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# **Autoveyor<sup>R</sup> 3000**

## **User Reference Manual**

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**P/N 02000021**

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# Autoveyor<sup>R</sup> 3000

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# Autoveyor<sup>R</sup> 3000

## Overview:

The Autoveyor<sup>R</sup> 3000 is a positive drive conveyor system that was specifically designed to serve the drive-thru bank environment. Its purpose is to move drive-thru banking transactions from the customer to the teller and back as efficiently as is possible with a minimum of maintenance and repair.

The Autoveyor<sup>R</sup> concept originated in the early 1970's as an alternative to the pneumatic drive-thru systems which were difficult for the customer to use and costly for the bank to purchase, install and operate. When introduced, the Autoveyor<sup>R</sup> was the low cost product in the market place. It also offered significant advantages over the competition in ease of use, easy overhead installation and low cost to maintain. Since that time the pneumatic tube manufacturers have continued to cheapen their products to the point now where they are significantly less expensive than the Autoveyor<sup>R</sup>.

Note that competitive systems have concentrated their efforts on low price and as a result could not afford to improve the performance or reliability of the pneumatic systems much, if at all, since the 1970's. Some maintain that pneumatic systems may be less reliable now than in the 1970's due to the inexpensive components used. Few will disagree that the current tube systems are little more than throw-away devices which work fine for the first year or two and then cost more to maintain than the original equipment cost.

While we at E.F. Bavis and Associates have never increased the price of the Autoveyor<sup>R</sup>, we have continued to refine the product to its current model, the Autoveyor<sup>R</sup> 3000.

Mechanically the Autoveyor<sup>R</sup> has not changed significantly. The basic design of the system is to use Polycord<sup>1</sup> round belting to trap the plastic carrier and move it in a serpentine action up the separate vertical to the integrated horizontal conveyor. The carrier is transported along that horizontal conveyor to the other end of the system where it is again trapped by vertical belts where it descends to the teller end. Serpentine action belts can be used to move the carrier horizontally or vertically. The Autoveyor<sup>R</sup> is designed to be a series of modular conveyors which are integrated together to perform a bi-directional means of transporting a standard carrier. As a result of this design, the Autoveyor<sup>R</sup> has no limitations as to the horizontal or vertical distance that it can traverse. Essentially the length of the system can be extended infinitely by adding additional conveyors.

What has changed over the years are the electrical and electronic controls which operate the system. The original Autoveyor<sup>R</sup> used electro-mechanical controls, mechanical relays essentially, to control the machine. The Autoveyor<sup>R</sup> - 2000 series machines used a combination of electro-mechanical and electronic controls which improved reliability and functionality. The current version has done away with the electro-mechanical functions and has moved exclusively to solid state electronics. In addition to improved performance and long term reliability of solid state components over electro-mechanical, the Autoveyor<sup>R</sup> -3000 offers a full range of diagnostic LED's which further improves functionality.

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<sup>1</sup> Polycord is a Trademark of Habasit Belting, Inc.

As you can see, the Autoveyor<sup>R</sup> has not only maintained its price, but has improved the quality and features of the system so that what is purchased today is far better in terms of reliability and features and less costly in inflation adjusted dollars than the systems of the 1970's and 1980's.

### **Shipped in 3 Pieces – Made to Site Specs!**

The standard Autoveyor<sup>R</sup> drive-thru system consists of the following modules: a vertical teller conveyor, a horizontal conveyor and a vertical customer conveyor. Non-standard units may have other modules, but the majority consists of these modules. For the most part, installation of the unit consists of hooking these modules together.

The Autoveyor<sup>R</sup> is bench built to the specifications of the site. The reason for this has to do with the nature of the conveyor system. As mentioned before, the vertical sections use serpentine action belts to move the carrier vertically. The layout of the pulleys in this type of belt arrangement is critical to the proper function of the machine. Attempts at making conveyors of this type in a modular fashion, which would not require custom made systems, have not yielded systems which are as reliable and as trouble free as the custom built systems.

