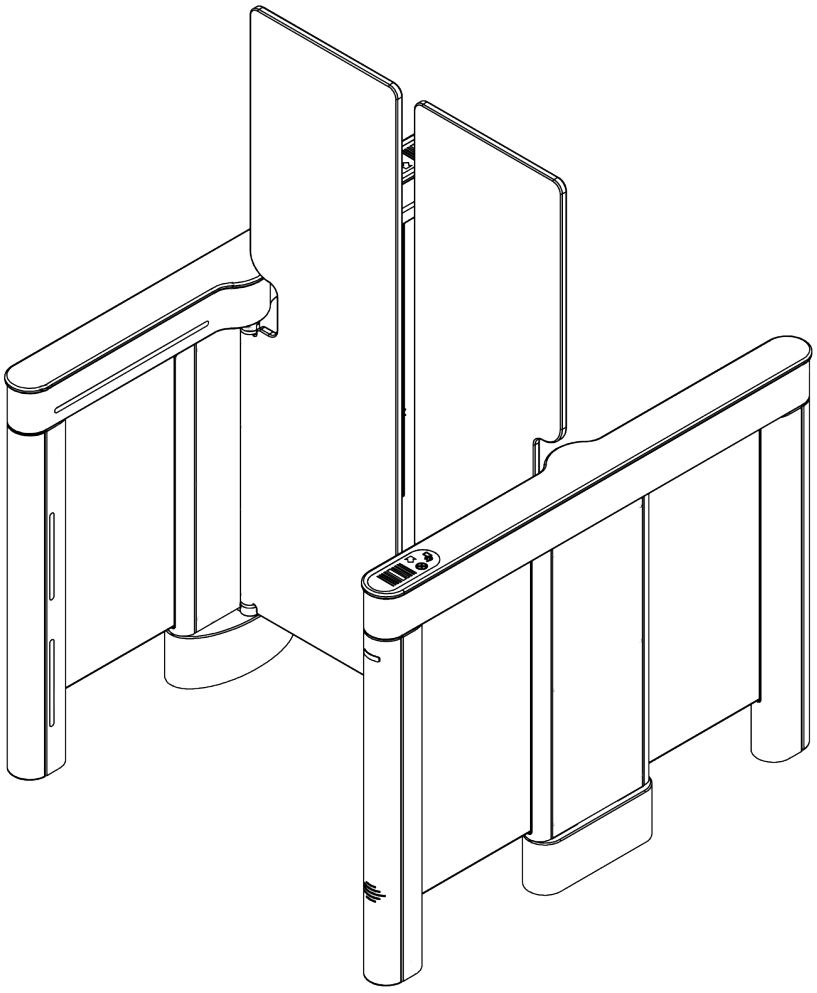
ALVARADO

protecting assets and controlling the flow of people

SUPERVISOR 5000
(SU5000)

Optical Turnstile with Bi-directional Motorized Barriers



Installation Instructions

Alvarado Manufacturing Company, Inc.
12660 Colony Street, Chino, CA 91710
Phone: +1 (909) 591-8431
Fax: +1 (909) 628-1403
support@alvaradomfg.com
www.alvaradomfg.com

PUD3667R1-8

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ETL Certification

This product is fully certified by a nationally recognized testing laboratory to UL 2593 and CSA C22.2 #247. Unauthorized modification to this product in any way is prohibited.

Safety Precautions

⚠ WARNING The Supervisor 5000 may present a risk to persons and property if it is not installed and/or operated correctly. This manual must be read in its entirety and all safety and operations information must be folloed. 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.

- Pour utilisation à l'intérieur seulement.
- Utilisez uniquement des personnes qualifiées pour installer et entretenir le tourniquet.
- NE PAS faire fonctionner le tourniquet s'il a été endommagé de quelque façon. S'il est endommagé, faire réparer ou ajuster l'unité avant l'utilisation par un(e) préposé(e) à l'entretien qualifié(e).
- NE PAS modifier ou altérer le tourniquet.
- Le tourniquet doit être maintenu selon un calendrier d'entretien adéquat par des personnes qualifiées.
- Dans les applications de contrôle d'accès, former tout le personnel qui utilisera le tourniquet selon la bonne méthode de fonctionnement. De plus, bien former les nouveaux utilisateurs à leur intégration au système.
- NE PAS utiliser des pièces ne provenant pas du Alvarado pour réparer un tourniquet endommagé.
- Suivez strictement les instructions de manutention pour déplacer ou soulever le tourniquet lors de l'installation
- Éteignez le tourniquet avant de brancher ou de débrancher le câblage de communication ou le câblage d'electricité.

- This turnstile can be used by children aged **12** years and above, and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge, if they have been given supervision or instruction concerning use of the turnstile in a safe way and understand the hazards involved. Children shall not play with or around 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

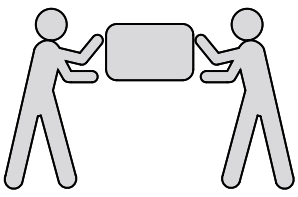
The following symbols are used throughout the manual to highlight important information and potential risks when installing, servicing or using the turnstiles covered in this manual.

