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# VEGA-RC™ Series

## BankNote Recycler

***Operation and Maintenance***
***Service Manual***

***(Revision 3)***

**P/N 960-100190RA_Rev. 3 {EDP #148851}**

a RoHS Compliant Product

**Issue #4078-SME-01-03**

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| REVISION HISTORY | | | |
|---|---|---|---|
| **Rev №.** | **Date** | **Reason for Update** | **Comment** |
| A | 9-15-09 | **Initial Version** | |
| 1 | 8-09-11 | **Added MDB Specification, updated the Parts Lists** | |
| 2 | 10-20-12 | **Added 24V DC Specification** | |
| 3 | 4-27-15 | **Added A/D Value, Updated the Parts Lists and Jam Clear info** | |

## International Compliance

- RoHS Directives or or or or
- UL & c-UL Marks **File No. E142330, Subscriber 857947001, Vo.2**
- CE Mark
- CB Scheme **NO56968, NO51248/A1/M1, NO54260/M1, NO78539**
- FCC Directives

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

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

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

## Electrical Current Symbol

Direct Current: ⎓ indicates Direct Current values on product labels.

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# VEGA-RC™ Series
## BankNote Recycler
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# VEGA-RC™ Series
## BankNote Recycler
Section 1

# 1 GENERAL INFORMATION

## Description

This section provides a general overview of the VEGA-RC™ Series BankNote Recycler pictured in Figure 1-1. This section is designed to help the user navigate through this manual with ease. It includes the following information:

- VEGA-RC 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 equipment; these are identified with **Bold** text and the following pictographs:
- **Special *Notes*** affect the use of the Banknote Recycler; 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.).

## VEGA-RC Unit

**Figure 1-1** VEGA-RC Banknote Recycler Unit


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# Product Description

## Model Descriptions

Table 1-1 lists the product model number descriptions

**Table 1-1** VEGA-RC Model Number Specifications

| Nº | Model: VEGA-RC - ** - * <br> Nº (1) (2) (3) |
|---|---|
| (1) | Product Series Name |
| (2) | Power Supply<br>12 = 12V DC<br>42 = 24V DC to 36V DC (MDB Specification)(Option) |
| (3) | Communication Type<br>-- = no Communication<br>1 = MDB + OPF (Option) |

# Precautions

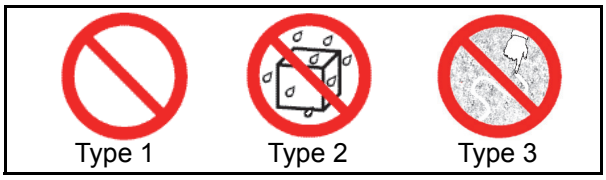


**Figure 1-2** Precautionary Symbols

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 into 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. 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. Insure that the Host Machine is also designed to avoid exposing the Banknote Insertion Slot to direct Sunlight or incandescent light.
4. Do not allow the Recycler to endure a range of temperature and humidity beyond the environmental limits specified (See "Environmental Specifications" on page 1-5).
5. Do not use the Recycler in environments that may be subject to extreme temperature changes.
6. Do not use the Recycler where it may be exposed to airborne evaporated or sporadic chemicals.
7. Clean and maintain the Recycler 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 VEGA Unit's power OFF before mounting the Recycler Unit to the top of the VEGA Unit or removing it from the VEGA Unit.
2. Plugging or unplugging the Recycler's communications connector while the VEGA Unit's Power is ON may also cause damage to the Recycler Unit.

### Preventive Maintenance

The preventive maintenance requirements are defined as follows:

1. When closing the Rear Cover of the Recycler, ensure that it clicks firmly into place.

**Caution: Be careful to avoid personal injury to your fingers when closing the Recycler's Rear Cover.**

**Caution: Turn the VEGA Unit's Power OFF when opening the Recycler's Rear Cover; otherwise, the Rollers may begin operating and personal injury to fingers may occur by getting pulled into the Unit.**

2. Do not redesign or disassemble the Recycler. 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 Recycler, as this may cause extreme damage to the Unit.**

3. Perform routine cleaning and maintenance at least once a month to keep the Unit's performance stable.
4. Use a soft, lint-free cloth, cotton swab or non-flammable compressed air spray to clean dust and debris from the Rollers.
5. If the Unit is exposed to water or other 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 Recycler's performance.


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**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.**

### HANDLING

The handling requirements are defined as follows:

1. This product is not securely locked from tampering. Have internal security management handle any tampering issues involving the Unit.
2. Do not strike or drop the Recycler to the ground: this may cause damage to it.
3. Do not pull hard on the winding belts when clearing a Banknote jam, or pull a belt out beyond its limits.

## Banknote Fitness Requirements

The following Banknote types may not recycle 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

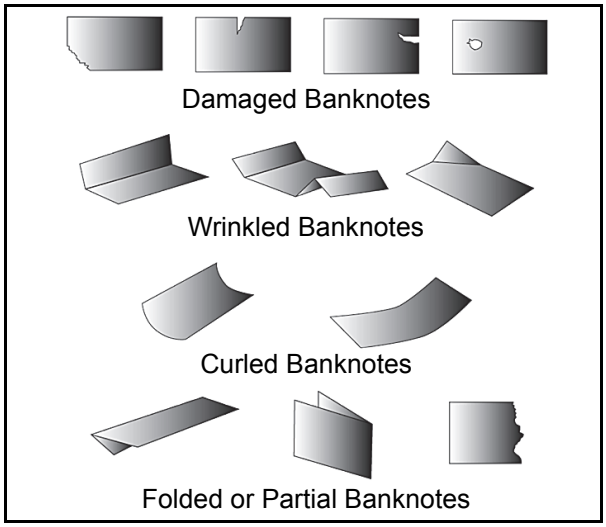


**Figure 1-3** Unacceptable Banknotes

## Primary Features

- When connected to the VEGA Banknote Validator, the VEGA-RC allows one (1) denomination to be recycled at a time.
- The VEGA-RC can recycle any Banknote accepted by the VEGA Unit, and can hold up to 30 Notes at a time. The improved internal mechanism significantly reduces the chance of a Banknote jamming inside the Recycler Unit.


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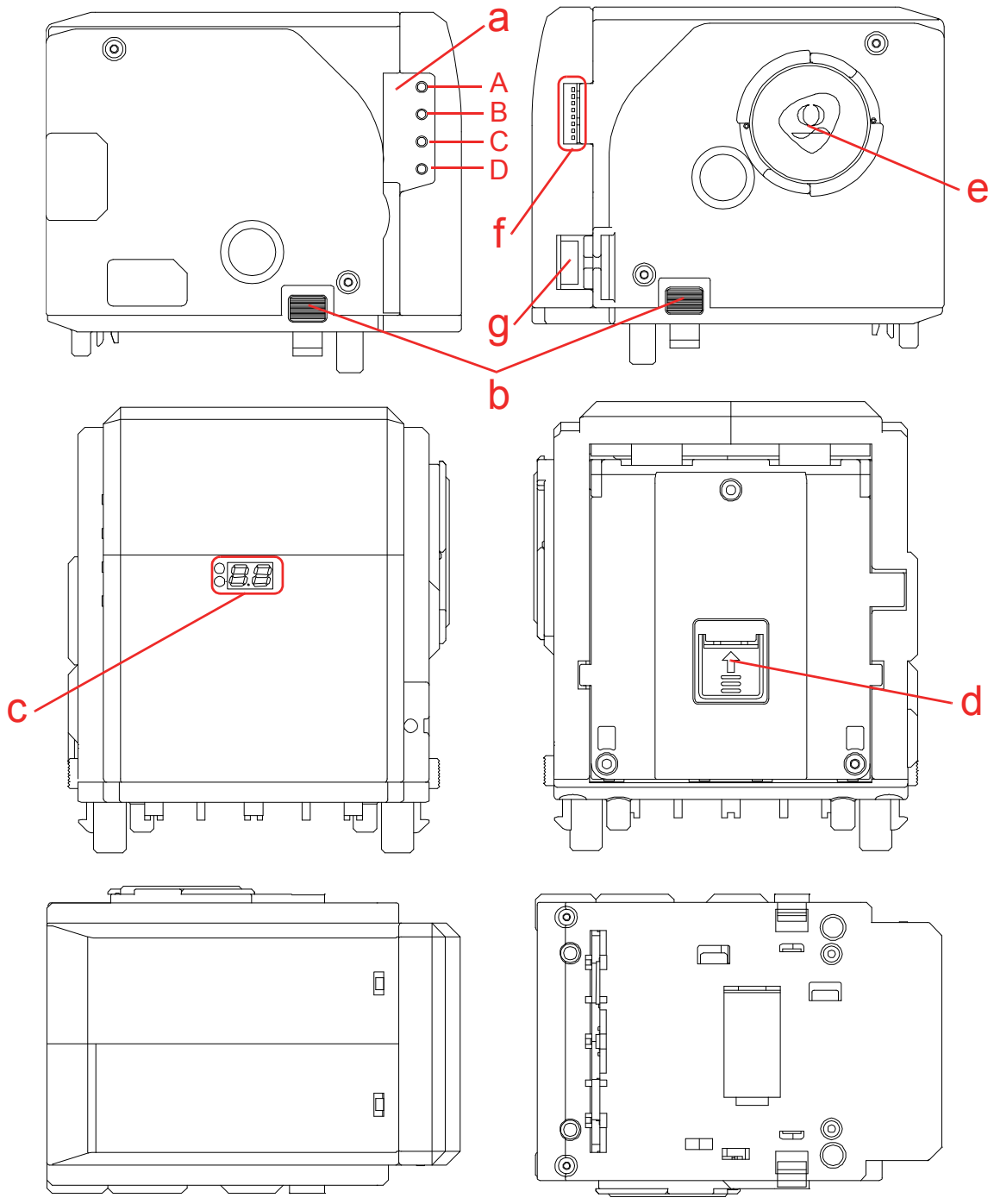
## Component Names

Figure 1-4 illustrates the VEGA-RC primary component parts and their relative location




a) Function Button Descriptions
   A.Change Display
   B.Dispense
   C.Restore
   D.Retrieve
b) VEGA Attach/Release Buttons
c) Green & Red LED Indicators & Seven Segment LED Displays
d) Rear Cover Open/Close Latch
e) Maintenance Cover
f) DIP Switch Block
g) VEGA Connector Cable Receptacle

**Figure 1-4** VEGA-RC Component Names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# Specifications

## Technical Specifications

**Table 1-2** Product Technical Specifications

| | |
|---|---|
| Acceptable Denomination* †: | Refer to the VEGA Unit's specific "Software Specification" |
| Banknote Types Accepted: | • Long edge: 110-160mm (4.33-6.3 in.)<br>• End: 60-82mm (2.36-3.23 in.) |
| Insertion Direction: | Four (4) ways |
| Processing Speed‡: | • Approximately 3 seconds (from Banknote insertion to stacking completion)**<br>• Approximately 3 seconds (from Banknote insertion to next insertion enable)‡<br>• Approximately 3 seconds (from Banknote dispense to eject completion)<br>• Approximately 4 seconds (from receiving a retrieve command to Banknote retrieved). |
| Diagnostic Indicators: | A 2-digit, 7 segment LED Display, and 2 single multi-color LED |
| Drum (Stacker) Capacity: | 30 notes<br>(150mm new Banknote/ e.g., 100 Euro Banknotes: Full detection)<br>The number of stored notes can be set between 1 and 30 notes<br>No near end detection |
| Stacking Method: | Banknote Winding System†† |
| Dispense: | No denomination discrimination<br>No double note detection (e.g., condition is detected by the VEGA Unit)<br>Note length discrimination (when denomination type is set) |

*. Acceptable denomination can be selected (Refer to the VEGA Software Information Sheet for the DIP Switch settings for setting the Banknote denomination to be recycled).

†. When the Banknote's long edge length margin is greater than 26mm, the Banknote cannot be accepted, even if its denomination is correct.

‡. Depends on the Host communication time lag when connected to the VEGA Unit.

**. When the Banknote length is 120mm (e.g., a Euro 5 Note), and the number of stacked Banknotes is less than 30 Notes; or when the number of stacked Banknotes is greater than 31 Notes, the processing speed will be approximately 5 seconds per Banknote.

††. DO NOT replace Banknotes by hand winding them back into place; allow them to be replaced by the Unit's recycling action only.

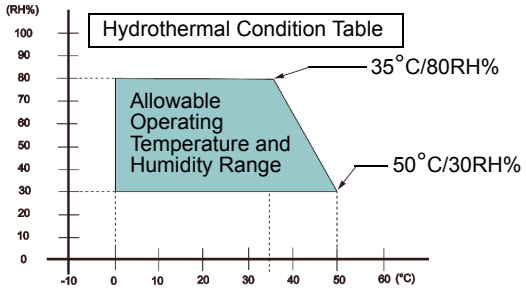
## Environmental Specifications

**Table 1-3** Product Environmental Specification

| | |
|---|---|
| Operating Temperature: | 0°C to + 50°C (32°F to 122°F)* |
| Storage Temperature: | -20°C to + 60°C (- 4°F to 140°F)* |
| Relative Operating Humidity: | 30% to 80% RH (non-condensed) |
| Relative Storage Humidity: | 10% to 85% RH (non-condensed) |
| Visible Light Sensitivity: | Avoid contact with direct sunlight (Interior lighting must be incandescent lamp with a Gradient Angle of 15 Degree or more and an Illumination of 3000 Lux or less) |
| Installation: | Indoors Only† (Not be exposed to the elements (including internal parts of the unit) |

*. Depends on hydrothermal condition.

†. Do Not exposed to the elements (including internal equipment.)

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## Electrical Specifications

**Table 1-4** Product Electrical Specification

| | |
|---|---|
| Supply Voltage* †: | 12V DC (±5%) 3A Recommended<br>24 - 36V DC (Range: 20 - 42.5V DC) 3A Recommended (Option) |
| Current Consumption‡: | Standby = 0.11A (12V DC)<br>Operation = 0.9A (Max:2A) (12V DC)<br>Option: Standby = 0.075A (24V DC)<br>Operation = 0.65A (Max: 1.0A) (24V DC)<br>Standby = 0.06A (36V DC)<br>Operation = 0.45A (Max: 0.72A) (36V DC) |

*. If there is the voltage ripple on the applied voltage, be sure that the minimum voltage does not fall below 20V DC and make the ripple voltage as smooth as possible. Hot-swapping prohibited (do not plug in/out while the power is applied). Limited Power Source (Class 2) required.

†. Be sure that the electrical specification when using the VEGA Unit with the optional VEGA-RC Unit (e.g., The VEGA-RC 12V DC Specification Unit must be installed on the VEGA 12V DC Specification Unit and the VEGA-RC 24V DC Specification Unit must be installed on the VEGA 24V DC Specification Unit).

‡. A each Current Consumption is for only the VEGA-RC Unit.

## Structural Specifications

**Table 1-5** Product Structural Specification

| | |
|---|---|
| Weight: | Unit: Approximately 1.1kg (2.425 lbs) |
| Mounting: | Horizontal (to the VEGA SH Type) |
| Outside Dimensions: | 117mm (4.60 in) High x 153mm (6.02 in) Deep x 113mm (4.44 in) Wide |


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## Outside Dimension

Figure 1-5 illustrates the outside dimensions of the VEGA-RC Unit.

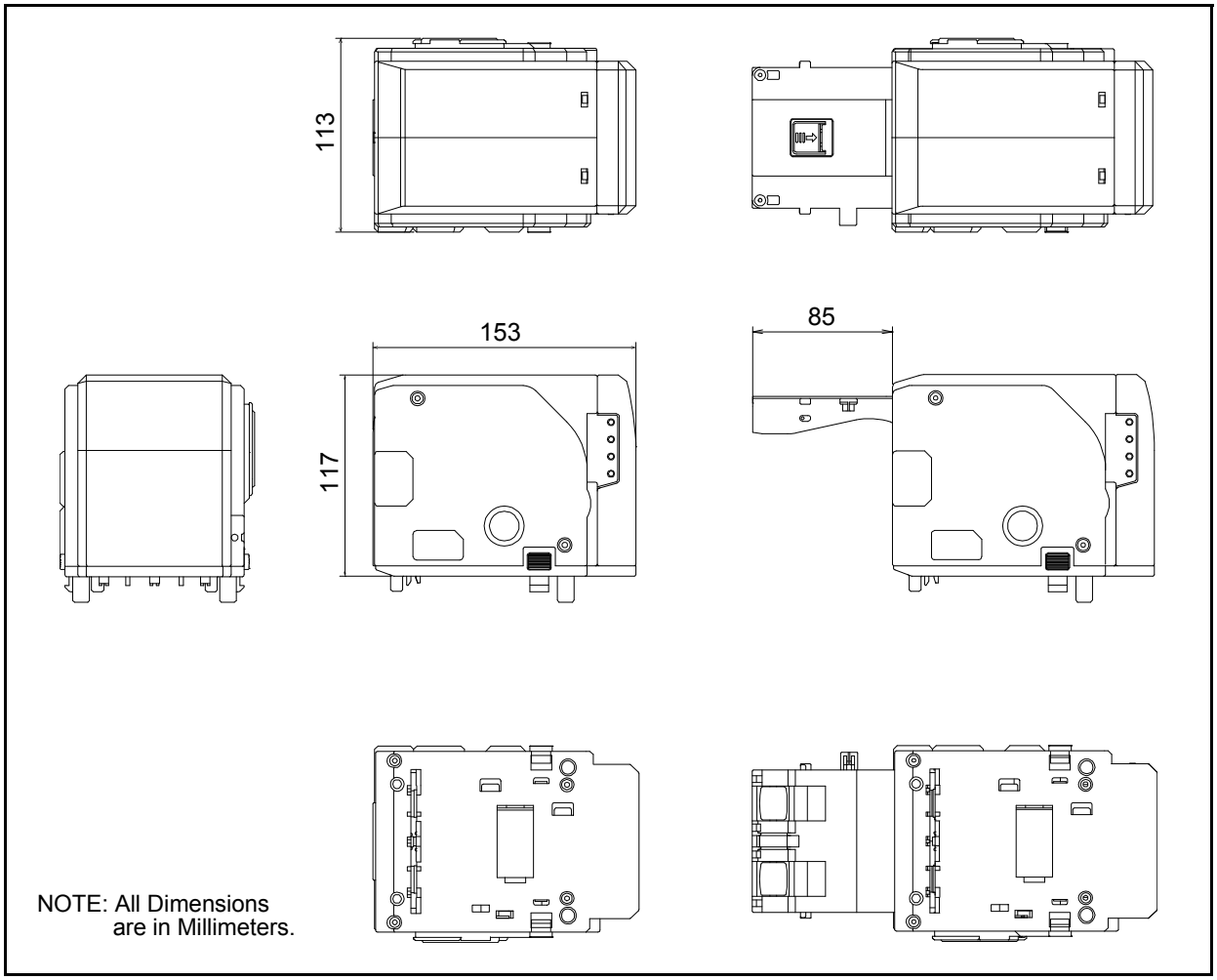


**Figure 1-5** VEGA-RC Outside Dimensions


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## Technical Contact Information

To obtain further Technical Information regarding the VEGA-RC Device, please contact the closest office to your location listed below:

### Americas

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Phone: +1-702-651-0000

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E-mail: support@jcmglobal.com

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All of these Websites are available via:
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# VEGA-RC™ Series
## BankNote Recycler
Section 2

## 2 INSTALLATION/OPERATION

This section provides installation and operation instructions for the VEGA-RC™ Series BankNote Recycler. The information within contains the following features:

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

## Installation

### Installation Procedure

Perform the following steps to install an optional VEGA-RC Unit onto a VEGA Unit body:

1. Place the VEGA-RC into position on top of the VEGA Unit as shown in Figure 2-1. The four circular guide posts (Figure 2-1 $a_1$, $a_2$, $a_3$ & $a_4$) on the bottom of the VEGA-RC Unit should fit directly into the four circular guide hole receptacles located on the VEGA Unit.

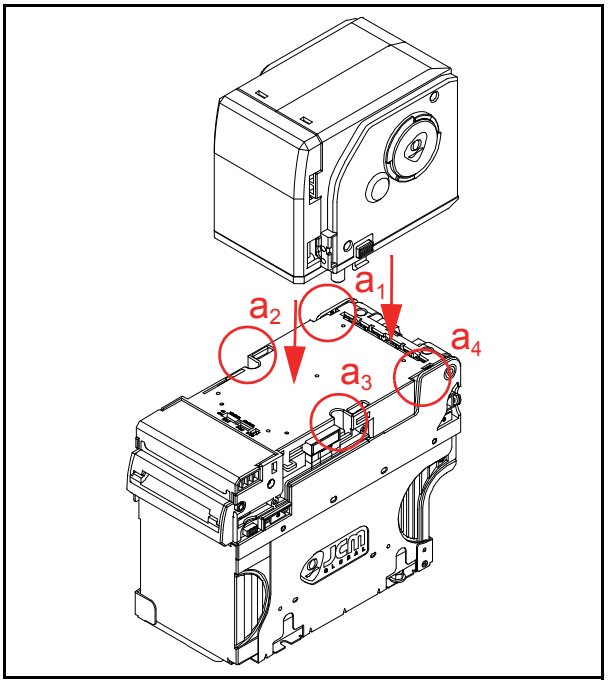
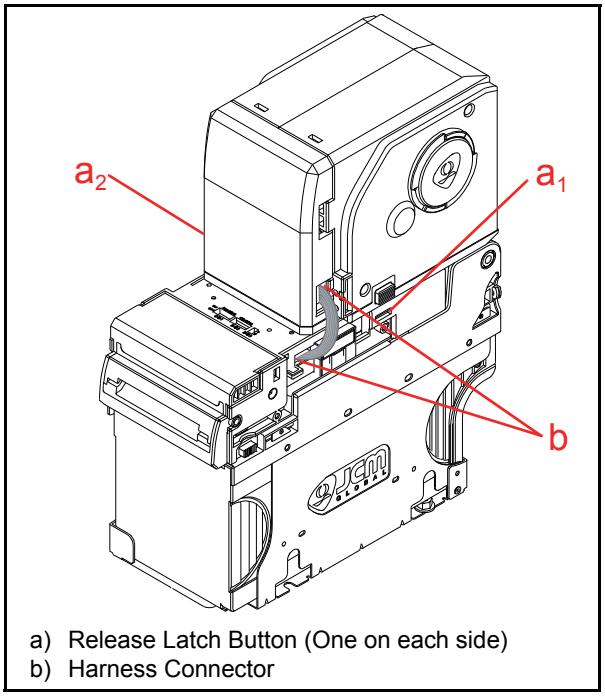



**Figure 2-1** VEGA-RC Positioning Post Locations

2. Gently press the Unit down into the mating hole receptacles, and listen for a click sound when the two (2) Latches lock in place between the VEGA-RC and the VEGA Unit (Figure 2-2 $a_1$ & $a_2$).




a) Release Latch Button (One on each side)
b) Harness Connector

**Figure 2-2** Latch Button and Harness Locations

3. Install the VEGA-RC Harness Cable Connector into its VEGA Unit mating Receptacle (Figure 2-2 b).

*NOTE: Press in the connectors to confirm a firm connection.*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## DIP Switch Configurations

Table 2-1 lists the DIP Switch settings for the VEGA-RC following its physical mounting on, and cabling to, the VEGA Unit.

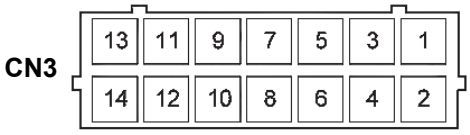
**Table 2-1** DIP Switch Settings


| Switch No. | Switch ON | Switch OFF |
|---|---|---|
| 1 | Denomination Settings (Communicated to VEGA) | |
| 2 | | |
| 3 | | |
| 4 | Reserved | |
| 5 | | |
| 6 | | |
| 7 | Reserved (OFF) | Reserved (OFF) |
| 8 | Enable self test | Disable self test |

## Connector Pin Assignments

Table 2-2 lists the various VEGA-RC to VEGA Unit Receptacle Connector Pin Assignments.

**Table 2-2** Recycler to Acceptor Receptacle Pin Assignments*




**PHD Connector (Side Type): S14B-PHDSS-B (JST)**
**Socket Housing: PHDR-14VS**
**Contact Type: SPHD-001T-P0.5**
**Recommended Wire: UL1007 AWG #22~26 Flat Cable (Slit Type)**

| Pin No. | Signal Name | I/O† | Function |
|---|---|---|---|
| 1 | SGND | -- | Signal GND |
| 2 | SGND | -- | Signal GND |
| 3 | VEGA-TXD (DL-TTL) | OUT | Serial data signal output line from Recycler to Acceptor (both DL-TXD signals are used) |
| 4 | VEGA-RXD (DL-TTL) | IN | Serial data signal input line from Acceptor to Recycler (both DL-RXD signals are used) |
| 5 | VEGA-ENC | IN | Serial data signal input line from Acceptor to Recycler |
| 6 | VEGA-PS12 | IN | Serial data signal input line from Acceptor to Recycler |
| 7 | VEGA-FRP | IN | Serial data signal input line from Acceptor to Recycler |
| 8 | VEGA-PSI1 | IN | Serial data signal input line from Acceptor to Recycler |
| 9 | VDD | -- | 12V DC, (Option: 20 - 42.5V DC)‡ |
| 10 | VDD | -- | 12V DC, (Option: 20 - 42.5V DC)‡ |
| 11 | VDD | -- | 12V DC, (Option: 20 - 42.5V DC)‡ |
| 12 | PGND | -- | Power GND |
| 13 | PGND | -- | Power GND |
| 14 | PGND | -- | Power GND |

*. Hot-swapping is prohibited (DO NOT plug the Interconnect Cable In or Out of the Unit while VEGA Unit's power is ON!).

†. I/O (Input/Output) Terminals as viewed from the Banknote Recycler's side.

‡. Be sure to use the correct Supply Voltage Specification parts (Use the 24V DC Specification Item when using 24V-36V DC Option VDD).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# Preventive Maintenance

## Displays and Functions

This section provides definitions for the Seven (7) Segment Display symbols, the various LED Lighting Patterns and the A,B,C & D Pushbutton operational functions of the VEGA-RC Recycler. Locations are identified by their "Component Names" on page 1-4. Figure 2-3 lists the various Seven (7) Segment Display symbols, and Figure 2-4 provides three (3) LED lighting conditions present during diagnostic testing procedures.

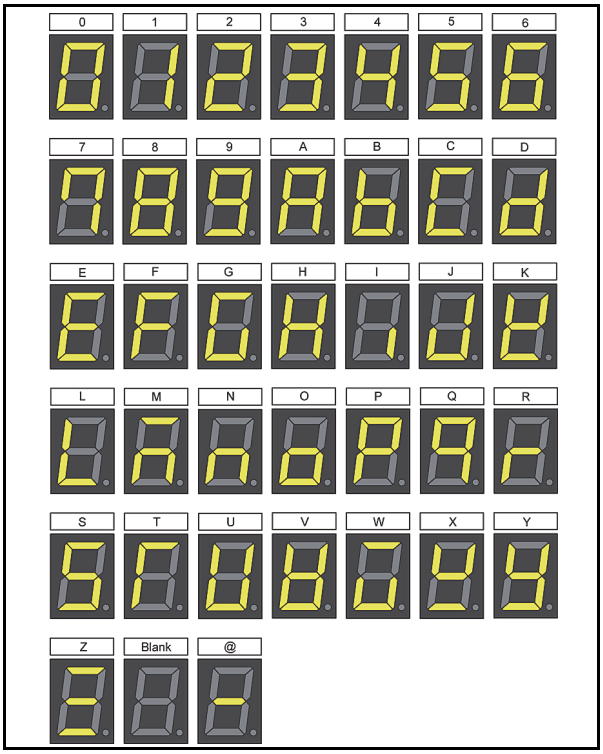


**Figure 2-3** Seven Segment Display Definitions

To understand the diagnostics LED indications shown by the various test conditions presented in the Figures illustrated within this Section, Figure 2-4 is provided to define the three (3) different Green and Red LED lighting states indicated by the upper and lower LED's located to the left of the Seven (7) Segment Displays.

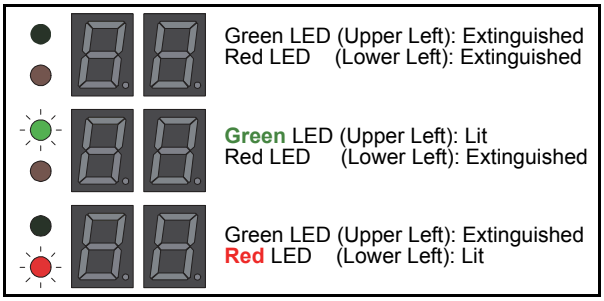


**Figure 2-4** Color LED Lighting Patterns

## Initializing

When first booting the VEGA-RC, initialization begins when the Seven (7) Segment Display flashing sequence shown in Figure 2-5 occurs.

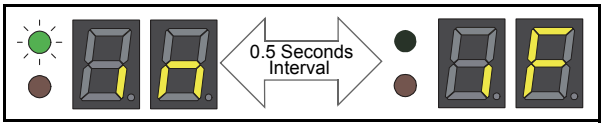


**Figure 2-5** Initializing Interface (in iF)

*NOTE: When the Banknotes are already stored in the VEGA-RC Drum, the last Banknote inserted is moved to the Home Position, when no Banknote is stored in the VEGA-RC Drum, the Drum is automatically positioned to the Banknote Winding Start Position while the Unit is initializing.*

*NOTE: If a Banknote Jam occurs while closing the Rear Cover, the error condition indicated in Figure 2-6 will occur.*

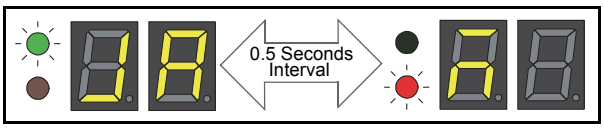


**Figure 2-6** Banknote Jam Occurs (JAM)

1. Once initialization is complete, the Figure 2-7 flashing Display sequence will appear to indicate the VEGA-RC is waiting for a start communication command from the VEGA Unit.