### **Installation:**

Installation of the Autoveyor<sup>R</sup> requires that holes to be cut in the outside wall and the ceiling of the canopy per the specification print. Once that procedure has been completed, it is suggested that the Teller Vertical be mounted in accordance with the authority having jurisdiction.

Figure #1 indicates various acceptable ways to install overhead versions of the Autoveyor<sup>R</sup>. Note that in each and every case the Autoveyor<sup>R</sup> sits or floats on the support. This is required in order to allow the metal horizontal to expand and contract as the temperature changes. In a 100 degree change in temperature, a 10 foot section of horizontal will vary approximately 1/8 of an inch. Therefore, on a 40 foot section of horizontal this movement is almost 1/2 inch!

Figure #1 points out by number particular points of interest in a typical Autoveyor<sup>R</sup> installation:

**1. Wall Stand Off:**

A wall stand off is shipped with each and every Autoveyor<sup>R</sup>. Its purpose is to stabilize the Teller end of the Autoveyor<sup>R</sup>. While the stand off is mounted to the wall, typically the Autoveyor<sup>R</sup> rests against the stand off as support and it is not attached to the Autoveyor<sup>R</sup> with any form of fastener.

**2. Wall Penetration:**

Typically, the turn box of the Autoveyor<sup>R</sup> extends into the hole in the building. As a result, one half of the turn box is supported by the building wall. It is suggested that the other end of the run box also be supported.

**3. Customer Base:**

This steel base is mounted to the island with two concrete anchors. Note that the customer unit can be raised or lowered a total of 3 inches on this base.

**4. Horizontal Hanger using all thread rod:**

All thread rod and unistrut can be used to hang and support the horizontal unit as long as it meets the requirement of the local authority having jurisdiction. Note also that the rods are positioned so that the horizontal unit is stabilized against side-to-side motion.

**5. Horizontal Hanger using truss or roof structure:**

Horizontals can be supported with the truss or roof structure as long as it is acceptable by the authority having jurisdiction. Note again that the unit is braced to provide stabilization against horizontal movement.

**6. Horizontal Hanger using steel tape support:**

As long as it is acceptable by the authority having jurisdiction, steel tape can be used to suspend horizontal components. Note however that the support member is not tape but a flat steel or wood component. Do not use the tape under the unit as it may allow that unit to twist.

Note that in all cases, control and power wires must be clear from rubbing on any of the supports.