⚠ 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 4:00pm 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
- 5/8" Concrete Drill Bit
- Shop Vac
- Hammer
- 3/32" Allen Wrench
- 9/16" Wrench
- Torque Wrench (ft-lbs.)
- Torque Wrench (in-lbs)
- 9/16" Socket
- Level
- 5/32" Allen Wrench
- #2 Phillips Head Screwdriver
- Precision Flat Head Screwdriver
- 4mm 'Stubby' Allen Wrench (Supplied)
- Clear RTV Silicone

Uncrating

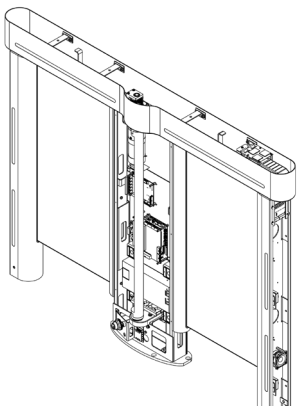


The SU5000 has been packed for shipping to prevent damage to the unit. Two or more installers are required to unload the SU5000 at the installation site. Once the turnstile cabinets have been placed in the installation location, carefully remove the protective packing material from the sides of the cabinets.

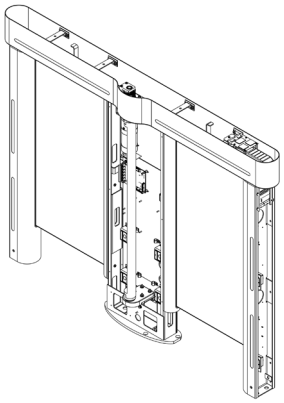
Parts List

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.

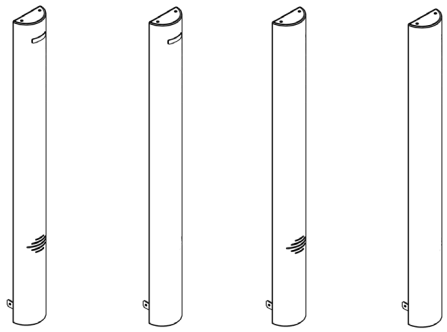
Single Lane Parts List



Master Cabinet
(Qty 1)



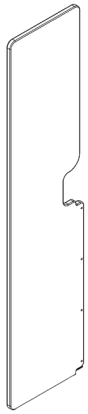
Slave Cabinet
(Qty 1)



End Covers
(Qty 4)

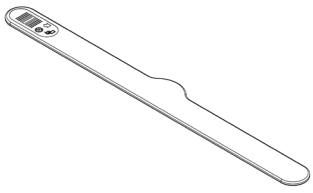
NOTE

End covers ship taped to the turnstile cabinets.

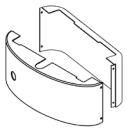


Barriers
(Qty 2)

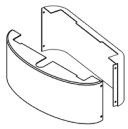
(Barrier height and width may vary.)



Cabinet Lids
(Qty 2)



Master Cabinet Base Cover
(Qty 1)



Slave Cabinet Base Cover
(Qty 1)

Hardware:

- Barrier Clamp Bars (Qty 2)
- Barrier Clamp Bar Screws (Qty 8)

Concrete Anchor Package:

- ⅜" x 2" Concrete Anchors (Qty 16)
- ⅜" x 2½" Hex Head Cap Screws (Qty 16)
- ⅜" Flat Washers (Qty 16)

Cabling:

- 8' Crossover Cable (Qty 1)

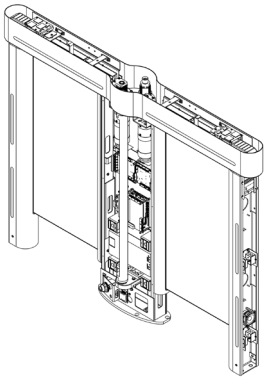
Software:

- File Management USB (Qty 1)

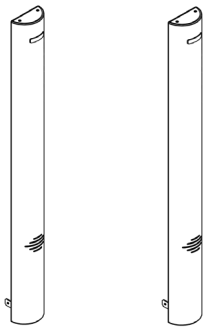
Parts List (cont.)

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

Center Cabinet Parts List (Per Center Cabinet)



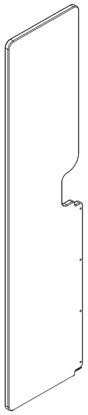
Center Cabinet
(Qty 1)



End Covers
(Qty 2)

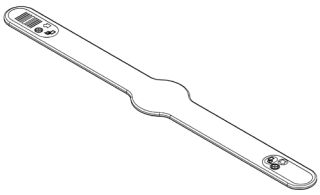
NOTE

End covers ship taped to the turnstile cabinets.

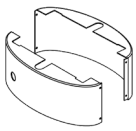


Barriers
(Qty 2)

(Barrier height and width may vary.)



Center Cabinet Lid
(Qty 1)



Center Cabinet
Base Cover
(Qty 1)

Hardware:

- Removable Barrier Clamps (Qty 2)
- Barrier Clamp Mounting Screws (Qty 8)

Concrete Anchor Package:

- ⅜" x 2" Concrete Anchors (Qty 8)
- ⅜" x 2½" Hex Head Cap Screw (Qty 8)
- ⅜" Flat Washers (Qty 8)

Cabling:

- 8' Crossover Cable (Qty 1)

Introduction

This manual covers the physical installation process for SU5000 Optical Turnstiles. A separate *SU5000 User Guide (PUD3668)* 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 *SU5000 User Guide (PUD3668)* be read in their entirety prior to beginning installation.

