Service Manual

20plus

3 Button Programming

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Royal Vendors, Inc.

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ROYAL VENDORS' COMMITMENT TO SAFETY

Royal Vendors is committed to safety with all of our product designs. We are committed to notifying the user of a possible danger involving the improper handling or maintenance of our venders. The servicing of any electrical or mechanical device involves **potential dangers**, both to those servicing the equipment and to users of the equipment. These dangers can occur because of improper maintenance or usage. The purpose of this safety segment is to alert everyone servicing Royal equipment of potentially dangerous areas, and to provide **basic safety guidelines** for proper upkeep.

The service manual contains various **warnings** that should be carefully read to minimize the risk of personal injury. This manual also contains service information to insure that proper methods are followed to avoid damaging the vender or making it unsafe. It is also important to understand these **warnings** provide general guidance only. Royal could not possibly know, evaluate, or advise of all of the conceivable ways in which service might be done. Consequently, Royal cannot predict all of the possible dangerous results. These outlined safety precautions are the basis for an effective safety program. Use these safety measures, along with the service bulletins, helpful hints and product specification sheets, when installing or servicing Royal equipment.

We recommend that persons servicing our equipment maintain a similar commitment to safety. **Only personnel properly trained should have access to the interior of the vender.** This will minimize the potential dangers that are inherent in electrical and mechanical devices. Royal has no control over the vender once it leaves the premises. It is the owner or lessor's responsibility to maintain the vender in a safe condition. See installation insert located in the coin box of a new vender for proper installation procedures and refer to the service manual for recommended maintenance procedures. If you have any questions, please contact the Technical Services Department at 1.800.931.9214.

SAFETY REGULATIONS

- Read the safety segment before installation or service
- Test for proper grounding before installing to reduce the risk of electrical shock and fire.
- Turn off or disconnect power cord from wall outlet before servicing.
- Only fully trained service technicians should service vender when vender has power.
- Remove any product before moving a vender
- Use appropriate equipment when moving a vender
- Always wear eye protection, and protect your hands, face, and body when working near the refrigeration system.
- Use only authorized replacement parts.
- Be aware of inherent dangers in rocking or tipping a vender

SECTION I: ELECTRICAL HAZARDS GENERAL ADVICE

Careless or improper handling of electrical circuits can result in injury or death. Anyone installing, repairing, loading, opening, or otherwise servicing a vender should be aware of this precaution. Apply all of the normal precautions when handling electrical circuits, such as:

- Refrigeration servicing to be performed by qualified personnel only.
- Unplug the vender before servicing
- Replace electrical cords if there is any evidence of fraying or other damage.
- Keep all protective covers and ground wires in place.
- Plug equipment into outlets that are properly grounded and polarized (where applicable), and protected with fuses or circuit breakers of the correct size.
- All electrical connections must be dry and free of moisture before applying power.

WARNING:
ALWAYS TEST TO VERIFY PROPER GROUNDING PRIOR TO INSTALLATION IN ORDER TO REDUCE THE RISK OF ELECTRICAL SHOCK AND FIRE

SECTION II: ELECTRICAL HAZARDS

A. Servicing with "Power Off"
For maximum safety, unplug the power cord from the wall outlet before opening the vender door. This will remove power from the equipment and avoid electrical hazards. Service personnel should remain aware of possible hazards from hot components although electrical power is off.

B. Servicing with "Power On"
Some service situations may require access with power on. Only fully qualified service technicians should perform power-on servicing. Particular caution is required in servicing assemblies that combine electrical power and mechanical movement. Sudden movement (to escape mechanical action) can result in contact with live circuits and vice versa. It is therefore important to maintain maximum clearances from both moving parts and live circuits when servicing.

WARNINGS:
1. ONLY FULLY TRAINED PERSONNEL SHOULD ACCOMPLISH "POWER-ON" SERVICING. SUCH SERVICE BY UNQUALIFIED INDIVIDUALS CAN BE DANGEROUS.

2. LIGHTING CIRCUITS CAN BE HAZARDOUS. ALWAYS DISCONNECT FROM POWER SUPPLY BEFORE REPLACING A BULB OR SERVICING THE VENDER IN THAT AREA.

3. NEVER USE A HOSE, PRESSURE WASHER OR ANY CLEANING METHOD THAT COULD WET ELECTRICAL COMPONENTS. SEE CLEANING SECTION OF MANUAL FOR SUGGESTED CLEANING METHODS. IF WATER CONTAMINATION OF ELECTRICAL COMPONENTS IS SUSPECTED, USE QUALIFIED ELECTRICAL TESTING EQUIPMENT AND TEST METHODS TO ASSURE THAT VENDER IS NOT A HAZARD BEFORE APPLYING POWER FOR ANY REASON.

SECTION 1: GENERAL INFORMATION

Introduction

This manual contains installation, operation and service instructions for Royal Vendors' TDV. The TDV is a microprocessor controlled vender which permits pricing per selection from $0.00 to $99.99. The TDV 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 ..... (504 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 ..... 8 or 10 selection
Altitude Adjustment ..... no adjustment required for the TDV'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	79.5" MODEL
20 oz. Plastic Pepsi Bottle	504
20 oz. Plastic Aquafina Contour 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 TDV, please contact Royal Vendors' Customer Service Department.*

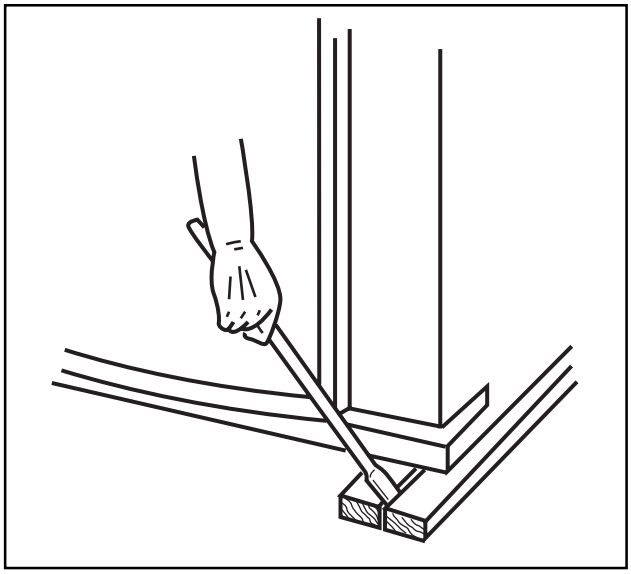

Figure 1.1

SECTION 2: SET-UP AND INSTALLATION

VENDER IDENTIFICATION

Your TDV 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

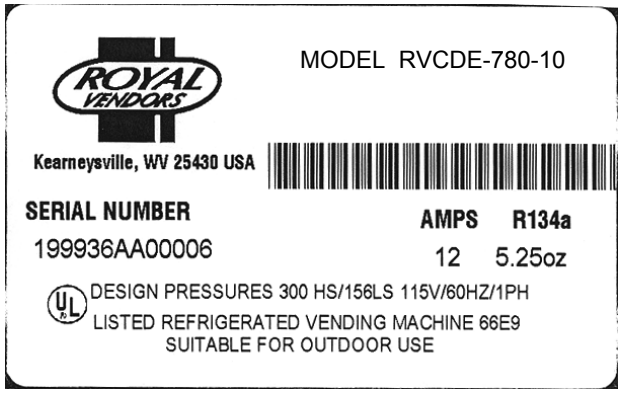

Figure 1.2

The vender's model number contains two important pieces of information. The machine type such as RVCC (Royal Vendors Cold Drink Electronic. It also contains the vender model number such as 780-10 (capacity of 780 twelve ounce cans / 10 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 TDV 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.*

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 RFrG mode is set to "1", The temperature will also be displayed after the lockout message.

The "USE CORRECT CHANGE ONLY" LED will be lit when change can not be paid out in every increment of the least tube coin up to and including the value set in the "ECO" menu. For example, given a least tube coin of a nickel and an ECO value of $0.25, the system must be able to pay back 5, 10, 20, and 25 cents.

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

If credit has been established, that amount of credit will be displayed instead of the above messages. 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.
Note: *If Con-7 is set to (0).*

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, cash, sales totals, and software version without opening the vender door. 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).

SECTION 2: SET-UP AND INSTALLATION

Peripherals

The TDV with Three-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 TDV to function. For example, the TDV 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:

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 front and rear retainer positions (for package length) See the table to the right for proper retainer positions for each package type.

2. Set the Cap Stops in proper positions (see figure 4). For loading: push Cap Stop in towards partition. After loading: pull Cap Stop out into the column.

3. Set package orientation according to figure 1. Bottles are positioned "butt to butt" in the rear column and cap forward in the front column.

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

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

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.*

Package	Front Retainer	Rear Retainer
20 oz. Pepsi	6	4
20 oz. Aquafina	6	4
20 oz. Gatorade	8	6
20 oz. Mt. Dew	6	4
20 oz. 7 Up	7	2
20 oz. Lipton	6	4
12 oz. Can	14	9
20 oz. Dr Pepper	*	*

*Due to different package types, retainer settings may vary.

SECTION 2: SET-UP AND INSTALLATION

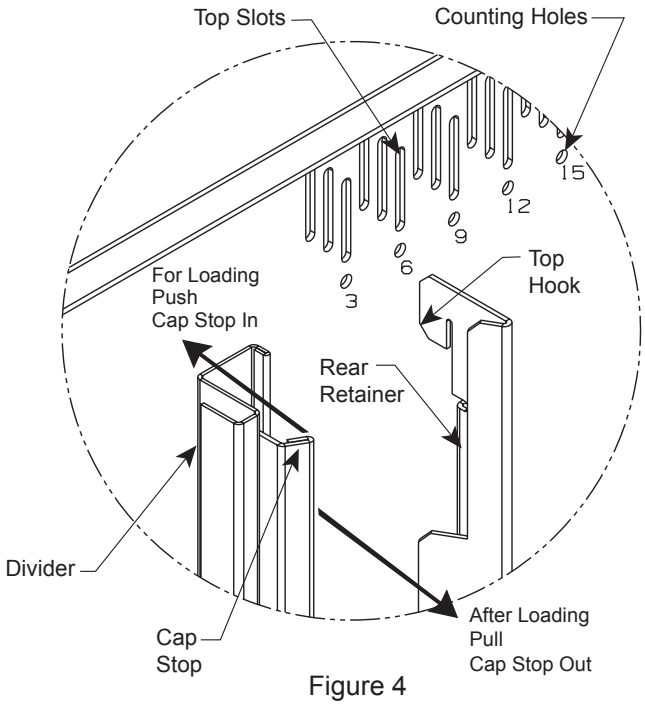

Figure 4

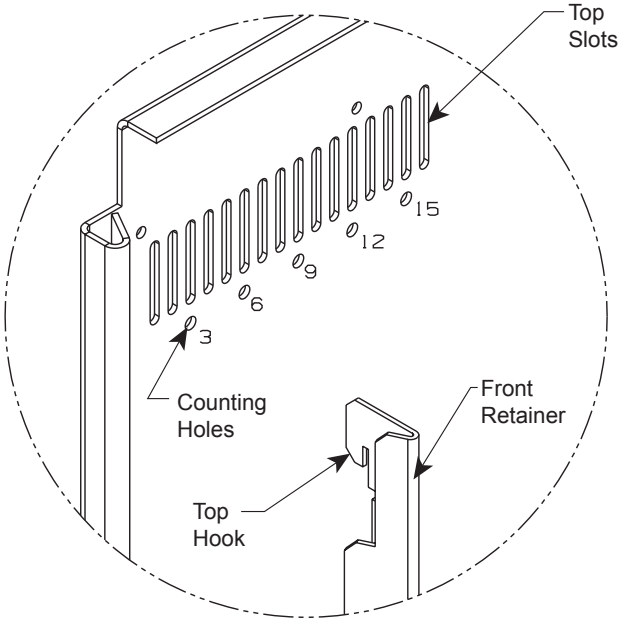

Figure 2

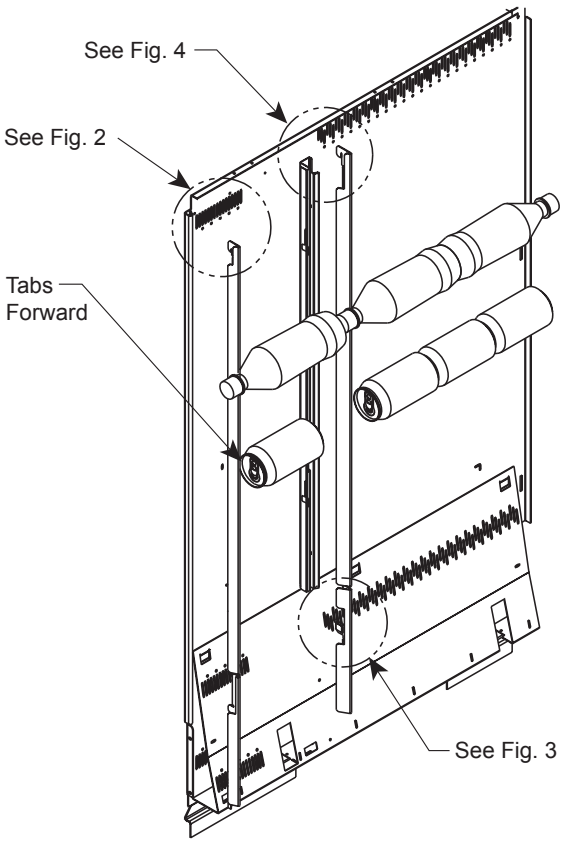

Figure 1
Package Orientation

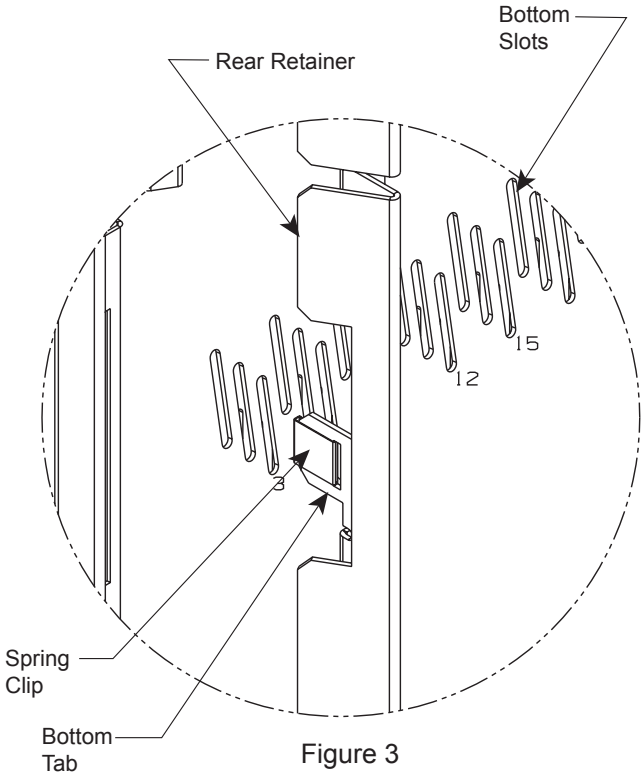

Figure 3

SECTION 2: SET-UP AND INSTALLATION

Setting the Adjustable Product Retainers

See the table on the previous page for proper positions for each package type.

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

Front Retainers - Columns 1 through 6

1. **Determine Correct Position for Package Type (See Figure 2.5).**
   Use Figure 2.5 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 2.5).**
   Check Figure 2.5 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 the bottom of the retainer away from the column wall disengaging the spring clip. Lift the rear retainers upwards and pull it out freeing the retainer from the upper slot. Reinstall retainer reversing the removal procedure. Make sure the top hook and the bottom spring clip are in aligned slots at both top and bottom.

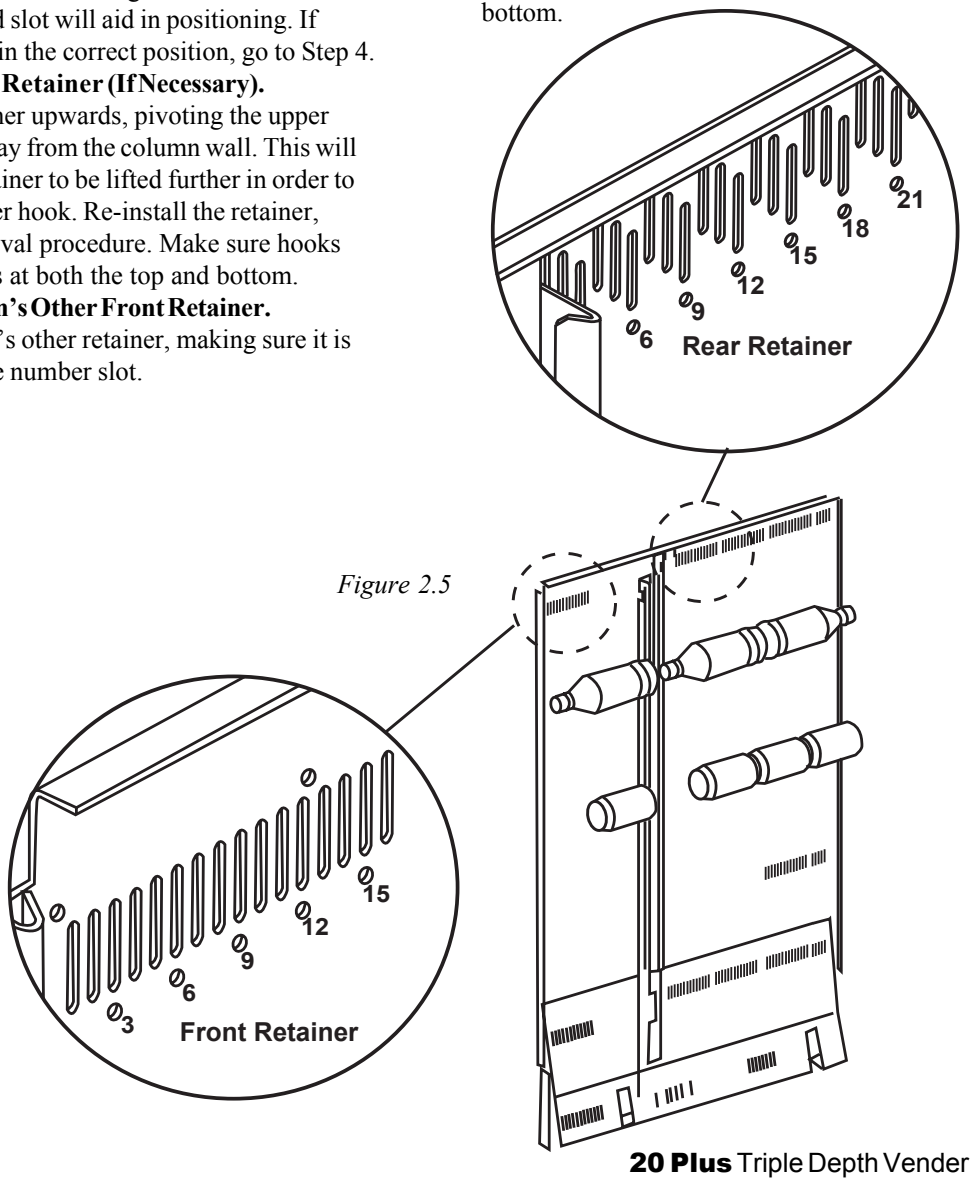

Figure 2.5

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

The TDV 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 TDV 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 TDV . 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.