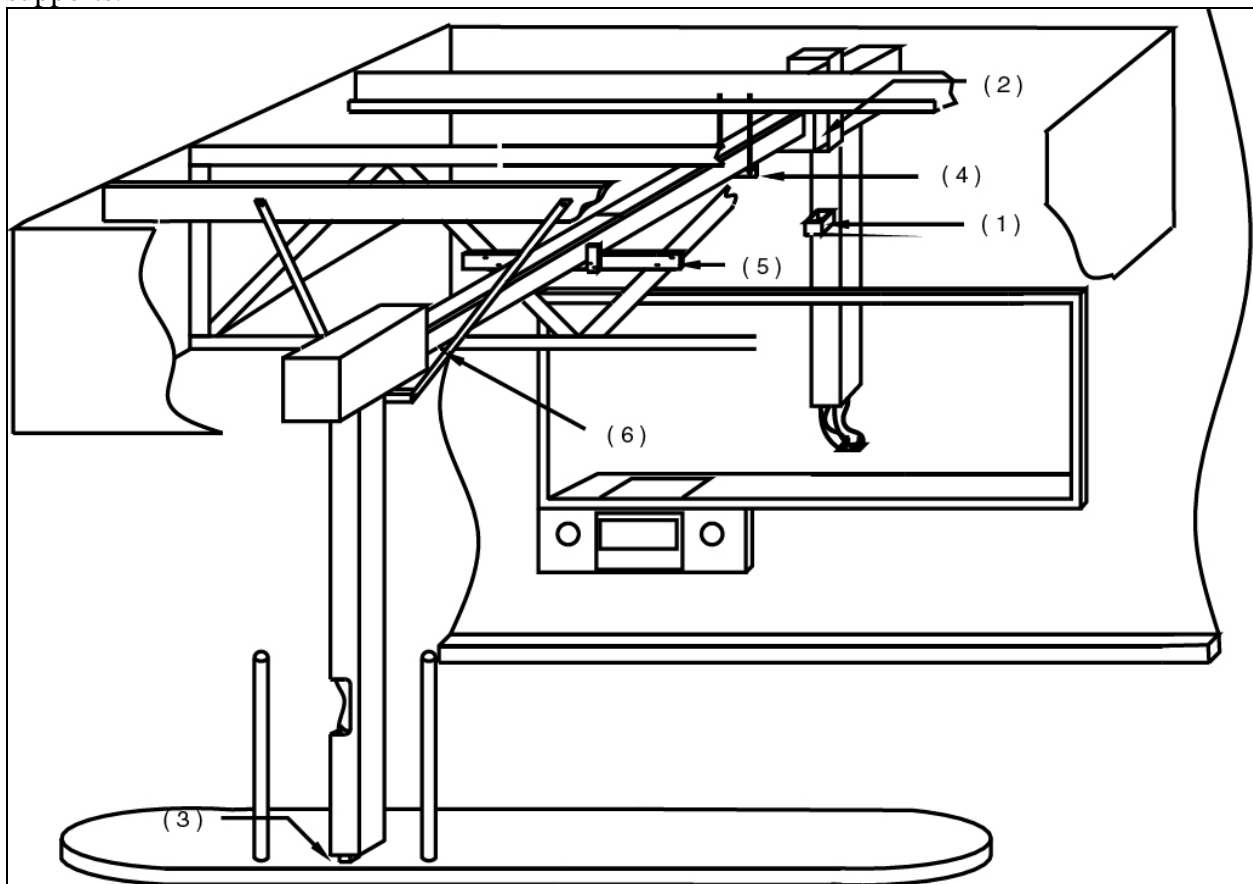


Figure 1

Figure #2 indicates the recommended underground installation. Note that the unit is kept off the bottom of the culvert to avoid contact with water that may settle in the culvert. It is strongly recommended for proper operation in underground culvert installations that sump pumps be provided in order to insure that the culvert does not flood.

The process of installation is rather simple. It consists of positioning the horizontal section on the supports in the canopy or culvert. Position the customer end to the horizontal. Connect the horizontal wiring plugs. Mount the teller end and connect the wiring plugs. Finish up by permanently mounting both ends and wiring the 110 volt power to the unit as required.

