Merlin RB

Royal Vendors Red Bull Vender

Operation and Service Manual

230 VAC 50 Hz Models

Red Bull ®
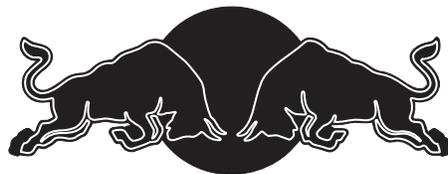
ENERGY DRINK

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Safety Segment

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 mainte- nance 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 minimise 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 specifica- tion sheets, when installing or servicing Royal equipment.

We recommend that persons servicing our equip- ment maintain a similar commitment to safety. **Only personnel properly trained should have access to the interior of the vender.** This will minimise 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 Service Department at +1 304 728-7056.

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 power source 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 authorised 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 earthing wires in place.
· Plug equipment into outlets that are properly earthed and polarised (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 EARTHING PRIOR TO INSTALLATION IN ORDER TO REDUCE THE RISK OF ELECTRICAL SHOCK AND FIRE.*

Safety Segment

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 SERVICING WITH POWER ON. 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.

Red Bull®

230 VAC 50 Hz
CAN VENDER

General Information

Introduction

This manual contains installation, operation, and service instructions for the Royal Vendors Merlin RB 230 VAC 50 Hz vender. This manual also contains a parts catalogue and electrical schematic for the Merlin RB.

Through the Merlin RB's flexibility, you will profit by using the Multi-Pricing and Space-to-Sales features. As you will see later in the manual, there are other features, such as the ability to control vending by using a built-in timer or by using an optional on / off key switch. Like most electronic equipment, the control board has the ability to control most items in the vending machine. It manages the operation of the refrigeration system, and even the lighting system, with an optional kit. The Merlin RB utilises high torque 24 volt DC vend motors. Testing has proven these vend motors to be very strong and reliable.
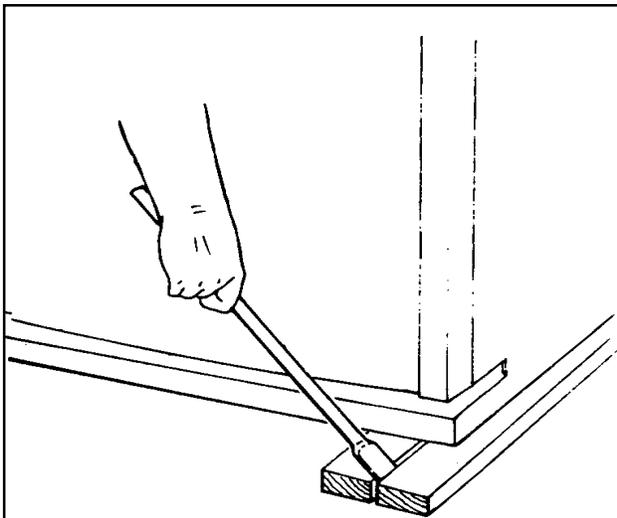
Figure 1.1: Removing the shipping skid.

Unpacking the Vender and Installing It On Location

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 on the procedure for filing a claim.

If the vender is being stored, remove the plastic stretch wrap, cardboard cover, and styrofoam cushioning first. The plastic stretch wrap and styrofoam cushioning can adhere to the exterior of the vender over an extended period of time, damaging the vender's finish.

Note: The vender's keys are located in the coin cup.

REMOVE THE SHIPPING SKID
Separate (split) each section of the shipping skid by inserting a claw hammer, crowbar, or similar device into the slot of each section to break it apart. Tilt the vender slightly to remove the separated pieces. *(See Figure 1.1.)*

REMOVE THE DOOR BLOCK
After opening the vender's door, locate the wooden shipping block at the bottom right under the door. Lift the block straight up to remove it.

REMOVE THE PORT DOOR TAPE
The port door is held open with tape. Remove this tape to allow the port door to close. Not allowing the port door to close will cause the vender to freeze up inside once it is plugged in.

PLACE THE VENDER ON LOCATION
When placing the vender on location, allow for a minimum of 10 cm of space at the back of the vender. This will ensure proper ventilation of the refrigeration system.

To level the vender, close and latch the vender's main door. Using a spirit level, adjust the four levelling legs until the top of the vender is level left-to-right and front-to-back. Make sure all levelling legs are in contact with the floor.

Voltage Requirements and Vender's Power Cord

The Merlin RB vender is designed to operate at a voltage of 230 volts AC, 50 Hertz. It requires the minimum of a 7 amp service, and it should be on a dedicated circuit. The service outlet voltage must not exceed 264 VAC or fall below 198 VAC.

The vender has a three-wire earthed cord. The vender must be plugged into an earthed electrical outlet to protect customers from electrical shock. If the outlet is not equipped with an earthed socket, have one installed by a qualified electrician. Do not use an extension cord, unless it has been authorised by a certified electrician. Extension cords are not recommended.

After plugging the vender's power cord into the AC voltage source, the following should be observed:

1. The fluorescent lights will come on;
2. The refrigeration compressor will start to run after approximately 5-7 minutes (with the door closed); and
3. The LED will light.

The control board is equipped with a battery backup for use in the event of a power loss. The battery is used to retain important programming information, such as space-to-sales, prices, etc., so that it will not be erased if power is lost or the vender is unplugged.

Programming the Vender

All programming of the vender is done in the Service Mode. To enter the Service Mode, open the vender's main door, and press and release the Service Mode button, located on the controller board. For programming instructions, see the section entitled "Vender Programming," later in this book.

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. An ARS (Authorized Return Service) label will be sent with all warranty parts. This method of shipping is preferred for returning parts to Royal Vendors.
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 vender / unit serial number.
4. A copy of the Packing Slip, correct serial number, and complete Return Material Tag (provided with part) are required for returning parts. Please complete the Return Material Tag, keeping the white copy for your records and returning the yellow tag with the attached part. Make sure you have your company's 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.

Merlin RB Specifications

Dimensions (372 cap.).......... 183 cm H x 61 cm W x 91 cm D
Approximate empty weight ... 231 kg
Operating voltage .... 230 VAC, 50 Hz
Amperage rating .... 4 Amp
Charge................................. 0.18 kg R134a
Construction .... Steel cabinet, steel door
Configuration .... 3 selections, 4 columns

Vender Identification

The Merlin RB 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 refrigeration unit; and
3. Control chip revision number - printed on a white label affixed to the chip.

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; and
* Refrigeration design pressures.

The vender's model number contains three important pieces of information: the machine type, such as RVRB (Royal Vendors Red Bull); the vender model number, such as 372 (capacity of 372 cans); and the number of selections, such as 3.

How to read the serial number (see Figure 1.2):

* The first 4 numbers represent the year the vender was produced;
* The fifth and sixth numbers represent the number of the week within that year the vender was produced;
* The first letter represents the style of the vender;
* The second letter represents the location where the vender was built; and
* The last five numbers represent the number of the vender built within that week.

REFRIGERATION SERIAL PLATE

The refrigeration serial plate is located at the bottom of the vender's cabinet in front of the condenser coil. It is mounted to the refrigeration unit kick plate. It looks similar to the vender serial plate shown in Figure 1.2, with the exception that the model number specified is the refrigeration unit model number. One refrigeration unit model is used on the Merlin RB:

Model	Compressor size	Usage
8000R	Super 1/3 Hp	All Merlin RB

CONTROL CHIP REVISION NUMBER

The control chip revision number is printed on a white label affixed to the chip itself. This number is very important when calling for service support or programming help, or for matching a replacement control board.
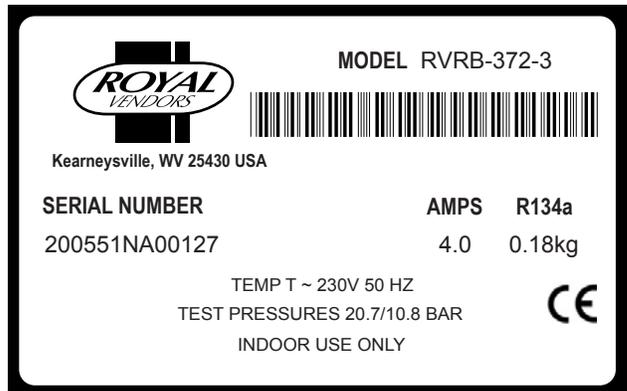
Figure 1.2: Vender serial plate.

Vender Component Explanation

Vender Control Board (including pinouts)

The control board is responsible for most vender operations. It is located in the upper left corner of the inside of the door. The control board is protected by a cover. Removing this cover will expose the control boad, along with all wiring connections to the board.

IDENTIFICATION: The Merlin RB control board can be easily identified by noting the revision number of the EEPROM chip on the control board. The number will be printed on a white decal affixed to this chip.

OPERATION REQUIREMENTS: The control board requires approximately 24 volts AC from the low voltage transformer (described later in this section). This will allow the control board to function and to supply power to all the vender's components listed below.

OPERATION: Upon receiving the appropriate voltage from the transformer, the control board will issue information to some components, receive information from some components, and communicate both ways with some components.

- The control board issues instructions (and / or voltage) to:
  - LED display
  - Vend motors (only when vend motors are to run)
  - Refrigeration relay.
- The control board receives information (and / or voltage) from:
  - Select switches (logic level)
  - Door switch (logic level)
  - Delivery chute sensor
  - Temperature sensor.
- The control board communicates both ways with:
  - Coin mechanism
  - Bill validator (optional)
  - Card reader (optional)
  - Hand-held computer (optional).

CONTROL BOARD PINOUTS: The Merlin RB control board has several electrical pinouts, a setup mode button, a delivery sensor adjustment trimpot, a delivery sensor adjustment indicator lamp, and various other electronic components (all of which have designated position codes). The following section outlines all the control board's pinouts.

The word *key* refers to the small plastic insert plugged into a position of the connector. The purpose of the key is to prevent connecting the harnessing backwards or upside-down. The *keyed position* is a blank position within the pinout (no pin) in which a key is inserted. Some pinouts may have several blank positions with a key plugged into one or more of the positions. You can use the key to determine which end of the pinout is Pin 1.

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 to 200 volts is enough to create problems within the circuitry of the electronics. It is advised when storing the electronics that they be kept in 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 earth you to the machine before touching the electronic boards. If it is not possible to use these, at least earth yourself before handling the electronic boards. Whatever method you use, always handle the electronic boards by the edges. Be careful not to touch the components on the control board.
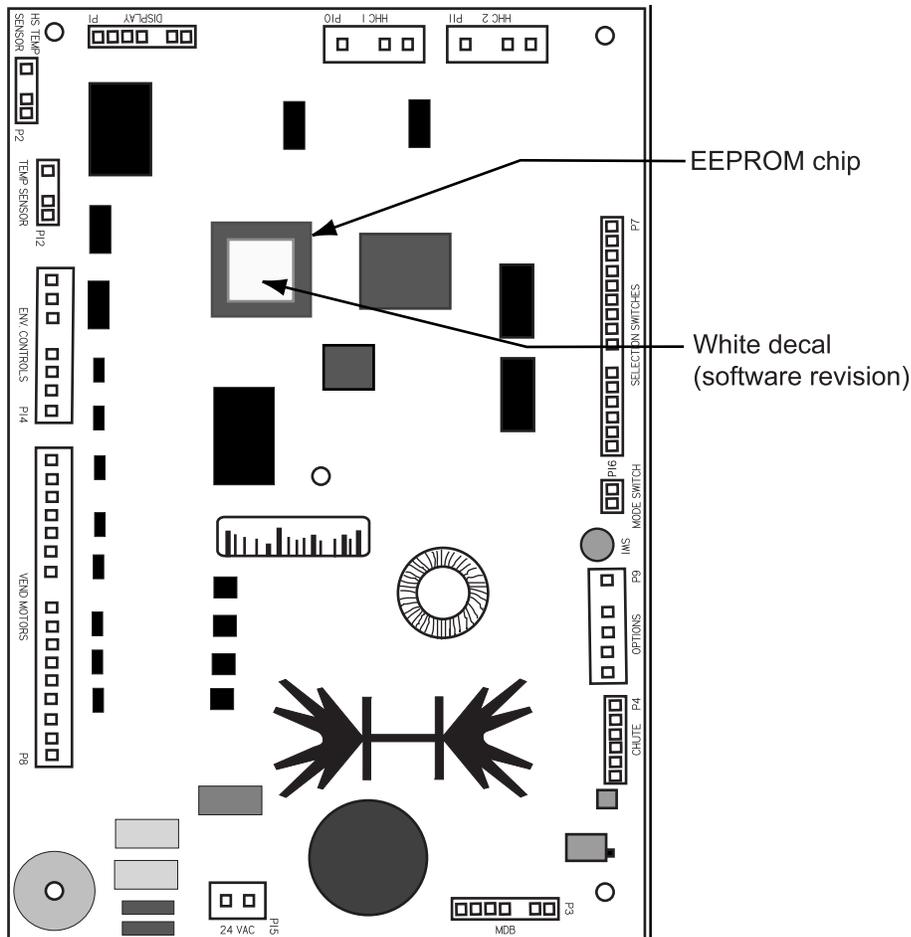
Figure 2.1: Merlin RB control board.

MERLIN RB CONTROL BOARD

Display **(Position P1)**: The four-wire harness connecting to this pinout travels from the vender's LED to the control board. It allows the control board to send power to and communicate with the LED. If this harness is cut or disconnected, the LED will go blank. If this harness is pinched, broken segments may be seen on the LED, with various segments of the display lit.

PIN	WIRE COLOUR	FUNCTION
1	Yellow	5 VDC
2	Green	Clock
3	Brown	Data
4	Red	Common

HS Temp Sensor **(Position P2)**: *This pinout is not currently used on the Merlin RB.*

MDB **(Position P3)**: The five-wire serial harness connecting to this pinout provides power and communications to and from the control board for the coin mechanism, the optional 34 VDC bill validator, and / or the optional debit card reader. If this harness is cut, pinched, or disconnected, you will noticeably lose power to these items.

PIN	WIRE COLOUR	FUNCTION
1	Black	34 VDC
2	Brown	Return
3	-	*Key*
4	Red	Receive
5	Orange	Transmit
6	Yellow	Common
7	-	*Key*

Section 2. Vender Component Explanation

Chute **(Position P4)**: The harness connecting to this pinout is a grey shielded cable harness. This harness is formed into the delivery impact sensor (mounted beneath the center of the delivery chute). It should never be cut, pinched, or spliced.

PIN	WIRE COLOUR	FUNCTION
1	Green	Earth
2	Red	2.5 VDC
3	Black	Neutral return
4	-	*Not used*

Selection Switches **(Position P7)**: The harness connecting to this pinout provides a logic-level signal from the control board to each selection switch. Upon activation, the selection switch will allow the logic-level signal to travel back to the control board. This tells the control board which switch has been activated.

PIN	WIRE COLOUR	FUNCTION
1	-	*Not used*
2	-	*Not used*
3	-	*Not used*
4	-	*Not used*
5	-	*Not used*
6	-	*Not used*
7	Purple	Selection switch #3
8	Grey	Selection switch #2
9	Black	Selection switch #1
10	-	*Key*
11	Red	5 VDC common
12	-	*Not used*
13	-	*Not used*
14	-	*Not used*
15	-	*Not used*
16	-	*Not used*

Vend Motors **(Position P8)**: The harness connecting to this pinout provides common power from the control board to each vend motor. There is one wire in this harness for each vend motor to provide each motor with 24 volts DC when a selection is made. Be sure that this harness is properly earthed.

PIN	WIRE COLOUR	FUNCTION
1	-	*Not used*
2	-	*Not used*
3	-	*Not used*
4	-	*Not used*
5	-	*Not used*
6	-	*Not used*
7	Green / white	Vend motor #1
8	Red / white	Vend motor #2
9	Yellow / white	Vend motor #3
10	-	*Key*
11	Orange / white	Vend motor #4
12	-	*Not used*
13	-	*Not used*
14	-	*Not used*
15	-	*Not used*
16	-	*Not used*
17	-	*Not used*

Options **(Position P9)**: The harness connecting to this pinout travels from the vender's door switch through the main door up to the control board. Pinout P9 is also used for the optional free-vend and no-vend key switch kits.

PIN	WIRE COLOUR	FUNCTION
1	White	5 VDC common
2	-	*Key*
3	(optional)	Free-vend switch input
4	(optional)	No-vend switch input
5	(optional)	Option switch input
6	Purple	Door switch input

HHC 1 **(Position P10)** and HHC 2 **(Position P11)**: The three-wire harnesses connecting to these two pinouts come from the Hand Held Computer (HHC) jacks. The HHC 1 jack is located inside the vender's main door, near the control board. The HHC 2 jack is optional, but is an external jack mounted in the top of the welded port assembly.

