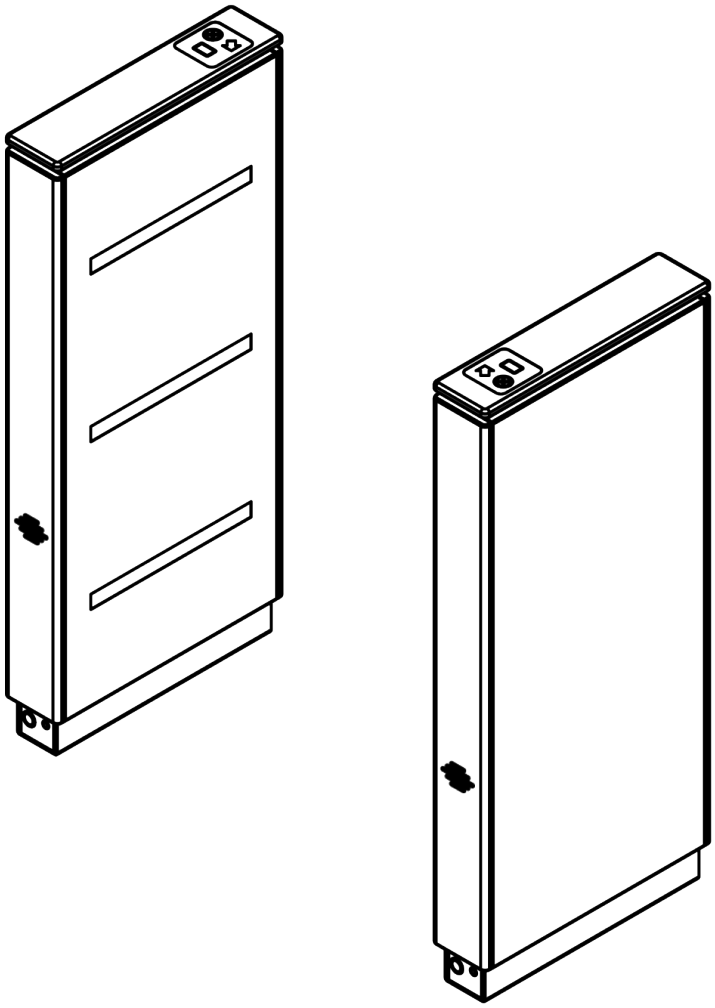
ALVARADO

protecting assets and controlling the flow of people

Supervisor 2000
(SU2000)

Barrier-Free Optical Turnstile



Installation Instructions

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PUD1601R6-1

Contents

Contents. 2
Safety Precautions. 3
Safety Icons. 3
Installation Tools. 4
Uncrating. 4
Parts List. 4
Introduction. 5
Pre-Installation Requirements. 6
- Slab Requirements. 6
- Space Requirements (28" Lane). 7
- Space Requirements (36" Lane). 8
- Space Requirements (28" & 36" Optional Platforms). 9
- Conduit Requirements. 10
- Electrical Requirements. 10
- Environmental Requirements. 11
- Communication Requirements. 11
- Card Reader Installation Requirements (Optional). 11
- User Training. 11
- Pre-Installation Checklist. 11

Pre-Installation Instructions. 12
- Side Panel Removal. 12
- Lid Removal. 12
- End Panel Removal. 13
- Turnstile Layout. 14
- Portable Baseplate Assembly (Optional). 15

Installation Instructions. 16
- Anchoring the Turnstile. 16
- Internal Card Reader Installation. 18

Wiring Instructions. 19
- Primary Power. 19
- Crossover Cable. 19
- I/O Control Board (13-0328 Rev. F). 20
- I/O Control Board (13-0328 Rev. F) Terminal Descriptions. 21

Configuring Passage Modes. 22
- Ethernet Communication (Optional). 24

Post-Installation Functions Check. 24
- Passage Modes. 24
- Powering On. 25
- Testing Lane Functionality. 26
- Testing Lane Key Control (Optional). 28
- Testing Ethernet Communication (Optional). 29

Finish the Installation. 30
Post-Installation Checklist. 30
Troubleshooting. 31
Appendix A - Multi-Lane Conduit Requirements. 32
Revision History. 33

Safety Precautions

⚠ WARNING The Supervisor 2000 may present a risk to persons and property if it is not installed and/or operated correctly. Therefore, this manual must be read in its entirety and all safety and operations information must be adhered to. Note the following precautions:

- For indoor use only.
- Use only skilled individuals to install and service the turnstile.
- DO NOT operate the turnstile if it has been damaged in any manner. If damaged, have the unit repaired or adjusted by a skilled service person before use.
- DO NOT modify or alter the turnstile.
- Have skilled individuals maintain the turnstile according to a proper maintenance schedule.
- In access control applications, train all personnel that will be using the turnstile in the proper method of operation. In addition, properly train new users as they are added to the system.
- DO NOT use non-Alvarado parts to repair a damaged turnstile.
- Closely follow the handling instructions for moving or lifting the turnstile during installation.
- Power off the turnstile before connecting or disconnecting any communication or power wiring to the turnstile.
- The turnstile shall be disconnected from its power source during service and when replacing parts. The turnstile shall be disconnected from its power source before connecting or disconnecting any communication or other activation/feedback control wires. If it is not possible that the technician can check from any point to which he has access that the main power is removed, a disconnection with a locking system in the isolated position shall be provided.

Safety Icons

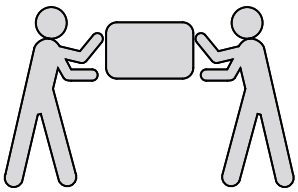
The following symbols are used throughout the manual to highlight important information and potential risks when installing, servicing or using the turnstiles covered in this manual.

⚠ WARNING This symbol is used in this manual to warn installers and operators of potential harm. Please read these instructions very carefully.

⚠ CAUTION This symbol is used in this manual to designate potential conditions that may pose a risk to pedestrians, personnel, property and equipment. Please read these instructions very carefully.

NOTE This symbol is used in this manual to designate useful information for the installer and operator. Please read these instructions.

☎ For questions, please contact Alvarado at (909) 591-8431, Monday – Friday 7:00am to 4:30pm PST. Please read this manual completely before installing or operating the purchased product.



A minimum of two people is required to complete the installation of this product.

Installation Tools

- Tape Measure
- Chalk Line
- Pencil
- Hammer Drill
- 1" Concrete Drill Bit
- Shop Vac
- Rubber Mallet
- Torque Wrench (ft-lbs.)
- Open Wrench
- 15/16" Socket
- Level
- #2 Phillips Head Screwdriver
- Precision Flat Head Screwdriver
- Clear RTV Silicone

Uncrating



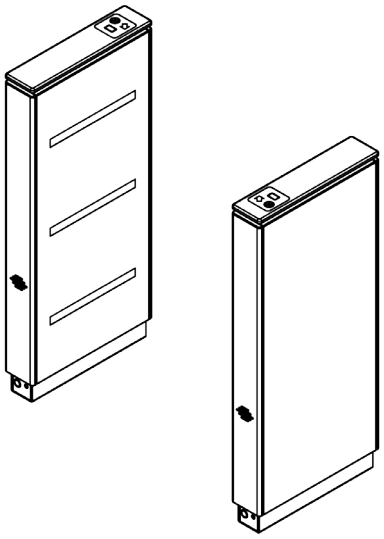
The SU2000 has been packed for shipping to prevent damage to the unit. Two or more installers are required to unload the SU2000 at the installation site. Once the turnstile cabinets have been placed in the installation location, carefully remove the protective packing material from the sides of the cabinets.

Parts List

This product is shipped with all installation hardware and components. If installing a single lane, refer to the Single Lane Parts List below. For additional lanes, refer to the Center Cabinet Parts List. Make sure that none of these parts are missing and/or damaged before beginning installation. If parts are missing and/or damaged, please contact Alvarado.

Single Lane Parts List

Slave Cabinet
(Qty 1)



Master Cabinet
(Qty 1)

Concrete Anchor Package:

- 5/8" Concrete Anchors (Qty 4)
- 5/8" Anchor Bolts (Qty 4)
- 5/8" Flat Washers (Qty 4)

Cabling:

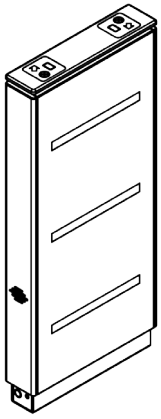
- 11' Crossover Cable (Qty 1)

Software:

- File Management CD (Qty 1)

Center Cabinet Parts List (Per Center Cabinet)

Center Cabinets are used to create additional lanes for multi-lane configurations. Each additional lane includes the parts below.



Center Cabinet
(Qty 1)

Concrete Anchor Package:

- 5/8" Concrete Anchors (Qty 4)
- 5/8" Anchor Bolts (Qty 4)
- 5/8" Flat Washers (Qty 4)

Cabling:

- 11' Crossover Cable (Qty 1)

Introduction

This manual covers the physical installation process for SU2000 Optical Turnstiles. A separate *SU2000 User Guide* provides operating instructions and additional information such as configuring turnstiles for bi-directional passage applications and monitoring outputs. It is highly recommended that both this manual and the *SU2000 User Guide* be read in their entirety prior to beginning installation.

SU2000 Cabinets

There are three types of SU2000 cabinets used to create passage lanes: a master cabinet, a slave cabinet, and a center (expansion) cabinet. A single passage lane consists of a master cabinet and a slave cabinet [Figure 1]. The center cabinet is used to create additional passage lanes with the addition of a single cabinet [Figure 2].

Each cabinet has an unsecured and secured side. Alvarado follows what we call the “right-hand rule." User status lights and card readers are always installed on the right-hand side in the entry and exit directions.

Master Cabinet

The master cabinet contains the main turnstile controller, I/O control board, power supply, sensor receivers, and a power button located at the base on the secured side.

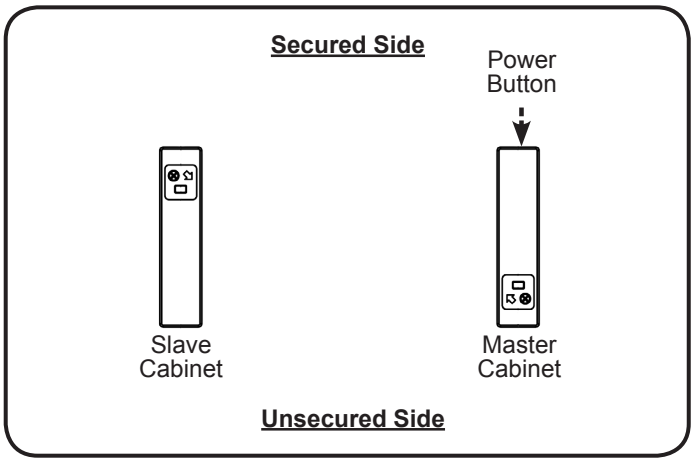
The reveal of the master cabinet contains a user status display that communicates lane status to the user.

Slave Cabinet

The slave cabinet contains sensor transmitters.

The reveal of the slave cabinet contains a user status display that communicates lane status to the user.

Figure 1 **Single-Lane Configuration**



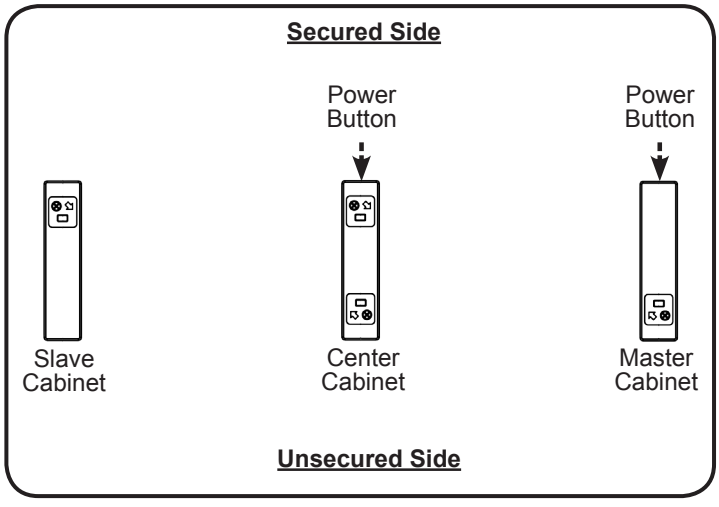
Center Cabinet (Multi-Lane Configuration)

Center cabinets contain both master and slave components. Center cabinets are extension cabinets used in multi-lane applications.

The center cabinet contains the main turnstile controller, I/O control board, power supply, sensors for both the master and slave side of the center cabinet, and a power button located at the base on the secured side.

