



**APEX VENDING**  
CANADA

## Operation and Service Manual



**Glass Front Vendor**

**(APEX 3 COMBO PRO)**

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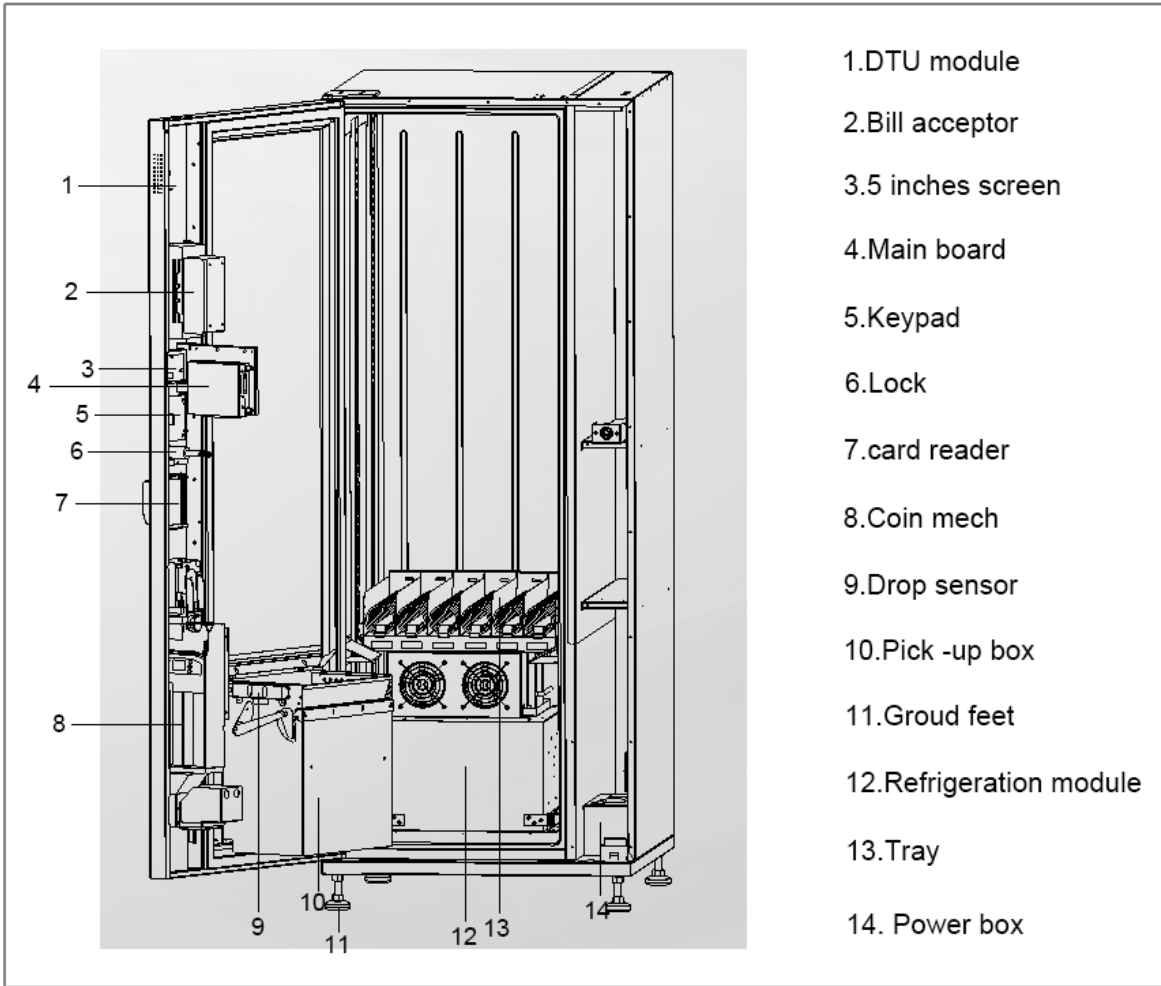
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**PUBLICATION NOTICE**

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.

**Machine structure diagram**



## **1.0 INTRODUCTION**

Congratulations on your choice of APEX COMBO PRO machine. All our models are multifunctional, high-capacity vending machines. This model has been designed, tested and manufactured to provide years of reliable, low- maintenance services in indoor environments. Its functions and flexible product configuration are just some of the many built-in functions of every vending machine.

### **1.1 SENSOR SYSTEM**

The induction system of our machine is a patented sales induction system, which can directly detect the product when the product falls. There is an infrared detection plane above the pick-up port, through which the product can sense whether the product has fallen to the pick-up port. Using this technology, the vendor "knows" whether your customer has received the product. This induction system has several important advantages:

#### **Guaranteed Delivery**

If the product hangs during the sale, the spiral can be rotated an additional 1/4 turn to try to deliver the product. No need to beat or shake the vending machine to get the undropped product.

#### **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 morerefund requests!

#### **Additional Benefits:**

1. The induction system has an adjustable function, adjusting the sensitivity of the sensor can be used correctly in different environments.
2. Disabling or blocking the sensor will not allow vandals to receive free product. The Sensor can

over-ride blocked or malfunctioning sensors and still vend.

3. Opening the glass door of the machine will cause condensation to form inside, but it will recover after a few minutes after closing the door and will not affect the detection of the sensor.

### **1.2 MODEL IDENTIFICATION**

When requesting service, replacement parts or technical assistance, please copy the information on the vendor's serial number plate . It is installed in the lower left corner of the back of the machine. The information contained on this nameplate is necessary to determine which parts, kits or maintenance should be applied to your specific model.

It is a 6-selection with refrigeration integral side door model, and it is also the company's standard model.

**1.3 GENERAL SPECIFICATIONS**

**Operating Environment**

The product is suitable for the altitude below 2000 meters, the ambient temperature is between -10°C-40°C, and can be placed indoors and outdoors. If put it outdoors, The vendor should not be located in an area where it may be subjected to a water jet or rain.

**Machinery Related Projects**

Cabinet Physical Dimensions:  
1940mm\*745mm\*865mm  
(Height \*Width\* Depth)

Machine weight:220KG

Unit Capacity:  
300-600 units (6 Trays \* 6 Columns), Units depending on configuration.