PIN	WIRE COLOUR	FUNCTION
1	Red	DEX receive data (tip)
2	-	Key
3	White	DEX transmit data (ring)
4	Green	DEX common

Temp Sensor **(Position P12)**: The wiring harness connecting to this pinout travels from the temperature sensor to the control board. The temperature sensor is mounted in the rear of the cabinet behind the evaporator fan. This harness is moulded into the temperature sensor and should never be cut, pinched, or spliced together if cut. If the harness is cut, pinched, or improperly grounded, the sensor may give the control board false temperature readings. Refrigeration activity is based on the signal reported to the control board from this sensor.

PIN	WIRE COLOUR	FUNCTION
1	Red	Return to common
2	White	Temperature sensor signal
3	-	*Key*
4	Black	5 VDC

Env. Controls **(Position P14)**: The harness connecting to this pinout powers the refrigeration relay (to power the refrigeration unit). It is also responsible for powering any optional relays, such as the refrigeration heater relay, evaporator fan relay, and light relay. It powers each relay from Pin 1. Upon activation, the control board will remain neutral for each relay from either Pin 2, 3, 4, or 6.

PIN	WIRE COLOUR	FUNCTION
1	White (ZX1)	24 VDC
2	ZX2	Heater relay
3	Red (ZX3)	Compressor relay
4	ZX4	Evaporator fan relay
5	-	*Key*
6	ZX6	Light relay
7	-	*Not used*
8	-	*Not used*

24 VAC **(Position P15)**: The two-wire harness connecting to this pinout comes from the transformer. It is imperative the correct harness be connected to this pinout. If this harness is not connected (or if power is lost to the connection), the vender will noticeably lose all functions (except for main door lighting), including power to the LED display. The coin mechanism will not accept coins, and the refrigeration system will not run. With this connector, the wires can be in either position, without affecting the control board.

PIN	WIRE COLOUR	FUNCTION
1	Red	24 VAC
2	Black	Neutral

Low Voltage Transformer

The Merlin RB Vender uses a low voltage transformer which reduces 230 volts AC (conventional voltage) to 24 volts AC, to power the vender's control board. The transformer is a major contributor to the vender's operation. Without the transformer, the control board cannot function.

LOCATION OF TRANSFORMER: The transformer is located in the top of the vender's main door. A metal panel shields the transformer. ***WARNING: Before removing this panel, remove power from the vender by unplugging the main power cord from the AC voltage power source!***

CHECK THE TRANSFORMER AND FUSE: If upon arriving at a vender, the LED display is not lit and the coin changer does not take coins or pay out coins, make sure the vender is plugged in. Next, check the transformer's external 3-amp fuse for visual damage. Check for continuity across the fuse with a voltage meter or similar device. If defective, replace the external fuse.

1. Check the power going into the transformer at the connected red and black wires. It should register 230 volts AC. If not, check voltage coming out of the main wiring harness.

2. If 230 volts is registered in Step 1, measure voltage at the other end of the transformer. The two (2) pin connector leading to the control board should register approximately 24 volts AC. If so, check the control board; the transformer is good.

3. If 230 volts is registered during Step 1 and 24 volts AC is NOT registered during Step 2, you probably have a bad transformer. Unplug the vender, and unplug the connections at the transformer (230-volt side). Then, unplug the transformer from the control board and from the connector at the fuse box. Remove the transformer from the door. Replace it with a new transformer.

Section 2. Vender Component Explanation

Delivery Chute Sensor

ADJUSTMENT: Located to the left of the control board's chute sensor connector is the sensor adjustment trimpot, which includes an adjustment screw. The trimpot is used to adjust and fine tune the sensor. It is capable of turning both clockwise and anticlockwise. Located to the right of the trimpot is the sensor adjustment LED indicator light. The indicator light is mainly used to aid in adjusting the sensor but can also be used to test its operation during product impact.

1. Turn the adjustment screw clockwise until the indicator light comes on.

2. Turn the screw anticlockwise until the light just goes out.

3. Continue to turn the screw anticlockwise two (2) turns. **Note:** *Slight adjustments may be needed outside the factory set one and a half turns. Turning the adjustment screw clockwise makes the sensor more sensitive and anticlockwise makes it less sensitive. Test vend after every ¼ turn.*

For multiple vending from all columns, make sure the sensor is adjusted to the factory specifications as listed above. Next, turn the adjustment screw clockwise ¼ turn to increase sensitivity. Test vend columns 1 and 4, and watch light on the board for a good on and off flash. If still multiple vending, turn the adjustment screw an additional ¼ turn clockwise until proper adjustment is made.

For dry vending (cancelled credit with no product delivery) from all columns, make sure the sensor is adjusted to the factory specifications as listed above. Next, turn the adjustment screw anticlockwise ¼ turn to decrease sensitivity. Test vend all columns. If still dry vending, turn the adjustment screw an additional ¼ turn anticlockwise until proper adjustment is made.

TESTING THE DELIVERY CHUTE SENSOR: Make sure the vender is plugged in and the controller has power (the LED display on the front of the vender will be lit and the coin mechanism will accept coins). The sensor indicator lamp will blink upon impact on the delivery chute. Lightly tap the chute with a tool or your fist to simulate a can drop.

1. Locate the sensor adjustment indicator lamp on the bottom left of the vender's control board. Under normal conditions (as in stand-by), the lamp should be off.

2. Test the sensor by vending from columns 1 and 4 while watching the control board's sensor adjustment indicator lamp. The light should blink solidly upon impact. If not, turn the adjustment screw clockwise in ¼-turn increments (to increase the sensitivity), and test after each turn. If the indicator lamp still does not light, turn the adjustment screw clockwise for many turns. If the indicator lamp does not light, change the sensor (assuming the control board has power and is working).

3. If the sensor adjustment indicator lamp lights properly during Step 2, change the control board.

4. Test the sensor by hitting the center of the delivery chute while watching the control board's sensor adjustment indicator lamp. The light should blink solidly upon impact.

Section 2. Vender Component Explanation

Refrigeration System

Your vender's refrigeration system comes as a completely sealed unit and should never be cut or tapped into, or the warranty will be voided.

IDENTIFICATION: The refrigeration unit is responsible for the cooling of the sealed cabinet and the products loaded within it. The refrigeration unit's base plate (compressor, condenser coils and condenser fan motor), are mounted in the bottom (warm) section of the vender's cabinet. The heat exchange or suction line extends into the upper (cold) section of the vender's cabinet, where the evaporator coil is mounted in front of the evaporator fan motor.

OPERATION REQUIREMENTS: The refrigeration system requires 230 volts AC from the main wiring harness for it to operate. The main wiring harness will get its voltage for the unit from the refrigeration relay.

OPERATION: The rising temperature in the cooling compartment is reported to the control board from the temperature sensor (see Figure 2.2). The control board registers the current temperature inside the vender's cabinet. When it rises equal to or above the pre-programmed cut-in temperature, the control board will then complete the circuit to the refrigeration relay to energise its coil (shown in Fig. 2.2). The refrigeration relay coil energises and closes the contact between the common and normally open positions (shown in Fig. 2.2). This allows power (230 VAC) to travel through the refrigeration relay switch and to the main wiring harness. The main wiring harness will power the unit immediately.

When the compressor is powered, it circulates refrigerant throughout the system by pulling low pressure refrigerant vapour from the evaporator coil through the suction line into the compressor. The compressor compresses it, and forces it through the discharge line into the condenser coil.

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 vapour to liquid.

The evaporator coil allows the liquid refrigerant to absorb heat from the cooling compartment as it evaporates in the coil. 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.

As the temperature drops, the temperature sensor reports this to the vender's main control board. When the temperature drops below the preset cut-out temperature, the control board will disable the refrigeration relay. This will break the refrigeration relay switch connection (shown in Fig. 2.2), thus cancelling power to the refrigeration unit.

REFRIGERATION COMPONENTS: The refrigeration system is a sealed system. Cutting or tapping into it will void the manufacturer's warranty. Described in this section are explanations of the refrigeration system's major components.

Cooling Compartment - The cooling compartment is the sealed area of the vender holding the product for delivery. This area is designed to allow free flowing air to circulate throughout the product.

Compressor - The compressor is an hermetically sealed unit located beneath (outside) the cooling compartment. The compressor is a pump, driven by the compressor motor, which draws low pressure vapour (refrigerant) from the evaporator coil, compresses it, and forces it into the condenser under high pressure. The motor is started and controlled by the temperature control.
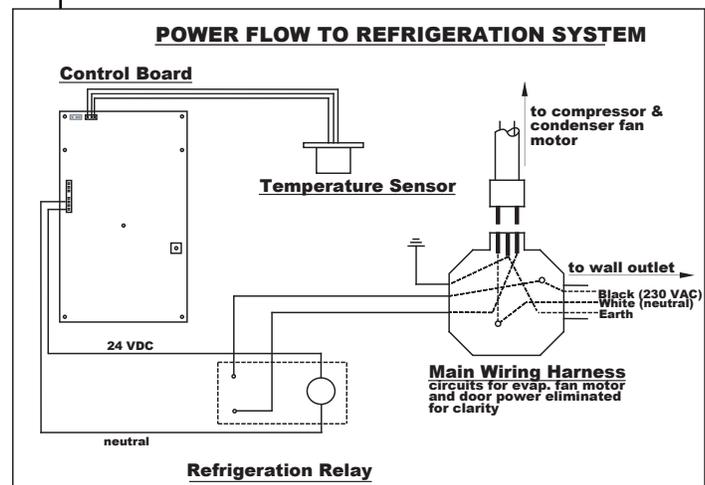
Figure 2.2. Refrigeration power flow.

Section 2. Vender Component Explanation

Condenser - The condenser is located beneath (outside) the cooling compartment next to the compressor (it can be seen from the front with the door open). The condenser removes heat from the high pressure vapour discharged from the compressor and condenses it to a high pressure liquid. The condenser and evaporator coils have aluminium fins attached to effectively increase heat exchange surfaces.

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 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 using only 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 the circuit to the compressor. After the compressor cools to a safe operating temperature, the thermal overload will close allowing the compressor and condenser fan motors to restart.

Condenser Fan and Motor - The condenser fan and motor, located beneath the cooling department, are a forced air device using outside ambient air to cool the surface of the condenser coil. The condenser fan and motor run while the compressor operates.

Evaporator Coil - The evaporator coil is located in the cooling compartment. As low pressure liquid passes through the evaporator coil, it absorbs and removes heat from the compartment as it changes to vapour. The condenser and evaporator coil have aluminium fins attached to effectively increase their heat exchange surfaces.

Evaporator Fan and Motor - The evaporator fan and motor are a forced air device circulating air throughout the cooling compartment and over the heat exchange surface of the evaporator coil. The evaporator fan and motor run continually.

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 low pressure causing the refrigerant to vapourise and absorb heat as it passes through the evaporator coil.

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 vapourise before it reached the compressor.

Refrigeration Relay - The refrigeration relay is located in the lower section of the vender's cabinet near the main wiring harness. It takes the place of the temperature control (thermostat) used in the past in electromechanical venders. The refrigeration relay is responsible for powering the compressor and condenser fan motors. The refrigeration relay consists of a coil powered by the control board (24 volts DC) and a double-pole switch. When the control board completes the circuit to the refrigeration relay, the relay will energise, closing the contact between the common and the normally open positions. When this happens, power (230 volts) travels from the refrigeration relay to the main wiring harness for the refrigeration unit.

REFRIGERATION SYSTEM FLOW CHART

High pressure gas
Condenser
Discharge line
Suction line
Compressor
Low pressure gas
Gas changing to liquid
Accumulator
Filter/Drier
Changing from high to low pressure liquid
Low pressure gas
Capillary
Evaporator
Liquid changing to a gas
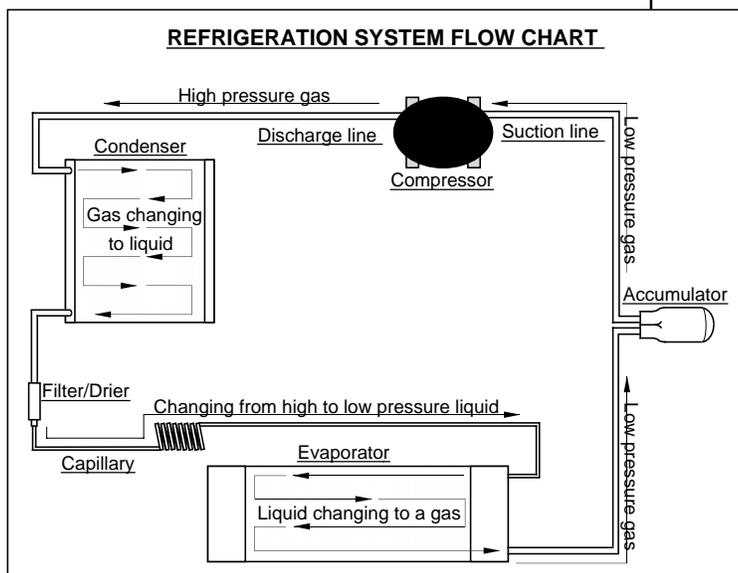
Figure 2.3. Refrigeration system flow.

Section 2. Vender Component Explanation

REFRIGERATION CYCLE

1. The rising temperature in the cooling compart-
    ment is reported to the control board through the
    temperature sensor.

2. The control board registers the current tempera-
    ture inside the vender's cabinet. When it rises
    equal to or above the pre-programmed cut-in
    temperature, the control board will complete the
    circuit to the refrigeration relay to energise its
    coil.

3. The refrigeration relay coil closes the contact
    between the common and normally open posi-
    tions allowing 230 volts to travel to the main
    wiring harness to start the compressor.

4. The compressor circulates refrigerant throughout
    the system by pulling low pressure refrigerant
    vapour from the evaporator coil, compressing it,
    and forcing it into the condenser. The con-
    denser, aided by the condenser fan motor,
    removes heat from the refrigerant as it flows
    through the condenser and releases it to the
    outside environment. The dropping of the
    refrigerant temperature changes the vapour to
    liquid.

5. The evaporator coil allows the liquid refrigerant
    to absorb heat from the cooling compartment as
    it evaporates in the coil.

6. The falling temperature in the cooling compart-
    ment is caused by the continual circulation of
    refrigerant through the system, removing heat
    from the cooling compartment and transporting it
    to the outside environment. When the tempera-
    ture drops, the temperature sensor reports this to
    the vender's control board.

7. When the temperature drops below the preset
    cut-out temperature, the control board will
    disable the refrigeration relay, thus killing power
    to the refrigeration unit.

Ballasts

The ballasts act as transformers to convert conven-
tional voltage (230 VAC) to a higher voltage required
to energise the vender's fluorescent lights. The
ballasts are located inside the vender's door, behind a
metal panel. To remove the ballasts from the door,
use a Phillips (cross) screwdriver to remove the
screws that mount the ballasts to the door chassis.

**WARNING: Before removing the
ballasts, remove power from the
vender by unplugging the main
power cord from the AC voltage
power source!**

*Note: Power to the ballasts is controlled by a relay,
which is in turn controlled by the logic of the vender's
control board. See SECTION 3: VENDER PRO-
GRAMMING for information on energising this relay
through the service menu for troubleshooting pur-
poses.*

Vender Programming

Introduction to Three-button Programming

It is very important that your vender is programmed properly. All programming of the vender options is done in the Service Mode. To enter the Service Mode, open the vender door, and press and release the blue service mode button that is located on the controller board.

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

Button	Meaning	Usage
1	UP	Increase, next, up
2	DOWN	Decrease, previous, down
3	ENTER (Press and release quickly)	Enter, accept, save
3	EXIT (Press and hold for two seconds)	Escape, cancel, exit

The controller will automatically return to the Sales Mode if:

• No response from the selection switches is received for approximately five minutes;
• The service mode button is pressed a second time;
• The Return to Sales mode is activated; or
• The door is actually closed.

If credit exists, the credit amount will be displayed after returning to the Sales Mode.

Menu System

When programming, you must first use the programming buttons listed above to manoeuvre 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 Price Setting Mode or the Space to Sales Mode. There are two different internal 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.

2. OPTIONAL MENU: This menu is available when Configuration 2 is set to "1".

Note: Programming flowchart located in rear of manual.

Internal (Service) Menu

Opening the vender's main door and pressing the control board's service mode button will allow entry into the Internal (Service) Menu. This section outlines all the menu items.

CASH

Cash Counter Display Mode
If <enter> is pressed at the "CASH" prompt, the controller will enter the non-resettable cash display mode by displaying "CASH" / "XXXX" / "XX.XX," where the X's will represent total cash over the life of the vender's control board. A decimal point will be displayed in the appropriate position with the lower four digits. If the cash amount is less than five digits long, the upper four-digit set is not displayed. Using <up> or <down> will cycle through each selection as "CLNN" / "XXXX" / "XX.XX," where the N's represent the appropriate selection number and the X's represent the resettable cash count for that selection. If <exit> is pressed at any time during this operation, the controller will return to the code level. Press the <up> button to proceed to the next prompt, "SALE."