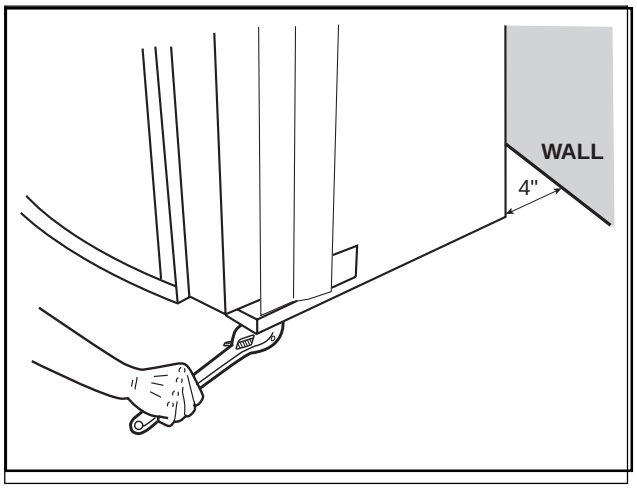

Figure 2.6

Vender Programming

THE NECESSITY OF CORRECT PROGRAMMING

Your 20 Plus Vender must be programmed correctly for it to operate properly. There are other modes that may not interfere with normal operation of the Vender; or you may not notice the abnormal operation (if they are not programmed properly). As a whole, improper programming could cause the following problems:

MODE	PROBLEM SEEN
Pric	Wrong prices, even free vending
StoS	Columns not vending or wrong columns vending
Con	Vender options such as forced vend/escrow not working properly
SdEP	Vender multiple vending or "long" vend cycles
StCL	If enabled with use of timer or key switch will disable selections
tinE	Will disable selections or Refrigeration System if turned on
FriG	Will keep the unit from running or allow warmer/colder temperatures
PAS	Will keep you from accessing the external password mode
LAnG	Will display different languages for display messages

PRECAUTIONS TO TAKE WHEN WORKING WITH CONTROL BOARD

As with any printed circuit board, our electronics are very sensitive to Electrostatic Discharge (ESD). Simply walking across a tile, or carpeted floor, can generate a range of 30,000 to 50,000 volts of electricity. One ESD can be enough to seriously damage your Control Board; or at least weaken it enough that "erratic problems" could occur in the future. Even a discharge surge under 100 or 200 volts is enough to create shorts, or problems, within the circuitry of the electronics. It is advised when storing the electronics that they be kept in their anti-static bags, even if the electronics are thought to be defective. If a Control Board is thought to be defective and is really not, it soon will be after being charged with ESD. The ideal prevention against ESD is to use anti-static conductive wrist straps which ground you to the machine before touching the electronic boards. If it is not possible to use these, at least ground yourself before handling the electronic boards by the edges. Be careful not to touch the components on the Control Board.

INTRODUCTION TO PROGRAMMING

As mentioned earlier in "The Necessity Of Correct Programming," it is very important your Vender is programmed properly. To do this, you must understand how the system works and what it takes to program your Vender. As you will see, after you are able to program one or two modes, you will be able to use similar procedures to program all modes.

MANEUVERING THROUGH LEVELS - The first step to understanding 20 Plus programming is to learn how to negotiate through and around the menu levels to accomplish your task. To maneuver through the menu levels you must use the select buttons on the front of your Vender. Certain buttons have different meanings. You will use these buttons to move "up" or "down" through the menus. You will also use certain buttons to enter onto a new menu level or to home back to a previous level. These four (4) meanings that we have just mentioned are listed below, along with the active button for each.
NOTE: *Programming Fowchart located in rear of manual*

BUTTON	MEANING	FUNCTION
1	UP	Increase, Next, Etc.
2	DOWN	Decrease, Previous, Etc.
3	ENTER [press and release, less than two (2) seconds]	Save, Accept, OK, Etc.
3	HOME [press & hold for two (2) seconds or greater]	Exit, Escape, Return, Etc.

MENU SYSTEM - The 20 Plus Vender's Menu System is much like the Menu System of the Merlin III Venders. When programming anything, you must first use the three programming buttons listed above to maneuver through menus and sub-menus before you will be allowed to accomplish your task. Each menu consists of various items, or modes, such as the "Pric" Mode (Selection Price Setting Mode) or the "StoS" Mode (Space to Sales Setting Mode). There are currently two different main menus available.

1. INTERNAL (Service) MENU: This menu is

available only with the Vender's main door open. It is accessed upon pressing the Control Board's mode button. This menu contains all the programming modes, such as the Selection Price Setting Mode and Space to Sales Mode.

2. EXTERNAL MENU: The External Menu is available whenever the LED display is showing the Sales Mode greeting, with the Vender's main door closed. This menu is mainly for operators or owners who do not want to open the machine but want to access error codes and sales (vend) counters. For your protection, we have a four (4) digit changeable password to access this mode.

Menu Levels

INTERNAL (Service) MENU

MODE	DESCRIPTION
CASH	Cash Counter Mode: Used to access the total and individual cash counts.
SALE	Sale Counter Mode: Used to access the total and individual vend counts.
Eror	Errors Mode: Used to read and clear Vender errors.
tESt	Test Vend Mode: Used to free test vend from columns .
Pric	Price Setting Mode: Used to program selection prices.
StoS	Space to Sales Mode: Used to program columns to vend from select buttons.
SdEP	Set Vending Depth: Used to program vending depth per selection.
Con	Configurations Mode: Used to set Vender options.
rtn	Return to Sales: Used to return to the sales (greeting) mode (if Con 2 is set to "0").

Optional Menu (if Con 2 is set to "1")

ECO	Exact Change Only Mode: This mode controls the Exact Change Only light.
CPO	Coin Payout Mode: Used to payout coins from Coin Mechanism.
tUFL	Tube Fill Mode: Used to fill Coin Mechanism tubes.
dSAL	Discounted Sale Counter: Used with discount prices or free vend switch.
diFc	Discounted Differential Cash Counter: Used with discount prices or free vend switch.
SdiS	Set Discount Pricing: Automatically reduces vend prices during the day (uses timer).
StCL	Set Timer Controlled Selections: Used to choose the selections to turn on / off.
tinE	Timer Mode: Used to program on / off times for selections, refrigeration and lighting.
FriG	Refrigeration Mode: Used to adjust temperatures and test refrigeration operation.
PAS	External Password Mode: Used to set a password to access External Menu
LAnG	Language Mode: Used to change the display to international languages.
rtn	Return to Sales: Used to return to the sales (greeting) mode (door closed state).

EXTERNAL MENU

MODE	DESCRIPTION
SALE	Sale Counter Mode: Used to access the total and individual vend counts.
rtn	Return to Sales: Used to return to the sales (greeting) mode (door closed state).
Eror	Errors Mode: Used to read and clear Vender errors.

Internal (Service) Menu

Opening the Vender's main door and pressing the Control Board's mode button will allow you to access the Internal Menu. This section completely outlines all the Internal Menus, including descriptions and operation instructions for each mode. *After five (5) minutes without activity, the Control Board will revert to the Sales Mode (the LED will show the greeting).*

Cash Counter Mode (CASH)

This mode allows you to manually extract the amount of cash taken into the Vender through product sales (up to $999,999.99). The Cash Counter Mode consists of a total count which is non-resettable. Individual selection counts are resettable, depending upon the proper configuration setting (see Configurations). The counts will be preceded by the count type (CL=cash level) and can be displayed in one (1) or two (2) sets of four (4) digits. Examples for both types of cash counters are:

Count Type	Actual Count	1st Display	2nd Display	3rd Display
Total Cash Count	$56,789.10	"CASH"	"567"	"89.10"
Selection Count	$6,789.10	"CL [number]"	"67"	"89.10" Cash

OPERATION: If **<enter>** is pressed when the display shows "CASH", the Controller will enter the Cash Counter Mode. The display will flash "CASH" and the total amount of cash taken into the Vender. This can be shown in two (2) sets of four (4) digits (see Example 1 above). Using **<up>** or **<down>** will cycle through individual selection cash counts for each. The display will flash individual selection counts (as shown in Example 2 above). If **<home>** is pressed anytime during this operation, the Controller will return to the "CASH" display. From "CASH" pressing **<down>** will take you to "rtn". Pressing **<up>** will take you to "SALE".

CLEARING INDIVIDUAL COUNTERS: If the Configurations Mode is set to allow the individual counters to be reset, the individual counters will reset upon reading at least one of them and closing the Vender's main door (actuating the Vender's door switch).

Sale Counter Mode (SALE)

This mode is very similar to the Cash Counter Mode. The Sale Counter Mode allows you to manually extract the amount of product vended from your Vender (up to 99,999,999 vends). The Sale Counter Mode consists of a non-resettable total count and individual selection counts which are resettable, depending upon the proper configuration setting (see Configurations). The counts will be preceded by the count type (SL=sale level) and can be displayed in one (1) or two (2) sets of four (4) digits. Examples for both types of sale counters are:

Count Type	Actual Count	1st Display	2nd Display	3rd Display
Total Sale Count	5,678,910	"SALE"	"567"	"8910"
Selection Sale Count	678,910	"SL [number]"	"67"	"8910"

OPERATION: If **<enter>** is pressed when the display shows "SALE", the Control Board will enter the Sales Counter Mode. The display will flash "SALE" and the total amount of sales made by the Vender. This can be shown in two (2) sets of four (4) digits (see Example 1 above). Using **<up>** or **<down>** will cycle through individual selection sale counts. The display will flash individual selection counts (as shown in Example 2 above). If **<home>** is pressed anytime during this operation, the Controller will return to the "SALE" display. From "SALE" pressing **<down>** will take you to "CASH". Pressing **<up>** will take you to "Eror".

CLEARING INDIVIDUAL COUNTERS: If the Configurations Mode is set to allow the individual counters to be reset, the individual counters will reset upon reading at least one of them and closing the Vender's main door (actuating the Vender's door switch).

Errors Mode (Eror)

This mode was designed to help diagnose Vender problems. Upon opening the Vender's main door, the LED will flash any possible errors. (For a list, refer to Section 5, Vender Maintenance: Error Codes.) If there are no errors, the display will flash "none" and after five (5) minutes of no activity will revert to the sales greeting (ICE COLD). The Errors Mode was designed to give a detailed description of each error and allow you to clear errors.

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OPERATION: If **<enter>** is pressed when the display shows "Eror", the Controller will enter into the errors descriptive display mode. At this point, the display will show any and all current Vender errors followed by the descriptive errors for each. If no errors exist, "none" will appear on the display but will revert back to the sales greeting after five (5) minutes of no activity. If **<home>** is pressed anytime during this operation, the Controller will return to the "Eror" display. From "Eror" pressing **<down>** will take you to "SALE" and pressing **<up>** will take you to "tESt".

CLEARING ERRORS: To clear an error, wait until the error to be cleared is shown on the LED display. Then immediately press the **<up>** or **<down>** button and hold it in for at least two (2) seconds and the error will disappear. Follow this procedure for each error.

Column Test Vend Mode (tESt)

This mode is used to vend test by column, not by selection. After entering into this mode, you will have to pick the column which is desired to be tested. By pressing the **<enter>** button, the Control Board will vend from that column. No money is needed. This mode will test the Control Board's ability to distribute 24 volts DC to the proper vend motor upon command. It will also test the mechanical part of the vending circuit, such as the vend motor and rotor. It does not test the Control Board's coin acceptance/credit/payout circuit.

OPERATION: If **<enter>** is pressed when the display shows "tESt" the Controller will enter the Column Vend Test Mode. The display will show "CO 1" (Column 1). Using **<up>** or **<down>** will cycle you through all the available columns to be test vended (the display may show some columns that are not in your Vender; nothing will happen if a test vend is attempted from these columns.). If **<enter>** is pressed, the Controller will attempt to test vend from the column which is being displayed. If a vend is not in progress, pressing **<home>** will return you to the "tESt" display. From "tESt", pressing **<down>** will take you to "Eror". Pressing **<up>** will take you to "PriC".

Note: *Test vends will not affect cash or sale counters.*

Selection Price Mode (PriC)

This mode is used to set vend prices. Depending on the Configurations Mode (discussed later in this Section), this mode will allow you to set either single or multi-pricing. When the configurations are set to allow single pricing, only one price has to be set in the "PriC" Mode (not individually). The current price will be displayed on the LED display during the greeting. If the configurations are set to allow multiple pricing (per selection), the display will not show the vend price during the greeting unless all selections are set to the same price. You will have two options when setting prices:

- Multiple Pricing – "ALL" Pricing – Gives you the option to set one price for all selections.

- Individual Pricing – Allows you to set a different vend price for each selection.

If a free vend key switch is in use (turned-on), the display will scroll "FREE" during the greeting instead of the normal vend price.*(That is, if all selections are assigned in StCL mode.)*

OPERATION: If **<enter>** is pressed when the display shows "PriC", the Controller will enter the price setting mode.

- Single Price Operation: The display will flash "SPri" and the current single price setting. This will be the single price viewing level. If **<enter>** is pressed again, the display will show the current single price only. If **<up>** is pressed or held, the price will increase in .05 increments. If **<down>** is pressed or held, the price will decrease in .05 increments. After the desired price has been set, press **<home>** to save your setting and return to the single price viewing level. Pressing **<home>** from the single price viewing level will return you to the display of "PriC".

- Multiple Price Operation: The display will flash "ALL" followed by the last price set for all selections. If **<enter>** is pressed at this point, the display will steadily show the current "ALL" price. If **<up>** is pressed or held, the price will increase in .05 increments. If **<down>** is pressed or held, the price will decrease in .05 increments. After the desired price has been set, press **<home>** to save your setting and return to where the display flashes "ALL" followed by the new "ALL" price. You may now set a few, all, or different individual prices if desired.

- Individual Pricing: If **<up>** or **<down>** is pressed when the display flashes "ALL" followed by the current majority price setting, the display will cycle through the individual price settings for each selection. The display will flash the selection number followed by the price for that selection. Example: If selection one

is set at fifty cents, the display will flash "P 1" followed by ".50". Pressing **<enter>** while a individual selection is being displayed will cause the display to steadily show the vend price for that selection to allow a change to the price. Press **<up>** to increase the price value in .05 increments or **<down>** to lower it in .05 increments. After the desired price has been set, press **<home>** to save your setting and return to where the display flashes "P X" followed by the new selection price. From "PriC", pressing **<down>** will take you to "tESt". Pressing **<up>** will take you to "StoS".

Space to Sales Mode (StoS)

This mode is a very important part of programming. It will determine what column will vend upon pressing a particular select button. You will use this mode to program column assignments by assigning a column (or columns) to each selection button that you desire to use. You may also decrease the number of the Vender selections. Example: Your Vender has a total of ten (10) select buttons on the front panel. If you wish, you may program the controller to only use eight (8), seven (7), or six (6) selections (or even less). This is done by assigning all additional columns to one of the popular selections being used. A benefit of doing this is you will be allowed to allocate the "extra" columns to a "faster moving" flavor. Space to Sales Mode will come factory set for your type of Vender. Upon entering the Space to Sales Mode two different types of settings are available:

- Factory Standard Space To Sales: There are eight (8) factory preset settings from which to choose.

- Custom Space To Sales: Allows you to custom configure any column to any selection.

OPERATION: If **<enter>** is pressed when the display shows "StoS", the Controller will enter the Space to Sales Setting Mode. The Control Board will always enter at the current Space to Sales Setting. If your Vender is programmed for custom Space to Sales, or if programmed with a Hand Held Computer, you will enter at "CStS". If **<up>** or **<down>** is pressed at this point, you will be allowed to cycle through all Space to Sales Settings.

- Factory Standard Space To Sales: Pressing **<enter>** at any Factory Standard ("Opt") Setting will "lock in," or reprogram, the Control Board for that particular Space to Sales Setting. Upon doing this, the display will automatically start sequencing through each selection followed by all the columns that are assigned to each (see Example below). After each selection has been shown, the display will return to "StoS".

