MC SERIES PARTS AND SERVICE MANUAL

Standard Change-Makers
A DIVISION OF RKU Standard Incorporated

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IMPORTANT NOTE:

This service manual is in addition to the Owner's Manuals that can also be downloaded from our website: https://standardchange.com/owners-manuals/ and is intended as a reference for troubleshooting our MC Series change machine line of products. Also included is the basic electrical setup for our machines for installations. For explanations of features and programming, please refer to our Owner's Manual.

1.0 INSTALLATION -ELECTRICAL CONNECTION/TESTING

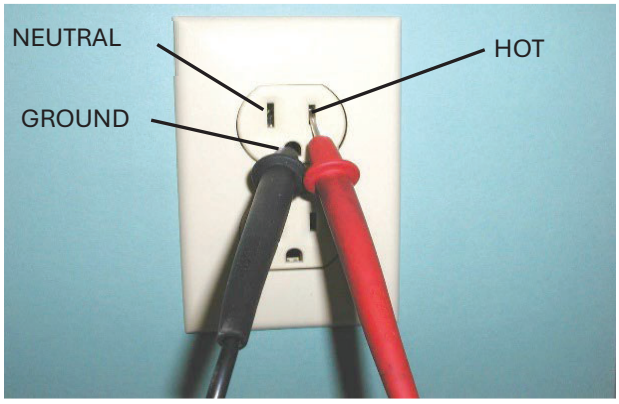
All Standard Change-Makers change machines only need to be connected to a properly grounded 15-amp electrical outlet (3rd wire ground back to main service panel). We also recommend that the changer be wired on a dedicated line. A dedicated line is a circuit which has no other equipment connected on the same circuit breaker or fuse. The purpose of a dedicated line is to reduce the possibility of line interference, which may cause the changer to malfunction. If the machine is in a harsh electrical environment, or if dedicated line is not feasible, the use of a high-quality line filter or surge suppressor (same as used for home computers) is recommended.

IMPORTANT

This machine must be grounded through a properly installed 3rd wire ground, which extends intact to the main service panel.

The Locations Electrical Supply

If this machine has a service cord that ends in a 3-pin connector. The wall receptacle you plug the machine into must be properly polarized and grounded. Operating your machine from an improperly connected power source will VOID THE WARRANTY. The wall receptacle must be able to supply a constant 120 volts at 60Hertz. The receptacle should be protected by a 15-amp circuit breaker or fuse. The machine should have its own electrical circuit. Perform checks on the power source as follows - See photo below:

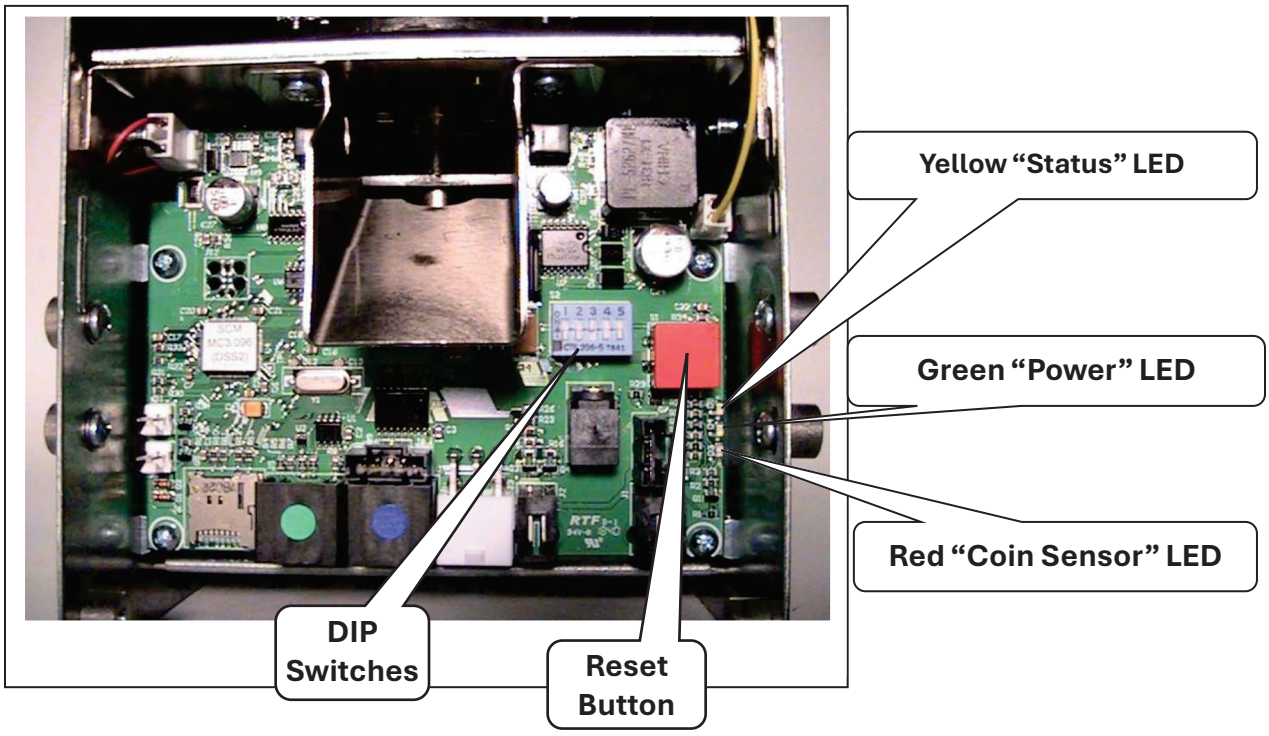


1. **Voltage Check** When placed across the HOT and NEUTRAL terminals, a volt-ohmmeter should indicate 110-130 volts AC**.**
2. **Polarity Check** When placed across the **HOT** and **GROUND** terminals, a volt-ohmmeter should indicate 110-130 volts AC.
3. **Proper Ground Check** When placed across the **NEUTRAL** and **GROUND** terminals, a volt-ohmmeter should indicate no more than .5 volts AC. Readings greater than .5 volts AC indicate a poor grounding condition that could result in noise problems for the electronic circuitry.

The MC line of bill to coin and bill to bill machines have built in diagnostics in the coin/token hoppers and bill dispenser control boards. In addition to these control boards, an optional EF+ Module will display error codes and store and time date errors in the “EVENT REPORT”. Below we will cover both in detail…

2.0 MC HOPPER CONTROL BOARD

All MC Machines will have a dispenser board on the coin/token hopper, or in the case of a bill or ticket dispensing machine, there will be a separate "Bill/Ticket Relay" Module. Both types of boards will have a YELLOW (Status) LED, GREEN (Power) LED, and a RED (Coin Sensor) LED. The RED LED will also act as an auto-addressing indicator light on power up or reset.



Status Indicator - The YELLOW (or top LED) is the *Status Indicator*. A quick constant flash indicates "GOOD/NORMAL" status. A slow repeating flash indicates an ERROR CODE. See the error code table located on section 2.2.

Power Indicator - This GREEN (or middle LED) is illuminated when the hopper is POWERED. If the green indicator light is not on, the hopper is not getting power.

Coin Sensor Indicator - The RED (or bottom LED) is the *Coin Sensor Indicator*. When the coin sensor is unblocked, the light will be OFF. When the sensor is blocked, the light will be ON. Durning a normal coin dispense, you will see the light go on and off as the coins pass this sensor.

Reset Button – This push button is used to RESET THE MACHINE from an error event. Make sure to record the flash code error presented by the status light for other troubleshooting steps.

DIP Switches - Each dispenser module includes a 5-position switch that is located on the dispenser circuit board (see table on the following page). The switch labeled SW1 is used to set the value of the dispenser during normal operation. The following page has switch positions for the different dispenser values.

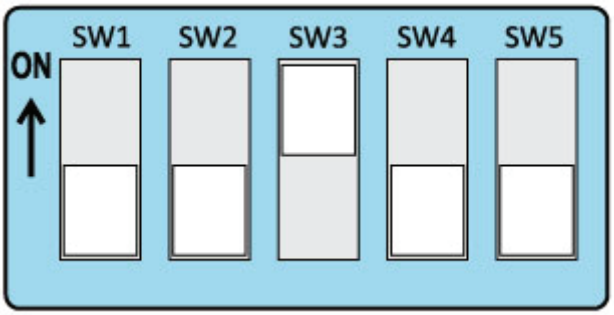
2.1 DISPENSER VALUE TABLE

DISPENSER SETTINGS

VERY IMPORTANT!!!

SW2-SW5 should always be set to reflect the correct DISPENSER VALUE.
SW1 should always be in the DOWN position when the dispenser is in the NORMAL OPERATING MODE.

VALUE	SW1	SW2	SW3	SW4	SW5
Programmed	***DOWN***	DOWN	DOWN	DOWN	DOWN
$.05	***DOWN***	DOWN	DOWN	DOWN	UP
$.10	***DOWN***	DOWN	DOWN	UP	DOWN
$.20	***DOWN***	DOWN	DOWN	UP	UP
$.25	***DOWN***	DOWN	UP	DOWN	DOWN
$.50	***DOWN***	DOWN	UP	DOWN	UP
$1.00	***DOWN***	DOWN	UP	UP	DOWN
$2.00	***DOWN***	DOWN	UP	UP	UP
$5.00	***DOWN***	UP	DOWN	DOWN	DOWN
$10.00	***DOWN***	UP	DOWN	DOWN	UP
$20.00	***DOWN***	UP	DOWN	UP	DOWN
$50.00	***DOWN***	UP	DOWN	UP	UP
$100.00	***DOWN***	UP	UP	DOWN	DOWN
$200.00	***DOWN***	UP	UP	DOWN	UP
$500.00	***DOWN***	UP	UP	UP	DOWN
Not Used	***DOWN***	UP	UP	UP	UP



2.2 DISPENSER FLASH CODES

When an error occurs, the dispense will display a flash code with the yellow status LED to indicate that the device is reporting an error. If it is a single-digit error, there will be a long pause between the flash code. If it is a two-digit error, there will be a short pause between the first and second digit, followed by a long pause.

EXAMPLE OF A **FLASH CODE 9** (SINGLE DIGIT ERROR)

EXAMPLE OF A **FLASH CODE 34** (TWO DIGIT ERROR)

CURRENT FLASH CODE CHART (MC SERIES MACHINES)

Flash Code	TROUBLESHOOTING HELP & COMMON FAILURE SOURCES
1	THE DISPENSER IS **SOLD OUT**. This is a normal operating condition, and it indicates that the dispense compartment needs to be refilled. Once refilled, the error condition will automatically go away (reset). If this error is issued and the device is not sold out (near empty), check the device sold out sensing contacts/circuit for debris. When the dispenser is sold out, the OOS light will flash slowly.
2	A **BILL ACCEPTOR** ERROR WAS DETECTED. The Bill Acceptor has detected an error. Note the flash code displayed on the bill acceptor and refer to the bill acceptor owner's manual for additional troubleshooting assistance. Also, check the Bill Acceptor power cable and make sure the cable is plugged into the Bill Acceptor harness on one end and to the Coin Hopper on the other end.
3	THE **BILL STACKER** IS **MISSING** OR **FULL** – Empty the Bill Stacker and press the reset button on the Primary Device. If the problem persists, remove the bill stacker and look for dirt or debris in the acceptors bill path. Reinstall the bill stacker, making sure it latches securely in place.
4	A **BILL JAMMED** ERROR – The bill acceptor has detected a stuck bill or foreign object in the note path (the path the bill travels through the Note Acceptor). Remove the item from the note path. Note: If this problem persists, check the note path drive belts for excessive wear or stretched. Clean or replace as necessary.
5	A **FAST VEND** SHUT-OFF ERROR – An abnormal sequence (quantity in certain time and/or period) of bills were deposited, and the machine was automatically disabled. See section of the owner's manual that discusses the Fast Vend Shut-off setting, for more details regarding this feature.
6	**STRINGING** WAS DETECTED – The stringing detection software has determined that a bill has been pulled out or attempted to be pulled out. Look for string, tape or debris. Balance (reconcile) your machine revenue.

