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The USL-1 series is a single price electronic coin changer which accepts U.S. 5¢, 10¢, 25¢ and $1 coins with vend price settings in 5¢ increments from 5¢ to $3.15 and is capable of interfacing with $1 Bill Validators.

Warranty

CONLUX USA CORPORATION warrants all new equipment (coin changers and bill validators) sold by it to be free from defective material and workmanship. Conlux will repair or replace (at its option) any part of the equipment which proves to be defective in materials or workmanship within a period of twenty-four (24) months from the date of original shipment from Conlux USA. This warranty includes salt water damage for twelve (12) months only from the date of original shipment from Conlux USA.

Other conditions applying to this warranty are as follows:

1. This warranty will not apply to any equipment which has been, in Conlux’s opinion, subject to: accident, abuse, misuse, neglect, improper installation, vandalism, or improper maintenance or repair by unauthorized service personnel; or is found to include parts other than genuine Conlux USA-supplied parts or options.

2. Conlux will not be responsible for any expense incurred by the purchaser incidental to the repair or replacement of equipment covered by this warranty.

3. Freight charges to send the equipment to Conlux or a Conlux-appointed Independent Authorized Service Center for warranty service will be the responsibility of the purchaser.

4. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES ORAL OR WRITTEN, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, WARRANTIES OF FITNESS OF PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES OF CONLUX. CONLUX NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT, ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THIS WARRANTY POLICY.

5. LIABILITY TO CONLUX USA AND ITS APPOINTED INDEPENDENT AUTHORIZED SERVICE CENTER IS LIMITED TO THE REPAIR OR REPLACEMENT, AT THEIR OPTION, OF DEFECTIVE PARTS WITHIN THE CONLUX USA PRODUCT(S) AND DOES NOT INCLUDE INCIDENTAL AND CONSEQUENTIAL DAMAGES.
2. GENERAL SPECIFICATIONS

<table>
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<th>Items</th>
<th>USL-1 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Setting Range</td>
<td>$0.05 ~ $3.15 (5¢ increments)</td>
</tr>
<tr>
<td>Coins Accepted</td>
<td>U.S. 5¢, 10¢, 25¢, $1 coins</td>
</tr>
<tr>
<td>Coins Paid Out</td>
<td>5¢, 10¢, 25¢ coins (automatic replenishment)</td>
</tr>
<tr>
<td>Coin Tube Capacity</td>
<td>5¢ coins — approx. 70 coins</td>
</tr>
<tr>
<td></td>
<td>10¢ coins — approx. 100 coins</td>
</tr>
<tr>
<td></td>
<td>25¢ coins — approx. 80 coins</td>
</tr>
<tr>
<td>Change Payout</td>
<td>DC Solenoid (5, 10, 25¢ tubes)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>AC 117V ± 10V, 60Hz</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>20MΩ or greater</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>+5°F ~ 140°F</td>
</tr>
<tr>
<td>Rated Power Consumption</td>
<td>14W (Wait State) 40W (Operate State)</td>
</tr>
<tr>
<td>Weight</td>
<td>5 Lbs</td>
</tr>
<tr>
<td>Function</td>
<td>Overprice Function, Inventory Function</td>
</tr>
<tr>
<td>Standard Feature</td>
<td>Bill Validator Harness</td>
</tr>
</tbody>
</table>

3. DETAILED SPECIFICATIONS

1 Payout System
1.1 Types of Change 5¢, 10¢, 25¢ coins (automatic replenishment)
1.2 Payout System DC Solenoid
1.3 Coin Tube Capacity
   5¢ coins — approx. 70 coins automatic replenishment
   10¢ coins — approx. 100 coins automatic replenishment
   25¢ coins — approx. 80 coins automatic replenishment
1.4 Change Payout Method
   When the total amount of the coins accepted exceeds the vend price, change is paid out
   corresponding to the vend price.
   (Overprice function)
   1.4.1 The decision on the types and number of coins paid out for change is made in accordance
   with the availability of coins in the change tubes.
   1.4.2 The payout order is 25¢ coins → 10¢ coins → 5¢ coins.

2 Empty Signal
2.1 If the quantity of coins in the 5¢ tube is lower than the predetermined number, the 5¢ out
   of change signal is sent.
2.2 Empty Signal Sensing System
   Out of change sensing is accomplished by means of a L.E.D. sensor mounted in the bottom of
   the change tube and an empty quantity counter which stores the number of coins in the change tube in
   memory.
   The out of change signal is sent when the following conditions exist.
   When the L.E.D. senses there are no coins and there are fewer than 8 coins registered
   on the empty quantity counter.
3 Vend Signal
3.1 When the number of accepted coins equals or exceeds the set vend price, a vend signal is sent to the vending machine.
3.2 After the vend signal is sent and the C.R.E.M. signal has been restored, the coin changer returns to the wait state. (If change is paid out, this occurs after payout.)
3.3 Sales Method
  3.3.1 Normal Mode
  Until the value of accepted coins reaches the vend price, the accepted coins will be returned when the coin return lever is pushed (escrow to vend). When the value of the accepted coins has exceeded the vend price, if there is a lack of change, the coin changer will not send a vend signal, and the accepted coins will automatically be returned.
  3.3.2 Forced Sales Mode
  The accepted coins can not be returned. When the value of accepted coins exceeds the vend price, a vend signal will be sent independent of the presence or absence of change.