Open door angle:180 °  
Protection level:IP35

Thermal insulation technology:  
Polyurethane integral foam

**Electrical Related Projects**

Rated voltage:110V~240V  
Standby current:1.190A  
Standby power:76.16W  
Rated power: 580W±10% Rated  
Average daily power consumption:7.14KW.H

**Cold and Hot Related Projects**

Compressor: Embraco  
Refrigerant:R134A,220G  
Refrigeration temperature:2~25°C

**Coin Mechanisms and Bill Validators**

Apex vendors will support all Multi-Drop Bus(MDB) coin mechanisms, bill validators and cardreaders. Where applicable, it will also support the“Executive Mechanism” Coin Changer.

**1.4 MERCHANDISER CONFIGURATIONS**

4		4		4	
7		7		7	
6	6	6	6	6	6
5	5	5	5	5	5
6	6	6	6	6	6
8	8	8	8	8	8

Example: 6A models using typical configuration

It has 6 layers and 6 columns. The number in the picture represents the spring pitch (the number of products that can be placed).

This is a standard selection, customers can change the number and size of selection according to their needs.

## **2.0 SAFETY**

### **2.1 COMMITMENT TO SAFETY**

Apex vending companies are committed to designing and producing safe products. As with all electrical or mechanical equipment, there are some potential hazards. The purpose of the automated sales system is to remind the personnel who will be repairing our equipment to pay attention to these potential hazards through this manual and the training of maintenance technicians, 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 should be pointed out that these warnings are not comprehensive. It is impossible for an automated sales system to predict all possible service methods, nor can it predict all possible safety hazards that may be caused by the service. Therefore, we always urge you to beware of dangers such as electric shock, mechanical jamming and dumping of vendors during the movement.

The automated sales system strongly recommends that all service personnel or organizations make a commitment to safety. Only personnel who have been properly trained in the vendor's services should attempt to perform any repairs on the vendor's internal components. Once the vendor leaves our factory, the automated sales system cannot control it.

**Keeping the vendor in a safe state is the sole responsibility of the owner.**

### **2.2 SAFETY PRECAUTIONS**

Below are listed safety precautions and safe practices to follow to avoid injury from selected hazards. This list cannot possibly cover all hazards, therefore please remember to

**++ THINK SAFETY FIRST! ++**

### **High Voltage Contact**

Each vendor is designed to operate at a specific voltage, depending on the country/region, it can be single-phase 110VAC 60Hz or 220-240VAC 50-60Hz. The voltage is specified on the serial number plate (see section 1.2 Model identification). The high-pressure area includes electrical panels, refrigeration units and fans. It is important to understand that contact with high-voltage lines can cause personal injury or death.

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

### **Grounding**

Certain electrical components have a yellow-green ground wire connected to the vendor's ground point. If you need to remove the ground wire during maintenance, please pay attention to how the wire is connected, including the location of any gaskets. After repairing, make sure that the wires and gaskets are completely replaced as they are. Please note that the supplier may work normally without a ground wire, but ungrounded components may present a risk of electric shock.

1. Before plugging into the vendor, always test that the outlet is properly grounded.
2. Be sure to reconnect the ground wire after repair.

### 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. Before servicing the vending machine motor, be sure to disconnect the supplier or control board from the power source.
2. When loading the product, be sure to check whether it is suitable to avoid jamming.
3. Before releasing the stuck or jammed helix, be sure to constrain the helix first.
4. When servicing the vendor, always wear hand and eye protection.
5. Keep hands, hair, loose clothing and tools away from moving parts at all times.

### Vendor Tipping

The weight of an empty vendor is over 300KG. A falling vendor can cause serious injury or death. Caution should always be taken to avoid dropping or tipping a vendor.

1. Never rock or tip the vendor. It must be kept horizontal for safe operation.
2. Never place the vendor in an inclined position such as on a ramp or with all the legs not on the same horizontal surface.

3. Do not place the vendor in a mobile environment, for example, if it is not properly fixed in place on the ship.
4. Do not place the vendor where it may be hit by a vehicle.
5. Do not transport unsafe vendor, or suppliers that still contain products.
6. Do not try to lift or move the vendor by hand. Always use equipment with appropriate load ratings. Please note that the specification weight listed is empty.

### Other Improper Conditions

Vendor's improper use or service may cause dangerous situations.

**WARNING:** Do not use inside electrical vendor unless recommended by Apex Vending.

1. Always reinstall all parts removed during maintenance to their original positions.
2. Do not make unauthorized changes to any part of the vendor.
3. Always replace worn, damaged or unsuitable components.
4. Do not use unauthorized parts or use parts for any purpose other than the intended use.

### 2.3 TEST STANDARDS

GB4706.1-2005

GB4706.72-2008

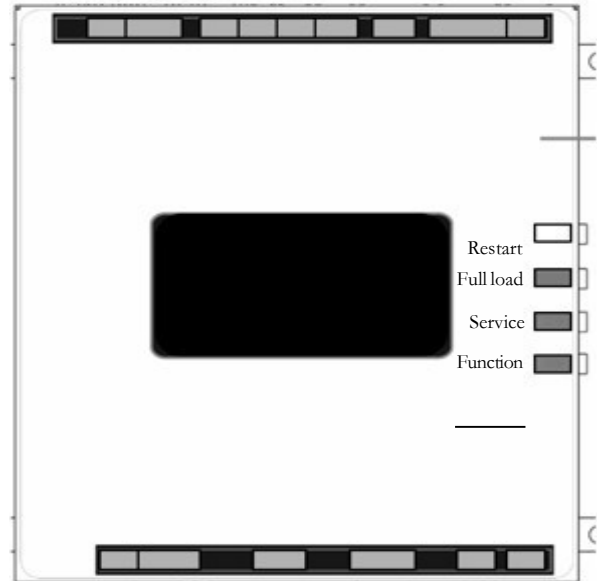
## **3.0 VENDOR SYSTEMS AND COMPONENTS**

### **3.1 VENDING OPERATION**

1. The vending system is comprised of the primary sensor, and the control logic. The primary sensors are attached to opposite ends of the hopper, and infrared light is passed between them.
2. When a selection is made, the vend motor will begin to run. After several seconds, if no product falls in the hopper (or motor returns to home position), the motor will be stopped, the credit will be maintained and the customer will be directed to this selection with “sales paused.” customer can choose products from other 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 (or returns to home position) and removes the credit.
4. When the vendor is serviced with the door open, the protective lens on the sensors can become fogged up, particularly in hot or humid locations. In these cases, the vendor will failed to vending until the fogging has cleared, usually within a minute after closing the door.

### **3.2 CONTROL BOARD**

The control board controls and monitors the vendor, MDB, and DEX systems. The control board is located in the back of the open vendor door, behind the small screen.



