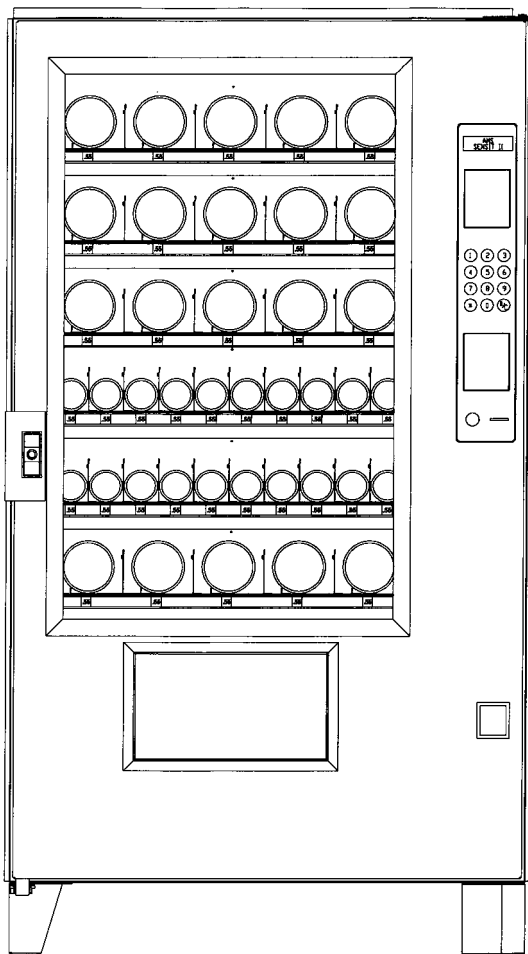




## SENSIT 3 OPERATION AND SERVICE MANUAL



**Glass Front Merchandiser**

**Model AMS 39 VRM**

**Outdoor Merchandiser**

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**PUBLICATION NOTICE**

L0086, Revision H, ECN 2436, 07/30/10

It is our intent to assist our customers with up-to-date documentation; however, this manual may not contain all updates and is subject to revision without notice. Please contact our Service Department with your requests or comments.



## 1.0 INTRODUCTION

Congratulations on the purchase of your new AMS Sensit 3 39-VRM merchandiser. The VRM is a versatile, high-capacity vending machine. The VRM is designed, tested, and built to provide years of reliable, low-maintenance service in both indoor and outdoor environments. A fully insulated cabinet, DEX data capability, and flexible product configuration are just some of the many standard features built into every AMS merchandiser.

### 1.1 SENSIT 3 SYSTEM

Your merchandiser is equipped with the Sensit 3 system. The Sensit 3 system is a patented vend-sensing system that detects when products fall into the delivery bin. Basically, a plane of infra-red light beams is created across the top of the delivery bin, and the Sensit 3 system can detect when any part of the light has been blocked by a passing product. Using this technology, the merchandiser “knows” when your customer gets the product. The Sensit 3 system has several important benefits:

#### 1.1.1 Guaranteed Delivery

If, after one revolution, the product hangs up or an opening was missed in loading, the helix will rotate two additional partial turns to make sure the product is delivered. No more hitting or shaking the merchandiser to get products that did not fall!

#### 1.1.2 Instant Refund

If the customer does not receive a product, he can receive a full refund by pressing the coin return, or he can select another product. No more refund requests!

#### 1.1.3 Automatic Helix Adjustment

With the Sensit 3 system, the helix stops as soon as the product falls, or when the helix returns to the home position. Different packages can be loaded in the same column. No more double vending!

#### 1.1.4 Additional Benefits:

1. Opening the delivery bin door will not affect the Sensit 3 system. The sensors are located above the delivery bin and will not be blocked by the door. Product that falls while the door is open will still pass through the beam.
2. Shining a light at the detector will not allow vandals to receive free product. Any tampering which changes the precise amount of light normally received will be treated as a successful vend, resulting in the vandal losing his money.
3. Disabling or blocking the sensor will not allow vandals to receive free product. The Sensit 3 system must be transmitting the normal

amount of light before the merchandiser will dispense any product.

3. On a humid day opening the door of a cold merchandiser may cause some condensation to form inside. The Sensit 3 system will not allow vending until this fogging clears, normally within a few minutes of closing the door.

### 1.2 MODEL IDENTIFICATION

When requesting service, replacement parts or technical assistance, please refer to the Vendor Serial Plate (Refer to Figure 1.1). It is attached inside the door near the upper right corner of the window and is visible from the outside. The information contained on this plate is necessary to determine what parts, kits, or maintenance should be applied to your specific model.

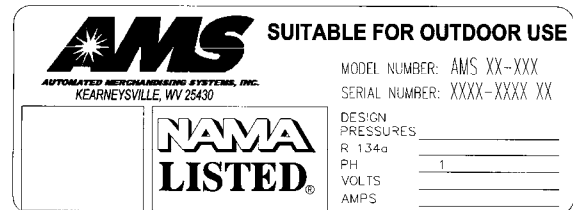
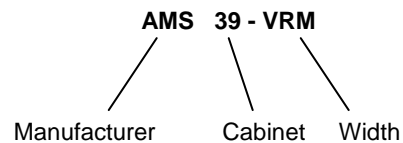


Figure 1.1 Vendor Serial Plate

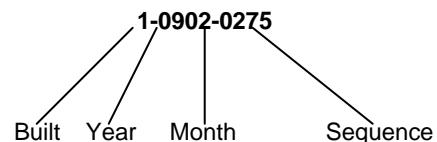
#### 1.2.1 Model Number Breakdown

(Refer to Figure 1.1)



#### 1.2.2 Serial Numbering System

(Refer to Figure 1.1)



Starting January 1, 2009, a new merchandiser serial number system went into affect as follows:

The first digit identifies where a merchandiser was manufactured. Those merchandisers built in the U.S. start with the number 1. Those merchandisers built in Mexico start with the number 2.

The next two digits identify the year of manufacture. These numbers are 09 (for 2009) and so forth.

The next two digits identify the month. The first month of the year is **01** and the last month is **12**.

The last four digits identify the number assigned to each merchandiser during assembly.

Numbering starts with **0000** and continues through **9999**, whereupon these four digits start over.

An example of the numbering system in use is as follows:

**1-0902-1156**

This merchandiser was manufactured at the Kearneysville, W.V. plant in 2009, in February, and was the 1156<sup>th</sup> merchandiser manufactured.

### 1.3 SPECIFICATIONS

#### 1.3.1 Operating Environment

The AMS Model 39-VRM Merchandiser is designed for indoor or outdoor use.

#### 1.3.2 Cabinet Physical Dimensions:

(Refer to Figure 1.2)

39"W x 72"H x 36"D (99 cm x 183 cm x 91 cm)

#### 1.3.3 Cabinet Weight:

Approx. 750 lbs. (340 kg)

#### 1.3.4 Unit Capacity:

1440 units max. /

150 units min.

(Depending on configuration: Refer to Section 4.2.4)

#### 1.3.5 Power Requirements:

United States,

Canada and Mexico: 115 VAC, 60 Hz  
10.8 amps

International:

230 VAC, 50/60 Hz  
5.4 amps

#### 1.3.6 Refrigeration Specification:

½ HP, R-134a, 10 oz. (.28 kg)

#### 1.3.7 Coin Mechanisms and Bill Validators

AMS merchandisers will support all NAMA-approved Multi-Drop Bus (MDB) coin mechanisms, bill validators and card readers. Where applicable, it will also support the "Executive Mechanism" Coin Changer.



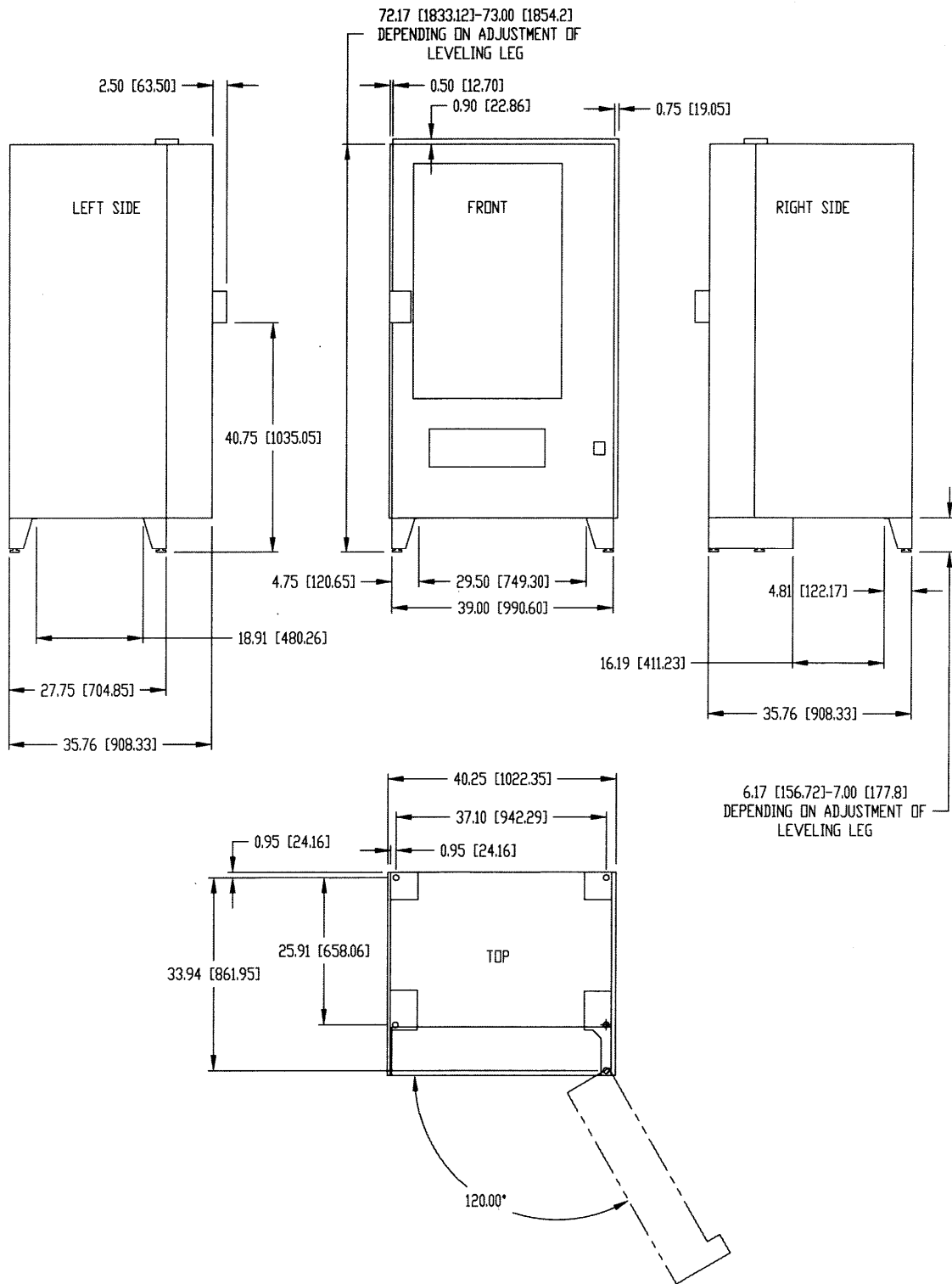


Figure 1.2 AMS 39-VRM Cabinet Dimensions (Inches[mm])

**1.3.8 Merchandiser Configurations**

10		12		15		15		15	
12		12		15		15		15	
15	15	15	15	15	24	24	24	24	24
18	18	18	18	18	18	18	18	18	18
18	18	18	18	18	18	18	18	18	18
12		12		12		12		12	

Figure 1.4 Example Configuration

The above drawing shows a configuration used in an AMS 35 model merchandiser.

The top tray in the above example contains 5 columns, formed by the placement of dividers, with motors and large diameter helices in place.

The pitch of the helices (the number of slots for loading product) is given by the number. The size of the square indicates the diameter of the helix (small or large).

All of the topmost tray helices shown above are of large diameter, and are of 10, 12 and 15 pitch. The configuration on this tray can hold  $10+12+15+15+15 = 67$  products.

All trays can be configured in this or another configuration, depending on the products being vended.

Products which fit in the 10 pitch helix may be too large to fit in the 15 pitch helix. The product must be free to be pushed out of the column by the helix and fall into the hopper.

The fifth tray down as shown in the above example contains ten columns with small diameter helices. The pitch is 18 for each column, so the configuration on this tray can hold  $18 \times 10 = 180$  products.

A good working configuration is one column with a given helix (or dual helices) which easily vends a given product. A record of working product configurations, as shown in the example diagram, will greatly speed up new set-ups or conversions.

With Sensit 3, extra wide product can be vended using the following coupled motor feature.

1. With dividers form a column wide enough for the product. When viewed from the front of the tray, install a clockwise (CW) motor and helix on the right side of the column, and a counter-clockwise (CCW) motor and helix on the left side of the column. Note that all normal or standard motors and helices turn CCW to vend product.
2. The motors can be any distance apart. The helices must be of the same pitch.
3. Using the configuration menu, couple the two motors together. Refer to Section 6.7.7.
4. Install the product into the two helices. Change the selection and price on the tray.

When this product is selected, the two helices will turn at the same rate to vend the product.

**1.3.9 Patent Disclosure**

This merchandiser and/or certain of its components are covered by one or more of the following U.S. and International patents;

U.S.	6,041,962
	6,145,699
	6,202,888
	6,384,402
	6,520,373
	6,708,079
	6,794,634
	7,191,915
	7,343,220
	7,446,302
	7,742,837
Canada	2,329,314
Mexico	230714

## 2.0 SAFETY

### 2.1 COMMITMENT TO SAFETY

Automated Merchandising Systems Inc. is committed to designing and producing a safe product. As with all electrical or mechanical pieces of equipment, potential hazards exist. It is the intent of Automated Merchandising Systems, through this manual and service technician training, to alert individuals who will be servicing our equipment to these potential hazards, and to provide basic safety guidelines.

To reduce the risk of serious injury or death, please read and follow all warnings in this manual. It is important that we point out that these warnings are not comprehensive. Automated Merchandising Systems can not possibly anticipate all of the ways that service may be conducted, nor all of the possible safety hazards that may result from service. Therefore at all times we urge you to beware of hazards such as electrical shock, mechanical entrapment, and tipping a merchandiser during movement.

Automated Merchandising Systems strongly recommends a commitment to safety on the part of all servicing personnel or organizations. Only personnel properly trained in vendor servicing should attempt any service to the internal components of the merchandiser. It is important to point out that Automated Merchandising Systems has no control over the merchandiser once it leaves our factory. **Maintaining the merchandiser in a safe condition is the sole responsibility of the owner.**

If you have questions concerning safety or service, or would like more information, please contact the Automated Merchandising Systems Service Department at 304-725-6921 or e-mail info@amsvendors.com.

### 2.2 SAFETY PRECAUTIONS

Below are listed safety precautions and safe practices to follow to avoid injury from selected hazards. This list can not possibly cover all hazards, therefore please remember to **THINK SAFETY FIRST**.

#### 2.2.1 High Voltage Contact

Each merchandiser is designed to operate on a specific voltage, either single phase 115VAC 60Hz or 220-240VAC 50-60Hz, depending on the country. The voltage is specified on the serial plate (Refer to Section 1.2 Model Identification). High voltage areas include the electrical panel, the refrigeration unit and fans, and the fluorescent lamp. It is important to understand that contact with the high voltage wiring can result in injury or death.

1. Always test the outlet for proper voltage, polarity and grounding before plugging in the merchandiser.
2. Always disconnect power to the merchandiser before servicing. Allow only fully trained service technicians to service the merchandiser if service must be performed with the power on.
3. Always keep electrical connections dry. Do not place the merchandiser in or near standing water.
4. Never use a worn or damaged power cord.

#### 2.2.2 Grounding

Some electrical components have a green or green/yellow ground wire attached to a grounding point in

the merchandiser. If it becomes necessary to remove a ground wire during service, note how the wire is attached, including the locations of any washers. After servicing, make sure that the wires and washers are replaced exactly as they were. Note that the merchandiser may appear to work normally without the ground wires, but there will be a potential shock hazard from ungrounded components.

1. Always test the outlet for proper grounding before plugging in the merchandiser.
2. Always reconnect ground wires after servicing.
3. Test the ground fault circuit interrupter (GFCI) periodically to insure proper operation.

#### 2.2.3 Fan Contact

Some merchandisers are equipped with electric fans, which can start automatically. These fans are guarded to prevent accidental contact. However, removal of guards or other components can leave fan blades exposed and create a physical hazard.

1. Always disconnect power to the merchandiser before servicing.
2. Always wear hand and eye protection when servicing the merchandiser.
3. Always keep hands, hair, loose clothing and tools away from fan blades.
4. Never insert hands or tools into concealed areas.
5. Always replace protective covers after service.