SU5000 Cabinets

There are three types of SU5000 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 1A]. The center cabinet is used to create additional passage lanes with the addition of a single cabinet [Figure 1B].

Each cabinet has an unsecured and secured side. Alvarado follows what we call the “right-hand rule." User status displays and card readers are always installed on the right-hand side as you enter the turnstile.

Master Cabinet

The center portion of the master cabinet contains the main turnstile controller, I/O control board, motor and motor control board, power supply, safety sensor receivers, one moving barrier, and a power switch located at the base on the secured side.

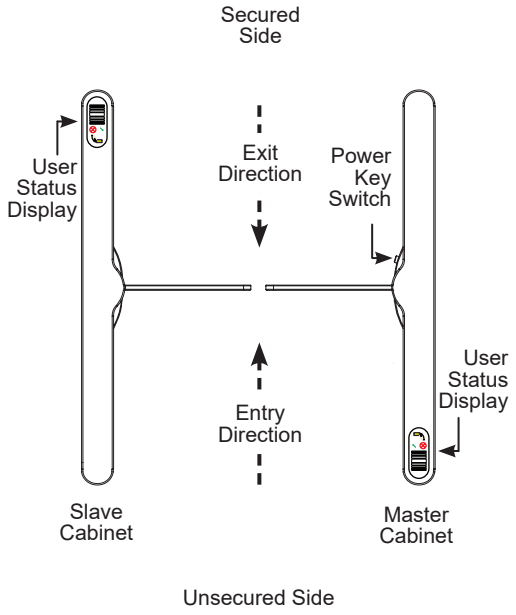
The top channel of the master cabinet contains the operational sensor receivers, a drive system, and a user status display that communicates lane status to the user. A card reader is normally installed during installation underneath the lid below the user status display.

Slave Cabinet

The center portion of the slave cabinet contains a motor and motor control board, safety sensor transmitters, and one moving barrier.

The top channel of the slave cabinet contains the operational sensor transmitters, a drive system, and a user status display that communicates lane status to the user. A card reader is normally installed during installation underneath the lid below the user status display.

Fig. 1A **Single-Lane Configuration**



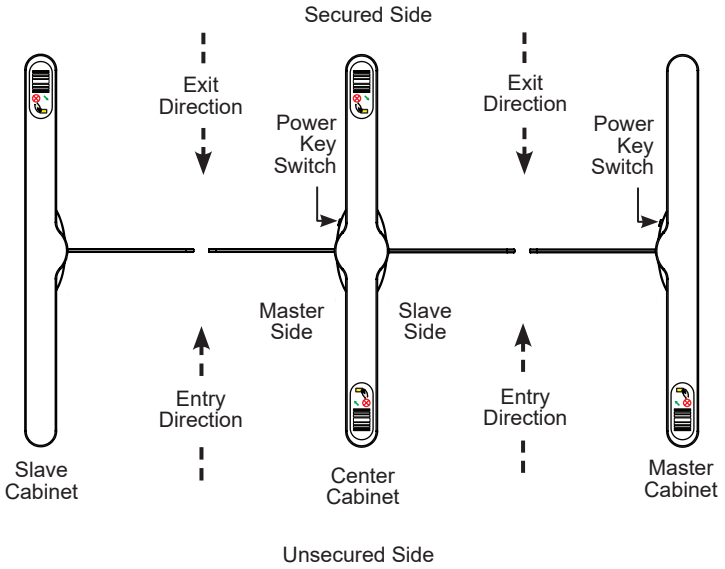
Center Cabinet (Multi-Lane Configuration)

Center cabinets contain both master and slave components. Center cabinets are extension cabinets used in multi-lane applications. An unlimited number of center cabinets can be added.

The center portion of the center cabinet contains the main turnstile controller, I/O control board, two motors and two motor control boards, power supply, safety sensors for both the master and slave side of the center cabinet, two moving barriers, and a power switch located at the base on the secured side of the master side.

The top channel of the center cabinet contains master and slave side operational sensors, two drive systems, and two user status displays that communicate lane status to the user. Two card readers are normally installed during installation underneath the lid below the user status display on both sides of the center cabinet top channel.

