

**AUTOMATIC PRODUCTS international, Ltd.**

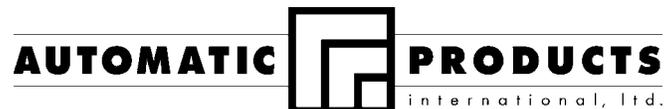
**OPERATING SYSTEM**

**SERVICE MANUAL**

**MODEL 511 *ROBO QUENCHER*<sup>TM</sup>**

**COLD BEVERAGE MERCHANDISER**

PLEASE DO NOT  
REMOVE MANUAL  
FROM MACHINE



A Higher Standard.

75 West Plato — ST. Paul , MN. 55107

## Express Warranty

Automatic Products international ltd. (APi) expressly warrants these automatic merchandisers (the "Unit"), manufactured by it, to be free under normal use and service from defects in material or workmanship for a period of two (2) years from the date of delivery of this Unit to the original purchaser. This warranty extends only to the original purchaser of the Unit. The exclusive remedy for this warranty is limited to the repair or replacement, at APi's sole option, of any part or parts of the Unit that are returned to APi or to the authorized dealer or distributor of APi from whom the unit was purchased with all transportation charges prepaid, and which, on APi's examination, shall, conclusively appear to have been defective. This warranty does not:

- a. extend to any Unit, or part thereof, that was subjected to misuse, neglect, or accident by other than APi after its delivery to the original purchaser;
- b. extend to any Unit, or part thereof, that was modified, altered, incorrectly wired or improperly installed by anyone other than APi or used in violation of the instructions provided by APi;
- c. extend to a Unit which has been repaired or altered by anyone other than APi or authorized dealer/distributor;
- d. extend to a Unit which has had the serial number removed, defaced or otherwise altered;
- e. extend to plastic or glass windows, lamps, fluorescent tubes and water contact parts;
- f. extend to any unit used outdoors
- g. extend to accessories used with the Unit that were manufactured by some person or entity other than APi.

**APi DISCLAIMS ALL OTHER WARRANTIES OF ANY KIND AS TO THE UNIT AND ALL WARRANTIES OF ANY KIND AS TO ANY ACCESSORIES. THIS DISCLAIMER OF WARRANTIES INCLUDES ANY EXPRESS WARRANTIES OTHER THAN THE LIMITED WARRANTY PROVIDED ABOVE AS TO THE UNIT AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AS TO THE UNIT AND ANY ACCESSORIES. UNDER NO CIRCUMSTANCES SHALL APi BE RESPONSIBLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, LOSSES OR EXPENSES ARISING FROM OR IN CONNECTION WITH THE USE OF, OR THE INABILITY TO USE, THE GOODS FOR ANY PURPOSE WHATSOEVER.** No representative of APi or any other person is authorized to assume for APi, or agree to on the behalf of APi, any other liability or warranty in connection with the sale of this Unit.

APi reserves the right to make any changes or improvements in its products without notice and without obligation and without being required to make corresponding changes or improvements in Unit theretofore manufactured or sold.



To achieve the most trouble-free operation from your AP511 Cold Beverage Merchandiser, it is recommended that this service manual be thoroughly read and the instructions followed pertaining to installation, servicing and maintaining of the unit.

Should you have questions pertaining to this manual or the vendor, please contact your APi distributor or write directly to:

**Automatic Products int. ltd.**  
**75 West Plato Blvd.**  
**St. Paul, MN. 55107 USA**  
**651-224-4391**  
**651-602-3558 (fax)**  
8 2002 Automatic Products international, ltd

## INTRODUCTION

The Automatic Products 511 Beverage Merchandiser is the state of the art in vending technology. The 511 features a state of the art robotic delivery system with current limiting motors. The AP 511 introduces a unique delivery mechanism that eliminates the agitation of a carbonated beverage that is usually experienced with the delivery of these products from other machines. The design of the product storage shelves permits the use of a wide variety of packaging, ranging from a standard 12 ounce can to most 20 ounce plastic and glass bottles available in the beverage marketplace today. The easy to understand, numerical key pad selection panel provides access to all setup and diagnostic service modes. All selections can be individually priced with the use of an Multi-Drop Buss (MDB) type coin mechanism and bill validator.

### HOW TO USE THIS MANUAL

This manual is divided into four basic parts:

1. Unpacking and Installation.
2. Optional Equipment & Refrigeration
3. Components and Refrigeration.
4. Operating System.
5. Programming
6. Parts
7. Troubleshooting.

WATCH THROUGHOUT THE MANUAL FOR THIS SPECIAL ♦ DIAMOND MARK. THIS INDICATES A POINT OF SPECIAL INFORMATION OR A HINT THAT WILL ASSIST YOU IN SETTING UP, OPERATING OR TROUBLESHOOTING THE MACHINE.



**CAUTION:** Certain procedures in both the operating section and the service section require that voltage be on in the machine. Only trained personnel should perform this function. Exercise extreme caution while performing these procedures. These procedures will be marked with the lightening bolt symbol as it appears at left.



**CAUTION:** Certain procedures in both the operating section and the service section requires a qualified trained technician to perform the particular task at hand. These procedures will be marked with the exclamation symbol as it appears at left.



**CAUTION:** It is important that this machine is hooked up to the proper voltage and polarity for your country. Use a Voltmeter to verify voltage and polarity. Should the reading be any different than a normal reading for your country or if you are unsure of what the reading should be contact an electrician.



**CAUTION:** Different Countries may have unique plug arrangements. Ensure that the machine is properly grounded before operating.



**CAUTION:** For 230Vac applications, the power cord in this machine is of a type Y attachment. If the power cord is damaged, it must be replaced by: the manufacturer, it's service agent, or a similarly qualified person, in order to avoid a hazard.