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

SALE

Sale Counter Display Mode
If <enter> is pressed at the "SALE" prompt, the controller will enter the non-resettable vend display mode by displaying "SALE" / "XXXX" / "XXXX," where the X's will represent total number of all paid vends over the life of the vender's control board. If the sales amount is less than five digits long, the upper four-digit set is not displayed. Using <up> or <down> will cycle through each selection as "SLNN" / "XXXX" / "XXXX," where the N's represent the appropriate selection number and the X's represent the resettable vend count for that selection. If <exit> is pressed at any time during this operation, the controller will return to the code level. Press the <up> button to proceed to the next prompt, "CArd."

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

CArd

Card Counter Display Mode
If <enter> is pressed at the "CArd" prompt, the controller will enter the card counter display mode by displaying "CASH" / "XXXX" / "XX.XX," where the X's represent the cash equivalent of the card-paid vends over the life of the vender's control board. A decimal point will be displayed in the appropriate position with the lower four digits. If the cash amount is less than five digits long, the upper four-digit set is not displayed. Using <up> or <down> will cycle to the card vend count by displaying "SALE" / "XXXX" / "XXXX," where the X's represent the number of card-paid vends over the life of the vender's control board. If <exit> is pressed at any time during this operation, the controller will return to the code level. Press the <up> button to proceed to the next prompt, "toKn."

toKn

Token Counter Display Mode
If <enter> is pressed at the "toKn" prompt, the controller will enter the token counter display mode by displaying "CASH" / "XXXX" / "XX.XX," where the X's represent the cash equivalent of the token-paid vends over the life of the vender's control board. A decimal point will be displayed in the appropriate position with the lower four digits. If the cash amount is less than five digits long, the upper four-digit set is not displayed. Using <up> or <down> will cycle to the token vend count by displaying "SALE" / "XXXX" / "XXXX," where the X's represent the number of token-paid vends over the life of the vender's control board. If <exit> is pressed at any time during this operation, the controller will return to the code level. Press the <up> button to proceed to the next prompt, "FrEC."

Section 3. Vender Programming

FrEC

Free Vend Accounting Mode

If <enter> is pressed at the "FrEC" prompt, the controller will enter the first of three sub-menus, "CASH." Pressing <up> or <down> will cycle through each of the other two sub-menus, "SALE" and "CoSt." In this menu, free vend-related fields include all free and zero-priced vends.

If <enter> is pressed at the "CASH" prompt, the controller will enter the cash value display mode by displaying "CASH" / "XXXX" / "XX.XX," where the X's represent the equivalent free-vend cash value received over the life of the vender's control board. A decimal point is displayed in the appropriate position with the lower four digits. If the cash amount is less than five digits long, the upper four digits will not be displayed.

Using <up> or <down> will cycle through each selection as "SLNN" / "XXXX" / "XX.XX," where the N's represent the appropriate selection number and the X's represent the resettable value of free vends. If <exit> is pressed at any time during this operation, the controller will return to the "FrEC" prompt.

If <enter> is pressed at the "SALE" prompt, the controller will enter the free vend counter display mode by displaying "SALE" / "XXXX" / "XXXX," where the X's represent the number of all free vends over the life of the vender's control board. If the sales amount is less than five digits, the upper four digits will not be displayed.

Using <up> or <down> will cycle through each selection as "SLNN" / "XXXX" / "XXXX," where the N's represent the appropriate selection number and the X's represent the resettable number of free vends. If <exit> is pressed at any time during this operation, the controller will return to the "FrEC" prompt.

If <enter> is pressed at the "CoSt" prompt, the controller will enter the free vend equivalent cost display mode by displaying "SLNN" / "XX.XX," where the X's represent the last saved price that is not 00.00 for that selection. A decimal point will be displayed in the appropriate position. Using <up> or <down> will cycle through each selection. If <exit> is pressed at any time during this operation, the controller will return to the "FrEC" prompt. From "FrEC," use <up> to proceed to the next prompt, "Eror."

Eror

Errors Mode

If <enter> is pressed at the "Eror" prompt, the controller will enter the error display mode. If no errors have occurred since the last error reset, the display will show "nonE." If an error has been detected since the last error reset, the display will show the first summary error code that has occurred, such as "CHAr," which would indicate a changer error. Pressing <up> or <down> will cycle through all of the summary error codes that are present. If <enter> is pressed at the summary error code, the controller will display the detailed error code beneath that summary code (see below for error codes). Pressing <up> or <down> at this point will cycle through all the detailed error codes that are present beneath the summary code. If <exit> is pressed at any time during this operation, the controller will return to the "Eror" prompt. Use <up> to proceed to the next prompt, "tESt."

If <up> or <down> is pressed and held for two seconds during the display of any error detail code, that error will be cleared. If other errors exist that fall under the currently accessed detail type, the next error will now be displayed. If no other errors of the current type exist, the next error summary code will be displayed, or "nonE" will be displayed if no other errors exist.

The error summary codes and their corresponding detailed error codes are as follows:

- **door**
  The "door" (door switch) error code indicates that the door switch has been open for more than one hour.

- **SELS**
  After the "SELS" (selection switch) error code, the controller will display "SSXX," where the X's indicate the first selection switch that has been determined to be closed for more than 25 seconds. This error is self-clearing if the switch opens.

Section 3. Vender Programming

- **CHAr**
  By pressing <enter> at the "CHAr" (changer) error code, the controller will display either:
  1. "CC," indicating no changer communications for more than two seconds;
  2. "tS," indicating a tube sensor error;
  3. "IC," indicating an inlet chute blocked error (no coins sensed by acceptor for over 96 hours);
  4. "tJXX," indicating a tube jam error for coin type XX;
  5. "CrCH," indicating a changer ROM checksum error; or
  6. "CSF," indicating the changer's scale factor is not valid for the machine configuration.

- **ACCE**
  By pressing <enter> at the "ACCE" (acceptor) error code, the controller will display either:
  1. "EE," indicating more than 255 escrow attempts since the last coin was accepted;
  2. "nJ," indicating a coin jam; or
  3. "LA," indicating a low acceptance rate (more than 20% of the last 255 coins were slugs).

- **bUAL**
  By pressing <enter> at the "bUAL" (bill validator) error code, the controller will display either:
  1. "bC," indicating no bill validator communications for more than 5 seconds;
  2. "bFUL," indicating a full bill stacker;
  3. "biLL," indicating a defective motor;
  4. "bJ," indicating a bill jam;
  5. "brCH," indicating a bill acceptor ROM checksum error;
  6. "bOPn," indicating an open cash box;
  7. "bS," indicating a sensor error; or
  8. "bSF," indicating an invalid bill acceptor scale factor.

- **CArd**
  By pressing <enter> at the "CArd" (card reader) error code, the controller will display either:
  1. "rC," indicating a card reader communications error;
  2. "rSF," indicating an invalid card reader scale factor; or
  3. "CrXY," indicating some other type of card reader malfunction was reported by the reader, where XY represents the error type reported by the reader. Up to five different "XY" errors may be displayed at any one time.

- **CHUt**
  The "CHUt" (chute sensor) error code indicates that a chute sensor signal is always present. This error code is self-clearing once the problem is corrected.

- **StS**
  After the "StS" (space-to-sales) error code, the controller will display "UAXX," indicating column X is unassigned. This error code is cleared when new space-to-sales programming resolves the error.

- **SSF**
  The "SSF" (system scale factor) error code indicates that the system's scale factor has been improperly changed or breached.

- **FriG**
  By pressing <enter> at the "FriG" (refrigeration) error code, the controller will display either:
  1. "SEnS," indicating an unplugged temperature sensor;
  2. "COLd," indicating temperatures 1.5°C or more below the compressor cut-out setting;
  3. "HOt," indicating temperatures 1.5°C or more above the compressor cut-in setting;
  4. "CnPr," indicating the compressor is not cooling within 30 minutes of turning on; or
  5. "ACLo," indicating that the average rectified voltage was under 22 VDC for at least 30 consecutive seconds.

- **rAM**
  The "rAM" (RAM) error code indicates that the machine setup information has been corrupted. When this error is present, the RAM will be completely reinitialised to default conditions. Upon pressing the service mode button, the controller will display "init" for approximately ten seconds and then reset the machine. At this point, the controller will need to be reprogrammed.

Section 3. Vender Programming

tESt

Test Vend Mode
If <enter> is pressed at the "tESt" prompt, the controller will enter the test vend mode by displaying "CoXX," where the X's represent the number of the column to be vended. This mode will test the control board's ability to distribute power (24 VDC) to the proper vend motor upon command. It also tests the mechanical part of the vending operation, such as the vend motor and rotor.

OPERATION: Pressing <enter> at the "tESt" prompt will cause the controller to enter the Test Vend Mode. Upon entry into this mode, the display will show "Co01," indicating a test vend from column 1 may be initiated. <Up> or <down> can be pressed to cycle through the available columns. Activation of <enter> at a displayed column will initiate a test vend on that column. Vends made while in this routine will not be added to the totals in the various counter modes. If <exit> is pressed at any time when "CoXX" is displayed, the controller will return to the "tESt" prompt. Use <up> to proceed to the next mode, "Pric."

Pri C

Price Setting Mode
If <enter> is pressed at the "Pric" prompt, the controller will enter the selection price setting mode. If multiple prices are enabled (at "C1" in configurations mode), the controller will display "ALL," for the universal selection price. If <up> is pressed, the controller will display "P1," for the price of selection 1. The current set price for selection 1 will alternate with the "P1" display. Using <up> or <down> will cycle through each individual selection price. If <enter> is pressed at "PX" (where "X" represents the selection number), the display will show the current price for the displayed selection. Use <up> or <down> to increase or decrease the price. When the desired price is on the display, use <exit> to save that price and return to the "PX" display. If the "ALL" price is set and saved, all individual selection prices will be set to that value. Pressing <exit> while a selection is displayed will return the controller to the "Pric" prompt. Use <up> to proceed to the next prompt, "StoS."

If single price mode is enabled, only the single price can be adjusted. In single price mode, "SPri" will be displayed after pressing <enter> at the "Pric" prompt. If <enter> is pressed at "SPri," the display will show the current price. Pressing <up> or <down> will increase or decrease this price. When the desired price is on the display, press <exit> to save that price and return to the "SPri" prompt. Press <exit> again to return to the "Pric" prompt. Press <up> to proceed to the next prompt, "StoS."

StoS

Space to Sales Mode
The space-to-sales mode is used to determine which column(s) will vend for each selection. If <enter> is pressed at the "StoS" prompt, the controller will enter the space-to-sales mode by displaying "OPtX," where "X" is the current option selected; or "CStS," if a custom space-to-sales configuration is currently used. Using <up> or <down> will cycle through the available space-to-sales options, as well as the "CStS" option. After setting space-to-sales and returning to the "StoS" prompt, use <up> to proceed to the next prompt, "SdEP."

Options
When one of the options (OPt0 - OPt3) is on the display and <enter> is pressed, the display will begin displaying the space-to-sales assignments for that configuration. The display will show "SLXX" (where the X's represent the selection number), followed by either "nonE," indicating that no columns are assigned to that selection; or a sequence of numbers that represent the columns that are currently assigned to that selection. Using <up> or <down> will cycle through the space-to-sales assignments for the other selections. If <exit> is pressed at this time, the display will return to the "StoS" prompt, and the option that was being viewed will be saved as the current space-to-sales configuration.

Note: *"OPt0" is used to clear all current space-to-sales settings, as shown in the table below.*

Table of space-to-sales options

	Selection	Column(s) assigned
OPt0	1, 2, 3	No columns assigned
OPt1	1, 2, 3	1, 2, 3, 4
OPt2	1, 2	1, 2, 3
	3	4
OPt3	1	1, 2
	2	3
	3	4

Custom space-to-sales

If <enter> is pressed at the "CStS" prompt, the controller will enter the custom space-to-sales option. The display will show "SL1" (selection 1), followed by either "nonE," indicating that no columns are assigned to this selection; or a sequence of numbers that represent the columns that are currently assigned to the selection. Using <up> or <down> will cycle through all available selections.

Pressing <enter> at the "SLXX" prompt (where the X's represent the selection number) will allow columns to be assigned to the selection. The display will show "Co 1," indicating the first column. Using <up> or <down> will cycle through all the columns. If any column number is flashing, that column is assigned to the current selection; if a column number is *not* flashing, it is *not* assigned to the current selection. Pressing <enter> will change the status of that column. Pressing <exit> at this point will return the controller to the selection level, where the display flashes the selection number and the columns assigned to that selection. Follow the same procedure for all selections to be programmed. When completely finished in custom space-to-sales mode, press <exit> to return to the "StoS" prompt.

SdEP **Selection Depth Setting Mode**

If <enter> is pressed at the "SdEP" prompt, the controller will enter the by-selection column-depth setting mode by displaying "ALL," indicating all selections. Using <up> or <down> will cycle through the individual selections. This is the selection level. If <exit> is pressed at any time during this operation, the controller will return to the "SdEP" prompt.

If <enter> is pressed, the display will show "ALL" or "SYYX," depending on whether the "ALL" mode is being used or an individual selection is being accessed. "YY" represents the number of the selection, and "X" represents the current column-depth setting for that selection. "X" will be 3 if the selection is set to triple-depth mode, 2 if set to double-depth mode, or 1 if set to single-depth mode. Using <up> or <down> will alternate "X" between 3, 2, and 1. When the desired setting is on the display, pressing <enter> will save that setting and return the controller to the selection level. Pressing <exit> will return the controller to the selection level without saving. If the "ALLX" setting is saved, all individual selections will be set to this depth. From the selection level, press <exit> to return to the "SdEP" prompt. Use <up> to proceed to the next prompt, "Con."

Con **Configurations Mode**

If <enter> is pressed at the "Con" prompt, the controller will enter the configurations mode by displaying "Cn X," where "n" is the configuration number and "X" is the current status. Using <up> or <down> will cycle through all available configuration options. If <exit> is pressed at any time during this operation, the controller will return to the "Con" prompt. From the "Con" prompt, use <up> to proceed to the next prompt, "rtn" *(when "C2" is set to "0")* or "ECO" *(when "C2" is set to "1")*.

If <enter> is pressed, the display will flash "X" (the current status). Pressing <up> or <down> will cause the flashing status to toggle between "0" (disabled) and "1" (enabled). When the desired status is displayed, pressing <exit> will save that status and return the controller to the "Cn X" display.

• **C1 - Single price / multi-price**
This option is used to toggle between the single-price and multi-price modes. In the single-price mode, one price will be used for all selections. In the multi-price mode, each selection may be set to a different price.

If X = 0, single pricing is used.
If X = 1, multi-pricing is used.

• **C2 - Optional menu enable**
This option is used to enable the optional menu, which contains several more mode options than available in the standard service menu.

If X = 0, the optional menu items will not appear.
If X = 1, the optional menu items will appear.

• **C4 - Open-door totals**
This option is used to turn on the display of the total machine sales and total machine cash values in the open-door mode.

If X = 0, only errors are displayed when the door is opened.
If X = 1, sales and cash totals will be displayed, and "Eror" or "nonE" will replace the error codes when the door is opened.

Section 3. Vender Programming

- **C5 - Door switch reset**
  This option is used to allow the door switch to reset all resettable MIS.

  If X = 0, all resettable MIS registers are reset only when the "CF" command is received from the Hand Held Computer (HHC).
  If X = 1, all resettable MIS registers are reset when the door switch is sensed as open and at least one of the resettable MIS registers has been read (i.e., cash and sales counts).

- **C6 - Correct change rule #1 (no cheat)**
  This option is used to prevent vending with insufficient change to pay back correct change after a purchase. If disabled and the correct change cannot be paid back, the vend is aborted and the deposited credit is returned, if possible.

  If X = 0, the customer will not be cheated.
  If X = 1, the customer may be cheated.

- **C7 - Correct change rule #2 (bill acceptance)**
  This option is used to allow bills to be accepted without the risk of cheating the customer. If enabled, a bill is not accepted unless the controller verifies that it has enough change to cover the bill's value plus any accumulated credit.

  If X = 0, high-order bill acceptance is disabled.
  If X = 1, high-order bill acceptance is enabled.

- **C8 - Forced vend attempt**
  This option prevents the machine from becoming a change maker. When this mode is enabled, escrow of coins is allowed until any of the following three events occurs: 1. Any bill is inserted into the bill acceptor; 2. Any "cash box" coin is inserted into the changer; or 3. The maximum vend price is reached. Once any of these conditions are met, any accumulated credit must be used toward a vend attempt, and coins will not be dispensed for credit in response to an escrow request. If a sold-out selection, or if a valid selection that becomes sold-out, is made, this option will be overridden and an escrow will be honoured.