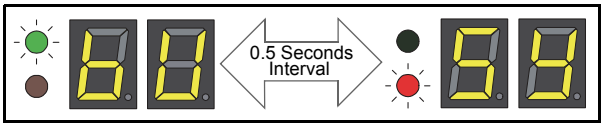


**Figure 2-7** Waiting to Communicate (BUSY)

2. When start communication command is received from the VEGA Unit, the VEGA-RC status LED Display will indicate a Stand-By Mode condition of "00", or indicate the active count of recycled notes within the Unit up to 30 (Figure 2-8).

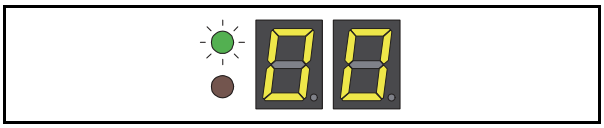

**Figure 2-8** Stand-By (00~30 + Green LED)

*NOTE: While in Stand-By mode, the number of Banknotes within VEGA-RC is shown on the 7 Segment Display.*

## Rear Cover Open

When the Rear Cover is open, the Seven (7) Segment Display will indicate the flashing sequence shown in Figure 2-9.

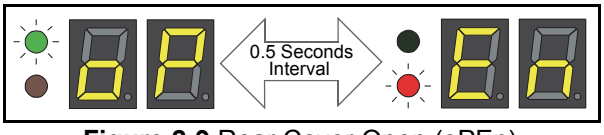


**Figure 2-9** Rear Cover Open (oPEn)


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## Stacker Full

When the number of recyclable Banknotes within VEGA-RC reaches its set limit, or the Full Detection Sensor discovers a storage limit equal to 30 notes, the Seven (7) Segment Display flashing sequence shown in Figure 2-10 indicating a Drum (Stacker) Full condition will appear.

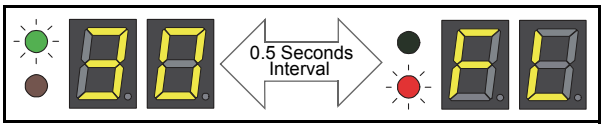


**Figure 2-10** Stacker Full (30 FulL)

*NOTE: The storage limit depends on the stored Banknote's condition, or the limit value set if lower than 30. The "FULL" indication shown in Figure 2-10 will continue showing until the Recycler Drum (Stacker) is emptied.*

## Stacker Empty

When there are no recyclable Banknotes within the VEGA-RC Drum when a dispensing or retrieving request occurs, the Seven (7) Segment Display flashing sequence shown by Figure 2-11 will occur indicating the Drum (Stacker) is Empty.

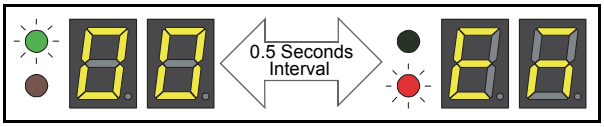


**Figure 2-11** Stacker Empty (00 EMpty)

*NOTE: The A, B, C, D pushbuttons are only functional When a host 'Key' command is sent to the VEGA-RC or when the VEGA is in Bill Acceptance Test Mode.*

## Restoring a Single Banknote

When transferring a recyclable Banknote back into the VEGA-RC using the "Restore" Mode, perform the following steps:

1. Check that the VEGA-RC Seven (7) Segment Display is not indicating a Drum (Stacker) Full condition.
2. Press the "**C**" [**Restore**] Pushbutton while the VEGA-RC is in the Stand-By Mode; the Seven (7) Segment Display flashing sequence shown in Figure 2-12 will indicate that the Restore Mode is active.

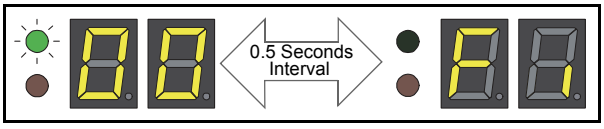


**Figure 2-12** Single Mode Restore (00 Fill)

*NOTE: The "Restore" Mode CANNOT be performed when the VEGA-RC status indicates a Drum (Stacker) Full condition. If Banknotes are inserted beyond its capacity limit, the Banknotes will be automatically stored in the VEGA Cash Box instead.*

3. When performing a "Restore Mode" by inserting a recyclable Banknote into the VEGA Insertion Slot, the Banknote will be stored into the VEGA-RC Drum (Stacker). After an inserted Banknote is stored in the VEGA-RC Drum (Stacker) correctly, the total number of recyclable Banknotes within the VEGA-RC will be indicated by the Seven (7) Segment Display flashing sequence; then the VEGA-RC status will return to the "Stand-By Mode" from its existing "Restore Mode".

## Restore (Continuous Mode)

When transferring recyclable Banknotes into the VEGA-RC in the Continuous Restore Mode, perform the following steps:

1. Check that the VEGA-RC Seven (7) Segment Display is not indicating a Drum (Stacker) Full condition.
2. When pressing the "**C**" [**Restore**] Pushbutton longer than two (2) seconds when in Stand-By Mode, the Seven (7) Segment Display flashing sequence indicated in Figure 2-13 will occur.

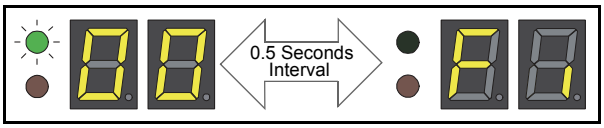


**Figure 2-13** Continuous Mode Restore (00 Fill All)

3. When performing a "Restore Mode" by inserting a recyclable Banknote into the VEGA Insertion Slot, the Banknote will be stored into the VEGA-RC Drum (Stacker). Once the inserted Banknote is stored in the VEGA-RC Drum (Stacker) correctly, the total number of recyclable Banknotes within the VEGA-RC will be indicated by the Seven (7) Segment
Display flashing sequence shown in Figure 2-14.

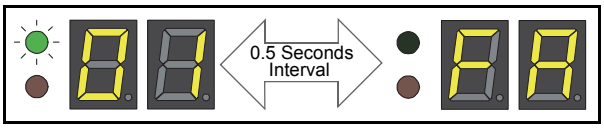


**Figure 2-14** Waiting to Restore (01 Fill All)

4. When the Seven (7) Segment Display indicates a "Stacker Full" condition, the "Restore Mode" operation is complete. If stopping the operation before its completion is necessary, press the "**A**" [**Change Display**] Pushbutton to end the "Restore Mode" operation immediately.

*NOTE: Not all Banknotes will be accepted by the VEGA-RC regardless of the "Single Mode" or "Continuous Mode" performance state. Damaged Banknotes (i.e., Worn, torn, wet or skewed insertion condition) are*


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*directly stored in the VEGA Cash Box in order to avoid a possible Banknote Jam. When the Restore Mode cannot be performed due to an existing VEGA-RC "Stacker Full" condition, or inserted Banknotes have reached the full limit, they will be stored in the VEGA Cash Box.*

## Retrieving All Banknotes

To retrieve recyclable Banknotes from within the VEGA-RC, perform the following steps:

1. Check that the VEGA-RC Seven (7) Segment Display is not indicating a Drum (Stacker) Empty condition. If the VEGA-RC Seven (7) Segment Display is not showing "00", press the "**D**" [**Retrieve**] Pushbutton while the VEGA-RC is in the Stand-By Mode to enter the note "Retrieving Mode" (Figure 2-15).

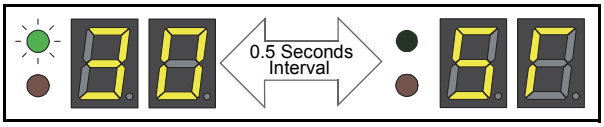


**Figure 2-15** Note Retrieving Mode (30 STore)

2. Once the Seven (7) Segment Display indicates the note "Retrieving Mode" is active, press the "**D**" [**Retrieve**] Pushbutton again within 5 seconds of its first pressing. The Seven (7) Segment Display indication shown in Figure 2-16 will appear and begin transferring recyclable Banknotes from the VEGA-RC Drum (Stacker) to the VEGA Unit's Cash Box.

*NOTE: If a retrieving operation is not started within 5 seconds of pushing the "D" Pushbutton again, the VEGA-RC status will return to the Stand-By Mode.*

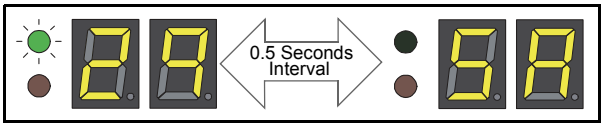


**Figure 2-16** Retrieving (29 Store All)

3. Once a retrieved Banknote is stored in the VEGA Unit's Cash Box, the Seven (7) Segment Display will decrement to indicate the total number of Banknotes remaining in the VEGA-RC Unit.
4. When the Seven (7) Segment Display indicates "00", the "Retrieving Mode" will end. If stopping the operation before its completion is necessary, press the "**A**" [**Change Display**] Pushbutton to end the "Restore Mode" operation immediately.

*NOTE: If no stored Banknotes exist in the Drum (Stacker), the Seven (7) Segment Display will show "Empty" indicating it is unable to perform further "Retrieving Mode" operations.*

## Withdrawing Single Banknotes

To dispense a recyclable Banknote from the VEGA-RC Drum (Stacker), perform the following steps:

1. Check that the VEGA-RC Seven (7) Segment Display is not indicating a Drum (Stacker) Empty condition by showing "00". Press the "**B**" [**Dispense**] Pushbutton when the VEGA-RC is in Stand-By Mode, to enter the "Dispense Mode" (Figure 2-17). When "Dispense Mode" is started, one (1) Banknote will be dispensed from the VEGA Insertion Slot.

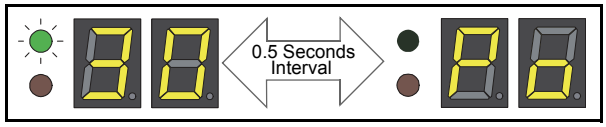


**Figure 2-17** Dispense Mode (30 Pay Out)

2. Once a recyclable Banknote is dispensed and pulled out of the VEGA Insertion Slot, the Seven (7) Segment Display will indicate the total remaining number of the stored recycled Banknotes still within the VEGA-RC Drum (Stacker) and then returns to Stand-By Mode (Figure 2-18).

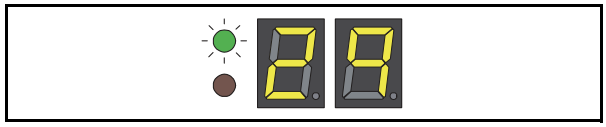

**Figure 2-18** The Number of the Stored Banknotes

## Withdrawing Banknotes Continuously

When continuously dispensing recyclable Banknotes from the VEGA-RC Drum (Stacker), perform the following steps:

1. Check that the VEGA-RC Seven (7) Segment Display is not indicating a Drum (Stacker) Empty condition by showing "00".
2. Press the "**B**" [**Dispense**] Pushbutton when the VEGA-RC is in Stand-By Mode, to enter the "Dispense Mode" (Figure 2-19). When "Dispense Mode" has begun, one (1) Banknote will be dispensed from the VEGA Insertion Slot per request.

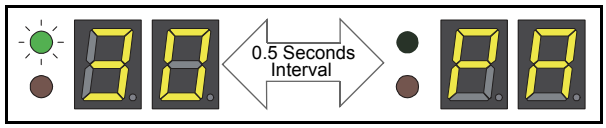


**Figure 2-19** Continuous Dispense (30 Payout All)

3. Remove the dispensed Banknote from the VEGA Bezel. The Seven (7) Segment Display will decrement to show the number of Banknotes remaining in the VEGA-RC.

When the Seven (7) Segment Display flashing sequence indicates "00", the "Dispense Mode" will end. If stopping the operation before its completion is necessary, press the "**A**" [**Change Display**] Pushbutton to end the "Restore Mode" operation immediately.


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*NOTE: If no stored Banknotes exist in the Drum (Stacker), the Seven (7) Segment Display will show "Empty" indicating it is unable to perform further "Retrieving Mode" operations.*

## Change Display

To perform a VEGA-RC "Change Display" operation proceed as follows.

1. Ensure that the total number of the recyclable Banknotes within VEGA-RC is indicated on the Seven (7) Segment Display when the Unit is in Stand-By Mode.
2. Press the "**A**" [**Change Display**] Pushbutton; the Seven (7) Segment Display flashing sequence shown in Figure 2-20 will appear.

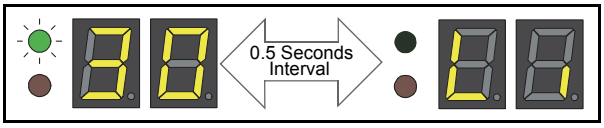


**Figure 2-20** Storage Limit (30 LImit)

3. When the Storage Limit amount is indicated, Press the "**A**" [**Change Display**] Pushbutton again within 5 seconds.
   The Seven (7) Segment Display flashing sequence shown in Figure 2-21 will appear.

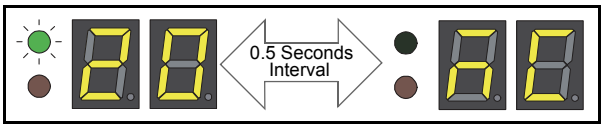


**Figure 2-21** Storage Denomination

*NOTE: If the storage limit or stacking denomination operation is not started within five (5) seconds of the button push, the VEGA-RC status will return to the Stand-By Mode.*

Refer to Figure 2-22 and Table 2-3 for examples of a Euro (€) denomination stacking operation.

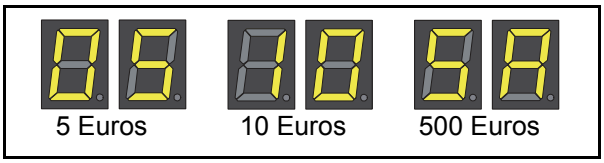


**Figure 2-22** Stacking € Denomination Examples

**Table 2-3** Stacking Denomination Example Table

| Typical Denomination | 7 Segment Indicator | |
|---|---|---|
| | Left | Right |
| €1 | 0 | 1 |
| €100 | 1 | A |
| €500 | 5 | A |
| €1000 | 1 | B |
| €2000 | 2 | B |
| €10000 | 1 | C |

## Storage Limitation

1. The Seven (7) Segment Display flashing sequence previously shown in Figure 2-20 will re-appear by pressing the "**A**" [**Change Display**] Pushbutton (Review the Figure 2-20 display).

   *NOTE: After showing the storage limit value for five (5) seconds, the VEGA-RC status will return to the Stand-By Mode.*

2. When pressing the "**C**" [**Restore**] or "**B**" [**Dispense**] Pushbuttons while the Seven (7) Segment Display shows the Storage Limit Value, the limit value can be set to any value desired between 1 & 30 (e.g., Figure 2-23 shows a Limit set value of 28) The new storage limit data value will be written into EEPROM within 5 seconds after the "**D**" [**Retrieve**] Pushbutton is pressed..

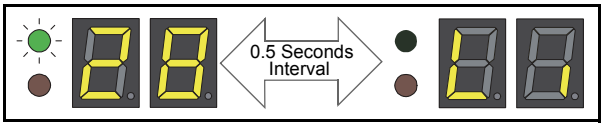


**Figure 2-23** Storage Limit Value Set

*NOTE: Reducing the storage limit value by one (-1) can be accomplished by pressing the "C" [Restore] Pushbutton once per decrement, and increasing the storage limit value by one (+1) can be accomplished by pressing "B" [Dispense] Pushbutton once per increment.*
*Pressing the "C" [Restore] Pushbutton when the Seven (7) Segment Display is showing thirty (30), will cause the count indicator to roll-over to "00".*
*The Storage Limit setting range is therefore 00 to 30. If the Storage Limit setting is "00", the storage limit value will depend on the Stacker Full Sensor's limit detection. If the storage limit is set between 01 and 30, the specified number set is the desired storage limit setting obeyed.*

*NOTE: If the "D" [Retrieving] Pushbutton is not pressed within 5 seconds after setting the new storage limit value, the new setting value is not recorded and the VEGA-RC Unit will return to the Stand-By Mode.*


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## Clearing a Banknote Jam

When a Banknote is jammed in VEGA-RC proceed as follows to clear it:

1. Pull the Rear Cover Open/Close Latch upward (Figure 2-24 a).
2. Open the VEGA-RC Rear Cover, and
3. Remove the jammed Banknote (Figure 2-24 b).

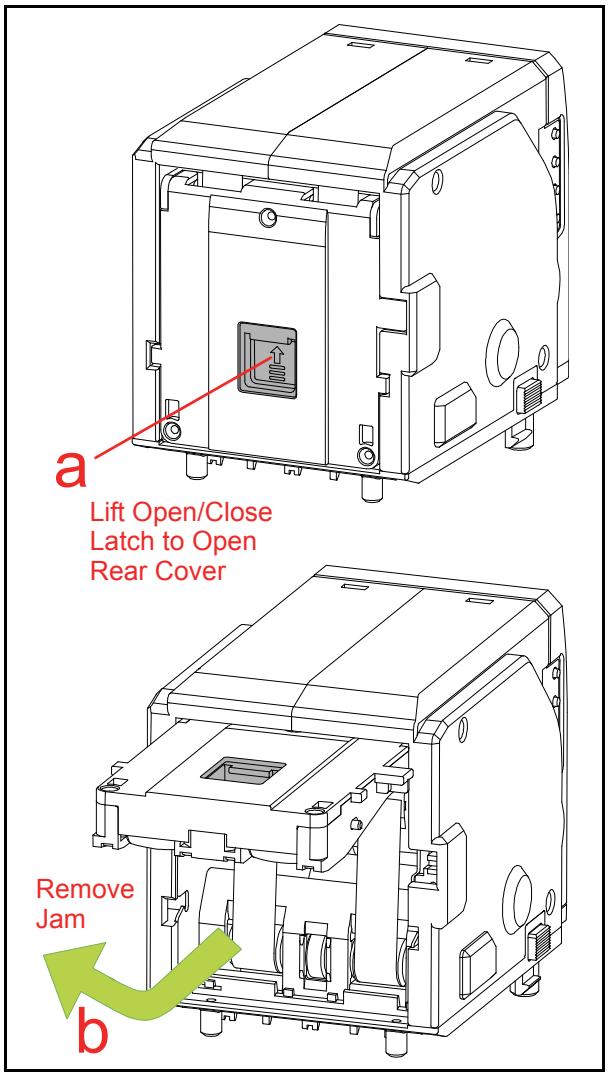
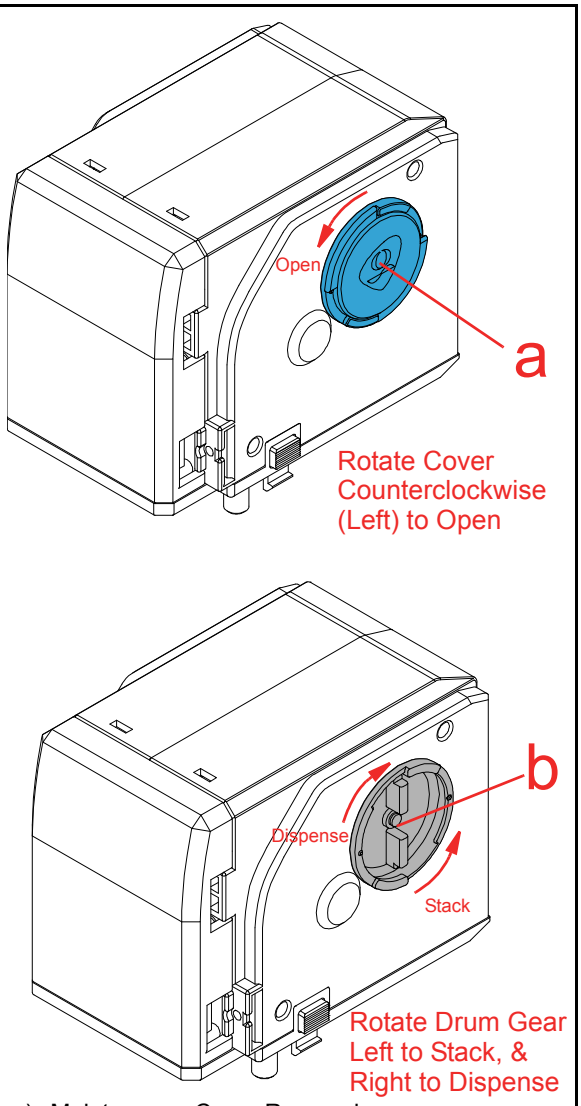



**Figure 2-24** Clearing a Banknote Jam (Step 1)

**WARNING: DO NOT re-insert a jammed Banknote back into the Recycler Drum (Stacker) after removing it.**

4. If the jammed Banknote cannot be removed by opening the Rear Cover, remove the Blue Maintenance Cover by rotating it to the left (Figure 2-25 a).
5. Rotate the Drum Moving Gear Control as follows:
   - Left = Stack
   - Right = Dispense (Figure 2-25 b)
6. The jammed Banknote can then be removed by opening the Rear Cover.




a) Maintenance Cover Removal
b) Thumb Winding Gear Control

**Figure 2-25** Clearing a Banknote Jam (Step 2)

**WARNING: DO NOT rotate the Drum Moving Gear in the Dispense (Right) direction without having a Banknote in the Unit! This may cause the Transport Belt to wind in the wrong direction causing poor performance.**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## Cleaning Procedure

Cleaning the Banknote Recycler's Transport path is very important. Adhering Iron powder or dirt on the Recycler's Sensors may cause poor performance or errors. Perform a scheduled cleaning at least once a month to keep the Recycler Transport path clean. Use a dry, soft, lint-free cloth or a Cotton swab to wipe dirt and stains from the Magnetic and Optical Sensors, Rollers and Belts. If necessary, blow the inside of the Unit clean with a compressed air jet to remove clinging foreign objects.

**Caution: Do not use alcohol, thinner or citrus based products for cleaning any surfaces.**

Figure 2-26 illustrates the locations of all of the Recycler's Sensors, and Table 2-4 lists their identity and specific cleaning preference.

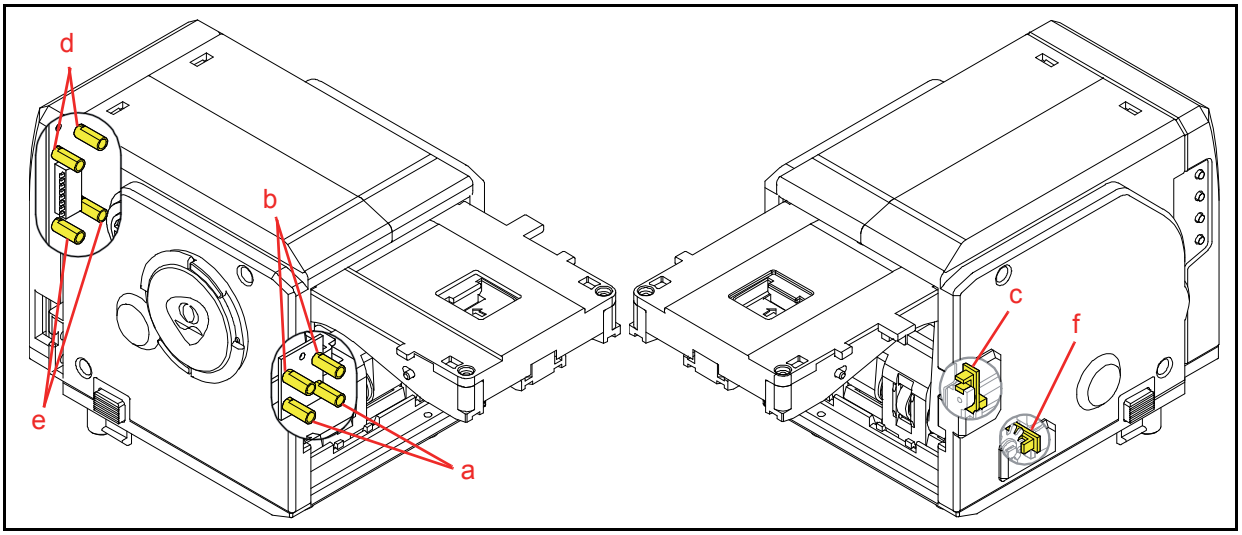


**Figure 2-26** VEGA-RC Sensor Locations

**Table 2-4** VEGA Sensor Locations

| No. | Sensor | Cleaning Preference |
|---|---|---|
| a | Position Detection Sensor 1 | Wipe clean using a lint-free cloth |
| b | Position Detection Sensor 2 | Wipe clean using a lint-free cloth |
| c | Open/Close Detection Sensor | Blow clean with compressed air spray |
| d | Full/Empty Detection Sensor 1 | Blow clean with compressed air spray |
| e | Full/Empty Detection Sensor 2 | Blow clean with compressed air spray |
| f | Transport Encoder Sensor | Blow clean with compressed air spray |

1. Open the Rear Cover and Clean the exposed Rubber Roller and four (4) Optical Sensors (Figure 2-27).

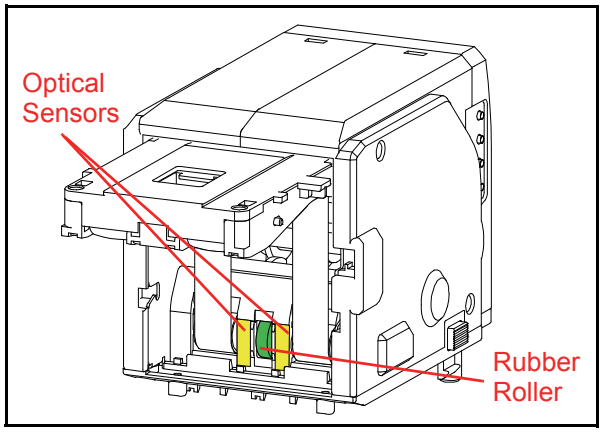


**Figure 2-27** Roller and Optical Sensor Locations

2. Clean the Pinch Roller and four (4) Prisms (Figure 2-28).

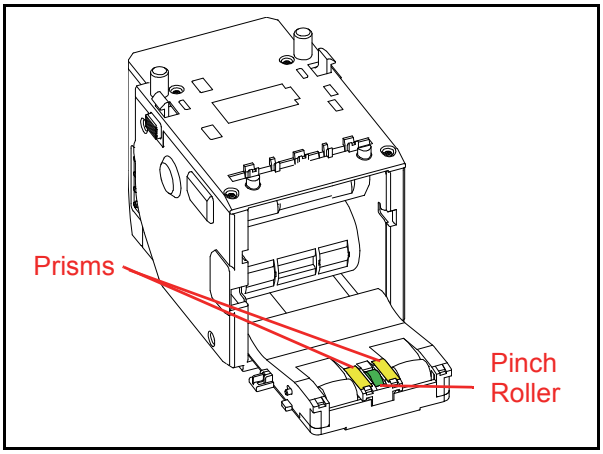


**Figure 2-28** Pinch Roller and Prism Locations


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*NOTE: Be sure to clean the Optical Sensors, Prisms, Rubber Rollers and the Pinch Roller, by using a lint-free cloth to remove dirt and foreign objects at least once a month.*

3. Use a pressurized jet of air to blow out collected stubborn dust and debris from the Unit.

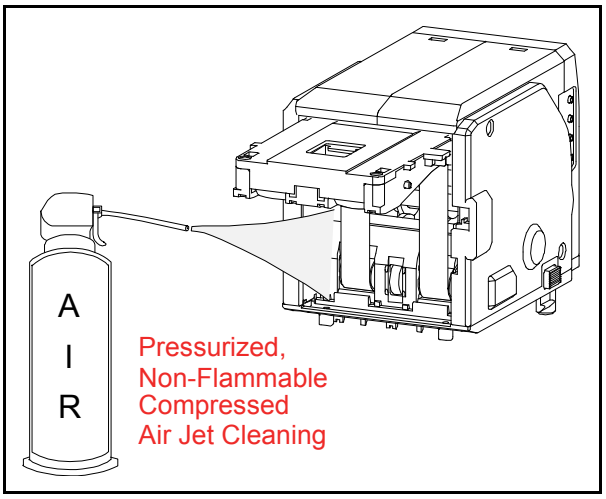


**Figure 2-29** Non-Flammable Air Jet Cleaning

*NOTE: Be sure to open the Rear Cover as indicated in Figure 2-29, and use a Pressurized Air Jet to clean the Unit least once a month.*


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## Interface Circuit Schematics

Figure 2-30 illustrates the VEGA-RC TTL Circuit Interface Schematic Diagram.

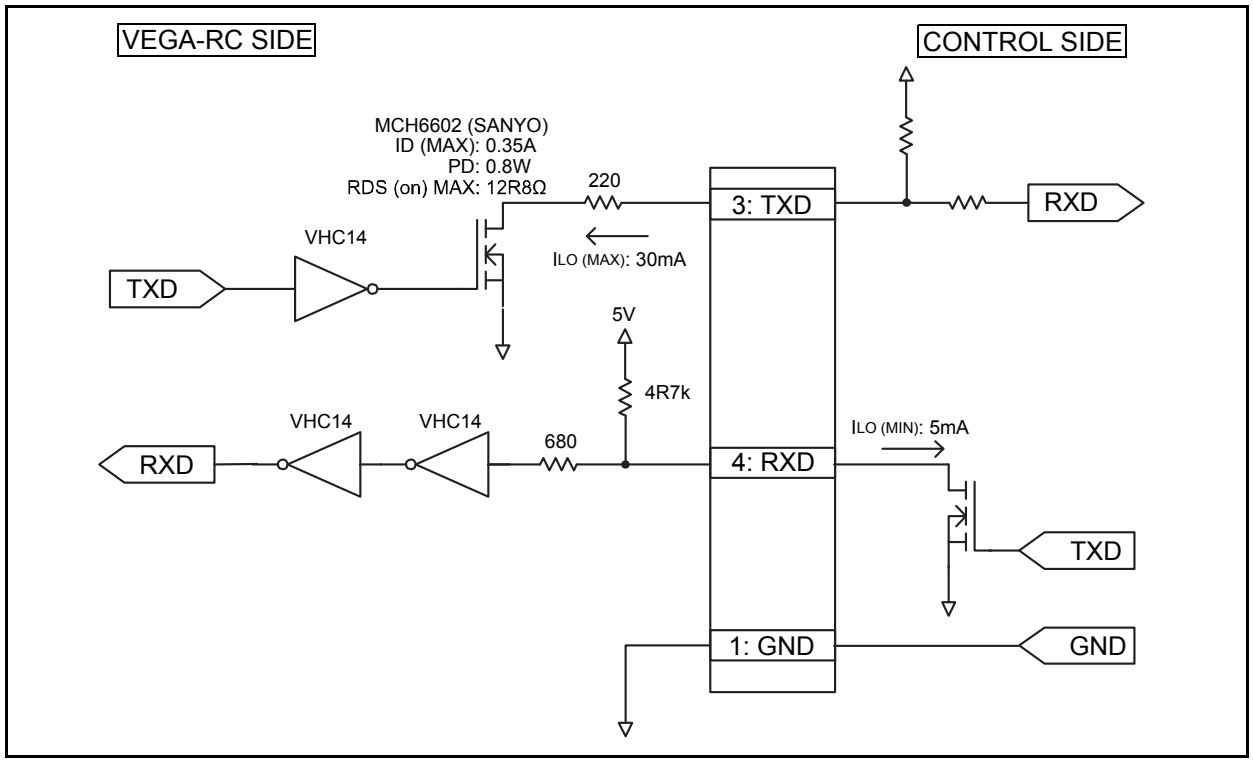


**Figure 2-30** VEGA-RC TTL Circuit Interface Schematic Diagram

Figure 2-31 illustrates the VEGA-RC Photo Coupler (MDB) Circuit Interface Schematic Diagram.