# FEATURES OF THE API 511 BEVERAGE MERCHANDISER

## STANDARD FEATURES

- Capacity up to 320 beverages
- Maximum of 40 different selections
- Multi Drop Bus capabilities
- Fault Diagnostics
- First in first out shelf loading
- Health control for vending dairy products

## PRICING

- Individual pricing by selection
- Free Vend Feature
- Software contained Accountability:  
vend counter, cash total

## DISPLAY

User friendly four character, seven segment display to help with the selection process and provide customer feedback

LED segments to indicate:

- Credit
- Selection price
- Remove product
- Diagnostic messages

## SPECIFICATIONS

Ratings:

120v,60 hz,11amps,1320watts

230v,50hz,5amps,1150watts

Dimensions:

Height: 72 inches (1830mm)

Depth: 34-1/8 inches (864mm)

Width: 44-3/8 inches (1130mm)

Shipping wt. 922 lbs.

## REFRIGERATION

- Compressor - 2 Horse Power
  - Refrigerant - R134A
  - Charge - 13.0 oz. (.37 kg.)
- Design Pressures:  
High side-200 psi  
Low side-135 psi

## Electrical

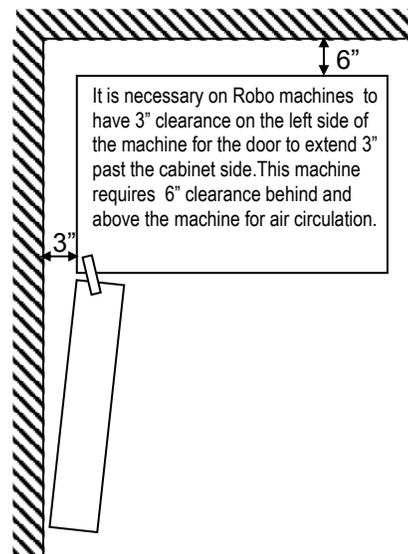
A grounded electrical outlet rated at 120 volts 15 amp must be available within six feet of the vendor.

## COIN MECHANISMS

- **IMPORTANT! DO NOT PLUG COIN MECHANISM INTO THE CONTROL BOARD WITH POWER ON. THIS MAY RESULT IN DAMAGING THE COIN MECHANISM AND LOGIC CONTROL BOARD.**
- **IMPORTANT!** Only the MDB coin mechanisms and bill validators listed on page 6 should be used in this machine.

## ACCEPTABLE AMBIENT OPERATING TEMPERATURE RANGE

All equipment manufactured by Automatic Products Int. Ltd. Is designed to operate in a temperature range of 10° C to 38° C (50° F to 100° F)In still air (75% R.H. non-condensing). The machine is being stored in a temperature range of -18°C to 68°C (0°f to 155°F).



# API 511 UNPACKING AND INSTALLATION

The 511 Robo Quencher™ Beverage Merchandiser is assembled and packed so that a minimum amount of time is necessary for preparation to install it on location. The following steps are recommended to insure correct unpacking.

## UNPACKING

1. Shipping Damage: Thoroughly inspect the exterior of the carton for damage which may have occurred during shipment. Report any damage to delivery carrier and follow their instructions.
2. Remove shipping carton, plastic bag from vendor and remainder of packing material. Inspect exterior of cabinet for damage.  
  
— SAVE SHIPPING CARTON FOR REUSE IF MACHINE IS TO BE RESHIPPIED.
3. Removing Vendor with a Fork Lift Truck:  
From the front of the vendor tip the vendor backward and run forks under the cabinet.
4. Remove clip from lock handle and open front door. If machine is equipped with a lock, the keys will be in the coin return cup. Inspect cabinet interior for evidence of damage.

**NOTE: Because the weight concentration is toward the back of the cabinet, trucking and lifting should be done from the back. CAUTION should be taken when trucking from side.**

5. On machines with lock in place, unlock and turn handle to open door. When no lock is furnished, remove tape and turn handle. Swing door to its full open position. Remove all packing tape and paper from various areas of machine. Remove shipping screws from the delivery mechanism.
6. **Warranty.** The warranty card is attached to the cover of this manual. It must be filled out in full and mailed at once to insure coverage.

## CLEANING

The 511 Robo Quencher™ will do the best product merchandising job for you if it is kept clean. The display window can be cleaned with any good glass cleaner. The exterior and interior surfaces should be cleaned with warm water and mild detergent. Rinse thoroughly and dry all surfaces.

**CAUTION:** Do not use any cleaners containing silicon as this could cause electrical failures.

The main product shelves can be best cleaned with the product slides removed from the machine. The slides can easily be removed by pushing the slide back and lifting up and out on the front of the slide.

The product slides can be cleaned with hot soapy water, and should be dried thoroughly before returning them to the product shelves. **DO NOT USE ANY ABRASIVE MATERIALS ON THE PRODUCT SLIDES.** Abrasive materials will damage the finished surface of the slides.

Clean the acceptor on the coin mechanism frequently as accumulated dirt in this area can cause coins to hang or not be accepted. Follow recommended cleaning procedures as described by the manufacturer.

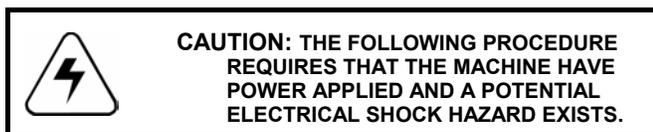
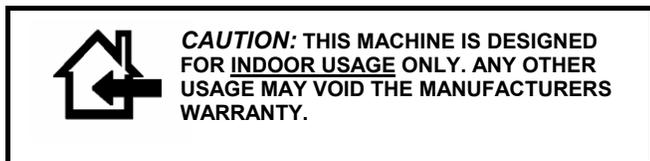
The delivery cage and sensor assembly should be cleaned with a damp cloth during each service visit. Wiping down the delivery cage assembly will prevent any syrup or dirt build up interfering with proper operation of the unit or the optical sensors. Wiping down the product delivery cage sensor will also prevent malfunctions from occurring.