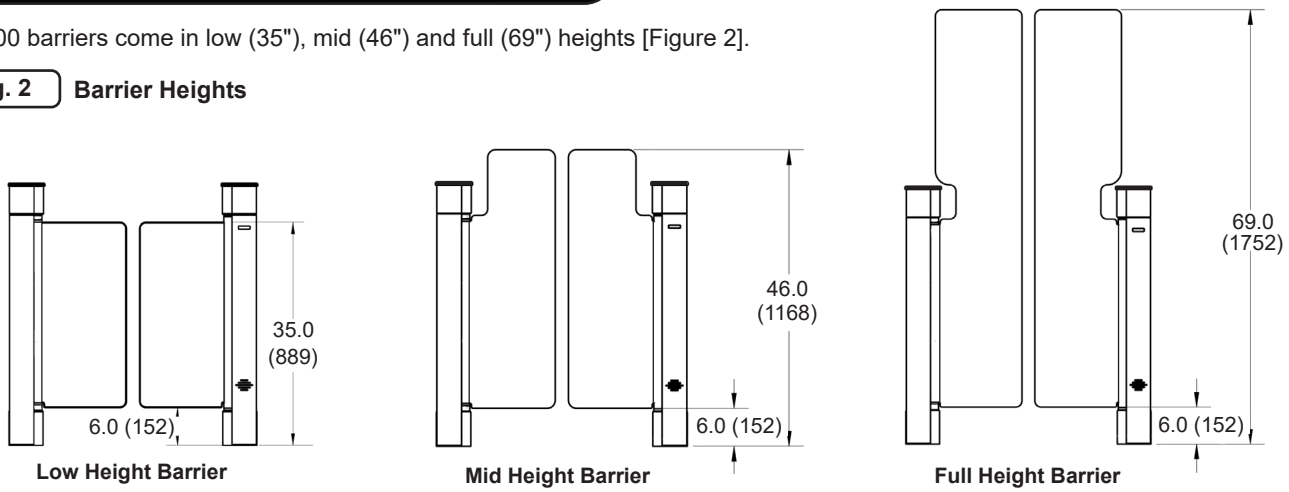
Fig. 1B **Multi-Lane Configuration**



Barrier Height

SU5000 barriers come in low (35"), mid (46") and full (69") heights [Figure 2].

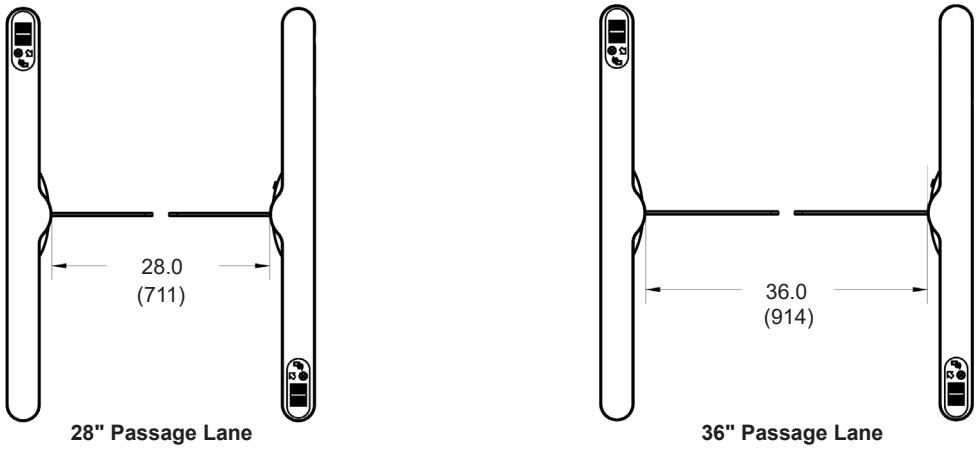
Fig. 2 **Barrier Heights**



Passage Lane Width

SU5000 barriers come in widths to create 28" or 36" passage lanes [Figure 3].

Fig. 3 **Passage Lane Widths**



Access Control Integration

There are two types of interfaces to allow an access control system to operate with the SU5000:

Dry Contact

Single passage activation and the various other inputs and outputs available to / from the SU5000 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 SU5000 using a defined TCP/IP command structure. There is an additional charge for implementation and 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

SU5000 turnstiles are TCP/IP enabled. Running Ethernet cabling to the SU5000 provides a number of benefits. (1) It allows implementation of Alvarado's TCP/IP control and monitoring software. (2) It allows easy implementation of SU5000 application software updates and enhancements. If the SU5000s are networked, updates can be installed over the network. (3) Alvarado has future plans to further develop the TCP/IP capabilities of the SU5000. The benefits of this future development can only be realized if the turnstiles are networked.

Before You Begin

Use only skilled technicians for site preparation and installation of the turnstile using Alvarado's instructions.

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.

