

SECTION 6:

TROUBLESHOOTING & SELF-DIAGNOSTICS

INTRODUCTION

The Century Series Bill Changers offer a number of self-diagnostic features that aid in troubleshooting. The microcomputer in the Changer Control Computer (CCC) monitors the changer functions, and displays an error code if it detects a malfunction. The meaning of each of the two-character error codes, and instructions for correcting each error, are discussed in this section.

This section also describes miscellaneous problems that can occur but may not cause an error code to be displayed, as well as checking procedures used to verify that the Bill Changer is functioning properly.

TROUBLESHOOTING

Logical troubleshooting minimizes the effort and expense of removing and replacing the wrong part. The *Corrective Actions* in this section are written in order from the most common to least probable solution, to help you put your Bill Changer back in service quickly, and with as little effort as possible.

Many failures are caused by minor problems such as loose connections or dirty contacts. Before replacing any parts, check to make sure that all plugs are firmly seated and that connector pins are not bent, broken, or pushed through the back of the connector when mated.

WARNING:

The Bill Changer operates on 120 or 220/240 VAC line voltage. If any possibility exists that the wall outlet may be wired backwards, or if the changer is connected to a wall outlet via a two-pronged grounding adapter, pull the plug from the outlet before attempting troubleshooting procedures. Failure to do so could result in serious electrical shock.

CLEARING BILL CHANGER ERROR CODES

After performing one of the *Corrective Actions*, reset the Bill Changer by pushing the UP and DOWN buttons simultaneously on the CCC while the NORMAL/PROGRAM switch is in the NORMAL position. If the error has been corrected, a dash will move from left to right across the 4-character status display.

If necessary, perform a test vend (or a number of them) with a valid bill to make sure that the error does not reappear.

ERROR CODES

The self diagnostic features of the Century Series Bill Changers are centered around the four-character status display on the CCC. The message displayed will tell you the type of fault encountered.

A description of each of the possible Bill Changer error codes follows. The Bill Acceptor may experience an error condition that is not communicated to the Changer Control. This is particularly true when pulse-type Bill Acceptors are used. There may be no indication that the Changer is disabled, but there will be no activity with the Bill Acceptor due to such an internal malfunction. In these cases, refer to the status indicator on the Bill Acceptor itself - and the Bill Acceptor Manual provided - in order to isolate and solve the problem.

ERROR CODES:

Er 1

Problem:

No coins or bills are accepted.

Symptom:

The changer is in shutdown due to an EEPROM error.

Corrective Action:

1. Enter the programming mode and check each program option.
2. Reprogram the machine if necessary.
3. Exit the programming mode. If the error returns, replace the CCC.

Er 2

Problem:

The changer did not payout coins for a bill accepted. A bill may have been stacked but no payout made.

Symptom:

The changer is in shutdown because the bill acceptor's output pulse was either too long or there were too many pulses issued. (Pulse type bill acceptors only.)

Corrective Action:

Pulse Type Bill Acceptor:

1. Verify that if a bill type is enabled at the bill acceptor, it is also enabled and that there is a proper payout setting for that bill in the CCC. If each is set properly and this error recurs, replace the CCC.

Serial Type Bill Acceptor:

1. If this was a new CCC being installed for the first time, enter the Programming Mode and program all setup options and the payout settings.
2. If the machine had been in operation, this code should never occur—replace the CCC.

ER 3

Problem:

The changer did not payout coins for a bill accepted. A bill may have been stacked but no payout made.

Symptom:

The changer is in shutdown because the bill acceptors' output pulse was either too long or there were too many pulses issued. (Pulse type bill acceptor only.)

Corrective Action:

Pulse Type Bill Acceptor:

If this is a newly installed Bill Acceptor –

1. **Check the bill acceptor's pulse settings.** All Credit Pulses must be between 19 and 120 MS in duration, with 19 to 150 MS space between pulses. One or two such pulses will be treated as a valid Type 1 Bill and if 3 to 7 are received, they will be treated as a valid Type 2 Bill. If there are 8 or more pulses detected, or the timing of the pulses or spaces exceeds those mentioned, an ER 3 condition will result.

