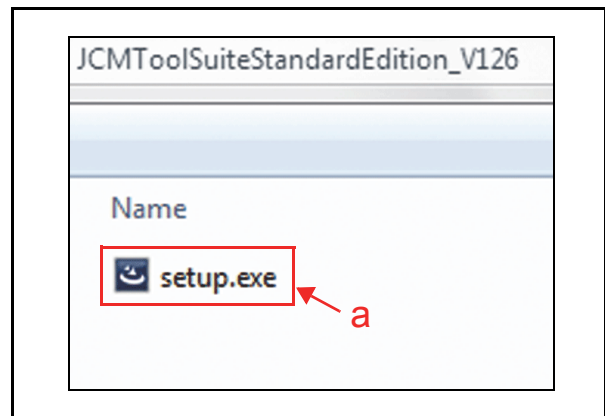
## Installation Procedures

This section provides the JCM Tool Suite Standard Edition installation procedure.

### Application Software Installation

Perform the following steps to install the "JCM Tool Suite Standard Edition" Application Software (refer to Figure 6-1 and Figure 6-2 for the necessary Tool and Harness Connections and USB Cable Type Requirement respectively).

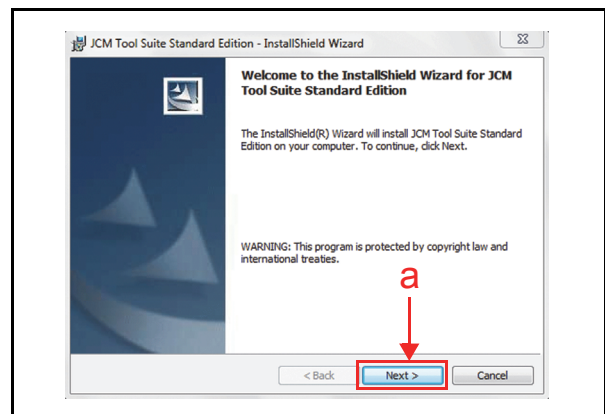
1. Copy the "JCMToolSuiteStandardEdition.zip" Application Software and extract on to the Desktop.
2. Open the Third Layer of the extracted Folder and Double-click on "Setup.exe"(Figure 6-3 a).



**Figure 6-3** Setup.exe File Location

The "JCM Tool Suite Standard Edition - Install Shield Wizard" Screen shown in Figure 6-4 will appear.

3. Click on the "Next>"  Button (Figure 6-4 a).



**Figure 6-4** InstallShield Wizard Screen

- 4. Click on the “Next>”  Screen Button (Figure 6-5 a) when the “Destination Folder” Screen shown in Figure 6-5 appears.

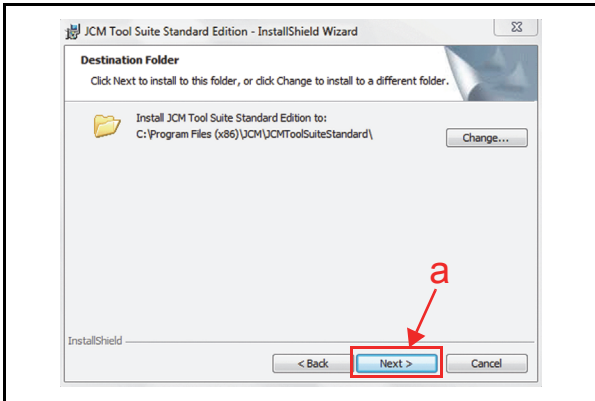


Figure 6-5 Destination Folder Screen

- 5. When the “Ready to Install the Program” Screen appears, select “Anyone who uses this computer (all users)” (Figure 6-6 a) and then click on the “Install”  Screen Button (Figure 6-6 b) to start the installation.

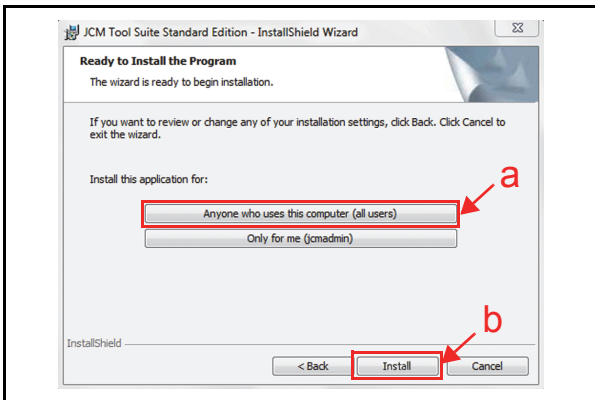


Figure 6-6 Current Settings Confirmation

- 6. Once installation is complete, the “InstallShield Wizard Completed” Screen shown in Figure 6-7 will appear. Click on the “Finish”  Screen Button (Figure 6-7 a) to end the installation process.

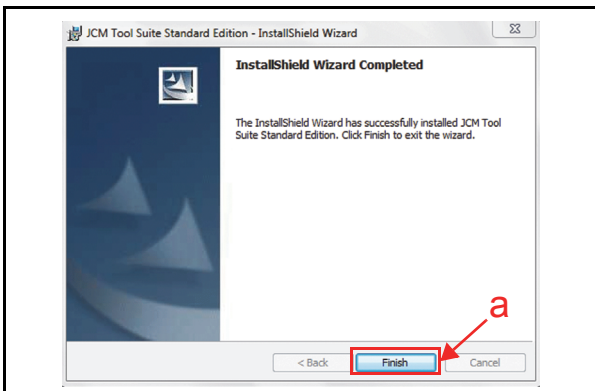


Figure 6-7 Installation Completion Screen

This completes the “JCM Tool Suite Standard Edition” installation procedure.

### Driver Installation Procedure

DBV-500-S USB Drivers need to be installed on the PC before the JCM Tool Suite Standard Edition can be used. To install the DBV-500-S Software Driver, proceed as follows:

*NOTE: USB Drivers are automatically loaded on the PC when JCM Tool Suite is installed. Use this procedure if the USB Drivers need to be installed manually.*

1. Copy the DBV-500-S Driver (DBV-500 USB driver-win7.inf) into the desired PC Folder.
2. Connect the USB Cable to the DBV-500-S Unit (refer to Figure 6-1 and Figure 6-2 for the Tool Requirements and Harness Connector locations).
3. When the Device Driver Installation Wizard Screen (Figure 6-8) appears, click on the “Next>”  Screen Button (Figure 6-8 a) to install the driver for the DBV-500-S Unit.

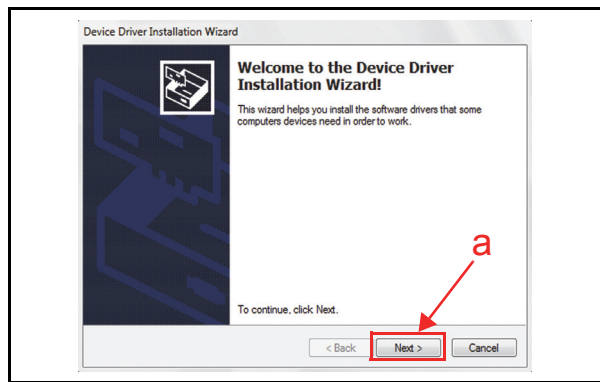


Figure 6-8 Hardware Update Wizard Screen 1

- 4. When the USB Driver Installation is complete, the “Completing the Device Driver Installation Wizard” Screen will appear as shown in Figure 6-9. Click on the “Finish”  Screen Button (Figure 6-9 a) to close the Screen.

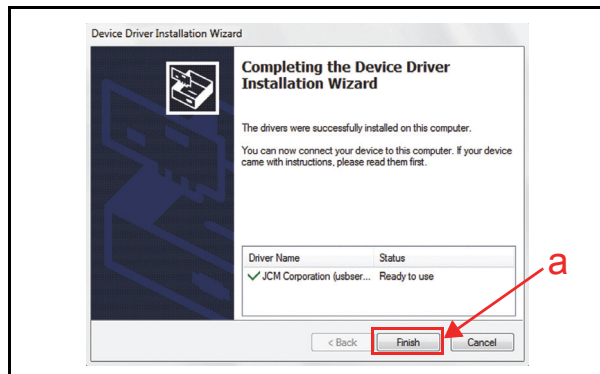


Figure 6-9 Hardware Update Wizard Screen 2

*NOTE: If the Windows Security Screen appears, select “Install this Driver Software (I)” to proceed.*

This completes the DBV-500-S USB Driver Software installation procedure.



## JCM Tool Suite Standard Edition Mode

The following two (2) mode feature types exist in the “JCM Tool Suite Standard Edition” package:

- Normal Mode
- Test Mode

“Normal Mode” is a mode designed to provide the DBV-500-S Operating Software to be downloaded. The “Service Mode” contains three (3) available choices shown in Figure 6-10 as follows:

- **Download** (for downloading software)
- **Statistics** (for observing log data)
- **Event Log View** (for confirming event log)

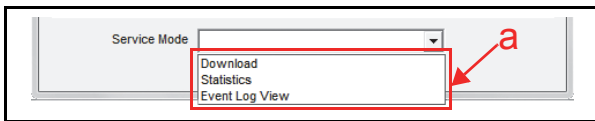


Figure 6-10 Normal Mode Selection

“Test Mode” is a mode designed to perform DBV-500-S Calibration and Performance Testing. The “Service Mode” contains five (5) available choices in its Pull-down Menu shown in Figure 6-11 as follows:

- **Download** (for downloading software)
- **Statistics** (for observing log data)
- **Sensor Adjustment** (for calibration)
- **Performance Test** (for performance testing)
- **Event Log View** (for confirming event log)

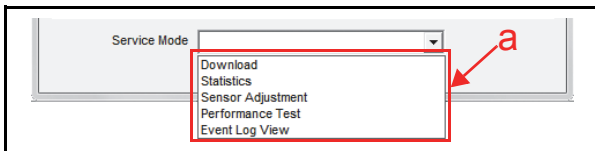


Figure 6-11 Test Mode Selection

## Download Procedures

The following two (2) procedures are available to download the DBV-500-S Software Program:

**NOTE:** Refer to Figure 6-1 and Figure 6-2 for the necessary Tool and Harness Connections and USB Cable Type Requirements respectively.

**NOTE:** For the download procedures with a DT-300 BlueWaveDX, refer to the JCM Global® BlueWave™ DT-300 Integration Guide and Operator Guide.

- The DBV-500-S Software Program is loaded on the Unit (Normal)
- The DBV-500-S Software Program is not loaded on the Unit (e.g., after replacing the CPU Board)

## Software Program Download

To download the DBV-500-S Software Program, proceed as follows:

1. Remove electrical power from the DBV-500-S Unit.
2. When upgrading the Software, set all of the 8-position DIP Switches of DIP Switch 1 to **OFF** (Figure 6-12).

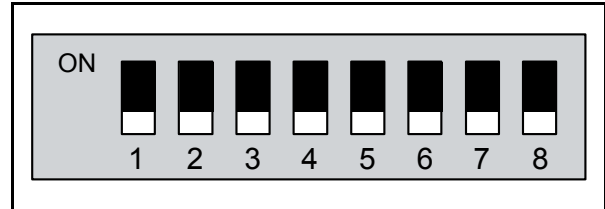


Figure 6-12 Normal Upgrade Setting

When downloading to a Unit (software not previously installed), set the DIP Switch 1 #6, #7 and #8 to **ON** (Figure 6-13).

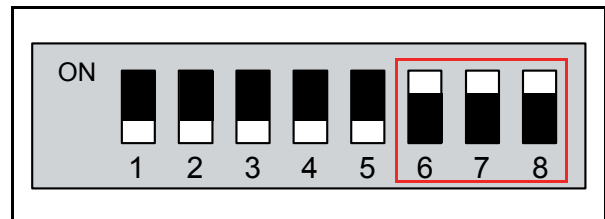


Figure 6-13 Initial Download Setting

3. Connect the USB Port of the DBV-500-S Unit to the PC (Refer to Figure 6-1 and Figure 6-2 for the Tool Requirements and Harness Connector locations).
4. Apply electrical power to the DBV-500-S Unit.
5. Launch the “JCM Tool Suite Standard Edition” Application. The Screen shown in Figure 6-14 will appear when the application opens.

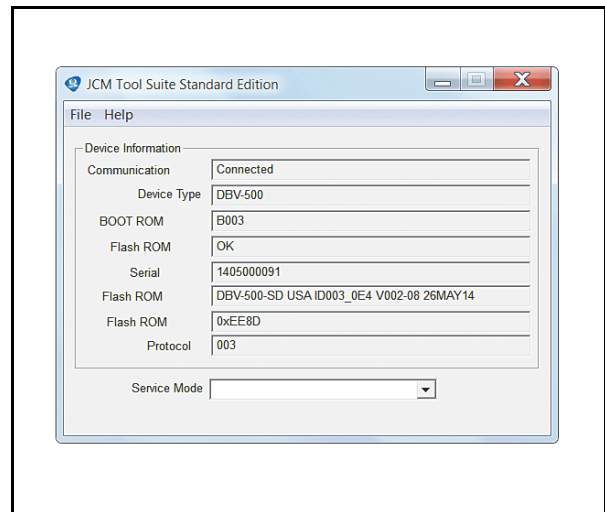
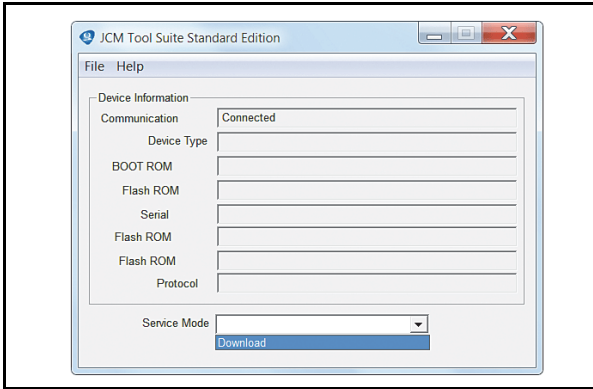


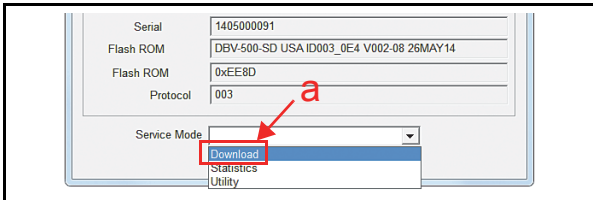
Figure 6-14 Normal Upgrade Screen

When downloading the Software Program to the DBV-500-S Unit for the first time, the Device Information will not appear (Figure 6-15).



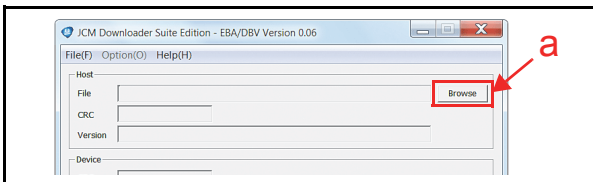
**Figure 6-15** Initial Download Screen

- Click and hold-down the “Service Mode” Pull-Down Menu and select “Download” (Figure 6-16 a) from within the Pull-Down Menu Selections. The selected Field will highlight Blue, the Status LED will flash at a Green Color rate.



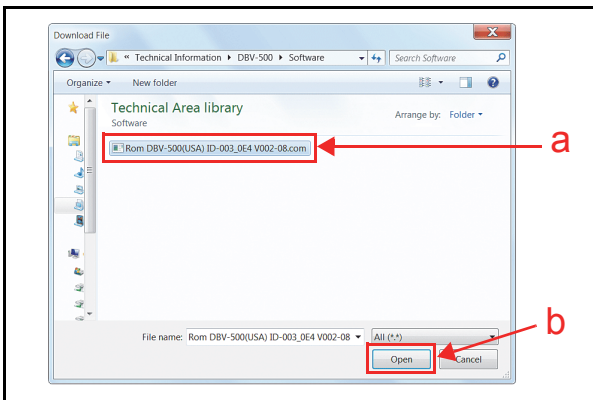
**Figure 6-16** JCM Tool Suite Standard Edition Screen Pull-Down Menu

- When “Download” is selected the “JCM Downloader Suite Edition Version X.XX” will automatically begin functioning, and the Screen shown in Figure 6-17 will appear. Click on the “Browse” Screen Button (Figure 6-17 a).



**Figure 6-17** Browse Screen Button Location

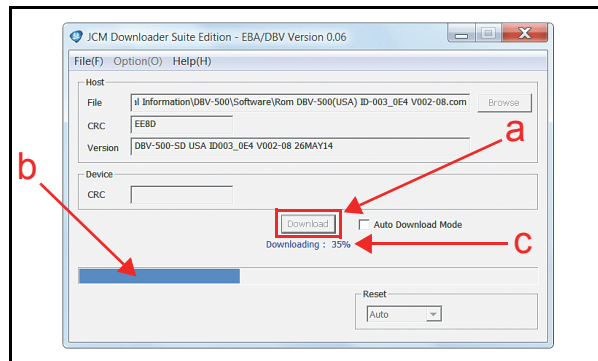
- Select the appropriate DBV-500-S Software Program Version shown in Figure 6-18a from the Download File Screen that appears and click on the “Open” Screen Button (Figure 6-18 b).



**Figure 6-18** DBV-500 Software Program Selection

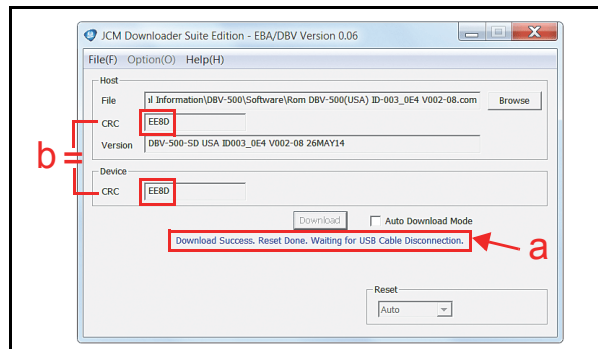
*NOTE: Select the correct DBV-500 Firmware for the Country desired.*

- When the “JCM Downloader Suite” Screen re-appears, click on the center “Download” Screen Button (Figure 6-19 a) to begin the Software download into the DBV-500-S Unit. The Download Screen will display a Progress Bar during the download operation (Figure 6-19 b), and a Blue Text Line below the Download Screen Button will display the download Percentage as “Downloading : XX%” (Figure 6-19 c). The Status LED will flash a Green Color rate at a longer interval during this operation.



**Figure 6-19** Download Progress Screen 1

- When the download is complete, the “Download Success. Reset Done. Waiting for USB Cable Disconnection.” Blue Text Line will appear (Figure 6-20 a). Confirm that the Host’s Checksum and the Device Checksum’s identically match each other (Figure 6-20 b).




**Figure 6-20** Download Completed Screen 1

This completes the DBV-500-S Software Downloading Procedures.



## Calibration

This section provides instructions for performing a calibration of the DBV-500-S Sensors.

 **NOTE:** Refer to Figure 6-1 and Figure 6-2 for the necessary Tool and Harness Connections and USB Cable Type Requirements respectively.