  Example: *If after entering a Factory Standard Setting the display flashes "SL 1", and then flashes "1", then flashes "2", selection one has been assigned to Columns 1 and 2 only. This will occur for each selection.*

- Custom Space To Sales: Pressing **<enter>** at "CStS" will allow you to enter the Custom Space To Sales Mode. Upon entering this mode, the display will always start by flashing "SL 1" (Selection 1) followed by flashing each column number assigned to this selection. Example: The display flashes "SL 1", then flashes "1", and then flashes "2". Selection 1 has Columns 1 and 2 assigned to it only. Pressing **<up>** or **<down>** at this point allows you to cycle through Selections 1 through 12, with each selection showing the columns assigned to it. If **<enter>** is pressed at a selection, the display will show "Co 1". This stands for Column 1 for that particular selection. Pressing **<up>** or **<down>** at this point will allow you to cycle through Columns 1 through 10 for the selection entered. If any column is flashing, this means it is assigned to the selection. If a column is *not* flashing, then it is *not* assigned to the selection. Pressing **<enter>** will change a column's flashing condition. This allows you to assign or un-assign columns. If no changes are made, pressing **<home>** will return you to the Space to Sales Setting list at "CStS". If a change to a selection is made, pressing **<home>** will return you to the selection level where the display flashes the selection number followed by the columns assigned to that selection. Follow this same procedure for all selections that you wish to program.

  Important Note: *Anything done in this mode will override any previously assigned Factory Standard or Custom Settings.*

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When completely finished in Custom Space to Sales Mode, pressing **<home>** will return you to "StoS" display. From "StoS" pressing **<down>** will take you to "PriC". Pressing **<up>** will take you to "SdEP".

Set Vending Depth Mode (SdEP)

Since the vend motors on a 20 Plus Vender do not have cams or switches, programming electronically the vending depth is extremely necessary. With older style Electro-Mechanical Venders, it was necessary to adjust the vend timing cam by either filling notches or rotating part of the cam to change the vending depth from triple or double to single depth. With the 20 Plus Vender, you have a choice of either single, double, or triple depth for each selection ***and not by column***. It is necessary to program the correct depth for each selection to prevent multiple or slow vends. For instance, if your actual vending depth is two and you program this selection for single depth, it will double vend every time.

OPERATION: If **<enter>** is pressed when the display shows "SdEP", the Controller will enter the Set Vending Depth Setting Mode. The display will show "ALL". From this point, two types of settings are available: the "All" depth setting enables you to set all depths the same (such as "ALL" of the price mode) and "Individual" depth setting gives you the option to set all depths individually for each selection.

- "ALL" Setting: If **<enter>** is pressed when the display shows "ALL", the Controller will enter the Depth Setting Mode for "ALL" selections. The display will steadily show "ALL" and flash the current depth setting. Pressing **<up>** or **<down>** allows you to change the flashing depth setting between 1, 2, or 3. Pressing **<enter>** will save changes and return you to where the display will show "ALL". At this time, you will be able to cycle through each individual depth setting. Pressing **<home>** from this level will return you to the "SdEP" display.

  Note: *If you have selection depth settings that are different, but a majority of the settings are the same, it is advised to set the majority setting from within the "ALL" setting first. You will then be able to program the few settings that are individually different. This will cut down on program time.*

- Individual Setting: If **<up>** or **<down>** is pressed when the display shows "ALL", the Controller will cycle through each individual setting showing the selection number and the current setting. If **<enter>** is pressed while the display is showing an individual depth setting, the current setting starts flashing. Pressing **<up>** or **<down>** allows you to change the flashing depth setting between 1, 2, or 3. Pressing **<home>** locks in your setting and returns you to the individual level at the point where you entered it (at the setting just changed). At this time, you will be able to cycle through each individual setting. Pressing **<home>** from the individual level returns you to the "SdEP" display. From "SdEP" pressing **<down>** will take you to "StoS". Pressing **<up>** will take you to "Con".

Configurations Mode (Con)

This mode is used to set Vender options dealing with pricing, acceptance, payback, and a few other optional features. While in the Configurations Mode, the display will show the configuration followed by the current setting. If the display shows "C 1 0", this means Configuration 1 is currently set to 0. In other words, the Vender is set for single pricing. The configurations are as follows:

CONFIG.#	SETTINGS
C1	0 = Single Pricing
	1 = Multiple Pricing
C2*	0 = Hide Optional Menu Items
	1 = Show Optional Menu Items
C4	0 = Display errors or "nonE"
	1 = Display Sales, Cash Values, and existing error or "nonE"
C5	0 = No reset of individual counters
	1 = Allow reset of individual counts upon reading and door switch actuation
C6	0 = Credit will be returned if proper change cannot be made
	1 = Allow vend regardless of changer tube levels (change may not be paid)
C7	0 = Will allow bill acceptance regardless of payout availability
	1 = Will only accept a bill if coin tubes have enough coins to cover the difference between the bill value and the maximum vend price

C8	0 = Escrow to vend (will act as a bill changer)
	1 = Forced attempt (will not act as a bill changer)
C9	0 = Change is automatically returned to customer after a valid vend
	1 = Will hold the customer's change in escrow to allow a multiple purchase
C10	0 = Bill escrow disabled
	1 = Bill escrow enabled
C11	0 = All errors displayed
	1 = Certain errors displayed

***Note:** C2 - Version 67100-7 and after.*

OPERATION: If **<enter>** is pressed when the display shows "Con", the Controller will enter the Configurations Mode. The display will show Configuration 1 and its setting (as listed in the Configurations Description). If **<up>** or **<down>** is pressed at this point, the display will cycle through each configuration. Pressing **<enter>** while the display shows a configuration, allows the current configuration setting to start flashing. Pressing **<up>** or **<down>** while the current configuration setting is flashing, allows you to toggle the configuration setting between 0 and 1. If changes are made to a configuration, pressing **<enter>** will return you to the Configuration List Level and save any change. Follow the above process for all configurations which you wish to set. When done, pressing **<home>** will return you to the "Con" display. From "Con", pressing **<down>** will take you to "SdEP". Pressing **<up>** will take you to "rtn" if C2 is set to "0", or to "ECO" if C2 is set to "1".

Return to Sales / Greeting Mode (rtn)

This mode is used to exit the Service Menu and return to the Sales Mode, where the display flashes the greeting (ICE COLD or PEPSI COLA) along with any other display options.

OPERATION: If **<enter>** is pressed when the display shows "rtn", the Controller will revert to the Sales Mode and the greeting will be displayed. From "rtn", pressing **<down>** will take you to "Con". Pressing **<up>** will take you to "CASH".

Optional Menu Items

Exact Change Value Mode (ECO)

This mode controls the Exact Change Only light. If the machine cannot make change for the value (or lower) specified in this mode, the Exact Change Only lamp will light.

OPERATION: If **<enter>** is pressed when the display shows "ECO", the Controller will enter the Exact Change Value Setting Mode. The display will show the exact change value. Pressing **<up>** or **<down>** allows you to adjust the value. Pressing <**home**> will save the currently displayed value and return you to the "ECO" display. From "ECO", pressing **<down>** will take you to "Con". Pressing **<up>** will take you to "CPO".

Coin Payout Mode (CPO)

This mode allows you to payout coins from the Coin Mechanism's Tubes through the Control Board. This mode is mainly used because some types of coin mechanisms do not have payout buttons (switches) on them. This can also be used as a test to confirm the Control Board's ability to payout coins (will payout the same as after a sale).

OPERATION: If **<enter>** is pressed when the display shows "CPO", the Controller will enter the coin payout mode and display the lowest coin value (.05). Using **<up>** or **<down>** will allow the user to cycle through all coin values available for payout. If **<up>** or **<down>** is pressed and held at this point, a coin of the displayed value will be paid out. The word "PAY" will be displayed as coins are paid out. Coins will continue to payout as long as **<up>** or **<down>** is held. If **<home>** is pressed anytime during this operation, the Controller will return to the "CPO" display. From "CPO", pressing **<down>** will take you to "ECO". Pressing **<up>** will take you to "tUFL".

***Note:** If you are using the "tUFL", you must use the "CPO" Mode to payout coins.*

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Coin Tube Fill Mode (tUFL)

This mode is used to keep inventory of the exact coin tube levels as each coin is inserted. During this mode, the LED display will register each coin as it is inserted (in no particular order) and report its value to the Vender's Control Board. The Control Board will in turn remember the Coin Mechanism's coin tube levels and automatically deduct a coin each time a coin is paid out (through "CPO" Mode or during a vend.). This mode can only be used if a Multi-Drop Bus Coin Mechanism is in use.

OPERATION: If **<enter>** is pressed when this display shows "tUFL", the Controller will enter the Coin Tube Fill Mode. The LED display will go blank allowing the deposit of nickels, dimes, or quarters through the coin insert or coin acceptor inlet chute. If **<home>** is pressed anytime during this operation, the Controller will return to the "tUFL" display. From "tUFL", pressing **<down>** will take you to "CPO". Pressing **<up>** will take you to "dSAL".

Note: *The use of the Coin Mechanism's Manual Coin payout buttons is discouraged to keep from corrupting the coin counts. As long as the sales greeting is scrolling, the manual buttons cannot be used.*

Discounted Sale Counter Mode (dSAL)

This mode is very similar to the Sale Counter Mode. It allows you to manually extract the amount of product dispensed through your Vender during the discounted sales periods (up to 99,999,999). The Sale Counter Mode consists of a non-resettable total count and individual count per selection which are resettable, depending upon the proper configuration setting (see Configurations). The counts can be displayed in up to two (2) sets of four (4) digits. Examples for both total and individual counters are:

Discount Count Type	Actual Count	1st Display	2nd Display	3rd Display
Total Sale Count	5,678,910	"SALE"	"567"	"8910"
Selection Sale Count	678,910	"SL [number]"	"67"	"8910"

OPERATION: If **<enter>** is pressed when the display shows "dSAL", the Controller will enter the Discounted Sales Counter Mode. The display will flash "SALE" and the total amount of discounted sales made by the Vender. This can be shown in two (2) sets of four (4) digits (as shown in Example 1 above). Using **<up>** or **<down>** will cycle through individual discounted sales counts for each selection. The display will flash individual counts (as shown in Example 2 above). If **<home>** is pressed anytime during this operation, the Controller will return to the "dSAL" display. From "dSAL" pressing **<down>** will take you to "tUFL". Pressing **<up>** will take you to "diFc".

CLEARING INDIVIDUAL COUNTERS: If the Configurations Mode is set to allow the individual counters to be reset, the individual counters will reset upon reading at least one (1) of them and closing the Vender's main door or actuating the Vender's door switch.

Differential Cash Discounted Counter Mode (diFC)

This mode is comparable to the Cash Mode. It allows you to monitor the difference between discounted prices and regular prices. The Differential Cash Discounted Counter Mode is a non-resettable total count. If product is sold for less than the vend price, the counts will be preceded by a negative symbol (-). If product is sold for greater than the vend price, the counts will be shown normally. Examples for both are:

Differential Count Type	Actual Count	1st Display	2nd Display	3rd Display
Differential Cash Count (Negative)	-$789.10	"CASH"	"-7"	"89.10"
Differential Cash Count (Positive)	$789.10	"CASH"	"7"	"89.10"

OPERATION: If **<enter>** is pressed when the display shows "diFC", the Controller will enter the Differential Cash Discounted Counter Mode. The display will flash "CASH" and the total difference between regular vend prices and discounted prices (as shown in Example 1 above). Pressing **<home>** anytime during this operation will allow the Controller to return to the "diFC" display. From "diFc", pressing **<down>** will take you to "dSAL". Pressing **<up>** will take you to "SdiS".

CLEARING INDIVIDUAL COUNTERS: This is a non resettable counter.

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SdiS Set Discount Pricing Mode (SdiS)

This mode is used to set discount prices for each selection. This mode works in conjunction with the built-in timer in the "tinE" Mode. Before entering "tinE" Mode, you must set the selections to "1" in StCL Mode. After the StCL Mode you may set the discounted price for each desired selection. Then, set the time you wish the discounted selection to be activated by using the "dScn" settings in the "tinE" Mode under the day function.

OPERATION: If **<enter>** is pressed when the display shows "SdiS", the Controller will enter the Discount Price Setting Mode. The display will flash "ALL" (for all selections) and flash the last discount price value that "ALL" was set at. This is referred to as the selection level. If **<enter>** is pressed at this point, the display will steadily show the discount value for all selections. Press **<up>** to increase the discount price value in .05 increments or **<down>** to lower it in .05 increments. If **<home>** is pressed after adjusting the price, your new discount price will be saved and the display will return to the selection level. You may now set a few, all, or different individual discount prices if desired. If **<up>** or **<down>** is pressed when the display flashes "ALL" (for all selections) then flashes the last discount price value that "ALL" was set at, the display will cycle through the individual discount price settings for each selection. The display will show the selection number followed by the discount price for that selection. Example: If selection one is set at fifty cents, the display will flash "P 1" followed by ".50". Pressing **<enter>** while an individual selection is being displayed will cause the display to steadily show the discounted vend price for that selection to allow a change to it. Press **<up>** to increase the discount price value in the same fashion as above or **<down>** to lower it. Pressing **<home>** after adjusting a price will save that price and return you to the selection level. Pressing **<home>** while at the selection level will return you to the "SdiS" display. From "SdiS", pressing **<down>** will take you to "diFc". Pressing **<up>** will take you to "StCL".

StCL Set Timer Controlled Selections Mode (StCL)

This mode is used to choose the selections to turn off either using the built-in timer or with the optional key switch kit. This mode must be set to enable one or all of the selections for the timer or the key switch to operate. The timer or key switch will control any selections set to "1". Selections set to "0" will function normally.
OPERATION: If **<enter>** is pressed when the display shows "StCL", the Control Board will enter the Set Timer Controlled Selections Mode at the selection level and the display will show "ALL". From this point, two types of settings are possible:

- "ALL" Setting: If **<enter>** is pressed when the display shows "ALL and the current setting", the Control Board will enter the "ALL" Setting Mode. The display will steadily show "ALL" and flash the current "StCL" setting. Pressing **<up>** or **<down>** allows you to change the flashing setting between 0 and 1. Pressing **<enter>** saves any change and returns you to the selection level where the display steadily shows "StCL" and the new setting. At this time you will be able to cycle through each selection to set individual settings. If completely done, pressing **<home>** from the selection level (display shows "ALL and current setting") will return you to the "StCL" display.

- Individual Setting: If **<up>** or **<down>** is pressed when the display shows "ALL and the current setting", the Controller will cycle through each selection showing the selection number and the current setting for that selection. Example: If the display shows "t 3 1" (for selection 3, the timer is set to on). If **<enter>** is pressed while the display is showing an individual selection timer setting, the current setting for that selection will start flashing. Pressing **<up>** or **<down>** allows you to change the flashing timer setting between 0 and 1. Pressing **<enter>** saves any change and returns you to the selection level. At this time you will be able to cycle through each selection to set other individual Timer Controlled Selection Settings. Pressing **<home>** from the selection level will return you to the "StCL" display. From "StCL", pressing **<down>** will take you to "SdiS". Pressing **<up>** will take you to "tinE".

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Time and Timer Settings Mode (tinE)

This mode is used mainly to turn selections, lighting, and/or refrigeration off and back on during predetermined times of the day and days of the week. In the "tinE" Mode, you must set the current year, date, hour and day of the week for the timer to operate. The "tinE" Mode is also used to set each "on" and "off" time in which the timer will operate. Within the "tinE" Mode, there are several different functions listed below with a meaning and example for each.

FUNCTION	PROGRAM MEANING	DISPLAY EXAMPLE *(After Entering Mode)*
YEar	Current Year	"1998"
datE	Current Month/Day	"06.08" (June 8)
hour	Current Hour/Min.	"13.30" (1:30 pm) *military time*
SEtd	Set Day of the Week	"SUN"
StOP	Disable Clock*	"CLOC" then "StOP"
daY	Timer On/ Off Days and Times	"ALL"
dSt	Display Time On LED	"dSt" with setting flashing
dLt	Daylight Savings Time	"dLt" with setting flashing

** This feature is used to conserve the Control Board's built-in battery if Vender is in storage for long periods of time. The Lithium battery shelf life is three (3) years with the clock turned on and ten (10) years with it off.*

OPERATION: If **<enter>** is pressed when the display shows "tinE", the Controller will enter the Time and Timer Settings Mode and the display will show "YEar". Pressing **<up>** or **<down>** allows you to cycle through each "tinE" function. Pressing **<home>** while the display is showing any of the earlier listed "tinE" functions will return you to the "tinE" display. When completely finished with all "tinE" functions, pressing **<home>** from the "tinE" functions menu returns you to the code level where the display shows "tinE". Pressing **<down>** will take you to "StCL". Pressing **<up>** will take you to "FriG".

- Year Function ("YEAr"): If **<enter>** is pressed when the display shows "YEAr", the Controller will enter the year setting "tinE" function and the display will show the year, with the first two numbers of the year flashing (Example: **19**.98). Pressing **<up>** or **<down>** allows you to change the first two digits of the year. If **<enter>** is pressed at this point, the first two numbers of the year lock in and the second set of digits start to flash (Example: 19.**98**). Pressing **<up>** or **<down>** allows you to change the second two digits of the year. Pressing **<home>** saves any change and returns you to the beginning of the year "tinE" function where the display shows "YEAr". From "YEAr", pressing **<down>** will take you to "dLt". Pressing **<up>** will take you to "dAtE".

