# MagPro R Series
# BILL ACCEPTOR
## Operation and Service Manual


coinco®

# TABLE OF CONTENTS

# SECTION 1: GENERAL INFORMATION

## INTRODUCTION

This manual contains information on installing, operating and maintaining Coinco's MagPro™ R Series bill acceptor. This manual is intended for owners, route operators and shop-level technicians as a primary source of information. Taking time to read this manual and becoming familiar with this information will help you obtain the best performance from your Coinco bill acceptor.

## MODELS

The MagPro™ R Series bill acceptor is a self-contained bill acceptor designed to interface with existing vending machines.

## FOR YOUR RECORDS

A label indicating the bill acceptor model number and serial number is affixed to the back of the bill acceptor. Refer to the model and serial number whenever you call upon your Coinco Service Center for information or service. The first four digits of the serial number contain the manufacturing date code which indicates the beginning of the warranty period.

***EXAMPLE:*** *Serial No. 260107053. First and second digits indicate week of manufacture. Third and fourth digits indicate year of manufacture.*

## FEATURES

- Modular design
- Illuminated Inlet
- Impact Resistant
- Bill hold feature
- Anti-jam software
- State-of-the-art electronic logic system
- Accept any combination of the following bills:

  $1, $2, $5, $10, $20
- Fast, accurate acceptance of both new and heavily circulated bills
- High capacity bill box
- Vandal-resistant design protects against:
  — Saltwater
  — Bill Pullback
  — Counterfeit Bills
- Utilizes low level pulse, serial and parallel or MDB electrical interfaces
- 24VAC and 24VDC Multi-Drop Bus interfaces
- Easily accessible bill path
- Self-diagnostics communicated via status light
- Standard/high level security switch
- Accepts bills face up in one or both directions
- Manufactured and supported by Coinco
- Made in the U.S.A.

## AFTER UNPACKING

After unpacking the unit, inspect it for any possible shipping damage. If the unit is damaged, notify the shipping company immediately. Only the co-signee (the person or company receiving the unit) can file a claim against the carrier for shipping damage. We recommend that you retain the original carton and packing materials to reuse if you need to transport or ship your acceptor in the future.

If the bill acceptor is being stored or used as a spare, always keep it in its shipping carton when not in use. This will keep it clean and offer the best protection for the unit.

## MAIN LOGIC BOARD ASSEMBLY

The main logic board contains the microprocessor which controls all the functions of the bill acceptor based on information from the vending machine and various bill acceptor sensors.

Also contained on the main logic board is the power supply which receives its primary voltage from the vending machine. On a 24VAC interface, the primary voltage is rectified, reduced to 12 volts, and is filtered on the logic board. On a 24VDC interface, it is reduced to 12 volts and filtered.

# SECTION 1: GENERAL INFORMATION

## SPECIFICATIONS

Power Requirements
24VAC
20 to 32VAC 60 Hz
0.2 Amp average standby
2.5 Amp average operating

24VDC
22 to 45VDC
0.2 Amp average standby
2.5 Amp average operating

Operating Temperature
0º F to 150º F
-18º C to 65º C

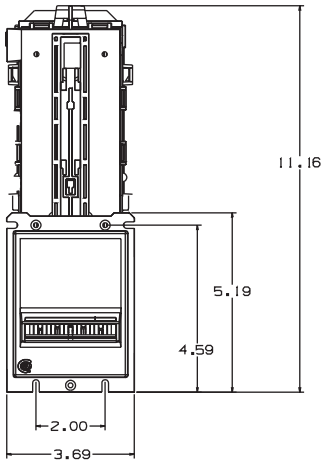
Storage Temperature
-22º F to 165º F
-30º C to 74º C

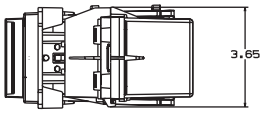
Relative Humidity
5% to 95% Non-condensing

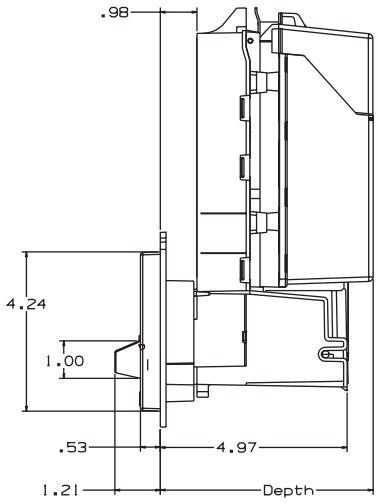
Physical Weight in Shipping Carton
4 pounds

Physical Dimensions
Height: 11.16 inches (top of bill box to bottom of mounting plate)
Width: 3.69 inches
Depth: See Dimensional Drawing Below

### Dimensional Drawing




| | Depth |
|---|---|
| MAG32R | 5.03 |
| MAG52R | 5.66 |
| MAG72R | 6.91 |

## OPTION SWITCH SETTINGS

The MagPro™ R Series bill acceptor contains an option switch module allowing the unit to be customized to the requirements of the individual account. This switch module is factory set with switches 3 and 8 in the ON position and positions 1, 2, 4, 5, 6 and 7 in the OFF position.

### Setting The Option Switches (See Figure 1)

Remove power from the bill acceptor. Remove the lower housing from the main housing to access the option switches (see Figure 1). Set the option switches to the desired positions (see Figure 2). Slide the lower housing into the main housing, apply power and test for proper operation.

### MagPro™ R Series Option Switch Settings (See Figure 2)

| Switch | On | Off |
|---|---|---|
| 1 | High Security | Standard Acceptance |
| 2 | Accepts bills in one direction only (face up, green seal first) | Accepts bills in both directions (face up) |
| 3 | Serial/Parallel Interface | Pulse Interface |
| 4 | $20 Accept | $20 Reject |
| 5 | $10 Accept | $10 Reject |
| 6 | $5 Accept | $5 Reject |
| 7 | $2 Accept | $2 Reject |
| 8 | $1 Accept | $1 Reject |

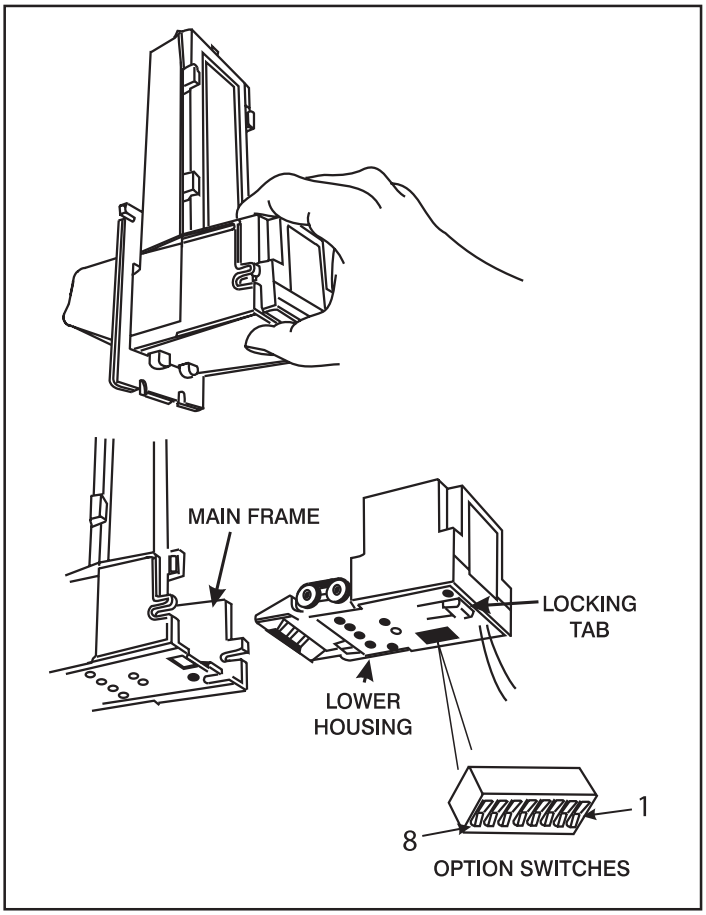



Figure 1

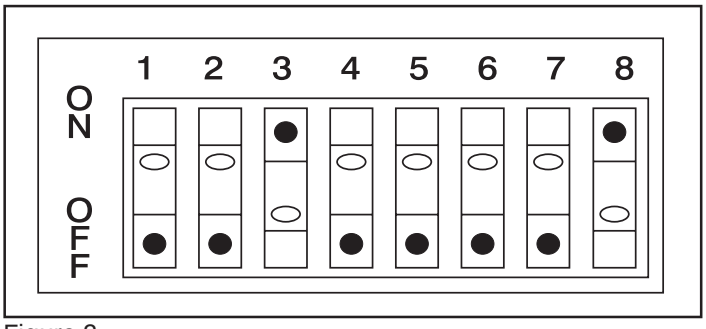



Figure 2

## INSTALLING THE BILL ACCEPTOR

1. Remove power from the vending machine.
2. Set the option switches to the desired settings.
3. Mount the bill acceptor according to mounting instructions found in vending machine manual or appropriate kit literature.
4. Connect the bill acceptor's harness connectors to the vendor's mating connectors.
5. Load the vending machine with product and the coin mechanism with change.
6. Apply power to the vending machine.
7. Test bill acceptor for proper operation.

# SECTION 3: OPERATION

## BILL RECOGNITION

When a bill is inserted into the bill acceptor, it blocks the left or right alignment sensors as well as the center optic sensor, the transport motor beings to run.

## BILL VALIDATION

From the time the transport motor begins to run until the trailing edge of the bill leaves the alignment sensors, optical and magnetic sensors send information to the microprocessor to determine the validity of the bill.

## BILL STACKING AND CREDIT

If the bill is determined to be authentic, it is transported to the stack position. Once the sensors of the lower housing's anti-pullback lever signals the microprocessor that the bill is in the stacking position, the stacker motor runs and credit is given.

## BILL REJECTION

If the bill is determined to be invalid, the wrong denomination or the anti-pullback levers are active when the bill is determined to be in the stack position, the transport motor will reverse returning the bill to the customer.

## COMPONENT EXPLANATION (See Figure 3)

### Bill Transport and Stacking

The bill transport system is composed of a motor and gearcase assembly, main drive belts and pulleys, lower housing rollers, and the intermediate frame. When the transport motor is energized, it pulls the bill in by sandwiching it between the lower housing rollers and main drive belts. During the validation process, the bill is transferred from the lower housing and main drive belts to the intermediate frame.

The bill stacker is composed of a motor and gearcase assembly and a pusher plate assembly. When the bill is transported past the anti-pullback levers into the stacking position, the stacker motor energizes driving the pusher plate, which in turn, pushes the bill into the bill box.

### Left and Right Alignment Sensors

The left and right alignment sensors send information to the microprocessor to insure that the bill is the right width and that it is being fed in correctly.

### Center Optic Sensor

The center optic sensor informs the microprocessor that the bill is ready to be transported if the information from the alignment sensors is correct.

### Left and Right Optic Sensors

The left and right optic sensors and associated circuitry perform various optical checks on the bill and send that information to the microprocessor for bill validation.

### Magnetic Sensor

The magnetic sensor and its associated circuitry performs checks on the magnetic properties of the bill and sends that information to the microprocessor for bill validation.

### Anti-Pullback Lever

The lower anti-pullback lever is optically monitored to tell the microprocessor when the bill has entered the stack position or if an attempt to defraud the unit is taking place.

### Stacker Home Sensor

The stacker home sensor is an optical sensor that informs the microprocessor of the position of the stacker pusher plate.

### Encoder Sensor

Connected to the transport motor is an encoder wheel which is optically monitored to determine the speed of the transport motor and to determine the position of the bill in the bill path.