### When to Calibrate

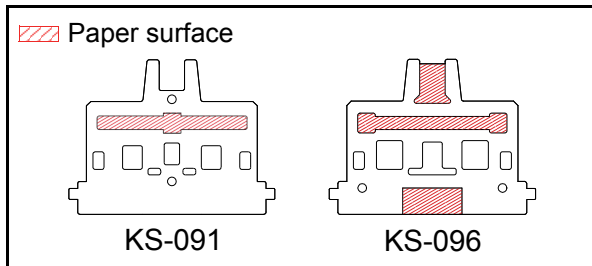
Calibration should be performed when one of the following four (4) conditions occur:

1. When removing one of the Circuit Boards.
2. When replacing one of the Circuit Boards.
3. When dirt adheres to the Sensors (See “Sensor and Roller Cleaning Procedure” on page 2-12.).
4. When the Banknote Acceptance Rate becomes drastically degraded.

### Placing the Reference Paper

This portion provides information concerning the KS-091 and KS-096 Reference Papers’ settings and uses.

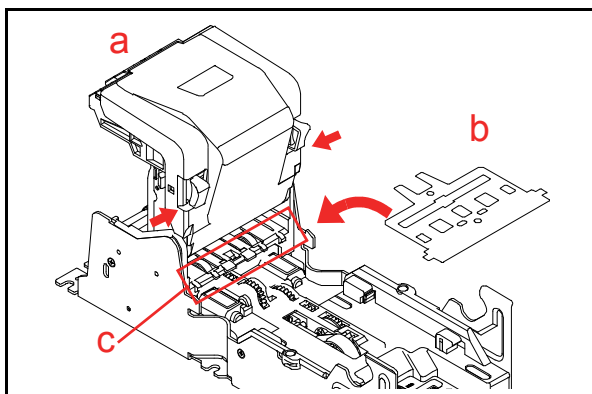
 **NOTE:** Do not touch the Paper Surfaces on either side of the KS-091 and KS-096 Reference Papers (Figure 6-21).



**Figure 6-21** KS-091 and KS-096 Reference Papers


Perform the following steps to properly place the Calibration Reference Paper into the DBV-500-S Device:

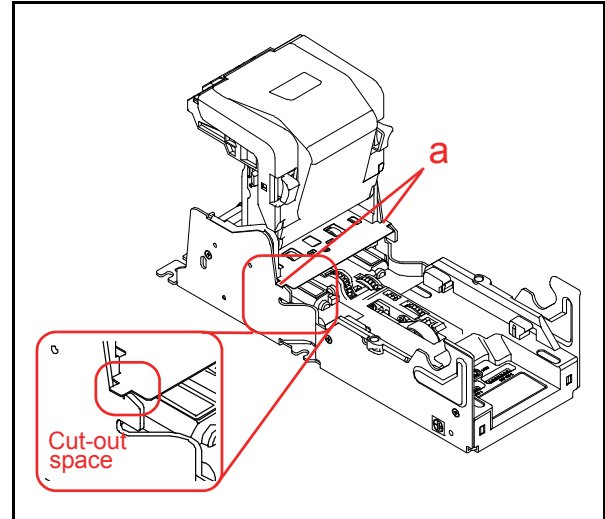
1. Open the Upper Guide while pressing in on the Upper Tray Open/Close Latches located on each side of the Validator Unit (Figure 6-22 a) and insert the Reference Paper (Figure 6-22 b) into the space between the Upper Guide and the Lower Guide (Figure 6-22 c).



**Figure 6-22** Placing Reference Paper 1

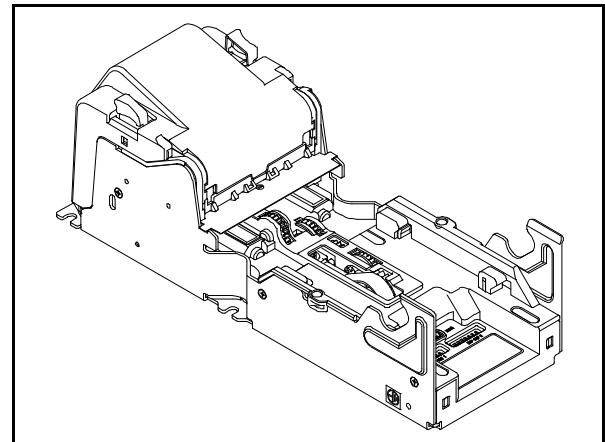
2. Confirm that the Reference Paper Tabs are hooked into both sides of the cut-out spaces of the DBV-500-S (Figure 6-23 a).

 **NOTE:** Be sure that the Reference Paper Tab is hooked to the Cut-out space firmly.



**Figure 6-23** Placing Reference Paper 2

3. Firmly close the Upper Guide (Figure 6-24) until it “clicks” into place, and ensure that both sides are tightly closed and locked.

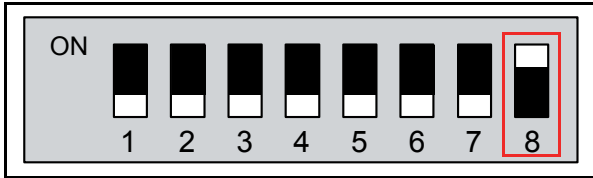


**Figure 6-24** Placing Reference Paper 3

### Calibration Preparation

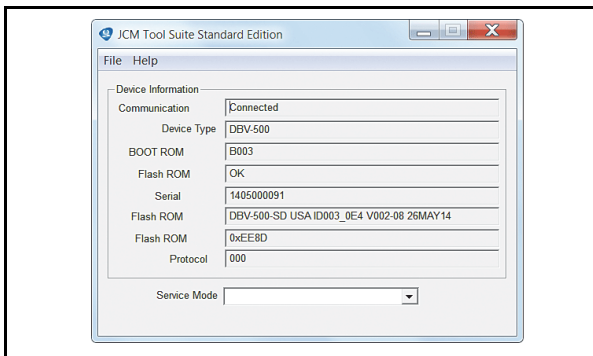
Perform the following steps to prepare the DBV-500-S for Sensor Calibration:

1. Remove electrical power from the DBV-500-S Unit.
2. Set DIP Switch1 #8 to **ON** (Figure 6-25).
3. Apply electrical power to the DBV-500-S Unit. The Status LED will begin flashing at a **Green** Color rate.



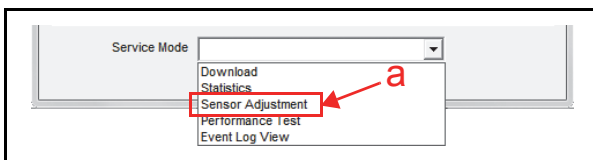
**Figure 6-25** DIP SW1 Setting

4. Launch the “JCM Tool Suite Standard Edition” Application (Figure 6-26).



**Figure 6-26** Launching JCM Tool Suite Standard Edition Screen

5. Click the “Service Mode” Pull-Down Menu, and select “Sensor Adjustment” (Figure 6-27 a).



**Figure 6-27** Sensor Adjustment Selection

6. Confirm that the Sensor Calibration Program Screen appears (Figure 6-28).

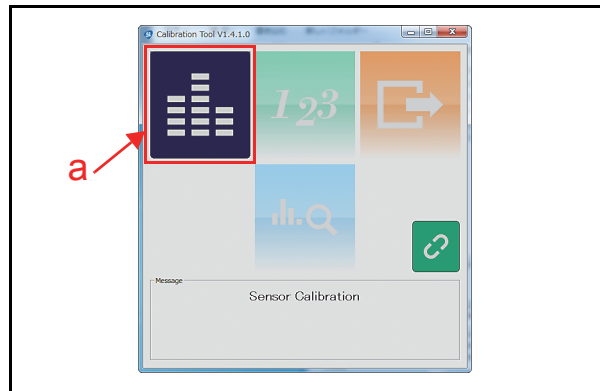


**Figure 6-28** Sensor Calibration Screen 1

### Sensor Calibration

To calibrate the DBV-500-S sensors, proceed as follows:

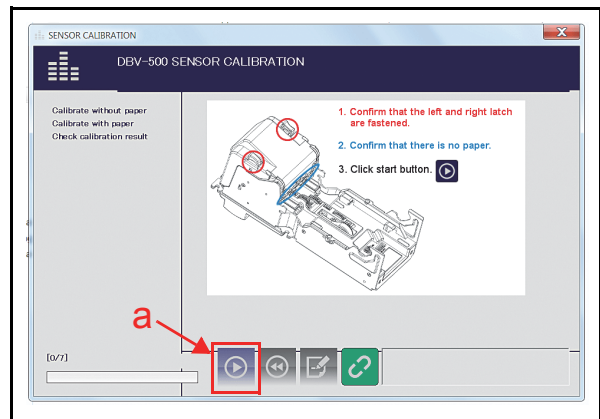
1. Click the “Sensor Calibration” button (Figure 6-29 a).



**Figure 6-29** Sensor Calibration Screen 2

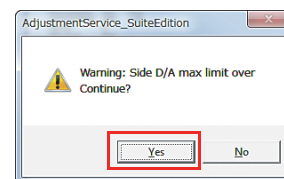
2. Confirm that the “DBV-500 SENSOR CALIBRATION” Screen appears (Figure 6-30).
3. Referring to the screen, confirm that the Transport Path is locked firmly and click the “Start” button (Figure 6-30 a) to begin the non-paper calibration.

*NOTE: Make sure there are no foreign objects in the Transport Path.*



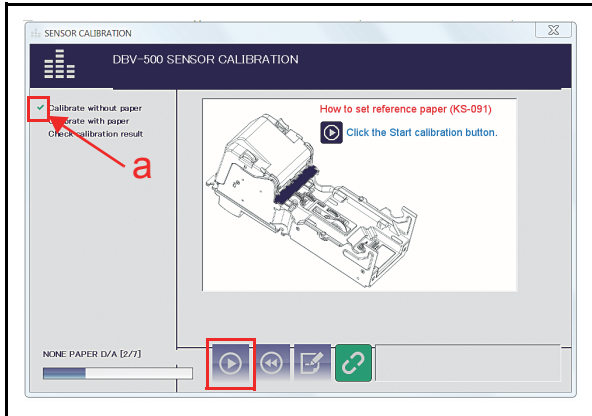
**Figure 6-30** Non-Paper Calibration Screen

*NOTE: When the Calibration does not complete with an expected Positioning Sensor D/A value, a warning message window pop up will appear. Click “YES” Button to proceed.*



*NOTE: When this warning message appears, the Side Sensor or the CPU Board replacement is recommended.*

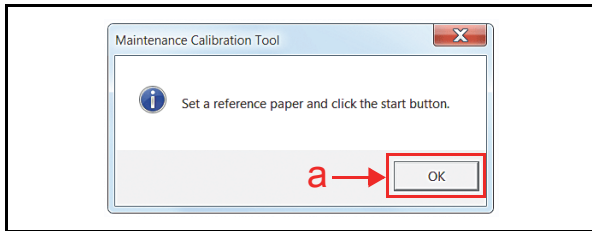
- Confirm that the non-paper calibration is completed with a check mark (Figure 6-31 a) appearing next to “Calibration without paper” text line.



**Figure 6-31** Non-Paper Calibration Completion

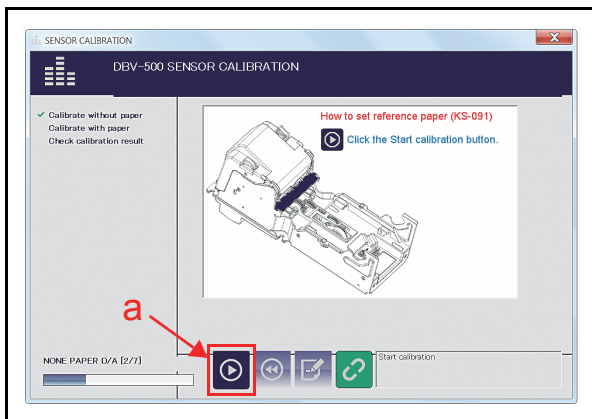
- The “Set a reference paper and click the start button.” message dialogue box will appear. Place the Reference Paper into the DBV-500-S Device and close the Upper Guide, then click the “OK” button (Figure 6-32 a).

*NOTE: For the KS-096 Reference Paper, either side of the Reference Paper can be used.*



**Figure 6-32** Placing Reference Paper Message

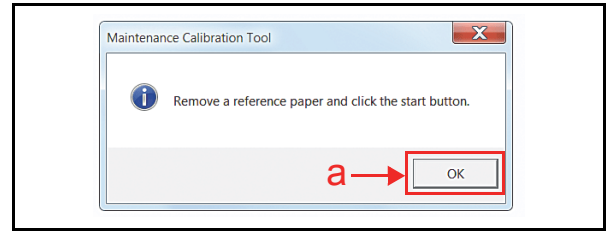
- Confirm that the Upper Guide is locked firmly and click the “Start” button (Figure 6-33 a) to begin the Reference Paper Calibration.



**Figure 6-33** Reference Paper Calibration

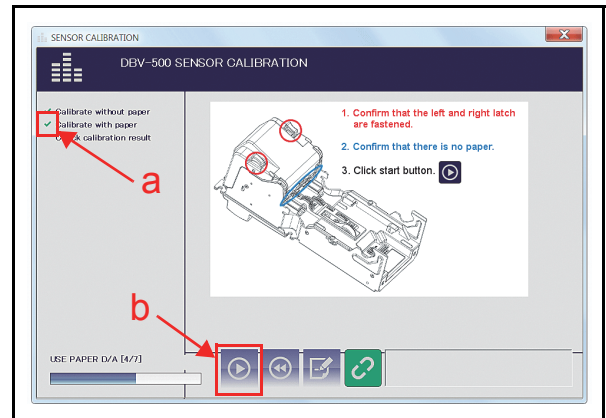
- Confirm the “Calibration with paper” calibration is completed with a check mark (Figure 6-35 a) appears next to “Calibration with paper” text line.
- Confirm the “Remove a reference paper and click start button.” message dialogue box appears.

- Remove the Reference Paper and click the “OK” button (Figure 6-34 a).



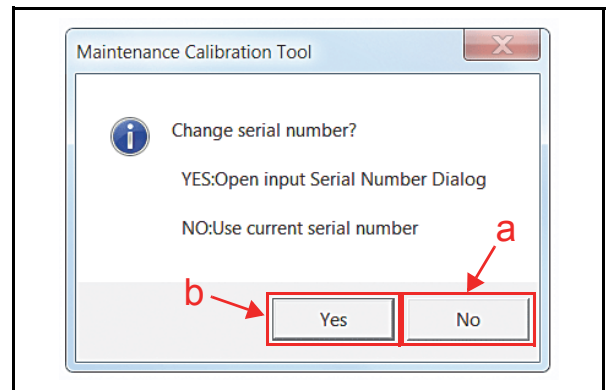
**Figure 6-34** Removing Reference Paper Message

- Confirm that the Upper Guide is locked firmly and click the “Start” button (Figure 6-35 b) to begin the second Non-paper Calibration.



**Figure 6-35** Second Non-Paper Calibration

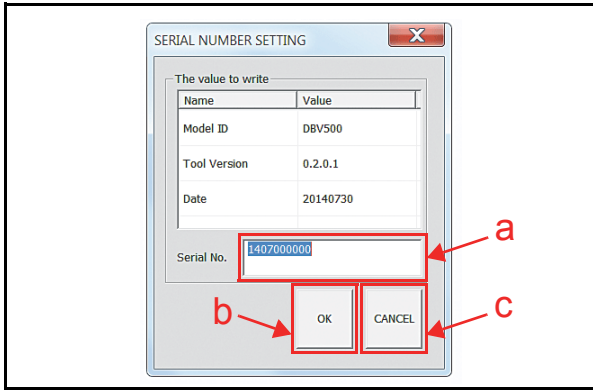
- When the second Non-paper Calibration is completed, the “Maintenance Calibration Tool” dialogue screen appears to change the Serial Number. When using the default Serial Number, click the “No” button (Figure 6-36 a) to finish the calibration.



**Figure 6-36** Serial Number Change Dialogue

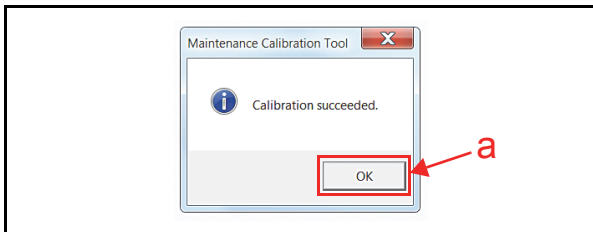
To change the Serial Number, click the “YES” button (Figure 6-36 b). The SERIAL NUMBER SETTING screen will appear. Type in the desired 10-digit (Maximum: 12-digit) Serial Number into the Serial No. text box (Figure 6-37 a), then click the “OK” button (Figure 6-37 b).

*NOTE: When clicking the “CANCEL” button (Figure 6-37 c), the Serial Number change is not saved.*



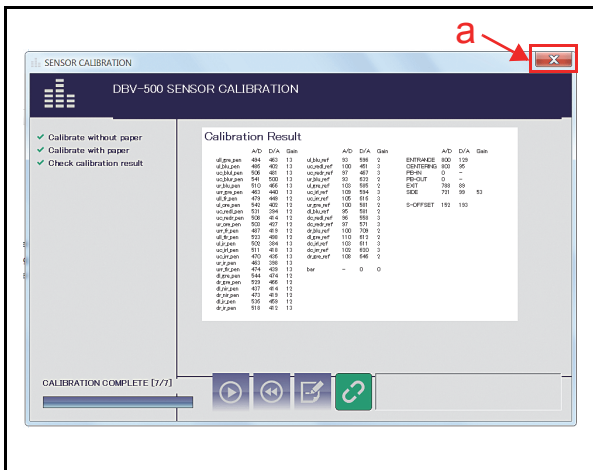
**Figure 6-37** Serial Number Setting

- Once the Serial Number Setting is completed, Calibration Data will be written into the EEPROM. When the data writing finishes normally, the “Calibration Succeeded.” message box appears, and click the “OK” button (Figure 6-38 a) to close the message dialogue.



**Figure 6-38** Serial Number Setting

- The “Calibration Result” will appear (Figure 6-39). Confirm the result and click the close button (Figure 6-39 a).



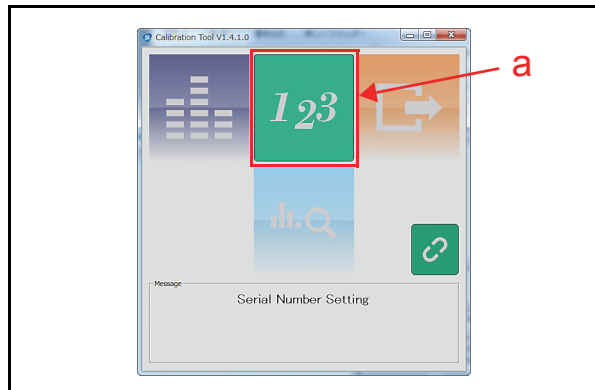
**Figure 6-39** Calibration Result

This completes the Sensor Calibration procedures.

### Serial Number Setting

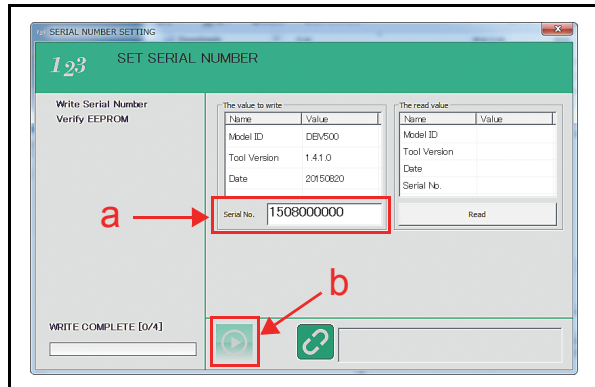
To set the Serial Number, proceed as follows:

- Click the SERIAL NUMBER SETTING Button (Figure 6-40 a).