7	A **COIN ACCEPTOR** ERROR WAS DETECTED. Check to ensure that a bent coin or piece of debris is not interfering with the coin deposit path. Check the associated cable (s) and connections.
8	A **DISPENSER** ERROR WAS DETECTED. • If the Sold-Out contacts for the dispenser have been bypassed, this error will occur when the dispenser becomes completely empty. Press reset after refilling the dispenser. • Check for debris in the dispense path of the associated dispenser - If blocked or dirty, remove debris. Check the counting optics (device eyes) and remove excessive dust or debris. Check the associated cable (s) and connections. Check the dispensing mechanism for debris - bent coin, coin bag string, stuck bill, etc.
9	A FATAL **MEMORY** ERROR WAS DETECTED – Warning: the memory device that stores all critical setup information (dispense amounts, security settings…) is failing. DO NOT reset the associated device or place it back into operation!!! Replace the device logic board or send it in for repair with a note stating the following – "*The EE memory has failed and will need to be replaced".*
10	**POWER** FAULT DETECTED – Power was lost during a dispense. Check for intermittent connections or faulty power line conditions, i.e., loose plug, corroded connections, or too much load on one circuit. **Warning:** Power faults can result in short pays.
11	AN **UNKNOWN** OR UNDOCUMENTED ERROR WAS DETECTED – Contact a service center for an updated error code list, and/or reset the machine and check for proper performance before placing it back into service.
12	**ILLOGICAL** – An illogical setup was detected. Examples – All bill acceptance is turned off, the dispenser type is invalid, the dispenser was told to dispense more than 200 coins, tokens, bills, or tickets.
13	**DATA** BAD ERROR – The machine has lost a portion of temporary memory. This error is not fatal, and the machine will remain online. If a vend was in progress when the error was detected, the vend amount and associated count were cleared. This error is typically caused by excessive power surges. Install a surge filter on the power line to the machine.
14	**OVERPAY** LOGIC ERR **–** The device calculated it was told to dispense too many items. Check the Dispense limit settings for the affected device. Check the Program settings.
15-30	**TRACKING CODES** – These codes are intended for use by SCM troubleshooting personnel. If the code persists, contact the nearest SCM service center.
31	DISPENSER **OUTPUT** BLOCKED **–** The dispenser (coin, bill, ticket) sensor is blocked. Check the dispenser counting sensor and associated connections.
32	DISPENSER IS **EMPTY –** The dispenser (coin, bill, ticket) is empty. If the dispenser is not empty, reset the error and insert a bill. Listen for the hopper motor to run and for a loud grinding sound that would indicate a broken feed mechanism.
33	DISPENSER IS **JAMMED –** The dispenser (coin, bill, ticket) is jammed. Check the dispense path for a bent coin or foreign objects (paper clips, screws)
34	DISPENSER HAS A **SENSOR** ERROR **– Something has passed the sensor when it was not expected.** Check for debris mixed in with the coins or bills. Debris can be counted as an extra "item". The board or dispenser chute may be loose, causing the dispenser to see something. If the error is from a ticket dispenser, check the tickets for tears in the area around the ticket notch. Extra notches (tears) can be counted as a ticket.
35	BILL DISPENSER **COMMUNICATION** ERROR – The bill dispenser is not talking. Check the communication (data) cable connections. Make sure the dispenser has power to it as

	well.
36	Not Used – Contact the factory if the error persists after resetting.
37	Not Used – Contact the factory if the error persists after resetting.
38	Not Used – Contact the factory if the error persists after resetting.
39	BILL DISPENSER CARTRIDGE IN WRONG POSITION – One of the bill cartridges in a multi-note dispenser is in the wrong position. Check the position of all bill cartridges.
40	Not Used – Contact the factory if the error persists after resetting.
41	Auto Address attempted during a dispense.
42	Reset during normal operation
43	Power up during normal operation
44	Power is lost during normal operation
45	Power to the hopper motor is shorted or lost

2.3 FAQ: FREQUENTLY ASKED QUESTIONS

Q: My Out of Service (OOS) light is blinking, and the machine will not take a bill.

A flashing Out-of-Service (OOS) light indicates a hopper sold-out condition. Add enough coins/tokens to cover the black funnel inside the hopper (both Classic and K5000 versions). If this is a bill dispensing machine, fill the cassette up more than half full and reset the bill dispenser relay control module.

Q: My bill acceptor is rejecting too many bills.

Dirty sensors can cause bill rejection. Clean the bill path and clean the sensors and belts with a Q-tip or clean, soft cloth. Also, check with the bill acceptor manual for manufacturer-specific error codes and troubleshooting information. Worn bills can also cause rejections.

Q: How do I turn on or off the acceptance of certain bills?

Refer to the following sections in the EF+ Module Owner's Manual (8M00617): "Bills Accepted Settings" (Section 1.7), and in the MC Owner's Manual (8M00420): "Bill Acceptance and Security" (Section 11-B). You can find the owner's manual online at: standardchange.com/owners-manuals/

Q: My Out-Of-Service light is on solid, and the machine will not take a bill.

When the machine is out of service, we disable the bill acceptor so that it will not accept any more bills. The first thing to look for is a flash code error on the coin/token hoppers. You can refer to the FLASH CODE error table in Section 2.2 (Page 6 of this manual) for more troubleshooting help.

Q: I need to send you a part for repair. Do I need an RMA number? *(Return Material Authorization)*

Yes, we request that all returns be accompanied by an RMA Number assigned by the Standard Change-Makers Service Department. We ask that you send your request to: rma@standardchange.com. Please include your company contact information, the Model and Serial Number of the item needing service. Our RMA Department will send you the completed RMA as an attachment for you to print out and include with the part being returned for service/repair.

Q: I need to upgrade the software on my machine. Can this be done in the field?

Software revisions for the Simple Function Modular Machines are not common. However, as new features are added, you may decide to upgrade your changer. Please see page 14 for the step-by-step procedure.

Q: I'm seeing flash code 2 on my primary coin hopper. What does that mean?

Flash Code 2 on a CPi (Mars) Bill Acceptor or the Primary Hopper means that the bill acceptor is being disabled, or the hopper cannot communicate with the bill acceptor. Please see Page 15 for troubleshooting information.

Q: I'm seeing flash code 3 on my primary coin hopper. What does that mean?

Flash Code 3 is a Bill Box (Stacker) Removed Error. It can also mean that there is an issue with the bill acceptor's bill box sensor (sensors on both the acceptor housing and the bill box must connect). Please see page 16 for troubleshooting information.

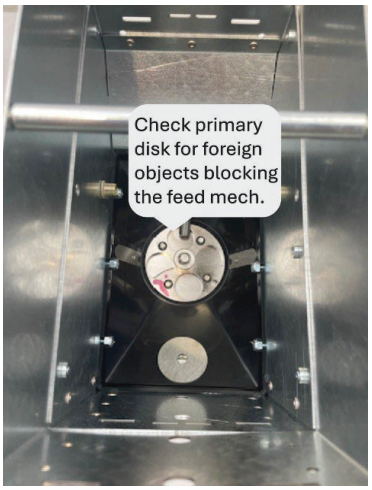
Q: I'm seeing flash code 4 on my primary coin hopper. What does that mean?

Flash Code 4 is a Bill Jam Error that can usually be solved by removing a jammed or "accordioned" bill or cleaning the bill acceptor bill path. See page 17 for additional information.

Q: I'm getting a flash code 32 - Empty Error, but my hopper is full of coins!

This error code may indicate a mechanical failure in the hopper if the hopper is full of coins. You should reset the error by pressing and releasing the red reset button on the hopper that is displaying the flash code. Next, insert a bill and listen to the hopper during the dispense. If the coins are not dispensing and you hear a loud grinding or stripping sound, then the hopper will need to be returned for service.

Q: I'm getting a Flash Code 33 - Jammed Error. What should I do?



Flash Code 33 is a Coin Jam Error and can usually be resolved by emptying your hopper and checking for non-coins at the bottom of the hopper. We've seen screws, nuts, paper clips, bent coins, wire, etc., at the bottom of hoppers returned to us for service.

Make sure you can turn the bottom Primary Disk by hand - with some effort. Any coin or debris in the Hopper Mechanism might be dispensed by rotating this disk. If you cannot turn the Primary Disk by hand, the hopper will need to be returned for service. (See photos above)

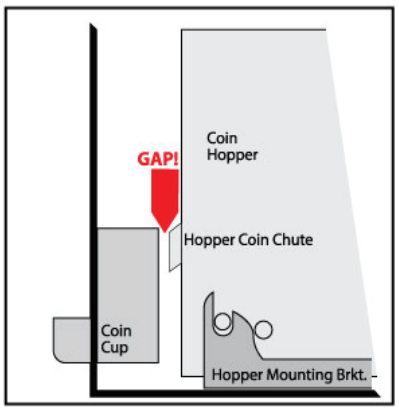
Q: I'm getting a Flash Code 34 error. What should I do?

Flash Code 34 is a Sensor Error, meaning the coin counting sensors located by the hopper chute are blocked or counted an extra coin. Please see page 17-18 for troubleshooting information.

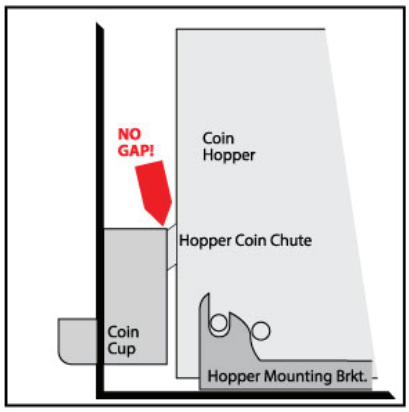
Q: My rear load machine is randomly "shorting" my customers. Sometimes, it steals a coin; the next time, it pays out more. What should I look for?

