Industrial Decorating Solutions

U.S. TAX STAMPING EQUIPMENT

Manufactured by United Silicone an ITW Company

Automatic Packing Machine APMD

SERVICE & OPERATION MANUAL

November 2012
Version 1.0

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Automatic Packing Machine

APMD

1.0 Introduction

The APMD is designed to receive stamped cartons of cigarettes from a stamping machine, stack them accordingly, and reinsert the cartons back into the box/case from which they were removed. It will perform in either "Pre Stamp Mode", where all the cartons are of the same brand and size, or in "Post Stamp Mode", where the products are of mixed brand and size.

The APMD is designed to be simple to operate and maintain and will work well with several different stamping machine options including the Value Line (VL-10, VL-HP) and SSM series stamping machines.

NOTE: Most images used in this manual are of a left to right APMD.

APMD Machine Facility Requirements

Air ……. 4 scfm @ 90psi clean dry air**.** See appendix A "Supplying Compressed Air for your US Tax Stamping Equipment" for details

Electrical ……... 120 Volts AC at 8 Amps single phase, 60hz
The APMD is supplied with an 8' cord.

Weight…… Approximate 825 lbs

Footprint…….. Appendix B

*Do not remove any guarding or safety equipment. If any safety equipment or guarding is damaged or malfunctioning immediately shut down the machine and lock it out. Call your qualified service technician to perform repairs.

2.0 Overview of Operation

2.0.1 Pre Stamp and Post Stamp
"Pre Stamp" refers to the practice of stamping incoming cases of cigarettes as they arrive from the manufacturer. The stamped product is then put on the shelves and orders are pulled from this "Pre-stamped" stock of product.

"Post Stamp" refers to the practice of putting the unstamped product from the manufacturer on the shelves directly when it is received. Orders are then pulled from this unstamped product then sent to the stamping line to have the tax stamps applied.

The APMD operates in either "Pre Stamp Mode", where all the cartons in a case are of the same brand and size, or in "Post Stamp Mode", where the products are of mixed brand and size. Many of the machine functions are the same regardless of mode and will be discussed first. The differences between the two modes will be discussed in paragraphs **2.1 Pre Stamp Mode** and **2.2 Post Stamp Mode**.

2.0.2 Basic functions
As stamped cartons are ejected from the stamping machine, they will land on the conveyor belt of the APMD. The stamper and packer should be aligned such that the cartons strike the alignment plate in a consistent manner. The alignment plate will absorb the "bounce" and align the incoming cartons for transport down the conveyor. If for any reason the incoming product should hit too hard (stopped belt or other such malfunction), the alignment plate gate will open causing the packer to go into an fault condition and stopping the stamping machine. Further operation of both machines is inhibited until the problem is cleared and the gate closed.

The cartons are transported to the stacking section of the packer via a moving continuous belt driven by a DC motor.

2.0.3 Conveyor Full sensor

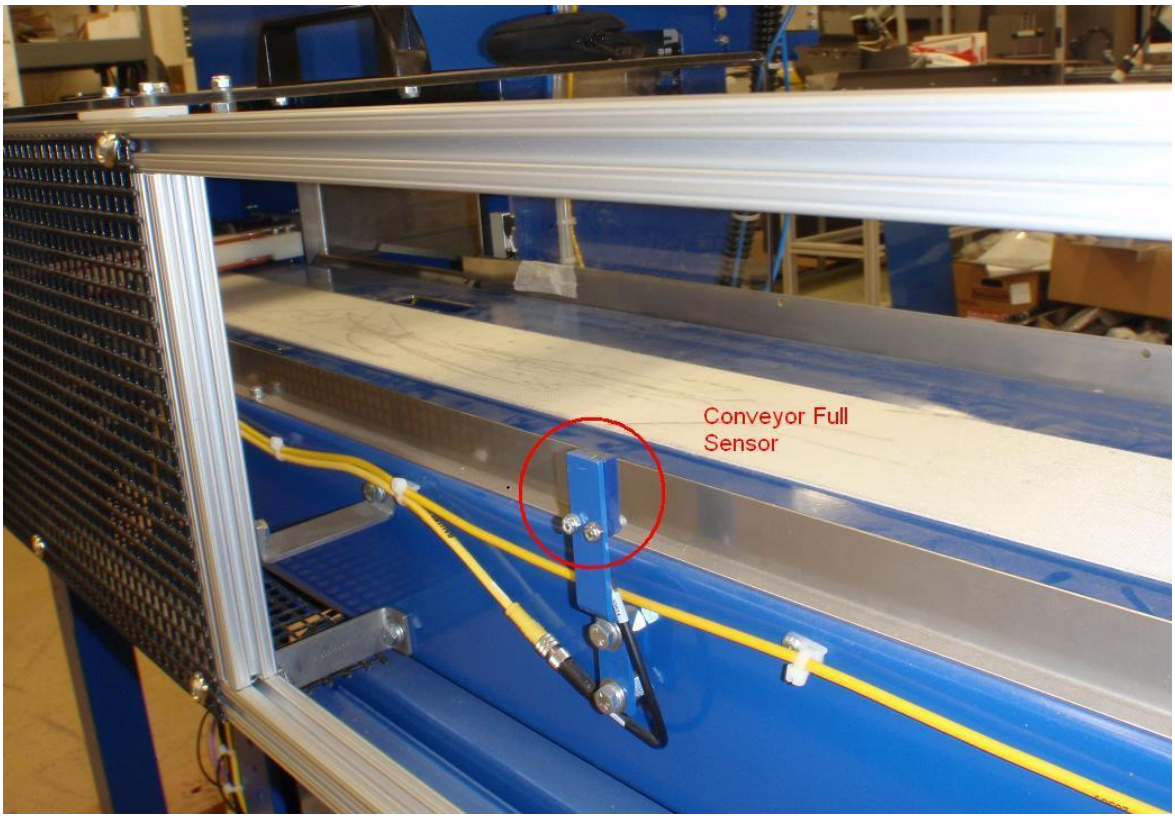

Figure 2.0.3
Conveyor Full Sensor

If for any reason the packer should back up (not placing a box on the unload for example) the belt will fill up with product to a point where it is detected by a sensor. This sensor is positioned such that when it sends the "Packer Conveyor Full" signal to the stamper there is sufficient space on the conveyor to allow the stamper to "clear" whatever product is still in the stamping machine. Normal function of the stamping machine will continue automatically after this sensor has been clear for a set time.

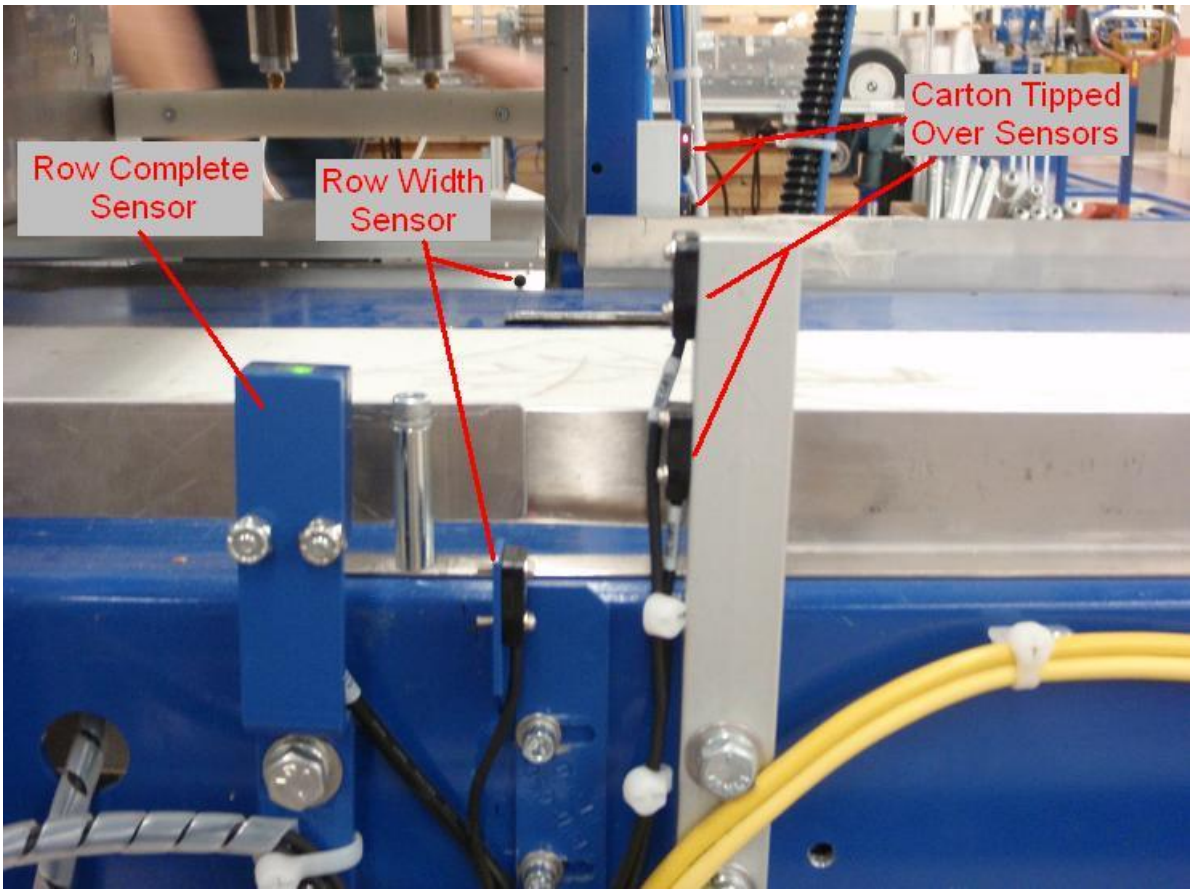

Figure 2.0.4
Sensor Array

2.0.4 Carton Tipped Over sensors
Just prior to entering the stacking section, the cartons pass an array of sensor that will detect if a carton is tipped on its side. These are "through beam" sensors, consisting of "send" and "receive" units. If the lower sensor pair detects a carton but the upper pair does not, it is assumed that a carton has tipped over. This sends a signal to the stamping machine and both machines will stop production until the problem has been cleared and the signal reset. The send and receive units for the two pairs are on opposite sides of the conveyor so that they don't interfere with each other.