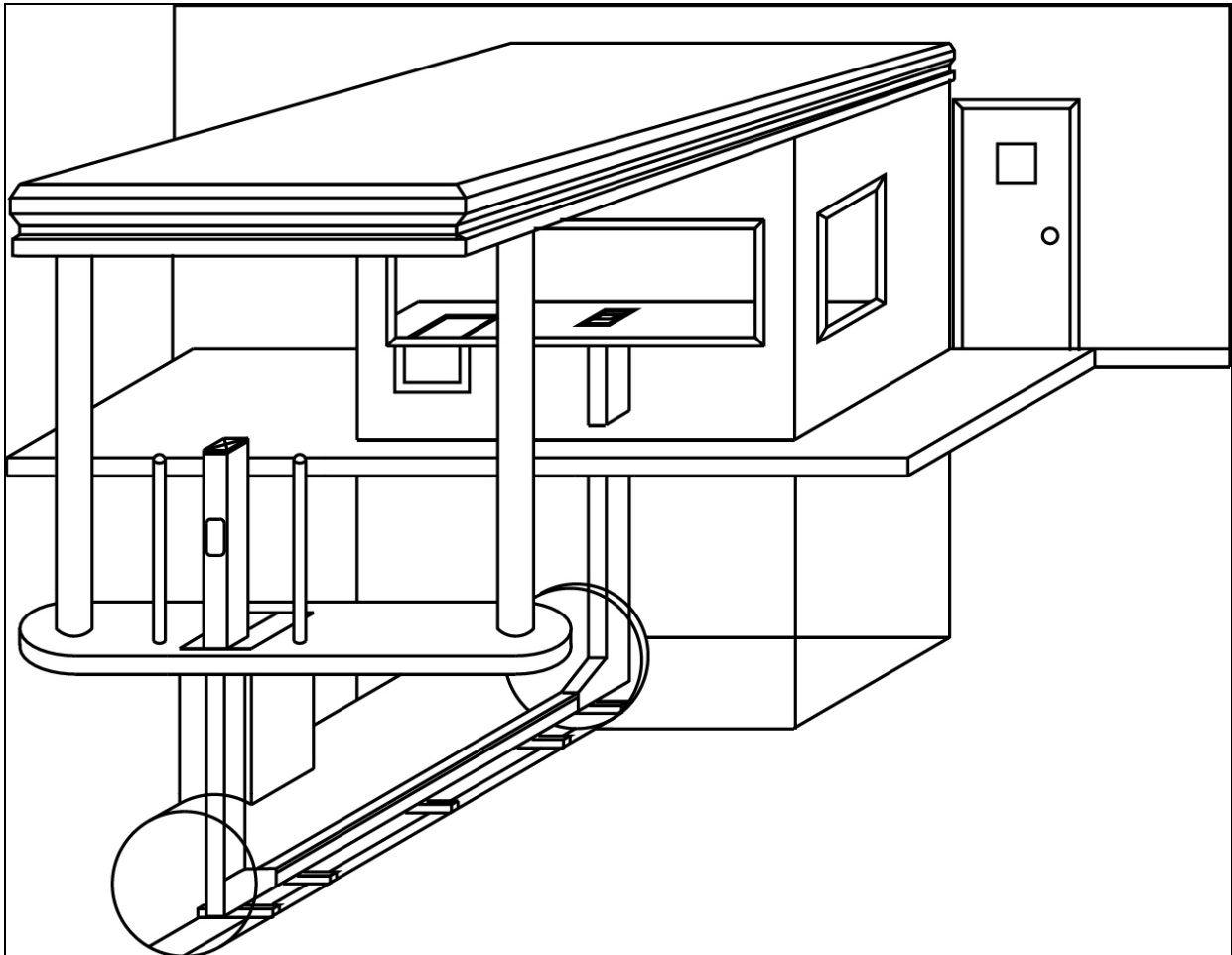


Figure 2

Note also that the teller vertical section of the downsend unit is not finished and is designed to be used inside the undercounter equipment.

## **Attaching Control Wire:**

The wiring system on the Autoveyor<sup>R</sup> 3000 Series equipment is all connectorized with pin and socket style connectors. The wiring simply plugs together, typically at vertical to horizontal junctions.

The audio circuits are 9 position connectors, master control circuits are 12 position connectors and motor circuits are 3 position connectors.

After plugging connectors together, it is important to secure the wiring away from all moving parts and sharp edges.

## **Power Wiring:**

The current model AV – 3000 is no longer supplied with a wired-in molded cordset. A ½” conduit knockout is supplied on the side of the aluminum heat box which encloses the vertical to horizontal transition. This is manufactured in a manner to allow the side panel to be removed for service without disturbing the line connections.

Connections at the customer motor location are as follows:

| Wire  | Potential      | Location                               |
|-------|----------------|--|
| Black | 120vac Hot     | Back of the FUSEHOLDER                 |
| White | 120vac Neutral | WHITE Position on the TERMINAL BARRIER |
| Green | Ground         | Green screw marked GND on riser        |

Connections at other motor locations as follows:

| Wire  | Potential      | Location                             |
|-------|----------------|--------------------------------------|
| Black | 120vac Hot     | Back of the FUSEHOLDER               |
| White | 120vac Neutral | J2 120vac NEUTRAL ON THE SLAVE BOARD |
| Green | Ground         | Green screw marked GND on riser      |

## **Audio Adjustment:**

The audio control and amplifier board can be found on the teller end of the unit behind the teller control panel. To gain access, unscrew the two thumbscrews found on the top right and left of the panel. The panel is hinged at the bottom and will swing down. The audio board is on the left hand side. It is mounted on a card slide for easy access to the adjustments.

Figure #3 provides a line drawing of the board and the volume adjustments.