4 Relation between Vend Price, Accepted Coins, and Change Paid Out
4.1 Sales with Accepted Coins Requiring no Change
  When the combination of accepted coins as one group equals the set vend price, a vend signal is sent for each group. (Normal and forced sales mode)
4.2 Sales with Accepted Coins Requiring Change
  4.2.1 When there is Change
  When the combination of accepted coins as one group exceeds the set vend price, a vend signal is sent for each group, and change is paid out according to the vend price.
  (Normal and forced sales mode)
  4.2.2 When There is Insufficient Change
  • Normal mode → When the value of accepted coins exceeds the vend price, no vend signal is sent and the accepted coins are automatically returned.
  • Forced sales mode → When the combination of coins as one group is accepted, a vend signal is sent for each group, and change according to the vend price is paid out under the assumption there is change.

5 Coin Rejection
In the following cases, inserted coins are rejected.
(1) When the power is off (power failure).
(2) When the amount of the coins accepted reaches the vend price.
(3) During a vend operation, when change is being paid out, or when the power is first switched on (for approximately 2 seconds).
(4) When the C.R.E.M. signal is cut off.
(5) When the same number of coins accepted continuously reaches the following limits.
  5¢ coins ... 40 coins
  10¢ coins ... 20 coins

6 Escrow Function (Up To The Vend Price)
6.1 All genuine coins that have been accepted are stored in the change tubes.
6.2 Pressing the coin return lever causes the escrow function to operate, returning the coins in the denominations which were accepted.
However, if a $1 coin is accepted, 25¢, 10¢ or 5¢ coins will be returned instead of the $1 coin.

★ When a $1 bill validator (NB-10 series) is installed, these specifications change, as shown in the following table.

<table>
<thead>
<tr>
<th>Item Changed</th>
<th>Coin Changer Only</th>
<th>Coin Changer and $1 Bill Validator Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currency Used</td>
<td>5¢, 10¢, 25¢ and $1 coins</td>
<td>5¢, 10¢, 25¢ and $1 coins, and $1 bills.</td>
</tr>
<tr>
<td>Escrow Function</td>
<td>See item 6.2</td>
<td>(Addition)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A $1 bill inserted into the bill validator is not returned when the return lever is pressed, instead, change is returned in combinations of 5¢, 10¢ and 25¢ coins.</td>
</tr>
</tbody>
</table>

(Note)
When the coin changer is out of 5¢ coins for change, the empty light is on and $1 bill insertion is prevented.

4. MODEL NO.

The product model name is shown in the table below. Select the model which you require from this table.

Table 1 Sales Mode category
<table>
<thead>
<tr>
<th>Normal mode</th>
<th>Forced sales mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>✓</td>
</tr>
<tr>
<td>1</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 2 Option category
<table>
<thead>
<tr>
<th>Drain Tube</th>
<th>Attached Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 3 Harness category
<table>
<thead>
<tr>
<th>Harness type</th>
<th>Power supply harness</th>
<th>NB harness</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Power supply harness (2)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Power supply harness (4)</td>
<td>✓</td>
</tr>
</tbody>
</table>
5. HANDLING AND INSTALLATION

5-1 Handling Instructions

Do not carry the coin changer by the harnesses.

Do not drop the coin changer.

Handle the gate assembly gently when opening and closing by hand.

Store the coin changer in a dry, clean location.

5-2 Names of The Parts and Their Functions

- Drain Spout
  This chute discharges liquid which has been poured into the coin insert of the vender.

- Rubber Elbow

- Drain Tube

- Discriminator Section
  This is an electronic discriminator which discriminates US $1, 25¢, 10¢ and 5¢ coins.

- Price Switch Cover

- Price Switch

- Inventory Switch
  This switch is used to remove coins from the change tubes.

- 10¢ Change Tube

- 5¢ Change Tube

- 25¢ Change Tube

- NB Harness

- Power Supply Harness
5-3 Installation Procedure

1. Attach the changer by aligning the key holes with the mounting screws on the vending machine, and fasten securely.

NOTE:
The Discriminator Can Not Be Removed From This Coin Changer.

2. Plug the 8 pin Jones plug into the vending machine socket.

5-4 Vend Price Setting

The vend price is set by changing the combination on the Price Switch (PS) mounted on the change tube above the inventory switches. (Lift the price switch cover.)

The DIP switches have the following values.

<table>
<thead>
<tr>
<th>DIP Switch Label</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5¢</td>
</tr>
<tr>
<td>2</td>
<td>10¢</td>
</tr>
<tr>
<td>3</td>
<td>20¢</td>
</tr>
<tr>
<td>4</td>
<td>40¢</td>
</tr>
<tr>
<td>5</td>
<td>80¢</td>
</tr>
<tr>
<td>6</td>
<td>160¢</td>
</tr>
</tbody>
</table>

Example: To set the vend price at 35¢, turn on switches 1, 2 and 3 of the DIP switch.