2.0.5 Row Complete sensor
The function of this sensor changes dependant on mode, but the basic function is that when this sensor is made, it signals the articulated arm to push a row of cartons into the stacking section. Full discussion of this sensor is below in paragraphs 2.1 and 2.2.

2.0.6 Row Pusher Assembly
When a complete row of cartons has been sensed at the end of the conveyor, the Row Pusher Assembly will lower an air actuated arm into position behind the cartons. A second air cylinder will then push them into the stacking section of the packer. The assembly will wait for the cartons to be lifted, then the arm will lift (to clear the next row of cartons that may have entered) and retract to the starting position.

2.0.7 Stacking Section
Once the row pusher arm reaches its fully advanced position, the stack lifter plate will lift the row of cartons past a pair of articulated escapement plates. These plates are mounted on pivot arms and are pushed open by the lifting cartons. Once the cartons are clear, the escapement plates spring return to their original "closed" position, supporting the cartons from beneath. The stack lifter plate then lowers to its starting position awaiting the next row. As the cycle continues, the accumulating rows of cartons are held in position by a pair of plates that compress them from the sides and by a top plate.

2.0.8 Stack Unload
Once the stacking process is complete (as determined by mode, discussed below), the packer is ready to unload. The operator places the empty box in position on the box support, triggering the "Box Present" limit switch. The box is then clamped into position by four air actuated clamps. There are two lower clamps positioned below the box support frame and two upper clamps on the stack retainer top plate. Once these clamps are made, the unload cylinder will push the stack pusher plate forward, pushing the stacked product into the box. When the stack pusher is triggers the extended sensor on the cylinder, the box clamps release and the now refilled box tips onto a dump table or the customer's outfeed conveyor line.

2.1 Pre Stamp Mode
The difference between the Pre Stamp Mode and the Post Stamp Mode is in how the width of the row of cartons is determined.

In Pre Stamp Mode, it is assumed that all the cartons to be stacked back into the box are identical and came out of the same box. The operator should select this mode when running product that fits this description.

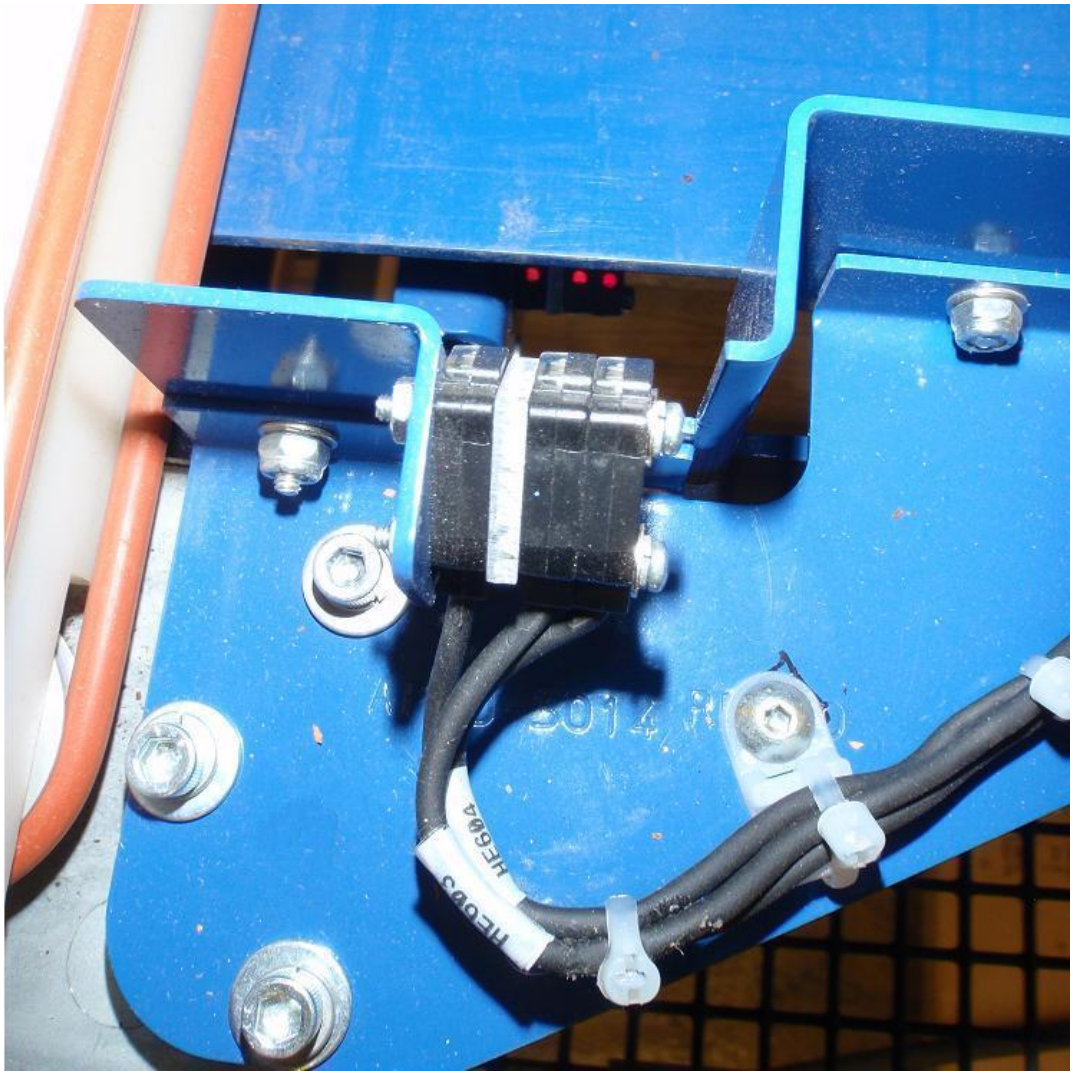

Figure 2.1
Carton Width Sensors

To determine the row width, the first carton of the run will be pulled into a "pocket" where its width is measured by an array of "through beam" sensors. It is assumed that the next 29 cartons will be the same width as the measured carton. The carton stop assembly will move to the appropriate position that will place the sixth carton in front of the Row Complete Sensor. IMPORTANT: The packer will not actually measure again until the stacking and unload cycles have completed! Once the Row Complete sensor is blocked for a preset time, the articulated arm will lower into position and push the row into the stacking section. This process will repeat until five such cycles have finished. (Five rows of six cartons each equals 30 cartons to the half-case.)

2.2 Post Stamp Mode

In Post Stamp Mode the product will be of unknown and varied widths. Therefore, instead of counting cartons and rows, in Post Stamp Mode the packer determines the width of product that will fit in the box.

The first carton of the production run is measured as in Pre Stamp Mode to determine the box width. Because of this, **it is absolutely necessary for the operator to place a carton in the first position that matches the box being used.** For instance, if the box being used is for Marlboro Red Kings, a king sized carton **MUST** be the first in the run.

2.2.1 Sequence of Post Stamp row adjustment

1. The first carton of the run is delivered against the carton stop assembly and is pulled back into the carton measuring pocket. The carton stop assembly will move to a position based on the measured width of the carton.
2. Cartons continue to be delivered, one against the previous, until the Row Complete sensor is made.
3. Two plates in the conveyor floor will lift up. These plates have two purposes: one, to lift the "seventh" carton out of the way, and two, to provide a "stop" for the row adjustment.
4. At this point the Row Width sensor (through beam type), should be clear (showing as "on") as the "seventh" carton has been lifted clear.
5. The carton stop assembly will move in the upstream direction until the Row Width sensor is blocked (showing as "off"). This measurement of the row width ensures that it will that will fit in the box, as determined by the measurement of the first carton. The number of cartons in the row may vary.
6. The articulated row pusher arm cycles, pushing the cartons into the stacking section. At the same time, the "seventh" carton lift plates lower, allowing cartons to advance towards the carton stop.
7. The articulated arm lifts and returns to its start position.

Note: Only the first carton of the first row will actually be measured. The measurement will be in effect until the stacking and unload processes have completed. The number of cartons that make up a row may vary. If the measured carton is very wide and all the rest are very narrow, you may get seven cartons per row. And vise versa, if the measured carton is very narrow and the rest very wide, you may only get five cartons per row.