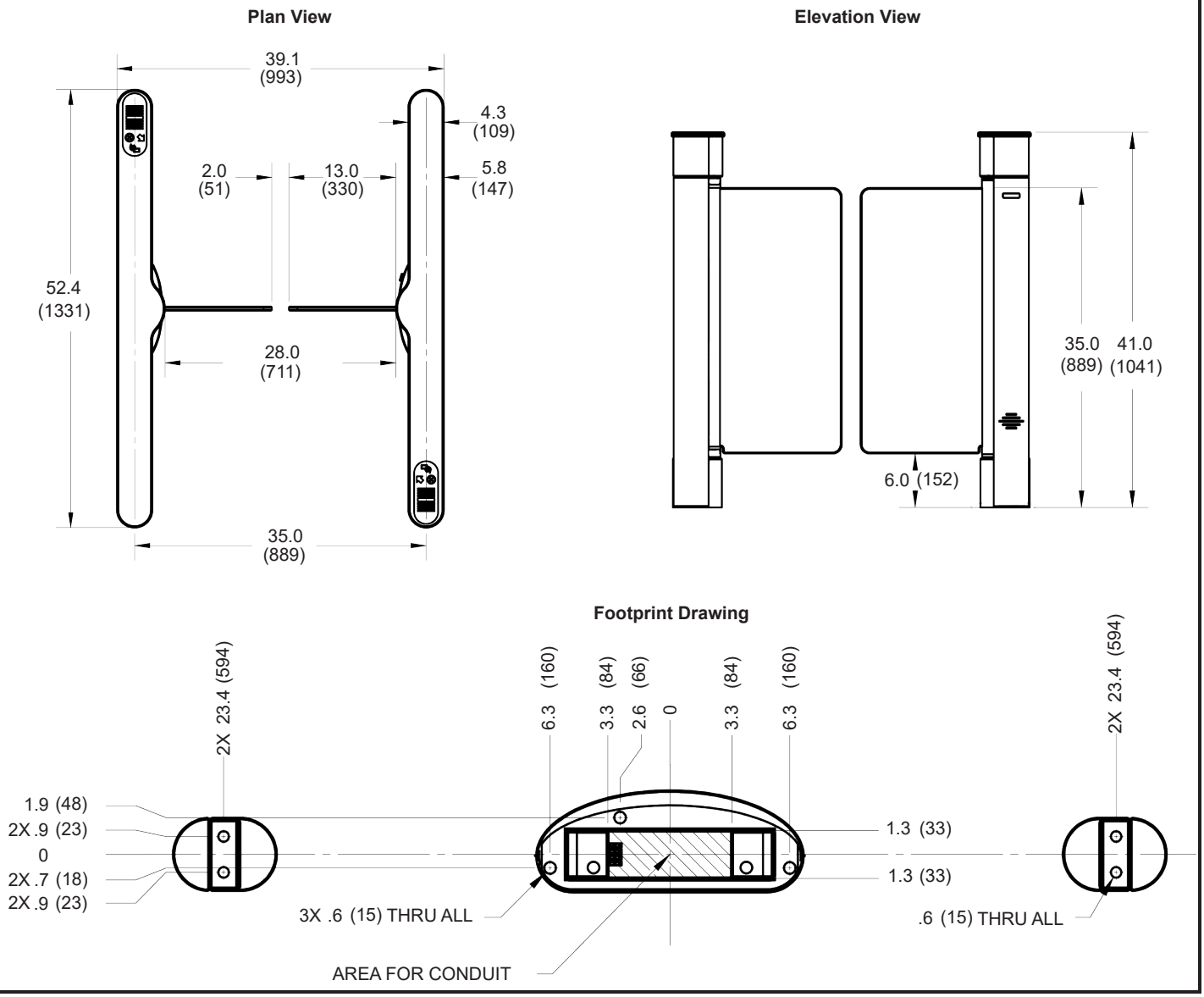
Space Requirements

Refer to the footprint and plan drawings [Figure 4 & 5] to determine the installation location and conduit requirements for a 28" single lane. See Appendix B for 36" width.

NOTE

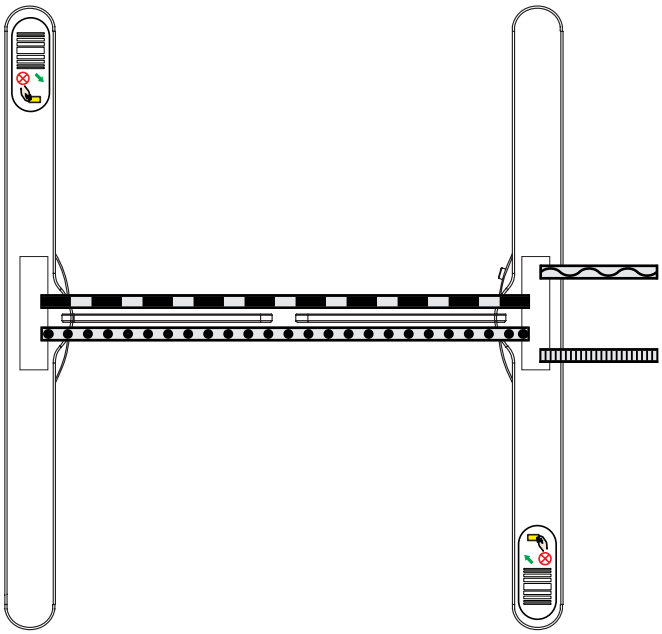
For ease of installation and service, allow 6" of space between cabinets and walls or other surfaces.

Fig. 4 **28" Single Lane - Plan, Elevation & Footprint Drawing**



Conduit Requirements

Fig. 5 **SU5000 Conduit Lines**



NOTE

For multi-lane conduit requirements, refer to Appendix E on Page 40.

NOTE

The opening for the conduit in the center of each cabinet is 6.50” x 2.50” (165mm x 64mm). The three required conduits MUST fit in this area [Figure 5].

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

****If the External DC Power Supply option was ordered, use this conduit to route 24VDC.**

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.

Electrical Requirements

Power Supply	110-120 VAC, 60 Hz or 220/240 VAC, 50 Hz
Power Requirements	Peak power consumption is 300W per lane with all options installed
Operational Voltage	Primary power is stepped down and rectified for low-voltage 24 VDC, 12 VDC, and 5 VDC operation
Fuse	2.5A (slo-blo) located in the master cabinet
Drive Motor	24 VDC (brushless)
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 SU5000 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 SU5000:

	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 SU5000 outside the listed temperature and humidity ranges may negatively affect turnstile performance, and could potentially cause damage to the turnstile and void the warranty.

