Service Manual

20 *plus*

4 Button Programming

Royal Vendors, Inc.

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SECTION 1: GENERAL INFORMATION

Introduction

This manual contains installation, operation and service instructions for Royal Vendors' 20 PLUS. The 20 PLUS is a microprocessor controlled vender which permits pricing per selection from $0.00 to $99.99. The 20 PLUS provides electronic space-to-sales (STS) programmability and will collect, store and transfer MIS data fields to a hand-held computer (HHC) or on-line device.

Specifications

Dimensions .... (522 cap. bottle) 79 1/2"H x 37"W x 41"D
Approximate Empty Weight .... Wide (79.5") 800 lbs
Capacity .... (780 cap.) 12 oz. cans, 12 columns
Operating Voltage .... 115 V AC, 60 Hertz
Amperage Rating .... 15 AMP
Charge .... 5.25 oz. R134A
Construction .... Steel cabinet, steel rack
Selections .... 9 or 13 selection,
Altitude Adjustment .... no adjustment required
for the 20 PLUS's Electronic
Cold Control

Unpacking the Vender

Unwrap the Vender

Unwrap the vender and remove the padding. Check for any signs of damage. If the vender is damaged, contact the carrier immediately. They will instruct you as to the procedure for filing a claim.

NOTE: The vender keys are located in the coin cup.

Remove the Shipping Skid

Separate (split) each section by inserting either a claw hammer, crowbar or similar device into the slot of each section to break apart. Tilt the vender slightly to remove the separated pieces (see Figure 1.1).

Capacity

PACKAGE TYPE	780 79.5" MODEL
20 oz. Plastic Coke Contour Bottle	522
20 oz. Plastic Sprite Contour Bottle	522
20 oz. Plastic Surge/Bolt Bottle	504
20 oz. Plastic PowerAde Bottle	504
12 oz. Can	780

NOTE: Since new packaging is constantly being introduced, this listing may not contain ALL vendible packages. For the latest information on packages that will vend in the 20 PLUS, please contact Royal Vendors' Customer Service Department.
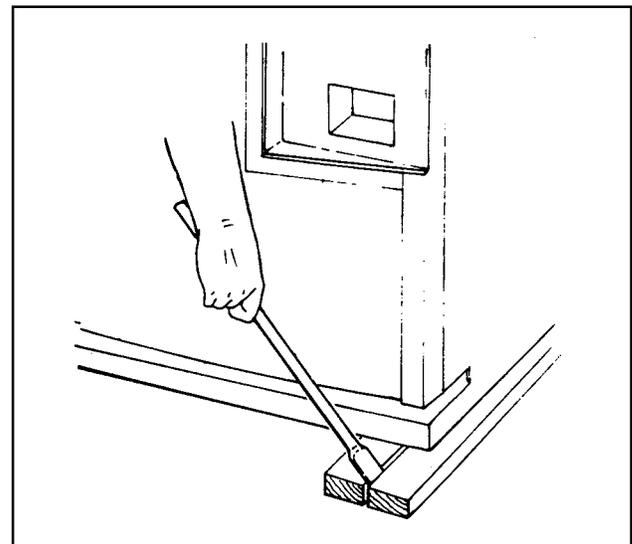
Figure 1.1

SECTION 2: SET-UP AND INSTALLATION

VENDER IDENTIFICATION

Your 20 PLUS can be easily identified by taking note of the following three items:

1. Vender Serial Plate - mounted on the exterior left side of the vender door
2. Refrigeration Serial Plate - mounted on the "kick plate" of the refrig. unit
3. Control Chip Revision Number - Mounted on the middle part of the control board.

VENDER SERIAL PLATE - The vender's main serial plate (shown in figure 1.2) is located on the exterior left side of the vender's main door and has the following information:

- Vender model number
- Vender serial number
- Amps required by vender
- Unit charge of R134A
- Refrigeration design pressures
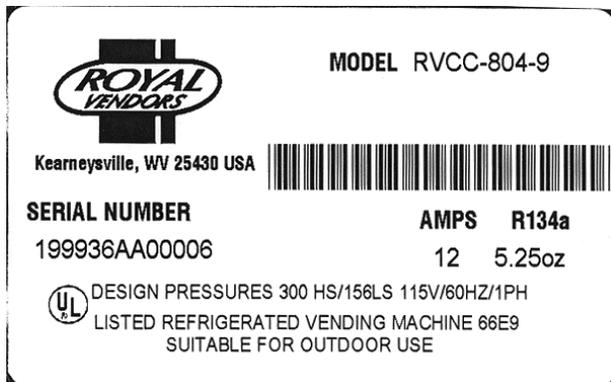
Figure 1.2

The vender's model number contains two important pieces of information. The machine type such as RVCC (Royal Vendors Coca Cola). It also contains the vender model number such as 780-13 (capacity of 780 twelve ounce cans / 13 selections).

How to read a Serial Number:
• The first 4 numbers represent the year the vender was produced
• The 5th and 6th numbers represent the week within the year the vender was produced
• The 1st letter represents the style of vender
•The 2nd letter represents the location the vender was built
• The last five numbers represent the number of that model built with in that week

REFRIGERATION SERIAL PLATE

The refrigeration serial plate is located in the bottom of the vender's cabinet in front of the condenser coil and is mounted to the refrigeration unit "kick plate". It looks similar to the serial plate shown in figure 1.2 with the exception that the model number specified is the refrigeration unit model. There is currently one model in use:

Model - 8000

Compressor Size - Super 1/3 Horsepower

Modes of Operation

The 20 PLUS operates in three basic modes: Sales Mode, Open-Door Mode, and Service Mode.

Sales Mode

This is the normal mode of operation when the vender door is closed. This display will scroll one of these messages unless credit is present:
1) The point-of-sale (P.O.S.) greeting.
2) "SOLd OUt" if the controller detects that all selection columns have been sold out or if there is a vend problem.
3) "NO SALE til" if all valid selections are included in the lockout range and one of the lockout time ranges is active.
.

If the "SOLd OUt" message is displayed, the "SOLD OUt" LED will also be flashing.
If the Free Vend Switch is on, the "FrEE" message will be displayed immediately after the P.O.S. greeting. This works in conjunction with the override.
If the machine is set for single-price mode (see "CON" section of this manual), the vend price will be displayed immediately after the greeting.

NOTE: Prices displayed in the Sales Mode will be rounded up to the next multiple of the lowest scale factor. For example, if prices are set to 50¢ with a coin changer and bill acceptor present, and the system is powered up at a later time with the changer removed and prices have not been changed, the prices will display in the sales mode as $1.00, while they will still be 50¢ in the Service Mode.

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If the P.O.S. greeting is being displayed and the temperature display option has been set in the Service Mode, this message would be displayed after the P.O.S. greeting.

If the vender is in a lockout condition, "No SALE tIL XXXX" will replace the P.O.S. greeting. Where "XXXX" represents the time the selections will come on. If DSP in the FriG mode is set to "1", The temperature will also be displayed after the lockout message.

The "USE CORRECT CHANGE" LED will be lit when the nickel tube is empty or if there is less than twenty cents in the nickel and dime tubes, or the total tube cash is less than the difference between the maximum and minimum vend price plus twenty cents.

If any column has been detected as sold-out or jammed, the rightmost decimal point on the LED display will be continuously lit.

Decimal Point

If credit has been established, that amount of credit will be displayed instead of the above messages in the single price configuration setting. When a token has been accepted, "FrEE" will be displayed. If no activity is sensed for a period of five minutes, all credit will be cleared, any bill in the escrow will be returned, and any card in the card reader will be returned.

If a lockout range begins and all valid selections are included in the lockout, any existing credit will be immediately returned to the customer.

Preview External Mode allows you to access error codes, and sales totals. This mode is entered after a user-changeable four-digit password is entered. See "PrEU" section of this manual for instruction on changing this password.

Open-Door Mode
When the vendor door is opened, the vender enters the Open-Door Mode and begins displaying any existing errors, or "nonE" if no errors exist. See "Eror" section of this manual for a description of all errors.

If configuration option C4 (see "Con" section of this manual) is enabled (set to "1"), the total machine sales and total machine cash values are displayed before the error codes. These values are displayed the same as in the "SALE" and "CASH" service mode functions (see the "SALE" and "CASH" sections of this manual).

While in the Open-Door Mode, pressing the Service Mode Button will put the vender into the Service Mode. Any other input (selection switch, escrow lever, credit input) will revert the vender to Sales Mode, even though the door is open.

Service Mode
All programming of vender options is done in the Service Mode. This mode is entered by pressing the Service Mode Button while the vender door is open, at which time "Eror" will be displayed (see "Vender Programming" section of this manual for further programming instructions).

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Peripherals

The 20 PLUS with Four-Button Programming can utilize three different credit acceptance devices (MDB only): the coin changer, the bill acceptor, and the debit card reader. One of these devices can be used alone or all three can be used together on some venders. Unlike many venders, it is not necessary to have a coin changer installed for the 20 PLUS to function. For example, the 20 PLUS can function using a bill acceptor only. In this configuration, all prices are rounded up to the nearest dollar, and the customer receives no change.

CAUTION: Whenever possible, do not plug or unplug peripherals while power is applied.

Coin Changer Installation

The coin changer mounts to a panel located on the inside of the vender's main outer door. The panel contains three mounting screws which are used to mount and secure the coin changer in the vender. Install the coin changer into the vender as follows:

1. Remove the acceptor from the changer, set the key holes in the back of the changer housing over the mounting screws in the vender. Tighten snugly.
2. Set the coin changer option switches to the desired settings. (See separate coin changer literature for detailed information.)
3. Replace acceptor and connect the coin changer power plug to the mating connector from the vender controller.
4. Load coin tubes using the Tube Fill Mode of the Service Mode. *NOTE: If Tube Fill Mode is not used to load the tubes, cash accountability figures will be approximate, not exact.*
5. Test changer with a variety of coins to ensure proper operation.

NOTE: For detailed changer information, refer to separate operation and service manual for coin changer.

Bill Acceptor Installation

The bill acceptor/debit card reader mounting hole is located on the inside of the vender outer door. Remove the filler plate by removing the four nuts which secure the filler plate, remove the filler plate and store it for future use (in the event the bill acceptor is removed). Install the new mounting plate in accordance with bill acceptor/debit card reader mounting instructions provided with the bill acceptor unit and its respective mounting plate.

Debit Card Reader Installation:

See Service Bulletin 163 or contact the Royal Vendors Service Department at (800) 931-9214 for proper instructions.

Connecting the Multi-Drop Bus Interface Harness:

1. Make sure MDB harness provided with bill acceptor/card reader is already connected to the bill acceptor/card reader.
2. If utilizing a coin changer, unplug the coin changer connector.
3. Plug the Y-harness mating connectors of the bill acceptor/card reader to the coin changer (if applicable) and the vender's MDB harnesses.

Loading the Vender

Resetting a column or setting up a column for the first time.

1. Set Space to Sales (refer to Space to Sales Label for selecting an option)

2. Adjust by selection column depth setting. Configure "SdEP" based on package to be vended. See "Vender Controller" label.

3. Set package orientation according to figure 2.1.

4. Set front and rear retainer positions (for package length) See Figure 2.2 for proper retainer positions for each package type.

5. Set the Cap Stops in proper positions (see figure 2.1). For loading: push Cap Stop in toward the partition. After loading: pull Cap Stop out into the column.

Note: Bottles in front columns should be loaded with caps facing away from the column divider. Bottles in rear columns should be loaded with bottoms facing each other. Can tops can be loaded either way but the last two cans in a column should always be loaded on the left side of the column (see figure 2.1).

Package	Front Retainer	Rear Retainer
20 oz. Coke	7	2
20 oz. Sprite	7	2
20 oz. Fruitopia	7	2
20 oz. Dasani	7	2
20 oz. Surge	7	2
20 oz. Barq's	7	2
20 oz. Powerade	9	6
12 oz. Can	14	9

Note: Use Cap Stop with all bottles.

Figure 2.2

SECTION 2: SET-UP AND INSTALLATION

Top Slots

Counting Holes

Figure 2.1

15

12

9

6

3

For Loading
Push
Cap Stop In

Top
Hook

Rear
Retainer

Divider

Cap
Stop

After Loading
Pull
Cap Stop Out

Figure 4

Top
Slots

15

12

9

6

3

Counting
Holes

Front
Retainer

Top
Hook

Figure 2

See Fig. 4

See Fig. 2

Tabs
Forward

See Fig. 3

Figure 1
Package Orientation

Rear Retainer

Bottom
Slots

15

12

3

Spring
Clip

Bottom
Tab
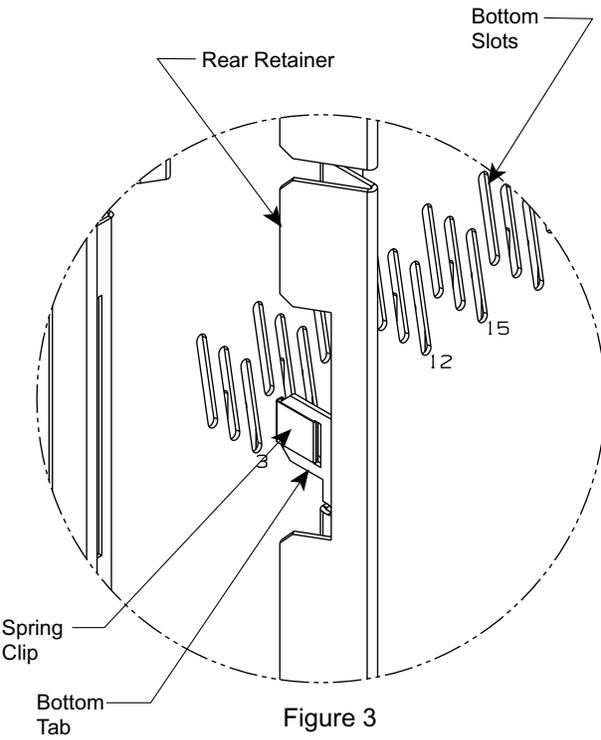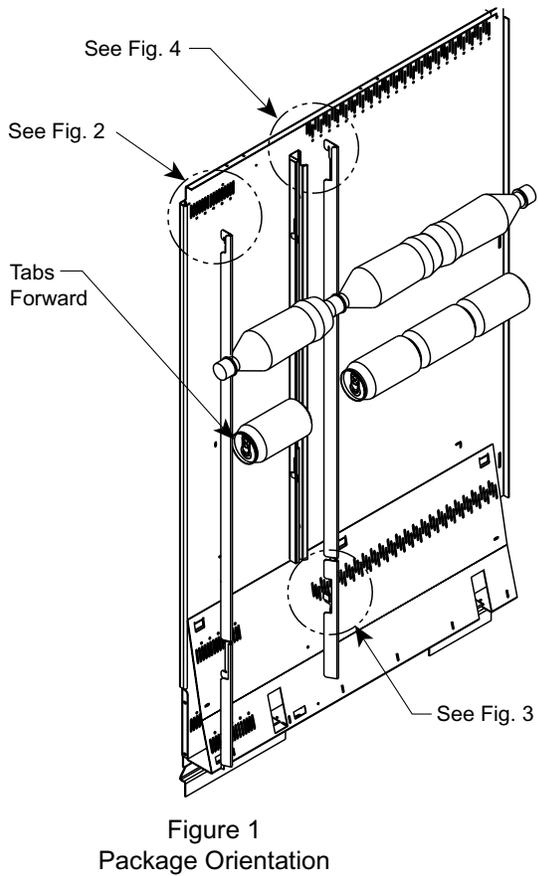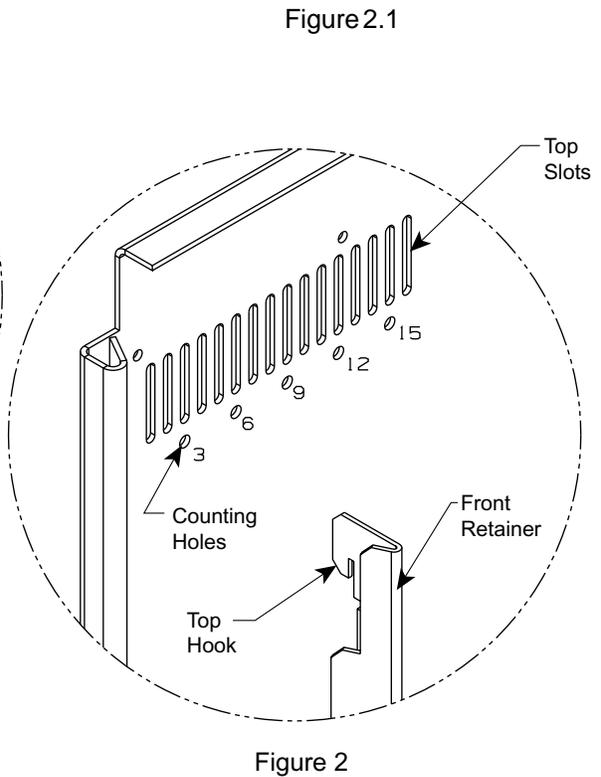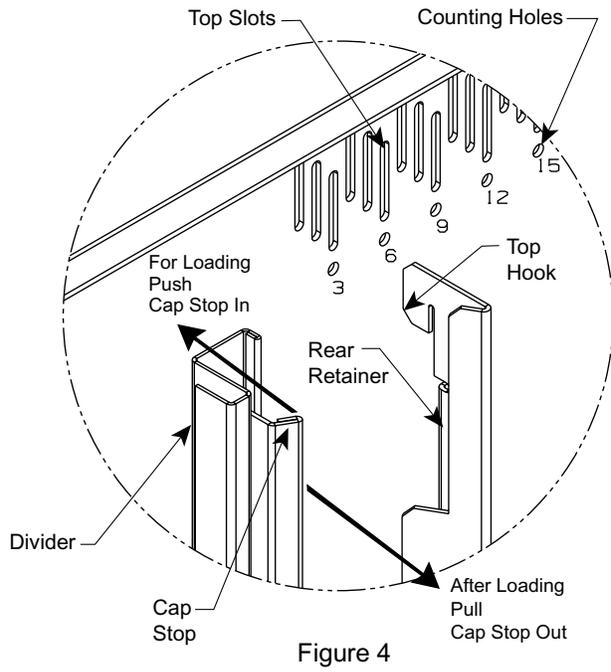
Figure 3

SECTION 2: SET-UP AND INSTALLATION

Setting the Adjustable Product Retainers

NOTE: Since new packages are constantly being introduced, the listing in Figure 2.2 may not contain ALL vendible packages. For the latest information on packages that will vend in the 20 PLUS, please contact Royal Vendors' Customer Service department (800) 931-9214.

Front Retainers - Columns 1 through 6 (Figure 2.3)

1. **Determine Correct Position for Package Type (See Figure 2.2).**
   Use Figure 2.2 to determine the proper position for the package type to be vended.
2. **Determine if Retainer is Already in Proper Position.**
   Check the current position of the front retainer. Note that slots are counted from front to rear of the vender; i.e. retainer position 3 would be the third slot from the front of the machine. "Counting holes" located beneath every third slot will aid in positioning. If retainer is already in the correct position, go to Step 4.
3. **Reposition Front Retainer (If Necessary).**
   Lift the front retainer upwards, pivoting the upper portion out and away from the column wall. This will allow the front retainer to be lifted further in order to disengage the lower hook. Re-install the retainer, reversing the removal procedure. Make sure hooks are in aligned slots at both the top and bottom.
4. **Repeat for Column's Other Front Retainer.**
   Adjust the column's other retainer, making sure it is located in the same number slot.

Rear Retainers - Columns 7 through 12

1. **Determine Correct Position for Package Type (See Figure 2.2).**
   Check Figure 2.2 for the correct retainer position.
2. **Determine if Retainer is Already in Proper Position.**
   Check the current position of the rear retainer. Note that slots are counted from the front to the rear of the vender. If retainer is already in the correct position, skip Step 3.
3. **Reposition Rear Retainer.**
   Pull out at the bottom of the retainer and this will unsnap it from its slot. Then lift up on the retainer to disengage the top hook. Reinstall the retainer by hanging the top hook in the desired slot and snapping the bottom of the retainer into the aligning slot.
4. **Repeat for Column's Other Front Retainer.**
   Adjust the column's other retainer, making sure it is located in the same number slot.

Figure 1
Package Orientation

See Fig. 2

See Fig. 4

Figure 4

Figure 2

Front Retainer

Rear Retainer

See Fig. 5

Figure 3

Figure 5

See Fig. 3
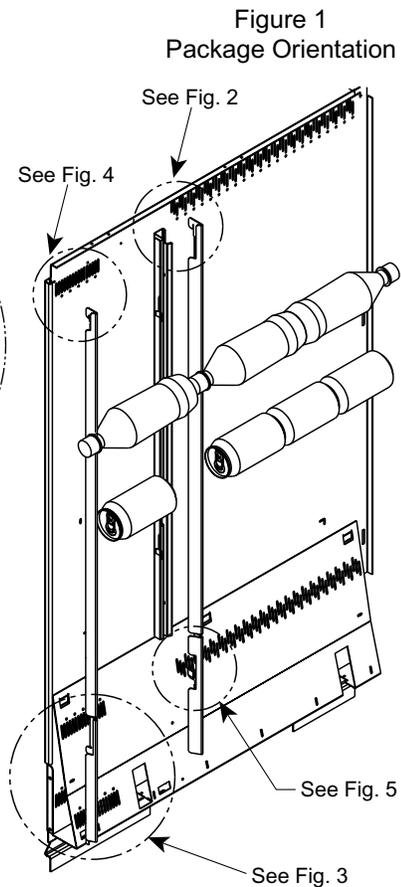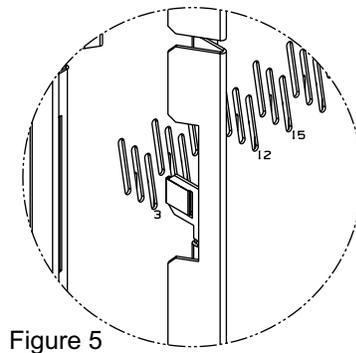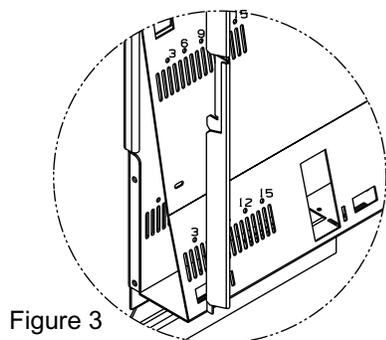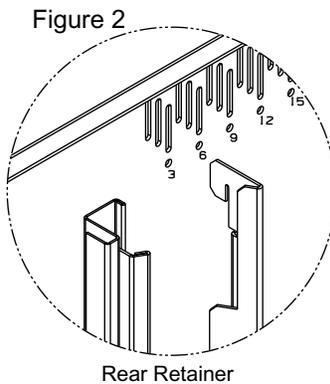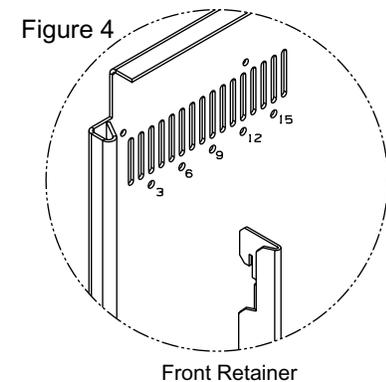
SECTION 2: SET-UP AND INSTALLATION

Using the Hand-Held Computer (HHC) to Program The Vender

The 20 PLUS interfaces with Direct Exchange/Uniform Communication Standard (DEX/UCS) or DEX/UCS Compatible Hand-held Computers (HHC). The HHC may be used to program the 20 PLUS vend price and space-to-sales, as well as other pertinent MIS and security information. The HHC interfaces to the vender controller via a computer socket located near the control board. Once the HHC is connected and meets initial communication requirements, it may then be used to program the 20 PLUS . See separate HHC manual for detailed programming instructions.