- Date Function ("dAtE"): If **<enter>** is pressed when the display shows "dAtE", the Controller will enter the date setting "tinE" function and the display will show the current date, with the first two numbers of the date flashing to indicate the month (Example: **03**.00). Pressing **<up>** or **<down>** allows you to change the first two numbers of the date. If **<enter>** is pressed from this point, the first two numbers of the date lock in and the second set of two digits will start flashing to indicate the day (Example: 03.**28**). Pressing **<up>** or **<down>** allows you to change the second two numbers of the date. Pressing **<home>** anytime during this process saves any change and returns you to the beginning of the date "tinE" function where the display shows "dAtE". From "dAtE", pressing **<down>** will take you to "YEAr". Pressing **<up>** will take you to "hour".

- Hour Function ("hour"): If **<enter>** is pressed when the display shows "hour", the Controller will enter the hour setting "tinE" function and the display will show the current hour in military time with the first two numbers of the hour flashing (Example: **14**.00). Pressing **<up>** or **<down>** allows you to change the hour. If **<enter>** is pressed from this point, the first two numbers of the hour lock in and the second set of two digits will start flashing to indicate the minutes (Example: 14.**31**). Pressing **<up>** or **<down>** allows you to change the second two numbers of the hour. Pressing **<home>** after making a change will return you to the beginning of the hour "tinE" function where the display shows "hour". From "hour", pressing **<down>** will take you to "dAtE". Pressing **<up>** will take you to "SEtd".

- Set Day Function ("SEtd"): If <**enter**> is pressed when the display shows "SEtd", the Controller will enter this mode displaying a day of the week. Pressing <**up**> or <**down**> allows you to change the day of the week. When the desired day is selected, press <**home**> to select and bring you to "SEtd". From "SEtd", pressing <**down**>will take you to "hour". Pressing <**up**> will take you to "StOP".

- Stop Function ("StOP"): If **<enter>** is pressed when the display shows "StOP", the Controller will enter the Stop Clock Setting "tinE" function and the display will flash "CLOC" and "StOP". Pressing **<enter>** will turn off the clock to reserve the Controller's built-in battery. The display will flash "Off" and automatically exit back to the display of "StOP". Pressing **<home>** anytime during this process will return you to the beginning of the Stop Clock "tinE" function where the display shows "StOP". From the "StOP" display, pressing **<down>** will take you to "hour". Pressing **<up>** will take you to "dAY".

- Day Function ("dAY"): If **<enter>** is pressed when the display shows "dAY", the Controller will enter the "tinE" function to allow you to set the timer on/off times for each day of the week. The display will show "ALL". From this point you have two different options: the All Day Timer Setting will enable you to set all days the same in which the timer operates (such as "ALL" of the price mode) and Individual Day Timer Settings will give you the option to set all the timer operations different daily. Pressing **<up>** or **<down>** allows you to cycle from "ALL" to each day of the week. If **<enter>** is pressed, either at "ALL" or a week day, the Controller will enter into that particular day. The display will show "SC-1", then "On", and then the current first "Off" time for selections as listed below. From here on, this will be referred to as the Timer Setting Mode Viewing Only Level. If **<up>** or **<down>** is pressed at the Timer Setting Mode Viewing Only Level, the display will cycle to all other available Timer Setting Modes:

SETTING MODE	PROGRAM MEANING
"SC-1"... "On"	1st **OFF** time for selections
"SC-1"... "Off"	1st **ON** time for selections
"SC-2"... "On"	2nd **OFF** time for selections
"SC-2"... "Off"	2nd **ON** time for selections
"SC-3"..."On"	3rd **OFF** time for selections
"SC-3"..."Off"	3rd **ON** time for selections
"dScn"... "On"	**ON** time for discounted selections
"dScn"... "Off"	**OFF** time for discounted selections
"FriG"... "On"	**OFF** time for Refrigeration System
"FriG"... "Off"	**ON** time for Refrigeration System
"Lt-1"... "On"	1st **OFF** time for illumination (ballast lighting)
"Lt-1"... "Off"	1st **ON** time for illumination (ballast lighting)
"Lt-2"... "On"	2nd **OFF** time for illumination (ballast lighting)
"Lt-2"... "Off"	2nd **ON** time for illumination (ballast lighting)
"Lt-3"... "On"	3rd **OFF** time for illumination (ballast lighting)
"Lt-3"..."Off"	3rd **ON** time for illumination (ballast lighting)

To set "On" and "Off" times for the timer, you must press **<enter>** upon reaching the desired Timer Setting Mode. After doing this, the Controller will enter into that particular Timer Setting Mode. The display will show the current setting with the hour flashing. This indicates that the hour can now be changed. Pressing **<up>** or **<down>** allows you to change the hour of this particular setting. Pressing **<enter>** will lock in the hour setting and start the minutes flashing (which will indicate to you the minutes can now be changed). Pressing **<up>** or **<down>** allows you to change the minutes of this setting. Pressing **<home>** anytime during this process will lock in your changes and bring you back to where the display shows the Timer Setting Mode and the time set for that mode (Timer Setting Mode Viewing Only Level).

At this point, **<up>** or **<down>** allows you to access all Timer Setting Modes listed earlier. From this Timer Setting Mode Viewing Only Level, pressing **<home>** again will return you to the day of the week level. Press **<home>** again to return to the display of "dAY". From "dAY", pressing **<down>** will take you to "StOP". Pressing **<up>** will take you to "dSt".

***Note**: If you are setting certain selections to go off and come back on at a programmed time, you must first enter "SC-1 On" to set the first off time for selections. When done programming the first off time, you must then program the first return on time for the selections by entering into "SC-1 Off" and programming your return on time. For the timer to be able to control the selections, you must set the selections to be controlled in the "StCL" Mode of the Internal (Service) Menu.*

- Display Time Function ("dSt"): If **<enter>** is pressed at this display, the Controller will enter the Display Time Setting Mode and the display will show "dSt" while flashing the current setting. Pressing **<up>** or **<down>** allows you to change the flashing setting back and forth between 0 and 1. If set to "1", the time of day will be displayed on the LED during the greeting. If set to "0", the time will not be displayed during the greeting. Pressing **<home>** anytime during the process will save changes and return you to the "dSt" display. From this point, pressing **<down>** will take you to "dAY". Pressing **<up>** will take you back to "dLt".

- Daylight Savings Time Function ("dLt"): This option allows for the automatic adjustment of Daylight Savings Time. If enabled, the time will automatically be adjusted forward one hour at 2:00 a.m. (2:02 a.m. at the latest) on the first Sunday of April and similarly adjusted back one hour on the last Sunday of October. If **<enter>** is pressed at this display, the Control Board will enter the Daylight Savings Time Enable / Disable Mode. The display will show "dLt" and flash the current setting. Pressing **<up>** or **<down>** allows you to change the flashing setting back and forth between 0 and 1. If set to "1", Daylight Savings Time will be enabled. If set to "0", Daylight Savings Time will be disabled. Pressing **<enter>** anytime during the process will save any change and returns you to the start of the Display Time Mode where the display will show "dLt". From this point, pressing **<down>** will take you to "dSt". Pressing the **<up>** button will take you to the "yEAr" mode.

  ***Note:** This is important if you are using the timer function set to "1".*

Refrigeration Parameters Mode (FriG)

This mode is used to control the environmental aspects of the Vender. It controls the Refrigeration System by allowing you to program the cut in and cut out temperatures of the refrigeration unit. The "FriG" Mode also allows you to show the current inside cabinet temperature (on the LED during the greeting). The temperatures shown on the LED during the greeting and programming can be changed from Fahrenheit to Celsius. The "FriG" Mode has a relay mode allowing you to test any controlling relays in the Vender (evaporation fan, refrigeration, ballast, and heater). There is even a setting to disable the unit for safety reasons. Within the "FriG" Mode, there are several different functions listed below with a meaning and an example for each.

***Note:** The "FriG" Mode is only applicable in Venders using Electronic Refrigeration Mode. However, if the "FriG" setting is set to "1", without the use of electronic control, the display will show unnecessary "FriG" errors.*

Function	**Program Meaning**	**Display Example** *(After Entering Mode)*
Cuti	Cut In Temperature	41F
Cuto	Cut Out Temperature	29F
dEG	Select Fahrenheit Or Celsius	
dSP	Display Inside Cabinet (evap.) Temperature	
FrG	Master Control On/Off	
rELY	Relay Test Mode	

OPERATION: If **<enter>** is pressed when the display shows "FriG", the Controller will enter the Refrigeration Parameters Mode and the display will show "Cuti". Pressing **<up>** or **<down>** allows you to cycle through all six (6) "FriG" functions. When completely finished with all programming in the "FriG" Mode, pressing **<home>**, while the display is showing any of the earlier listed "FriG" functions, will return you to the "FriG" display. From "FriG", pressing **<down>** will take you to "tinE". Pressing **<up>** will take you to "PAS".

SECTION 3. VENDER PROGRAMMING

- Cut In Function ("Cuti"): If **<enter>** is pressed when the display shows "Cuti", the Controller will enter the Cut In Setting "FriG" function and the display will show the current Cut In Temperature Setting (Factory setting: 41°F). Pressing **<up>** or **<down>** allows you to change the Cut In Setting. The setting can be adjusted between 39°F to 45°F (4°C to 7°C). Pressing **<home>** anytime during this process will save any change and returns you to the beginning of the "Cuti" "FriG" function where the display shows "Cuti". From "Cuti", pressing **<down>** will take you to "rELY". Pressing **<up>** will take you to "Cuto".

- Cut Out Function ("Cuto"): If **<enter>** is pressed when the display shows "Cuto", the Controller will enter the Cut Out Setting "FriG" function. The display will show the current Cut Out Temperature Setting (Factory setting: 29°F). Pressing **<up>** or **<down>** will allow you to change the Cut Out Setting. The setting can be adjusted between 24°F to 34°F (-4°C to 1°C). Pressing **<home>** anytime during this process will save any change and returns you to the beginning of the "Cuto" "FriG" function where the display shows "Cuto". From "Cuto" pressing **<down>** will take you to "Cuti". Pressing **<up>** will take you to "dEG".

- Select Degree Function ("dEG"): If **<enter>** is pressed when the display shows "dEG", the Controller will enter the Degree Setting "FriG" function. The display will show "dEG" and flash the current degree setting. Pressing **<up>** or **<down>** will allow you to change the current setting. Program to "F" for Fahrenheit (Factory Setting) or "C" for Celsius. Pressing **<home>** anytime during this process will save any change and returns you to the beginning of the "dEG" "FriG" function where the display shows "dEG". From "dEG", pressing **<down>** will take you to "Cuto". Pressing **<up>** will take you to "dSP".

- Display Temperature Function ("dSP"): If **<enter>** is pressed when the display shows "dSP", the Controller will enter the Display Temperature "FriG" function. The display will show "dSP" and flash the current setting. Pressing **<up>** or **<down>** allows you to change the current setting. Program to "1" to display the temperature on the LED display during the sales greeting or "0" to not display the temperature during the greeting. Pressing **<home>** anytime during this process will save any change and returns you to the beginning of the "dSP" "FriG" function where the display shows "dSP". From "dSP", pressing **<down>** will take you to "dEG". Pressing **<up>** will take you to "FrG".

- Unit Disable (Master On/Off) Function ("FrG"): If **<enter>** is pressed when the display shows "FrG", the Controller will enter the Unit Disable "FriG" function. The display will show "FrG" and flash the current setting. Pressing **<up>** or **<down>** allows you to change the current setting. Program to "1" (Electronic Refrigeration Factory Setting) for the refrigeration unit to operate normally or "0" to disable unit. Pressing **<home>** anytime during this process will save any change and returns you to the beginning of the "FrG" "FriG" function where the display shows "FrG". From "FrG", pressing **<down>** will take you to "dSP". Pressing **<up>** will take you to "rELY".

- Relay Test Function ("rELY"): If **<enter>** is pressed when the display shows "rELY", the Controller will enter the relay "FriG" function to allow you to test the various Vender relays. The display will show "Fan" (which is the test mode for the optional Evaporator Fan Motor Relay). Pressing **<up>** or **<down>** allows you to cycle through each relay test mode available.

RELAY TEST MODE MENU	**MEANING**
Fan	Evaporator Fan Relay Test (requires optional kit)
Htr	Heater Relay Test (requires optional kit)
LitE	Illumination Relay Test (requires optional kit)
CnPr	Compressor Relay Test

If **<enter>** is pressed at any of the four (4) relay test modes, the display will flash the name of the relay and then flash off. If the relay is currently off and you wish to enable it, **<enter>** here. If not, pressing either **<up>** or **<down>** allows the display to flash the name of the relay and then flash off. If the relay is currently off and you wish to test the circuit by turning it on, **<enter>** here. If the circuit tested does not work, you have five (5) minutes in Test Mode to check voltage. Pressing **<home>** from within any relay Test Mode (if after a test) will allow you to return to the Relay Test Mode Menu (where the display will show the name of the relay menu you were just in). Pressing **<home>** from a point on the Relay Test Mode Menu returns you to the beginning of the Relay Mode (where the display shows "rELY").

SECTION 3. VENDER PROGRAMMING

External Menu Password Setting Mode (PAS)

With the 20 Plus Vender, you have the capability to access both total historical and individual selection can counts externally. You are also able to read Vender errors externally (errors cannot be cleared externally). The "PAS" Mode gives you the option to change the external password to any of your select buttons in a four-digit combination, or you may decide it best to use the factory setting of **1 - 3 - 2 - 4** *(earlier software versions used 4 - 2- 3- 1)*. If you do decide to set your own password and happen to forget it, just access this menu and the current password will be displayed.

HELPFULHINTS

1. Password numbers range from 0 to 9.
2. If your Vender only has seven selections, you cannot use 8, 9, or 0 in your password or you will not be able to enter the password.
3. To disable the external password, set one of the four (4) digits to "0" or a selection that is not available (as described in Hint #2).

OPERATION: If **<enter>** is pressed when the display shows "PAS", the Controller will enter the External Password Setting Mode. The display will show the current external password with the first number of the four (to extreme left of display) flashing. Pressing **<up>** or **<down>** allows you to change the flashing digit. If **<enter>** is pressed, the second number from the left will start flashing. By doing this, you lock in any changes made to the first digit and you are now able to change the second digit. Follow the same process for every digit. If the fourth digit is flashing and **<enter>** is pressed, you will return to "PAS". Pressing **<home>** any time during this process locks in your setting and returns you to the "PAS" display. From "PAS", pressing **<down>** will take you to "FriG". Pressing **<up>** will take you to "LAnG".

International Language Setting Mode (LAnG)

The 20 Plus Vender gives you the opportunity to set an international languages of English, French, Spanish, Hebrew, or German to show vending messages, such as "sold out," to the customer.

OPERATION: If **<enter>** is pressed when the display shows "LAnG", the Controller will enter the International Language Setting Mode. The display will show the current language being used. Pressing **<up>** or **<down>** allows you to change the language to one of the following:

EnGL English Language
HEbr Hebrew Language
FrEn French Language
GEr German Language
SPAn Spanish Language

Pressing **<home>** anytime during this process saves any change and returns you to the "LAnG" display. From "LAnG", pressing **<down>** will take you to "PAS". Pressing **<up>** will take you to "rtn".

Return to Sales / Greeting Mode (rtn)

This mode is used to exit the Service Menu and return to the Sales Mode, where the display flashes the greeting (ICE COLD or PEPSI COLA) along with any other display options.
OPERATION: If **<enter>** is pressed when the display shows "rtn", the Controller will revert to the Sales Mode and the greeting will be displayed. From "rtn", pressing **<down>** will take you to "LAnG". Pressing **<up>** will take you to "CASH".

External Menu

By entering the correct four-digit password when Vender is in stand-by condition (display is showing the greeting, a credit is not established, and the Vender is not set for free vend), you will access the External Menu. This menu consists of three (3) menu items previously discussed in the Internal Menu. The External Menu is designed to give you access to a few features, such as total and individual (per selection) vend counts, Vender error diagnostics, and a clearing feature for individual vend counts. This menu may come in handy for a location manager who does not have access to the inside of the Vender but wishes to report problems and get vend counts. Programming CANNOT be done through this menu! *After five (5) minutes without activity, if money is inserted or if the coin return lever is actuated, the Control Board will revert to the Sales Mode (the LED will show the greeting).*

Sale Counter Mode (SALE)

This mode is very similar to the Cash Counter Mode. The Sale Counter Mode allows you to manually extract the amount of product vended from your Vender (up to 99,999,999 vends). The Sale Counter Mode consists of a non-resettable total count and individual selection counts. These are resettable depending upon the proper configuration setting (see Configurations). The counts will be preceded by the count type and can be displayed in one (1) or two (2) sets of four (4) digits. Examples for both types of Sale Counters are as follows:

Count Type	Actual Count	1st Display	2nd Display	3rd Display
Total Sale Count	5,678,910	"SALE"	"567"	"8910"
Selection Sale Count	678,910	"SL [number]"	"67"	"8910"

OPERATION: If **<enter>** is pressed when the display shows "SALE", the Control Board will enter the Sale Counter Mode. The display will flash "SALE" and the total amount of sales made by the Vender, possibly in two (2) sets of four (4) digits (see Example 1 above). Using **<up>** or **<down>** will cycle through individual selection sale counts. The display will flash individual selection counts (see Example 2 above). If **<home>** is pressed anytime during this operation, the Controller will return to the "SALE" display. From "SALE", pressing **<down>** will take you to "Eror". Pressing **<up>** will take you to "rtn" (if present).

Return to Sales / Greeting Mode (rtn)

This mode is used to exit the External Menu and return to the Sales Mode where the display flashes the greeting (ICE COLD or PEPSI COLA) along with any other display options.

OPERATION: If **<enter>** is pressed when the display shows "rtn", the Controller will revert to the Sales Mode and the greeting will be displayed. From "rtn", pressing **<down>** will take you to "Sale". Pressing **<up>** will take you to "Eror".