**Figure 3.1 Control Board Components**

#### **Upgrading Software**

The software can be upgraded by using a USB flash disk . The U disks is available at Office supply chains or on the internet. Maximum capacity of 16Gb . and the storage format need FT32.

#### **Mode Switch**

Pressing the service mode button (Refer to Figure 3.1) allows the user to get in to the controller's service mode to change settings, access vend data, and check error codes for troubleshooting. Data is displayed on the front display panel, and entered at the front selection panel. Pressing Exit on keyboard, until go back to vend mode.

### **DEX Jack(if customized)**

The DEX jack is provided for use with external features, such as Data collection(payment method)with third party devices can also be made here.

### **3.3 VEND**

#### **SENSOR Primary**

##### **Sensor**

The primary sensor is located on the right of the hopper when viewing the back of the door. The sensor, inside a protective housing, receives light from the secondary sensor . 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 the control board. When servicing the primary board, be mindful of the emitters and circuitry, These can be damaged by rough handling.

### **3.4 DOOR**

#### **Validator & Debit Card Reader Locations**

There are two locations that will accept bill validators and/or debit card readers.

#### **Changer Location**

Changer is installed in the door below the coin chute. The switch handle mate to the keyhole slots on the back of the changer .

#### **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.

#### **Door Switch**

The door switch is mounted on the left ,middle of the door,no control uses for the door switch.

### **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.

The number displayed top left corner Is the temperature,the signal icon is displayed top right corner shows the strength of the SIM card signal.

### **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 vendor.

### **Coin Return Switch**

The coin return switch is located next to the coin slot. Stirring the coin return switch 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 Change 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.

### **Lighting Options**

Several time period lighting options, depending on the model and size of the vendor, Single or dual LED lamps.

### **3.5 TRAY RAILS**

The rails are located inside the cabinet and are used to support the trays. The rails are adjustable up and down in 20 centimeter every step.

### 3.6 TRAYS

Refer to section 5, and 11 for optional tray accessories.

Two types of motors may be used with this vendor. The configuration of the machine will be different if all of one or another is used, or if there is a mix. software can be used to best advantage if all motors are designed for homing, but must be similar within the same tray.

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.

#### DLE Vend Motors

The vend motors have a plastic case of which is white. coupled motors can replace dual helix motors. Where a dual helix motor is used, replace it with single motor and use same 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 always stop at the home position.

**Note:** When in any Mode, We can manually adjust the home position of the helices.

#### Springs

There are dozens sizes of springs available, There are several pitches available in each size, and is determined by counting the number of product openings in the spring (Confirmation on order).

#### Dividers

The dividers separate product columns on the tray. On snack trays, 2 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. Bottle tray supporting plate are held in place with a screw.

### 3.7 Electrical box

The electrical(power) box is located behind the door.It's on the bottom floor of the machine.

#### Power Switch

The power switch is located on the middle of box which is blue . The power switch is used to disconnect 110VAC/220VAC power to the machine. Above it is the temperature controller power switch which is red.

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.

#### Transformer

The transformer reduces the input voltage to 24 volts AC for the control board. Lighting and window heater.

#### 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.

#### Relay

AMS relays use a 24 VDC signal from the control board to close the relay and supply power to the refrigeration unit or other accessories.

#### Power Distribution Harness

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

#### Ground Attachment

The vendor electrical ground is made through the use of grounding studs or screws at the lower back wall of the machine. Earth ground and individual ground wires from the high voltage components are attached in power box , and should always be replaced after service or repair

## **4.0 VENDOR PREPARATION AND INSTALLATION**

Setting up a vendor 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 vendor is to be located.

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

#### **Checking the Outlet (U.S. and Canada)**

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

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 110 volts and 130 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 vendor. **Abnormal voltage, reversed polarity or improper grounding may cause the vendor to malfunction or create hazardous conditions in the vendor, resulting in possible injury, damage to the vendor, 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 vendor, 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 VENDOR.**

#### **Checking the Outlet (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 vendor is rated for the outlet voltage. This requirement does not apply to any vendor using 120V service.

#### **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 vendor, you will find a similarly worded decal on the back of the vendor near the power cord.

#### **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.**

#### **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.**

**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 VENDOR PREPARATION**

**Inspection**

Inspect the vendor carefully for shipping damage prior to signing the carrier's delivery receipt. Check for dents on the top or sides of the vendor, 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.

**Mounting and Connecting Bill Validators and Card Readers**

The Apex vendor 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.**

1. On the inside of the right mount door, 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.
2. Remove the four nuts and spacer that retain the steel cover panel. Remove the steel cover panel.
3. 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.
4. Connect the wiring harness to the MDB harness from the control board. If two devices are installed, connect the second device to the validator.
5. 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.
6. Reconnect power to the control board.

## Mounting and Connecting Coin Mechanism

### (Changer)

The Apex vendor 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.

1. On the inside of the right door, below the coin chute, (3) screws which correspond to slots on the back of the changer. Do not adjust these screws.
2. 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.
3. Tighten the mounting screws (reference manufacturer's literature).
4. Connect the wiring harness to the bill validator (if applicable) or to the MDB connector from the control board.
5. Adjust the orange plastic coin chute as required to align the chute with the changer.
6. Reconnect power to the control board.

### Testing Motors

The vend motors MUST BE TESTED after any changes in the arrangement, type, or number of motors have been made.

1. Press the service mode switch on the control board (Refer to Figure 3.1).
2. Press 888888 go to setting interface Using the 6 or 8key, scroll through the menu to "Selection test".
3. Enter selection number to test the motor. motor is moved a circle and back to the home

position.

4. Watch the display for missing motors that should be connected. The vendor will not vend from a given helix when the motor is missing, jammed or has home switch problems.
5. After the motors have been tested ,check to make sure all the helices are in the home position. If the end of a helix is not at its right position in the column, pull it out of the motor (within motor spring force), turn it until it is, and release the helix into the motor.

### Test Product Loading

Before putting the vendor 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.

7. Remove the cardboard spacers and ties securing the trays.
8. Make use of Section 5.3 for tray vertical adjustments and Section 5.4 for tray column configuration when configuring your vendor to suit your product.
9. 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.
10. 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 1.4, and 5.5 through 5.9).
11. 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.
12. 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).

13. If desired, the position can be set manually by pulling the helix out of the motor, rotating it, and releasing it will automatic recovery in the motor.

### **Installing Price Labels(Factoryinstalled)**

After determining the product placement, install the price labels. The labels are shipped in the 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.

### **Setting Prices**

After product placement and installation of the price labels, set the prices into the vendor.