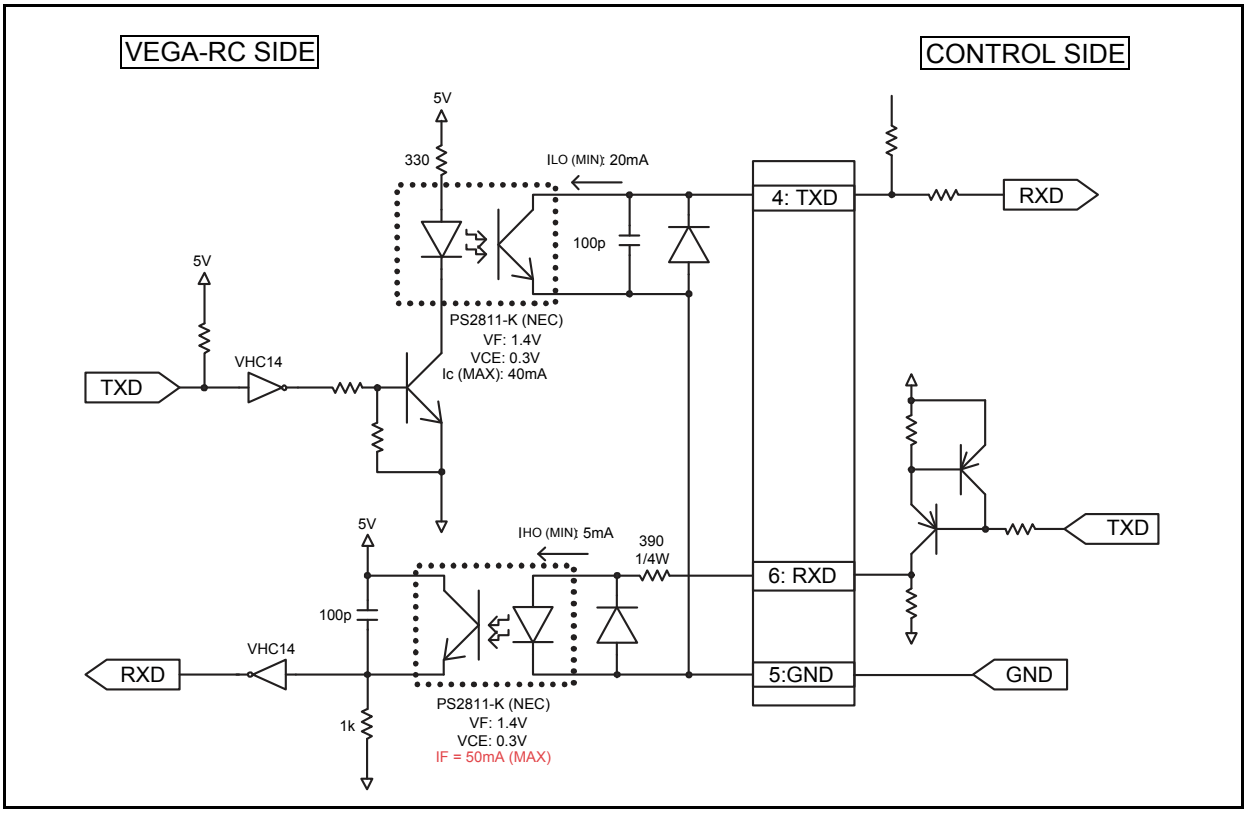


**Figure 2-31** VEGA-RC Photo Coupler (MDB) Circuit Interface Schematic Diagram


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## Operational Flowcharts

Figure 2-32 depicts part one of the basic VEGA-RC Banknote acceptance flow process (Initializing).

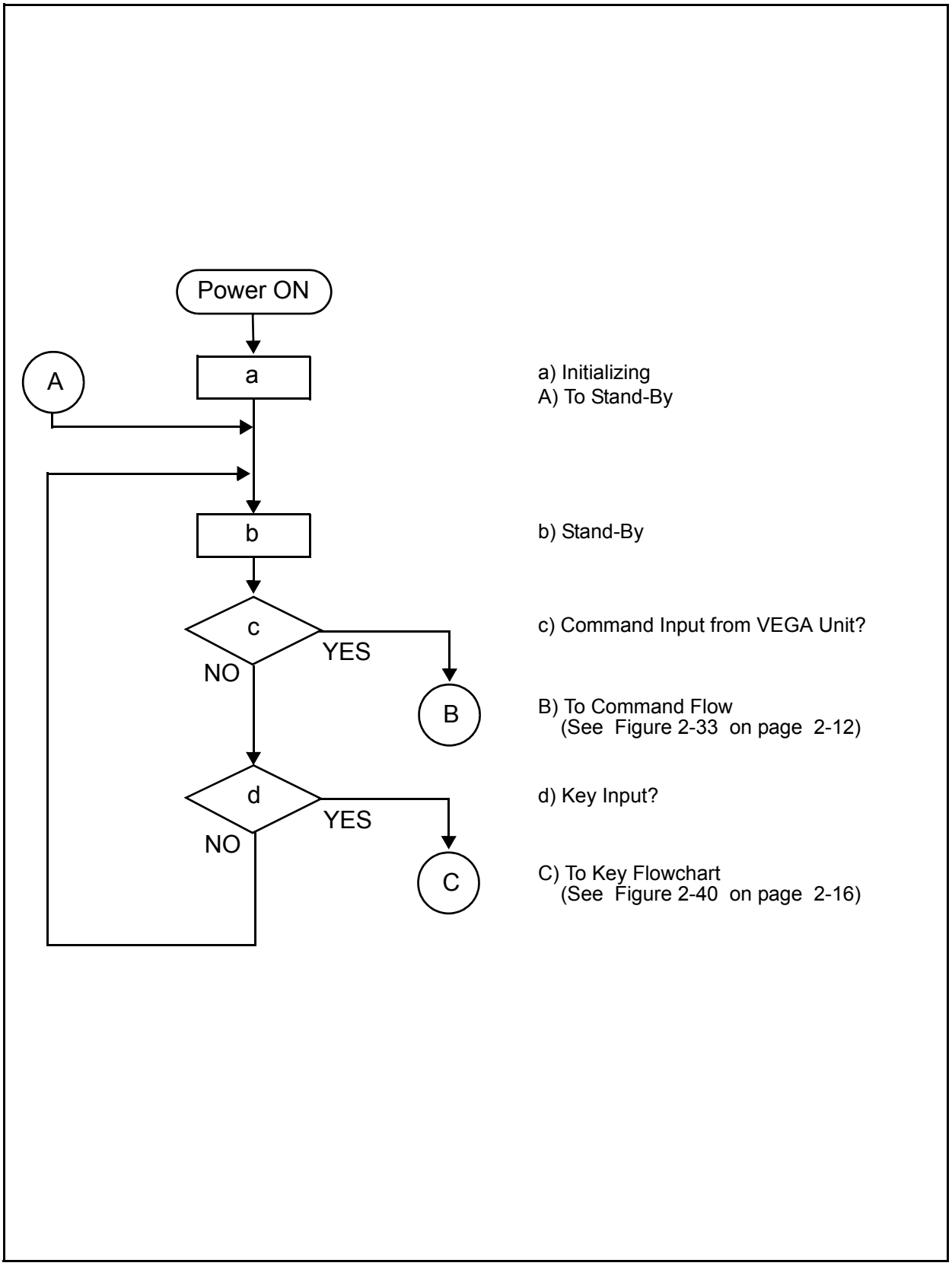


**Figure 2-32** VEGA-RC Banknote Recycler Operational Flowchart (Initializing)


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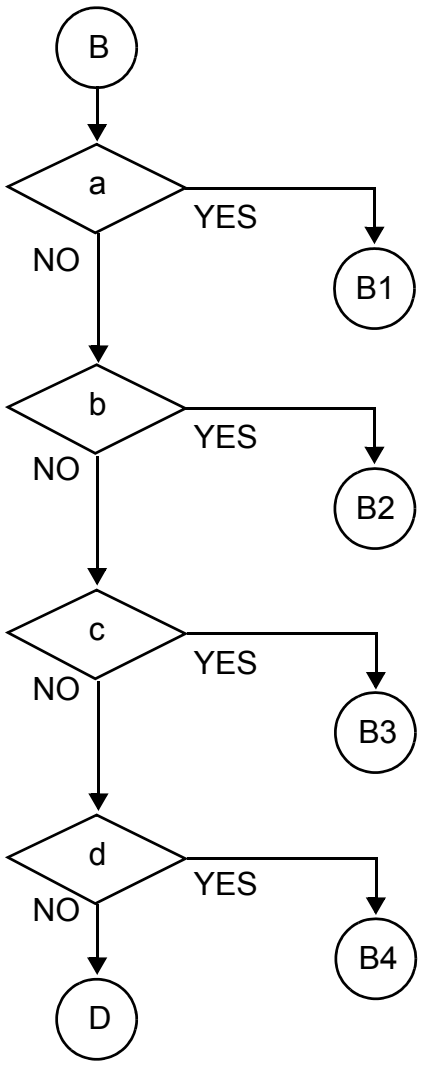
## Operational Flowcharts (Continued 2)

Figure 2-33 depicts part two of a typical VEGA-RC Banknote acceptance flow process (Command).




B) Command Flow

a) Restore Command?

B1) To Restore Flow
(See Figure 2-35 on page 2-13)

b) Dispense Command?

B2) To Dispense Flow
(See Figure 2-36 on page 2-14)

c) Retrieving Command?

B3) To Retrieving Flow (See Figure 2-38 on page 2-15)

d) Collect Log Command?

B4) To Collect Log Flow
(See Figure 2-39 on page 2-15)

D) To Clearing Error (Error Clearing Flow)
(See Figure 2-34 on page 2-13)

**Figure 2-33** VEGA-RC Banknote Recycler Operational Flowchart (Command)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## Operational Flowcharts (Continued 3)

Figure 2-34 depicts part three of a typical VEGA-RC Banknote acceptance flow process (Error Clearing).

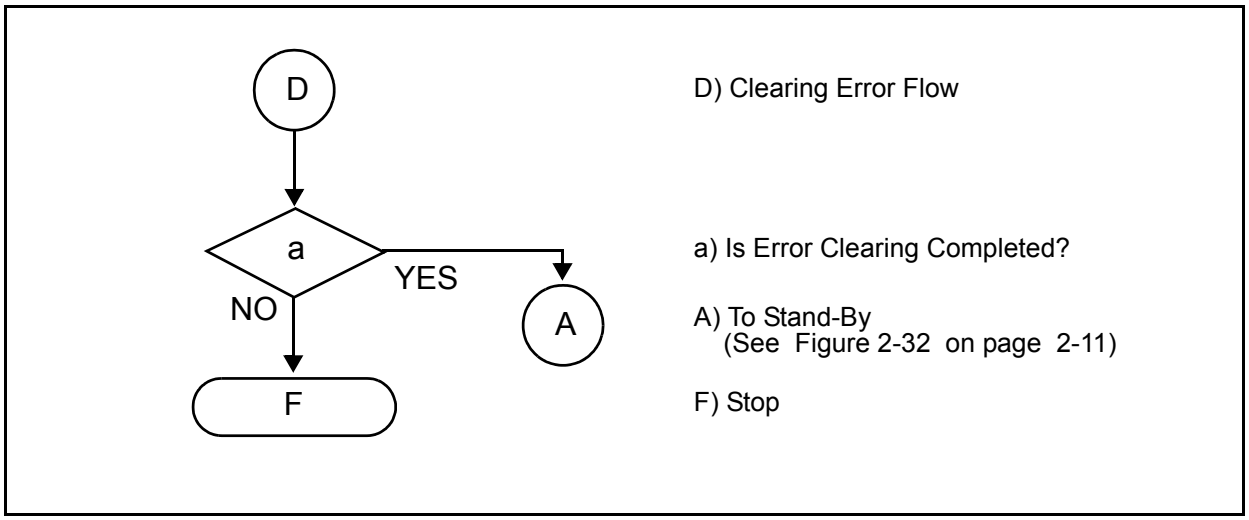


**Figure 2-34** VEGA-RC Banknote Acceptor Operational Flowchart (Error Clearing)

Figure 2-35 depicts part four of a typical VEGA-RC Banknote acceptance flow process (Restore).

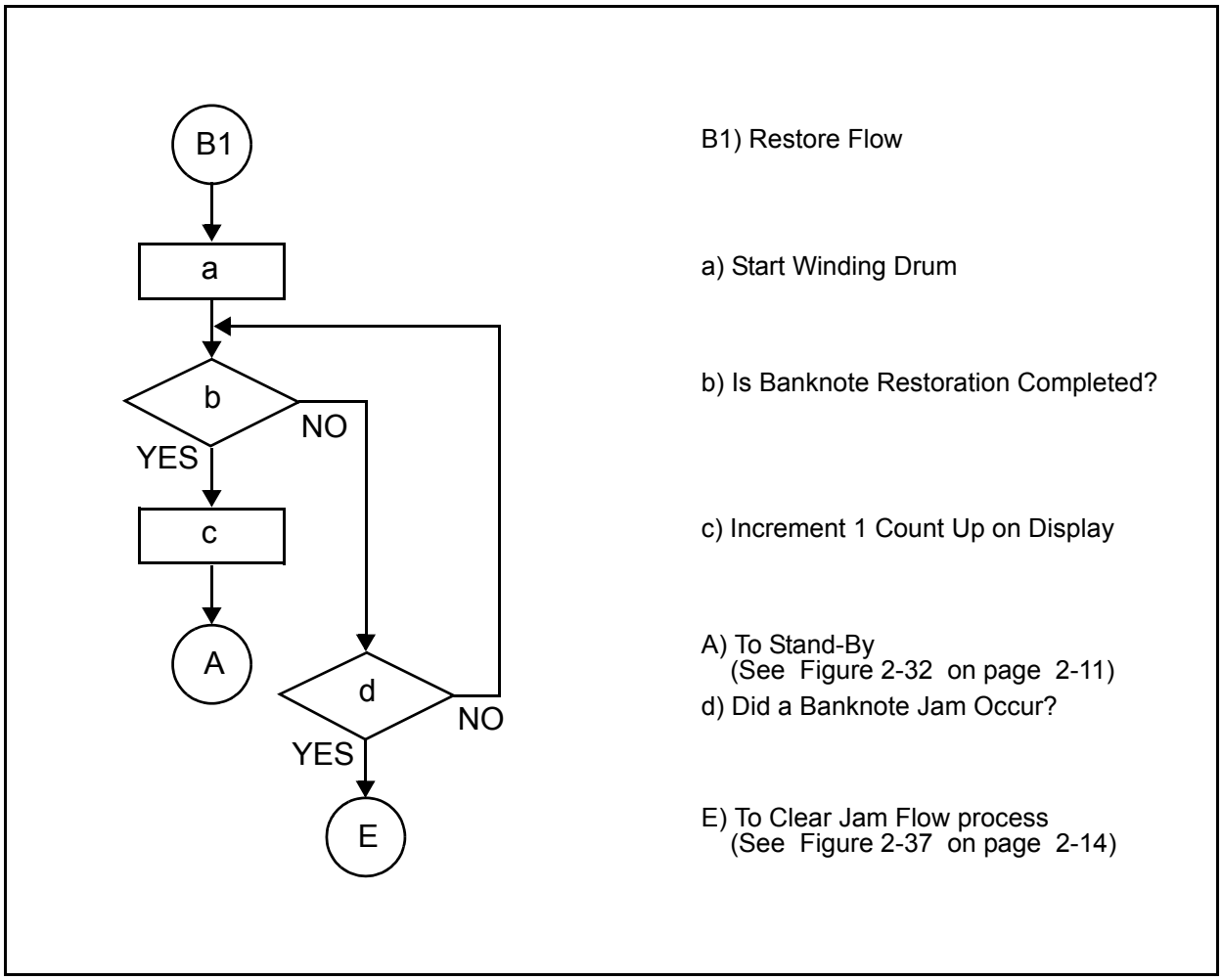


**Figure 2-35** VEGA-RC Banknote Recycler Operational Flowchart (Restore)


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## Operational Flowcharts (Continued 4)

Figure 2-36 depicts part five of a typical VEGA-RC Banknote acceptance flow process (Dispense).

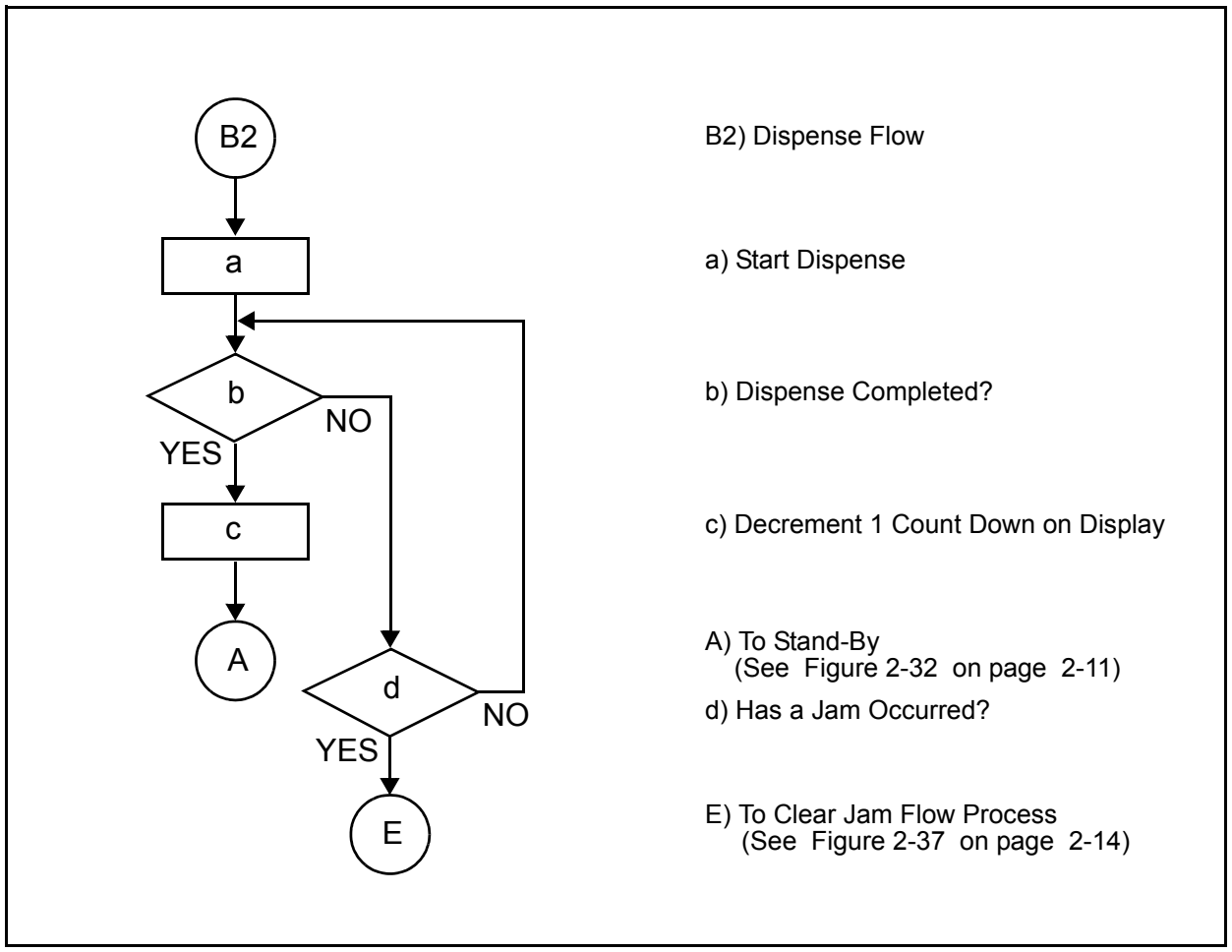


**Figure 2-36** VEGA-RC Banknote Recycler Operational Flowchart (Dispense)

Figure 2-37 depicts part six of a typical VEGA-RC Banknote acceptance flow process (Clear Jam).

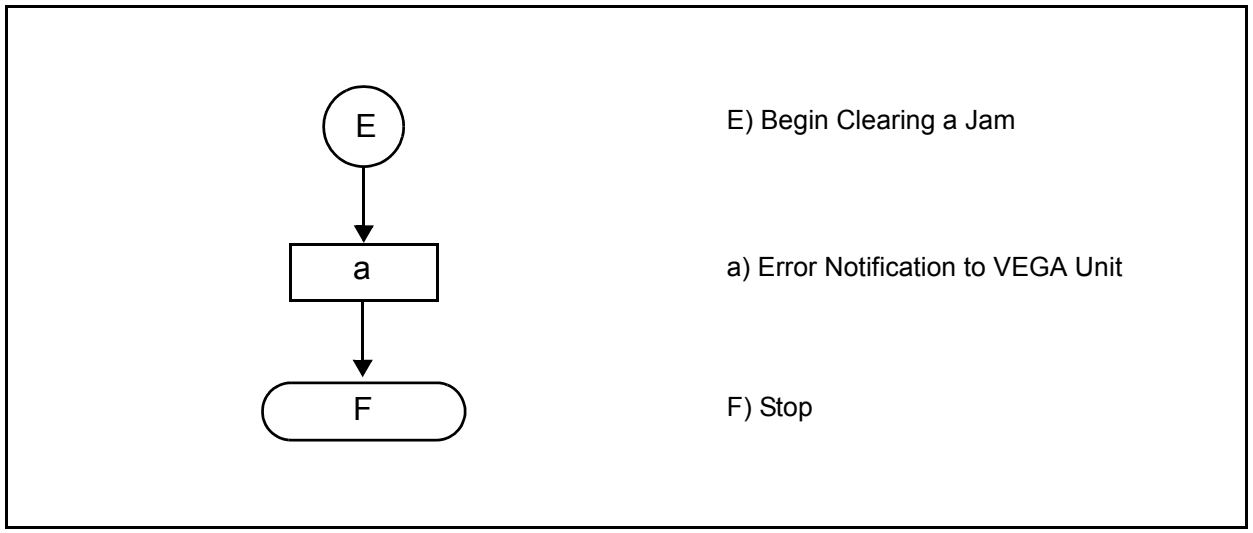


**Figure 2-37** VEGA-RC Banknote Recycler Operational Flowchart (Clear Jam)


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## Operational Flowcharts (Continued 5)

Figure 2-38 depicts part seven of a typical VEGA-RC Banknote acceptance flow process (Retrieving)

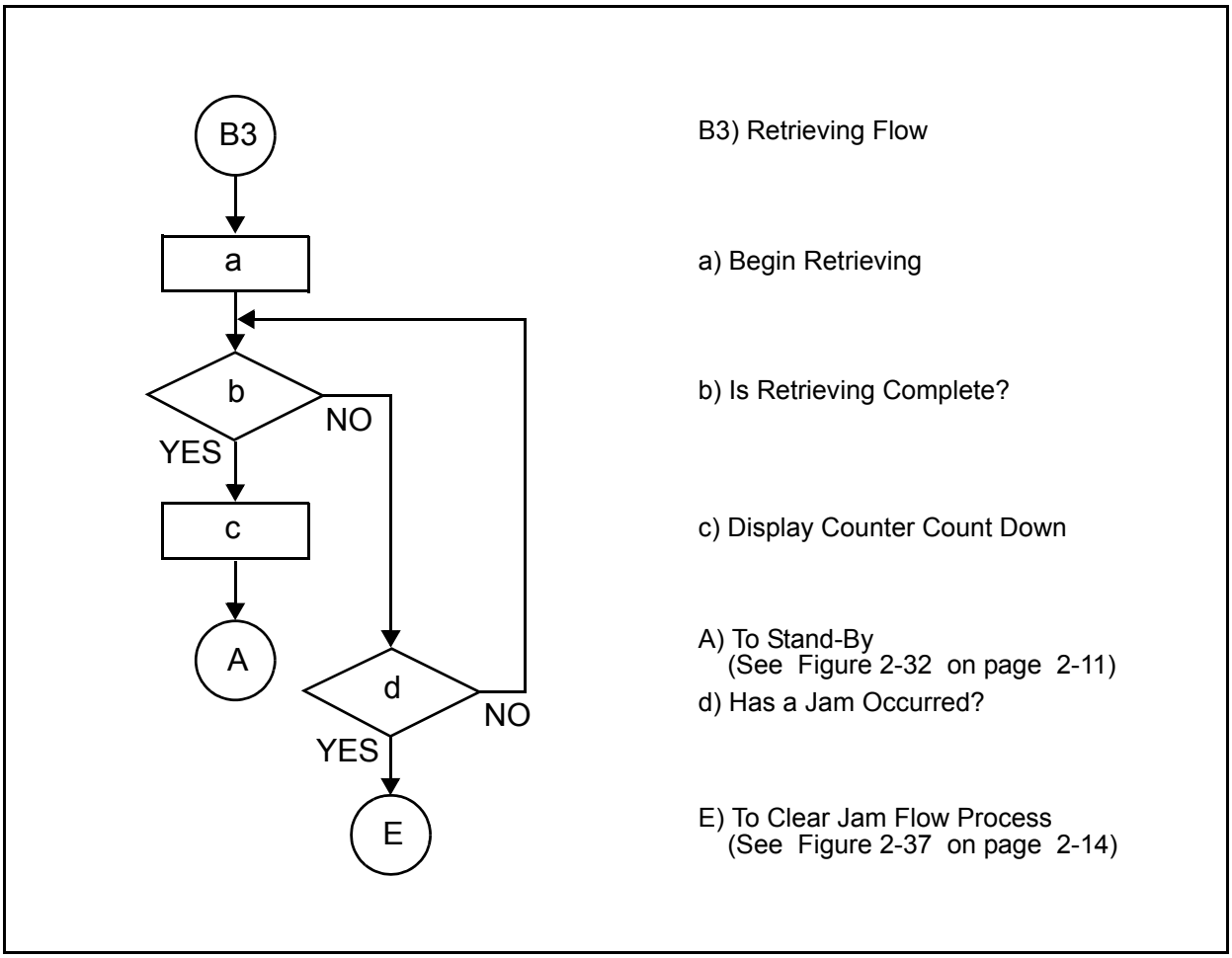


**Figure 2-38** VEGA-RC Banknote Recycler Operational Flowchart (Retrieving)

Figure 2-39 depicts part eight of a typical VEGA-RC Banknote acceptance flow process (Collect Log).

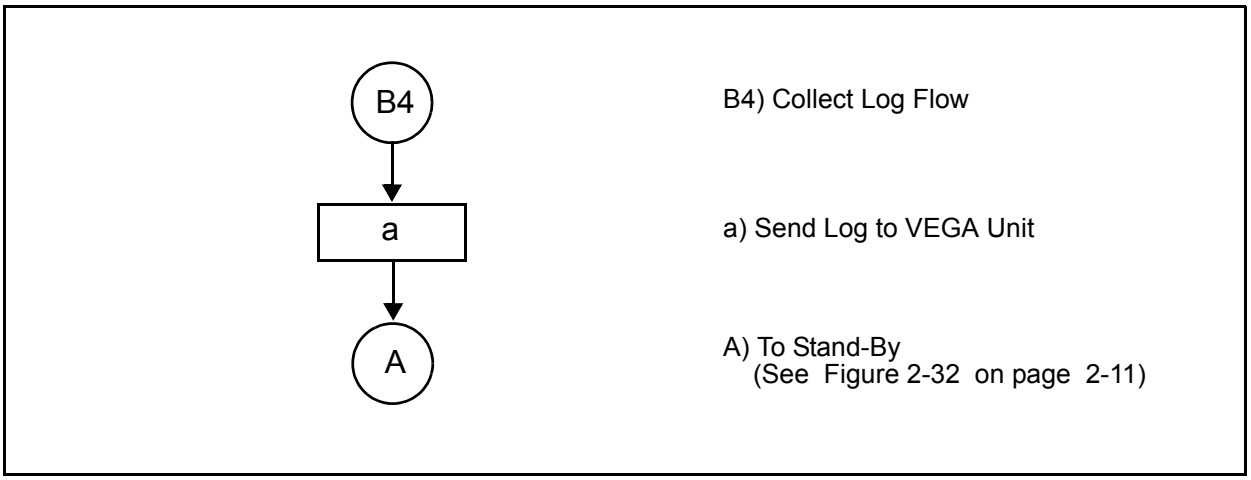


**Figure 2-39** VEGA-RC Banknote Recycler Operational Flowchart (Collect Log)


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## Operational Flowcharts (Continued 6)

Figure 2-40 depicts part nine of a typical VEGA-RC Banknote acceptance flow process (Key Input).