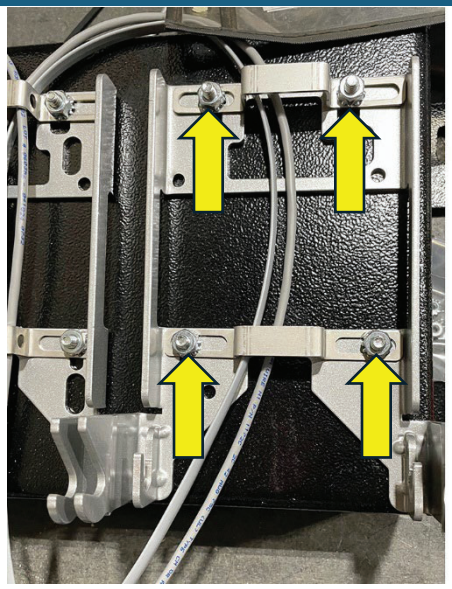
When a machine, especially a rear-load machine, pays inconsistently as described above, the issue is typically hopper alignment to the coin cup. Along with short pay, you will typically see a Flash Code Error 34 as well (see page 17-18 for additional information on error 34)

INCORRECT ALIGNMENT



CORRECT ALIGNMENT





Reference figures on previous page - There should not be a gap between the chute and the coin cup. If a gap exists, quarters can fall into the cabinet and result in short payments to your customers. Coins can also accumulate in the coin chute, which will drop out on the next transaction, making it appear that the machine overpaid. If too many coins back up into the shoot, the coin sensor can be blocked, causing a flash code 34 error as well.

To remedy this condition, you should disconnect the cables and remove the hopper. You will see four nuts that hold the silver Hopper Mounting Bracket to the cabinet. Follow these instructions:

1. *Loosen the four nuts securing the hopper mounting bracket (See photo above)*
2. *Replace the Hopper and move the hopper forward so there is no gap between the chute and coin cup.*
3. *Mark the location of the Hopper Mounting Bracket at this point (with tape or marker).*
4. *Try to remove the hopper again, without moving the bracket!*
5. *Adjust the Mounting Bracket to your mark and tighten the four nuts.*
6. *Install the Hopper and check the Hopper Coin Chute alignment to the Coin Cup.*
7. *Re-connect the cables and test the hopper by filling it partially and inserting bills in the bill acceptor*

Q: I lost my key, and I can't get into my change machine. How can I order a spare key?

Due to security reasons, our Parts Department can only order a spare key with a valid keycode supplied by the customer. Corporate policy dictates that the Parts Department will never give you a keycode based on your serial number only. This is for your security, as well as our own.

Q: I've been replacing the funnel and rings on my hoppers, but the repair doesn't seem to last. Do you have any tips on replacing these parts?

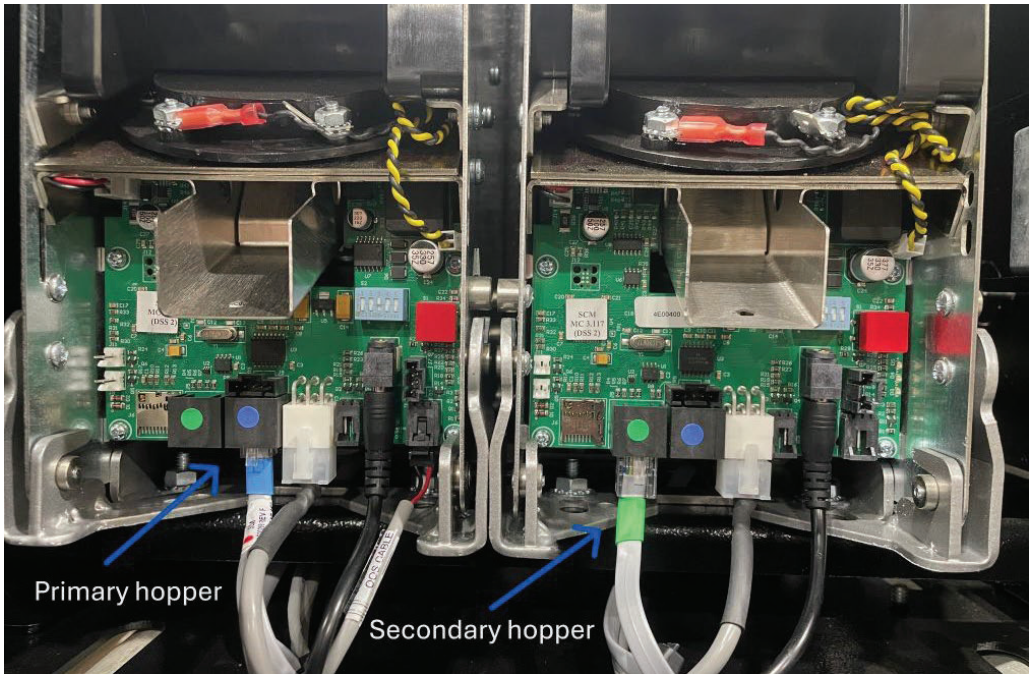
Replacing the funnel and ring does take some detailed steps to make the repair last. Check out our YouTube video by entering "replacing funnel and rings" in the YouTube search bar, or go directly to this link:
https://youtu.be/J3RcLJNcqg4?si=LCU35bqneqVJqbqI

Q: My machine keeps resetting, and the red light on the hopper boards continues to flash.

What is most likely happening is that the machine is stuck in an Auto-Addressing Routine. Each time the machine is powered up, the Primary Device (usually Hopper A or the EF+ Module) will try to communicate with the other dispenser(s). If the Secondary Hopper(s) do not respond, the machine will automatically reset and try to communicate again. If the Primary Device cannot communicate with the Secondary dispenser(s) after the reset, the machine will stay out of service.

*What to look for: (1) All hoppers are powered up (Green LED is lit on the Hopper Boards), and (2) the gray Communication Cables (with the Blue and Green connectors) are connected **as shown below**. A hopper with no power, a disconnected Communication Cable, or a bad cable/connection will cause this Auto-Addressing issue.*

Primary Hopper **Secondary Hopper**



Blue end of the Communication Cable is plugged into the Primary hopper, and the Green end of the same cable is plugged into the Secondary hopper.

Q: I would like to replace my funnel and ring on my hopper. Do you have a procedure or tips on how to do this?

Replacing the funnel and adapter ring is a common replacement item on the Classic hopper. The most important steps are (1) securing the ring to the feed mechanism correctly. (2) aligning the funnel to the ring. (3) securing the funnel to the hopper housing. We have a video on YouTube showing a step-by-step procedure which can be viewed by typing in "Replacing a funnel and adapter ring" on the YouTube search tab.

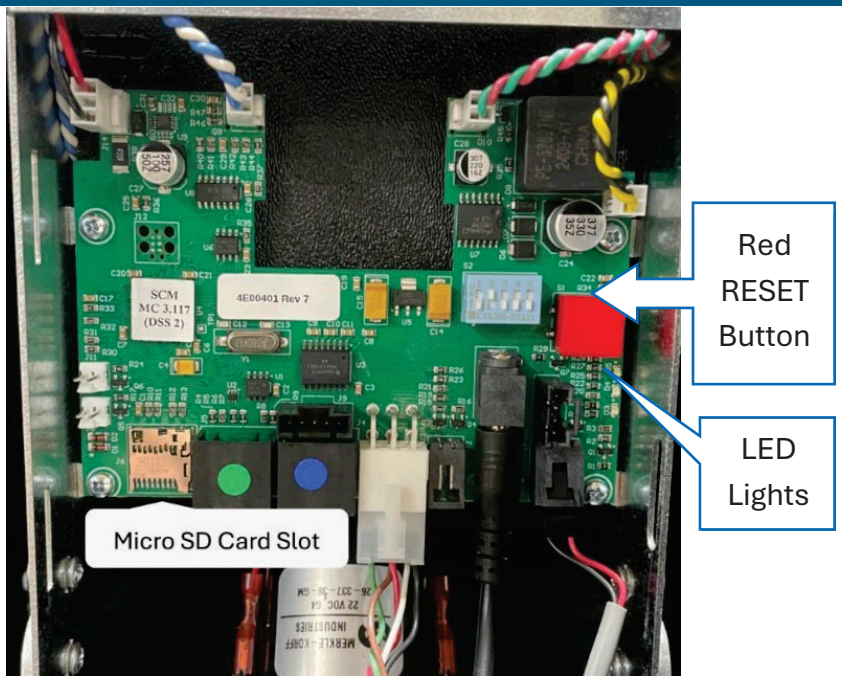
The one-piece funnel/adapter ring on the K5000 series greatly reduces the frequency of funnel /ring replacements due to its one-piece construction. You can purchase a new K5000 Hopper from the Parts Department or send a Classic Hopper back to Standard RMA for retrofit. For more information, contact the Standard Change-Makers Service/Parts Department.

Q: Can I update the Hopper Software in the field?

Yes, our hopper boards are programmed using a Micro SD Card programmed at the factory. Just use the procedure below. ***NOTE:*** *For tech-savvy customers who have the capability to program cards, software files can be emailed upon request.*

1. *Insert the Micro-SD Card with the firmware update installed on it.*
2. *Press the red RESET button on the Control Board.*
3. *The RED LED should come on solid, and the YELLOW LED will flash quickly while the memory is being erased.*
4. When *the programming is being uploaded to memory, the RED LED blinks quickly, and the YELLOW LED is off.*
5. *When the upload is completed, the RED is off, and the YELLOW LED will flash quickly.*
6. *You can now remove the card.*
7. *After removing the Micro-SD Card, press the red RESET button again to reset the hopper.*

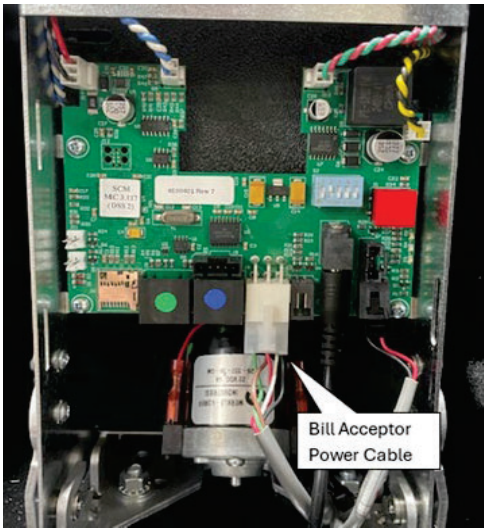
(SEE PHOTO ON NEXT PAGE FOR HOPPER CONTROL BOARD IMAGE)

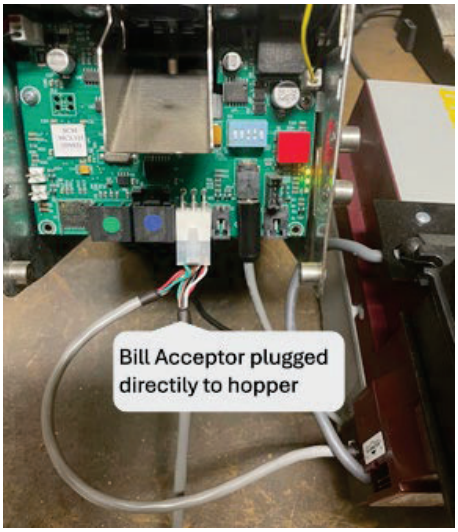


(Rear Load Machine Hopper Control Board Shown)

2.4 FLASH CODE 2 – BILL ACCEPTOR ERROR

Flash Code 2 on the Hopper Control Board is a generic bill acceptor error. OEM Bill Acceptors have different means of displaying the error. The **Pyramid APEX** bill acceptors have a diagnostic button on the left side of the lower track module. The **Coinco Vantage** has an error light on the back of the lower track module. And the **CPi (Mars) Talos** requires you to insert a bill so that the bezel lights can issue a flash code. All bill acceptors have a flash code table on their bill stackers to tell you the type of fault that has occurred.





The Flash Code 2 can also mean the hopper is not able to communicate with the bill acceptor. The most likely cause would be a bad bill acceptor power cable.