1. To enter the service mode, press the yellow button on the control board (Refer to Figure 3.1, 3<sup>rd</sup> button ).
2. Using the 6 or 8 keys, scroll through the menu to "PRICE SETTINGS".
3. Press Enter.choose selection price(one of three)
  - a. Choose selection price for one selection
  - b. Choose tray price for one tray.
  - c. Choose entire machine price is for the each vendor selection at this price.
4. Enter the selection number for which you want to set the price (example: 12).
5. Press 1&2 to edit or change the price.
6. Press ENTER to save this price.
7. The prices as set will be maintained by the vendor even if there is a power failure or if the machine is unplugged: however, prices will need to be reset if the program chip is changed

or if the configuration of motors or trays is changed.

8. Using the EXIT keys, exit the servicemode.

## **ON-SITE INSTALLATION**

### **Remove the Shipping Boards**

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

### **Placing the Vendor in Location**

1. Place the vendor within 5 feet of the designated power outlet. The power outlet should be accessible when the vendor is in position, and the ventilation opening in the back of the vendor must be clear of obstructions.
2. For refrigerated models, allow at least 12 inches between the wall and the back of the vendor for air circulation.
3. Make sure the vendor does not block walkways or exits.
4. Do not place the vendor 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 vendor to prevent the door hitting the wall when opened, or use a protective wall bumper. The door must open wide enough to allow the trays to be pulledout.
6. The vendor is designed to meet ADA guidelines for persons in wheelchairs using a parallel approach (side of wheelchair adjacent to front of vendor). Make sure there is adequate room to maneuver a wheelchair into this position in

front of the vendor.

### Leveling the Vendor

For safe operation the vendor must be level.

1. On the bottom of the vendor are four (4) threaded leveling legs located at the corners of the cabinet . Before beginning, be sure that all four leveling legs are screwed incompletely.
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. 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.
4. Repeat the last two steps to level the vendor front-to-back.
5. After the vendor is level, adjust the support screw under the door until it contacts the floor.

### CAUTION:

**Wear gloves-edges may be sharp! Always wear eye protection when servicing vendor!**

### TOOLS REQUIRED:

construction wrench

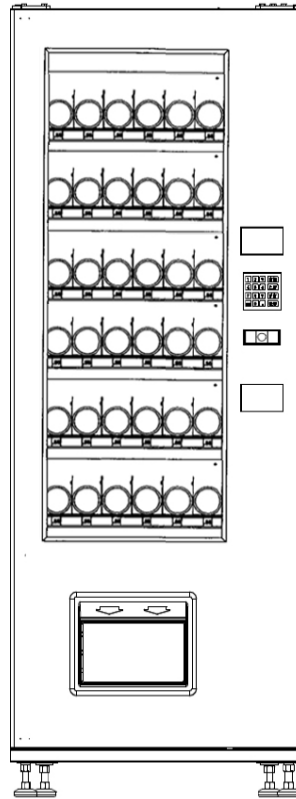


Figure 4.2 Leveling the vendor

## 5.0 TRAY CONFIGURATION AND ADJUSTMENT

The trays in the supplier are highly configurable. In fact, any combination of wide and narrow columns can be provided on the tray. Before changing the configuration of the pallet, make sure to order the parts you need, such as a new spring, divider or additional motor.

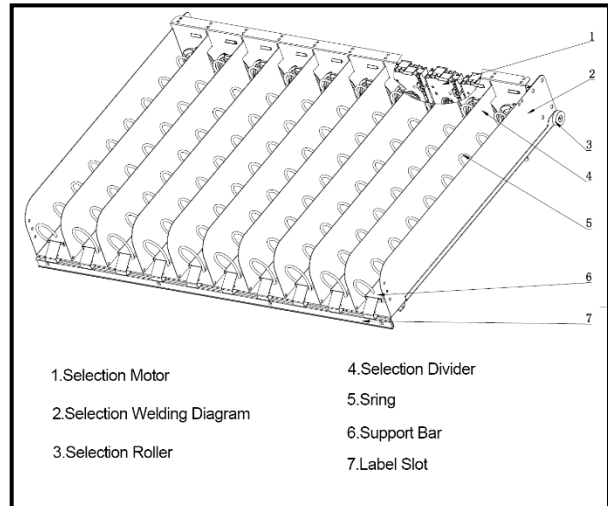
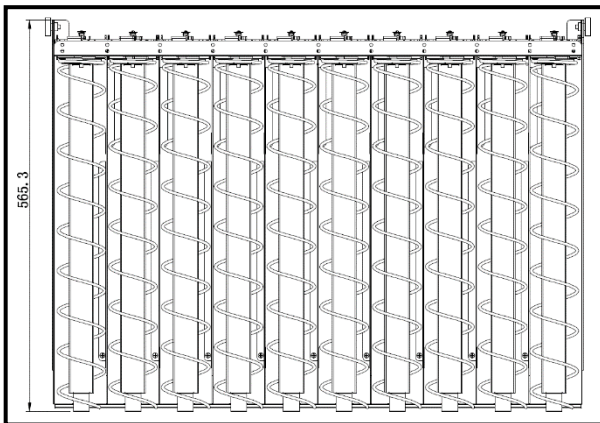
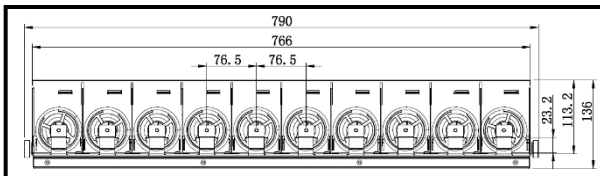
### 5.1 Tray installation

Pick up the tray horizontally, align the left and right pulleys with the slide rails, and push the pulleys into the slide rails until the tray is fully pushed in. There are raised parts on the left and right sides of the front of the tray to prevent the tray from falling out automatically. Finally, plug in the selection cable, and the installation is complete.

### 5.2 Tray removal

First disconnect the selection cable on the right side, take out the tray horizontally, and complete the removal.

### 5.3 Coil Tray



**Figure 5.1 Coil Tray**

1. Change divider
  1. To remove, first remove the screws of the divider, and then pick it up from the front, you can take out the divider.
  2. Reverse the disassembly process to reinstall.
  
2. Change spring
  1. Each spring has a adapter, and the spring is stuck on the adapter. To remove the spring from the adapter, first pull the spring directly out, rotate it counterclockwise, and take out the spring.
  2. Reverse the disassembly process to reinstall.
  