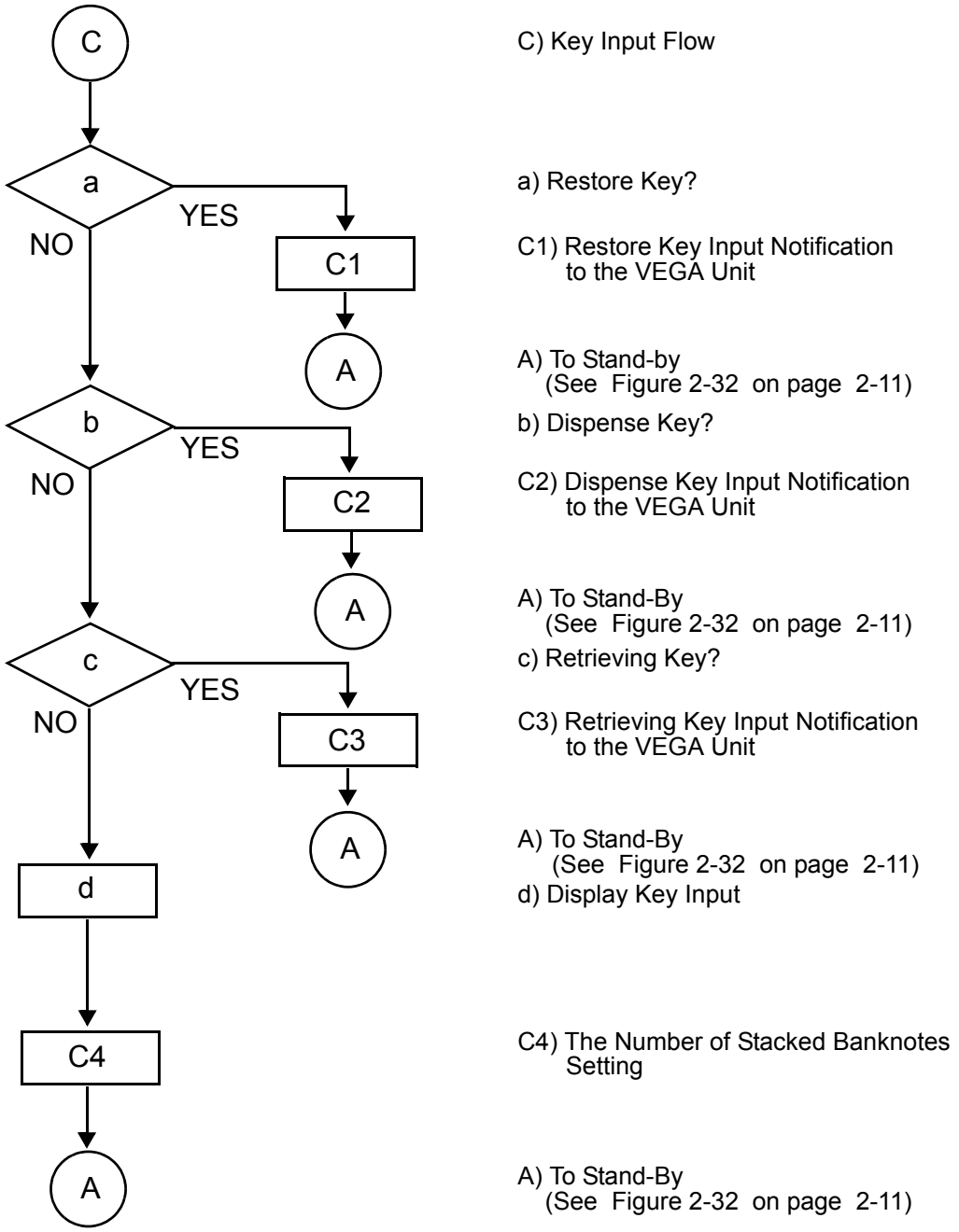


**Figure 2-40** VEGA-RC Banknote Recycler Operational Flowchart (Key Input)


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# VEGA-RC™ Series
## BankNote Recycler
Section 3

## 3 COMMUNICATIONS

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

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# VEGA-RC™ Series
## BankNote Recycler
Section 4

## 4 DISASSEMBLY/REASSEMBLY

This section provides disassembly and reassembly instructions for the VEGA-RC™ Series BankNote Recycler. This section contains the following information:

- Tool Requirements
- Main CPU Board Removal
- Drive Motor Removal
- Open/Close Detection Board Removal
- Encoder & Position Detection Board Removal
- Rubber Pulley/Drive Roller Removal
- Clear & Metallic Edge Belt Removal
- Clear & Metallic Edge Belt Replacement

### Tool Requirements

The following tools will be required to perform disassembly and reassembly:

- A #1 & #2 Phillips Screwdriver
- Set of Jewelers Phillips Screwdrivers
- E-Clip (E-Ring) Pliers
- Needle Nose Pliers
- Tweezers

### Main CPU Board Removal

To remove the Main CPU Board proceed as follows:

1. Use a Jewelers Screwdriver to release the two (2) Claw Hooks located on the upper side of the Front Cover (Figure 4-1 $a_1$ & $a_2$), and remove the Front Cover from the VEGA-RC Unit (Figure 4-1 b).

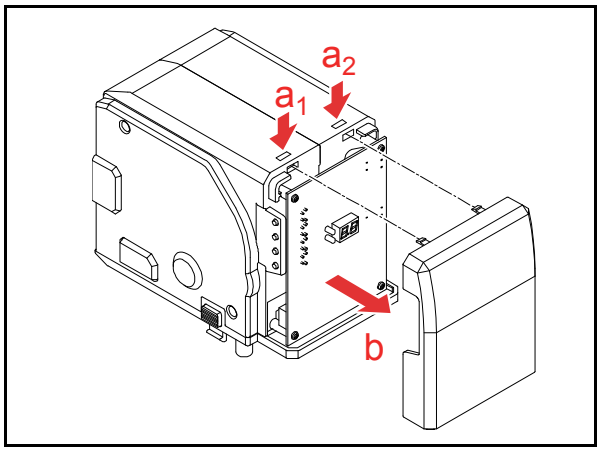


**Figure 4-1** Front Cover Removal

2. Remove four (4) mounting screws (Figure 4-2 $a_1$, $a_2$, $a_3$, & $a_4$) retaining the Main CPU Board (Figure 4-2 b) to the Unit.
3. Pull the CPU Circuit Board slightly outward at its top, and then slide it to the right in order to clear the Pushbuttons from the left side of the chassis. The CPU Circuit Board is now only connected to the Unit by two (2) Connectors located in the lower left corner of the Board.
4. Carefully unplug the two (2) Connectors from the CPU Board (Figure 4-2 $c_1$ & $c_2$).

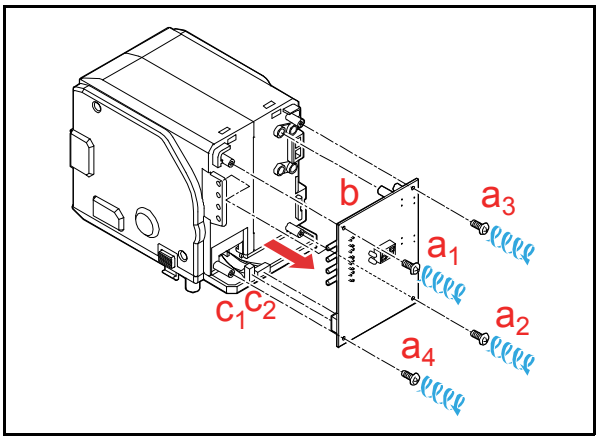


**Figure 4-2** Main PC Board Removal

*NOTE: If the CPU Board is being replaced with a new Board, be sure to remove the Display Protection Sticker located on the Seven (7) Segment Display of the new CPU Board before installing it.*

*NOTE: Be sure to remove the Connectors by grasping on the Connector Plug itself! Pulling on the harness may damage the Cable or dislodge the pins from within Connector.*

### Drive Motor Removal

To remove the Drive Motor proceed as follows:

1. Remove the four (4) Cabinet mounting screws (Figure 4-3 $a_1$, $a_2$, $a_3$, & $a_4$) two (2) located on each side of the Unit using a #2 Screwdriver, and remove the Right Side Cover (R) (Figure 4-3 b); then
2. Remove the Left Side Cover (L) (Figure 4-3 c) from the Unit.

*NOTE: Do NOT overtighten the screws when installing the side covers. The screw thread may be stripped making screw removal impossible.*


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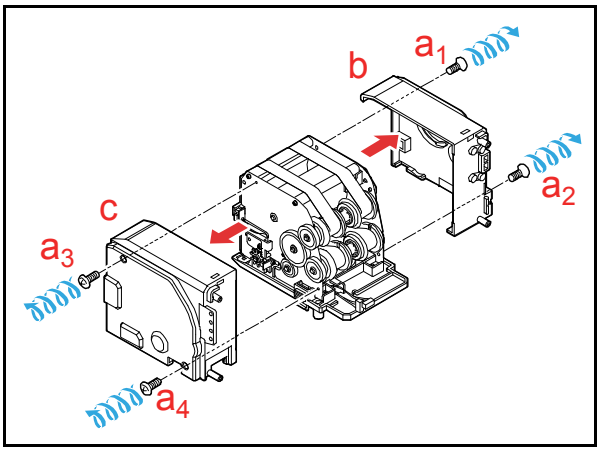


**Figure 4-3** Cover (R) & Cover (L) Removal

3. Remove the four (4) mounting screws (Figure 4-4 $a_1$, $a_2$, $a_3$, & $a_4$) from the bottom base of the VEGA-RC Unit.
4. Release the Sensor Cable Harness from the grooved Cable Channel located in the Base (Figure 4-4 b), and then separate the Unit from the Base Assembly (Figure 4-4 c).

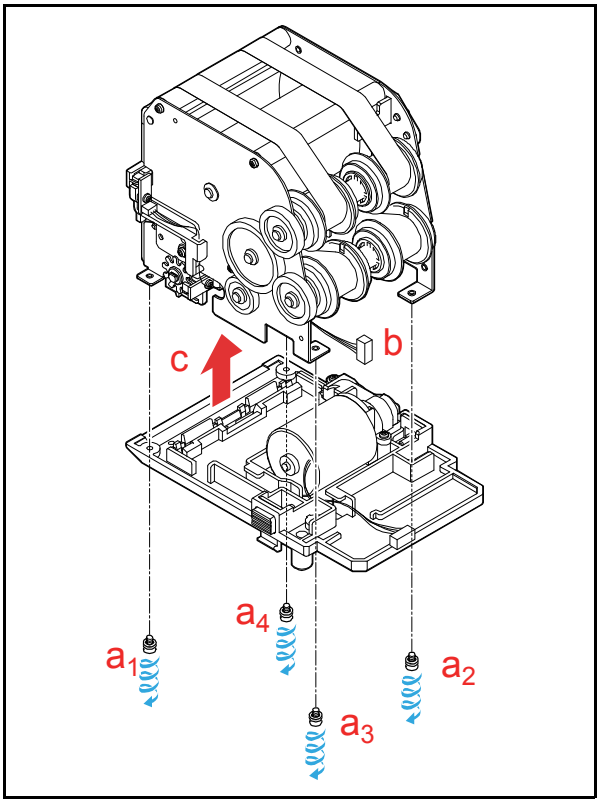


**Figure 4-4** Base Part Removal

5. Remove the two (2) Gear Box Mounting Screws (Figure 4-5 $a_1$ & $a_2$), and lift the Gear Box Cover (Figure 4-5 b) and Motor (Figure 4-5 c) out of the Base Assembly.

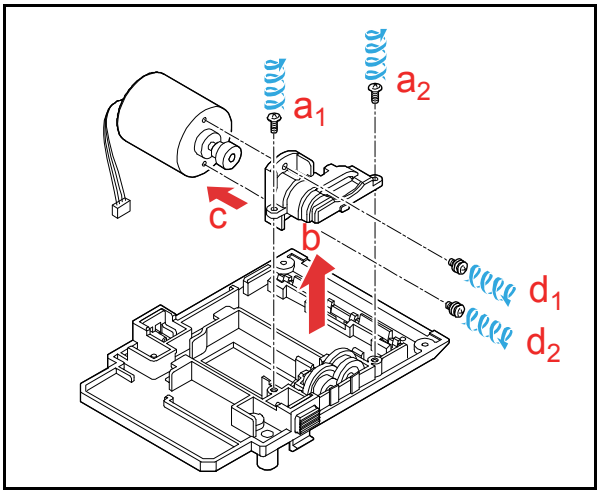


**Figure 4-5** Motor Removal

6. Remove the two (2) Motor Mounting Screws (Figure 4-5 $d_1$ & $d_2$) retaining the Motor to the Gear Box Cover, and pull the Motor out of the Gear Box Cover Assembly.

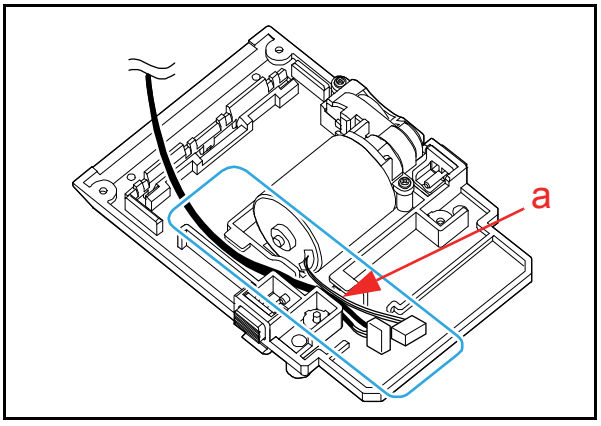


**Figure 4-6** Drive Motor Installation

*NOTE: Ensure that the Motor Power Cable feeds towards the front of the Base Assembly when re-installing the Motor, and that the Sensor Cables are re-routed into the grooved Cable Channel (Refer to Figure 4-6 a) when re-attaching the Base Assembly to the Unit.*


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## Open/Close Detection Board Removal

To remove the Open/Close Detection Board proceed as follows:

*NOTE: Be sure to remove the Connectors by grasping on the Connector Plug itself! Pulling on the harness may damage the Cable or dislodge the pins from the Connector.*

1. Unplug the two (2) Signal Connectors (Figure 4-7 $a_1$ & $a_2$) attached to the Encoder and Position Detection Boards.

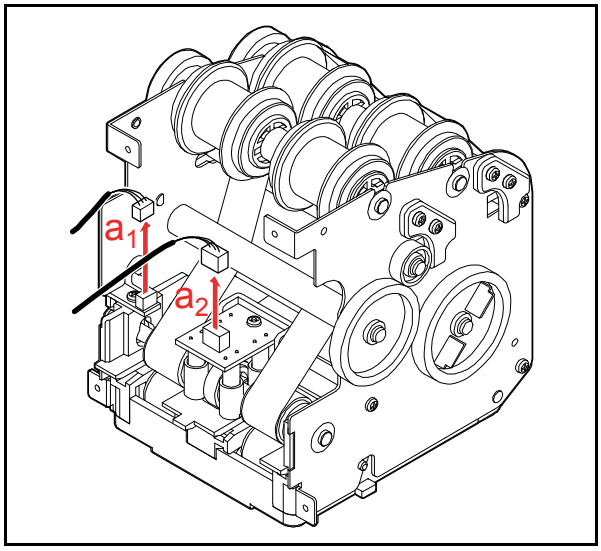


**Figure 4-7** Connector Removal

2. Remove the single (1) Sensor Bracket Mounting Screw (Figure 4-8 a) retaining the Sensor Bracket to the VEGA-RC Unit (Figure 4-8 b), and remove the Sensor Bracket from the Unit.

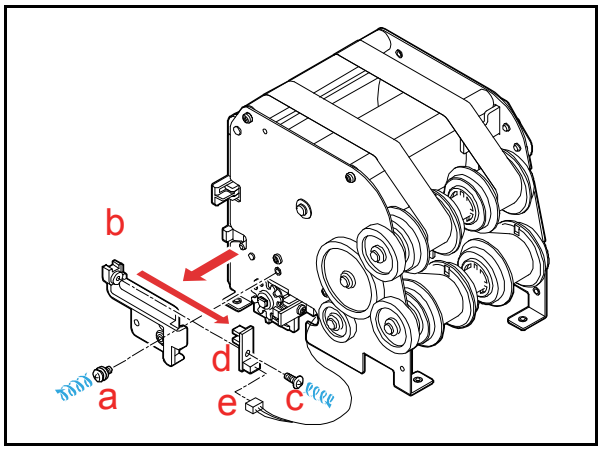


**Figure 4-8** Open/Close Detection Board Removal

3. Remove the single (1) mounting screw (Figure 4-8 c) retaining the Open/Close Detection Board in place (Figure 4-8 d) on the Sensor Bracket, and remove the Open/Close Detection Board from the Sensor Bracket.
4. Unplug the single (1) Signal Connector (See Figure 4-8 e) attached to the Open/Close Detection Board Head.

*NOTE: Be sure to grasp the small Circuit Boards by their sides when removing or reinstalling the mounting Screws in order to avoid damage to their Sensors or other Circuit Board components.*

## Encoder & Position Detection Board Removal

To remove the Encoder & Position Detection Board proceed as follows:

1. Remove the two (2) side mounting screws (Figure 4-9 $a_1$ & $a_2$) holding the Course Reversing Assembly (Figure 4-9 b) in place. Using one hand, slightly flare/widen the left and right Plastic sides of the Unit.
2. Using the other hand, grasp the Course Reversing Assembly at its center, and pull it straight outwards from the Unit along with the Belts (Figure 4-9 b).
3. With the Belts extended, remove the Course Reversing Assembly from within the Belts by carefully sliding it out to the right (Figure 4-9 c).

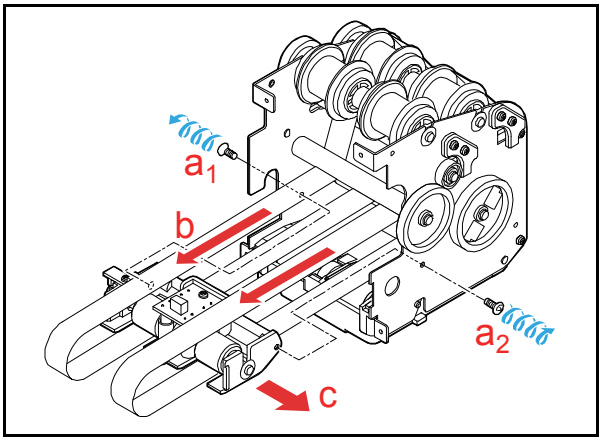


**Figure 4-9** Course Reversing Assembly Removal

*NOTE: The Clear, Transparent Film Belts are tensioned and will automatically self-retract back towards their Bobbins.*
*Once the Course Reversing Assembly is removed, manually turn the Bobbins if necessary to take up any remaining slack in the Belts.*

4. While holding the Encoder Board in place, remove its single (1) mounting screw (Figure 4-10 a), and lift the Encoder Board up and off the Course Reversing Assembly (Figure 4-10 b).
5. Hold the RC Position Detection Board in place and remove its single (1) mounting screw (Figure 4-10 c), then lift the RC Position Detection Board up and off the Course Reversing Assembly (Figure 4-10 d).


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*NOTE: Be sure to hold onto the Circuit Boards when removing their retaining Screws in order to avoid damage to their Sensors or other components located on the Circuit Boards.*

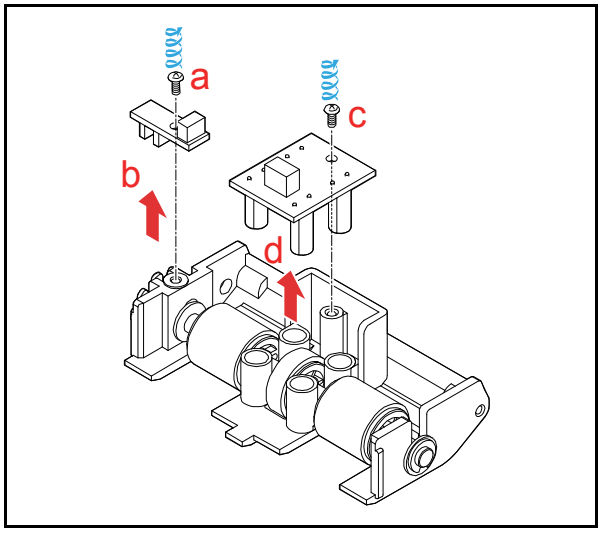


**Figure 4-10** Encoder Board & Position Detection Board Removal

## Rubber Pulley & Drive Roller Removal

To remove the Rubber Pulley & Drive Roller proceed as follows:

1. Remove the six (6) E-rings securing the Drive Gear, Rollers and Bushings in place on the Drive Shaft (Figure 4-11 $a_1$ through $a_6$), and
2. Remove the three (3) Pins (Figure 4-11 $b_1$, $b_2$ & $b_3$) from the Shaft, then
3. Separate the two (2) Rubber Rollers (Figure 4-11 $c_1$ & $c_2$), the single (1) Drive Roller (Figure 4-11 d) from the Shaft by pulling it out of the Assembly from the right side (Figure 4-11 e).

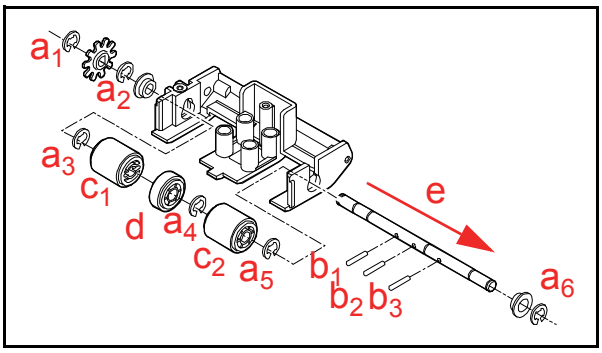


**Figure 4-11** Rubber and Drive Roller Removal

## Clear & Metallic Edge Belt Removal

To remove the Clear & Metallic Edge Belt proceed as follows:

1. Remove the three (3) End Cap retaining screws (Figure 4-12 $a_1$, $a_2$ & $a_3$) holding the Tray Cover in place (Figure 4-12 b), and
2. Remove the Tray Cover from the VEGA-RC Unit.

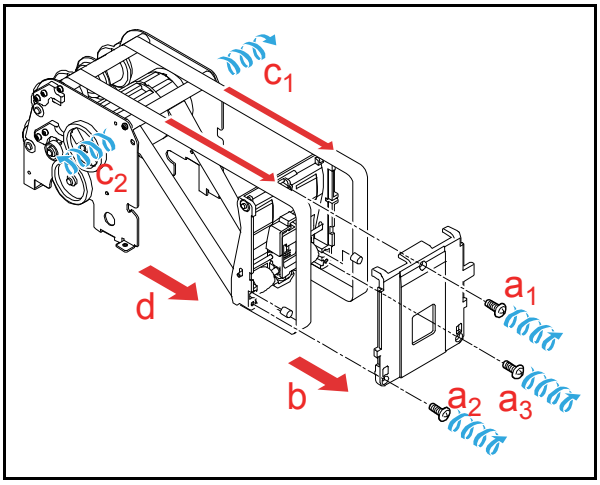


**Figure 4-12** Tray Cover & Tray Removal

3. Loosen the two (2) Tray mounting screws (Figure 4-12 $c_1$ & $c_2$) located on the left and right sides of the Unit.
4. Using one hand, carefully flare/widen the Plastic sides of the Unit at the top, and use the other hand to pull the Tray outwards from the Unit (Figure 4-12 d).
5. With the Tray extended, remove the two (2) Belts by sliding them off at the bottom left and bottom right sides of the Tray.

*NOTE: Once the Clear, Transparent Film Belts are removed from the Tray, manually wind the Bobbins to remove any slack in the Belts.*

6. Rotate the White-colored Thumb Handle (Figure 4-13 a) in a clockwise direction to turn the Main Bobbin (Figure 4-13 b) until the Belt Retaining Clips appear (Figure 4-13 $c_1$ & $c_2$).
7. Remove the two (2) Clips from the Main Bobbin (Figure 4-13 $d_1$ & $d_2$).
8. Remove the single (1) Metallic Silver Edge Coated Belt (Figure 4-13 e) and the three (3) Clear, Transparent Film Belts (Figure 4-13 $f_1$, $f_2$ & $f_3$) from the Upper Frame Body Shaft Assembly (Figure 4-13 g) and from the Lower Frame Body Shaft Assembly (Figure 4-13 h).
9. Remove the two (2) E-rings (Figure 4-13 $i_1$ & $i_2$) from the ends both Upper and Lower Frame Body Shaft Assembly, and take the Frame Body Assemblies out of the VEGA-RC Unit (Figure 4-13 j).


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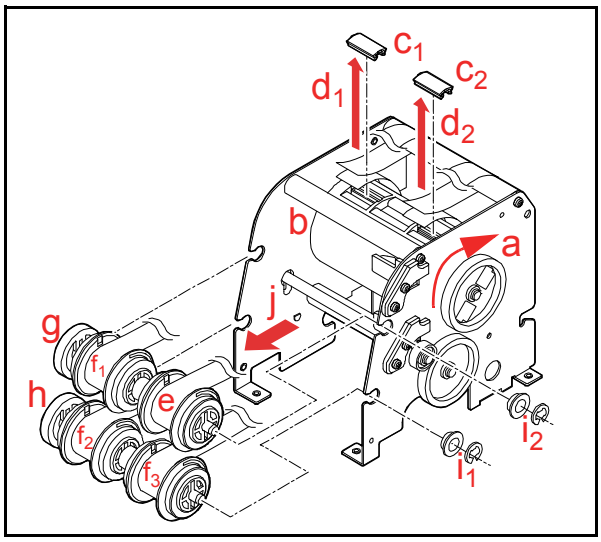


**Figure 4-13** Frame Body Shaft Assy. Removal

10. Slide the Belt Bobbin (Figure 4-14 $a_1$ & $a_2$) to the inside, and pull the single (1) pin out of the Shaft (Figure 4-14 b).
11. Separate the two (2) Belt Bobbins from each other, and perform same procedure used for removing the Upper and Lower Frame Body Shaft Assemblies.

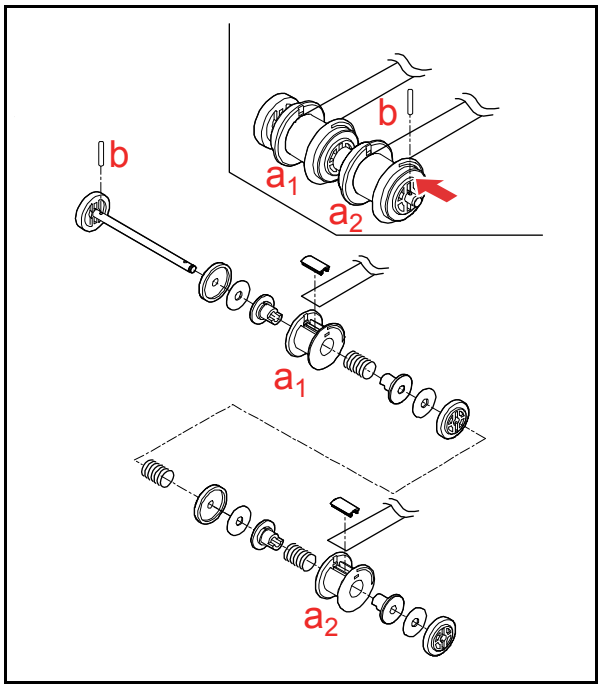


**Figure 4-14** Belt Bobbin Removal

*NOTE: When reeling the Belts back onto their Bobbins (Figure 4-15 a), be sure to rotate the Belts in the direction indicated by the arrow printed on the Bobbin.*
*When re-installing the KS Limit Spring (Figure 4-15 b), insert one end of the spring into the hole located on the right side of the Belt Bobbin (Figure 4-15 c), and insert the other end into the notched tip of the Bobbin Core (Figure 4-15 d).*
*When installed correctly, the Belts will automatically self-retract when gently pulled on.*

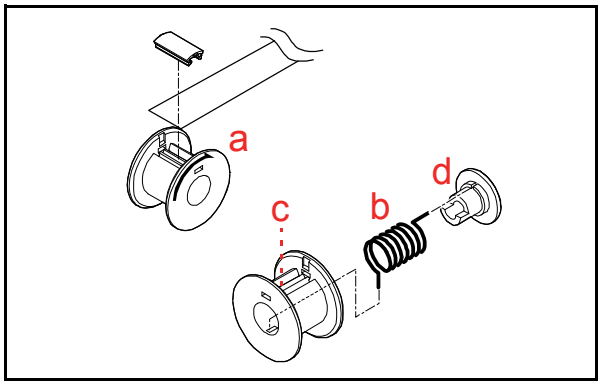


**Figure 4-15** Frame Body Shaft & Limit Spring

## Clear & Metallic Edge Belt Replacement

To replace the Clear & Metallic Edge Belts, proceed as as follows:

1. Install the Right Frame Body Shaft (R) (Figure 4-16 a) and the Left Frame Body Shaft (L) (Figure 4-16 b) with both sets of Belts attached to the VEGA-RC Unit.

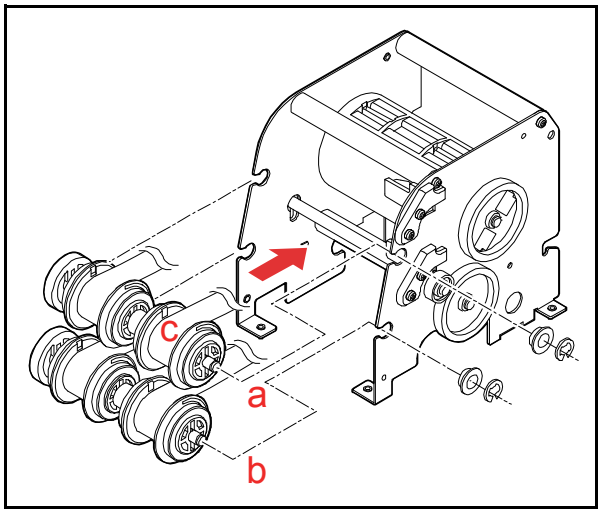


**Figure 4-16** Frame Body Shaft Assy. Installation


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*NOTE: Be sure to install the Metallic Silver Edged Belt onto the correct Bobbin as indicated in Figure 4-16c.*

2. Route the Belts from the Frame Body Shafts to the Main Bobbin as shown in Figure 4-17a.
3. Reattach the ends of the Belts to the Main Bobbin using the Retainer Clips (Figure 4-17 b).