The reveal of the center cabinet contains two user status displays that communicate lane status to the user.

Figure 2 **Multi-Lane Configuration**



Access Control Integration

There are two types of interfaces to allow an access control system to operate with the SU2000:

Dry Contact

Single passage activation and the various other inputs and outputs available to / from the SU2000 are accessed through the I/O control board located in the master cabinet. The required system input is a voltage-free, momentary dry contact. Outputs are also provided in this form. In rare cases, depending on the access control system, it may be desirable to utilize isolation relays to ensure proper system signaling. Additional information on I/O interfacing is provided later in this manual.

TCP/IP

For select projects, a TCP/IP interface is available. This interface allows a third-party access system to communicate to / from the SU2000 using a defined TCP/IP command structure. There is an additional charge for use of the TCP/IP interface and implementation requires programming efforts on the part of the access system provider. Instructions pertaining to the TCP/IP interface is outside the scope of this manual.

Network Communication

SU2000 turnstiles are TCP/IP enabled. Running Ethernet cabling to the SU2000 master and center cabinets provides a number of benefits. (1) It allows implementation of Alvarado's TCP/IP control and monitoring software. (2) It allows easy implementation of SU2000 application software updates and enhancements. If SU2000's are networked, updates can be installed over the network. (3) Alvarado has future plans to further develop the TCP/IP capabilities of the SU2000. The benefits of this future development can only be realized if turnstiles are networked.

Pre-Installation Requirements

The pre-installation requirements listed below must be reviewed before installing the turnstile. These notes also serve as a checklist that must be complied with after installation. The installation site should also be evaluated before actual installation of the turnstile to ensure that future turnstile placement is possible and installed as desired. This evaluation includes proper spacing, a firm foundation, and separate conduit runs for power and data lines.

Slab Requirements

The following slab requirements must be taken into consideration when selecting the installation location:

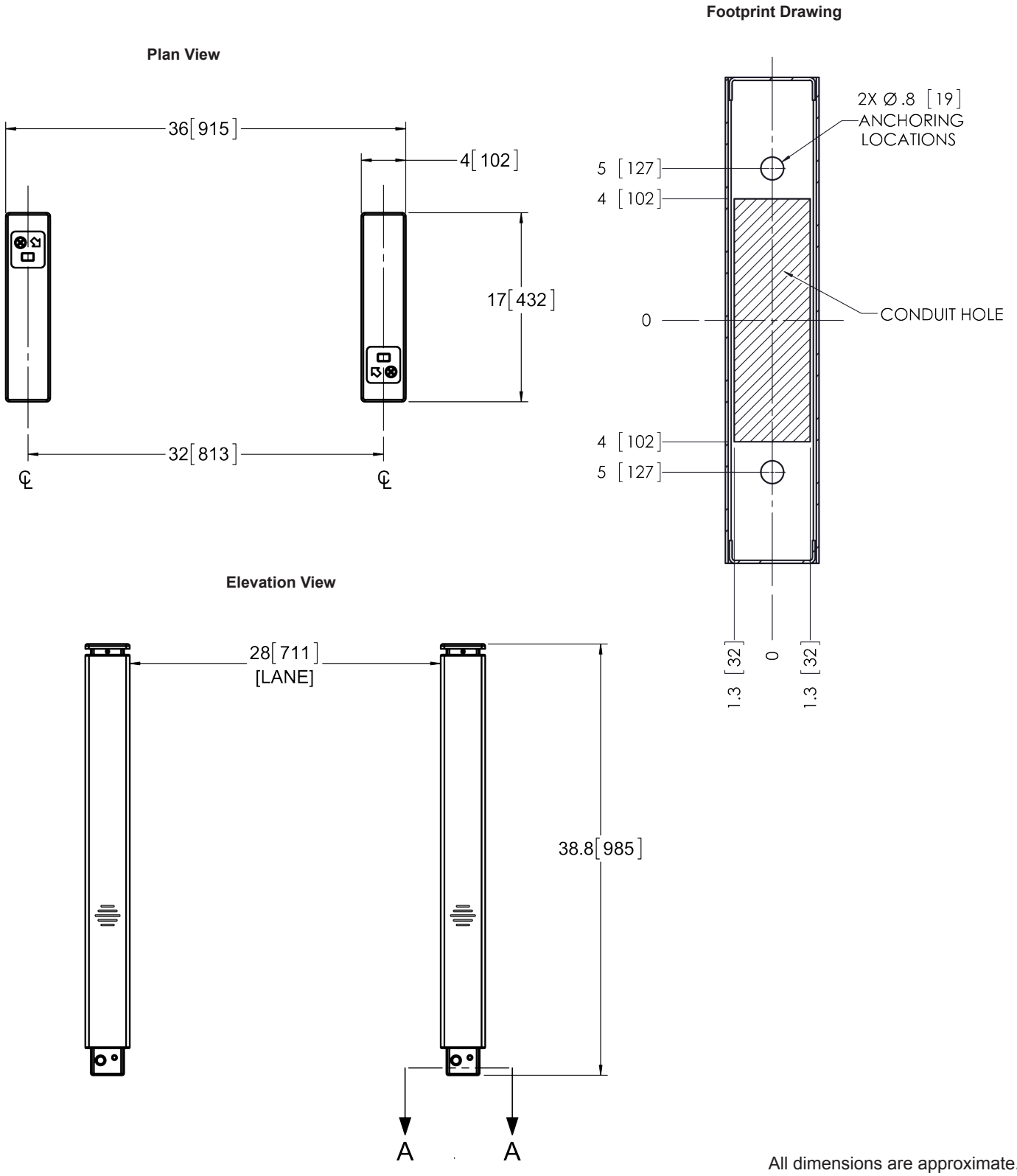
- A level solid concrete pad with a minimum thickness of 4" (102mm).
- Use full-sweep electrical conduit underneath the floor.
- Three separate conduits for primary source power, external data, and the crossover cable must be used.
- Cabinets must be installed plumb with the floor while level and square to each other.

Space Requirements (28" Lane)

NOTE

For ease of installation and servicing, Alvarado recommends 6" of space between the cabinets and adjacent walls or other surfaces.

Figure 3 **28" Single Lane - Plan, Elevation & Footprint Drawing**



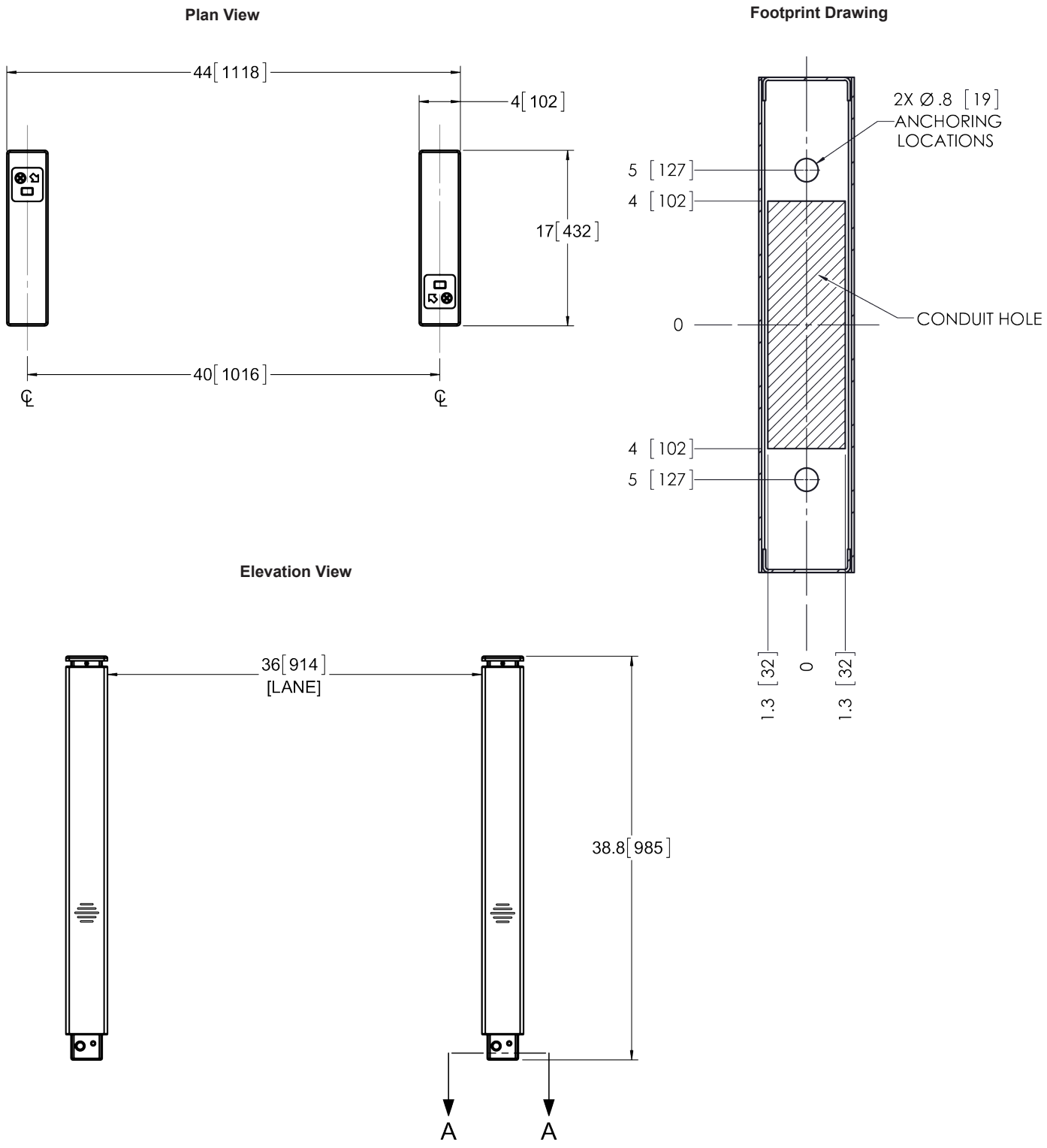
All dimensions are approximate.

Space Requirements (36" Lane)

NOTE

For ease of installation and servicing, Alvarado recommends 6" of space between the cabinets and adjacent walls or other surfaces.

Figure 4 **36" Single Lane - Plan, Elevation & Footprint Drawing**



All dimensions are approximate.

Space Requirements (28" & 36" Optional Platforms)

NOTE

For ease of installation and servicing, Alvarado recommends 6" of space between the cabinets and adjacent walls or other surfaces.