Errors Mode (Eror)

This mode was designed to help diagnose Vender problems. Upon entering this mode, the display will flash any possible error (for a list, refer to Section 6, Vender Maintenance: Error Codes). If there are no errors, the display will momentarily flash "none" and revert to "Eror" on the External Menu. Errors cannot be cleared from this External Errors Menu. They have to be cleared from the Internal Menu.

OPERATION: If **<enter>** is pressed when the display shows "Eror", the Controller will enter into the Errors Descriptive Display Mode. At this point, the display will show any and all current Vender errors followed by the descriptions for each. If no errors exist, "none" will appear on the display. If **<home>** is pressed anytime during this operation, the Controller will return to the "Eror" display. From "Eror", pressing **<down>** will take you to "rtn".

CLEARING ERRORS: To clear an error, you must access the "Eror" Mode from within the Internal (Service) Menu.

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 Chute 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

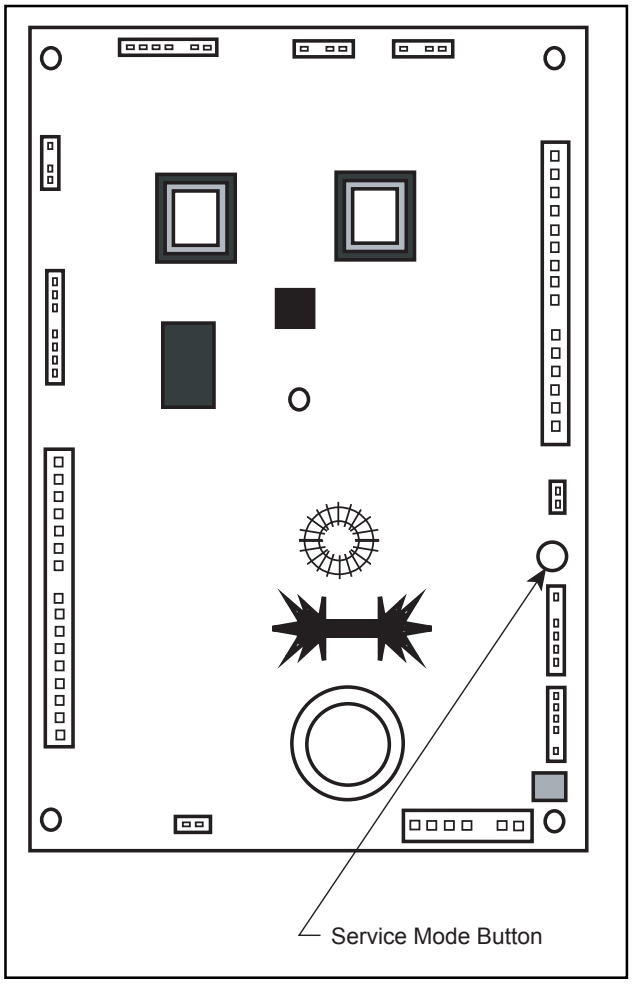


Figure 3.0

Digital Display

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 TDV 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.

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 TDV 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.*

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 aproximate 5 to 8 minute delay (after door switch is pressed).

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).

Selection Switches

The selection switches signals the vender controller when a selection is made. 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 is equipped with an internal thermal-fuse which protects the vender in the event of a short in the secondary circuit.

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 with the same column.*

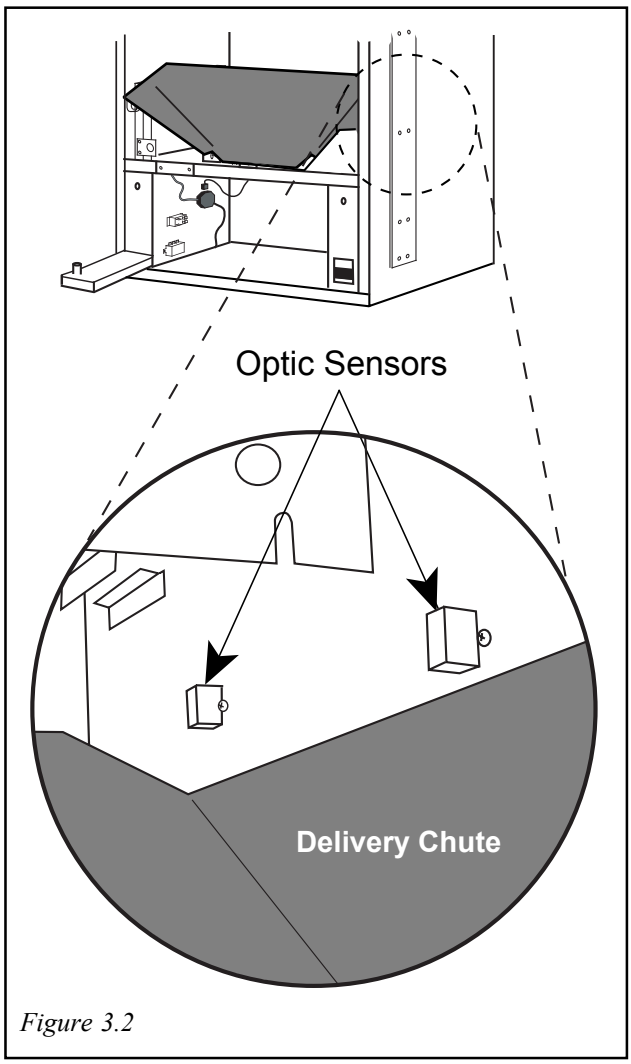


Figure 3.2

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.*

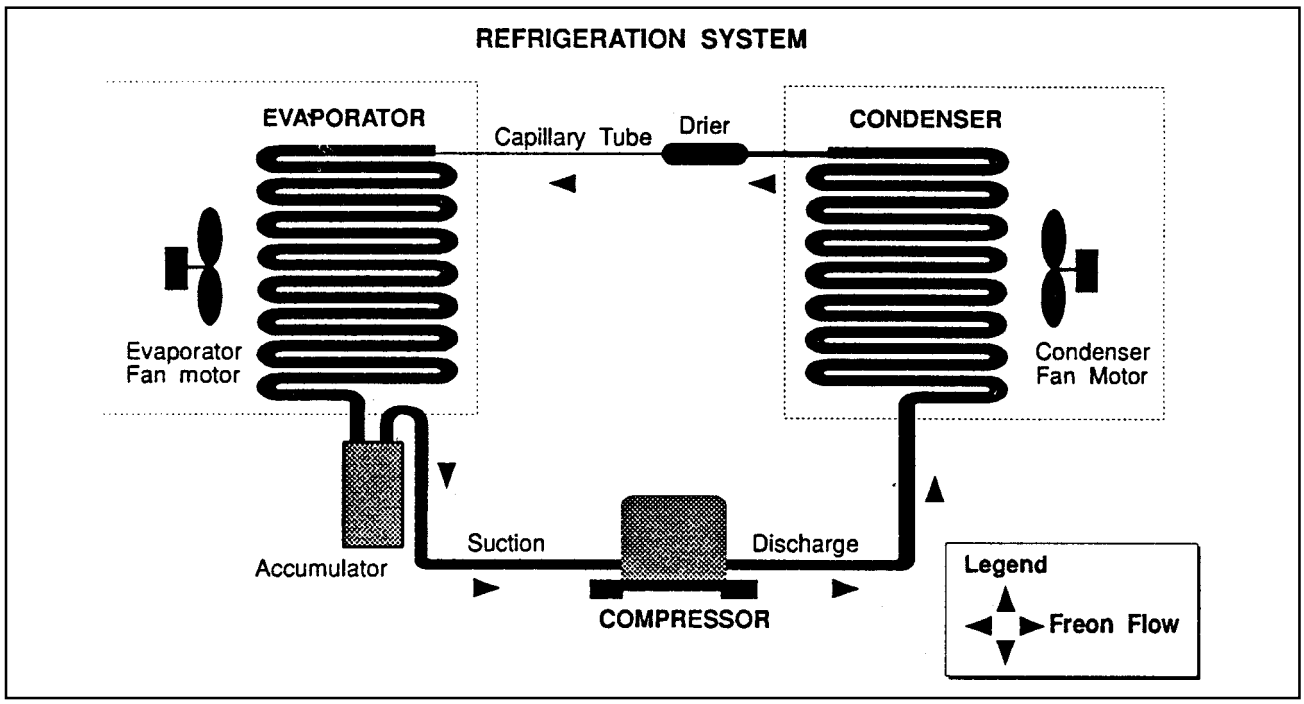


Figure 3.8

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.

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). As the next 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.*

Column Sequencing

If a selection has multiple columns assigned to it, the same column is vended each time the selection button is pressed until the number of times vended is equal to the depth of the column. Then, that selection proceeds to the next column assigned. This is to allow the columns to vend evenly.

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. 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 TDV.

PART	CLEANING METHOD
Control Board*	The Vender's Control Board should always be enclosed inside its cover to protect it. Routine cleaning is not 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 TDV.

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 TDV 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.

20 plus Troubleshooting

Use the following section to troubleshoot your 20 Plus vender in the case you have a problem in one of the following areas: power, acceptance (coin or bill), vending, or refrigeration. Although we have added what we felt are the most encountered problems, your specific problem may not be here. If this is the case please, contact your local Royal Vendors' service representative.

COIN ACCEPTANCE

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
Coin mechanism will not accept coins	No power to Vender's main door (lights not lit) or no power to transformer / Control Board	Check to make sure the LED and the sign lighting are lit. If not, check power at transformer.
	Coin mechanism harness to Control Board is cut or disconnected	Repair or replace changer harness.
	Short in coin mechanism	Unplug all harnessing from the Control Board except the transformer (power) connection, and the coin mechanism connection and test acceptance. If it accepts, replug each connection, one at a time, and test acceptance after each.
	Defective Control Board	After a new coin mechanism has been tried and the harness has been checked for continuity, replace Control Board.
No acceptance or rejects percentage of good coins	Coin return lever	Make sure changer is mounted correctly and a the coin return lever is in the proper position.
	Acceptor is dirty or foreign matter is in the path	Check to ensure that the coin mechanism's acceptor is clean.
	Coin changer is improperly tuned (if tunable)	Contact coin changer manufacturer.
	Defective Control Board	Replace the Control Board and test.
Accepts coins but gives erratic/no credit	*If erratic or no credit:* Acceptor (coin mechanism)	Replace coin mechanism (acceptor) and test. If If OK, check the following.
	If no credit, defective harness between coin mechanism and Control Board	Check harness for cut wires or wrong connections. If defective, replace it.
	If no credit, defective Controller	Replace Control Board and test.

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
Changer will not payout coins	Defective harness between coin mechanism and Control Board	Check harness for cuts or wrong connections. If defective, replace it.
	Defective coin mechanism	Replace coin mechanism and test. If it pays out test the Control Board.
	Defective Controller	Test Vender's manual coin payout. If Vender pays out using the CPO mode but not during sales, check the coin mechanism or coin mechanism harness. The Control Board is more than likely not the problem.

BILL ACCEPTANCE

Validator will not pull in a bill	Make sure that the validator harnessing is correct for your style of validator and it is plugged in properly	Replace defective or wrong validator harness.
	Acceptance disabled by coin mechanism or bad harnessing (validator status light is on)	Make sure that the coin mechanism is plugged in (accepts coins) and the tubes are full of coins.
	Make sure that the changer harnessing is correctly connected	Repair or replace faulty harnessing.
	If validator accepts, replace coin mechanism and test.	Replace defective validator.
	If validator accepts, replace validator and test	Replace defective validator.
	If validator accepts, replace Controller and test	Replace defective Controller.
Validator takes a bill and not establishing a credit	Defective (wrong, cut or miswired) validator harnessing. (credit not getting from validator to Control Board via credit wire)	Make sure that the validator harnessing is correct for your style of validator and it is plugged in / wired properly.
	Defective validator	Replace validator and test acceptance.
	Defective Controller	Replace Controller and test acceptance.
Validator takes a bill and not erasing credit	Validator switch settings (if any)	Refer to validator service manual or validator representative.
	Defective validator interface harness	Refer to validator service manual or validator representative
	Defective validator	Replace validator and test acceptance and erasure of credit.
	Defective Controller	Replace Controller and test acceptance and erasure of credit

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
Validator takes a bill and allows payback of coins without a selection	Controller's configurations not set properly	Access the Venders Configurations Mode and check the "Forced Attempt" setting.

VENDING PROBLEMS

Multiple vending	If from all selections: optic sensor wire cut, not properly grounded, disconnected, or improperly set	Set Vender's optic sensors by disconnecting the harness leading from the control board to the optic sensor board and turning the adjustment screw: 1. clockwise until indicator lights 2. clockwise 2 full turns more 3. reconnect harness If no progress is made by adjusting, replace sensors. ***Note:*** *Slight adjustments may be needed outside the factory set two turns. Turning the adjust ment screw clockwise makes the sensors more sensitive and counterclockwise makes them less sensitive. Test vend after every 1/4 turn.*
	Control Board sending power to motor when not supposed to	Check power at vend motor during multiple vend (24 volts DC). If power is present, the Control Board is at fault.
	Mechanical error	Check the vend motor to ensure the gearing within it is OK.
Wrong product vending upon selection	Misload by Vender loader	Ensure all products within each column are the same.
	Space to Sales not set properly	Enter Space to Sales and make sure the columns are set correctly according to the buttons.
	Miswired motor	Check wiring at the each vend motor at the bottom of the Vender's main door and at the motor's connection of the Control Board.
	Miswired selection	Check the wiring at each select switch and at the select switch's connection of the Control Board.
No vend upon selection - Dry vend (no refund)	Delivery sensor	Check to see if the optic sensor adjustment LED is constantly on. If so, turn the adjustment screw counter clockwise until adjustment LED goes out.
	Check optic sensor harnesses for cuts or pinches. The sensor adjustment LED will constantly be on, if a cut is found.	Replace defective sensors.

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
	Unplug the sensors' connection from the Control Board, if the adjustment LED stays on	Replace defective controller.
No vend from some but not all columns (allows refund or second choice)	Make sure the LED display acknowledges the selection switch.	Check the select switch and trace the selections harness back to the Control Board. Replace if necessary.
	Individual wire that runs from the motor connection of the Control Board to the vend motor of the defective column.	If cut or pinched, check individual wire running from motor connection at Control Board to defective column.
	Control Board	Measure voltage at vend motor's connection of the Control Board. Measure it on the individual wire for the motor attempted and the wire by itself next to the key (neutral). A selection must be made and "hold" must be displayed on the LED. You should register 24 VDC at the vend motor. If not, replace Control Board.

MISCELLANEOUS PROBLEMS

LED not lit	If no power, check for 24 volts AC at the Control Board's power connection.	Check transformer and power to transformer.
	Press Controller's mode button. Does LED light? Power the Vender down and up. Does LED light?	If not, check LED lead.
	LED lead	Check the lead for any sign of being pinched or cut. If so, change the LED.
	LED	Remove all harnessing but LED lead and the power lead from transformer to Control Board. Check the new LED before mounting it in the Vender. If still bad, replace the Control Board and test.

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
Display shows sold out immediately upon pressing select button with column full of product (sold-out not clearing)	Door switch wiring incorrectly connected, cut , or pinched	Check for cuts on the two (2) door switch wires going from the switch to the Control Board. Also check for bad connections at the door switch, the plug at the bottom of the Vender's main door, and at the Control Board's connection. Are any found? If not, check the door switch.
	Door switch	Check the door switch to see if it is defective. If so, replace it.
	Control Board	Check Control Board by shorting across the two (2) pins for the door switch wiring (Control Board's option connection) Does this clear the sold out condition? If so, replace the Control Board.
LED shows "Out of Service"	Corrupted control board	Press the service mode button. After approximately 20 seconds, the control board will be reset to its default settings. Reprogram the control board.

REFRIGERATION PROBLEMS

Refrigeration unit runs constantly	Cut out temperature not set properly	Check cut out setting in the "FriG" mode. Correct if necessary.
	Temperature sensor not reading correctly	Test the temperature sensor by showing the temperature on the display and measuring the actual inside cabinet temperature with a thermometer or by opening/closing door to see if the temperature changes. Replace if defective.
	Short in wiring harness from Controller to refrigeration relay	Unplug one (1) of the two (2) wires coming from the Control Board to power the relay. If the unit cuts off, locate the shorted wire to be either on the door side or the cabinet side of the harness and correct or replace defective harness.
	Refrigeration relay's contacts are welded together	Unplug one (1) of the two (2) "pink" connector wires coming from the Control Board to power the relay. If the unit continues to run, switch the two (2) "blue connector" wires coming from the main wiring harness to the two (2) other available connectors (if present). If not, replace relay.

SECTION 5: VENDER MAINTENANCE

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
Refrigeration unit will run	Unit itself is defective	Unplug the refrigeration unit from the top of not the main wiring harness and plug it into a direct power source. If it does not run, replace the refrigeration unit.
	"FrG" setting not set properly	Check "FrG" setting in the "FriG" Mode to make sure it is set to "1". If set incorrectly, reprogram it to show "1"
	Cut in / Cut out settings not set properly	Check cut in /cut out settings. If set incorrectly, reprogram them.
	Temperature sensor not reading correctly	Test the temperature sensor by showing the temperature on the display and measuring the actual inside cabinet temperature with a thermometer or by opening/closing door to see if the temperature changes. If found defective, replace temperature sensor.
	Short in wiring harness from Controller to refrigeration relay	Unplug the two (2) "pink" connector wires coming from the Control Board and measure voltage. You should read approximately 24 volts DC from one (1) of the wires. If not, locate the shorted wire to be either on the door side or the cabinet side of the harness and correct or replace defective harness.
	Refrigeration relay is defective	Test the relay by making sure all connections are made for the refrigeration unit, the refrigeration relay and the Control Board. Next go into the "FriG" mode. Check the Compressor by pressing **<enter>** when you get to "CnPr" and pressing **<enter>** again when the display flashes "CnPr" and "On".If the unit does not come on, switch the two (2) wires coming from the main wiring harness to the two (2) other available connectors (if present). If not, replace relay.