3. Change adapter
  1. Hold down the two long clips on the adapter, and then remove.
  2. Reverse the disassembly process to reinstall.
  
4. Change motor
  1. Push out the clip on the front of the motor, then take out the motor, and unplug the motor wire.
  2. Reverse the disassembly process to reinstall.

5. Change support bar
  1. Loosen the screw at the front end of the support bar, and then take out the support bar.
  2. Reverse the disassembly process to reinstall.

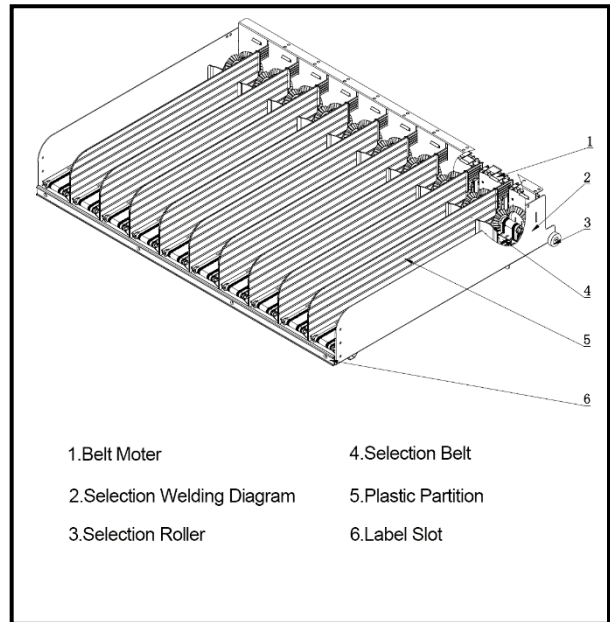
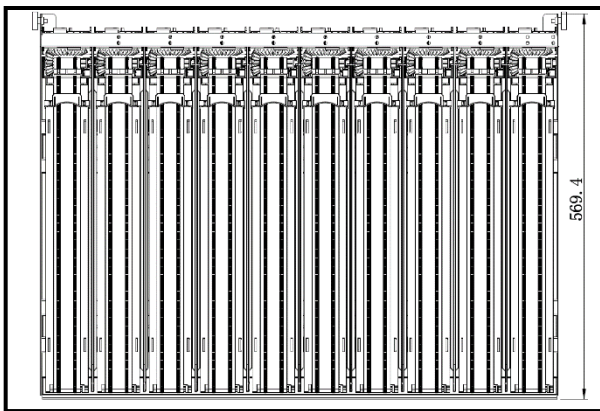
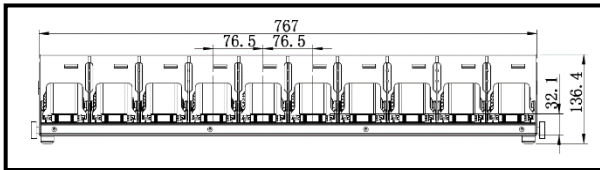
#### 5.4 Product placement

1. Without support bar: Tilt the product backward and put it in the gap of the spring.
2. With support bar: The product is placed vertically in the gap of the spring.

#### 5.5 Spring selection coupling

Two adjacent single-spring selection can be coupled into a double-selection to place larger commodities. Remove the divider between the two single-selection, and replace the right spring with a right spring (the standard is the left Spring), then the motor is installed backwards, and finally the coupling is set in the menu. Spring selection can only be coupled with 2 selection.

#### 5.6 Conveyor Tray



**Figure 5.2 Conveyor Tray**

#### 5.7 Difference from coil tray

1. The method of replacing the motor, divider, and adapter is similar to that of the coil tray.
2. Change Belt: There are 4 clips at the bottom of the belt to fix it on the tray. Loosen the 4 clips to take out the belt.
3. Product placement: The product is placed vertically on the belt and must be able to be placed on the belt steadily, otherwise the product will fall down with the movement of the belt.
4. Belt selection coupling: The method is the same as that of the spring, but the belt selection can be coupled in multiples, and no more than 5 selections can be coupled, which can place super-large products.

## **6.0 SERVICE PROGRAMMING**

### **6.1 Service Model**

Press the yellow mode button on the control board to enter the service mode (see Figure 3.1), There are two menus, one is the basic menu, the password is 888888, and the other is the super menu, the password is 125808521, Press the 2468 key to indicate down, left, and up, as well as cancel and confirm key.

### **6.2 Basic Menu (888888)**

#### **6.2.1 General Setting**

1. **Bill Change** - Test banknote change.
2. **Price Setting** - Set the price of a single selection, each layer, or the whole machine.
3. **Inventory Setting** - Set the inventory of a single selection, each layer, or the whole machine.
4. **Selection Test** - Test whether the motor of a single selection is operating normally.
5. **Light Control** - Set the light working time, only set the master machine.

#### **6.2.2 Payment System**

1. **Wechat** - Turn on this option to use the WeChat function.
2. **Alipay** - Turn on this option to use the Alipay function
3. **Unionpay/Pos** - Connect card reader function need to turn this option.
4. **Bill** - Set the money-receiving mode of the banknote device, set the maximum denomination of the banknote device, and test bill change.
5. **Coin** - Query and set the number of coins, test coin change.

#### **6.2.3 Selection Management**

1. **Selection Numbers** - Detecting the number of machine selections.
2. **Drop Sensor Detecting** - Turn the drop sensor on or off.
3. **Selection Configuration** - Check selection Information.

4. **Selection Item ID** - Correspondence between selection and product code.

5. **Selection Test** - Test a single selection.

6. **Selection Cycle Test** - Automatically test the first to last selection.

7. **Belt Detecting Set** - The movement time of the belt cargo lane includes timeout time and stop time. The timeout time refers to the belt movement time before the product is detected (default 6000), and the stop time refers to the belt movement time after the product is detected (The default is 0, if the bottom area of the product is large, you need to set it).

8. **Extra 1/4 turn setting** - When the goods are jammed, the motor rotates more than 1/4 circlesetting.

9. **Selection Capacity** - Set the selection capacity of a single, each layer, or the whole machine, the capacity must be greater than the inventory number.

10. **Jammed Motor Solution** - Can continue to purchase after setting up the selectionjammed.

#### **6.2.4 Sales Statistics**

1. **Daily Sales** - Query the sales records of the day, press the left and right keys to switch the date.

2. **Monthly Sales** - Query the sales records of the current month, press the left and right keys to switch the month.

3. **Yearly Sales** - Query the sales records of the current year, press the left and right keys to switch the year.