Component
Explanation

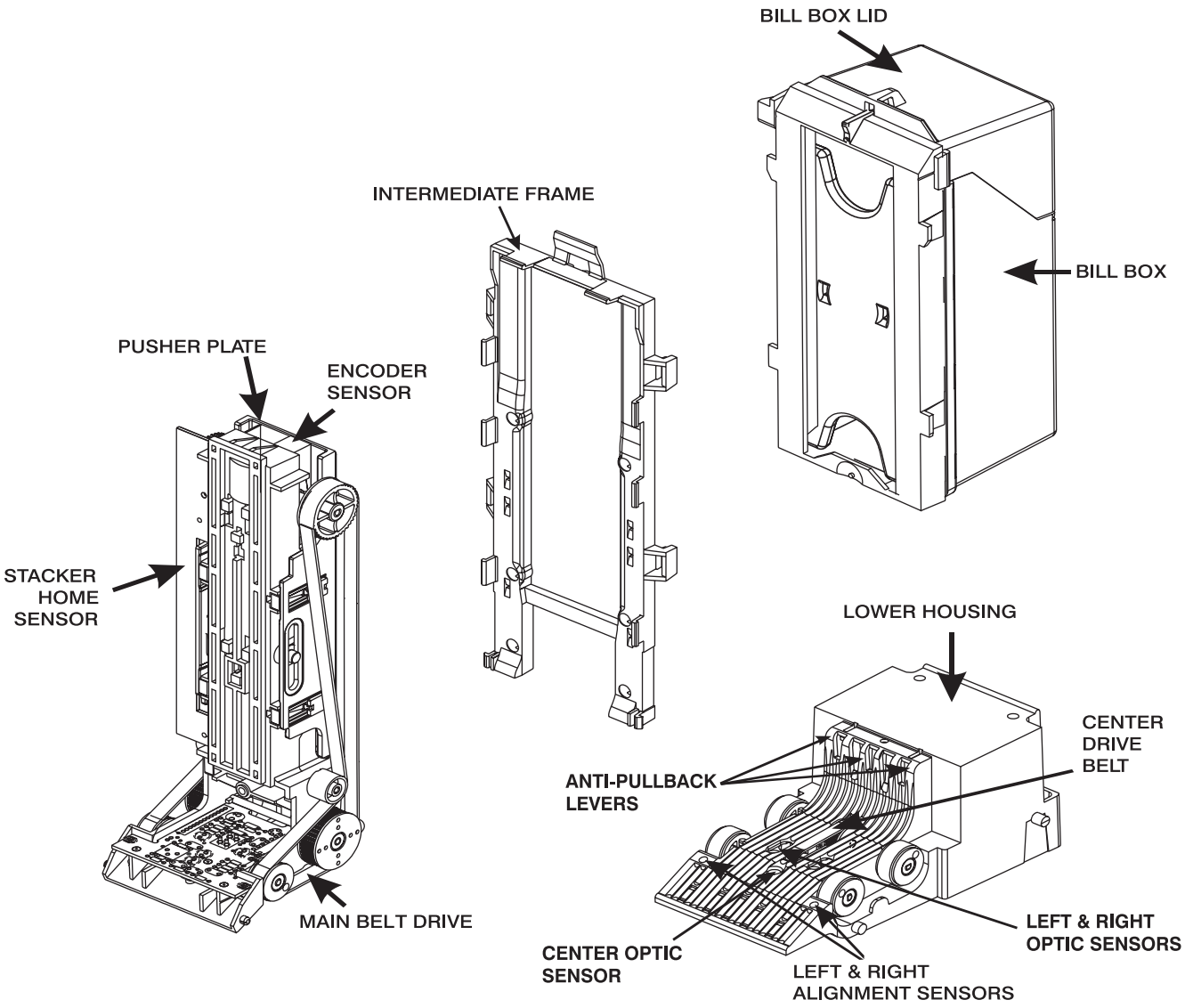
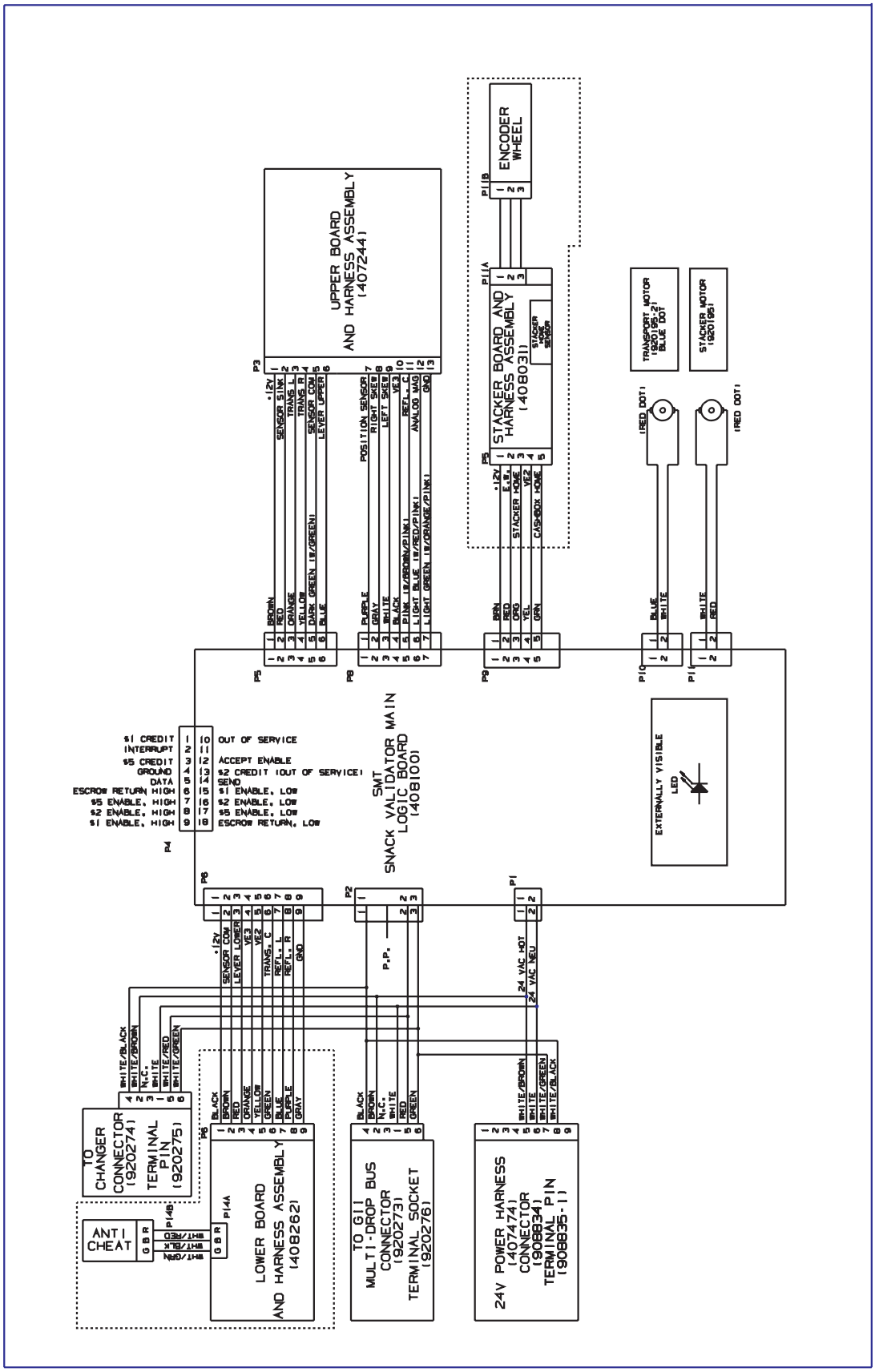



Figure 3

# SECTION 3: OPERATION

Interconnect Drawing



## DISASSEMBLING THE MagPro™ R SERIES

### Removing the Bill Box (See Figure 4)

Push the bill box tab forward while sliding the bill box up.

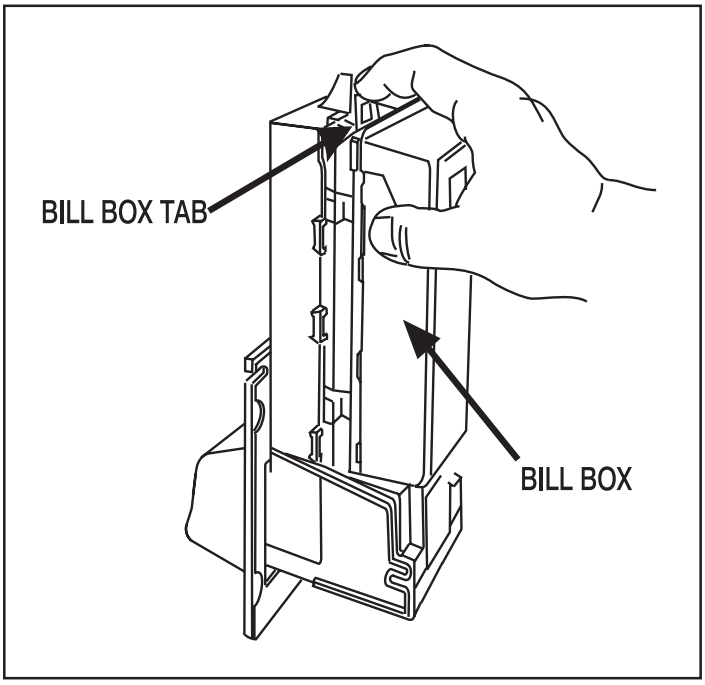



Figure 4

### Removing the Lower Housing (See Figure 5)

To remove the lower housing, push the locking tab on the bottom of the bill acceptor and pull the lower housing to the rear.

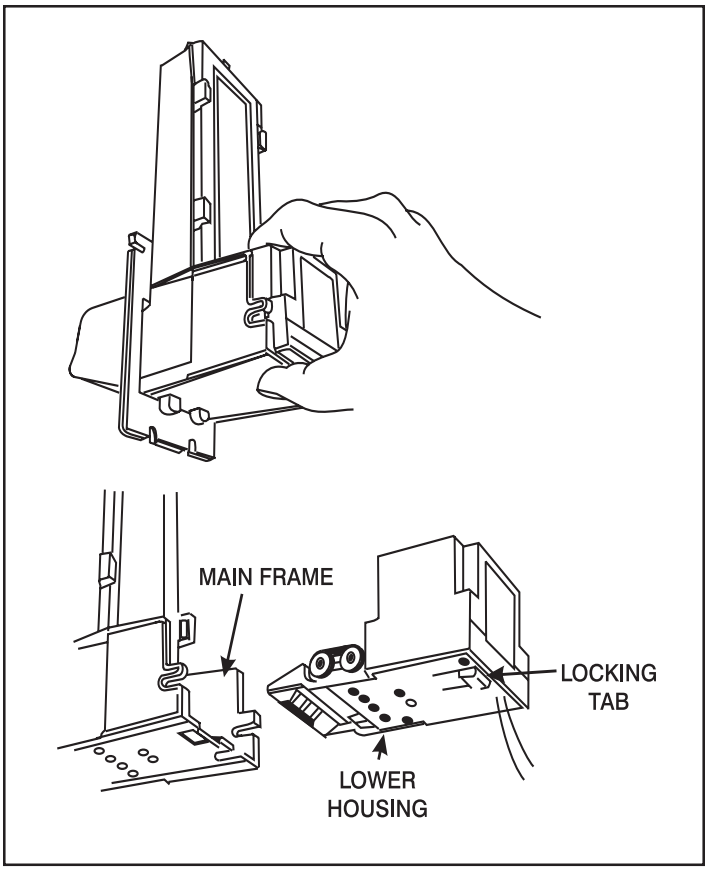



Figure 5

# SECTION 4: MAINTENANCE

## DISASSEMBLING THE LOWER HOUSING

### Removing the Main Logic Board (See Figure 6)

Remove the lower housing from the main housing. Remove the two Phillips screws that secure the cover to the lower housing. Raise the logic board assembly from the lower housing and unplug the harnesses from the logic board.