If this Bill Acceptor had been functioning in the Changer –

1. **Check the wiring harness from the CCC to the Bill Acceptor for a short to ground.**
2. **Replace the Bill Acceptor.**

Serial Type Bill Acceptor:

1. **Make sure that the CCC is programmed for a serial type bill acceptor (bA 2 or bA 3) and make the program change if necessary.** If it is set for type 2, replace the CCC.

Er 4

Problem:

No coins or bills are accepted.

Symptom:

The changer is in shutdown because of a fault with the bill acceptor.

Corrective Action:

1. Check for a full bill acceptor stacker.
2. Check for any debris in the bill acceptor.
3. Replace the bill acceptor.

Note: If a Rowe CBA-4 or RBA-7 is used and the CCC is set for Bill Acceptor type 2, this error will disappear if the bill acceptor problem resolves itself. Under any other circumstances, however, this condition will remain in effect until the error is manually cleared.

Er 5 or Er 6 or Er 11

Problem:

The changer did not payout the correct number of coins. *Er 5* signifies that the left hopper was the source; *Er 6* signifies that the right hopper caused the problem. *Er 11* signifies that the machine failed to complete the payout and is operating in the MC Mode; i.e., neither hopper could satisfy the payout.

Symptom:

The changer is in shutdown because no coins were paid out of the hopper for 60 seconds after the dispenser was enabled or for 60 seconds after the previous coin during a dispense cycle.

Corrective Action:

1. Make sure the hopper is lifting the coins into the coin chute. Check for dirt build-up on the coin path (See Section 5). Check for coin jam or binding parts in the hopper.
2. Check the hopper motor. Remove the hopper and clear the error code. Perform a test vend on the changer using a valid bill or coin. If the motor runs, check carefully for excessive bind in the hopper (See Section 5). If the motor does not run, check for 120 VAC at the hopper motor. If voltage is present, the motor is defective. If there is no voltage present, proceed to Step 3.
3. Check for voltage at the CCC connection to the dispenser harness. If 120 VAC is present between P3 Pin 6 and P3 Pin 9, then the harness is at fault. Disconnect the 120 VAC, either at the wall plug or by disconnecting the harness at P4 on the CCC and then check for continuity between pin 6 and the hopper motor and pin 9 and the hopper motor. If continuity test fails, repair or replace the harness.

Note:

If a hopper motor feels very hot to the touch, wait until it cools down, then reset the CCC. Insert a bill to test for proper operation. If the motor operates after cooling off, check hopper for coin jams or binds.

Er 7

Problem:

The changer may have paid an extra coin from one or both of the hoppers.

Symptom:

The changer is in shutdown because two extra coins have been paid out, since the last time the changer was reset.

Corrective Action:

1. **Check for mechanical problems with the dispenser assembly.** Most likely the cause is mechanical, rather than electrical. Check the hopper motor brake's stop-pawl for wear or breakage. Check magnetic brake actuator for binds or sticking. Repair or replace hopper motor.
2. **Check the wiring to the photo-detector cell and LED on the dispenser assembly for loose connections or pinched wiring.** Repair wiring or replace photo-detector cell or LED.

Er 8 or Er 9

Problem:

The changer may have paid an incorrect number of coins. *Er 8* signifies that the left hopper/coin detector was the source; *Er 9* signifies that the problem came from the right hopper/coin detector.

Symptom:

The changer is in shutdown because the coin-detector is (or was) blocked.

Corrective Action:

1. **Check for debris such as paper or a foreign object stuck between the photo-detector and the LED on the dispenser assembly.**
2. **Verify that the LED is lit.** Check the wiring to the photo-detector cell and LED on the dispenser assembly for loose connections or pinched wiring. Repair wiring or replace photo-detector cell or LED.

Er 10

Problem:

Programming Error.

Symptom:

The computer will not exit the programming mode because there is an error in the present setup.

Corrective Action:

1. **A programmable setting is not correct for the conditions under which it was set.** An example of this would be an additional bill type was enabled, but the payout settings for that bill type were not set. Verify all programming options and make any necessary changes. If the settings are correct, and the error persists, replace the CCC.

Er 11 - SEE PAGE 6-5

Er 12

Problem:

The changer is out of service.

Symptom:

The last customer was most likely short-changed due to loss of power during the payout cycle.