NOTE: The HHC may be used to lock out the manual programming of the vender.

CAUTION: Connect HHC only after power has been applied to the vender. Allow "8888" message to clear from controller display before connecting HHC.

Testing the Vender

Load coins in coin mechanism through "TuFL" mode and make sure all coins lie flat. Close the vender door and secure with door lock. Using a variety of coins and/or dollar bills, check the vender operation by vending several cans and/or bottles from each column. Before putting vender into service, allow the vender to run overnight to stabilize the cabinet temperature.

NOTE: Install and/or adjust the select button flavor strips to correspond to the loading of the columns.

It is not necessary to prime the vend columns before putting the vender into service.

Installing the Vender on Location

Placing the Vender on Location
When placing the vender on location, allow for a minimum of four inches (4") of space at the back of the vender. This will ensure proper ventilation of the refrigeration system (see Figure 2.6).

Level the Vender
Level the vender by adjusting the four leveling legs on the bottom corners of the vender. Use a "bubble level" on the top and side of cabinet to ensure the vender is level. The four leveling screws must be in contact with the floor (see Figure 2.6).

Voltage Requirements
The vender is designed to operate at a voltage of 115 volts, 60 Hertz. It requires the minimum of a 15 amp dedicated service. The service outlet voltage must not exceed 129 VAC or fall below 103 VAC.

Vender Power Cord
The vender has a three wire grounding cord. The vender must be plugged into a grounded electrical outlet to protect the customer from an electrical shock. If the outlet is not equipped with a grounded socket, have one installed by a qualified electrician.

NOTE: Extension cords are not recommended unless authorized prior to use by a certified electrician.

If you are not sure your outlet is properly grounded, have it checked by a qualified electrician.

WALL

4"
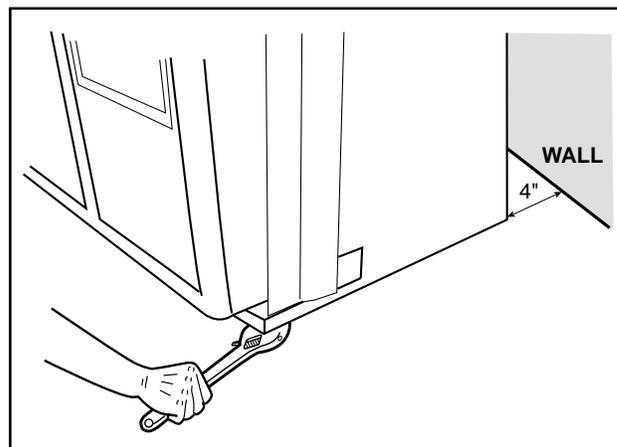
Figure 2.6

Four-Button Programming

All programming of the vender options is done in the Service Mode. To enter the Service Mode, open the vender door and press and release the Service Mode Button which is located on the controller board (see Figure 2.7).

The first four selection switches are used to navigate through the service routines as follows:

Button	Meaning	Usage
1	(ABORT)	Escape, Cancel
2	(UP)	Increase, Next
3	(DOWN)	Decrease, Previous
4	(ENTER)	OK, Accept, Save

The controller will automatically return to the Closed-Door Mode if:

1) No response from the selection switches is received within approximately five minutes;
2) The Service Mode Button is pressed a second time;
3) The "rtn" function is activated.

If the door is closed, the controller will return to the Sales Mode. If credit exists, the credit amount will be displayed after returning to the Sales Mode.
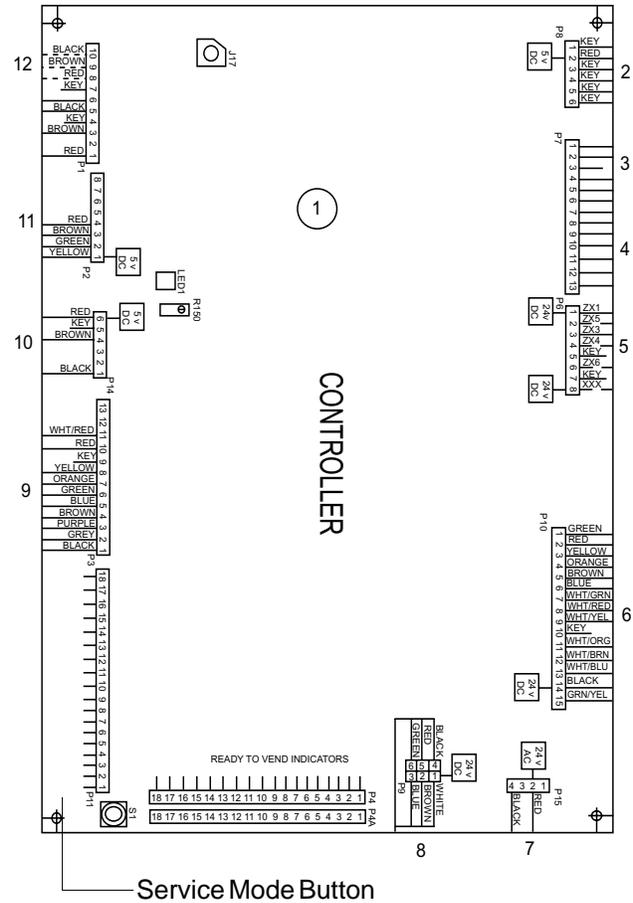
Figure 2.7

SECTION 3. VENDER PROGRAMMING

20 Plus Programming Flowchart

EXTERNAL MENU

- Eror
- CASH
- SALE
- rtn

INTERNAL (SERVICE) MENU

- Eror
- CPO
- tuFL
- tESt → VEnd → SL → SO → dSP → rELY
  - VEnd → CO1 - CO12
  - SL → Sel. Switch Test (1-13)
  - SO → S/O Test (1-12)
  - dSP → LED Segments, Correct Change Lamp & Sold Out Lamp Flash Test
  - rELY → Cnp / Fan / Lit / Htr
- PASS
- rtn

PASSWORD PROTECTED MENU

- CASH
- SALE
- PrIC
- StS → OPt1 - OPt9 → CLr → CStS → rStS
- Con → C1 → C2 → C3 → C4 → C5 → C6 → C7 → C8 → C9 → C10
- CCOC → Con → CCU → ACC
- PrEU

LAnG → EnG → Frn → GEr → Ita → Port → ESP → SLO

tinE → Enb → YEAR → nth → dAtE → Hour → dSt → NA / OFF / AUS / EU

Lit → Con
- Strt → dAy → Hour
- StoP → dAy → Hour

rFrG → Enb → Strt → StoP → deG → SEtP → Stor → dSP
- Strt → dAy → Hour
- StoP → dAy → Hour

If Configuration 2 is enabled, the following menus will appear:

bLC1 → Enb → Strt → StoP → SEL → Lit
- Strt → dAy → Hour
- StoP → dAy → Hour

bLC2 → Enb → Strt → StoP → SEL → Lit
- Strt → dAy → Hour
- StoP → dAy → Hour

dISC → Enb → Strt → StoP → SEL → LESS
- Strt → dAy → Hour
- StoP → dAy → Hour

OVEr → FrE → bLC → dSC → Lit → FrG

SdEP → 1 - 13 → ALL
- Set by selection

rUnd → Strt → StoP → SEL → rAtE
- Strt → dAy → Hour
- StoP → dAy → Hour

REV. A
4-00

Code Levels

Individual modes are identified by displaying their code as follows:

CODE	DESCRIPTION
Eror	Error Display Mode
CPO	Coin Payout Mode
tUFL	Tube Fill Mode
tESt	Test Vend Mode
PASS	Password Protection
• CASH	Cash Counter Display Mode
• SALE	Vend Counter Display Mode
• PrIC	Selection Price Setting Mode
• StS	Space to Sales Programming Mode
• Con	Machine Configuration Mode (C1-C10)
• CCOC	Correct Change Only
• PrEU	Preview Data Password Mode
• LAnG	Language Selection Mode
• tinE	Time/Date Setting Mode
• Lit	Lighting Control
• rFrG	Refrigeration Control Mode
• bLC1*	**Block Selection Mode**
• bLC2*	**Block Selection Mode**
• dISC*	**Discount Setting Mode**
• OUEr*	**Manual Switch Over-ride Mode**
• SdEP*	**Set Depth By-selection Setting Mode**
• rUnd*	**Remote Vend Mechanism Routine**
rtn	Return to Sales Mode

* If optional features (C2 under Con Menu) are disabled, these menus will not appear, and will not apply. The exception to this rule is SdEP which will not appear, but will still apply.

• Code level modes preceded with a "•" are considered sensitive to incorrect setup procedures. Therefore, they can only be accessed after a predefined and unchangeable password has been entered via the selection switches. Once the password has been entered, all functions will be available. "PASS" will be displayed only if the password has not been entered. Otherwise the function codes will be displayed as listed above.

The password is entered via the first four selection switches while the controller is displaying "PASS." The password must be entered within 10 seconds in the following order: 4-2-3-1. The display will go blank after the first selection switch is pressed. After completing the sequence, press (ENTER). If the password is not recognized, the display will remain blank but will reappear if no buttons are pressed..

Code Level Explanation

ERROR DISPLAY MODE

If (ENTER) is pressed at the "Eror" prompt, the controller will enter the error display mode. If no errors have occurred since the last error reset, the display will show "nonE." If an error has been detected since the last error reset, the display will show the first error summary code that has occurred.

EXAMPLE: "CJXX" would indicate a column jam error.

If (ENTER) is pressed, the controller will display the detailed error for the summary code. (UP) and (DOWN) will cycle through any remaining error detail codes. If the (ABORT) is pressed while displaying any *detailed* code, the controller will return to the summary code. If the (ABORT) is pressed while displaying any *summary* code, the controller will return to the code level.

If (ENTER) is pressed and held for two seconds during the display of a detailed error code, that error will be cleared. If other currently accessed detailed errors exist, the next error will now be displayed. If no other errors of this type exist, the next error summary code will be displayed, or "nonE" if no other errors exist.

Vend Mechanism Error *"UEnd"*

The "UEnd" prompt indicates that at least one vend mechanism error has been detected. If the (ENTER) is activated, the controller will display:

"CJxx" Indicating a column jam error.

If more than one detailed error is presented, they may be viewed using (UP) and (DOWN) . These errors are cleared via the HHC or Service Mode.

Control System Error *"Ctr1"*

After the "Ctrl" prompt, the controller will display:
dS Indicating a door switch error.
Ran Indicating RAM error.
ACLO Indicating low AC.
SF Indicating a scaling factor error.
IS Indicating an inlet sensor error.
Ib Indicating the inlet is blocked.

Selection Switch Error *"SEL"*

After the "SEL" prompt, the controller will display "SSXX" where 'XX' indicates the selection switch has been active for more than 15 seconds while in the sales mode.

Space to Sales Error *"StS"*

After the "StS" prompt, the controller will display "UAXX" where 'XX' represents the column which is not assigned to a selection.

Coin Changer Error *"CHAr"*

After the "CHAr" prompt, the controller will display:

"CC"   Indicating a changer communications error.
"tS"   Indicating a tube sensor error.
"IC"   Indicating an inlet chute blocked error (no coins sensed in the acceptor for over 96 hours).
"tJXX" Indicating a tube jam error (where 'XX' indicates the tube number).
"CrCH" Indicating a changer ROM checksum error.
"EE"   Indicates excessive escrow.
"nJ"   Indicating a coin jam.
"LA"   Indicating a low acceptance rate.

The "CC" error is cleared when proper communication is established. The "CSF" error is cleared upon power up or via the HHC or service mode. The "IC" error is cleared when a coin is accepted. All other "CHAr" errors are reset via the HHC or Service Mode, or when the condition causing the error no longer exists.

Bill Acceptor Error *"bUAL"*

After the "bUAL" prompt, the controller will display:

"bC"   Indicating a bill communication error.
"bFuL" Indicating a full bill stacker.
"biLL"   Indicating a defective motor.
"bJ"   Indicating a bill jam error.
"brCH" Indicating a bill acceptor ROM checksum error.
"bOPn" Indicating an open cash box.
"bS"   Indicating a sensor error.

The "bC" error is cleared when proper communication is established. The "bSF " error is cleared upon power up, via the HHC or the service mode. The remaining errors are cleared whenever the validator reports no errors and is enabled (the validator is "enabled" when it accepts money).

Card Reader Error *"Crdr"*

After the "Crdr" prompt, the controller will display:

"CrC"   Indicating a card reader communication error.
"Crxy"   Indicating an error number reported by the card reader, where 'x' is a hexadecimal digit representing the card reader code and 'y' is a hexadecimal digit representing the manufacturer-specific sub-code.

Refrigeration Error *"rFrG"*

After the "rFrG" prompt, the controller will display:

"SEnS" Indicating a temperature sensor error.
"CoLD" Indicating temperatures three or more degrees below the compressor cut-out setting.
"Hot"   Indicating cabinet temp. is above limit.
"CnPr"   Indicating that the compressor is not cooling within 30 minutes of turning on, or;
"Htr"   indicating the heating system has failed to increase 1 deg. per hour while heater is on.

The "CoLD" error is cleared when the temperature rises above three degrees below cutout. The "Hot" error is cleared when the temperature drops to the "SetP". The "SEnS" error is cleared when a sensor is detected. The remaining "rFrG" errors can also be cleared via the HHC or service mode.

External Menu

Access the External Menu by entering your 4-digit password (factory set 4-2-3-1), when the main door is closed.

The External Menu contains:
Errors (Eror)
Cash Counts (CASH)
Sales Counts (SALE)
Return (rtn)

Note: Use the Preview Data Password Mode (PrEU) under the password protected menu to display or change the current password.

SECTION 3. VENDER PROGRAMMING

Internal (Service) Menu

COIN PAYOUT MODE

`CPO`

If (ENTER) is pressed at the "CPO" prompt, the controller will enter the coin payout mode and display the lowest coin value that can be paid out. Using (UP) or (DOWN) will allow the operator to cycle through the coin values that are routed to the coin tubes. If (ENTER) is pressed, a payout of the displayed value will be made. Coins will continue to payout as long as (ENTER) is held down. If (ABORT) is pressed at any time, the controller will return to the "CPO" prompt. Press the (UP) button to proceed to the next prompt "tuFL".

TUBE FILL MODE

`tuFL`

If (ENTER) is pressed at the "tuFL" prompt, the controller will enter the coin tube fill mode. In this mode, the operator is allowed to deposit any coin into the coin changer's acceptor where that coin tube is not full. The tube inventory level will be displayed after each coin is accepted. If (ABORT) is pressed at any time during this operation, the controller will return to the "tuFL" prompt. Press the (UP) button to proceed to the next prompt "tESt".

NOTE: This is the only method of loading the tubes that ensures exact cash accountability.

TEST VEND MODE

`tESt`

If (ENTER) is pressed at the "tESt" prompt, the controller will enter the test vend mode. Using (UP) or (DOWN) will allow the operator to toggle between the following modes:

"VEnd"   Column Vend Test
"SL"   Selection Switch Test
"SO"   Sold Out Test (per column)
"dSP"   Display Test
"rELY"   Relay Test- (CnP, FAn, Lit, Htr)

Column Vend Test *"UEnd"*

If (ENTER) is pressed at the "UEnd" prompt, the controller will enter the column vend test mode. The display will show "CO 1", which represents "column 1". Pressing (UP) and (DOWN) cycle through the available columns. If (ENTER) is pressed, the controller will attempt to vend a product from the displayed column. Vends made while in this routine will affect only the test vend counters. If (ABORT) is pressed at anytime during this operation, the controller will return to the "UEnd" prompt. Press the (UP) button to proceed to the next prompt "SL".

Selection Switch Test *"SL"*

If (ENTER) is pressed at the "SL" prompt, the controller will enter the selection switch test mode. The display will show "SL 4", which indicates that the fourth selection switch was pressed last. When any selection switch is pressed, it will be represented by the right two digits. The last selection switch pressed will remain on the display until the service mode timer expires or the (ABORT) button is pressed and held for two seconds, this will return the controller to the "SL" prompt. Press the (UP) button to proceed to the next prompt "SO".

Sold Out Test *"SO"*

If (ENTER) is pressed at the "SO" prompt, the controller will enter the sold out test mode. The display will show "C 1X", which represents column one, if X is (0) column one is not sold out and if X is (1) column one is sold out. Pressing (UP) and (DOWN) cycles through the available columns. Pressing the (ENTER) button has no action. Pressing (ABORT) button will return the controller to the "SO" prompt. Press the (UP) button to proceed to the next prompt "dSP".

Display Test *"dSP"*

If (ENTER) is pressed at the "dSP" prompt, the controller will enter the display test mode. The display, correct change only light and sold out light will run a diagnostic test until service timer expires or if the (ABORT) button is pressed. Press the (UP) button to proceed to the next prompt "rELY".

Relay Test Mode *"rELY"*

If (ENTER) is pressed at the "rELY" prompt, the controller will enter the relay test mode by displaying "CnpX." If (ABORT) is pressed in this mode, the user will return to the "rELy" prompt. Using (UP) or (DOWN) will allow the operator to toggle between the following modes:

"CnP"   Compressor Relay
"FAn"   Evaporator Fan Relay
"Lit"   Light Relay
"Htr"   Heater Relay

If (ENTER) is pressed at the "CnPX" prompt, the controller will enter compressor relay test. If X = (0) the relay is not activated and if X= (1) the relay is activated. Pressing (ENTER) will toggle the display between "0" and "1."

For all relays
X= 1 relay is activated;
X= 0 relay is not activated.

Pressing (ABORT) at the "rELy" display will bring you out to "tESt". Press the (UP) button to proceed to the next prompt "PASS".

Password Protected Menu

PASSWORD PROTECTION

PASS   "PASS" will be displayed only if the password has not been entered. Otherwise the function codes will be displayed as listed under the Code Level section of this manual. The password is entered via the first four selection switches while the controller is displaying "PASS." The password must be entered within 10 seconds in the following order: 4-2-3-1. The display will go blank after the first selection switch is pressed. After completing the sequence, press (ENTER). If the password is not recognized, the display will go back to "PASS".

CASH COUNTER DISPLAY MODE

CASH   If (ENTER) is pressed at the "CASH" prompt, the controller will enter the non-resettable cash display mode by displaying "CASH"/"XXXX"/"XX.XX" where the 'X's represent total cash over machine life. A decimal will be displayed in the appropriate position with the lower four digits. If the cash amount is less than five digits long, the upper four digits are not displayed. Using (UP) or (DOWN) will cycle through each selection as "CANN" "XXXX/XX.XX," where the "NN" indicates the selection and the 'X's represent the resettable cash per selection. If (ABORT) is pressed anytime during this operation, the controller will return to the code level. Press the (UP) button to proceed to the next prompt "SALE".

VEND COUNTER DISPLAY MODE

SALE   If (ENTER) is pressed at the "SALE" prompt, the controller will enter the non-resettable vend display mode by displaying "SALE/"XXXX"/"XXXX." where the 'X's represent the number of all paid vends over machine life. If the sales amount is less than five digits, the upper four digits will not be displayed. Using (UP) or (DOWN) will cycle through each selection as "SLNN"/"XXXX/XXXX." where the "NN" indicates the selection and the 'X's represent the resettable number of vends for that selection. A decimal will be displayed in the right-most position with the lower four digits. If (ABORT) is pressed anytime during this operation, the controller will return to the "SALE" prompt. Press the (UP) button to proceed to the next prompt "PrIC".

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PrIC
SELECTION PRICE SETTING MODE

If (ENTER) is pressed at the "PrIC" prompt, the controller will enter the selection price setting mode. The display will show "Pr 1" if the machine is in multi-price mode, or "SPrI" if the machine is in single-price mode.

The 20 PLUS Vender is shipped from the factory in multi-price mode with a .75 cent vend price.

Notes:
1. In the single-price mode, the price for selection 1 is the price for all selections. Single-price is displayed as "SPrI" instead of "Pr1" as a reminder to the operator that the machine is currently in single-price mode.

In the multi-price mode, individual selection prices can be changed using the (UP) and (DOWN) to display "PrXX," where 'XX' is the selection number, or choose "ALL" to change the prices for all selections. If (ENTER) is pressed, the display will show the current price for the displayed selection. Using (UP) or (DOWN) will increase or decrease the price. Holding (UP) or (DOWN) for more than five seconds will cause the price to change at 10 times the normal rate. When the desired price is on the display, pressing (ENTER) will save that price, while pressing (ABORT) will return to the selection level without saving. Press the (UP) button to proceed to the next prompt "StS".

StS
SPACE-TO-SALES PROGRAMMING MODE

If (ENTER) is pressed at the "StS" prompt, the controller will enter the space-to-sales programming mode by displaying "OPtn," where 'n' is the current option selected; "CStS" for custom configuration, or "rStS". Using (UP) or (DOWN) will allow the operator to cycle through all 9 available space-to-sales options "OPt1"-"OPt9," as well as the "CStS" "CLr" and "rStS" "CLr" options. When one of the "OPt1"-"OPt9", options are on the display, pressing (ENTER) will select that space-to-sales option and return to the code level. If one of the "OPt1"-"OPt9," "CStS," or the "rStS" option is displayed and (ABORT) is pressed, the user will return to the "StS" prompt without changing the settings.

NOTES:
1.If (ENTER) is pressed at "CLr", the "StS" settings will reset to none.
2. There is a decal, located on the inner door, that shows the relationship between columns and selections.
3. If the clear program is used without assigning any columns, the LED with read "Sold-out".

Custom Space-to-Sales Programming *"CStS"*

If (ENTER) is pressed at the "CLr" "CStS" prompt, the custom space-to-sales programming mode is entered. The display will show "SL XX" and alternate this message with either "nonE," if no columns are assigned to the selection, or a sequence of numbers (XX) that represent the columns currently assigned to the selection. Pressing (UP) or (DOWN) will cycle through the remaining selections, plus the "SAUE" {save} option. Pressing (ABORT) at this point will move the user to the "SAUE" option, where pressing (ENTER) will save the changes, and pressing (ABORT) will return to the "CStS" prompt without saving any of the changes.

If (ENTER) is pressed at a "SLXX" prompt, the display will show "Cnn" where 'nn' is the column number. Pressing (UP) or (DOWN) will cycle through all 12 columns. If (ENTER) is pressed at any column indicator, the display will change to "CnnY" where "Y" will be '1' if column "nn" is currently assigned to the selection, or '0' if it is not. (UP) and (DOWN) can be used to change the assignment status of the column. Pressing (ABORT) at this time will return the user to the "Cnn" display without changing the status of the column, while pressing (ENTER) saves the displayed status of the column. Pressing (ABORT) at any column indicator ("Cnn") returns the user to the "SLXX" display. Pressing (ABORT) at this point will move the user to the "SAUE" option. While at the "SAUE" prompt, pressing (ENTER) saves the custom space-to-sales settings and returns to the code level ("StoS"), while pressing (ABORT) returns to the "CStS" prompt without saving the settings. Press the (UP) button to proceed to the next prompt "rStS".
NOTE: Assigning a column to a selection does not clear previous assignment of that column. Care must be taken to ensure that a column is not mistakenly double-assigned or left unassigned.