#### 2.2.4 Helix Motion and Jamming

Energized vend motors can turn a helix with considerable torque, creating a possible entrapment hazard. Also, turning helices may eject tools or other objects left on trays. A helix that is jammed or caught can store energy as it binds, which can cause it to twist or spring outward suddenly even if power is disconnected. Use gloves and caution when freeing a jammed helix.

1. Always disconnect power to the merchandiser or control board before servicing the vend motors.
2. Always check for proper fit when loading products in helices to avoid jamming.
3. Always restrain the helix before freeing a jammed or caught helix.
4. Always wear hand and eye protection when servicing the merchandiser.
5. Always keep hands, hair, loose clothing and tools away from moving parts.

#### 2.2.5 Refrigerant Release

The refrigeration system is pressurized and sealed at the factory. Puncturing or cutting any component in the system will cause refrigerant gas and liquid to be propelled out of the system, creating an immediate physical hazard. Use caution to avoid accidentally opening the refrigerant system.

It should also be noted that releasing refrigerant to the atmosphere is a federal crime and is punishable by law. Any service work requiring the system to be opened must be performed by a licensed technician using

certified recovery equipment. Unauthorized service to the sealed refrigerant system will void the warranty.

1. Never puncture or cut any component in the refrigeration system.
2. Always use licensed service technicians to service the refrigeration system.
3. Always wear hand and eye protection when servicing the merchandiser.

### 2.2.6 Vendor Tipping

The empty weight of the merchandiser is approximately 750 pounds (340 kg). A falling merchandiser can cause serious injury or death. Caution should always be taken to avoid dropping or tipping a merchandiser.

1. Never rock or tip the merchandiser. It must be kept horizontal for safe operation.
2. Never place the merchandiser in an inclined position, such as on a ramp or with all the legs not on the same horizontal surface.
3. Never place the merchandiser in a moving environment such as on a ship without properly securing it in place.
4. Never place the merchandiser in a location where it may be struck by a vehicle.
5. Never transport an unsecured merchandiser, or a merchandiser still containing product.
6. Never attempt to lift or move the merchandiser by hand. Always use equipment with the proper load rating. Note that the Specification weight listed is empty weight.

### 2.2.7 Other Improper Conditions

Hazardous conditions can be created by improper use or service of the merchandiser.

**WARNING:** Do not use electrical appliances inside the merchandiser unless recommended by AMS.

1. Always reinstall any parts removed during service to their original locations.
2. Never make unauthorized modifications to any part of the merchandiser.
3. Always replace components that are worn, broken, or otherwise unfit for use.

4. Never use unauthorized parts, or use parts for anything other than their intended application.

### 2.2.8 Ground Fault Circuit Interrupter

This merchandiser is equipped with a Ground Fault Circuit Interrupter (GFCI), in compliance with ANSI/UL 751 and 451, and is in compliance with UL 943.

### 2.3 TEST STANDARDS

AMS vending machines bearing the ETL mark have been tested and comply with one of the following standards:

#### 2.3.1 ANSI/UL 541

Standard for Refrigerated Vending Machines ANSI/UL 541 and the Standard for Refrigeration Equipment, CAN/CSA C22.2 No. 120

#### 2.3.2 ANSI/UL 751

Standard for Safety for Vending Machines ANSI/UL 751 and the Standard for Vending Machines, Consumer and Commercial Products (CAN/CSA C22.2 No. 128)

#### 2.3.3 Additional Standards

Certain models comply with the following:

2.3.3.1 European Union  
European Economic Area  
CE (European Conformity)

2.3.3.2 2007 Appliance Efficiency  
Regulations  
CEC-400-2007-016-REV1

2.3.3.3 Natural Resources Canada (NRCan)  
Energy Efficiency Regulations, OEE

2.3.3.4 Americans with Disabilities Act  
Refer to Section 4.3.2.

## 3.0 VENDOR SYSTEMS AND COMPONENTS

### 3.1 SENSIT 3 SYSTEM THEORY OF OPERATION

1. The Sensit 3 system is comprised of three elements; the primary sensor, the secondary sensor, and the control logic. The primary and secondary sensors are attached to opposite ends of the hopper, and infrared light is passed between them. The primary sensor, the secondary sensor and the control board controls the performance of the vending operation.
2. When a selection is made, the vend motor will begin to run. After several seconds, if no product falls in the hopper, the motor will be stopped, the credit will be maintained and the customer will be directed to "PLEASE MAKE ANOTHER SELECTION."
3. When the controller measures a variation in the light intensity during the vend cycle, it recognizes that a product has fallen through the light into the hopper. The controller stops the vend motor and removes the credit.
4. When the merchandiser is serviced with the door open, the protective lens on the sensors can become fogged up, particularly in humid locations. In these cases, the merchandiser will display "SENSIT BLOCKED – UNABLE TO VEND" until the fogging has cleared, usually within a minute after closing the door.

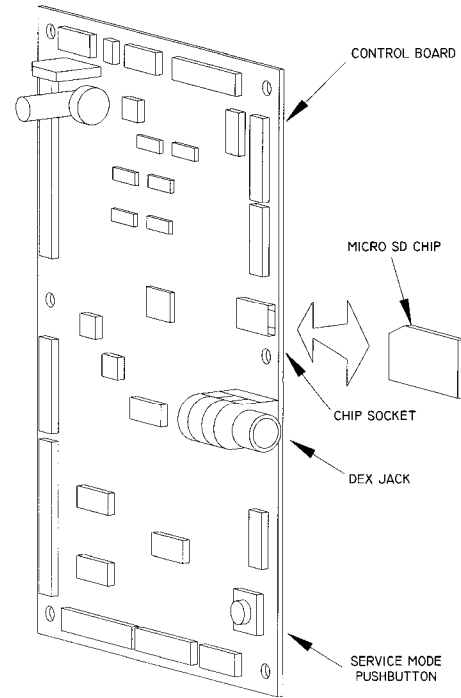


Figure 3.1 Control Board Components

### 3.2 CONTROL BOARD

The control board controls and monitors the merchandiser, DEX, and the mode switch used to enter service mode. The control board is located in the upper left hand corner of the open cabinet door, behind an access door.

#### 3.2.1 Upgrading Software

The software can be upgraded by using the SD chip. Note that all settings such as pricing and motor configuration will be saved. Refer to Section 8.1.

#### 3.2.2 Mode Switch

Pressing the mode switch (Refer to Figure 3.1) allows the user to get in to the computer's service mode to change settings, access vend data, and check error codes for troubleshooting. Data is displayed on the front display panel, and changes entered using the keypad. Pressing the switch again or closing the door will return the merchandiser to vend mode.

#### 3.2.3 DEX Jack

The DEX jack (Refer to Figure 3.1) is provided for use with external features, such as Speech (Refer to Section 6.9.5). Data collection with third party devices can also be made.

### 3.3 VEND SENSOR

#### 3.3.1 Primary Sensor

The primary sensor is located on the left of the hopper when viewing the back of the door. The sensor, inside a protective housing, sends light to and receives light from the secondary sensor (both sensors operate the same way in this regard). It contains circuitry to send a signal to the control board. When a product drops through the beam, it causes a change which is interpreted by the control as a successful vend. The primary sensor board also contains circuitry to connect to the secondary sensor, and to connect the temperature sensor to the control board. When servicing the primary board, be mindful of the emitters and detectors. These can be damaged by rough handling.

#### 3.3.2 Secondary Sensor

The secondary sensor, inside a protective housing, is located on the right side of the hopper when viewing the back of the door. The sensor sends light to and receives light from the secondary sensor (both sensors operate the same way in this regard). When servicing the secondary board, be mindful of the emitters and detectors, which can be damaged by rough handling.

### 3.4 DOOR

#### 3.4.1 Validator & Debit Card Reader Locations

There are two locations that will accept bill validators and/or debit card readers (Refer to Section 4.2.2). The lower position meets the guidelines of the Americans with Disabilities Act (ADA) for access by handicapped persons.

#### 3.4.2 Changer Location

Three screws are installed in the door below the coin chute. These screws mate to the keyhole slots on the back of the coin changer (Refer to Section 4.2.3).

#### 3.4.3 Coin Box

The coin box is located below the changer, behind a separate door, and is used to hold overflow coins when the changer is full. It is removed by tilting slightly and lifting out.

#### 3.4.4 Door Switch

The door switch is mounted on the back of the door. The control uses the door switch to turn off the refrigeration unit when the door is open, and to switch from service mode to vend mode when the door is closed.

#### 3.4.5 Display

The display is located on the front of the door. It serves as the interface for using and programming the machine. In service mode, it displays the active function and parameter values. In vend mode it can display the selection entered, the price of a selected item and the credit accumulated. When the machine is idle it can display the time and a scrolling message.

When the asterisk key is pressed the display also indicates the chiller status. One of the highlighted characters listed below will be shown in the lower right corner of the display.

- = Chiller off due to open door
- V = Chiller off due to low voltage
- D = Chiller off due to defrost timer
- P = Chiller off due to pressure timer
- % = Chiller can run, subject to temperature, set-point and EnergySENSIT

The number displayed before the % sign indicates the % of time the compressor has been running in the previous 4 hours.

In case there are multiple reasons for a chiller not running, the display will show the foremost reason listed (i.e., door open takes precedence over low voltage).

#### 3.4.6 Keypad

The keypad is located below the display on the front of the door. A vending selection is made by keying in the number combination that corresponds to the location of an item in the machine. The keypad is also used to enter data in operation and servicing of the merchandiser

#### 3.4.7 Coin Return Button

The coin return button is located next to the coin slot. Pressing the coin return button will release bent or irregular coins that are not accepted by the changer. If the machine fails to vend a selection that has been made,

pressing the coin return will return the full credit. If the Force Vend option is disabled, it can also return the full credit before a selection is made. If the Bill Changer option is enabled, the coin return will return change for bills inserted in the bill validator.

#### 3.4.8 Lighting Options

Several lighting options, depending on the model and size of the merchandiser, are available. All options are intended to illuminate the products displayed on the trays. Options include single or dual fluorescent lamps, and single or dual LED lamps with adjustable brightness control.

### 3.5 REFRIGERATION (CHILLER) SYSTEM

#### 3.5.1 Temperature Control

The evaporator fan runs continuously to circulate air within the cabinet. A temperature sensor located near the evaporator measures the temperature of air entering the evaporator. When this temperature is above the temperature setting in the control, the compressor and condenser fan are turned on.

When the temperature falls to 4°F below the temperature setting, the compressor and condenser fan are turned off (Refer to Section 6.5).

#### 3.5.2 Refrigeration Controls

1. The refrigeration system is operated through the control board. A temperature sensor in the cabinet relays the current temperature to the control.
2. If the temperature is above the setting that has been programmed in by the user, the control sends a 24VDC signal to the refrigeration relay. The energized relay closes to complete the high voltage circuit that powers the compressor and the condenser fan.
3. If the compressor should overheat, a thermal overload removes power to the compressor until it has cooled.
4. To protect against evaporator freeze-up, after one hour of continuous running the compressor will be shut off for 7.5 minutes to allow for defrosting
5. When the temperature in the cabinet reaches 4°F cooler than the temperature setting, the control de-energizes the relay breaking the circuit powering the compressor.
6. The control will also shut off the compressor if the door is opened. This is to prevent the fan from drawing in outside air which may freeze up.
7. After the compressor has shut down, the control will wait until the compressor has been shut down 3 minutes and if applicable, the door has been closed 10 seconds before restarting the compressor. The delay allows pressure in the system to equalize.

### 3.6 TRAY RAILS

The rails are located inside the cabinet and are used to support the trays. The rails are adjustable up and down in 1" increments (Refer to Section 5.3).

### 3.7 TRAYS

#### 3.7.1 Vend Motors

Two types of motors may be used with this merchandiser. The configuration of the machine will be different if all of one or another is used, or if there is a mix.

S3 software can be used to best advantage if all motors are for S3.

The vend motors are snapped into mounting holes on the back of each tray. The motor is driven by 24 VDC through a harness from the control board (Refer to Sections 4.2.4, 4.2.5 and 5.10).

#### 3.7.1.1 S3 Vend Motors

The S3 vend motors have a plastic case of which the rear half is blue. S3 coupled motors can replace dual helix motors. Where a dual helix motor is used replace it with a 23007 motor (having a blue and ivory case for CCW rotation) and a 23007-01 motor (having a blue and gray case for CW rotation) and reinstall the helices. Use Tray Setup in Service Mode to couple the motors in each column together, causing them to turn at the same rate.

Coupled motors will stop at the home position after one revolution of the helices (regardless of S3 option setting): if the product has entered the hopper the credit is taken, and if the product has not entered the hopper the display will read "Please Make Another Selection". The same selection or another may be made.

#### 3.7.1.2 SII Vend Motors

A Sensit II vend motor has a plastic case which is all ivory in color. A dual motor allows two helices, one for CW and another for CCW rotation, to be installed. The dual motor housing only allows helices to be adjacent to each other.

#### 3.7.2 Helices

There are typically three sizes of helices in a merchandiser, approximately 2 5/8", 3", and 4" in diameter. There are several pitches available in each size. The pitch is determined by counting the number of product openings in the helix (Refer to Section 1.3.8 and also in Sections 5.6 through 5.10).

#### 3.7.3 Dividers

The dividers separate product columns on the tray. Two horizontal slots in the divider allow for the installation of a candy pusher. To remove the divider, push rearward and lift. To install, insert the rear tab in the desired slot, push rearward and then down. Make sure the locking tabs on the bottom have engaged their respective slots and pull forward.

#### 3.7.4 Candy Pusher Bar

The candy pusher bar keeps candies pushed to one side of the column. This is typically used with tall candy bars. The candy pusher bar is removed by pulling the bar free from the plastic clips. To reinstall, it is easiest to squeeze the bar into the clip using pliers (Refer to Section 5.15).

### 3.8 ELECTRICAL PANEL

The electrical panel is located in the recess formed by the right rail mount on the right side of the cabinet, behind an access panel.

#### 3.8.1 Power Switch

The power switch is located on the side of the right rail mount near the fuse. The power switch is used to disconnect 24VAC power to the control board.

The power should be shut off when MDB devices are being connected or disconnected, when the board is being serviced, or before any wiring harness is connected to or disconnected from the control board or sensors.

#### 3.8.2 Fuse Holder

The fuse holder is located on the side of the right rail mount near the refrigeration unit power outlet. It contains a 3 amp fast-blow fuse to protect the 24 VAC power supply to the control board. A spare fuse is stored in the cover. The fuse holder is opened by pressing in and down on the indicated side of the cover and pulling out.

#### 3.8.3 Transformer

The transformer reduces the input voltage to 24 volts AC for the control board.

#### 3.8.4 RFI Filter

The filter removes electrical noise from the power supplied to the 24VAC transformer to prevent interference with operation of the control board and software.

#### 3.8.5 Relay

The relay uses a 24 VDC signal from the control board to close the relay and supply power to the refrigeration unit.

#### 3.8.6 Ballast

The ballast provides the necessary power to the optional fluorescent lamp or lamps in the door.

#### 3.8.7 Power Distribution Harness

The power distribution harness splits the incoming power into individual leads for the high voltage components.

#### 3.8.8 Ground Attachment

The merchandiser electrical ground is made through the use of grounding studs or screws at the lower back wall of the right rail mount. Earth ground and individual ground wires from the high voltage components are attached here.

#### 3.9 1.5" HELIX TRAY (OPTIONAL)

The 1.5" Helix Tray is mounted below the bottom snack tray. To load the tray with small products such as gum and mints, grasp the tray and pull forward to unsnap the catches. After loading, push the tray to the rear until the catches snap in place.

The motors in the 1.5" Helix Tray operate in the same way as snack or bottle tray motors (Refer to Section 5.16).





## **4.0 VENDOR PREPARATION AND INSTALLATION**

Setting up the merchandiser has been divided into three stages. Step 4.1 confirms power and site suitability. Step 4.2 includes preparations accomplished in the shop. Step 4.3 is accomplished on-site, where the merchandiser is to be located.

### **4.1 CONFIRMING POWER AT OUTLET**

#### **4.1.1 Checking the Power (U.S. and Canada)**

AMS recommends using a dedicated outlet which can supply 15 to 20 amps per merchandiser.

Using a volt meter set to AC VOLTS, check the voltage between the positive (smaller) lug entry and the ground lug entry (or center screw on two-lug outlets). The reading should be **between 103 volts and 126 volts**. Next, check the voltage between the negative (larger) lug entry and the ground. The reading should be **0 volts**. If your results vary, contact a qualified electrician to correct the outlet wiring before plugging in the merchandiser.