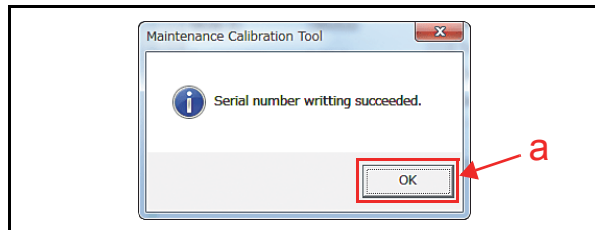
**Figure 6-40** Serial Number Setting Button

- Confirm that the “SET SERIAL NUMBER” Screen appears (Figure 6-41).
- Type the desired 10-digit (Maximum: 12-digit) Serial Number into the Serial No. text box (Figure 6-41 a) then click the “Start” button (Figure 6-41 b).



**Figure 6-41** Set Serial Number Screen

- Once the Serial Number Setting is completed, the “Serial number writing succeeded.” message box appears. Click the “OK” button (Figure 6-42 a) to close the message dialogue.



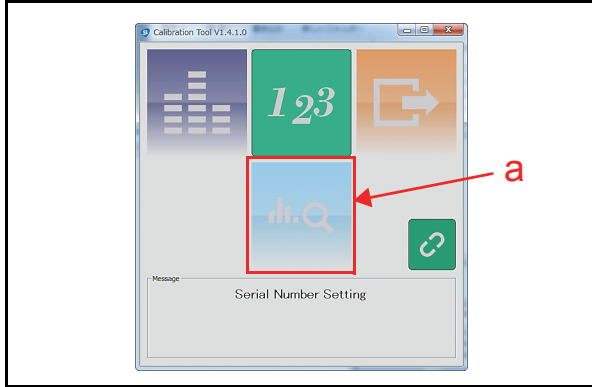
**Figure 6-42** Serial Number Setting Completion



### White Level Test

To perform the DBV-500-S White Level Test, proceed as follows:

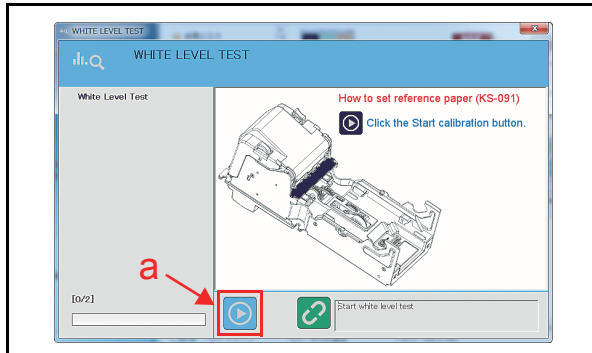
1. Click the White Level Test Button (Figure 6-43 a).



**Figure 6-43** White Level Test Button

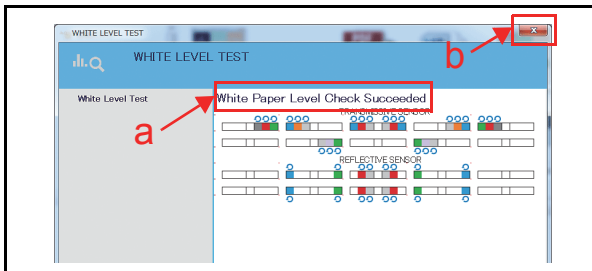
2. Confirm that the “WHITE LEVEL TEST” Screen appears (Figure 6-44).
3. Insert the Reference Paper while referring to the instruction shown on the Screen. Firmly close the Upper Guide until it “clicks” into place, and ensure that both sides are tightly closed and locked, then click the “Start” Button (Figure 6-44 a) to begin the White Level Test.

*NOTE: For the KS-096 Reference Paper, either side of the Reference Paper can be used.*



**Figure 6-44** White Level Test Start Button

4. Once the White Level Test is completed, “White Paper Level Check Succeeded” (Figure 6-45 a) message appears on the right column of the Screen. Click the “Exit” Button (Figure 6-45 b) to end the White Level Test.



**Figure 6-45** White Level Test Completion

### Performance Tests

This section provides Performance Testing instructions for the DBV-500-S Unit. There are two (2) Performance Test methods:

- Performance Test using a PC
- Performance Test without a PC

Choose a Performance Test procedure by selecting the one related to the particular circumstance desired.

*NOTE: Refer to Figure 6-1 and Figure 6-2 for the necessary Tool and Harness Connections and USB Cable Type Requirements respectively.*

### Performance Test Items using a PC

Table 6-1 lists the test items for the DBV-500-S Performance Test using a PC. To perform the DBV-500-S Performance Tests using a PC, proceed with the following steps.

**Table 6-1** Performance Test Items using a PC

Test Items	Test Purpose
FEED_MOTOR_FWD_TEST	Speed Check with Normal Rotation
FEED_MOTOR_REV_TEST	Speed Check with Reverse Rotation
STACK_TEST	Movement Check (3 sec interval)
SENSOR_TEST	Each Sensor Performance Test
DIPSWITCH1_TEST	DIP SW1 Performance Test
DIPSWITCH2_TEST	DIP SW2 Performance Test
LED_TEST	LED Performance Test
CENTERING_TEST	Movement Check (3 sec interval)

### Performance Test Preparation

To prepare the Performance Test, proceed as follows:

1. Remove electrical power from the DBV-500-S Unit.
2. Set DIP SW1 #8 to ON (Figure 6-46).

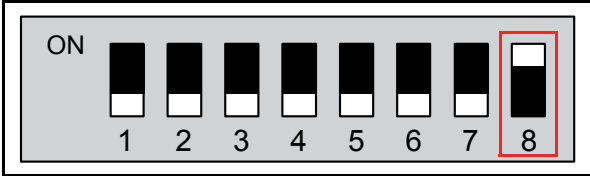


Figure 6-46 DIP SW1 Setting

3. Apply electrical power to the DBV-500-S Unit. Confirm the LED flashes at a Green color rate when the DBV-500-S Unit is in Test Mode.
4. Connect the PC and the DBV-500-S Unit using the USB Cable.
5. Launch the “JCM Tool Suite Standard Edition” Application and confirm that the Initial Screen shown in Figure 6-47 appears.
6. Click the “Service Mode” Pull-down Menu, and select “Performance Test” (Figure 6-47 a).

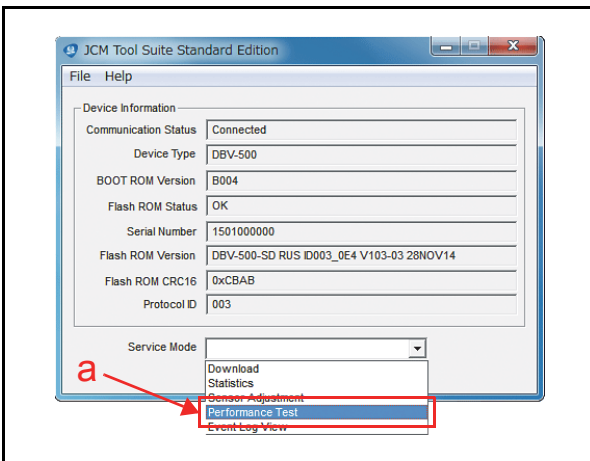


Figure 6-47 JCM Tool Suite Standard Edition Initial Screen

7. Confirm that the Performance Test Main Screen appears (Figure 6-48).

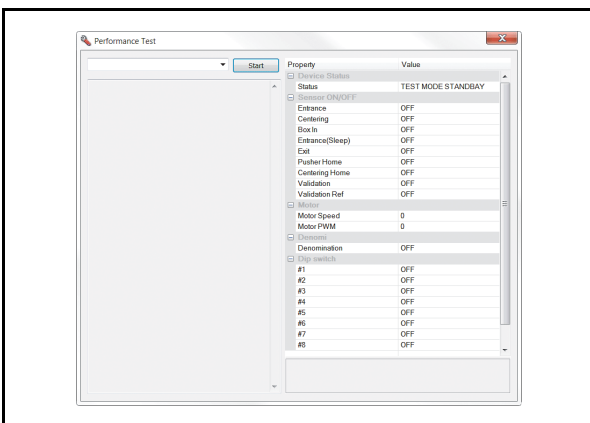


Figure 6-48 Performance Test Main Screen

### Feed Motor Test

To perform the Feed Motor Normal/Reverse Rotation Test, proceed as follows:

1. Launch the Performance Test Main Screen (Review Figure 6-48).

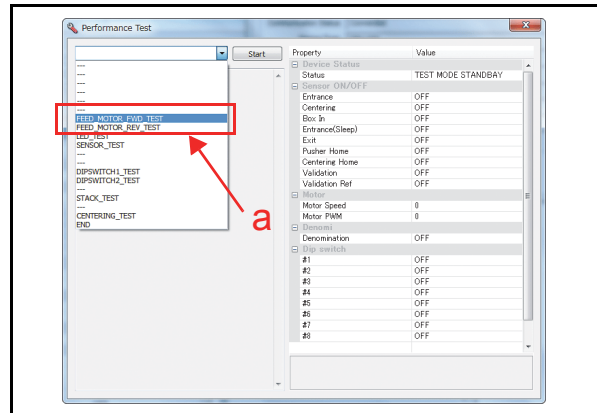


Figure 6-49 Feed Motor Test Selection

2. Click the “Performance Test” Pull-down Menu and select the Feed Motor Normal Test “FEED MOTOR\_FWD\_TEST” or the Feed Motor Reverse Test “FEED MOTOR\_REV\_TEST” (Figure 6-49 a).
3. Click the “Start”  Screen Button (Figure 6-50 a) to begin the test.

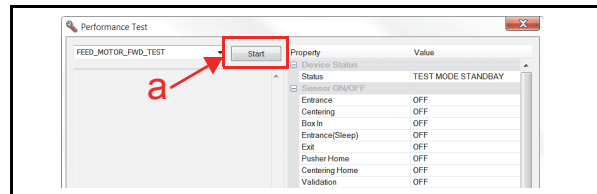


Figure 6-50 Feed Motor Test Start Button

4. Confirm that the Feed Motor rotates in a forward/reverse direction without errors, and motor speed is in the acceptable range (within approximately 600mm/s to 800mm/s). The measured speed will appear in the “Motor” area (Figure 6-51 a) on the Screen.
5. Click the “Stop”  Screen Button (Figure 6-51 b) to end the test.

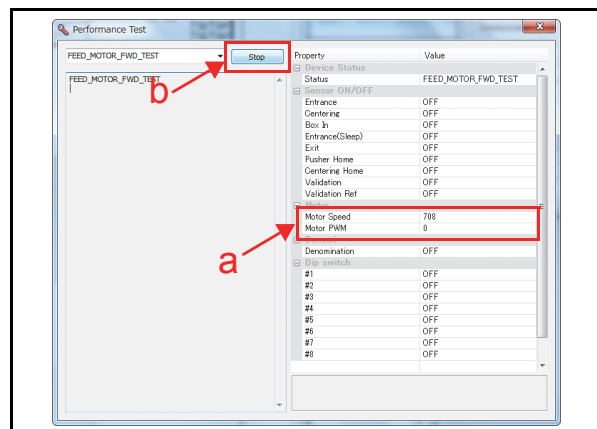


Figure 6-51 Feed Motor Test Stop Button

### Stacking Movement Test

1. Launch the Performance Test Main Screen (See Figure 6-48 “Performance Test Main Screen” on page 6-10).
2. Click the “Performance Test” Pull-down Menu and select the “STACK\_TEST” (Figure 6-52 a).

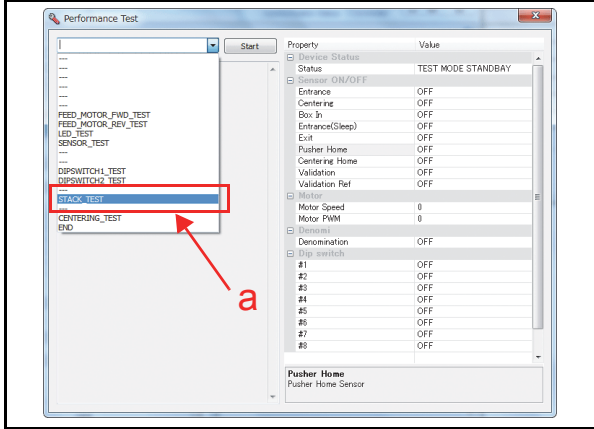


Figure 6-52 Stacking Movement Test Selection

3. Click the “Start”  Screen Button (Figure 6-53 a) to begin the test.

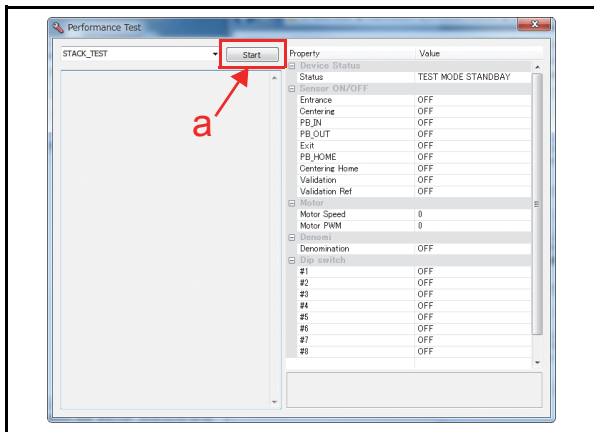


Figure 6-53 Stacking Movement Test Start Button

4. Confirm that the Stacking movement is performing normally.
5. Click the “Stop”  Screen Button (Figure 6-54 a) to end the test.

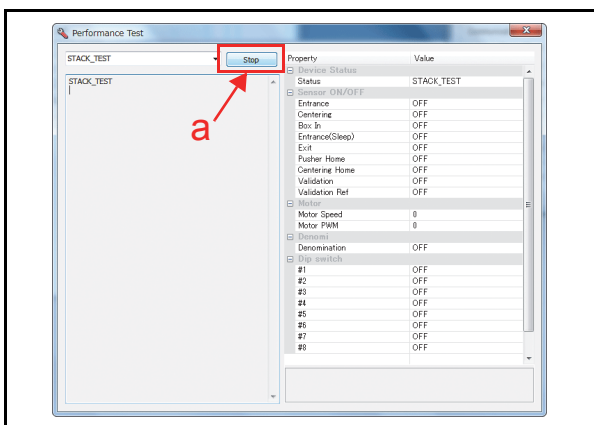


Figure 6-54 Stacking Movement Test Stop Button

### Sensor Test

Nine (9) Tests exist within the Sensor Test Menu. Table 6-2 lists each Sensor Test Item function.

Table 6-2 Sensor Test Items

Sensor	Test Purpose/ Procedure	PC Screen	
		Detected	NOT
Entrance Sensor	Cover/uncover each Sensor by a Banknote, and confirm the Sensor detects Banknote existence properly	ON	OFF
Centering Sensor			
Box Sensor	Seat/remove the Cash Box and confirm the Sensor detects Cash Box placement		
Entrance Sensor (When Sleep)	Cover/uncover each Sensor by a Banknote, and confirm the Sensor detects Banknote existence properly		
Exit Sensor			
Pusher Home Sensor	The Sensor detects that the Pusher Mechanism is at a Home Position or not		
Centering Home Sensor	The Sensor detects that the Centering Mechanism is at Home Position or not		
Validation Sensor	Cover/uncover each Sensor by a Banknote, and confirm the Sensor detects Banknote existence properly		
Validation Reference Sensor			

1. Launch the Performance Test Main Screen (refer to Figure 6-48 “Performance Test Main Screen” on page 6-10).
2. Click the “Performance Test” Pull-down Menu and select the “SENSOR\_TEST” (Figure 6-55 a).

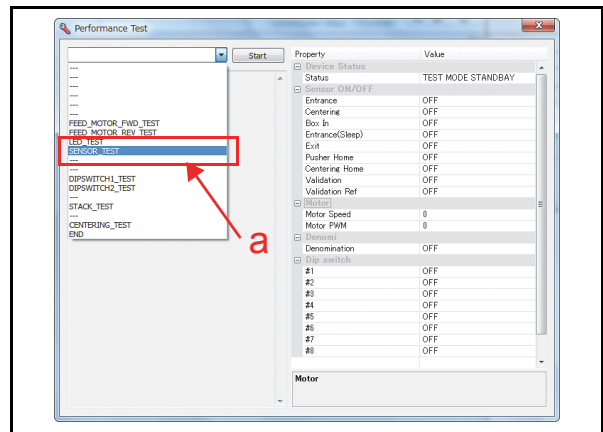

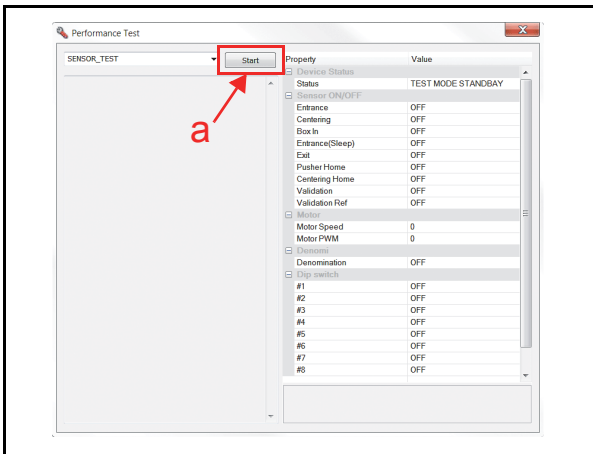



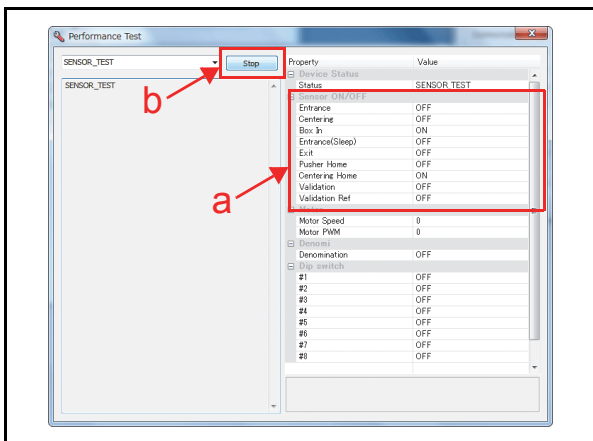
Figure 6-55 Sensor Test Selection

3. Click the “Start”  Screen Button (Figure 6-56 a) to begin the test.



**Figure 6-56** Sensor Test Start Button

4. Confirm that the PC Screen ON/OFF indication (Detected/NOT Detected) is changing each time when each Sensor is covered/uncovered by a banknote. The resulting condition will appear in the “Sensor ON/OFF” area (Figure 6-57 a).
5. Click the “Stop”  Screen Button (Figure 6-57 b) to end the test.