	Opt1	Opt2	Opt3	Opt4	Opt5	Opt6	Opt7	Opt8	Opt9
SPACE TO SALES SETTINGS — *12 COLUMNS*									
Sel 1	1,6,7	1,2,7,8	1,2,7,8	1,2,7,8	1,2,7,8	1,2,7,8	1,2,3	1,2,3	1,2,3
Sel 2	1,6,7	1,2,7,8	1,2,7,8	1,2,7,8	3,9	1,2,7,8	4,5	4,5	4,5
Sel 3	2,8	1,2,7,8	1,2,7,8	1,2,7,8	4	3,9	6	6	6
Sel 4	2,8	1,2,7,8	1,2,7,8	1,2,7,8	5	4,10	7	7,8	7,8,9
Sel 5	3	3	3,9	3,9	6	5	8	9	10
Sel 6	3	4	3,9	3,9	10	6	9	10	11
Sel 7	4	5	4	4,10	11	11	10	11	12
Sel 8	5	6	5	4,10	12	12	11	12	
Sel 9	9	9	6	5	1,2,7,8	1,2,7,8	12		
Sel 10	10	10	10	6					
Sel 11	11	11	11	11					
Sel 12	12	12	12	12					
Sel 13	1,6,7	1,2,7,8	1,2,7,8	1,2,7,8					

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Recommended Space-to-Sales *"rStS"*

If (ENTER) is pressed at the "rStS" prompt, "CLr" a recommended space-to-sales configuration is calculated, based on first choice attempts since StS was last changed. The display will flash "SL 1" and alternate this message with either "nonE," indicating that no columns should be assigned to selection 1, or a sequence of numbers that represent columns that should be assigned to selection 1. Pressing (UP) or (DOWN) will cycle through the remaining selections. Pressing (ENTER) or (ABORT) will move the user to the "SAUE" option, where pressing (ENTER) will save the recommended space to sales or pressing (ABORT) will return the "StS" prompt without saving the changes. Press the (UP) button to proceed to the next prompt "Con".

Con   **MACHINE (C1-C10) CONFIGURATION MODE**

If (ENTER) is pressed at the "Con" prompt, the controller will enter the machine configuration mode by displaying "C1-1," which designates configuration option number 1. If (ABORT) is pressed while at the "Cn" level, the controller will return to the code level. Pressing (UP) or (DOWN) will allow the selection of available configuration options. Pressing (ENTER) will change the display to "Cn X" where "n" is the configuration number and "X" is the current status of the option. The status is changed using (UP) or (DOWN). Pressing (ENTER) saves the status of the current option and returns the user to the "Cn" prompt, while pressing (ABORT) returns to the "Cn" prompt without saving. From the "Con" prompt, press (UP) to proceed to the next prompt "CCOC".

Royal Vendors recommended E.V.S. configuration settings:
Con 1 - (**1**) Multi price
Con 2 - (**1**) Opt features on
Con 3 - (**0**) Greeting displayed
Con 4 - (**0**) Totals disabled
Con 5 - (**0**) Mis reset
Con 7 - (**0**) Five minute timer used
Con 8 - (**1**) Force vend enabled
Con 9 - (**0**) Multi purchase disabled
Con 10 - (**0**) Bill escrow

C1   **Single/Multi-Price**

This configuration chooses between the single-price and multi-price settings by pressing (UP) or (DOWN). In the single-price mode, the price of selection (0) will be used for all selections. In the multi-price mode (1), each selection can be set to a different price.

If X = 1, Multi-pricing is used.
If X = 0, Single-pricing is used.

C2   **Optional Features Enable**

This configuration enables optional features "bLC1", bLC2", "dISC", "OUEr" and "SdEP" if set to "1".

If set to "0" the optional features will be disabled and will not be displayed in the menus. *Notes: The timers and the key switch functions will not work if set to "0". SdEP is the only optional feature that will work if set to "0"*

C3   **P.O.S. Disable**

This option is used to disable the point of Sales (P.O.S.) message if set to "1".

If set to "0" the P.O.S. is enabled (greeting will be displayed).

C4   **Open Door Totals**

This option changes the Open-Door Mode Display (see "Modes of Operation" section of this manual for a description of the Open-Door Mode). If enabled, the total machine sales and total machine cash values are displayed before the error codes. These values represent the number of all paid vends and the cash amount of all paid vends, respectively. The sales and cash values are displayed the same as in the "SALE" and "CASH" service mode functions. The display shows "SALE"/"XXXX"/"XXXX." for two seconds each four digits, then "CASH"/"XXXX"/"XX.XX", then existing errors or "nonE." If this option is disabled, existing errors are displayed, or "nonE" if no errors exist.

If X = 1,   "SALE"/"XXXX"/"XXXX.",
          "CASH"/"XXXX"/"XX.XX",
          and existing errors or "nonE" are displayed.
If X = 0,   Existing errors or "nonE" is displayed.

C5   **Door Switch Reset**

This option is used to allow the door switch to reset all resettable MIS.

If X = 1, All resettable MIS registers are reset when the door switch is activated, if any one of the resettable MIS registers are read.
If X = 0, All resettable MIS registers will be reset only when the "CF" command is received from the HHC.

C6   **For Future Use**

`C7` **Save Credit**
This configuration is used to determine how long the credit is displayed.

If $X = 1$, The credit is left on the display indefinitely.
If $X = 0$, After 5 minutes the credit is erased.

`C8` **Escrow Rule #1: Force-Vend**

This configuration prevents the machine from becoming a change maker. When this mode is set to (1) enabled, escrow of coins is allowed until any of the following:

• Any bill is inserted into the bill acceptor.
• Any "cash box" coin (a coin that is not assigned to a tube) is inserted.
• The maximum vend price is reached. Once any of these conditions are met, escrow is ignored and a vend must be made.

If a selection is made that is sold out or locked out, this option will override and an escrow will be honored.

If this mode is set to (0), the force-vend option will be disabled.
NOTE: Force vend has no effect on the card reader. Once a card is inserted, it can always be returned to the customer via an escrow or the return switch on the card reader.

If $X = 1$, Force-vend is enabled.
If $X = 0$, Force-vend is disabled.

`C9` **Escrow rule #2: Multi-Vend**

Allows multiple purchases without reentering coins. If enabled, instead of returning the change after a vend, the credit will remain on the display to be used for another selection. An escrow will be honored at any time. This option will take precedence over the force-vend option after the first vend has been completed.

If $X = 1$, Multi-vend is enabled.
If $X = 0$, Multi-vend is disabled.

NOTE: If the card reader is not multi-vend capable, the card will be ejected after each vend regardless of the state of this option.

`C10` **Bill Escrow Inhibit**
This configuration allows the escrow of bills. If 'X' is set to "1" and the bill value inserted takes the accumulated credit over the maximum vend price, bills will always go to the cash box. If the rule is set to "0", the bill will be held in the escrow position.

If $X = 1$, Bill escrow is disabled
If $X = 0$, Bill escrow is enabled.

`CCOC` **CORRECT CHANGE ONLY CONTROL MODE**

If (ENTER) is pressed at the "CCOC" prompt, the controller will enter the correct change only control mode.
The first sub-menu "Con", if disabled (0), it would prevent customers from being cheated if sufficient change is not available for payout. The vend is aborted and credit is returned.

If $X=1$, No cheat rule is enabled;
(The vender will payback available change, however the customer could potentially be cheated).
If $X=0$, Will not cheat the customer if disabled.

NOTE: If "Con" is set to "0", CCU and ACC do not apply:
The second sub-menu "CCU", will control the Exact Change Only light. If the vender can not make change for the value (or lower), the Exact Change Only lamp will light when set to "00.00". The four digit value can range from "00.00 to 99.95" which represents the correct change value. Using the (UP) or (DOWN) buttons will increase or decrease the number in increments of the lowest coin tube amount.

The third sub-menu "ACC" *(unconditional acceptance of currency)*, controls the value for dollar coins or bills to be accepted, regardless. Upon entering "ACC" the prompt will show the current four digit value (00.00 - 99.95) which represents the unconditional acceptance value. Using the (UP) or (DOWN) buttons will increase or decrease the number in increments of the lowest coin tube amount. If (ABORT) is pressed anytime during this operation, the controller will return to the code level. Pressing the (UP) button will procede to the next prompt "PrEU".

`PrEU` **PREVIEW DATA "External" PASSWORD MODE**

If (ENTER) is pressed at the "PrEU" prompt, the controller will display the current password for the external preview mode. The first digit of the number will be flashing. Pressing (UP) or (DOWN) will adjust the currently flashing digit up or down. Pressing (ENTER) will save the currently flashing digit and the next digit of the password will begin flashing. All digits may be modified in this manner. Pressing (ENTER) while the last digit is flashing saves the currently displayed password and returns to the "PrEU" prompt, while pressing (ABORT) at any time in the procedure returns to the "PrEU" prompt without saving. From the "PrEU" prompt pressing (UP) will procede to the next prompt "LAnG" *Note: Password digits correspond to selection switches. If a digit is set to a nonexisting selection switch number or "0", it will not be possible to enter the preview mode.*

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LAng LANGUAGE SELECTION MODE

The "LAng" mode gives you the opportunity to set vending messages in any of the following international languages:

        English - "EnG"
        French - "Frn"
        German - "GEr"
        Italian - "ItA"
        Portuguese - "Port"
        Spanish - "ESP"
        Slovene - "SLO"

Pressing (ENTER) will display the last programmed setting. Press (UP) or (DOWN) to cycle through the available languages. When desired language is displayed, press the (ENTER) button to save your choice. If (ABORT) is pressed anytime during this operation, the controller will return to the "LANG" prompt. Press the (UP) button to proceed to the next prompt "tinE".

tinE TIME/DATE SETTING MODE

If (ENTER) is pressed at the "tinE" (time) prompt, the controller will enter the time setting mode and the first display will be "Enb" (enable). Using (UP) or (DOWN) will allow you to cycle through all available time selection options. Pressing (ENTER) will allow you to set the sub-menu you have entered into (example "Enb"). If (ABORT) is pressed anytime during this operation, the controller will return to the "tinE" prompt. Press the (UP) button to proceed to the next prompt "Lit".

TIME SELECTION OPTIONS
(current time settings)

*"Enb"   Enable (must be set to "1")
"yEAr"   Current Year (Example '99)
"nth"   Current Month
"dAtE"   Current Day of the Month
"Hour"   Current Time (hours, minutes)
"dSt "   Daylight Savings Time Selection
            (NA, OFF, AUS, EU)

*NOTE: Enable must be set to "1" at all times to assure proper vender operations.

Enable Setting *"Enb"*
This setting controls the time and date support by keeping a continuous updated clock connection (1) or you can turn the clock off (0), so the clock is not updated. Toggle between the (1) and (0) by pressing (UP) or (DOWN). Pressing (ENTER) will save the current setting and return to the "Enb" prompt. Press the (UP) button to procede to the next prompt "YEAr".

If X=1, Will keep the clock current when enabled.
If X=0, Will not keep the clock current if disabled.

Set Year *"YEAr"*
If (ENTER) is pressed at the "yEAr" prompt, the last two digits of the year are displayed and will be flashing. Pressing (UP) or (DOWN) will increase or decrease the year setting. Pressing (ENTER) will save the displayed year setting and return the user to "yEAr" while pressing (ABORT) will return to "yEAr" without saving. Press the (UP) button to proceed to the next prompt "nth".

Set Month *"nth"*
After (ENTER) is pressed at the "nth" prompt, you will be able to select the current month (01-12). Pressing (UP) or (DOWN) will increase or decrease the month setting. Pressing (ENTER) will save the displayed month and return the user to the month level. Pressing (ABORT) while the month digits are flashing returns to the month level without saving the month. Press the (UP) button to proceed to the next prompt "dAtE".

Set Date *"dAtE"*
If (ENTER) is pressed at the "dAtE" prompt, two digits will appear and represent the day of the month (01-31). Pressing (UP) or (DOWN) will increase or decrease the number. Pressing (ENTER) will save the displayed number and return the user to the date level. Pressing (ABORT) while the numbers are flashing returns to the date level without saving the number. Press the (UP) button to proceed to the next prompt "Hour".

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Set Hour *"Hour"*
If (ENTER) is pressed at the "Hour" prompt, the current time is displayed in a 24-hour format. The left two digits of the display show the current hour, the right two digits show the current minutes. While the hour setting is flashing, pressing (UP) or (DOWN) will increase or decrease the hour setting. If (ENTER) is pressed, the minute setting will flash. (UP) or (DOWN) will set the minutes. Pressing (ENTER) at this point will save the displayed hour and minutes setting and return the user to "hour." Pressing (ABORT) while the hour or minutes digits are flashing returns to "Hour" without saving the hour or minutes. Press the (UP) button will procede to the next prompt "dSt"

Daylight Savings Time *"dSt"*
After the (ENTER) button is pressed at the "dSt" prompt, the display will show the current daylight saving time code. Using the (UP) and (DOWN) buttons will rotate through the available options. Pressing (ENTER) any time will save the selected options and return the user to "dSt." Pressing (ABORT) button while in (NA, OFF, AUS, or EU) will return you to the "dSt" without saving any changes.

NA	North American Rules
OFF	No daylight savings time changes made
AUS	Australian Rules
EU	European Rules

Pressing the (ABORT) button at the "dSt" display, the controller will return to the "tinE" prompt. Press the (UP) button to proceed to the next prompt "Lit".

LIGHTING CONTROL MODE
(Optional Relay Kit Required)
If (ENTER) is pressed at the "Lit" prompt, the controller will enter the lighting control mode and the first display will be "Enb"(enable). Using (UP) or (DOWN) will allow you to cycle through all available lighting control mode options (Enb, Strt, Stop).

Enable *"Enb"*
If (ENTER) is pressed at the "Enb" prompt, the controller will enter the lighting control enable mode. If set to (1) the lighting control will be enabled and the lighting panels of the vender will be turned off during the following pro-grammed time blocks *(if the lamp relay kit is installed).* If set to (0) the lighting control will be disabled. Toggle between the (1) and (0) by pressing (UP) or (DOWN). Pressing (ENTER) will save the current setting. If (ABORT) is pressed anytime during this operation, the controller will return to the "Lit" without saving your settings. Pressing (UP) will procede to the next prompt "Strt".

If X=1, The lighting control is (on) enabled.
If X=0, The lighting control is (off) disabled.

Start Time Setting *"Strt"*
If (ENTER) is pressed at the "Strt" prompt, the controller will display "daY"(day of the week). Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the timer is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 The timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All).

Press (ENTER) at the desired day to activate or not activate the timer for that day. The value must be blinking to edit the setting. Press (UP) or (DOWN) to toggle between (0) or (1). When desired selection is shown, press (ENTER) to save your setting. If the (ABORT) is pressed anytime during this operation, the controller will return to the "daY" prompt without saving your selection. Press the (UP) button to proceed to the next prompt "Hour".

If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the start time and return to the "Hour" prompt, pressing (ABORT) from the "Hour" prompt will return the controller to "Strt" prompt. Press the (UP) button to procede to the next prompt "StoP".
Note: The time is based on 24 hour time (Military time)

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Stop Time Setting *"StoP"*

If (ENTER) is pressed at the "StoP" prompt, the controller will display "daY"(day of the week). Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the day is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 The timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All). Press (ENTER) at the desired day to activate or deactivate the timer for that day. The value must be blinking to edit the selection. Press (UP) or (DOWN) to toggle between (0) or (1). When desired selection is shown, press (ENTER) to save your selection. If (ABORT) is pressed anytime during this operation, the controller will return to the "daY" prompt without saving your selection. Press the (UP) button to proceed to the next prompt "Hour".

If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the stop time and return to the "StoP" prompt. Pressing (ABORT) at "StoP" prompt will bring you out to "Lit" prompt. Press the (UP) button to proceed to the next prompt "rFrG".

 ## REFRIGERATION CONTROL MODE

If (ENTER) is pressed at the "rFrG" prompt, the controller will enter the refrigeration control mode by displaying "Enb", indicating the energy conservation mode. Using (UP) or (DOWN) will allow the operator to toggle between the following modes:

"Enb"   Enable energy conservation
"Strt"   Start time setting
"Stop"   Stop time setting
"deG"   Degree - Fahrenheit or Celsius
"SEtP"   Set point *(maintaining cabinet temperature setting)*
"Stor"   Storage - maximum cabinet temperature setting
"dSP"   P.O.S. temperature display

If (ABORT) is pressed at this point, the controller will return to the "rFrG" prompt without saving the changes.
Note: The refrigeration unit can not be disabled from the controller when using manual thermostat (cold control).

Enable Energy Conservation *"Enb"*

If (ENTER) is pressed at the "Enb" prompt, the controller will enter the energy conservation enable mode. If set to (1) the energy conservation control will be enabled and the cabinet temperature will be allowed to raise to the "Stor" programmed time blocks. If set to (0) the energy conservation will be disabled and the refrigeration unit will operate as normal and will maintain the "SEtP" temperature. Toggle between the (1) and (0) by pressing (UP) or (DOWN). Pressing (ENTER) will save the current setting. If (ABORT) is pressed anytime during this operation, the controller will return to the "Enb" level without saving your selection. Press the (UP) button to proceed to the next prompt "Strt".

If X=1, Enabled (on), the refrigeration unit runs when the storage temperature is reached*. *see note below.*
If X=0, The refrigeration unit will run according to the "SEtP" setting.
***Note:** If enabed (set to 1), the cabinet temperature will rise to the "Stor" temperature operated by the timer program, ONLY if the Start and Stop times are set.*

Start Time Setting *"Strt"*

If (ENTER) is pressed at the "Strt" prompt, the controller will display "daY"(day of the week). Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the timer is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 the timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All). Press (ENTER) at the desired day to activate or deactivate the timer for that day. The value must be blinking to edit the setting. Press (UP) or (DOWN) to toggle between (0) or (1). When desired setting is shown, press (ENTER) to save your setting. If (ABORT) is pressed anytime during this operation, the controller will return to the "daY" prompt without saving your selection. Press the (UP) button to proceed to the next prompt "Hour".
If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the start time and return to the "Hour" prompt. Pressing (ABORT) from the "Hour" prompt will return the controller to "Strt" prompt. Press the (UP) button to proceed to the next prompt "StoP".
Note: The time is based on 24 hour time (Military time)

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Stop Time Setting *"StoP"*

If (ENTER) is pressed at the "StoP" prompt, the controller will display "daY"(day of the week). Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the timer is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 The timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All). Press (ENTER) at the desired day to activate or deactivate the timer for that day. The value must be blinking to edit the selection. Press (UP) or (DOWN) to toggle between (0) or (1). When desired setting is shown, press (ENTER) to save your setting. If (ABORT) is pressed anytime during this operation, the controller will return to the "daY" prompt without saving your setting. Press the (UP) button to proceed to the next prompt "Hour".

If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the stop time. Press the (ABORT) button to return to the "StoP" prompt. Press the (UP) button to proceed to the next prompt "dEG".
Note: The time is based on 24 hour time (Military time).

Fahrenheit/Celsius Setting *"dEG"*

If (ENTER) is pressed at the "dEG" prompt, the controller will display "dEGX," if 'X' is 'F' the controller is currently in °**F** Fahrenheit mode, or if 'X' is 'C' the controller is in the °**C** Celsius mode. Pressing (UP) or (DOWN) will toggle the 'X' digit between 'F' and 'C'. Pressing (ENTER) will save the displayed temperature mode and return the user to the "dEG" prompt, while pressing (ABORT) will return to the "dEG" prompt without saving any changes. Press the (UP) button to proceed to the next prompt "SEtP". This function can also be accessed via the HHC.

FACTORY SETTING:
Fahrenheit: 35°F Set point, 60°F Storage
Celsius: 1.5°C Set point, 15.5°C Storage

Set Point Setting *"SEtP"*

The set point setting is what temperature the cabinet will maintain and when (ENTER) is pressed at the "SEtP" prompt, the controller will display "tt.tX," where 'tt.t' will be in degrees and X will represent either 'F' Fahrenheit or 'C' Celsius. Pressing (UP) or (DOWN) will increase or decrease by 1° F (or 0.5°C). Pressing (ENTER) will save the set point and return the user to the "SEtP" prompt, while pressing (ABORT) will return to the "SEtP" prompt without saving any changes. Press the (UP) button to proceed to the next prompt "Stor".

Storage Setting *"Stor"* (Applies only when using timer)

The storage setting is the maximum temperature you want the cabinet to reach when the timer mode is in use.

If (ENTER) is pressed at the "Stor" prompt, the controller will display the current storage setting "tt.tX," where 'tt.t' will be in degrees and X will represent either 'F' Fahrenheit or 'C' Celsius. Pressing (UP) or (DOWN) will increase or decrease by 1° F (or 0.5°C). Pressing (ENTER) will save the setting and return the user to the "Stor" prompt, while pressing (ABORT) will return to the "Stor" prompt without saving any changes. Press the (UP) button to proceed to the next prompt "dSP".

POS Temperature Display *"dSP"*

If (ENTER) is pressed at the "dSP" prompt, the controller will display "dSPX," if 'X' is '0' the controller is not displaying the cabinet temperature in the POS message, or '1' if the controller is currently displaying the cabinet temperature after the POS message. Pressing (UP) or (DOWN) will toggle the 'X' digit between '0' and '1'. Pressing (ENTER) will save the currently displayed setting and return the user to the "dSP" prompt, while pressing (ABORT) will return to the "dSP" prompt without saving the changes. Pressing (ABORT) at the "dSP" prompt will bring you out to "rFrG" prompt. Press the (UP) button to proceed to next prompt "bLC1", (if configuration 2 is set to "1").

Configuration 2 must be enabled (set to 1) for the following timer functions to operate:

Note: The timers or the override switch will not function, if C2 is set to "0".

bLC1   **BLOCK SELECTION 1**

bLC2   **BLOCK SELECTION 2**

If (ENTER) is pressed at the "bLC1" or "bLC2" prompt, the controller will enter the block selection control and the first display will be "Enb"(enable). Using (UP) or (DOWN) will allow you to cycle through available sub menus. If (ABORT) is pressed anytime during this operation, the controller will return to the "bLC1" "bLC2" without saving your selection.

Enable Blocking *"Enb"*

If (ENTER) is pressed at the "EnbX" prompt, the controller will enter the blocking enable mode. If set to (1) the blocking control will be enabled and the active selections will not be able to vend during the following programmed time blocks. If set to (0) the blocking control will be disabled. Toggle between the (1) and (0) by pressing (UP) or (DOWN). Pressing (ENTER) will save the current setting. If (ABORT) is pressed anytime during this operation, the controller will return to "EnbX" without saving your selection. Press the (UP) button to proceed to the next prompt "Strt" prompt.

If X=1, The blocking control is enabled.
If X=0, The blocking control is disabled.

Start Time Setting *"Strt"*

If (ENTER) is pressed at the "Strt" prompt, the controller will display "daY". Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the day is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 The timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All) Press (ENTER) at the desired day to activate or deactivate the timer for that day. The value must be blinking to edit the selection. Press (UP) or (DOWN) to toggle between (1) or (0). When desired setting is shown, press (ENTER) to save your setting. If (ABORT) is pressed anytime

during this operation, the controller will return to the "daY" prompt without saving your setting. Press the (UP) button to proceed to the next prompt "Hour".

If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the start time and return to the "Hour" prompt. Press the (ABORT) button to return to the "Strt" prompt. Press the (UP) button to proceed to the next prompt "StoP".
Note: The time is based on 24 hour time (Military time)

Stop Time Setting *"Stop"*

If (ENTER) is pressed at the "StoP" prompt, the controller will display "daY". Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the day is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 The timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All). Press (ENTER) at the desired day to activate or deactivate the timer for that day. The value must be blinking to edit the selection. Press (UP) or (DOWN) to toggle between (0) or (1). When desired setting is shown, press (ENTER) to save your setting. If (ABORT) is pressed anytime during this operation, the controller will return to the "daY" prompt without saving your selection. Press the (UP) button to proceed to the next prompt "Hour".

If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the stop time. Press the (ABORT) button to return to the "StoP" prompt. Press the (UP) button to proceed to the next prompt "SEL".
Note: The time is based on 24 hour time (Military time).

Selection Setting *(SEL)*

If (ENTER) is pressed at the "SEL" prompt, the controller will enter the selection setting and the first display will show the current setting for selection one "01 X". If X is (1) the selection is active or (0) the selection is not active. Using (UP) or (DOWN) will allow you to rotate through the valid selections or select "ALL". If (ABORT) is pressed anytime during this operation, the controller will return to the "SEL" without saving your selection.

X= (1) The selection is active.
X= (0) The selection is not active.