**Abnormal voltage, reversed polarity or improper grounding may cause the merchandiser to malfunction or create hazardous conditions in the merchandiser, resulting in possible injury, damage to the merchandiser, or fire.**

The power cord is shipped in the hopper on the inside of the door. The cord is supplied with a standard NEMA 3-wire plug. If there are no 3-wire outlets available for powering the merchandiser, a grounding adapter may be used to convert a 2-wire outlet to accept the 3-wire plug. **The adapter must have a ground tab or wire which must be fastened to the center screw of the outlet.**

**NEVER USE AN EXTENSION CORD WITH THE MERCHANDISER.**

#### **4.1.2 Checking the Power (Outside the U.S. and Canada)**

Consult a qualified electrician to check the outlet for proper polarity, voltage, and grounding. Check the serial plate on the side of the door to confirm the merchandiser is rated for the outlet voltage.

#### **4.1.3 Electrical Service Requirement for CE Compliance**

The following requirement applies only to models using ½ HP compressors and displaying the CE mark on the serial plate. If this requirement applies to your merchandiser, you will find a similarly worded decal on the back of the merchandiser near the power cord.

This requirement does not apply to any merchandiser using 120V service.

**ELECTRICAL SERVICE REQUIREMENT FOR CE COMPLIANCE:**

**THIS EQUIPMENT IS INTENDED FOR USE ONLY IN PREMISES HAVING A SERVICE CURRENT CAPACITY OF AT LEAST 100A PER PHASE, SUPPLIED FROM A**

**DISTRIBUTION NETWORK HAVING A NOMINAL VOLTAGE OF 400/230V. THE USER SHOULD DETERMINE IN CONSULTATION WITH THE SUPPLY AUTHORITY, IF NECESSARY, THAT THE SERVICE CURRENT CAPACITY AT THE INTERFACE POINT IS SUFFICIENT FOR THIS EQUIPMENT.**

#### **4.1.4 Requerimiento de Servicio Eléctrico para Certificación CE**

El siguiente requerimiento se aplica solamente a los modelos que utilicen compresores de ½ HP y que muestren la marca CE en la placa de serie. Si este requerimiento se aplica a su dispensadora, verá una calcomanía con una terminología parecida en la parte posterior de la dispensadora, cerca del cordón de corriente.

Este requerimiento no se aplica a dispensadoras que utilizan un servicio de 120V.

**REQUERIMIENTO DE SERVICIO ELECTRICO PARA CERTIFICACION CE:**

**ESTE EQUIPO SE PUEDE UTILIZAR SOLAMENTE EN ESTABLECIMIENTOS QUE CONTENGAN UNA CAPACIDAD DE CORRIENTE DE SERVICIO DE POR LO MENOS 100A POR FASE, Y SUMINISTRADOS POR UNA RED DE DISTRIBUCION QUE CONTenga UN VOLTAJE NOMINAL DE 400/230V. EL USUARIO DEBERA CONSULTAR CON UNA AUTORIDAD DE SUMINISTRO, SI ES NECESARIO, PARA VERIFICAR QUE LA CAPACIDAD DE CORRIENTE DE SERVICIO EN EL PUNTO DE INTERFASE ES SUFICIENTE PARA ESTE EQUIPO.**

#### **4.1.5 Les Utilites Electriques Necessaire Pour Conformement Aux Regles CE**

Le suivant condition applique seulement à modèle en utilisant ½ HP compresseur et montrer le CE sur l'en série plaque. Si cette condition s'applique à votre vendeur, vous verrez un decal de même exprimé sur le dos du vendeur près du cordon d'alimentation.

Cette condition ne s'applique pas au service de 120V d'utilisation de vendeur.

**LES UTILITES ELECTRIQUES NECESSAIRE POUR CONFORMEMENT AUX REGLES CE:**

**CET EQUIPEMENT NE DOIT UTILISER QUE SUR LES LIEUX AVEC UNE CAPACITE DU COURANT AU MOINS 100A LA PHASE, FOURNIE A UN RESEAU DE DISTRIBUCION AVEC UN VOLTAJE NOMINAL DE 400/230V. LA PERSONNE QUI SE DETERMINER PENDANT UNE CONSULTATION AVEC L'ADMINISTRATION DU SECTEUR, S'IL FAUT, QUE LA CAPACITE DE COURANT AU POINT D'INTERFACE EST ASSEZ POUR CET EQUIPEMENT.**

## 4.2 MERCHANDISER PREPARATION

### 4.2.1 Inspection

Inspect the merchandiser carefully for shipping damage prior to signing the carrier's delivery receipt. Check for dents on the top or sides of the merchandiser, bent legs, broken glass, or other damage on the exterior of the machine. Check the interior for components that may have been knocked loose or other damage.

### 4.2.2 Mounting and Connecting Bill Validators and Card Readers

The AMS merchandiser will support any NAMA-approved Multi-Drop Bus (MDB) bill validator or card reader. Please read the device manufacturer's literature before proceeding.

1. **Always disconnect power to the control board before servicing.**
2. On the inside of the main door, locate and open the access doors on the left side. Locate the white plastic coin chute which leads from the coin slot on the front of the door. Above the coin chute are (2) metal plates, each fastened to a set of (4) threaded mounting studs which correspond to the mounting holes in the bill validator. Either set of mounting studs may be used for a bill validator or card reader. The lower mounting position is ADA approved for consumers with disabilities.
3. Remove the four nuts that retain the steel cover panel. Remove the steel cover panel, then press out the plastic cover panel in the escutcheon.
4. Refer to the manufacturer's literature for instructions on accessing the mounting holes in your device. Place the mounting holes over the threaded studs and reinstall the nuts. Some devices may require spacers, which are available from AMS (Part Number 20258).
5. Connect the wiring harness to the MDB harness from the control board. If two devices are installed, connect the second device to the validator.
6. If a coin mechanism has been previously installed, disconnect it from the control board MDB harness and connect it to the validator or second device if installed.
7. Reconnect power to the control board.

### 4.2.3 Mounting and Connecting Coin Mechanism (Changer)

The AMS merchandiser will support any NAMA-approved Multi-Drop Bus (MDB) Coin Mechanism. On some export models, the Mars-type Executive Mechanism is supported. Please read the coin mechanism manufacturer's literature before proceeding.

1. **Always disconnect power to the control board before servicing.**
2. On the inside of the main door, locate and open the access doors on the left side. Locate the white plastic coin chute which leads from the coin slot on the front of the door. Below the coin chute are (3) screws which correspond to slots on the back of the changer. Do not adjust these screws.
3. Install the changer by placing the large round opening at the bottom of each slot over a screw

head. Be careful to hold the wiring harnesses in this area out of the way. Once each of the round openings are over the screw heads, the changer is lowered to engage the narrow portion of the slot with the shank of each screw.

4. Tighten the mounting screws (reference manufacturer's literature).
5. Connect the wiring harness to the bill validator (if applicable) or to the MDB connector from the control board.
6. Adjust the white plastic coin chute as required to align the chute with the changer.
7. Reconnect power to the control board.

### 4.2.4 Configuring Motors

The motors **MUST BE CONFIGURED** after any changes in the arrangement or numbers of motors have been made.

1. Press the service mode switch on the control board (Refer to Figure 3.1).
2. Using the # or the \* key, scroll through the menu to "TRAY SETUP".
3. Press **6** to configure the motors. Each switched motor is moved to the home position (moving the motor only if it is not at home) in addition to detecting connected motors. If the number of motors displayed does not match the number of motors in the merchandiser, press **1 \* 0** to jog all the motors in the merchandiser.
4. Watch the display for missing motors that should be connected. The merchandiser will not vend from a given helix when the motor is missing, jammed or has home switch problems.
5. After the motors have been configured check to make sure all the helices are in the home position. If the end of a helix is not at its lowest position in the column (the 6 o'clock position) pull it out of the motor, turn it until it is, and reinsert the helix into the motor. Coupled motors will stop at the home position after one revolution of the helices, regardless of S3 option setting.

Note: When not in Service Mode and with door open, press # to reset switched motors to Home position (Home/Sensor +/-2 or Home/Sensor +/-3 only. Refer to Section 6.7.3). Motors already at home will not move.

### 4.2.5 Test Product Loading

Before putting the merchandiser on location, it is a good idea to determine the placement of products on the trays. Place at least one product in each helix to check for fit.

1. Remove the cardboard spacers and ties securing the trays.
2. Make use of Section 5.3 for tray vertical adjustments and Section 5.4 for tray column configuration when configuring your merchandiser to suit your product.
3. Make sure the product can slide in and out of the helix easily. If the product is too snug, it may cause the helix to jam during vending. Place it in a helix with a larger opening.

4. Likewise, if the product is too loose in the helix, it may not vend properly. Use a helix with the smallest opening that will allow the product to slide in and out freely (Refer to Sections 1.3.8 and 5.6 through 5.10).
5. Place tall, narrow products in a column with a candy pusher bar, which is an adjustable bar used to push the product to one side of the column. Typically these are installed in columns 9 and 0 on the candy trays.
6. Make sure there is adequate clearance between the tops of the packages and the trays above when sliding the trays in and out, and when the product is being vended.
7. This is also a good time to set the end position of the helix to make sure the first product is held securely in the helix. To do this, vend a product from each column. The control stops the helix the instant the sensor detects a product falling in the hopper. The end position of the helix will automatically be set to the correct position when a product is vended (Refer to 6.7.3 Motor Type to change motor action).
8. If desired, the end position can be set manually by pulling the helix out of the motor, rotating it, and reinserting it in the motor.
9. Test vend the product and add a helix ejector if necessary. The helix ejector is a plastic device installed on the front end of the helix to push out the bottom of the product (Refer to Section 5.8).

#### 4.2.6 Installing Labels

After determining the product placement, install the selection number and price labels. The labels are shipped in an envelope with this manual.

1. Insert the bottom edge of the label in the lower groove of the extrusion on the front of the tray.
2. Carefully press in on the label until it bows enough to snap into the top groove of the extrusion.

#### 4.2.7 Setting Prices

After product placement and installation of the price labels, set the prices into the merchandiser (Refer to Section 6.6).

1. To enter the service mode, press the mode switch on the control board (Refer to Figure 3.1, or the decal inside the access door, for the location of the mode switch).
2. Using the \* or # keys, scroll through the menu to **"PRICE SETTINGS"**.
3. Press 1.
4. Enter the selection for which you want to set the price (example: **12**).
5. Press 9 to edit or change the price.
6. Enter the price and press \* to save this price, then do one of the three things listed below:
  - a. To save the selection at this price press \* again.
  - b. Press **1** to save all the tray selections at this price.
  - c. Press **2** to save all the merchandiser selections at this price.
7. The prices as set will be maintained by the merchandiser even if there is a power failure or if the machine is unplugged: however, prices will need to be reset if the control board has been changed, or if the configuration of motors has changed.

8. Using the \* or # keys, scroll through the menu, or exit the service mode by pressing the mode switch or closing the merchandiser door.

### 4.3 ON-SITE INSTALLATION

#### 4.3.1 Remove the Shipping Boards

1. Split the shipping boards by inserting a crowbar into the slots at either end.
2. If necessary, lift the merchandiser to remove the broken boards using properly rated equipment. Do not tilt the merchandiser. Do not attempt to lift the merchandiser with a 2-wheel hand truck.

#### 4.3.2 Placing the Merchandiser in Location

1. Place the merchandiser within 5 feet of the designated power outlet. The power outlet should be accessible when the merchandiser is in position, and the ventilation opening in the back of the merchandiser must be clear of obstructions.
2. For refrigerated models, allow at least 4 inches between the wall and the back of the merchandiser for air circulation.
3. Make sure the merchandiser does not block walkways or exits.
4. Do not place the merchandiser in a location where it can be struck by vehicles.
5. Leave at least 18 inches between a wall and the hinge side of the merchandiser. The door must open wide enough to allow the trays to be pulled out, and to prevent the door striking the wall when opened.
6. The merchandiser is designed to meet ADA guidelines for persons in wheelchairs using a parallel approach (side of wheelchair adjacent to front of merchandiser). Make sure there is adequate room to maneuver a wheelchair into this position in front of the merchandiser.

#### 4.3.3 Leveling the Merchandiser

For safe operation the merchandiser must be level.

1. On the bottom of the merchandiser are four (4) threaded leveling legs located at the corners of the cabinet and a fifth support screw under the door. Before beginning, be sure that all five leveling legs are screwed in completely.
2. With the door closed and locked, check the four main legs and adjust any leg that is not contacting the floor. Make sure the support screw under the door is all the way up and is **not** contacting the floor at this time.
3. Place a level on top of the cabinet and check for horizontal from side-to-side.
4. Adjust the leveling legs on the low side one turn at a time until the cabinet is level.
5. Repeat the last two steps to level the merchandiser front-to-back.
6. After the merchandiser is level, adjust the support screw under the door until it contacts the floor.

#### 4.3.4 False Leg Installation

##### WARNING

The False Leg helps to prevent the machine from tipping forward when the merchandiser door is open and one or more bottle trays are extended. Failure to install the false leg on merchandisers with bottle trays may result in serious injury (Refer to Figure 4.2).

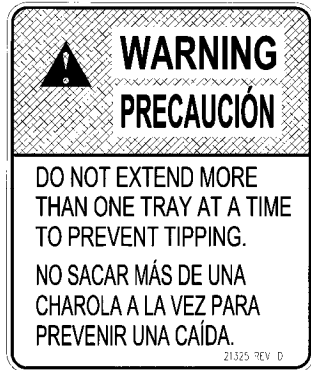


Figure 4.2 Tip-Over Warning

**CAUTION:** Wear gloves-edges may be sharp! Always wear eye protection!

##### TOOLS REQUIRED:

1/4" Nut driver or socket wrench

1. Align the holes in the top of the false leg with the 1/8" holes on the left side of the bottom of the door (Refer to Figure 4.3). The closed end of the false leg should be facing forward.
2. Install screws through the holes and tighten until snug. Do not over tighten.

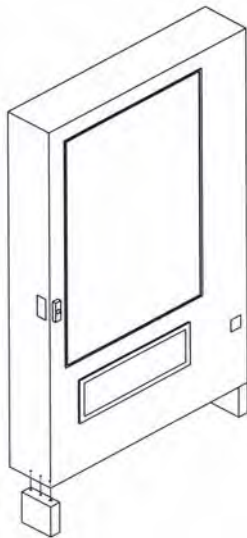


Figure 4.3 False Leg Installation

#### 4.3.5 Initial Power-Up and Cool-down

When placing a refrigerated machine on a new location it is important to allow the machine to cool to the operating temperature **prior to placing products** in the machine. **All food products are to be pre-packaged.** Depending upon the machine's initial temperature and ambient conditions, it will take about 4 to 5 hours to accomplish this. Normal practice is to place a machine on location and come back the next day to load it. **Do not load warm bottle/milk and food products into the merchandiser. All bottle/milk and food products are to be pre-chilled.**

1. Plug in the merchandiser.
2. Check that the lights inside the door come on: the chiller may or may not be running in its cycle at this time.
3. Enter the service mode and check that all settings are correct.
4. Check error codes for problems.
5. Load product after the merchandiser has cooled. Load one tray at a time, from the bottom up.
6. Insure merchandiser is operating properly. If the Health and Safety option is being used check merchandiser after 30 minutes from closing of the door to ensure NAMA requirements are being met.

## 5.0 TRAY ADJUSTMENT AND CONFIGURATION

The trays in AMS merchandisers are highly configurable. Practically any combination of wide and narrow columns can be set up on a tray. Before changing the configuration of your trays, make sure to order the parts you will need, such as new helixes, dividers or additional motors.

### 5.1 SNACK AND CANDY TRAY

#### 5.1.1 Removal

1. To remove the tray, start with the tray pushed to its rearmost position. Lift the back of the tray up and pull the tray forward about ten inches. Reposition your hands to grasp the tray at its sides and slide the tray out. If the tray is spaced close to the tray above, it may be helpful to raise the front of the tray as you pull it free.
2. When removing a tray, it is not necessary to disconnect the tray harness. The harness is long enough that it will allow a removed tray to be placed on the floor without having to be disconnected.

#### 5.1.2 Installation

To install the tray, place the rear on top of the rails. Slide the tray all the way to the rear. It will automatically drop into position. Make sure the harness slack is draped to the outside of the rail.

### 5.2 BOTTLE TRAY

#### 5.2.1 Removal

1. Disconnect the harness inside the right column in the cabinet. The connections are labeled corresponding to the number of the tray (1-6). Push the connector out through the hole in the back of the column.
2. Pull the tray out until it stops. Carefully pull the harness up on top of the tray.
3. Locate the slide rail release levers on both sides of the tray. There should be an arrow indicating which way to push to release the levers. Note that the lever direction on the right side is opposite the direction on the left side. Push the release levers in the directions indicated and simultaneously pull on the tray.
4. Be sure to push the extended slide rails back into the cabinet before closing the door. Otherwise the slides may be damaged.