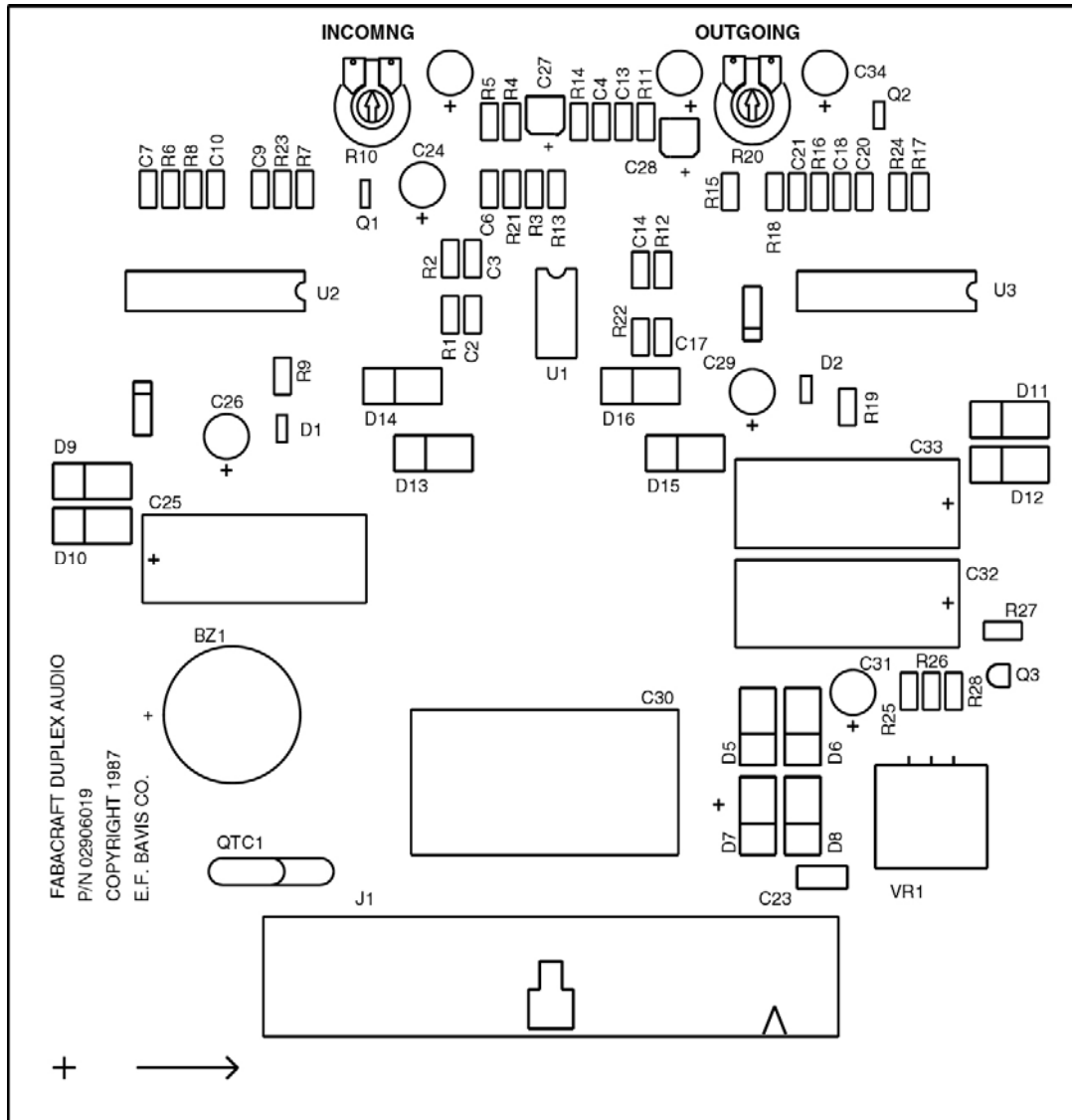


Figure 3

If field adjustment of the AUDIO SYSTEM is necessary, it should be performed as follows:

Before sliding the audio board out of the machine, disconnect the power by pulling out on the CIRCUIT BREAKER located on bottom of the control board. The audio board has a lot of wires attached to it and clearances are close; this reduces the chances of permanent damage to the board. To restore power simply push the CIRCUIT BREAKER back in after the board has been slid into the machine.