To edit a selection, press (ENTER) when the desired selection is displayed, the value must blink before any changes can be made. Pressing (UP) or (DOWN) will change the current setting. Pressing (ABORT) while editing a selection will bring you back to the original setting without saving any changes. Press the (UP) button to proceed to the next prompt "Lit".

Lighting Control *"Lit"* *(Optional relay kit required)*

If the lighting control option is activated and the (ENTER) button is pressed at "LitX" the controller will enter the current lighting control setting. If "X" equals (1), the lighting control will be activated and the lighting will be turned off during the blocking period. If "X" is set to (0) the lighting control will be disabled.

X= (1) Lighting control will be actived.
X= (0) Lighting control will be not actived.

Press (ENTER) to edit the setting, "1" or "0" must blink before any changes can be made. Pressing (UP) or (DOWN) will change the current setting. Pressing (ABORT) while editing a setting will bring you back to the original setting without saving any changes. Pressing (ABORT) at the "Lit" prompt will bring you out to "bLC1" or "bLC2" prompt. Press the (UP) button to proceed to the next prompt "diSC".

DISCOUNT SETTING

If (ENTER) is pressed at the "diSC" prompt, the controller will enter the discounting control setting and the first display will be "Enb"(enable). Using (UP) or (DOWN) will allow you to cycle through available sub menus. If (ABORT) is pressed anytime during this operation, the controller will return to the "diSC" without saving your selection.

Enable Discount *"Enb"*

If (ENTER) is pressed at the "EnbX" prompt, the controller will enter the discount enable mode. If "X" is set to (1) the discount will be enabled and the active selections will be discounted during the following programmed time blocks. Or if "X" set to (0) the discount setting will be disabled. Toggle between the (1) and (0) by pressing (UP) or (DOWN). Pressing (ENTER) will save the current setting. If (ABORT) is pressed anytime during this operation, the controller will return to "EnbX" without saving your selection. Press the (UP) button to proceed to the next prompt "Strt".

If X=1, The discounting price is enabled.
If X=0, The discounting price is disabled.

Start Time Setting *"Strt"*

If (ENTER) is pressed at the "Strt" prompt, the controller will display "daY". Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the timer is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 The timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All). Press (ENTER) at the desired day to activate or deactivate the timer for that day. The value must be blinking to edit the selection. Press (UP) or (DOWN) to toggle between (0) or (1). When desired selection is shown, press (ENTER) to save your setting. If (ABORT) is pressed anytime during this operation, the controller will return to the "daY" prompt without saving your setting. Press the (UP) button to proceed to the next prompt "Hour".

If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the start time and return to the "Hour" prompt. Pressing (ABORT) from the "Hour" prompt will return the controller to "Strt". Press the (UP) button to proceed to the next prompt "StoP".
Note: The time is based on 24 hour time (Military time)

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Stop Time Setting *"StoP"*

If (ENTER) is pressed at the "StoP" prompt, the controller will display "daY". Enter into "daY" by pressing the (ENTER) button. The display will show the current day of the week followed by a (1) if the timer is active on that day or (0) if the timer is not active on that day.

If X= 1 The timer is active on that day.
If X= 0 The timer is not active on that day.

Using (UP) or (DOWN) will allow you to cycle through the days of the week (non, tue, UEd, thu, Fri, SAt, Sun or All). Press (ENTER) at the desired day to activate or deactivate the timer for that day. The value must be blinking to edit the selection. Press (UP) or (DOWN) to toggle between (0) or (1). When desired setting is shown, press (ENTER) to save your setting. If (ABORT) is pressed anytime during this operation, the controller will return to the "daY" prompt without saving your selection. Press the (UP) button to proceed to the next prompt "Hour".
If (ENTER) is pressed at the "Hour" prompt, the left two digits of the display will begin to flash, prompting the user to adjust the hour setting. (UP) or (DOWN) is used to adjust the hour. When the desired hour is shown, pressing (ENTER) will cause the right two digits to flash, showing the current minute setting. The minutes are set in the same fashion. When the minutes are properly displayed, pressing (ENTER) will save the stop time. Pressing (ABORT) while editing a selection will bring you back to "Hour" without saving any changes. Pressing the (ABORT) button from the "Hour" prompt, the controller will return to the "StoP" prompt. Press the (UP) button to proceed to the next prompt "SEL".

Selection Setting *"SEL"*

If (ENTER) is pressed at the "SEL" prompt, the controller will enter the selection setting and the first display will show the current setting for selection one "01 X". If X is (1) the selection is active or (0) the selection is not active. Using (UP) or (DOWN) will allow you to rotate through the valid selections or select "ALL". If (ABORT) is pressed anytime during this operation, the controller will return to the "SEL" without saving your selection.
X= (1) The selection is active.
X= (0) The selection is not active.

To edit a selection, press (ENTER) when the desired selection is displayed, the value must blink before any changes can be made. Pressing (UP) or (DOWN) will change the current setting and pressing (ENTER) will save the settings. Pressing (ABORT) while editing a selection will bring you back to the original setting without saving any changes. When finished making changes, press (ABORT) to return to the "SEL" prompt. Press the (UP) button to proceed to the next prompt "LESS".

Discount Amount *"LESS"*

If (ENTER) is pressed at the "LESS" prompt, the controller will enter the discount amount setting and the first display will show the current four digit discount amount (.00 - 99.95). *For example if the amount was set to .10, every price set in the price mode will be reduced by 10 cents.* Using (UP) or (DOWN) will allow you to increase or decrease the number in increments of the least coin tube amount. Press (ENTER) to save the setting and return you to the "LESS" prompt. Press (ABORT) to return to the "LESS" prompt without saving any changes. Pressing (ABORT) at "LESS" prompt will bring you out to "diSC" prompt. Press the (UP) button to proceed to the next prompt "OVEr".

MANUAL SWITCH OVER-RIDE

If the vender is equipped with a key-switch it can be used to over-ride numerous operations of the vender (timer control). The key-switch can control one, or several features. When the switch is activated, the feature is over-ridden. Press (ENTER) at the "OUEr" prompt, the controller will enter the key switch over-ride setting and the first display will show "FrE". Using (UP) and (DOWN) will allow the operator to toggle between the following modes "FrE", "bLC", "dSC", "Lit" and "FrG".

An "over-ride switch kit" must be used to over-ride the following features:

"FrE" Free Vend Enable
"bLC" Selection Blocking Over-Ride
"dSC" Discounting Over-Ride
"Lit" Lighting Control Over-Ride
"FrG" Refrigeration Over-Ride

Free Vend Enable *"FrE"*

(See Service Bulletin 167). If (ENTER) is pressed at the "FrE" prompt, the controller will enter the free vend over-ride setting. "FrEX", if 'X' is set to (1) free vending is enabled, if 'X' is set to (0) free vending is disabled. Using (UP) or (DOWN) will allow you to toggle between (1) or (0). If (ABORT) is pressed anytime during this operation, the controller will return to the "FrE" prompt without saving your selection. Press the (UP) button to proceed to the next prompt "bLC".

X= (1) Free vending is enabled.
X= (0) Free vending is disabled.

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Blocking Over-ride *"bLC"*
If (ENTER) is pressed at the "bLC" prompt, the controller will enter the selection blocking over-ride enable setting and the first display will show the current setting "bLCX". If "X" is blinking (0) the selection blocking over-ride is disabled or if blinking (1) the selection blocking (bLC1 & bLC2) over-ride will be enabled.

X= (1) Selection blocking (bLC1 & bLC2) is enabled
    (Turns off timer control modes).
X= (0) Selection blocking is disabled.

Using (UP) or (DOWN) will allow you to toggle between (1) or (0). If (ABORT) is pressed anytime during this operation, the controller will return to the "bLC" without saving your selection. Press the (UP) button to proceed to the next prompt "dSC".

Discount Over-ride *"dSC"*
If (ENTER) is pressed at the "dSC" prompt, the controller will enter the discounting over-ride enable setting and the first display will show the current setting "dSCX". If "X" is blinking (0) the discounting over-ride is disabled or if blinking (1) the discounting over-ride will be enabled.

X= (1) Discounting over-ride is enabled
    (Turns off timer control).
X= (0) Discounting over-ride is disabled.

Using (UP) or (DOWN) will allow you to toggle between (1) or (0). If (ABORT) is pressed anytime during this operation, the controller will return to the "dSC" without saving your selection. Press the (UP) button to proceed to the next prompt "Lit".

Lighting Control Override *"Lit"*
(Optional Relay Kit Required)
If (ENTER) is pressed at the "Lit" prompt, the controller will enter the lighting control over-ride enable setting and the first display will show the current setting "LitX". If "X" is blinking (0) the lighting control over-ride is disabled or if blinking (1) the lighting control over-ride will be enabled.

X= (1) Lighting control over-ride is enabled
    (Turns off timer control).
X= (0) Lighting control over-ride is disabled.

Using (UP) or (DOWN) will allow you to toggle between (1) or (0). If (ABORT) is pressed anytime during this operation, the controller will return to the "Lit" without saving your selection. Press the (UP) button to proceed to the next prompt "FrG".

Refrigeration Control Over-Ride *"FrG"*
If (ENTER) is pressed at the "FrG" prompt, the controller will enter the refrigeration control over-ride enable setting and the first display will show the current setting "FrGX". If "X" is blinking (0) the refrigeration over-ride is disabled or if blinking (1) the refrigeration over-ride over-ride will be enabled.

X= (1) Refrigeration over-ride is enabled
    (turns off timer control for the storage temperature)
X= (0) Refrigeration over-ride is disabled.

Using (UP) or (DOWN) will allow you to toggle between (1) or (0). If (ABORT) is pressed anytime during this operation, the controller will return to the "FrGX" without saving your selection. Pressing (ABORT) at "FrG" prompt will bring you out to "OVEr" prompt. Press the (UP) button to proceed to the next prompt "SdEP".

SdEP SET SELECTION DEPTH MODE
If (ENTER) is pressed at the "SdEP" prompt, the controller will enter the "by-selection" depth setting mode by displaying "01X". Where "X" represents "1" for single depth, "2" for double depth or "3" for triple depth. Using (UP) or (DOWN) will allow the operator to cycle through the individual selections ("0YY") as well as the "ALL" selection. If (HOME) is pressed anytime during this operation, the controller will return to the code level. If (ENTER) is pressed, the display will show "ALLX" or "0YYX," depending on if the "ALL" mode is being used or if an individual selection is being accessed. "YY" represents the number of the selection and "X" represents the current column-depth setting of the selection. "X" will be '1' if the selection is set to single-depth mode, '2' if it is set to double-depth or '3' if it set to triple depth. Using (UP) or (DOWN) will toggle "X" between '1', '2' or '3'. When the desired setting is on the display, pressing (ENTER) will save that setting and return to the selection level, while pressing (ABORT) will return to the "SdEP" prompt without saving any changes. If the "ALLX" setting is saved, all individual selections will be set to this value. Press the (UP) button to proceed to the next prompt "rtn". This function can also be accessed via the HHC.
Note: The 20 Plus' front columns automatically default to 1 depth.
Note: When viewing the "ALLX" setting, the last value for "ALL" will be displayed, regardless of any changes that have been made to the individual settings.

rUnd REMOTE VEND MECHANISM ROUTINE
If the ENTER button is activated at the "rUnd" prompt the VMC will enter the universal satellite device control routine. Upon entry into this routine the display will show the first summary level code, "Strt". Using the UP or

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DOWN buttons will cycle through the available summary level codes as listed below. Activation of the ENTER button will enter the detail level routines. Activation of the ABORT button while a summary level prompt is displayed will return the VMC to the "rUnd prompt. Activation of the ABORT button at the "rUnd" prompt has no action.

Start Time Setting *"Strt"*
If the ENTER button is activated at the "Strt" prompt the VMC will enter the start time setting routine. Upon entry into this routine the display will show the first summary level code, "dAY". Using the UP or DOWN buttons will cycle through the available summary level codes as listed below. Activation of the ENTER button will enter the detail level routines. Activation of the ABORT button while a summary level prompt is displayed will return the VMC to the "Strt" prompt. Activation of the ABORT button at the "Strt" prompt will return the VMC to the "rUnd" prompt.

If the ENTER button is activated at the "dAy" prompt the VMC will enter the day of week setting routine. Upon entry into this routine the display will show the current day of the week setting, i.e. "FriX", where X will be 1 if the state is active, or 0 if the state is not active. Using the UP or DOWN buttons will rotate through "non", "tUE", "UEd", "tHu", "Fri", "SAt", "Sun", or "ALL". Activation of the ABORT button will return the VMC to the "day" prompt without making any changes.

If the ENTER button is activated at the "Hour" prompt the VMC will enter the start time setting routine. Upon entry into this routine the display will show the current four digit hour and minute setting, in 24-hour format (0000, midnight, to 2359). The hour setting will be blinking to indicate that it can be edited. Using the UP or DOWN buttons will increase or decrease the number. Activation of the ENTER button will cause the minute setting to begin blinking indicating that it can now be edited. Using the UP or DOWN buttons will increase or decrease the number. Activation of the ENTER button will save the hour and minute setting and return to the "Hour" prompt. Activation of the ABORT button will return the VMC to the "Hour" prompt without saving any changes.

Stop Time Setting *"Stop"*
If the ENTER button is activated at the "StoP" prompt the VMC will enter the start time setting routine. Upon entry into this routine the display will show the first summary level code, "dAY". Using the UP or DOWN buttons will cycle through the available summary level codes as listed below. Activation of the ENTER button will enter the detail level routines. Activation of the ABORT button while a summary level prompt is displayed will return the VMC to the "StoP" prompt. Activation of the ABORT

button at the "StoP" prompt will return the VMC to the "dISC" prompt.

If the ENTER button is activated at the "dAy" prompt the VMC will enter the day of week setting routine. Upon entry into this routine the display will show the current day of the week setting, i.e. "FriX", where X will be 1 if the state is active, or 0 if the state is not active. Using the UP or DOWN buttons will rotate through "non", "tUE", "UEd", "tHu", "Fri", "SAt", "Sun", or "ALL". Activation of the ABORT button will return the VMC to the "day" prompt without making any changes.

If the ENTER button is activated at the "Hour" prompt the VMC will enter the start time setting routine. Upon entry into this routine the display will show the current four digit hour and minute setting, in 24-hour format (0000, midnight, to 2359). The hour setting will be blinking to indicate that it can be edited. Using the UP or DOWN buttons will increase or decrease the number. Activation of the ENTER button will cause the minute setting to begin blinking indicating that it can now be edited. Using the UP or DOWN buttons will increase or decrease the number. Activation of the ENTER button will save the hour and minute setting and return to the "Hour" prompt. Activation of the ABORT button will return the VMC to the "Hour" prompt without saving any changes.

"SEL"
If the ENTER button is activated at the "SEL" prompt the VMC will enter the selection setting routine. Upon entry into this routine the display will show the current setting for selection one as "01 X", where X is 1 if the state is active or 0 if the state is not active. Using the UP or DOWN buttons will rotate through the valid selections or "ALL". Activation of the ABORT Button will return the VMC to the "SEL" prompt without making any changes.

"rAtE"
If the ENTER button is activated at the "rAtE" prompt the VMC will enter the universal satellite device vend rate routine. Upon entry into this routine the display will show the current vend rate (0 - 255). Using the UP or DOWN buttons will increase or decrease the number in single digit increments. A rate of "0" will disable the universal satellite device vending. All active selection vends (from above menu), regardless of selection, should be counted in this vend rate. Activation of the ENTER button will save the setting and return to the "rAtE"

RETURN TO SALES MODE
If (ENTER) is pressed at the "rtn" prompt, or if 30 seconds passes without a selection switch being pressed while at the "rtn" prompt, the controller will return to the normal door open mode.

SECTION 4: VENDER COMPONENT EXPLANATION

Vender Controller
(Figure 3.0)

The vender controller is the focal point of all vender operations. Power for the control board is provided by the low voltage transformer. The controller board processes information from input devices such as selection switches, door switch, etc., and issues instructions to output devices such as the digital display, vend motor, etc. Devices such as the coin changer, bill validator and hand-held computer communicate both ways with the controller.

THE CONTROLLER RECEIVES INFORMATION FROM:
Selection Switches
Optic Sensor
Switch Module
Door Switch
Temperature Sensor (optional)

THE CONTROLLER ISSUES INSTRUCTIONS TO:
Vend Motor
Digital Display

THE CONTROLLER COMMUNICATES BOTH WAYS WITH:
Coin Changer
Bill Validator
Hand Held Computer
Debit Card Reader

Optic Sensor Board

Control Board

Figure 3.0

Digital Display (Figure 3.1)

The digital display is located on the vender door next to the coin inlet. The digital display receives its instructions from the vender controller.

In the sales mode, the digital display will display a greeting when the machine is not in use. In the sales mode when the 20 PLUS is being used, the digital display will show the accumulated credit when the customer deposits money; the amount of change to be paid back on an over deposit; and the sales price of the selection when selected.

L.E.D. Display
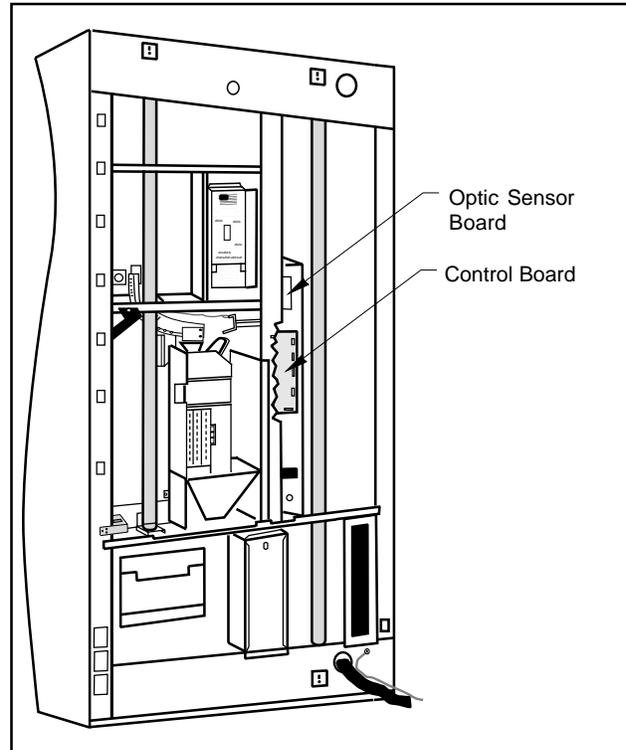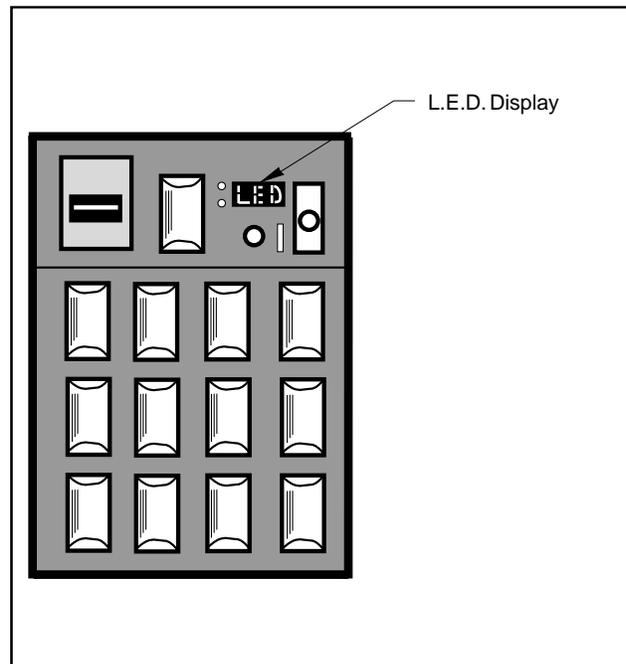
Figure 3.1

SECTION 4: VENDER COMPONENT EXPLANATION

Coin Changer

The coin changer determines the validity and value of each coin that is inserted into the vender and sends the coin information to the vender controller. The coin changer also continuously informs the vender controller if coins are available in the change tubes to be used for change payout. All change tube status and credit information is accumulated in the vender controller which controls all vend and payout functions as well as illumination of the vender's correct change light.

NOTE: For detailed changer information, refer to separate operation and service manual for coin changer.

Bill Acceptor

The bill acceptor determines the validity and value of each bill that is inserted into the vender and sends the bill information to the vender controller.

NOTE: For detailed bill acceptor information, refer to separate operation and service manual for bill acceptor.

Debit Card Reader

The debit card reader is the newest credit acceptance device in the vending industry. The 20 PLUS with Four-Button Programming is equipped to utilize the card reader system.
Customers purchase "credit cards" for use in card reader equipped vending machines. These cards are either magnetically encoded with an amount of credit or contain a computer chip which stores the amount of credit. Upon insertion into the card reader, the controller determines if there is enough credit on the card to make the requested purchase. If there is enough credit available, the product is vended and the vend price is subtracted from the amount of credit on the card.
NOTE: For detailed debit card reader information, refer to separate operation and service manual for debit card reader.

Optic Sensor

The optic sensor (2) is mounted on the right bottom portion of the stack. The reflectors are located on the left bottom portion of the stack. When the optic field is broken, a signal is sent to the board indicating product was delivered and signals the controller to reset and initiate payback of change if too much money was inserted. (see Figure 3.2).

Note: While vending with the door open, it is possible for the optic sensor to be hindered by light coming into the cabinet when the door is open.

Optic Sensors

Delivery Chute
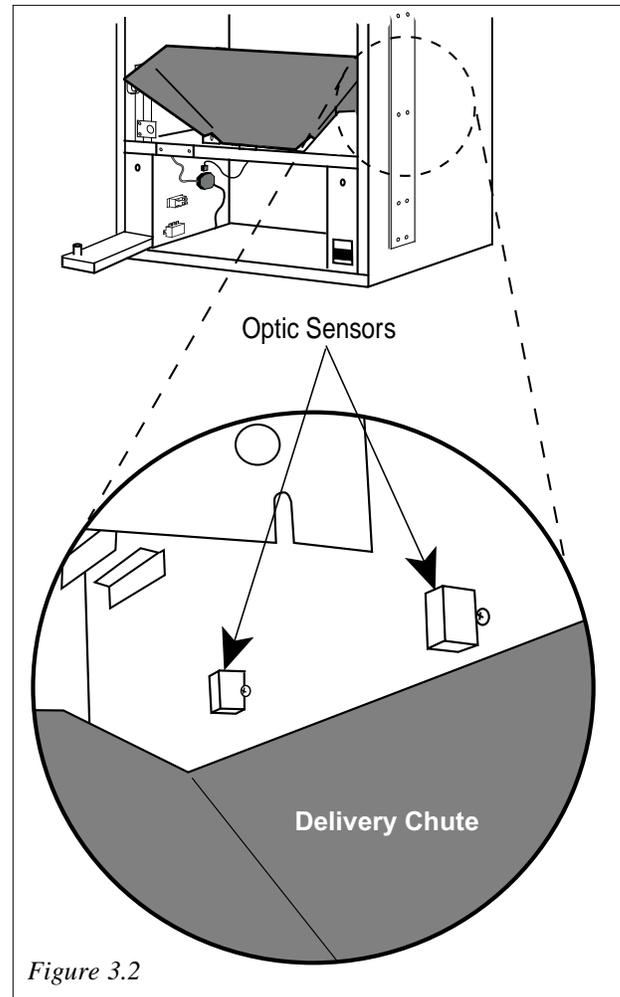
Figure 3.2

To properly adjust the optic sensor when replacing a KO control board from a Coke 20 Plus Vender.

Instructions:
1. Unplug optic sensor harness from the control board (P14).
2. Adjust the set screw (on the control board) clockwise until the indicator light becomes solid. Once the light becomes solid, continue two full turns clockwise.
3. Plug optic sensor harness to the control board (P14).
Note: After the optic sensor harness is plugged in, the indicator light on the control board will go out and the indicator light on the optic sensor board will come on.
4. Test adjustment by passing your hand across the path of the two optical sensors in the cabinet. Watch for the indicator light on the control board (LED1) to blink when the path is broken.