#### 5.2.2 Installation:

**CAUTION: An incorrectly installed tray can disengage from the rails and fall when extended! It is recommended that installation be performed by at least two people!**

1. Fully extend the slide rails in the cabinet and hold in position.
2. Move the ball carriers out to the ends of the slide rails (Refer to Figure 5.1) and hold in position.

3. Route the tray harness over the rail in the cabinet and into the right column. Connect the tray harness to the appropriate receptacle.
4. Align the rails on the sides of the tray with the extended slide rails and insert. Continue to hold the ball carriers and slide rails in place until the rails on the tray are firmly engaged in the ball carriers.
5. Push the tray in completely to lock the rails together.
6. Carefully extend the tray to check for proper installation. Support the tray to prevent falling if the rails are not properly engaged. Visually inspect the rails, and gently pull the front of the tray side to side to make sure the rails will not disengage.

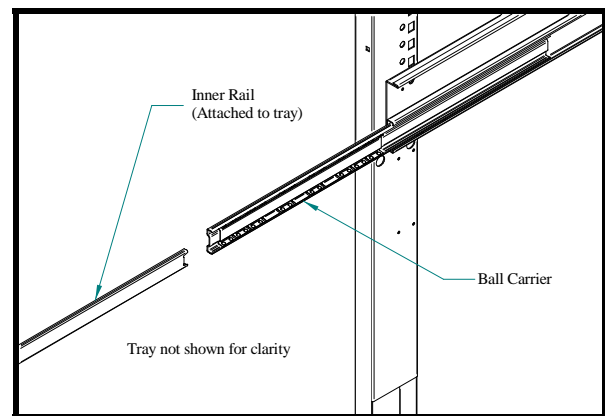


Figure 5.1 Bottle Tray Rails

### 5.3 TRAY VERTICAL POSITIONS

The trays can be adjusted to different vertical positions in 1 inch increments. To reposition a tray use the following steps

#### 5.3.1 Removal

1. Remove the tray for access to the support rails.
2. Remove the safety screw located at the front of each rail.
3. The front of the rail can now be lifted upward and disengaged from the vertical column.
4. Pull forward to disengage the rail from the slots at the back of the cabinet.
5. Use these same steps for the other side.

#### 5.3.2 Installation

1. To reinstall the rail in the new position, locate the rear "T" slots that will be used.
2. Then push the two tabs at the back of the rail into the appropriate slots.
3. Engage the hooked tabs at the front of the rail into the appropriate rectangular holes and pull down.

4. Make sure the rail is level.
5. Reinstall safety screw at the front of the rail.
6. Use these same steps for the other side.
7. Reinstall the tray, making sure the harness is routed over the top of the rail and all slack is draped to the outside of the rail.

**5.4 TRAY COLUMN ADJUSTING**

Bottle tray column dividers are fastened in place and cannot be adjusted.

The tray columns used for snacks and candy can be adjusted by the user to up to 10 columns wide. Typically the vend columns are set to single (2.66”) or double (5.32”) width, to be used with the standard small or large helixes, respectively. Single and double width columns can be configured in any arrangement on the tray by following the procedure below.

Note that coupled motors may also be used in the tray (Refer to Sections 4.2.4 and 6.7.7).

Plan your tray arrangement before beginning to determine which extra parts may be required. Contact your distributor to order the necessary parts.

1. Disconnect the harness and remove the tray. Place the tray on a flat, stable work surface.
2. Reposition, remove, or add tray dividers in the desired locations. To remove the divider, push rearward then lift. Reverse the procedure to reinstall.
3. It may be necessary to move a motor and helix. Pull forward on the helix to remove it from the motor. Press down on the top motor tab to remove the motor from the tray.
4. Reposition the motors to the center of each vend column, using the upper mounting position for the large helix and the lower position for the small helix. It may be easiest to disconnect the motors from the harness first.
5. The tray harness has 10 sets of motor connections. The first set of motor connections (at the end of the harness farthest away from the harness connector) is position 0, followed by 1, 2, and so on. The last set which is nearest to the harness connector is position 9.

NOTE: Every colored wire is paired with a red wire having a black stripe to complete the circuit. The connectors on the red wires having a black stripe are narrow and must be connected to the narrow connectors on the motors. The connectors on the colored wires are wide and must be connected to the wide connectors on the motors. Connectors which are not used should be folded up out the way and secured in place with wire ties.

6. At the back of the tray and when facing the motors, tray selection 0 will be the motor on the right end. Selection 9 will be on the left. If the tray has ten columns, attach the harness connectors to the motors, red to 0, blue to 1, gray to 2 and so forth. See the connection chart which follows.

SELECTION NUMBER	USE WIRE COLOR
Tray Number Plus 0	Red
Tray Number Plus 1	Blue
Tray Number Plus 2	Gray
Tray Number Plus 3	Purple
Tray Number Plus 4	Brown
Tray Number Plus 5	Yellow
Tray Number Plus 6	Green
Tray Number Plus 7	Orange
Tray Number Plus 8	Black
Tray Number Plus 9	White

7. If the tray has five columns, the zero and all even numbers are not connected. Attach the blue connector to the rightmost motor, attach the purple connector to the next motor, and so forth. See the connection chart which follows.

SELECTION NUMBER	USE WIRE COLOR
Tray Number Plus 1	Blue
Tray Number Plus 3	Purple
Tray Number Plus 5	Yellow
Tray Number Plus 7	Orange
Tray Number Plus 9	White

8. Turn the tray around so you are facing the front. Place the selection number in front of each column, according to the motor connections used. For example, if this tray is tray 5, then for a ten column tray the left hand column is column 50 and the right hand column is 59. For a five column tray the left column would be 51 and the right column 59.
9. Reconnect the harness to the inside of the merchandiser, routing it over the rail and through the back of the rail mount.
10. Reinstall the tray.
11. After changing any tray configuration, it will be necessary to reconfigure the motors (Refer to Section 6.7.6).

**5.5 CHANGING DIVIDERS**

1. To remove, push rearward on the divider as far as it will go, then lift it up and out of the tray.
2. Reverse the removal procedure to reinstall.

**5.6 SNACK AND CANDY HELIX**

To remove, pull straight out on the helix to disengage the adapter from the motor. Reverse the removal procedure to reinstall.

**5.7 HELIX ADAPTER**

1. To remove, twist the adapter to free the mounting leg from the locking tab.
2. Reverse the removal procedure to reinstall.

**5.8 HELIX EJECTOR**

The ejector’s function is to cause the product to fall sooner, and therefore stop the helix sooner. This will help

retain the next product in the helix coil, especially if they are 'difficult' products

1. The helix ejector is pulled off and pressed on the spiral by hand.
2. The ejector is typically positioned half a coil or less from the end of the spiral.
3. The "fin" shaped portion is angled towards the front of the tray.
4. The best position and angle for the ejector is determined by test vending products.

### 5.9 HELIX ALIGNMENT DEVICE

The helix alignment device is installed against the left side of the large helixes to keep them centered in their columns.

1. To remove, grasp the front of the helix alignment device with pliers and pull or pry upward. Take care not to lose the plastic mounting clips.
2. Reinstall by pressing the plastic mounting clips back into the mounting holes. Note that the mounting flange goes toward the spiral.

### 5.10 MOTOR POSITIONS

Motor position can be changed sideways for different columns, and there are two mounting positions on the snack tray. The lower and upper positions are used for the small and large spirals, respectively.

1. To remove, press down and rearward on the top mounting tab, then pull the lower mounting legs out of the mounting slots.
2. Reverse the removal procedure to reinstall.

### 5.11 BOTTLE ALIGNMENT DEVICE

The bottle alignment device will, in some cases, inhibit the rotation of bottles as they are vended. It has two uneven-length legs. It can be installed with either leg on top, depending on which works best.

1. To remove the bottle alignment device, remove the screws from the underside of the tray that hold it in place.
2. To reinstall, reverse the removal procedure.

### 5.12 BOTTLE TIPPER BAR

The bottle tipper bar is typically used with carbonated beverage bottles. The bottles have a dimpled bottom which permits them to straddle the spiral and stand upright. The tipper bar restrains the top of the bottle so that it falls bottom first, rather than tumbling off the tray.

1. To remove, bow the bar until one end can be pulled free from the support bracket. Take care not to lose the plastic bushings in the supports.
2. To reinstall, reverse the removal procedure.

### 5.13 AVOIDING PRODUCT HANG-UPS

Avoid large products, such as chips, from 'hanging-up' between the tray and the glass by loading them 'left corner first' into the helix. The bottom left corner of the bag should be in front of the helix to let the helix push the bottom out first (Refer to Figure 5.2). An incorrect loading may cause the bag to fall top first, which could lead to a

hang-up. Loading 'left corner first' prevents the product from falling top first.

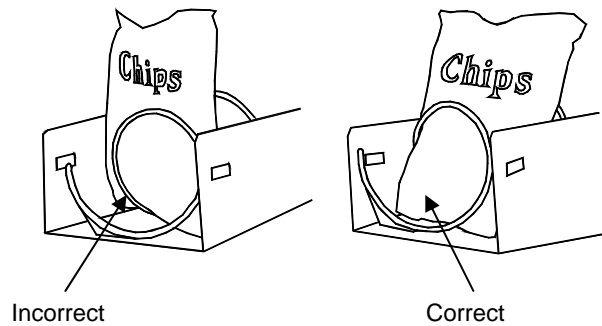


Figure 5.2 Large Bag Vending

### 5.14 TALL PRODUCT VENDING

Place tall, narrow products in a column with a candy pusher bar. Typically these are installed in columns 9 and 0 on the candy trays. Rotate the bar upward or downward to the desired position. It should hold the product upright, but not pinch or bind the product.

### 5.15 CANDY PUSHER BAR INSTALLATION

The candy pusher bar is an adjustable bar that mounts to any tray divider to keep tall candies from falling sideways (Refer to Figure 5.3). Four pusher bars are provided with the standard glass front merchandiser.

1. Snap the pusher bar into the retainer.
2. Rotate the pusher bar to accommodate the product.

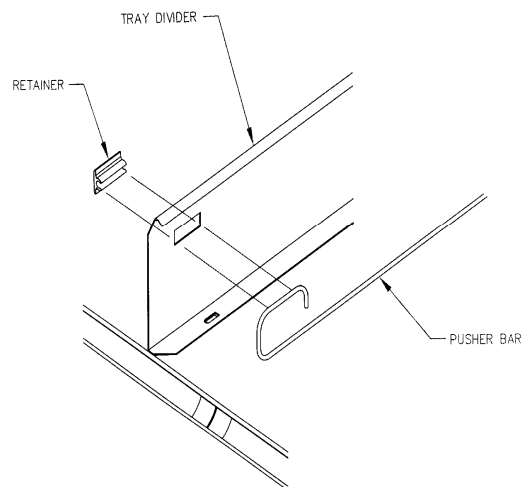


Figure 5.3 Pusher Bar Installation

### 5.16 1.5" HELIX TRAY ADJUSTMENT AND LOADING

#### 5.16.1 General Information

Some merchandisers are equipped with a 1.5" Helix Tray designed to vend small candy, gum and mint packs. The 1.5" Helix Tray can also be ordered separately for new installations (Refer to Section 11).

### 5.16.2 Tray Adjustment And Loading

As delivered from the factory there are two wide columns for products such as Life Savers, and two narrow columns for products such as gum or Certs. However, the tray may be reconfigured to fit the product being vended by adjusting the position of the column dividers (Refer to Figure 5.4). The dividers, being adjustable, change the column width. Adjust the divider position by removing the screw at the rear of the divider. Pull on the divider towards the front of the tray to loosen it. Reposition the divider by inserting the mounting tabs into the appropriate slots. Push the divider down and to the rear to tighten it into place. Reinstall the screw at the rear of the divider. Test the column for proper vending.

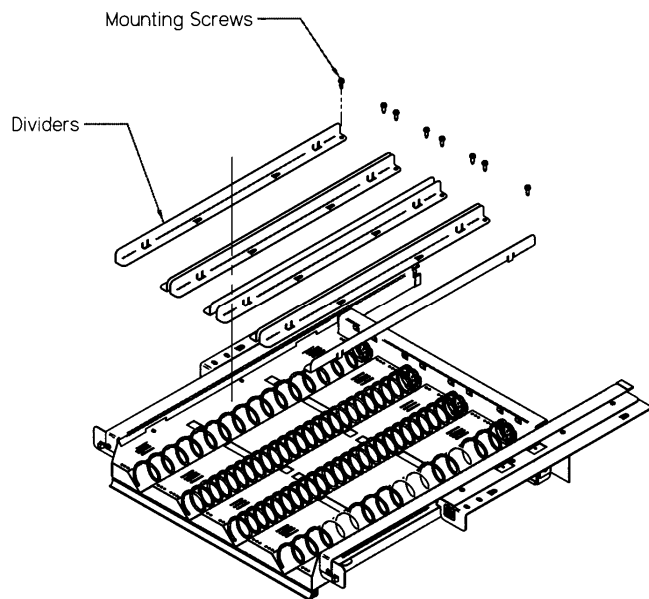


Figure 5.4 1.5" Helix Tray



## 6.0 SERVICE PROGRAMMING

### SERVICE MODE

Access the service mode by pressing the mode switch on the control board (Refer to Figure 3.1). After displaying any errors, the first function is displayed. Press # or \* to scroll through the errors and functions. Return to vend mode by closing the door, pressing the mode switch or allowing the 2 minute time-out to occur.

For convenience, there is a decal inside the cabinet that presents the basic information in this section in a flow-chart format.

### 6.1 ERROR CODES

Any errors that have been recorded will be displayed when the mode switch is pressed. Section 7.3 provides descriptions of errors and tips for troubleshooting them.

ALWAYS CORRECT THE ERROR BEFORE CLEARING THE MESSAGE.

1. **# NEXT ERROR** – View the next top level error code.
2. **1. SUBLVL ERRORS** – Displays any sublevel error codes for MDB devices.
3. **0. CLEAR ERROR** – Erases the error code from memory.

### 6.2 ACCOUNTING DATA

Limited sales information can be displayed directly on the merchandiser display. More detailed sales information is contained in the DEX data. This data can be collected with any DEX data collection system.

1. **HIST. VENDS** – Displays number of vends since initialization of the control board.
2. **HIST. CASH** – Displays the total sales since initialization of the control board.
3. **RESET. VENDS** – Displays the number of vends since the last reset.
4. **RESET. CASH** – Displays the total sales since the last reset.
5. **HIST. SELECTIONS** – Displays sequential number of paid vends for each individual selection since initialization of the control board. Depending on the configuration, up to 80 selections may be audited. Enter a selection by entering its characters. The display will show the total paid count for the selection for 2 seconds. At this time another selection may be entered. All selections can be accessed this way. Press # to exit to the Accounting Menu.
6. **CLEAR VALUES** – Clears RESET. VENDS and RESET. CASH.
7. **SERIAL NUMBER** – Allows programming of the serial number that will appear in field ID101 in the DEX data. The user may also

choose to have this programmed serial number used in place of the changer serial number in field CA101.

8. **RESET. CARD** – Displays the total cashless sales since the last reset.

### 6.3 FILL/DISPENSE

The FILL/DISPENSE function allows the user to add coins to the changer or dispense coins from the changer.

1. **SELECT TUBE 1-5** - To dispense coins, press 1 through 5 (for a 5-tube changer) to dispense from tubes 1-5. Tubes are numbered starting with the lowest denomination. The control will display the value of the coin being dispensed and the total number of coins in that tube.
2. **OR INSERT COINS** - To fill the changer, simply drop coins in the coin slot. The display will show the value of the coin and the total number of coins in that tube. Note that coins can also be added through the back of the changer. However, the control will not have an accurate count of the coins in the tube unless the tube is filled completely. When the high-level sensor in the tube detects coins, the control will set the correct coin count for that tube.

### 6.4 DELAYED SALES

The user can delay sales of specified selections to give the product time to settle or cool. The delay must be manually started each time sales are to be delayed. Delayed sales does not add to or subtract from the time limits imposed by the Health and Safety rules (Refer to Section 7.2). To automatically prevent sales during specific days and times, use SALES BLOCKING (Refer to Section 6.10).

1. **START DELAY** – Begins the sales delay timer. Before starting the timer, choose menu item "5. EDIT SEL'NS" to specify which selections will be delayed. Customers will not be able to purchase those selections until the delay period ends.
2. **CANCEL DELAY** – Stops the delay timer and allows vending of all selections.
3. **SET DELAY** – Adjust the time of the delay timer in 15 minute increments.
4. **CLEAR ALL** – Clears all selections that were chosen to be delayed.
5. **EDIT SEL'NS** – View and change the delay status of all selections. The user can choose to apply the delay to a single selection, a tray, or all selections in the merchandiser.

## 6.5 TEMPERATURE

The user can set the refrigeration temperature and review the cooling performance of the merchandiser.