5¢ + 10¢ + 20¢ = 35¢

5-5 Loading The Change Tubes

*Loading 5¢, 10¢ and 25¢ Coins

Note:
1. If a coin drops in and stands on end, correct it.
2. Be careful not to load bent coins.
5-6 Change Inventory

In regard to the coins paid out manually:
5¢ coins → When the 5¢ inventory switch is pushed, 5¢ coins are paid out automatically.
10¢ coins → When the 10¢ inventory switch is pushed, 10¢ coins are paid out automatically.
25¢ coins → When the 25¢ inventory switch is pushed, 25¢ coins are paid out automatically.
※ When the inventory switch is pushed ON, the payout solenoid operates.
Pressing the inventory switch again will shut OFF the payout solenoid.

5-7 Vend Test
① Set the price switch to the desired vend price.
② Plug the 8pin Jones plug into the vending machine socket.
③ Load 20 → 5¢ coins in the change tube. The empty light on the vending machine should be off.
④ Insert different combinations of 5¢, 10¢, and 25¢ coins through the coin slot of the vending machine. The vend relay should energize each time the vend price is reached, and the coin changer should payout change if needed.
⑤ Insert 1 → 5¢ coin. Press the coin return lever, a 5¢ coin should be returned.
⑥ If a $1 Bill Validator is installed, insert a $1 bill. The coin changer will energize the vend relay and payout the correct change.
⑦ Operate the inventory switches to empty the change tubes.

6. CONSTRUCTION AND DESCRIPTION
6-1 Description of Parts
6-2 Flow of Coins

Coins are discriminated by the front sensor. When they are judged to be valid coins, the CREM solenoid operates and the coins are guided past the credit sensor which counts the coins.

In the case of $1 coins, a separator solenoid operates at the same time. By means of a separator chute, the coins are guided to each coin tube and are stored for payout.

Defective coins are returned automatically. Those coins which have stopped in the gate can be ejected to the coin return chute by operating the return lever.

If the overflow sensor detects coins in a tube, those coins are guided to the cashbox in the vending machine.

During manual return, automatic return and change payout, the payout solenoid operates and each coin is paid out.
6-3 Discriminator Coin Paths
The electronic coin discriminator section judges whether 5¢, 10¢, 25¢ and $1 coins are genuine or fake, separates them and credits the good coins.

<table>
<thead>
<tr>
<th>Item</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coins Accepted</td>
<td>U.S. 5¢, 10¢, 25¢, $1 coins</td>
</tr>
<tr>
<td>Discrimination Method</td>
<td>Magnetic flux transmission-receiving system</td>
</tr>
<tr>
<td>Good/Bad Coin Separator Mechanism</td>
<td>Yes (CREM Solenoid operates when a coin is judged to be good.)</td>
</tr>
<tr>
<td>Coin Separator Mechanism</td>
<td>Yes (A solenoid separates $1 coins from 5¢, 10¢ and 25¢ coins. The separator chute guides each coin to the correct coin tube.)</td>
</tr>
<tr>
<td>Anti Stringing</td>
<td>Yes (By the housing hook.)</td>
</tr>
<tr>
<td>Trouble Sensor Function</td>
<td>Yes (Jamming of coins between the front sensors and coin sensors.)</td>
</tr>
</tbody>
</table>

**Discriminator Coin Paths**

![Diagram of coin paths](image)
6-4 Coin Paths

Coins which are accepted and pass the credit sensor are guided to the change tubes or cash box ($1 coin).

If an overflow sensor detects coins in a tube, the detected coins are guided to the cashbox in the vending machine. The change paid out by payout solenoids, defective coins (including slugs), etc. are returned to the coin return cup of the vending machine.
6-5 Discrimination Method

6-5-1 Discrimination by Metal Content and External Shape (Diameter)

When coins pass between the front sensors, the metal content and diameter of the coins are checked and compared with the preset reference values of the control board. A coin is judged to be genuine only when these values match.

6-5-2 CREM Solenoid and CREM Extension

If a coin is judged to be good, the CREM solenoid operates, the CREM extension opens and the coin is received. If a coin is judged to be bad (defective), the CREM extension remains closed and the coin is guided to the return chute.
6-5-3 Separator Solenoid and Lever

When 5¢, 10¢ and 25¢ coins are accepted, the separator solenoid operates and a chute rail guides the 5¢, 10¢ and 25¢ coins into their respective coin tubes. $1 and overflow coins drop to the cash box in the vending machine.

6-5-4 Separation of 5¢, 10¢ and 25¢ coins by the Separator Chute

25¢ coins roll along the rail in the separator chute and are guided to the 25¢ coin tube. 5¢ and 10¢ coins roll along the same rail in the separator chute but drop off along the way and are guided into their coin tubes.
6-6 Operation of Switches, Sensors and Parts

6-6-1 Gate Lever Assembly and Related Parts

When the return lever on the vending machine is operated, it pushes the gate lever down and the gate opens.