The process will repeat for each row until five rows have been processed. If the operator wishes, he can unload the stack prior to completing five rows. There is a button on the main screen for this purpose. Also, this can be accomplished in manual mode, discussed below under "Operator Controls".

3.0 Powering Up
There are 4 simple steps to turning on the APMD packer.

Step 1: Turn on the electrical panel
Step 2: Turn on the compressed air on the pneumatic panel
Step 3: Check for moisture in filter bowls
New bowls will auto drain but should be checked
Step 4: Ensure all guards are closed and reset Emergency Stop

3.1 Electrical
Electrical power is turned on by turning the large knob on the electrical panel. This switch is located on the door of the main electrical enclosure. The enclosure is on the back side of the stamp machine. Turn the switch to the twelve o'clock position to turn it "ON". To turn off the power rotate the switch to the nine o'clock position. This switch is "Lock-Out, Tag-Out" compliant and a lock can be applied with the switch in the "Off" position.

Figure 3.1 Electrical Lock-Out switch

After main power is turned on, the operator display panel will display a series of screens followed by the main display screen.

3.2 Air

An air control valve is located on the pneumatic panel located on the front of the packer, under the conveyor. For the packer to operate, the air lockout must be pushed upwards to the correct position. This valve is "Lock-Out, Tag-Out" compliant and a lock can be applied with the valve in the "Off" position.

Figure 3.2 Air inlet panel

Prior to turning on the supply of compressed air to the stamping machine, it is important to check for the presence of water in the water separator bowl, the filter bowl, and the coalescing bowl. The APMD requires that the compressed air supplied to this stamping machine be clean and dry. All air coming from an air compressor is "wet" as a result of being compressed by the compressor. After the air compressor, the compressed air must be dried by passing through an aftercooler and/or air dryer. *Types and advantages of different compressed air dryers and other important information about air compressors are contained in Appendix A of this manual "Supplying Compressed Air to your US Tax Stamping Equipment".*

3.2.1 Moisture

If the air to the packer is clean and dry, then there should be little or no moisture in the separator bowl and filter bowl. The filters used are "auto-drain" which release moisture as the air passes through the filter. The moisture will drain out of the bottom of the filter. A drainage line from filters to a floor drain is recommended.

The separator and filter bowls are more likely to fill with water. Check daily for moisture or blockage. *The air compressor and air dryer should be checked to determine why moisture is present*.

4.0 Operator Controls

All machine control functions of the APMD Packer may be accessed through the operator panel, mounted on a pivot arm to the stacking section of the packer. The panel consists of the main touch screen, which displays a number of screens that give access to all machine functions. An "Emergency Stop" button is also located on this panel.

Emergency Stop – This is the large red button mounted to the operator control box, with a yellow highlighting ring around it. Pressing this button will cause all packer functions to stop immediately and will remove electrical and pneumatic power from most machine motions. This is a three position switch.

- With the button pushed all the way in, the packer will be in the "Emergency Stop" condition and the button will be illuminated. This position is maintained until the operator pulls the button out.

- The middle position is the normal running position. The button will be in this position during regular production. This position will be maintained until the operator pushes the button in to cause an Emergency Stop, or pulls the button out to reset the stop.
- The outer position is the Reset position. Pulling the button to this point will reset the Emergency Stop condition to normal running, provided no other emergency stop condition exists (i.e. guard door open). This is a momentary position and will spring return to the middle, normal run position when released.

Also on the main operator control box is a touch screen with several "soft" buttons to control various packer and screen functions. The individual screens will be discussed in detail further below.

- **Main –** Calls up the Main Screen on the touch panel. This is the screen that will normally be displayed during production.
- **Manual –** Calls up the Manual Screen on the touch panel. From this screen, various functions of the packer can be performed from buttons on the touch screen.
- **Setup –** Calls up the Setup Screen on the touch panel. From here, various machine control functions can be modified.
- **Sensor Status -** Calls up the Sensor Status Screen on the touch panel. This screen displays the status of all the various sensors on the packer.
- **Back –** Returns the touch panel display to the previously displayed screen, where applicable.
- **Start –** Press and hold this button for three seconds to initiate production auto-cycle. Cycle will only start if all conditions are met and no faults are present.
- **Stop –** Initiates a "cycle stop" request. The packer will complete any motions currently active and stop at the end of the cycle.
- **Alarm History -** Displays a screen showing all alarms since the last time the history was cleared.
- **Reset –** Used to reset various machine functions as needed.
- **Next –** Will display the next screen in a series of screens, where applicable.

See the following pages for all screen descriptions.

4.1 Main Screen

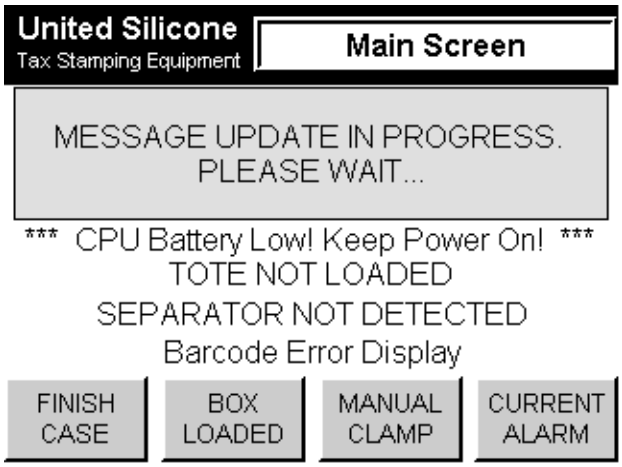

Figure 4.1
Operator Main Screen

The Main screen is shown with messages and buttons that may or may not be present depending on the condition of the machine. The following will describe the functions and when they should be expected to be visible.

Button Label	Button Function
Main Screen display	The Main Screen displays the current status of the packer in a display field, shown here, "Ready to Cycle". This field will also display other status messages, such as the motor homing message or the current alarm if applicable.
Current Alarm	If an alarm message is currently active, a button will appear in the lower right corner of the touch screen that, when pushed will take you to the "Current Alarms" screen where all current alarms will be listed.
Finish Case	is the "Finish Case" button in the lower left corner. When pressed, this will interrupt the normal counting sequence to allow a partial case to be unloaded. The row pusher arm will cycle, pushing any remaining cartons into the stacking section. This is a manual operation, the operator is responsible to insure there are not any cartons entering the path of the push arm. Cartons in the path when the push starts will be damaged. The stack lift plate will cycle, moving any remaining cartons past the escapement and into the carton stack. Then the stack top plate will be lifted (to clear the stack pusher), the stack pusher will push the entire stack into the box, the box clamps release and the partial case will tip onto the dump table or conveyor.
Box Loaded	The Box Loaded button will display when a box is present. This button allows the operator to release the case to allow for removal.

Manual Clamp	Manual Clamp overrides the box detection switch which engages the box clamps. Box damage is common, when the box is damaged in a manner which prevents the machine from detecting the box the operator can place the box and press the Manual Clamp button. The clamps will engage and when appropriate the stack push will extend into the box. The operator must be prepared to verify the box is clamped as the machine is relying on the operator input to determine the box is present.
Message Display	"CPU Battery Low Keep Power On" indicated the memory battery is low. If the power is cycled the machine settings may be lost. As with all equipment it is a good practice to keep a record of the machine settings. The battery can be replaced when the message is display, contact service for assistance.
	"Tote Not Loaded" May also display as "Box Not Loaded". This is to indicate the machine is ready to push the stack out of the machine and is waiting for a Box or Tote to do so.
	"Separator Not Detected" is a message to indicate the optional Carton Separator has not been detected on the conveyor as expected. The case may not be separated as intended. The orders in the system should be checked for accuracy.
	"Bar Code Error" will display on packers equipped with a bar code reader if the code is not as expected.

4.2 Manual Screens

Manual packer functions are performed from a series of manual screens. Each manual screen will have a button at the bottom of the screen that will activate or deactivate the Manual Mode. None of the other buttons, regardless of function, will operate unless the Manual Mode button is active. When in Manual Mode, automatic cycle of the machine is inhibited and the Main Screen display field will show a "Manual Mode Active" message. Use the "Next" and "Back" buttons to move between the four manual mode screens.