1. **CURRENT TEMP** – Displays the actual temperature in the cabinet.
2. **SETPOINT** – The user can adjust the refrigeration setpoint in 1°F increments. This is the temperature at which the refrigeration system will turn on. The refrigeration unit will turn off when the actual temperature is 4°F below the setpoint. If the merchandiser has Health and Safety software, and is vending perishable food, the temperature must be set to 41°F or below. A set point of 40°F is recommended.
3. **START LOG** – Begin recording the actual temperature every minute for the first 30 minutes of cooling after the door is closed.
4. **VIEW LOG** – View the temperatures recorded in the cooling log. The reading number, temperature, date and time are displayed. Press **1** or **2** to scroll up or down through the readings. This log will not display until 30 minutes after the log is started.

**TIP:** To view a temperature history of the previous 2 days, use DATA LOGS (Refer to Section 6.14).

## 6.6 PRICE SETTINGS

Before setting prices, install a changer so that the control will recognize the proper scaling factor for your currency.

### 6.6.1 SET PRICES

Enter the tray then the column for the first selection to be priced. The current price for the selection will be displayed. Press **9** to edit, then enter the new price, making sure to enter all digits after the decimal point. The decimal is placed automatically based on the scaling factor from the changer.

Example: For a price of \$1.50, enter **1 5 0**.

The user can choose to apply the new price to that selection (\*\*), all selections on the tray (\*1), or all selections in the merchandiser (\*2). It is usually faster to set all selections to the most common price in the merchandiser (\*2), then change individual trays or items that have a different price.

### 6.6.2 VALUEVEND

ValueVend starts with the prices that were set using SET PRICES. Using ValueVend,

any two selections are grouped together (a matching product or a different product) and offered at a reduced price. Up to 10 such groups are available. For example, in one group, soup and crackers are offered individually at full price, but if one is purchased along with the other the (total) price is reduced.

The vending machine operator should advertise the special combination and prices.

**1. RESPOND TIME** is used to set the number of seconds (20 to 99) the customer has to make the second selection before any remaining credit is returned. Set the time to at least 30 if dual languages are scrolled in the display.

**1** – Press to increase the seconds.

**2** – Press to decrease the seconds.

**\* --** Press to save the new setting and return to the ValueVend menu.

**2. CHANGE** is used to select the group to change (Group 1 through Group 10). Pressing the "\*" button once each time will step the display to the next group. Only one group at a time can be set.

**0 CLEAR** – Clears all of the settings in the current group. Use this key before changing ValueVend settings. Using CLEAR will not change the selection price as set using SET PRICES.

**1 EDIT** – Enter the first selection, enter the second selection, then enter the discounted price for this grouping. The discount will appear to the customer as a discount on the second selection. Selections can be any combination of tray and column. Press "\*" to save this EDIT setting and return to the CHANGE display.

Press **#** to return to the CHANGE display without saving.

**\* NEXT** – Press to return to the CHANGE display.

**# EXIT** – Returns to the ValueVend menu.

## 6.7 TRAY SETUP

### 6.7.1 Test Motors

Enter the selection number to be tested, or press \* to see the following options for testing multiple motors.

**1-JOG ALL** – All motor positions in the merchandiser will be tested. Each motor will be turned only a very small amount, so that products loaded in the merchandiser will not be dispensed. The display will show the number of the motor being jogged, or it will show a message that a motor is missing.

**2-JOG TRAY** – All motor positions on the selected tray will be tested. The display will show the number of the motor being jogged, or it will show a message that a motor is missing.

**3-CHECK JAMMED** – The control will attempt to run each motor that has caused a jammed motor error. The status of the motor will be displayed afterward.

**6.7.2 Link Motors**

The user can link adjacent selections of the same product on the same tray. The leftmost linked selection is the master selection. All other linked selections are vended using the selection number and price of the master selection. Linked selections are vended sequentially for better product rotation. Entering the selection number of any linked selection will default to the master

selection number, and the control will vend the next linked selection in the sequence.

1. **NEW LINK** – Enter the tray where the motors are to be linked, then enter the first and last column numbers (left to right) to be linked.
2. **VIEW / EDIT** – The user can view, change, or delete existing links.
3. **CLEAR ALL** – This will delete all current links. The prices of the previously linked selections will remain the same as their master selections until new prices are set.

**6.7.3 Motor Type**

Motor Type allows the user to change the motor stop and credit deduction behavior. See the table below for more details on the various settings available under this function.

MOTOR TYPES			
ITEM	DISPLAYED OPTION NAME	MOTOR STOP	CREDIT DEDUCTION
1	SENSIT	Sensor*	Sensor
2	HOME/SENSOR/3	Home	Sensor
3	HOME/SENSOR +/3 (FACTORY DEFAULT)	Home + Extra**	Sensor
4	HOME_ONLY/3	Home	Home
SII WITH HOMING MOTOR TYPES			
5***	HOME/SENSOR/2	Sensor	Sensor
6***	HOME/SENSOR+/2	Home + Extra**	Sensor
7***	HOME_ONLY/2	Home	Home
* If S3 motors are used: the switch function is ignored. ** "Extra" means that if a drop is not detected by the home position, the motor will move additional increments to try to vend the product. *** These are settings for use only with merchandisers equipped with Sensit II with Homing.			

**6.7.4 Delayed Stop**

The user can program a delayed stop of up to one second to allow a motor to continue running after the product has been dispensed.

1. **ENTER SELECTION** – Enter the number of the selection to be delayed, enter **9** to edit, then enter the time in tenths of a second. The decimal point is placed automatically.

Example: Entering **8** will program a delay of 0.8 seconds.

The user can save the programmed delay to the selection, the entire tray, or all selections in the merchandiser. Linked

selections will use the delay programmed for the master selection.

**6.7.5 Letter / Number**

The control board/software default is for NUMERIC, using the 12-key keypad. Note that if the control board is changed this setting may need to be set to "Number". This setting should be changed to "Letter" if the merchandiser is equipped with 20 pushbutton keypads (with alphabetic characters). Depending on the setting, the top tray is designated "1" or "A", and downward with numbers (2-8) or letters (B-H).

**6.7.6 Configure Motors**

Configure Motors moves each switched motor to the home position (moving the motor only

if it is not at home) in addition to detecting connected motors. This selection **MUST BE RUN** after changes in the arrangement or numbers of motors have been made.

The merchandiser will not vend from a given helix when the motor is missing, jammed or has home switch problems.

The configuration of connected motors is stored in memory. If a configured motor is later found to be missing during a vend, an error message will be generated in service mode to alert the service person that the motor is disconnected.

### 6.7.7 Couple Motors

With Sensit 3, configurations to vend extra wide product can be made by using the couple motors feature (Refer to Section 1.3.8). The couple motor feature works by coupling together a set of two adjacent motors. One motor may be a motor that turns counterclockwise, and the other motor may turn clockwise. Both motors turn for the same length of time. Trays may have multiple coupled motors.

In Service Mode select Tray Setup, then select option 7 - Couple Motors

Press "1" to enter a new couple motors selection.

Enter the number of the tray. For example, press 5 for tray 5 (press "#" to return to the option menu without saving any selections).

Next, enter the number of the first column to couple. For example, press 0 for the first column.

Last, enter the number of the second column to couple. For example press 2 for the last column (the last column could also be 3, 5 or 9, depending on the product configuration required).

The display will read COUPLE 50,52. Press the "\*" to save these selections (press "#" to return to the options menu without saving any selections).

Note that a coupled motor set will vend using the lowest numbered column selected. In the example given above, use 50 to select a product. A column selection of 52 will display a message "PLEASE MAKE ANOTHER SELECTION". Selecting any column numbers between the lowest and last column numbers saved will also display the same message.

The tray numbers on the front of the tray should be changed to suit.

Press "2 VIEW/EDIT" to view or change previous entries. If the display continues to scroll around NEW, VIEW/EDIT and CLEAR, then there are no entries saved.

If there are entries saved the display will read COUPLE 50,52 (for example). If the 0 button is pressed the only the coupled motor selection as shown will be cleared from the control board - any other coupled motor sets will remain as is.

If the "\*" button is pressed the display will show the next set of coupled motors saved. If there are no other sets the display will not change.

If the 1 button is pressed the display will show the current selection of columns. The tray number cannot be changed - enter the first column and last column as was done for NEW. Press "\*" to save, or "#" to exit without saving.

Press "3" to clear all coupled motor sets from the control board. The display will read CLEARED and the display will return to the menu from option

## 6.8 MDB (MULTI-DROP BUS)

### 6.8.1 Settings

The user can select the following settings.

#### 6.8.1.1 Force Vend

The factory default is "N" for no. If set to "Y", the customer is forced to make a selection before the control will allow a refund. If the selected product cannot be dispensed, a full refund can be returned to the customer. Note that using 6.8.1.3 CHANGE BILL will override force vend.

#### 6.8.1.2 No Cheat

The factory default is "Y" for yes. If set to "Y", the control will not allow a vend to occur unless correct change can be returned to the customer. If disabled, the control will allow the customer to be short-changed up to \$1.00.

#### 6.8.1.3 Change Bill

The factory default is "N" for no. If set to "Y", the customer can insert a bill and receive a full refund in coins by pressing the coin return button. Note that using CHANGE BILL will override force vend.

#### 6.8.1.4 Hold Lost Credit

The factory default is "Y" for yes. If set to "Y", any remaining credit after a vend that can't be returned to the customer will be maintained on the

display for 15 minutes. The customer can add to this credit to purchase additional items.

#### 6.8.1.5 Multi-Vend

The factory default is “N” for no. If set to “Y”, the merchandiser will hold the change following a vend. The customer can make additional purchases with the remaining credit. The customer may push the coin return button at any time to refund this credit.

#### 6.8.1.6 Lev2 Coin Mech

The factory default is “N” for no. If set to “Y”, the merchandiser will treat the coin mechanism as a level 2 device. Merchandiser must be powered down before change will take effect. AMS recommends that this option remain as “N” for no.

#### 6.8.1.7 Instant Reval

Adds value to card immediately when cash is inserted.

### BILL AND CASH-LESS APPLICATIONS

Sensit 3 software allows running the merchandiser with no coin mech.

The changes to allow bill-only and bill and cashless applications affect fundamental MDB behavior of the VMC. It was decided to make these changes without introducing new layers of option settings. The typical customer using a coin-based system should not notice any changes except under unusual conditions. This section will explain those changes and unusual conditions.

To simplify the discussion, the term “healthy” will be used to describe a peripheral (coin mech, bill validator, or a cashless device) which is present, which is communicating normally to the VMC, and which has no fatal out-of-service conditions.

### MDB OUT-OF-SERVICE

Previously, the VMC would go out-of-service if what it determined a “critical” peripheral became unhealthy. In a coin-based system, the coin mech was the critical peripheral. In a cashless-only system, the card reader was the critical peripheral. Bill-only applications were not supported, so an unhealthy validator was never sufficient to take the machine out-of-service.

In this firmware, the machine will only go out-of-service if at first at least one peripheral becomes healthy, then all peripherals become unhealthy.

### REMAINING IN SERVICE W/O COIN MECH

If a bill validator is present, and the coin mech becomes unhealthy, the VMC will now continue running with the validator (and cashless if present). Over the past several years, the criteria for an “unhealthy” finding have become more stringent, as various reported error conditions

such as coin jams were removed from out-of-service consideration. Right now, in practical terms, the coin mech either has to burn out completely or become disconnected to be considered unhealthy by the VMC’s criteria. A healthy coin mech going unhealthy should be a rather rare occurrence.

To help notify patrons and service personnel that the coin mech has become unhealthy, the EXACT CHANGE message will be activated. This should discourage patrons from inserting paper money, unless the prices happen to be in paper money increments. Also, patrons trying to feed coins into the mech will notice immediately that the coins disappear (in the case of a serious coin jam) or fall through.

### ‘#’ KEY FOR ESCROW RETURN

In bill-only applications, there is no classic coin return button to request return of the last-inserted bill. As a result, when the coin mech is considered unhealthy, the ‘#’ key will be treated as equivalent to a coin mech escrow return.

### BILL-ONLY APPLICATION NOTES:

In a bill-only system, prices must be restricted to the scaling factor of the bill validator. Usually, this scaling factor will start from the smallest paper currency unit instead of the smallest coin unit. This will limit setting selection prices that would require change-making.

Due to the absence of a coin mech, the normal No Cheat logic is disabled, regardless of the VMC option setting. The VMC’s fairness is limited to not taking in more money than the maximum price in the machine. As mentioned earlier, the ‘#’ key is equivalent to escrow return, possibly allowing the patron to retrieve the last-inserted bill.

The EXACT CHANGE message should never occur in a pure bill-only system.

### BILL PLUS CASHLESS APPLICATION NOTES

Prices will be restricted to the scaling factor of the cashless device, which is usually the smallest coin unit.

Revaluation occurs in the same way it does with a coin mech, except in cases where the payment medium is at or near its maximum balance. With a coin mech, the VMC will allow credit to exceed the maximum balance as long as any excess can be paid back in coins. Without a coin mech, the VMC rejects any bills that would exceed the maximum balance (in a card-first revaluation) or rejects the payment medium entirely (in a cash-first revaluation).

#### 6.8.1.8. Hide Card Value

Use this feature to display or not display the value on the card.

Press "8" to change the YES to a NO and again to change it back. Press "#" to save any change and exit this feature.

## 6.9 OPTIONS

### 6.9.1 Message

The user can customize the scrolling message that is displayed when the merchandiser is idle. Other words can be customized by using the CREATE CUSTOM option in the LANGUAGE menu (Refer to Section 6.9.3).

Write out the desired message first. The message to be displayed on the scrolling display can be up to 50 characters, including letters, numbers, punctuation and spaces. New messages erase old ones.

Select the message option and the controller will prompt the user to press "1" to change the message, or press "#" to exit.

To enter a message, the user should rapidly tap a particular key to cycle through a list of characters for that key. Stop at the desired character. When the keypad is left idle, the last-displayed character is moved over to the end of the message. Continue to select the next character. The key definitions are similar to those of telephones and cell phones:

<b>KEY 0:</b> (space)0	<b>KEY 5:</b> JKL5
<b>KEY 1:</b> !? ,. \$; * & " + / < > = # % ' 1	<b>KEY 6:</b> MNO6
<b>KEY 2:</b> ABC2	<b>KEY 7:</b> PQRS7
<b>KEY 3:</b> DEF3	<b>KEY 8:</b> TUV8
<b>KEY 4:</b> GHI4	<b>KEY 9:</b> WXYZ9

Pressing the \* key will back space through the message. Pressing the # key will save the message.

### 6.9.2 Prize

The factory default is "0" for none. The user can set the merchandiser to give away a free product after a predetermined number of successful vends. Enter the number of vends between free vends, up to 9999. Setting the number to "0" will disable the prize option.

### 6.9.3 Language

#### 6.9.3.1 Primary

The user is presented with a menu of available languages. The user may choose the primary language for the display of all messages. Note that Service Mode messages are available in Primary language only.

#### 6.9.3.2 Secondary

If desired, the user can select a secondary language for the display of all messages. Messages will be displayed first in the

primary language, then in the secondary language.

#### 6.9.3.3 Create Custom

The user can create customized versions of words or enter words in another language. For convenience, the primary language messages can be used as a starting point. The user can then select words to modify. After creating the customized messages, set the primary or secondary language to CUSTOM.

#### 6.9.4 Product Sensor

If set to "Y", the merchandiser will use the product sensor (optional) to determine if there is product in the delivery bin. The control board will not allow vending until any product in the delivery bin is removed. A "REMOVE PRODUCT" message will be displayed. This feature is used primarily when vending glass bottles and products that can be damaged by other falling products.

#### 6.9.5 Speech

A speech synthesizer option is available for use with RC Systems Inc. DoubleTalk LT speech synthesizer. It operates only while the merchandiser is in service mode. The speech synthesizer vocalizes keystrokes and what is shown on the display.

The Options menu selection 5 enters the synthesizer on/off menu. Press 5 to toggle on/off. Press # to exit to the Options Menu.

When turned on the synthesizer is inactive until the merchandiser is placed into service mode.

The synthesizer must be plugged into the DEX plug on the control board. A utility cable (AMS P/N 20786, Harness, Chip Programming) may be used, but it must be plugged into a male-to-male gender adapter (Radio Shack 26-231B) followed by a null modem adapter (Radio Shack 26-264). The serial cable from the DoubleTalk LT is plugged into the null modem adapter. The ¼" jack from the utility cable is then plugged into the DEX plug on the control board (other DEX functions cannot be used while the DoubleTalk LT is plugged in). A dedicated cable could also be constructed.

## 6.10 SALES BLOCKING

Four separate time periods in each day of the week can be set, during which selections can be blocked (prevented from vending). All or any combination of selections in the merchandiser can be blocked from vending, or are exempt from blocking (free to vend).