If there are any defective coins, etc. stopped behind the gate, this operation causes them to be guided into the coin return chute. In addition, the movement of the front sensor causes the cancel signal to be sent. (escrow)

*The movement of the Front sensor

<table>
<thead>
<tr>
<th>Normal Position</th>
<th>Gate Lever Depressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel Signal OFF</td>
<td>Cancel Signal ON (Escrow)</td>
</tr>
</tbody>
</table>

6-6-2 Anti Stringing Hook

The hook of the housing prevents stringing!
6-6-3 Credit Sensor

When a coin is determined to be genuine by the front sensor, it will be guided past the credit sensor and its value will be accumulated in the memory of the control board.

6-6-4 Overflow and Empty Sensors

- **Overflow sensor**
  This sensor detects the full level of coins in the change tube.
  If the tubes are judged to be full, the overflow signal is sent.

- **Empty sensor**
  This sensor detects the presence of coins in the change tube.
  The coin changer will determine the tubes to be empty when the coins are below the following levels.

  - 5¢ coin change tube: 15 ± 3 coins
  - 10¢ coin change tube: 15 ± 3 coins
  - 25¢ coin change tube: 11 ± 3 coins

6-6-5 Inventory Switch

The inventory switch is used to empty the coin tubes, refer to page 9 for pay out.
6-7 Payout System
The 3 payout solenoids are operated by the control board. Voltage supplied to a payout solenoid produces an electromagnetic force which pulls the solenoid plunger inside the solenoid.
This movement compresses a spring and causes the lever (attached to the plunger) to push the change slide outward, underneath the change tube removing a coin from the tube. The voltage is then removed from the payout solenoid and the compressed spring forces the payout slide back to its original position and the coin is dropped from the payout slide through a hole in the bottom base.

- **5¢ coin payout**
  Payout is made by the operation of the payout solenoid (2). The payout operation is described above.

- **10¢ coin payout**
  Payout is made by the operation of the payout solenoid (3). The payout operation is described above.

- **25¢ coin payout**
  Payout is made by the operation of the payout solenoid (1). The payout operation is described above.
6-8 Signal Devices and their Functions

• Transformer ① reduces AC117V to AC27V.
• Stabilized power supply ② converts AC to 0V, 5V, 15V and 117V DC.
• Signal converter ③ and the input-output signal unit, convert signals from ⑧ and sends them to the vending machine as well as converting signals from the vending machine and sending them to ⑦.
• Drive device ④ drives the CREM solenoid and separator solenoid in accordance with signals from ⑧.
• Sensor signal devices ⑤ include the front sensor, credit sensor (sensor 1), sensor 2, inventory switch, overflow sensors and empty sensors. The signals from each sensor or switch are input to ⑦.
• The PS device in ⑥ is the price switch. Setting condition is input to ⑦.
• The computation, memory and discrimination controller in ⑦ processes the conditions in ⑥ and signals from ③ and outputs operation signals to ③ and ⑨.
• Drive devices ⑨ include the 5¢, 10¢ and 25¢ payout solenoids which are operated by signals from ⑧.
6-9 Input and Output Relationships as seen from the Control Board.

<table>
<thead>
<tr>
<th>Terminal No. and Phase Relationship</th>
<th>Item</th>
<th>Input/Output</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>Input (Power Supply)</td>
<td>Power Supply Terminal</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Output</td>
<td>Vend Signal Terminal</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Output</td>
<td>Out of Change Terminal</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Input</td>
<td>C.R.E.M.Cutoff Terminal</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Output</td>
<td>Free Vending Prevent Terminal</td>
</tr>
</tbody>
</table>

- Front Sensor
- Credit Sensor (Pass Sensor 1)
- Pass Sensor 2
- Overflow Sensor
- Empty Sensor
- Inventory Switch

- Control Board
- CREM Solenoid
- Separator Solenoid
- 5¢ Payout Solenoid
- 10¢ Payout Solenoid
- 25¢ Payout Solenoid
- $1 Bill Validator NB-10 Series
# 7. SIGNAL CONDITIONS AND WIRING DIAGRAM

## 7-1 Connection Terminal Signal Conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Input/Output</th>
<th>Power Supply Condition and Input Output Signal Condition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Input (PowerSupply)</td>
<td>The vending machine side should supply AC117 ± 10V. at 60 Hz, at all times.</td>
<td>Power supply Terminal</td>
</tr>
<tr>
<td>3</td>
<td>Output</td>
<td>When the amount of the accepted coins reaches the vending price, the power supply at terminal 1 is output as a signal.</td>
<td>Vend Signal Terminal</td>
</tr>
<tr>
<td>5</td>
<td>Output</td>
<td>The power supply at terminal 2 is output as a signal in the following cases. When coin insertion is prevented. When the coin changer is out of change.</td>
<td>Out of Change Indicator Terminal</td>
</tr>
<tr>
<td>6</td>
<td>Input</td>
<td>Normally, the power supply signal for the power supply at terminal 1 is supplied, but it should be cut off in the following cases. When all product is sold out. When a signal is output to terminal 3. When vending operations are ended.</td>
<td>C.R.E.M. Cutoff Terminal</td>
</tr>
<tr>
<td>7</td>
<td>Output</td>
<td>Normally the power supply signal at terminal 1 is output, but it should be shut off when the vend signal is sent.</td>
<td>Free Vending Prevent Terminal</td>
</tr>
</tbody>
</table>