  If X = 0, forced vend attempt is disabled.
  If X = 1, forced vend attempt is enabled.

  Note that forced vend attempt has no effect on the card reader. Once a card is inserted, it can always be returned to the customer via the escrow lever on the changer or return button on the card reader.

- **C9 - Multi-vend**
  This option will allow multiple purchases without re-entering coins. If enabled, instead of immediately returning the change after a vend, the credit will remain on the display to be used for another selection. An escrow request will be honoured at any time. This option will take precedence over the forced-vend option after the first vend has been completed.

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

  Conflicting options
  In order to avoid conflicts between options and potential cheating of customers, it is recommended that the following rule be followed:

  If the no-cheat mode is disabled (C6 = 0), then both bill acceptance and bill escrow should be enabled (C7 & C10 = 1). This is the only way to ensure the customer will never be cheated.

- **C10 - Bill escrow**
  This option will allow escrowing of bills. If enabled, and the current bill value inserted takes the accumulated credit over the maximum price, the bill will be held in the escrow position. If the rule is disabled, bills will always go to the cash box.

  If X = 0, bill escrow is disabled.
  If X = 1, bill escrow is enabled.

- **C11 - Limited error field visibility**
  When this option is enabled, the controller will only report certain error types via DEX. The errors that will not be reported are: all refrigeration errors; the card reader communications error; and all scale factor errors.

  If X = 0, all errors are reported via DEX.
  If X = 1, only certain errors are reported via DEX.

Return to Sales Mode
This mode is used to return to the Sales Mode, where the display flashes the greeting (ICE COLD, etc.). To return to the Sales Mode, press <enter> at the "rtn" prompt.

Note: This mode will only appear after "Con" when "C2" is set to "0." If "C2" is set to "1," this mode will not appear at this point in the menu.

Optional Menu

ECO

Exact Change Only Control Mode
This mode configures the value that the controller will use to control the "Exact Change Only" indicator. If the controller determines that it cannot return the exact amount of this value and every value in increments of the least coin tube value less than it, then the indicator must be turned on. For example, given a least coin tube of a ¤0.05 and an ECO value of ¤0.25, the system must be able to pay back ¤0.05, ¤0.10, ¤0.20, and ¤0.25.

If <enter> is pressed at the "ECO" prompt, the current exact change value will be displayed. Press <up> or <down> to adjust this value. Press <exit> to save the currently displayed value and return to the "ECO" prompt. From "ECO," use <up> to proceed to the next prompt, "CPO."

CPO

Coin Payout Mode
This mode allows coins to be paid out 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 (or switches) on them. This mode can also be used as a test to confirm the control board's ability to pay out coins.

If <enter> is pressed at the "CPO" prompt, the controller will enter the coin payout mode by displaying the lowest coin value that can be paid out. Using <up> or <down> for less than one second will allow the controller to cycle through the coin values that are being routed to the coin tubes.

If <up> or <down> is pressed for greater than one second and less than two seconds, a coin of the displayed value will be paid out. The word "PAY" will be displayed while the coin is dispensed. The controller will continue to pay out coins of the displayed value as long as <up> or <down> is held. When the <up> or <down> button is released, the display will return to showing the coin value. MIS registers will be updated appropriately. If <exit> is pressed at any time during this operation, the controller will return to the "CPO" prompt. Use <up> to proceed to the next prompt, "tUFL."

tUFL

Coin Tube Fill Mode
This mode is used to keep inventory of the exact coin tube levels as each coin is inserted. During this mode, the LED will register each coin as it is inserted (in no particular order) and report its value to the 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 (either through "CPO" or through a vend).

If <enter> is pressed at the "tUFL" prompt, the controller will enter the coin tube fill mode, at which point the display will be blank. After a coin is accepted, the tube inventory level for the deposited coin will be displayed. If a full tube is detected, the denomination of coin for that tube will no longer be accepted. During this operation, MIS tube counts and manual fill mode counters will be updated accordingly. If <exit> is pressed at any time during this operation, the controller will return to the "tUFL" prompt. Use <up> to proceed to the next prompt, "dSAL."

dSAL

Discounted Sale Counter Mode
This mode is very similar to the Sale Counter Display Mode. It permits manual extraction of the amount of product dispensed through the vender during the discounted sales periods (up to 99,999,999). This mode consists of a non-resettable total count and individual counts per selection which are resettable, depending upon the proper configuration setting.

If <enter> is pressed at the "dSAL" prompt, the controller will enter the non-resettable discount vend display mode by displaying "SALE" / "XXXX" / "XXXX," where the X's will represent total number of all discounted vends over the life of the vender's control board. If the discount sales amount is less than five digits long, the upper four-digit set is not displayed. Using <up> or <down> will cycle through each selection as "SLNN" / "XXXX" / "XXXX," where the N's represent the appropriate selection number and the X's represent the resettable discount vend count for that selection. If <exit> is pressed at any time during this operation, the controller will return to the "dSAL" prompt. Press the <up> button to proceed to the next prompt, "diFC."

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

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di FC

Differential Cash Counter Mode
This mode is comparable to the Cash Counter Display Mode. It permits monitoring of the difference between discounted prices and regular prices. This mode consists only of a non-resettable total count.

If <enter> is pressed at the "diFC" prompt, the controller will enter the non-resettable cash display mode by displaying "CASH" / "YXXX" / "XX.XX," where the X's will represent total discounted value of all discounted vends over the life of the vender's control board. If product is sold for less than the normal vend price, "Y" will be a negative sign ("-"); if product is sold for greater than the normal vend price, "Y" will be a blank. A decimal point will be displayed in the appropriate position with the lower four digits. If the discount amount is less than five digits long, the upper four-digit set is not displayed. If <exit> is pressed at any time during this operation, the controller will return to the "diFC" prompt. Press the <up> button to proceed to the next prompt, "SdiS."

Sdi S

Discount Price Setting Mode
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 into the "tinE" mode, all selections to be discounted should be set to "1" in the "StCL" mode. Then, the time the discounted selections are to be activated should be set by using "dSCn," located under "dAY" in the "tinE" mode.

If <enter> is pressed at the "SdiS" prompt, the controller will enter the discount price setting mode. The display will alternately flash "ALL" and the last discount price set for all selections. If <up> is pressed, the controller will alternately display "P1" and the discount price of selection 1. Using <up> or <down> will allow the controller to cycle through each available individual discount price. This is the *selection level*. If <exit> is pressed at any time at this level, the controller will return to the "SdiS" prompt. Use <up> to proceed to the next prompt, "StCL."

If <enter> is pressed at the selection level, the display will continuously show the current discount price for the displayed selection. Using <up> or <down> will increase or decrease the discount price. When the desired discount price is on the display, press <exit> to save that price and return to the selection level. If the "ALL" discount price is set, all individual discount prices will be set to this value.

StCL

Set Timer Control Mode
This mode is used to choose which selections to turn off by 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 in order for the timer or key switch to operate. The timer or key switch will control any selections set to "1." Selections set to "0" will function normally.

If <enter> is pressed at the "StCL" prompt, the display will show "ALLX" or "tY X," depending on whether the "ALL" setting is being used or an individual selection is being accessed. "Y" represents the individual selection number, and "X" represents the status of "ALL" or the individual selection ("1" if enabled or "0" if disabled). The "X" character will be flashing. Using <up> or <down> will toggle "X" between "0" and "1." When the desired setting is on the display, pressing <exit> will save that setting and return the controller to the selection level. If "ALLX" is being used, all selections will be set to this value. If <exit> is pressed at the selection level, the controller will return to the "StCL" prompt. Use <up> to proceed to the next prompt, "tinE."

ti nE

Time Setting Mode
If <enter> is pressed at the "tinE" prompt, the controller will enter the time setting mode by displaying "YEAr." Using <up> or <down> will cycle through all available time setting options. If <exit> is pressed at any time during this level of the operation, the controller will return to the "tinE" prompt. From the "tinE" prompt, use <up> to proceed to the next prompt, "FriG."

The following options can be selected in "tinE":

- "YEAr" - current year
- "dAtE" - current date (month, day)
- "hour" - current time (hours, minutes)
- "SEtd" - current day of week
- "StOP" - turn real time clock on / off*
- "dAY" - timer settings
- "dSt" - display current time
- "dLt" - daylight savings time enable / disable

** - **NOTE:** The "StOP" feature is used to conserve the control board's built-in lithium battery when the board is placed in storage for long periods of time. The shelf life of the battery is about three years with the clock turned on or about ten years with the clock turned off.*

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- **YEAr**
  If <enter> is pressed at the "YEAr" prompt, the current year is displayed and will be flashing. Pressing <up> or <down> at this point will increase or decrease the year setting. Pressing <exit> at this point will save the displayed year setting and return the controller to the time selection level.

- **datE**
  If <enter> is pressed at the "dAtE" prompt, the current date is displayed. The left two digits of the display show the current month, and the right two digits show the current day. The month setting will be flashing. Pressing <up> or <down> at this point will increase or decrease the month setting. If <enter> is pressed, the day setting will flash. <Up> or <down> can now be used to set the day. Pressing <enter> again will cause the month setting to flash again. Pressing <exit> in this mode will save the displayed month and day settings and return the controller to the time selection level.

- **hour**
  If <enter> is pressed at the "hour" prompt, the current time is displayed in a 24-hour format. The left two digits of the display show the current hour, and the right two digits show the current minutes. The hour setting will be flashing. Pressing <up> or <down> at this point will increase or decrease the hour setting. If <enter> is pressed, the minute setting will flash. <Up> or <down> can now be used to set the minutes. Pressing <enter> at this point will cause the hour setting to flash again. Pressing <exit> in this mode will save the displayed hour and minutes setting and return the controller to the time selection level.

- **SEtd**
  If <enter> is pressed at the "SEtd" prompt, the current day of the week is shown. Pressing <up> or <down> will cycle through all days. When the desired day is selected, press <exit> to save the displayed day setting and return the controller to the time selection level.

- **StOP**
  If <enter> is pressed at the "StOP" prompt, the display will alternately show "CLOC" / "StOP". If <enter> is pressed at this point the system clock will be shut off, the display will show "OFF" for approximately 1/2 second, and then the display will return to the "StOP" prompt. If <exit> is pressed at the "CLOC" / "StOP" prompt, the controller will return to the "StOP" prompt without turning off the system clock. To restart the system clock, use the "hour" feature to reset the current time. When the current time is reset, the battery will be turned on automatically.

- **dAY**
  If <enter> is pressed at the "dAY" prompt, the controller will enter the time range programming function to allow the timer on / off times to be set for each day of the week. The display will show "ALL." From this point, there are two different options: "ALL," to allow the timer to function at the same time settings every day of the week; and individual day settings for using different time blocks for different days. Pressing <up> or <down> will cycle through "ALL" and each day of the week. If <enter> is pressed, either at "ALL" or an individual day, the controller will enter into that particular day. The display will show "SC-1" / "On," then the currently set *off-time*, as listed below. If <up> or <down> is pressed at this 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"	*off-time* for discounting
"dScn" / "OFF"	*on-time* for discounting
"FriG" / "On"	*off-time* for refrigeration
"FriG" / "OFF"	*on-time* for refrigeration
"Lt-1" / "On"	1st *off-time* for illumination
"Lt-1" / "OFF"	1st *on-time* for illumination
"Lt-2" / "On"	2nd *off-time* for illumination
"Lt-2" / "OFF"	2nd *on-time* for illumination
"Lt-3" / "On"	3rd *off-time* for illumination
"Lt-3" / "OFF"	3rd *on-time* for illumination

To set "On" and "OFF" times for the timer, press <enter> upon reaching the desired timer setting mode. 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> will change the hour of this particular setting. Pressing <enter> will lock in the hour setting, and the minutes will begin to flash (which indicates that the minutes can now be changed). Pressing <up> or <down> will change the minutes of this setting. Pressing <exit> at any time during this operation will lock in the changes and bring the controller back to the timer setting mode, followed by the time set for that particular mode. (Example: "SC-1" / "On" / "0900.")

At this point, <up> or <down> will cycle through all timer setting modes listed previously. From this level, pressing <exit> will return the display to the day of the week. Pressing <exit> again will return the display to "dAY." Press <up> to proceed to "StOP."

Note: If certain selections are being set to go off and come back on at a programmed time, first enter into "SC-1" / "On" to set the first off-time for selections. Then, program the first return on-time for selections by entering into "SC-1" / "OFF." For the timer to be able to control the selections, those selections must be set to "1" in the "StCL" mode.

- **dSt**
  If <enter> is pressed at the "dSt" prompt, the display will show "dStX," where the 'X' will be flashing. If X = 0, this indicates that the current time is not being displayed in place of the POS message in sales mode. If X = 1, the time is being displayed in sales mode. Using <up> or <down> will toggle the value of "X." If <exit> is pressed at this point, the currently displayed value of "X" will be saved and the controller will return to the "dSt" prompt.

- **dLt**
  If <enter> is pressed at the "dLt" prompt, the display will show "dLtX," where the "X" will be flashing. If X = 0, this indicates that the controller will not adjust the time for daylight savings. If X = 1, the controller will adjust the time for daylight savings. Using <up> or <down> will toggle the value of "X." If <exit> is pressed at this point the currently displayed value of "X" will be saved and the controller will return to the "dLt" prompt. When enabled, the controller will advance the system time forward one hour at 2:00 AM on the first Sunday of April. It will back up the system time one hour at 2:00 AM of the last Sunday of October. *(Note: This conforms to North American Daylight Savings Time standards. Other standards are not available at this time.)*

Fri G   **Refrigeration Control Mode**
If <enter> is pressed at the "FriG" prompt, the controller will enter the refrigeration control mode. Using <up> or <down> will cycle through the various refrigeration control settings ("Enb," "Strt," "StoP," "dEG," "SEtP," "Stor," "dSP," and "rELY"). If <exit> is pressed, the controller will return to the "FriG" prompt. Press <up> to proceed to the next prompt, "PAS."

- **Enb**
  If <enter> is pressed at "Enb," the controller will display "EnbX." "X" will be flashing, indicating that it can be edited. If X = 1, the energy conservation control will be enabled. This means the cabinet temperature will be allowed to rise to the programmed storage level during programmed time blocks. If X = 0, the energy conservation mode will be disabled, and the machine will function as normal. Pressing <up> or <down> will toggle "X" between "1" (enabled) and "0" (disabled). Pressing <exit> will save the displayed setting and return the controller to the "Enb" prompt.

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- **Strt**

  If <enter> is pressed at the "Strt" prompt, the controller will enter the start energy conservation time setting routine. Upon entry into this routine, the display will show "dAY." Pressing <exit> at this point will return to the "Strt" prompt without saving any changes.

  If <enter> is pressed at the "dAY" prompt, the controller will enter the day of the week setting routine. Upon entry into this routine, the display will show "ALL," representing every day of the week. Pressing <up> or <down> will rotate through "Sun," "Mon," "tuE," "Wed," "thu," "Fri," "Sat," or "ALL." Pressing <enter> at any of these prompts will cause the controller to enter the hour:minute time setting routine for that day. The display will show the current four-digit hour and minute setting, in 24-hour format. The hour setting will be flashing to indicate that it can be modified. Pressing <up> or <down> will increase or decrease the hour. Pressing <enter> will stop the hour from flashing and cause the minutes to flash, indicating that they can be modified. At this point, pressing <up> or <down> will increase or decrease the minutes value. Pressing <exit> will save the hour and minute setting for the corresponding day value and will return to the prompt for that day. Pressing <exit> again will return the controller to the "dAY" prompt. Pressing <exit> one more time will return the controller to the "Strt" prompt.

- **StoP**

  If <enter> is pressed at the "StoP" prompt, the controller will enter the stop energy conservation time setting routine. Upon entry into this routine, the display will show "dAY." Pressing <exit> at this point will return the controller to the "StoP" prompt without saving any changes.

If <enter> is pressed at the "dAY" prompt, the controller will enter the day of the week setting routine. Upon entry into this routine, the display will show "ALL," representing every day of the week. Pressing <up> or <down> will rotate through "Sun," "Mon," "tuE," "Wed," "thu," "Fri," "Sat," or "ALL." Pressing <enter> at any of these prompts will cause the controller to enter the hour:minute time setting routine for that day. The display will show the current four-digit hour and minute setting in 24-hour format. The hour setting will be flashing to indicate that it can be modified. Pressing <up> or <down> will increase or decrease the hour. Pressing <enter> will stop the hour from flashing and cause the minutes to flash, indicating that they can be modified. At this point, pressing <up> or <down> will increase or decrease the minutes value. Pressing <exit> will save the hour and minute setting for the corresponding day value and will return the controller to the prompt for that day. Pressing <exit> again will return the controller to the "dAY" prompt. Pressing <exit> one more time will return the controller to the "StoP" prompt.