The TELLER INCOMING VOLUME CONTROL should be turned to minimum. With the teller speaking into the INSIDE MICROPHONE and a vehicle present at the CUSTOMER UNIT, the OUTGOING VOLUME CONTROL on the AUDIO BOARD should be adjusted for satisfactory volume.

The TELLER INCOMING VOLUME CONTROL should now be adjusted to maximum. The INCOMING VOLUME CONTROL ON THE audio board should be adjusted clockwise until feedback occurs, then counterclockwise until feedback stops. This should complete adjustment.



If the incoming level is not sufficiently high enough, the outgoing level will have to be reduced to be able to get additional incoming volume. The gain levels are a balance; adjustment of each has an effect on the other. If the incoming level is too high, the TELLER INCOMING VOLUME CONTROL can be adjusted to a lower level.

There are two new controls labeled BOOST IN and BOOST OUT. If the teller cannot hear the customer, by depressing the BOOST IN button maximum incoming volume is achieved while muting the outgoing audio to prevent feedback. If the customer cannot hear the teller, by depressing the BOOST OUT button maximum outgoing volume is achieved while muting the incoming audio to prevent feedback.

### **Control Board:**

The Autoveyor<sup>R</sup> 3000 control board is located opposite of the audio board behind the Teller Control Panel. It features a full assortment of diagnostic LED's, which provide detailed information about the current status of the machine and can be used to diagnose problems. Details on problem diagnosis can be found in the section titled, Problem Diagnosis.

### **Fuse Details:**

The CONTROL BOARD has no fuses but utilizes self-resetting PTC thermistors. There is a RESETTABLE CIRCUIT BREAKER. A RED FAULT LED indicates if any of the aforementioned devices has been tripped.

The MASTER FUSE is a FNQ15. When replacing this fuse, it is important to replace it with fuses of the same type and rating. This fuse is now located on the outside of the turn box beside the AC POWER FEED, accessible without the need to remove any covers. A STATUS LED is provided that is illuminated when there is AC power and the fuse is good.

### **User Controls:**

The Autoveyor<sup>R</sup> 3000 features automatic and manual control systems for use by the teller and customer alike. Unlike other systems, one only needs to lift the carrier up into the system in order to send the carrier through to the other side. This automatic feature is the primary way that carriers are sent between customer and teller without need of pressing a "start" or "send" button. Fact is that there is no start button present on the standard Autoveyor<sup>R</sup> 3000.

### **Teller Controls:**

On the teller panel (Figure 4) itself are several control buttons whose operation are described on the following page:

## Autoveyor<sup>R</sup> 3000 Teller Controls

| Control Button                                  | Function When Pressed  |
|---|--|
| <b>BOOST IN</b>                                 | Pressing the BOOST IN button disables the outgoing audio and provides a full volume incoming audio signal. It is to be used by the teller when they are having difficulty hearing or understanding what a customer in the drive-thru is saying.  |
| <b>BOOST OUT</b>                                | Pressing the BOOST OUT button disables the incoming audio and provides a full volume outgoing signal. It is to be used by the teller when the customer cannot hear or is having difficulty hearing the teller.   |
| <b>AUDIO ON</b><br>(LED indicator above button) | Pressing the AUDIO ON button toggles the audio system on and off. The system is ON when the LED above the button is illuminated red. The audio system is OFF when the LED is not illuminated. Note that when the POWER is toggled on, the audio system is also set to the ON position.   |
| <b>CUSTOMER CALL</b><br>(LED)                   | When the CUSTOMER CALL LED is flashing it indicates that a customer has pressed the CALL TELLER button on the customer end of the machine. Once the CALL TELLER button has been pressed the CUSTOMER CALL LED flashes for 30 seconds as an aid to the teller.  |
| <b>POWER ON</b><br>(LED indicator above button) | The POWER ON button toggles the machines power on and off. A red LED above the button is illuminated when the power is set to the on position. When the power is toggled on the door on the customer end of the machine opens. When the power is toggled off the door closes.  |
| <b>RECALL</b>                                   | The RECALL function allows the teller to bring a carrier back to the teller end without assistance. It operates by closing the outside door, which lifts the carrier up into the opening initiating the transaction. Once the door has fully closed and the carrier is on the way to the teller, the door automatically opens. |
| <b>CANCEL</b>                                   | Pressing the CANCEL button once a transaction has been initiated stops the transaction, reverses the motors and returns the carrier to its point of origin, whether sent from the customer or the teller end.  |

**Customer Controls:**

The customer controls consist of a single Call Teller button. Remember that transactions are initiated by lifting a carrier up into the opening so there is no start button.