Removal of Vender Components

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

Controller Board

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

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 side of the port body (2 on the left and 2 on the right). Then take a 11/32 socket and loosen the bolts 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.

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. Remove the removable vandal panel (the left panel).
7. Have someone stand at the front of the main door to balance it so it will not fall over.
8. Release the lever located at the top left of the cabinet near the top hinge.
9. Pick the door up off of the lower hinge
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.

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. Attach the ground wire to the inner door and the main door.
11. Plug up the vender.

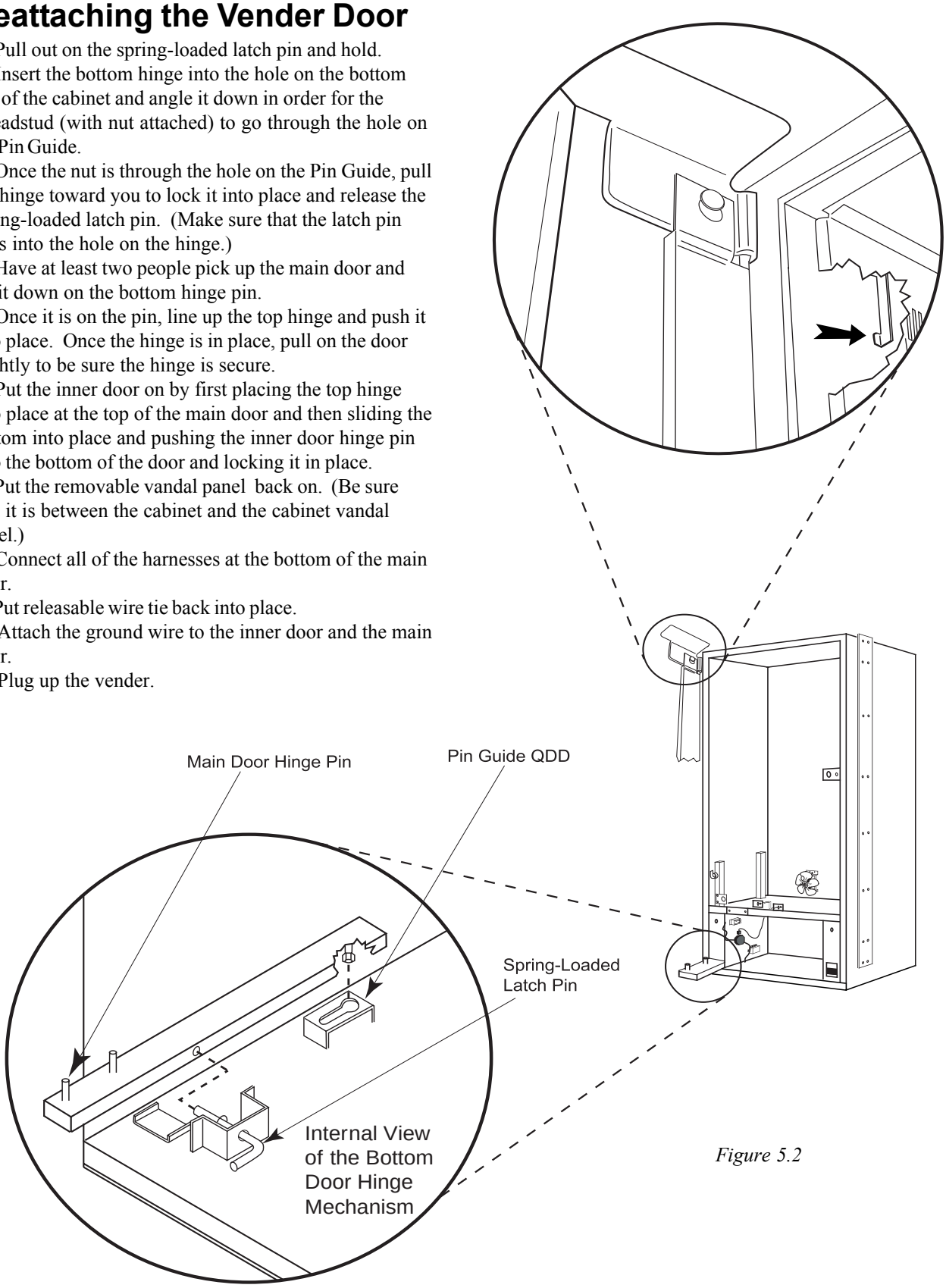


Figure 5.2

Lights

To remove the fluorescent lights, first unplug power to the vender. Then, 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.

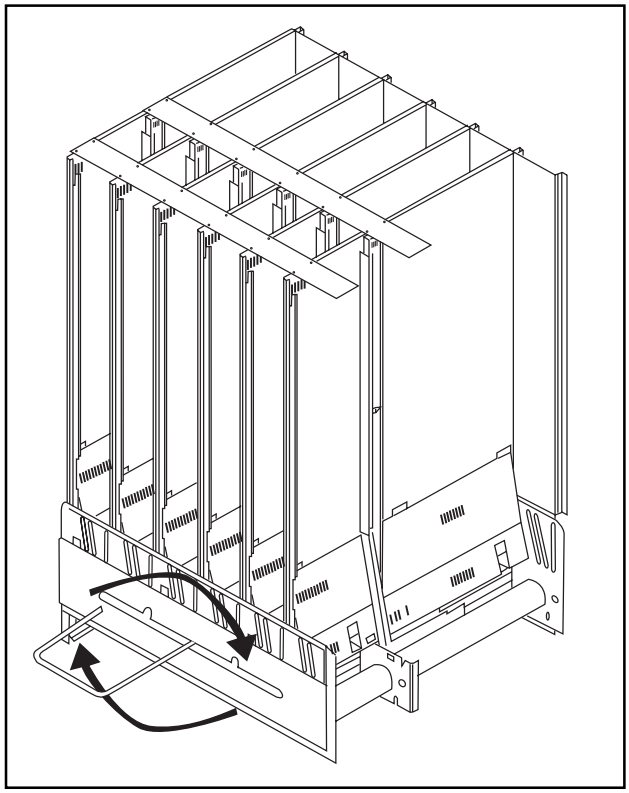


Figure 5.5

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

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.

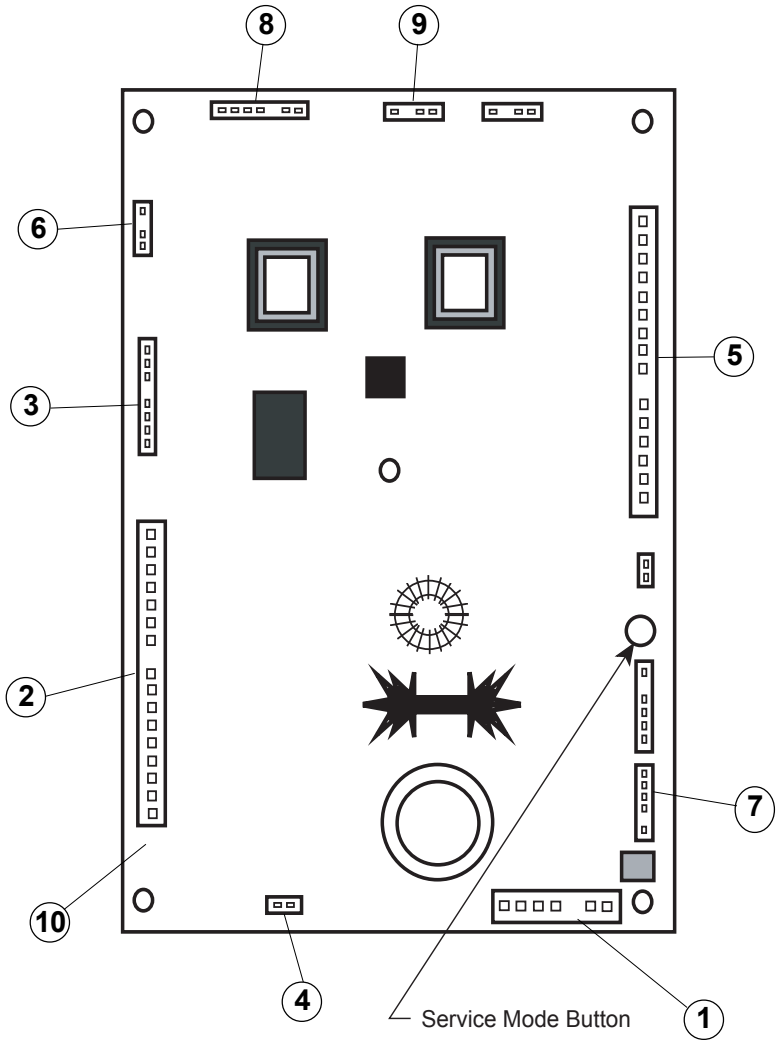
Condenser Fan

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 6: EXPLODED VIEWS

exploded views

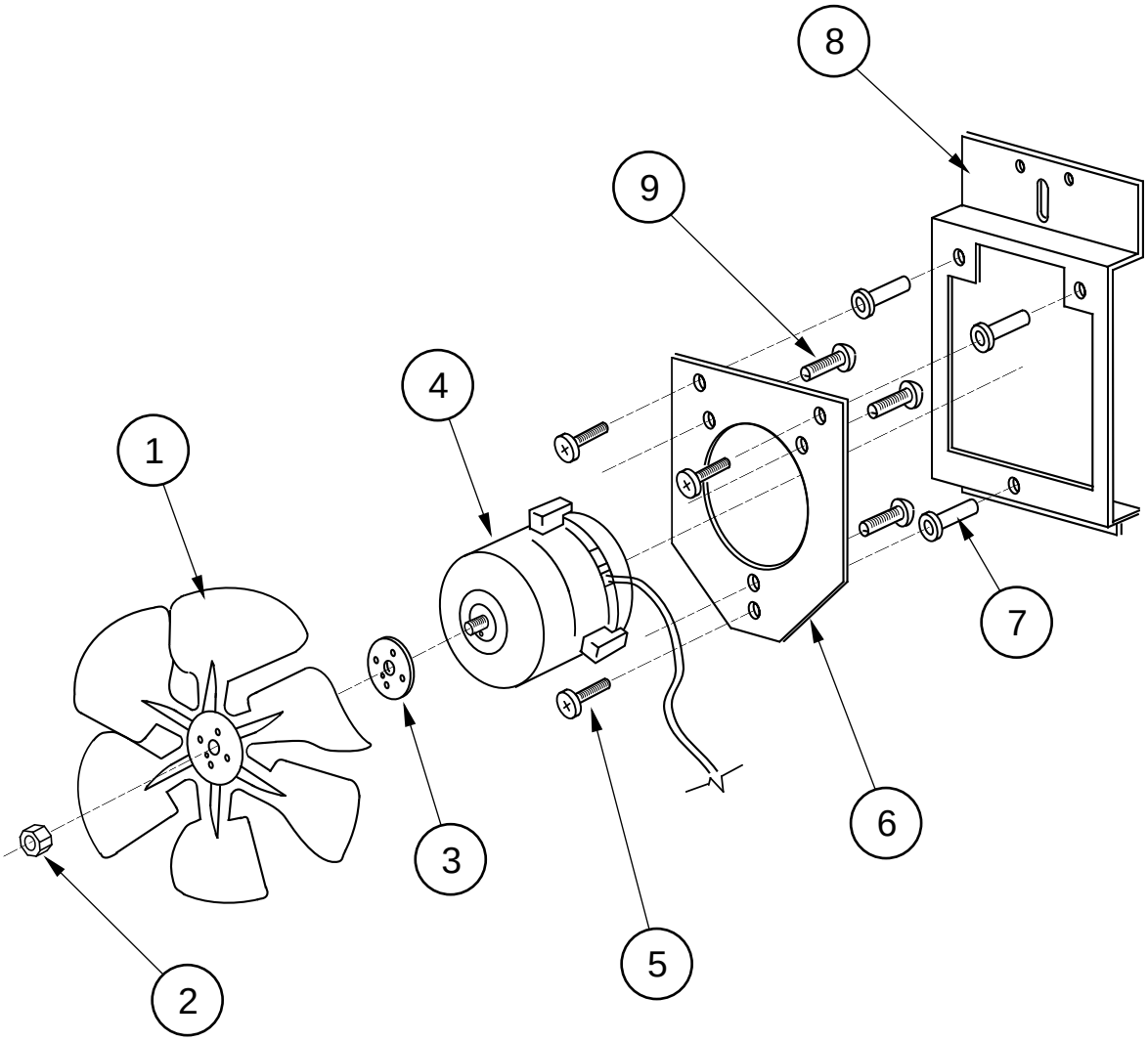


Control Board and Wiring

Item #	Description	Part Number
1	Door Mech. Harness	842233
2	12 Column Mechanism Harness	842241
-	Main Wiring Harness	842234
3	Refrigeration Relay - Door Side	842236
-	Refrigeration Relay - Cabinet Side	842237
4	Power Supply to Door - Door Side	842240
-	Power Supply to Door - Cabinet Side	842238
5	Selection Harness (10 Sel.)	842243
6	Temperature Sensor - Cabinet Side	822046
-	Temperature Sensor - Door Side	822047
7	PC Board to Optic Sensor Interface	842266
-	Optic Interface to Sensor Harness	842267
8	LED Display Lead	842081
9	Dex Harness	842099
10	Control Board	836127
-	LED Display	836012