The delivery door assembly can easily be removed from the door for cleaning and servicing. Once the bottle shield is removed, the delivery door assembly can easily be removed by removing two phillip screws along the top of guide bracket below the coin slot assembly. The delivery door assembly can then be disassembled on a bench for cleaning.

# INSTALLATION

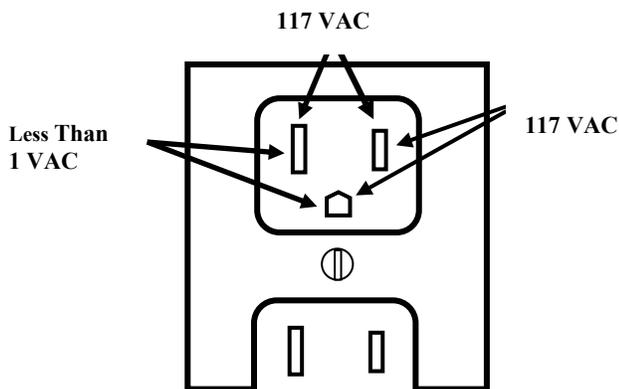
## Leveling the machine:

Leveling the machine once it has been delivered to a location is critical for the proper function of the machine. The four leveling screws in the legs are the means of leveling the machine. After positioning the machine, level machine in front to rear and right to left directions

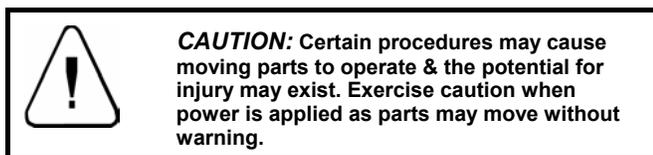


## Voltage and Polarity Check:

It is important that this machine is hooked up to the proper voltage and polarity. Using a voltmeter, perform the following checks from the illustration below.



— Note: should the readings be different from above, have a certified electrician correct the problem.



## Coin Mech Installation:

With door fully open, locate the logic control mounted to upper left side of the inner door. Locate the mode switch on the logic board and press the mode switch one time and press 11. The XY mechanism lock will release and move left to a standby position. Turn main power switch off and swing the coin mech cover to the left to install the coin mechanism. Install the coin mech hold down screw provided. Plug coin mechanism into six pin MDB plug provided.

## Dollar Bill Validator Installation:

Locate the logic control board on the door. Below the logic board will be a filler plate held in place with four nuts. Remove the filler plate and install dollar bill validator in place using the same hardware. Connect the Acceptor harness into the six pin MDB harness routed from the coin mechanism. Plug the other six pin MDB connector from the validator harness onto the P2 pin out connector on the logic control board.

## LOADING PRODUCT SHELVES:

Open the right and left doors to full open position. Lift the red shelf locking lever to release the shelf. Place the first three bottles into position desired, slightly push the product bottles back and insert the next product bottle. Follow the same procedure for loading the remainder of the machine.

## SET SELECTION PRICE:

Price settings are done individually. Maximum price capability is \$99.95. For price setting instructions refer to Quick Set-Up Reference Sheet.

### Install selection price tabs:

Price tabs are included in all manual packets. Price tabs are to be installed onto the dispensing gate above the item selection label.

## SET / CHECK TEMPERATURE:

The cabinet temperature is settable from +32° to +50° Fahrenheit (0°c–+10°c) inclusive in 1 degree increments. For temperature setting instructions refer to Quick Set-Up Reference Sheet. Factory default temperature setting is 35°F

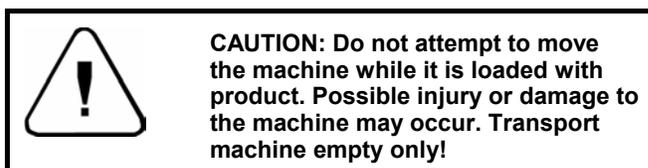
Cabinet temperature can be checked by depressing and holding the (<) or (>) arrow key on selector key pad for three seconds. The temperature of the cabinet will then appear on the display as follows: the (>) arrow key will display Fahrenheit / the (<) arrow key will display Celsius.

## CARRIAGE HEIGHT ADJUSTMENT:

After loading all product into machine, test each selection for proper dispensing into XY mechanism. If product is not dispensing correctly into carriage (i.e.- tilting forward) adjust the height of the carriage so that the lower edge is 1 click (button press) below the slide. For carriage height adjustment, please refer to Quick Set-Up Reference Sheet.

## INSTALL AIR DEFLECTOR

Install air deflector on rear screen outlet by loosening the mounting screws and placing the keyholes over the screw heads, and tightening the screws.



# Components

## POWER SUPPLY:

The 120 VAC power cord from the wall outlet enters the rear of the machine and plugs into the main junction box located in the upper right side the cabinet above the coin mechanism. The voltage output to the board is 24 volts and is connected to the P3 position of the logic control board.

## LIGHTING SYSTEM:

There is only one florescent lamp in the 511 Beverage Merchandiser. The lamp is located in the top of the cabinet and lights up the main product area.

## MAIN PRODUCT SHELVES:

There are five rows of eight columns. Each selection has a dual dispensing gate mounted to the front of the shelf. All columned shelves are identical and interchangeable. The paired columned shelves are supported vertically to prevent warping due to product weight.