When a customer presses the Call Teller button, a tone sounds at the Teller End of the machine and the Customer Call LED begins to flash. While the tone stops as soon as the customer releases pressure on the button, the Customer Call LED continues to flash for about 30 seconds

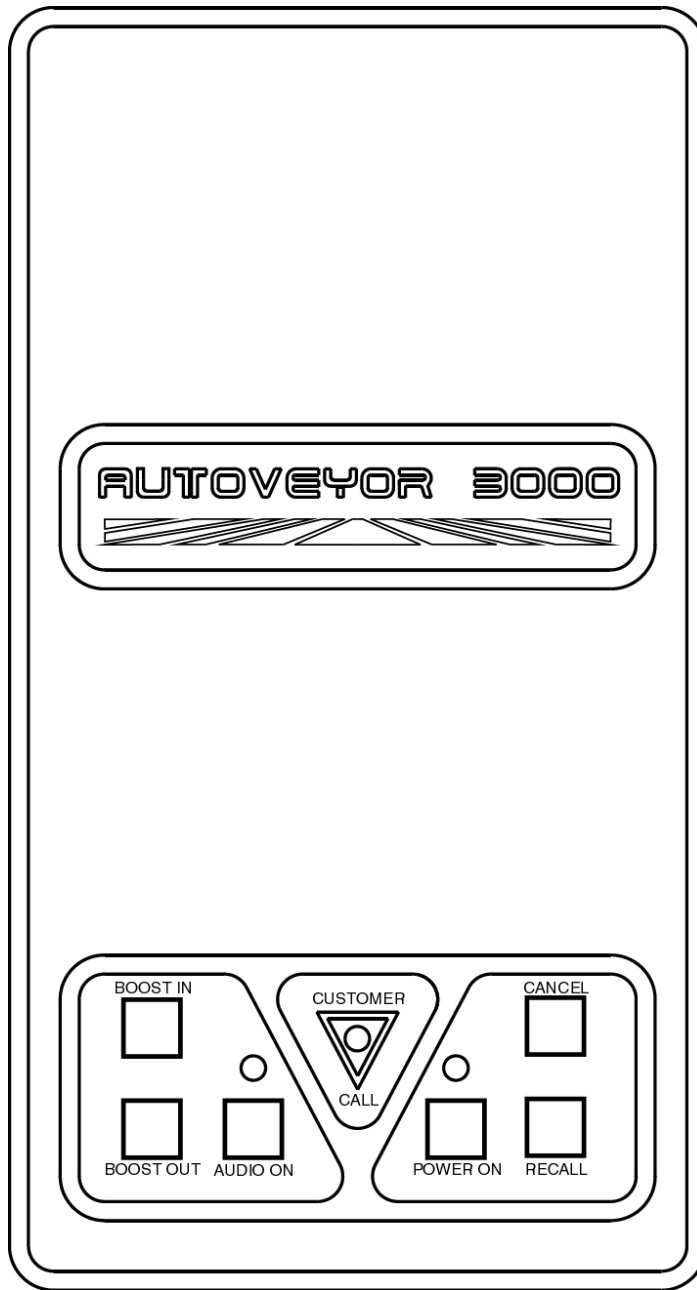


Figure 4, Teller Controls

**Safety Features:**

The Autoveyor<sup>R</sup> 3000 is designed to be safe to use as confirmed by its U.L. Listing<sup>2</sup> Below are some of the features that are important from a safety point of view.

### **Low Voltage Controls:**

All control wiring of the Autoveyor<sup>R</sup> is low voltage and intrinsically safe.