Figure 5 **28" Portable Baseplate**

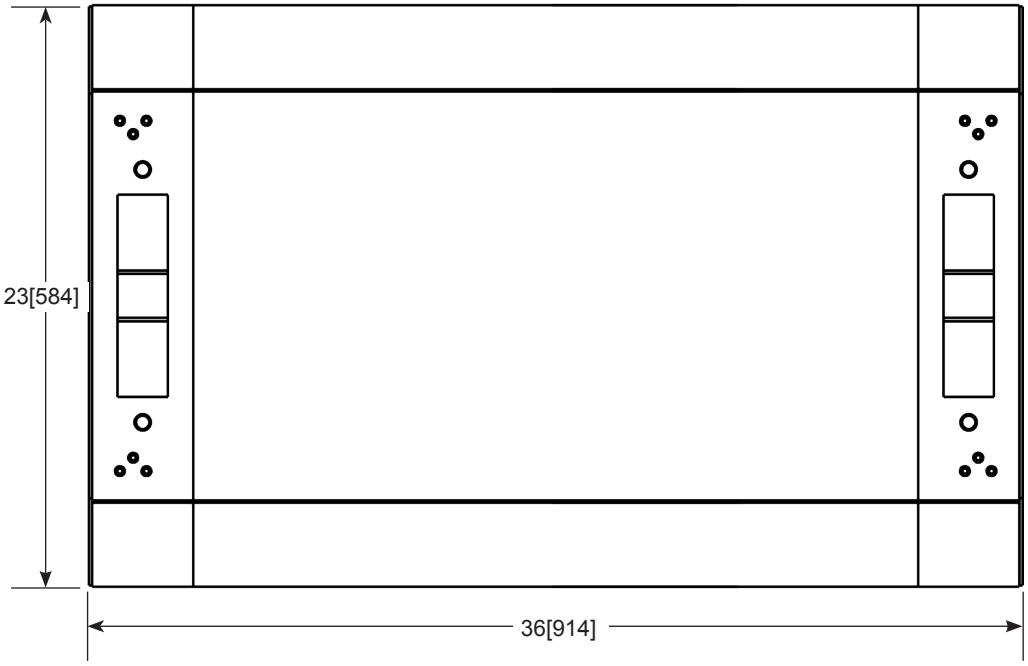
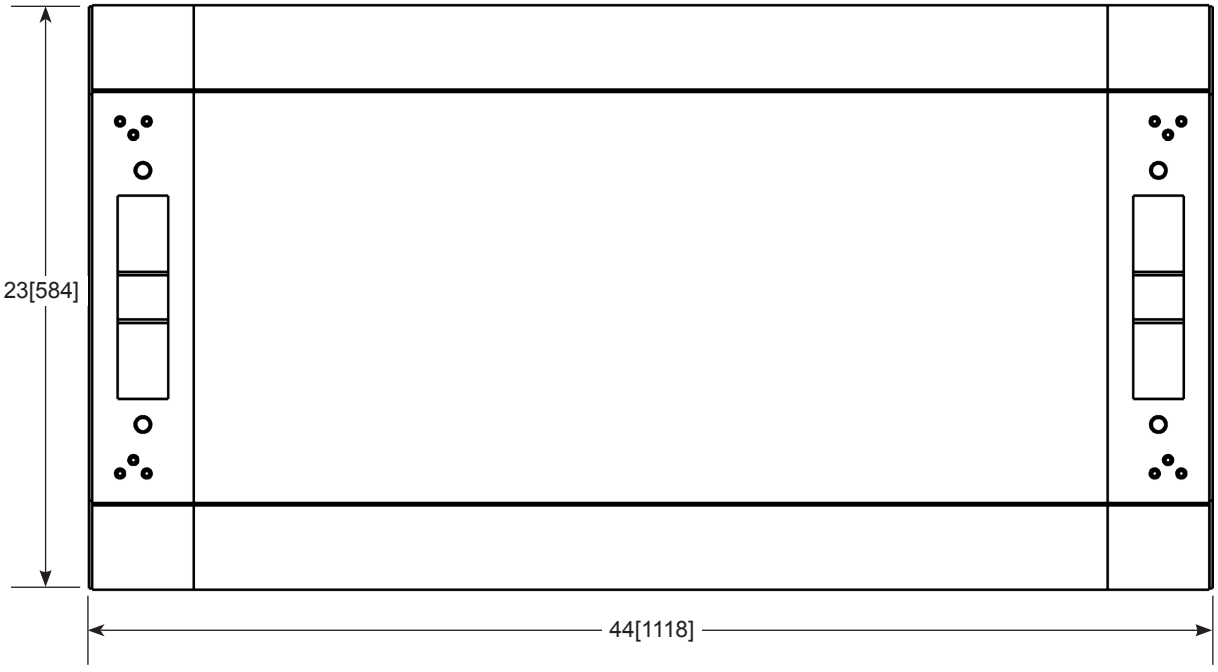


Figure 6 **36" Portable Baseplate**



All dimensions are approximate.

Conduit Requirements

NOTE

The conduit openings for each cabinet are 8" x 2.80" (203mm x 71mm). The three required conduits will fit in these areas [Figure 7].

Primary Power

- 3/4" (19mm) power conduit for primary source power (e.g. 120 VAC, 220 VAC) must be run to the master and center cabinets.

Access Control/Readers/Ethernet

- 3/4" (19mm) conduit for external access control/ network communication must be run to all cabinets requiring a card reader. Networked turnstiles must have Ethernet cable run to the master and center cabinets.

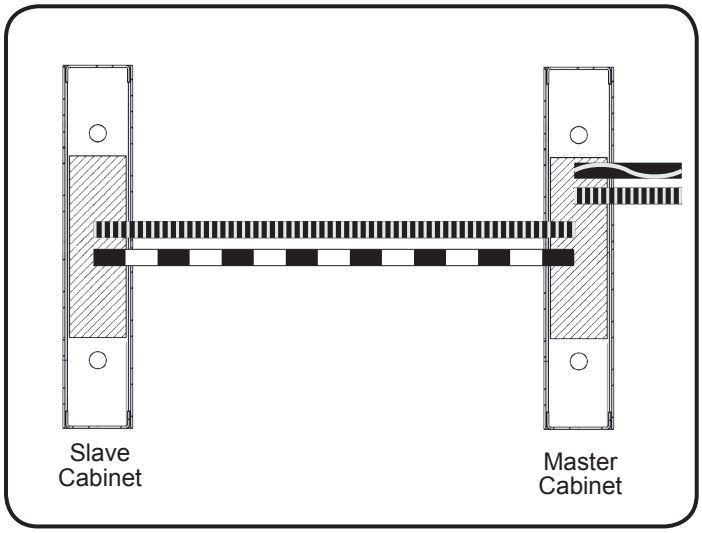
Crossover Cable

- 1 1/2" (38mm) conduit **must** be run to interconnect the cabinets in each lane.

NOTE

Seal the floor area around the conduits running up and into the cabinets. This will prevent condensation and debris build-up coming from whatever may be below the floor.

Figure 7 **Conduit Openings**



Symbology	Description	Conduit Size
	Primary Power	3/4"
	Access Control/ Readers/ Ethernet	3/4"
	Crossover Cable	1.5"

NOTE

For multi-lane conduit requirements, refer to Appendix A on Page 32.

Electrical Requirements

Power Supply	110-120 VAC, 60 Hz or 220/240 VAC, 50 Hz
Power Requirements	Peak power consumption is 60W per lane with all options installed.
Operational Voltage	Primary power is stepped down and rectified for low-voltage12 VDC and 5 VDC operation.
Fuse	2.5A (slo-blo) located in the master cabinet
Surge Protection	Alvarado suggests the use of surge protection on the high-voltage power line to further protect electronics

Environmental Requirements

- **DO NOT** install the product outdoors. This product is intended for indoor use only.
- **DO NOT** install the SU2000 where infrared lighting (strobe lights, flash photography, etc.) is in the direct path of the optical sensors. Interference may affect the performance of the turnstile.

The following are suggested operating temperature and humidity ranges for the SU2000:

	Operation	Non-Operation/Storage
Temperature Range	10° - 32°C / 50° - 90°F	0° - 40°C / 32° - 104°F
Humidity Range (Non-Condensing)	15% - 85% RH	--

⚠ CAUTION Operating the SU2000 outside the suggested temperature and humidity ranges may negatively affect turnstile performance and could potentially cause damage to turnstile components.

Communication Requirements

Signal Inputs and Outputs To / From Access Control System

Inputs - Signal inputs from outside systems are wired into the SU2000's I/O control board. There are two types of input signals, momentary dry contacts (MDC) and sustained dry contacts (SDC). All input signals must be normally open, voltage-free, dry contacts, with the exception of the fire alarm input, which can be configured (via jumper on the I/O control board) to accept either a normally open or normally closed sustained contact. MDCs must be at least 100ms in duration to register. While the SU2000 can accept signals up to 2 seconds in duration, the suggested MDC input duration is 1 second or less to support rapid throughput in high volume applications.

Outputs – Signal outputs are available from the SU2000's I/O control board. Outputs are normally open, voltage-free, momentary dry contacts. The output signal length is 500ms in duration.

Inability to Provide Specified Inputs - If the access system does not have dry contract outputs, isolation relays should be used. NEVER connect signal lines containing voltage directly to the I/O control board.

Network Communication

A networked PC with Alvarado's TCP/IP control and monitoring software is required. Adhere to IEEE standards for network cabling requirements.

Card Reader Installation Requirements (Optional)

Card readers or other physical access devices may be installed to the end panels on the right-hand sides of the lane, or on adjacent pedestals. Card readers / physical access devices are not supplied by Alvarado. Due to the slim profile of the SU2000, generally only mullion sized card readers can be installed.

The physical dimensions of the card reader should not exceed: 1.00" H x 1.9" W x 6.5" D (25mm x 48mm x 165mm).

User Training

All personnel that will be involved with operating the SU2000 should be trained in the proper method of operation. Detailed operation instructions are outside the scope of this manual, but can be found in the *SU2000 User Guide* (also included with the product). If further training is desired, contact Alvarado for information regarding on-site training services.

Pre-Installation Checklist

It is the installer's responsibility to ensure the following steps are completed before beginning the installation.

1. All components and hardware to be installed have been unpacked, correctly identified, and moved to the installation location.
2. The turnstile configuration and layout has been confirmed with the site manager.
3. All applicable requirements in the Pre-Installation Requirements section have been met.

Pre-Installation Instructions

NOTE

It is assumed that the Pre-Installation Checklist steps are complete.

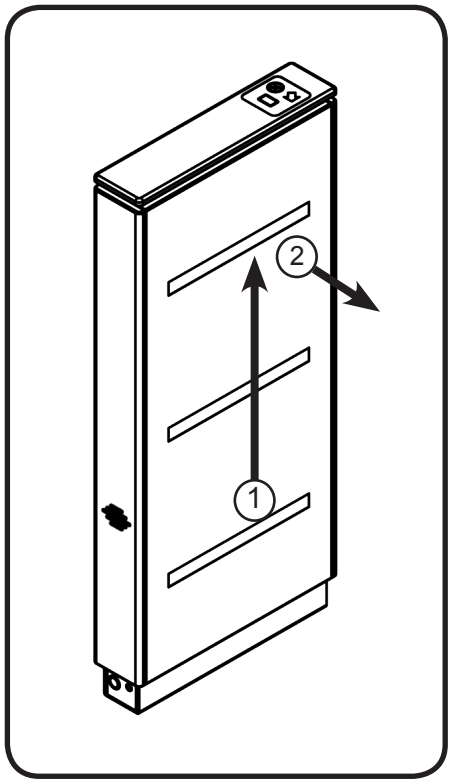
Side Panel Removal

1. To remove a side panel, slide the side panel up til it clears the pins, then pull straight out [Figure 8].

NOTE

Do not force open the side panels. Use a screwdriver to carefully loosen any tight fitting side panels. Take care when doing this to prevent damage to the unit. Note the location of the side panel after removing in order to correctly secure it.

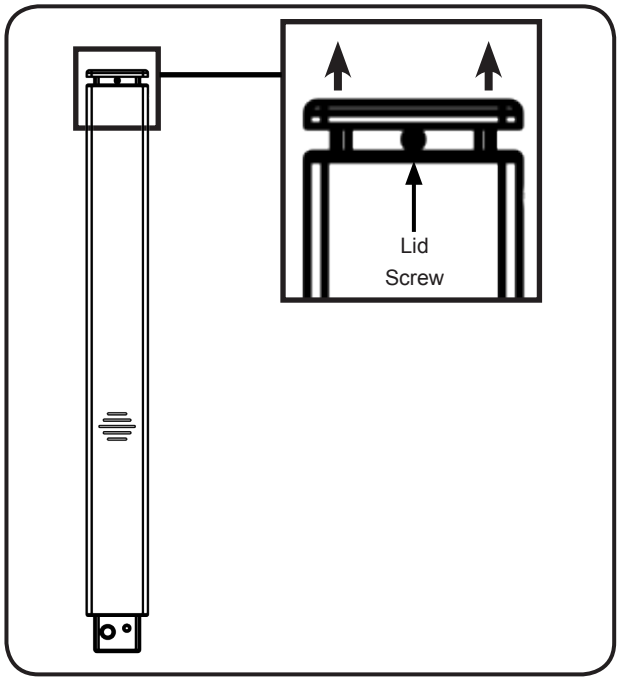
Figure 8 **Side Panel Removal**



Lid Removal

1. Locate the lid screws located on the cabinet end panels as shown in [Figure 9]. There is one lid screw per side.
2. Using a #2 Phillips head screwdriver, remove the two (2) lid screws,
3. Gently lift the lid in an upward motion to remove.