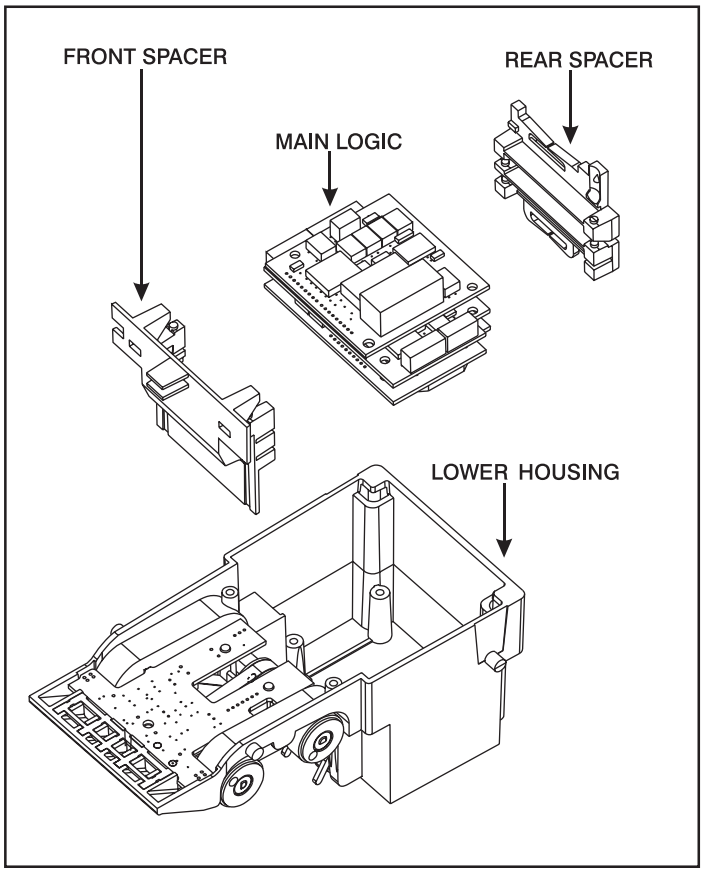



Figure 6

### Removing the Lower Sensor Board (See Figure 7)

Remove the Phillips screw that secures the sensor board to the lower housing, unsnap the lower housing anti-pullback sensor board and remove the lower sensor board.

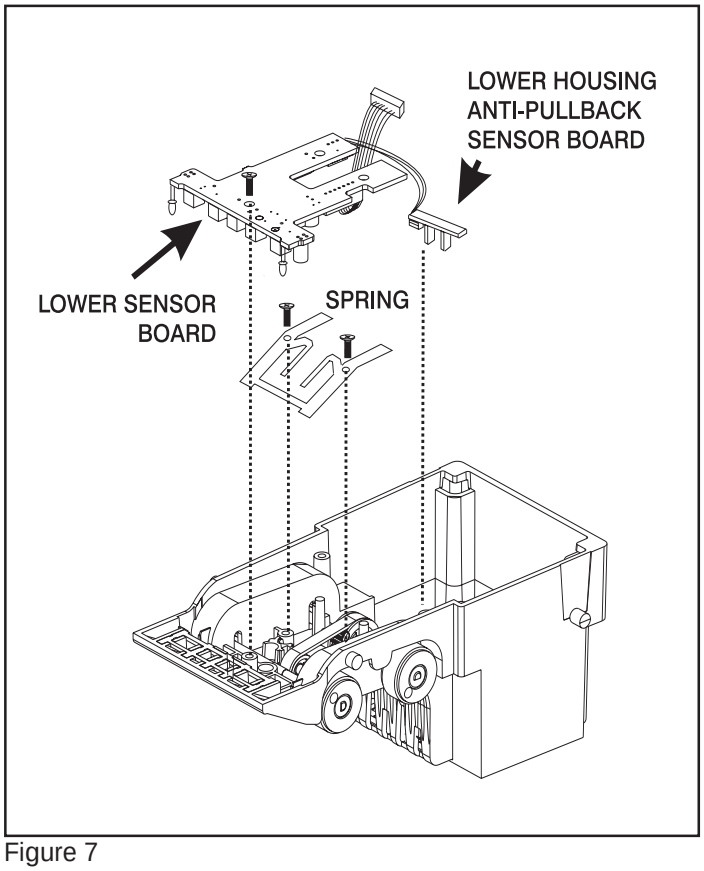



Figure 7

### Removing the Lower Housing Anti-Pullback Lever and Spring (See Figure 8)

Using a small drift or Phillips screwdriver, depress the locking tab in the small hole in the top of the lower housing. At the same time, insert a small standard blade screwdriver into the center slot and push the anti-pullback assembly back out of the retaining tabs. Remove the anti-pullback lever from its mount by releasing the locking tabs. Pay close attention to the placement of the spring to assure its correct position on reassembly.

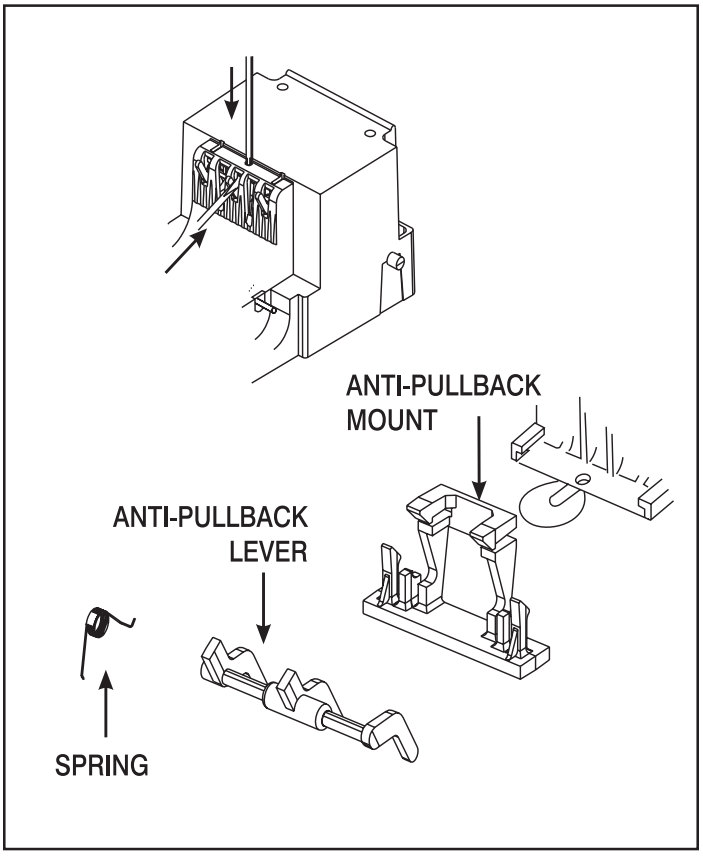



Figure 8

### Removing the Lower Housing Rollers and Center Drive Belt (See Figure 9)

Slide the front pulleys off the shaft. To remove the center belt, slide the back pulleys off the shaft. Gently tap the back shaft with a small hammer until the shaft splines are free from the center pulley.

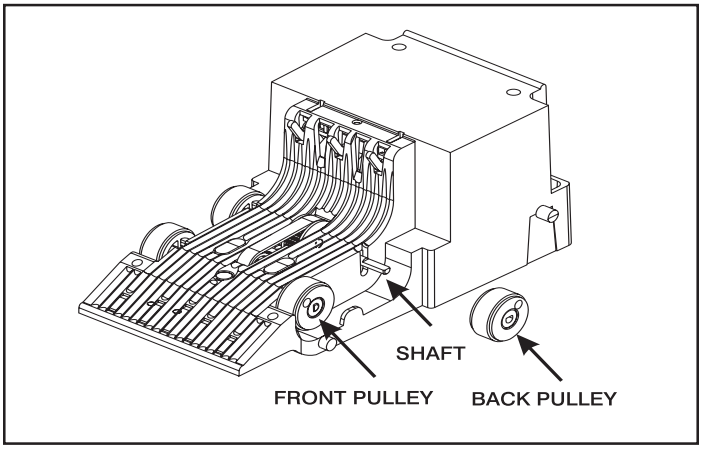



Figure 9

### Removing the Intermediate Frame (See Figure 10)

Using a small straight tip screwdriver, free the ten locking tabs which secure the intermediate frame to the main frame and remove the intermediate frame.

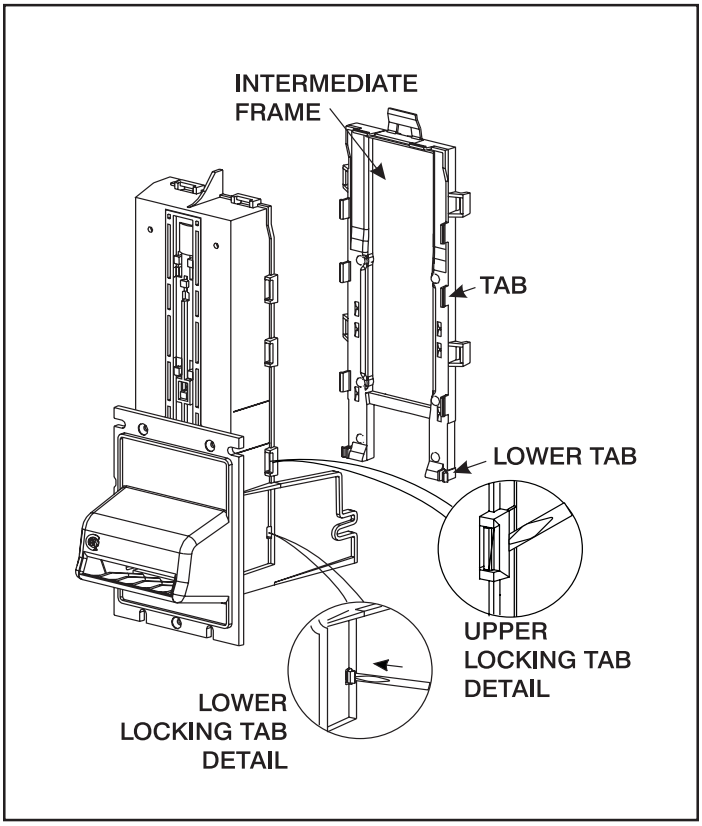



Figure 10

# SECTION 4: MAINTENANCE

### Removing the Inlet Mask (See Figure 11)

Using a Phillips screwdriver and a 5/16" wrench, remove the three screws and nuts from the inlet mask and remove the mask.

### Removing the Mounting Frame and Static Grounding Spring (See Figure 11)

Using a Phillips screwdriver, remove the screws that secure the mounting plate and grounding spring and remove both.

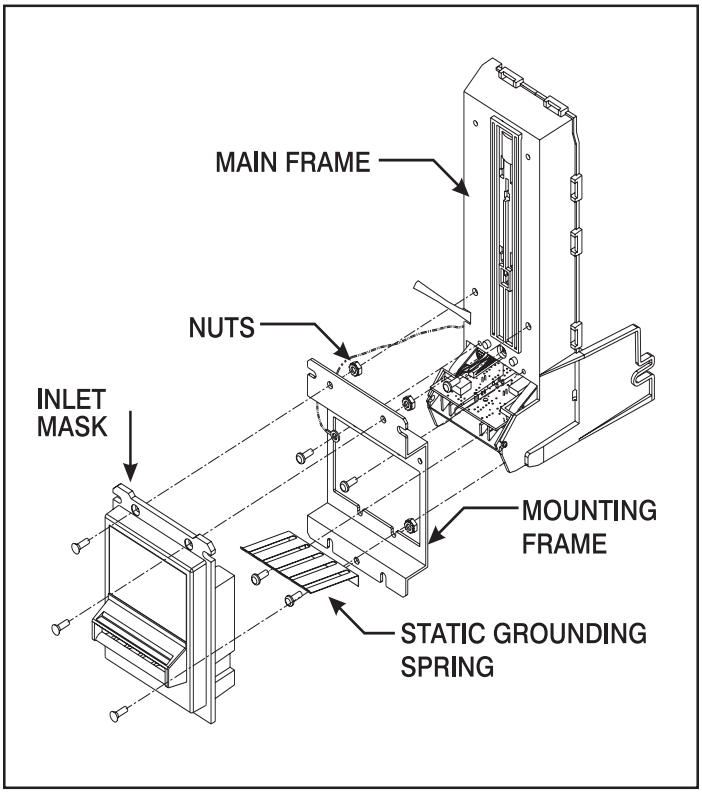



Figure 11

### Removing the Chassis from the Mainframe (See Figure 12)

Remove the Phillips screw securing the chassis to the main frame. Remove the web wrap from the chassis harness. Spread the main frame to free the two locating pins of the chassis from the main frame and pull down on the chassis. Carefully route the chassis harness through the opening in the main frame. Pull the chassis through the lower main frame opening.