!Caution!: If the optic sensor harness is plugged up to the wrong pin position (P2 which is for the L.E.D.), the optic sensor board will become inoperable.

SECTION 4: VENDER COMPONENT EXPLANATION

Door Switch

The vender door switch is mounted to the lower right side of the vender's door and is actuated by the door each time it's opened or closed (see Figure 3.3). The following functions are performed each time the vender door is closed:

1. Clears any column sold-out.
2. Scrolls E-Prom
3. If door switch reset is enabled (see "Con"), the resettable MIS counters may be reset, upon reading selection 1.
4. Starts the refrigeration unit after an approximate 5 to 8 minute delay (after door switch is pressed).

Selection Switches

The selection switches signals the vender controller when a selection is made (see Figure 3.3). These switches are also used to program all vender functions (see "Vender Programming" section of this manual).

Low Voltage Transformer

The step-down transformer has a secondary winding which produces 24-volt AC output. The transformer works in conjuction with an external fuse which protects the vender controller in the event of a short in the secondary circuit. (See figure 3.3 for location)
A power supply located on the vender controller changes the 24-volt transformer output to direct current.

Vend Rack Assembly

The vend rack assembly, located in the cooling compartment of the vender, is composed of twelve product columns; six located in the front (columns one through six) and six in the rear (columns seven through twelve). The rear columns are triple-depth columns for cans and double-depth for bottles. The front columns are single-depth columns for both packages (bottles or cans).
NOTE: Different package types cannot be mixed within the same column.
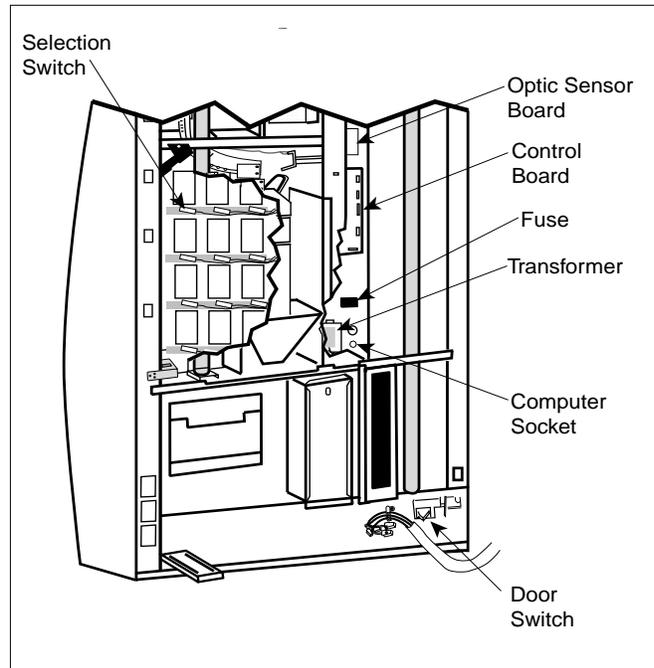
Figure 3.3

Refrigeration System
Component Explanation

COMPRESSOR/COMPRESSOR MOTOR: The compressor/compressor motor is a hermetically sealed unit located beneath (outside) the cooling compartment. The compressor is a pump, driven by the compressor motor, which draws low pressure vapor (refrigerant) from the evaporator coil, compresses and forces it into the condenser under high pressure. The motor is started and controlled by the temperature control.

STARTING RELAY: The starting relay is mounted on the side of the compressor housing. The compressor motor has two windings, a start and a run winding. To give the motor additional torque when it first starts, the starting relay switches in the additional start winding. After the motor gets up to speed the relay opens the start winding and the motor continues off the run winding.

THERMAL OVERLOAD: The thermal overload is a heat sensitive device mounted on the side of the compressor housing. If the compressor motor gets too hot or draws an excessive amount of current, the thermal overload will open, breaking both the start and run circuits of the motor. After the compressor cools to a safe operating temperature, the thermal overload will close allowing the compressor and condenser fan motors to restart.

CONDENSER: The condenser coil is located beneath (outside) the cooling compartment next to the compressor/compressor motor. The condenser removes heat from the high pressure vapor discharged from the compressor and condenses it to a high pressure liquid.

CONDENSER FAN MOTOR: The condenser fan motor, located beneath the cooling compartment, is a forced air device that uses outside ambient air to cool the surface of the condenser coil. The condenser fan motor runs while the compressor runs.

EVAPORATOR: The evaporator coil is located in the cooling compartment. As low pressure vapor passes through the evaporator coil, it absorbs and removes heat from the compartment.

EVAPORATOR FAN MOTORS: The evaporator fan motor is a forced air device that circulates air throughout the cooling compartment and over the heat exchange surface of the evaporator coil. The evaporator fan motor runs continuously.

NOTE: The Condenser and Evaporator Coils have aluminum fins attached to effectively increase their heat exchange surfaces.
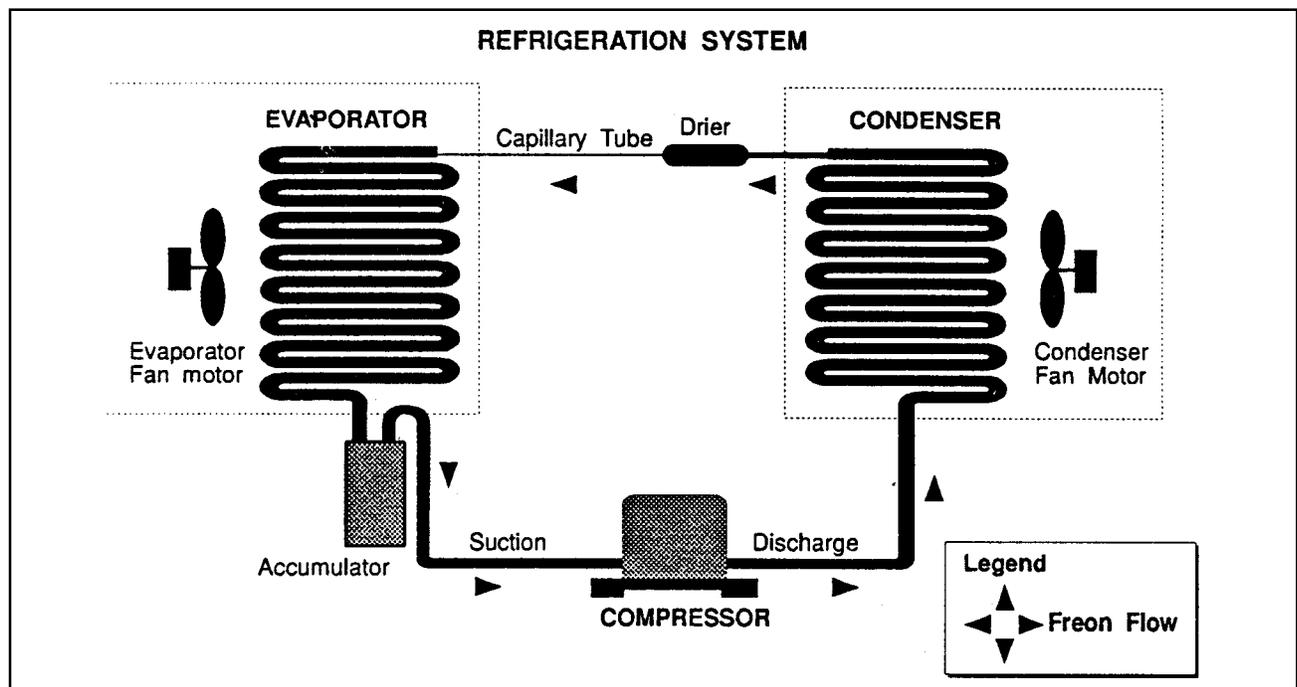
Figure 3.8

SECTION 4: VENDER COMPONENT EXPLANATION

CAPILLARY TUBE: The capillary tube is located in the refrigerant line, between the condenser and evaporator coils. The small diameter tube is used as a metering device to control the flow of liquid refrigerant to the evaporator coil. This creates a low pressure causing the refrigerant to vaporize and absorb heat as it passes through the evaporator.

DRIER: The drier is located in the refrigerant line between the capillary tube and condenser. It traps and removes moisture from the refrigeration system while allowing oil and refrigerant to pass through the system.

ACCUMULATOR: The accumulator is located in the refrigerant line between the evaporator coil and compressor. The accumulator traps any liquid refrigerant which did not vaporize before it reaches the compressor.

COOLING COMPARTMENT: The cooling compartment is the sealed area of the vender that holds the product for delivery. This area is designed to allow free flowing air to circulate throughout the product.

The Electronic Refrigeration Cycle

1. The temperature sensor (electronic thermometer) informs the board of the cabinet temperature. The boards function is to interpret the temperature and turn on/off according to the program setting for refrigeration.

2. The control board activates the relay, turning on the compressor and condenser fan motors. The control board also deactivates the relay, turning off the compressor and condenser fan motors.

3. The compressor circulates refrigerant throughout the system by pulling low pressure refrigerant vapor from the evaporator coil, compressing it and forcing it into the condenser coil.

4. The condenser, aided by the condenser fan motor, removes heat from the refrigerant as it flows through the condenser coil and releases it to the outside environment. The dropping of the refrigerant temperature changes the vapor to a liquid.

5. The capillary tube controls the amount of refrigerant released to the evaporator coil.

6. The evaporator coil allows the vaporized refrigerant to absorb heat from the cooling compartment as it flows through the coil.

7. The falling temperature in the cooling compartment is caused by the continual circulation of refrigerant through the system, removing heat from the cooling compartment and transporting it to the outside environment.

Note: After the door is closed, there will be a 5-8 minute delay before the refrigeration system will come on.

Vend Cycle

Stand-By Condition

In a Stand-By Condition, the Vender will show the greeting and possibly the vend price (if set for a single price or if all prices are set to same) and a choice of other optional features on the LED display. If a select button is pressed prior to reaching the vend price (establishing a credit), the display will show the vend price for that selection. This will indicate to the customer more money is needed for that particular selection.

Establishing Credit

As coins are inserted into the Coin Mechanism, a corresponding credit count will appear on the display. The Coin Mechanism will continue to accept coins until the highest vend price has been achieved. All coins in excess of the vend price will be returned to the coin cup. Once the vend price has been achieved, the Control Board will set up a credit enabling a vend to be made for any selection equal to or less than the established credit.

Valid Selection

The Vender's Control Board constantly sends a logic level signal to the common position of each select switch. When a selection is made, the selection switch closes. This allows the low voltage signal to travel from the switches common position through the switch and out the normally open position of that switch to the select switch's harness connection on the Control Board.

Vend Sequence

At this time (if there has not been a previous sold out), the Control Board distributes 24 volts DC through the door and cabinet wiring harnesses and directly to the coil of the chosen vend motor. Simultaneously the display will scroll. This is an indication to the customer a vend is in progress and to please wait. As the vend motor receives power, it will turn the rotor in an attempt to vend a product.

During the vend cycle, the control board is constantly looking for feedback (resistance) from the vend motor letting the controller know that the motor is turning. If the motor circuit is broken, and the proper feedback is not recognized within two seconds, that particular column will register "sold out". This occurs so the customer does not have to wait for a "sold out" message through the entire vend cycle.

Product Delivery

As the can or bottle drops onto the product delivery chute, an optic field is broken and the optic sensor sends a low voltage signal to the Vender's Control Board. This indicates that a product has been vended. After the Control Board receives the sensor's signal, it will take into account how the Vender is programmed (set depth) and will act accordingly.

If the first can has just vended, the Control Board will kill all power to the vend motor at the exact same time that the optic field was broken (this avoids a multiple vend of the next product to the rear of the cabinet). After the third can vends, the Control Board will cycle the vend motor to pick up another load of product. This allows a quick vend, less than three (3) seconds, for the next customer.

Note: The Control Board will go through a learning process known as the Learning Mode. It will be reset either on power down/up or a door opening/closing. This allows the Vender's Controller to decide which is the front or rear product in the rear column. The Learning Mode acts in conjunction with the depth setting to allow for an automatic reload after the rear can has vended. How it works: The Controller will notice the first "long-timed out" vend cycle during the learning process. From this, the Controller will know the very next vend will be the front product.

Sold-Out

Upon selection, the display will cycle to show the vend progress. After ten (10) to twelve (12) seconds (if a drop of product is not detected), the display will show "sold-out". A sold out may be due to:

1. The column attempted is jammed, therefore product does not drop,
2. The column attempted is genuinely sold out (empty) of product, or
3. The optic sensor does not detect the product drop.
4. The vend motor circuit is not complete.
5. If any or all selection, doesn't have a column assigned, it will read "Sold Out".

The digital display will indicate "sold out" and flash the sold out lamp. This signals to the customer to make another selection or push the coin return lever for a full refund. If set for forced purchase, the customer must make an initial selection. If the initial selection is sold out, the customer will be allowed a full refund or an alternate selection. If the Vender is totally sold out of a product, illumination of the "sold out" lamp and the "sold out" message on the digital display will be continuous. No money will be accepted into the Vender in a total sold out condition.

Resetting Sold Out Selections

A sold out condition is only cleared by the Vender's door switch by opening the Vender's main door. If a sold out condition is not cleared, the Controller will not attempt to vend from that selection. The display will not cycle to indicate a vend is in progress. It will automatically show "sold-out" upon pressing the select button (either before or after reaching a vend price).

Vender Maintenance

General Maintenance

WHAT TO CLEAN

A routine cleaning schedule is the best way to insure the optimum possible operation and appearance from your 20 PLUS.

PART	CLEANING METHOD
Control Board*	The Vender's Control Board should always be enclosed inside its cover to protect it. Routine cleaning is <u>not</u> necessary but, if desired, the Controller's area may be blown out with compressed air.
Condenser and Evaporator Coils	For efficient operation, the Condenser and Evaporator Coils must be kept clear of any dirt or foreign materials. Clean dirt and lint from the Condenser and Evaporator Coils with a brush, vacuum cleaner, or compressed air.

* Note: Never use petroleum cleaners or submerge electronics in water. If the Controller is accidentally sprayed with water, be sure to allow it to dry thoroughly before powering up the Vender.

WHAT TO LUBRICATE

A routine cleaning schedule is the best way to insure the optimum possible operation and appearance from your 20 PLUS.

PART	CLEANING METHOD
Latch Strike Nut	The Latch Strike Nut should be lubricated periodically with a petroleum base grease.
Inner Door Gasket	The door gasket comes from the factory pre-lubricated but should be lubricated periodically with a silicone base grease. Apply to the vertical piece of gasket on the hinged side of the inner door which touches the Vender's main door. This will help prevent any peel back of the gasket which can cause air leaks into the sealed cabinet resulting in freeze ups.
Refrigeration System	The Refrigeration System is a sealed unit and does not require any lubrication. Also, the Condenser and evaporator motors do not require any lubrication.

IMPORTANT SAFETY NOTE: To prevent bodily injury or damaging the electronics, NEVER plug or unplug any electrical connectors with power applied.

SECTION 5: VENDER MAINTENANCE

Using the Vender's Error Code System

The 20 PLUS has a Built-in Error Code Diagnostic System that will help you troubleshoot and solve problems. This system is best used in conjunction with the Troubleshooting Section in the rear of this Manual. The error codes shown below consist of two codes: a Main Error and a Detailed Error. These errors are not a replacement for your knowledge of the Vender or its operation. They will only point you in the general direction of the problem. Most Vender parts are independent of one another. Because of this, most problems can be confined to the item in question (such as a LED Display, Coin Changer, or Select Switch), the harnessing connecting it to the Control Board, and the Control Board itself. Upon opening the Vender's main door, you will enter the Service Mode. The display will flash any Vender Error Codes or "none" if no problems exist. Errors can be cleared from the "Eror" Mode within the Service Menu.

Note: It is recommended the Error Codes be cleared after correcting any problem(s) to prevent confusion and unnecessary work in the future.

Error Codes

MAIN	DETAILED ERROR	CORRECTIVE ACTION
SELS	SS 1 thru SS 12 (sel. switch closed)	Fix stuck button/switch or replace switch
CHAr	CC (Changer Communication)	Check changer harness connections
	TS (Changer Tube Sensor)	Consult changer manufacturer
	IC (Inlet Chute Blocked)	Check Vender's coin chute for blockage
	tJ (Changer Tube Jam)	Check changer's coin tubes/tube sensors
	CrCh (Changer ROM Checksum)	Consult changer manufacturer
ACCE	EE (Excessive Escrow)	Check for stuck coin return lever
	nJ (Acceptor Coin Jam)	Check for blockage/dirty sensor in acceptor
	LA (Low Acceptance Rate)	Consult changer manufacturer
StS	DAxx (Double Assigned Column)	Correct space to sales setting if necessary
	UAxx (Unassigned Column)	Correct space to sales setting if necessary
bUAL	bS (Bill Validator Sensor)	Remove obstruction or clean sensors
	biLL (Bill Validator Motor)	Consult bill validator manufacturer
	bJ (Bill Jam)	Remove jammed bill or clean bill sensors
	bOPn (Bill Validator Cash Box Open)	Close bill acceptor cash box
	bFUL (Bill Validator Cash Box Full)	Remove bills from cash box
	bC (Bill Validator Communications)	Check bill validator harness connections
FriG	SEnS (Temperature Sensor)	Check for a cut/disconnected temperature sensor
	CoLd (Sensing Temperature 3 Degrees below Cutout)	Check for a welded contact in refrigeration relay or shorted wire from board to Refrigeration Relay
	CnPr (Not Cooling Within 30 Minutes Of Cut in	Check "FrG" in programming and check all wiring connections from board to refrigeration unit
	ACLo (Less Than 95 Volts For Greater Than 30 Minutes)	Check voltage at wall outlet during the peak of the load with all units (if any others are present in circuit) running.

SECTION 5: MAINTENANCE

Removal of Vender Components

CAUTION: To prevent damaging the electronics, never plug or unplug any electrical connectors with power applied.

Controller Board (See Figure 5.2)

Unplug the harnessing from the controller board. Remove ground screw or 11/32 nut from the lower right hand stand-off and free the controller board from the five nylon stand-offs by pulling out on the controller board. Some stand-offs may need to have the small tab in the center depressed in order to free the controller board.

Digital Display

The digital display is located on the inside of the vender outer door next to the coin chute.   To remove, unplug the harness from the digital display board and pull straight out on the digital display board.

Low Voltage Transformer (see Fig. 5.2)

Unplug the harness from the transformer to the fuse box. Then trace the wire from the transformer to the white two pin connector on the main door harness. Remove the two 11/32" nuts securing the transformer to the outer door.

Coin Changer

See appropriate coin changer service manual.

Bill Acceptor

See appropriate bill acceptor service manual.

Card Reader

See appropriate card reader service manual.

Lexan Sign

First remove 2 7/16 nuts on the top of the port body and 4 on the sides of the port body (2 on the left and 2 on the right). Then take a 11/32 socket and loosen the nuts on the right side until the sign will be ready to come off. Pull the trim to the side and pull the sign out to the left and slide the new sign in and bolt down the trim. Finally place the port trim back in and secure with bolts.

Delivery Chute

Remove the 3/8 inch hex head bolt and phillips head screw from the chute bracket. Lift chute slightly and pull forward.
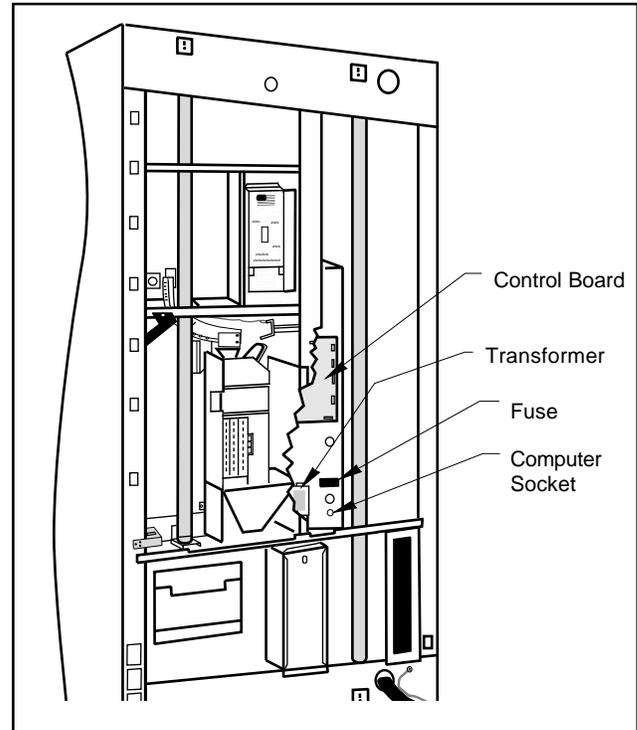
Figure 5.2

Removal of the Vender Door

1. Unplug the vender.
2. Disconnect the releasable wire tie by pressing down on the tab on the wire tie.
3. Disconnect all harnesses at the bottom of the door
4. Remove the inner door ground wire.
5. Remove the inner door by pushing down on the lower hinge pin and then pulling the door out from the bottom to allow it to drop off of the top hinge (this is easier with the inner door in the closed position).
6. Have someone stand at the front of the main door to balance it so it will not fall over.
7. Release the lever located at the top left of the cabinet near the top hinge.
8. Pick the door up off of the lower hinge
9. Remove the removable vandal panel (the left panel).
10. Pull out the spring-loaded latch pin on the bottom hinge on the inside of the cabinet and hold. Then push the bottom hinge back until the first stud is even with the cabinet.
11. Push down on the bottom hinge that is hanging out of the cabinet to release from its latch inside of the cabinet (This may require a little finesse).
12. Once the bottom hinge is loose pull it towards you and remove it from the cabinet and release the spring-loaded latch pin.

SECTION 5: MAINTENANCE

Reattaching the Vender Door

1. Pull out on the spring-loaded latch pin and hold.
2. Insert the bottom hinge into the hole on the bottom left of the cabinet and angle it down in order for the threadstud (with nut attached) to go through the hole on the Pin Guide.
3. Once the nut is through the hole on the Pin Guide, pull the hinge toward you to lock it into place and release the spring-loaded latch pin. (Make sure that the latch pin goes into the hole on the hinge.)
4. Have at least two people pick up the main door and set it down on the bottom hinge pin.
5. Once it is on the pin, line up the top hinge and push it into place. Once the hinge is in place, pull on the door slightly to be sure the hinge is secure.
6. Put the inner door on by first placing the top hinge into place at the top of the main door and then sliding the bottom into place and pushing the inner door hinge pin into the bottom of the door and locking it in place.
7. Put the removable vandal panel back on. (Be sure that it is between the cabinet and the cabinet vandal panel.)
8. Connect all of the harnesses at the bottom of the main door.
9. Put releasable wire tie back into place.
10. Reattach the ground wire to the inner door and the main door.
11. Plug up the vender.