*NOTE: Ensure that the edges of the Belts are flush with one another.*

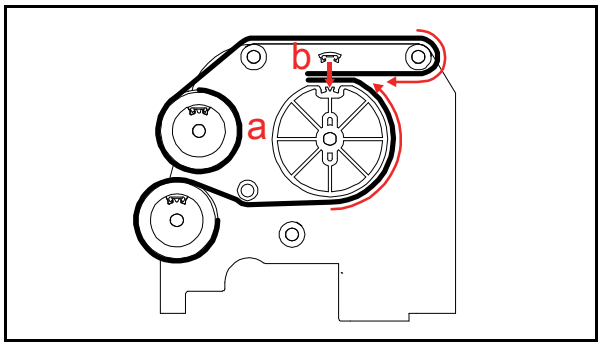


**Figure 4-17** Re-attaching the Belts

4. Pull on the Belts to obtain some slack and then re-install the Tray (Figure 4-18 a) and the Tray Cover (Figure 4-18 b). (Refer to "Clear & Metallic Edge Belt Removal" on page 4-4).

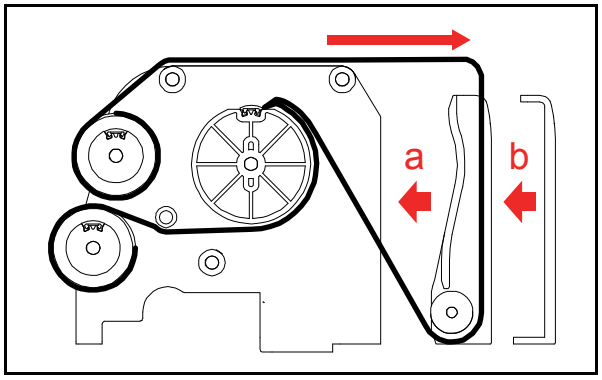


**Figure 4-18** Tray & Tray Cover Installation

*NOTE: After reinstalling the Tray, turn the Bobbins by hand to take up any excess slack in the Belts. This will make re-installation of the Tray Cover easier.*

5. Withdraw the Belts and reassemble the Course Reversing Assembly (Figure 4-18 a). (Refer to "Clear & Metallic Edge Belt Removal" on page 4-4).
6. As a final check, verify that the Belts are installed and routed correctly as shown in Figure 4-19.

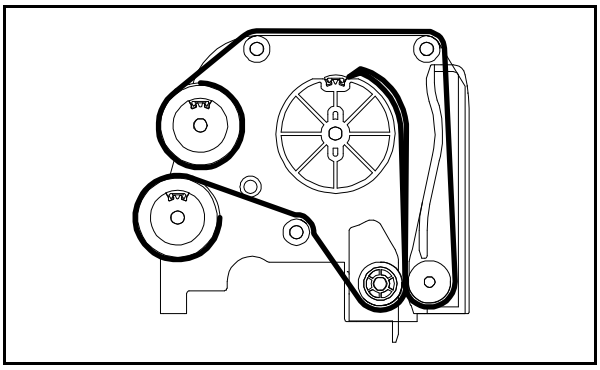

**Figure 4-19** Clear and Metallic Belt Installation Order

To re-assemble any other component assemblies in this procedure, simply reverse the existing disassembly instructions provided here.


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# VEGA-RC™ Series
## BankNote Recycler
Section 5

## 5 WIRING DIAGRAMS

This section provides the VEGA-RC™ Series BankNote Recycler Frame wiring diagram for the following items:

- System Wiring Diagram*

### VEGA-RC System Wiring Diagram

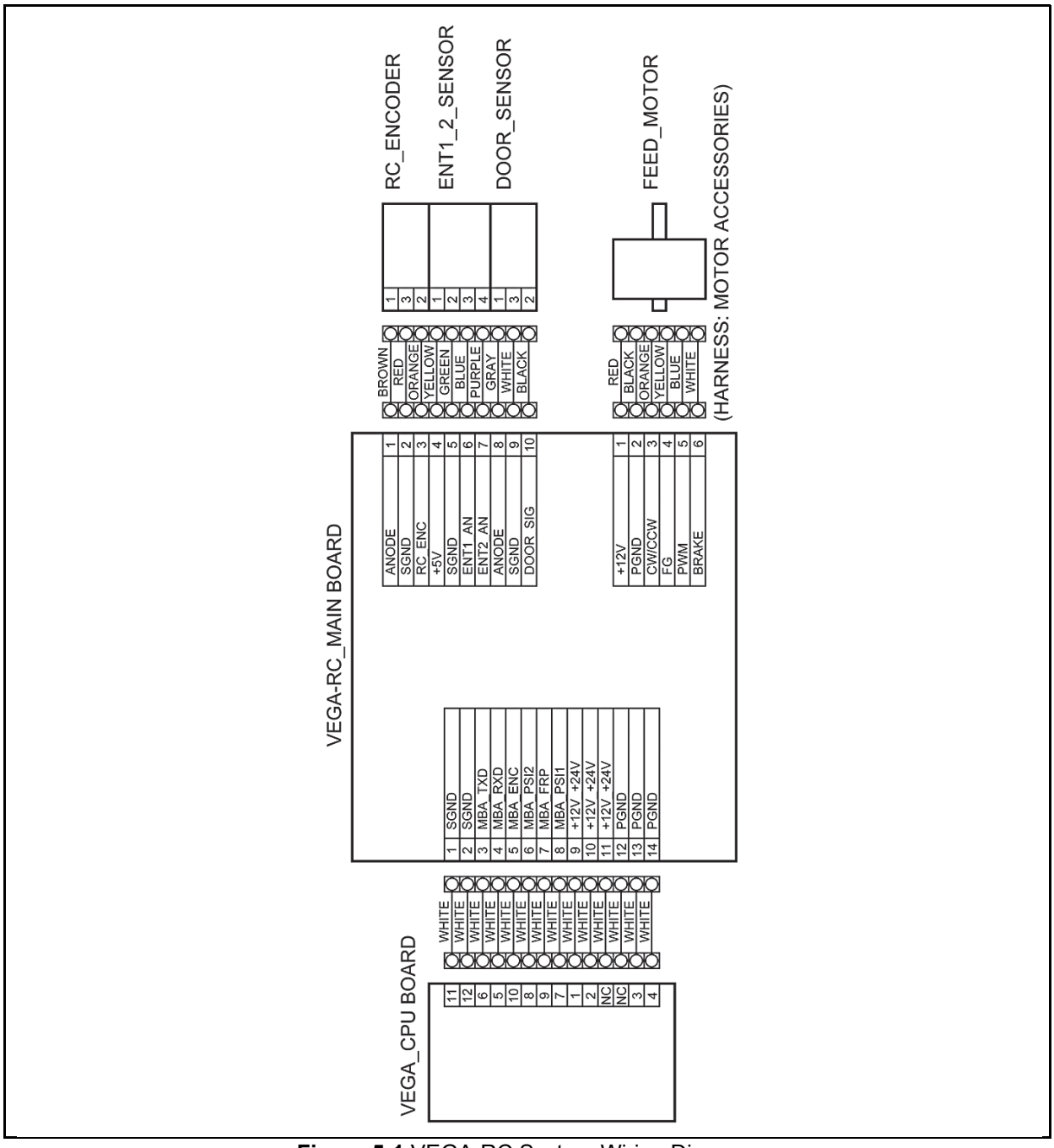


**Figure 5-1** VEGA-RC System Wiring Diagram

* CN2 is a Connector for additional Interfaces. However, CN2 is not indicated on the Wiring Diagrams because the actual part is not yet fitted in place.


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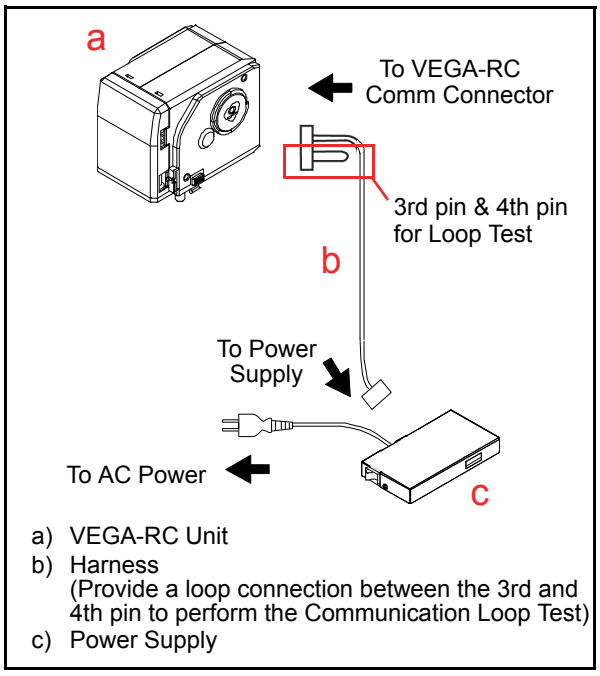
## 6 PERFORMANCE TEST

This section provides Performance Testing instructions for the VEGA-RC™ Series BankNote Recycler. This section contains the following information:

- Workbench Tool Requirements
- Display and Operation
- Performance Test Mode

### Workbench Tool Requirements

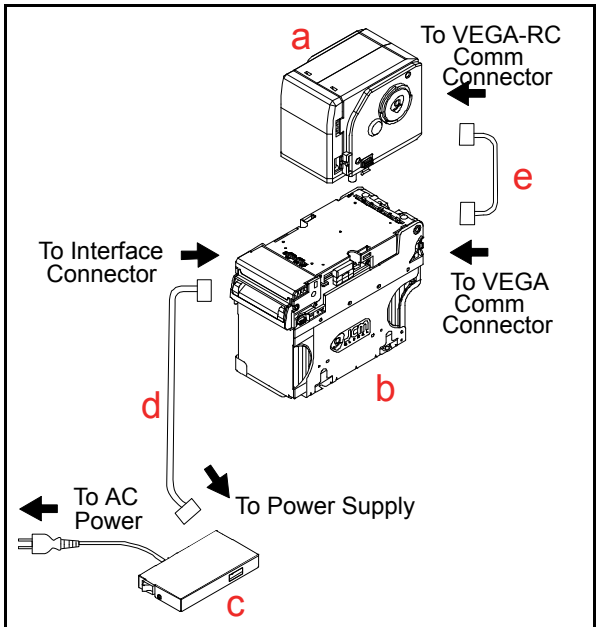
Figure 6-1 and Figure 6-2 illustrate and list the tools and equipment interconnects necessary for a VEGA-RC Unit workbench test fixture.




a) VEGA-RC Unit
b) Harness
(Provide a loop connection between the 3rd and 4th pin to perform the Communication Loop Test)
c) Power Supply

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

*NOTE: Only short the 3rd pin (TXD) and the 4th pin (RXD) of the VEGA-RC Main CPU Board CN3 to each other when performing a Communication Loop Test, otherwise leave them as individual pin connections.*




a) VEGA-RC Unit
b) VEGA Unit
c) Power Supply
d) Harness
e) VEGA to VEGA-RC Interconnection Harness

**Figure 6-2** Tool and Harness Connection

*NOTE: When preparing to run a VEGA-RC Unit Performance Test, set DIP Switch No.8 on the VEGA-RC Unit to 'ON'. Although the two units are physically connected, it is not necessary to set any DIP Switches on the VEGA Unit in order to run the VEGA-RC performance tests.*

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## Display and Operation

The VEGA-RC DIP Switch and Pushbuttons are used during VEGA-RC performance testing. Refer to "Component Names" on page 1-4 of this Manual to identify the location of these controls.
When running a Performance Test, the status and test results of each test are indicated on the Seven (7) Segment Displays located on the VEGA-RC CPU Board visible through the Rear Cover.
Refer to Figure 6-3 below as a guide for number and character recognition when reading the Seven (7) Segment Displays.

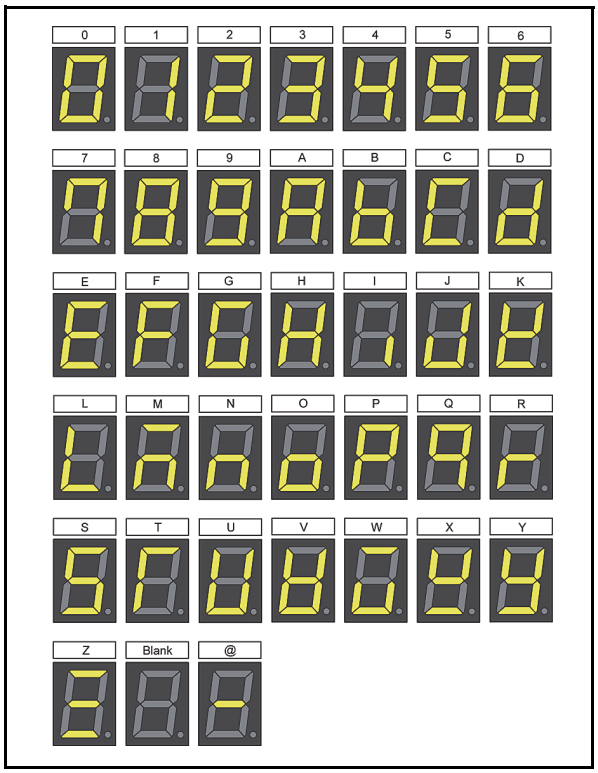



**Figure 6-3** Reading Seven Segment Display

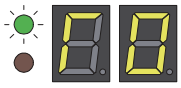
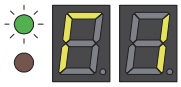
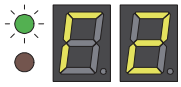
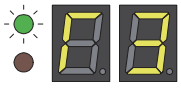
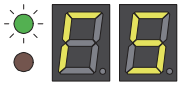
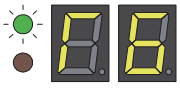
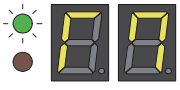
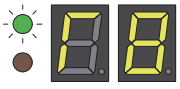
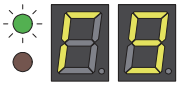
## Performance Test Modes

To launch a particular Performance Test Mode, proceed as follows:

1. Set DIP Switch #8 of the VEGA-RC to ON.
2. Apply power to the VEGA-RC by turning the VEGA Unit's power ON. The VEGA-RC Unit is now in Test Mode. The Seven (7) Segment Display will indicate "T0" to begin the Performance Test Modes.
3. Table 6-1 illustrates the nine Seven (7) Segment Display patterns that occur during the various Performance Tests selections.
4. Use Pushbuttons "B" or "D" to select a particular Performance Test. When the desired test number is shown on the Seven (7) Segment Display, press the "A" to start the selected test.

*NOTE: Pressing the "A" Pushbutton for longer than 3 seconds will exit the current test and return to the Test Select Mode with the Seven (7)Segment Display showing "T0".*

**Table 6-1** Performance Test Indication

| 7-Seg | Indication/Description | |
|---|---|---|
|  | T0 | Key Function Test |
|  | T1 | Position Detection Sensor 1 A/D Value* |
|  | T2 | Position Detection Sensor 2 A/D Value* |
|  | T3 | Full/Empty Detection Sensor 1, 2 A/D Values* |
|  | T4 | Reserved |
|  | T5 | Reserved |
|  | T6 | Reserved |
|  | T7 | Communication Loop Test |
|  | T8 | Reserve |
|  | T9 | Detected dirt on the Transport Belts |

*. The A/D Value threshold of both Position Detection Sensor 1 and 2 is set at 80H. If the A/D Value is over 80H, both Sensors determine that no Banknote is detected. However, if the A/D Value is less than 80H, these Sensors determine a Banknote is detected.

## Test T0 - Key Function Test

This test group checks various Key function of the VEGA-RC unit including:

- Pushbutton Function Test
- DIP Switch Test
- Rear Cover Sensor Test
- Escrow Sensor Input Test
- Stack-in Sensor Input Test
- Flap Sensor Input Test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*NOTE: Refer to "Component Names" on page 1-4 for the location of the VEGA-RC components, and refer to "Roller and Optical Sensor Locations" on page 2-8 to identify the Sensor Locations.*
*To confirm the VEGA functions or locations of the parts/sensors, refer to the VEGA Operation and Maintenance Manual.*

## Pushbutton Function Test

Select "T0" to perform the Pushbutton Functional Test. This test verifies that each of the four (4) external VEGA-RC Pushbuttons is functioning properly. Perform the following steps to verify that the Display indications shown in Table 6-1 are correct:

1. Use Pushbutton "B" or "D" to select Test Zero (T0).
2. Press Pushbutton "A". The Seven (7) Segment Display indicates "TS" followed by "01".

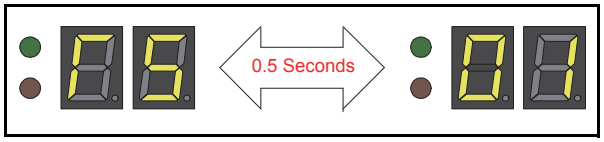


**Figure 6-4** Pressing A: Change Display

3. Press Pushbutton "B". The Seven (7) Segment Display indicates "TS" followed by "02".

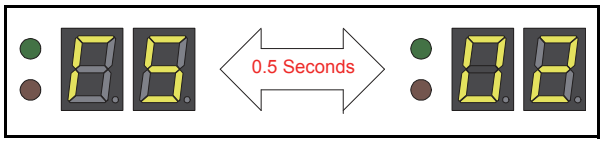


**Figure 6-5** Pressing B: Dispense

4. Press Pushbutton "C". The Seven (7) Segment Display indicates "TS" followed by "03".

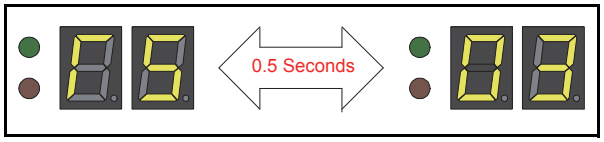


**Figure 6-6** Pressing C: Restore

5. Press Pushbutton "D". The Seven (7) Segment Display indicates "TS" followed by "04".

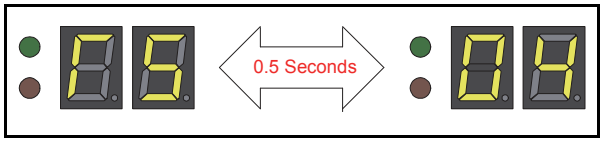


**Figure 6-7** Pressing D: Retrieve

Press and hold-down Pushbutton "A" for three (3) seconds to return the unit to the Test Selection Mode.

## DIP Switch Test

This test is used to check that each of the eight (8) Switches located on the VEGA-RC DIP Switch Block is operating correctly. This is accomplished by manually changing each Switch settings on the DIP Switch Block, and then verifying that a correct output is presented on the Seven (7) Segment Display. During the test the DIP Switches function as an 8-bit Binary Counter which outputs a decimal value from 0 to 255 when the equivalent value (in binary) is set on the DIP Switches.

DIP Switch #1 represents the Least Significant Bit (LSB) of counter, while DIP Switch #8 represents the Most Significant Bit (MSB). The Seven (7) Segment Display indicates the value in a 2-digit hexadecimal format range from "0" to "F" as set on DIP Switches #1, #2, #3 and #4 for the right side and DIP Switches #5, #6, #7 and #8 for the left side (Figure 6-8, Table 6-2).

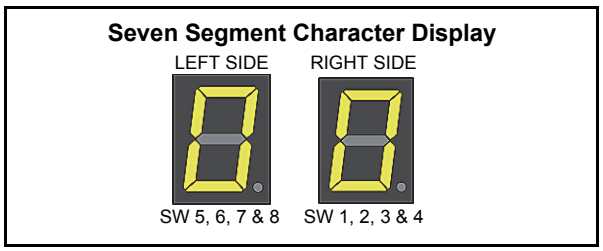


**Figure 6-8** Typical Display vs. Switch Associations

**Table 6-2** Switch Settings vs. Hex Values

| DIP Switch Binary Setting | Hexadecimal Value Displayed | |
|---|---|---|
| | SW #8, 7, 6, 5 | SW #4, 3, 2, 1 |
| 0000 0000 | 0 | 0 |
| 0001 0001 | 1 | 1 |
| 0010 0010 | 2 | 2 |
| 0011 0011 | 3 | 3 |
| 0100 0100 | 4 | 4 |
| 0101 0101 | 5 | 5 |
| 0110 0110 | 6 | 6 |
| 0111 0111 | 7 | 7 |
| 1000 1000 | 8 | 8 |
| 1001 1001 | 9 | 9 |
| 1010 1010 | A | A |
| 1011 1011 | B | B |
| 1100 1100 | C | C |
| 1101 1101 | D | D |
| 1110 1110 | E | E |
| 1111 1111 | F | F |

1. Use Pushbutton "B" or "D" to select Test Zero (T0).
2. Press Pushbutton "A". The Seven (7) Segment Display indicates "TS" followed by "01".


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3. On the VEGA-RC DIP Switch, set Switches #1 through #8 OFF. The Seven (7) Segment Display indicates "DS" followed by "00".
4. On the VEGA-RC DIP Switch, set Switches #1, #3, #5 and #7 to ON and Switches #2, #4, #6 and #8 to OFF. The Seven (7) Segment Display indicates "DS" followed by "55".
5. On the VEGA-RC DIP Switch set Switches #1, #3, #5 and #7 to OFF and Switches #2, #4, #6 and #8 to ON. The Seven (7) Segment Display indicates "DS" followed by "AA".
6. On the VEGA-RC DIP Switch, set Switches #1 through #8 to ON. The Seven (7) Segment Display indicates "DS" followed by "FF".

The DIP Switch Test is now complete. Press and hold the "A" Pushbutton down for three (3) seconds to return the unit to Test Selection Mode.

Figure 6-9 and Table 6-3 illustrates a typical DIP Switch Test Display.

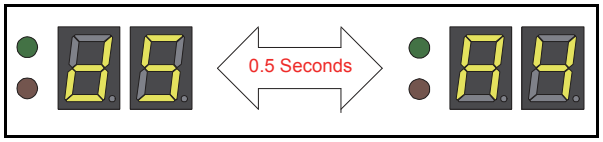
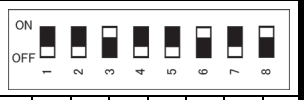



**Figure 6-9** Typical DIP Switch Test Display

**Table 6-3** Typical DIP Switch Test Indications

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DIP Switch: All OFF |  | | | | | | | |
| DIP Switch No. | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Binary Digit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 Segment Display |  | | | |  | | | |
| DIP Switch: 3, 6, 8 ON |  | | | | | | | |
| DIP Switch No. | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Binary Digit | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 7 Segment Display |  | | | |  | | | |
| DIP Switch: All ON |  | | | | | | | |
| DIP Switch No. | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Binary Setting | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 Segment Display |  | | | |  | | | |

## Rear Cover Sensor Test

This test is performed to make sure that the Rear Cover Sensors work properly. Open the Rear Cover. When the Rear Cover functions normally, one of the Seven (7) Segment Display shown in Figure 6-10 or Figure 6-10 will appear.

To perform the Rear Cover Sensor Test, proceed as follows:

1. Use Pushbutton "B" or "D" to select Test Zero (T0).
2. Press Pushbutton "A". The Seven (7) Segment Display indicates "TS" followed by "01".
3. Open the Rear Cover of the VEGA-RC and verify that the Seven (7) Segment Display indicates a "door open" message (Figure 6-10).

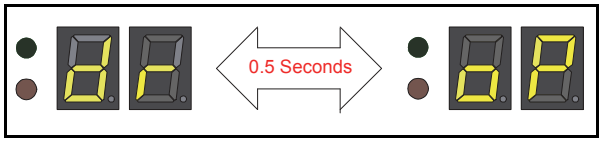



**Figure 6-10** Rear Cover Open (dr oP)

4. Close the Rear Cover of the VEGA-RC and verifying that the Seven (7) Segment Display indicates a "door closed" message (Figure 6-11).

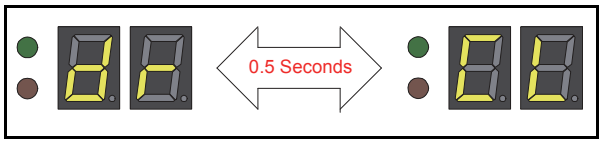



**Figure 6-11** Rear Cover Closed (dr CL)

The Rear Cover Sensor Test is now complete. Press and hold-down the "A" Pushbutton for three (3) seconds to return the Unit to the Test Selection Mode.

## VEGA Escrow Sensor Input Test

This test is performed to verify the VEGA Escrow Sensor's status. Before proceeding, perform the Light Interception and Transmissive Tests of the VEGA Unit's Escrow Sensors.

To perform the VEGA Unit Escrow Sensor Test, proceed as follows:

1. Use Pushbutton "B" or "D" on the VEGA-RC to select Test Zero (T0).
2. Press Pushbutton "A". The Seven (7) Segment Display indicates "TS" followed "01".
3. On the VEGA Unit, press in on the Upper Part Open/Close Latches, and lift open the Upper Part approximately 3 or 4 inches. Verify the Seven (7) Segment Display indicates a "Sensor OFF" condition (Figure 6-12).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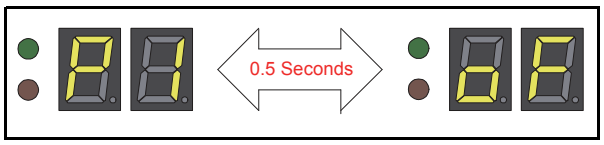


**Figure 6-12** Escrow Sensor OFF (Pl oF)

4. Close the VEGA Unit's Upper Part and verify that the Seven (7) Segment Display indicates a "Sensor ON" condition (Figure 6-13).

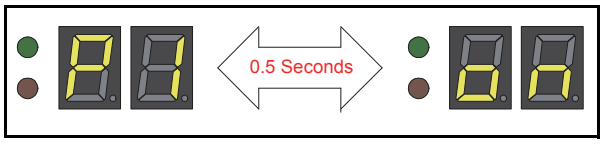


**Figure 6-13** Escrow Sensor OFF (Pl on)

Escrow Sensor Input Test is now complete. Press and hold-down the "A" Pushbutton on the VEGA-RC Unit for three (3) seconds to return the Unit to Test Selection Mode.

## VEGA Stack-in Sensor Input Test

This test is performed verify the VEGA Stack-in Sensor's status. Perform the VEGA Escrow Sensor Input Test first before proceeding with this test.

To perform the VEGA Unit Stack-in Sensor Input Test, proceed as follows:

1. Use Pushbutton "B" or "D" on the VEGA-RC to select Test Zero (T0).
2. Press Pushbutton "A". The Seven (7) Segment Display indicates "TS" followed by "01".
3. At the rear of the VEGA Unit, remove the Course Reversing Guide, by depressing the Course Reversing Guide Release Buttons and pull the Guide Door away from the Unit allowing light to effect the internal Sensor.
4. With the Course Reversing Guide Door removed, verify that the Seven (7) Segment Display on the VEGA-RC indicates a "Sensor ON" indication (Figure 6-14).

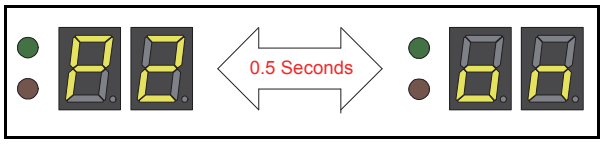


**Figure 6-14** Stack-in Sensor ON (P2 on)

5. Replace the Course Reversing Guide back onto the VEGA Unit, and verify that the Seven (7) Segment Display on the VEGA-RC now indicates a "Sensor OFF" condition (Figure 6-15).

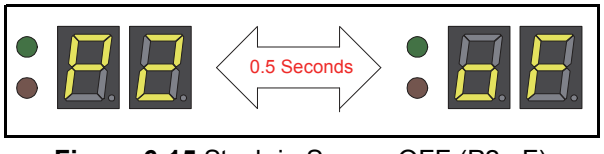


**Figure 6-15** Stack-in Sensor OFF (P2 oF)

The Stack-in Sensor Input Test is now complete. Press and hold-down the "A" Pushbutton on the VEGA-RC Unit for three (3) seconds to return the Unit to Test Selection Mode.

## VEGA-RC Flap Sensor Input Test

This test is performed to verify the VEGA-RC Flap Sensors' status. To perform the VEGA-RC Flap Sensor Input Test, proceed as follows:

1. Use Pushbutton "B" or "D" on the VEGA-RC to select Test Zero (T0).
2. Press Pushbutton "A". The Seven (7) Segment Display indicates "TS" followed by "01".
3. On the VEGA Unit, press in on the Upper Part Open/Close Latches and lift the Upper Part to its fully open position. The Seven (7) Segment Display on the VEGA-RC will indicate "P1" followed by "oF" (Figure 6-16).

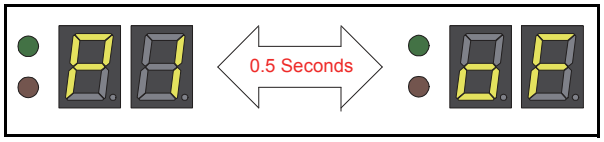


**Figure 6-16** Upper Part Open (Pl oF)

*NOTE: Be careful when opening the VEGA Upper Part to its fully open position. Unless sufficient banknotes exist in the VEGA Cash Box to counterbalance the weight of the VEGA-RC, the unit may tend to tip backwards and will need to be supported by hand in order to maintain the Unit in an upright position.*

4. On the VEGA Upper Part, find the Black colored Plastic spring located RC Flap Lever which is located toward the rear on the right side of the Unit.

*NOTE: When the Upper part is fully open, the spring-located RC Flap Lever will appear on the right side of the Unit directly above the circular mounting hole which is used for attaching the Upper Part to the Lower Section. The RC Flap Lower is not visible or accessible when the Upper Part is closed.*

5. Press downwards on the RC Flap Lever to activate the RC Flap Sensor. Verify that the display on the VEGA-RC indicates "Fr" followed by "on" (Figure 6-17).