## 7-2 Time Chart

### 1. Vend Operation

- **Vend Signal Terminal**:
  
  ![Vend Signal Terminal Diagram](image)

- **Free Vend Prevent Terminal**:  
  
  ![Free Vend Prevent Terminal Diagram](image)

- **C.R.E.M. Cutoff Terminal**:  
  
  ![C.R.E.M. Cutoff Terminal Diagram](image)

- **Change Making Operation**:  
  
  ![Change Making Operation Diagram](image)

### 2. Change Return Operation

- **Return Lever**:  
  
  ![Return Lever Diagram](image)

- **Coin Return Operation**:  
  
  ![Coin Return Operation Diagram](image)
### 7. SIGNAL CONDITIONS AND WIRING DIAGRAM

#### 7-3 Control Board Signal Condition

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire Color</th>
<th>Input/Output</th>
<th>Signal</th>
<th>Voltage(V) during Stand-by Position</th>
<th>Voltage(V) during Operation Position</th>
<th>M.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>J3 2Pin Post</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Black</td>
<td>Input</td>
<td>Power Supply Secondary Side</td>
<td>27VAC</td>
<td>27VAC</td>
<td>J3-2</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Input</td>
<td>Power Supply Secondary Side</td>
<td>27VAC</td>
<td>27VAC</td>
<td>J3-1</td>
</tr>
</tbody>
</table>

| J4 2Pin Post |
| 1       | Red        | Output       | 117VDC                   | 117VDC                              | 117VDC                               | GND  |
| 2       | Black      | Output       | Solenoid 1 (25 Ω)        | 0VDC                                | 117VDC                               | GND  |

| J5 2Pin Post |
| 1       | Red        | Output       | 117VDC                   | 117VDC                              | 117VDC                               | GND  |
| 2       | Black      | Output       | Solenoid 2 (5 Ω)         | 0VDC                                | 117VDC                               | GND  |

| J6 2Pin Post |
| 1       | Red        | Output       | 117VDC                   | 117VDC                              | 117VDC                               | GND  |
| 2       | Black      | Output       | Solenoid 3 (10 Ω)        | 0VDC                                | 117VDC                               | GND  |

| J7 3Pin Post |
| 1       | Red        | Output       | 117VDC                   | 117VDC                              | 117VDC                               | GND  |
| 2       | --         | --           | --                       | --                                  | --                                   | --   |
| 3       | Black      | Output       | CREM, Solenoid            | 0VDC                                | 117VDC                               | GND  |
## 7. SIGNAL CONDITIONS AND WIRING DIAGRAM

### J8 3-Pin Post

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire Color</th>
<th>Input/Output</th>
<th>Signal</th>
<th>Voltage(V) during Stand-by Position</th>
<th>Voltage(V) during Operation Position</th>
<th>M.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red</td>
<td>Output</td>
<td>117VDC</td>
<td>117VDC</td>
<td>117VDC</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Black</td>
<td>Output</td>
<td>Separator Solenoid</td>
<td>117VDC</td>
<td>0VDC</td>
<td>GND</td>
</tr>
</tbody>
</table>

### J9 10-Pin Post

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire Color</th>
<th>Input/Output</th>
<th>Signal</th>
<th>Voltage(V) during Stand-by Position</th>
<th>Voltage(V) during Operation Position</th>
<th>M.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>Output</td>
<td>6VDC</td>
<td>6VDC</td>
<td>6VDC</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
<td>Output</td>
<td>Timing T0</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
<td>Output</td>
<td>Timing T1</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
<td>Output</td>
<td>Timing T2</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
<td>Input</td>
<td>Input Signal 2</td>
<td>0VDC</td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>Brown</td>
<td>Output</td>
<td>5VDC</td>
<td>5VDC</td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>Red</td>
<td>Output</td>
<td>Timing T3</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>Orange</td>
<td>Output</td>
<td>Timing T4</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td>Yellow</td>
<td>Output</td>
<td>Timing T5</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>10</td>
<td>Green</td>
<td>Input</td>
<td>Input Signal 2</td>
<td>0VDC</td>
<td>5VDC</td>
<td>GND</td>
</tr>
</tbody>
</table>

### J12 8-Pin Post

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire Color</th>
<th>Input/Output</th>
<th>Signal</th>
<th>Voltage(V) during Stand-by Position</th>
<th>Voltage(V) during Operation Position</th>
<th>M.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>Output</td>
<td>Timing T0</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
<td>Output</td>
<td>Timing T1</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
<td>Output</td>
<td>Timing T2</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
<td>Output</td>
<td>Timing T3</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
<td>Output</td>
<td>Timing T4</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>Blue</td>
<td>Output</td>
<td>Timing T5</td>
<td></td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>Purple</td>
<td>Input</td>
<td>Input Signal 0</td>
<td>0VDC</td>
<td>5VDC</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>Gray</td>
<td>Input</td>
<td>Input Signal 1</td>
<td>0VDC</td>
<td>5VDC</td>
<td>GND</td>
</tr>
</tbody>
</table>