- **dEG**

  If <enter> is pressed at the "dEG" prompt, the controller will display "dEGX," where "X" will be flashing "C" if the controller is currently in Celsius mode, or "F" if the controller is currently in Fahrenheit mode. Pressing <up> or <down> will toggle "X" between "C" and "F." Pressing <exit> at this point will save the displayed temperature mode and return the controller to the "dEG" prompt.

- **SEtP**

  If <enter> is pressed at the "SetP" prompt, the controller will display the current set point temperature setting, "xx C" or xx F," depending on the degree ("dEG") mode setting. The cold set point default is 2°C. Pressing <up> or <down> will adjust the temperature value by 0.5°C. The set point temperature can be adjusted from -4°C through 7°C. Pressing <exit> at this point will save the displayed temperature and return the controller to "SetP."

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- **Stor**

  If <enter> is pressed at the "Stor" prompt, the controller will display the current storage (for energy conservation mode) temperature setting, "xx C" or "xx F," depending on the degree ("dEG") mode setting. The default storage temperature is 14°C. Pressing <up> or <down> will adjust the temperature value by 0.5°C. The storage temperature can be adjusted from 7°C through 24°C. Pressing <exit> at this point will save the displayed temperature and return the controller to "Stor."

- **dSP**

  If <enter> is pressed at the "dSP" prompt, the controller will display "dSPX," where "X" will be "0" if the controller is not currently displaying the cabinet temperature, or "1" if the controller is currently displaying the cabinet temperature in addition to the POS message. Pressing <up> or <down> will toggle "X" between "0" and "1." Pressing <exit> at this point will save the currently displayed setting and return the controller to the "dSP" prompt.

- **rELY**

  If <enter> is pressed at the "rELY" prompt, the controller will enter the relay test mode by displaying "Fan." If <exit> is pressed in this mode, the user will return to the "rELY" prompt. Using <up> or <down> will toggle between the following submodes:

  - "Fan " - evaporator fan relay
  - "LitE" - machine light control relay
  - "Htr " - heater kit relay
  - "CnPr" - compressor relay

  If <enter> is pressed at any of these prompts, the controller will alternately flash the prompt and the word "OFF," if that relay is currently off; or the word "On," if that relay is currently on. Pressing <up> or <down> will toggle the alternate display word between "OFF" and "ON." Pressing <enter> at this point will override that relay's current status until either the status is changed or until the "rELY" mode is exited completely. The display will return to the relay test mode. When the "rELY" mode is exited, all relays will return to the state they were in prior to entering the "rELY" mode.

  NOTE: *In this feature, the user has the ability to continuously turn the compressor on and off. Be aware that quickly restarting the compressor may result in serious damage to the compressor.*

PAS — Password Preview Mode

On the Merlin RB vender, the total historical and individual sales counts can be accessed externally, as well as the error mode, by entering the external password. Neither the sales counts nor the errors can be cleared externally. The Password Preview Mode allows the external password to be changed.

If <enter> is pressed at the "PAS" prompt, the controller will display the external password preview mode. The first digit of the number will be flashing. Pressing <up> or <down> will adjust the currently flashing digit up or down. Pressing <enter> will save the currently flashing digit and cause the next digit of the password to begin flashing. All digits may be modified in this manner. Pressing <exit> at any point in the procedure will save the currently displayed password and return the controller to the "PAS" prompt. Use <up> to proceed to the next prompt, "LAnG."

Note: *Password digits correspond to the selection switches. If a digit is set to "0" (zero), it will not be possible to enter the external password.*

LAnG

Language Setting Mode
The Merlin RB vender has the ability to display vending messages ("ICE COLd," "SOLd Out," etc.) in any of several preset languages. The available languages are listed below.

If <enter> is pressed at the "LAnG" prompt, the controller will display the current language setting. Pressing <up> or <down> will sequence through the available languages:

*   **EnGL**   English
*   **FrEn**   French
*   **SPAn**   Spanish
*   **Hebr**   Hebrew
*   **GEr**   German
*   **CUSt**   Custom.

Pressing <exit> at any point in the procedure will save the currently displayed language setting and return the controller to the "LAnG" prompt. Use <up> to proceed to the next prompt, "rtn."

Note: *Custom language is present only if custom language has been uploaded using DEX.*

rtn

Return to Sales Mode
This mode is used to return to the Sales Mode, where the display flashes the greeting (ICE COLD, etc.). To return to the Sales Mode, press <enter> at the "rtn" prompt.

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 switch's 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 can.

Product Delivery

As the product drops, the vibration from the impact allows the delivery sensor to send a low voltage signal to the vender's control board, indicating 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 a product drop is registered (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. 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;
3. The sensor is out of adjustment and does not detect the product drop; or
4. If any (or all selections) doesn't have a column assigned, it will read "SOLd OUt."

The digital display will indicate "SOLd OUt." This signals to the customer to make another selection or push the coin return lever for a full refund. If set for forced attempt, 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, 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 indicate a vend is in progress. It will automatically show "SOLd OUt" upon pressing the select button (after reaching a vend price).

Vender Maintenance

What to Clean

WARNING: Electrical and electronic components should NEVER be subjected to water. Do not use hoses or pressure washers to clean the interior of the vender.

Cabinet and Vend Mechanism: Steam clean as required. *Never* use petroleum cleaners.

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 debris from the condenser and evaporator coils with a small light-bristled brush, vacuum cleaner, or compressed air. This will help to ensure an extended unit life.

Control Board: The vender's control board should always be enclosed by its cover to protect it. Routine cleaning is not necessary but, if desired, the controller's area may be blown out with compressed air.

What to Lubricate

Inner Door Gasket: The door gasket comes from the factory pre-lubricated but should be lubricated periodically with a silicone-based 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.

Latch Strike Nut: The latch strike nut should not be lubricated.

Refrigeration Unit: The refrigeration unit is a sealed system that does not require any lubrication. Also, the condenser and evaporator fan motors do not require any lubrication.

Preventive Maintenance

Vender Levelling: Make sure that the vender is level when placed on site. If the vender is not properly levelled it can begin to accumulate standing water, which over a period of time may begin to freeze and will eventually freeze the evaporator. Another problem that may occur from an unlevelled vender will be improper vending, which would include but not be limited to product not vending from column, product vending slow from column, product not sliding or rolling down to the delivery port, or product jamming.

Lighting System: The lighting system contains high voltage. Power MUST be disconnected when working with or around this portion of the vender. Light bulbs should be replaced whenever one or more of the bulb ends are blackened or discoloured, or when the lights are flickering or are not lit, and it has been determined that the ballast is good. Replace these bulbs as soon as it is determined they are bad. If it is decided not to use the lighting system, the ballast MUST be unplugged. **DO NOT** remove the bulbs and leave the ballast plugged in. Doing so can cause the ballast to generate a very high amount of electrical noise, which can cause problems for or permanently damage electronic components.

**WARNING:
ELECTRIC SHOCK DANGER**
Power MUST be disconnected when working with or around the lighting system.

Vender Troubleshooting

Using the Vender's Error Code System

The Merlin RB has a built-in error code diagnostic system that will help in troubleshooting and solving problems. This system is best used in conjunction with the following section, *Troubleshooting*.   These errors are not a replacement for knowledge of the vender or its operation, but they will lead in the general direction of the problem. Most vender parts are independent of one another, so most problems can be confined to the item in question (such as an LED, coin changer, or select switch), the harnessing connecting it to the control board, or the control board itself. See *Section 3: Vender Programming* for detailed instructions on how to use and access the vender's error codes.

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

Main	Detailed Error	Corrective Action
door	(door switch - no detailed error)	Check and / or replace the door switch or door switch harnessing.
SELS	SS01 thru SS03 (selection 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.
	CSF (invalid changer scale factor)	Consult changer manufacturer.
ACCE	EE (excessive escrow)	Check for stuck coin return lever.
	nJ (acceptor coin jam)	Check for blockage or dirty sensor in acceptor.
	LA (low acceptance rate)	Consult changer manufacturer.
bUAL	bC (bill validator communications)	Check bill validator harness connections.
	bFUL (bill validator cash box full)	Remove bills from cash box.
	biLL (bill validator motor)	Consult bill validator manufacturer.
	bJ (bill jam)	Remove jammed bill or clean bill sensors.
	brCH (bill acceptor ROM checksum error)	Consult bill validator manufacturer.
	bOPn (bill validator cash box open)	Close bill acceptor cash box.
	bS (bill validator sensor)	Remove obstruction or clean sensors.
	bSF (invalid bill acceptor scale factor)	Consult bill validator manufacturer.
CArd	rC (card reader communications error)	Check card reader harness connections.
	rSF (invalid card reader scale factor)	Consult card reader manufacturer.
	CrXY (other card reader error)	Consult card reader manufacturer.
CHUt	CS (chute sensor always on)	Adjust chute sensor.
StS	UAxx (unassigned column)	Correct space to sales setting, if necessary.
FriG	SEnS (temperature sensor)	Check for a cut or disconnected temperature sensor.
	CoLd (sensing temperature 1.5°C below cut-out)	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 (rectified voltage under 22 VDC for more than 30 seconds)	Check voltage at wall outlet during the peak of the load with all units (if any others are present in circuit) running.

Troubleshooting

Use the following section to troubleshoot the Merlin RB vender in the event there is a problem in one of the following areas: power, acceptance (coin or bill), vending, or refrigeration. Listed below are the problems that are most likely to be encountered. If the Merlin RB displays a problem not listed here, please contact a Royal Vendors service representative.

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
COIN ACCEPTANCE		
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 a percentage of good coins	Coin return lever	Make sure changer is mounted correctly and the coin return lever is in the proper position.
	Acceptor is dirty or foreign matter is in the path	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	*Erratic or no credit:* Acceptor (coin mechanism)	Replace coin mechanism (acceptor) and test.
	No credit: Defective harness between coin mechanism and control board	Check harness for cut wires or wrong connections. If defective, replace it.
	No credit: Defective control board	Replace control board and test.
Changer will not pay out 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 control board	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.

Section 6. Vender Troubleshooting

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
BILL ACCEPTANCE		
Validator will not pull in a bill	Make sure that the validator harnessing is correct for the style of validator being used and that 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 changer is plugged in (accepts coins) and the tubes are full of coins.
	Changer harnessing not properly connected	Repair or replace faulty harnessing.
	If validator accepts, replace changer and test.	Replace defective validator. If problem persists, replace control board.
Validator pulls in the bill but will not establish credit	Defective (wrong, cut, or miswired) validator harnessing.	Make sure the validator harnessing is correct for the style of validator being used and it is plugged in / wired properly.
	Defective validator	Replace validator and test.
	Defective control board	Replace control board and test.
Validator takes a bill but is not erasing credit	Validator switch settings (if any)	Refer to validator's service manual or validator representative.
	Defective validator interface harness	Refer to validator's service manual or validator representative.
	Defective validator	Replace validator and test.
	Defective control board	Replace control board and test.
Validator takes a bill and allows payback of coins without making a selection	Control board's configurations not set properly	Access the vender's configurations mode and check the C8 ("forced attempt") setting.
VENDING PROBLEMS		
Multiple vending	*If from all selections:* Delivery sensor cut, not properly grounded, disconnected, or improperly set	Set vender's delivery sensor by turning the adjustment screw: 1. Clockwise until the indicator lights; 2. Anticlockwise until it goes out; and 3. Anticlockwise one and a half turns. If no progress is made by adjusting, replace the sensor.
	Control board sending power to motor when not supposed to	Check power at vend motor during multiple vend (24 VDC). If power is present, the control board is at fault.
	Mechanical error	Check the vend motor to ensure the gearing within it is OK.

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
Wrong product vending upon selection	Misloaded vender	Ensure all products within each column are the same.
	Space-to-sales not properly set	Enter space-to-sales. Make sure the columns are set correctly according to the buttons.
	Miswired motor	Check wiring at each vend motor, at the vend motor connection in the bottom of the door, and at the control board vend motor connection.
	Miswired selection button	Check the wiring at each selection switch and at the selection switch harness connection at the control board.
No vend upon selection / dry vend (no refund)	Delivery sensor	Check to see if the delivery sensor adjustment LED is constantly on. If so, turn the adjustment screw anticlockwise until the adjustment LED goes off.
	Cuts or pinches in delivery sensor harness (adjustment LED constantly on)	Replace defective sensor.
	Defective control board	Unplug the sensor connection from the control board. If the adjustment LED light stays on, replace the control board.
No vend from some, but not all, columns (allows refund or second choice)	Selection switch	Make sure the LED acknowledges each selection switch. If not, check the selection switch. Trace the selection switch harness all the way up to the control board. Replace if necessary.
	Wiring from motor connection on control board all the way to the vend motor of the defective column	Check wiring all the way from the control board to the vend motor for cuts, pinches, or backed out wires.
	Control board	Measure voltage at vend motor's connection on the control board. Measure it on the individual wire for the motor attempted and the common (neutral) wire. A selection must be made and the LED should be displaying as if a vend is in process ("scrolling down"). 24 VDC should be registered. If not, replace control board.

Section 6. Vender Troubleshooting

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
REFRIGERATION PROBLEMS		
Refrigeration unit runs constantly	Setpoint temperature not properly set	Check "SEtP." Correct if necessary.
	Temperature sensor not reading correctly	Test the temperature sensor by setting the temperature to be displayed on the LED 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 control board to refrigeration relay	Unplug one of the two wires coming from the control board to power the relay. If the unit cuts off, locate the shorted wire in the harnessing, and correct or replace defective harness.
	Refrigeration relay contacts welded together	Unplug one of the two wires (with pink connectors) coming from the control board to power the relay. If the unit continues to run, replace the relay.
Refrigeration unit will not run	Defective refrigeration unit	Replace the refrigeration unit.
	Setpoint not set properly	Check "SEtP" settings. If set incorrectly, reset it.
	Temperature sensor not reading correctly	Test the temperature sensor by setting the temperature to be displayed on the LED 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 control board to refrigeration relay	Unplug one of the two wires coming from the control board to power the relay. If the unit cuts off, locate the shorted wire in the harnessing, and correct or replace defective harness.

Section 6. Vender Troubleshooting

TROUBLE	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
Refrigeration unit will not run	Defective refrigeration relay	Test relay by making sure all connections are made for refrigeration unit, refrigeration relay, and control board. Next, go into "FriG" mode. Scroll to "rELY," press <enter>, and go to "CnPr." Press <enter>, change it to "On," and press <enter> again. If unit does not come on, replace relay.
MISCELLANEOUS PROBLEMS		
LED not working	No power to control board	Check for 24 VAC at control board's main power connection, coming from the transformer. If no power, replace transformer.
	LED harness	Check the LED harness for pinches, cuts, or backed out wires. If any found, replace harness.
	LED	Check for 5 VDC on pins 1 and 4 of the harness at the LED. If power is present, replace the LED.
Display shows "SOLd OUt" immediately upon pressing a selection (column full of product and sold-out not clearing)	Door switch wiring improperly connected, cut, or pinched	Check for cuts on the two 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. If no problems found, check door switch.
	Door switch	Check the door switch for defects (stuck shut, etc.). If defects found, replace the door switch.
	Control board	Check the control board by shorting across the two pins for the door switch wiring (white and purple wires). If the sold-out condition is still not cleared, replace the control board.

MerlinRB
ELECTRONIC REFRIGERATION TROUBLESHOOTING FLOWCHART

START HERE

is unit running with door closed? — **yes** → open door & record errors* → use controller "cnp" relay test

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

did unit quit running upon opening door? — **yes** → unplug 1 of the 2 white relay wires (st1 & 2) from the refrig. relay

did unit quit running upon opening door? — **no** → did unit quit running? — **yes** → is a short found? — **yes** → replace refrigeration relay → go to final phase

is a short found? — **no** → look for a short in one of these two white wires

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

look for a short in one of these two white wires → plug all harn. back. unplug connection at control board for the ref. relay → is refrig. unit off? — **yes** → replace refrigeration relay → go to final phase

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

check voltage to the evap. fan motor → is the evap motor receiving 230 V? — **no** → replace main wiring harness → go to final phase

is the evap motor receiving 230 V? — **yes** → replace evaporator fan-motor → go to final phase

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

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

Setp 1.5 C → is the temp. shown accurate? — **yes** → is this setting correct? — **yes** → replace defective temp. sensor → go to final phase

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

is the temp. shown accurate? — **no** → check temp. sensor harness for cuts → is harness cut, smashed or disconnect.? — **no** → replace defective temp. sensor → go to final phase

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

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did unit start and continue to run? — **yes** → Is the setp 1.5 C? → change "dsp" setting to "1" to show evap. air temp. on display

did unit start and continue to run? — **no** → check voltage at two white relay wires (st1 & 2)** → do you get 24-28 DC volts? — **yes** → Check for 230 V at power cord → do you get 24-28 DC volts? — **yes** → replace refrigeration relay → go to final phase

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

do you get 24-28 DC volts? — **no** → check voltage between pins 1 & 3 from control board** to relay → do you get 24-28 DC volts? — **yes** → replace main control board → check harness and connections between control board and relay → fix faulty relay harnessing → go to final phase

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

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

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

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

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FINAL PHASE

Start → check "setp 1.5 C" settings and make sure that "dsp" is set to "1" to track the ref. units temperature progress → close vender's door and wait approx. 5 minutes to see if ref. unit comes on → did the unit come on? — **yes** → wait to see if the ref. unit stops when the display registers the "cuto" setting -2 C → did the unit quit running? — **yes** → problem solved

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

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

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ELECTRIC SHOCK DANGER
Always use extreme caution when working with live electricity. Failure to do so could cause an electrical shock, possibly resulting in severe injury or even death.