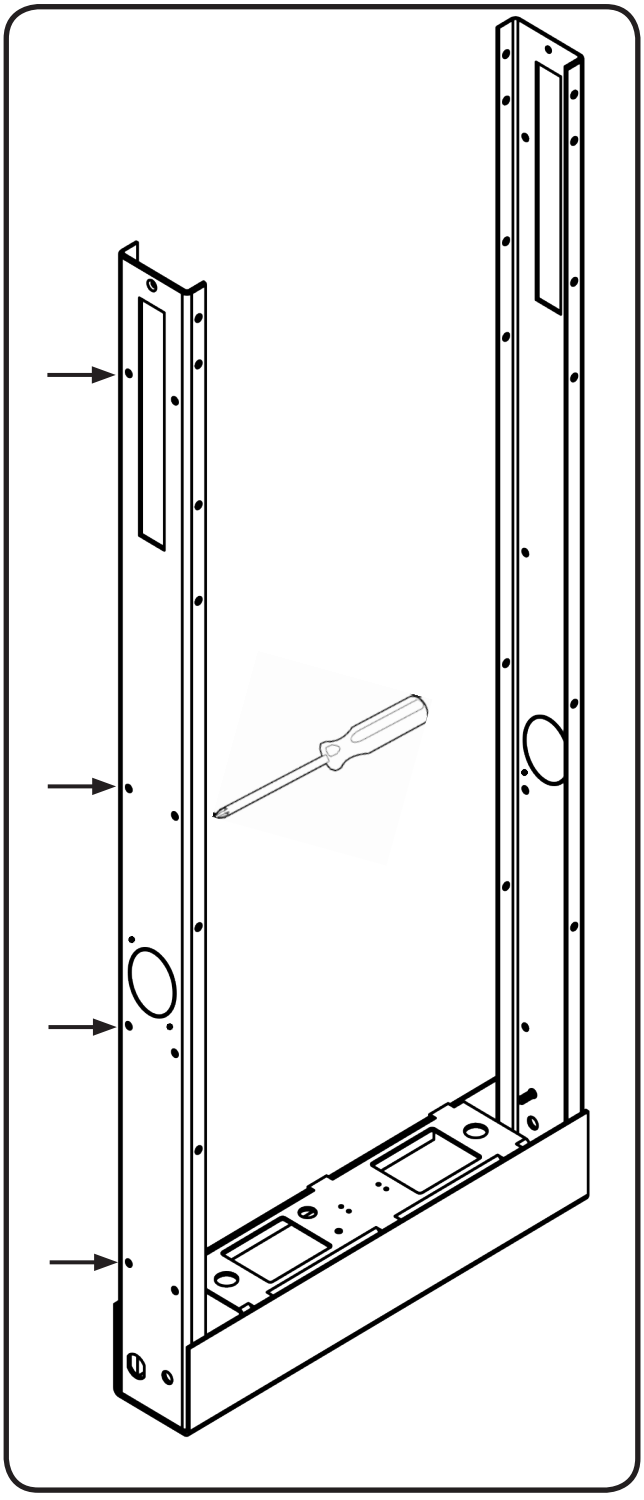
Figure 9 **Lid Removal (Side View)**



End Panel Removal

1. Locate the eight (8) end panel screws located on the **inside** of the frame [Figure 10].
2. Using a #2 Phillips head screwdriver, remove the eight (8) end panel screw.
3. Gently remove the end panel and set aside.

Figure 10 **End Panel Removal**



NOTE

Bare frame is shown for ease of view.

Turnstile Layout

With the panels and lids removed, confirm that the cabinets are laid out such that one side of the lane contains the master controller cabinet components and the other side of the lane contains the slave cabinet components. The correct layout orients the power button on the secured side as shown in [Figure 11]. An example of an incorrect layout is shown in [Figure 12]. Before proceeding, verify the master controller cabinet components are facing the slave cabinet components, and the power button(s) are located on the secured side. The Lane 1 master cabinet is always the right-most cabinet in relation to the unsecured side.

Figure 11 **Correct Turnstile Layout**

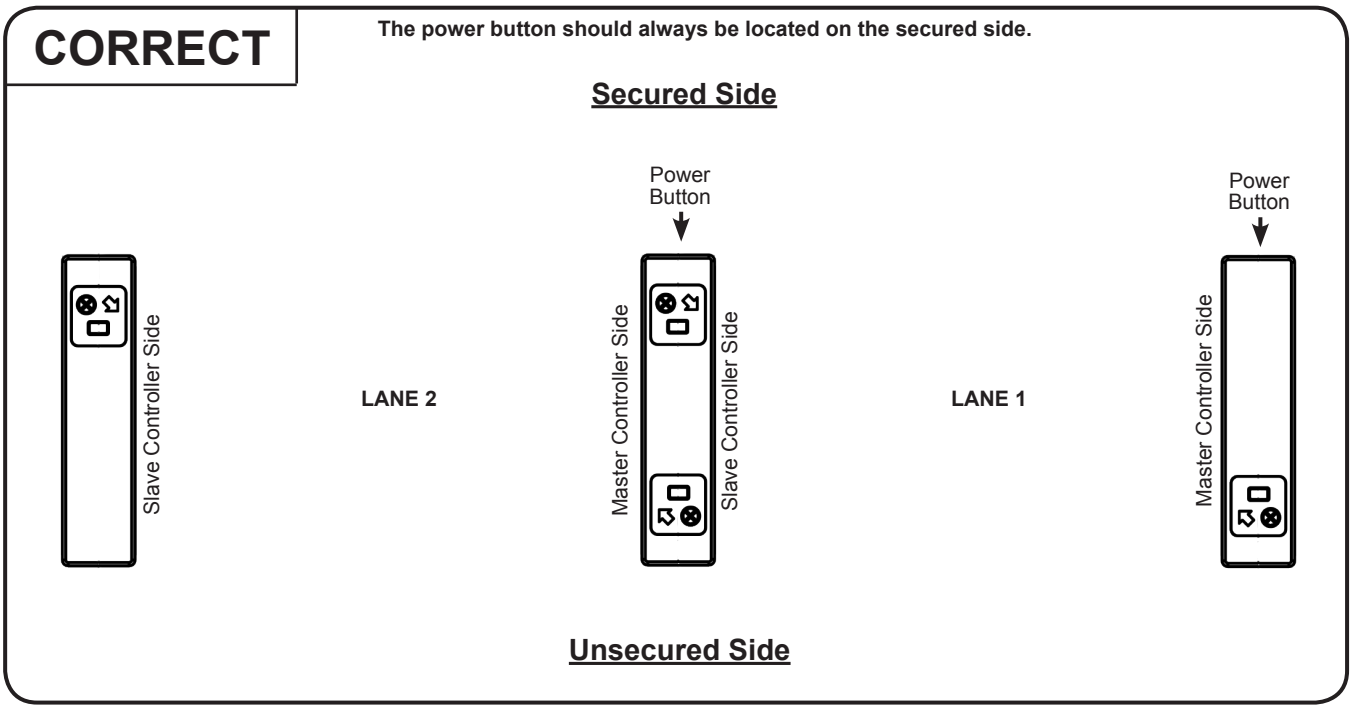
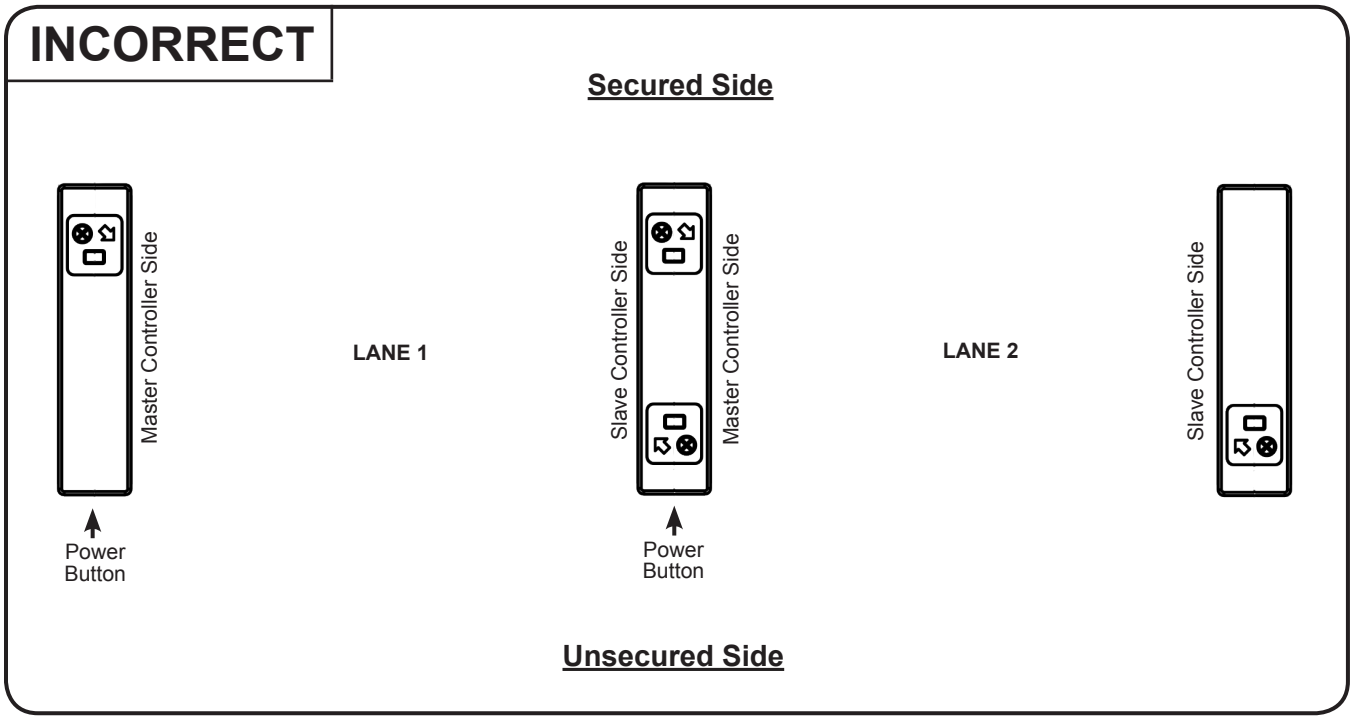


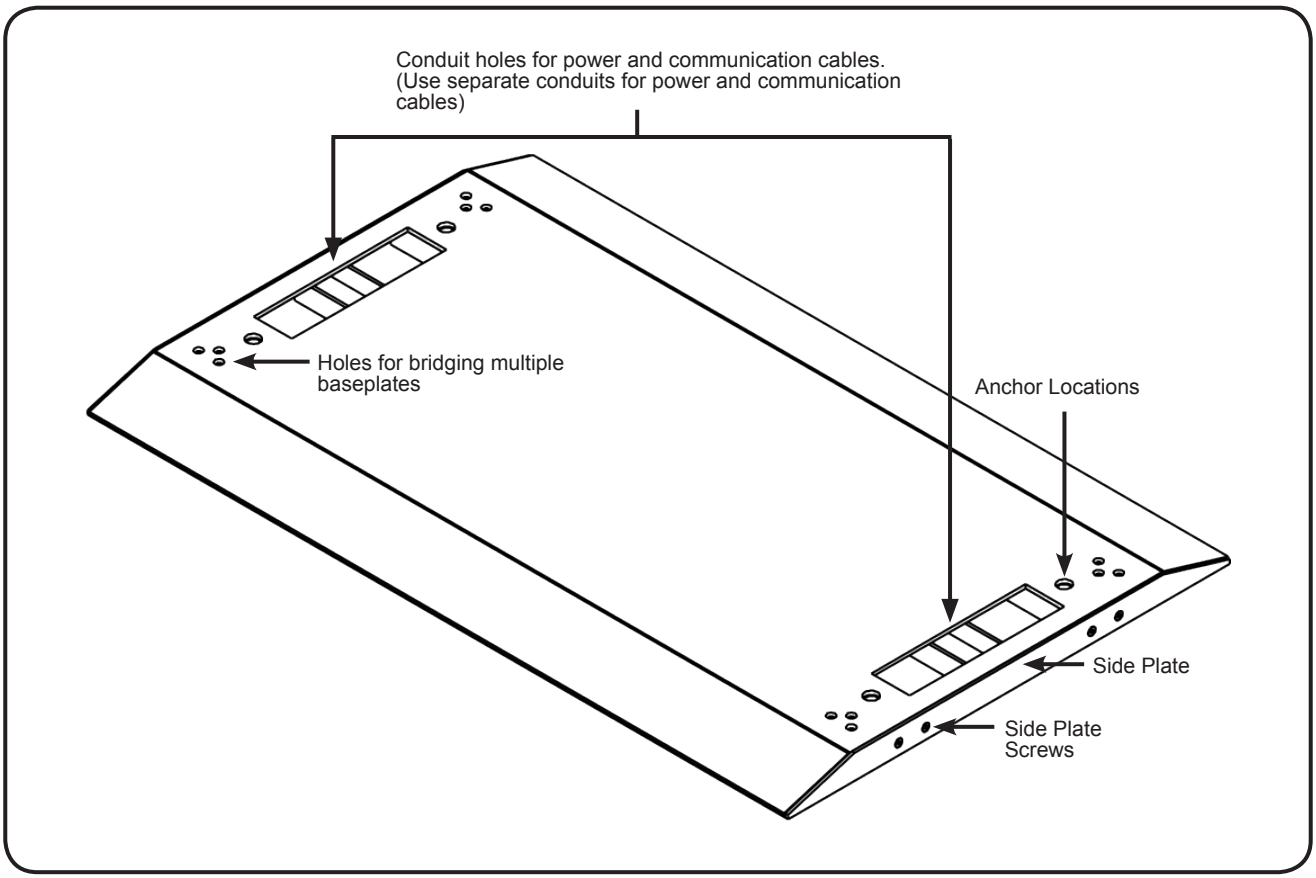
Figure 12 **Incorrect Turnstile Layout (Lanes Oriented Backwards)**



Portable Baseplate Assembly (Optional)

An optional SU2000 portable baseplate may be purchased with the SU2000 turnstile. A baseplate enables installation of the SU2000 turnstile on a solid foundation without the need to drill holes in the ground. The portable baseplate also provides concealed conduit channels for wiring all power and communication cables. Baseplates come in different sizes and may be bridged together with other baseplates for multiple turnstile lanes. The following information will guide the installer in assembling the portable baseplate:

Figure 13 **Portable Baseplate**



Examine the area with a measuring tape and carefully mark the location where the portable baseplate(s) will be placed. An external power source and external data cables (required for GateKeeper and external controls), must be accessible and provided to the turnstile. The side plate on the portable baseplate must be removed in order to provide external power/data (or the side plate may be drilled with appropriate holes as needed for concealment). Determine which side plate to remove and remove it by unfastening the (4) screws as shown in [Figure 13].