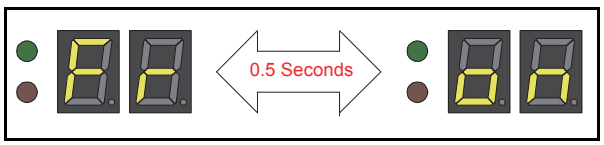


**Figure 6-17** RC Flap Sensor ON (Fr on)


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6. Release the RC Flap Lever. The Lever will automatically return to its home position. Verify that the VEGA-RC Seven (7) Segment Display indicates "Fr" followed by "oF" (Figure 6-18).

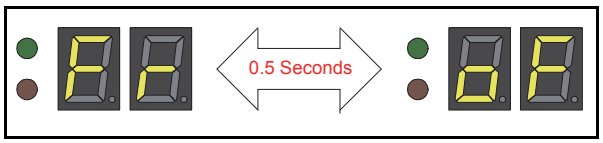


**Figure 6-18** RC Flap Sensor OFF (Fr oF)

The RC Flap Sensor Input Test is now complete. Close the VEGA Upper Part. Press and the hold-down the "A" Pushbutton on the VEGA-RC Unit for three (3) seconds to return the Unit to Test Selection Mode.

## A/D Value Relative Test

Test T1, T2 and T3 verify the operation of Position Detection Sensors and Full/Empty Detection Sensors by displaying current A/D Value on the VEGA-RC Seven (7) Segment Display.
The displayable range is from "00" to "FF" hexadecimal. The Banknote detection threshold is set at 80H.

*NOTE: While the A/D Value is showing, the Green LED will flash at 0.5 second intervals.*

### Test T1 - Position Detection Sensor 1 A/D Value Display Test

To perform the Position Detection Sensor #1 A/D Value Display Test, proceed as follows:

1. Use Pushbutton "B" or "D" on the VEGA-RC to select Test #1 (T1).
2. Press Pushbutton "A" to begin the test.
3. The Seven (7) Segment Display will indicate the current A/D Sensor's Value (Figure 6-19).

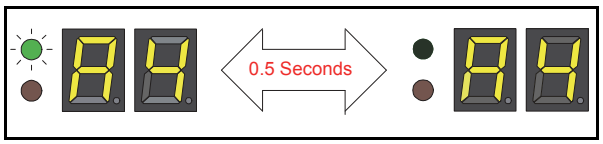


**Figure 6-19** Position Detection Sensor 1 Test

4. If the VEGA-RC Unit currently contains any Banknotes, verify that the displayed A/D Value is less than 80H.
   If the VEGA-RC does not contain any Banknotes, verify that the displayed A/D Value is greater than 80H.

The Position Detection Sensor #1 Test is now complete. Press and hold-down the "A" Pushbutton on the VEGA-RC Unit for three (3) seconds to return the Unit to Test Selection Mode.

### Test T2 - Position Detection Sensor 2 A/D Value Display Test

To perform the Position Detection Sensor #2 A/D Value Display Test, proceed as follows:

1. Use Pushbutton "B" or "D" on the VEGA-RC to select Test #2 (T2).
2. Press Pushbutton "A" to begin the test.
3. The Seven (7) Segment Display will indicate the current A/D Sensor's Value (Figure 6-19).

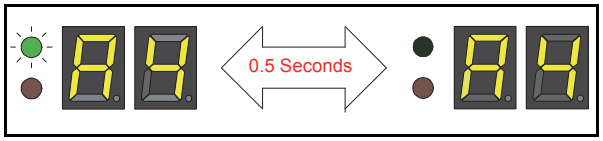


**Figure 6-20** Position Detection Sensor 2 Test

4. If the VEGA-RC Unit currently contains any Banknotes, verify that the displayed A/D Value is less than 80H.
   If the VEGA-RC does not contain any Banknotes, verify that the displayed A/D Value is greater than 80H.

The Position Detection Sensor #2 Test is now complete. Press and hold-down the "A" Pushbutton on the VEGA-RC Unit for three (3) seconds to return the Unit to Test Selection Mode.

### Test T3 - Full/Empty Detection Sensor 1 and 2 A/D Value Display Test

Full/Empty Detection Sensor #1 is used to detect the Metallic Silver coated reflective end portion of the Transparent Film Belts.
The detection threshold is set at 30 Hexadecimal. If the displayed A/D Value is less than 30H then the Sensor is properly detecting the Metallic Silver coated portion of the Transparent Film Belt.
A displayed value greater than 30H, indicates that the Sensor is currently detecting another portion of the Transparent Film Belt.
Full/Empty Detection Sensor #2 is used to detect the Film Belt's Bobbin radius. The detection threshold is set at 40 Hexadecimal. If the displayed A/D Value is less than 40H, it indicates that the Bobbin is empty (e.g., no Belt is wound on the Bobbin). However, a displayed value greater than 40H indicates that the Belt Film is still present on the Bobbin.

To Perform the Full/Empty Detection Sensor #1 and #2 A/D Value Display Tests, proceed as follows:

1. Use Pushbutton "B" or "D" on the VEGA-RC to select Test #3 (T3).
2. Press Pushbutton "A" to begin the test.
3. The Seven (7) Segment Display will alternately indicate the current A/D Values of both Sensors. When the Green LED Flashes, the displayed value is for Full/Empty Detection Sensor #1.


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When the Red LED Flashes, the displayed value is for Full/Empty Detection Sensor #2 (Figure 6-21).

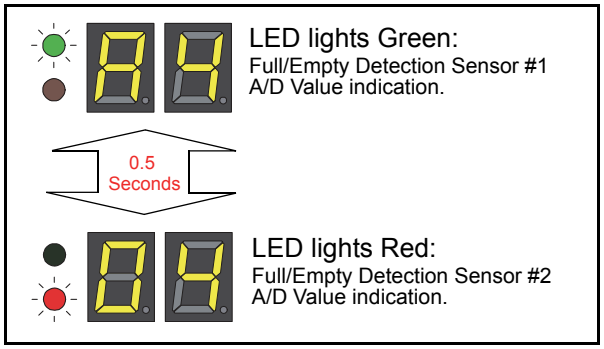


**Figure 6-21** Full/Empty Sensor 1&2 A/D Value

The Full/Empty Detection Sensor #1 and #2 Test is now complete. Press and hold-down the "A" Push-button on the VEGA-RC Unit for three (3) seconds to return the Unit to the Test Selection Mode.

*NOTE: Test T4, T5, T6 and T8 are presently unavailable and reserved for future use.*

## Test T7 - Communication Loop Test

This test is used to perform the Communication Loop Test between the VEGA-RC and the VEGA Unit's Communication Ports. The 3rd pin (TXD) and 4th pin (RXD) of the VEGA-RC Main CPU Board Connector CN3 must be looped to each other to perform this test (See "Tool and Harness Connection" on page 6-1).

*NOTE: Only the 3rd pin (TXD) and the 4th pin (RXD) of the VEGA-RC Main CPU Board CN3 to each other when performing the Communication Loop Test, otherwise leave them as individual pin connections.*

To perform the Communication Loop Test, proceed as follows:

1. Remove Power from the VEGA Unit.
2. Setup the Units for the Communication Loop Test (See "Tool and Harness Connection" on page 6-1).
3. On the VEGA-RC, set the DIP Switch #8 to ON.
4. Apply power to the VEGA Unit. The Seven (7) Segment Display will indicate "T0".
5. Use Pushbutton "B" or "D" on the VEGA-RC to select Test #7 (T7).
6. Press Pushbutton "A" to begin the test.
7. Confirm that the Seven (7) Segment Display will indicate "Co" and the Green LED will light.

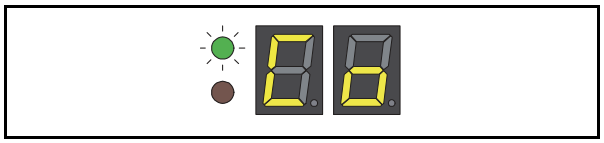

**Figure 6-22** Communication Loop Test (Co)

8. Press Pushbutton "B" to begin the Loop Test. if communication is OK, the Seven (7) Segment Display will indicate "C0" and "C0" (Figure 6-23).

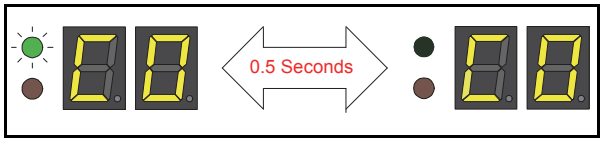


**Figure 6-23** Communication Loop Test (C0C0)

9. When the Communication Loop Test is complete, the Seven (7) Segment Display will indicate the results of the test.
   If the test completed normally, the Green LED will be lit and the Display will indicate "OK" (Figure 6-24).

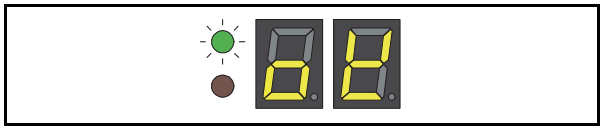

**Figure 6-24** Normal Completion (OK)

If the test fails, or if the unit was unable to establish communication at the start of the test, the Red LED will be lit and the Display will indicate "NG" (Figure 6-25).

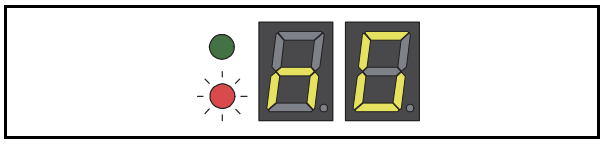

**Figure 6-25** Abnormal Completion (NG)

The communication Loop Test is now complete. Turn The VEGA Unit power OFF and returned to its original test configuration (See "Tool and Harness Connection" on page 6-1). Turn the VEGA Unit power ON with the VEGA-RC DIP Switch #8 set to ON position in order to return the Unit to the Test Selection Mode.

## Test T9a - Transport Belt Dirt Confirmation Test

This test is used to check for dirt on the VEGA-RC Transport Film Belts. The test is accomplished by running the Transport Belts from end to end, both forward and backward, while using Full/Empty Detection Sensor #1 to monitor the condition of the various belts. At the end of the test, the resulting


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A/D Value is used to determine whether the Belts are clean or dirty.

For this test, the threshold for dirt has been set at 30 hexadecimal. If the displayed A/D Value is less than 60H, the Transport Belts are in dirt condition. If the value is less than 30H, the Sensor is not functioned normally.

*NOTE: If the Full/Empty Detection Sensor #1 is dirty due to dust build-up or other debris contaminating the belt, then the resulting A/D Value displayed will be inaccurate. If necessary, use Compressed Air to blow the Sensor clean prior to testing the Unit again.*

*NOTE: An A/D Sensor reading of less than 30H indicates that the Sensor is detecting the Metallic Silver coated end portion of the Transport Belt used for determining the Empty/Full status of the VEGA-RC Drum.*

*NOTE: The Transport Dirt Confirming Test time is approximately 2 to 3 minutes.*

To perform the Transport Belt Dirt Confirmation Test, proceed as follows:

*NOTE: Before performing this test, ensure that no Banknotes are present on the VEGA-RC Drum.*

1. Press Pushbutton "B" or "D" on the VEGA-RC Unit to select Test #9 (T9).
2. Press Pushbutton "A" to begin the test.
3. While the Transport Belts are moving during the test, the Seven (7) Segment Display will indicate the duty cycle of the Motor Control Drive Signal (Figure 6-26).

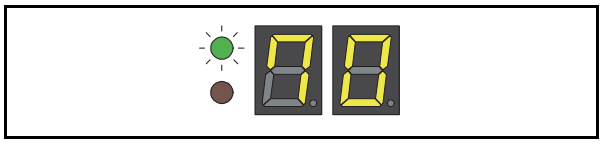

**Figure 6-26** Motor Control Drive Value (70)

4. When the test is complete, the test results will be indicated on the Seven (7) Segment Display. The Green and Red LEDs will alternately flash and the Display will indicate "FM" followed by an A/D Value (Figure 6-27).

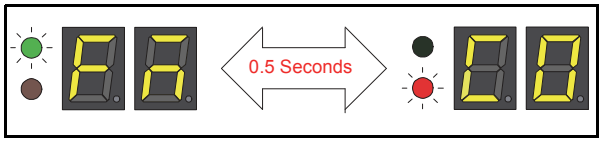


**Figure 6-27** Transport Tape Dirt Result (Fm C0)

The Transport Tape Dirt Confirmation Test is now complete. Press and hold-down the "A" Pushbutton on the VEGA-RC Unit for three (3) seconds to return the Unit to Test Selection Mode.

## Test T9b - Full/Empty Detection Sensors 1 and 2 A/D Value Display Test

This test verifies that Full/Empty Detection Sensor #1 and #s are operating properly. This test is a continuation of the Test T9a, and displays three (3) Sensor A/D Values calculated during the test. The displayed A/D range for each sensor is from "00" to "FF" hexadecimal.

*NOTE: The Seven (7) Segment Display Indication continues showing the A/D Value until the "D" (Retrieve) Pushbutton is pressed a second time.*

To perform this test, first run the Test T9a - Transport Belt Dirt Confirmation. When the Seven (7) Segment Display on the VEGA-RC indicates the value shown in Figure 6-27, proceed as follows:

1. Press Pushbutton "D" on the VEGA-RC Unit. The Seven (7) Segment Display will indicate the A/D Value of Full/Empty Detection Sensor 1 at the time it detected the silver coated end portion of the Transport Film Belt (Figure 6-28).

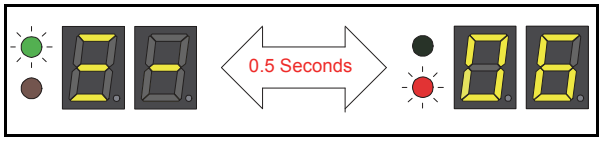


**Figure 6-28** Full/Empty Detection Sensor 1 Light Interrupted A/D Value (Z@06))

2. Press Pushbutton "D" on the VEGA-RC Unit. The Seven (7) Segment Display will indicate and A/D Value for Full/Empty Detection Sensor #2. The value being displayed represents the Sensor reading that was taken when the internal Film Belt Bobbin was "Full". The Seven (7) Segment Display will indicate "F-" followed by the Full A/D Value (Figure 6-29).

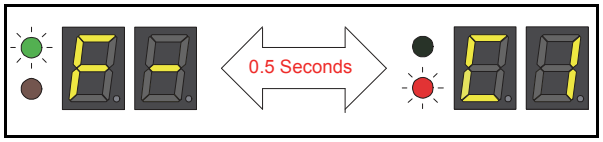


**Figure 6-29** Full/Empty Detection Sensor 2 Full A/D Value (F@C1)

3. Press Pushbutton "D" on the VEGA-RC Unit. The Seven (7) Segment Display will indicate an A/D Value for Full/Empty Detection Sensor #2. The value being displayed represents the Sensor reading that was taken at a time when the internal Film Belt Bobbin was "Empty", or nearly empty. The Seven (7) Segment Display will indicate "E-" followed by the Empty A/D Value (Figure 6-30).


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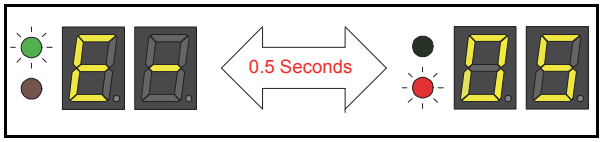


**Figure 6-30** Full/Empty Detection Sensor 2 Empty A/D Value (E@05)

The Full/Empty Detection Sensor #1 and #2 A/D Value test is now complete. Pressing Pushbutton "D" will allow the user to cycle back and view the A/D Values again.

*NOTE: Full/Empty Detection Sensor #2 is used to detect the Film Belt Bobbin's radius. The detection threshold is set at 40 Hexadecimal. If the displayed A/D Value is less than 40H it indicates that the Film Belt Bobbin is empty or nearly empty.*

To exit the test, press and hold-down the "A" Push-button on the VEGA-RC Unit for three (3) seconds to return the Unit to Test Selection Mode.


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# VEGA-RC™ Series
## BankNote Recycler
Section 7

## 7 EXPLODED VIEWS AND PARTS LISTS

This section provides product exploded views and parts lists for the VEGA-RC™ Series BankNote Recycler. This section contains the following information:

- Entire VEGA-RC Exploded View and Parts List (Part 1)
- Entire VEGA-RC Exploded View and Parts List (Part 2)
- Entire VEGA-RC Exploded View and Parts List (Part 3)
- Entire VEGA-RC Exploded View and Parts List (Part 4)
- Entire VEGA-RC Exploded View and Parts List (Part 5)
- Entire VEGA-RC Exploded View and Parts List (Part 6)
- VEGA-RC Tray Assembly Exploded View and Parts List
- VEGA-RC FB Upper Shaft Assembly Exploded View and Parts List
- VEGA-RC Motor Unit Exploded View and Parts List
- VEGA-RC Course Reversing Assembly Exploded View and Parts List
- VEGA-RC FB Lower Shaft Assembly Exploded View and Parts List

### Entire VEGA-RC Exploded View 1

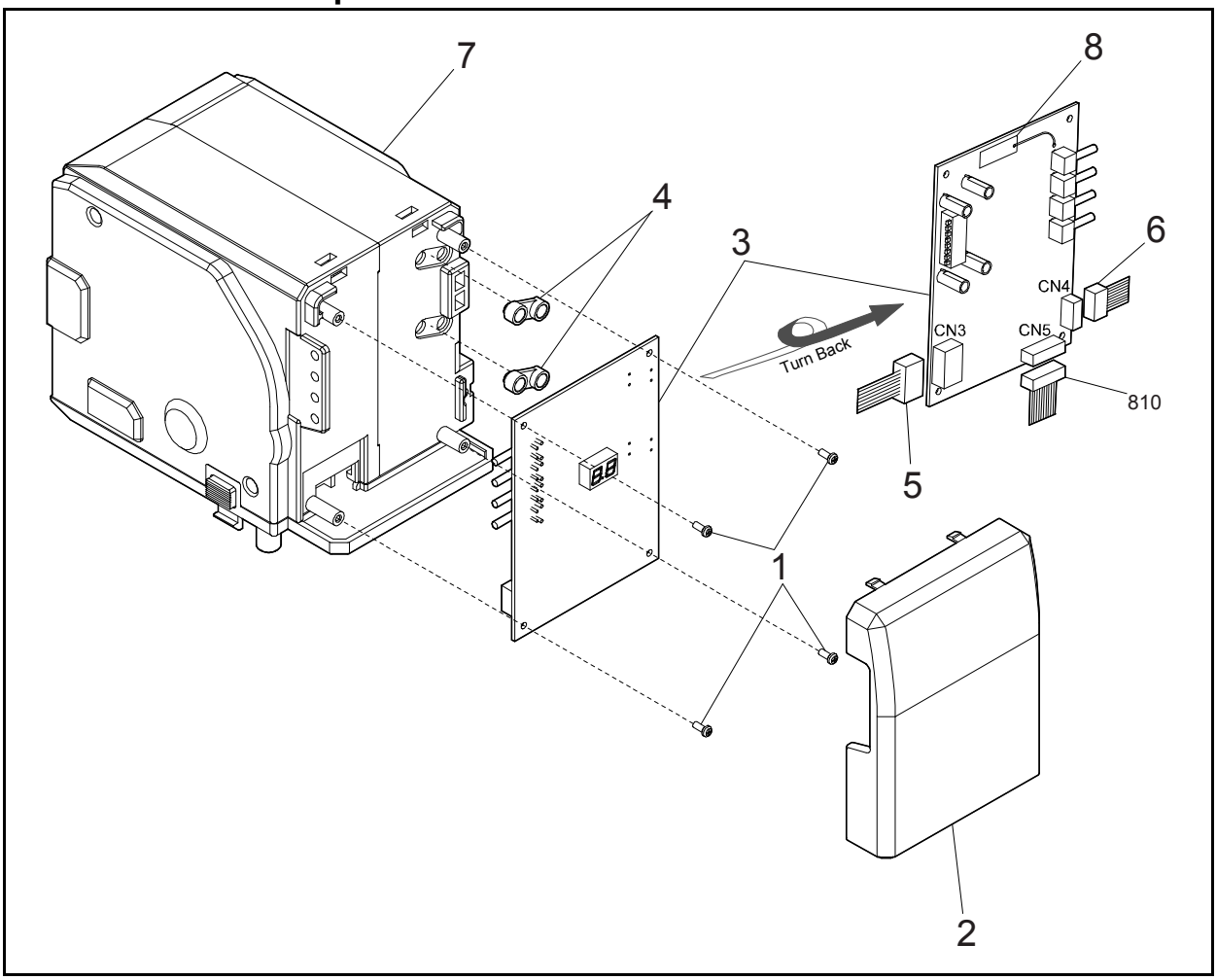


**Figure 7-1** Entire VEGA-RC Exploded View (Part 1)


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## Entire VEGA-RC Parts List 1

**Table 7-1** Entire VEGA-RC Parts List (Part 1)

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 1 | 104081 | 186-266000R | 2.6x6 Phillips, Binding Self Tightening 3M(Black) | 4 | |
| 2 | 144781 | 900-200349R | FRONT COVER | 1 | |
| 3 | 144415 | 300-200158R | MAIN BOARD | 1 | |
| 4 | 144779 | 900-200350R | SENSOR LENS | 2 | |
| 5 | 145994 | 400-100639R | VEGA CONNECTION HARNESS | 1 | |
| 6 | 145995 | 400-100640R | SENSOR HARNESS | 1 | |
| 7 | - | - | Entire VEGA-RC 2 | 1 | |
| 8 | 189816 | N/A | Static Shield Assy | 1 | |


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## Entire VEGA-RC Exploded View 2

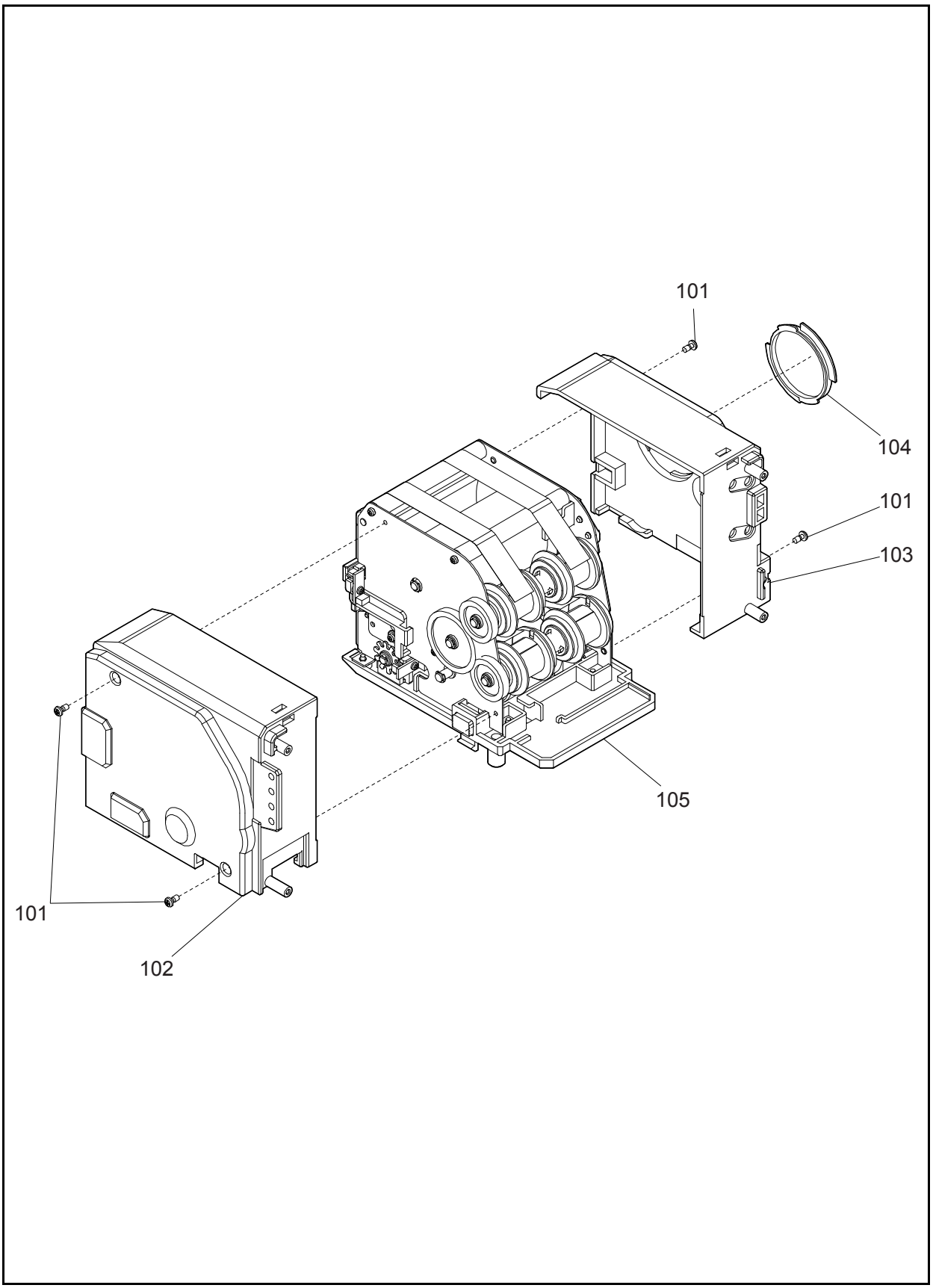


**Figure 7-2** Entire VEGA-RC Exploded View (Part 2)


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## Entire VEGA-RC Parts List 2

**Table 7-2** Entire VEGA-RC Parts List (Part 2)

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 101 | 104332 | 186-360000R | M3x6 Pan Head Polycarbonate Screw | 4 | |
| 102 | 144786 | 900-200370R | COVER Left | 1 | |
| 103 | 144787 | 900-200371R | COVER Right | 1 | |
| 104 | 144764 | 900-200372R | COVER HANDLE | 1 | |
| 105 | - | - | Entire VEGA-RC 3 | 1 | |


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## Entire VEGA-RC Exploded View 3

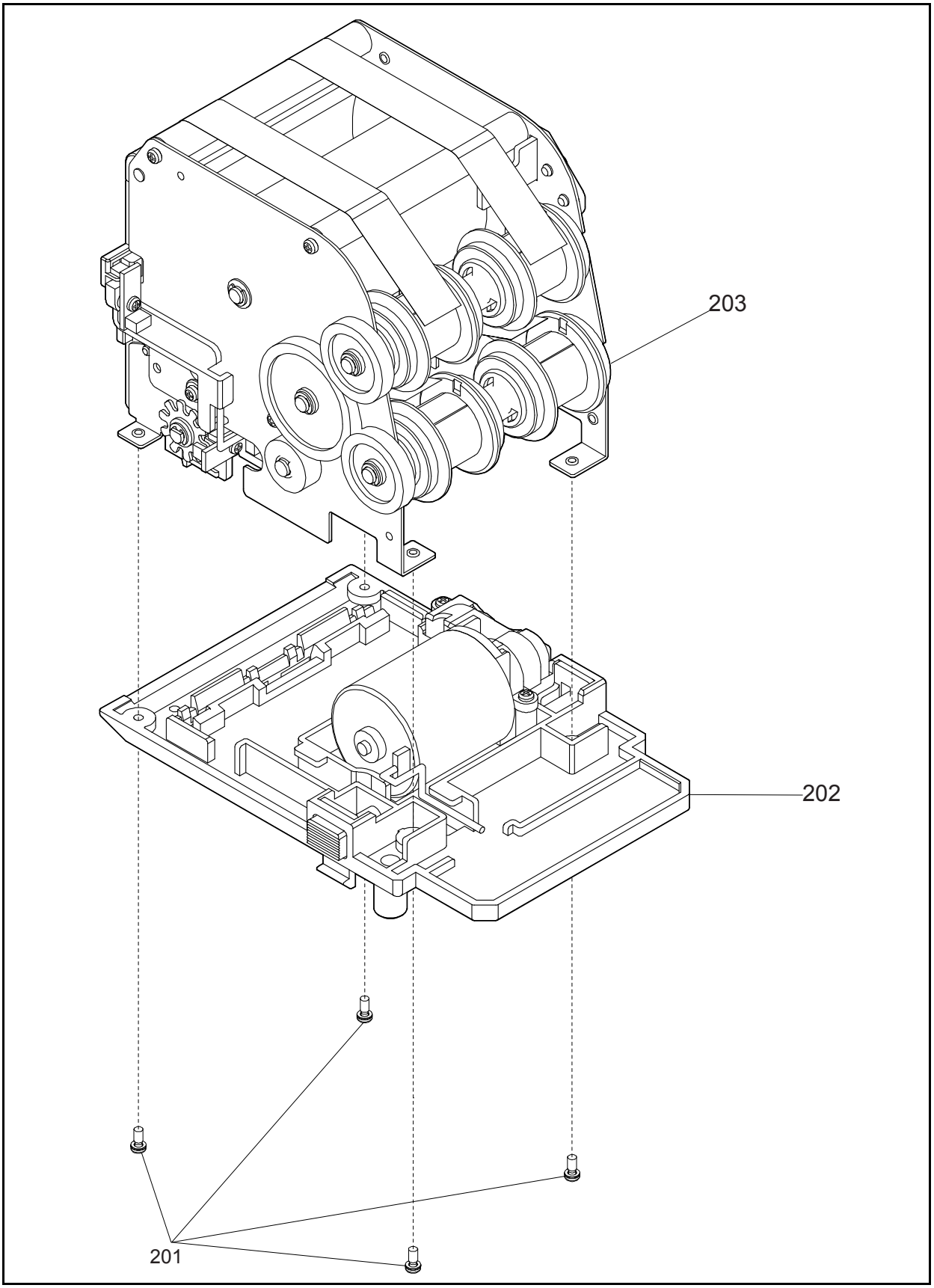


**Figure 7-3** Entire VEGA-RC Exploded View (Part 3)


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## Entire VEGA-RC Parts List 3

**Table 7-3** Entire VEGA-RC Parts List (Part 3)

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 201 | 005555 | 186-260106R | M2.6x6 Pan Head Screw with Washer 3M | 4 | |
| 202 | - | - | VEGA-RC MOTOR UNIT | 1 | |
| 203 | - | - | Entire VEGA-RC 4 | 1 | |


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## Entire VEGA-RC Exploded View 4