Corrective Action:

1. **Make certain that there is a continuous power source connected to the Changer.** Check to be certain that the supply is again restored properly. Check the fuse or circuit breaker is OK.
2. Check the internal circuit breaker (5A) and the ON-OFF switch for intermittent contact.
3. If the problem recurs, and power failure can be completely ruled out, replace the CCC.

Er 13

This error should never occur in a Century Changer. If it does, replace the CCC.

Er 14

This error should never occur in a Century Changer. If it does, replace the CCC.

Er15 or Er16

Problem:

The changer does not contain enough coins to continue in service. *Er15* signifies that the left hopper is too low to continue; *Er16* signifies that the right hopper is too low to continue.

Symptom:

The changer is in shutdown because the low coin level sensor in the hopper has signalled a low level and the CCC has counted down to within 25 coins of the maximum payout.

Corrective Action:

1. **Refill the hopper with the appropriate coins or tokens.**
2. **If the hopper contains sufficient coins, check the low level sensing circuit.** The decimal point on the second-from-left 7-segment display is used as a low coin condition indicator for the hopper when lit.

If a low-level indicator is lit, but the hopper contains sufficient coins, the low coin level sensing circuit should be checked for proper operation.

3. **Remove the hopper.** The low-level indicator LED should not be lit. If it is lit, check the wiring between the low-level sensor contacts on the dispenser assembly and the CCC for pinched or shorted wiring. The voltage across pins 2 & 5 of P3 on the CCC should be 4.5 - 5.0 VDC. If this is the case, replace the hopper, or repair the low-level sensing circuits in the hopper.

Er21 or Er22 or Er23

Problem:

The changer goes out of service when trying to exit the programming mode.

Symptom:

The computer experienced a problem while saving information in its onboard memory chip.

Corrective Action:

1. The most likely cause for this would be a power loss during the programming process. Another possible cause could be a recurring low line voltage condition – See *Er12*.

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Problem:

The Changer will not accept coins.

Symptom:

The coin equipment is disabled because of a coin related error.

Corrective Action:

1. **If a mechanical coin acceptor is installed, check the coin switch and switch actuator wire for proper operation.** Check for a stuck coin or other object holding the switch closed. Clear the obstruction, and reset the error.
2. **If an electronic coin acceptor is installed, check for a stuck coin or other object in the flight deck.** Check the programming. Verify that if a coin type is enabled at the coin acceptor, it is enabled and the payout for that programmed into the CCC. If an electronic coin acceptor accepts a coin that was not programmed into the CCC, this error code will appear.
3. **Check the wiring between the coin acceptor and the CCC for pinched or shorted wiring.** If in doubt, disconnect the coin acceptor harness at the CCC. Reset the error. If the error does not return, replace the coin acceptor or the coin acceptor harness. If the error does return, replace the CCC.

MISCELLANEOUS PROBLEMS

The following problems may occur in the Bill Changer without causing a fault code.

ERRATIC PAYOUT

Problem:

The changer is not consistently dispensing the correct number of coins.

Symptom:

One vend is short a coin. The next vend contains an extra coin.

Corrective Action:

1. **Check the coin chute on the back of the dispenser.** Most likely, a coin is getting hung up in the dispenser coin chute, after it has been "counted" by the detector, then being shaken loose by a later vend. Check the coin chute for any dirt or obstruction that might cause a coin to hang up.

LARGE NUMBER OF VALID BILLS REJECTED

Problem:

The bill acceptor rejects a large number of valid bills.

Corrective Action:

Refer to the Troubleshooting Chart in the Bill Acceptor Field Service Manual and Parts Catalog included with your Bill Changer.

BILLS JAM FREQUENTLY

Problem:

Bills repeatedly become jammed in the Bill Acceptor transport.

Corrective Action:

Refer to the Bill Jamming Checklist in the Bill Acceptor Field Service Manual and Parts Catalog included with your Bill Changer.

COIN COUNTING PHOTOTRANSISTOR (SENSOR) CHECK

Use the following procedure to check the phototransistor (sensor) in the dispenser coin detector system:

1. Switch the Bill Changer power OFF at the electrical box.
2. Remove the black plastic cover from the phototransistor and connect a common meter lead to the metal dispenser backing plate as shown in Figure 6-1.
3. Connect the positive (+) meter lead to the blue wire (*Figure 6-1, Sensor Check - Blue Wire*).
4. Turn the power switch ON and check to see that the LED is lit. The meter should indicate between 4.7 and 5.2 VDC.