### **Run Limit Timer:**

The drive and the door motors are programmed through the control circuitry to only run for a certain amount of time before they automatically shut off. This limits any damage that may be caused in the event of some form of failure situation.

### **Limited Power Door Motor:**

The motor, which powers the Customer End Door, open and closed, features a limited amount of power and a run limit timer. If someone were to be trapped by the door, it is designed so that it cannot generate crushing forces and is designed to shut off after a predetermined amount of time.

### **Thermally Protected Drive Motors:**

In the unlikely occurrence that the drive motors were to overheat, they are designed in such a way that they automatically shut down.

### **Branch Circuit Protection:**

Each motor is protected by an FNQ 15 amp motor fuse, which is accessible without the need to remove the turn box cover. In addition to the fuse, there is a power status LED indicator next to the fuse holder. When illuminated, this LED indicates that there is power to the motor and the fuse is good.

There are many other features present in the machine in order to provide safe operation, however, no amount of safety design can keep someone from getting hurt if they misuse the equipment. We have done everything that we can think of to insure that the equipment is safe including having it reviewed for safety by a third party<sup>3</sup>

### **Belt Repair:**

Any belt that becomes broken can be repaired using the proper welding tools. Minimum requirements are a Belt Iron, part number 01048011, and Belt Guiding Tongs, part number 01049011. In order to get the tension off of the belt ends for welding, Klein Clamps are very helpful, part number 05001111. Note that steam irons, lighters, and other forms of belt heating are not acceptable. The belt iron is set at a specific temperature; using other forms of heat will likely cause premature belt failure.

If a belt needs to be replaced, do not measure the existing belt in order to determine the length of the replacement belt. Older belts may be stretched or otherwise damaged and will yield an improper model for the new belt. It is recommended that when a new belt is to be installed for whatever reason, contact the factory and provide the serial number<sup>4</sup> of the machine. They will respond with the proper length of the belt.

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<sup>2</sup> See U.L. label attached to the machine for details on listing.

<sup>3</sup> See Note 2

<sup>4</sup> The serial number is located on the customer turn box and also on the back of the red customer station

There is no need to strip the skins off of the machine in order to replace a belt. Autoveyors<sup>R</sup> have belts in pairs; in order to reinstall a belt into the system, attach the new belt to the matching pair and hand cycle the machine. If done properly with one cycle you should have both ends threaded all the way thru the system.

Note that there is no preventive maintenance required on the belting...if it is not broke, don't fix it!

### **Preventive Maintenance:**

Preventive maintenance for the Autoveyor<sup>R</sup> 3000 consists of keeping the machine clean and touching up the paint. Every 2 years of heavy operation, power belts should be checked for excessive wear, however, typical life on these belts is 5 to 7 years.

There is just nothing else to do but wait for something to just wear out and stop working. The reason for this is a result of the design of the Autoveyor<sup>R</sup>. Most components of the system are used at a fraction of their rated capacity. Further, we have chosen bearings that are shielded so that no lubrication is required. The drive motors are brushless and require no maintenance. Switches are isolated from direct contact with fast moving carriers. Finally, the major wear component of the system is the inexpensive carrier which should be replaced on a regular basis. In fact, many financial institutions tell us that the carriers "ugly out" long before they wear out.

So, as you can see, unlike other systems a lot of time was taken in the design of the system so maintenance would not be an issue.

### **Unusual Installations:**

Sometimes it is necessary to mount the horizontal upsend section of an Autoveyor<sup>R</sup> either above or below an existing canopy. Remember that the horizontal section is not water tight, so provisions must be made to provide for protection from the environment.

Another aspect to consider in unusual installations is the protection of all the wiring. Note that wire used in the Autoveyor<sup>R</sup> is not designed to be exposed to outside elements. It must also be protected.

In units that are hung under a canopy, it is strongly suggested that the unit be protected from tall vehicles.

Finally, if the horizontal section is installed above the canopy in some sort of housing, be sure that the housing is well ventilated. There have been several instances where housings of this type have gotten so hot that they have cooked the grease out of the system's bearings. Proper ventilation will keep this problem to a minimum.