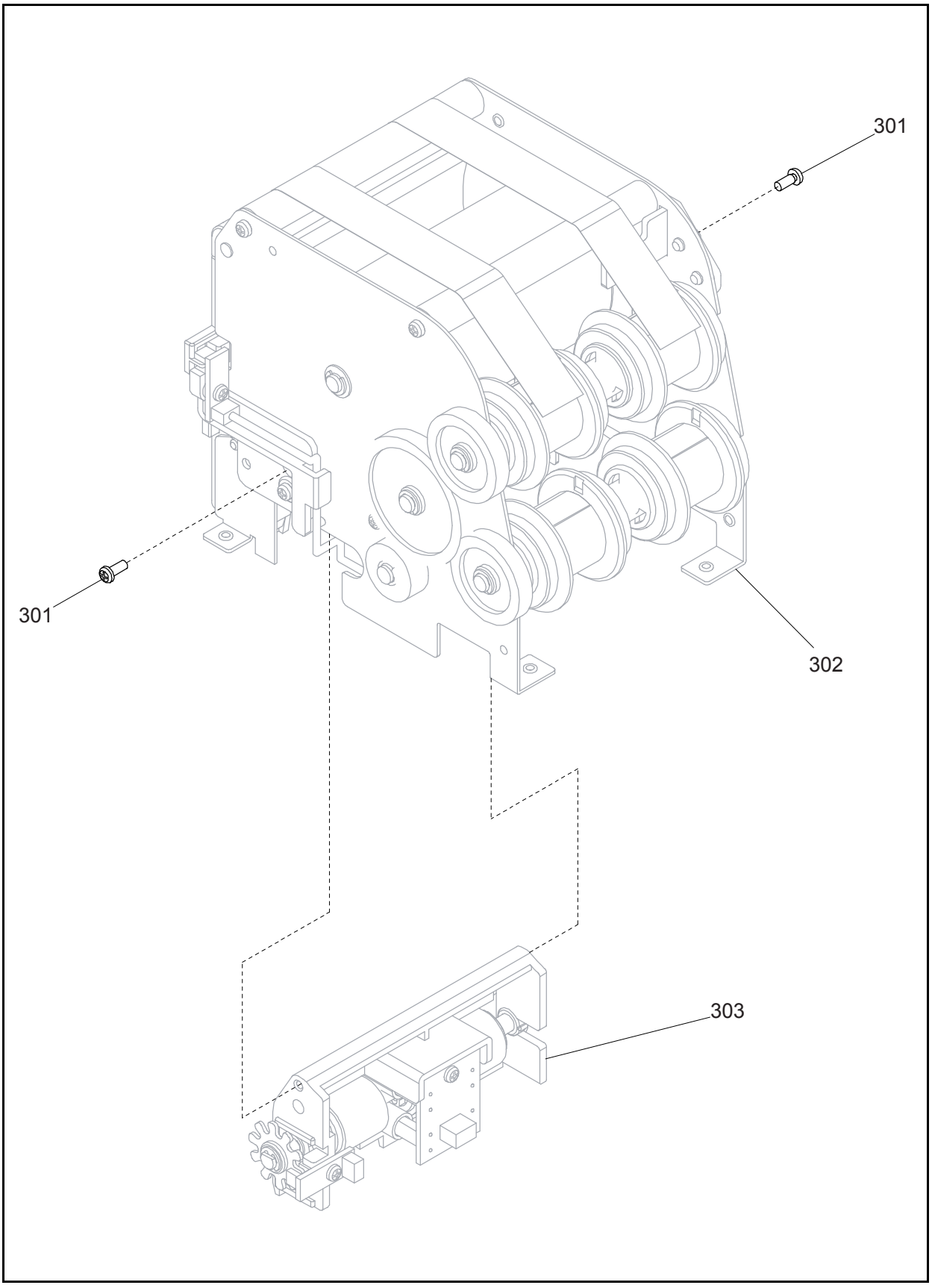


**Figure 7-4** Entire VEGA-RC Exploded View (Part 4)


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## Entire VEGA-RC Parts List 4

**Table 7-4** Entire VEGA-RC Parts List (Part 4)

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 301 | 104081 | 186-266000R | 2.6x6 Phillips, Binding Self Tightening 3M (Black) | 2 | |
| 302 | - | - | Entire VEGA-RC 5 | 1 | |
| 303 | - | - | VEGA-RC COURSE ASSY | 1 | |


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## Entire VEGA-RC Exploded View 5

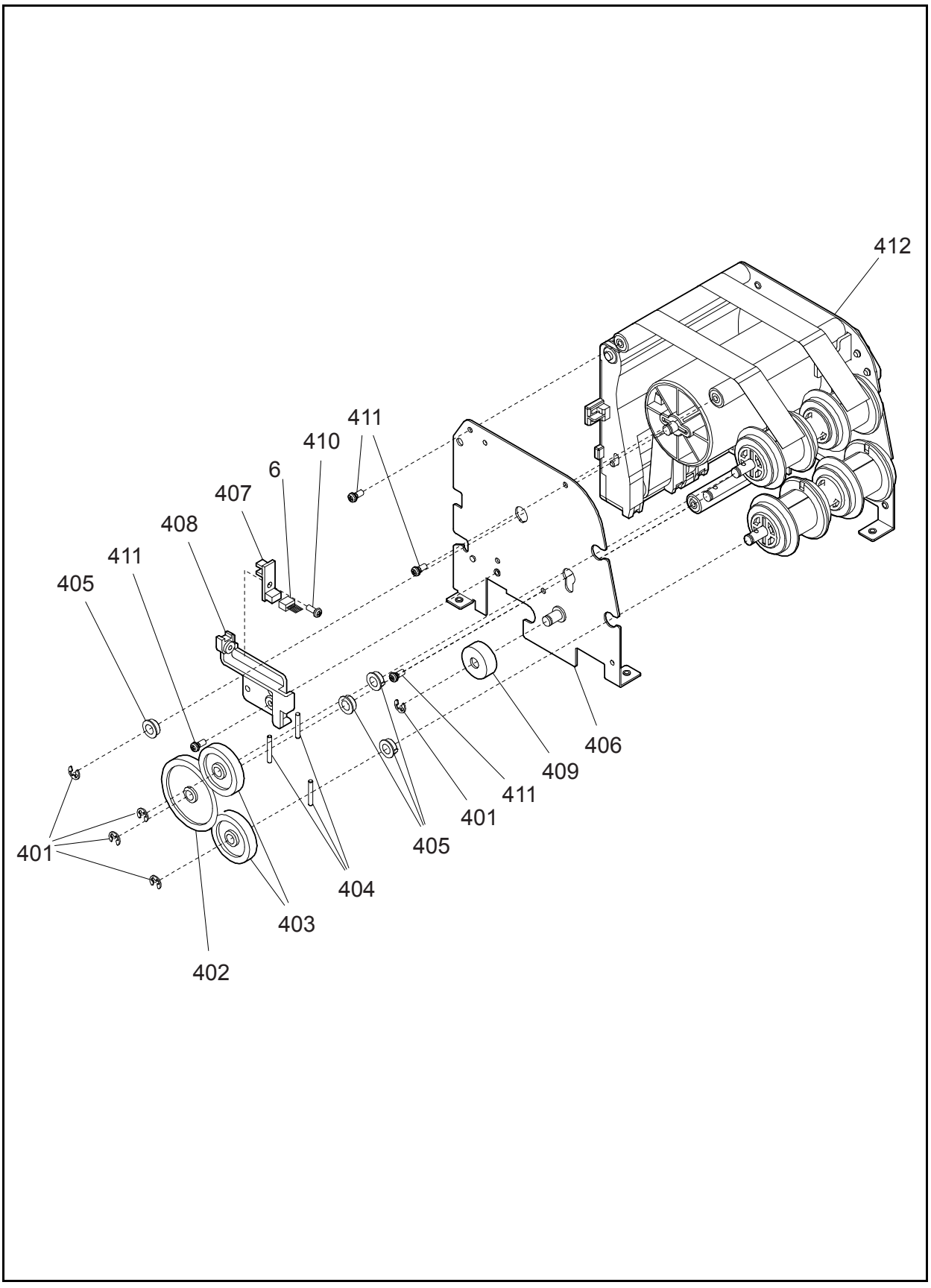


**Figure 7-5** Entire VEGA-RC Exploded View (Part 5)


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## Entire VEGA-RC Parts List 5

**Table 7-5** Entire VEGA-RC Parts List (Part 5)

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 401 | 091516 | 200-100984R | Φ3 E-Ring | 5 | |
| 402 | 144725 | 900-200373R | IDLE GEAR 2 | 1 | |
| 403 | 144727 | 900-200374R | FBD GEAR | 2 | |
| 404 | 144743 | 200-200773R | SET PIN15 | 3 | |
| 405 | 144584 | 200-200774R | BEARING | 4 | |
| 406 | 144755 | 200-200775R | SIDE FRAME (Left) Assy. | 1 | |
| 407 | 145993 | 300-200159R | INTERRUPT BOARD | 1 | Open/Close Detection Board |
| 408 | 144783 | 200-200776R | SENSOR BRACKET | 1 | |
| 409 | 144591 | 900-200375R | CLUTCH GEAR | 1 | |
| 410 | 104081 | 186-266000R | 2.6x6 Phillips, Binding Self Tightening 3M (Black) | 1 | |
| 411 | 005555 | 186-260106R | M2.6x6 Pan Head Screw with Washer 3M | 4 | |
| 412 | - | - | Entire VEGA-RC 6 | 1 | |


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## Entire VEGA-RC Exploded View 6

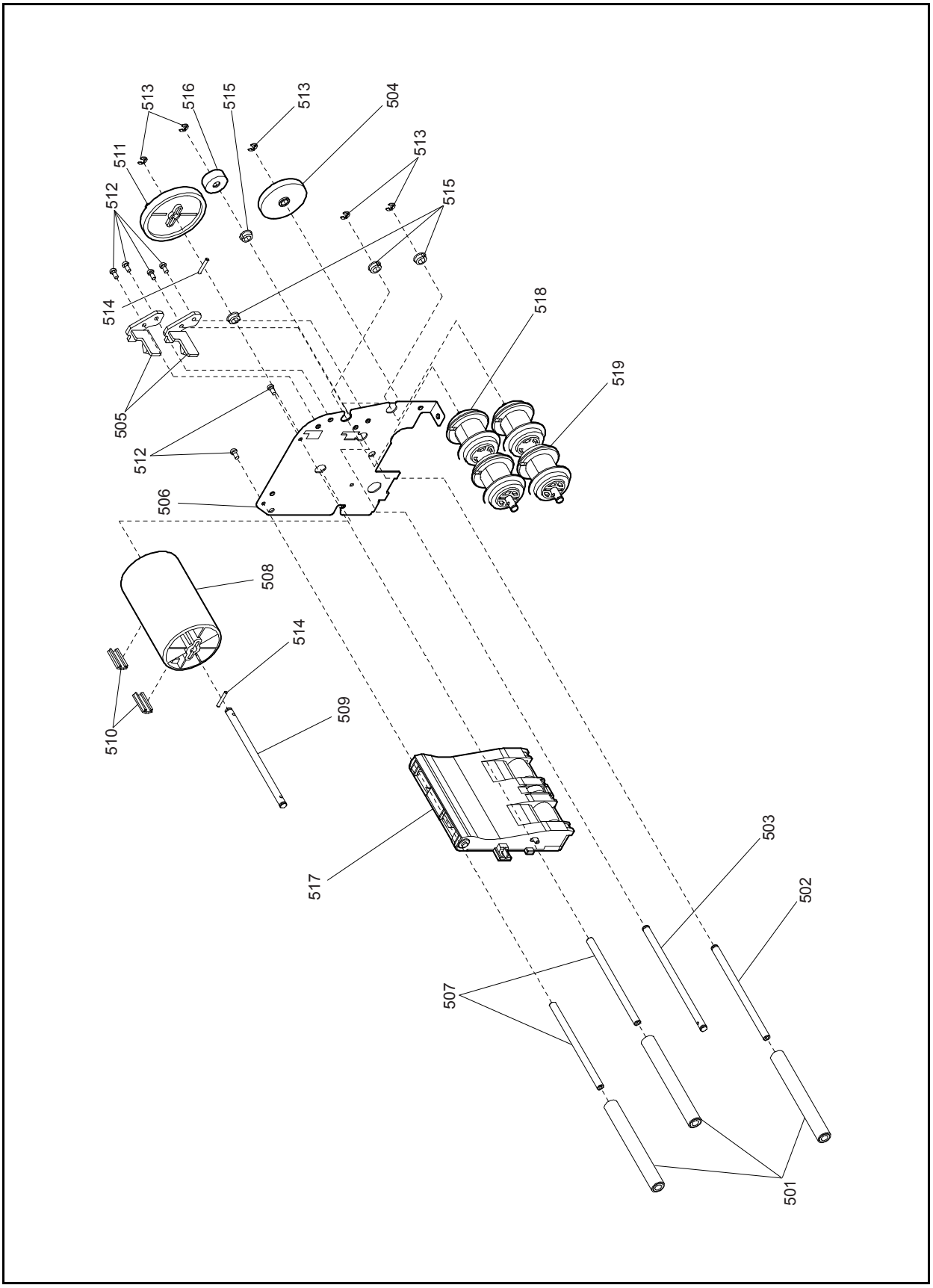


**Figure 7-6** Entire VEGA-RC Exploded View (Part 6)


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## Entire VEGA-RC Parts List 6

**Table 7-6** Entire VEGA-RC Parts List (Part 6)

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 501 | 144767 | 900-200376R | GUIDE ROLLER | 3 | |
| 502 | 144742 | 900-200380R | IDLE BEAM | 1 | |
| 503 | 144731 | 200-200778R | CLUTCH SHAFT | 1 | |
| 504 | 144724 | 900-200337R | IDLE GEAR 1 | 1 | |
| 505 | 144763 | 900-200378R | F/E PRISM | 2 | |
| 506 | 144754 | 200-200779R | SIDE FRAME (R) | 1 | |
| 507 | 144737 | 900-200379R | PULLEY BEAM | 2 | |
| 508 | 144766 | 900-200381R | MAIN BOBBIN | 1 | |
| 509 | 144730 | 200-200777R | BOBBIN AXLE | 1 | |
| 510 | 144770 | 200-200780R | CLIP | 2 | |
| 511 | 144723 | 900-200382R | HANDLE GEAR | 1 | |
| 512 | 005555 | 186-260106R | M2.6x6 Pan Head Screw with Washer 3M | 6 | |
| 513 | 091516 | 200-100984R | Φ3 E-Ring | 5 | |
| 514 | 144743 | 200-200773R | SET PIN 15 | 2 | |
| 515 | 144584 | 200-200774R | BEARING | 4 | |
| 516 | 144591 | 900-200375R | CLUTCH GEAR | 1 | |
| 517 | - | - | VEGA-RC TRAY ASSY. | 1 | |
| 518 | - | - | VEGA-RC FB SHAFT ASSY. (UPPER) | 1 | |
| 519 | - | - | VEGA-RC FB SHAFT ASSY. (LOWER) | 1 | |


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## VEGA-RC Tray Assembly Exploded View

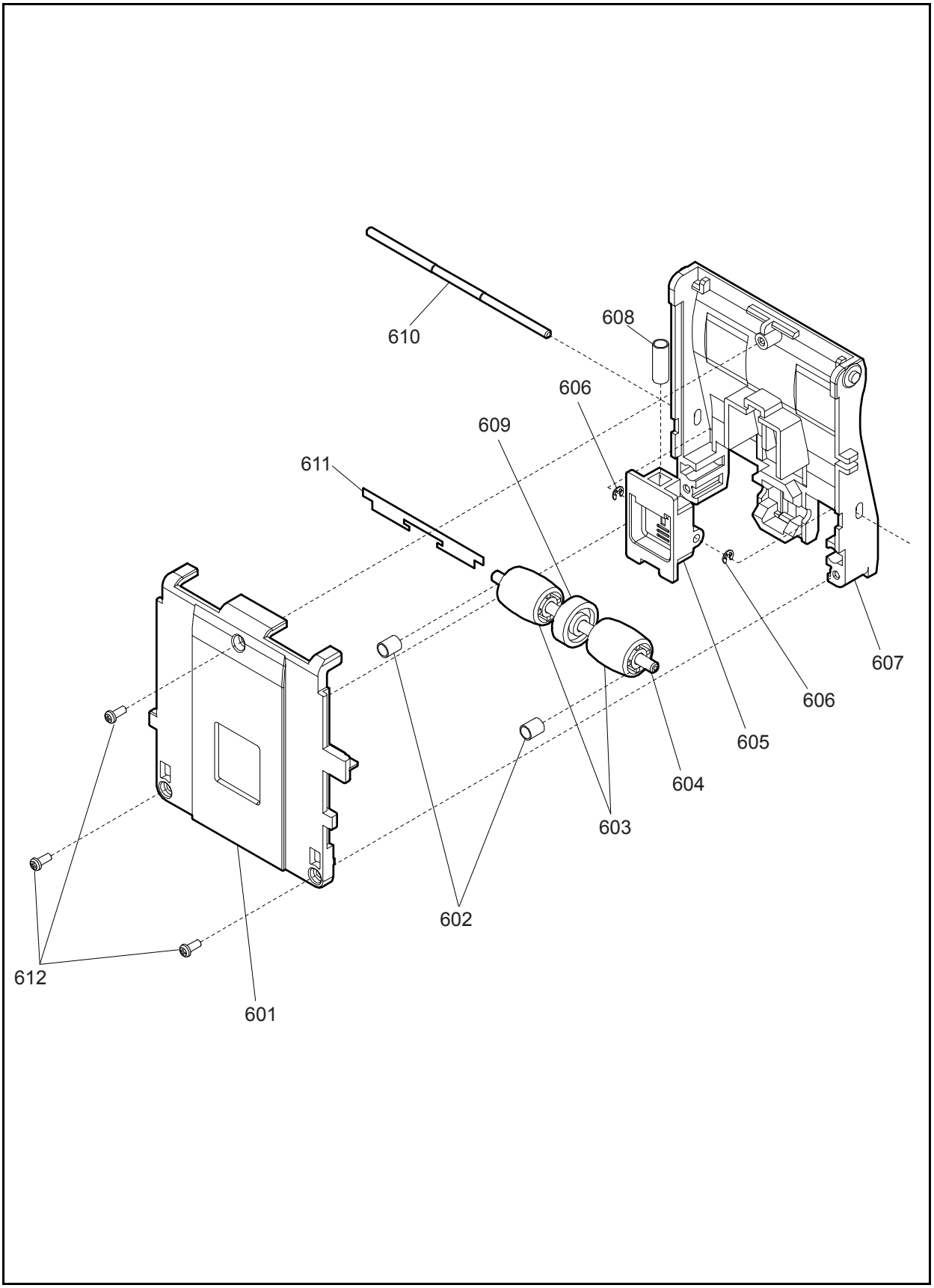


**Figure 7-7** VEGA-RC Tray Assembly Exploded View


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## VEGA-RC Tray Assembly Parts List

**Table 7-7** VEGA-RC Tray Assembly Parts List

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 601 | 144777 | 900-200383R | TRAY COVER | 1 | |
| 602 | 144791 | 900-200384R | TIGHTENING CS | 2 | |
| 603 | 144758 | 900-200385R | CROWN PULLEY | 2 | |
| 604 | 144734 | 200-200781R | TIGHTENING AXLE | 1 | |
| 605 | 144762 | 900-200386R | LATCH HANDLE | 1 | |
| 606 | 091517 | 100-100060R | Φ2 E-Ring | 2 | |
| 607 | 144776 | 900-200387R | TRAY | 1 | |
| 608 | 144790 | 900-200388R | LATCH CS | 1 | |
| 609 | 144757 | 900-200389R | PINCH ROLLER | 1 | |
| 610 | 144740 | 200-200782R | SET SHAFT | 1 | |
| 611 | 148347 | 900-101160R | BLIND COVER | 1 | |
| 612 | 104081 | 186-266000R | 2.6x6 Phillips, Binding Self Tightening 3M (Black) | 3 | |


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# VEGA-RC FB Upper Shaft Assembly Exploded View

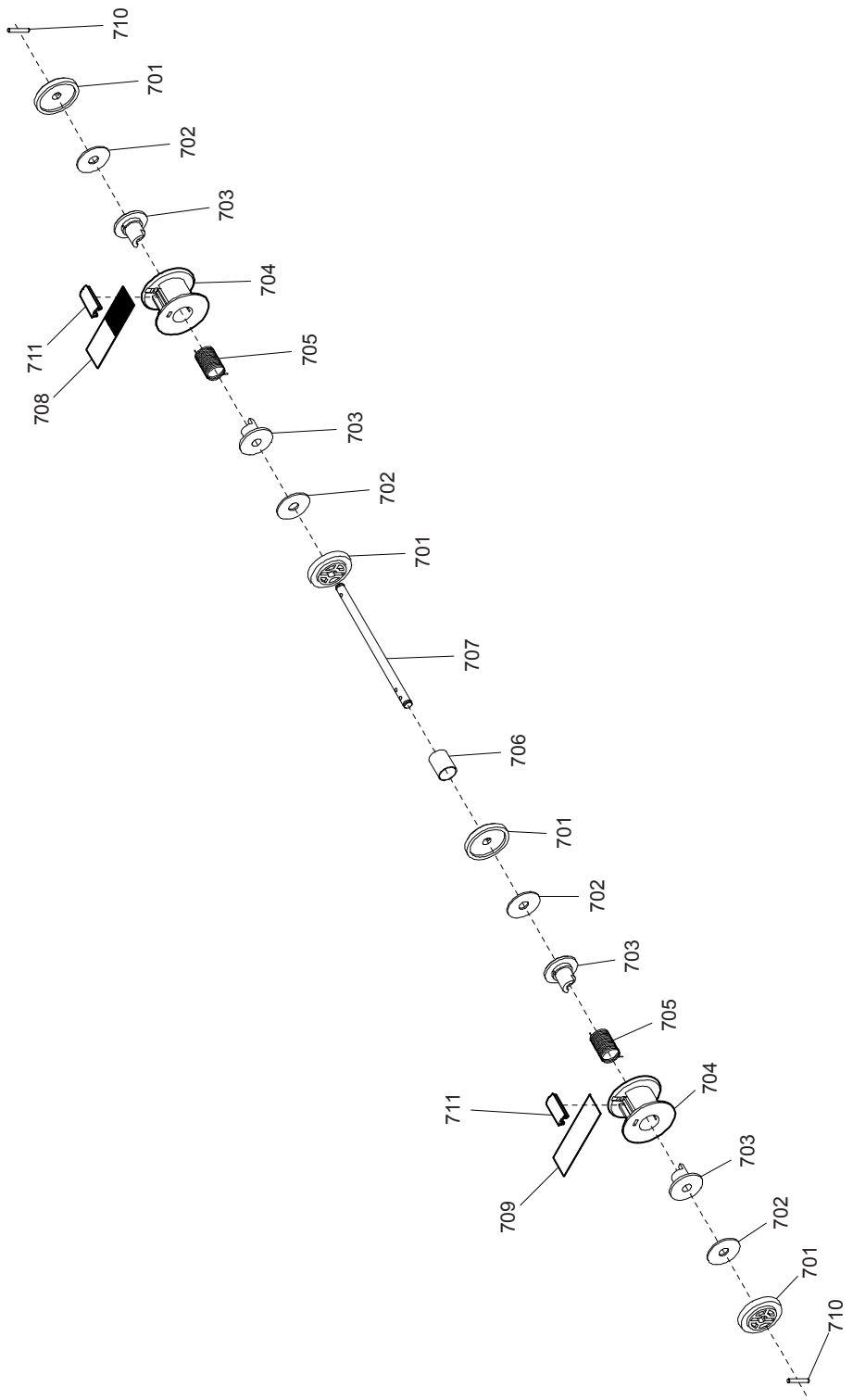


**Figure 7-8** VEGA-RC FB Upper Shaft Assembly Exploded View


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## VEGA-RC FB Upper Shaft Assembly Parts List

**Table 7-8** VEGA-RC FB Upper Shaft Assembly Parts List

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 701 | 144773 | 200-200783R | BOBBIN CAP | 4 | |
| 702 | 144751 | 900-200390R | FELT | 4 | |
| 703 | 144772 | 900-200391R | BOBBIN CORE | 4 | |
| 704 | 144769 | 900-200392R | FILM BOBBIN | 2 | |
| 705 | 144793 | 900-200393R | LIMIT KS | 2 | |
| 706 | 144788 | 900-200394R | LIMIT CS | 1 | |
| 707 | 144736 | 200-200784R | FB SHAFT | 1 | |
| 708 | 144750 | 900-200395R | FILM | 1 | |
| 709 | 144839 | 900-200396R | FILM 2 | 1 | |
| 710 | 144743 | 200-200773R | SET PIN 15 | 2 | |
| 711 | 144770 | 200-200780R | CLIP | 2 | |


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# VEGA-RC Motor Unit Exploded View

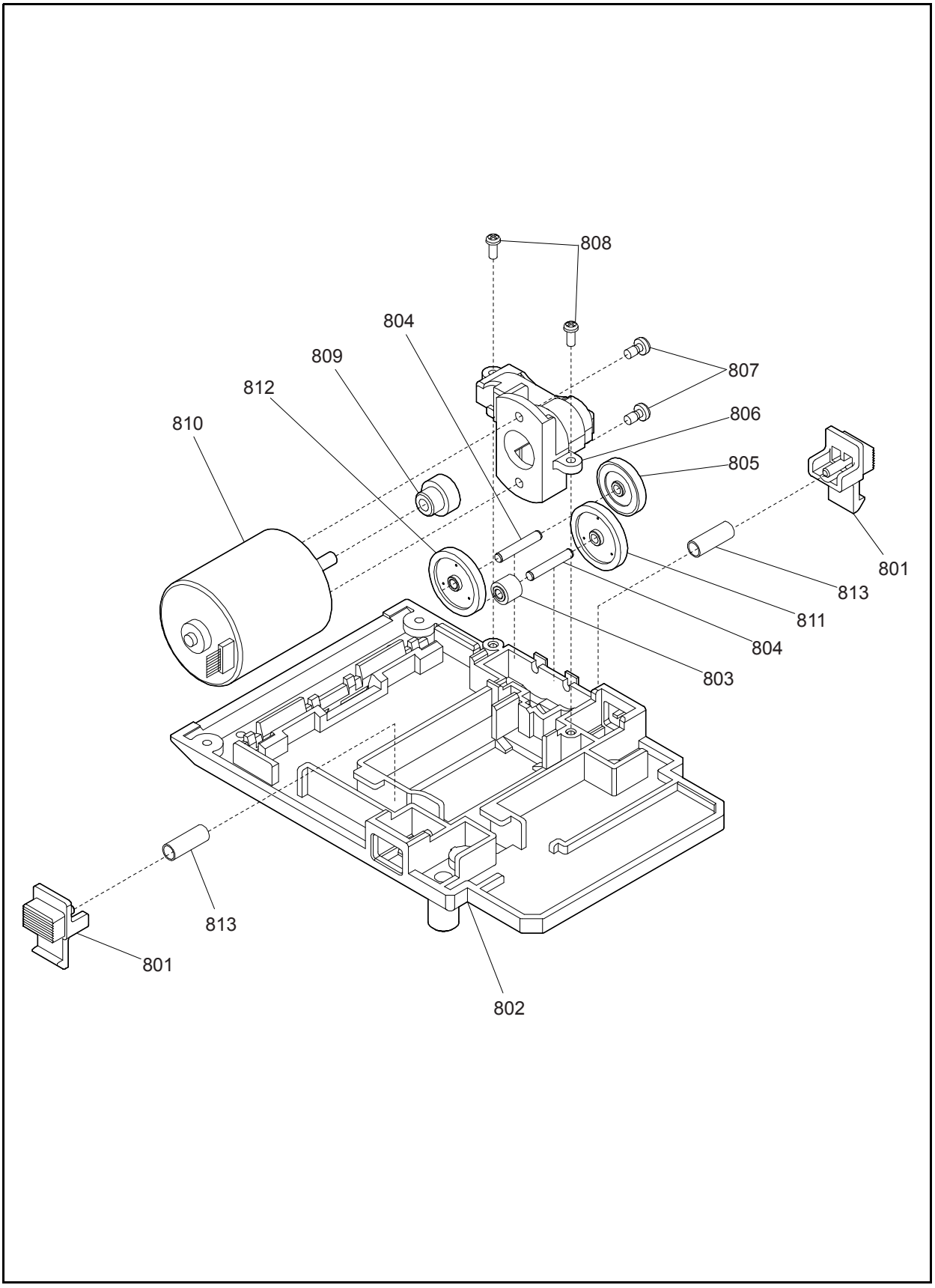


**Figure 7-9** VEGA-RC Motor Unit Exploded View


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## VEGA-RC Motor Unit Parts List

**Table 7-9** VEGA-RC Motor Unit Parts List

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 801 | 144760 | 900-200397R | REMOVAL LATCH | 2 | |
| 802 | 144780 | 900-200398R | BOTTOM | 1 | |
| 803 | 144726 | 900-200399R | RC MOTOR GEAR | 1 | |
| 804 | 113898 | 200-200750R | Φ3x18 Parallel Pin Sustainer (Hard) | 2 | |
| 805 | 144636 | 900-200400R | IDLE GEAR3 | 1 | |
| 806 | 144784 | 200-200785R | GEAR BOX COVER | 1 | |
| 807 | 003609 | 186-360000R | M3x6 Pan Head Screw with W Washer 3M | 2 | |
| 808 | 144840 | 171-268000R | 2.6x8 Phillips, Binding Self Tightening 3M (Black) | 2 | |
| 809 | 144728 | 200-200786R | RC PINION | 1 | |
| 810 | 145456 | 451-422279R | DC BRUSHLESS MOTOR | 1 | |
| 811 | 144633 | 900-200401R | B IDLE GEAR 3 | 1 | |
| 812 | 144631 | 900-200402R | B IDLE GEAR 2 | 1 | |
| 813 | 144790 | 900-200388R | LATCH CS | 2 | |


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# VEGA-RC Course Reversing Assembly Exploded View