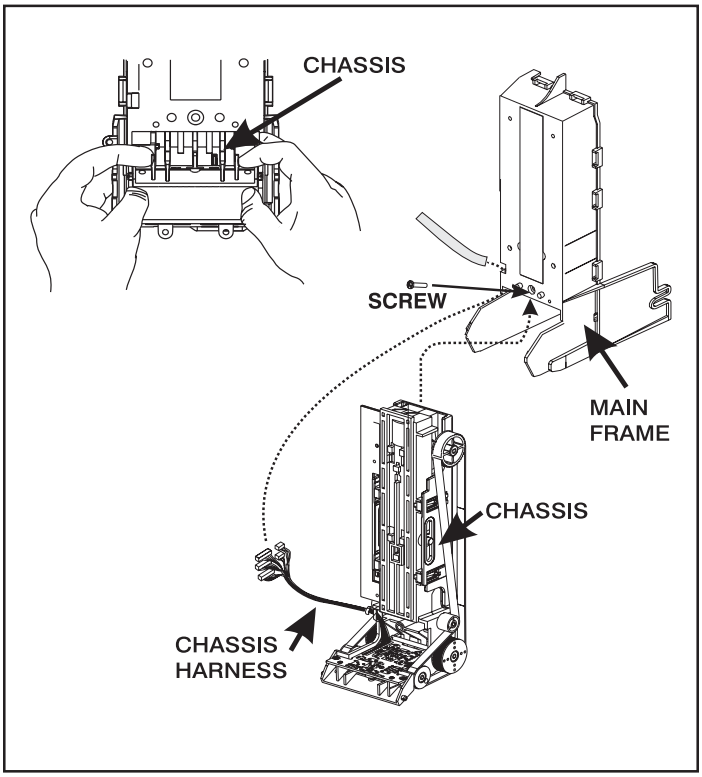



Figure 12

## DISASSEMBLING THE CHASSIS

### Removing the Pusher Plate from the Chassis (See Figure 13)

Cut the cable tie that secures the chassis harnessing. Remove the pusher plate from the stacker gear box assembly by slightly spreading the pusher plate until it clears the stacker motor cam assembly. Pull the pusher plate straight out until the locking tabs of the stacker slides catch the chassis. Using a small screwdriver, release the four tabs and remove the pusher plate.

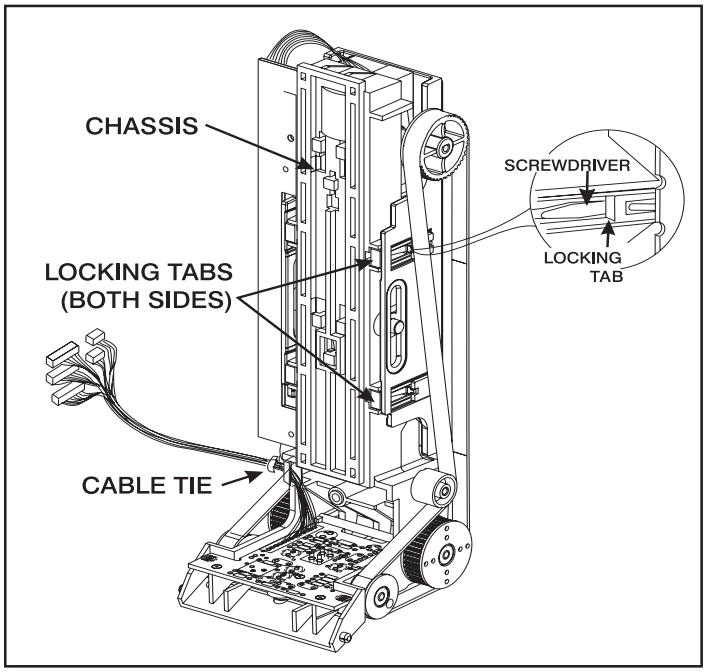



Figure 13

### Removing the Encoder Sensor and Stacker Board (See Figure 14)

Remove the encoder wheel dust cover from the transport gear case and motor assembly. Free the encoder sensor from the top of the transport motor gear case assembly. Remove the Phillips screw that secures the stacker board to the chassis and remove the stacker board.

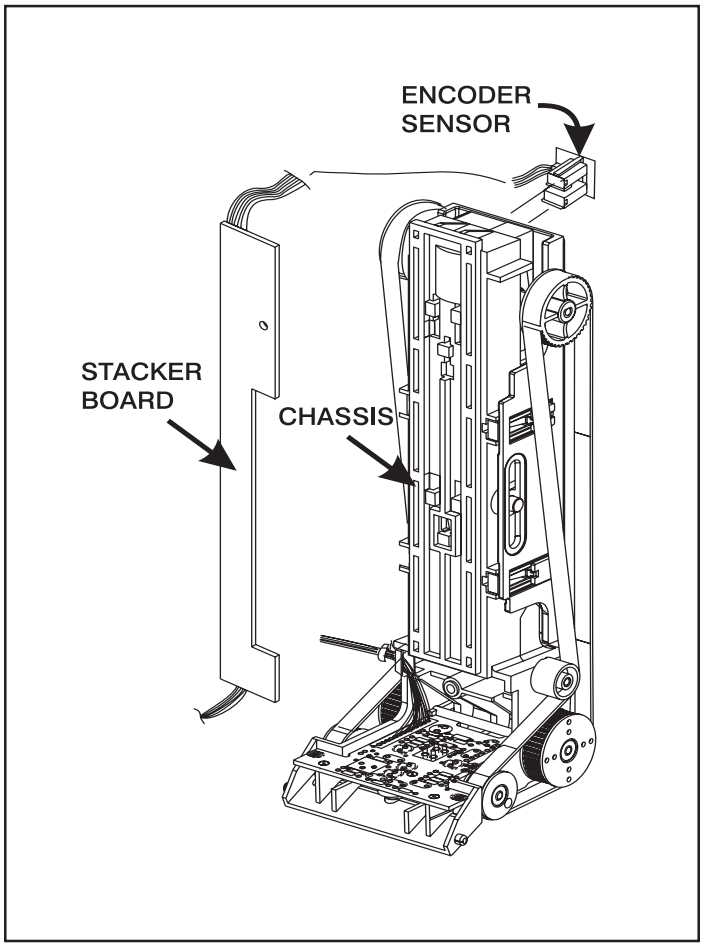



Figure 14

# SECTION 4: MAINTENANCE

### Removing the Main Drive Belts and Pulleys (See Figure 15)

Compress the belt tensioning spring by pressing down on the transport motor and gear case assembly and remove the chassis belts. Slide the pulleys off the lower shafts to prevent them from falling off.

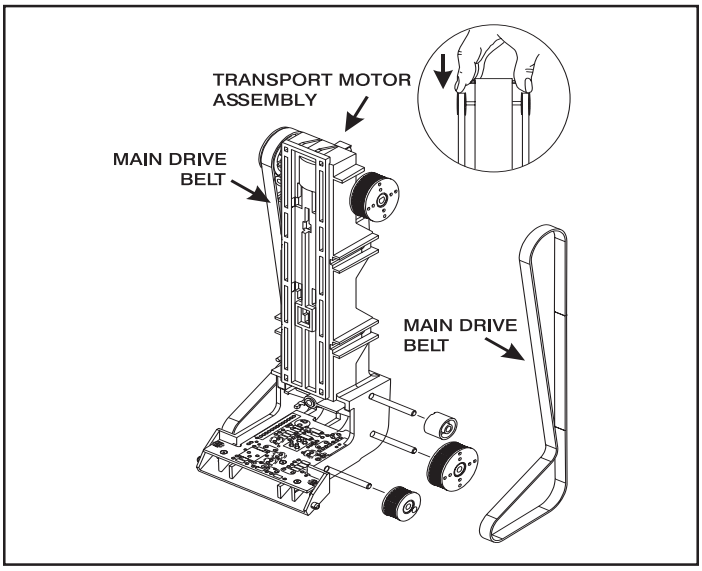



Figure 15

### Removing the Inlet Stacker Gear Box and Motor Assemblies (See Figure 16)

Compress the belt tensioning spring by pushing up on the stacker motor and gear case assembly until the three locking tabs of the gear case can be freed from their mating slots in the chassis frame. Remove the stacker motor and gear case assembly along with the tensioning spring. Slide the transport motor and gear case assembly down until its three locking tabs are freed from their mating slots in the chassis frame.

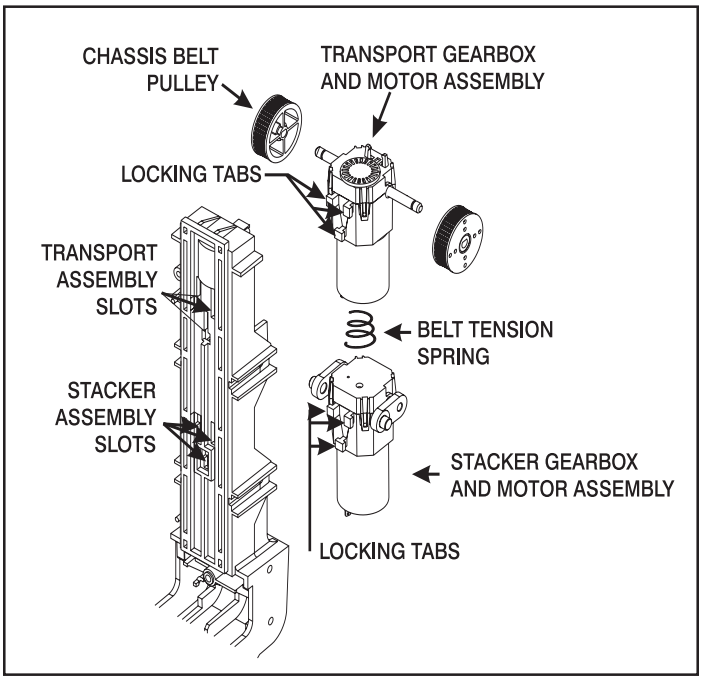



Figure 16

### Removing the Upper Sensor Board from the Chassis (See Figure 17)

Remove the lower chassis belt shaft. Using a small screwdriver, remove the two metal sensor board retaining clips and the harness retaining clip. Lift the front of the sensor board and pull forward.

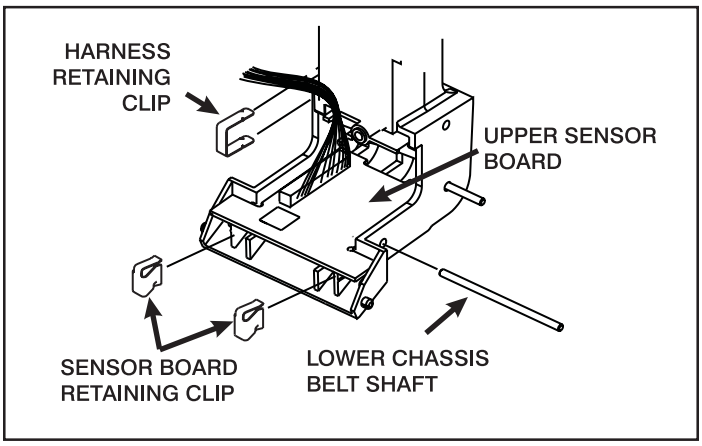



Figure 17

## ROUTINE CLEANING PROCEDURE

***NOTE:*** *Petroleum-based cleaners and freon-based propellants can damage plastic and some electronic components. Scouring pads and stiff brushes may harm the protective conformal coating on the circuit boards and can mar the plastic. These items should never be used when cleaning the MagPro™ R Series bill acceptor.*

The MagPro™ R Series should be cleaned every 20,000 bills or every two years (or as needed, depending on the environmental conditions of the location). Dust can be removed with a soft brush or cloth or it can be blown out using compressed air.

### Procedure

1. Disconnect power from the bill acceptor.
2. Remove the bill box and use a soft cloth to wipe the dust from around the intermediate frame and stacker plate.
3. Remove the lower housing.
4. Using compressed air or a soft brush, blow or brush the dust off of the optic sensors.
5. Remove dust from around the rollers on the lower housing and the sensors on the upper sensor board. The upper sensors are located directly above the lower housings sensor when the lower housing is installed.
6. The bill path can only be cleaned using a soft cloth moistened with a mild soap/detergent and a warm water solution to remove dirt.
7. Clean the magnetic head using a swab and isopropyl alcohol.
8. Remove the dust from the transport belt areas and any other places of build up.
9. Once the lower housing is dry, place it back into the mainframe so that the tab on the bottom locks into place.
10. Blow the dust out of the encoder wheel and its sensors. (It may be necessary to extend the stacker plate to access the encoder wheel. This can be done by supplying power to the unit momentaily, so that the stacker plate extends.)
11. Remount the bill box.
12. Apply power and insert the bills to verify that the unit is funtioning properly.