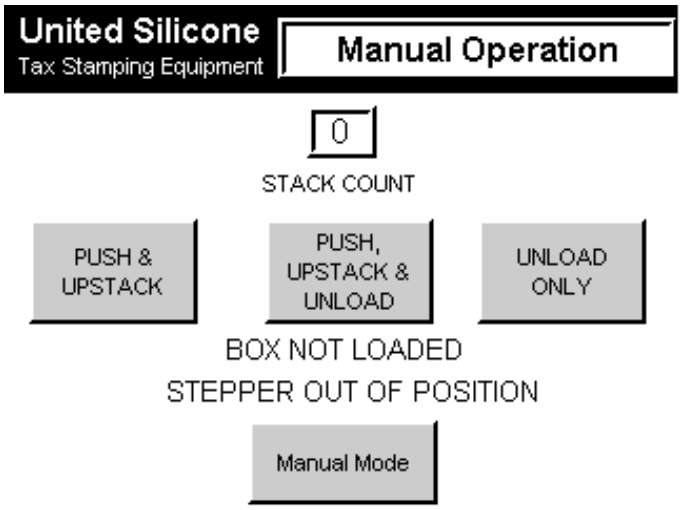

Figure 4.2.1
Manual Screen 1

Button Label	Button Function
Push & Upstack	Pressing this will cycle the articulated row pusher arm then the stack lift cylinder.
Push, Upstack & Unload	The function will perform the above then lift the stack top plate (to clear the stack pusher) then the stack pusher cycles.
Unload Only	Unload Only lifts the stack top plate (to clear the stack pusher) then the stack pusher cycles into the box or tote. The unload function will not cycle unless the box clamps are closed
Stack Count	The text box displays how many times the stack lift cylinder has cycled for the current case. This effectively shows the number of rows currently loaded in the stacking section. This field will reset to zero after each unload cycle. The stack count can be adjusted by pressing the text box with the number. The system will display a key pad to enter the correct number of rows. Press the correct number and enter.
Manual Mode	Manual Mode must be enable for the functions to active on the manual screens

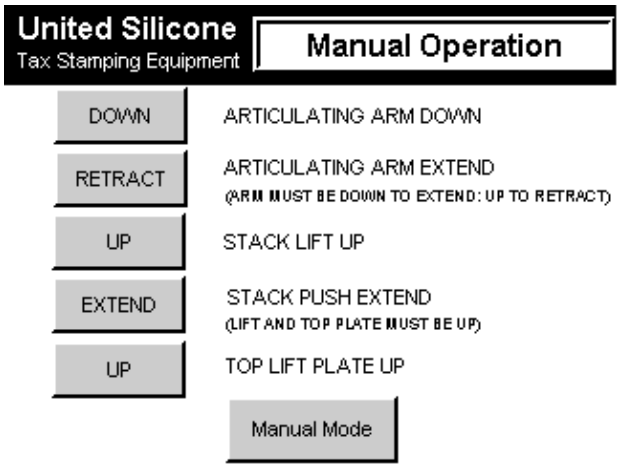

Figure 4.2.2
Manual Screen 2

Button Label	Button Function
Articulating Arm Down	Transitions the articulating arm from up to down.
Articulating Arm Extend	Moves the arm from the retracted or home position to the Extend position to push the cartons into the escapement.
Stack Lift Up	The stack lift in the up position moves the cartons into position to be pushed in to the case. The down position is ready to receive cartons from the Articulating arm.
Stack Push Extend	The stack push in the extend position moves the cartons into the box or tote, in the retracted position the chamber is ready to receive cartons from the Stack lift.
Top Lift Plate Up	The top lift plate up is raised to clear the min box height before the stack push can extend.

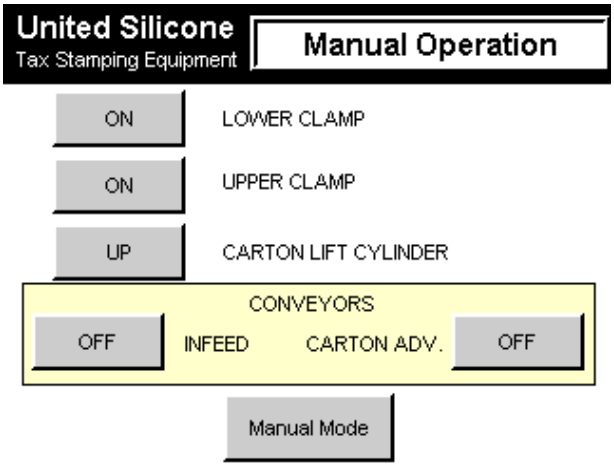

Figure 4.2.3
Manual Screen 3

Button Label	Button Function
Lower Clamp	On or Off Toggles the clamps at the base of the box to hold the box in place for the stack push.
Upper Clamp	On or Off Toggles the clamps at the top of the box or the side of the tote if equipped to hold the box or tote in place for the stack push.
Carton Lift Cylinder	The carton lift cylinder is the cylinder assembly that lifts the carton on the infeed for the measurement before the articulating arm pushes in to the machine in post stamp mode.
Conveyor Infeed	On or Off toggles in the conveyor to move the carton in front of the articulating arm.
Carton Advance	On or Off toggles the bands that move the first carton into the measurement station.

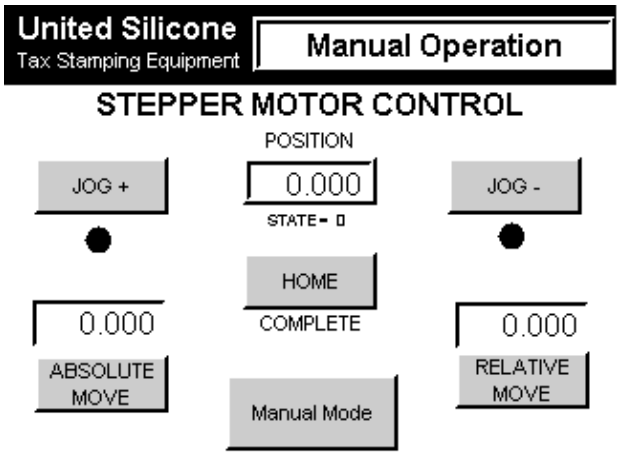

Figure 4.2.4
Manual Screen 4

Button Label	Button Function
Jog +/-	These buttons will move the motor for the carton stop in the indicated direction as long as the button is held or the motor reaches its position limits.
Home	The "Home" button will initiate the stepper motor homing sequence and the motor will end at its home or "zero" position.
Position	Indicates the relative position from the home location of the carton stop
Absolute Move	The "Absolute Move" display and button will move the motor to the entered position, relative to the home or "zero" position. Touch the display box to call up a keypad where you can enter the desired position. Then press the "Absolute Move" button and the motor will move as requested. At the end of the move, the display field at the top should read the same as the value you entered.
Relative Move	The "Relative Move" display and button will move the motor the specified amount relative to the current position. Touch the display box to call up a keypad where you can enter the desired movement value. Then press the "Relative Move" button and the motor will move as requested.

For example, you can execute an "Absolute Move" of 1.5 and the motor will move to the 1.5 position. Then if you execute a "Relative Move" of -0.5 the motor will move to the 1.0 position.

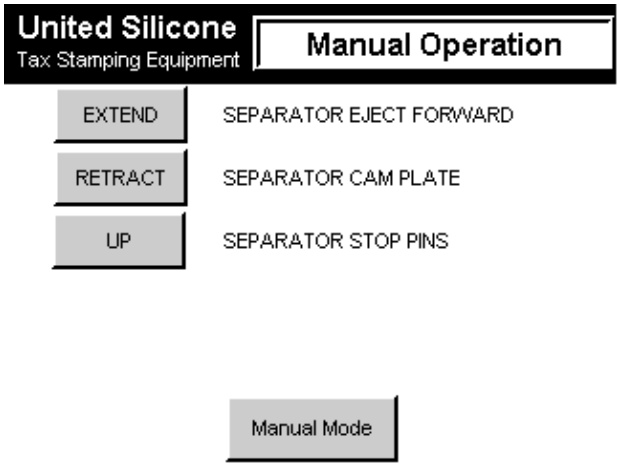

Figure 4.2.5
Manual Screen 5

This screen is used on machines equipped with an order separator feature. The separator blocks feed through the stamping machine to the packing machine between separate orders. The Separator holds the new order until the old order is purged from the machine.

Button Label	Button Function
Extend	The separator ejects pushes the order separator blocks from the machine and retracts it to the home position.
Retract	The separator cam plate when extended raises the pusher block up for the return of the separator eject.
Up	The separator pins are located on the conveyor bed. In the up position the pins stop the separator blocks or cartons at the eject position.

4.3 Setup Screens

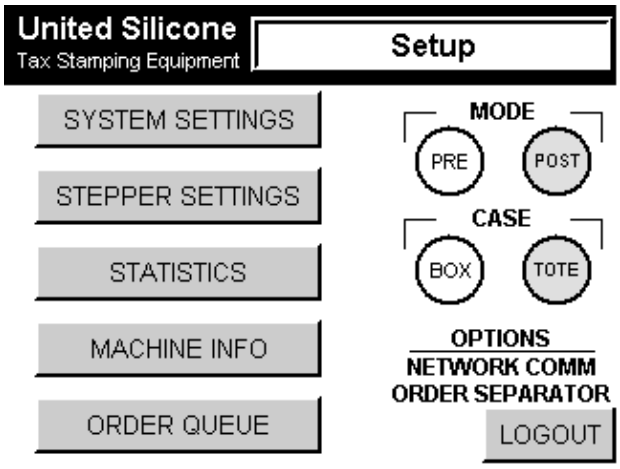

Figure 4.3.1
Setup Screen

Button Label	Button Function
System Settings	This buttons displays the general settings of the machine.
Stepper Settings	The stepper settings allows for the adjustment of the carton stop for the various widths.
Statistics	This screen displays the number of cycles on the machine and the date and time.
Machine Info	Displays the software revision and IP address. Panel settings and the factory settings are adjusted here.
Order Queue	If the machine is equipped the orders stored in the machine are visible here.
Mode	"Pre" and "Post" toggle allows the operator to set the type of selection the machine is operating. If all the cartons in a case are the same the machine should be set to Pre. IF the cartons are not all the same the machine should be set to Post
Case	If the machine is equipped with the tote option the operator can choose to pack to totes or boxes.
Options	The options message displays the enable options on the machine. The network communications and order separator are display
Logout	The button is displayed when the service password is entered granting access to the upper level screens.