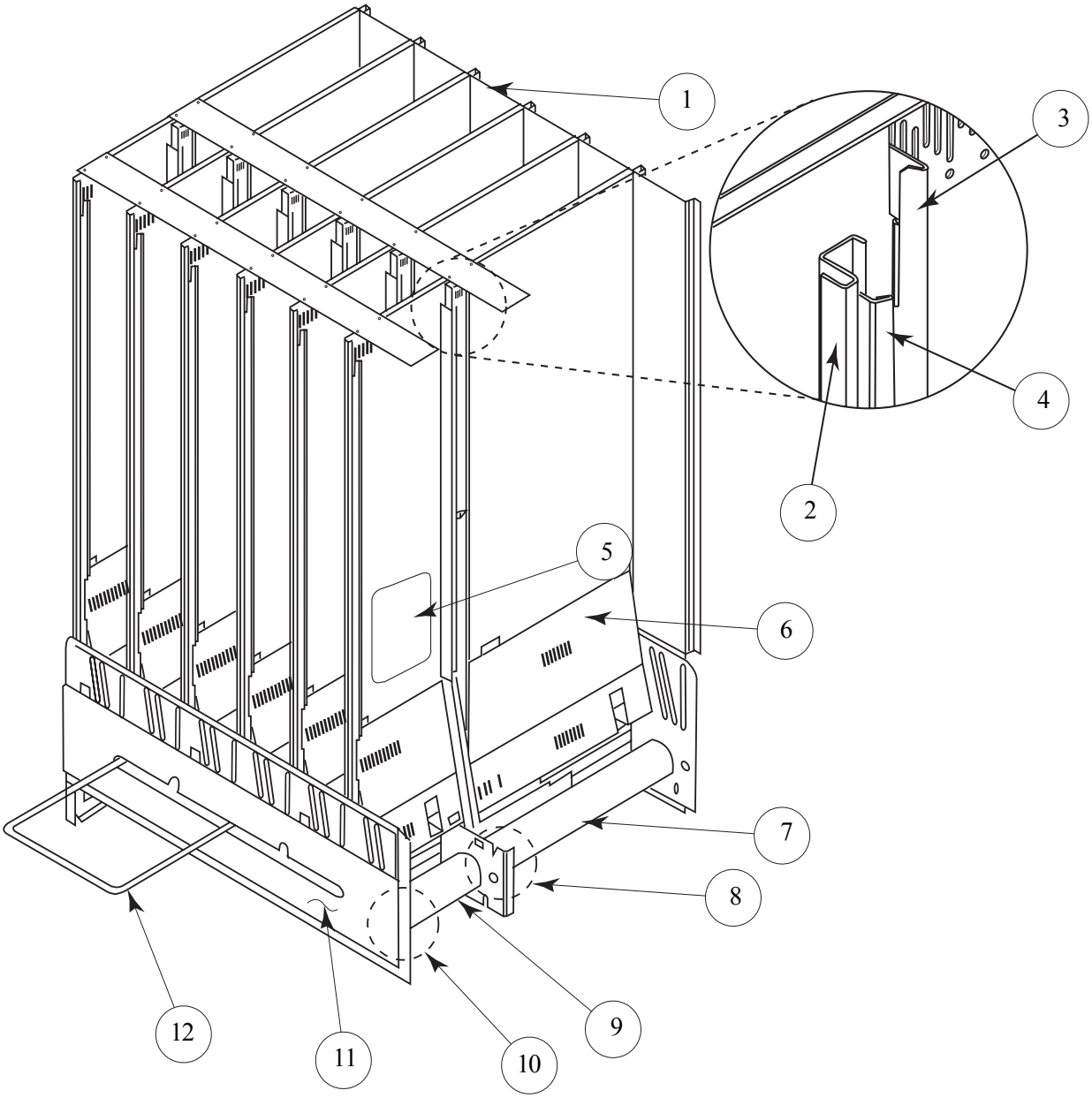
SECTION 6: EXPLODED VIEWS

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
	- EconoCool	231060	1

SECTION 6: EXPLODED VIEWS



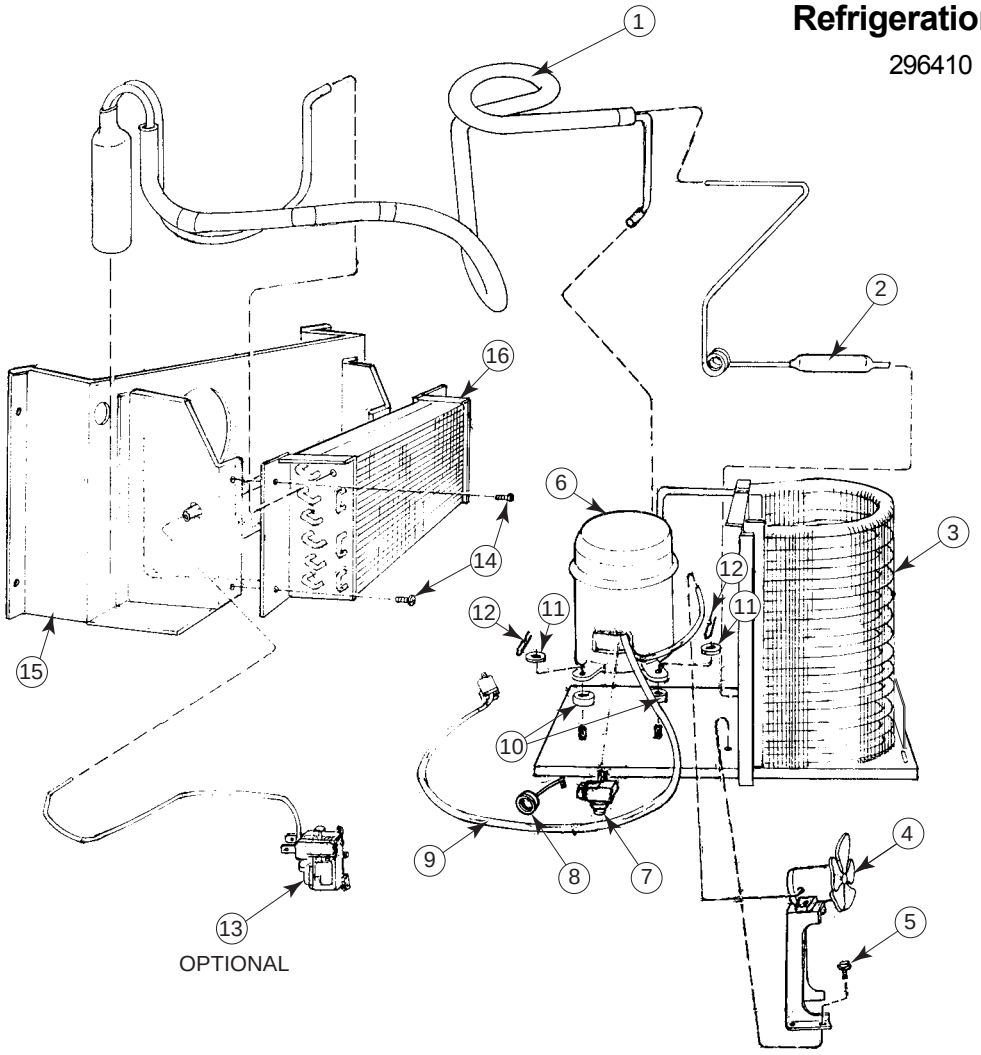
Item #	Description	Part #	Qty.
1	20 PLUS Stack Assy 79”	296710	1
	-72”	297700	1
2	Divider, Left 79”	296708	6
	-72”	297705	6
3	Retainer, Rear Left 79”	296712	6
	-72”	324711	6
4	Cap Stop	296715	12
5	Anti Friction Sheet	915197	36
6	Baffle	296707	6
7	Rotor - Rear	813025	6
8	Rear Vend Motor High Torque	839032	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 79”	210745	6
	-72”	211712	6
•	Front Right Retainer 79”	210746	6
	-72”	211713	6
•	Divider, Right 79”	296709	6
	-72”	297706	6
•	Retainer, Rear Right 79”	296713	6
	-72”	324712	6
•	Insert, Divider	296717	6
•	Rotor Rod	803048	12
•	Bearing Rotor / Rear	915222	12
•	Retainer Clip	810074	12

SECTION 6: EXPLODED VIEWS

Refrigeration Unit

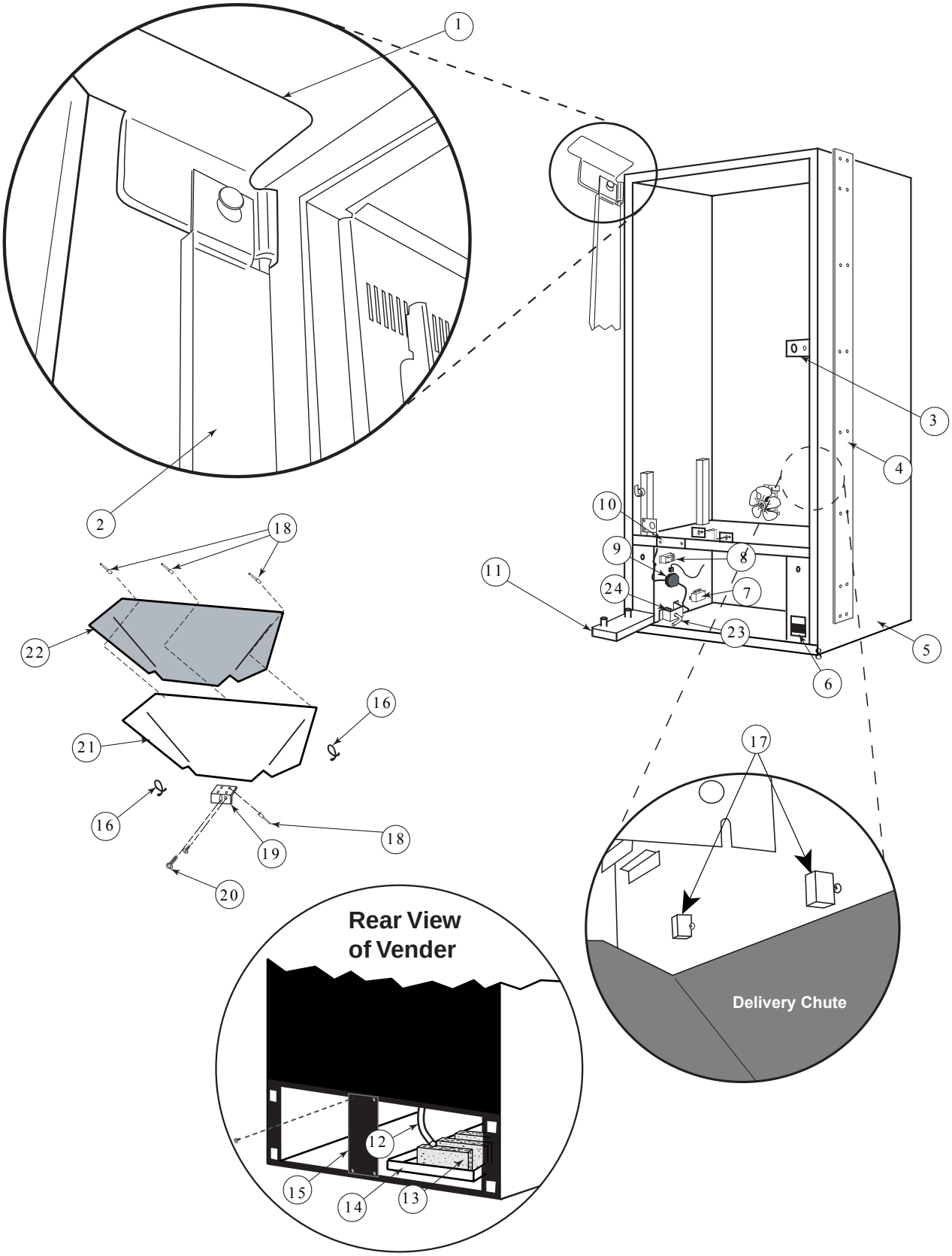
296410



Item No.	Description	Part Number	Qty.
1	Heat Exchange	See Note#1	1
2	Dryer	824011	1
3	Condenser	820008	1
4	Condenser Motor (Blade Only)	839010 (810014)	1
5	Screw, #8-32x1/2	901006	2
6	Capstart Compressor, 1/3+ Tecumseh, R134a	819028	1
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	Cold Control	822001	
14	Screw. #8x1/2	902004	4
15	Fan Shroud Assy.	210088	1
16	Evaporator Coil	820002	1
•	Evaporator Cover	296004	1

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

SECTION 6: EXPLODED VIEWS



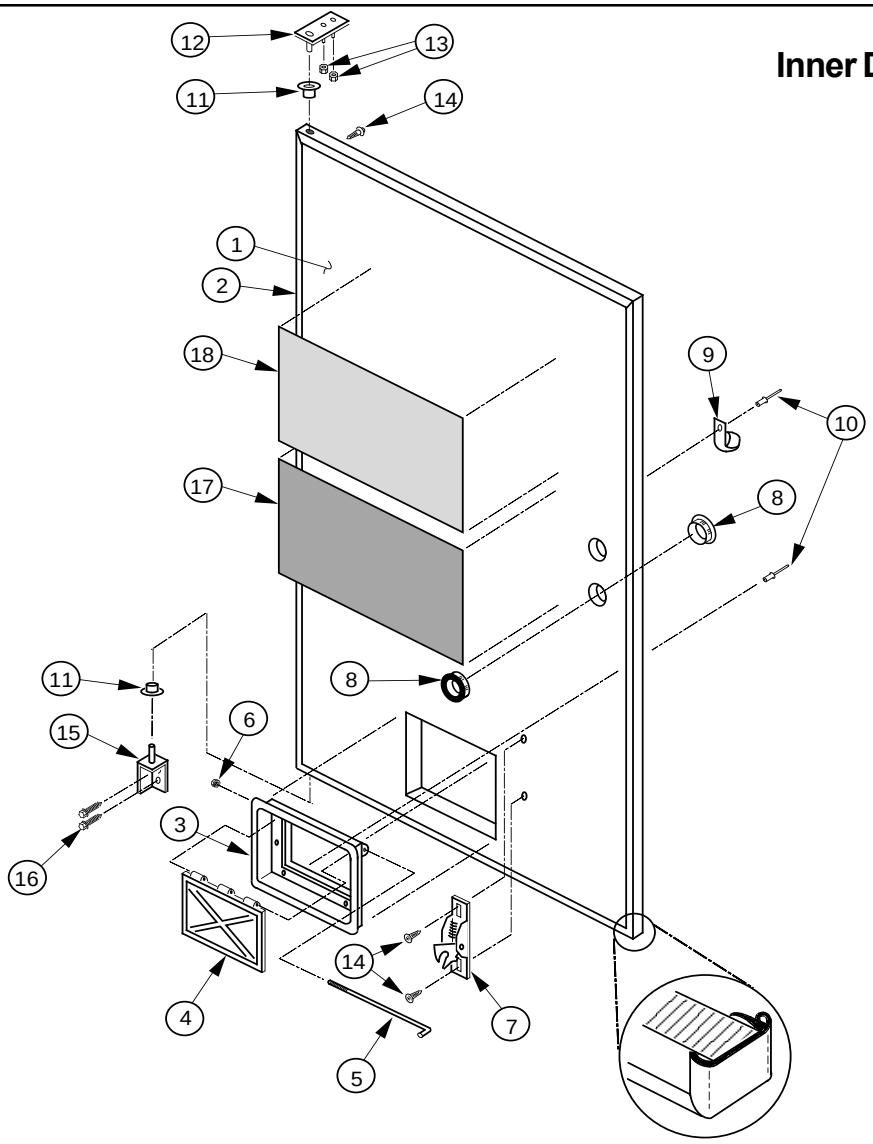
SECTION 6: EXPLODED VIEWS

Item No.	Description	Part Number
1	Top Hinge, TDV	810070
2	Left Vanal Panel, TDV, 79" (removeable)	296006
3	Latch Strike Assy	010030
4	Right Cabinet Vandal Panel, 79"	290004
5	Cabinet Assy 79"	296010
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	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 Chute Sensor w/harness	822049
18	Rivets 1/8"	908004
19	Chute Locator Bracket	141014
20	Bolts 1/4-20x1"	901003
21	Delivery Chute	320001
22	Delivery Chute Liner	815362
23	Latch Pin	811039
24	Latch Pin Spring	914026

SECTION 6: EXPLODED VIEWS

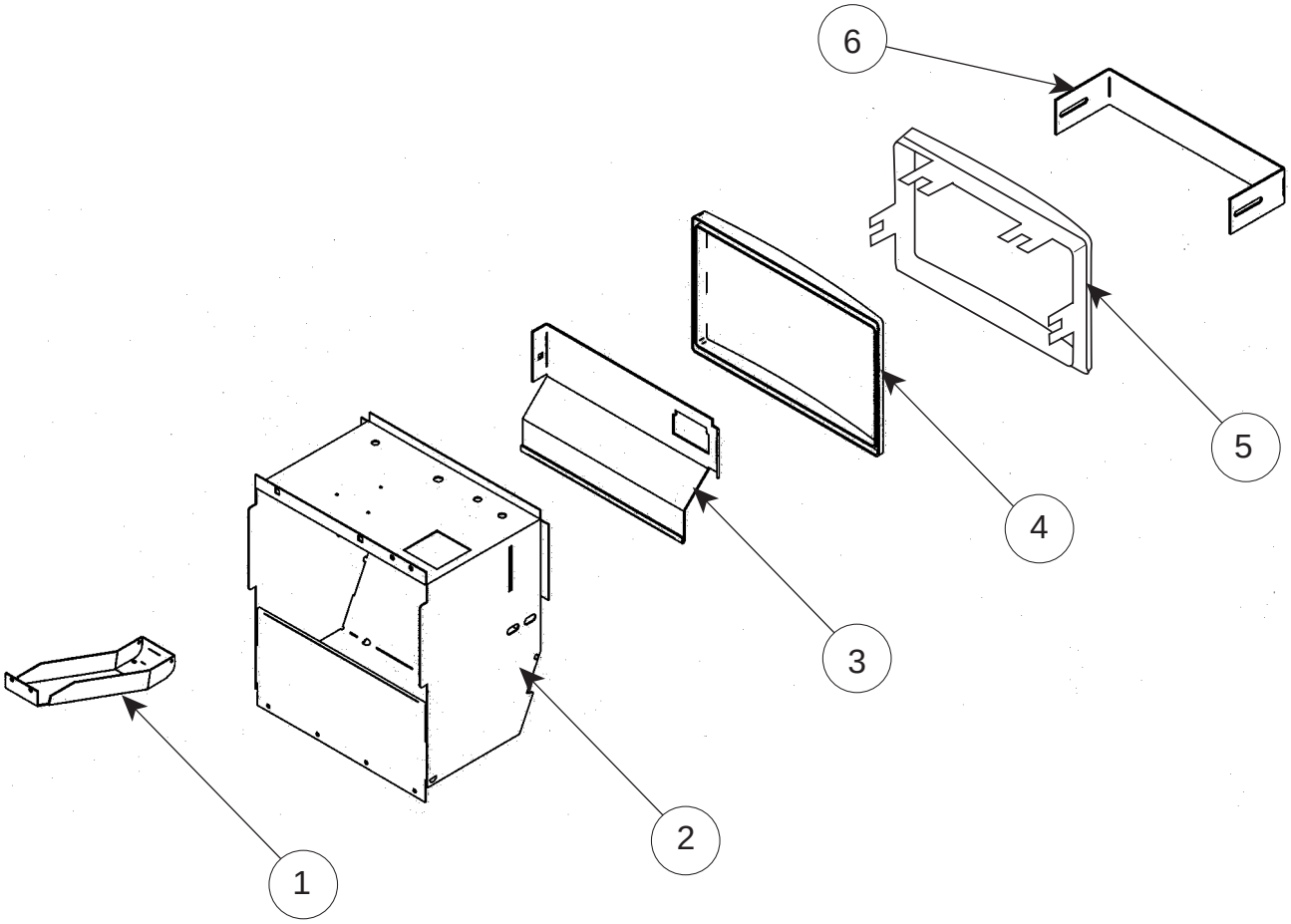
Inner Door Assembly



Item No.	Description	Part Number	Qty.
1	-79 " Inner Door	320610	1
	-79" Dr. Pepper Inner Door	322610	1
	-72" Inner Door	297610	1
	-72" Dr. Pepper Inner Door	323610	1
2	-79" Gasket	815350	1
	-72" Gasket	815351	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, #8-18x1/2"	902001	50
15	Hinge, Bottom, Door	296504	1
16	Bolt,1/4-20x1"	901003	2
17	Loading Instructions	931409	1
18	Controller Instructions	931407	1