# SECTION 4: MAINTENANCE

## CLEANING PROCEDURE FOR SALTED UNITS

***NOTE:*** *Petroleum-based cleaners and freon-based propellants can damage plastic and some electronic components. Scouring pads and stiff brushes may harm the protective conformal coating on the circuit boards and can mar the plastic. These items should never be used when cleaning the MagPro™ R bill acceptor.*

### Procedure

1. Remove power from the bill acceptor.

2. Remove the bill acceptor from the vending machine.

***WARNING:*** *If moisture is present, allow the unit to dry thoroughly before applying power to avoid possible shock hazard. If the stacker plate does not return to the home position, remove power and carefully remove the bill box to avoid damaging the bill box and/or stacker plate.*

3. Open the bill box lid and verify that the stacker plate is in the standby/home position. If it is not in the home position, apply power and observe that the stacker plate returns home.

4. Remove the bill box.
5. Remove the lower housing.

6. Remove the bottom cover and logic boards from the lower housing.

> ***CAUTION:***
> *The motor and main logic boards are not protected from moisture. Therefore the unit must be held in a manner that prevents water from running onto the logic boards or into the motor area.*

7. Run hot water (110°-140°F) over the lower housing from the top and bottom. Using a soft brush, gently clean any residual salt. Use a soft absorbent cloth to clean any residue off the lower housing.

8. Remove the front mask. Using hot water and a soft brush, clean the front mask, upper sensor board, and main frame.

9. Verify that the anti-pullback levers move freely and that the spring returns them to their open position.

10. Allow the unit to dry thoroughly.

11. Clean the magnetic head using a swab and isopropyl alcohol.

12. Replace the front mask.

13. Replace the lower housing cover.

14. Replace the lower housing into the main frame.

15. Remount the bill box.

16. Apply power and insert bills to verify that the unit is functioning properly.

# SECTION 5: TROUBLESHOOTING

## INTRODUCTION

The Troubleshooting Guide on the following pages is intended to help locate problems within the bill acceptor. If an acceptor cannot be repaired by following the guide, return the acceptor to the nearest Coinco Service Center for repair. If it is necessary to return the acceptor to Coinco, please accompany the acceptor with a complete description of the malfunction to help expedite the repair and return of the bill acceptor.

Logic troubleshooting minimizes time spent in removing and replacing modules that are not defective. Some failures are caused by minor problems such as loose or faulty connections. Please check the following before replacing any parts:

- Connectors are inserted correctly.
- Connector pins are not bent or broken.
- All wires are properly secured.
- Coin changer inventory tubes are filled to their correct levels.

## DIAGNOSTIC FLASH CODES

Troubleshooting can be achieved by reading flashes or blinks of light from the Diagnostic LED (see Figure 19).

Diagnostic codes 1-5 may appear during normal servicing of the MagPro™ R Series. To access diagnostic codes 6-18, and turn off power to the MagPro™ R Series for 10 seconds. Reapply power to the MagPro™ R Series. Diagnostic codes 6-18 will appear for the respective error conditions detected in the MagPro™ R Series. If more than one error or condition exists, the lower number diagnostic code will appear until its condition is corrected.

Diagnostic codes 2, 8, 14 and 18 are not used. Codes 1, 3, 4, 5, 15 and 16 may appear during normal servicing. If the MagPro™ R Series is flashing a 5 code, turn off power for 10 seconds. Reapply power and codes 6, 7, 9, 10, 11, 12, 13 or 17 will appear for approximately 30 seconds. After 30 seconds, these codes will revert back to the 5 code. If more than one error exists, the lower number code will appear until its condition is corrected.

| # Of Flashes | Description of Codes |
|---|---|
| 1 | Bill Box Full |
| 2 | Not Used |
| 3 | Check Bill Path |
| 4 | All Bill Accept Switches Are Off |
| 5 | Bill Jam or Sensor Error |
| 6 | Stacker Motor/Home Sensor |
| 7 | Transport Motor/Encoder Sensor |
| 8 | (Reserved for Future Use) |
| 9 | EEPROM Check Sum Error |
| 10 | RAM or ROM Check Sum Error |
| 11 | Center Optic Sensor |
| 12 | Right Optic Sensor* |
| 13 | Left Optic Sensor* |
| 14 | Bill Position Sensor Error |
| 15 | Right position Sensor* |
| 16 | Left Position Sensor* |
| 17 | Lower Board Anti-Pullback Lever Sensor |
| 18 | Not Used |

** The left and right sensors referenced above are given viewing the MagPro™ R Series from the front.*

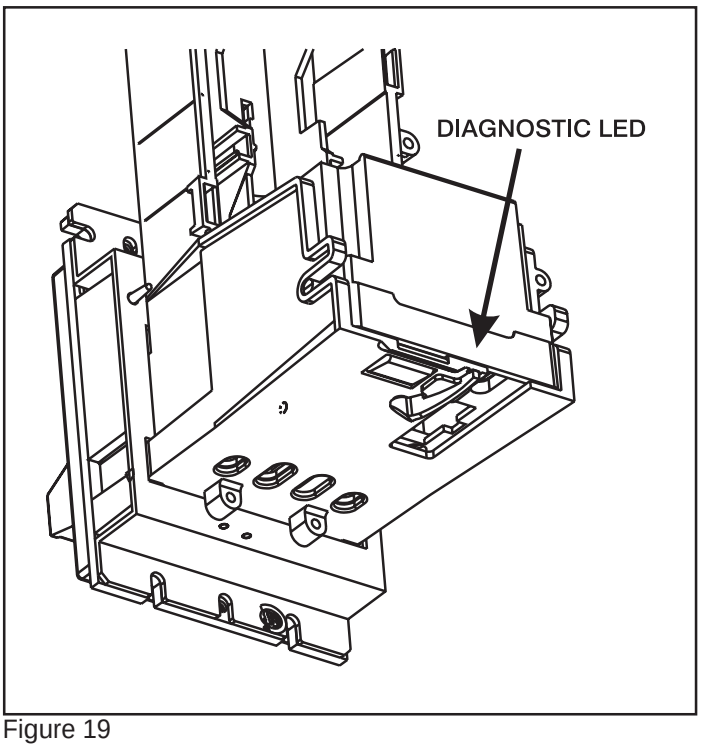
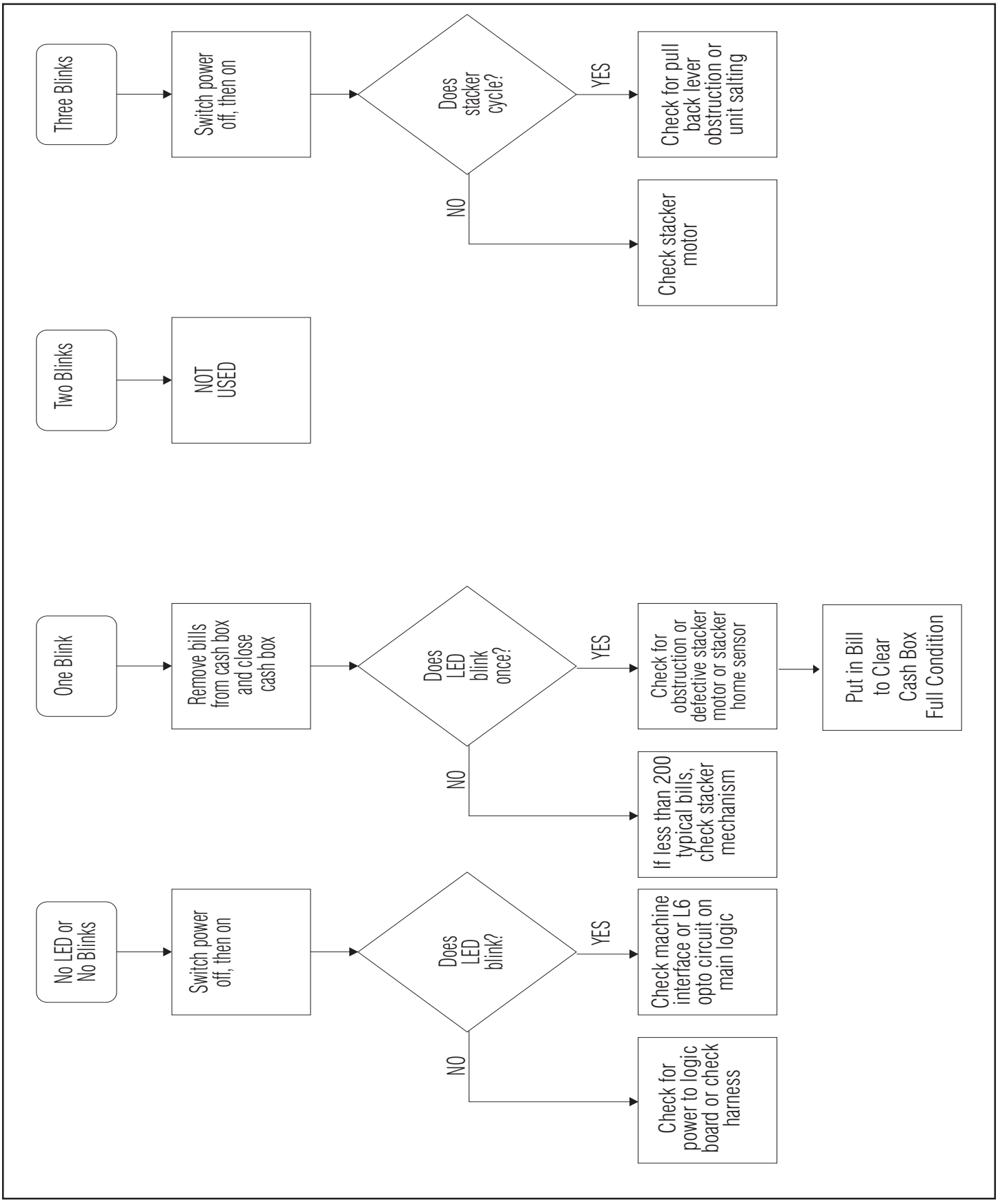
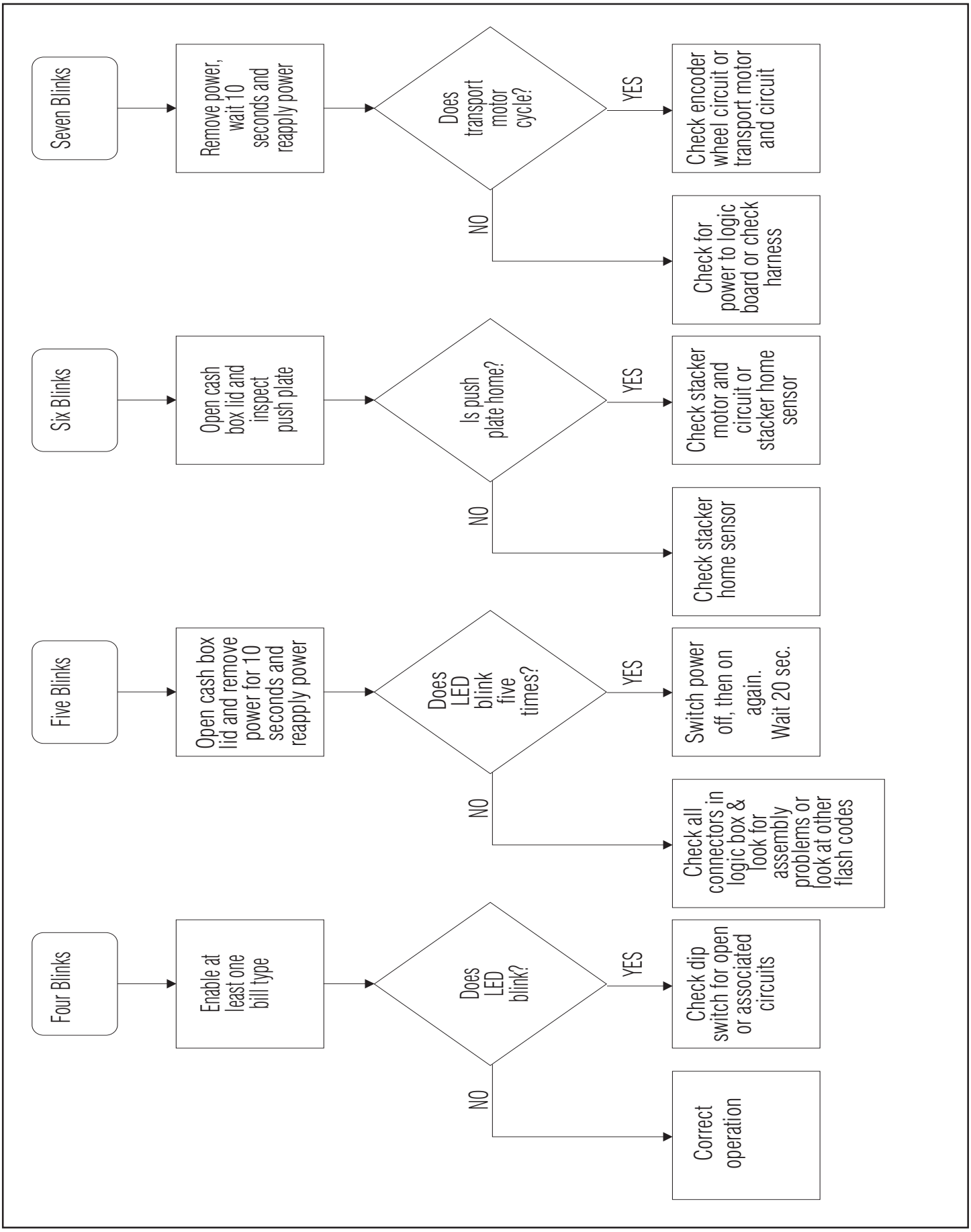