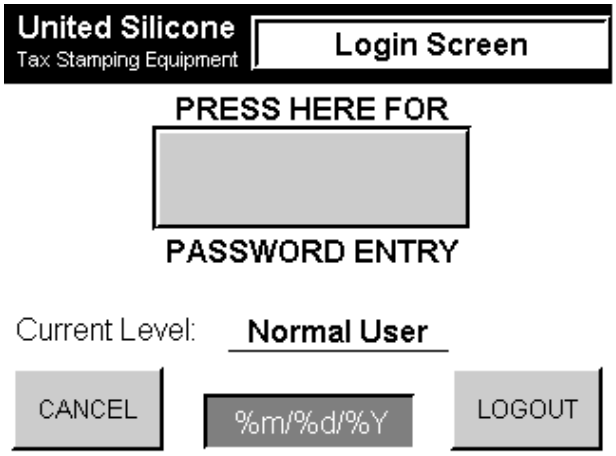

Figure 4.3. 1
Login Screen

Button Label	Button Function
Start	You will see this screen any time you try to access a page that allows modifying critical machine functions. Touch the "Password Entry" area to call up the keypad. You may go back to the previously displayed page by pressing "Cancel", or you may log off and return to the "Normal User" access level by pressing the "Logout" button.

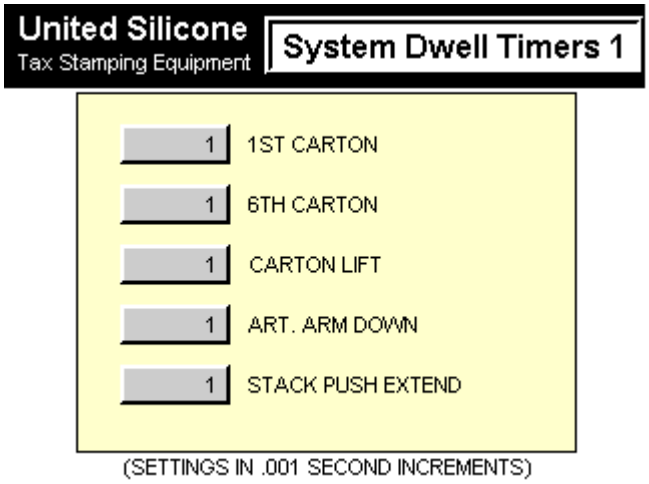

Figure 4.3.2
System Timers 1 Screen

WARNING: Changing timers can seriously affect the function of the machine and should only be performed by qualified service personnel.

Button Label	Button Function
1st Carton	This timer is the amount of time the machine monitors the carton nest before accepting the measurement.
6th Carton	The timer monitors the sensor for the accumulation of cartons at the articulating arm. Once the sensor has been on for the set time the arm pushes the cartons into the stack lift.
Carton Lift	The timer allows the carton list used in post stamping time to raise before the sensors monitors for the presents of the carton.
Art. Arm Down	The time the machine waits for the articulating are to be down before the arm is extending pushing the cartons into the stack lift.
Stack Push Extend	The times controls the time the cylinder continues to extend past the forward switch.

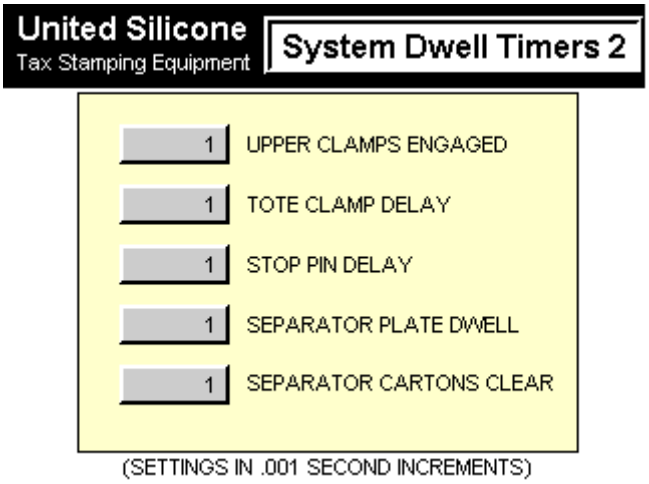

Figure 4.3.3
System Timers 2 Screen

WARNING: Changing timers can seriously affect the function of the machine and should only be performed by qualified service personnel.

Button Label	Button Function
Upper Clamps Engaged	This is a delay between the top clamps engagement and the stack push
Tote Clamp Delay	When equipped the delay is to allow for the tote to settle before the clamps engage.
Stop Pin Delay	When equipped, the delay is started when the order separator is detected by the sensors in the conveyor bed, when it ends the pins are sent up to stop the separator
Separator Plate Dwell	When equipped the timer allows for the separator plate to get into position before the separator push returns home
Separator Cartons Clear	When equipped with a separator it is the amount of time the push arm waits after the separator stop pins are up before starting to eject the separator. This allows time for the cartons beyond the stop pins to be in position before pushing the last row.

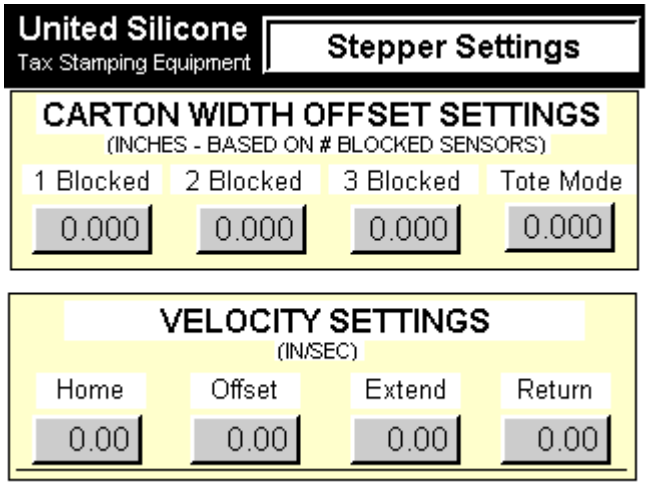

Figure 4.3.4
Stepper Settings Screen

Button Label	Button Function
Carton Width Offset	The offset is the amount the carton stop moves to reduce the width of the product pushed into the stack escapement
Number Blocked	These settings are used in box mode. The first carton in a box is measured based on the number of sensors blocked, Three being the Widest carton.
Tote Mode	When in tote mode the measurement is not used the adjustment is to a fixed position that should be determined based on the width of the tote being packed to.
Velocity Settings	This is the speed of the stepper motor based on the function being performed.
Home	The home speed is the speed the motor moves when returning to the home switch.
Offset	The offset is the speed of the move to the positions from the carton measurement.
Extend	Is the speed used in post stamping when the stepper is moving the cartons to block the sensor.
Return	The return speed is the speed of the movement back to the ready position in post stamp mode and after a case is completed in pre stamp.

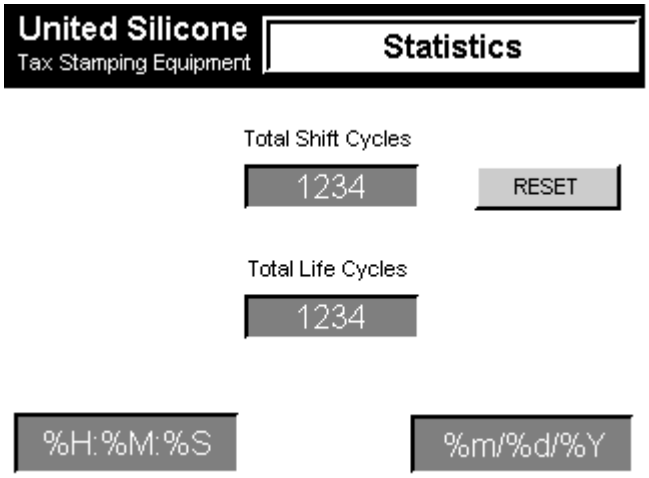

Figure 4.3.5
Machine Statistics Screen

Button Label	Button Function
Total Shift Cycles	The Shift Cycle count can be reset by the operator and is intended to show the number of cases processed in a given production shift. The operator may reset this field at the beginning of the shift and the packer will keep track of the number of cases processed until it is reset again.
Total Life Cycles	This is the total number of cases cycled through the machine. The number can be reset during specific events.
Time	The current time is displayed in this field. A service code is required to change the set time.
Date	The current date is displayed in this field. A service code is required to change the set date.