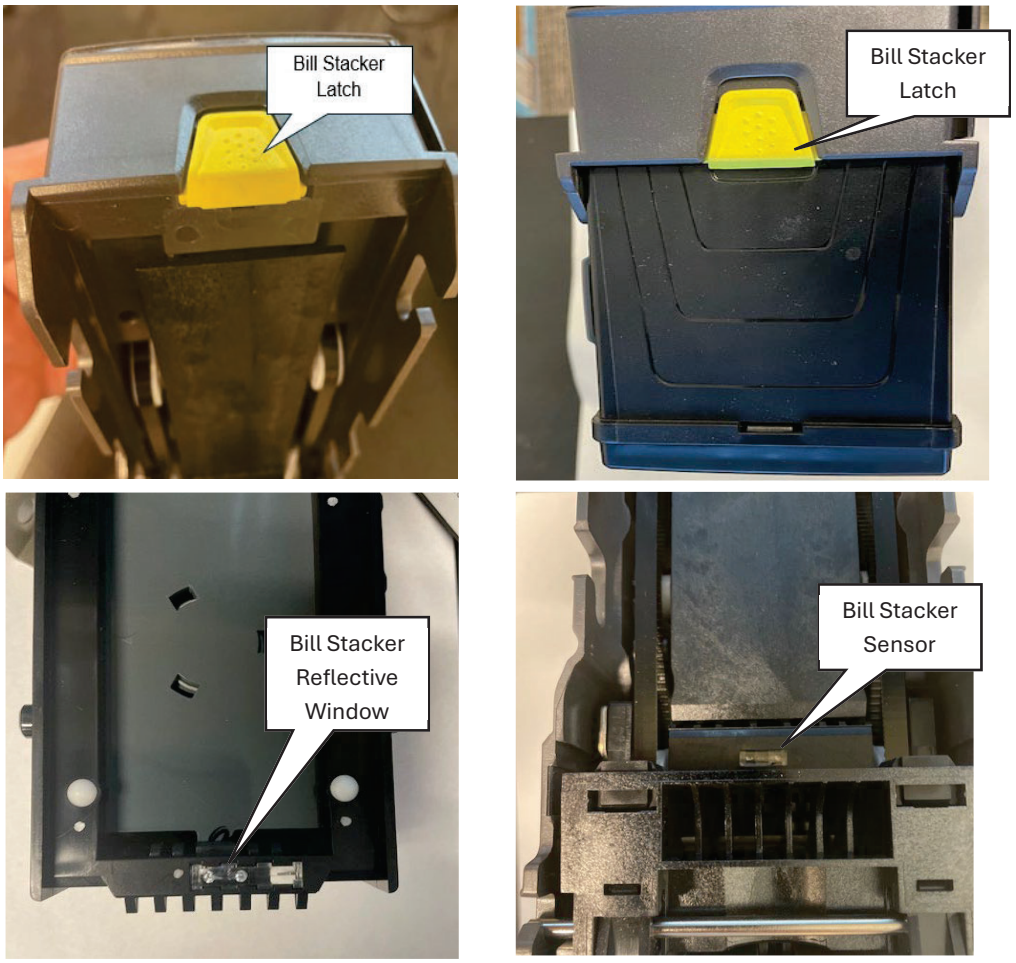
This cable connects to the bill acceptor harness on one end and to the hopper control board on the other. You can test for a bad cable by removing the bill acceptor and plugging the bill acceptor harness directly to the hopper board, eliminating the bill acceptor power cable. If the acceptor powers up and the flash code is reset, then

replace the bill acceptor power cable (Part #4C00263).

2.5 FLASH CODE 3 - STACKER MISSING or FULL ERROR

Flash Code 3 indicates that the Bill Box is removed, or the Bill Acceptor Stacker's sensor is dirty, defective, or out of calibration. It can also mean that the stacker latch has failed and is no longer holding the bill box in place. This is especially important in SC Conversion Kits where down-stack bill acceptors are used.

On CPI (Mars) units, clean both the Reflective Window on the stacker cassette and the bill acceptor stacker sensor. If you still get Flash Code 3, the sensor board in the bill acceptor is most likely defective and will need to be replaced. For Pyramid Bill Acceptors, clean the sensor and inspect the bill stacker latch. If you still receive the Flash Code 3 error, the sensor is most likely out of calibration and will need to be serviced. (See images below)



Photos show a CPI (Mars) bill acceptor. Other models will have similar features

2.6 FLASH CODE 4 – BILL JAMMED ERROR

Bill jams in OEM acceptors can be caused by several reasons. Wet bills, torn or taped bills, and dirty or bad belts are some of the main reasons you might see a Flash Code 4 error. Most of the time, this error is easy to fix by removing the Bill Acceptor's Lower Track Module and removing the bill or foreign object (coin, paper, etc).

If you don't find something stuck in the track or bill path, try cleaning the bill acceptor sensors and belts with a solution of warm water and mild cleaner like Dove dishwashing soap (or similar) on a clean, damp cloth. Then wipe dry with a clean, soft cloth.

See images below on how to remove the Lower Track Module of the most popular OEM bill acceptors that you will find in one of our machines – Pyramid, Coinco, and CPI (Mars).

Pyramid 7400 Series

Press Up on Black Button to Release

Coinco Vantage

Press Up on Blue Button to Release

CPI T7-Talos Series

Lift up on Silver Bar to Release

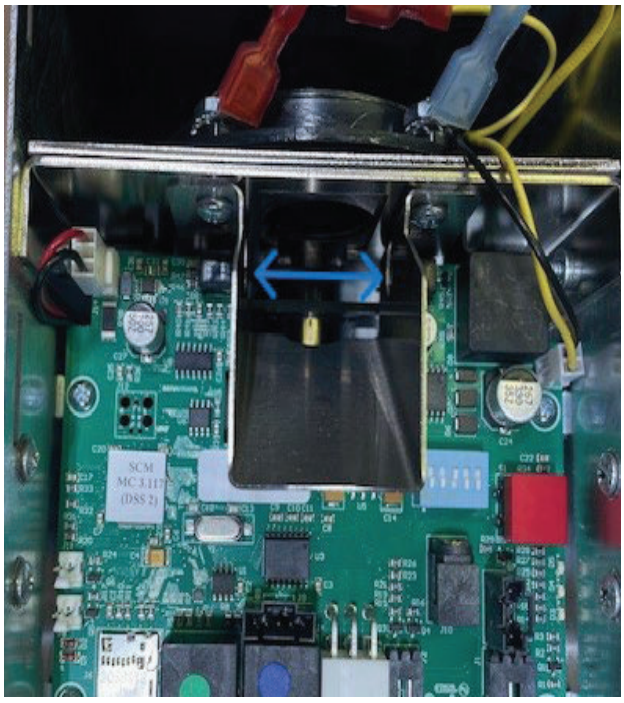
2.7 FLASH CODE 34 – HOPPER SENSOR ERROR

Flash Code 34 is a Hopper Sensor Error, meaning the coin counting sensors located by the hopper chute are blocked or counted an extra coin. If the RED LED light on the hopper board is on, then this optic sensor is most likely blocked by a coin or needs to be cleaned. If the RED light is off and you can reset the error by pushing the Red RESET button, then cleaning the sensors would be in order.

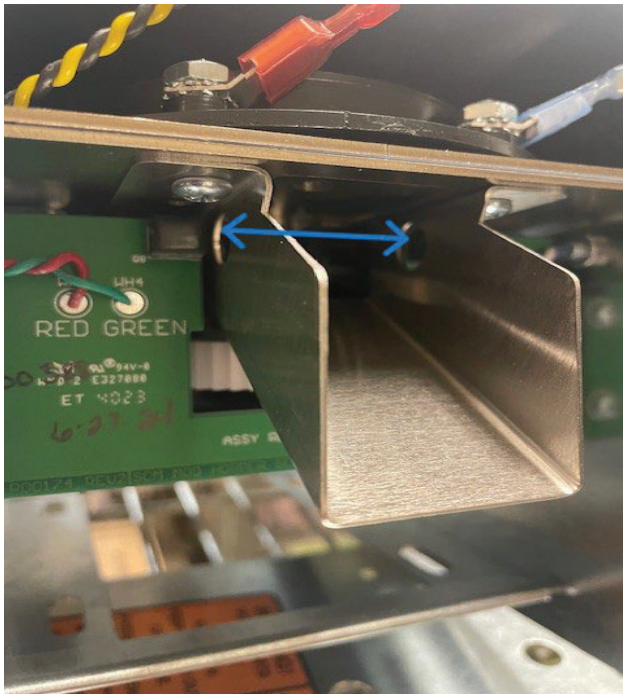
If your machine is a Front-Load, then the hopper chute will be facing you when you open the door. Use compressed air to blow up inside the hopper chute, paying attention to the round hole on either side of the hopper coin chute (See *blue arrows in photos below*).

There is a sensor pair mounted on the board next to the two holes in the chute. One side is the LED Emitter that will shoot an infrared beam of light through the hole, across the coin chute, and through the hole on the other side of the chute. There, the receiving side of the sensor pair "sees" the beam of light. Whenever a coin drops through the coin chute, that beam is broken, and the sensor tells the control board that something has passed the sensor. If this is a Rear-Load machine, you will need to tilt the hopper back to access the chute and sensor board. Again, blow air up into the coin chute, paying attention to the holes.

There is also potential for a misalignment between the hopper coin chute and the coin cup, causing coins to back up into the chute and blocking the sensor. If you are finding coins at the bottom of your cabinet by the coin cup, then moving the hopper closer to the coin cup may be needed. The hopper is set on a mount that is adjustable by loosening four nuts and sliding the hopper forward. (See instructions on page 12)



Front Load Hopper (with door open)



Rear Load Hopper (with cover off)

3.0 EF+ MODULE

The **EF+ Module** is an optional feature for most MC Series coin changers and comes standard in the larger capacity change machines (like the MC600RL-DA and MC800-DA Series) and Bill Exchanger (BX & BCX) Series machines. The EF+ Module becomes the **Primary Device** and serves as a Programming module, a Troubleshooting aid, and a Record Keeper. In the top-level menu is an 'EVENT REPORT' function that records and time stamps all events and errors that occur in the machine. The record will hold the last 50 events and can be cleared to restart the report.

Many of the Error Messages displayed are retrieved from the dispenser's Flash Code tables. In this way, instead of counting flashes on a dispenser board, the error message is displayed on the 2-Line LCD Display at the top of the EF+ Module. This device also has an email application that requires an ETHERNET line to send 'EVENT' and 'AUDIT' reports. These features are optional and are covered in the EF+ Owner's Manual that can be found online on our website www.standardchange.com .

ERROR HELP TEXT - Shown below is a list of the *Error Conditions,* probable causes, and corrective actions. Note that some of the error conditions indicate that you should contact the **Standard Change-Makers Service Center** in Indianapolis, IN.