4. **Entire Machine Sales** - Query all transaction records, it will display the total amount, the total number of products, and the number of transactions of the payment type.

5. **Selection Sales Message** - Enter the selection number to query the sales records of a singleselection.

6. **Clear Sales Message** - Clear all sales records.

7. **Clear Security Code** - Set a password for clearing records.

8. **Initial Remote System** - Clear invalid data in the motherboard.

### 6.2.5 System Setting

1. **User Menu Password** - Set user menu password.
2. **System Time** - Set the motherboard system time and date.
3. **Volume Setting** - Set the voice level of the voice broadcast, the range is 0-200.
4. **Temperature Controller Setting** - Set the on and off of the temperature controller, set the mode of the temperature controller, cooling mode, heating mode, constant temperature mode, and set the temperature value.
5. **Temperature Controller Status** - Query the status of the temperature controller, such as: the temperature controller is normal, the temperature controller connection fails, the compressor is disconnected, etc.
6. **Compressor Working Period** - Set the compressor working time period, 3 time periods can be set, such as: 10-16, Indicates that the compressor is on from 10:00 to 16:00, and the compressor is off at other times.
7. **Query Driver Board Information** - If the machine is connected to other slave machine, you can query the program version of the slave machine driveboard.

### 6.2.6 Fault Diagnosis

1. **Drop Sensor Test** - To test whether the drop sensor is normal, there are automatic and manual tests. During manual testing, you need to shift the sensor with your hands or objects. The automatic test and manual test are both successful to be considered normal.
2. **Apply License** - When the machine shows that the service is suspended, you need to enter this menu. The customer provides us with a random code, and we give a verification code to the customer. After inputting, press confirm button.
3. **Bill Validator Diagnosis** - Query whether the bill validator is in normal state and whether it is connected to the main board.
4. **Coin Mechanism Diagnosis** - Query whether the coin mechanism is in normal state and whether it is connected to the main board.
5. **VMC Error Clear** - Clear the error message on the

motherboard.

6. **Clear Jammed Selection** - If there is a item jam fault in the selection, it will be displayed in this option, and the selection can work normally after clearing.
7. **Clear Motor Error** - Sometimes the motor will be abnormal after the goods are jammed, and the motor will malfunction. You need to clear the fault information here to work normally.
8. **Clear Extra Turn Error** - If you turn on the function of 1/4 turn of the jam, and then the jam fault occurs, you need to clear it here, otherwise the position of the spring will change, which will affect products vend.
9. **Selection Check** - Check whether the selection is normal.
10. **Network Diagnosis** - Check whether the machine is networked and the signal value of the network.

### 6.3 Super Menu(125808521)

#### 6.3.1 Payment System

1. **Coin System Set** - Choose the right coin system, coin or hopper coin. Generally choose "coin".
2. **Export System Config** - The configuration information of this machine can be output to USB drive, such as price, selection information, etc.
3. **Import System Config** - After exporting the configuration on the machine to a USB flash drive, insert the USB flash drive into another machine and import it, you can synchronize the configuration on the machine.
4. **Set Logo** - You can choose to display or not display the company LOGO.

#### 6.3.2 Selection Management

1. **Selection Mode** - Three modes can be selected, spiral mode, conveyor belt mode, hook mode, Choose which mode the machine actually uses.
2. **Selection Capacity** - Same as 6.2.3.9
3. **Motor AD** - Motor threshold, the critical value of motor rotation, default is 150.
4. **Selection Coupling** - Two or more single selection are coupled to make it possible to place large commodities. First select the first selection that needs to be coupled, and then select the coupling quantity, such

as: 011 and 012 coupling, enter 011 first, and then enter 2, it is ok.

**5. Clear Selection Coupling** - Clear the coupling of all settings on the machine.

**6. Coupling Synchronization Time** - When the spring selection is coupled, the two selection motors will not run synchronously, and a synchronization time needs to be set, the default is 1200.

**7. Set Motor Short Value** - When the motor reaches a certain value, the main board will display that the motor is short-circuited, the range is 700-900, and the default is 820.

### 6.3.3 System Setting

**1. Machine ID** - Machine code, each machine has an independent code, 10 digits, set in this menu.

**2. Device Language** - The menu language can be changed, only Chinese and English are supported.

**3. User Menu Password** - Same as 6.2.5.1

**4. System Time** - Same as 6.2.5.2

**5. Delivery Door Close Time** - The delivery of the machine with elevator is automatically opened and closed, and enough time can be set to pick up the goods, the default is 60S.

**6. Connecting Upper Computer** - If the machine is connected to an Android system, you need to select Yes in this option, and the default option is No.

**7. Connecting Lift** - If the machine has a lifting system, you need to select Yes in this option, and the default option is No.

**8. Drop Sensor Frequency Adjustment** - Adjust the frequency of the drop sensor, automatic adjustment, only used for machines with lifting system.

**9. Drop Sensor Sensitivity** - Adjust the sensitivity of the drop sensor, the range is 15-30, the lower the value, the more sensitive it is, only used for machines with lifting systems.

### 6.3.4 Fault Diagnosis

**1. Drop Sensor Test** - Same as 6.2.6.1

**2. Apply License** - Same as 6.2.6.2

**3. Bill Validator Diagnosis** - Same as 6.2.6.3

**4. Coin Mechanism Diagnosis** - Same as 6.2.6.4

**5. Clear Jammed Selection** - Same as 6.2.6.6

**6. Clear Motor Error** - Same as 6.2.6.7

**7. Connecting Temperature Controller** - The temperature and parameters can be set through the menu after the temperature controller is connected to the main board. This option can choose whether to connect or not. The default is yes.

**8. Temperature Controller Parameter** - Temperature controller parameter settings, such as: temperature lower limit, temperature lower limit, defrost cycle, defrost time, etc.

**9. DTU Initialization** - DTU is a networking module, sometimes DTU may not be able to communicate with the main board normally, and DTU needs to be initialized at this time.