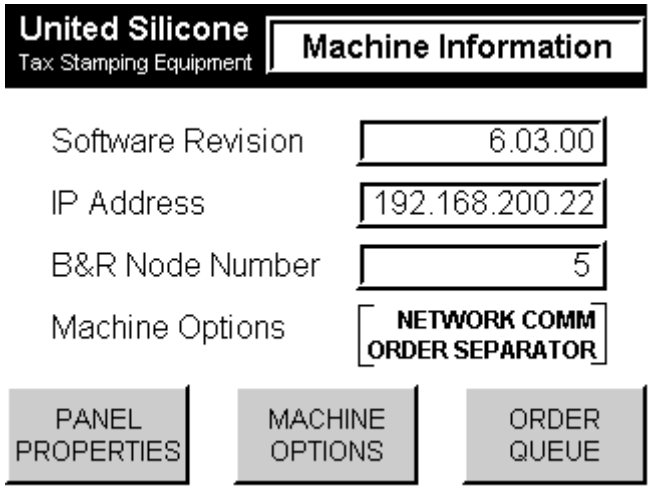

Figure 4.3.6
Machine Info Screen

Button Label	Button Function
Software Revision	Displays the current version of the program running in the packaging machine
IP Address	If the machine is connected to a network the address must be configured for communication
B & R Node Number	This is the address of the Packaging machine. It should be one above the stamp machine it is connected.
Machine Options	Displays enabled machine options
Panel Properties	The service pass code is required for this screen. Once entered it displays a screen for setting contrast, brightness and other screen related settings.
Machine Options	The service pass code is required to access the factor settings use for installed machine options
Order Queue	The order queue is used when equipped with an order separator to allow for the tracking of orders. In the event an order is short or needs to be removed this screen will provide access to do so.

4.4 Sensor Status screens

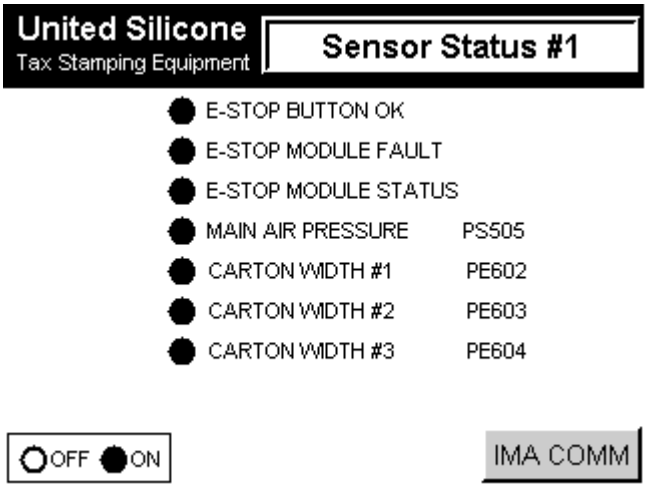

Figure 4.4.1
Sensor Status Screen

The Sensor status screens are used as an indicator of the status of the inputs to the control system. They are used as a trouble shooting tool.

Button Label	Button Function
On or Off	The Key in the lower right indicates the displayed state for the inputs the processor is using. When looking at the input there is a refresh rate which must be considered when transitioning a sensor quickly.
IMA COMM	The IMA COMM button displays a screen used to monitor the Packer communications when connected and enabled.

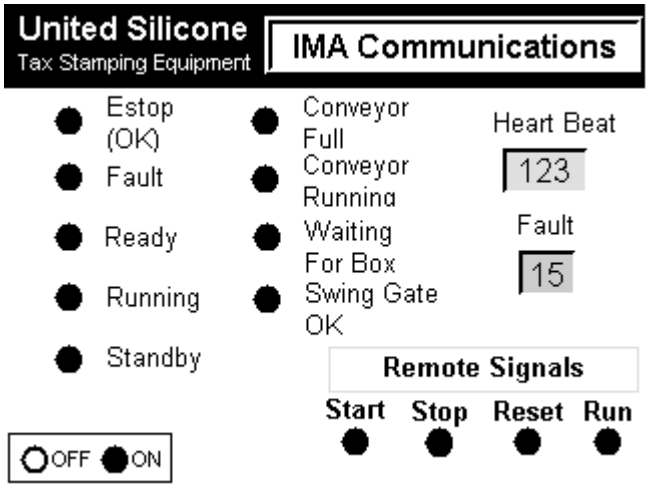

Figure 4.4.2
IMA Communications Screen

The IMA Communication Screen allows the operator to diagnose and monitor communications between the tax stamp machine and the case packer when the IMA communications is enabled.

4.5 Alarm History

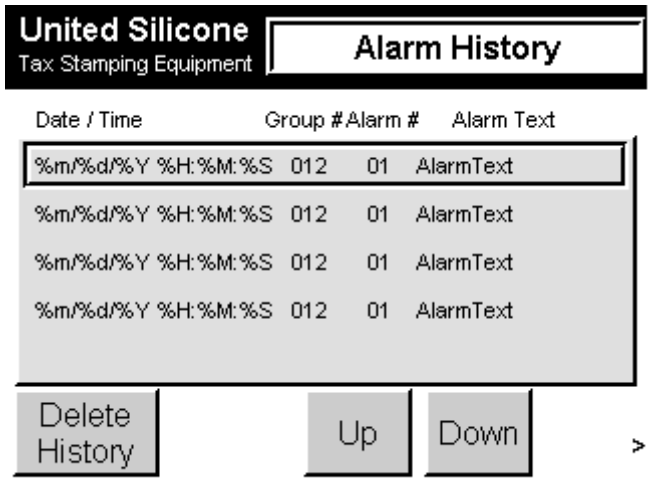

Figure 4.5.1
Alarm History screen

The Alarm History screen is accessed by pressing the "Alarm History" soft button on the operator panel. Here a complete history of all machine alarms is displayed for review and troubleshooting purposes. You can scroll through the list by using the "Up" and "Down" buttons at the bottom of the screen. There is a "Delete History" button as well, which will clear the entire list. While the history can be deleted at any time, it is strongly recommended that it only be cleared by service personnel who may need the information provided for troubleshooting purposes.

Pressing the "Next" button will call up the "Alarm Totals" screen.

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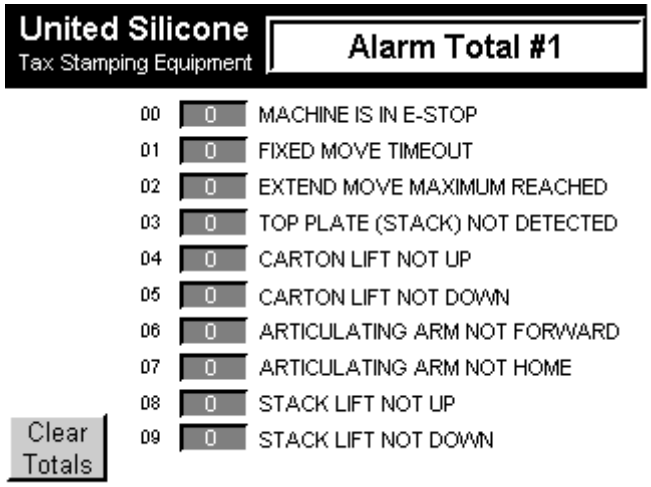


Figure 4.5.2
Alarm Totals screens

These screens display the number of times a given fault has occurred since the last time the "Clear Total" button was pressed. Again, this information can be very useful to service personnel so the totals should not be cleared except in those situations.

5.0 Troubleshooting

The troubleshooting process can be greatly simplified by referencing the alarm tables. Most error conditions that can occur on the APMD are alarmed and noted with reference given to the failure that originated the alarm.

Replacing Fuses
Fuses are located inside the main electrical box.

Retro-reflective Sensors
Retro-reflective sensors emit a beam of invisible light that is reflected off a surface. When the reflection of this beam is detected by the sensor the sensor is "made" or "on" and a small indicator light on the sensor will illuminate. Many of this type of sensor will have a "sensitivity" adjustment for near or far targets. This type of sensor can be tested by blocking the beam with a small scrap of paper or cardboard. Objects that are very dark in color (flat black for example) may not be sensed.

Through-Beam Sensors
Similar to the Retro-Reflective sensors, Through-Beam sensors emit a beam of invisible light to detect a target. But in this case, the receiving side is mounted separately from the sending side. Thus, the target interrupts the light beam, causing the sensor to change state. The Carton Tipped Over sensors are of this type. When checking this type of sensor, the indicator light will be illuminated when the beam is NOT interrupted and will go dark when the beam IS interrupted. This is a very reliable sensor method, but can be difficult to align and set up.

Magnetic (or Hall-Effect) Sensors
These sensors work by detecting the presence of ferrous (iron type) metals inside their sensing range. The sensors that detect the position of pneumatic cylinders on the APMD are of this type. They will have a small indicating light to show when they are made.

Ultra Sonic Reflection sensors
The Row Complete and Conveyor Full sensors are of this type. Similar to the Retro-reflective sensors mentioned above but instead of light, this sensor uses an inaudible sound wave to detect objects. They perform better when the color of the target object is widely varied or very dark. However, they can "miss" a target if it is off angle or not flat. Like the other sensors, there is a small light that indicates when the sensor is "made".

E-Stop System
The E-Stop can be activated by the mushroom button on the main panel or by opening the sliding cover over the conveyor belt. Mounted on the cover is a red magnetic switch that will match up with a sensor mounted to the machine rail. Either of these items will force the safety module, located inside the electrical panel, to remove power from parts of the packer and shut off the air.

Something should have moved and didn't.
There may be a number of possible problems:

 It may have moved, but the movement wasn't detected. Check the associated sensors.

 It is possible that the sensor shows that it is made, but the signal didn't reach the controller. Be sure to check sensors on the "Sensor Status" screen.

 It may be bound mechanically. A qualified person should check for free movement of the mechanism after the machine has been lock out and all energy has been removed.

 It may be contaminated. Clean the mechanism and try again.

 There may be a problem with the output from the control. Check the associated output module.