## PRODUCT DELIVERY ASSEMBLY:

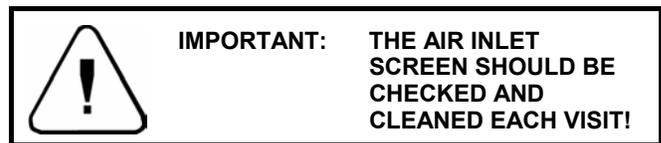
The delivery door is located below the T-handle on the monetary door. The delivery carriage (XY) mechanism is located in the main cabinet. In standby, the XY mechanism is positioned and locked in place directly in front of the coin mechanism. The product delivery assembly consists of five primary components:

- 1) X mech moves the delivery assembly left to right .
- 2) Y mech moves up and down.
- 3) Z mech moves engaging cage in and out
- 4) Product Delivery Door (Home Position)
- 5) Lock motor

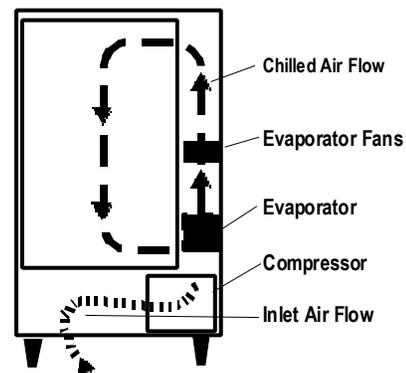
When a selection is made, the controller insures that the delivery door is closed and the Z mechanism (the carriage) is empty. If all systems are ready, the cage lock is released, the X axis motor locates vertical column using an optical sensor is unlocked and the Y axis motor (locates shelf position using an optical encoder) hovers to selected item. The Z Mech (dispense gate engager) is activated until the Z out switch is triggered and depresses the shelf gate to release product which then slides into the delivery cage. The Z mech will wait one second to confirm a product has been dispensed. If a product is not present in the Z mech, the Z mech will return to a vertical position in front of the selection and display Sold out. If a product is present, the Z mech will run until the Z in switch is activated. Once this occurs, the Z mech will return to the home position and lock in place. The delivery door then opens, and remains open until the product is removed.

## REFRIGERATION UNIT

The refrigeration unit is located in the bottom right side of the main cabinet. The air inlet for the compressor is located on the left side of the bottom of the cabinet and is protected by a removable screen. An air deflector is included with each machine and should be installed on the mounting screws on the rear of the machine. The purpose of the air deflector is to ensure proper air flow and correct heat transfer, and to prevent the machine from being pushed up against the wall.



The evaporator is mounted above the compressor assembly, and when installed, is entirely within the insulated cabinet. The single evaporator fan is mounted above the evaporator. The chilled air is circulated up through a large duct on the right side of the cabinet, forced out over the top of the product shelves area and is then drawn down to the inlet of the evaporator and is pulled through the evaporator by the one fan.



Refrigeration Air Flow and Primary Refrigeration Components

The temperature is controlled by a solid state temperature sensing device, located on the right panel of the cabinet and is connected to the control board. The control board then activates a low voltage relay that controls the operation of the compressor.

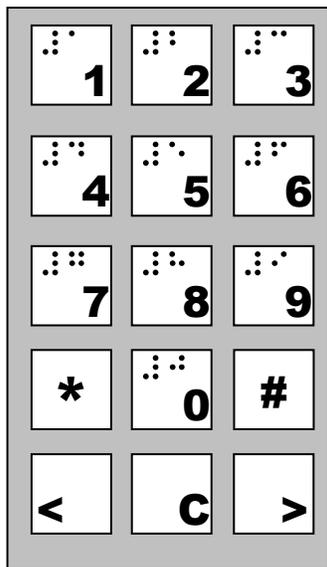
# Components

## Control Board & Display

The control board contains all of the decision-making control and the display. All peripherals plug into the controller. The display on the controller indicates: Credit, Price of the Product, Diagnostic Information and Options (In Service Mode). In addition, there are (2) LED's that indicate Make Another Selection and Check Selection Price.

## Keypad

The Selection keypad (pictured below) is located on the front of swing out panel directly below the selection keypad. The Selection Keypad is used as an input source for settable data when in Service Mode. The keypad is only active for service functions when the door is open, so even in the event of vandalism to the control bezel; no access to the control functions is permitted.



## Coin Mechs, Validators and Card Readers:

The Robo Series Machines support MDB protocol only.

	MDB Coin Mechanism	MDB Bill Validator
<b>Mars</b>	TRC-6510 TRC-6512 VN-4510	VN2502-U5M VN2512-U5M
<b>CoinCo</b>	9302-GX, USQ-G701 USQ-G703 USQ-L701	MAG 32 MAG 52
<b>Conlux</b>	USLZ-004-01F CCM 5 G	USLZ-004-01F

The Robo Series will automatically determine at power up which peripherals are connected and configure itself accordingly.

# Operating System

## INTRODUCTION

The APi 511 Beverage Merchandiser is user friendly and allows the user to move freely through the programming by choosing selected keys. It provides ease for insertion, modification, and deletion of operational parameters and data. In addition, the program system provides the user with status and diagnostic messages to aid in the use and service of the machine.

## OPERATIONAL MODE

The operational mode provides the machine with the ability to vend products. The machine is in Operational Mode whenever the tower cabinet door of the machine is closed. Upon opening the tower cabinet door, the machine will remain in Operational Mode until the Mode Switch on the Control board is depressed at which time it will enter the Service Mode.

## SERVICE MODE

The Service Mode is entered by depressing and releasing the Mode Switch, on the Control Board. A second depression of the Mode Switch, will exit the Service Mode and return the Controller to the Operate Mode. Entrance into the Service Mode will clear any current credit and disables all credit acceptance. In addition, entering the Service Mode, displays diagnostics information until an additional Service Mode function has been selected. Diagnostics information includes MDB errors and defective or jammed arm movement motor codes. All errors are cleared upon exiting the Service Mode.