Communication Requirements

Signal Inputs and Outputs To / From Access Control System

Inputs - Signal inputs from outside systems are wired into the SU5000'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. MDC's must be at least 100ms in duration to register. While the SU5000 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 SU5000'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 cannot provide the specified MDCs, 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.

Internal Card Reader Installation Requirements (Optional)

Card readers or other physical access devices may be installed under the top channel lid on either or both right-hand sides of the turnstile. Card readers / physical access devices are not supplied by Alvarado.

The physical dimensions of the card reader cannot exceed: 1.00" H x 3.5" W x 5.25" L (25mm x 89mm x 133mm).

Barcode Reader Requirements (Optional)

An optional 1D/2D barcode reader can be factory supplied and installed to either or both right-hand legs of the turnstile. The barcode reader specifications are listed below.

- **Imager**: Honeywell 3320g Area Imager
- **Communication**: RS232 Serial
- **Optional Communication**: Wiegand (Using an RS232 Serial to Wiegand converter)
- **Recommended Barcode Symbology**: Code128 or Interleaved 2 of 5 for 1D barcodes; DataMatrix for 2D symbology
- **Size of Open Scan Area**: 3.00" W x 1.00" D (76mm x 25mm)
- **Maximum Barcode Reading Area on Card or Pass**: 2.00" W x .75" D (51mm x 19mm)
- **Maximum Distance of Barcode from Leading Edge of Card or Pass:** 1.00" D (22mm)

NOTES

At least two weeks prior to shipment, provide Alvarado with sample media of the exact size and type that will be scanned by the barcode reader. A sample of EVERY type of media that you expect to validate should be provided. Samples provided to Alvarado must be IDENTICAL (i.e., material, size, color, etc.) to the barcode media that will be used in the application.

Barcode colors and spacing matter in how well the bar codes read. In order for a barcode symbol to be recognized, there must be an adequate contrast between the dark bars and the light spaces. For best readability, follow the standard color combinations; A black barcode on a white background is always best.

User Training

All personnel that will be involved with operating the SU5000 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 included *SU5000 User Guide (PUD3668)*. 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 Before Getting Started section have been met.

Pre-Installation Instructions

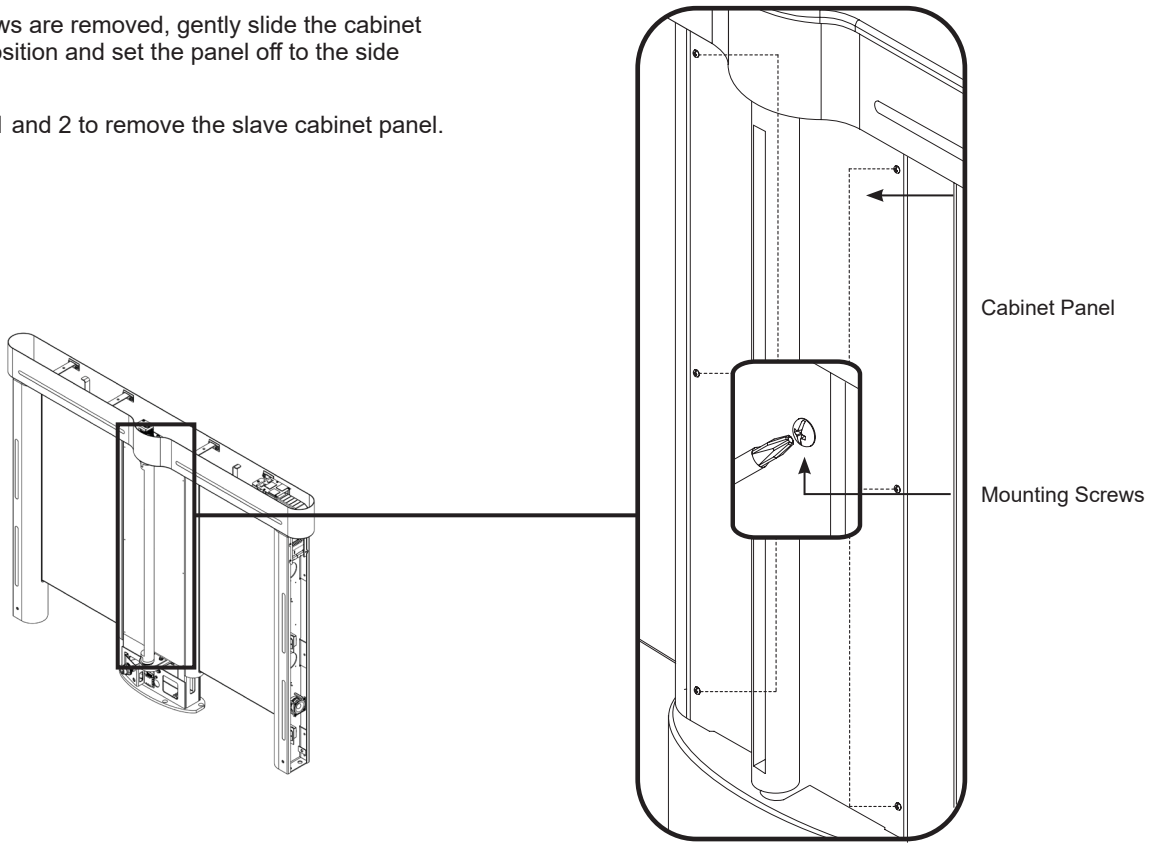
NOTE

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

Cabinet Panel Removal

1. Using a Phillips screwdriver, remove the six (6) mounting screws that secure the cabinet panel to the master cabinet [Figure 6]. Do not discard the cabinet panel screws as they will be reused.
2. Once the screws are removed, gently slide the cabinet panel out of position and set the panel off to the side [Figure 6].
3. Repeat steps 1 and 2 to remove the slave cabinet panel.