### J10 2-Pin Post

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Wire Color</th>
<th>Input/Output</th>
<th>Signal</th>
<th>Voltage(V) during Stand-by Position</th>
<th>Voltage(V) during Operation Position</th>
<th>M.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black</td>
<td>Input</td>
<td>$1 Bill Signal</td>
<td>0VDC</td>
<td>15VDC</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Output</td>
<td>15VDC</td>
<td>15VDC</td>
<td>15VDC</td>
<td>GND</td>
</tr>
</tbody>
</table>

**Note:**
1. Input/Output column conditions are viewed from the Control Board.
2. The column M.P. shows the standard measuring points.
8. SIMPLE REPAIRS

The coin changer can become dirty from coins, dust, dripping water, foreign matter, etc. If they become extremely dirty, then good coin acceptance cannot be maintained.
(The cleaning frequency may differ depending on the vending machine type and location.)

☆ Disassembly and assembly of chute cover and chute

① The chute cover can be removed by releasing the 2 locking tabs on the right side from the housing.

② The chute can be pulled out to the front after releasing the 2 locking tabs on the left side from the housing.

☆ Cleaning

① Cleaning the gate
Open the gate assembly and use a dry cloth to remove any dirt from the coin path.

② Front sensor
Open the front sensor and use a soft cloth or a cotton swab to remove any dirt. The front sensor is a precision part of the coin changer, care is required when the handling.

③ Cleaning of chute and housing
• Use a dry cloth to remove dirt from the coin path at the rear of the chute.
• When cleaning the coin path of the housing, pay attention to the CREM and separator lever and other parts while wiping off any dirt.
9. TROUBLE SHOOTING

• Measuring the Voltage

Connect the appropriate meter for the type of voltage being measured, as shown in the figure below, and measure the voltage. To measure voltage, use a digital multimeter. When checking continuity, be sure to switch off the power and disconnect the wire harness first.

Check the following points before loosening the screws used to mount the coin changer in the vending machine.

(a) Are the vend price settings correct?
(b) Are there any abnormal tendencies in the installation condition of the vending machine?
(c) Is the connector connecting the vending machine and the coin changer completely inserted?
(d) Are there any abnormalities in the connector signal conditions?
(e) Is there anything abnormal in the conditions of installation in the vending machine?
   ○ Is there any misalignment of the coin insert slot and payout slot?
   ○ Does the return lever of the coin changer operate correctly when the vending machine’s return lever is operated?

• A Guide to the Diagnosis of Faults

Make level measurements at the inspection points as follows:

• AC voltage measurement
• DC voltage measurement
• Continuity check

*Contents

9-1 Routine

A. Power Supply Check
B. Check the C.R.E.M. Cutoff Signal.
C. Check the Price Switch.

9-2 Troubles

1. The C.R.E.M. cutoff signal is input constantly.
2. Coins are accepted even though the power supply is not on.
3. The out of change signal doesn’t send out even though there is no 5¢ change.
4. Inventory switch (5¢, 10¢ and 25¢) does not operate.
5. The out of change signal send out even when 5¢ change is present.
6. The vend signal is output even though no coins are inserted.
7. Not all the coins have been accepted.
8. The vend signal is not output.
9. There is no change.
10. A lot of (a little of) change comes out.
11. Different change comes out when the inventory switch is operated.
9-1 Routine

A. Power Supply Check

- Measure the voltage between terminals #1 and #2 of J3.
- 27VAC
  - Y: to Next
  - N: Measure the voltage between terminals #1 and #2 of J2.
- 117VAC
  - Y: Replace the transformer assembly.
  - N: Replace the control board assembly.

- Measure the voltage between terminals #5 and #6 of J1.
- 117VAC
  - Y: Replace the wiring harness assembly.
  - N: Check the vending machine side.
  - Y: Make connections correctly.

B. Check the C.R.E.M. cutoff signal.

- Measure the voltage between terminals #2 and #6 of the 8P connector.
- 117VAC
  - Y: Check the vending machine side.
  - N: Make connections correctly.

- Measure the voltage between terminals #1 and #5 of J1.
- 117VAC
  - Y: Replace the wiring harness assembly.
  - N: to Next
9. TROUBLE SHOOTING

9-2 Troubles

1. The C.R.E.M. cutoff signal is input constantly.

   Check the C.R.E.M. cutoff signal.

   Replace the control board assembly.

2. Coins are accepted even though the power supply is not on.

   Repair the CREM extension, or replace.
3. The out of change signal doesn't send out even though there is no 5¢ change.

- Measure the voltage between terminals #5 and GND of J9.
  - 5VDC
  - 0VDC
    - Y
    - Measure the voltage between terminals #4 and #6 of J1.
      - 11VAC
        - N
        - Measure the voltage between terminals #1 and GND of J9.
          - 5VDC
            - Y
            - Replace the sensor board assembly.
          - N
          - Check the power supply.
            - Replace the control board assembly.
    - Y
    - Replace the harness assembly.
      - Check the vending machine side.