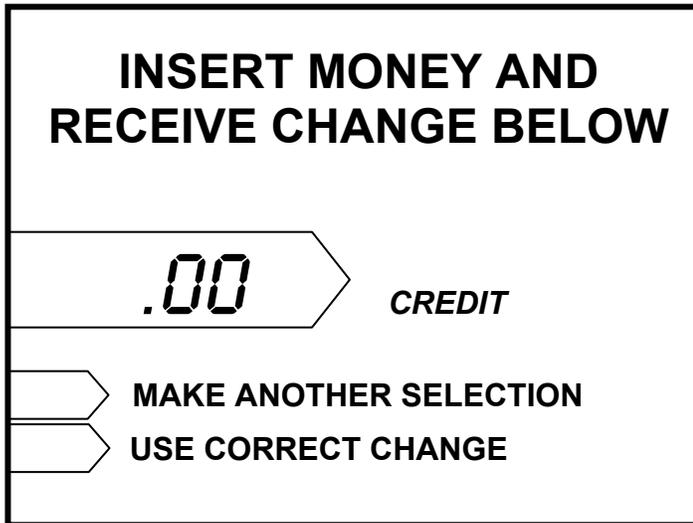
The following table lists the Multi-Drop Bus errors that may be displayed in the Diagnostics Mode:

Multi-Drop Bus Error	Display
Invalid changer scale factor	"CscF"
Defective coin tube sensor	"tSnS"
Coin jam detected	"CJAM"
Coin tube jam detected	"tJAM"
Coin acceptance problem detected	"CnEr"
Acceptor unplugged	"AcEr"
Coin changer ROM checksum bad	"ChEr"
Invalid acceptor scale factor	"bScF"
Defective bill sensor	"bSnS"
Bill jam detected	"bJAM"
Bill stacker is full	"StFL"
Bill cash box is out of position	"Cshb"
Bad bill motor detected	"bMtr"
Bill acceptor ROM checksum bad	"bLEr"
Invalid card reader scale factor	"rScF"
Card error detected	"CdEr"
Invalid card detected	"bCrd"
Card reader jam detected	"rJAM"
Communications error detected	"CoEr"
Card reader failure	"brdr"

# Operating System

## Power Up State

Following a power-up or reset condition, the display will show "----" and then credit available will show on the display



## Operate Mode

Upon closing the door, the display will show the firmware revision level and then enter operational mode.

## Standby

In Stand by, zeros will be shown along with the designated decimal point. Accumulated credit will be shown until a selection is made. Position of the decimal point is determined by the MDB peripherals.

## Keypad echo

When the first numeric key is pressed the display will show the selection number in the second leftmost digit. This character will remain for 5 seconds or until another key is pressed. If a second numeric key is entered, the pair will be shown on the display for one second and then the associated price for the product will display. If the selection is disabled the display will show "d" and flashes the "Make Another Selection" LED.

## Credit Accumulation

Credit may be accumulated through a coin changer, bill acceptor or card reader. Card reader credit cannot be mixed with coin and/or bill credit during a single transaction or vend. Credit acceptance will be disabled when the accumulated credit equals or exceeds the highest priced item. Credit accumulation from any source is disabled or escrowed if change is not available. If the amount of card reader credit available exceeds the maximum displayable credit, the maximum credit will be displayed.

## Vend process

After a keypad entry is made the control board determines if sufficient credit is available for the selection attempted. If the credit is greater than or equal to the selection price, a vend attempt will be made for that selection. During this time, the selection will be shown on the display. If credit is less than the selection price, the price will be displayed and the Use Correct Change LED will flash for 5 seconds or until a new selection key is pressed.

## Change payment

Change will be returned after the vend is complete. The amount of change to be returned will be displayed until all coinage is paid back. The least amount of coins available will be paid back for all credit returns.

## Use Correct Change LED

If the level of the changer's least value coin tube is below the lowest sensor, the "Use Correct Change" LED will be illuminated continuously. If the machine is unable to vend the selected item because of low change, the "Use Correct Change" LED will flash 5 times.

## Make Another Selection LED

If the machine is unable to vend the selected item, the "Make Another Selection" LED will be flash 5 times. In the case of a sold out condition the LED will flash and the display will read "SOLD OUT" for 30 seconds or until a keypress.

# Operating System

## Token Vends

Following the acceptance of a token, the display will show "FrEE". Further credit acceptance is disabled and a single item may be selected to vend for the token credit.

## Accountability Information

All MIS data is stored as both resettable and non-resettable with the exception of Machine Identification Number, Machine Serial Number, Software Version Number, Number of MIS Resets, Number of Machine Resets, Door Open History, and Value of Coins in Tubes which shall be stored as non-resettable only. All vend counters will roll over at 7 digits (9,999,999). All cash counters will roll over at 8 digits including the decimal point (999,999.99).

Vend accounting (MIS) is updated as follows:

\* Indicates which field is updated for a given vend type.