Place the portable baseplate carefully in the marked location. The installation process continues in the following sections. Follow the instructions there in order to pull the appropriate cables through the conduit openings.

For multiple lanes, baseplates may be attached together. Holes are provided for bridging multiple baseplates together. The side plate must be removed in order to bridge the baseplates together side by side. Secure the baseplates side by side by fastening the (6) screws provided to the link from the other baseplate (a link is provided for multiple lane baseplates).

Installation Instructions

Anchoring the Turnstile

NOTES

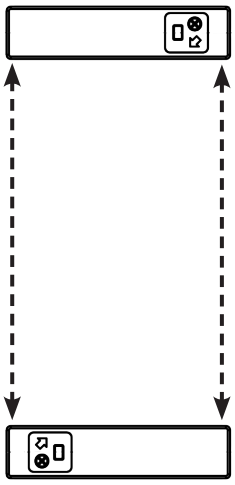
The Lane 1 master cabinet is always the right most cabinet in relation to the unsecured side.

For ease of installation and servicing, Alvarado recommends a minimum of 6" of space between the cabinets and adjacent walls or other surfaces.

1. Place the master cabinet and the slave cabinet in the determined location [see dimensions - Figures 3 -4].
2. Cabinets must be level to each other and square to all neighboring cabinets. This will ensure that all optical sensors are aligned for optimum performance. Use the following procedure to square each cabinet with respect to the floor and other cabinets:

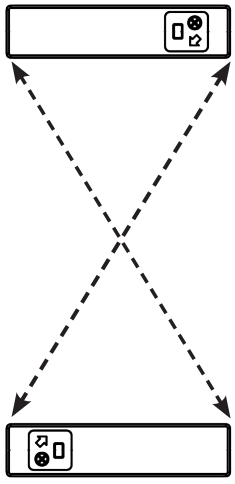
A. Measure the distance from the inside wall of one cabinet to the inside wall of the other cabinet, on both the entry and exit side of the lane for a consistent measurement [Figure 14].

Figure 14



B. Measure the diagonal distance from the end of one cabinet to the end of the opposing cabinet, then measure the opposing diagonal [Figure 15]. If these distances are equal, the cabinets are square.

Figure 15



Anchoring the Turnstile (cont.)

3. Use a pencil and mark each anchor hole location [Figure 16]. There will be a total of two (2) anchor holes per cabinet. Remove the cabinets when complete.

Figure 16 Marking Anchor Holes

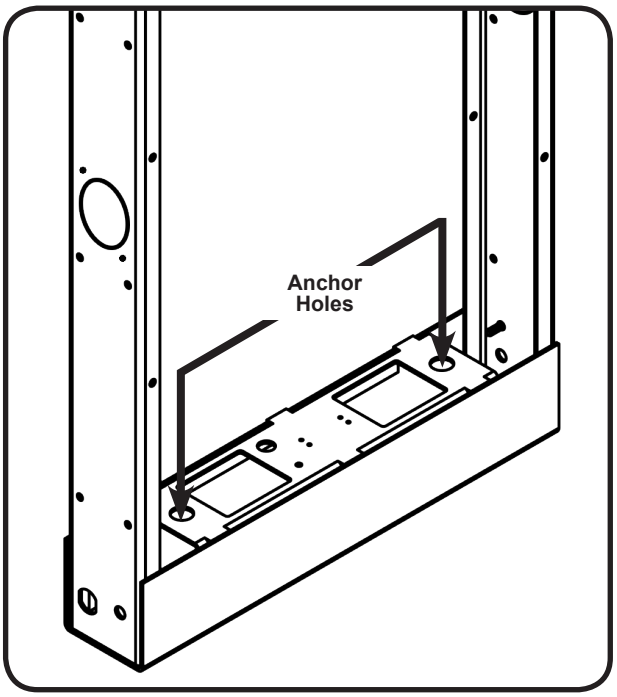
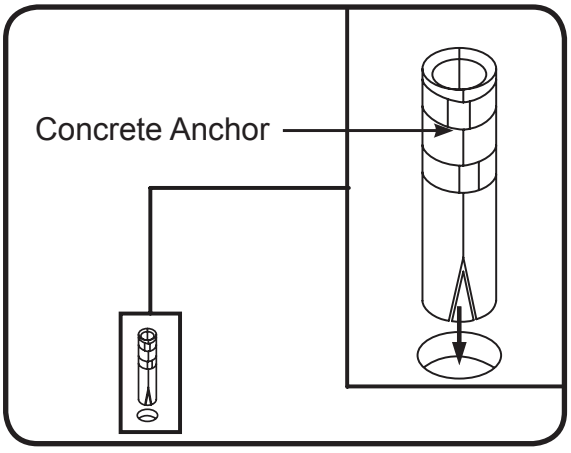


Figure 17 Anchoring



4. Using a 1" concrete drill bit, drill the anchor holes 3" in depth at the center of each marked location.

NOTE

The anchor holes must be clean before installing the anchor bolts. If the holes are not clear of debris, the anchor bolts may not tighten correctly.

5. Insert the anchors into each drilled hole [Figure 17]. The threaded end of the anchor must be inserted into the hole first. Use a rubber mallet to tap the anchors into place, if needed. Ensure that the anchors are flush with the concrete floor.
6. If not already done, pull all wires (AC power, access control and crossover cable) through conduit and conduit access holes prior to anchoring cabinets.
7. Using clear RTV silicone, seal the gaps between the conduit and conduit holes.
8. Maneuver each cabinet over the anchor locations. Insert two (2) 5/8" anchor bolts and flat washers.
9. Using a torque wrench (ft-lb) and 15/16" socket, torque the anchor bolts to 60 ft-lbs.

Internal Card Reader Installation

Card readers used in connection with the site access control system are not included with the SU2000. The SU2000 has sufficient room on the end panel for the installation of small mullion or slim-style proximity card readers. An access hole in the frame is provided for routing card reader wiring.

Card readers may also be installed on an adjacent pedestal. Contact Alvarado for information on obtaining pedestals

NOTE

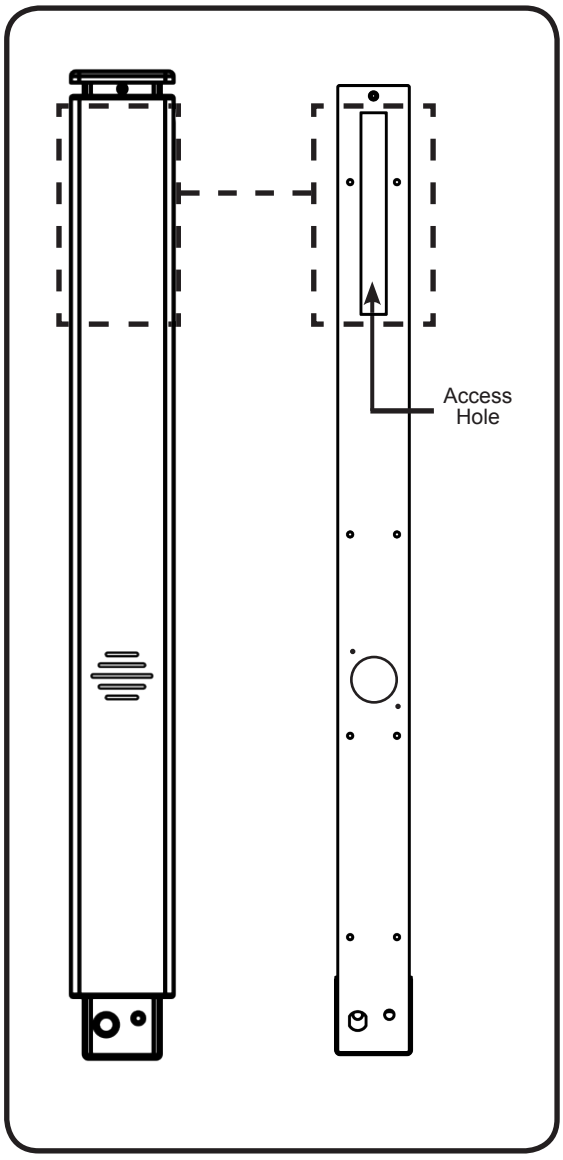
Card readers require separate power input – do not pull this power from the SU2000 power supply.

1. Determine the card reader installation location [Figure 18].
2. Install the card reader to the end panel per card reader manufacturer's installation instructions.
3. Route the card reader wiring through the access hole and turnstile, and connect to your access control system.

NOTES

Card reader wiring must be routed down through the access hole.

Figure 18 **Card Reader Installation Location Shown With and Without End Panel**



Wiring Instructions

Primary Power

IMPORTANT

110VAC and 220VAC primary power (unless ordered otherwise) must be hard wired in place. It is strongly recommended that a licensed electrician perform this procedure in accordance with all applicable local codes.

The primary wiring lines for 110VAC and 220VAC consist of the following:

Terminal	110V	220V
Ground	Green	Green/Yellow
Neutral	White	Blue
Line	Black	Brown

1. Locate the pre-installed power terminal block and attached wiring (located inside the master cabinet leg) [Figure 19].
2. Attach each primary power wire to the power terminal block with the corresponding color exiting on the other side [Figure 19A].
3. Using a Phillips head screwdriver, tighten each terminal block connection.

NOTES

The orientation of the pre-installed terminal block may differ from what is shown in [Figure 19 & 19A]. On some installations, the terminal block is rotated 90 degrees .

Figure 19 Primary Power and Crossover Cable (Master Cabinet)

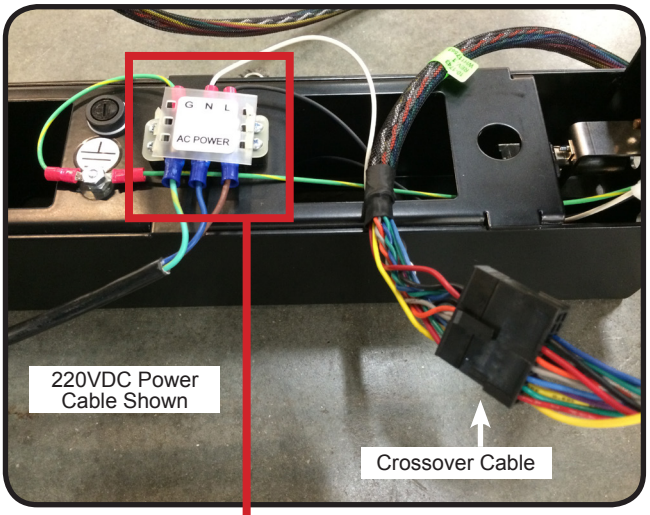
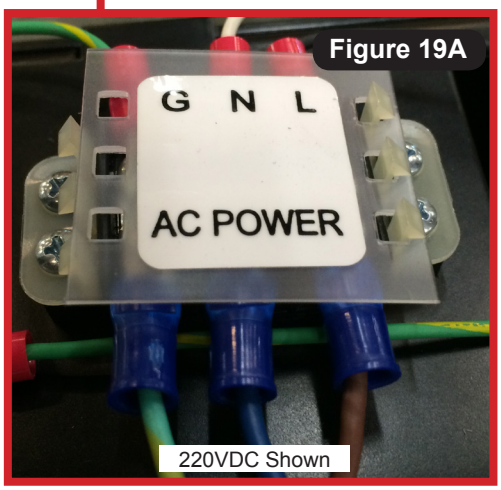


Figure 19A

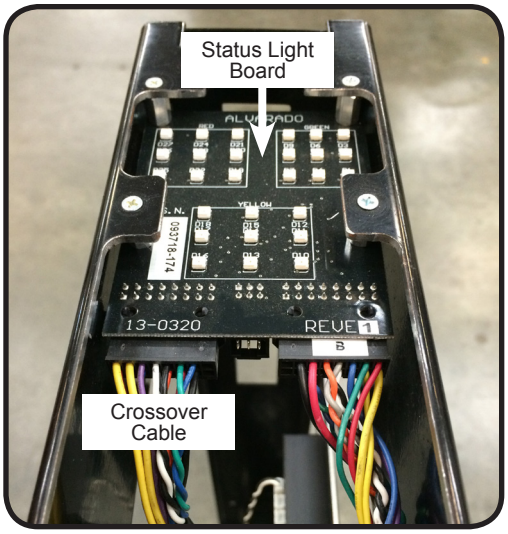


Crossover Cable

The included crossover cable interconnects communication signals and low-voltage power between the master and slave cabinets. The default length of the crossover cable included with the SU2000 is 11'. Optional crossover cable lengths of 20' and 40' are available.