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*normal errors are "cnp" and "cold" for this type of problem.
**for voltage to be read. you must first enable the compressor (via the "rely" mode.
***for this type of problem it is recommended that the settings be setp 1.5 C.

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Training Guide

Troubleshooting Technique

Objective: Understand sequence of operation, identify what vender is doing, and compare to what it should be doing.
- Find defective component, confirm failed component, repair / replace component, test to confirm fix;
- Identify source, path, or load;
- Distinguish between software and hardware;
- Repair the problem, not the symptom.

Simple circuit
- Power supply (source - *example: control board*)
- Line (path - *example: display harness*)
- Device (load - *example: LED display*)
- Failure of any one results in service call.
- Skill required is systematical, logical process of elimination.
    1. Do I have power?
    2. Can the power get to where I want it?
    3. Does the device work?
- Confirm through use of volt / ohm meter.
- Understand the impact of software on hardware.
- Test to confirm repair.
- Low-voltage circuits are affected by harness connections, insulation, line noise, polarity, and earthing.
- The meter is *not* an option when checking low-voltage circuits.

Component Highlights

Control board
- "Brains" of vender
- Controls all vending operations
- See *Section 2: Vender Component Explanation* for full explanations of control board pinouts and functions.

Power Supply *(See Figure 6.1)*
- Supplies 24 VAC (±10%) to control board
- Only AC voltage at control board
- Check for primary voltage to transformer at lamp ballast harness
- Check for secondary voltage across position P15, pins 1 and 2
- Secondary is protected by a 3-amp fuse
- Ohm-out fuse holder

Figure 6.1 - Power Supply

LED Harness *(See Figure 6.2)*
• Supplies 5 VDC to LED
• Check for 5 VDC across position P1, pins 1 and 4
• Ohm-out harness

Multi-Drop Bus (MDB) Harness *(See Figure 6.3)*
• Supplies 24 VDC to changer, validator, and / or card reader from position P3, pins 1 and 6
• Data transmitted and received by control board
• Confirm with changer, LED on; payout works
• Multiple harnesses may be connected in series for more peripherals - check all harnesses

Chute Sensor *(See Figure 6.4)*
• Position P4 on control board
• Low-voltage (5 mV @ 500 μSeconds) impact sensor
• Voltage returned from chute sensor, signaling control board to cancel credit and reset
• Trimpot (R19 on control board) is used to increase or decrease sensitivity

Figure 6.3 - MDB Harness

Figure 6.2 - LED Harness
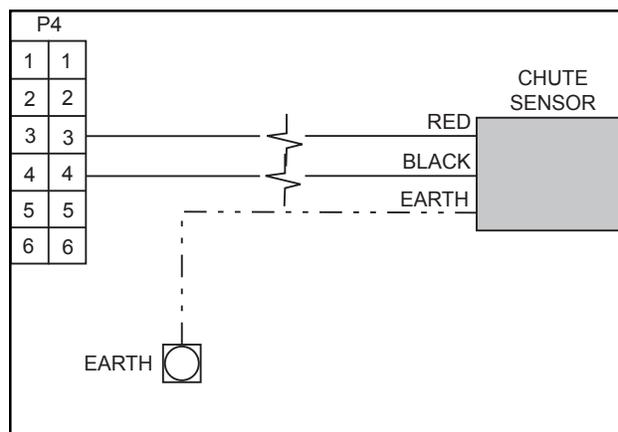
Figure 6.4 - Chute Sensor Harness

Select Switch Harness *(See Figure 6.5)*
- Supplies 5 VDC to select switches from position P7, pin 11
- Press select button and watch LED reset
- Signal from switch via N.O. terminal
- Check with ohm-meter

Vend Motor Harness *(See Figure 6.6)*
- Vend motor power supply - 24 VDC from pin 14 at position P8
- Neutral side is closed, cycles vend motor
- If vend motors to right do not vend, check black wire (24 VDC) from last working vend motor
- If one single motor does not work, check neutral

Door Switch / Options Harness *(See Figure 6.7)*
- Supplies 5 VDC from position P9 to door switch (pins 1 and 6) and to options harnesses (free-vend switch, no-vend switch, etc.)
- Door switch:
  1. Updates door status to control board (open / closed)
  2. Depress switch, check to see if LED resets
  3. Check wires at switch for correct positions
- Options switches:
  1. Allow free-vend, no-vend, etc.
  2. 5 VDC on pins 6 and pin for option switch (see wiring diagram)
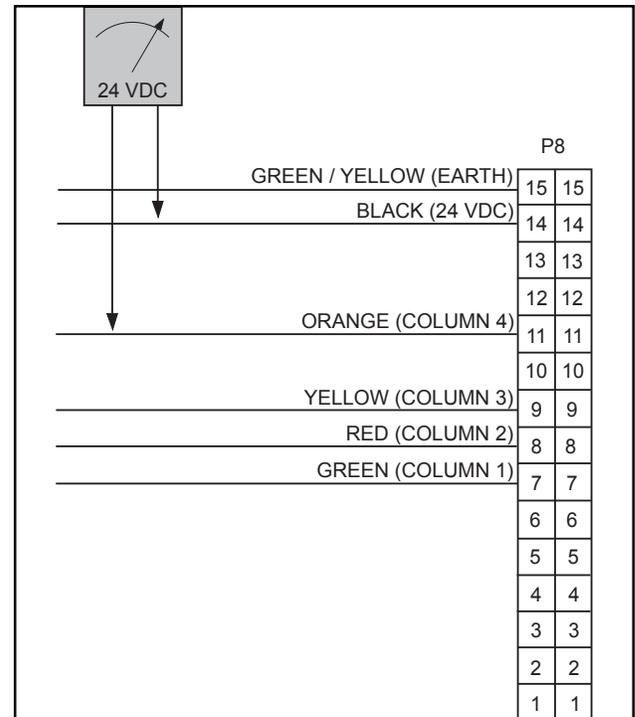
Figure 6.6 - Vend Motor Harness

Figure 6.5 - Select Switch Harness
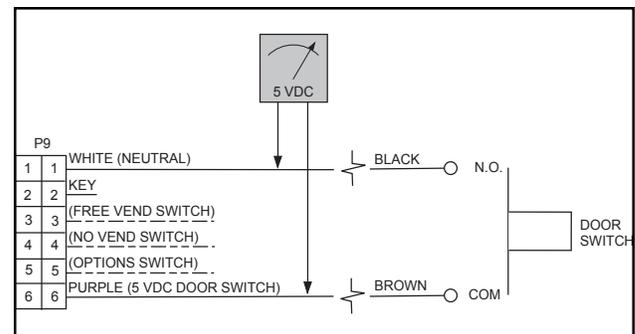
Figure 6.7 - Door Switch / Options Harness

DEX / UCS Harness *(See Figure 6.8)*
- Located at positions P10 (Internal) and P11 (External)
- Computer access point
- Internal: read / write anytime; standard item
- External: read anytime; can only write when door switch is open; optional item

Temperature Sensor Harness *(See Figure 6.9)*
- Supplies 5 VDC to temperature sensor from position P12, pins 1 and 4
- 5 VDC from pins 1 and 4
- <5 VDC return resistance across pins 1 and 2
- Set to display temperature on LED, compare to thermometer
- Temperature sensor mounted on rear of cabinet

Environmental Control (Refrigeration) Harness *(See Figure 6.10)*
- Supplies 24 VDC to refrigeration relay from position P14, pins 1 and 3
- Check for 24 VDC in relay test mode
- Harness also used for connections to evaporator fan relay, heater relay, and light relay
- Allows relay to energize and close contacts to complete 230 VAC hot circuit
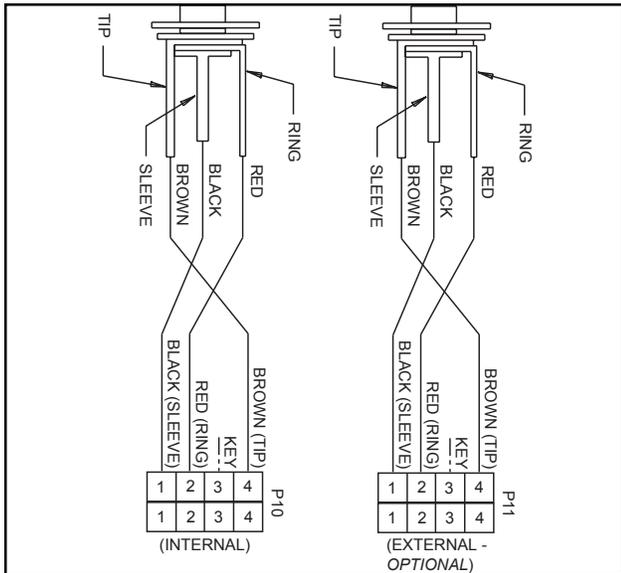
Figure 6.8 - DEX / UCS Harness
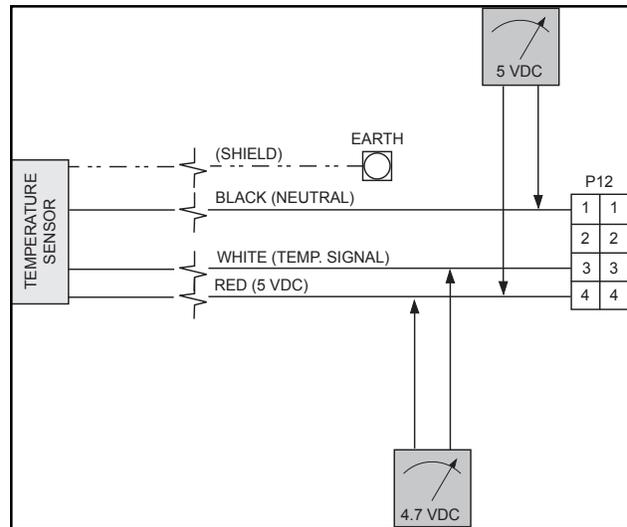
Figure 6.9 - Temperature Sensor Harness
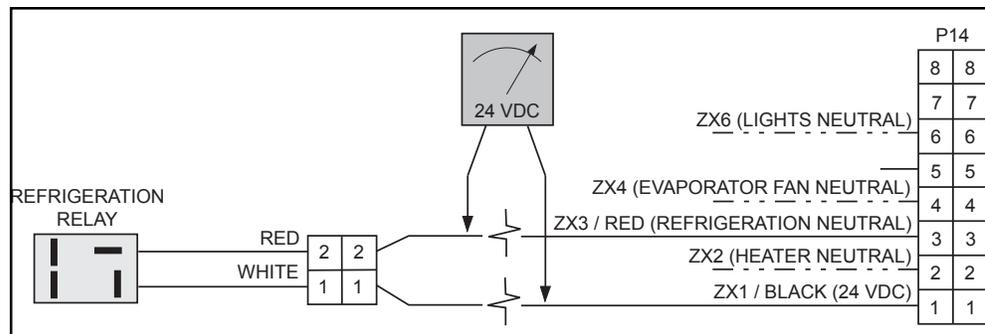
Figure 6.10 - Environmental Control Harness

Parts Catalogue
Control Board and Wiring
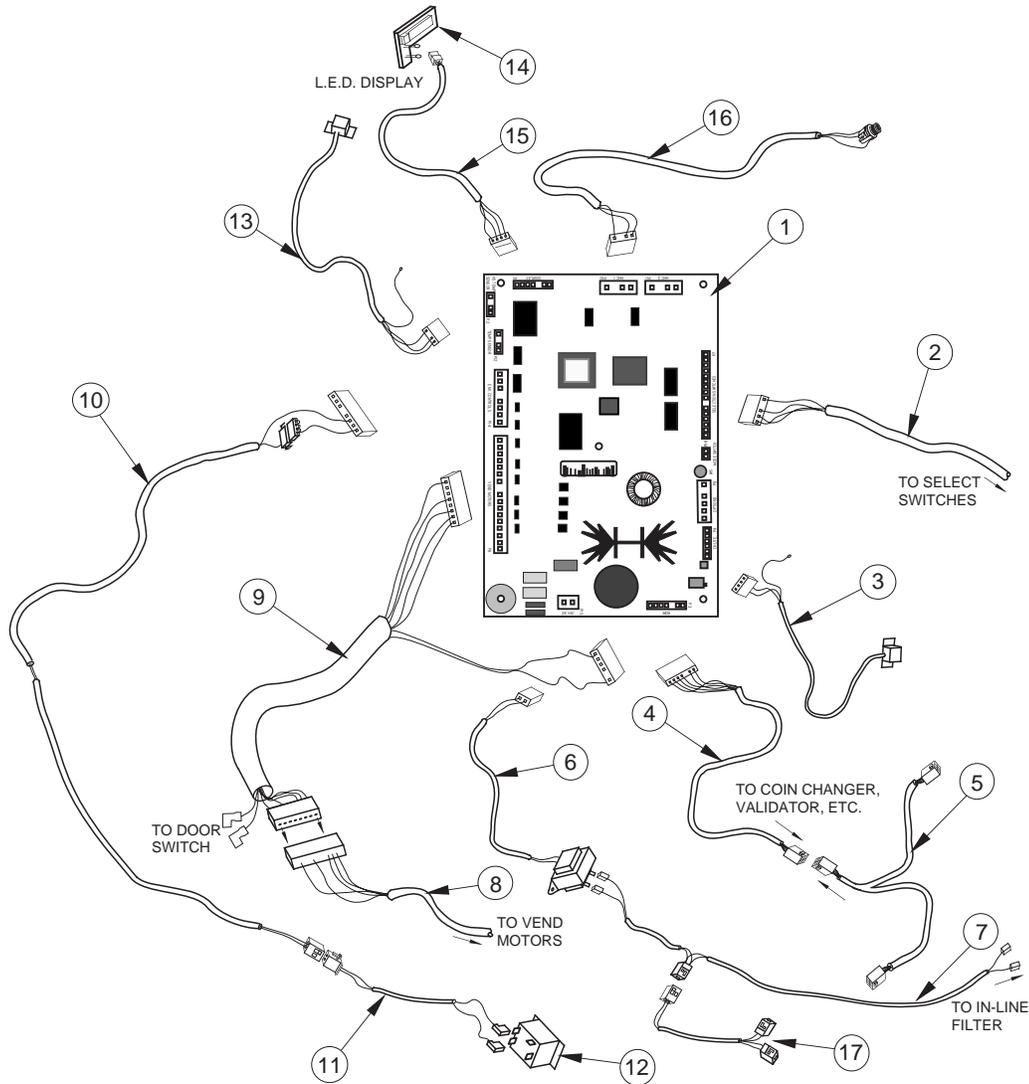
Item No.	Description	Part No.
1	Control Board, Merlin RB	836169
2	Select Harness, Merlin RB	842523
3	Chute Sensor, Door Side	836122
	- Cabinet Side	836121
4	Serial Changer Harness	842079
5	MDB Harness	842116
6	Transformer Assembly	842220
	- UK / Ireland / Aust. / NZ	842221
	Harness, Fuse /	
	Transformer to Board	842210
	Fuseholder Assembly IEC	842566
	- Fuse IEC	842567
7	230 VAC Line Voltage Harness	842590
8	Vend Motor Harness, Cabinet	842524

Item No.	Description	Part No.
9	Vend Motor / Door Switch	
	Harness, Door Side	842525
10	Refrigeration Control Relay	
	Harness, Door Side	842236
11	Refrigeration Control Relay	
	Harness, Cabinet Side	842332
12	Relay	836130
13	Temperature Sensor, Door Side	822047
	- Cabinet Side	822046
14	LED Display	836012
15	LED Display Harness	842081
16	Internal DEX Harness	842099
17	Ballast Line Harness RB IEC	842591