PHONE: 800-968-6955 / 317-899-6966
Mon – Fri: 8:30 AM – 4:15 PM (Eastern Time)
EMAIL: Service@standardchange.com
ONLINE SERVICE FORM: https://standardchange.com/service/

(SEE EF / EF+ MODULE ERROR CHART ON NEXT PAGE)

EF / EF+ MODULE DISPLAY ERRORS

"SOLDOUT"	Indicates a dispenser does not have enough product to complete a vend. Check device.
"EMPTY"	A dispenser did not dispense in the allowed time and was not detected as sold out. Check device.
"JAMMED"	A dispenser is jammed and unable to dispense. Check device.
"PROGRAM"	Note the device in error and contact the nearest factory service center.
"EEPROM"	EEPROM failing. Note the device in error and contact the nearest factory service center.
"MOTOR"	Device has reported a motor error. Note the device in error and contact the nearest factory service center.
"SENSOR"	If device in error message is a bill acceptor, clear the bill path and clean sensors. If device in error message is a coin dispenser, contact the nearest factory service center.
"ROM"	Note the device in error and contact the nearest factory service center.
"OUTPUT BLOCKED"	If device in error message is a bill dispenser, clear bill dispense path (jammed bill). If device was a coin dispenser, clear the coin dispenser path.
"BILLBOX"	The bill acceptors' billbox has been removed. Replace billbox then press reset button on EF+ module to clear error message.
"BILLBOX FULL"	The bill acceptor billbox is full.
"OVERPAY"	A dispenser has detected an overpay. Check device for debris at the output sensor.
"FAST VEND"	The total number of bills accepted has exceeded preprogrammed limit in the preprogrammed allowable time period. Adjust the Fast Vend Settings if necessary.
"TAMPER"	The bill acceptor has detected a stringing attempt. Clear the bill path and clean sensors.
"COMM"	A communication error has occurred between the EF+ and another device.
"POWER LOST"	Power was lost during a dispense. This is a "soft error" and the machine will stay online. Check all power connections in the machine. If this error condition occurs frequently, have the power source to the machine checked for faulty wiring, poor grounding, etc. and add a power surge filter (same as used for computers) to the machine.
"ILLOGICAL"	Bills accepted and/or vend settings conflict with standard operating patterns. Common examples: No bills programmed to be accepted or revenue to be dispensed exceeds the value of the revenue to be deposited. Check all of the Vend Settings.
"BILL ACC. - EF"	This message is displayed if the EF+ module doesn't see any acceptors (Bill, Coin or Credit) in the system. Check acceptor cables and connections.
"DISPLAY COMM"	This message is displayed if the EF+ module loses communication to the CC/Select module (LCD display module used in most Credit Card / Select Machines.

"HARDWARE ADDED CHECK VEND SETTING"	This message is displayed when the EF+ sees a different dispense type or value added after power up or reset.
"HARDWARE REMOVED CHECK VEND SETTING"	This message is displayed when the EF+ sees that a dispenser type of value is missing after power up or reset
"AUTO ADDRESSING"	This message is displayed when the EF+ cannot complete its initialization on power up.

3.2 FAQ: FREQUENTLY ASKED QUESTIONS ON EF+

Q: Can I add an EF+ Module to an existing MC Series Machine?

Yes, we have kits to add the EF+ Module to any MC machine. Once EF+ is installed and the two wires that come with the kit are attached (instructions included), the EF+ becomes the Primary Device, and all the error displays, alerts, audits, and email reporting will be added to your machine.

Contact the Standard Parts Department at: Parts@standardchange.com for part numbers and pricing for your specific model of machine.

Q: Can the EF+ Module software be upgraded in the field?

Yes, you can order a pre-programmed Micro-SD Card from our Parts Department at: parts@standardchange.com and follow the instructions below.

1. *Insert the pre-programmed Micro-SD Card into the "SD" Slot on the right side of the module (as shown in the photo above).*
2. *With the power ON, press the RESET button on the EF+ Module's keypad.*
3. *The LCD Display will show: "Erasing Flash Memory"*
4. *The Display will then show: "Program Flash Memory"*
5. *Display will then show: "Main Menu..."*
6. *It is safe to remove the Micro-SD Card, and test the machine by scrolling through the Menu -- pressing the LEFT ARROW or RIGHT ARROW buttons*

Q: I'm seeing an ILLOGICAL error on the display. What causes this?

The ILLOGICAL error is typically associated with adding or replacing the EF+ Module. This means that EF+ Module has communicated with a bill acceptor but

has determined the bill acceptor is not programmed to accept any bills. Using the ARROW KEYS on the EF+ Module keypad, press the RIGHT ARROW until you see 'Bill Acceptance Settings'. Press the DOWN ARROW and select YES for each bill denomination you want to accept. When you reach 'End of Settings,' press EXIT twice to return to the 'Main Menu.' ***NOTE:*** *The first time you press EXIT returns you to the top-level menu (Bill Acceptance Settings), and the second time you press EXIT returns you to the 'MAIN MENU.'*

Q: I'm seeing Hardware Added, Check Vend settings. What does this mean?

"HARDWARE ADDED" means that the EF+ Module has detected a dispenser with a different value from the last time it was powered up. This could be that a dollar hopper was installed to replace a quarter-valued hopper or that the switch setting on one of the dispenser boards was moved. The EF+ Module is requesting you to check your 'Vend Settings' to be sure the machine pays out correctly.

Using the EF+ Module keypad, press the RIGHT ARROW button to "Bill Vend Settings". Press the DOWN ARROW button and review each payout for $1, $5, $10, and $20 to make sure they are correct. If you see a different value dispenser, check your DIP switch settings as shown on page 5. If you still have issues with the dispenser values displayed, you may need to factory default the EF+ Module. See page 23 for instructions on how to do this.

Q: I'm seeing "Hardware Removed, Check Vend Settings. What does this mean?

"HARDWARE REMOVED" means that the EF+ Module has detected that a dispenser value has been removed from the 'Configuration Menu' since the last time it was powered up. See the explanation for 'Hardware Added' above and follow the same instructions.

Q: I'm seeing "Auto-Addressing" on the EF+ Module, and my machine will not reset. What do I look for?

"AUTO-ADDRESSING" happens when the machine is powered up or reset. During this time, the EF+ Module is initializing and communicating with any hardware component connected to the MDB Serial BUS. If the EF+ Module cannot communicate with the first device to which it is connected, it will remain in this 'auto-addressing' state.

In Bill-to-Coin machines, the problem is typically the Communication Cable from the EF+ Module to the "A Hopper." This cable will have a BLUE Connector plugged into the EF+ Module, and the GREEN Connector will be plugged into the "A Hopper" control board (the corresponding connectors on the board are indicated with a blue and green dot). Also, be sure that the "A Hopper" dispenser board receives power and that the Power GREEN LED on the board is lit solid. A bad communication cable or no power to the "A Hopper" is typically the issue.

Q: I'm not receiving my Email Alerts and/or Audit Reports. What should I check?

The first item you want to check is the email address you typed in for spelling errors, and send a test alert to that address to see if it goes through. After sending the test alert, if you see: "CONNECTION NO SERVER ACK," you will want to check your ETHERNET wiring and network connections.

If the EF+ Module response is "SUCCESSFUL," then scroll down through the menu items by pressing the DOWN ARROW on the EF+ Module to be sure you have selected the proper Alerts and/or Reports, and also that the account has been enabled.

To check your EMAIL SET-UP:

1. *Press the right arrow button on the EF+ several times until you see 'EMAIL SETTINGS?'*
2. *Press the DOWN ARROW button to "Edit Account? Recipient 1"*
3. *Press the YES button, and confirm the name.*
4. *Press the DOWN ARROW button and confirm the email address.*
5. *Press the DOWN ARROW button and press YES to send a test alert.*
6. *Press the DOWN ARROW button and select the Alerts you want to receive.*
7. *Press the DOWN ARROW button and select the Reports you want to receive.*
8. *Press the DOWN ARROW button and select YES for 'Enable Account?'*
9. *Press EXIT twice to get back to the "Main Menu"*

NOTE: When you are not at 'MAIN MENU' on the EF+ Module, your machine will be out of Service, and the OOS light will turn on. It will not go back in service until you exit to the Main Menu again.

3.3 FACTORY DEFAULTING THE EF+ MODULE SETTINGS

**** VERY IMPORTANT **** Verify the switch settings on the dispenser control boards match the value of the item being dispensed before proceeding. See the Dispenser Value Settings table on page 5.

To "Default" the EF+ Module, follow the instructions below:

1. Press the LEFT ARROW button to 'Configuration Report'
2. Press the UP ARROW button to 'End of Configuration'
3. Press the LOGO button on the upper-left side of the EF+ Keypad
4. When you see 'Restore All Defaults?' - Press the YES button.
5. When it asks, 'Are you sure?' - Press the YES button.
6. This takes you back to the 'Configuration Menu'
7. At 'Configuration Menu' - Press EXIT twice and then RESET. This should take you to 'Main Menu'

8. At the Main Menu: Press the RIGHT ARROW to 'Bill Vend Settings.'
9. At 'Bill Vend Settings' - Press the DOWN ARROW button to fill in the dispense amount for each bill denomination.
10. Press EXIT twice to return to the 'Main Menu.'

4.0 MAINTENANCE

Removing a Module for Repair - All Modules have been packaged in a manner that will allow the easiest possible removal and require the least number of tools possible. The following tools are recommended:

- 7/16, 3/8, and 11/32 Sockets or Nut Drivers; used for 1/4-20, #10-32, and #8-32 nuts.
- Socket Extension; used for long reach in deep cabinets.
- Flat head, #2 Phillips, and #0 Phillips Screw Drivers; used for removing module covers.
- Needle-nose Pliers and Wire Cutters; used for removing small parts and cable ties.

BILL ACCEPTORS

- Use canned air regularly to remove dust and debris from the bill path.
- Use clean damp rag to wipe off optic sensors on the upper and lower track assemblies.
- Use a clean damp rag with mild detergent to clean the belts, paying particular attention to senser windows mounted to the side of the lower track.
- Review OEM manufacturer's information on-line for additional tips.

COIN / TOKEN HOPPERS

- Dump hopper once every six months and remove bent coins or tokens.
- Use canned air to remove dust and debris from the hopper shell and dispenser area.
- Use a clean Q-tip and wipe off the coin interrupters located on either side of the coin chute openings.

UPDATING DISPENSER SOFTWARE (Follow these steps below)

1. *Insert the Micro-SD Card with the firmware update installed on it.*
2. *Press the red RESET button on the Control Board.*
3. *While the memory is being erased, the RED LED should be on solid, and the YELLOW LED will flash quickly.*
4. When *the programming is being uploaded to memory, the RED LED blinks quickly, and the YELLOW LED is off.*
5. *When the upload is completed, the RED LED is off, and the YELLOW LED will flash quickly. You can now remove the card*
6. *After removing the Micro-SD Card, press the red RESET button again to reset the hopper.*

See Photo at top of Page 15 for close-up of Hopper Control Board)

COIN DISPENSERS SOLD-OUT CONFIGURATION (CLASSIC HOPPER)

NOTE: Factory Default setting: $20 sold-out level

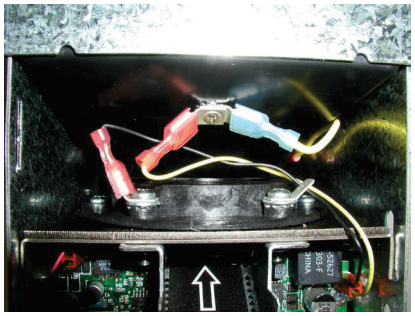
The **Sold-Out Level** (the amount of coins remaining in the coin dispenser when the sold-out condition is triggered) for the dispenser should be set to prevent a short-pay condition that can occur when the coin reserve is near empty and a patron inserts a large denomination bill. In other words, you will want to leave enough coins in the dispenser to ensure that the last person to use the machine before it shuts off due to an "empty" condition, receives all of their change. Therefore, the sold-out level setting should match or exceed the value of the largest bill denomination to be accepted, typically a $20 bill.