1. Connect one end of the crossover cable to the connector tucked into the master cabinet as shown in [Figure 19].
2. Connect the other end of the crossover cable to the slave cabinet status light board as shown in [Figure 20].

Figure 20 Crossover Cable Connection (Slave Cabinet)



I/O Control Board (13-0328 Rev. F)

Signal Inputs and Outputs To / From Access Control System

Inputs

Signal inputs from outside systems are wired into the SU2000's I/O control board. There are two types of input signals, momentary dry contacts (MDC) and sustained dry contacts (SDC). All input signals must be normally open (N.O.), voltage-free, dry contacts, with the exception of the fire alarm input, which can be configured (via jumper on the I/O control board) to accept either a normally open or normally closed (N.C.) sustained contact. MDCs must be at least 100ms in duration to register. While the SU2000 can accept signals up to 2 seconds in duration, the suggested MDC input duration is 1 second or less to support rapid throughput in high volume applications.

NOTES

Factory default Fire Alarm jumper setting is normally open (N.O.).

Outputs

Signal outputs are available from the SU2000's I/O control board. Outputs are normally open, voltage-free, momentary dry contacts. The output signal length is 300ms in duration.

Inability to Provide Specified Inputs

If the access control system does not have dry contact outputs, isolation relays should be used. NEVER connect signal lines containing voltage directly to the I/O control board.

Figure 21 I/O Control Board

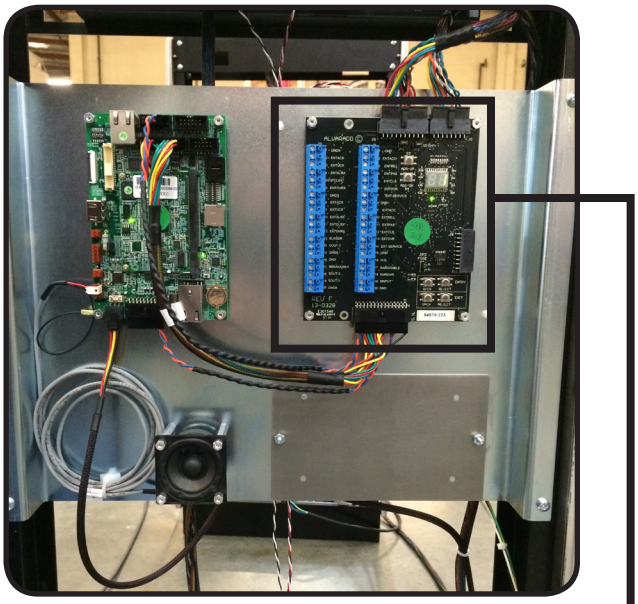
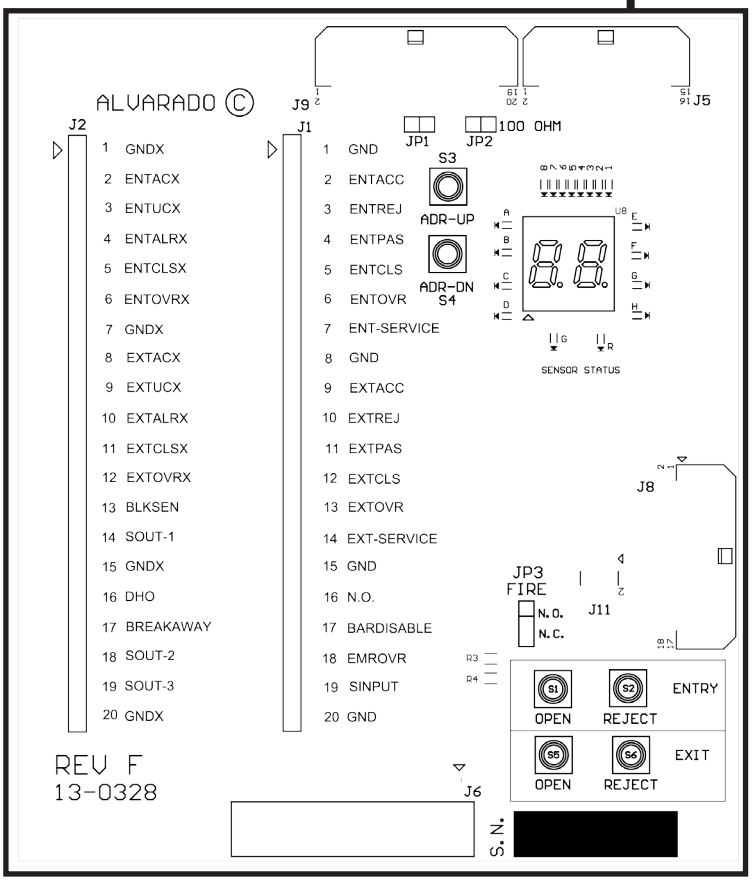


Figure 21A I/O Control Board (13-1328 Rev. F)



LEGEND	
ITEM	NAME
J1	Input Terminals
J2	Output Terminals
JP1	RS485 Termination Resistor
JP2	RS485 Termination Resistor
JP3	Fire Alarm Jumper (N.O. - N.C.)
S1	Entry Side Open Test Button
S2	Entry Side Reject Test Button
S3	Previous Sensor Group
S4	Next Sensor Group
S5	Exit Side Open Test Button
S6	Exit Side Reject Test Button

I/O Control Board (13-0328 Rev. F) Terminal Descriptions

J2 Output Contacts					J1 Input Contacts				
Pin #	Pin Name	Function Description	Contact Type	Function & Behavior Description	Pin #	Pin Name	Function Description	Contact Type	Function & Behavior Description
1	GNDX	Ground	N/A	Common output signal ground.	1	GND	Ground	N/A	Common input ground signal.
2	ENTACX	Authorized Passage Entry	MDC	An output occurs when an authorized entry passage is completed.	2	ENTACC	Good Card Entry	MDC	Opens the turnstile for one authorized passage until passage occurs or timeout.
3	ENTUCX	Unauthorized Passage Entry	MDC	An output occurs when an unauthorized entry passage is completed.	3	ENTREJ	Bad Card Entry	MDC	Illuminates the entry side RED User Status Icon for 2 seconds.
4	ENTALRX	Unauthorized Presence Entry	MDC	Not used on the SU2000.	4	ENTPAS	Free Passage Entry	SDC	Sets the turnstile to Free Passage mode in the entry direction.
5	ENTCLSX	N/A	N/A	Reserved	5	ENTCLS	Close Direction Entry	SDC	Sets the turnstile to No Passage mode in the entry direction.
6	EXTACX	N/A	N/A	Reserved	6	ENTOVR	Single Override Entry	MDC	Opens the turnstile for one authorized passage in the entry direction independent of the access control system. (Typically used for button at security desk.)
7	GNDX	Ground	N/A	Common output signal ground.	7	ENTSERVICE	Visitor Mode	SDC	Places the turnstile in Free Passage in both the entry and exit directions. (Typically used with toggle switch at security desk.)
8	EXTACX	Authorized Passage Exit	MDC	An output occurs when an authorized exit passage is completed.	8	GND	Ground	N/A	Common input ground signal.
9	EXTUCX	Unauthorized Passage Exit	MDC	An output occurs when an unauthorized exit passage is completed.	9	EXTACC	Good Card Exit	MDC	Opens the turnstile for one authorized passage until passage occurs or timeout.
10	EXTALRX	Unauthorized Presence Exit	MDC	Not used on the SU2000.	10	EXTREJ	Bad Card Exit	MDC	Illuminates the exit direction RED User Status Icon for 2 seconds.
11	EXTCLSX	N/A	N/A	Reserved	11	EXTPAS	Free Passage Exit	SDC	Sets the turnstile to Free Passage mode in the exit direction.
12	EXTOVRX	N/A	N/A	Reserved	12	EXTCLS	Close Direction Exit	SDC	Sets the turnstile to No Passage mode in the exit direction.
13	BLKSEN	Blocked Sensor	MDC	An output occurs when a sensor is blocked for a defined length of time (default 15 seconds).	13	EXTOVR	Single Override Exit	MDC	Opens the turnstile for one authorized passage in the exit direction independent of the access control system. (Typically used for button at security desk.)
14	SOUT-1	Free Passage Exit	MDC	An output occurs when there is a passage in the exit direction.	14	EXTSERVICE	Horizontal Arm Breakaway	SDC	Not used on the SU2000.
15	GNDX	Ground	N/A	Common output signal ground.	15	GND	Ground	N/A	Common input ground signal.
16	DHO	Loitering	MDC	An output occurs when a user loiters in the lane after the allotted time to close after passage (default 12 seconds).	16	N/O	Normally Open	SDC	Not used on the SU2000.
17	BREAKAWAY	Barrier Arm Broken Away	MDC	Not used on the SU2000.	17	BARDISABLE	Disables Barrier Arms	SDC	Not used on the SU2000.
18	SOUT-2	Crawl Detection	MDC	An output occurs when the crawl sensors detect an unauthorized passage.	18	EMROVR	Emergency Override	SDC (N/O or N/C)	Turnstile opens in the exit direction. Turnstile is inactive until SDC is removed, or contact is reestablished if N/C jumper is enabled. (Typically used for fire alarm or life safety systems.)
19	SOUT-3	N/A	N/A	Reserved	19	SINPUT	N/A	N/A	Reserved
20	GNDX	Ground	N/A	Common output signal ground.	20	GND	Ground	N/A	Common output signal ground.

Configuring Passage Modes

The SU2000 provides bi-directional access control in conjunction with a facility access control system. For bi-directional applications, the entry and exit directions can be individually configured to different passage modes to suit facility requirements. For example, a turnstile can be configured for Controlled Passage mode in the entry direction, and Free Passage mode in the exit direction. SU2000 passage modes are described on Page 24. Further information on the smart use of passage modes can be found in the *SU2000 User Guide*.

Turnstile passage modes can be configured in one of three ways:

I/O Control Board

Passage modes are set via wiring to the I/O control board inputs. This method is ideal for facilities that do not require changing passage mode configurations throughout the day. This is the most common method used by our customers. Instructions for wiring to the I/O control board are provided below.

Turnstile Lane Key Control

If this option has been ordered for your turnstiles, two 3-position key switches are installed on the turnstile. Turning the key to one of the three positions allows each turnstile direction to be placed in any of the passage modes. Instructions on using Lane Key Control are provided on Page 28.

GateKeeper

GateKeeper is an optional desktop software application. GateKeeper, along with other functionality, allows the passage modes for both the entry and exit side of the turnstiles to be changed. Instructions on configuring passage modes using GateKeeper is outside the scope of this manual.