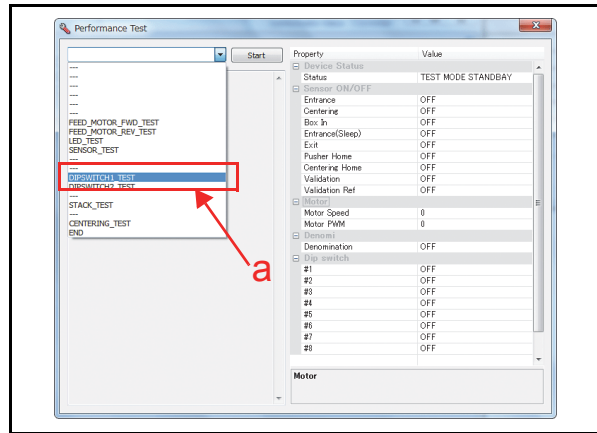


**Figure 6-57** Sensor Test Stop Button

### DIP SW1/SW2 Test

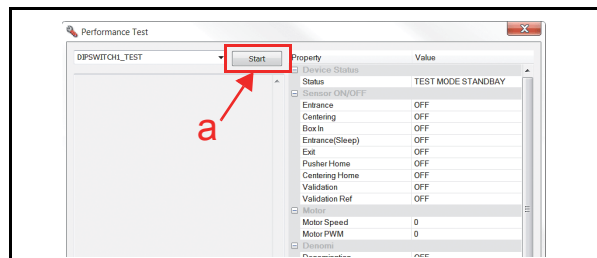
To perform the DIP SW1/SW2 Test, proceed as follows:

1. Launch the Performance Test Main Screen (See “Performance Test Main Screen” on page 6-10).
2. Click the “Performance Test” Pull-down Menu and select the “DIPSWITCH1\_TEST” or “DIP-SWITCH2\_TEST” (Figure 6-58 a).




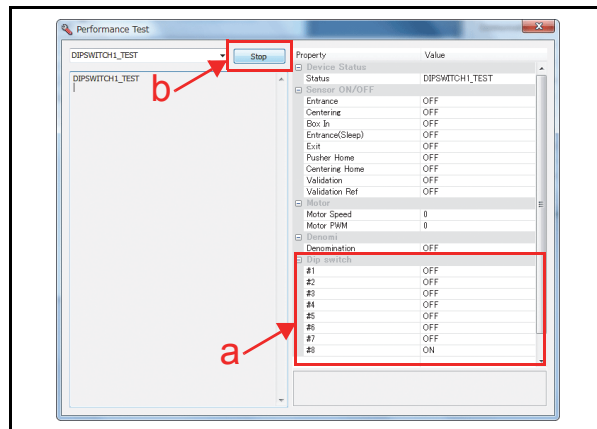
**Figure 6-58** DIP SW1/SW2 Test Selection

3. Click the “Start”  Screen Button (Figure 6-59 a) to begin the test.



**Figure 6-59** DIP SW Test Start Button

4. Set the DIP Switches to ON and OFF and confirm that each switch is performing normally. The resulting condition will appear in the DIP Switch area (Figure 6-60 a).
5. Click the “Stop”  Screen Button (Figure 6-60 b) to end the test.



**Figure 6-60** DIP SW Test Stop Button



### LED Test

To perform the LED Test, proceed as follows:

1. Launch the Performance Test Main Screen (Refer to “Performance Test Main Screen” on page 6-10).
2. Click the “Performance Test” Pull-down Menu and select the “LED\_TEST” (Figure 6-61 a).

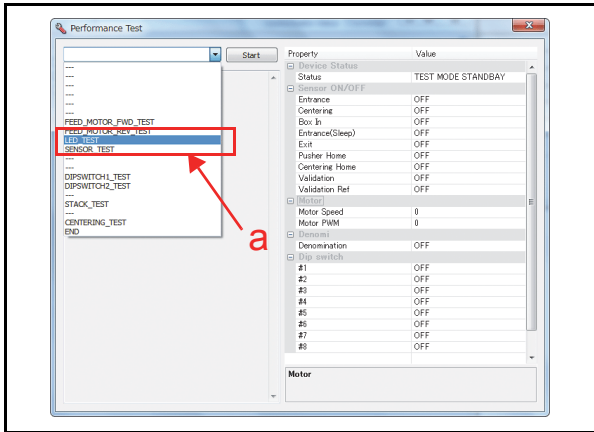


Figure 6-61 LED Test Selection

3. Click the “Start”  Screen Button (Figure 6-62 a) to begin the test.

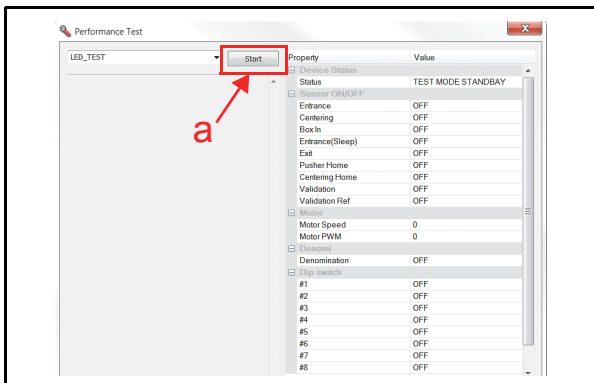


Figure 6-62 LED Test Start Button

4. Confirm that the LED flashes in the following color sequence, Red ■ => Green ■ => Blue ■ => Yellow ■ => Magenta ■ => Cyan ■ => White ■.
5. Click the “Stop”  Screen Button (Figure 6-63 a) to end the test.

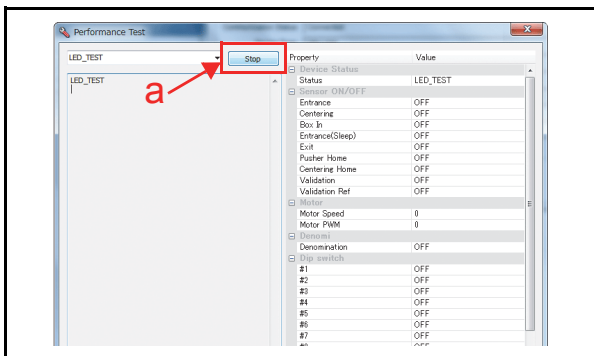


Figure 6-63 LED Test Stop Button

### Centering Movement Test

To perform the Centering Mechanism Movement Test, proceed as follows:

1. Launch the Performance Test Main Screen (Refer to “Performance Test Main Screen” on page 6-10).
2. Click the “Performance Test” Pull-down Menu and select the “CENTERING\_TEST” (Figure 6-64 a).

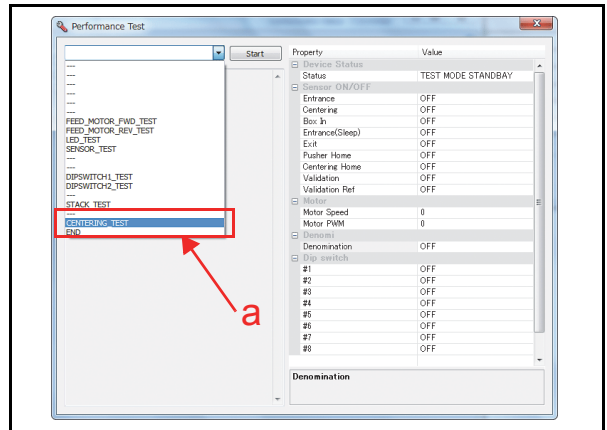


Figure 6-64 Centering Test Selection

3. Click the “Start”  Screen Button (Figure 6-65 a) to begin the test.

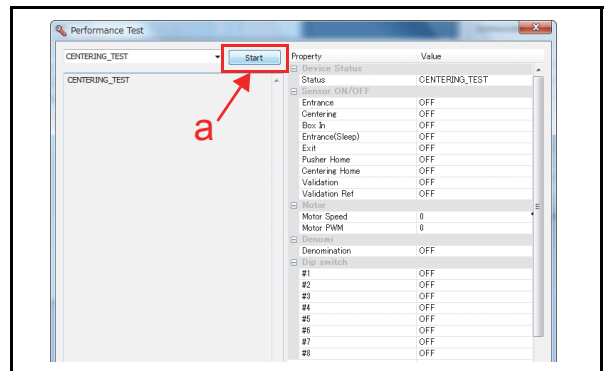


Figure 6-65 Centering Test Start Button

4. Confirm that the Centering Mechanism Movement performs normally.
5. Click the “Stop”  Screen Button (Figure 6-66 a) to end the test.

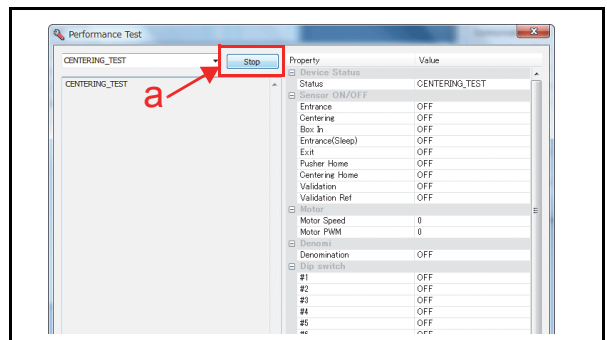


Figure 6-66 Centering Test Stop Button

### Performance Test without a PC

Table 6-3 lists the items and DIP Switch 1 settings for the DBV-500 Performance Test.

**Table 6-3** Performance Test Items and DIP Switch 1 Settings

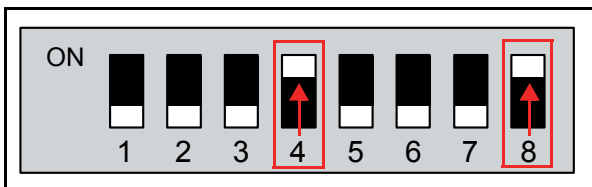
Test Item	DIP Switch Setting								Test Purpose
	1	2	3	4	5	6	7	8*	
Transport Motor Normal Rotation	ON							ON/OFF	Speed Check while Normal Rotation
Transport Motor Reverse Rotation		ON						ON/OFF	Speed Check while Reverse Rotation
Stacking			ON					ON/OFF	Stacking Mechanism Movement Check at 3 seconds intervals
Aging Test				ON				ON/OFF	Aging Movement Check at intervals set by DIP SW1 #6 & #7
Centering Mechanism	ON				ON			ON/OFF	Centering Mechanism Movement Check at 3 seconds intervals
Sensor Test							ON	ON/OFF	Each Sensor Performance Check
Acceptance Test (with Validation)	ON	ON	ON	ON				ON/OFF	Acceptance Check with Validation
Acceptance Test (without Validation)	ON	ON	ON	ON		ON		ON/OFF	Acceptance Check without Validation
Reject Test (without Validation)	ON	ON	ON	ON	ON		ON	ON/OFF	Reject Check without Validation
DIP Switch 1 Test	ON	ON	ON	ON	ON	ON	ON	ON/OFF	DIP Switch 1 Performance Check
DIP Switch 2 Test		ON	ON	ON	ON	ON	ON	ON/OFF	DIP Switch 2 Performance Check
LED Test				ON	ON	ON	ON	ON/OFF	LED Performance Check

\*. DIP Switch 1 #8 Setting; OFF to start test, ON to stop test.

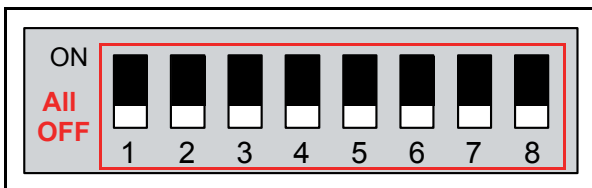
### Aging Test

To perform the Aging Test, proceed as follows:

1. Remove electrical power from the DBV-500-S Unit.
2. Set the DBV-500-S DIP SW1 #4 and #8 to **ON** (Figure 6-67) and the DIP SW2 switches all to **OFF** (Figure 6-68).



**Figure 6-67** Aging Test DIP SW1 Setting



**Figure 6-68** Aging Test DIP SW2 Setting

3. Connect the Power Harness and apply electrical power to the DBV-500-S Unit.
4. To start the Aging Test, set the DBV-500-S DIP SW1 #8 to **OFF** (Figure 6-69).



**Figure 6-69** DIP SW1 #8 OFF

5. Set the DBV-500-S DIP SW1 #6 and #7 (Figure 6-70). DIP SW1 #6 and #7 can be used to change interval timing of the Aging Test. (See Table 6-4 Aging Test Interval Timing Settings for Switch #6 and #7 settings for each interval.)



**Figure 6-70** DIP SW1 #6 and #7 ON

**Table 6-4** Aging Test Interval Timing Settings

#6	#7	Interval
OFF	OFF	30 seconds
ON	OFF	15 seconds
OFF	ON	2 seconds
ON	ON	10 seconds

6. Place the Cash Box onto the DBV-500-S Unit to begin the aging movement.
7. Remove the Cash Box and set the DIP SW1 #8 to **ON** to end the Aging Test.

This completes the Aging Test.

### Sensor Test

To perform the Sensor Test, proceed as follows:

1. Remove electrical power from the DBV-500-S Unit.
2. Set the DBV-500-S DIP SW1 #7 and #8 to **ON** (Figure 6-71) and the DIP SW2 switches all to **OFF** (Figure 6-72).

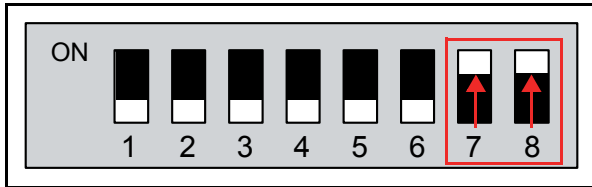


Figure 6-71 Sensor Test DIP SW1 Setting

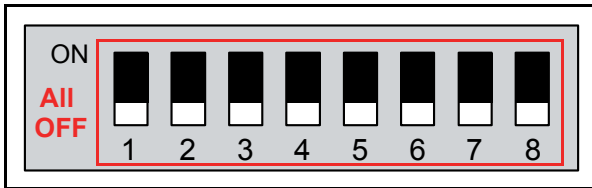


Figure 6-72 Sensor Test DIP SW2 Setting

3. Connect the Power Harness and apply electrical power to the DBV-500-S Unit. Then, confirm that the LED lights at a Green gradient color.
4. Set the DBV-500-S DIP SW1 #8 to **OFF** (Figure 6-73) and confirm that the LED flashes at a Purple color rate.

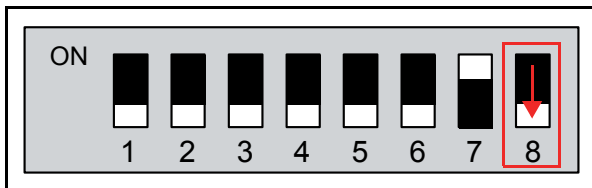


Figure 6-73 Sensor Test DIP SW1 #8 OFF

5. Block each Sensor and confirm the Bezel LED color changes to the correct color for the Sensor being tested according to Table 6-5.

Table 6-5 Sensor and LED Condition\*

Sensor Name	Condition	LED
Except following condition		OFF
Entrance Sensor	Cover each Sensor by a Banknote.	RED
Centering Start Sensor		GREEN
Validation Sensor		BLUE
Exit Sensor		YELLOW
Stacker Home Position Sensor	When the Pusher Plate is NOT at Home Position	MAGENTA
Centering Home Position Sensor	When the Centering Mechanism is NOT at Home Position	CYAN
Box In Sensor	Seat the Cash Box.	WHITE

\*. If multiple sensors are active, the status of the sensor with lowest priority is shown.

6. Set the DIP SW1 #8 to ON to end the test.  
This completes the Sensor Test.

### Acceptance Test

To perform the Acceptance Test, proceed as follows:

1. Remove electrical power from the DBV-500-S Unit.
2. Set the DBV-500-S DIP SW1 #1, #2, #3, #4 and #8 to **ON** (Figure 6-74) and the DIP SW2 all switches to **OFF** (Figure 6-75).

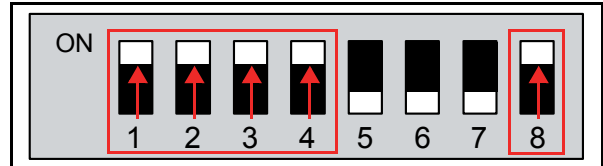


Figure 6-74 Acceptance Test DIP SW1 Setting

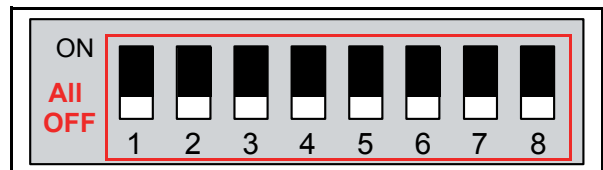


Figure 6-75 Acceptance Test DIP SW2 Setting

3. Apply electrical power to the DBV-500-S Unit and confirm that the LED lights at a Green gradient color.
4. Set the DBV-500-S DIP SW1 #8 to **OFF** (Figure 6-76) and confirm that the LED flashes at a Purple color rate.

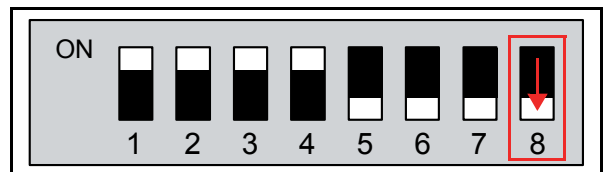


Figure 6-76 DIP SW1 #8 OFF

5. Place the Cash Box onto the DBV-500-S Unit.
6. Confirm that the DBV-500-S performs an initial-ization and goes to idle, waiting for a Banknote insertion. If errors occur, refer to Appendix A Table A-1.

This completes the Acceptance Test.

### LED Test

To perform the Sensor Test, proceed as follows:

1. Remove electrical power from the DBV-500-S Unit.
2. Set the DBV-500-S DIP SW1 #4, 5, 6, 7 and #8 to **ON** (Figure 6-77) and the DIP SW2 switches all to **OFF** (Figure 6-78).

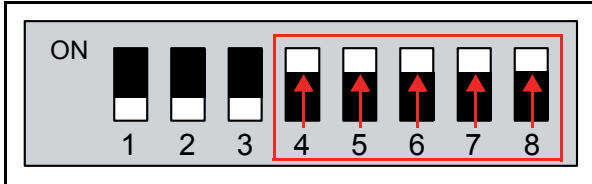


Figure 6-77 LED Test DIP SW1 Setting

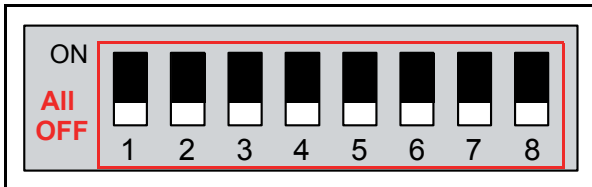


Figure 6-78 LED Test DIP SW2 Setting

3. Connect the Power Harness and apply electrical power to the DBV-500-S Unit. Then, confirm that the LED lights at a Green gradient color.
4. Set the DBV-500-S DIP SW1 #8 to **OFF** (Figure 6-79) and confirm that the LED flashes at a Purple color rate.

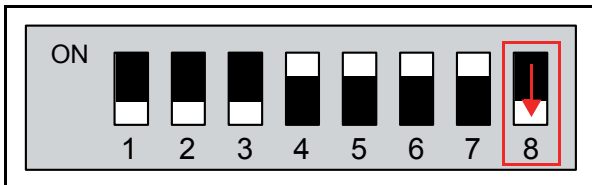


Figure 6-79 LED Test DIP SW1 #8 OFF

5. Confirm that the LED flashes in the following color sequence, Red ■ => Green ■ => Blue ■ => Yellow ■ => Magenta ■ => Cyan ■ => White ■.
6. Set the DIP SW1 #8 to ON to end the test.