To determine how to set the optimum sold-out level, see the pictures below. To access the sold-out level settings, simply open the dispenser access door.

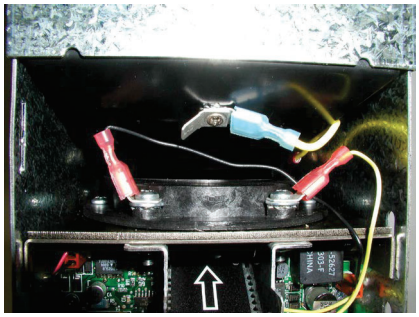
$20 Sold-Out Level Setting

NOTE: This is the DEFAULT set-up when the machine leaves the factory.

$5 Sold-Out Level Setting



Sold-Out "Bypassed"



NOTE: If the Dispenser becomes Empty in this Sold-Out "By-Pass" configuration, a "Dispense Error – 8" will occur. The Red Reset Button on the dispenser must be pressed.

5.0 PART ORDERING INFORMATION

To obtain service on a component or module, please follow these instructions:

1. Locate the fault to a specific component or module. See the Troubleshooting Section of this manual for assistance.
2. Call Standard Change-Makers service center at 1-800-968-6955. You will need to give the service representative the following: **MODEL & SERIAL NUMBER of the machine**
3. If you cannot furnish these numbers, it will be extremely difficult for the Service Department to help you. The serial number and model number are located on a label inside your machine. Service Center phone numbers are given on the last page of this manual.
4. Always remove power from your machine prior to removal of a component.
5. Remove the faulty component from the changer cabinet.
6. If the component is to be returned to the factory or service center, pack the component in the original factory packaging (if possible). If the original packaging is not available, use a suitable substitute. Care should be taken to prevent damage to the components from electrostatic discharge and mechanical shipping damage.

NOTE: Please avoid the use of Styrofoam “peanuts” when packing. If peanuts are used, the component should be encased in a plastic bag to prevent clogging the mechanism.

5.1 BILL ACCEPTORS (OEM):

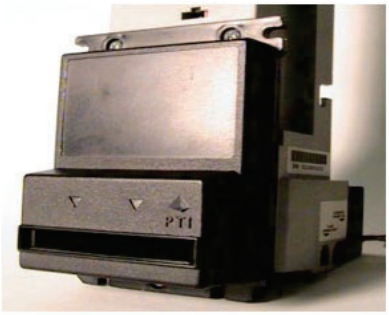
Part Number	Description
5V00352	Coinco, Vantage, USA, $20, 500 Bill
5V00365	CPI, T7, USA, $20, USA, 500 Bill
5V00300	Pyramid,7400, USA, $20, StandardBezel,500
5V00304	Pyramid,7400, USA, $20, External Bezel,500

Pyramid
APEX

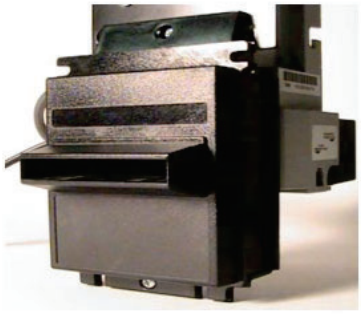
Coinco
Vantage

CPi (Mars)
Talos T7

Pyramid Bill Acceptors have two bezel types associated with Part Numbers. The Part # 5V00300 is available on Model Numbers: MC100, MC200, and MC900-DA Series (as Shown below).



5V00300 – Pyramid, Standard Bezel



5V00304 – Pyramid, External Bezel

HARNESSES

Part Number	Description
4C00263	MDB Bill Acceptor Power Cable

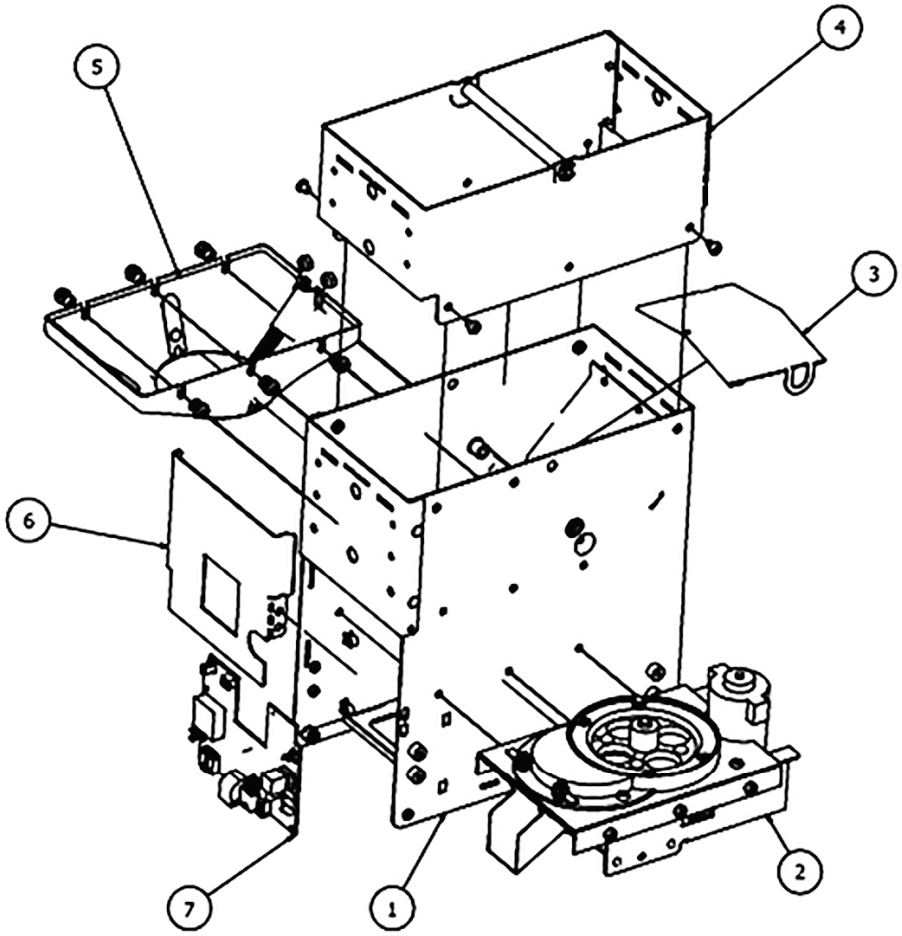
4C00299	36” Hopper Control Cable
4C00316	72” Hopper / EF+ Control Cable

Part Number	Description
4C00303	36” Hopper Power Cable
4C00317	72” Hopper / EF+ Power Cable

4C00300	72” Sold-Out Cable

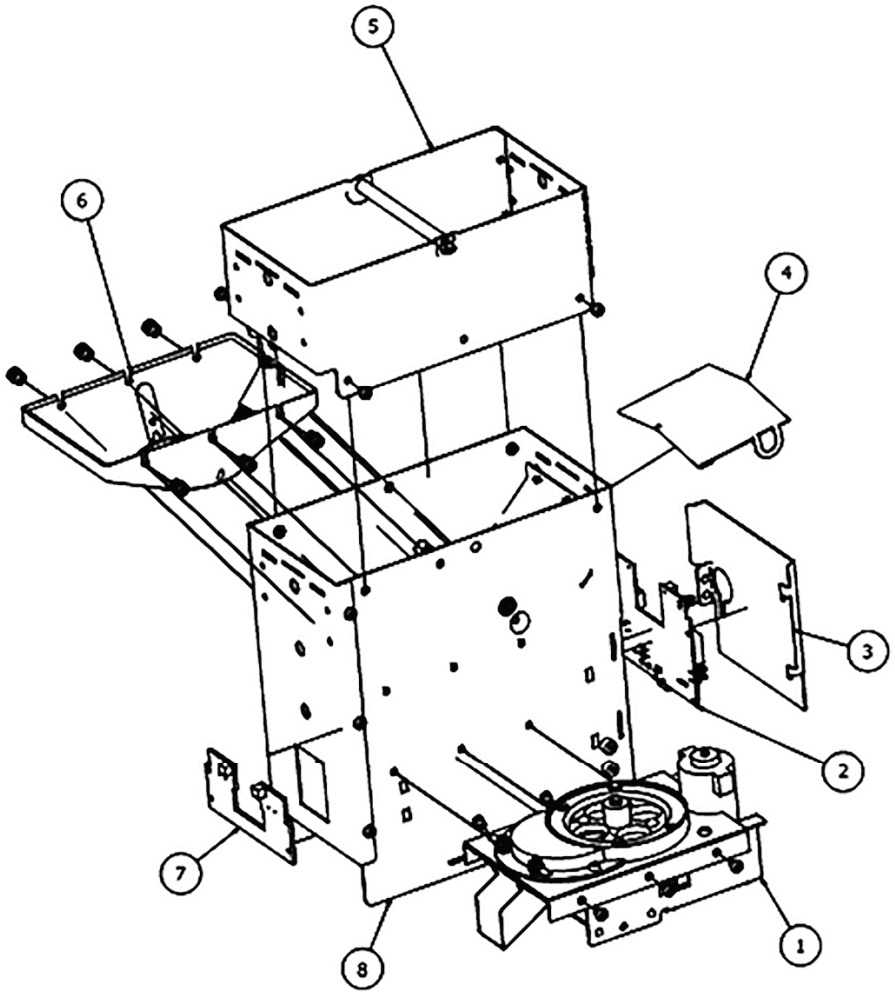
HOPPER DIAGRAMS (with Part Numbers)

5.2 Classic Hoppers - Front Load (Part Numbers 5H00XXX)



1. 4M00731 Hopper Housing
2. 4M01374 **Quarter** Dispense Mechanism (Classic)
   4M00688 **Dollar Coin** Dispense Mechanism (Classic)
3. 2F01170 Diverter Plate
4. 4M00729 Coin Cassette
5. 4A00121 Hopper Funnel
6. 2F02445 Hopper Door
7. 4E00400 Hopper Control Board (Front Load Only)