Setting Controlled Passage Mode (I/O Control Board)

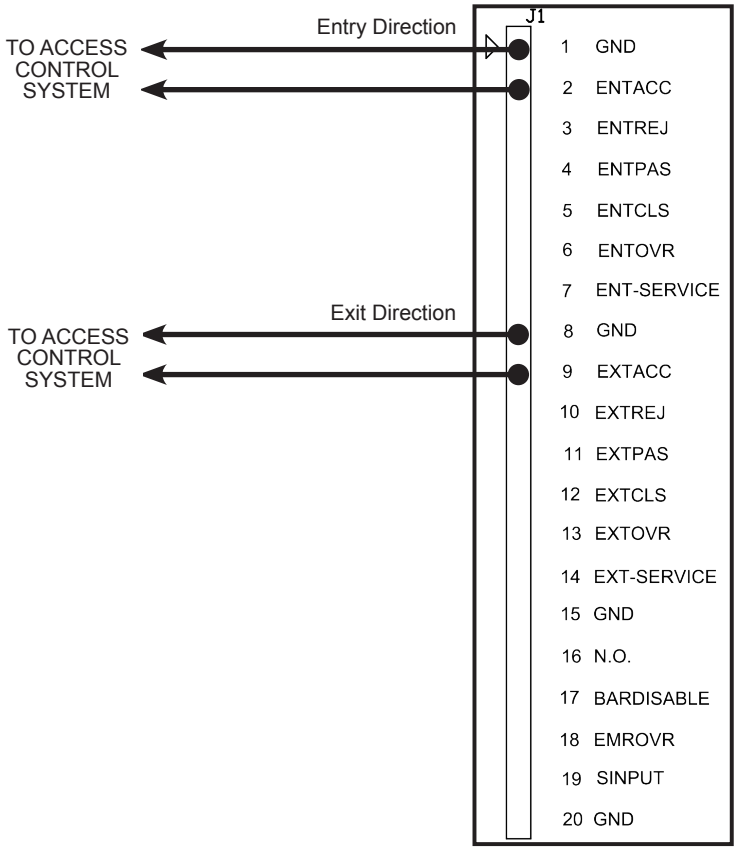
Entry Direction

1. Locate the access control system leads used to indicate an authorized passage in the **entry** direction is allowed.
2. Connect leads to the ENTACC and GND terminals on the I/O control boards Input terminal strip (J1) [Figure 22].

Exit Direction

1. Locate the access control system leads used to indicate an authorized passage in the **exit** direction is allowed.
2. Connect leads to the EXTACC and GND terminals on the I/O control boards Input terminal strip (J1) [Figure 22].

Figure 22



Setting Free Passage Mode (I/O Control Board)

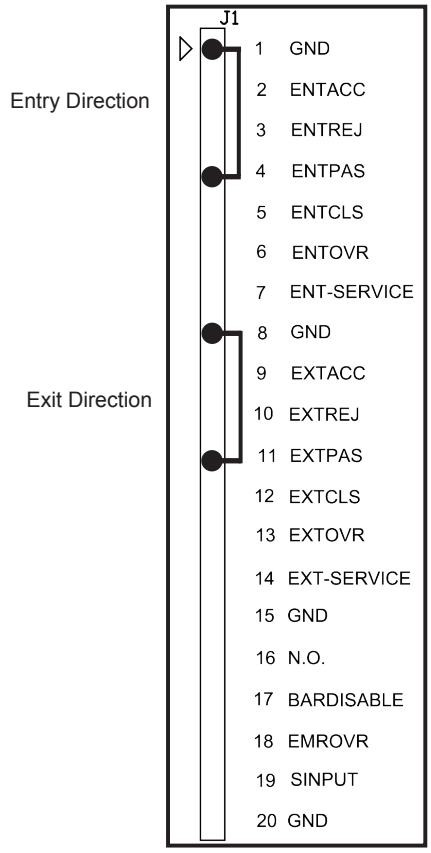
Entry Direction

1. Locate the ENTPAS and GND terminals.
2. Using a wire jumper, connect the ENTPAS and GND terminals [Figure 23].

Exit Direction

1. Locate the EXTPAS and GND terminals.
2. Use a wire jumper to connect the EXTPAS and GND terminals [Figure 23].

Figure 23



Setting No Passage Mode (I/O Control Board)

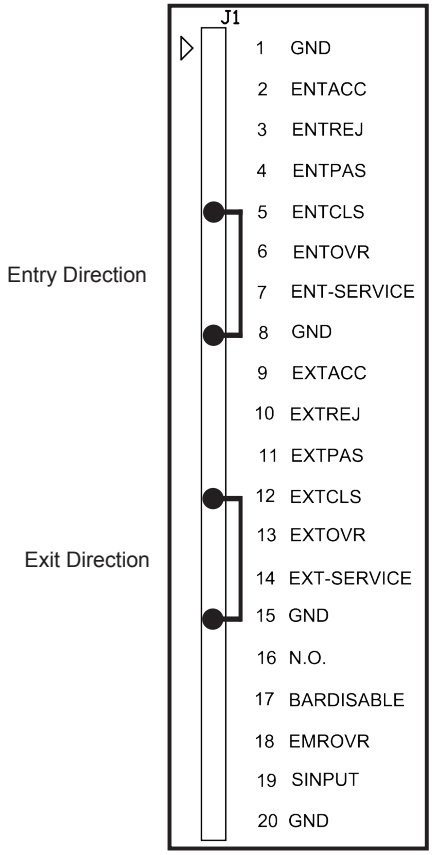
Entry Direction

1. Locate the ENTCLS and GND terminals.
2. Use a wire jumper to connect the ENTCLS and GND terminals [Figure 24].

Exit Direction

1. Locate the EXTCLS and GND terminals.
2. Using a wire jumper, connect the EXTCLS and GND terminals [Figure 24].

Figure 24



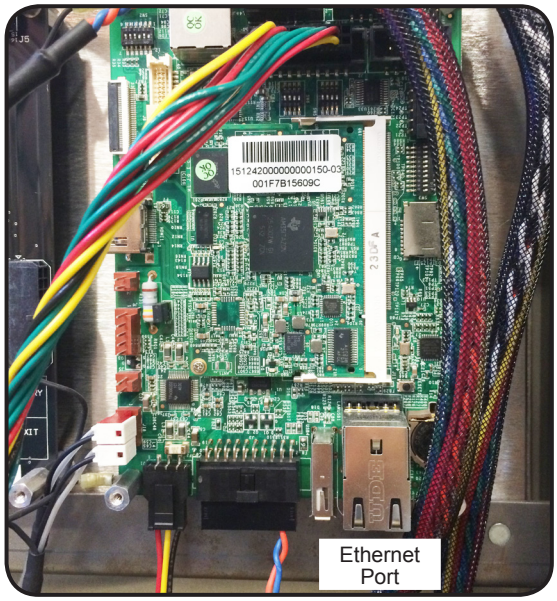
Ethernet Communication (Optional)

NOTE

It is assumed that Ethernet cabling has been run to the turnstile via conduit and pulled through the conduit opening in Step 6 of the Anchoring the Turnstile section.

1. Locate the CPU board in the master / center cabinet.
2. Connect the Ethernet cable to the Ethernet Port [Figure 25].

Figure 25 CPU Board

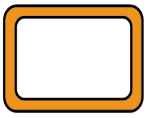


Post-Installation Functions Check

Alvarado turnstiles are thoroughly inspected and tested for proper performance prior to being shipped. Perform the following function checks to verify the turnstiles have been installed properly and are fully operational. If any problems are encountered during the functions check, refer to the Troubleshooting section on Page 31.

Passage Modes

Before beginning the Post-Installation Functions Check, please read the following brief descriptions of the three SU2000 passage modes. More information on SU2000 passage modes can be found in the *SU2000 User Guide*.

Passage Mode	Description	User Status Display
Controlled Passage	Upon receipt of an authorization signal from an access control system, a single passage is allowed. Controlled Passage mode can be either single direction or bi-directional.	
Free Passage	An authorization signal is not required for a user to pass through the lane. Free Passage mode can be either single direction or bi-directional.	 (Flashing)
No Passage	No passage is allowed. Valid electronic credentials are ignored. Any passage will set off violation alarms. No Passage mode can be either single direction or bi-directional.	

Powering On

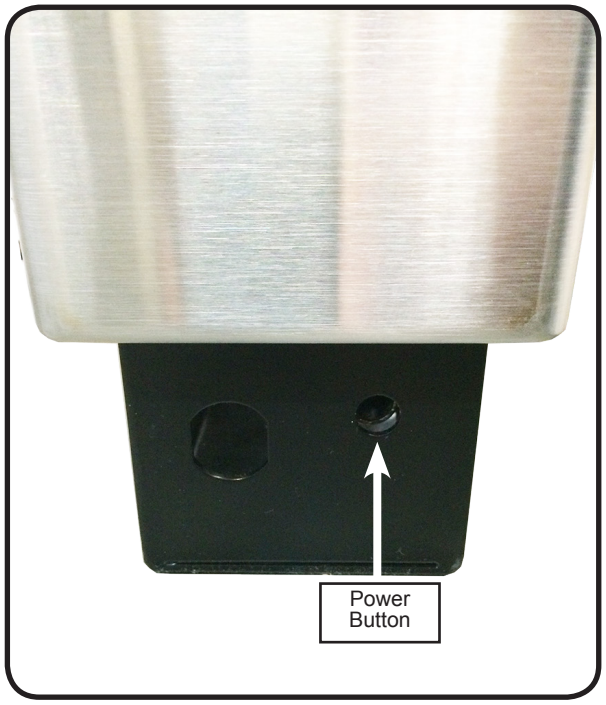
There is a power button located at the base of the end cabinet on the secured side of all master and center cabinets [Figure 26].

1. Using a slim object such as a pencil or pen, push the power button.
2. The power-up cycle takes less than one minute to complete. Two chimes sound during the power-up cycle to indicate status:
   - Ascending Chime: Operating system booted successfully.
   - Descending Chime: Turnstile application launched successfully, and the power-up cycle is complete.

NOTE

After the boot-up cycle is complete, the SU500 enters into the operating modes last configured.

Figure 26 **Power Button**



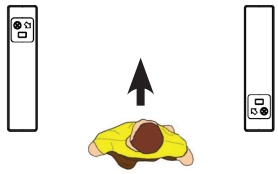
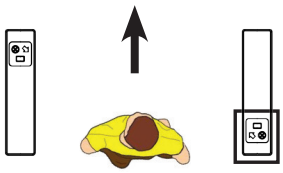
Testing Lane Functionality

Perform the following turnstile functionality tests to validate basic turnstile operation. Tests are provided for Controlled Passage, Free Passage, and No Passage modes.

The following is assumed (Controlled Passage mode tests only):

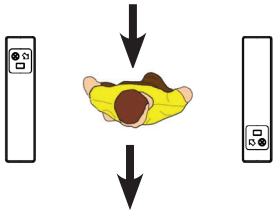
- The access control system is operational and all access control wiring to the turnstile is connected.
- Valid access cards are on hand for activating the turnstile.

CONTROLLED PASSAGE MODE

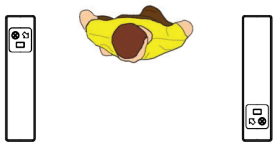
TEST	PROCEDURE	TURNSTILE RESPONSE
Unauthorized Entry / Exit Secured Side  Unsecured Side (Unauthorized Entry shown)	Enter the turnstile without authorization.	• Unauthorized Entry / Exit alarm sounds. • Red stop icon flashes on the user status display in the direction of the violation.
Authorized Entry / Exit Secured Side  Unsecured Side (Authorized Entry shown)	Using a valid card, activate the turnstile. Walk through the turnstile.	• Authorized Entry chime sounds. • Green arrow icon illuminates on the user status display on the entry / exit side, respectively.

Testing Turnstile Functionality (cont.)

FREE PASSAGE MODE

Free Passage Entry / Exit Secured Side  Unsecured Side (Free Passage Exit shown)	Enter the turnstile and complete a passage.	• User status display green arrow is flashing. • No alarm sounds as the user enters and exits the turnstile.

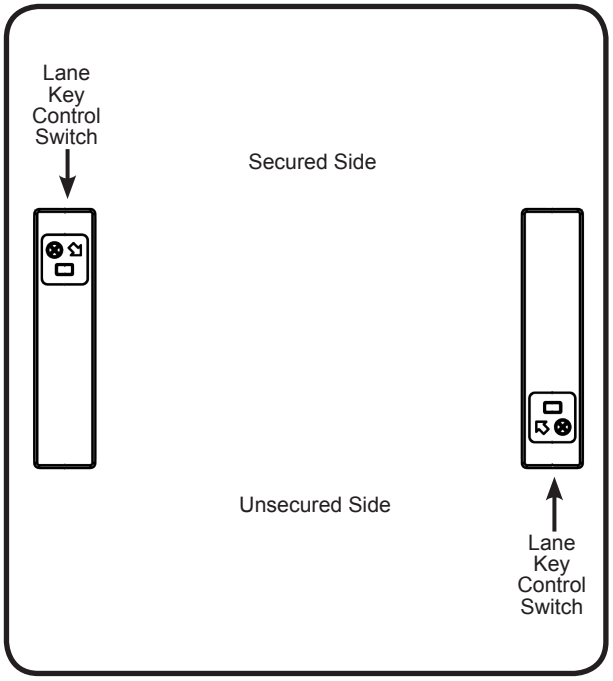
NO PASSAGE MODE

No Passage Entry / Exit Secured Side  Unsecured Side (No Passage Exit shown)	Enter the turnstile.	• User status display red icon is illuminated. • Unauthorized Entry alarm sounds.