Figure 19

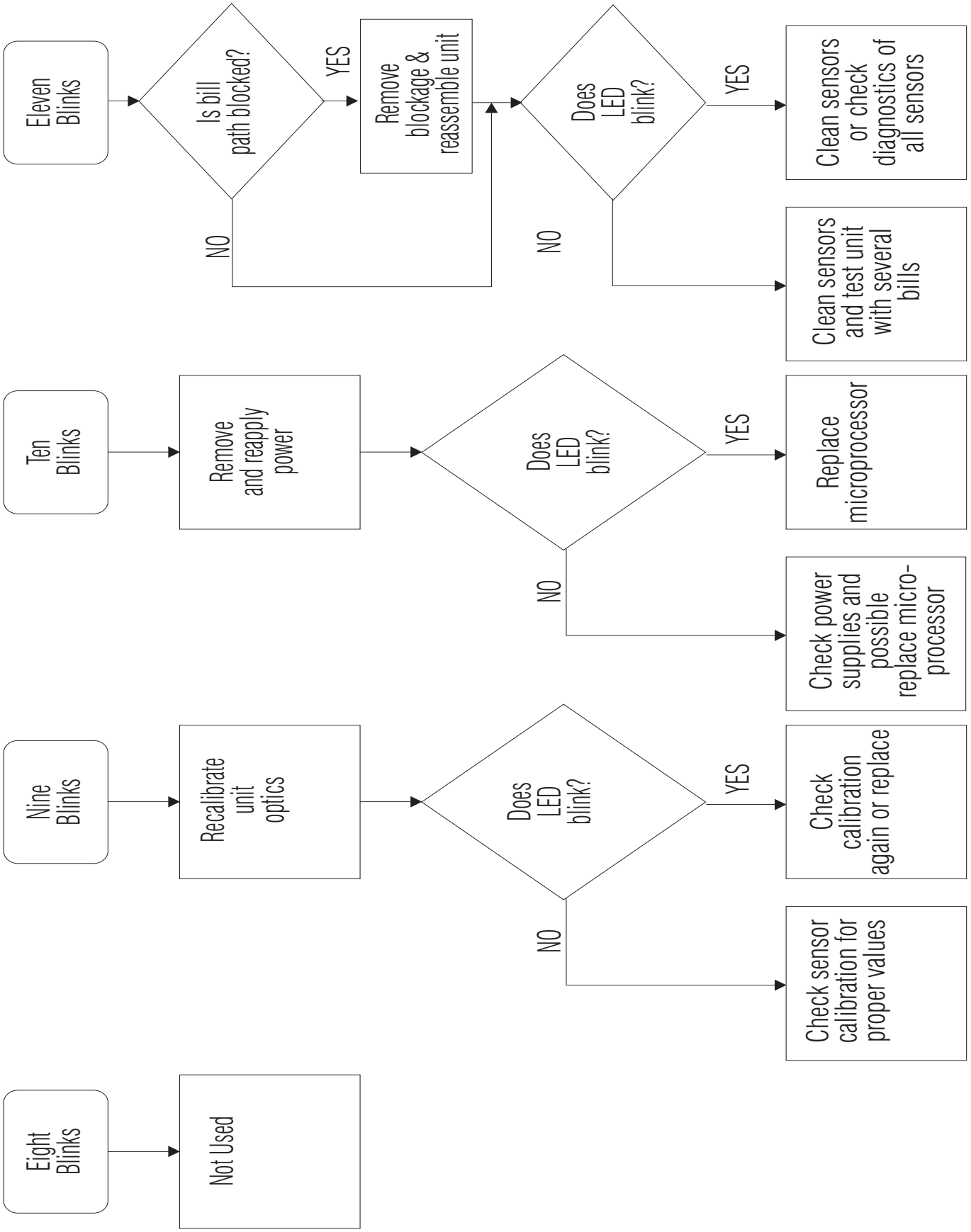
# SECTION 5: TROUBLESHOOTING

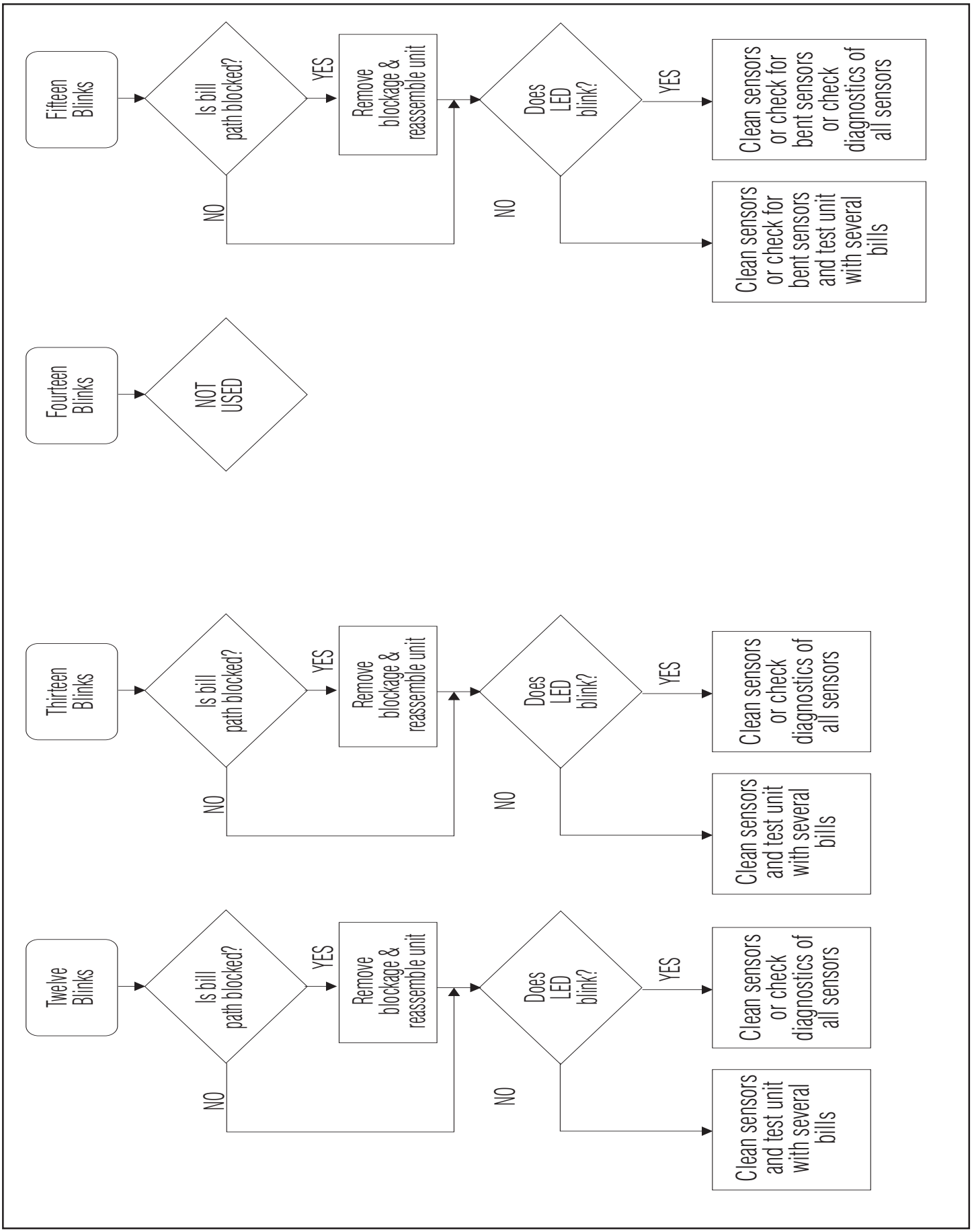
## TROUBLESHOOTING GUIDE



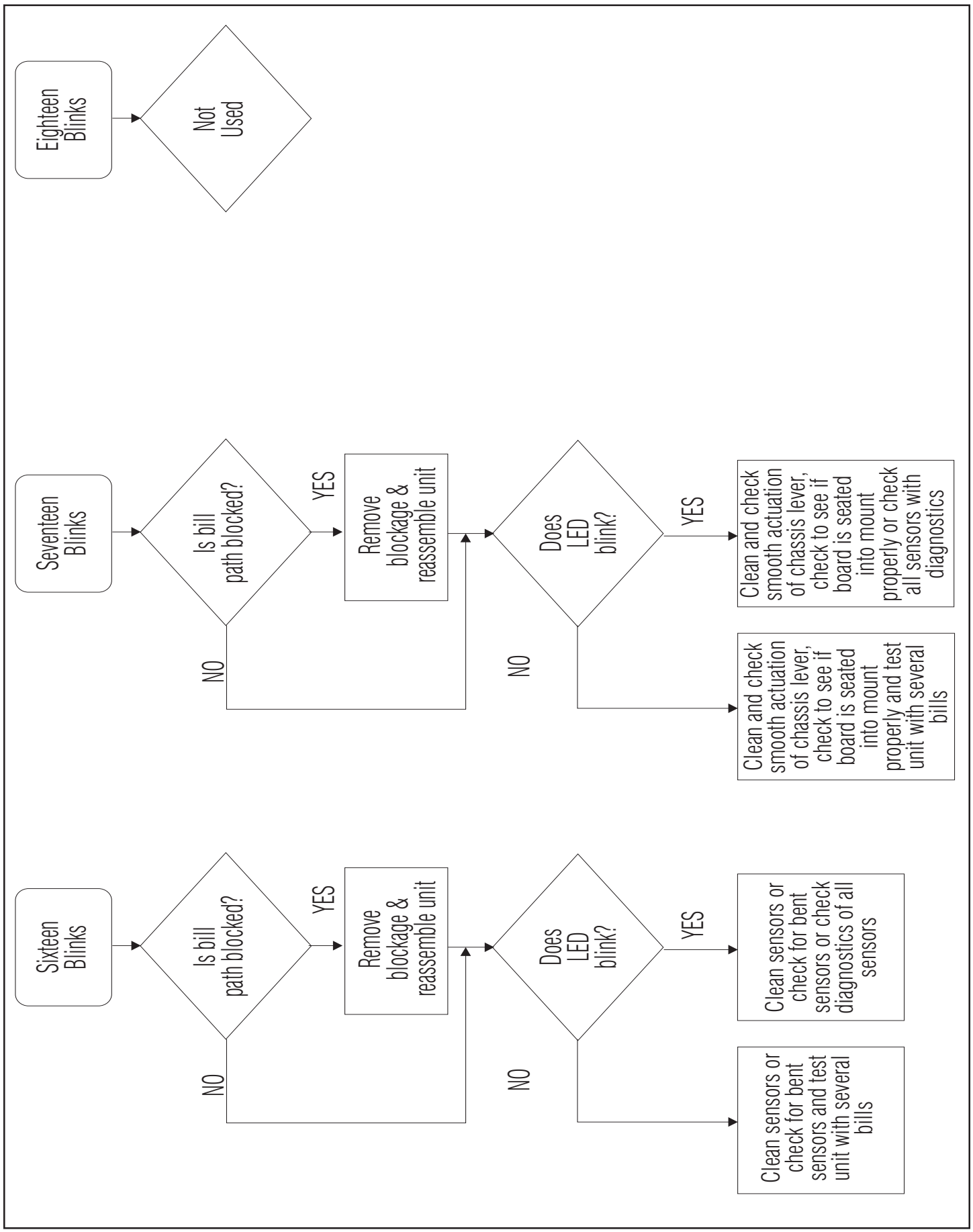

Seven Blinks
Remove power, wait 10 seconds and reapply power
Does transport motor cycle?
YES
Check encoder wheel circuit or transport motor and circuit
NO
Check for power to logic board or check harness
Six Blinks
Open cash box lid and inspect push plate
Is push plate home?
YES
Check stacker motor and circuit or stacker home sensor
NO
Check stacker home sensor
Five Blinks
Open cash box lid and remove power for 10 seconds and reapply power
Does LED blink five times?
YES
Switch power off, then on again. Wait 20 sec.
NO
Check all connectors in logic box & look for assembly problems or look at other flash codes
Four Blinks
Enable at least one bill type
Does LED blink?
YES
Check dip switch for open or associated circuits
NO
Correct operation

# SECTION 5: TROUBLESHOOTING

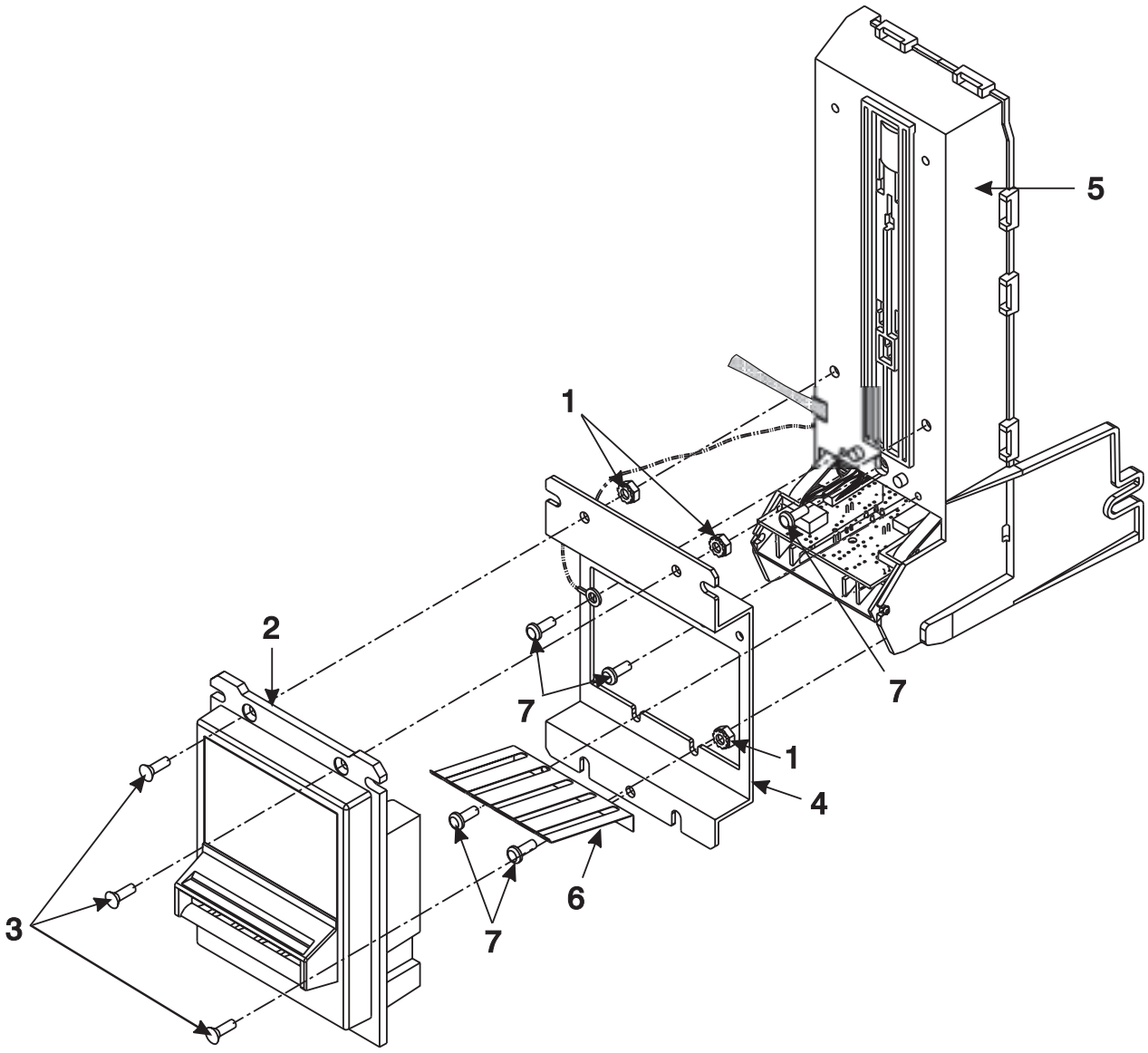



Twelve Blinks
Is bill path blocked?
YES