**10. Restore Factory** - Restore the factory settings of the motherboard, and then need to reset the parameters, etc.

### 6.4 Boot interface information

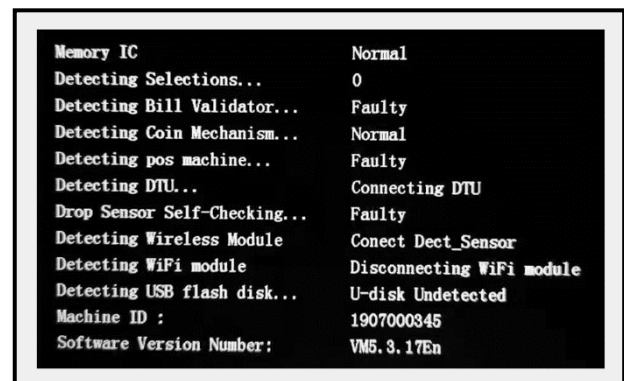


Figure 6.1 Boot interface

1. Check whether the main chip is normal.
2. Check the number of selection.
3. Check the status of the bill validator、coin mechanism and pos machine.
4. Check the status of the DTU、drop sensor、Wifi module.
5. Check whether the USB flash drive is inserted.
6. Check machine code.
7. Check the version of the main board program.

## **7.0 TROUBLESHOOTING**

### **7.1 Out Of Service**

Some errors will disable the vendor, When this happens, a "out of service" message will be displayed.

To allow the vendor to use it again, you need to press the yellow menu button on the motherboard. In the fault diagnosis, find Apply Licence, enter the verification code and press the confirm button, then the machine is working.

### **7.2 Machine Error Display**

<b>Error Display</b>	<b>Error Reason</b>	<b>Solution</b>
Out of stock	No inventory quantity is set in the motherboard	Set the inventory number in the menu, refer to 6.2.1.3
Pause to purchase	There is a selection jammed failure	Clear the jammed fault or motor fault, refer to 6.2.6.6 or 6.2.6.7
The motor does not exist	The motor is damaged or the motor wire is not connected properly	Change the motor or reconnect the cable
Machine memory error	Machine data storage abnormal	Set in the menu, 6.2.3.8, password 888888
Upcomputer Communication error	Unused functions are turned on in the menu	Set in the menu, 6.3.3.6, choose "No", then power off restart machine
Delivery door is not closed	Unused functions are turned on in the menu	Set in the menu, 6.3.3.7, choose No, then power off restart machine

### **7.3 Mchine Trouble Shooting Chart**

#### **Mchine Trouble Shooting Chart**

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

<b>Symptom</b>	<b>Possible Cause</b>	<b>Remedy</b>
No power at the control board	No power from power cord	Check power cord ,output or supply
	The power box is disconnected from the control board or not connected firmly	Check the connection cable between the power box and the control board
	The power box has no DC24V output	Check power box
	Short circuit in other lines	Double check other lines
The screen is black or flickering	The screen failure	Check the screen
	The screen cable is loose	Reconnect the screen cable
Keyboard not working	The keyboard failure	Check the keyboard
	The VMC board failure	Check the VMC board

No product detected	Menu setting is not enabled	Turn on in the menu
	The drop sensor cable is not connected properly	Check the connection cable
	Drop sensor failure	Check the drop sensor

#### 7.4 Temperature controller error code display

Error Code	Detailed explanation
EA1	Compressor current is too large (>5A)
EA2	Compressor open circuit (0A)
EA3	Evaporating fan current is too large (>0.72A)
EA4	Evaporator fan open circuit (0A)
EA5	Cooling fan current is too large (>0.54A)
EA6	Cooling fan open circuit (0A)
E0	The temperature drops or rises too slowly

#### 7.5 Cooling System Troubleshooting

1. The refrigeration temperature does not drop(EA2)

Keep the distance between the machine and the wall above 20cm, ensure normal ventilation, the dust screen behind the machine should be cleaned up on time, check whether the copper pipe is cold by hand, and judge whether the compressor is cooling normally. If it is not, the compressor is leaking, and new gas needs to be added (please operate by professionals).

2. Temperature controller showing "LL"

"LL" is the sensor failure, directly replace the sensor. If it still does not work, replace the temperature controller.

3. Compressor icing

Check the menu first to check whether the defrost cycle and time are correct, check whether the two fans in front of the compressor are rotating, if the fan does not rotate, the fan does not rotate, and the air-conditioning cannot circulate and stay in the compressor, it will cause icing, and then check whether the sensor is normal, If the sensor is abnormal, the compressor will continue to work, which will cause icing, and finally the copper pipe of the compressor will be blocked, which will cause icing.

4. Temperature controller connection fails

Check whether the temperature controller connection line is connected properly, check whether the communication address of the temperature controller is correct, E9 parameter 0 represents the master, 1 represents the slave 1,..., and finally there is a problem with the temperature controller.

5. Compressor water leaks

Check whether the water outlet of the compressor is blocked, whether the water tank is damaged, and whether the air tightness of the machine is good.

**\*\*\* If you encounter other difficult to solve or unseen failures, please contact the vendor, the vendor will have professional engineers to guide and solve.**

## 8.0 MAINTENANCE

### 8.1 UPGRADING FIRMWARE

Occasionally it may be necessary to take advantage of new software features. The software can be upgraded by using a U flash disk, available at most electronics retailers.

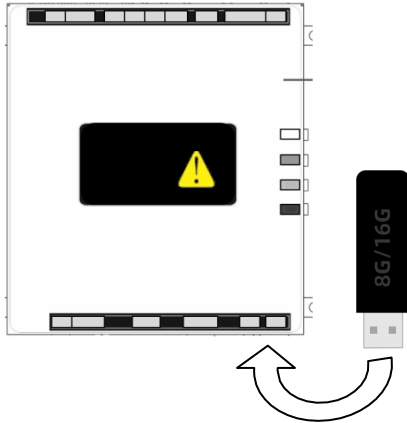


Figure 8.1 Loading Control Software

1. Locate the socket for the U flash disk (Refer to Figure 8.1).
2. Load the U flash disk into the socket (it will only fit one way). Push in until it latches in place.(New motherboard to this step, and then restart will automatically update)
3. Press and hold the red function button .then press white button to restart.Release the button when the update progress barappears.
4. After the software has been loaded the vendor will re-boot, and display will show the software number, version and name.
5. Remove the U flash disk.
6. Check options and set prices as needed. Note that prices and settings (but not DEX data) are saved and restored during this process.
7. Store the U flash disk in a safe place.

The VOICE program that starts the sequence of loading the program into RAM,. This can be upgraded in the same manner as firmware, when in self-check screen, press the full loaded button(green button) until the

upgrade progress bar appears.

### 8.2 CLEANING THE VENDOR EXTERIOR

Clean the vendor 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.
5. Clean the glass front inside and outwith a good window cleaner.

### 8.3 CLEANING THE VENDOR 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 vendors use a door liner made from ABS plastic. This liner will crack if chemical solvents or harsh detergents are used.