Field	Vend Type			
	Token	Vend	Testvend	Freevend
#VENDS	*	*		*
\$VENDS (Sale Price)		*		
#/PROD	*	*		*
\$/PROD (Sale Price)		*		
#/TESTVEND			*	
# /FREE				*
\$ /FREE				*
# /TOKEN	*			
\$ /TOKEN	*			

**Table 1: MIS Field Update Chart**

# Operating System

## DEX/UCS

The Robo Series supports DEX/UCS Communications Protocol - NAMA Vending Industry Data Retrieval Standard. The machine will automatically recognize the DEX/UCS device when it is plugged into the control board and will recognize when the device initiates the communication protocol. The transmission/reception of data to the device will then take place automatically. The MIS data stored by the machine for a DEX/UCS download is as follows:

DEX/UCS	Definition
ID1*09876543210123456789* ROBO*0020123456789123456 7**12345678901234567890	* Serial # * Model # * Software Version *Machine Location** Machine ID #
VA1*300*9*300*9	* Total Value Vends (H) * Total # Vends (H) * Total Value Vends (I) * Total # Vends (I)
VA2**2**2	** # Test Vends (H) ** # Test Vends (I)
VA3*50*1*50*1	* Value of Free Vends (H) * Number of Free Vends (H) * Value of Free Vends ( I ) * Number of Winner Free Vends ( I )
TA2****6*390	**** Value of Token Vends (H) * Number of Token Vends (H)
CA2*300*9*300*9	* Total Cash (H) * Total Cash Vends (H) * Total Cash(I) * Total Cash Vends (I)
CA3*600*0*300*0*300*600*0* 300	*Value of Cash in ( I ) *Value of Cash to box ( I ) *Value of Cash to Tubes ( I ) * Value of Bills to box ( I ) * Value of Cash in ( H ) * Value of cash to box (H) * Value of Cash to Tubes (H) * Value of Bills to box (H)
CA4*200*540*200*540	Value of Cash Dispensed ( I ) * Value of Cash Manually Dispensed ( I ) * Value of Cash Dispensed ( H ) * Value of Cash Manually Dispensed ( H )
CA15* 0	Value of Coin Tubes
DA2*0*0*0*0	* Value of Card Sales (H) * Number of Card Sales (H) * Value of Card Sales ( I ) * Number of Card Sales ( I )
EA3*1	Total # of DEX Reads.
LS*0001	* Loop Header (Start of information by selection or product code)

H equals Historical (since initialization)  
I equals Interval ( since last DEX read or reset)

# Programming

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## Service Modes (quick reference)

See the following pages for more detailed information on each of the service modes listed below.

To access the Service Mode press the mode button on the board, the display will prompt **Sr** or scroll through a list of errors (if any). The last error will remain on the display until a Service mode is entered. To access the service modes, enter one of the mode numbers below.

MODE NUMBER	
01	Price Assignment
02	Test Vend
03	Multiple Vend Setup
04	Bill Escrow Setup
05	Force Vend Setup
06	Free Vend Setup
08	Historical Total Value of Sales
09	Historical Total # of Vends
10	Coin Dispense
11	Coin Mechanism Access Mode
12	Historical Value of Sales By Selection
13	Historical # of Vends By Selection
20	Refrigeration Setup
21	Health Timer Setup
22	Machine Setup and Tests

## Service Mode Numbers

### 01 - Price Assignment

The display will prompt **Prc**.

Enter the price to be set using the numeric keypad.

Press **#** and the display will prompt **"S"** for Selection.

Enter all the selection numbers to be set at the price entered in the previous step.

Press **#** to enter another price or **C** to lock in and go back to the service mode.

### 02 - Test Vend

The display will prompt **SL**.

Enter the selection numbers to be tested.

Press **C** or close door to exit.

### 03 - Multiple Vend Setup

The display will prompt **nuL n**.

Use **#** to toggle between **n** (no) & **Y** (yes).

Press **C** or close door to exit.

### 04 - Bill Escrow Setup

The display will prompt **ESc n**.

Use **#** to toggle between **n** (no), **F** (first bill) or **L** (last bill).

Press **C** or close door to exit.

### 05-Force Vend Setup

The display will prompt **Fu n**.

Use **#** to toggle between **n** (no) & **Y** (yes).

Press **C** or close door to exit.

### 06 - Free Vend Setup

The display will prompt **Fr n**.

Use **#** to toggle between **n** (no) & **Y** (yes).

Press **C** or close door to exit.

### Accountability

The first four digits are displayed for two seconds followed by the second four digits.

Press **C** to exit.

### 08 - Historical Total Value of Sales.

### 09 - Historical Total # of Vends.

### 10 - Coin Dispense

KEY "1": dispenses the lowest value coin tube

KEY "2": dispenses the next highest coin tube

KEY "3": dispenses the next highest coin tube

KEY "4": dispenses the highest value coin tube (if available)

### 11-Coin Mechanism Access Mode

The cage will move out of the home position and coins can be added to inventory of the coin mechanism.

### 20 - Refrigeration Setup

Upon entering the "Refrigeration" setup mode the display shows the current "Refrigeration" temperature. The **<** or **>** key may then be used to increase or decrease the temperature respectively.

### 21 - Health Timer Setup

The **#** key may then be used to toggle the "Health Timer" option ON/Off.

### 22 - Machine Setup and Tests

**Vend Position:** "\*" then "Column"

**Go Home:** "\*" then "1"

**Safe Area:** "\*" then "4"

**Z Mech Extend:** "\*" then "7"

**Z Mech Retract:** "\*" then "8"

**Set Row:** "\*" then "3"

**Set Selection:** "\*" then "9"

**Product Door Open:** "\*" then "5"

**Product Door Close:** "\*" then "6"

# Programming

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## Service Mode (detailed)

The Service Modes allow you to update all the prices and options in the machine. Upon opening the machine door and depressing the Service button located on the top left corner of the board, the controller enters the Service mode. If a period of no activity occurs for 5 minutes, the controller will automatically revert to the Operate mode. Entrance to the Service mode clears any current credit. In addition, entering the Service mode, will display the # of errors, each error may be scrolled through using the arrow keys. Diagnostics information includes Multi-Drop Bus errors and defective or jammed motor codes. All errors are cleared upon exiting the service mode. If no errors are present the display will Prompt **Sr** for service.