Fig. 6 **Removing Screws**



Baseplate Installation (Optional)

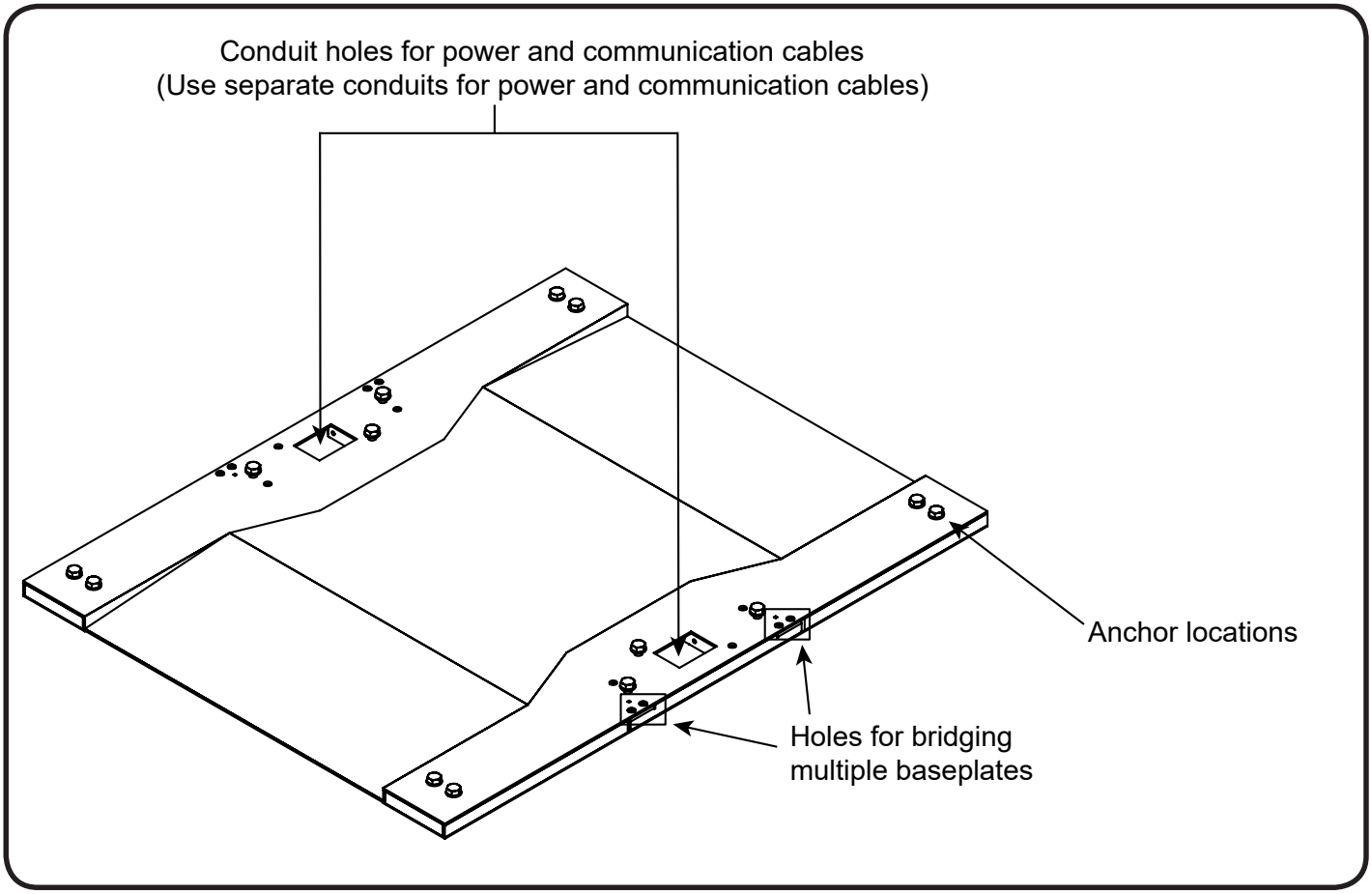
NOTE

Refer to Appendix C on Page 34 for 28" and 36" baseplate dimensions.

The baseplate enables installation of the SU5000 turnstile on a solid foundation without the need to drill holes into the concrete. The baseplate also provides concealed conduit channels for wiring primary power, crossover communication, and access control. Baseplates may be bridged together for multi-lane configurations. The following information will guide the installer in baseplate installation:

1. Determine and mark the installation location.
2. Place the baseplate in the marked location.
3. Determine how the primary power and access control wiring will be routed to the master and/or center cabinet. Most commonly, the wiring is run into the baseplate through one of the side plates and routed to the master and/or center cabinet. To remove the side plate, remove the four (4) screws as shown in [Figure 8].
4. Use the **center** cable channel to route the primary power, crossover cable, and access control wires as shown in [Figure 8].
5. Mount the SU5000 cabinets to the baseplate at the anchor location using the supplied mounting bolts [Figure 8].
6. For multi-lane applications, bridge the baseplates using the supplied bridge support(s) and screws [Figure 8].
7. Reinstall the side plate(s).