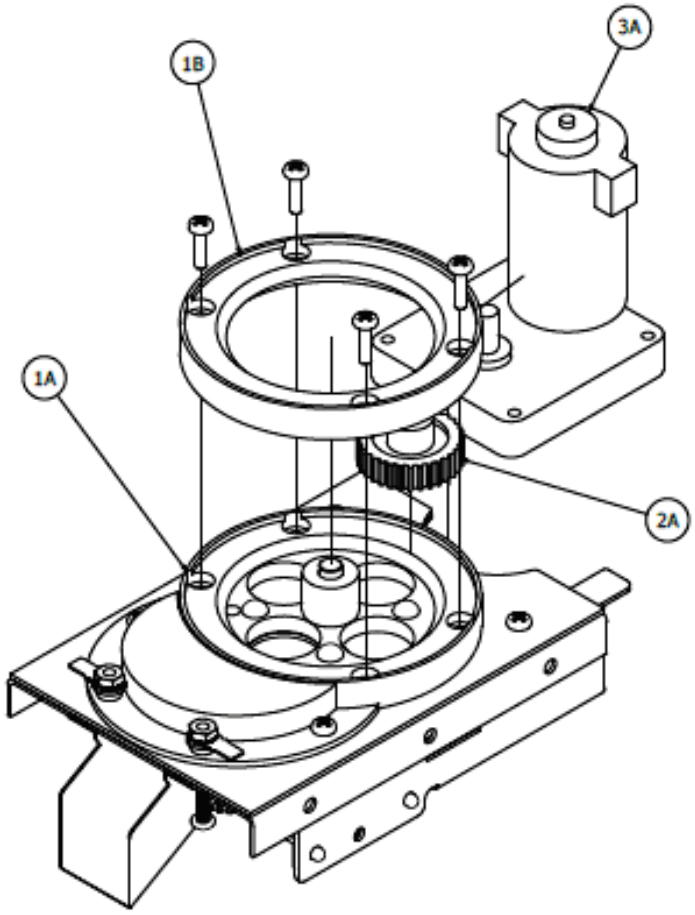
5.3 Classic Hoppers - Rear Load (Part Numbers 5H00XXX)



1. 4M01374 **Quarter** Dispense Mechanism (Classic)
   4M00688 **Dollar Coin** Dispense Mechanism (Classic)
2. 4E00401 Hopper Control Board (Rear Load Only)
3. 2F05115 Hopper Door
4. 2F01170 Diverter Plate
5. 4M00729 Coin Hopper Cassette (3.2K) **
6. 4A00121 Hopper Funnel Assembly
7. 4E00388 Senser Board (Rear Load Only)
8. 4M01185 Rear Load Hopper Housing

** Different Cassette Part Numbers for 3.2K, 5.2K, and 9.0K Hoppers

5.4 **Classic Hopper Dispense Mech** (Used in Front and Rear Load Hoppers)



1A Feed Mechanism (includes Primary & Secondary Disks)

4M01358 **Quarter** Feed Mech **

4M00581 **Dollar Coin** Feed Mech **

1B Adapter Ring Only

2P00101 **Quarter** Adapter Ring

2P00105 **Dollar** Adapter Ring

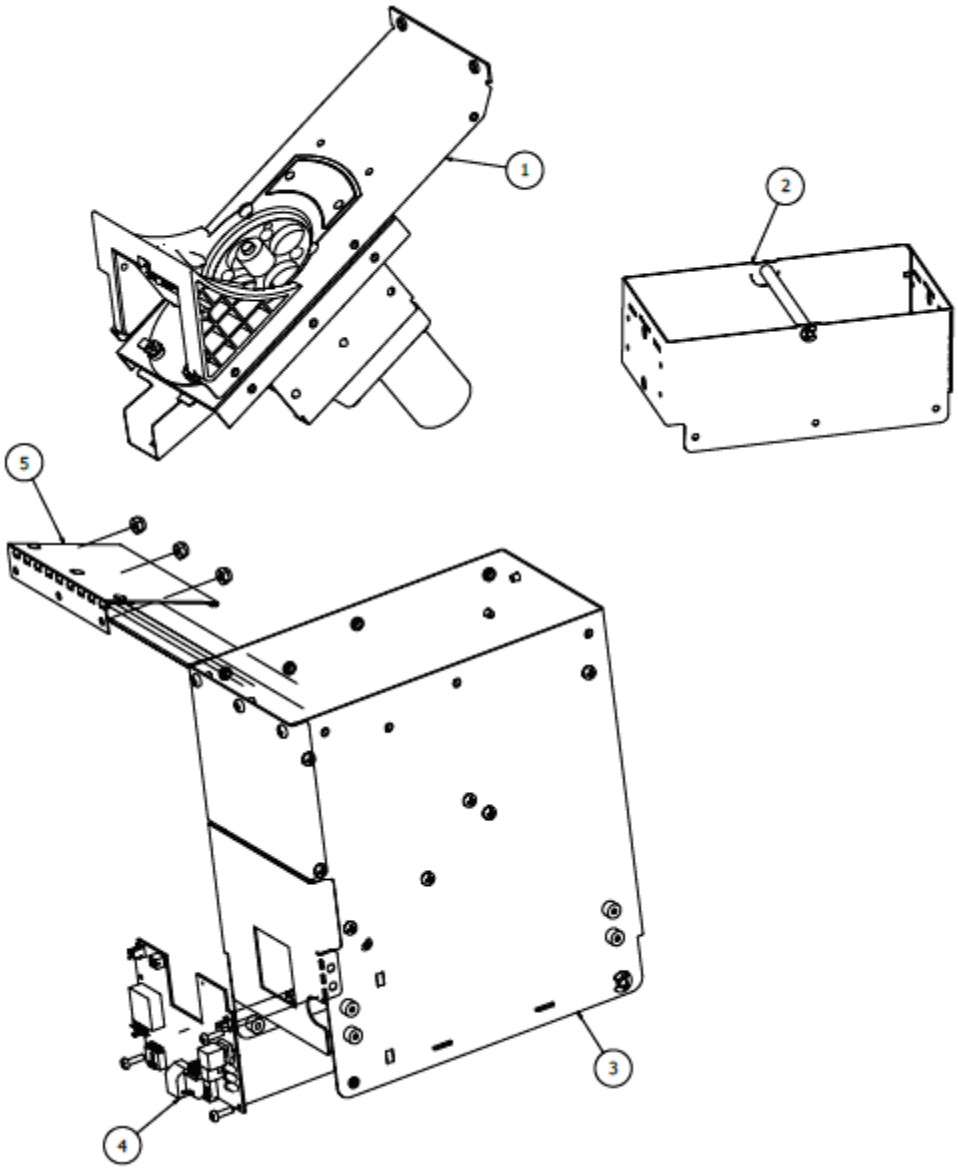
2A 2G00109 Motor Gear *

3A IM00113 DC Motor

* Not shown: 3P00102 Motor Pin

** Contact Parts Department for more Feed Mechanism models for other coin/token sizes.

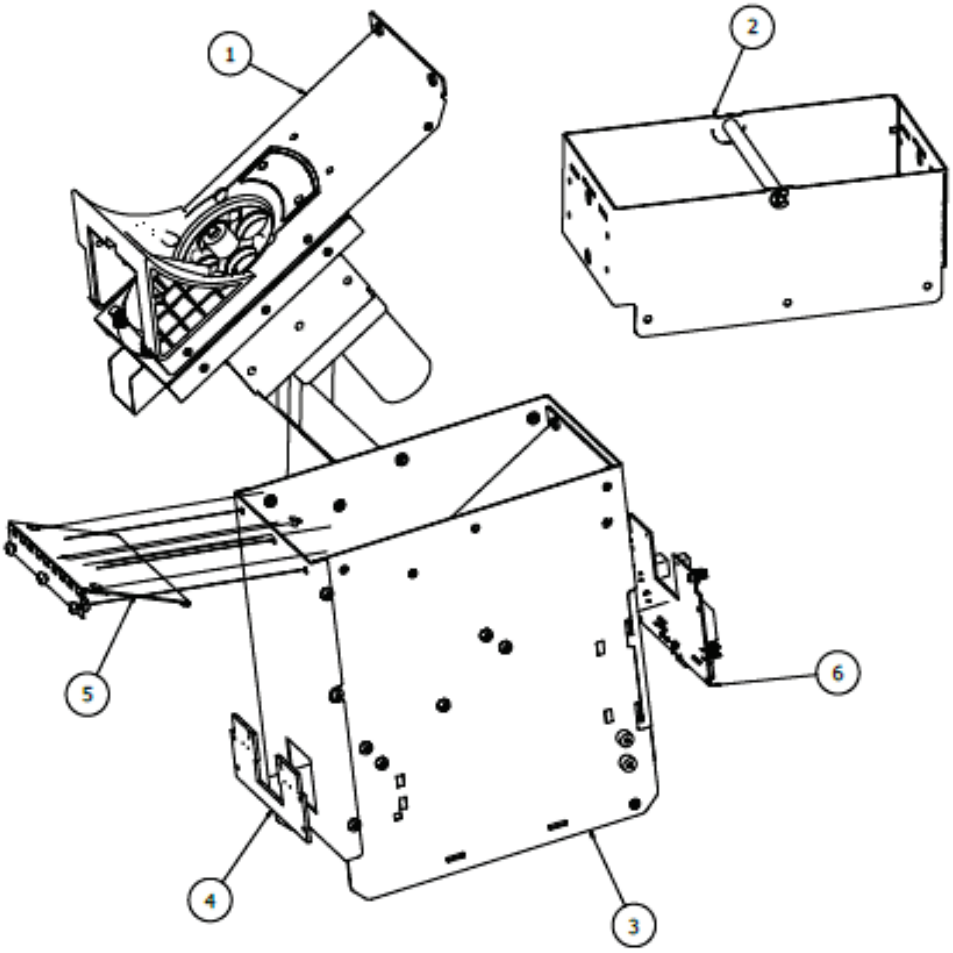
5.5 K5000 Hoppers - Front Load (Part Numbers 5HK5XXX)



1. 4M01058 K5000 Dispense Mechanism, US Quarter *
2. 4M00729 2.8K Coin Cassette **
3. 4M00999 Housing
4. 4E00400 Hopper Control Board (Front Load Only)
5. 5M00532 Void Plate Assembly

* Call Parts for additional Dispenser Sizes and Part Numbers
** Call Parts Dept. for additional Part Numbers for Coin Cassette capacities