Entering one of the service mode numbers below allows access to that service mode. **Example: entering 01 will take you into price assignment.**

### Service Mode Numbers

#### 01 - Price Assignment

Upon entering the price assignment mode 01 the controller will display "**Prc** " for 2 seconds and then " . " .

Enter the price to be set using the numeric keypad.

Press **#** and the display will prompt "**S**" for Selection.

Enter all the selection numbers to be set at the price entered in the previous step.

Press **#** to enter another price or C to lock in and go back to the service mode.

The maximum price is that can be set at \$99.99 due to the display limitations. (The display format is dependent upon scale factor and decimal point position provided by the credit peripherals connected.)

#### 02 - Test Vend

Upon entering the Test Vend mode 02, the controller will display "**SL** " .

Enter the selection number to be tested. Once the selection is entered, a vend will be attempted. If the vend is successful, the controller display "**SL**" again. If the selected motor fails, the controller will display "FAiL" for 2 seconds and then display "SL " and wait for another selection to be entered. Test Vend will be turned off automatically on door closure. Press **C** or close door to exit.

#### 03 - Multiple Vend Setup

Upon entering the "multi-vend" set up mode 03, the display shows the current "Multi-vend" state. Use **#** key to toggle the "Multi-vend" option between "**nul n**", n = disabled or "**nul Y**" = enabled. Multi-vend enabled (nul Y) allows the customer to make additional selections as long as sufficient credit exists to purchase the lowest priced item in the machine. The customer may establish additional credit at any time when in this mode. If the customer presses the Coin Return Lever, the amount of available credit drops below the lowest priced item in the machine (by set price) or a 30 second time-out expires, change is returned regardless of the state of Multiple Vend. Multi-vend disabled ("nul n") will cause the change to be paid back immediately after product is removed.

Press **C** or close door to exit.

Multi-Vend State	Display
Multi-vend enabled	" <b>MULy</b> "
Multi-vend disabled	" <b>MULn</b> "

# Programming

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## 04 - Bill Escrow Setup

Upon entering the “Bill escrow” set up mode 04, the display shows the current “Bill escrow” state. The **#** key is used to toggle the “Bill escrow” option between FIRST/LAST/OFF. When Escrow FIRST is enabled the unit shall hold the first bill deposited in escrow until a vend is initiated. Once a vend is initiated the bill must be stacked before the product is dispensed. In this mode only one bill maybe used per vend. With this feature set to LAST all bills are stacked until credit is above the highest vend price, if change is available. With escrow OFF all bills accepted will be stacked immediately, providing there is sufficient change to payback. Press **C** or close door to exit.

Bill Escrow State	Display
Bill escrow first	“EScF”
Bill escrow last	“EScL”
Bill escrow disabled	“EScn”

## 05 - Force Vend Setup

Upon entering the “Force vend” set up mode 05 the display shows the current “Force vend” state. Use the **#** key to toggle the “Force vend” option between ON/OFF. When the force vend option is enabled, once credit has reached the lowest vend price set in the machine, the customer must purchase at least one item prior to requesting that any remaining credit be returned. Force Vend does not apply when debit cards are used or if all coins/bills are held in tubes/escrow. Press **C** or close door to exit.

Force Vend State	Display
Force vend enabled	“Fu Y”
Force vend disabled	“Fu n”

## 06 - Free Vend Setup

Upon entering the “Free vend” set up (mode 06) the display shows the current “Free vend” state. Use the **#** key to toggle the Free vend option between Y (ON) and N (OFF). When the “Free vend” option is enabled, the machine can be vended without credit. **NOTE: If free vend is enabled, it will stay enabled until it is disabled.** Press **C** or close door to exit.

Free Vend State	Display
Free vend enabled	“Fr Y”
Free vend disabled	“Fr n”

## 08 – Historical Total Value of Sales

Upon entering the Historical Total Value of Sales the display shows the sales displayed as an eight digit number. The eight digits are broken into two, four digit displays. First displayed, are the upper four digits for 2 seconds followed by the lower four (with decimal point location) for 2 seconds. These two fields will alternate every 2 seconds until this mode is exited. Press **C** or close door to exit.

## 09 - Historical Total # of Vends

Upon entering the Historical Total # of Vends the display shows the vends displayed as an eight digit number. The eight digits are broken into two, four digit displays. First displayed, are the upper four digits for 2 seconds followed by the lower four (with decimal point in the right most digit) for 2 seconds. These two fields will alternate every 2 seconds until this mode is exited. Press **C** or close door to exit.

# Programming

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## 10 – Coin Dispense

Upon entering the Coin Dispense the display shows “Coin”. As you depress the keys below coins are dispensed from the inventory tubes.

KEY "1": dispenses the lowest value coin tube

KEY "2": dispenses the next highest coin tube

KEY "3": dispenses the 3rd highest coin tube

KEY "4": dispenses the 4<sup>th</sup> highest value coin tube (if available)

## 11-Coin Mechanism Access Mode

The cage will move out of the home position and coins can be added to the inventory of the coin mechanism.

## 20 - Refrigeration Setup

Upon entering the “Refrigeration” setup mode the display shows the current “Refrigeration” set temperature. The {< >} key may then be used to increase or decrease the set temperature respectively. The temperature is settable from +32° to +50° Fahrenheit inclusive in 1 degree increments. The compressor is turned on when the temperature reaches +4°F of the set temperature for 2 consecutive readings. The compressor will remain on until the temperature falls below -2°F of the set temperature for 2 consecutive readings. Once the current mode is left the displayed temperature is stored.