4. Inventory switch (5¢, 10¢ and 25¢) does not operate.

- Measure the voltage between terminals #8 and GND of J12.
  - 0VDC
    - N
    - Replace the control board assembly.
      - Y
      - Verify that no change comes out.
        - Same as above when the 25¢ switch is pressed.
          - 5VDC
            - Y
            - Replace the inventory board assembly.
          - N
          - Same as above when the 5¢ switch is pressed.
            - 0VDC
              - Y
              - Same as above when the 10¢ switch is pressed.
The Out of Change Signal send out even when 5¢ change is present.

Steps:
1. Measure the voltage between terminals #5 and GND of J9.
2. Measure the voltage between terminals #4 and #6 of J1.
3. Measure the voltage between terminals #1 and GND of J9.
4. Check the vending machine side.
5. Check if all the coins have not been accepted.
6. Replace the control board assembly.
7. Replace the sensor board assembly.
8. Replace the sensor board assembly.
9. Replace the sensor board assembly.
10. Inspect the vending machine side.
11. Replace the control board assembly.
12. Replace the control board assembly.
13. Replace the control board assembly.
14. Set the price again.
15. Add change.
16. Repair it.

The Vend signal is output even though no coins are inserted.

Steps:
1. Measure the voltage between terminals #2 and #3 of the 8P connector.
2. 117VAC
3. Replace the control board assembly.
4. Replace the control board assembly.

Not all the coins have been accepted.

Steps:
1. Has the gate lever been pressed?
2. Has the lever been pressed?
3. Has the price been set?
4. Has it been set?
5. Is there enough 5¢ change?
6. Is there enough?
7. Check the power supply.
8. Check the Price switch.
9. Check for trouble.
10. Replace the control board assembly.
The vend signal is not output.

- Check the vend price setting switch.
  - Wrong setting? Y
    - Set the vend price correctly.
  - Wrong setting? N
- Check the coin return slot.
  - Is there any change? Y
    - Insert the coins again.
  - Is there any change? N
- Check if there is enough 5¢ change.
  - Is there enough? Y
    - Check the Price Switch
  - Is there enough? N
    - Add change.
  - Check the Price Switch
- Measure the voltage between terminals #2 and #5 of J1.
  - 117VAC N
    - Replace the control board assembly.
  - 117VAC Y
- Measure the voltage between terminals #2 and #3 of the 6P connector.
  - 117VAC N
    - Make connections correctly.
  - 117VAC Y
    - Check the vending machine side.
  - Are connector connections faulty? Y
    - Replace the harness assembly.
  - Are connector connections faulty? N
There is no change.

Check if there is change standing on edge in the tube.

Is it standing on edge?

N

Y

Replenish the change correctly.

Check if there are jammed coins in the payout slide.

Are there jammed coins?

N

Y

Remove the coins.

When change is not paid out from the 25¢ tube.

Measure the voltage between terminals #1 and GND of J4.

N

Y

117VDC

Replace the control board assembly.

Measure the voltage between terminals #2 and GND of J4.

N

Y

117VDC

Are connector connections faulty?

N

Y

Make connections correctly.

Same as above, during payout.

Replace the payout solenoid assembly.

When change is not paid out from the 5¢ tube.

Measure the voltage between terminals #1 and GND of J5.

N

Y

117VDC

Measure the voltage between terminals #2 and GND of J5.

N

Y

117VDC

Same as above, during payout.

117VDC

GND

Replace the control board assembly or the payout solenoid assembly.

When change is not paid out from the 10¢ tube.

Measure the voltage between terminals #1 and GND of J6.

N

Y

117VDC

Measure the voltage between terminals #2 and GND of J6.

N

Y

117VDC

Same as above, during payout.

117VDC

GND
9. TROUBLE SHOOTING

@ A lot (a little of) change comes out.

Is the price switch correct?

Correct?

Y

N

Set the price switch correctly.

Is the replenishment coins into the tube correct?

Correct?

N

Y

Replenish the change correctly.

Are the each payout solenoid connections correct?

Correct?

N

Y

Make connections correctly.

Are the each payout solenoid mounting position correct?

Correct?

Y

N

Make installations correctly.

Check the Price switch.

Measure the voltage between terminals #2 and GND of J4, J5 and J6 during payout.

117VDC

GND

N

Y

Replace the control board assembly.

Replace the payout solenoid assembly.

Different change comes out when the inventory switch is operated.

Verify if excess (or insufficient) change comes out.
10. DISASSEMBLY AND ASSEMBLY PROCEDURE

Disassemble the coin changer in the order written, assemble in reverse order.

1. Removal of the Chute Cover
   Release the 2 locking tabs on the right side of the chute cover from the housing. Pull the chute cover out and to the right to remove.
   ✴ Assembly Precautions:
   Insert the left side tabs of the chute cover into the chute first, then press the right side tabs into the housing.

2. Removal of The Chute
   Release the 2 locking tabs on the left side of the chute from the housing.
   Pull the chute out and to the left to remove.
   ✴ Assembly Precautions:
   Insert the right side tabs of the chute into the housing first, then press the left side tabs into the housing.