 Some outputs are fused electrically. Check the fuses. If blown replace, but also check to see if the motion is bound. Something blew the fuse. Clear any binding motion before trying again. Another possible cause of a blown fuse would be if the signal is electrically shorted or grounded. Ensure neither is the case before re-energizing the output.

 If the motion is pneumatically activated, check for sufficient air pressure with no leaks. Some motions are equipped with flow regulators on the cylinder fittings. These may need to be adjusted to provide smooth motion.

Something moved that shouldn't have.
Possible problems include:

 There may be a problem with the output from the control. Check the associated output module.

 There may be a problem with a sensor that initiates the movement. Check the associated sensors.

 The mechanism may have become loose or broken. Check the mechanism and correct.

6.0 Warranty

The warranty of this equipment is defined in the purchase documents. Please refer to the purchase documentation for details

What this Warranty Does *NOT* cover

1 This warranty does not cover consumable and normal wear parts such as springs, filters, or gaskets that are consumed during the operation of the machine. If you have questions about what is considered a consumable or normal wear part, please contact your sales or parts representative.

2 This warranty applies to United Silicone-manufactured equipment only. If a major component of the equipment is made by other manufacturers such as the Air Compressor System, the original equipment manufacturer's warranty applies, unless otherwise specified. Please contact your sales or parts representative for a copy of the warranty for your particular item.

3 This warranty does not extend to product failures or defects caused by, or associated with, but not limited to: failure to maintain the machine correctly, unsuitable physical or operating environment, accident, neglect, natural disasters, hazards, misuse, electrical supply, unauthorized repair, contaminated air, modification or alteration or the use of non-United Silicone recommended parts, accessories or consumables. United Silicone will not accept any liability or responsibility under the terms of warranty expressed herein for, but not limited to: negligence, loss of profit or either material or personal. Mandatory liability shall be restricted to the replacement of the defective component or assembly. This warranty may be voided if the covered assemblies or components have been repaired or altered by other than an authorized United Silicone service representative in any way which, in the sole judgment of United Silicone, affects the performance or purpose for which the equipment was manufactured. This warranty does not constitute a service agreement. Any warranty visits for assemblies or components deemed not to be defective in the sole judgment of United Silicone may be billable.

7.0 APENDICIES

7.1 Appendix A: Supplying Compressed Air for your US Tax Stamping Equipment

Most of US Tax Stamping Equipment's Cigarette Stamping Machines require a source of compressed air in addition to electrical power. The quality and quantity of compressed air you supply to this equipment will affect the reliability of the equipment, the frequency and cost of service calls and downtime on this equipment, as well as the initial cost and ongoing energy costs of the compressed air equipment you select.

1) Compressed Air Capacity.
The values listed in table 1 show the volume of compressed air at 90 psi which is necessary to be available on a *full-time continual basis* while each piece of equipment is operating.

Equipment	Compressed Air at 90 psi Required per single head machine
M120 stamp machine w/ cold glue	2.0
M120 stamp machine w/ hot glue	3.7
SSM stamp machine	5.1
SSMP stamp machine	5 .5
LSM stamp machine	2.0
Pneumatic Case Packer	5.7
Universal Case Packer	10.5
12M Case Cutter w/o built-in compressor	7.0
CC612 Case Cutter	12.0
VL-10 Stamp Machine	4.0

The first step is to add together these requirements for each piece of stamping equipment you intend to operate simultaneously. A worksheet has been provided at the end of this document. Next add in any equipment which you expect you are likely to add within the next 3-5 years. Most air delivery systems have significant leaks and losses within them. Even a small leak at a fitting, for example, can result in a large loss of compressed air. For new, high quality piping systems which have a total line length less than 25 feet, of large diameter, solid copper lines with few bends and connections, we recommend that you add at least 20% margin on top of your computed total air requirements. If your lines are old, longer, threaded pipe and or contain multiple quick-disconnect or other type fittings, you should add at least 30-40% margin on top of your calculated total air requirements.

For example, if you have a cold-glue M120 stamp line with a Case Packer, no plans to add additional equipment and an air run of threaded pipe 50' from your compressor to stamping equipment, you should select a compressor which can supply at least 1.30 x (2.0 + 5.7) = 10 CFM of compressed air at 90 psi. If you are planning to use a reciprocating air compressor, it is typical practice to size the output of the compressor to be 1.5 to 2.0 times larger than the

amount of air you expect to consume on an ongoing basis. In this way, the compressor will not need to run continuously.

Following the example of the cold-glue M120 with a Case Packer, you would need to specify 15 to 20 CFM of compressed air at 90 psi to allow your compressor to run at a reduced duty cycle. Reciprocating compressor manufacturers often recommend that running on a reduced duty cycle will extend the life of your reciprocating compressor. (Scroll style compressors, on the other hand, are more commonly run 100% of the time and as a result, it is not necessary to include this extra factor when selecting a scroll compressor. Still, specifying a larger compressor always allows for future compressed air capability.)

When selecting an air compressor, it is important to note that the volume of air it can provide, usually stated in SCFM or CFM depends upon what pressure you are supplying the air at. For the purposes of selecting a compressor system to drive your Tax Stamp Stamping equipment, you need only be concerned with how much air the compressor can supply at 90 psi. If a compressor is specified for an air output at a higher pressure, for example, 19 scfm @ 135 psi, you can estimate the amount of air this compressor will deliver at 90 psi by multiplying as follows: 19 scfm x (135 psi / 90 psi) = 28 scfm.

2) Use of a shared source ("shop air") of compressed air for the Stamping Equipment.

While some customer facilities already have an available source of compressed air, typically known as "shop air", Tax Stamping Equipment strongly recommends **against** using these sources of compressed air for operating our stamping equipment. Typically "shop air" is shared among multiple uses within a facility and the available volume of compressed air varies from moment to moment and day to day. Each time the available air volume on these shared systems drops below the levels required by our equipment, the stamping equipment will begin to perform irregularly. In addition, "shop air" is typically intended for low performance machines such as air-operated hand-tools. The air used to operate these lower performance machines typically has much higher levels of air line contamination (from grit, water and oil) than can be well tolerated within the precision machinery of the Tax tamping Equipment. The use of contaminated shop air can lead to costly and lengthy stamping equipment downtime. recommends dedicated, clean, dry air for use with our equipment.

3) Moisture, dirt and oil in the compressed air system.

The quality of the air supplied to your stamping equipment is important. The three most common contaminants in compressed air supplies are water, grit and oil. Water is the most common contaminant. Water typically enters the system as incoming air is compressed. Air can "hold" less and less humidity as it is compressed. The humidity which is "squeezed out" of the air as it is compressed condenses within the compressor, tank and air lines. This is particularly common if the relative humidity of the incoming air is high such as in facilities near lakes, rivers and oceans. In addition, cold air holds less humidity than warm air. Air

leaving a compressor is typically warm – often on the order of 150F or more. If this air is rapidly cooled, for example, if the air line leaves the compressor and then travels thru a cold warehouse or passes between two buildings, moisture can condense out and collect inside the air lines. Compressed air delivery systems need to be designed to remove excess moisture from the air and air lines. This is typically accomplished with a piece of equipment known as a dryer. Two types – desiccant dryers and refrigerated dryers are commonly used.

Most air compressors have built in air filters designed to remove dirt and grit from incoming air. Standard industrial grade air compressor filters typically remove all particles greater than 1 micron in diameter and are sufficient for use with all Tax Stamping Equipment.

Some compressed air systems are designed to ADD lubricant to the compressed air to reduce the wear and improve the performance of certain types of machinery. Other air delivery systems contain air/oil separators to remove oil from the compressed air. All Tax Stamping Equipment is designed to operate on clean (no particles or oil); dry (no water) air although the 12M case cutter can also accept lubricated compressed air.

All Tax Stamping Equipment machines which utilize compressed air contain their own, integral coalescing filter bowls which are designed to remove oil, water and dirt which may have passed thru the primary systems in the compressed air delivery system, but these systems are intended only to remove occasional contaminants and do NOT eliminate the need for properly filtered and dried air delivery systems.

4) Related Compressor Equipment.

Most compressed air systems include each of the following components:

Compressor & Storage Tank

The primary choices among compressor types are piston/reciprocating vs rotary/screw. Among the piston compressors you will select between single and dual head compressors and lubricated vs oil-les. Screw compressors are generally more expensive but significantly quieter, usually less than 70 dBA at a distance of 3 feet from the compressor (a level of sound typical on a busy downtown street) while reciprocating compressors are often above 80 dBA (a level of sound similar to that near a typical residential gasoline powered lawn mower.) The level of sound-output is an important consideration and should not be overlooked. Since it is desirable to have the compressor located near the stamping equipment it should be noted that it is difficult to converse and sometimes distracting to work in the particularly noisy environment surrounding a reciprocating compressor. Ideally the compressor can be moved around a corner, behind a wall, or one floor above or below the area where operators will be working – but keep in mind that it is also important to try to have the compressor, delivery lines and stamping equipment all at nearly the same temperature as described elsewhere in this document. Screw compressors have fewer wearing components and generally require a simpler maintenance schedule. Screw

compressors also deliver cleaner air with no oil in the air. This generally extends the life of the stamping equipment by reducing buildup inside of cylinders and air valves. If a reciprocating compressor is used it is important to select a high quality oil-coalescing filter to try to remove as much oil as possible from the compressed air stream. The number of heads (1 or 2) on a piston compressor relates to the total amount of air output. Generally dual head compressors will handle larger CFM requirements (typically 30+ CFM at 90 psi). As mentioned earlier, rotary compressors are usually designed to run a 100% duty cycle while most reciprocating compressors are usually used on a 50%-66% duty cycle. As such, it is usually necessary to specify a larger capacity reciprocating compressor in order to provide the same output as a rotary compressor.