This completes the LED Test.

### Other Performance Tests

To perform the other Performance Tests, proceed as follows:

1. Remove electrical power from the DBV-500-S Unit.
2. Set the DBV-500-S DIP SW1 #8 to **ON** (Figure 6-80) and the DIP SW2 switches all to **OFF** (Figure 6-81).

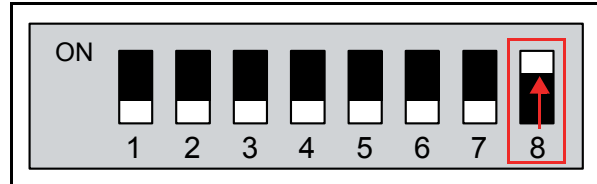


Figure 6-80 Other Tests DIP SW1 Setting

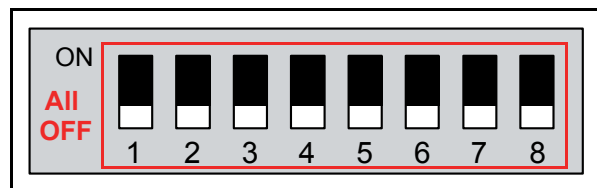


Figure 6-81 Other Tests DIP SW2 Setting

3. Connect the Power Harness and apply electrical power to the DBV-500-S Unit.
4. Select the desired Performance Test by setting the DIP Switches as indicated in Table 6-3.
5. Set the DIP SW1 #8 to **OFF** to start the test.

*NOTE: If any errors occur, refer to Table A-4 "LED Flash Error Codes" on page A-3*

6. Set the DIP SW1 #8 to ON to end the test.
- This completes the Performance Test.

# DBV® Series

## DBV-500-S Banknote Validator

### Section 7

#### 7 EXPLODED VIEWS & PARTS LISTS

This section provides product exploded views and parts lists for the DBV® Series Banknote Validator Unit (DBV-500-S). This section contains the following information:



**NOTE:** Parts may be changed for improvement without notice.

- DBV-500-S Entire Unit Exploded View
- DBV-500-S Main Unit Exploded View
- DBV-500-S Upper Guide Exploded View
- DBV-500-S Main Frame Exploded View
- DBV-500 Series Box Frame Unit Exploded View
- DBV-500 Series Cash Box Unit Exploded View
- DBV-500 Series Cash Box Option Parts Exploded View
- DBV-500-S Harness Parts List

#### DBV-500-S Entire Unit Exploded View

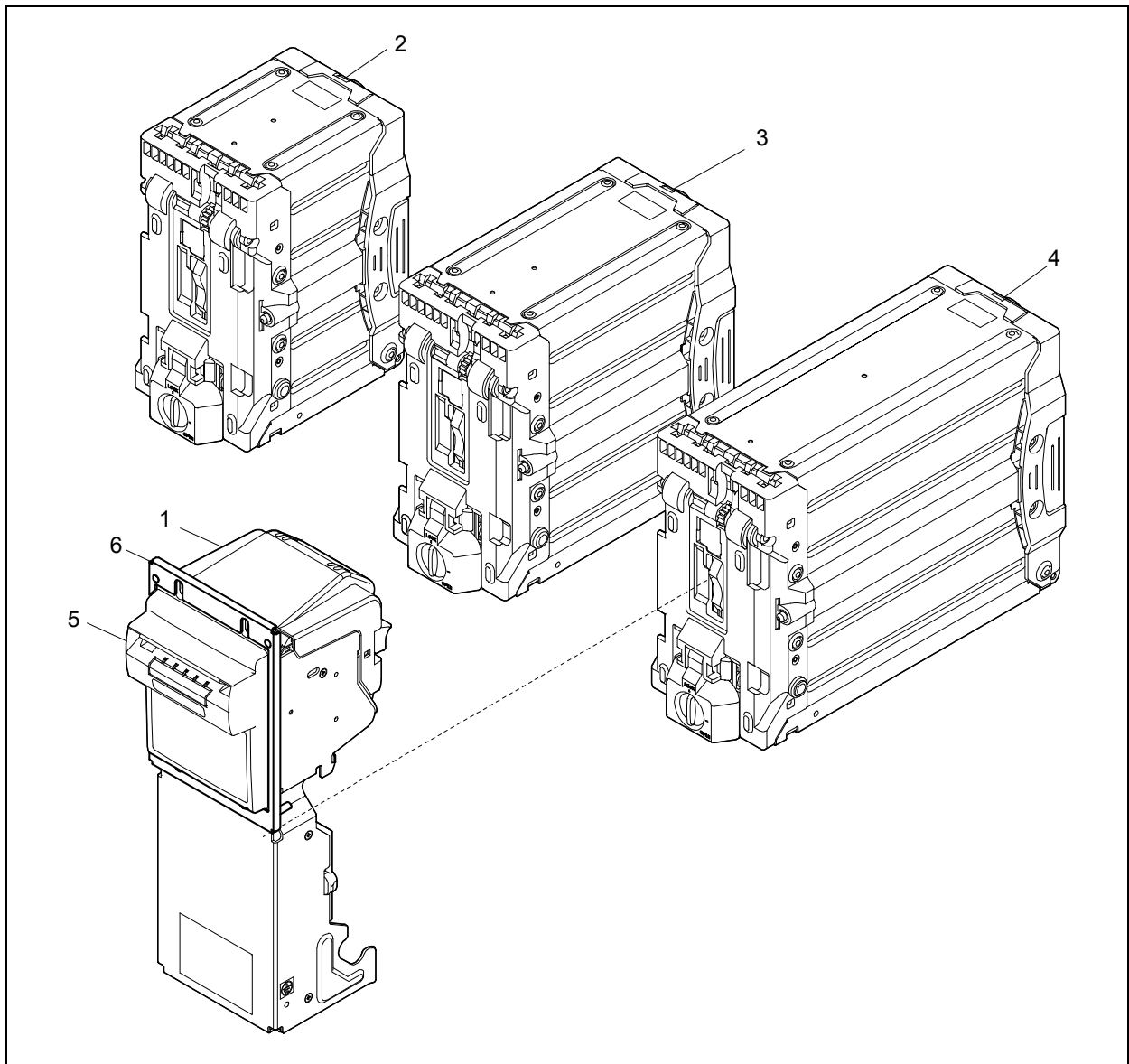


Figure 7-1 DBV-500-S Entire Unit Exploded View Diagram

**DBV-500-S Entire Unit Parts List****Table 7-1** DBV-500-S Entire Unit Parts List

Ref No.	EDP No.	Description	Qty	Remark
1	261499	DBV-500-S Unit (00000-010000-00)	1	
2	231591	Standard S-Box S0000 (Standard 500 note Cash Box) *	1	
	240913	177mm S-Box S0001 (177mm Specification 500 note Cash Box)	1	
3	231592	Standard M-Box M0000 (Standard 1000 note Cash Box)*	1	
	240914	177mm M-Box M0001 (177mm Specification 900 note Cash Box)	1	
4	231593	Standard L-Box L0000 (Standard 1400 note Cash Box)*	1	
	240915	177mm L-Box L0001 (177mm Specification 1300 note Cash Box)	1	
5	231594	DBV-500 Series Bezel Type A Assy. (SD/SU Compatible, CC Shape Bezel, 78mm, Black)	1	Bezel Type Description: 1 = Bezel Type A See Table 1-2 on page 1-2.
	231729	DBV-500 Series Bezel Type B Assy. (SD/SU Compatible, CC Shape Bezel, 71mm, Black)	1	Bezel Type Description: 2 = Bezel Type B See Table 1-2 on page 1-2.
6	234399	Panel Bracket	1	Panel Bracket Type Description: 1 = Type A (CC Installation) See Table 1-2 on page 1-2.

\*. Refer to "DBV-500 Series Cash Box Unit with option" on page 7-17 for a Cash Box with an option(s).

### DBV-500-S Main Unit Exploded View

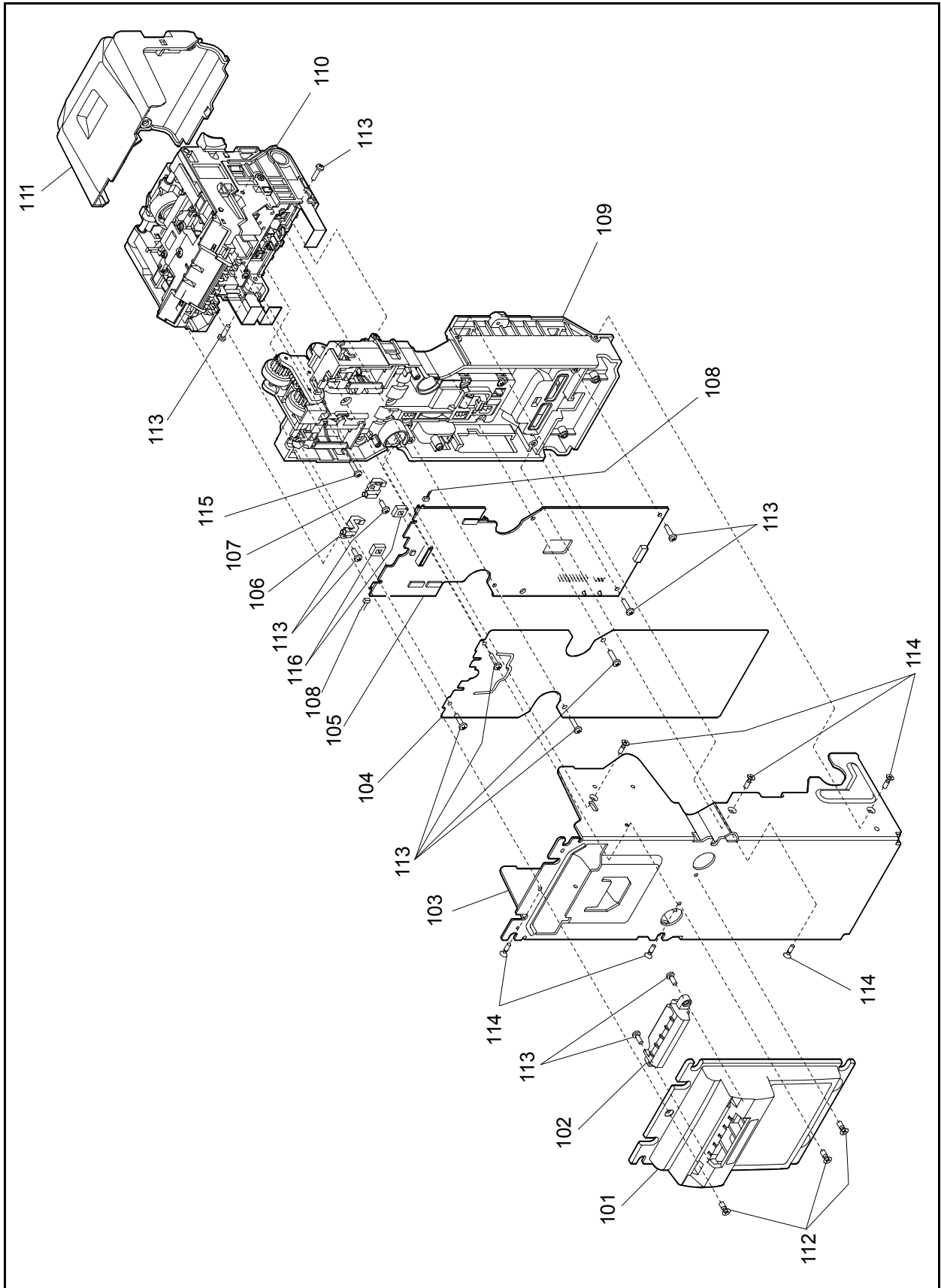


Figure 7-2 DBV-500-S Main Unit Exploded View

**DBV-500-S Main Unit Parts List****Table 7-2 DBV-500-S Main Unit Parts List**

Ref No.	EDP No.	Description	Qty	Remark
101	239924	Bezel Type A	1	
	239926	Bezel Type B	1	
102	239925	Bezel Type 1 Light Guide	1	
103	242893	Base Plate	1	
104	234394	CPU Protective Sheet	1	Service Part
105	261429	Main Board (CPU Board)*	1	Service Part
106	231428	Light Guide L	1	
107	231429	Light Guide R	1	
108	231532	Side Sensor Harness	2	
109	-	Main Frame Assembly	1	
110	-	Upper Guide Assembly	1	
111	254445	Upper Cover	1	
112	005769	M3x6 Flat Head Screw	3	
113	056165	2.6x8 Phillips, Self-Tapping, Binding Head Screw†	12	
114	189527	2.6x10 Phillips, Self-Tapping, Flat Head Screw†	6	
115	197914	2.6x12 Phillips, Self-Tapping, Binding Head Screw†	1	
116	237963	LED Sponge	2	Service Part

\*. Refer to "System Wiring Diagram" on page 5-1 for the Sensors mounted on the circuit board.

†. P-TITE is recommended.



### DBV-500-S Upper Guide Exploded View

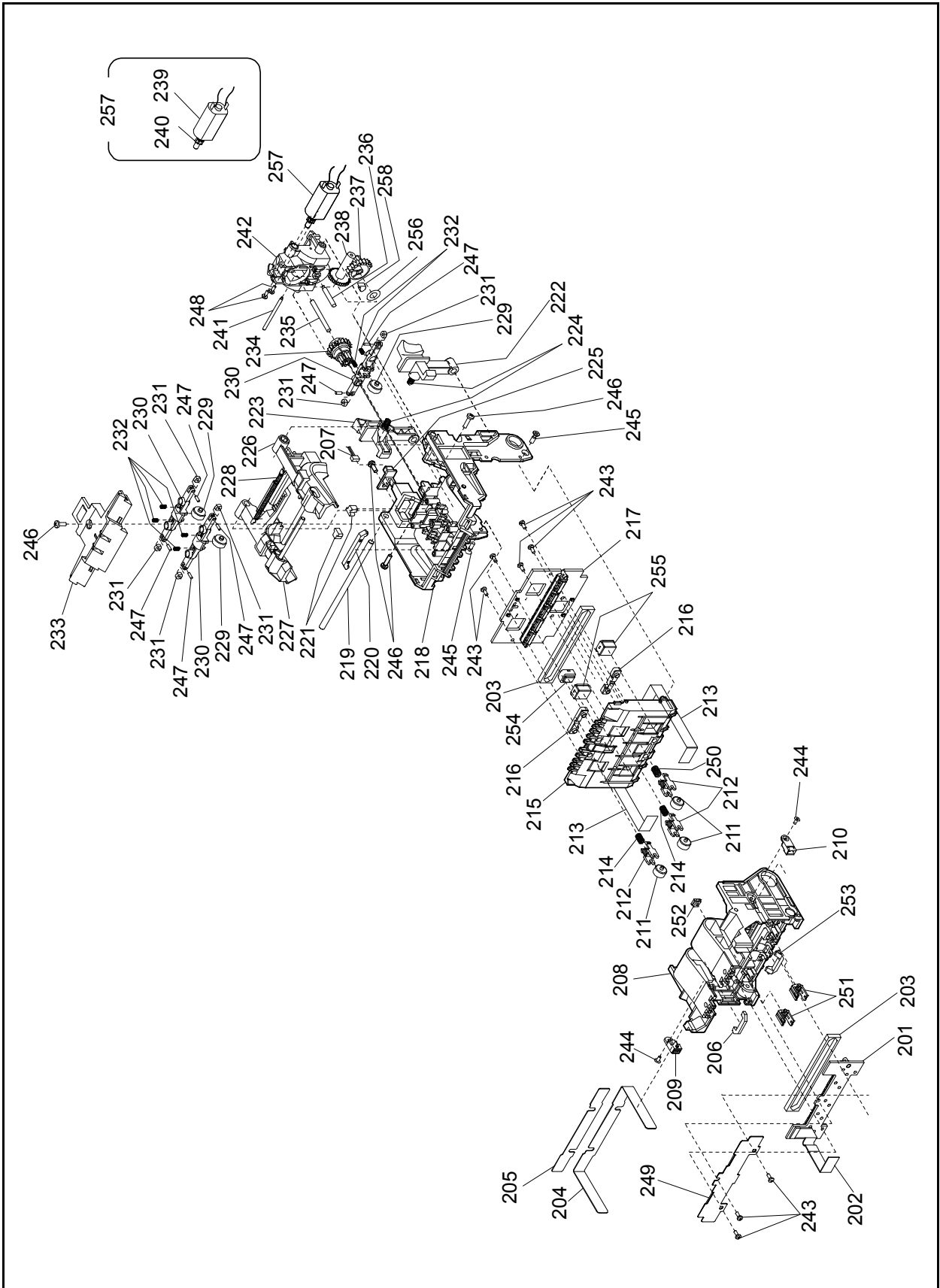


Figure 7-3 DBV-500-S Upper Guide Exploded View

**DBV-500-S Upper Guide Parts List****Table 7-3 DBV-500-S Upper Guide Parts List**

Ref No.	EDP No.	Description	Qty	Remark
201	237080	Inside Sensor Board *	1	Service Part
202	231530	Inside Sensor FFC	1	
203	231400	Seal Sponge	2	Service Part
204	239412	FFC Protective PT A	1	Service Part
205	239413	FFC Protective PT B	1	Service Part
206	231427	Prism B	1	
207	231533	Centering Home Sensor Harness	1	
208	254444	Lower Guide	1	
209	231521	Side Sensor (Light-Receiving)	1	Service Part
210	231516	Side Sensor (Emission)	1	Service Part
211	258167	φ9 Idle Roller	3	
212	236947	φ9 Idle Roller Bracket	3	
213	231531	Outside Sensor FFC	2	
214	231376	Transport Spring B 140	2	
215	254443	Upper Guide 2	1	
216	254448	Sensor Cover	2	
217	261430	Outside Sensor Board*	1	Service Part
218	258779	Upper Guide 1	1	
219	231462	Centering Shaft B	1	
220	231426	Prism A	1	
221	231435	Sound Silencer Block	2	
222	236945	Latch R	1	
223	236944	Latch L	1	
224	231377	Latch Spring	2	
225	116208	Centering Home Position Sensor	1	Service Part
226	236941	Centering Guide R Assembly	1	
227	236940	Centering Guide L Assembly	1	
228	259079	Centering Spring	1	
229	195230	Transport Roller URF	3	
230	239006	Centering Arm	3	
231	231458	Centering Arm Roller	6	
232	231375	Transport Spring A 70	6	
233	231432	Centering Cover	1	
234	254438	Centering GE Gear	1	
235	231463	Centering Shaft C	1	
236	231465	Centering Shaft E	1	
237	231387	Centering Gear C	1	
238	228507	Centering Gear 1	1	
239	235094	Centering Motor Harness Assembly	1	Service Part
240	231388	Centering Gear D	1	Press-in fit required for assembly
241	231464	Centering Shaft D	1	

**Table 7-3** DBV-500-S Upper Guide Parts List

Ref No.	EDP No.	Description	Qty	Remark
242	254446	Centering Bracket	1	
243	101172	2x6 Phillips, Self-Tapping, Binding Head Screw†	8	
244	231545	M2x4 Lamix Screw	2	
245	189527	2.6x10 Phillips, Self-Tapping, Flat Head Screw†	2	
246	056165	2.6x8 Phillips, Self-Tapping, Binding Head Screw†	4	
247	242623	Centering Shaft F	6	
248	051496	M2x5 W Washer (Small)	2	
249	254902	Shield Plate Assembly	1	
250	254903	Transport Spring C 400	1	
251	254450	MAG Partner	2	
252	254449	UV Partner	1	
253	254447	Prism C (Exit Sensor Prism)	1	
254	260189	UV Dummy Head	1	
255	254452	MAG Dummy Head	2	
256	023054	5.2x10x0.2 Poly Slider	1	
257	259076	Centering Motor Assy.	1	Service Part
258	239005	Rubber Bushing	1	

\*. Refer to "System Wiring Diagram" on page 5-1 for the Sensors mounted on the circuit board.