3. Removal of The Gate Assy
   Release the gate spring by inserting a small screwdriver or scribe into the loop of the spring inside the housing, then pry the spring to the right and pull the gate out.
   ✴ Assembly Precautions:
   When installing the gate, make sure the gate spring clips behind the housing.

4. Removal of The Drain Spout
   Lift up on the bottom of the drain spout and pull the left side out first.

5. Removal of The Back Cover
   Remove the 2 screws, pull the back cover out and to the right.
   ✴ Assembly Precautions:
   Insert the left side tabs of the back cover into the side of the housing first.

Continues on next page ⇒
6. Removal of The Control Board
Remove the 5 screws attaching the control board to the housing. Gently push the front sensor through the housing and unplug the connectors.

7. Removal of The Pass Sensor Board (Old Type)
Remove the screw attaching the pass sensor to the housing.

Release the locking tabs on the left and right sides of the change tube assy from the housing, then pull out and up to remove.
☆ Assembly Precautions:
First, feed the wires through the housing, to the back side. Next insert the bottom of the change tube assy into the bottom of the housing, then the top.

1. Removal of The Transformer
Remove the 2 screws attaching the transformer to the change tubes.
9. Removal of The Bottom Base and 5¢, 10¢ and 25¢ Slides
Remove the 2 screws attaching the bottom base to the housing, then remove the 5¢, 10¢ and 25¢ slides
☆ Assembly Precautions:
Insert the tabs of the bottom base into the back side of the housing, then the screws.

10. Removal of The Payout Solenoids
Remove the 2 screws attaching each solenoid to the housing.
☆ Assembly Precautions:
Install the payout solenoids in the correct locations:
1=25¢ (White connector),
2=5¢ (Blue connector),
3=10¢ (Black connector).
Route the wires as shown.
11. Removal of Levers (A), (B) and The Lever Shaft
Remove the retaining ring from the left side of the lever shaft, then slide it out of the housing.
☆ Assembly Precautions:
Lever(B) must be installed in the 10¢ slot.

12. Removal of The Funnel Guide and Funnel
Remove the screw attaching the funnel guide, then remove the screw attaching the funnel to the housing.

13. Removal of The Gate Lever and Spring
Remove the screw attaching the gate lever to the housing, then release the lever spring from the housing with a small screwdriver.
☆ Assembly Precautions:
Insert the spring into the gate lever before assembling.

14. Removal of The CREM and Separator Solenoids
Remove the screws on the front side of the housing that attach the CREM and separator solenoids.
☆ Assembly Precautions:
Make sure that the solenoid arm engages the lever for correct operation.
14-1. Removal of The CREM Extension and Separator Lever
Release the tab on the right side from the housing first, then remove.

☆ Assembly Precautions:
Insert the left side tab first, then push the right side in place.

15. Removal of The Power Supply Harness Assy
Remove the screw attaching the harness guide to the housing, then remove the harness guide from the side of the housing. Pull the power supply harness assy and bushing from the top of the housing.

☆ Assembly Precautions:
Make sure the harness bushing is seated properly in the top of the housing.

16. Removal of The Route Plates
Remove the 2 screws attaching the route plates to the right side of the housing.
<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>252101</td>
<td>Change Tube ASSY</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-1</td>
<td>252203</td>
<td>Sensor Board ASSY</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>252211</td>
<td>Inventory Board ASSY</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td>252413</td>
<td>Change Tube</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>252714</td>
<td>Transformer ASSY</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>904038</td>
<td>Self Tapping Screw</td>
<td>2</td>
<td>(+) Pan-head M3 × 20</td>
</tr>
<tr>
<td>1-6</td>
<td>904027</td>
<td>Self Tapping Screw</td>
<td>2</td>
<td>(+) Pan-head M3 × 6</td>
</tr>
<tr>
<td>1-7</td>
<td>252511</td>
<td>Inventory Seal (A)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>252102</td>
<td>Gate ASSY</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2-1</td>
<td>252402</td>
<td>Gate</td>
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<td></td>
</tr>
<tr>
<td>2-2</td>
<td>252424</td>
<td>Coil Case Cap</td>
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<tr>
<td>2-3</td>
<td>367509</td>
<td>Cap Spring</td>
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<td></td>
</tr>
<tr>
<td>2-4</td>
<td>361503</td>
<td>Gate Pin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2-5</td>
<td>252505</td>
<td>Gate Spring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2-6</td>
<td>252502</td>
<td>Gate Rail</td>
<td>1</td>
<td>X Not Interchangeable</td>
</tr>
<tr>
<td>2-7</td>
<td>902003</td>
<td>Screw</td>
<td>1</td>
<td>(+) Flat-head M3 × 4</td>
</tr>
<tr>
<td>3</td>
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11-2 Changer (Rear Side)

Power Supply Harness ASSY (2)

Power Supply Harness ASSY (4)
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12. EXTERNAL VIEW AND DIMENSIONS

Note: Unless otherwise specified, tolerances in the drawing shall be ± 0.02 inch.