Remove blockage & reassemble unit
NO
Does LED blink?
YES
Clean sensors or check diagnostics of all sensors
NO
Clean sensors and test unit with several bills
Thirteen Blinks
Is bill path blocked?
YES
Remove blockage & reassemble unit
NO
Does LED blink?
YES
Clean sensors or check diagnostics of all sensors
NO
Clean sensors and test unit with several bills
Fourteen Blinks
NOT USED
Fifteen Blinks
Is bill path blocked?
YES
Remove blockage & reassemble unit
NO
Does LED blink?
YES
Clean sensors or check for bent sensors or check diagnostics of all sensors
NO
Clean sensors or check for bent sensors and test unit with several bills

# SECTION 5: TROUBLESHOOTING



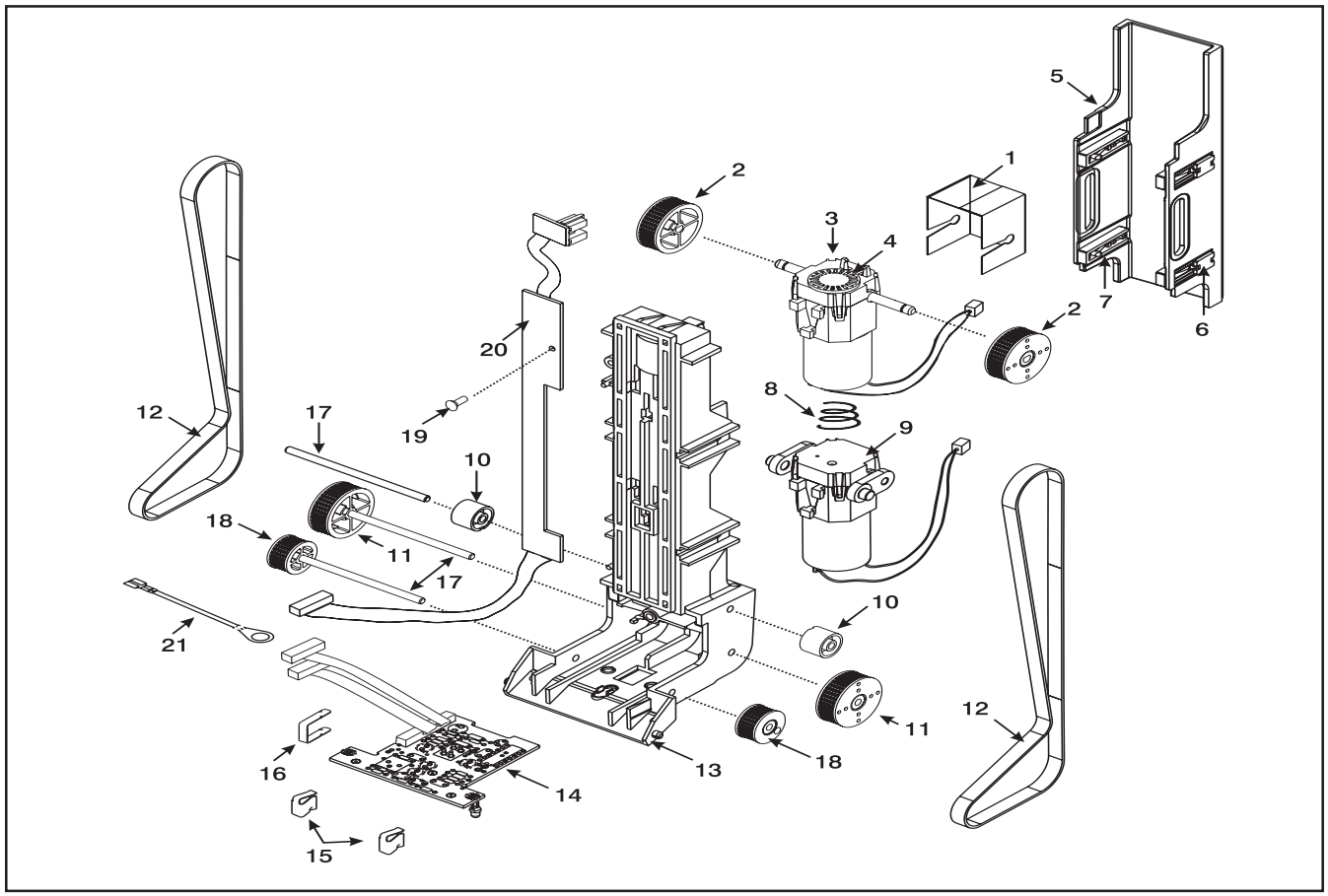
MAIN FRAME
R-Series




| ITEM NO. | PART NO. | DESCRIPTION | QUANTITY |
|---|---|---|---|
| 1 | 438-6 | Nut & Lockwasher 6-32 | 3 |
| 2 | 925223 | Snack Mask (Pad Printed) | 1 |
| 3 | 921401 | Screw | 3 |
| 4 | 921492 | Frame Mount | 1 |
| 5 | 920807-5 | Main Frame | 1 |
| 6 | 921357 | Grounding Spring | 1 |
| 7 | 345-6R6 | Screw, 6 x 3/8 | 5 |