Refrigeration Temperature	Display
Refrigeration Display	“rFxx”

## 21 - Health Timer Setup

Upon entering the “Health Timer” setup mode the display shows the current “Health Timer” state. The {#} key may then be used to toggle the “Health Timer” option ON/OFF. When the “Health code” option is enabled, the entire machine will function as follows: After a door close or a defrost cycle the temperature is ignored for 30 minutes. After that time, if the temperature is above 41°F for 15 consecutive minutes or longer the machine is shut down displaying “OUT OF ORDER” and have a error “Fd” on the display. To reset the milk timer the machine will have to be powered down and then up.

Health Timer State	Display
Health Timer enabled	“HLty”
Health Timer disabled	“HLtn”

# Programming

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## 22 – Machine Set up and Test

Upon entering the Machine Setup and Tests, the display will read "tEst". The following modes are available using the key sequence listed.

### **Vend Position: "\*" then "Column"**

This will bring the Z Mech in front of the vend selection. "Z Mech Out" or "In" is used to simulate a vend of a product or to check height. Height adjusting is done by depressing the left or right arrow keys to bring the Z Mech up or down respectively. To save the height for just that selection use the "Set Selection" or to set the entire row use the "Set Row". When finished with the selection either go to another selection or go home.

### **Go Home: "\*" then "1"**

Brings the Z Mech to the home position

### **Safe Area: "\*" then "4"**

This is a location just outside of home. It is used to adjust the height that you go into home. Height adjusting is done by depressing the left or right arrow keys to bring the Z Mech up or down respectively. To save the new height use the "Set Selection".

### **Z Mech Extend: "\*" then "7"**

This will extend the Z Mech when you are at a vend selection

### **Z Mech Retract: "\*" then "8"**

This will retract the Z Mech when you are at a vend selection .

### **Set Row: "\*" then "3"**

If you are at a selection it will set that to be the vend height for the entire row

### **Set Selection: "\*" then "9"**

If you are at a selection it will set that to be the vend height for that selection.

### **Product Door Open: "\*" then "5"**

The cage lock will engage and then the product door will open.

### **Product Door Close: "\*" then "6"**

The product door will close and then the cage lock will retract.

# Programming

## ELECTRICAL CONNECTIONS

### P1 XMOTION CONTROL

- 1 MOTOR X
- 2 MOTOR X COMMON
- 3 KEY
- 4 LOCK MOTOR
- 5 LOCK MOTOR COMMON
- 6 Y HOME SWITCH COMMON
- 7 Y HOME SWITCH
- 8 X POSITION SENSOR GROUND
- 9 X POSITION SENSOR SIGNAL
- 10 X POSITION +5 SUPPLY
- 11 SENSE SWITCH: SHELF INTERLOCK
- 12 X POSITION SENSOR LED DRIVE
- 13 X MOTOR HOME SWITCH
- 14 GROUND FOR SENSE SWITCHES
- 15 SENSE SWITCH: LOCK MOTOR LOCKED
- 16 SENSE SWITCH: LOCK MOTOR FREE

### P2 MDB

- 1 34VDC
- 2 KEY
- 3 PWR GROUND
- 4 MASTER RXD
- 5 MASTER TXD
- 6 COMMUNICATION COMMON
- 7 N/C

### P3 POWER

- 1 24 VAC
- 2 EARTH GROUND
- 3 24 VAC

### P4 TEMPERATURE SENSOR

- 1 GROUND
- 2 KEY
- 3 TEMPERATURE SIGNAL
- 4 5 VDC

### P5 DELIVERY DOOR

- 1 DELIVERY DOOR OPEN
- 2 DELIVERY DOOR CLOSE
- 3 KEY
- 4 DELIVERY DOOR SWITCH OPEN
- 5 DELIVERY DOOR SWITCH CLOSE
- 6 DELIVERY DOOR SWITCH COMMON

### P6 SERVICE

- 1 DOOR SWITCH COMMON
- 2 KEY
- 3 DOOR SWITCH
- 4 24 VDC
- 5 REFRIGERATION RELAY CONTROL

### P7 RS232 SERIAL INTERFACE (PHONO PLUG)

- 1 RECEIVE DATA
- 2 GROUND
- 3 TRANSMIT DATA

### P8 KEYPAD

- 1 ROW 1
- 2 ROW 2
- 3 ROW 3
- 4 ROW 4
- 5 ROW 5
- 6 KEY
- 7 COLUMN 1
- 8 COLUMN 2
- 9 COLUMN 3
- 10 COLUMN 4

### P9 Y/Z MOTION CONTROL

- 1 MOTOR Y FORWARD
- 2 MOTOR Y REVERSE
- 3 CAGE MOTOR OUT
- 4 CAGE MOTOR IN
- 5 KEY
- 6 CAGE SWITCH IN
- 7 CAGE SWITCH OUT
- 8 CAGE SWITCH COMMON
- 9 Y POSITION 5 V
- 10 Y POSITION SENSOR A
- 11 Y POSITION GROUND
- 12 Y POSITION SENSOR B
- 13 GROUND
- 14 PRODUCT PRESENT SENSOR
- 15 PRODUCT PRESENT LED +
- 16 PRODUCT PRESENT LED

### KEYPAD MATRIX

Switch #	Connection A	Connection B
1	PIN 1	PIN 7
2	PIN 1	PIN 8
3	PIN 1	PIN 9
4	PIN 2	PIN 7
5	PIN 2	PIN 8
6	PIN 2	PIN 9
7	PIN 3	PIN 7
8	PIN 3	PIN 8
9	PIN 3	PIN 9
*	PIN 4	PIN 7
0	PIN 4	PIN 8
#	PIN 4	PIN 9
<-	PIN 5	PIN 7
C	PIN 5	PIN 8
->	PIN 5	PIN 9