Main Door Hinge Pin

Pin Guide QDD

Spring-Loaded Latch Pin

Internal View of the Bottom Door Hinge Mechanism
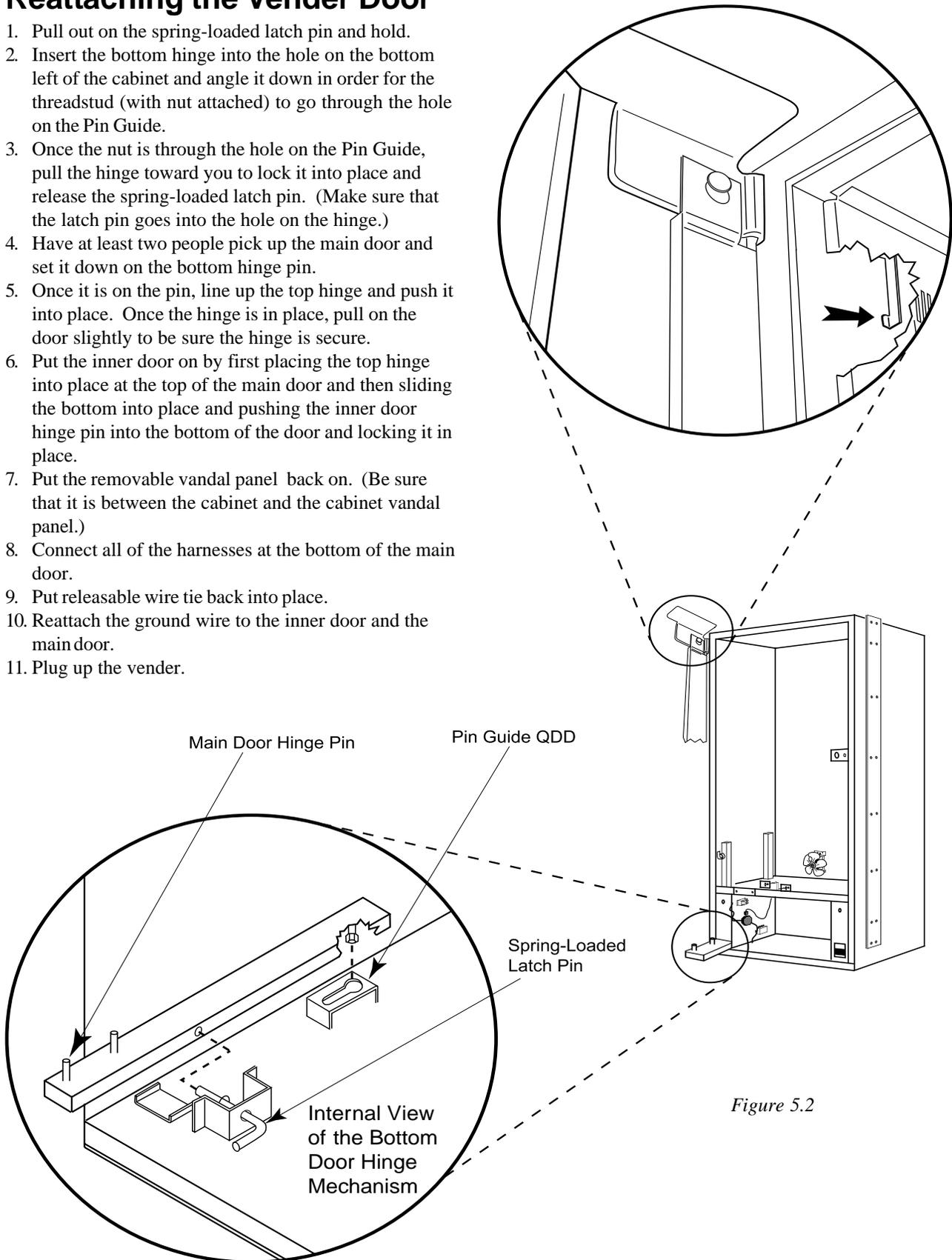
Figure 5.2

SECTION 5: MAINTENANCE

Lights

To remove the fluorescent lights, grasp light and lift upward. Remove the bottom of light tube from fixture, lower light tube and free from the top fixture, remove light.

Light Ballast

To remove ballast, unplug light ballast, remove the lights and remove the four screws holding the four light fixtures. Remove the one screw securing the light ballast, remove ballast.

Vend Rack Assembly (See Figure 5.5)

Remove the delivery chute (see "Delivery Chute" for more details). Prop chute against vender door. Remove latch strike assembly by removing three 3/8 inch bolts. Remove four 3/8 inch hex head bolts (two at the top of rack, two at lower rear) which secure vend rack. Slide vend rack out of vender cabinet.

Note:

1. Place a prop under the main door to keep vender from tipping over.

Spring-loaded case support can be turned either direction by pulling out and rotating.
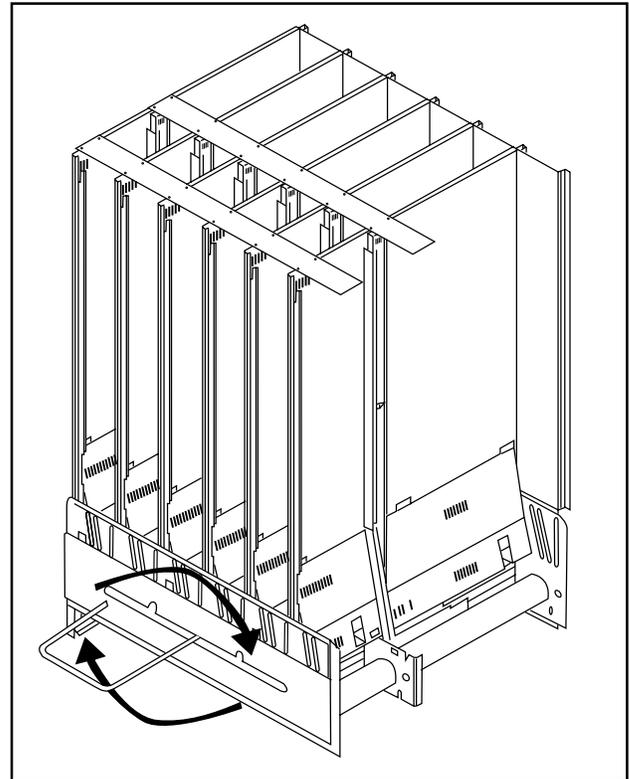
Figure 5.5

CAUTION: When removing the vend rack, main door should be supported or cabinet may fall over. Vend rack weighs 200+ lbs.

Figure 5.6

Closed Position

Open Position

Selection Switch

Optic Sensor Board

Control Board

Fuse

Transformer

Computer Socket

Door Switch
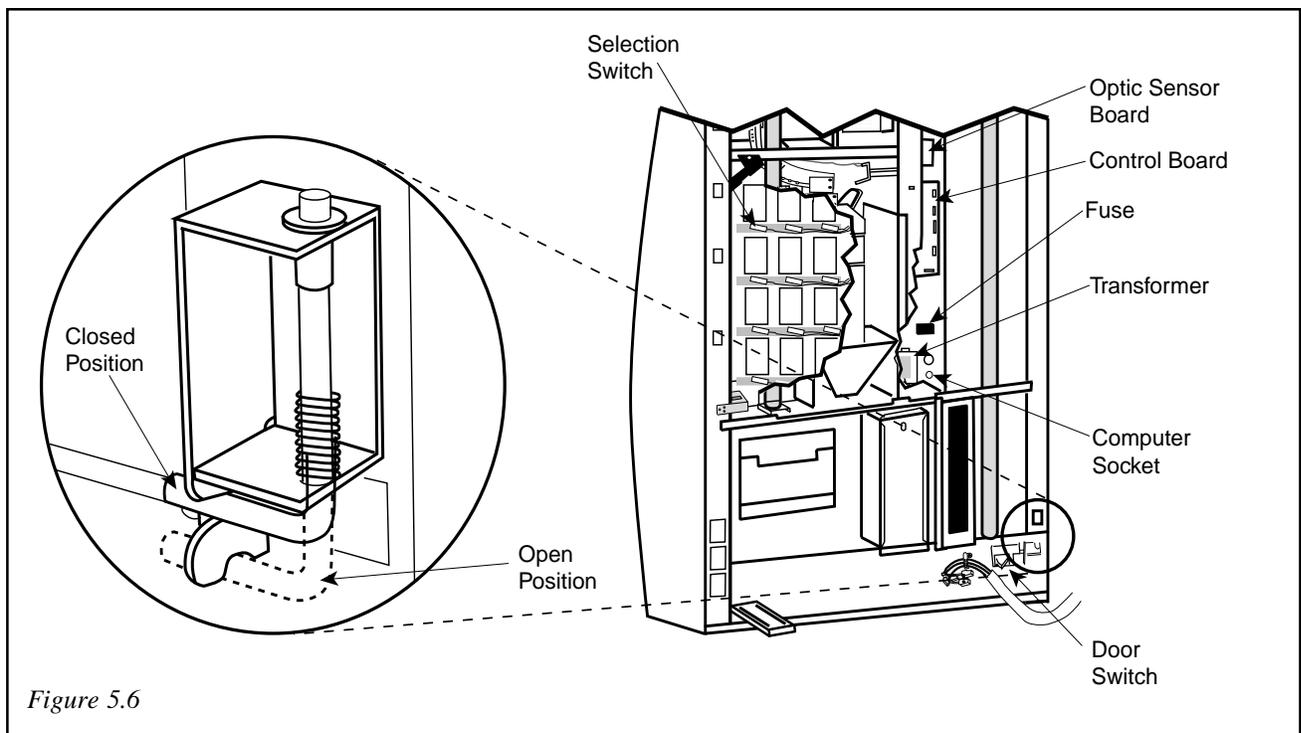
SECTION 5: MAINTENANCE

COOLING SYSTEM

Compressor
To remove the compressor as a sealed unit, first remove the delivery chute (see "Delivery Chute" section). Remove the two 3/8 inch bolts holding the compressor and condenser assembly. Remove the two screws and strap which secure the harness and cooling lines where they enter the refrigerated compartment. Remove the two screws from the sheet metal shroud to the left of the condenser coils. Remove the four screws securing the evaporator coil and pull the entire sealed system forward, being careful not to damage the drain tube.

Evaporator Fan
With the delivery chute removed (see "Delivery Chute" section of this manual), remove the sheet metal cover from the top of the evaporator coil by pushing back and lifting on the cover. Unplug the harness coming from the fan. Remove the two 3/8 inch bolts from the fan (one bolt per fan). Lift fan and remove.

Temperature Sensor
(Electronic Cold Control)
The temperature sensor is located on the rear cabinet wall, behind the evaporator coil. It is secured with two screws. It will be necessary to remove the delivery chute to access the temperature sensor.

Condenser Fan
From the back of the vender, locate the condenser fan and compressor assembly. Remove the bale strap and cover from the starter overload located on the compressor. Remove the condenser fan harness from the compressor. Remove the four screws that secure the fan assembly from the condenser. Remove fan assembly.

NOTE: Condenser coils must be kept unrestricted for maximum efficiency.

SECTION 5: MAINTENANCE

Trouble Shooting

The 20 Plus vender is equipped with a self-diagnostic feature to aid in the repair and maintenance of the vender. When servicing the vender, pay close attention to the digital display. When the vender door is opened the electronics will begin displaying any error codes that are stored in memory. If there are no errors, the display will read "nonE." See "Four-Button Programming" section of this manual.

To enter the Service Mode, press and release the Service Mode Button located on the controller. The display will read "Eror." If (ENTER) is pressed at the "Eror" prompt, the controller will enter the error display mode. If no errors have occurred since the last error reset, the display will show "nonE." If an error has been detected since the last error reset, the display will show the first error summary code that has occurred.

If (ENTER) is pressed, the controller will display the detailed error for the summary code. The (UP) and (DOWN) buttons will cycle through any remaining error detail codes. If (ABORT) is pressed while displaying any *detailed* code, the controller will return to the summary code. If (ABORT) is pressed while displaying any *summary* code, the controller will return to the code level.

NOTE: When troubleshooting errors with peripherals, the appropriate peripheral service manual(s) should also be consulted for further tests and corrective actions.

ERROR	ERROR CODE	DETAILED ERROR DESCRIPTION	TEST PROCEDURE	CORRECTIVE ACTION
C HAr (Coin Acceptor Error)	EE	More than 255 escrow attempts since the last coin was accepted.	Check escrow lever and associated mechanisms. Go to Open-door Mode and wait for 30 seconds. Manually clear the error	If vender returns to Sales Mode from Open-door Mode without input, replace changer/acceptor. If it stays in Open-door Mode and the manually-cleared error does not reoccur, system may be OK.
	nJ	Coin Jam.	Check changer/acceptor for jammed coins or other obstructions.	If no obstructions are apparent, replace changer/acceptor.
	LA	Low Acceptance Rate(more than 20% of the last 255 coins were rejectedas slugs)	Check changer/acceptor for obstructions or dirt. Drop coins in Sales Mode or Tube Fill Mode to test acceptance.	If no obstructions are apparent, and acceptance appears to be OK, this may be an indication of cheating attempts. If no obstructions are apparent andcoins do not accept, or acceptancerate is poor, replace changer/acceptor.
bUAL**	bC	Bill Communication Error	If changer or card reader is being used, check for "CC" or "rC" errors. Unplug machine and wait at least five seconds. Plug machine back in.	If there is no "CC" or "rC" error: 1) Check bill acceptor harness; 2) Replace bill acceptor. If there is a "CC" or "rC" error: 1) Check control board MDB harness.
	bFuL	Full bill stacker	Ensure bill cashbox is empty and that the cashbox is properly closed and in place.	If cashbox appears to be OK, replace bill acceptor.
	biLL	Motor is defective	No test available.	Replace bill acceptor.
	bJ	Bill jam error	Check bill acceptor for obstructions or dirt.	If no obstructions are apparent, replace bill acceptor.
	brCH	Bill acceptor ROM check sum error.	Unplug machine, wait at least five seconds, replug machine. Manually clear the error.	If error does not clear, replacebill acceptor.

*   *Error Code must be manually cleared. See "Eror" section of this manual for detailed instructions.*
**   *These Error Codes will be automatically cleared when the validator reports no errors and is enabled (the validator is "enabled" when it accepts money).*

SECTION 5: MAINTENANCE

ERROR	ERROR CODE	DETAILED ERROR DESCRIPTION	TEST PROCEDURE	CORRECTIVE ACTION
	bOPn	Open cash box.	Check that bill cashbox is closed and in correct position.	If cashbox appears to be OK, replace bill acceptor.
	bS	Sensor error.	Check bill acceptor for obstructions or dirt.	If no obstructions are apparent, replace bill acceptor.
	CC	Changer communication error.	If card reader/bill acceptor is being used, check for "rC" or "bC" errors. Unplug machine, wait at least five seconds, and replug.	If there is no "rC" or "bC" error: 1) Check changer harness. 2) Replace changer. If there is a "rC" or "bC" error: 3) Check control board MDB harness.
	tS	Tube sensor error.	Check changer tubes for blockage.	Clear tube blockage, if found. If no blockage found, replace changer.
	IC	Inlet chute blocked error. (no coins sensed in the acceptor for over 96 hours)	Check inlet chute for blockage. Drop coins in Sales Mode or Tube Fill Mode to test acceptance. Manually clear the error.	Clear inlet chute blockage. If no blockage found, replace changer. If acceptance rate is acceptable, system is probably OK. If acceptance rate is low or changer will not accept coins, replace changer.
	tJXX	Tube jam error.	Check changer tubes and payout for blockage.	Clear blockage, if found. If no blockage found, replace changer.
	CrCH	Changer ROM Checksum error.	Unplug machine, wait at least five seconds, replug machine. Manually clear the error.	If error does not clear, replace changer.
	CSF	Changer's scale factor is not valid for the machine configuration.l	Ensure that changer, bill acceptor, and card reader are all models for same country. Unplug machine, wait at least five seconds, replug machine.	If models are compatible, replace changer.
Crdr (Card Reader Error)	CrC	Card reader communication error.	If changer or bill acceptor is being used, check for "CC" or "bC" errors. Unplug machine, wait at least five seconds, and replug.	If there is no "CC" or "bC" error: 1) Check card reader harness; 2) Replace card reader. If there is a "CC" or "bC" error: 1) Check control board MDB harness.
	Crxy*	Card reader error. (see card reader manual for description of error codes)	No test available.	Refer to card reader manual for corrective action.
OLn On Line Module	OC	On line module communication (No communication for 5 sec.)		Proper communications
	Onc	On line network communication (Network is not responding, OLM can not call out)		Proper communications
	OI	On line module internal problem, causing improper functions (check sum, etc.)		
rUnd Remote Vend	rUC	Remote vend Mech. (No communication for 5 sec.)		Proper communications
S-d Selection/Display Device	SdC	Display device communication (No communication for 5 sec.)		Proper communications

*   Error Code must be manually cleared. See "Eror" section of this manual for detailed instructions.

SECTION 5: MAINTENANCE

ERROR	ERROR CODE	DETAILED ERROR DESCRIPTION	TEST PROCEDURE	CORRECTIVE ACTION
	SdXX	Error code number "XX" device specific		
rFrG	SEnS	Unplugged or defective temperature sensor error.	Check the temperature sensor connection of the control board to make sure it is plugged in. Check if it is wired properly and the pins are making contact.	If the sensor is unplugged, replug it. If it is miswired, replace the temperature sensor. If the connections are bad, attempt to repair them or replace the temperature sensor if it is unrepairable.
	CoLd	Temperature three or more degrees below the compressor cut out setting	1) Check the refrigeration unit before opening the vender's main door to see if it's running. 2) Open the vender's main door and see if the unit cuts off. 3) Make sure the vender's door switch is working properly. 4) Unplug one of the two white wires plugged into the refrigeration relay.	If upon unplugging one of the white wires, the unit stops: 1) Check the temperature sensor reading 2) Check Setp settings 3) Check two white wires for shorts from the control board. 4) If upon unpluging one of the white wires, the unit still runs; unplug one of the black wires. If the unit stops, replace refrigeration relay. If optional heater kit is not installed, one may be required. 5) If heater kit is installed and heater does not turn on (heater relay does not click upon energizing with the relay test mode), check the two white wires from the board to the heater relay for voltage (should be +24VDC on one of the two wires). Check the other wire for continuity between the control board and the relay. If voltage is OK, replace relay. Otherwise, replace control board.
	Hot	Cabinet termperature is above the limit	Procede with normal refrigeration trouble shooting.	
	Htr	Heating System has failed to increase 1 degree per hour	Procede with normal refrigeration trouble shooting.	
	CnPr	Compressor is not cooling within 30 minutes of turning on.	1) Check the refrigeration unit before opening the vender's main door to see if it's running. 2) Open the vender's main door and check the display to see that the door switch is working as normal. 3) Access the "rFrG" setup mode and check the "SetP" settings. 4) While in the "rFrG" mode, change "dSP" to '1' to show the temperature on the display during the greeting and see if it's correct. 5) While in the "Test" mode, access the "rELy" mode and turn the compressor on.	1) If the unit is running, clear the error and see if it reoccurs. 2) If the display does not function as normal, check the door switch circuit. 3,4) Change any settings if necessary and check temperature sensor operation. 5) If the unit does not run (refrigeration relay not clicking upon energizing with the relay test mode), check the two white wires from the board to the refrigeration relay for voltage (should be 24+ VDC on one of the two wires). Check the other wire for continuity between the control board and relay. Note: The compressor relay test mode must be on to check voltage.

*   *Error Code must be manually cleared. See "Eror" section of this manual for detailed instructions.*

ERROR	ERROR CODE	DETAILED ERROR DESCRIPTION	TEST PROCEDURE	CORRECTIVE ACTION
SEL (Selection)	SSXX	Selection switch has been closed for more than 25 seconds (where 'XX' indicates selection switch number).	Check the selection switch number shown in the detailed error code 'XX' to see if: 1) the button is sticking; 2) the switch is sticking/defective; 3) the harness is wired wrong/shorted.	Try to correct the problem if one of the three is found. If you can't correct it, then replace the component in question.
StS (Space-to-Sales Error)	UAXX	A column is unassigned.	Access Space-to-Sales Mode and go to custom Space-to-Sales.	Change space-to-sales setting as required. In some situations, it may by quicker to completely reset all
COLJ (Column Jam Error)	CJXX*	Column jam error. (where 'XX' indicates the the column number of the jam)	Check column for problem. Enter "test" and vend one time from column.	Correct problem. Clean contamination. If two or more products are received, increase chute sensor sensitivity, or replace chute sensor. To increase sensitivity, turn screw clockwise. See "Chut" section.
Ctrl	dS*	Door switch error.	Check the vender's door to see it it's sticking or miswired. If nothing is found at the door switch, check two wires from door switch to control board to see if they're pinched or shorted.	Replace the door switch, if defective. Repair or replace the door switch harness to the control board.
ACLo*		Average rectified voltage was under 22VDC for at least 30 consecutive seconds.	Check for low voltage at the wall outlet at the unit startup with all else on circuit running, in an "extreme" condition.	If low voltage can't be found on the wall outlet in an extreme condition, check for shorts in the vender.
rAN (Set Up Info Corrupted)	rM*	Ram Error.	No test available	If error shows up frequently, replace control board and contact Royal Vendors.
	SF	Scale factor error	Check the connections of changer harness; make sure changer is plugged up and working.	Make corrections to harness or replace the changer if necessary.
		IS Inlet sensor blocked		Check changer harnessing for cut, pinched or crimped wires. Replace changer.
		IB Inlet is blocked		Check inlet for blockage; if nothing is found. Check changer harnessing for cut, pinched or crimped wires. Replace changer.

* Error Code must be manually cleared. See "Eror" section of this manual for detailed instructions.

SECTION 5: MAINTENANCE

ERROR	PROBABLE CAUSE	CORRECTIVE ACTION
COIN ACCEPTANCE/ PAYOUT (RECORD ALL ERRORS ON PAPER)		
Coin mechanism will not accept coins.	No power to control board.	Check to make sure the LED and the sign lighting are lit. Check fuse and transformer.
	Harness from coin mech to board is cut or disconnected.	Using a meter, check each wire for continuity and to ground.
	Short in coin mechanism.	Unplug all connections from the control board except the transformer and coin mech connections. Test acceptance. If it accepts, replug each connection one at a time and test acceptance after each.
	Acceptor is dirty or other problem may exist (not tuned)	Clean acceptor or contact your local coin mech dealer.
	Short in control board.	If above procedures do not work, replace controller
No acceptance or Rejects a percentage of good coins.	Coin return lever pressing down on acceptor's coin plunger.	Make sure changer is mounted correctly and the coin return lever is in the proper position.
	Acceptor is dirty or foreign matter is in the path.	Clean acceptor or contact dealer.
	Coin changer is improperly tuned (if tunable).	Contact manufacturer for tuning.
	Defective controller board.	Replace/test controller.
Always accepts coins but gives erratic/no credit.	IF NO CREDIT: Defective harness between coin mech and control board (will have "CC" error).	Check harness for cut wires or wrong/bad connections. Test each wire for continuity or test to ground. If found to be defective, replace.
	IF ERRATIC OR NO CREDIT: Acceptor or coin mech.	Replace coin mech and test. If OK, then check the following:
	IF NO CREDIT: Defective controller.	Replace/test controller.
Changer will not payout coins.	Defective harness between coin mech and control board.	Test vender's manual coin payout. If vender won't pay out using the CPO mode or during sales, check harness for cuts, bad continuity or wrong connections. If defective, replace and test.
	Defective coin mech.	Replace coin mech and test. If it pays out, the coin mech was defective.
	Defective controller	If coin mech won't payout coins manually in the CPO mode or during the Sales Mode and the above two procedures have failed, replace the control board and test payout both in the CPO mode and during a sale.
	Changer payout buttons are disable while door is closed or while in Open-Door Sales Mode	Enter the Service3 Mode or access the Coin Payout Mode ("CPO").