†. P-TITE is recommended.

### DBV-500-S Main Frame Exploded View

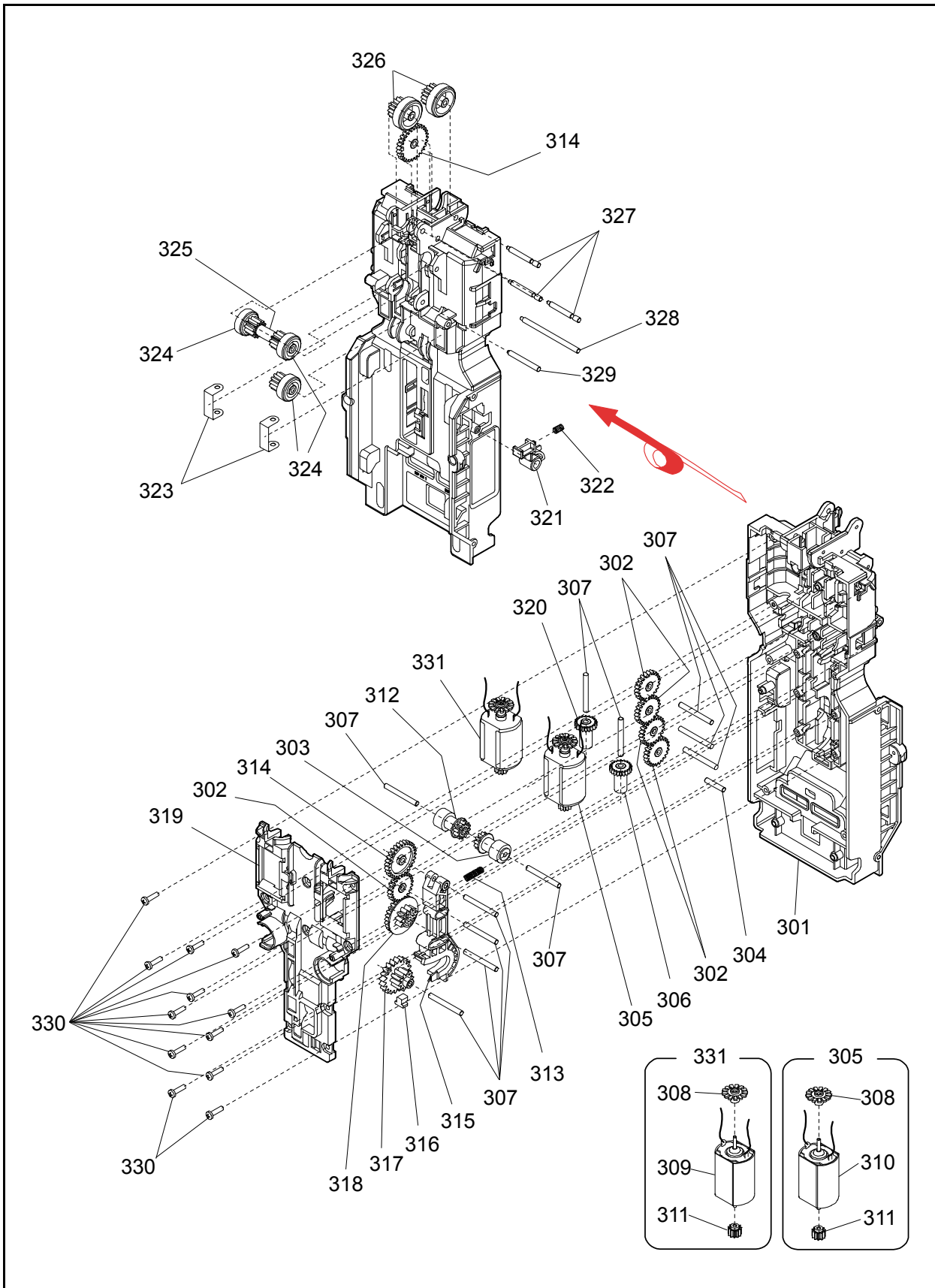


Figure 7-4 DBV-500-S Main Frame Exploded View

**DBV-500-S Main Frame Parts List****Table 7-4 DBV-500-S Main Frame Parts List**

Ref No.	EDP No.	Description	Qty	Remark
301	254441	Main Frame	1	
302	231389	Transport Gear A	5	
303	231393	Transport Worm Wheel	1	
304	231470	Transport Shaft E	1	
305	259078	Transport Motor Assy.	1	Service Part
306	239923	Transport Worm Gear	1	
307	231466	Transport Shaft A	11	
308	231424	Transport Stacker Encoder	2	
309	257723	Stacker Motor and Harness Assembly	1	
310	257722	Transport Motor and Harness Assembly	1	
311	242995	Transport Stacker Pinion Gear PPS	2	Press-in fit required for assembly
312	231397	Stacker Worm Wheel	1	
313	231378	Stacker Arm Spring	1	
314	231390	Transport Gear B	2	
315	236946	Stacker Arm	1	
316	231435	Sound Silencer Block	1	
317	231395	Stacker Gear B	1	
318	236948	Stacker Gear A	1	
319	242621	Transport Motor Cover	1	
320	242622	Stacker Worm Gear	1	
321	231431	Box DT Button	1	
322	231379	Box DT Spring	1	
323	231406	Worm Gear Holder	2	
324	239928	Transport Roller Gear B	3	
325	233091	Drive Pipe	1	
326	239927	Transport Roller Gear A	2	
327	254906	Transport Shaft D	3	
328	231467	Transport Shaft B	1	
329	234395	Transport Shaft C	1	
330	056165	2.6x8 Phillips, Self-Tapping, Binding Head Screw*	12	
331	259077	Stacker Motor Assy.	1	Service Part

\*. P-TITE is recommended.

### DBV-500 Series Box Frame Exploded View

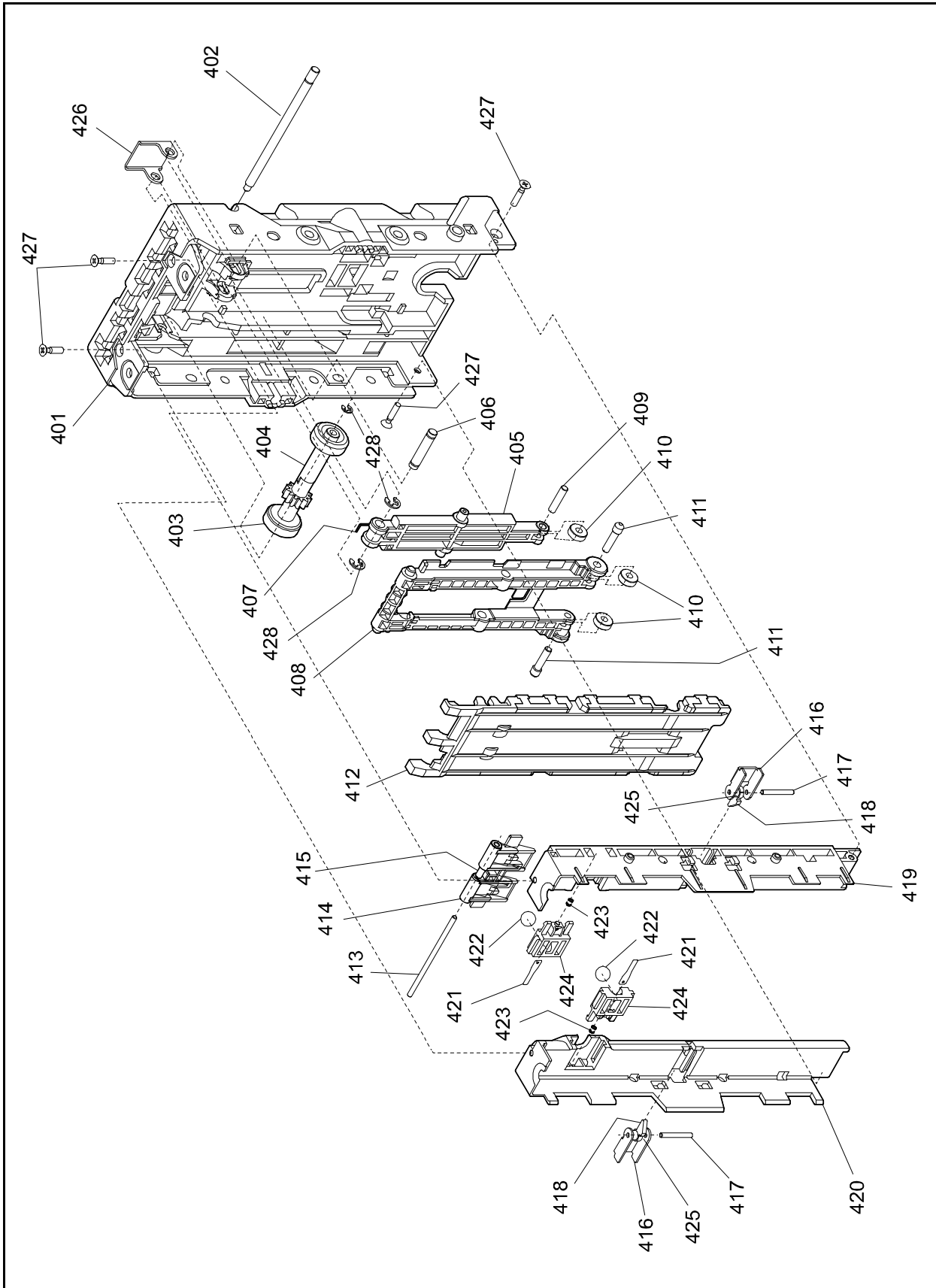


Figure 7-5 DBV-500 Series Box Frame Exploded View

**DBV-500 Series Box Frame Parts List****Table 7-5 DBV-500 Series Box Frame Parts List**

Ref No.	EDP No.	Description	Qty	Remark
401	257148	Box Frame A	1	
402	234403	Box Roller Shaft	1	
403	244544	Transport Roller Gear D	1	
404	242658	Transport Roller Gear C	1	
405	231444	Pusher Arm A	1	
406	231472	Pusher Arm Shaft	1	
407	257066	Box Arm Spring	1	
408	250881	Pusher Arm B AP	1	
409	231474	Pusher Shaft A	1	
410	231461	Pusher Roller	3	
411	231475	Pusher Shaft B	2	
412	231446	Pusher Plate	1	
413	231471	Lever Shaft	1	
414	257149	Pusher Lever	1	
415	231399	PB Arm Spring	1	
416	231412	Finger Bracket	2	
417	082680	φ2x16 Parallel Pin	2	
418	070742	ST Lever R	1	
419	237867	Box Transport Guide L	1	
420	237868	Box Transport Guide R	1	
421	231407	Ball Spring Plate	2	
422	236966	PA66 Ball (66 Nylon)	2	
423	231380	Ball Guide Spring	2	
424	237869	Ball Bracket	2	
425	070720	Stacker Lever Spring	2	
426	234043	Pusher Hinge Plate	1	
427	189527	2.6x10 Phillips, Self-Tapping, Flat Head Screw *	4	
428	003707	φ3 E-Ring	3	

\*. P-TITE is recommended.

### DBV-500 Series Cash Box Exploded View

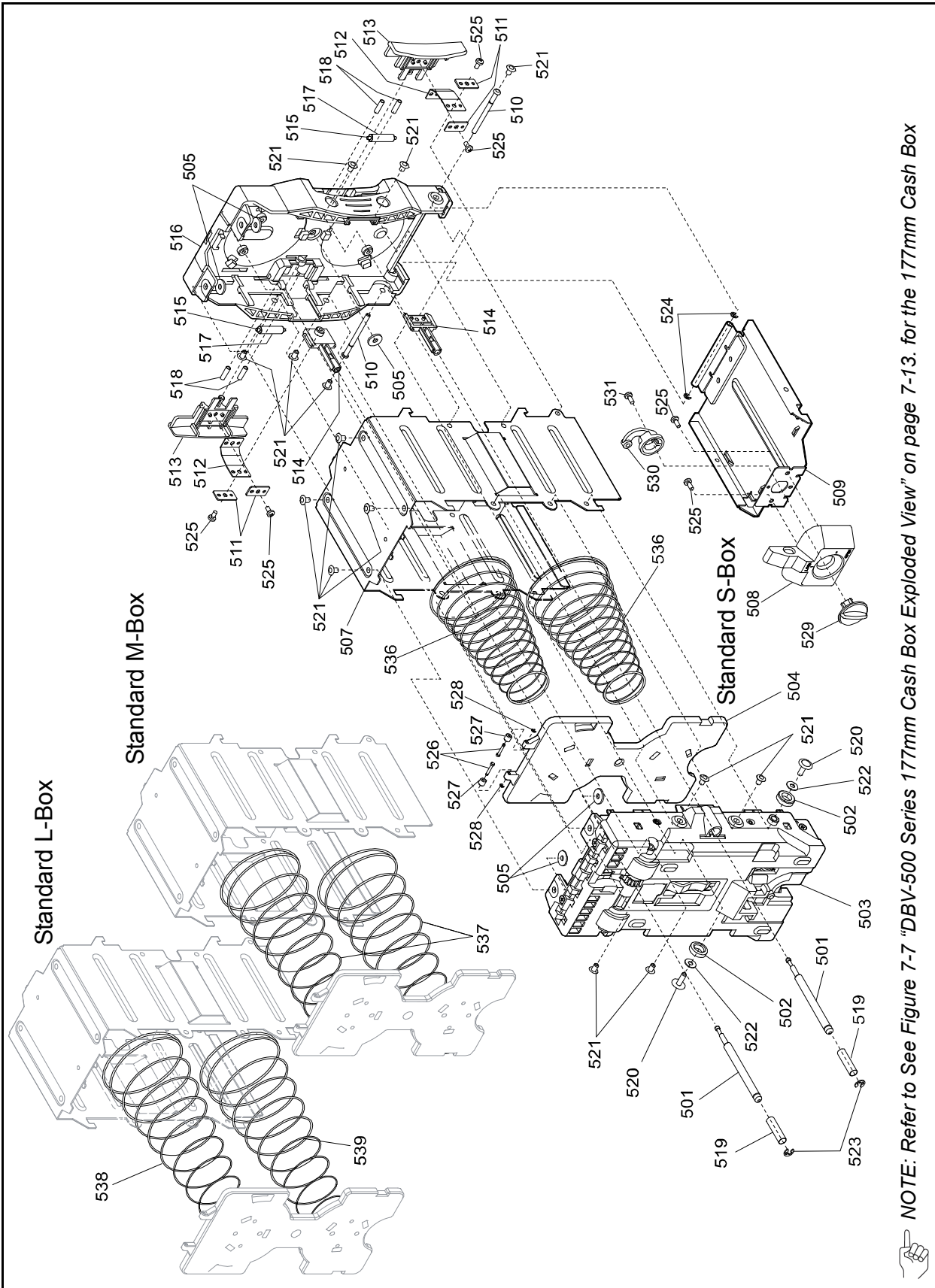


Figure 7-6 DBV-500 Series Standard Cash Box Exploded View



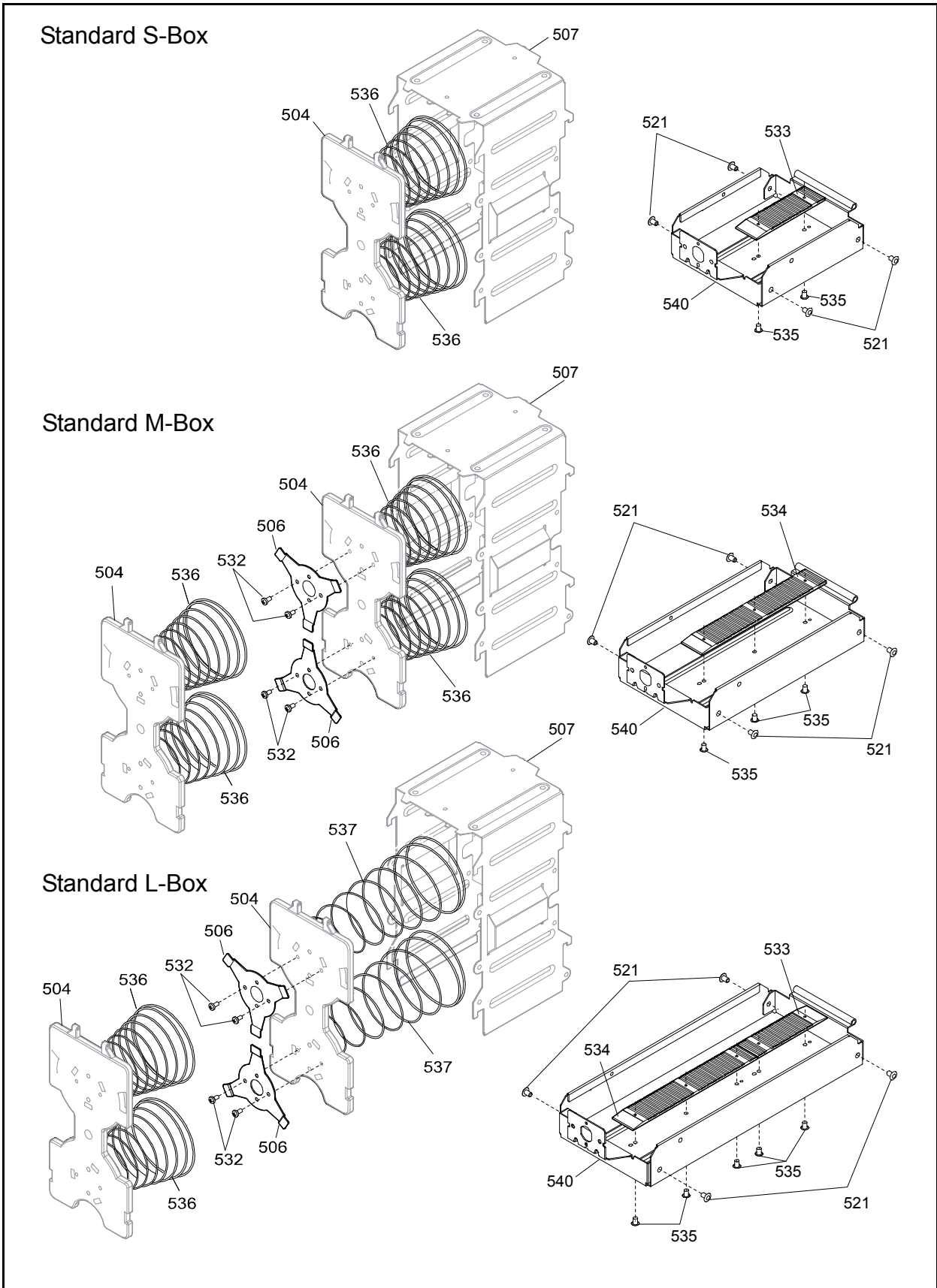


Figure 7-7 DBV-500 Series 177mm Cash Box Exploded View

**DBV-500 Series Cash Box Parts List****Table 7-6 DBV-500 Series Cash Box Parts List**

Ref No.	EDP No.	Description	Qty	Remark
501	231476	Lock Pin 500	2	For S-Box
	231479	Lock Pin 1000	2	For M-Box
	231480	Lock Pin 1500	2	For L-Box
502	231374	Rail Collar	2	
503	-	Box Frame A Assembly	1	
504	253848	Receive Plate	1	For Standard Cash Box and 177mm S-Box
			2	For 177mm M-Box and 177mm L-Box
505	231409	φ10 Washer Plate	5	
506	253396	Relay Plate	2	For 177mm M-Box and 177mm L-Box
507	242894	Box Frame 500 Assembly	1	For S-Box
	242896	Box Frame 1000 Assembly	1	For M-Box
	257460	Box Frame 1500 Assembly	1	For L-Box
508	257712	Key Bracket	1	
509	242895	Box Door 500 Assembly	1	For Standard S-Box
	242897	Box Door 1000 Assembly	1	For Standard M-Box
	257461	Box Door 1500 Assembly	1	For Standard L-Box
510	252760	Hinge Pin	2	
511	231408	Sheet Holder	4	
512	231404	Latch Sheet	2	
513	236965	Latch Button B	2	
514	236964	Latch Button A	2	
515	234402	Latch Button Shaft	2	
516	236961	Box Frame B	1	
517	234406	Sheet Collar	2	
518	231381	Box Latch Spring A	4	
519	231382	Box Latch Spring B	2	
520	234405	Shield Type Blind Rivet (AD-44)	2	
521	040464	Shield Type Blind Rivet (AD-42)	14	For Standard Box
			18	For 177mm Box
522	234787	φ3.3x8x0.5 Flat Washer	2	
523	003707	φ3 E-Ring	2	
524	003705	φ2 E-Ring	2	
525	063250	2.6x6 Phillips, Self-Tapping, Binding Head Screw*	6	
526	257150	Receive Plate Shaft	2	
			4	For 177mm M-Box and 177mm L-Box
527	236967	Receive Plate Roller	2	
528	236969	φ1.2 E-Ring	2	For 177mm M-Box and 177mm L-Box
			4	
529	236971	Door Lock A	1	