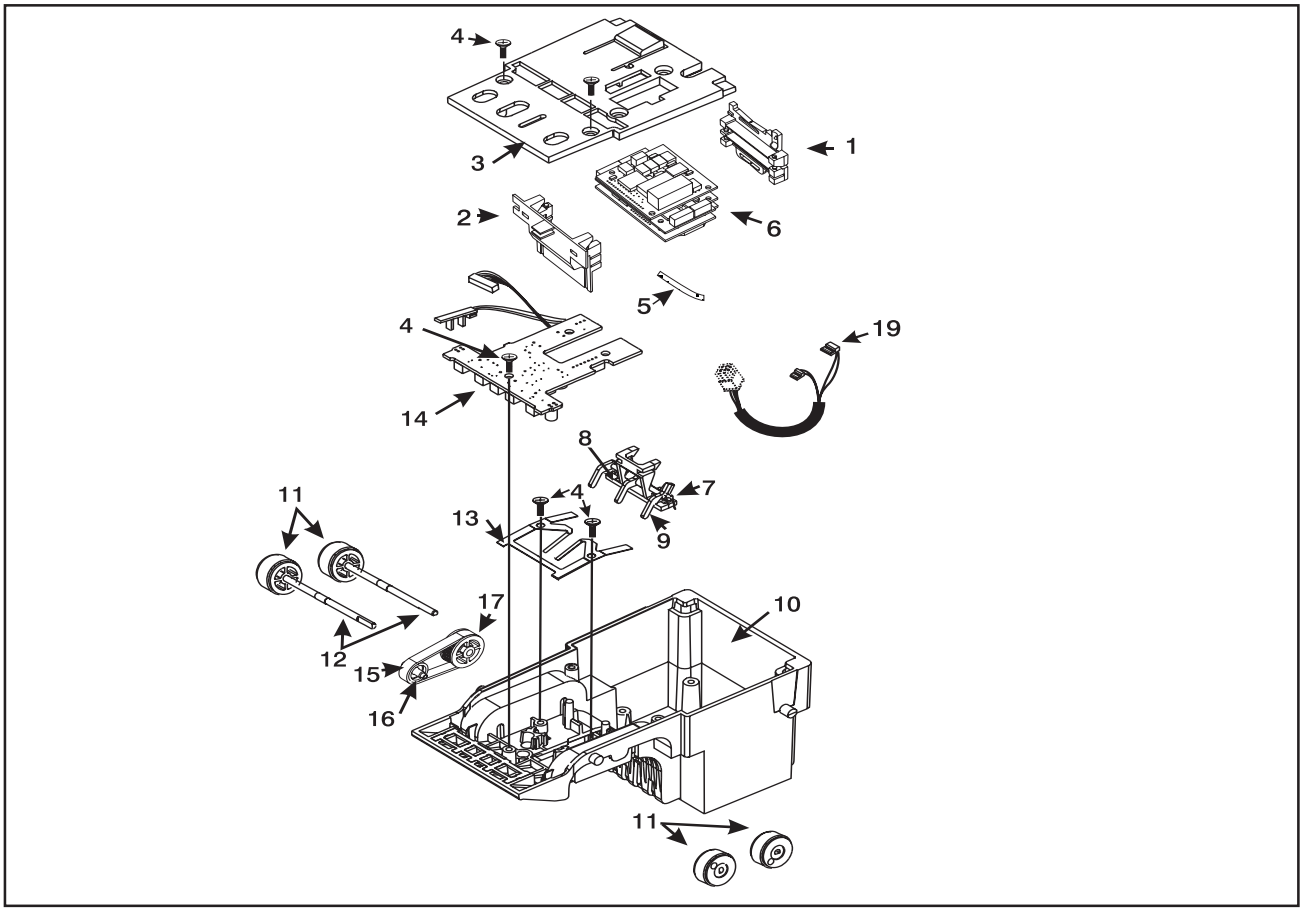
# SECTION 6: PARTS LIST

CHASSIS ASSEMBLY
407975-4




| ITEM NO. | PART NO. | DESCRIPTION | QUANTITY |
|---|---|---|---|
| 1 | 423770 | Dust Cover | 1 |
| 2 | 408054 | Upper Transport Pulley and Hub Assembly | 2 |
| 3 | 407254-3 | Gearbox Assy., Transport (includes #4) | 1 |
| 4 | 920000-3 | Wheel, Encoder | 1 |
| 5 | 407952 | Pushplate Assembly (includes #6 and #7) | 1 |
| 6 | 920836 | Stacker Cap | 4 |
| 7 | 920833-1 | Stacker Slide | 4 |
| 8 | 925202 | Spring, Belt Tension | 1 |
| 9 | 407253-6 | Gearbox Assembly, Stacking | 1 |
| 10 | 920829-1 | Pulley, Idler | 2 |
| 11 | 408055 | Lower Transport Pulley and Hub Assembly | 2 |
| 12 | 921403 | Belt, Chassis | 2 |
| 13 | 407974 | Chassis and Lens Assembly | 1 |
| | 920821-4 | Upper Housing Chassis | 1 |
| 14 | 407244-12 | Sensor Board, Upper | 1 |
| 15 | 920827 | Clip, Upper Board | 2 |
| 16 | 921128 | Clip, Wire | 1 |
| 17 | 920040 | Shaft, Wheel | 3 |
| 18 | 408057 | Inlet Pulley and Hub Assembly | 2 |
| 19 | 345-4R4 | Screw, 4x1/4 PH Plastite | 1 |
| 20 | 408031-5 | Stacker Board | 1 |
| 21 | 407454-2 | Ground Wire | 1 |

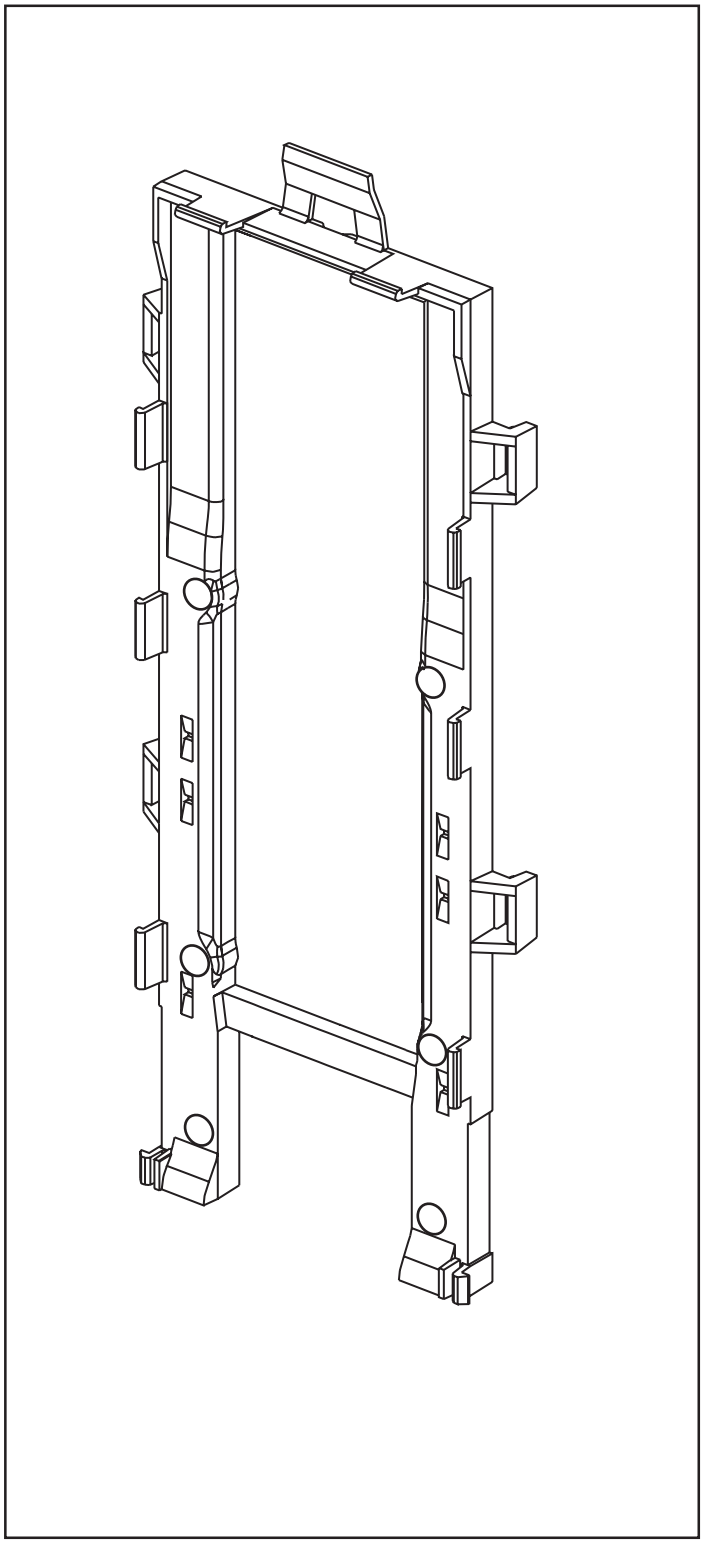
LOWER HOUSING ASSEMBLY




| ITEM NO. | PART NO. | DESCRIPTION | QUANTITY |
|---|---|---|---|
| 1 | 925065 | Spacer, PCB Rear | 1 |
| 2 | 925066 | Spacer, PCB Front | 1 |
| 3 | 921704 | Bottom Cover | 1 |
| 4 | 345-4R4 | Screw, 4 1/4 PH Plastite | 5 |
| 5 | 921707 | 1/2” Expandable Sleeving | 1 |
| 6 | 408100 | Logic Board (includes #1 and #2) | 1 |
| 7 | 920889 | Spring, Anti-Pullback | 1 |
| 8 | 920819-1 | Mount, Anti-Pullback | 1 |
| 9 | 920818 | Lever, Anti-Pullback | 1 |
| 10 | 408310 | Lower Housing Assembly with Lens and Decal | 1 |
| 11 | 408165-1 | Pulley and Tire Assembly | 4 |
| 12 | 923080 | Drive Shaft | 2 |
| 13 | 923102 | Spring, Mag | 1 |
| 14 | 408262-2 | Sensor Board, Lower | 1 |
| 15 | 923403 | Center Belt | 1 |
| 16 | 923101 | Idler Roller | 1 |
| 17 | 408056 | Pulley and Hub Assembly | 1 |
| 18 | 901358 | Cable Tie (not shown) | 1 |
| 19 | 407531 | Harness, Power | 1 |

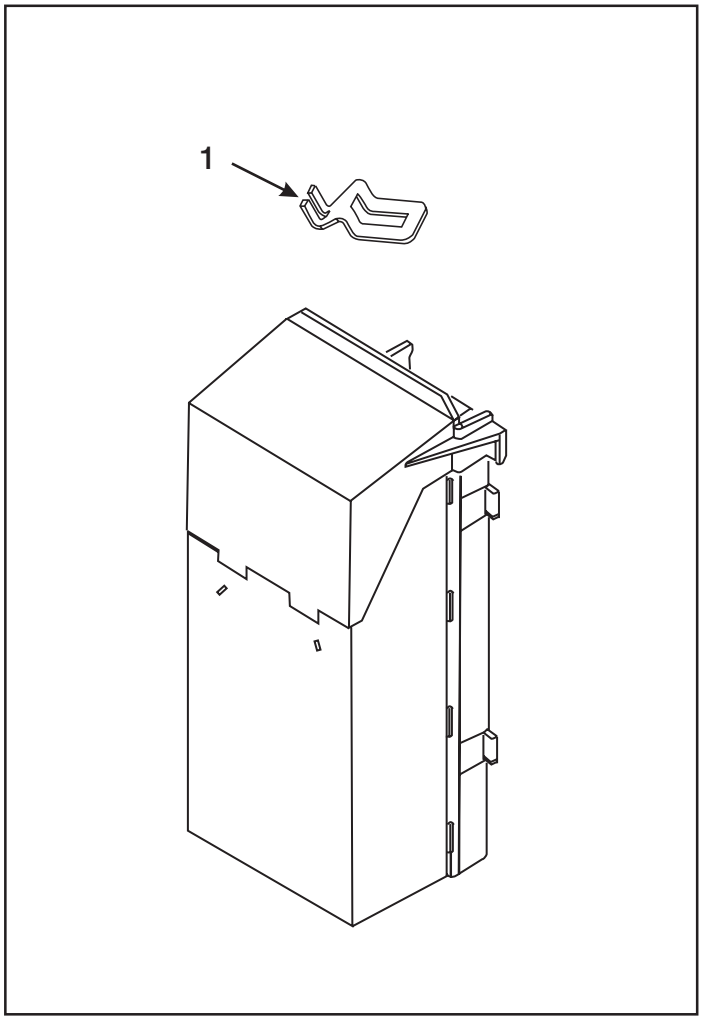
# SECTION 6: PARTS LIST

INTERMEDIATE FRAME ASSEMBLY
408261



CASHBOX ASSEMBLY

408301 (300 Capacity)
408300 (450 Capacity)
408300-1 (650 Capacity)




***NOTE:*** *The 300 note box can be used in all vendors that were produced with a bill acceptor opening. The 450 note box can be used in all can drink vendors with the inner door knock out removed and in most snack vendors.*

| ITEM NO. | PART NO. | DESCRIPTION | QUANTITY |
|---|---|---|---|
| **1** | **922405** | **Lock Bracket** | **1** |

# NOTES

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