### 6.10.1 1-4 SET PERIODS

1. Enter the number (1-4) of the time period to set-up. For example, choose #1.
2. Enter the time when sales blocking period #1 is to start, then press SAVE as indicated.
3. Select a.m. or p.m. for starting.
4. Enter the time when sales blocking period #1 is to end, then press SAVE as indicated.
5. Select a.m. or p.m. for ending.  
NOTE: A time period can be started, for example, at 9:00 p.m., and may be set to end at 6:00 a.m. (which would be the following day).
6. Starting with Sunday, press 1 to select if time period #1 blocking will be ON or OFF. Select 2 to continue with the next day of the week.
7. NOTE: Sales blocking as set in the merchandiser may be turned ON and OFF by turning one or more days of the week ON or OFF.

#### 6.10.2 ALL SELECTIONS?

1. To block all selections in the merchandiser in time period #1 select YES for 'ALL SELECTIONS?'
2. To choose different selections to block in time period #1 select NO. Choose the combination of selections to block as desired. Any combination of tray and column may be blocked (for example, trays 3, 4 and 5, and selections 61, 62 and 66).
3. In this Selection Entry display, enter the number of the first selection. For example, choose 25.
4. The display will show 25, and if it is blocked or exempt.
5. Press the number "9" on the keypad anytime to switch 25 from being blocked to being exempt, or back again.
6. Press "#" on the keypad to exit without saving, and return to the previous display.
7. Press "\*" on the keypad to show the next display for selection 25.
8. Press "\*" again to save selection 25 as blocked or exempt, as was displayed.
9. Press "1" to save ALL of #2 tray as blocked or exempt.
10. Press "2" to save ALL selections in the merchandiser as blocked or exempt.
11. Press "#" to exit and return to the previous display. After a short time without any keystrokes the control will save entries as-is and return to the Selection Entry display.
12. After saving, these selections will be blocked as set for time period #1.
13. Return to 1-4 SET PERIODS and chose time period #2. Follow the same steps as given above for time period #1. The time of day, the days of the week, and the selections can be different from time period 1. All four time periods may be different from others.
14. The settings in sales blocking may be changed at any time by selecting the time

period and changing the time of day, day of the week, and selections.

#### 6.11 CLOCK SETTINGS

1. **TIME AND DATE** – Enter the current time and date. This information will be used for data logs and error records.
2. **DAYLIGHT SAVINGS** – The factory default is "N" for no. If set to "Y", the time is automatically adjusted for Daylight Savings Time.
3. **DISPLAY CLOCK** – The factory default is "Y". The current time will appear on the display beneath the scrolling message when the merchandiser is not in use.
4. **12/24 FORMAT** – The user can choose to display the time in 12-hour or 24-hour (military) format. The factory default is 12-hour format.

#### 6.12 FREE VEND

The factory default is "N" for no. The merchandiser can be quickly set to vend all products for free. Prices are ignored while FREE VEND is enabled. The original prices will be restored when FREE VEND is turned off.

1. **VIEW / EDIT** – The current setting is displayed, and the user can change the setting. A warning will be briefly displayed if FREE VEND is turned on.

#### 6.13 AUXILIARY OUTPUT

The auxiliary output is a 5VDC signal lasting 100 milliseconds following a successful vend. This signal can be used to trigger user-supplied external devices. As of this writing, AMS does not supply such accessory devices and cannot offer technical assistance for such devices. This feature is provided only as a convenience to those users of advanced technical skill who wish to connect such a device to their AMS merchandiser and have sufficient electronic expertise to do so

1. **VIEW / EDIT** – The current setting is displayed, and the user can change the setting. Enabling the auxiliary output will not harm the merchandiser or affect the performance of the merchandiser in any way.

#### 6.14 DATA LOGS

The user can review recorded data on merchandiser temperature, power outages, and door openings. This data is sometimes helpful in diagnosing problems with the merchandiser. These logs are cleared whenever the software is changed.

1. **TEMPERATURE** – The temperature log contains temperature measurements taken at half-hour intervals over the previous two days. The display shows the recording number, the recorded temperature, and the time and date of the recording. The log holds 96 measurements, with number 1 being the most recent.
2. **POWER** – The power outage log records power failure information. The display shows the recording number, whether power went ON or OFF, the temperature in the cabinet, and the time and date of the recording. The log holds 10 recordings, with number 1 being the most recent.
3. **DOOR SWITCH** – The door switch log records door openings and closings. The display shows the recording number, whether the door was OPENED or CLOSED, the temperature in the cabinet, and the time and date of the recording. The log holds 10 recordings, with number 1 being the most recent.

### 6.15 EnergySENSIT

The EnergySensit feature is a way of reducing energy consumption. When enabled, EnergySensit predicts periods of inactivity and allows the internal temperature of the merchandiser to rise, taking advantage of these inactive times.

Essentially, by looking at past activity, the merchandiser learns when to expect vend and when not to and alters the internal temperature (and hence, energy consumption) accordingly. Less energy is used as the internal temperature is allowed to increase.

Because of this increase in temperature, it's not recommended for use on temperature-critical products. Note that the EnergySensit temperature change feature cannot be enabled while the Health & Safety function is enabled.

#### 6.15.1. ENABLE

The factory default is "N" for no. When set to "Y," EnergySensit is enabled.

**NOTE:** If the Health and Safety feature is ON, the display will show "ENERGYSENSIT OFF" immediately after displaying "HEALTH AND SAFETY ON." To use EnergySensit the Health and Safety feature must be off.

#### 6.15.2. CLEAR HISTORY

EnergySENSIT keeps a recorded history. The entire contents of the history can be deleted and a new record will start at that time.

#### 6.15.3. SET TEMP CHG

The factory default is 10° F. TEMP CHG (temperature change) allows the user to set the

temperature change as an increase from the original temperature set point (Refer to Section 6.5). During predicted periods of inactivity, the merchandiser will maintain a temperature equal to the temperature set point plus the temperature change value. This value can be set from 1°F to 30°F.

For example, 45° chiller set point  

$$\begin{array}{r} + 10^\circ \text{ EnergySENSIT change} \\ \hline 55^\circ \text{ merchandiser temperature} \end{array}$$

#### 6.15.4. PATT TIME

The factory default is 7 days. PATT TIME (pattern time) is a repeating cycle or time period that the surrounding environment experiences. Although it can be set from 1 to 10 days, 7 days represents the typical cycle of most environments in the US and many other countries. In a swing-shift type environment where employees work 4 days and then have 4 days off, set the PATT TIME to 8.

#### 6.15.5. HIST FACT

The factory default is 3. The HIST FACT (historical factor) is used to determine how much past data to use for predicting future periods of inactivity. If set to 3, it will use data from three pattern times. If set to 4, it will use data from 4 pattern times, and so on. It can be set from 3 to 15. The higher the number, the less likely that someone will purchase a warmer-than-ideal product but the energy savings won't be as great.

#### 6.15.6. DEL TIME

The factory default is 3 hours. DEL TIME (delay time) is the time it takes the vendible products to warm (or cool) by the TEMP CHG amount. Typically, a machine full of beverages will require a greater delay time than one full of snacks.

#### 6.15.7. LIGHTING

This is an optional feature in EnergySensit. Note that Lighting may be used regardless of the status of the other EnergySensit feature, or of Health and Safety. The factory default is "N" for No. Press the "7" key to change between No and Yes.

Lighting uses the historical activity data to turn the merchandiser lights off and on for the optional fluorescent lamps, or to dimmable brightness for the optional LED lamps. If the lights are off and the keypad is used or credit activity is detected, the lights will come on for three minutes.

If the lights are off and the door is opened, the lights will come on and remain on until the



door is closed. When the door is closed, the lights will turn off.

Lighting does not affect the merchandiser display.

#### **6.15.8 BRIGHTNESS**

The optional fluorescent lamps are not dimmable. They are either on or off.

The optional LED lamps are dimmable. To use the LED dimming feature the merchandiser must be equipped with S3, have a 20158L harness and have LED lamps installed.

In Service Mode, scroll to EnergySensit, then select option 8 for Brightness. Use the keypad 1 and 2 buttons to change the default brightness as shown on the display. Press the \* key to save the new default setting. The default will operate when the merchandiser door is closed. The factory default is 100%.

During the time the door is open the LED lamps will change to 90% regardless of any settings.

If the EnergySensit lighting feature is turned on, and the software determines the lights should turn off, the LED lamps will automatically dim to a minimum of 10%. If the keypad is used or credit activity is detected, the lights will brighten to the default setting for three minutes.

Brightness does not affect the merchandiser display.

**6.16 PROGRAM QUICK REFERENCE**

Programming instructions can also be found inside the door near the control board.

**SERVICE MODE**

- Open door and press the mode switch on the control board to enter SERVICE MODE.
- Press # or \* to scroll through the functions.
- Return to vend mode by closing the door or pressing the mode switch.

**ERROR CODES**

- # NEXT ERROR
- 1 SUBLVL ERRORS
- 0 CLEAR ERROR

**ACCOUNTING DATA**

- 1 HIST. VENDS
- 2 HIST. CASH
- 3 RESET VENDS
- 4 RESET CASH
- 5 HIST. SELECTIONS
- 6 CLEAR VALUES
- 7 SERIAL NUMBER
- 8 RESET CARD

**FILL/DISPENSE**

- SELECT TUBE 1-5
- OR INSERT COINS

**DELAYED SALES**

- 1 START DELAY
- 2 CANCEL DELAY
- 3 SET DELAY
- 4 CLEAR ALL
- 5 EDIT SEL'NS

**TEMPERATURE**

- 1 CURRENT TEMP
- 2 SETPOINT
- 3 START LOG
- 4 VIEW LOG

**PRICE SETTINGS**

- 1 SET PRICES
- 2 VALUEVEND

**TRAY SETUP**

- 1 TEST MOTORS  
ENTER SELECTION OR \* TO CHOOSE  
OPTION
- 2 LINK MOTORS
  - 1 NEW LINK
  - 2 VIEW / EDIT
  - 3 CLEAR ALL
- 3 MOTOR TYPE
- 4 DELAYED STOP
- 5 LETTER / NUMBER
- 6 CONFIGURE
- 7. COUPLE MOTORS

**MDB SETTINGS**

- 1 FORCE VEND
- 2 NO CHEAT
- 3 CHANGE BILL
- 4 HOLD LOST CREDIT
- 5 MULTI-VEND
- 6 LEVEL2 COIN MECH.
- 7 INSTANT REVAL
- 8 HIDE CARD VALUE

**OPTIONS**

- 1 MESSAGE
- 2 PRIZE
- 3 LANGUAGE
  - 1 PRIMARY
  - 2 SECONDARY
  - 3 CREATE CUSTOM
- 4 PRODUCT SENSOR
- 5 SPEECH

**SALES BLOCKING**

- 1 - 4 SET PERIODS
- ALL SELECTIONS

**CLOCK SETTINGS**

- 1 TIME AND DATE
- 2 DAYLIGHT SAVINGS
- 3 DISPLAY CLOCK
- 4 12/24 FORMAT

**FREE VEND**

- 1 VIEW / EDIT

**AUXILIARY OUTPUT**

- 1 VIEW / EDIT

**DATA LOGS**

- 1 TEMPERATURE
- 2 POWER
- 3 DOOR SWITCH

**ENERGYSENSIT**

- 1 ON/OFF
- 2 CLEAR HISTORY
- 3 SET TEMP CHG
- 4 SET PATT TIME
- 5 SET HIST FACT
- 6 SET DEL TIME
- 7 LIGHTING
- 8 BRIGHTNESS

Note: When not in Service Mode and with door open, press # to move out-of-position switched motors to Home position (Home/Sensor +/2 or Home/Sensor +/3 only).

## 7.0 TROUBLESHOOTING

### 7.1 OUT OF SERVICE MESSAGE

Certain critical errors will disable the merchandiser. When this happens, an “OUT OF SERVICE” message will be displayed.

To get the merchandiser back in service, press the mode switch on the control board. Any errors will be displayed immediately. Refer to the list of error codes and explanations below. Correct the cause of the error, and press “0” to clear the error code. If the error code was generated by an MDB device (CHANGER, BILL VALIDATOR, or CARD READER), press 1 to see more detailed (sublevel) error codes.

### 7.2 MACHINE ERROR CODES: CAUSES AND SOLUTIONS

#### 7.2.1 Viewing Top Level Error Codes

To view top level error codes, enter the service mode by pressing the mode switch located at the lower right corner of the control board. ACCT DATA will be displayed if there are no errors or an error has been cleared

(whether corrected or not). If the error message has been cleared, but the cause has not been corrected, the message can be re-displayed by briefly turning off the power. Use the keypad buttons to perform the following:

- #. **NEXT ERROR** – to view the next top level error code in memory.
- 1. **SUBLVL ERRORS** – to display any sublevel error codes including MDB devices.
- 0. **CLEAR ERROR** – to erase the error code from memory (first correct the error).

#### 7.2.2 Viewing Sub-Level Error Codes

To view the sub-level error codes, press the 1 key while the top level error code is being displayed. Correct the condition which caused the error first, then clear the error code by pressing “0”. Once all errors are cleared, “ACCT-DATA” will be displayed. Refer to the next section for a description of error codes, their causes and solutions.

#### 7.2.3 ERROR CODES - CAUSES AND SOLUTIONS

ERROR CODES – CAUSES AND SOLUTIONS			
TOP LEVEL ERROR CODE	SUB LEVEL CODE	CAUSES	SOLUTIONS
<b>X STUCK</b>	NONE	Keypad selection button X has been depressed more than 2 minutes.	Clear any obstructions or dirt from around the selection buttons and make sure they can move freely. If proper operation is not restored, replace the keypad.
<b>PROD. SENSOR</b>	NONE	The product sensor is blocked or disconnected.	Remove any products or other objects in the bottom, or in sensor openings in ends of the delivery bin. Check sensor harness connections.
<b>SENSIT BLOCKED</b>	NONE	The vend sensor is blocked or lens is fogged.	Remove any obstructions from the path of the sensor.
<b>SENSIT DISCONN'D</b>	NONE	The vend sensor is disconnected.	Check all sensor harness connections.
<b>HOME ERROR</b>	NONE	Motor switch problem	Check for correct motor type. Check for proper connections. Check for correct motor set-up
<b>CHANGER</b>	A message has been generated by the changer. Press 1 to see changer sub-level error codes.		
	COMMUN	COMMUNICATIONS – Communications error.	Check MDB harness connections.
	SENSOR	SENSOR – Sensor error.	Consult changer manual or manufacturer.
	JAM TUBE	JAMMED TUBE – Jammed coin tube.	Clear any obstructions from the coin tube.
	CHK SUM	CHECK SUM – Check sum error.	Consult changer manual or manufacturer
	CHUTE	CHUTE – No coins accepted for a period of time.	Clear any obstructions from the coin chute.

ERROR CODES – CAUSES AND SOLUTIONS			
TOP LEVEL ERROR CODE	SUB LEVEL CODE	CAUSES	SOLUTIONS
<b>BILL VALIDATOR</b>	A message has been generated by the bill validator. Press <b>1</b> for bill validator sub-level error codes.		
	COMMUN	COMMUNICATIONS – Communications error.	Check MDB harness connections.
	STK FULL	STACKER FULL – Stacker is full.	Empty stacker.
	MOTOR	MOTOR – Bad stacker motor.	Consult acceptor manual or manufacturer for repair.
	JAM BILL	JAMMED BILL - Bill is jammed.	Clear any jammed bills from the acceptor.
	CHK SUM	CHECK SUM – Check sum error.	Consult acceptor manual or manufacturer.
	OPEN BOX	OPEN BOX – Open box.	Close the bill box.
	SENSOR	SENSOR – Sensor error.	Consult acceptor manual or manufacturer.
<b>CARD READER</b>	A message has been generated by the card reader. Press <b>1</b> to see sub-level error codes.		
	CARD ERROR –	Card error	Use a different card.
	INVALID CARD –	Invalid card	Use a different card
	TAMPER	Tamper error.	Consult card reader manual or manufacture
	COMMUNICATIO NS 4	Communications error.	Check MDB harness connections
	SERVICE	Unit needs service.	Consult card reader manual or manufacturer.
	READ ERROR	Reader failure.	Consult card reader manual or manufacturer.
	COMMUNICATIO NS 9	Communications error	Check MDB harness connections.
JAMMED CARD	Card is jammed.	Clear the jammed card from the card reader.	

### 7.3 CLEARING JAMMED MOTOR

If one or more motors and helixes become jammed, the motor(s) will be displayed as a sublevel error under “Motor Jammed”.

Energized vend motors can turn a helix with considerable torque, creating a possible entrapment hazard. Disconnect power to the merchandiser or control board before freeing a jammed helix or motor. Always restrain or block the helix before freeing a jammed or caught product.

**CAUTION: Use caution when freeing jammed product!  
Refer to 2.2.4 Helix Motion and Jamming!**

Clear any jammed products from the indicated vend columns.