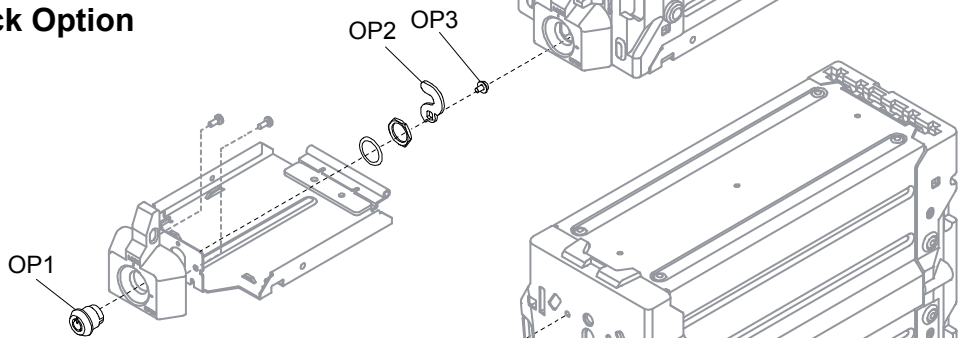
**Table 7-6** DBV-500 Series Cash Box Parts List

Ref No.	EDP No.	Description	Qty	Remark
530	236972	Door Lock B	1	
531	056165	2.6x8 Phillips, Self-Tapping, Binding Head Screw *	1	
532	104416	2.6x5 Phillips, Self-Tapping, Binding Head Screw *	4	For 177mm M-Box and 177mm L-Box
533	250882	Uneven Plate Small	1	For 177mm S-Box and 177mm L-Box
534	250883	Uneven Plate Medium	1	For 177mm M-Box and 177mm L-Box
535	253840	2x3 Lamix PS-TITE	2	For 177mm S-Box
			3	For 177mm M-Box
			5	For 177mm L-Box
536	231383	Box 500 Spring	2	For Standard Cash Box, 177mm S-Box and 177mm L-Box
			4	For 177mm M-Box
537	231385	Box 1000 Spring	2	For Standard M-Box and 177mm L-Box
538	231386	Box 1500 Spring	1	For Standard L-Box
539	244604	Box 1500 Spring 2	1	For Standard L-Box
540	253844	Box Door 177mm S-Box Assembly	1	For 177mm S-Box
	253845	Box Door 177mm M-Box Assembly	1	For 177mm M-Box
	253846	Box Door 177mm L-Box Assembly	1	For 177mm L-Box

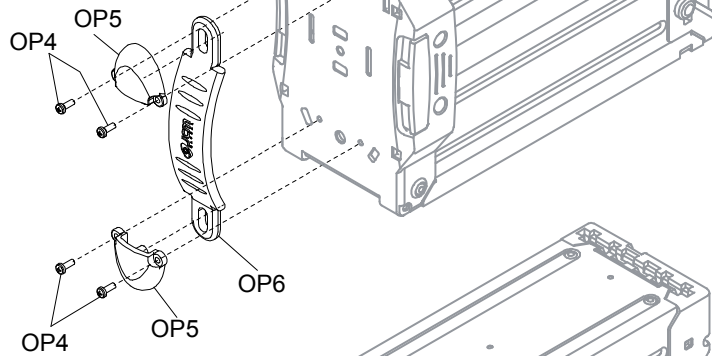
\*. P-TITE is recommended.

### DBV-500 Series Cash Box Option Parts Exploded View

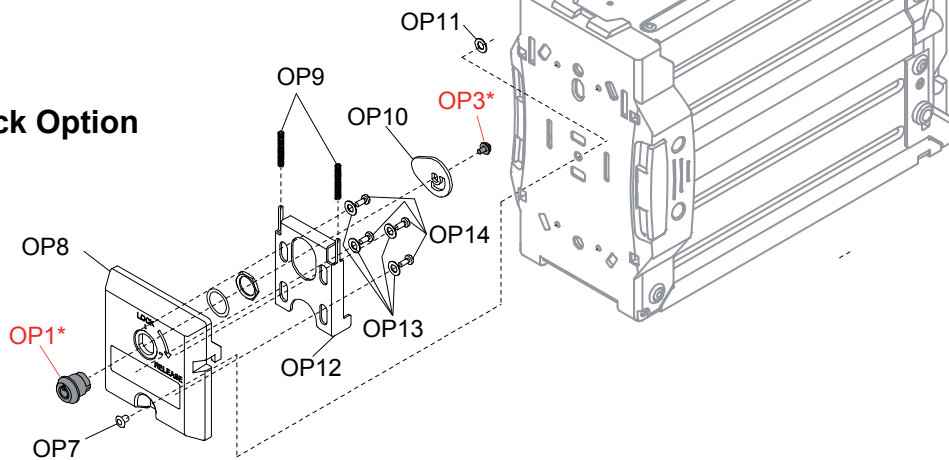
#### Door Lock Option



#### Handle Option



#### Frame Lock Option



\*. A Lock OP1 and a Screw OP3 are not included in the Frame Lock Option.

Figure 7-8 DBV-500 Series Cash Box Option Parts Exploded View

**DBV-500 Series Cash Box Option Parts List****Table 7-7 DBV-500 Series Cash Box Option Parts List**

Ref No.	EDP No.	Description	Qty	Remark
OP1*	152089	Lock (Designated)	2	For S-Box S3100 (with Handle and Door Lock options)
	026378	Lock (Undesignated)	2	
OP2	231410	Door Lock Tang	1	For Door Lock option
OP3	025196	M2.6x6 W Washer (Large)	1	For Door Lock option
OP4	231601	3x8 Phillips, Self-Tapping, Binding Head Screw (Black)†	4	For Handle option
OP5	147947	Handle Cover	2	For Handle option
OP6	231599	D500 Handle	1	For Handle option Cash Box Handle Type Description: 1 = Handle Type A See Table 1-2 on page 1-2.
OP7	237783	TAP-D48HR Rivet	1	For Frame Lock option
OP8	236970	Box Lock Bracket	1	For Frame Lock option
OP9	231384	Box Lock Spring	2	For Frame Lock option
OP10	231413	Box Lock Tang	1	For Frame Lock option
OP11	231409	φ10 Washer PT	1	For Frame Lock option
OP12	231411	Box Lock Plate	1	For Frame Lock option
OP13	000756	φ4x8x0.5 Flat Washer	4	For Frame Lock option
OP14	063250	2.6x6 Phillips, Self-Tapping, Binding Head Screw†	4	For Frame Lock option

\*. Make sure that the correct Lock specification for the Unit is selected. Refer to "Lock Dimension Reference" on page 2-2 for the lock dimension.

†. P-TITE is recommended.

The following DBV-500 Series Cash Box Units with an option(s) are available:

**Table 7-8 DBV-500 Series Cash Box Unit with option**

EDP No.	Description	Qty	Remark
243101	S-Box S1100 (with Handle option)	1	
240919	S-Box S1101 (with Handle option)	1	
239054	S-Box S3100 (with Handle and Door Lock options)	1	
238412	S-Box S4100 (with Handle and Door Lock options)	1	
243102	M-Box M1100 (with Handle option)	1	
240920	M-Box M1101 (with Handle option)	1	
238411	M-Box M4100 (with Handle and Door Lock options)	1	
243103	L-Box L1100 (with Handle option)	1	
240921	L-Box L1101 (with Handle option)	1	
238410	L-Box L4100 (with Handle and Door Lock options)	1	

**DBV-500-S Harness Parts List****Table 7-9 DBV-500-S Harness Parts List**

EDP No.	Description	Qty	Remark
231528	External Connection Harness A (3521-05-001 CPU Board Interface Harness)	1	External Connection Harness A Type Description: 1 = Standard Harness See Table 1-2 on page 1-2.
260563	External Connection Harness A (3521-05-010 USB Interface Harness)	1	External Connection Harness A Type Description: 2 = USB Interface Harness See Table 1-2 on page 1-2.
231529	External Connection Harness B (3521-05-002 CPU Board Power Supply Harness)	1	External Connection Harness B Type Description: 1 = Standard Harness See Table 1-2 on page 1-2.

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# DBV® Series

## DBV-500-S Banknote Validator

### Section 8

## 8 INDEX

### B

Banknote Jam  
clearing a ...2-11

### C

Calibration  
Methods of ...6-5  
Cleaning  
methods of, and equipment required for ...2-12  
Contact Information  
Address and Telephone Numbers for ...1-12, 3-1

### D

DBV-500-S  
photo of a ...1-1  
Dimensions  
entire unit clearance  
illustrated drawing for ...1-8  
Disassembly/Reassembly  
instructions for ...4-1

### E

Exploded View  
illustrations of ...7-1

### F

Fault Table  
table listings of ...A-1  
Flowchart  
Operational  
symbol language describing flow functions ...2-21

### I

Installation  
steps required for ...2-1

### M

Model Descriptions  
Product Number Specifications of ...1-2

### N

Navigation  
within manual  
procedure for ...1-1

### P

PC Calibration  
Preparation for ...6-6  
Performance Tests  
instructions for ...6-9  
Precautionary Symbols  
types of ...1-3  
Primary Features  
DBV-500-S  
DBV Product Series of ...1-4

### S

Safety  
pictographs indicating  
1 to 3 symbols inside boxed area ...1-1  
Software Descriptions  
Product Number Specifications of ...1-2  
Special Notes  
italic text highlights  
finger points to ...1-1  
Steps  
sequential numbering of ...1-1

### T

Tool Requirements  
workbench ...4-1  
Troubleshooting  
Instructions for ...A-1  
Type Descriptions  
Product Number Specifications of ...1-2

### W

Wiring Diagram  
system & individual primary part ...5-1

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# DBV® Series

## DBV-500-S Banknote Validator

### Appendix A

## A TROUBLESHOOTING

This section provides troubleshooting instructions for the DBV® Series DBV-500-S Banknote Validator Unit, including the following information:

- Introduction
- Troubleshooting Overview
- Fault Table Listings
- LED Indication Conditions

### Introduction

Most Banknote Validator failures result from minor causes. Before replacing any parts, be sure that all assembly and circuit board connectors are properly fitted with their harnesses properly connected.

Poor performance by the DBV-500-S Banknote Validator is often caused when dust or foreign objects adhere to the sensors or rollers. Clean the Banknote validation section first, then carefully observe the operating state of the Validator when re-initializing power. This observation is important

in locating any causes of failure and the possible fault location.

Perform all repairs by referring to Calibration and Testing in Section 6 of this Manual, and the Disassembly/Reassembly instructions in Section 4 of this Manual.

### Troubleshooting Overview

This product allows the operator to perform fault diagnosis by checking various Fault Table Listings against the symptoms. Survey the cause(s) of any failure occurrences during the process.

After determining the cause of the failure, execute the Performance Test, and then repair the unit replacing any appropriate parts deemed necessary.

### Fault Table Listings

Table A-1, Table A-2 and Table A-3 list the various possible DBV-500-S Unit fault conditions that can occur and the necessary actions required to correct them.

**Table A-1** General Fault Conditions

Symptoms/Error Messages	Possible Fault Causes	Corrective Action Required
Banknote Validator is not working (does not accept any Banknotes)	No external Power is applied to the Banknote Validator (+12/24V DC & GND)	Verify that the Power Supply +12/24V DC and Ground Cables are connected to their appropriate Pins on the main connector.
	Wrong or inappropriate connections	Verify that all Harness Connectors are properly connected. Check for any bent, missing or damaged Pins in the Connector Plugs and mating Receptacles.
	Corrupted Software	Re-download the correct Software.
	CPU Board failure	Conduct an Initial Performance Test. If the test result is Negative (NG), replace the CPU Board. Make sure to re-calibrate the Sensors after CPU Board is replaced.
Banknote jams occur often	A Pressure Roller is dirty or damaged	Clean all Pressure Rollers. Replace as necessary.
	A pressure Roller Spring is loose or missing	Check all Pressure Roller Springs using a finger pressure test. Replace as necessary.
	A foreign object is lodged in the Transport path and/or inside the Cash Box	Clean the Transport path and remove any foreign object discovered.
	The Validator Unit is not properly set	Ensure the Upper Guide Latches are secure and the Cash Box is properly seated.
	The Banknote width is out of specification (Banknote is wider than 78 mm or narrower than 60mm)	Use only Banknotes widths having the correct DBV-500-S Unit's size specifications.
Acceptance rate is degraded	Dirt and/or stains on the Rollers and Lenses	Clean the Transport path. Refer to "Sensor and Roller Cleaning Procedure" on page 2-12.
	The Unit has been disassembled, and calibration adjustments have not occurred following a reassembly	Re-calibrate the Sensors after reassembling the DBV-500-S Unit.

Table A-1 General Fault Conditions (Continued)

Symptoms/Error Messages	Possible Fault Causes	Corrective Action Required
Acceptance rate is degraded	The wrong Software version or an older Software version is being used	Make sure that the programmed Software is the latest version, and it supports the Currency values for the specific Country (e.g., check denomination/issuing year).
	Software not designed to accept current Banknotes	Check the particular specifications for the required Banknote Type Acceptance, and make sure the Banknotes will be accepted by the Software loaded (e.g., check denomination/issuing year).
All Banknotes being rejected	Incorrect software (different Currency type)	Download the correct Software for Currency being accepted.
	Banknotes are not being accepted by the Software	Make sure the Banknote values required are included in the Software Specifications (e.g., denominations/issuing year).
	Incorrect DIP Switch settings	Enable all denominations by setting all DIP Switches to OFF.
	Banknote acceptance is being inhibited by a Host Controller command	Enable Banknote acceptance for the required Host Command.
	Validation Sensor failure	Change the CPU Board and/or Sensor Board and calibrate.
	Unit was disassembled and calibration was not performed following reassembly	Calibrate all Sensors following reassembly.
Motor continues to run	Upper Guide is open	Firmly close the Upper Guide.
	A foreign object or a jammed Banknote is stuck in the Transport path	Open the Upper Guide, remove the foreign object or jammed Banknote, and close the Cover.
	Motor Drive failure	Conduct a Forward/Reverse Motor Rotation Test.
Can not enter the TEST mode	Incorrect DIP Switch settings	Set the DS1 DIP Switch No. 8 to ON, and reapply power to the DBV-500-S Unit.
	Dip Switch failure	See Section 6 of this manual regarding the DIP Switch Test, and conduct a DIP Switch TEST to check if the specific DIP Switch Block contains a failure.
	CPU Board failure	Exchange the CPU Circuit Board with a known good Circuit Board and calibrate.

## Adjustment Error

Table A-2 lists the various possible DBV-500-S Unit Adjustment fault conditions.



*NOTE: Adjustment Errors are the most common errors and occur during calibration.*

Table A-2 Adjustment Fault Conditions

Symptoms/Error Messages	Possible Fault Causes	Corrective Action Required
Can not start the "AdjustmentService_SuiteEdition.exe" from the JCM Tool Suite application by double-clicking on its icon	PC Operating System (OS) is not compatible	The current Adjustment program only supports the Windows® 7/8/10 Operating Systems.
	The Program Files are corrupted	Request the correct programs from JCM.
Communication Error	Wrong or inappropriate connections	Check the PC Harness connections and the related DBV-500-S Interface Connectors for damage. Check for any bent, missing or damaged Pins in the Connector Plugs and/or Receptacles.
	DBV-500-S Switch settings are incorrect	Reset the DBV-500-S DS1 DIP Switches #8 to ON (DIP Switch #1 through #7 settings are not specifically required). Apply power to the DBV-500-S Unit.
	DIP Switch failure	See Section 6 of this manual regarding DIP Switch settings and conduct a DIP Switch Test.
	CPU Board failure	Exchange the CPU Circuit Board with a known good Circuit Board.
Adjustment Error	Incorrect Reference Paper type	Follow the instructions provided in the "AdjustmentService_SuiteEdition.exe" from the JCM Tool Suite application and use the correct Reference Paper.
	Validation Sensor failure	Change the CPU Board and Sensor Board.

### Communication Error

Table A-3 lists the various possible DBV-500-S Unit Communication fault conditions.

**Table A-3** Communication Fault Conditions

Symptoms/Error Messages	Possible Fault Causes	Corrective Action Required
Cannot communicate with the Host Machine	DIP Switch settings are incorrect	Set all DIP Switches to OFF and then set the DIP Switch correctly while referring to the "Software Information Sheet".
	Connectors are off or loosely connected	Firmly connect all of the Communication Connectors.
	Damaged Connector Pins	Check for any bent, missing or damaged Pins in the Connector Plugs and mating Receptacles.
	CPU Board is corrupted	Exchange the CPU Circuit Board with a known good Circuit Board.
	Incorrect Interface	Verify that the correct interface between the Host Machine and the Banknote Validator is being used.

### LED Indication Conditions

The External LED Display indicates various combinations of solid or alternating Color light flashing conditions when any of the Standard Errors listed in Table A-4 occur.

Identify the cause and solution for an indicated error by comparing it against each listing in Table A-4.