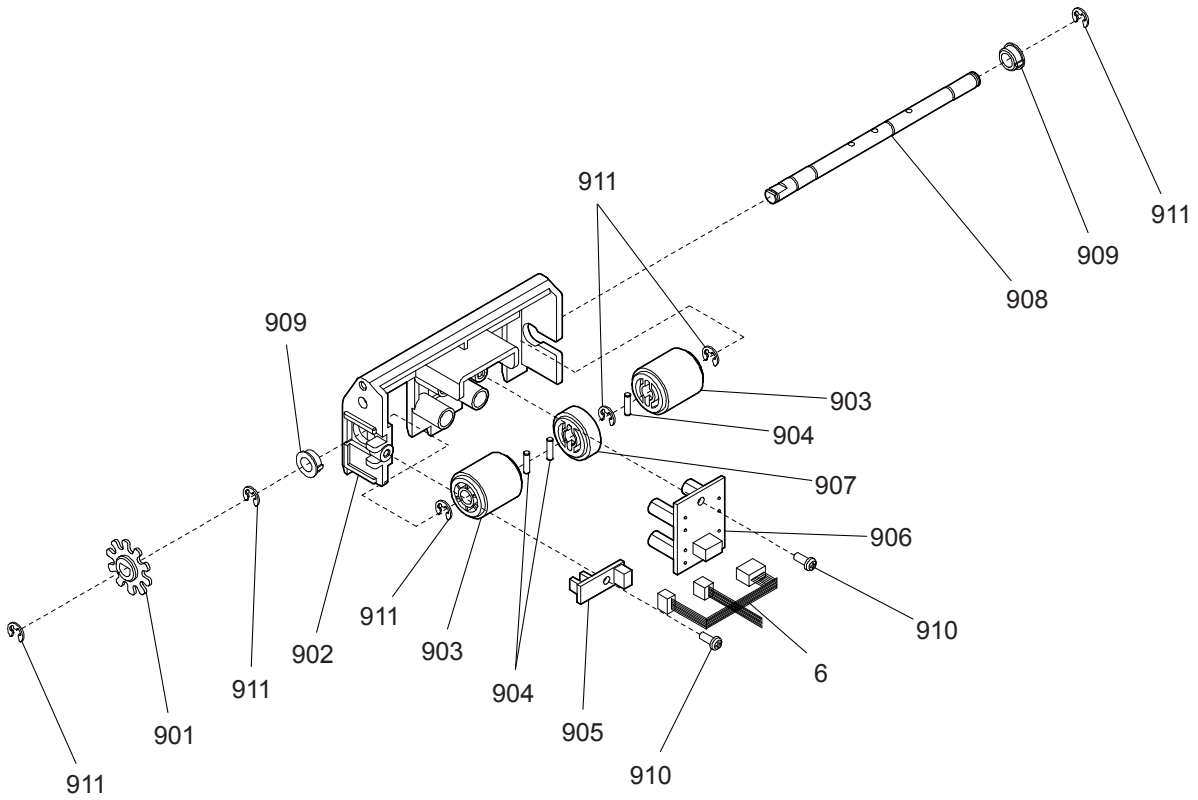


**Figure 7-10** VEGA-RC Course Reversing Assembly Exploded View


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## VEGA-RC Course Reversing Assembly Parts List

**Table 7-10** VEGA-RC Course Reversing Assembly Parts List

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 901 | 144761 | 200-200787R | ENCODER | 1 | |
| 902 | 144775 | 900-200403R | COURSE RVERSING GUIDE | 1 | |
| 903 | 144753 | 900-200404R | RUBBER PULLEY | 2 | |
| 904 | 144612 | 200-200788R | SET PIN 8 | 3 | |
| 905 | 145993 | 300-200159R | INTERRUPT BOARD | 1 | Encoder Board |
| 906 | 144416 | 300-200160R | SENSOR BOARD | 1 | Position Detection Board |
| 907 | 144752 | 900-200405R | DRIVE ROLLER | 1 | |
| 908 | 144733 | 200-200789R | DRIVE SHAFT | 1 | |
| 909 | 144584 | 200-200774R | BEARING | 2 | |
| 910 | 104081 | 186-266000R | 2.6x6 Phillips, Binding Self Tightening 3M (Black) | 2 | |
| 911 | 091516 | 200-100984R | Φ3 E-Ring | 6 | |


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## VEGA-RC FB Lower Shaft Assembly Exploded View

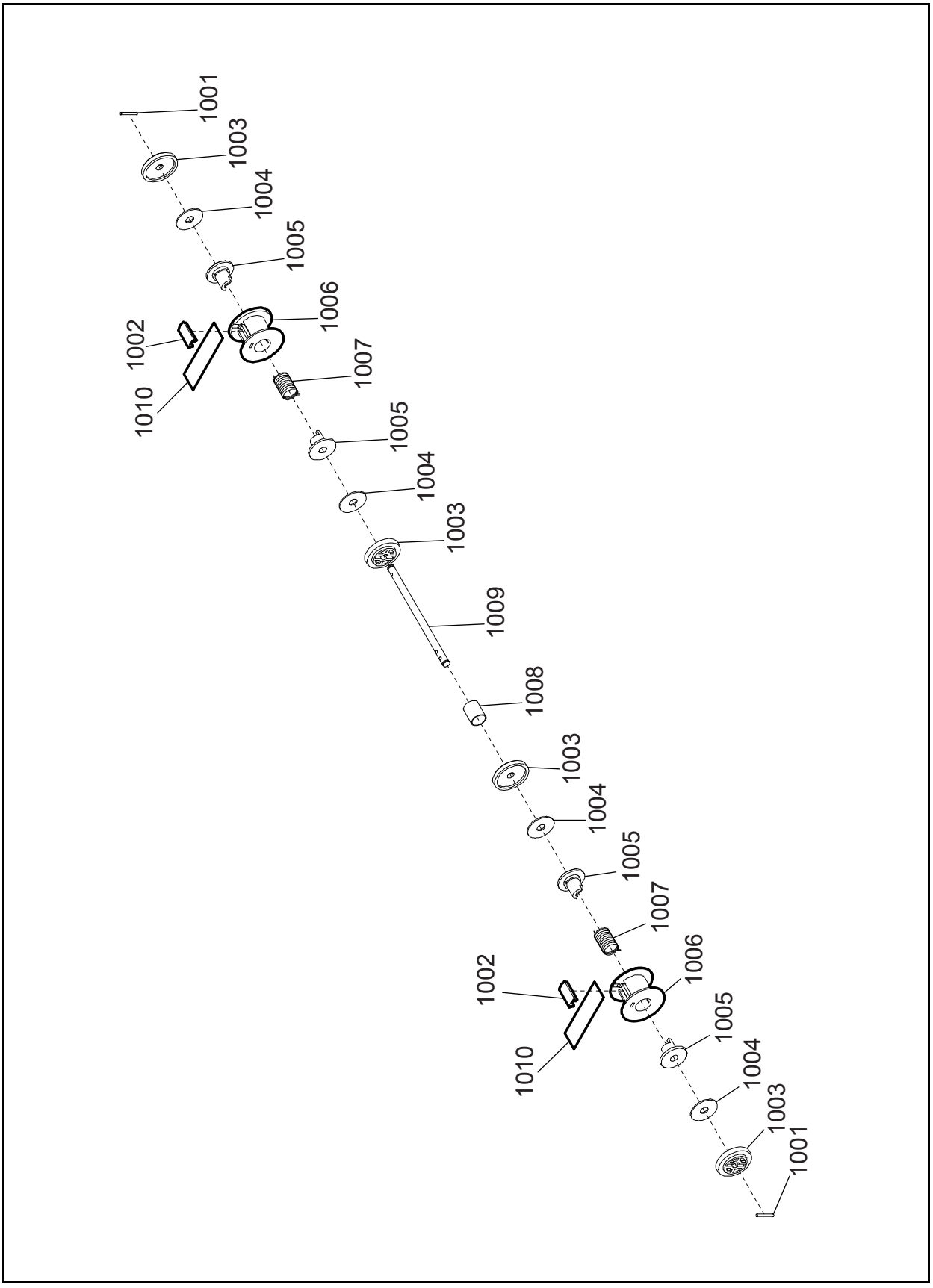


**Figure 7-11** VEGA-RC FB Lower Shaft Assembly Exploded View


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## VEGA-RC FB Lower Shaft Assembly Parts List

**Table 7-11** VEGA-RC FB Lower Shaft Assembly Parts List

| Ref Nº. | EDP Nº. | JAC Nº. | Description | Qty. | Remark |
|---|---|---|---|---|---|
| 1001 | 144743 | 200-200773R | SET PIN 15 | 2 | |
| 1002 | 144770 | 200-200780R | CLIP | 2 | |
| 1003 | 144773 | 200-200783R | BOBBIN CAP | 4 | |
| 1004 | 144751 | 900-200390R | FELT | 4 | |
| 1005 | 144772 | 900-200391R | BOBBIN CORE | 4 | |
| 1006 | 144769 | 900-200392R | FILM BOBBIN | 2 | |
| 1007 | 144793 | 900-200393R | LIMIT KS | 2 | |
| 1008 | 144788 | 900-200394R | LIMIT CS | 1 | |
| 1009 | 144736 | 200-200784R | FB SHAFT | 1 | |
| 1010 | 144839 | 900-200396R | FILM BELT 2 | 2 | |


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# VEGA-RC™ Series
## BankNote Recycler
Section 8

## 8 INDEX



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# VEGA-RC™ Series
## BankNote Recycler
Appendix A

## A TROUBLESHOOTING

This section provides Troubleshooting instructions for the VEGA-RC™ Series BankNote Recycler. This section contains the following information:

- Introduction
- Troubleshooting Overview
- Malfunction LED Error Codes.
- Operation Error Codes
- Banknote Jam Clearing Caution

### Introduction

Most Banknote Recycler failures are due to minor causes. Before replacing any parts, make sure that all assembly and Circuit Board Connectors are properly fitted and the Harness is properly connected.

Poor performance by the VEGA-RC Banknote Recycler is often caused when dust or foreign objects adheres to the Sensors or the Transport Belts. Clean the Banknote insertion section first, then observe the operating state of the Recycler in detail when re-initializing power. This observation is important in locating any failure causes and the possible fault location.

Perform all repairs by referring to the Performance Tests Section portion of Section 6, and in the Disassembly/Reassembly Instructions in Section 4 of this Service Manual.

### Troubleshooting Overview

The VEGA-RC allows the operator to perform fault diagnosis by checking various fault Table listings against the symptom, and 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 VEGA-RC Unit replacing any appropriate parts deemed necessary.

### Malfunction LED Error Codes

Table A-1 through Table A-4 lists the various possible VEGA-RC fault conditions that can occur and the necessary actions required to correct them.

### Operation Error Codes

The VEGA-RC's Seven (7) Segment LED Display shows an Error Code when an error occurs like a Banknote Jam inside the Unit. To clear the displayed error indication, press the "A" [Change Display] Pushbutton longer than 3 seconds to return the Unit to normal operation.

**Table A-1** Operational Error Codes

| Error Codes | Causes | Solutions |
|---|---|---|
| 11 | [Restore Error] A Banknote remains in the VEGA-RC internal Drum when power is re-supplied. | Remove the Banknote that remains in the Drum of the VEGA-RC Unit. (The remaining Banknote is NOT counted as a stored Banknote by Host Machine). |
| 12 | [Dispense Error] A dispensable Banknote remains in the VEGA-RC internal Drum when power is re-supplied. | Remove the Banknote remaining in the VEGA-RC Unit.<br>(The remaining Banknote is counted as a dispensed Banknote by the Host Machine). |
| 13 | [Retrieving Error] A retrievable Banknote remains in the VEGA-RC internal Drum when power is re-supplied | Remove the retrievable Banknote out the VEGA-RC Unit.<br>(The remaining Banknote is counted as a dispensed Banknote by the Host Machine). |
| 15 | [Performance Inactive] Does not operate, but is receiving commands from a Host (Display does not appear, but returns a response to a Host command as follows:<br>Negative response to a Restore Command<br>Dispense and Retrieve Commands occur while unable to perform the requested command. | Confirm the DIP Switch settings on the VEGA Unit.<br>Check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>VEGA Unit & VEGA-RC Interconnect Harness, VEGA-RC CPU Board CN3 & VEGA CPU Board CN7<br>If the error is not resolved, change the above related component(s). |
| 16 | [Restore Error] a Banknote Jam occurs within the VEGA-RC<br>Time out arrival time error between Sensors. | Check for a Banknote Jam (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7), an in path foreign object, incorrect settings or loose Harness connections within the Unit. Also check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>[Position Detection Sensor 1] Sensor Board CN1, VEGA-RC CPU Board CN4<br>[Position Detection Sensor 2] Sensor Board CN1, VEGA-RC CPU Board CN4<br>If the error is not resolved, change the above related component(s). |


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**Table A-1** Operational Error Codes (Continued)

| Error Codes | Causes | Solutions |
|---|---|---|
| 17 | [Restore Error] Banknote Jam occurs at the VEGA Unit's Insertion Slot.<br>Error caused by inserting a Banknote longer than 200mm. | Check for a Banknote Jam (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7), or an in path foreign object. Also check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>[Position Detection Sensor 1] Sensor Board CN1, VEGA-RC CPU Board CN4<br>[Position Detection Sensor 2] Sensor Board CN1, VEGA-RC CPU Board CN4<br>If the error is not resolved, change the above related component(s). |
| 18 | [Restore Error] VEGA-RC Transport Encoder Slipped. | See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7,and look for an in path foreign object, incorrect settings or loose Harness connections within the Unit. Also check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>Transport Encoder Board CN1, CPU Board CN4<br>If the error is not resolved, change the above related component(s). |
| 20 | [Dispense/Retrieving Error] a Banknote Jam occurs within the VEGA-RC<br>Time out arrival time error between Sensors. | Check for a Banknote Jam (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7), an in path foreign object, incorrect settings or loose Harness connections within the Unit. Also check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>[Position Detection Sensor 1] Sensor Board CN1, VEGA-RC CPU Board CN4<br>[Position Detection Sensor 2] Sensor Board CN1, VEGA-RC CPU Board CN4<br>If the error is not resolved, change the above related component(s). |
| 21 | [Dispense/Retrieving Error] a Banknote Jam occurs at the VEGA Unit's Insertion Slot.<br>Error caused by inserting a Banknote longer than 200mm. | |
| 22 | [Dispense/Retrieving Error] VEGA-RC Transport Encoder Slippage (e.g., a Folded Banknote caused a Jam)<br>VEGA-RC Transport Encoder Slippage error caused by Banknote hitting each other at the exit. | Check for a Banknote Jam (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7),an in path foreign object, incorrect settings or loose Harness connections within the Unit. Also check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>Transport Encoder Board CN1, CPU Board CN4<br>If the error is not resolved, change the above related component(s). |
| 23 | [Dispense/Retrieving Error] a Banknote Jam occurs at the VEGA-RC Flap<br>Error caused by a Banknote that does not arrive at the Recycler's Flap. | Check for a Banknote Jam (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7), or an in path foreign object. Open the VEGA-RC Rear Cover, and remove the last Banknote in the stack. (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7). Also check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>VEGA-RC Flap Sensor<br>If the error is not resolved, change the above related component(s). |
| 24 | [Dispense/Retrieving Error] Banknote Jam occurs at Escrow Sensor<br>Error caused by a Banknote that does not arrive at the Escrow Sensor. | Check for a Banknote Jam (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7), or an in path foreign object. Open the VEGA-RC Rear Cover, and remove the last Banknote in the stack. (See "When a Banknote is jammed in VEGA-RC proceed as follows to clear it:" on page 2-7) Also check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>VEGA-RC Escrow Sensor<br>If the error is not resolved, change the above related component(s). |

*NOTE: Dispensing performance of the VEGA-RC Unit will exhibit an abnormal termination when a Banknote remains on the one of the Sensors (i.e, on the Entrance Sensor, the Validation Sensor, the Escrow Sensor, the Recycler [RC] Flap Sensor, the Stack Input Sensor, or on the Cash Box Present Sensor) in the VEGA Unit. The Banknote being processed will be counted as a dispense completed Banknote.*

*NOTE: When a command from the Host Machine is being received, or a dispense request occurs from pressing the VEGA-RC Pushbutton; or when an Electrical Power failure occurs before the dispensing process begins, the Banknote being processed will be counted as a dispense completed Banknote.*


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## Warning Codes

When the following errors occur, they can be cleared by pressing the "A" [Change Display] Pushbutton longer than three (3) seconds; but further performance will not be guaranteed. For this reason, a CPU Circuit Board change is recommended.

**Table A-2** Warning Codes

| Error Codes | Causes | Solutions |
|---|---|---|
| 98 | Program rewriting time is Over Limit. (occurred more than 1000 times)<br>Rewriting warning of an Over Limit program because program rewriting is limited to 1000 times. | When program rewriting time occurs over 1000 times, this error code will appear for five (5) seconds. This code will then be shown every rewrite time thereafter. |
| 99 | EEPROM is malfunction.<br>Warning when an abnormal EEPROM reading process occurs. | Change the CPU Circuit Board. When this occurs, EEPROM data such as the number of the accepted Banknotes , errors, the total number of the errors, the operation log, dispense times, and the Serial Number will be lost. |

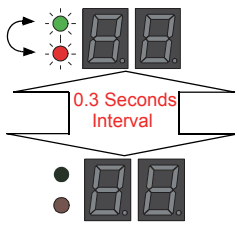
## Machine Lock-up Error Codes

When following errors occur, the Unit will stop operating.

**Table A-3** Machine Lock-Up Error Codes

| Error Codes | Causes | Solutions |
|---|---|---|
| 01 | The VEGA-RC Motor is not moving (VEGA-RC abnormality error).<br>Checking the Motor Encoder while initializing (Brushless FG signal). | Check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>[VEGA-RC Motor] VEGA-RC CPU Board CN5, Motor Harness<br>If the error is not resolved, change the above related component(s). |
| 02 | Using a 24V DC Supply for a 12V DC specification. | Check that the working voltage set is for the related Circuit Board (e.g., Standard = V12DC specification or Optional = MDB specification). |
| 03 | Using a 12V DC Supply for a 24V DC specification. | Check that the working voltage set is for the related Circuit Board (e.g., Standard = V12DC specification or Optional = MDB specification). |
| 04 | The Transport Tape is cut or slack.<br>Checking the Transport Encoder while initializing. | Check that the Transport Tape is not cut or slack. Check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>Transport Encoder Board CN1, CPU Board CN4<br>If the error is not resolved, change the above related component(s). |
| 05 | Receives conflicting denomination information (Money Class) during communication. | Check that the VEGA-RC stacking denomination matches the VEGA Unit's command denomination. (Confirm that both Unit DIP Switch settings agree.) |
| 06 | VEGA Unit Motor Abnormal Error.<br>Motor encoder signal is not received from the VEGA Unit when performing a Store, Dispense or Retrieving operation. | Check that the Transport Tape's slack/cut out. Check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean:<br>VEGA Unit Feed Motor<br>If the error is not resolved, change the above related component(s). |
| 07 | Abnormal Inhibit information. | The VEGA Unit's denomination setting for VEGA-RC is Inhibited. Check that the VEGA Unit's denomination settings match the VEGA-RC's denomination settings. |
| 09 | Opening the Rear Cover while the Unit is in operation.<br>Opening the Rear Cover when a Store, Dispense or Retrieving operation occurs and the Cover is not firmly closed. | Check and re-close the Rear Cover. Check that the Transport Tape's is not slack or cut out. Check that the following assemblies are properly connected and/or harnessed, and all of the Unit's Sensors are clean: Sensors.<br>Open/Close Detection Sensor Board, CPU Board CN4<br>If the error is not resolved, change the above related component(s). |
| 10 | EEPROM writing error.<br>Failed to write data into EEPROM normally. | Change the CPU Circuit Board. |

**Table A-4** Machine Lock-Up Error Indications

| 7 Segment Display | Causes | Solutions |
|---|---|---|
|  | Internal RAM error<br>(when VEGA Unit power is supplied) | Turn the VEGA Unit's power OFF. When turning the power ON again, ensure that the LEDs located next to the Seven (7) Segment Display are NOT simultaneously blinking Red and Green at a 0.3 seconds interval.<br>If the error is not resolved by recycling the power, change the CPU Circuit Board. |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## Banknote Jam Clearing Caution

When an error occurs during operation and the jammed Banknotes must be removed from the VEGA-RC Unit, ALWAYS rotate the Drum Moving Gear in a dispense direction.

*NOTE: When a Banknote is jammed in the VEGA-RC, proceed as follows to clear it.*

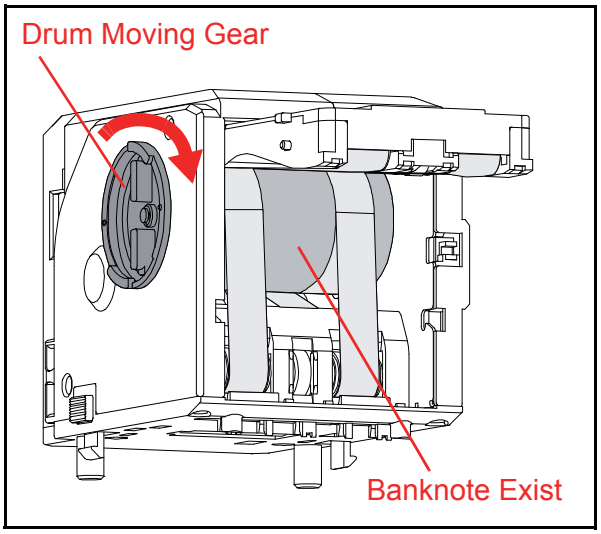
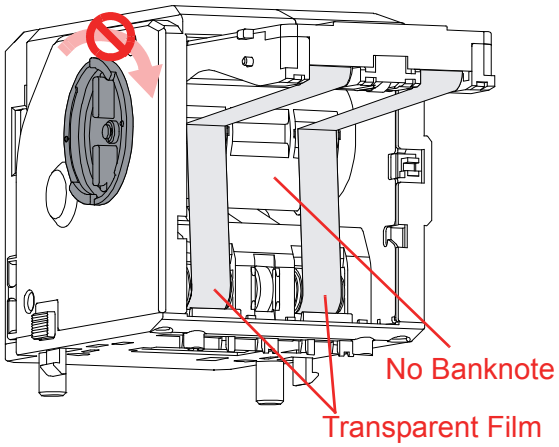
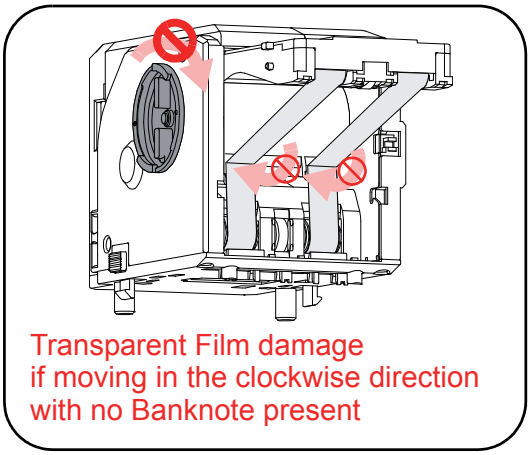



**Figure A-1** Banknote Jam Clearing Warning

**WARNING: When no Banknote is present, DO NOT rotate the Drum Moving Gear in a dispense direction (Clockwise) The Transparent Film Belts will move in a reverse direction that can cause damage to the Unit.**





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# VEGA-RC™ Series
## BankNote Recycler
Appendix B

## B GLOSSARY

### A

**1 A/D Value**

an Analog to Digital Converter Value (normally expressed in a range from 00 to FF Hexadecimal) representing the reading obtained from internal Optical Sensors in the VEGA-RC during a diagnostic testing mode ... 6-6

### B

**2 Banknote Jam**

on occasion, wrinkled or damaged Banknotes become stuck within the mechanical area of the recycling Unit. This condition may occur due to acceptance of a severely degraded Banknote, ... 2-7

### C

**3 Cash Box**

a container designed to collect and store the Banknotes accepted by the VEGA-BV. When used in conjunction with a Recycler Unit, selected Banknotes feed to the Recycler first, and to the Cash Box secondly, once the Recycler has been filled to capacity ... 2-5

**4 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 micro-chips and memory devices, and is responsible for controlling the overall operation of the equipment into which it is installed ... 4-1

### D

**5 DIP Switch**

an acronym for Dual Inline Package Switch - it is a mountable two-position slide switch containing up to 16 individual switches per block assembly located on a Printed Circuit Board (PCB), which may be set to an 'ON' or 'OFF' position. DIP Switches are often used in circuits where manual selection of operational changes, options and features are desired ... 2-2

**6 Dispense**

the function performed when Pushbutton "B" is depressed during Test T0 and Test T7 in Section 6 ... 1-4


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## E

**7 E-Clip**

a semicircular clip that resembles a capital letter "E" designed to fit onto a shaft groove to retain a component, or the shaft itself in place ... 4-1

**8 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. EEPROMS are often used to store system command instructions and reference data sets that are accessed on a frequent basis or when the equipment is first powered up ... 2-6

**9 Encoder Sensor**

a small Printed Circuit Board (PCB) located inside the Recycler Unit. It contains an Optical Sensor used for detecting the rotation of the Transport Motor Shaft Encoder. The resulting output signal is sent to the CPU Board where it is translated to determine the speed of the Transport Motor ... 2-8

**10 Escrow Sensor**

an Optical Sensor used to detect when a Banknote has reaches the Escrow position in the Transport path. In most Validators, this occurs immediately after Banknote validation, but before any further transaction commands (Banknote stacking, Banknote return) are processed. The Escrow Sensor is actually located within the VEGA Banknote Validator Unit ... 6-4

## F

**11 Film Belts**

Transparent Plastic (Celluloid) Belts located inside the Recucler Uni which aer used for tranporting Banknotes onto, and off of, the VEGA-RC's internal Drum ... 4-4

**12 Flap Sensor**

an Optical Sensor located on the VEGA Upper CPU Circuit Board Assembly which detects movement of the Stacker Flap located at the rear of the VEGA Banknote Validator Cash Box or to the VEGA-RC Recycler Drum ... 6-5

## L

**13 LED**

an acronym for Light Emitting Diode. An LED is a semiconductor device which when turned on, emits a signal output in the visible light range. Available in a variety of colors, LED's are cost effective and are commonly used as indicator lights in a veriety of equipments. LEDs are also available in the invisible light range (i.e., ultra violet, near-infared, etc) making them useful in variety of electronic equipments and applications, such as Banknote validation circuitry ... 2-3


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**14 Log**

an archived record of Banknote transactions that have been processed by the Validator. Logged Data is stored in memory and is available for viewing upon request. Information available from Log usually includes the number of Banknotes accepted or rejected, its denomination, which direction the Banknote was inserted into the Unit, the number of times a Banknote was rejected, Error Codes occurring during the validation and/or stacking process, etc ... 2-15

**15 LSB**

an acronym for Least Significant Bit. In the computing world, Computer programming worlds/instructions are often represented as strings of binary numbers (1's and 0's) with increasing positional values when read from right to left (i.e., 10110011). The Least Significant Bit represents the bit farthest to the right of the word (regardless of the word size), having the smallest numerical/positional value. The LSB is tested during the VEGA-RC DIP Switch Tests ... 6-3

## M

**16 MDB**

an acronym for Multi Drop Bus. In the automated vending industry, MDB is a commonly used serial interface standard/communication data protocol used for communications between a Vending Machine Controller (VMC) and its installed peripherals such as Banknote Validators and Coin Changers. MDB compatibility is a featured option in the VEGA-RC ... 1-2

**17 MSB**

an acronym for Most Significant Bit. In the computing world, Computer programming words/instructions are often represented as strings of binary numbers (1's and 0's) with increasing positional values when read from right to left (i.e., 10110011). The Most Significant Bit represents the first bit on the left side of the word (Regardless of the word size), having the largest numerical/positional value. The MSB is tested during the VEGA-RC DIP Switch Tests ... 6-3

## O

**18 OPF**

an acronym for Open Platform Format, representing an alternate serial interface standard or communciations data protocol for maintaining serial data communication between electronic payment devices such as Banknote Validators and Coin Changers. OPF compatibility is a featured option in the VEGA-RC ... 1-2

**19 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 detect-ing timing and movement events ... 2-8

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## P

**20 Photo Coupler Isolation**

a method of increasing safety to both equipment and personnel by isolating and routing transmitted data signals via using a Light Emitting Diode and a Photo-sensitive Transistor Circuit ... 2-10

## R

**21 Restore**

the Pushbutton function which allows for filling the VEGA-RC with recyclable Banknotes by feeding them into the unit via the VEGA banknote entry slot. When needed, this function is performed automatically under control of the Host System during normal transaction processing until the Recycler is full and cannot stack any additional Banknotes. The Restore function may also be performed manually by depressing pushbutton 'C' on the VEGA-RC. This is the primary function performed when Pushbutton 'C' is depressed during Test T0 in Section 6 ... 1-4

**22 Retrieve**

the Pushbutton function which retrieves Banknotes stored in the VEGA-RC and passes them to the VEGA, where they are then stacked to the VEGA Cash Box. This allows for emptying the Recycler of stored banknotes while maintaining system security. The Retrieve function may be performed function performed when Pushbutton "D" is depressed during Test T0 and Test T9a or T9b in Section 6 ... 1-4

## S

**23 Sensor**

a photo sensitive device amd LED combination designed to detect timing and movement events within a Validation Device ... 1-2

## T

**24 the Seven Segment Display**

a chip package that displays alphanumeric data from program control by lighting bar combinations of its 7-Segments in a chip package in order to form user-recognized letters and numbers. In the VEGA-RC Unit, it relates to the two (2) Seven (7) LED Semiconductor Chip Packages located on the face of the VEGA-RC CPU Board. The display is used to indicate both operational status as-well as diagnostic test information ... 2-3

## V

**25 VEGA-RC**

a 30-note Banknote Recycler Unit option that can be used in conjunction with the VEGA-BV Unit. The VEGA-RC can be programmed to accept and recycle any Banknote denomination within a defined set of country currency value, and is capable of working with payment processing and vending systems in paying back Banknotes to a customer as a result of cash transactions initiated by a Host System ... 1-1

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