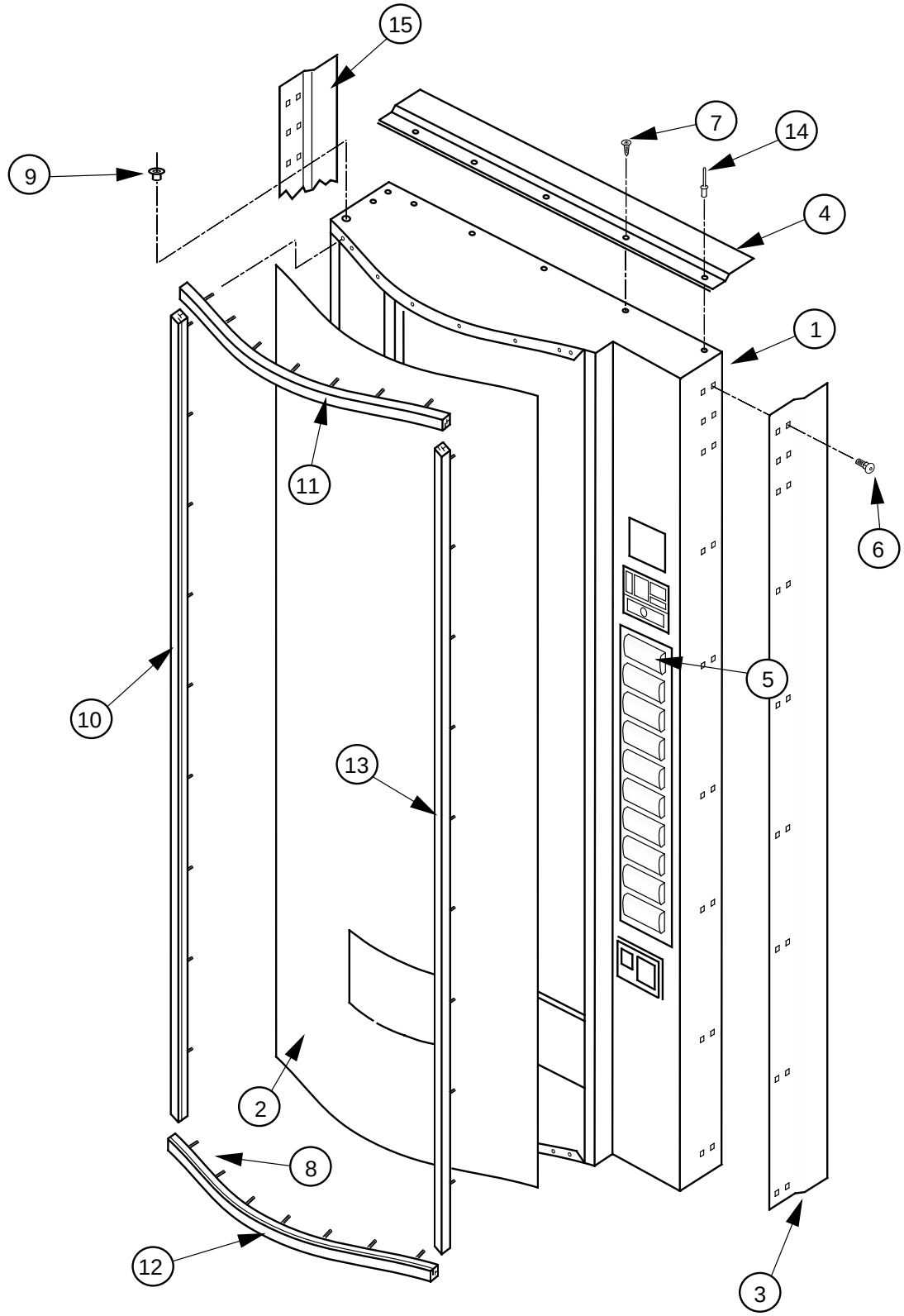
SECTION 6: EXPLODED VIEWS

Port Assembly



Item No.	Description	Part Number	Qty.
1	Coin Cup, CDC	231505	1
2	Port Body Assy., Welded	303540	1
	-Non CDC	305510	
3	Anti-theft Plate, CDC	303503	1
	-Non CDC	305501	1
4	Port Spacer	815248	1
5	Port Trim	815249	1
6	Package Stop	273508	1

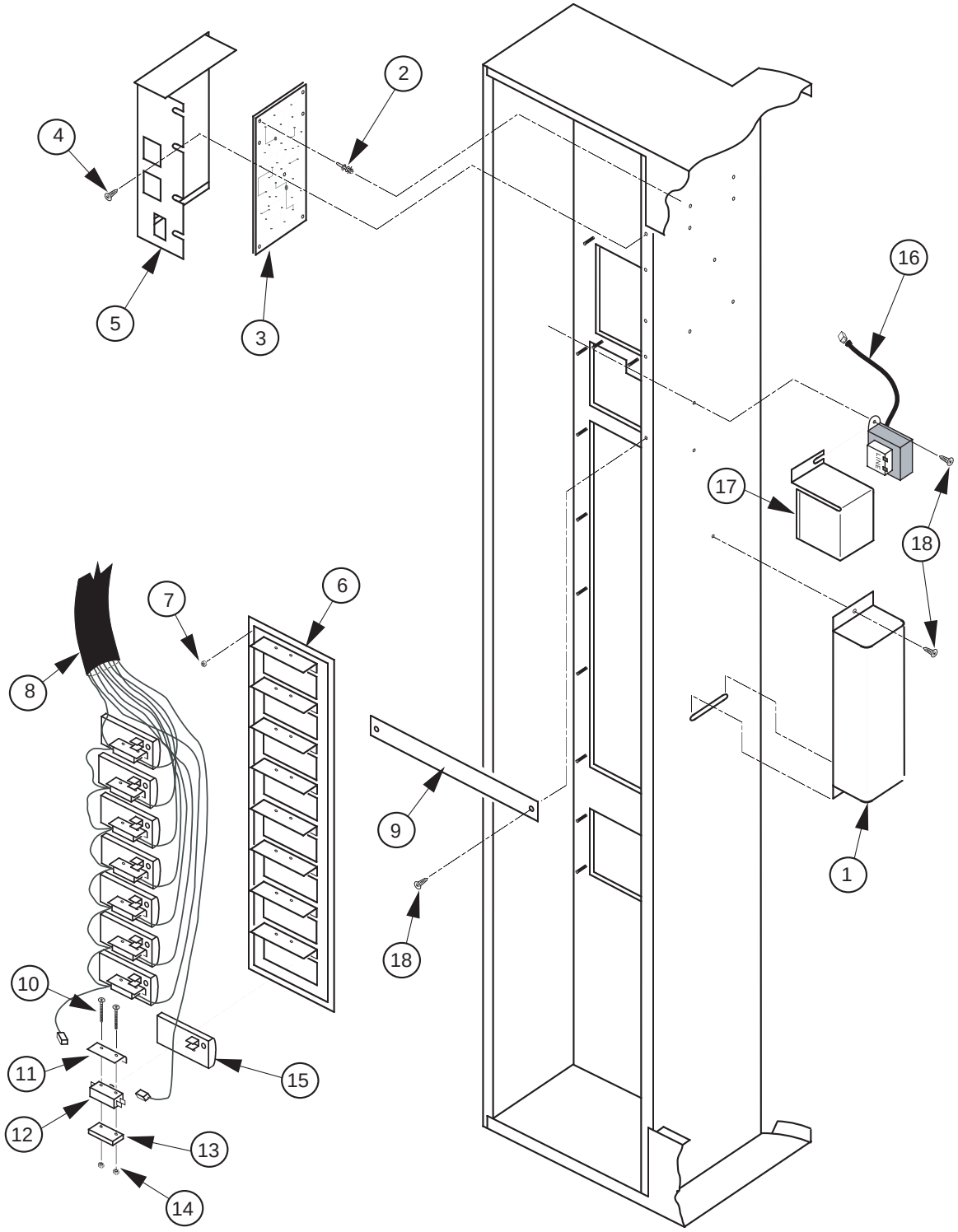
SECTION 6: EXPLODED VIEWS



Door Assembly, Front

ITEM #	DESCRIPTION .	PART NUMBER
1	Pepsi Door Weld Assembly, 10 Sel. 79” Wide Vender	320512
2	Sign	SEE NOTE #1
3	Right Vandal Panel 79” (Specify color)	010519
	Right Vandal Panel 72” (Specify color)	011501
4	Rain Guard, Wide Venders	258504
5	Button Assembly	815025
6	Carriage Bolt, 1/4-20x1/2”	901007
7	Self Drilling Screw, #8x1/2”	902004
8	“T”-Screw 8-32	901001
9	Top Door Bushing	803003
10	Left Side Trim 79” Wide Vender, Pepsi	141553
	Left Side Trim 79” Wide Vender, Cold Drink	032505
11	Top Trim Wide Vender, Pepsi	012553
12	Bottom Trim Wide Vender, Pepsi	012553
	Top/Bottom Trim (M4) Narrow Vender, Pepsi	263504
13	Right Side Trim 79” Wide Vender, Pepsi	012554
	Right Side Trim 79” Wide Vender, Cold Drink	032506
14	Pop Rivet, 1/8”	908001
15	Left Vandal Panel, 79” (Specify color)	296006
•	Christmas tree (black)	916009

SECTION 6: EXPLODED VIEWS

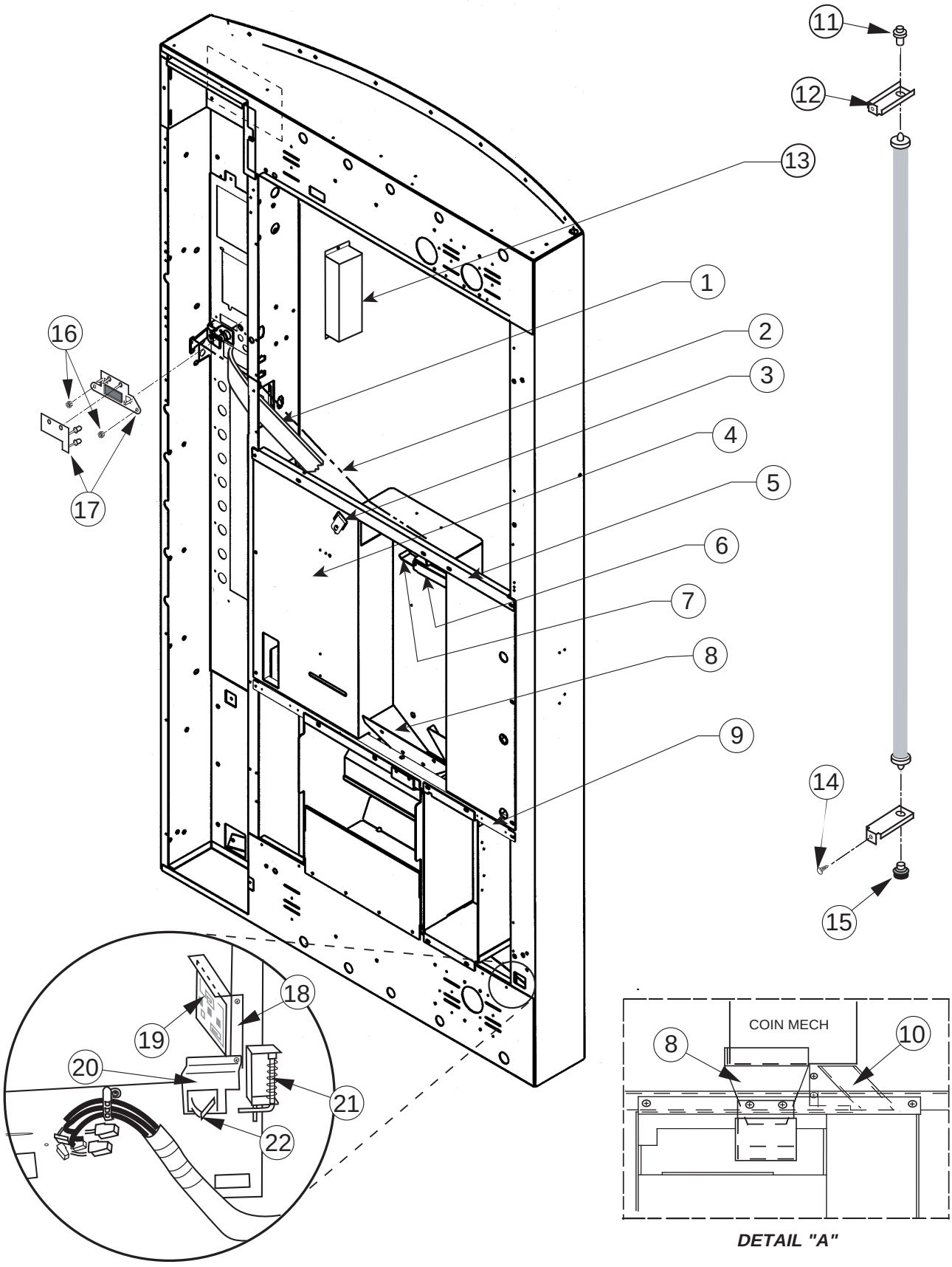


Select Panel Assembly, Rear

ITEM #	DESCRIPTION	PART NUMBER
1	Ballast, Slimline	838002
2	PC Board Spacer	916027
3	Control Board	836127
4	Self Drilling Screw, #8-18x1/2”	902004
5	Control Board Cover	141903
6	Control Panel Welded Assembly, 10 Select	017530
	Control Panel Welded Assembly, 8 Select	012510
7	Keps Nut, #8-32	905001
8	Select Switch Harness	See Note #1
9	Panel Strap (optional)	010531
10	Screw	901041
11	Spring Shield	815164
12	Switch (large)	835012
13	Switch Spacer	815018
14	Keps Nut	905018
15	Button Assembly	815025
16	Transformer Assembly	010572
17	Transformer Cover	010063
18	Self Tapping Screw, #8-32x3/8”	901002
•	Splash Guard (protect sel. switches)	815303

NOTE #1: There are various parts. Please specify model and serial number at the time of order.

SECTION 6: EXPLODED VIEWS



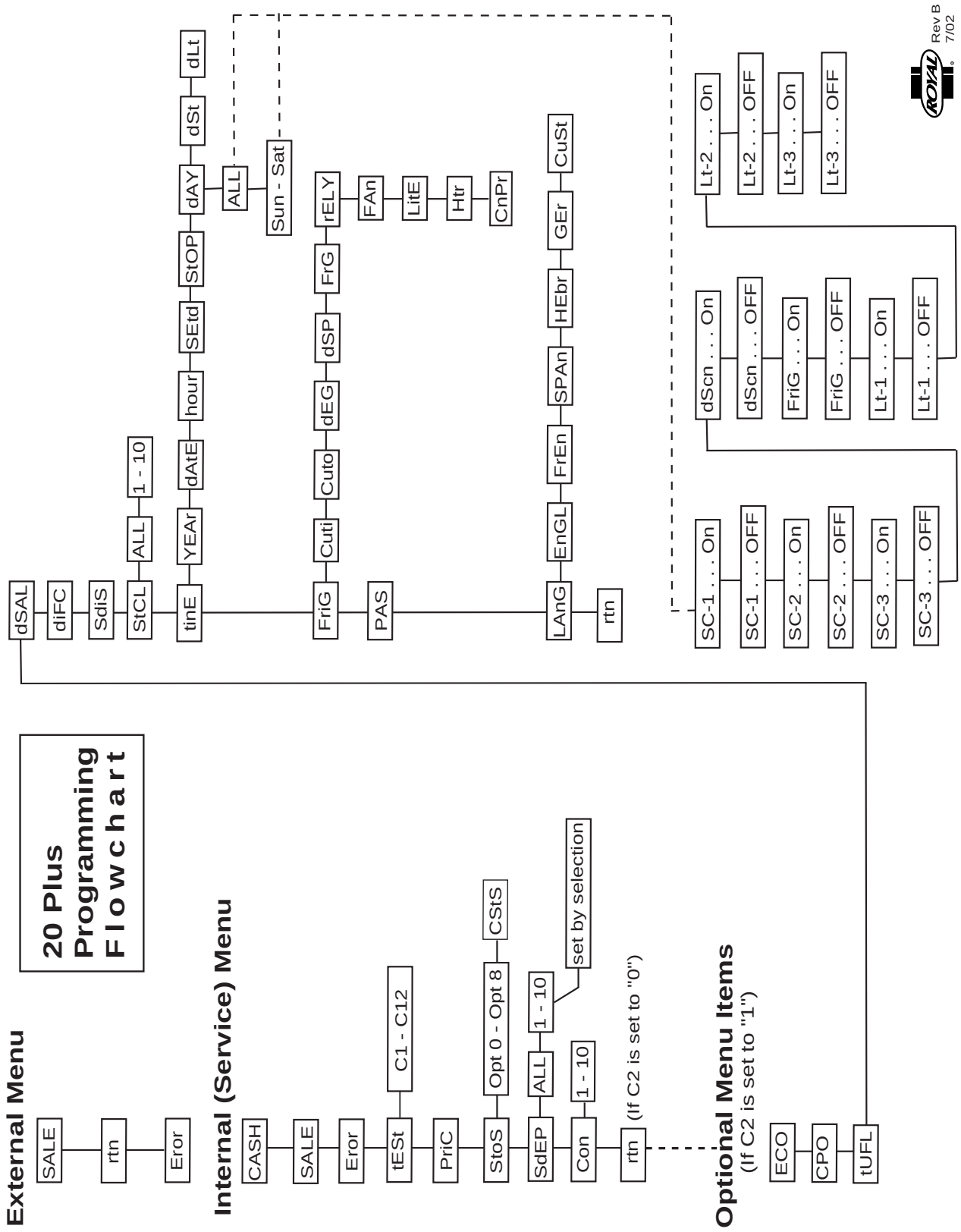
DETAIL "A"

Center Door Changer Vault

Item No.	Description	Part Number
1	Coin Chute Assy., CDC, 79.5"	161590
2	Cable	911032
3	Coin Chute Support, WP	303507
4	Changer Vault W/A	303506
5	Changer Vault Brace	161518
6	Coin Return Hinge Bracket	290543
7	Coin Return Lever	161507
8	Coin Hopper, WP	303502
9	Port Brace	010515
10	Coin Box Chute, WP	303501
11	Top Lampholder	842003
12	Lamp Bracket	010517

Item No.	Description	Part Number
13	Ballast	838002
14	Sems Screw	901011
15	Bottom Lampholder	842004
16	Keps Nut	905001
17	LED Assembly	010593
18	Optic-Sensor Board Bracket	320508
19	Optic-Sensor Board	836124
20	Door Switch Bracket	296502
21	Bottom Inner Door Hinge	296504
22	Door Switch	835019
•	Ballast assembly, 79"	012940
•	-72"	013920

PROGRAMMING FLOWCHART



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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