A storage tank is designed to allow the compressor to not have to run full time to supply all of the necessary air flow. Typically a tank is sized to be 2-4 gallons per CFM output from the compressor (example, a 20 CFM compressor typically has a 40-80 gallon tank). In many cases, water will condense inside portions of the compressed air circuit – including the compressed air tank. These tanks are designed with drains so that the water can be removed regularly (typically daily). Keep in mind that a significant amount of water can be removed, so it is important to have a drain or other means to remove the collected water from your facility.

Aftercooler

The after cooler is used to bring the temperature of the compressed air to sufficiently low temperatures so that it can be properly dried by either a desiccant dryer or refrigerated dryer. In some systems, the aftercooler and dryer are integrated into a single system. Most aftercoolers are similar to automobile radiators consisting of a heat exchanger and a fan which forces room air past the heat exchanger to cool the compressed air.

Dryer

Under typical warehouse operating conditions, a dryer is needed which has a throughput (SCFM) equal to or greater than the total anticipated compressed air requirement. Drying capacity is specified in units of “Dew Point”. A typical refrigerated dryer supplies air with a maximum dew point of around 37F meaning that the air exiting the dryer would not be expected to condense out moisture if it were kept above a temperature of 37F. When selecting a dryer for a facility where the ambient temperatures are expected to fall below the dew point of the dryer, US Tax Stamping Equipment recommends consulting directly with a compressor dryer manufacture to discuss the specific details of the installation. Special Desiccant Dryers are available that can produce very low dew points if needed. Regardless of which type of dryer you use, note that depending upon the conditions of operation, significant quantities of water may be removed by the dryer. It is usually necessary to have a floor drain or other provision near the dryer to allow easy removal of the condensed water from your facility.

Delivery Piping.

Delivery piping is often overlooked in the system design and problems with too small line diameters and too long piping runs can cause significant operational difficulties. Common problems to avoid include:

- Use large diameter piping. All piping should be a minimum of ½" dia for 0-30 CFM and ¾" dia for 30-60 CFM. Above 60 CFM, US Tax Stamping Equipment recommends a custom piping plan be designed or reviewed by your chosen compressor equipment manufacturer.

- Use short piping runs between the compressor and the equipment. Maintain all piping runs of ½" tubing to less than 40 feet and ¾" tubing to less than 75 feet. The maximum distance from the compressor to all pieces of stamping equipment should be less than 75 feet.

- Avoid serial placement of equipment along a single piping run – instead use a central manifold with individual branches to each piece of equipment. (Otherwise the last piece of equipment on the piping run may become "starved" as equipment upstream consumes the air before it reaches the last piece.)

- The temperature of air surrounding the compressed air delivery system is very important. The simplest arrangement is when the compressor, all delivery piping and the stamping equipment all remain at nearly the same temperature. If you are planning to locate the compressor in a different room, or in an outdoor shed, or if the delivery piping will pass thru walls between areas of different temperature (for example, if the compressor is in one building and the delivery piping goes outside and then into the next building before reaching the stamping equipment) US Tax Stamping Equipment recommends that you work with a qualified local compressor company to address the specifics of your installation in a custom piping plan.

5) Recommended Compressors.

US Tax Stamping Equipment does sell/service air equipment, contact your service tech or a US Tax Stamping Equipment customer service representative. Note that our customers have had success using a wide range of equipment from many different suppliers. Ingersoll-Rand, Speedair, Atlas Copco, Gast and Dayton are among some of the more popular choices we observe in the field. We recommend that the selection be made primarily on the basis of purchase and operational costs, warranty, and service contract terms and availability.

Secondary considerations might include noise output, utility requirements, vendor installation/service arrangements and other specifications.

5) Local Laws / Codes Compliance.
US Tax Stamping Equipment equipment is used in many different jurisdictions and regulatory environments. While we endeavor to provide safe and reliable equipment and installation recommendations which represent generally accepted industry practice, the end user is ultimately responsible for selecting, installing and plumbing the compressed air system in such a manner so as to meet all local ordinances and applicable safety and plumbing codes. US Tax Stamping Equipment recommends that each customer work with a locally licensed contractor and/or plumber to ensure that the completed final system is in full compliance. US Tax Stamping Equipment takes no responsibility in this regard and makes no representation that the recommendations in this document and those of our field service technicians and other employees are necessarily in complete compliance with our customers' site-specific regulatory and/or safety requirements.

US Tax Stamping Equipment Air Requirement Worksheet

Step 1: Complete this table …

Equipment	COLUMN A Compressed Air at 90 psi Required per single head machine	COLUMN B Number of these machines at your facility, include any extra equipment you may add within 5 years	COLUMN C Multiply each row in Column A by the quantity in Column B
M120 stamp machine w/ cold glue	2.0		
M120 stamp machine w/ hot glue	3.7		
SSM stamp machine	5.1		
SSMP stamp machine	5 .5		
LSM stamp machine	2.0		
Pneumatic Case Packer	5.7		
Universal Case Packer	10.5		
12M Case Cutter w/o built-in compressor	7.0		
CC612 Case Cutter	12.0		
VL-10 Stamp Machine	4.0		

Step 2: Total all of the values in Column C = _____ CFM at 90 PSI

Step 3: Review Key Question #1 from this document and use this information to select an appropriate margin percentage based upon your specific site, piping type and length. The minimum recommended margin is 20%, but you may need a larger factor depending upon your facility. Enter your percentage on the line below. Write the value as a decimal number, for example, if your margin is 20%, write 0.20 on the line below.

Margin = _____

Step 4: If you are going to use a reciprocating compressor enter 1.75 on the line below. If you are going to use a rotary compressor enter the value 1.00 on the line below.

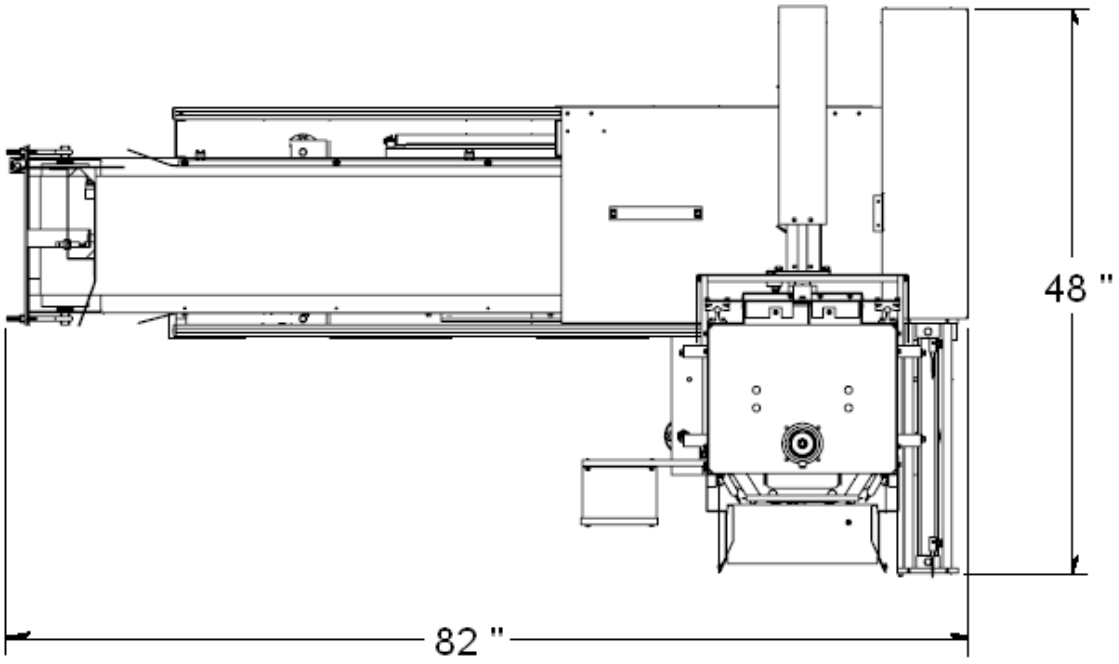
Compressor Factor = _____

Step 5: Multiply the values you wrote in steps 2, 3 and 4 together and write your answer on the line below. This is the minimum number of CFM your compressor will need to supply at 90 psi.

(Step 2 Total) x (Margin) x (Compressor Factor) = _____ CFM @ 90 psi

Step 6: Now select an aftercooler, dryer and air line hose and air circuit layout which can all accommodate at least this amount of air thru-put.

7.2 Appendix B: APMD Footprint (left to right)



Password Protection

(Remove this sheet after installation)

These are the three levels of control this machine, two of which require that the operator login (refer to section 9.3.3. in this manual)

Level 0 - “Normal User” - password: no password required

Level 1 - “Supervisor” - password: 1234 (sensor screens)

Level 2 – “Factory” - password: **** (enable screens)