To reset the error, first enter service mode (Refer to Section 6.0), then select Tray Setup (Refer to Section 6.7.1). Press “1”, then “\*“, then “3”. The control will attempt to run the jammed motors. If the motor had been taken out of the motor matrix, it will be re-established in the matrix.

#### 7.4 WATER ACCUMULATION IN THE CABINET

Water accumulating in the cabinet is usually caused by one of two things: condensation of moist air or rain water leaking into the cabinet. Excessive condensation indicates an air leak which allows moist outside air to continually enter the cabinet and condense on the evaporator. To minimize condensation on the evaporator:

1. Make sure the refrigeration unit cover gasket is sealing properly all the way around. In particular, check the openings where the refrigeration lines and drain tube pass through the cover. These openings should be sealed completely around the lines and tube with duct putty.
2. Make sure the cabinet door is properly tightened when it is closed so that it makes contact with the gasket on all sides.
3. Make sure there are no objects preventing the vend door from closing. The vend door must open and close freely and close completely.

Rain water can enter the cabinet through the rear ventilation opening. Rain entering through this opening is not considered hazardous since all components of the refrigeration unit are sealed. Water will drain out through the ventilation opening in the bottom of the cabinet. Check to make sure the refrigeration unit cover gasket is seating properly if excess water is noticed in the front of the cabinet.

Some water accumulation on the inside bottom area of the cabinet door is expected and should drain out on its own. Check to make sure the rain guards on the top of the door and cabinet are present and functioning properly to minimize water coming in around the door gasket.



**7.5 MACHINE TROUBLE SHOOTING CHART**

The following troubleshooting chart may be used to find quick remedies for electrical and mechanical failures in the merchandiser.

**IF A REPLACEMENT PART IS NECESSARY, PLEASE CONTACT YOUR DISTRIBUTOR**

Symptom	Possible Cause	Remedy
No power at the control board. (no beeping sound during power-up or when the service mode button is pushed)	No power from power cord.	Check power cord, outlet or supply.
	3.0 amp fuse is blown.	Replace 3.0 amp fuse.
	Fuse harness is not connected to the back of the fuse holder.	Connect fuse holder harness.
	Power harness is disconnected.	Reconnect power harness.
	Short or cut in the power harness between the transformer and control board	Check continuity through the power harness. If there is no continuity replace the power harness.
Transformer does not have power at the 24 VAC secondary side.	Insure primary side of transformer is receiving power. If there is no 24 VAC on secondary side replace transformer.	
Merchandiser displays "Please Make Another Selection".	Selection not configured in the motor matrix.	Reconfigure the motors.
	Motor jammed	Clear jammed motor and clear error code
	Vend not sensed by sensor	Clear fault in sensor boards or harness: possible control board error
Merchandiser does not accept coins.	Options set for "Free Vend"	Scroll to Free Vend and change to <b>N</b>
	Changer unplugged.	Plug in changer.
	Coins jammed.	Clear jammed coins.
	Defective changer or other MDB device.	Replace changer.
	Credit amount exceeds the highest price. (Prices may be set at \$0.00.)	Set prices.
	Control board is in service mode.	Exit service mode.
Merchandiser will not pay out coins.	Changer unplugged.	Plug in changer.
	Defective changer.	Replace changer.
	Coins jammed.	Clear jammed coins.
	No coins in changer.	Add coins to the changer.
Validator will not accept bills.	Changer unplugged.	Plug in changer.
	Not enough change in the changer.	Add coins to the changer.
	Validator unplugged.	Plug in the validator.

## 7.5 MACHINE TROUBLE SHOOTING CHART - Continued

**IF A REPLACEMENT PART IS NECESSARY, PLEASE CONTACT YOUR DISTRIBUTOR**

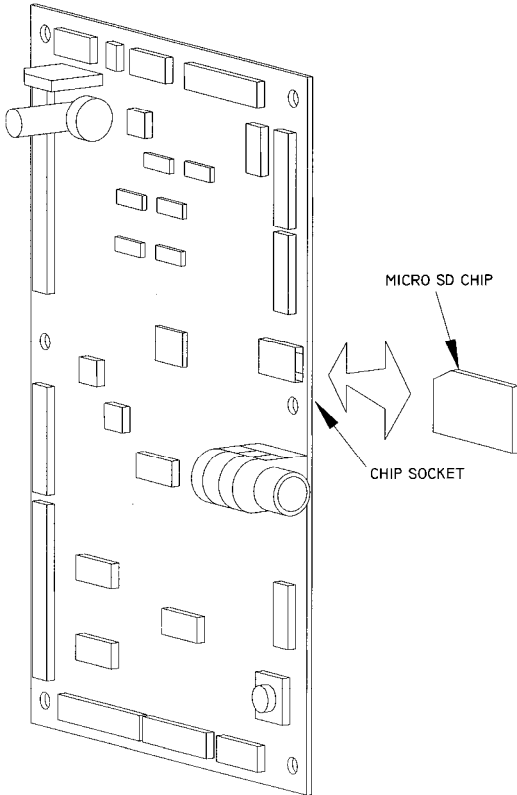
Symptom	Possible Cause	Remedy
Bill is immediately stacked.	Change feature is enabled.	Disable change feature.
	Highest price is greater than bill value.	Change price.
	Non configured selection has a price greater than bill value.	Set and save all prices, including selection columns not in use.
Tray selections do not make a complete cycle.	Harness off at the J-1, J-5 and/or J-6 connector on the control board.	Connect harness to the control board connector. Check harnesses.
Tray selection continues to turn after a successful vend.	Home switch option (used in older style Gum and Mint trays, Assy. 20668) may be set to ON	Set Home Switch to OFF
Evaporator frozen	Moist outside air entering cabinet	Check for air leaks.
		Close door tightly.
		Check all gaskets for leaks
	Check for evaporator fan motor not working.	Replace failed evaporator fan motor.
		Check evaporator fan switch harness connection.
	Replace evaporator switch.	
Refrigeration unit not running.	Door switch is not working.	Adjust switch for positive contact with door.
		Close door tightly.
		Check door switch harness connection.
		Replace defective door switch.
		Replace defective door switch harness.
	Temperature setting in the control board is set too high.	Reset temperature setting.
	Refrigeration relay harness disconnected.	Connect refrigeration relay harness.
	Inoperative Relay	Check for low voltage and high voltage.
	Defective refrigeration relay.	Replace relay.
Over-pressure timer.	Allow 3 minutes for system pressure to equalize, then try again.	



## 8.0 SERVICE

### 8.1 UPGRADING FIRMWARE

Occasionally new software features may become available. The software can be upgraded by using the SD chip. Note that all settings such as pricing and motor configuration will be saved.



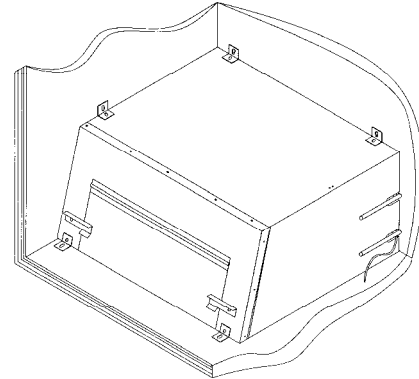
**Figure 8.1 Loading Control Software**

1. Disconnect the power to the control board by using the power switch located on the right rail mount above the refrigeration unit power outlet (alternatively, disconnect the fuse block or the power cord).
2. Locate the socket for the SD program chip (Refer to Figure 8.1).
3. Load the program chip into the socket (it will only fit one way). Push in until it latches in place.
4. Restore the power. The software options on the chip will be shown on the display.
5. Press the "\*" key to scroll through the options.
6. When the desired software is shown on the display press the "#" key
7. The selected software will be loaded and verified (this will take 1 to 2 minutes).
8. After the software has been loaded the display will show AMS with the software number, version and name.
9. Disconnect the power.
10. Remove the chip by pushing it into the socket a small amount. It will unlatch and slide out when pressure is released.
11. Remove the chip and store it in a safe place.

12. Restore power to the merchandiser. The new AMS software number, version and name will be displayed. Check for new options and set them as needed.

### 8.2 CLEANING THE REFRIGERATION UNIT

AMS recommends cleaning the inside of the refrigeration unit at least twice a year under normal conditions, more often in dusty environments.



**Figure 8.2 Refrigeration Unit Housing**

**CAUTION: Always wear eye protection and gloves when cleaning merchandiser! Condenser fins are sharp!**

1. Unplug the merchandiser.
2. Remove the temperature sensor from refrigeration unit housing.
3. Remove the refrigeration unit housing (Refer to Figure 8.2).

**CAUTION: Condenser fins are sharp!**

4. Remove dust from the condenser fins and coils with a vacuum or stiff brush.
5. Remove dust from the inside of the rear screen.
6. Remove dust from the outside of the bottom screen.
7. Replace the housing. When reinstalling the refrigeration unit housing, it is important to seal the housing completely to prevent air leaks. Outside air leaking into the cabinet can cause condensation to form, which can lead to water overflowing the drain pan or ice build-up on the evaporator. Follow the procedure below to ensure proper sealing.
  - a. Locate the notches on the back right corner of the housing (Refer to Figure 8.2).
  - b. Remove any duct putty from the notches. Do not discard the putty. It will be reinstalled in a later step.
  - c. Set the housing in place, making sure the drain line and power cord pass through the lower notch. The insulated copper tubing should pass through the upper notch.
  - d. Push the housing tightly against the back of the cabinet and visually check that the foam gasket is making contact on all sides.

- e. Continue to push on the housing while reinstalling the screws through the mounting tabs. Be careful – do not overtighten the screws.
- f. Remove the screen from the outside back of the cabinet.
- g. Press the duct putty into the notches. Make sure to seal completely around the drain line, power cord, and insulated copper tubing.
- h. Reinstall the screen.
8. Reinstall the temperature sensor.
9. Plug in the merchandiser.

### 8.3 CLEANING THE BOTTOM SCREEN

Obstructions and lint blocking the air flow up into the chiller condenser can damage the chiller. Clean monthly to allow air to flow through the chiller condenser.

Clean the rear screen as needed by using the instructions given in Section 8.2, Cleaning the Refrigeration Unit.

#### 8.3.1 Cleaning Fixed Bottom Screen

1. Open the door to the merchandiser to stop the chiller.
2. A vacuum attachment with a brush is preferred; however, a bristle brush may also be used.
3. Do not use water or other liquid chemicals or solvents.
4. From the underside of the merchandiser gently sweep lint away from the screen with the brush. Do not push the lint into the screen.
5. Clean the floor under the merchandiser with the brush, removing any obstructions such as cardboard and wrappers.
6. Close the merchandiser door.

#### 8.3.2 Cleaning Removable Bottom Screen

1. Open the door to the merchandiser.
2. Turn the two tabs on the chiller housing and swing the chiller cover door all the way up.
3. With a finger in the removable screen handle, lift it up slightly and slide it towards you.
4. A vacuum attachment with a brush, or a bristle brush, may be used to remove dirt and lint from screen.

#### CAUTION: Condenser fins are sharp!

5. Remove dust from the condenser fins and coils. Do not damage the fins or coils.
6. Do not use water or other liquid chemicals or solvents.
7. Reinstall the clean and dry removable screen by sliding it back into the holder.
8. Close door on chiller housing and turn the two tabs to hold door closed.
9. Clean the floor under the merchandiser with the brush, removing any obstructions such as cardboard and wrappers.
10. Close the merchandiser door.

### 8.4 CLEANING THE MERCHANDISER EXTERIOR

Clean the merchandiser exterior as necessary using mild household cleaners and water. Dampen a cloth or sponge with the cleaning solution and gently wipe clean the exterior.

1. Do not use chemicals or solvents. These can damage paint, plastic trim and decals.
2. Do not use abrasive cleaners.
3. Do not use a water jet.
4. Do not let water or cleaning solutions contact electrical or electronic components.

### 8.5 CLEANING THE MERCHANDISER INTERIOR

Clean the interior using mild household cleaners and water. Dampen a cloth or sponge with the cleaning solution and gently wipe the interior surfaces clean.

Some merchandisers use a door liner made from ABS plastic. This liner will crack if chemical solvents or harsh detergents are used.

1. Unplug the merchandiser from the power socket.
2. Open the merchandiser door.
3. Do not use chemicals or solvents. These can damage paint, extruded plastic parts and other plastic parts.
4. Do not use abrasive cleaners.
5. Do not use a water jet.
6. Do not let water or cleaning solutions contact electrical or electronic components.
7. Allow to air dry, or place a window fan on the floor in front of the open interior.
8. When dry, plug in the merchandiser.

### 8.6 CLEANING THE GLASS WINDOW AND WINDOW COVER

The glass window panel inside the door is hinged to allow easy cleaning. A spring-type latch is mounted on the lockbolt cover. Press the spring to release and open the hinged window panel.

1. Clean the glass window with any good glass cleaner.
2. The plastic window cover can be cleaned with the same cleaner or a neutral detergent using a soft sponge, wool cloth or chamois and rinsed with water. NEVER use any solvents, chemical, or abrasive cleaners, or scrapers, squeegees or brushes on the plastic window cover.

### 8.7 LUBRICATION WITH LITHIUM GREASE

Once a year the bottle tray rail ball bearings and door moving parts should be lubricated with grease.

1. Pull out the tray. The tray rail is constructed of telescoping channel sections. Apply a very light coating of white lithium grease on the outside of the first two sections, along the top and bottom edges.
2. Apply grease on the inside of the last two sections along the top and bottom.
3. Apply grease (or similar lubricant) to the door lock bolt threads and the door hinges as necessary.
4. Wipe off excess grease. No other lubrication is required.

### 8.8 LAMP REPLACEMENT

#### 8.8.1 Replacing Optional Fluorescent Bulbs

1. Unplug the merchandiser from the wall.
2. Open the door.

3. Turn bulb one-quarter turn and, at both ends at the same time, slide out through the slots in bulb sockets.
4. Remove one of the two black end caps from the clear protective tube. Slowly remove defective bulb by sliding it out of the tube.
5. Dispose of bulb properly.
6. Slowly insert new bulb into clear protective tube, turning the bulb so the pins are centered in the opening in the black end cap. Install the second black end cap, centering the opening over the pins.
7. Install the bulb by inserting bulb pins at both ends at the same time through slots in bulb sockets, then turn bulb one-quarter turn.
8. Plug in the merchandiser to test the lamp.
9. Close the merchandiser door.

### 8.8.2 Replacing Optional LED Lamps

1. Open the door.
2. Turn off the power to the control board by using the power switch.
3. Locate the LED harness and remove it from the MDB harness.
4. Remove the screws holding the large and small P-clips, and remove the LED lamps.
5. Install the replacement LED lamps, using the small and large P-clips and the screws.
6. Connect the LED harness to the MDB harness.
7. Turn on the power to the control board.
8. With the LED lamps operating, turn the LED lamps to direct the light into the merchandiser.
9. Close the merchandiser door.

### 8.9 DEFROSTING THE EVAPORATOR COIL

Excess moisture accumulating inside the cabinet may freeze in the evaporator coil. As the coil becomes blocked all useful chilled air is also blocked.

1. Unplug the merchandiser
2. Open the door.
3. If the merchandiser has entered an H&S vending hold, the food products should be disposed of.
4. Place a fan on the floor in front of the merchandiser to direct room temperature air into the back of the cabinet.
5. Do not use any tools or electrical appliances to chip at, heat up or otherwise 'speed up' the defrosting action around the coil. Do not puncture the coil.
6. Check if the base under the evaporator drain pan is the non-freezing type, which has two large rectangular vent holes formed in its longest side. If the base is made without these large holes contact AMS to arrange for a Non-Freezing Evaporator Drain Pan Kit (Refer to Kit Drawing 21351).
7. Look for the source of excess moisture.
8. Look for broken or leaking product. Dispose of it and clean up the liquid.
9. Inspect the vend hopper and clean it of liquids and broken containers.
10. Check to make sure the vend hopper door doesn't 'hang open'.
11. Check that the gasket of the chiller housing is securely contacting the cabinet and is sealing it on all sides.
12. Check to ensure the sealing putty is firmly in place around the two openings on the rear, right hand edge

- of the chiller housing. Use more putty if it is missing or is not enough.
13. Check the door gasket around the cabinet opening. It should be intact.
14. Check if the door closes squarely on all four sides and the lock draws the door firmly against the gasket.
15. After the evaporator coil has been defrosted, clean up any water inside the cabinet.
16. Close the door.
17. Plug in the merchandiser and allow merchandiser to cool down before loading perishable products.