Door Rear
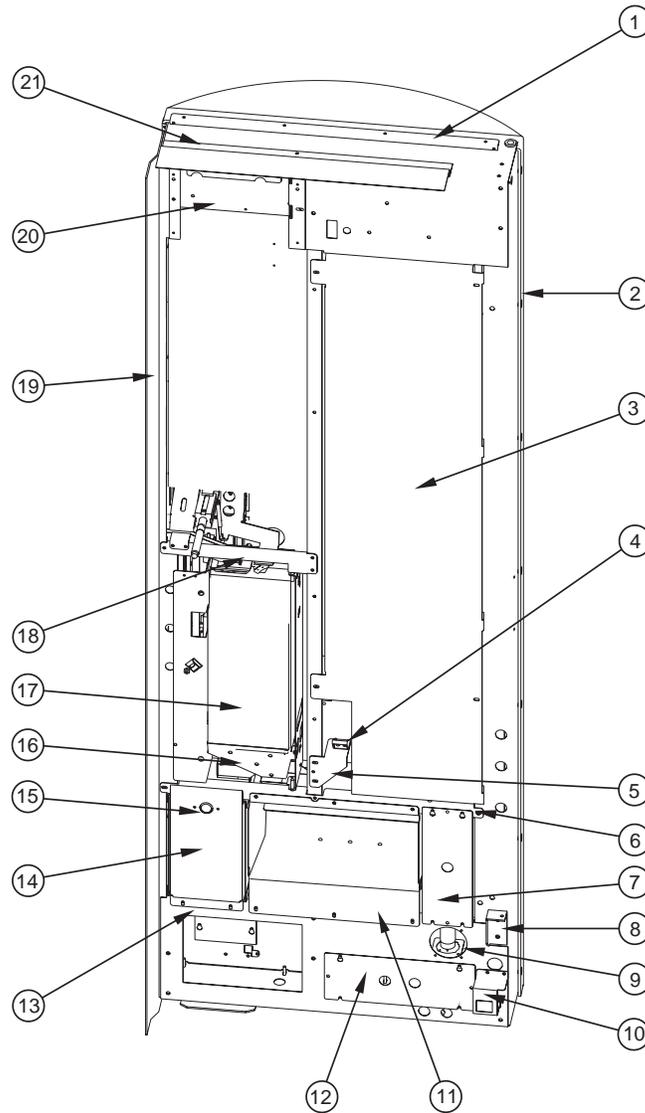
Item No.	Description	Part No.
1	Sign Retainer, Top / Bottom RB	354563
2	Sign Retainer, Left RB	354534
3	Rear Door Panel RB IEC	354573
4	Latch Strike, Burst Open Latch	912003
5	Bracket, Burst Open Latch RB	354543
6	Delivery Port Brace W/A RB	354557
7	Shield Port Side RB IEC	354574
8	Bottom Inner Door Hinge	010543
9	Lamp Socket Bracket RB IEC	354571
	- Lamp Socket	842578
10	Door Switch Mounting Bracket	296502
11	Delivery Port W/A RB	354553
12	Shield Bottom Door RB IEC	354575
13	Coin Box Housing RB	354515

Item No.	Description	Part No.
14	Coin Box RB	354516
15	Cash Box Lock	812195
16	Coin Hopper RB	354529
17	Changer Door Assembly RB	354540
18	Select Panel Brace W/A RB	354556
19	Right Vandal Panel 72"	011501
20	S/A Control Board Housing	325541
21	Rain Guard RB	354518
•	Ballast 230 VAC	838041
•	Lamp, 24" / 61 cm	841035
•	Lamp, 48" / 122 cm	841027
•	Wide Port Anti-theft Plate	263505
•	Brace Lamp Socket Bracket	354572

Security Plate Assembly
354520
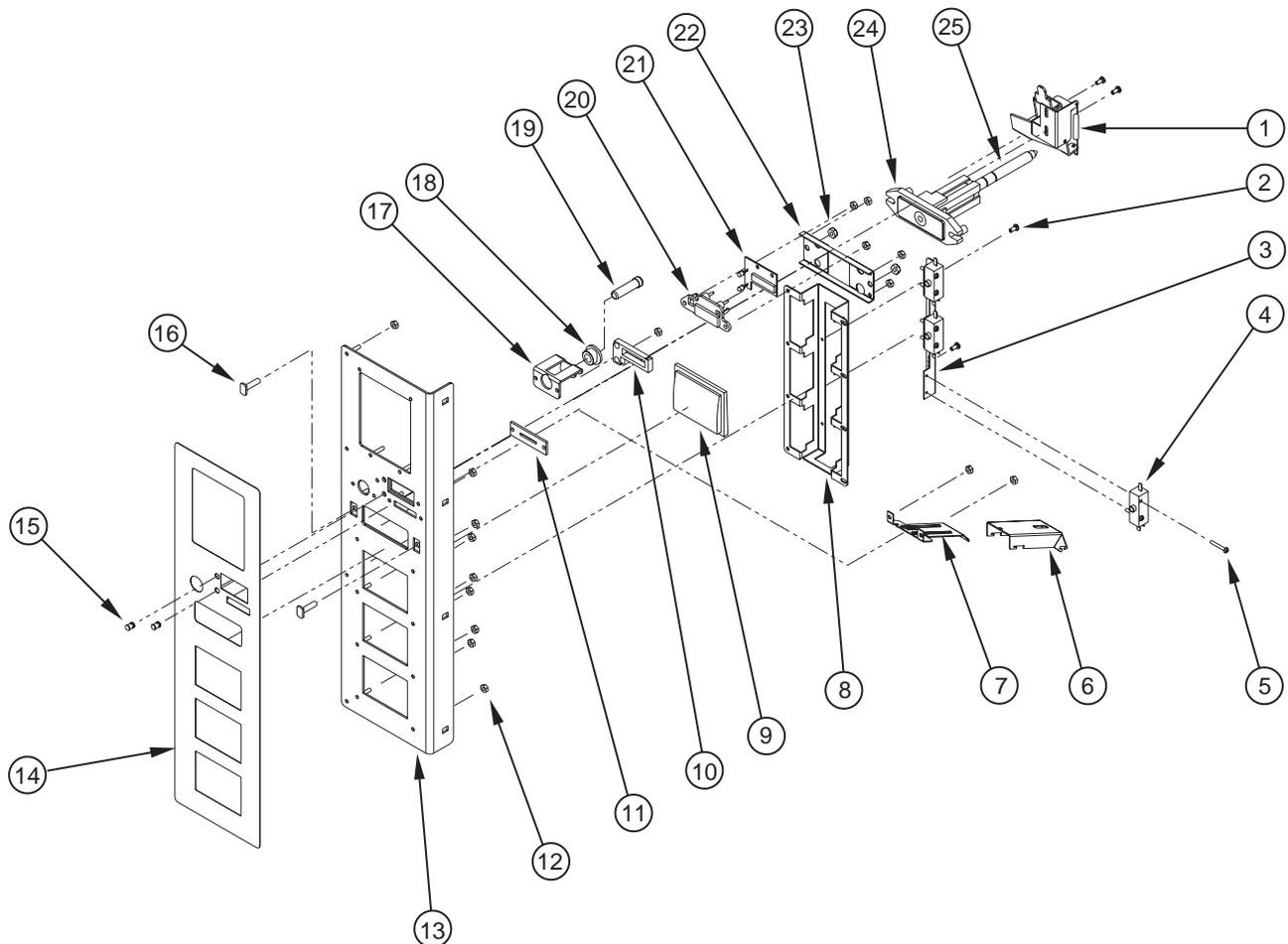
Item No.	Description	Part No.
1	Coin Return Lever Assembly	354550
2	Screw #8-32 x 3/8"	901011
3	Select Button Angle RB	354508
4	Select Button Switch	835012
5	Screw #6-32 x 1" T-form	901086
6	Coin Chute Cover RB	354539
7	Coin Chute RB	354538
8	Select Button Channel RB	354507
9	Select Button RB	816141
10	LED Shroud	929031
11	Coin Plate RB	354523
12	Keps Nut #8-32	905001
13	Security Plate W/A RB	354530

Item No.	Description	Part No.
14	Security Plate Decal (English)	831608
15	LED Lens	916032
16	1/4-20 x 1" T-bolt	901037
17	Bushing Retainer	337556
18	Coin Return Bushing	803059
19	Coin Return Button	803031
20	LED Window	815121
21	LED Display	836012
22	T-handle Brace	337583
23	Keps Nut 1/4-20	905002
24	T-handle Housing	812190
25	T-handle Assembly	812176

Vend Mechanism Assembly
354700
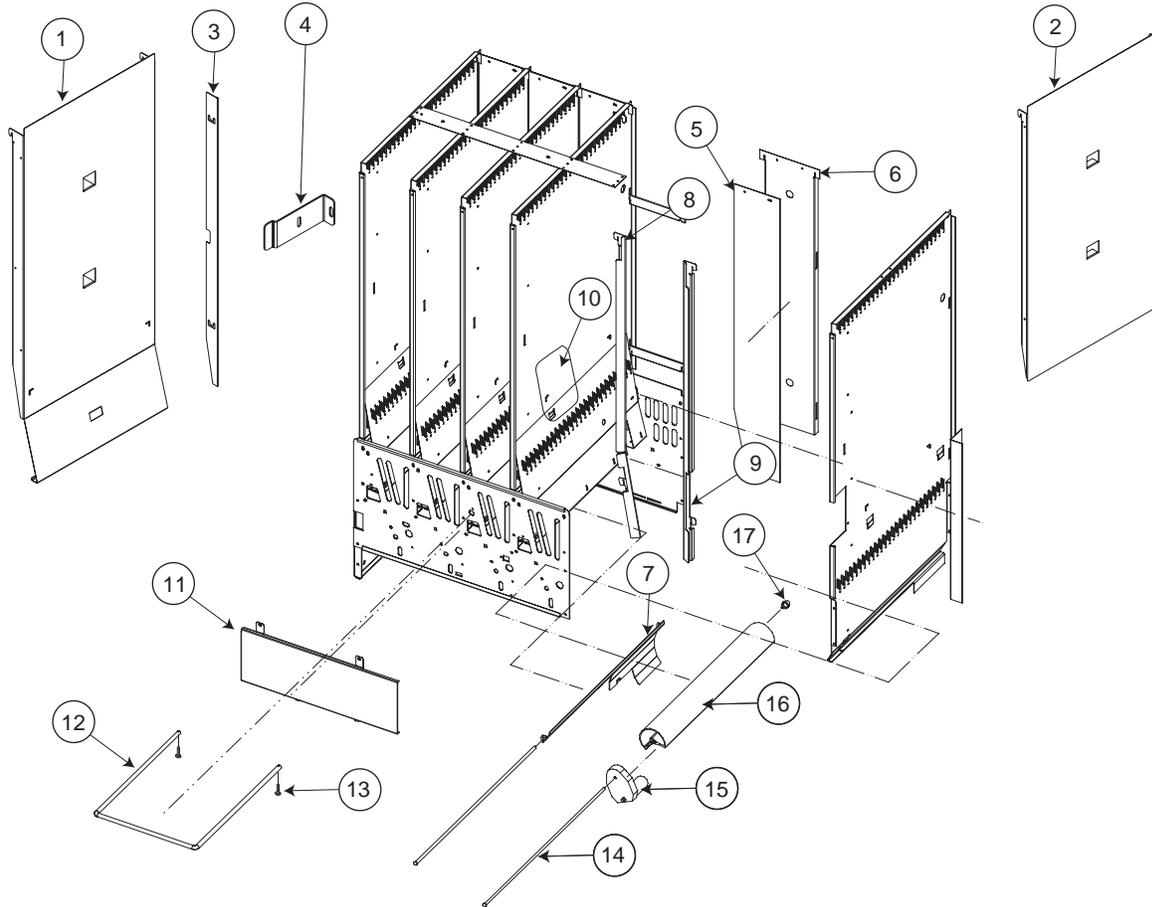
Item No.	Description	Part No.
1	250 mL Wide Column Filler (column 4 only)	354707
2	Column Filler (columns 1-3)	354708
3	250 mL Retainer (column 4 only)	324722
4	Lock Strap (column 4 only)	354710
5	Stack Back Plate Cover, columns 1-3	354706
	- Stack Back Plate Cover, column 4	815355
6	Stack Back Plate, columns 1-3	354705
	- Stack Back Plate, column 4 only	324708
7	Product Stop, columns 1-3	354724
	- column 4	324718
8	Left Product Retainer (columns 1-3)	354709
9	Right Product Retainer (column 1 only)	324712
10	Anti-friction Sheet	915197
11	Harness Cover RB	354703
12	Case Support	811067
13	Self Drilling Screw	902004
14	Rotor Rod	803052
15	Vend Motor	839032
16	Rotor	813026
17	Rotor Bearing	915222
•	Vend Motor Assembly (includes items 15-17)	324730

Inner Door Assembly
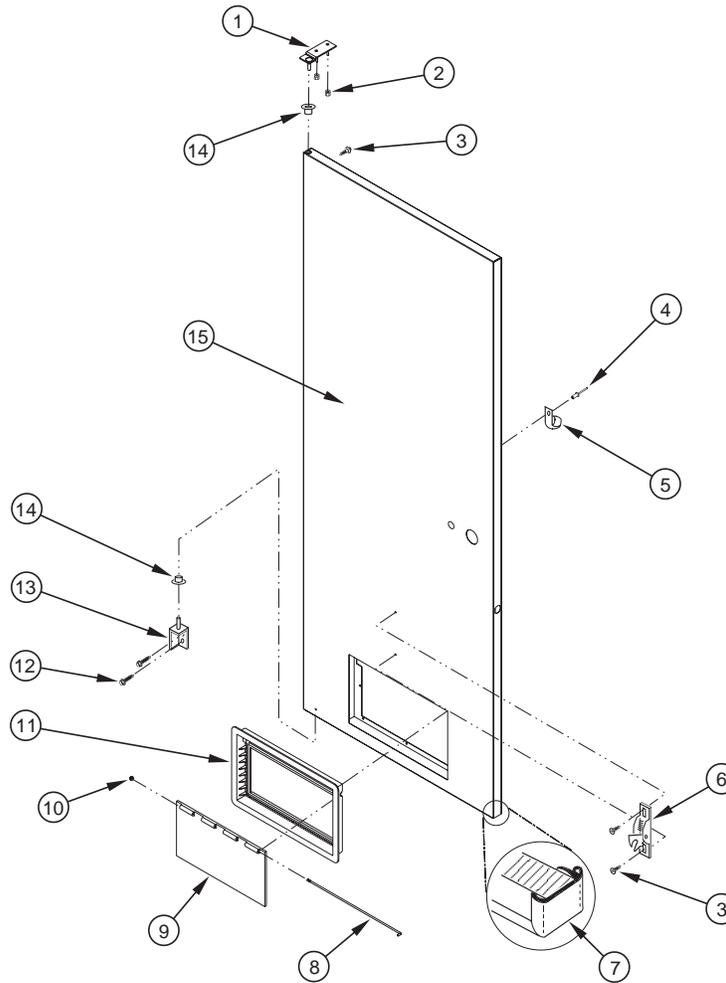
Item No.	Description	Part No.
1	Top Inner Door Hinge W/A	010520
2	Keps Nut #8-32	905001
3	Self Drilling Screw	902001
4	Rivet, 1/8"	908002
5	Cable Clamp, 1"	916004
6	Burst Open Latch	812002
7	Inner Door Gasket RB	815567
8	Port Door Rod	811028
9	Port Door	815192
10	Elastic Stop Nut	905006
11	Port Door Frame	815191
12	Screw, 1/4-20 x 1" with Serrations	901003
13	Bottom Inner Door Hinge	010550
14	Inner Door Bushing	815026
15	Inner Door Assembly	354610
•	Loading Label RB (English)	931610
•	Controller Instruction Label RB (English)	931611
•	Interconnect Label RB IEC	931696
•	Inner Door Lock with Key	812055