Testing Lane Key Control (Optional)

Optional 3-position lane key control switches may be installed on the turnstile to change passage modes for both directions of travel. Two lane key control switches are installed per lane (one for each side) at the base as shown in [Figure 27].

Figure 27 **Lane Key Control Switch Locations**

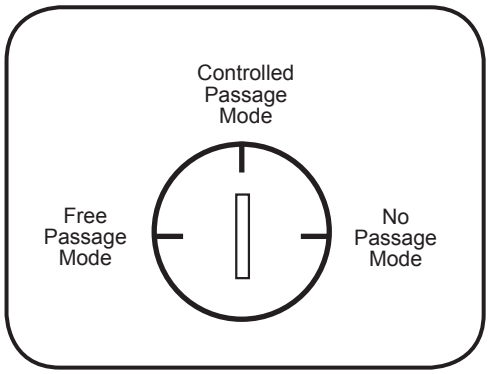


Turning the key to one of three positions overrides all existing settings, placing the turnstile in Controlled Passage mode, Free Passage mode or No Passage mode depending on the orientation of the key. Refer to the Passage Modes section on Page 24 for more information.

NOTE

The keys to the lane key control switches are packaged in the hardware box that was shipped with the turnstile.

Figure 28 **Lane Key Control Switch**



Testing Ethernet Communication (Optional)

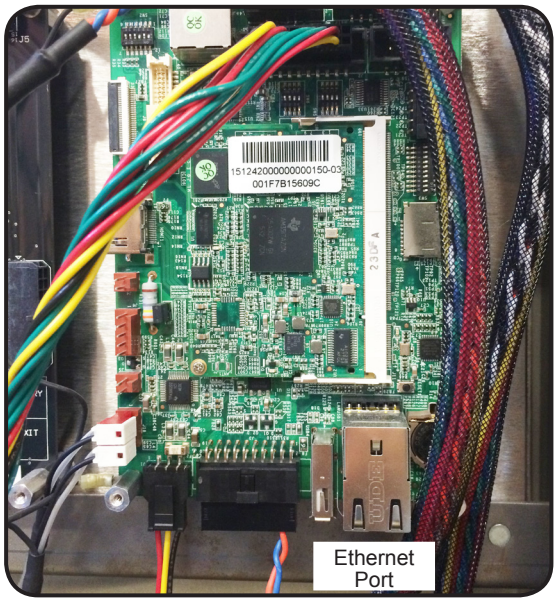
NOTE

The following procedure is applicable to non-networked (standalone) turnstiles. For instructions on testing Ethernet communication over a facility network, please refer to the *SU2000 User Guide*.

Required Items:

- CAT5/6 Ethernet Cable
- Laptop Computer Running Windows 7 or Windows 8

Figure 29 CPU Board



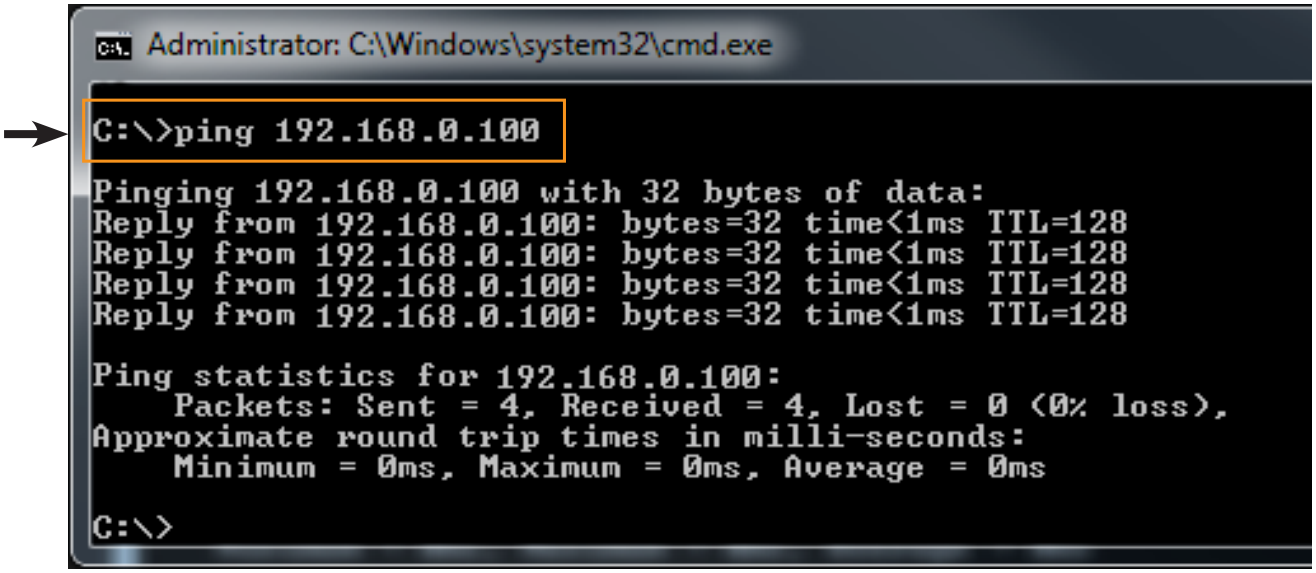
1. Locate the Ethernet port on the CPU board [Figure 29].
2. Connect the Ethernet cable to the Ethernet port.
3. Connect the other end of the Ethernet cable to the laptop computer.
4. Launch **Command Prompt** on the computer by typing **CMD** in the '**Search programs and files**' field.
5. Enter the following command: **ping XXX.XXX.X.XXX,** where XXX.XXX.X.XXX is the IP address of the turnstile [Figure 30].

NOTE

192.168.0.100 is the default IP address configured by Alvarado. If the turnstile has been assigned a different network IP address, ping that IP address instead. Contact your system administrator for network information.

6. A successful ping will result in the message shown in [Figure 30]:

Figure 30 Ping Results



Finish the Installation

Complete the following steps below only if the primary power, crossover cable, and access control wiring is connected.

1. Reinstall the lids and secure with the lid mounting screws.
2. Reinstall the end panels and secure with the end panel mounting screws.
3. Reinstall the side panels.

Post-Installation Checklist

1. Power On
   - ☐ SU2000 boots up successfully.

2. Lane Functionality
   - ☐ User status displays are functioning properly.
   - ☐ Auditory alarms are playing back correctly.

3. Access Control Integration
   - ☐ Installed card readers are successfully reading credentials.
   - ☐ Valid credentials are activating the turnstile.

4. Attachment
   - ☐ Cabinet lids, end covers, and base covers are securely fastened to the turnstile.

5. Wipe Down Turnstile
   - ☐ Stainless Steel – Wipe down stainless steel with a damp cloth or use Alvarado's recommended commercial products (see *SU2000 User Guide*).
   - ☐ Powder Coated - Wipe down power coated surfaces with a damp cloth.

6. Manuals Handoff
   - ☐ Provide both these *SU2000 Installation Instructions*, and the *SU2000 User Guide* to the project or site manager.

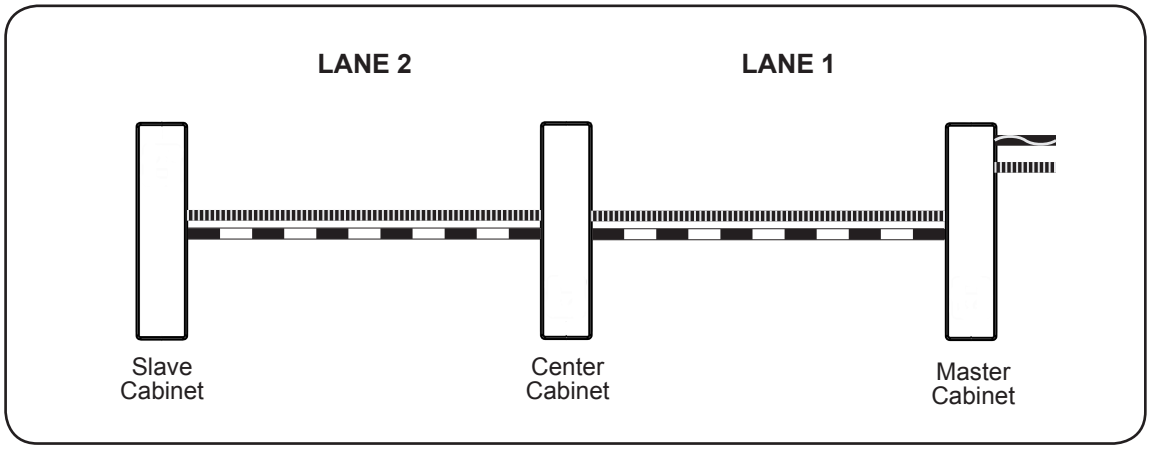
Troubleshooting

This basic troubleshooting section is provided to aid installers with the most commonly encountered installation problems. If you require more troubleshooting assistance, see the *SU2000 User Guide*.

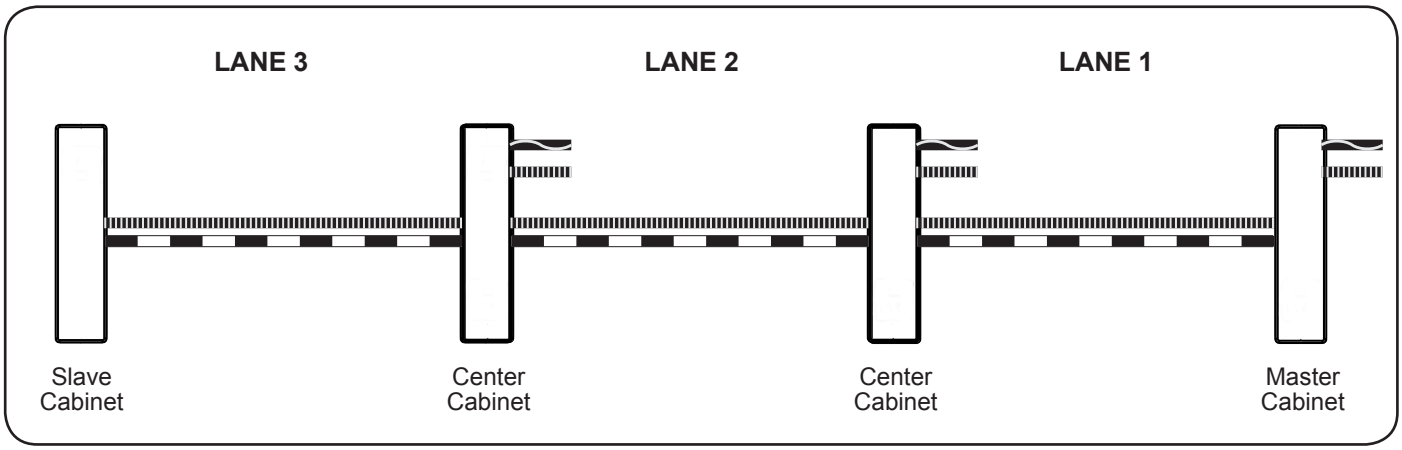
Symptom	Possible Cause	Solution
Unit will not turn on	No Power	Make sure that there is power to the turnstile power terminal block. Check if LEDs are lit on the I/O control board and the seven-segment display is showing a number.
	Blown Fuse	Check fuse. If necessary replace with a 2.5A (slo-blo) fuse.
Constant auditory alarming	Communication/ Low Voltage Cable	Check the I/O control board to see if amber LEDs are lit. If they are lit, the most likely problem is a loose or improper communication connection. Disconnect the black 16-pin connectors from the I/O control board and apply contact cleaner / lubricant to connector pins and reseat. Retry operation. If condition persists, perform the same process on the 16-pin connectors going into and out of the light boards and sensor boards. Retry operation. Alvarado Technical Support has a process document and can provide additional instructions.
Blocked Sensor Auditory Alarms sounds after 15 seconds (default).	Wire or cable blocking sensors	Check for a stray wire or cable in front of the transmit and receive operational sensors (horizontal arrays).Tuck any stray wire or cable out of sensor viewing area. If this does not resolve the problem, contact Alvarado Technical Support for instructions on using the I/O control board to perform diagnostics on sensors.

Appendix A - Multi-Lane Conduit Requirements

Two-Lane Configuration



Three-Lane Configuration



Symbology	Description	Conduit Size
	Primary Power	3/4”
	Access Control/ Readers/ Ethernet	3/4”
	Crossover Cable	1.5”

Revision History

Revision	Date	Author	Description
6-0	02/12/15	A. Flores	Updated to new optical electronics configuration.
6-1	07/17/15	A. Flores	Updated crossover cable length to 11'. Added Appendix A - Multi-Lane Conduit Requirements



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