5.6 K5000 Hoppers - Rear Load (Part Numbers 5HK5XXX)

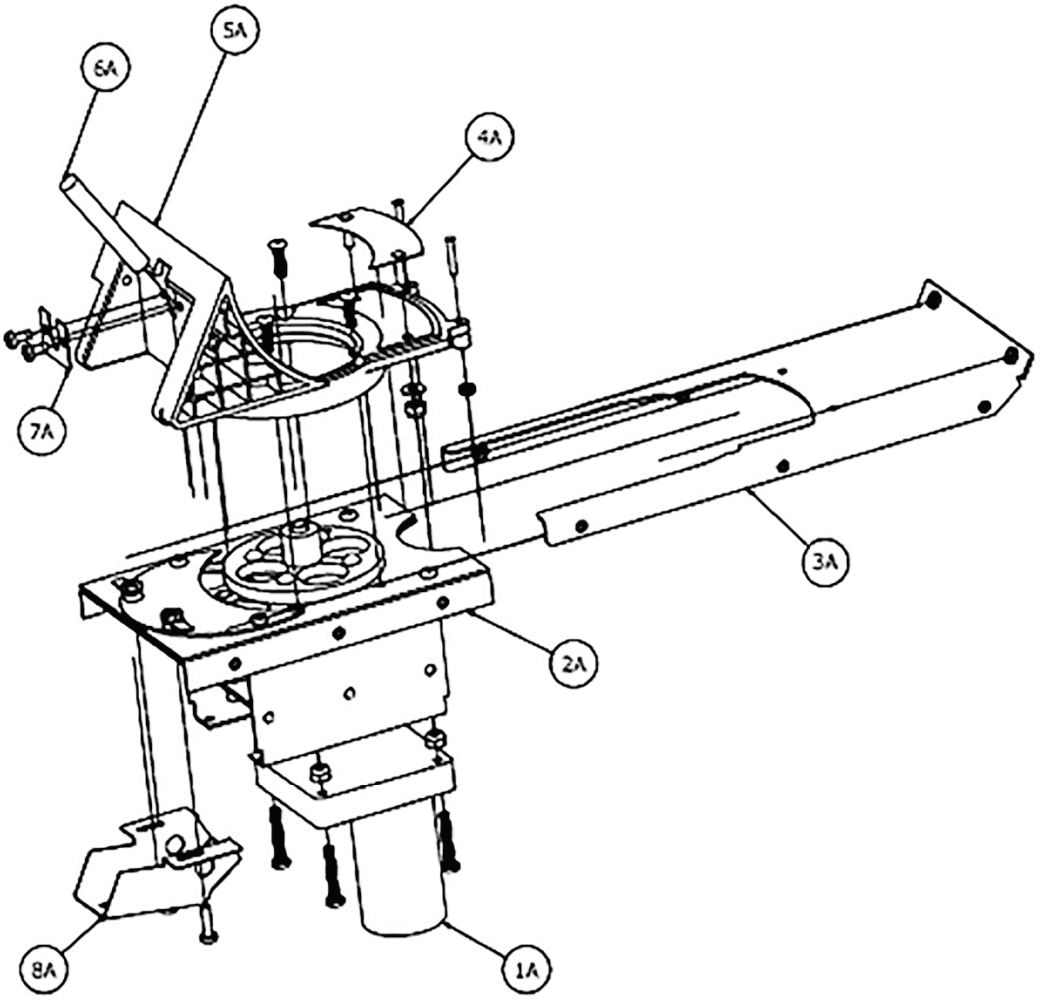


1. 4M01058 K5000 Dispense Mechanism, US Quarter *
2. 4M02023 3.2K Coin Cassette **
3. 4M01477 Housing Assembly
4. 4E00388 Hopper Sensor Board (Rear Load Only)
5. 5M00532 Void Plate Assembly
6. 4E00401 Hopper Control Board (Rear Load Only)

* Call Parts for additional Dispenser Sizes and Part Numbers
** Call Parts Dept. for additional Part Numbers for Coin Cassette capacities

5.7 K5000 Dispense Mechanism *

4M01058 - **Quarter** Dispense Mechanism
4M01059 - **Dollar Coin** Dispense Mechanism



1A	4M00702	Motor Assembly
2A	4Mxxxx	Quarter Feed Mech*
3A	2F08115	Funnel Mounting Plate
4A	2F08116	Sold Out Sensor
5A	2P00271	Dollar/Quarter Omni Funnel
6A	2C00161	Coin Stir Spring
7A	2F08117	Spring plate
8A	2F08052	Hopper Coin Chute

* Contact our Parts Department for additional Dispense Mechanisms sizes and part numbers.

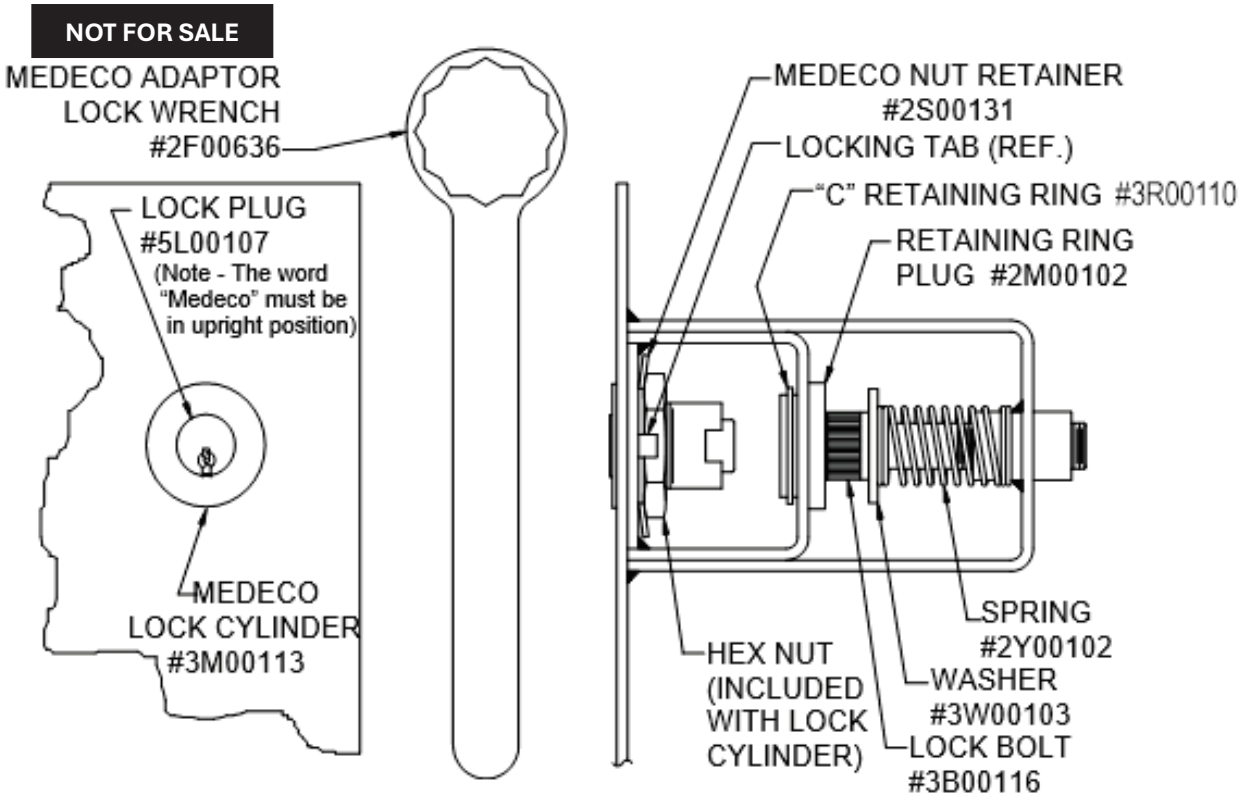
5.8 High Security Plug / Crank Lock Assembly

Plug Locks with Keys:

5L00107	MEDECO™ Lock Plug with one Key
5L00107-2	MEDECO™ (2) Lock Plugs and (2) Keys
5L00107-3	MEDECO™ (3) Lock Plugs and (3) Keys
3M00109	MEDECO™ Key (Special Order)
2W00100	Lock Bolt Wrench

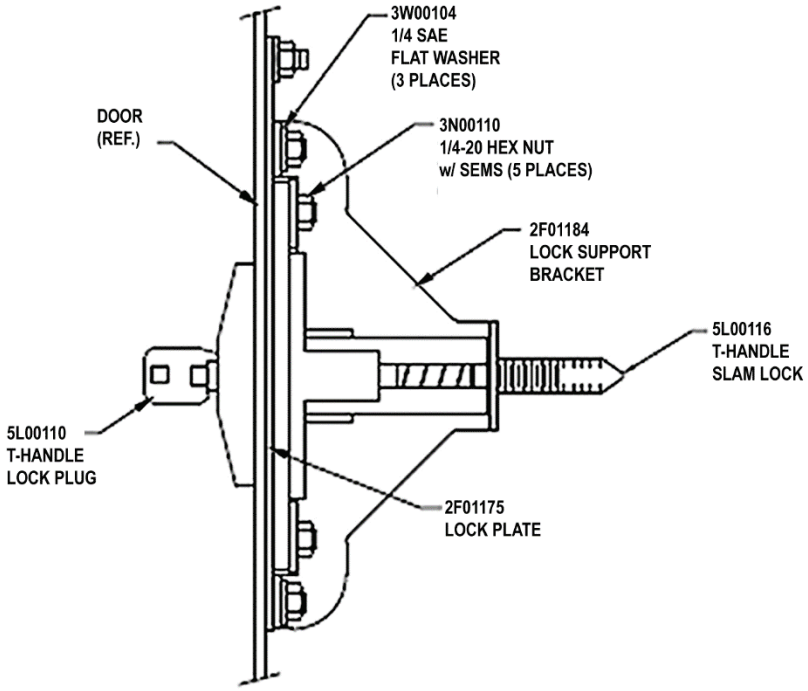
(Lock Bolt Wrench and MEDECO™ Plug

PLUG/CRANK LOCK ASSEMBLY

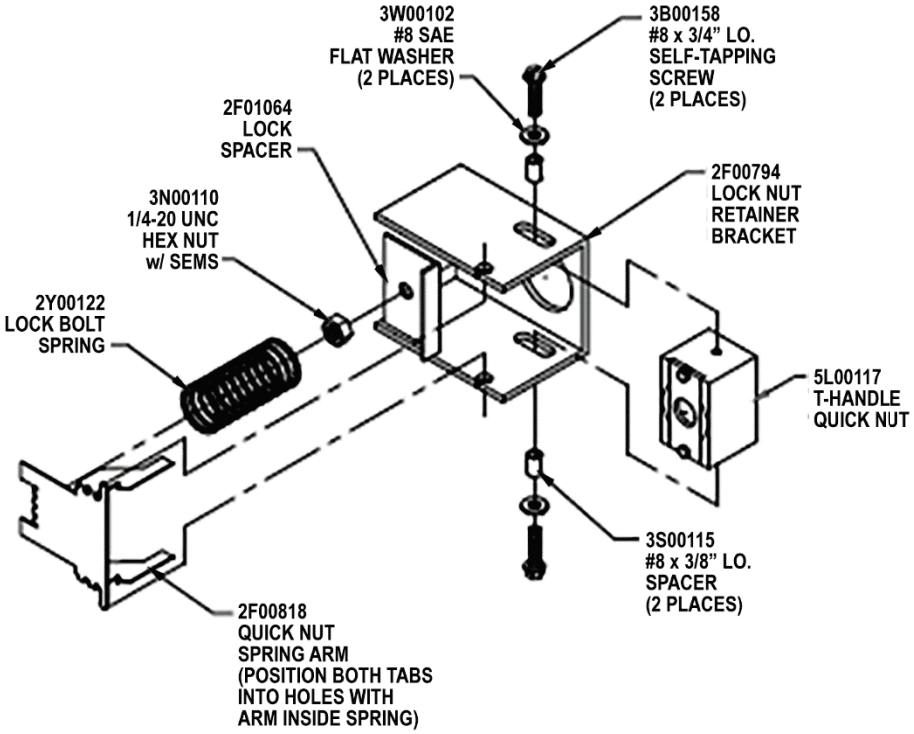


5.9 Quick Release T-Handle Slam Lock Assembly

Ace Locks – Door Assembly



Ace Locks – Lock Block (Cabinet) Assembly



Contact Information – Standard Change-Makers

Headquarters and Service Center Contact Information.

Phone: (317) 899-6966 | Toll Free: (800)-968-6955

SERVICE DEPT. - EMAIL ADDRESSES:

rma@standardchange.com	Repairs and Returns (RMA Numbers)
parts@standardchange.com	To Order Parts
service@standardchange.com	For Service Questions

Website: standardchange.com

SHIPPING ADDRESS:

Standard Change-Makers

3130 North Mitthoeffer Road

Indianapolis, IN 46235-0550

All returns and repairs should be sent to this address with RMA Number written on the outside of the carton and on all paperwork with your contact information inside.