SECTION 5: MAINTENANCE

ERROR	PROBABLE CAUSE	CORRECTIVE ACTION
BILL ACCEPTANCE		
Bill Acceptor will not pull bill in	No Power to validator	Unplug vender for 10 seconds and replug to see if bill acceptor cycles. If not, check acceptor harnessing or replace the bill acceptor.
	Wrong acceptor harness or wires of the harness are in the wrong positions.	Make sure that the acceptor harnessing is correct for your style acceptor and that it's wired properly.
	Acceptance disabled by coin mech (if present), or bad harnessing.	Make sure that the coin mech is plugged in (accepts coins) and that the coin tubes have enough coins to enable bill acceptance.
	Coin Mech is not operative.	Make sure that the changer harnessing is correctly connected and has continuity. Repair or replace if necessary.
	Replace acceptor and test. If acceptor accepts, bill acceptor was defective.	Replace bill acceptor.
Bill Acceptor takes a bill not establishing a credit.	Defective acceptor harness (credit not getting from acceptor to control board through the harness).	Make sure that the acceptor and harnessing is correct for you rstyle of acceptor and it is plugged in and wired properly.
	Defective acceptor.	Replace/test acceptor.
	Defective controller.	Replace/test controller.
Bill Acceptor takes a bill and credits but not erasing credit	Defective/wrong acceptor interface harness. Defective bill acceptor.	Refer to bill acceptor service manual or bill acceptor representative. Replace acceptor and test acceptance and erasure of credit.
	Defective controller.	Replace/test controller for erasure of credit.
Acceptor takes a bill and allows payback of coins without a selection.	Controllers configurations not set properly.	Access vender confiuration modeand check and "Forced Vend" setting.
Vending Problems		
Multiple Vending	Depth settin gnot set correctly in SdEP mode. (May be set to single depth.)	Enter SdEPMode and check setting to be correct. Refer to "SdEP" section of this manual.
Wrong product vending upon selection.	Misload by vender loader.	Ensure that all product within each column is the same.
	Space-to-Sales not set properly.	Look for StS error. Check or reset Space-to-Sales.
	Miswired selection.	Check the wiring from the controller to the selection switches.
	Defective controller board.	Unplug the sensors connection from the control board. Watch LED. If the adjustment LED stays on, replace defective controller.
Will vend from some but not all columns (allows refund or 2nd choice)	Select button, switch, or harnessing.	Check the selection switch. And trace the selection harnesses back to the control board. Replace if necessary.
Complete sold out condition	Timer is enabled or StS has been cleared (CLr)	Disable timer control or program StS

SECTION 5: MAINTENANCE

ERROR	PROBABLE CAUSE	CORRECTIVE ACTION
MISCELLANEOUS PROBLEMS		
Display shows sold out immediately upon pressing select button of full column (sold out not clearing).	Door switch wiring incorrectly connected or cut/pinched. Door Switch. Control Board.	Check for cuts on the 2 door switch wires going from the switch to the control board. Also check for bad connections. Check the door switch to see if it's defective. Use a meter to measure for continuity between Com./N.O. positions and Com./N.C. positions. Check control board by shorting across the two pins for the door switch at the (P5) pin position on the board. Does this clear the sold out condition? If it doesn't, replace the control board.
Vender Appears Dead; No Digital Display and No Lights	Defective main harness. Secondary power harness to the transformer. Lights defective.	Repair main harness or replace. Repair or replace secondary power harness. (See Interconnect Drawing, this section)
No Digital Display; Vender Lights On	Transformer not properly connected or defective.	Check transformer connection to Check power from transformer controller board. (See Interconnect Drawing, this section) Replace if necessary.
	Defective display or display harness.	Check display and display harness and replace if necessary.
	Defective controller board	Replace controller board.
Vender Scrolls Message On Display But Does Not Accept Money	Changer out of tune. Defective changer. Defective controller board.	See "Tuning Changer." Replace changer. Replace board.
Vender Accepts Money But Does Not Credit	Defective changer. Defective controller board.	Replace changer. Replace board.
Vender Accepts And Credits Money But Does Not Vend (Does Not Indicate a Sold-Out.	Defective selection switch. Defective selection switch harness. Defective controller board.	Replace selection switch. Repair or replace harness. Replace controller board
Vender Delivers Wrong Product	Vender loaded wrong. Vender Space-to-Sales set wrong	Correct loading. See "StS".
	Defective controller board.	Replace controller board.
Flashing 8888's on the LED.	Chips on control board not seated properly	Seat the chips down properly.
	Bad LED connection	Scrape the pins on the LED
	Defective control board.	Unplug everything from the board except the LED and power in. If the 8888's remain then replace the board
	Defective components.	If the 8888's have disappeared from the previous step, then begin plugging up harnesses one at a time. Replace whatever causes the 8888's to reappear.
Solid 8888's on the LED	Defective LED	Replace LED and/or harness
	Defective control board.	Replace control board.

SECTION 5: MAINTENANCE

ERROR	PROBABLE CAUSE	CORRECTIVE ACTION
ELECTRONIC REFRIGERATION		
Refrigeration unit will not run. The cabinet temperature reads 255F or 17F	Defective temperature sensor.	1) Check connection 2) Replace temperature sensor.
Vender will not display a temperature when DSP is set to 1.	Defective temperature sensor. Defective control board	Unplug the existing sensor and plug the new sensor up and ground it to the board. Hold down the door switch and see if the LED displays a temperature. If it does not display a temperature, replace the board.
Refrigeration unit will not run.	Defective unit.	Plug the unit directly to the wall outlet to see if it runs and cools. If not, then replace the unit.
Unit will only run in the compressor relay test mode. (Located under tEST)	Defective door switch	Open and close the door to make sure the LED scrolls. If not then check the door switch, harness, or control board.
	Defective temperature sensor.	Follow the same steps detailed above about the temperature sensor.
	Wait the 5 to 10 minute delay once the door is closed	Wait to see if the unit comes on.
	Defective control board.	If unit still does not come on, then replace the control board
Unit will not run in the compressor relay test mode.**NOTE: Leave the compressor relay test mode on, in order to check for voltage.	Defective control board.	Check for 24VDC across pins 1 and 3 of the control board. These are the large set of pins that connects with the regulator board. If no voltage or incorrect voltage is found, then replace the control board.
	Defective adapter harness.	Check wires 1 and 3 for the same voltage as above. Replace if incorrect.
	Defective regulator board.	Check for 24VDC at the top of the regulator board across pins 1 and 3. Replace if incorrect.
	Defective relay harness	Check for 24VDC at the relay across the 2 wires with pink connectors. Replace if incorrect.
	Defective relay	Check for 110VAC on the contact side of the relay. Replace if incorrect.
Refrigeration unit constantly runs	Defective door switch	Upon opening the door, the LED should not read "Ice Cold...". If it does, then replace the door switch
	Defective control board	Replace the control board.
	Adapter harness wired incorrectly.	Check to make sure the harenss is wired 1 through 6. Correct the wires if wired wrong.
	Defective relay. Contacts welded together	Unplug one of the wires with the pink connectors from the relay. Also unplug the 110VAC side of the relay. If the unit cuts off, then replace the relay.
	Defective main power cord	If the unit continues to run after unplugging everthing from the relay, replace the junction block

ERROR	PROBABLE CAUSE	CORRECTIVE ACTION
Evaporator freeze-up	Check the steps above if the unit runs when the door is open.	See above.
	Evaporator fan not running	Check wiring to evaporator fan. Check for 110VAC. If no voltage is found, replace the junction block. If the correct voltage is found, replace the evaporator fan motor.
	Air leaks around the inner door or port body.	Check for condensation around the inner door for air leaks. Ensure the door is tightened down far enough. Make sure the port door is not held open.
	Mullen area not properly sealed (area where the harnesses enter the cabinet).	Apply permagum.
	Drain tube clogged	Check to make sure water can freely flow through the drain tube.
	SETP set too low	Increase the SETP to 40 degrees F
	Refrigeration unit not charged properly.	Replace unit.

ELECTRONIC REFRIGERATION TROUBLESHOOTING FLOW CHART

START HERE

is unit running with door closed? — **yes** → open door & record errors*

did unit quit running upon opening door? — **yes** → [to evap. fan motor running path]

is the evaporator fan motor running? — **yes** → is the evap. fan blade intact? — **yes** → check to ensure that the evap. coils are not frozen (if so, thaw) → change "dsp" setting to "1" to show evap. air temp. on display

is unit running with door closed? — **no** → open door & record errors*

open door & record errors* → plug unit into wall outlet

plug unit into wall outlet → did unit start and continue to run?

did unit start and continue to run? — **no** → replace unit → go to final phase

did unit start and continue to run? — **yes** → use controller "cnp" relay test

did unit quit running upon opening door? — **no** → did unit quit running?

did unit quit running? — **no** → replace refrigeration relay → go to final phase

did unit quit running? — **yes** → look for a short in one of these two white wires

unplug 1 of the 2 white relay wires (st1 & 2) from the refrig. relay

is a short found? — **yes** → replace refrigeration relay → go to final phase

is a short found? — **no** → plug all harn. back. unplug connection at regulator board for the ref. relay

is refrig. unit off? — **yes** → [to replace refrigeration relay]

is refrig. unit off? — **no** → plug all harn. back. unplug connection at main cont. board for the reg. board

is the evaporator fan motor running? — **no** → check voltage to the evap. fan motor

is the evap motor receiving 110? — **no** → replace main wiring harness → go to final phase

is the evap motor receiving 110? — **yes** → replace evaporator fan motor → go to final phase

is the evap. fan blade intact? — **no** → repair/replace evap. fan blade and/or motor → go to final phase

Setp 35 f → is this setting correct? — **no** → program correct settings → go to final phase

is this setting correct? — **yes** → replace defective temp. sensor → go to final phase

change "dsp" setting to "1" to show evap. air temp. on display → is the temp. shown accurate? — **yes** → Setp 35 f

is the temp. shown accurate? — **no** → check temp. sensor harness for cuts

is harness cut, smashed or disconnect.? — **no** → replace defective temp. sensor

is harness cut, smashed or disconnect.? — **yes** → repair harness or replace temp. sensor → go to final phase

did unit start and continue to run? — **no** → check voltage at two white relay wires (st1 & 2)**

do you get 24-28 DC volts? — **yes** → Check for 110 V at power cord → replace refrigeration relay → go to final phase

do you get 24-28 DC volts? — **no** → check voltage between pins 1 & 3 from regulator board** to relay

is refrig. unit off? — **yes** → replace main control board → go to final phase

is refrig. unit off? — **no** → replace regulator board → go to final phase

do you get 24-28 DC volts? — **yes** → Check Regulator Board Harness → check harness and connections between reg. board and relay → fix faulty relay harnessing → go to final phase

do you get 24-28 DC volts? — **no** → check voltage between pins 1 & 3 from main board** to regulator board

do you get 24-28 DC volts? — **yes** → replace regulator board → go to final phase

do you get 24-28 DC volts? — **no** → replace main control board → go to final phase

did unit start and continue to run? — **yes** → Is the setp 35 f?

Is the setp 35 f? — **yes** → change "dsp" setting to "1" to show evap. air temp. on display

is the temp. shown accurate? — **no** → check temp. sensor harness for cuts

is harness cut, smashed or disconnect.? — **yes** → repair harness or replace temp. sensor → go to final phase

is harness cut, smashed or disconnect.? — **no** → replace defective temperature sensor

is the temp. shown accurate? — **yes** → change main control board → go to final phase

replace defective temperature sensor → is the temp. shown accurate? — **yes** → go to final phase

is the temp. shown accurate? — **no** → repair harness or replace temp. sensor → go to final phase

*normal errors are "cnp" and "cold" for this type of problem.

**for voltage to be read. you must first enable the compressor (via the "rely" mode.

***for this type of problem it is recommended that the settings be setp 35 f.

FINAL PHASE

Start

check "setp 35 f" settings and make sure that "dsp" is set to "1" to track the ref. units temperature progress

close vendors door and wait approx. 5 minutes to see if ref. unit comes on

did the unit come on? — **no** → change main control board

did the unit come on? — **yes** → wait to see if the ref. unit stops when the display registers the "cuto" setting 28 f

start final phase → did the unit quit running? — **no** → change main control board

did the unit quit running? — **yes** → problem solved

Rev. B
6/99

exploded views

CONTROLLER

READY TO VEND INDICATORS

Control Board and Harnesses

Item #	Description	Part Number	Qty.
1	KO Control Board	836126	1
2	Temp Sensor - Cabinet	822046	1
	Temp Sensor - Door	822048	1
3	Door Switch Harness	842229	1
4	Options (Contact RV Cust. Service)		
5	Refrigeration Relay - Cabinet	842237	1
	Refrigeration Relay - Door	842235	1
6	Door Mech Harness	842232	1
	12 Column Mech Harness	842241	1
7	Power Supply - Cabinet	842238	1
	Power Supply - Door	842239	1
8	Serial Changer Extension (MDB)	842244	1
9	13 Select Harness	842242	1
10	Control Board to PC Board Harness	842266	1
	PC Board to Sensor Harness	842268	1
11	L.E.D. Harness	842081	1
12	External Dex Harness	842095	1

SECTION 6: EXPLODED VIEWS

Evaporator Fan Motor Assembly
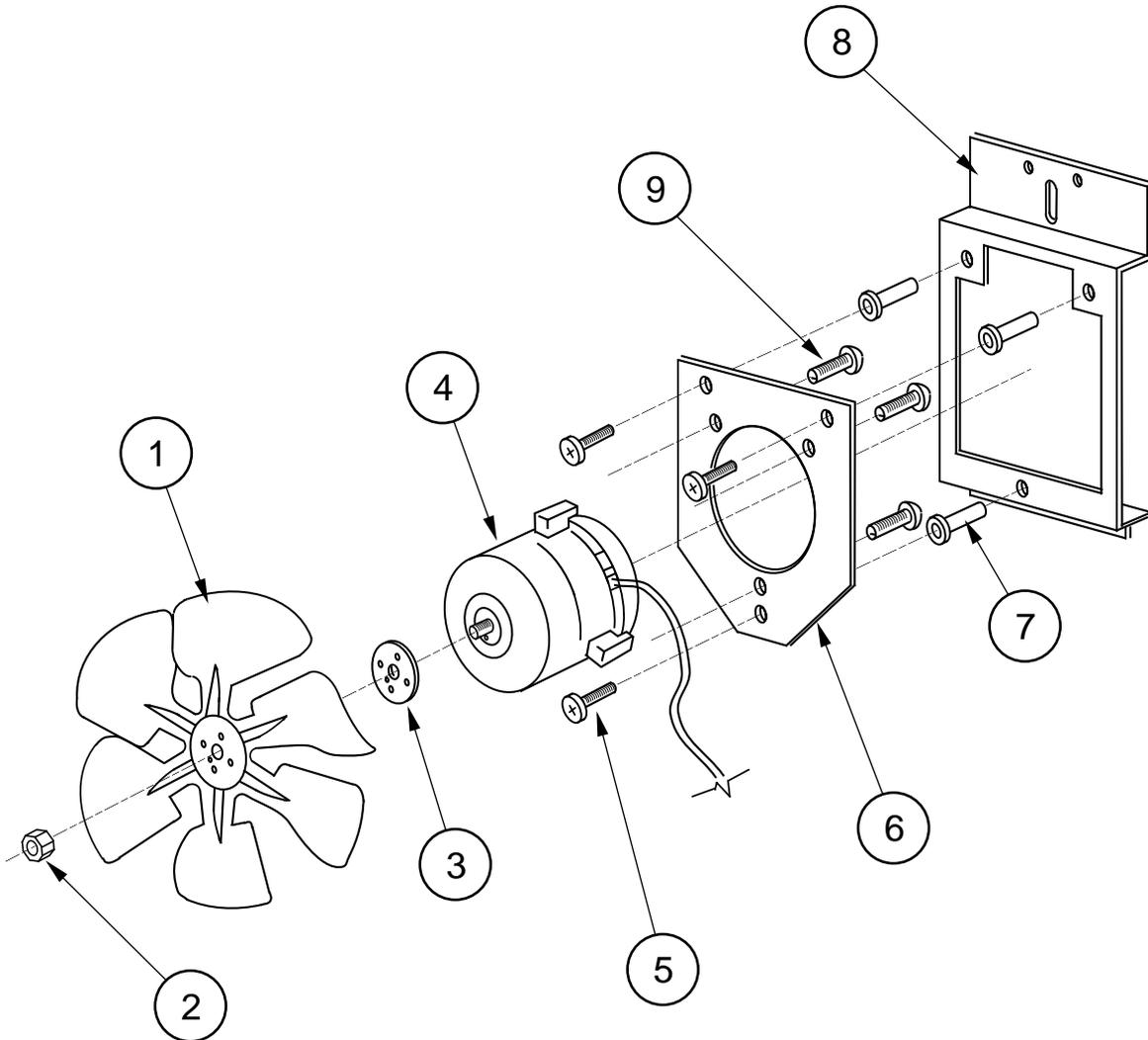
Item No.	Description	Part Number	Qty.
1	Fan Blade	810045	1
2	Nut, 1/4-20	905002	1
3	Silencer	-----	1
4	Motor, 35W/115V	839028	1
5	Machine Screw #8-32x1/2"	901038	3
6	Fan Plate	010058	1
7	Well Nut, #8-32	905026	3
8	Fan Mounting Bracket	010057	1
9	Sems Screw #8-32x3/8"	901011	3
1-9	Fan Assembly	210400	1

SECTION 6: EXPLODED VIEWS
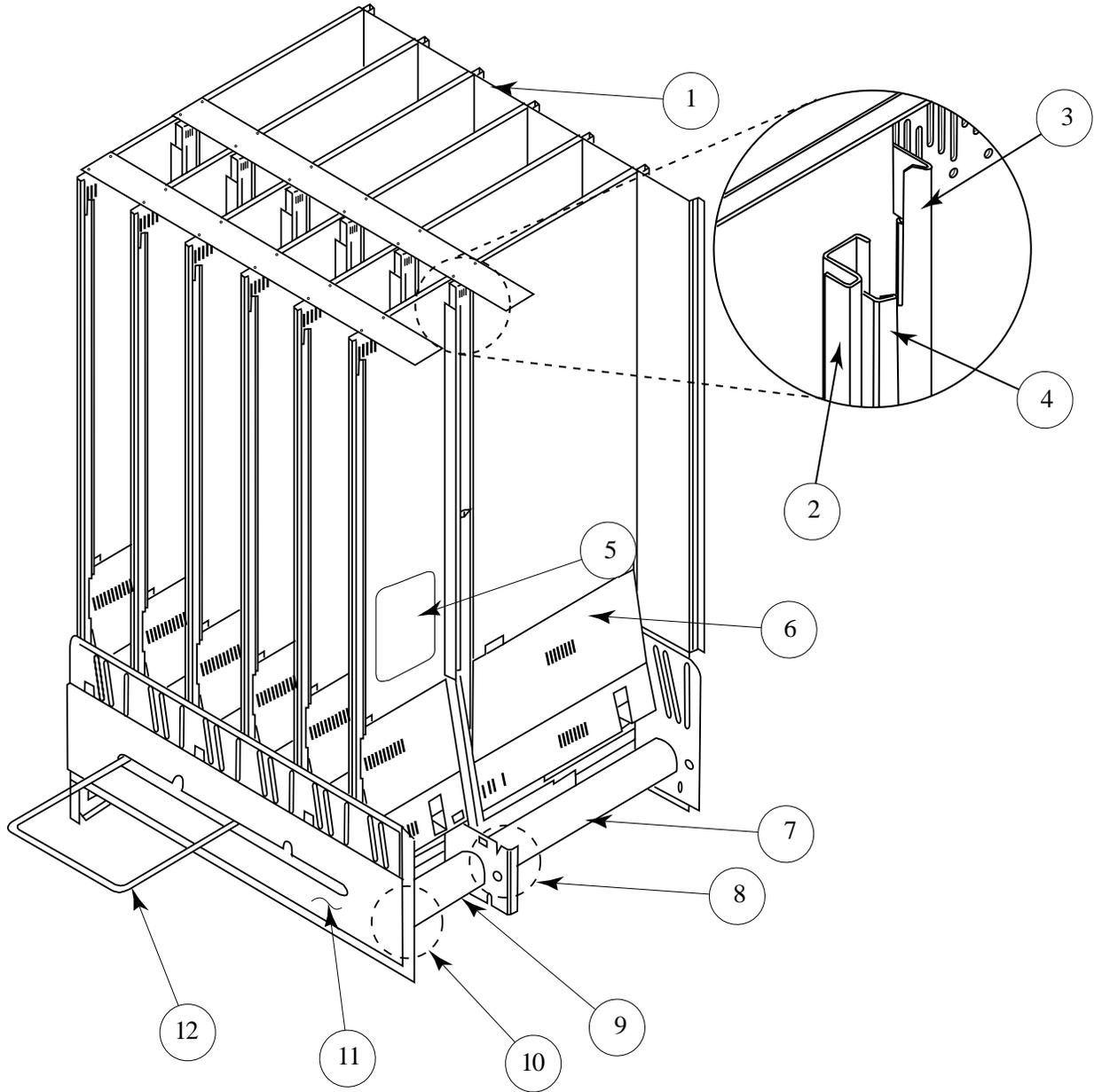
Item #	Description	Part #	Qty.
1	20 PLUS Stack Assy	296710	1
2	Divider, Left	296708	6
3	Retainer, Rear Left	296712	6
4	Cap Stop	296715	12
5	Anti Friction Sheet	915197	36
6	Baffle	296707	6
7	Rotor - Rear	813025	6
8	Rear Vend Motor High Torque	839032	6
9	Rotor - Front	813024	6
10	Front Vend Motor Low Torque	839031	6
11	Harness Shroud	296724	1

Item #	Description	Part #	Qty.
12	Case Support	811040	1
•	Spring, Case Support	914028	1
•	Stiffener, Partition	296722	6
•	Bracket, Case Support	296723	2
•	Front Left Retainer	210745	6
•	Front Right Retainer	210746	6
•	Divider, Right	296709	6
•	Retainer, Rear Right	296713	6
•	Insert, Divider	296717	6
•	Rotor Rod	803048	12
•	Bearing Rotor / Rear	915222	12
•	Retainer Clip	810074	12

Rear View of Vender

Delivery Chute
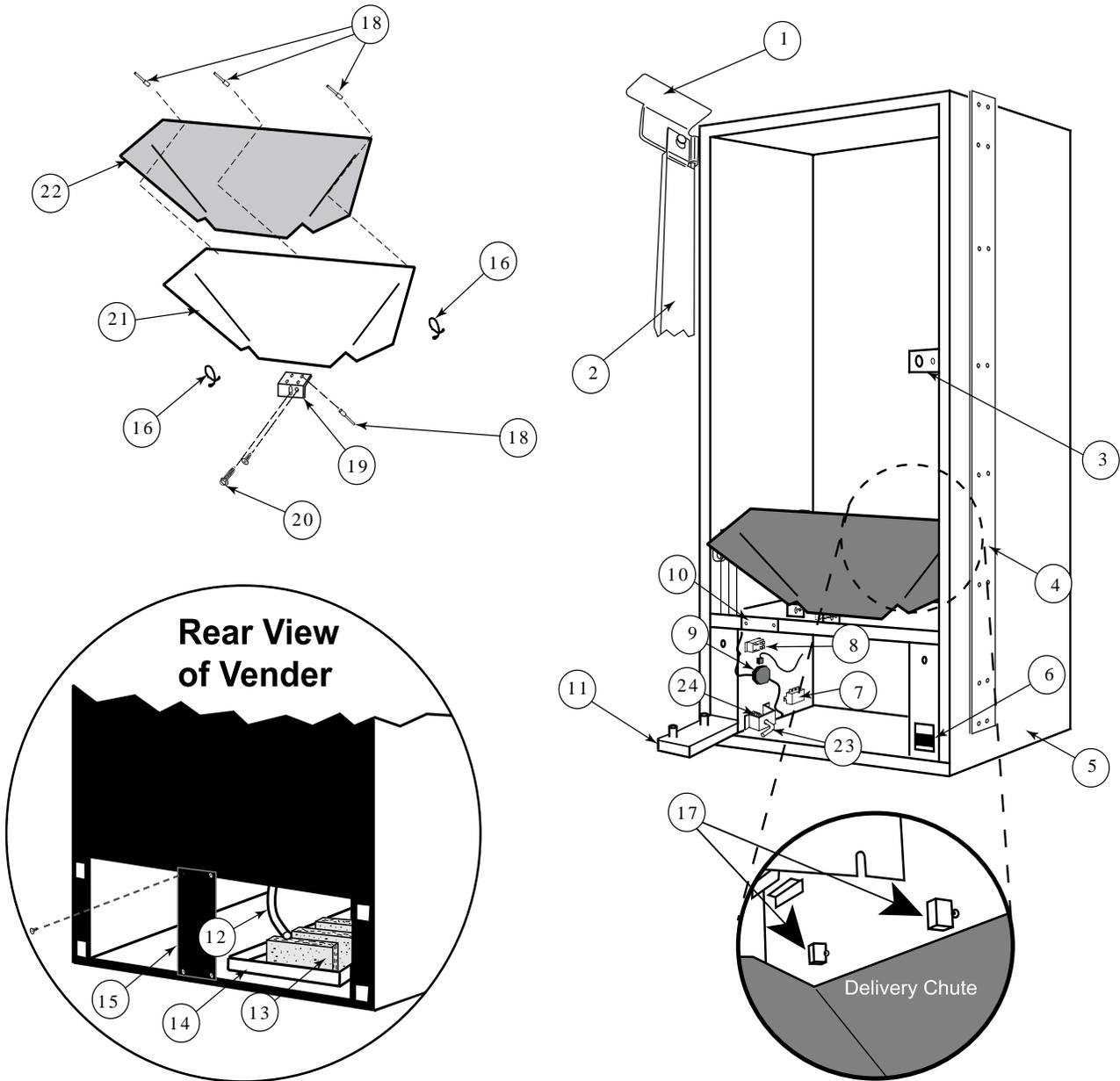
Item No.	Description	Part Number
1	Top Hinge, 20 PLUS Marketing	810069
	-Landscape	810070
2	Left Vandal Panel, 20 PLUS, 79"	296006
	(removeable)	
3	Latch Strike Assy	010030
4	Right Cabinet Vandal Panel, 79"	290004
5	Cabinet Assy 79"	296260
6	Door Lift Bracket	296219
7	EMI Filter	842061
8	Relay	836065
9	Main Wiring Harness	842234
10	Wiring Plate Cover	010002
11	Bottom Door Hinge, Marketing	810071
	-Landscape	810072
12	Drain Tube	815134
13	Sponge	815037