*NOTE: The Error Codes flash different patterns when in the normal operation mode (communicating with the Host Machine) or when performing the Performance Tests. The LED shows more detailed flash patterns while running the Performance Test to identify the specific error causes.*

### LED Flash Error Code Conditions

Table A-4 lists the various LED Flash Error Code causes and solutions for Banknotes.

**Table A-4** LED Flash Error Codes

Normal Operation	Performance Test	Error	Causes and Solutions
LED Sequence	LED Sequence		
White (3)	White (1)	External Flash ROM Boot Program ROM Check Error	The Boot Program that is supposed to run after Power is applied is not correctly written in ROM, or it cannot be read. [Solution] Check that the following part is properly assembled and/or Harness connected. [Relative Parts] CPU Circuit Board. If the error is not resolved, change the above related part or parts and calibrate the unit.
White (3)	White (2)	External Flash ROM Boot I/F Area ROM Check Error	The Boot Interface Area was not written correctly or cannot be read. [Solution] Re-download the Program. If the error is not resolved, check that the following part is assembled and/or Harness connected. [Relative Parts] CPU Circuit Board. If the error is not resolved, change the above related part or parts and calibrate the unit.
		External Flash ROM Main Program ROM Check Error	The Main Operating Program is not written into the ROM correctly, or cannot be read. [Solution] Re-download the Program. If the error is not resolved, check that the following part is properly assembled and/or Harness connected. [Relative Parts] CPU Circuit Board. If the error is not resolved, change the above related part or parts and calibrate the unit.
White (3)	White (3)	CPU Internal RAM Check Error	RAM reading or writing was not properly performed. [Solution] Check that the following part is properly assembled and/or Harness connected. [Relative Parts] CPU Circuit Board. If the error is not resolved, change the above related part or parts and calibrate the unit.
White (3)	White (4)	External SD-RAM Error	External SD-RAM reading or writing was not properly performed. [Solution] Check that the following part is properly assembled and/or Harness connected. [Relative Parts] CPU Circuit Board. If the error is not resolved, change the above related part or parts and calibrate the unit.

Table A-4 LED Flash Error Codes (Continued)

Normal Operation	Performance Test	Error	Causes and Solutions
LED Sequence	LED Sequence		
White (3)	White (5)	EEPROM Error	EEPROM reading, writing and/or saving was not properly performed. [Solution] Perform the Sensor Calibration procedure. If the error is not resolved, check that the following part is properly assembled and/or Harness connected. Clean or adjust the following part. [Relative Parts] CPU Circuit Board. If the error is not resolved, change the above related part or parts and calibrate the unit.
White (3)	White (6)	Downloading File Error	Downloading files does not proceed. [Solution] Select a file supported by the DBV-500-S Unit.
White (3)	White (8)	I2C Access Error	While communicating with each device on the CPU Board, Sensors detect an abnormal operating condition. [Solution] Check that the following part is properly assembled and/or Harness connected. Clean the following part. [Relative Parts] CPU Circuit Board. If the error is not resolved, change the above related part or parts and calibrate the unit.
Red (3)	Red (1)	Stacker Motor Lock-Up	While operating the Stacker Motor, no pulse inputs occurred greater than the specified value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Stacker Motor, Stacker Encoder. If the error is not resolved, change the above related part or parts and calibrate the unit.
Red (3)	Red (2)	Pusher Mechanism Home Position Error	When stacking Banknotes, the Pusher Mechanism is not returning to the Home 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, Stacker Motor, Stacker Home Sensor, Stacker Motor Encoder. If the error is not resolved, change the above related part or parts and calibrate the unit.
Red (3)	Red (3)	Banknote Jam (Cash Box)	When transporting a Banknote in the Cash Box, the Sensors are not detecting a Banknote present condition when the time interval is too long, or the pulse number is greater than specified value for the function. [Solution] Remove Banknotes from the Cash Box. Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Exit Sensor, Pusher Mechanism, Stacker Motor, Stacker Home Sensor, Stacker Motor Encoder. If the error is not resolved, change the above related part or parts and calibrate the unit.
Red (3)	Red (4)	Feed Motor Speed Error	While Initializing, pulse input interval is less than the specified value. [Solution] Remove Banknotes from the DBV-500-S Unit. 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 and calibrate the unit.
Red (3)	Red (5)	Feed Motor Lock-Up	While operating the Feed Motor, no pulse inputs occurred greater than the specified 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 and calibrate the unit.
Red (3)	Red (6)	Centering Mechanism Movement	The Centering Guide has not moved. [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 Motor, Centering Guide Home Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Red (3)	Red (7)	Reserved	Contact your local JCM Representative if this error occurs.

**Table A-4 LED Flash Error Codes (Continued)**

Normal Operation	Performance Test	Error	Causes and Solutions
LED Sequence	LED Sequence		
Red (3)	Red (8)	Fraud Detection	<p>Sensors detect Banknotes occurring with abnormal timing.                      [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 Timing Sensor, Validation Sensor, Side Sensor, Exit Sensor, Feed Motor and Feed Motor Encoder.                      If the error is not resolved, change the above related part or parts and calibrate the unit.</p>
Purple (3)	Purple (1)	Cash Box Full	<p>Sensors detected that the Cash Box is full.                      [Solution] Remove Banknotes from the Cash Box.                      Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors.                      [Relative Parts] Pusher Mechanism, Stacker Motor, Stacker Home Sensor, Stacker Motor Encoder.                      If the error is not resolved, change the above related part or parts and calibrate the unit.</p>
Purple (3)	Purple (2)	Cash Box Removal	<p>The Cash Box has been removed.                      [Solution] Firmly re-seat the Cash Box.                      Check that the following part is properly assembled and/or Harness connected. Clean or adjust the following Sensor.                      [Relative Parts] Box Sensor.                      If the error is not resolved, change the above related part or parts and calibrate the unit.</p>
Purple (3)	Purple (3)	Banknote Jam (Transport Unit)	<p>When transporting or returning a Banknote in the Transport Unit, the Sensors detect an abnormal condition. The sensors did not detect a Banknote present condition when the time interval was too long, or the pulse number is greater than specified value for the function.                      [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 Timing Sensor, Validation Sensor, Side Sensor, Exit Sensor, Feed Motor, Feed Motor Encoder.                      If the error is not resolved, change the above related part or parts and calibrate the unit.</p>

## LED Flash Reject Code Conditions

Table A-5 lists the various LED Flash Reject Code causes and solutions for Banknotes.

**Table A-5** LED Flash Reject Codes

Normal Operation	Performance Test	Error	Causes and Solutions
LED Sequence	LED Sequence		
Yellow (3)	Yellow (2)	Magnification Error	Sensors detected improper levels. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 of this manual. [Relative Parts] Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Yellow (3)	Yellow (3)	Denomination Error	The Sensor detected an abnormal Banknote Type. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 of this manual. [Relative Parts] Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Yellow (3)	Yellow (4)	Pattern Error	The Sensor detected an abnormal Banknote Type. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 for unacceptable Banknote. [Relative Parts] Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Yellow (3)	Yellow (5)	Photo Level Error	While transporting a Banknote, improper sensor levels were detected. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 for unacceptable Banknote. [Relative Parts] Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Yellow (3)	Yellow (6)	Banknote Length Abnormal	The Sensors detected the Banknote length was longer or shorter than the specified value. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 for unacceptable Banknote. [Relative Parts] Rollers, Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Yellow (3)	Yellow (7)	Pattern Error 1	The Sensors detected an improper Banknote pattern. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 for unacceptable Banknote. [Relative Parts] Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Yellow (3)	Yellow (8)	Invalid Banknote Error	The Sensors detected the Banknote as invalid. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 for unacceptable Banknote. [Relative Parts] Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Yellow (3)	Yellow (9)	Pattern Error 2	The Sensors detected an improper Banknote pattern. [Solution] Clean the Banknote Path. Check that the Banknote is not damaged or exhibiting unfit conditions. Refer to "Banknote Fitness Requirements" on page 1-4 for unacceptable Banknote. [Relative Parts] Validation Sensor. If the error is not resolved, change the above related part or parts and calibrate the unit.
Green (3)	Green (1)	Skewed Insertion Error	The Banknote has been inserted in an incorrect/crooked direction. [Solution] Insert a Banknote in the proper alignment. Clean the Banknote Path and check the Centering Mechanism for proper operation. [Relative Parts] Centering Mechanism, Rollers. If the error is not resolved, change the above related part or parts.

**Table A-5 LED Flash Reject Codes (Continued)**

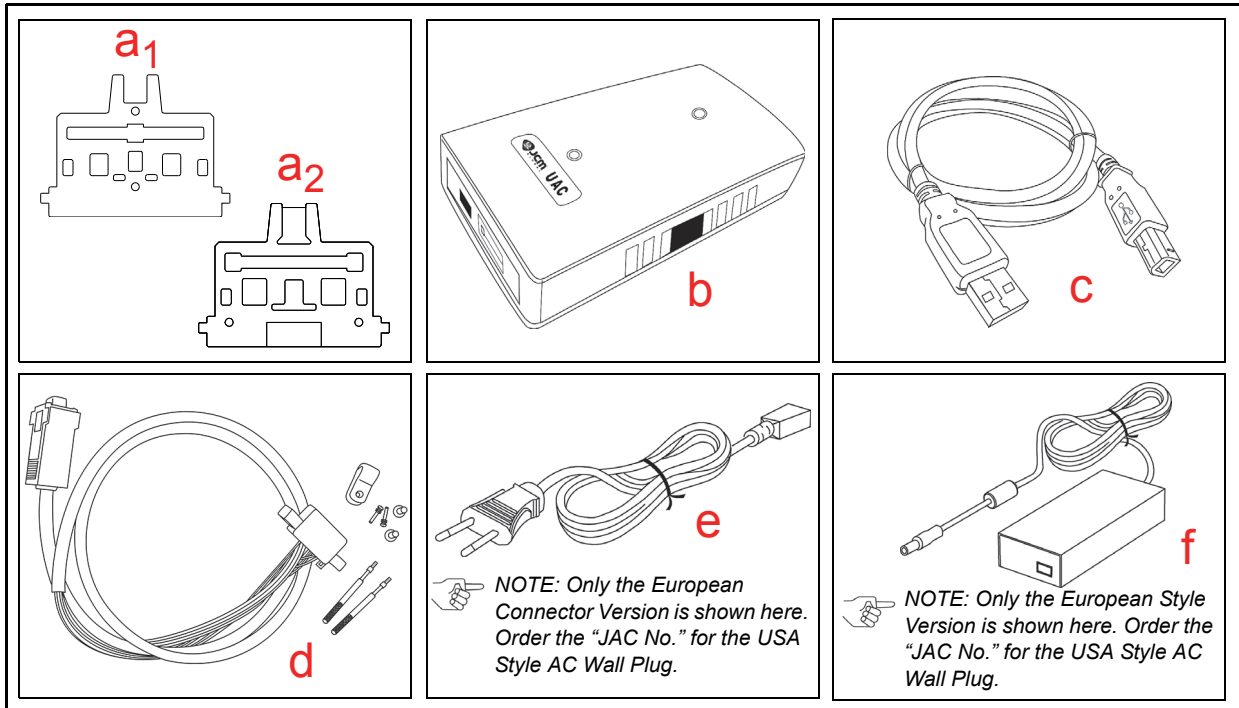
Normal Operation	Performance Test	Error	Causes and Solutions
LED Sequence	LED Sequence		
Green (3)	Green (2)	Remaining Banknotes Returned	While initializing, a Banknote was detected in the Unit. [Solution] Clean or adjust the following parts. [Relative Parts] Centering Mechanism, Rollers, Validation Sensors. Entrance and Exit Sensors. If the error is not resolved, change the above related part or parts and calibrate the unit.
Green (3)	Green (3)	Transport Time-out Error	The Sensors detected improper movement of a Banknote. [Solution] Clean the Rollers and Banknote Path. [Relative Parts] Rollers, Sensors, Validation Sensors. If the error is not resolved, change the above related part or parts and calibrate the unit.
Green (3)	Green (4)	Banknote Detection Error	Sensors detected a Banknote with abnormal timing. [Solution] Clean debris from the Banknote Path. [Relative Parts] Entrance, Exit, Validation and Side Sensors. If the error is not resolved, change the above related part or parts and calibrate the unit.
Green (3)	Green (5)	Inhibit Setting Abnormal	The Banknote has been inhibited by DIP Switch Setting or Host Command. [Solution] Check DIP Switch Block 1 Settings, refer to the Software Information Sheet for proper settings. Check Harness connections and communications. [Relative Parts] DIP Switch Block 1, Harnesses If the error is not resolved, change the above related part or parts.
Green (3)	Green (6)	Return Commanded	The Banknote was returned in response to a Host Command. [Solution] Check for proper communications with the Host computer. [Relative Parts] CPU. If the error is not resolved, change the above related part or parts and calibrate the unit.



## Maintenance Equipment

This portion provides product information for the DBV-500-S Maintenance Equipment.

### DBV-500-S Maintenance Equipment



**Figure A-1** Additional Maintenance Equipment Requirements

**Table A-6** Additional Maintenance Equipment Parts List

Ltr.	EDP No.*	JAC No.	Description	Qty.	Remark
a <sub>1</sub>	236939	← Use EDP#	Reference Paper (White: KS-091)	1	
a <sub>2</sub>	260820	← Use EDP#	Reference Paper (KS-096)	1	
b	G00205	501-100218R	UAC Module	1	
c	G00230	400-100249R	UAC USB Cable	1	
d	GA0006	400-000158R	DBV-500-S UAC Harness	1	
e	G00213	302-100007RA	Power Cord (USA or Euro)	1	For UAC
f	G00286	← Use G#	AC Power Adapter	1	For UAC

\*. A Product EDP Number that begins with a "G" is a Product developed by JCM-E Germany.

### Reference Paper Handling

All JCM Reference Paper should be handled as follows:

1. Do not allow the Reference Papers to endure high temperatures and/or high humidity environments.
2. Store unused Reference Papers in their original Shipping Carton to avoid exposing them to direct Sunlight and/or bright indoor light. Ensure that the Reference Papers being stored are not damaged as they are replaced into their shipping carton.
3. Do not use Reference Paper containing damaged areas that are worn, dirty, wrinkled, distorted and/or discolored.
4. Use new Reference Paper for every 400 Units being calibrated. Incorrect calibration errors may occur when using Reference Paper that has been used for calibrating more than 400 Units.



# DBV® Series

## DBV-500-S Banknote Validator

### Appendix B

## B GLOSSARY

### B

#### 1 **Banknote Jam**

on occasion, wrinkled or damaged Banknotes become stuck within the mechanical area of the Validation Unit. This condition may occur due to acceptance of a severely degraded Banknote, or due to a feed error occurring in the Transport Path. Banknote Jams may be cleared by following instructions found in the Operations and Maintenance Manual... 1-3

#### 2 **Bezel**

a removable Plastic Assembly attached to the front of the Banknote Insertion Slot of the Validator Unit. It features, a rectangular access slot of easy insertion and retrieval of Banknotes. Bezels are available in different shapes and sizes in order to accommodate Banknotes of different width and a different stacking configuration... 1-2

### C

#### 3 **Calibration**

a process performed on electronic equipment which ensures that all circuits are properly aligned and operating at optimum levels. Calibration is accomplished using a software based program which checks and sets the operational reference levels for sensors. This helps to ensure that the Unit operates with the highest Banknote acceptance rate possible. Calibration is recommended whenever the CPU board, or one of the Sensor Boards are replaced... 6-1

#### 4 **Cash Box**

a container designed to collect and store the Banknotes accepted by the Validator... 1-2

#### 5 **Centering Mechanism**

a mechanical assembly designed to center Banknotes that enter the Validator at a skewed angle... 1-4

#### 6 **Checksum**

a numerical value assigned to a data file or block of data (usually expressed in Hexadecimal notation). Checksum values are used to verify that the contents of a data file are not corrupted in any way during transmission or encryption. The Checksum values of both the original and duplicate files are compared to each other. If the values do not match then it is recommend that the file be copied (uploaded) again until the Checksum do match.... 6-4

#### 7 **Country Code**

specific codes given to a country to identify its currency type... 1-2

#### 8 **CPU**

an acronym for Central Processing Unit. In most systems the CPU is a multi-pin semiconductor device mounted on a Printed Circuit Board (PCB). It is used in conjunction with other interface microchips and memory devices, and is responsible for controlling the overall operation of the equipment into which it is installed... 4-2

**D****9 DBV**

acronym for Dollar Banknote Validator... 1-1

**E****10 EEPROM**

an acronym for Electronically Erasable Programmable Read Only Memory. A form of non-volatile Read Only Memory (ROM), which can be both written to, and erased, via electronic signals without the need to remove it from its Circuit Board housing where it is installed. EEPROM system command instructions and reference data sets that are accessed on a frequent basis or when the equipment is first powered up... 6-8

**F****11 FFC**

an acronym for Flexible Flat Cable. This type of Cable contains printed circuit traces in it, and is generally used to interconnect and distribute signal information between various Printed Circuit Board... 4-2

**J****12 JCM Tool Suite Standard Edition**

a PC Application Program that includes Sub-routine Programs for Downloading a File, Calibrating Sensors, examining Performance Metrics and testing Validator Functions... 6-1

**L****13 LED**

an acronym for Light Emitting Diode. An LED is Semiconductor Device which turned on, emits a signal output in the visible light range. Available in a variety of colors, LEDs are cost effective and are commonly used as Indicator Lights in a variety of equipment devices. LEDs are also available in the invisible light range (i.e., ultraviolet, near-infrared etc.) , making them useful as operational indicators for a variety of electronic equipment and applications, such as Banknote Validation Circuit in the Validator Unit... 6-13

**14 Limited Power Source**

an electronic circuit designed to prevent damage to a Power Supply in the event a short circuit occurs... 1-4

**O****15 Optical Sensor**

a Photo Sensitive Device and LED combination which generates a signal of varying amplitude in response to changes or blockage of the amount of light striking the sensor surface. Optical Sensors are well suited for detecting timing and movement events... 1-6

**P****16 Photo-Coupler Isolation**

a method of increasing safety to both the equipment and personnel by isolating and routing transmitted data signals via Light Emitting Diode (LED) and Photosensitive Transistor combination circuit in various electronic equipment devices... 1-6

**17 Pictograph**

small internationally recognized safety and attention symbols placed to the left of Notes, Cautions and Warnings throughout a JCM Maintenance Manual... 1-1

**18 Precautions**

Special instructions and warnings that appear in JCM Maintenance Manuals. Precautions are intended to promote personal safety and prevent damage to equipment when working with the applicable JCM Product... 1-3

**R****19 RS232C**

a common Serial Data communication standard Protocol... 1-6

**S****20 Special Notes**

notation within JCM Maintenance and Operation Manuals that alerts the reader to specific information that can affect operation of the Unit. Notations often appear throughout the manual, and are identified by the pictograph icon. Special Notes are always written in italic text... 1-1

**T****21 TTL**

an acronym for Transistor to Transistor Logic levels... 1-6

**U****22 USB**

an acronym for Universal Serial Bus. The USB protocol is a widely used serial-based communications data bus which allows a large number of peripheral devices to communicate with a host controller, and is commonly found on nearly all personal download data files into flash memory quickly and easily from a PC... 1-6

**V****23 Validator**

In Banknote Validator, identifies the process of drawing a Banknote into the Unit and then uses various Sensors to read and determine the authenticity of the Banknote based on the comparison of collected readings to a set of reference data stored in memory...

1-1

DBV® Series DBV-500-S Banknote Validator



**G L O B A L**

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