Refrigeration Section
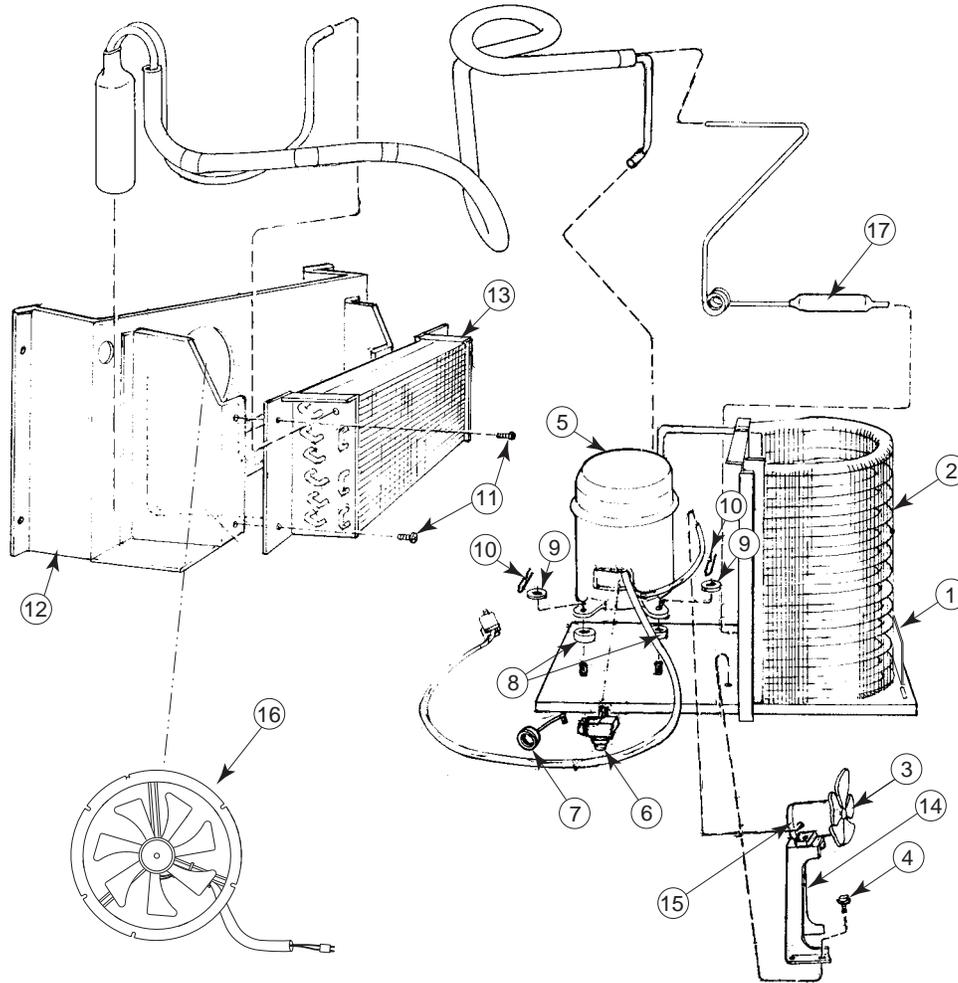
Item No.	Description	Part No.
1	Refrigeration Unit RB IEC	354430
2	Condensor	820008
3	Condensor Fan Blade	810014
4	Sems Screw, 8-32 x 1/2"	901006
5	Compressor 230 VAC 50 Hz	819030
6	Compressor Relay	822062
7	Overload	822010
8	Compressor Grommet	916015
9	Grommet Plug	815017
10	Compressor Spring Clip	914002
11	Self-drilling Screw	902004
12	Evaporator Fan Housing Assembly RB	354410
13	Evaporator RB	820011
14	Condensor Fan Motor Bracket	296403
15	Condensor Fan Motor 230 VAC 50 Hz	839019
16	SmartFan Evaporator Fan Motor Assembly 230 VAC 50 Hz	337050
17	Drier	824011
•	U-clip	906007

Door Front
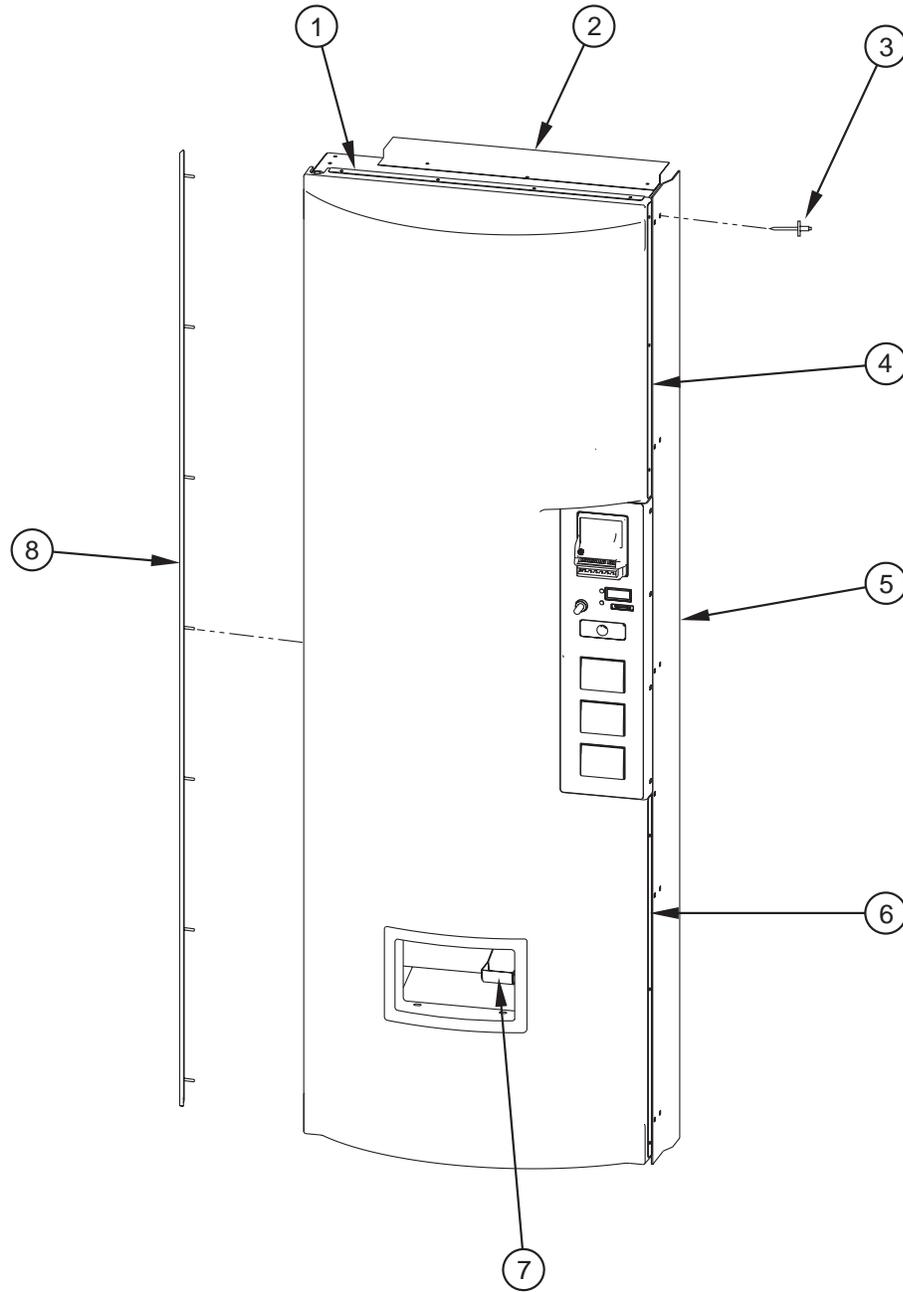
Item No.	Description	Part No.
1	Sign Retainer, Top / Bottom RB	354563
2	Rain Guard RB	354518
3	Pop Rivet, 1/4" x 0.620"	908018
4	Sign Retainer, Top Right RB	354561
5	Right Vandal Panel 72"	011501
6	Sign Retainer, Bottom Right RB	354562
7	Coin Cup RB	354525
8	Sign Retainer, Left RB	354560
•	Lock Cover Assembly	354110
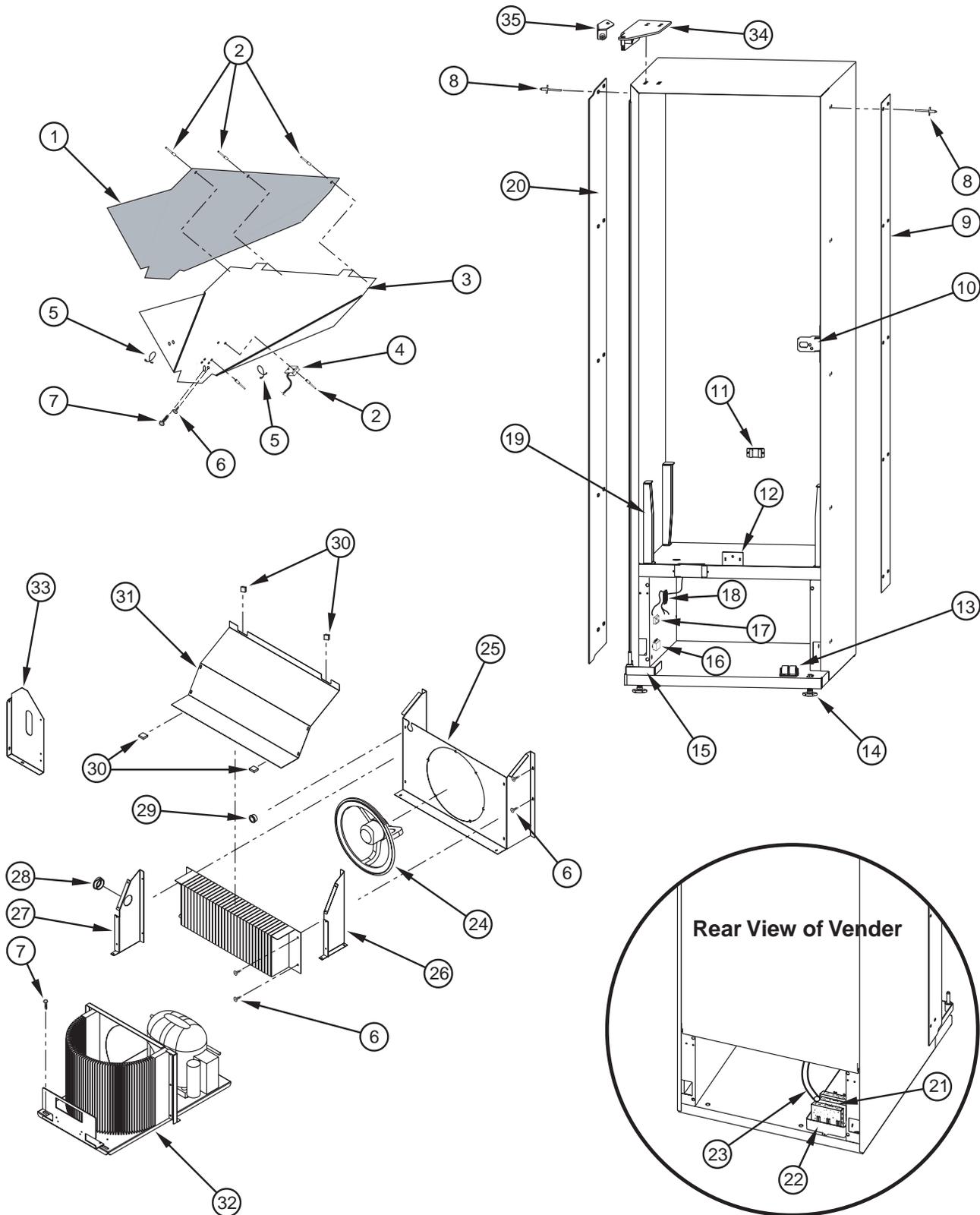
Miscellaneous Parts

Miscellaneous Parts

Item No.	Description	Part No.
1	Product Chute Liner RB	815568
2	Pop Rivet, 1/8" x 0.256"	908004
3	Product Chute RB	354002
4	Chute Sensor	836004
5	Tension Clips	916059
6	Self-drilling screw	902004
7	Screw, 1/4-20 x 1" with Serrations	901003
8	Pop Rivet, 1/4" x 0.620"	908018
9	Right Vandal Panel 72"	011501
10	Latch Strike	281002
11	Temperature Sensor Bracket	810085
12	Product Chute Tie Bracket	010017
13	Door Lifter Bracket with Rollers	815030
14	Levelling Leg	803002
15	Bottom Hinge W/A	010082
16	EMI Filter	842061
17	Refrigeration Relay	836130
18	Main Wiring Harness (to power point), Continental Europe (Schuko)	842532
	- Australia / New Zealand / Argentina	842568
	- United Kingdom / Ireland / Gibraltar / Hong Kong / Singapore / Malaysia	842584
19	Rack Support	281001
20	Left Vandal Panel 72"	142022
21	Sponge	815037
22	Condensate Pan	815368
23	Drain Tube	815134
24	SmartFan Evaporator Fan Motor Assembly 230 VAC 50 Hz	337050
•	Evaporator Fan Housing Assembly (includes 25 - 31 and hardware listed below)	354410
25	Evaporator Fan Housing	354411
26	Evaporator Bracket, Right RB	354402
27	Evaporator Bracket, Left RB	354403
28	Bushing, 1 3/8"	916003
29	Bushing, 0.625" ID	906048
30	U-clamp	906007
31	Evaporator Fan Shroud Cover RB	354401
32	Refrigeration System RB IEC	354430
33	Condensor Baffle RB	354404
34	Universal Top Hinge Assembly	810075
35	Door Stop Assembly RB	354567
•	Screw, #8 x 3/4" (for mounting SmartFan)	902022
•	Expansion Nut, #8 (for mounting SmartFan)	906054

MerlinRB

WIRING SCHEMATIC
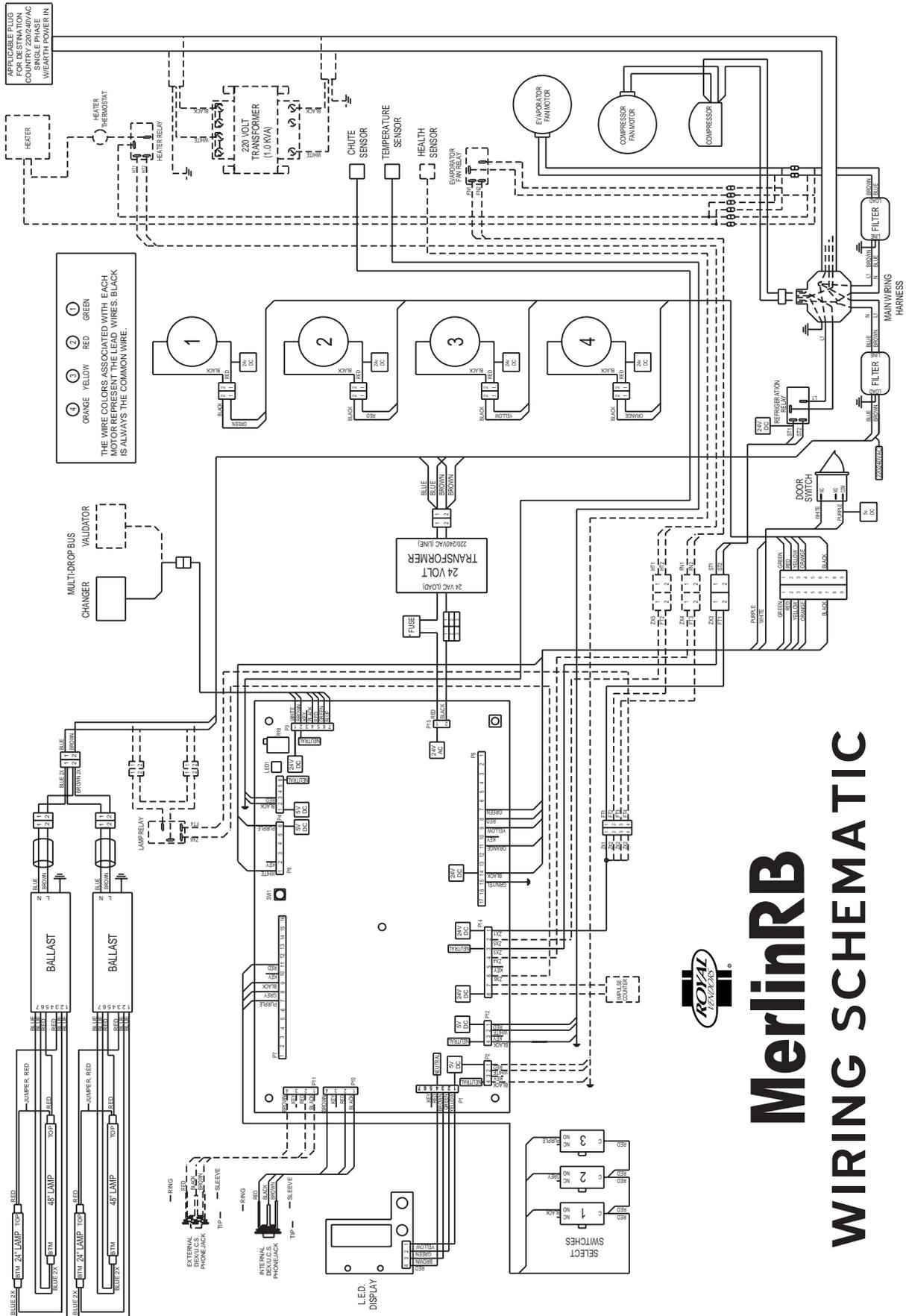
Printed in the
United States of America

Imprimé aux
Etats-Unis d'Amérique