Item No.	Description	Part Number
14	Condensate Pan	815368
15	Rear Baffle	010037
16	Tension Clips	916059
17	Optic Sensor with harness	822049
18	Rivet 1/8"	908004
19	Chute Locator Bracket	141014
20	Bolts 1/4-20x1"	901003
21	Delivery Chute	296003
22	Delivery Chute Liner	815356
23	Latch Pin	811039
24	Latch Pin Spring	914026
•	Reflectors	815369
•	Non Reflector Backer	815370
•	Flex Chute Pad 1X4X.75	826023
•	Flex Chute Pad 1X11X.75	826022

SECTION 6: EXPLODED VIEWS
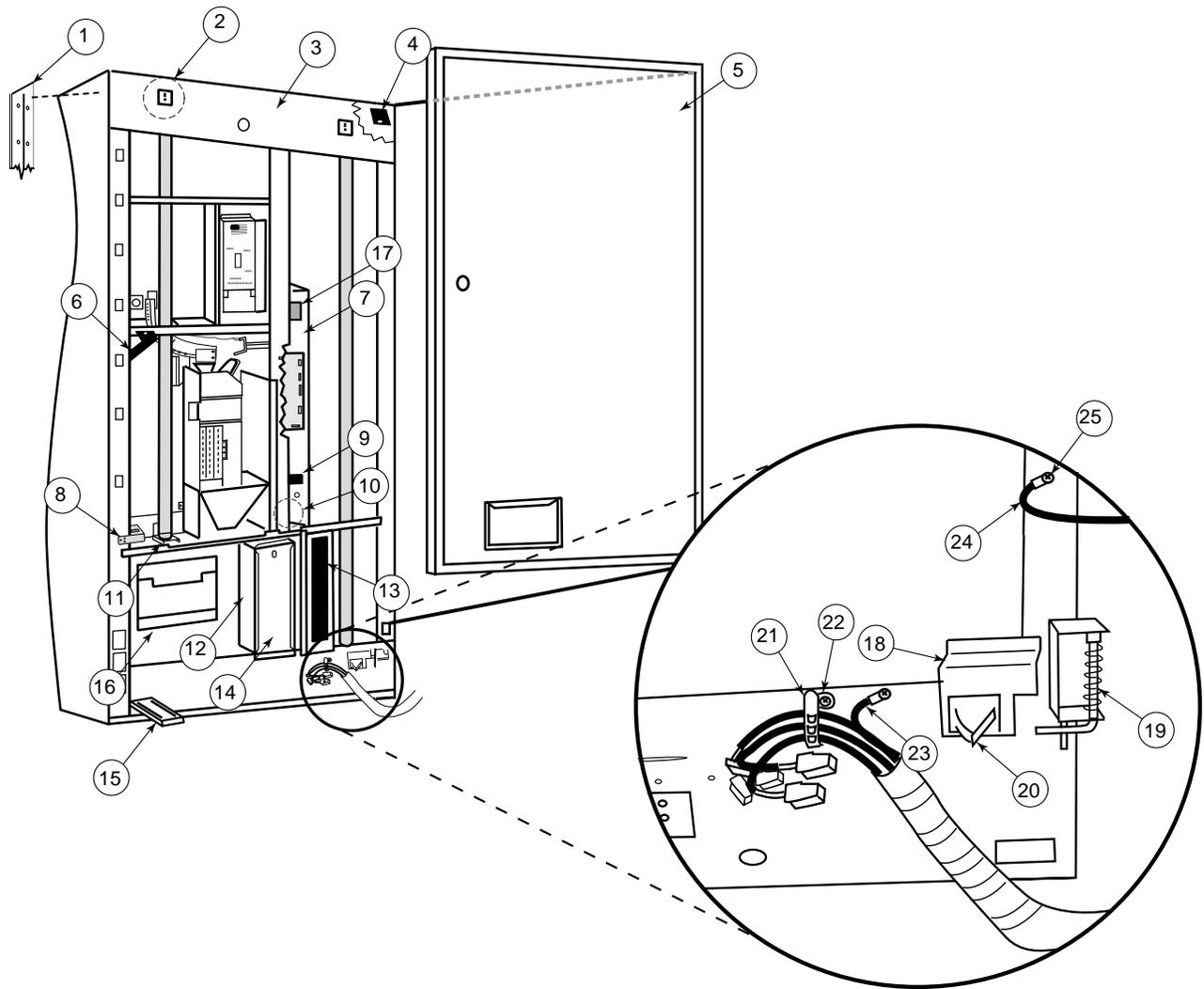
Item No.	Description	Part Number
1	Right Vandal Panel 79"	290585
2	Top Lamp Bracket, Marketing	290533
3	Door Assy, 20 PLUS 79"	296533
4	Water Diverter (Top Hinge)	290575
5	Inner Door Assembly	296610
6	Water Diverter, Marketing	815298
7	Control Board Mounting Panel, Marketing	290523
8	Burst Open Latch, Marketing	290546
9	Fuse Box Assy.	842219
10	Transformer Assy.	842147
11	Lamp Bracket (Bottom), Marketing	290534

Item No.	Description	Part Number
12	Coin Box Housing, Marketing	290526
13	Ballast Panel Assy., Marketing	290571
14	Coin Box	815347
15	Door Lift	296509
16	Port W/A, Marketing	290540
17	Optic-Sensor Board	836124
18	Door Switch Bracket, 20 PLUS	296502
19	Bottom Door Hinge (Inner Door)	296504
20	Door Switch	835019
21	Releaseable Cable Tie	916082
22	Cable Mount	916083
23	Ground Wire with Tab	842271
24	Ground (Inner Door)	GD 7-1
25	Grounding Tab	940063
•	Port Box Padding, Marketing	826017

Rear Door Miscellaneous Assemblies

Lamp

Coca Cola Marketing Vender *(Rear Door Miscellaneous Assemblies)*

Item No.	Description	Part Number
1	Control Panel Strap, Marketing	290582
2	Validator Divider, Marketing	290541
3	LED Assy, Marketing	291525
4	Coin Return Lever Assy, Marketing	291529
5	Lever Stop, Marketing	290544
6	Control Panel Brace, Marketing	290529
7	Changer Shield, Marketing	290525
8	Coin Return Lever, Marketing	161507
9	Changer Door Assy, Marketing	290562
10	Select Switch	835001
11	Switch Carrier Strip, Marketing	815273
12	Coin Chute Assy, Marketing	290564
13	T-Handle Brace, Marketing	290539
14	Hole Block Cover, Marketing	290555
15	POS Window Plate, Marketing	290535
16	T-Stud Sealer Washer	915258
17	Bulkhead, Top	290515

Item No.	Description	Part Number
18	Validator Support	291543
19	Cable Sleeve	906015
20	Coin Return Hinge Bracket	290543
21	Button Channel, Marketing	290506
22	Cable	911038
23	Feature Button Bracket	290512
24	Feature Button Plate	290538
25	Bulkhead, Bottom	290514
26	Coin Chute Support	290542
27	T-Bolt	901052
•	Validator Guard, Marketing	290101
•	Painted Hole Block Cover	290108
•	LED Shroud, Marketing	929031
•	Select Button Spring, Marketing	914024
•	Red Carriage Bolt	901051
•	Red Pop Rivet	908015
•	Validator Filler	931361
•	Validator Cover with Studs	291526

SECTION 6: EXPLODED VIEWS

Coca Cola
Marketing Vender

Rear View
of Button
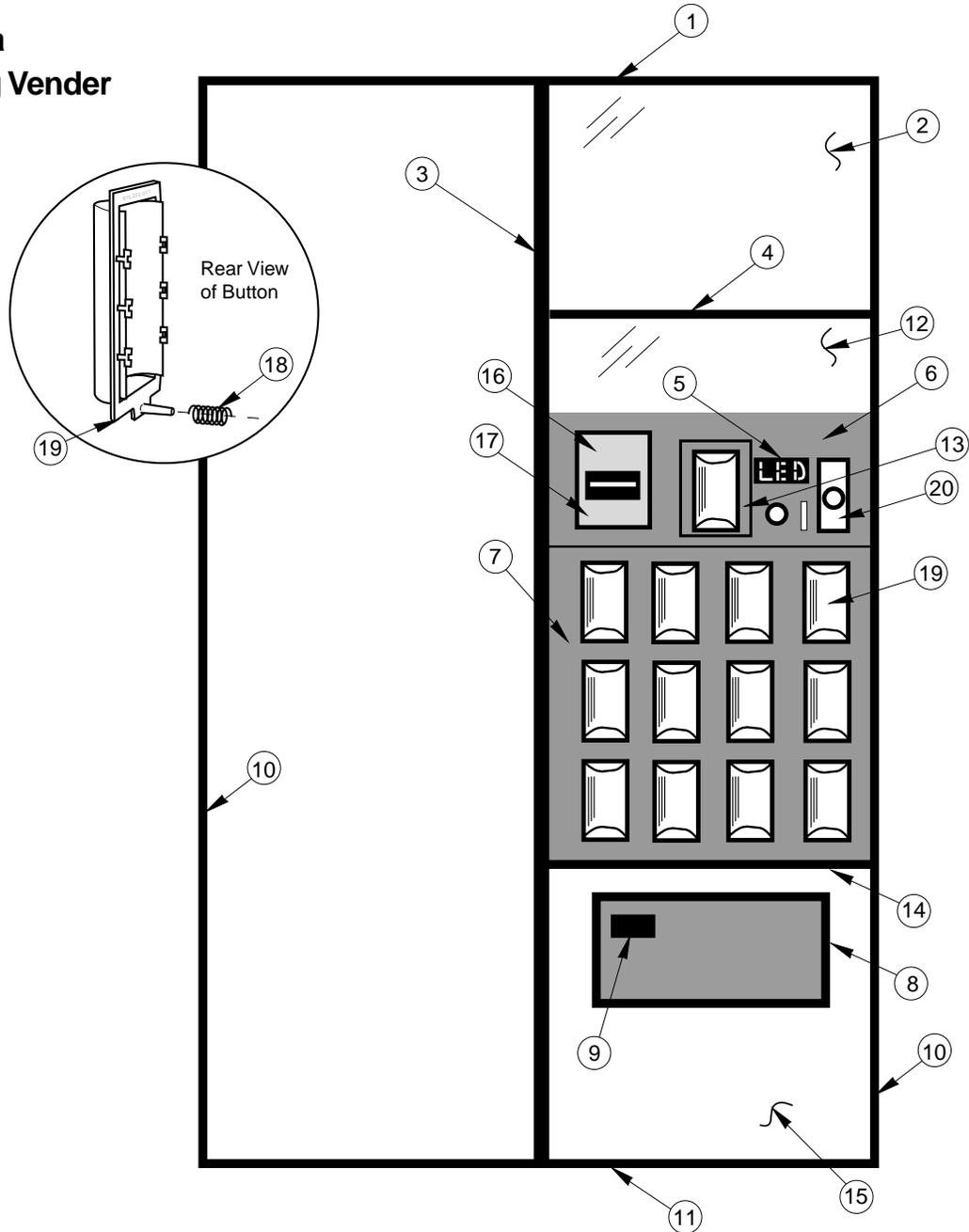
Item No.	Description	Part Number
1	Sign Trim Top, Wide 72"/79", Marketing	291539
2	Lexan Ad Panel, 79"	848574
3	Sign Trim Center 79", Marketing	292514
4	Top Sign Trim-Flat, Marketing	291545
5	L.E.D. Assembly	010593
6	Control Panel Assy, Marketing -W/A	290599
		290520
7	Button Panel Assy. with Harness, Marketing	290566
8	Port Trim, Marketing	290516
9	Coin Cup, Marketing	290522
10	Sign Trim Lt/Rt 79", Marketing	292513
11	Sign Trim Bottom, Wide, Marketing	291538

Item No.	Description	Part Number
12	Lexan POS Window, Marketing	815304
13	Feature Button Bracket, Marketing	290569
14	Bottom Sign Trim-Flat, Marketing	291541
15	Port Panel Sign, Marketing	848,278
16	Validator Mounting Plate Assy	844008
17	Validator Decal, Marketing	931360
18	Spring	914004
19	Select Button	815272
20	T-Handle Assy	812290
•	Feature Button Bracket Decal	831349
•	Control Panel Decal, Marketing	848233
•	Control Panel Decal, Marketing (with lock cover holes)	848295
•	Christmas tree (red)	916084

SECTION 6: EXPLODED VIEWS
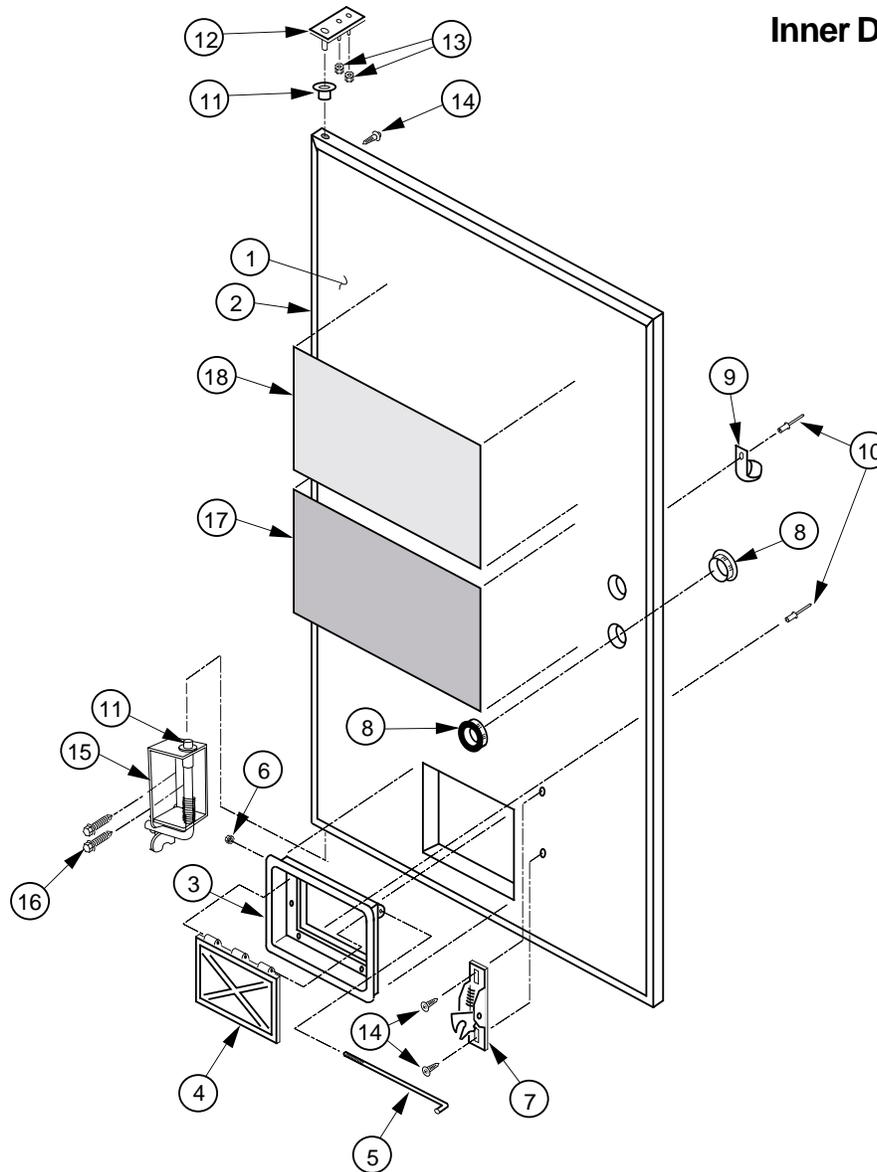
Item No.	Description	Part Number	Qty.
1	-79" Marketing Inner Door*	296610	1
2	-79" Inner Door Gasket	815350	1
3	Port Door Frame	815191	1
4	Port Door	815192	1
5	Port Door Rod	811028	1
6	Lock Nut, #6-32	905006	1
3-6	Port Door Assy	810053	1
7	Burst Open Latch	812002	1
8	Bushing, 1.38"	916003	2
9	Clamp, Cable, 1"	916004	1
10	Rivet, 3/16" Diameter	908002	2
11	Bushing, Inner Door	815026	2
12	Hinge, Inner Door (Top)	010520	1
13	Nut, #8-32	905001	2
14	Screw, Self-drilling, #8x1/2"	902001	50
15	Hinge, Bottom, Door	296504	1
16	Bolt,1/4-20x1"	901003	2
17	Loading Instructions	931408	1
18	Controller Instructions	931406	1

Refrigeration Unit
296410
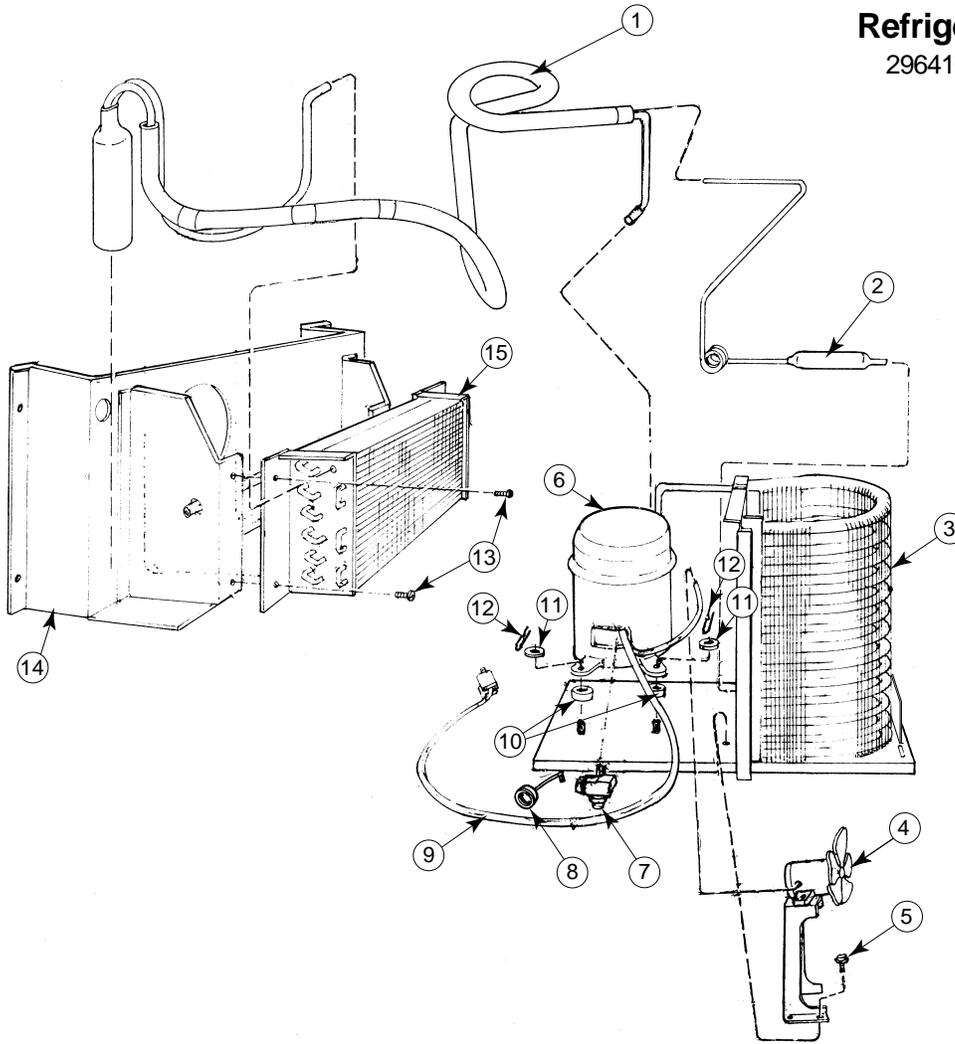
Item No.	Description	Part Number	Qty.
1	Heat Exchange	See Note#1	1
2	Dryer	824011	1
3	Condenser	820008	1
4	Condenser Motor	839010	1
	(Blade Only)	(810014)	
5	Screw, #8-32x1/2	901006	2
6	Capstart Compressor,	819028	1
	1/3+ Tecumseh, R134a		
7	Relay, 1/3+ Tecumseh	836065	1
8	Overload, 1/3+ Tecumseh	822010	1
9	Compressor Lead	See note #1	
10	Grommets, Compressor	916015	4
11	Grommet Plug	815017	4
12	Clip, Compressor	914002	4
13	Screw. #8x1/2	902004	4
14	Fan Shroud Assy.	210088	1
15	Evaporator Coil	820002	1
•	Evaporator Cover	296004	1

Note #1: *This part is not available individually. It must be ordered as an assembly.*

CREDIT AND REPLACEMENT POLICY

Credits or replacements will be issued on warranty items if the proper procedures are followed:

1. ROYAL VENDORS will pay shipping charges on all parts covered under this warranty when transportation has been made the most economical way. (Ex. within the continental U.S. regular ground UPS). An A.R.S. (Authorized Return Service) sticker will be sent with all warranty parts. This method of shipping is preferred for returning parts to Royal.

2. Credits will only be issued to warranty parts that have been ordered in advance. Not for parts ordered as stock. (NO EXCEPTIONS)

3. When ordering warranty parts in advance, please have the full vendor / unit serial number.

4. A copy of the Packing Slip, the correct serial number and complete Return Material Tag (provided with part) are required for sending back parts. Please fill out the Return Material Tag completely, keeping the white copy for your records and sending the yellow tag back with the attached part. Make sure you have your company name, address, phone number, serial number and model number, along with a brief explanation of the problem

5. If the item returned is not under warranty, it will be sent back to you at your expense or it will be scrapped.

6. All warranty parts should be properly wrapped and packed securely to avoid further damage. Refrigeration units that are returned from the field and have been tapped into, tampered with, not packaged properly or have had the serial plate removed, will void the warranty.

7. If parts are not returned within 15 working days, the invoice will be due in full.

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