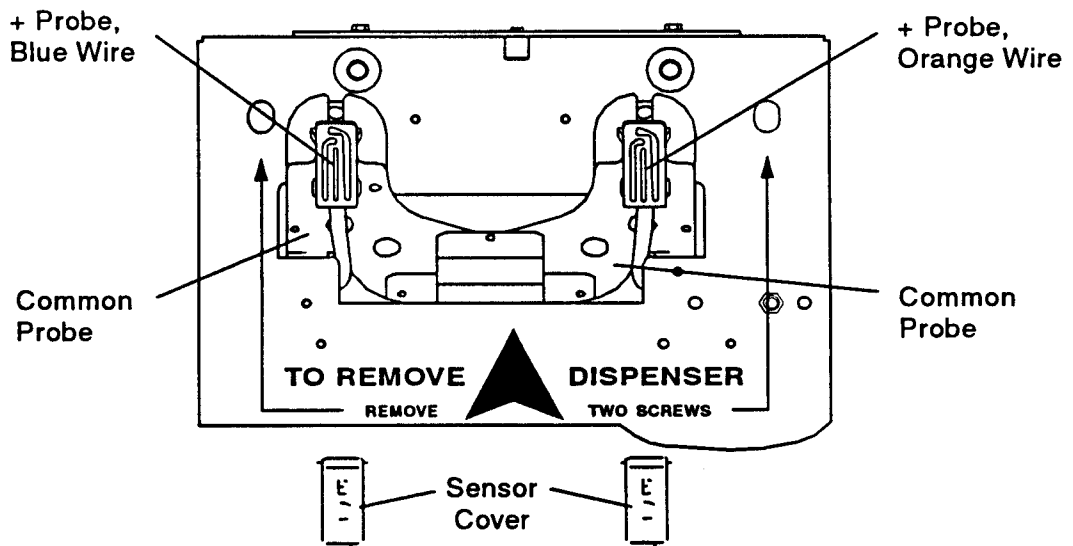
If the meter indication is not correct (between 4.7 and 5.2 VDC), the voltage regulator on the CCC board may need replacement (*see Section 7*). Repair the malfunction before continuing this procedure.

If the meter reading is correct:

5. Move the + meter lead to the orange wire on the phototransistor as shown in *Figure 6-1, Sensor Check - Orange Wire*. The meter should indicate between 3.5 and 5.0 VDC.

If the voltage is less than 3.5 volts, replace the phototransistor board with the correct part number listed in *Section 8: PARTS CATALOG*.

Figure 6-1
Sensor Check



LOW COIN SENSOR ELECTRICAL CHECK

Perform the following procedure to ensure that the Low Coin Sensor is functioning properly.

1. Turn the Bill Changer power to OFF.
2. Remove the hopper and empty it of all coins.

WARNING:

Make sure that the power is OFF before performing the following step.

3. Locate connector P3 on the Changer Control Computer (CCC). Connect a DC voltmeter to P3-5 (GND) and P3-4 (+).
4. Replace the empty hopper and turn Bill Changer power to ON. The voltmeter should read less than +.5 volts DC.
5. Tape 2 x 2 inch piece of aluminum foil around the end of a non-metallic object such as a long plastic ruler or wood stick. Figure 6-3, the Hopper Cleaning Brush is good for this purpose.
6. Place the foil end of the test object *inside* the hopper as close as possible to the location of the sensor (*Figure 6-2, Hopper Sensor Area*). The voltmeter should now have a reading of no less than 4.3 volts and a maximum of 5.5 volts.

Figure 6-2
Hopper Sensor
Area

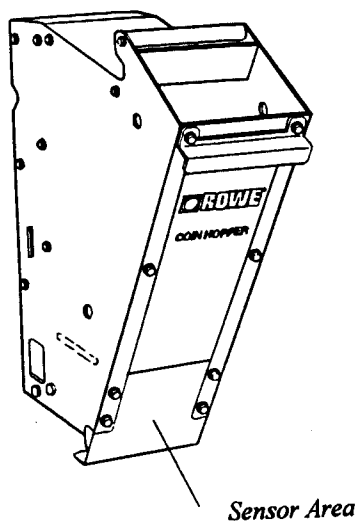


Figure 6-3
Hopper Cleaning
Brush