### 8.10 TESTING THE TEMPERATURE SYSTEM (Health and Safety)

1. Enter the service mode (Refer to Section 6.0).
2. Press # until the Temperature section appears, then press 2 to view the current set point. The temperature will be displayed in both Fahrenheit and Celsius. The setpoint of the merchandiser must be 41°F or lower for the H&S option to be enabled. Press 5 to initiate the NAMA H&S 15 minute Automatic Shutoff Controls test.
3. At this point the sensor can either be temporarily disconnected, causing the controller to assume a temperature of 120°F/49C, or relocated outside the cabinet. Relocating the sensor outside will allow the sensor to be tested as well.
4. The sensor is mounted to its bracket using two spring clamps (Refer to Figure 8.3). To remove it, first unwrap the sensor wire from the two slots in the bracket, and then slide the sensor out of the two spring clamps.
5. If the sensor is relocated outside the merchandiser, carefully close the door and allow the sensor bulb to exceed 41°F when the door is closed. The temperature may be monitored by pressing the \* button (the sensor bulb has a 20-25 second response delay to minimize hysteresis error before the correct temperature is displayed).
6. 15 minutes after the door is closed, the display should read "OUT OF SERVICE- HS1". The merchandiser will not vend products until the door is opened and the error is cleared (Refer to Section 6.1).

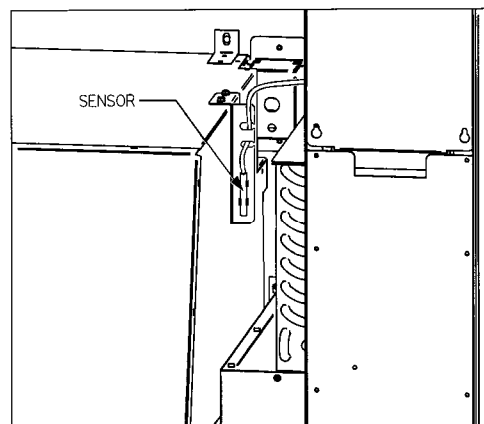


Figure 8.3 Temperature Sensor

7. After testing, remount the temperature sensor on the two spring clips, and carefully re-wrap the sensor wire in the two bracket slots ensuring the wire is not caught or pulled, and is not pinched when the door is closed.
8. Close merchandiser door. The merchandiser will return to normal operation (including a cool-down time if needed).

### 8.11 UTILITY LOADING INSTRUCTIONS

Utility loading instructions are not available at this time. Refer to Section 8.1 for loading of software.

### 8.12 GFCI TEST

1. If the power is on in the merchandiser, test the GFCI as follows: press the TEST pushbutton on the GFCI for 1 second to trip the GFCI and shut it off. The merchandiser power should turn off. Then press the RESET pushbutton for 1 second to return the GFCI to normal operation. The merchandiser should turn on.
2. If the power is not on in the merchandiser check the GFCI as follows: even if the GFCI is off, press the TEST pushbutton on the GFCI for 1 second to trip the GFCI and shut it off. Then press the RESET pushbutton for 1 second to return the GFCI to normal operation. The merchandiser should turn on.
3. If the GFCI can be reset but there is no power, check the power outlet at the wall.
4. If the GFCI will not stay on after RESET is pressed there is a short circuit in the merchandiser. Unplug the merchandiser. Follow the suggestions in Section 7.5 to determine the cause of the short circuit, and correct it.

### 8.13 REPLACING THE POWER CORD

Use this procedure to remove a power cord that is cut, split open or is otherwise damaged or a hazard. A ¼" nut driver, needle nose pliers, gloves and protective eyewear are required.

Save all hardware and fasteners for re-use.

1. Remove power from the vendor by removing the power plug from the wall outlet. Move the vendor away from wall in order to reach the back.
2. Open vendor door. Separate the power cord from the rest of the vendor electrical harness by using the quick disconnect.
3. Remove screws attaching the wire bushing plate from inside rear wall of cabinet.
4. Remove wire bushing and power cord from the plate.

5. Outside of cabinet, remove the two screws attaching back grommet plate to cabinet.
6. Slide grommet plate down and away from slot in molded-on grommet on power cord.
7. Remove power cord down and away from round cut-out in back of cabinet.
8. Remove the damaged power cord from the cabinet and discard it.
9. Insert the new power cord end with the quick disconnect into the power cord hole. Do not plug in the new power cord at this time.
10. Slide the groove of the molded-on grommet on the power cord up onto the round cut-out in back of cabinet.
11. Slide the grommet plate up into lower half of molded-on grommet, making sure it slides up behind the cut-out in the cabinet. The power cord should come out of the grommet and be facing down.
12. Position protective cover over grommet plate.
13. Insert and tighten 2 screws.
14. Inside the cabinet, install the wire bushing and power cord onto the wire bushing plate.
15. Reinstall the plate to the inside rear wall of the cabinet
16. Reconnect the power cord quick disconnect inside the cabinet.
17. Plug the power cord into the power outlet. The power should come on in the vendor.
18. Test the GFCI on the power cord (Refer to Section 8.12).
19. If everything is operational return the merchandiser to its position next to the wall.

### 8-14. STORING THE MERCHANDISER

If the merchandiser is to be stored without power for several days or longer, use the following instructions. These instructions are similar to those used to store any refrigerator.

1. Remove any products from the merchandiser.
2. Unplug the merchandiser from the power outlet.
3. Clean the inside using the general directions given in Section 8-5.
4. Leave the door open for a day to allow the interior to thoroughly dry.
5. Close the door and lock it to protect the interior.
6. Roll up the power cord and place it in the hopper.
7. If the merchandiser is being moved follow the handling and setup procedures given in Section 4.

### 9.0 WIRING DIAGRAM

**▲ POWER-DOWN BEFORE DISCONNECTING ANYTHING.**

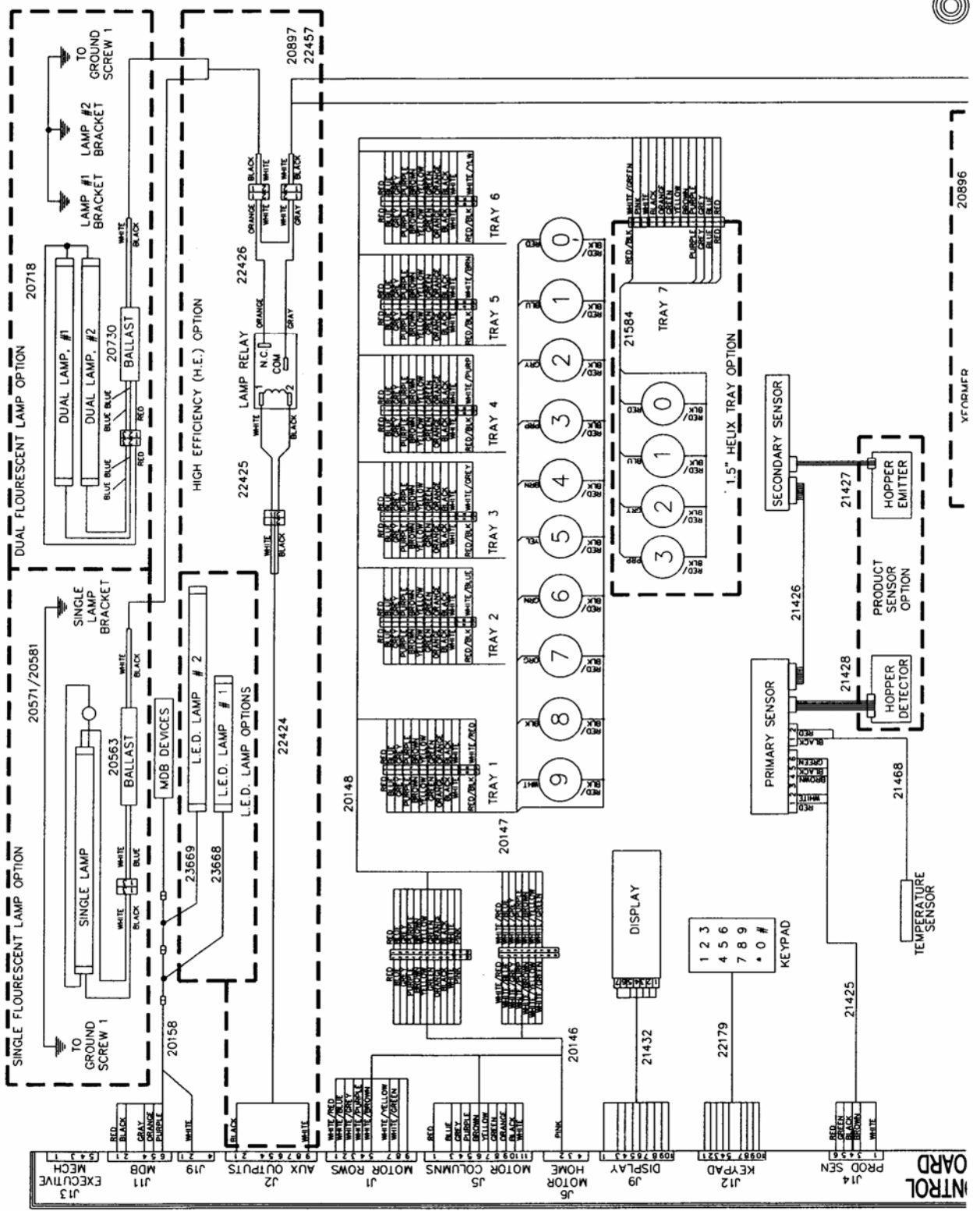


Figure 9.1 Typical Wiring Diagram, Sheet 1 of 2



**10.0 SUPPORTED DEX FIELDS**

NOTE: Certain fields may not be reported if the value is zero.

BA101	Bill Validator Serial Number	CA1001	Value of cash filled since last reset
BA102	Bill Validator Model Number	CA1002	Value of cash filled since initialization
BA103	Bill Validator Software Revision		
		CB101	Control board serial number
CA101	Coin mechanism serial number	CB102	Control board model number
CA102	Coin mechanism model number	CB103	Control board software revision
CA103	Coin mechanism software revision		
CA201	Value of cash sales since initialization	DA101	Cashless 1 Serial Number
CA202	Number of cash vends since initialization	DA102	Cashless 1 Model Number
		DA103	Cashless 1 Software Revision
CA203	Value of cash sales since last reset		
CA204	Number of cash vends since last reset	DA201	Value of cashless sales since initialization
CA301	Value of cash in since last reset	DA202	Number of cashless vends since initialization
CA302	Value of cash to the cash box since last reset		
CA303	Value of cash to tubes since last reset	DA203	Value of cashless sales since last reset
CA304	Value of bills in since last reset	DA204	Number of cashless vends since last reset
CA305	Value of cash in since initialization		
CA306	Value of cash to the cash box since initialization	DA401	Value credited to cashless device since initialization
CA307	Value of cash to the tubes since initialization	DA402	Value credited to cashless device since last reset
CA308	Value of bills in since initialization	DA501	Value of cashless discounts since last reset
CA401	Value of cash dispensed since last reset	DA502	Number of cashless discounts since last reset
CA402	Value of cash manually dispensed since last reset	DA503	Value of cashless discounts since initialization
CA403	Value of cash dispensed since initialization	DA504	Number of cashless discounts since initialization
CA404	Value of cash manually dispensed since initialization	DA901	Value of cashless overpay since last reset
CA601	Number of DEX reads performed since initialization	DA902	Value of cashless overpay since initialization
CA602	Number of door openings since initialization		
CA701	Value of cash discounts since last reset	DXE01	Transmission Control Number:"1"
CA702	Value of cash discounts since initialization	DXE02	Number of Included Sets:"1"
CA703	Number of cash discounts since last reset		
CA704	Number of cash discounts since initialization	EA301	Number of reads with reset since initialization
		EA302	Date of the current read out
CA801	Value of cash overpay since last reset	EA303	Time of current read out
		EA304	This terminal/interrogator identification
		EA305	Date of the last read out
		EA306	Time of the last read out

EA307	Last terminal/interrogator identification		
EA401	Date of first DEX configuration	EA402	Time of first DEX configuration
EA403	Installation terminal/interrogator identification during first DEX configuration	PA206	Value of discounts given since initialization
EA701	Number of power outages since last reset	PA207	Number of discounted paid vends since last reset
EA702	Number of power outages since initialization	PA208	Value of discounts given since last reset
		PA401	Number of free vends since initialization
G8501	Record Integrity Check (least significant byte first)	PC101	Product number (one based index)
		PC102	Product price
		PC103	Product Identification
IC101	Machine serial number	TA201	Value of vend token sales since initialization
IC106	Machine Asset Number	TA202	Number of vend token vends since initialization
IC501	System Date (yymmdd)	TA203	Value of vend token sales since last reset
IC502	System Time (hhmm)	TA204	Number of vend token vends since last reset
IC504	System Daylight Savings Mode (OFF, NA, EU, AUS)		
ID101	Machine serial number	SE01	Number of Included Sets
ID102	Machine model number	SE02	Transaction Set Control Number: "0001"
ID103	Machine Software Revision		
ID106	Machine Asset Number		
ID107	VIDTS stage: "5"		
ID108	VIDTS revision: "0"		
ID401	Decimal point position		
ID402	Numeric Currency Code (ISO4217)	VA101	Value of all paid sales since initialization
ID403	Alphabetic Currency Code	VA102	Number of all paid vends since initialization
ID501	System Date (yymmdd)	VA101	Value of all paid sales since last reset
ID502	System Time (hhmm)	VA104	Number of all paid sales since last reset
ID504	System Daylight Savings Mode (OFF, NA, EU, AUS)	VA105	Value of all discounts since initialization
PA101	Product number (set to the selection number(e.g. 12))	VA106	Number of all discounted paid vends since initialization
PA102	Product price	VA107	Value of all discounts since last reset
PA103	Product Identification	VA108	Number of all discounted paid vends since initialization
PA201	Number of products vended since initialization	VA301	Value of all free vends since initialization
PA202	Value of paid products since initialization	VA302	Number of all free vends since initialization
PA203	Number of products vended since last reset	VA303	Value of all free vends since last reset
PA204	Value of paid product sales since last reset	VA304	Number of all free vends since last reset
PA205	Number of discounted paid vends since initialization		



## **11.0 OPTIONAL EQUIPMENT**

**Part No. 21565 – Kit, 1.5” Helix Tray, Reduced Depth (39”)**

A four-selection helix tray that mounts below the bottom tray.

**Part No. 20449 - Kit, Candy Pusher**

The candy pusher is an adjustable bar that mounts to any tray divider to keep tall candies from falling sideways.

**Part No. 20450 - Kit, Helix Splitter**

The helix splitter is a plastic divider that can be inserted into a small helix to divide each coil into two product openings, thereby doubling product capacity. The helix splitter works best with narrow products such as Life Savers.

**Part No. 20535 - Kit, Cup Rail, Small Helix**

**Part No. 20536 - Kit, Cup Rail, 4” Helix**

**Part No. 20723 - Kit, Cup Rail, 3” Helix**

The cup rail is a flat plastic bar that can be placed inside the helix to provide a flat surface for rigid flat-bottomed packages that otherwise do not stay upright when placed in a helix. Examples would be drink boxes or bottles, or individual serving cups of soup, pudding, etc.

**Part No. 20664 - Kit, Banking Spacer**

**Part No. 21166 - Kit, False Leg**

False leg to be installed on all machines having 2 or more bottle trays to prevent machine tipping during loading.

**Failure to install the false leg could result in serious injury.**

**P/N 20786, Harness, Chip Programming**

Use with the speech hardware and software program.

**P/N 23630 Assembly, LED Lights, Dual, VRM**

Description of parts needed for installing dual LED lights in a VRM.



## **12.0 LIMITED WARRANTY**

Automated Merchandising Systems Inc. (AMS) warrants this equipment to the Original Purchaser only, for a period of one (1) year from the date of shipment, to be free under normal use and service from defects in material or workmanship, and for three (3) years on the refrigeration unit, electronic control board, and the two sensor boards. The refrigeration unit consists of the compressor, fan motors, relay, and the sealed components of the system. Light bulbs, glass, and painted surfaces are not covered by this warranty.

Should any part prove defective within the warranty period, AMS will repair or replace (at its option) the defective component. AMS will provide normal ground shipment for parts replaced under warranty. This warranty does not cover the labor or other costs associated with removal and reinstallation of a defective component. All defective components, at the option of AMS, are to be returned, properly packaged, freight prepaid, to AMS or to the authorized dealer or distributor from whom the equipment was purchased for verification of the defect. Prior to returning any parts for replacement the customer is to contact the AMS Service Department at (304) 725-6921 for return authorization. AMS reserves the right to refuse any collect shipment.

This warranty applies only if the equipment has been serviced and maintained in strict accordance with the instructions presented in this service manual and no unauthorized repair, alteration, or disassembly has been done. Any defects caused by improper power source, abuse of the product, accident, alteration, vandalism, improper service techniques, or damage incurred during return shipment due to improper packaging will not be covered by this warranty. Likewise, any equipment that has had the serial number removed, defaced or otherwise altered will not be covered by this warranty.

AMS reserves the right to make changes or improvements in its products without notice and without obligation, and without being required to make corresponding changes or improvements in equipment already manufactured or sold.