1. Unplug the vendor from the power socket.
2. Open the vendor door.
3. Do not use chemicals or solvents. These can damage paint, extruded plastic parts and other plasticparts.
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 openinterior.
8. When dry, plug in the vendor.

### 8.4 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.

## 8.5 LAMP REPLACEMENT

### 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 vendor.
9. Close the vendor door.

## 8.6 UTILITY

A basic software Utility is available for main control boards. Currently it allows an operator to save/load vendor configurations, and upgrade firmware. Please contact your distributor or Apex Vending for more information.

## 8.7 REPLACING THE POWER CORD and GFCITEST

### TOOLS REQUIRED:

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

### REMOVAL&INSTALLATION

1. Move the vendor away from the wall and unplug the power cord from the wall outlet.
2. put the power cord in the protective slot at the back of the vendor .
3. The wire retracts into the vendor.

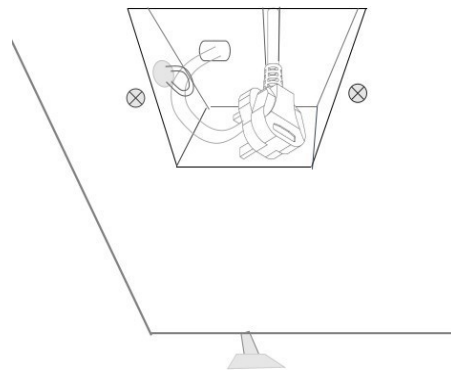
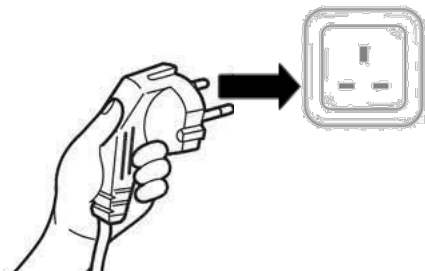


Figure 8.2 Power Cord and Protective Slot

### INSTALLATION

Plug the new power cord into the power outlet.



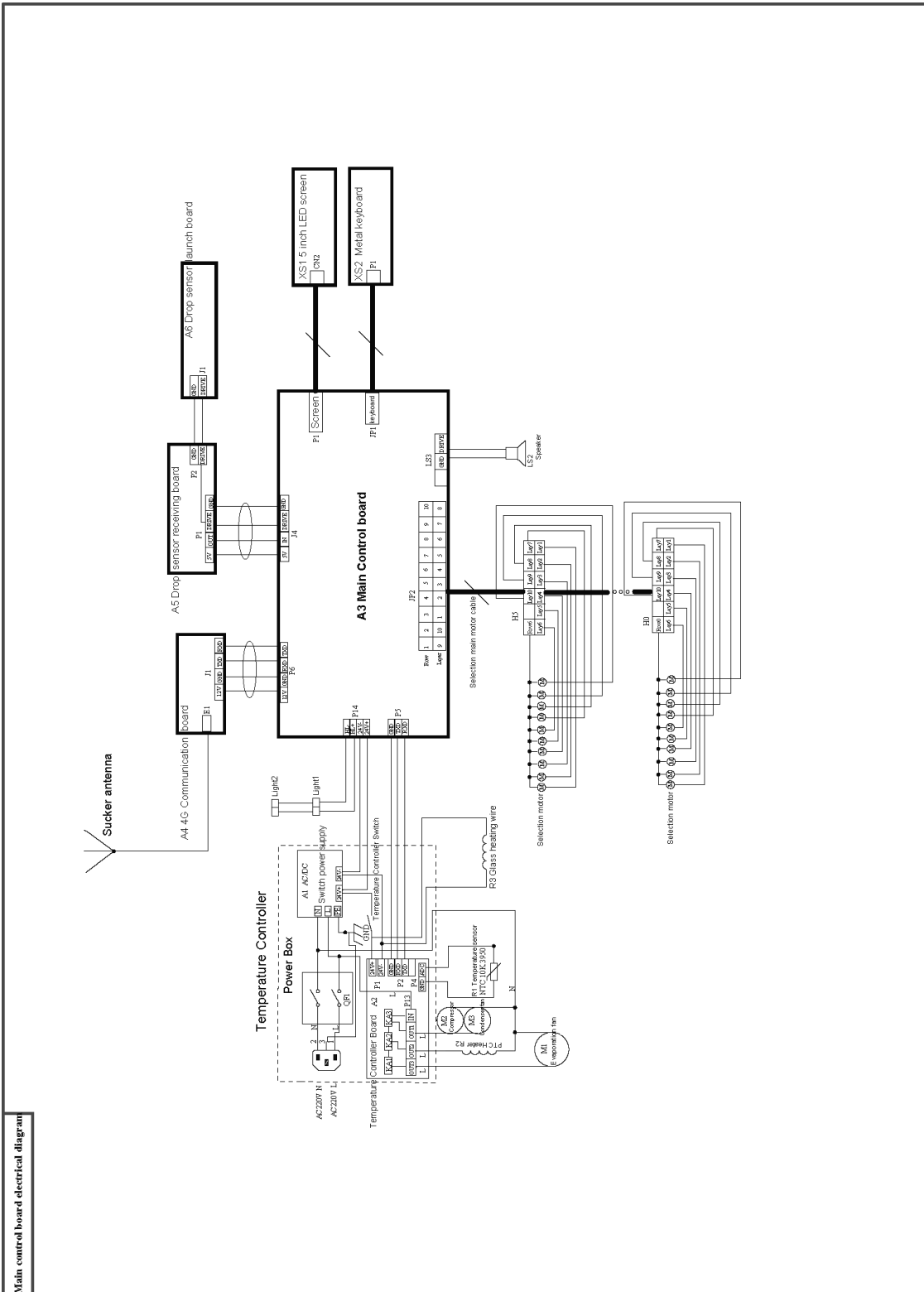
1. Plug the power cord into the power outlet. The power should come on in the vendor.
2. If there is no power, check the power outlet at the wall. If there is power at the outlet check for power at the plug end of the powercord.
3. If everything is operational return the vendor to its position next to the wall.

## **8.8 STORING THE VENDOR**

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

# 9.0 WIRING DIAGRAM



## **10.0 LIMITED WARRANTY**

Apex Vending Canada 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 one (1) year 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, Apex vending will repair or replace (at its option) the defective component. Apex vending 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 Apex vending are to be returned, properly packaged, freight prepaid, to Apex vending 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 Apex Vending Service Department for return authorization. Apex vending reserves the right to refuse any collectshipment.

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.

Apex vending 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.