Fig. 8 **Baseplate**



Installation Instructions

Anchoring the Turnstile

NOTE The lane 1 master cabinet is always the right-most cabinet in relation to the unsecured side.

1. Place the master cabinet and the slave cabinet in the determined location [see Space Dimensions - Figure 4].
2. All cabinets must be level and square to each other. This will ensure that the optical sensors are aligned, and that the barriers will line up properly when installed. Use the following procedures to level the cabinets, and square each cabinet with respect to the floor and other cabinets:

A. Measure the distance from the inside wall of one cabinet top channel to the inside wall of the other cabinet top channel, on both the entry and exit side of the lane for a consistent measurement [Figure 9A].

B. Measure the diagonal distance from the end of one cabinet to the end of the opposing cabinet, then measure the opposing diagonal distance [Figure 9B]. If these distances are equal, the cabinets are square.

Fig. 9A

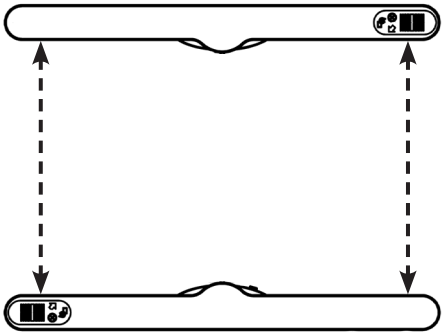
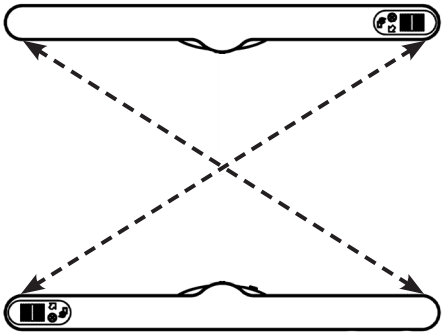
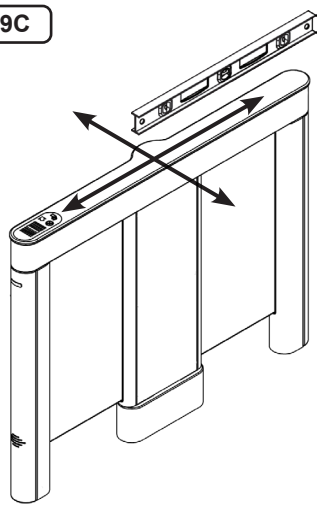


Fig. 9B



C. Using a level, verify each cabinet is level [Figure 9C]. If necessary, shim to bring the cabinets level.

Fig. 9C



Anchoring the Turnstile (cont.)

3. Use a pencil and mark each mounting hole location [Figure 10]. There will be a total of seven (7) mounting holes per cabinet. Remove the cabinets when complete.
4. Using a 5/8" concrete drill bit, drill the anchor holes 3" in depth at the center of each marked location.

⚠ CAUTION

If drilling through terrazzo flooring, add the thickness of the terrazzo tile to the hole depth. Use appropriate length anchor bolts.

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 11]. The threaded end of the anchor must be inserted into the hole first. Use a hammer 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 in center frame of cabinet 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 seven (7) 3/8" x 2-1/2" anchor bolts and flat washers.
9. Using a socket wrench and 9/16" socket, provisionally snug the anchors. Do not fully tighten them yet.
10. Refer to Barrier Installation on pg.21 and perform the barrier leveling procedure.
11. Once cabinets are level and square to one another, torque anchors to 80 ft-lbs.

Fig. 10 Marking Anchor Holes

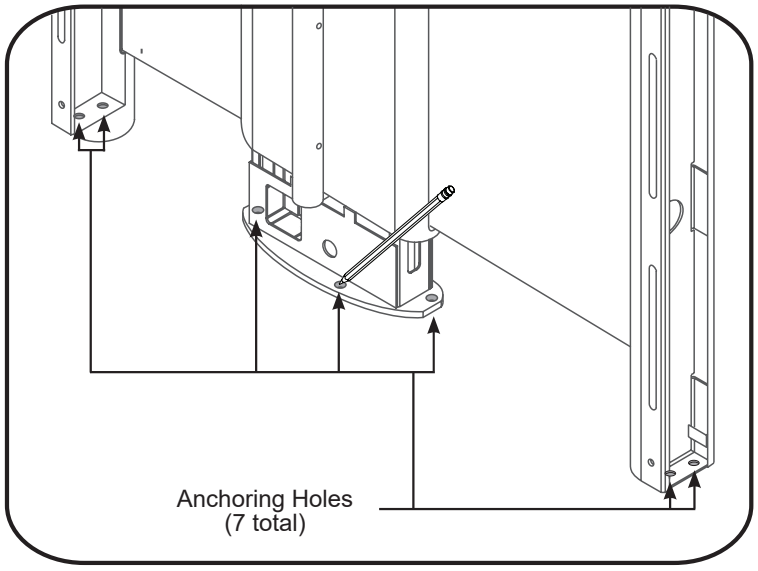
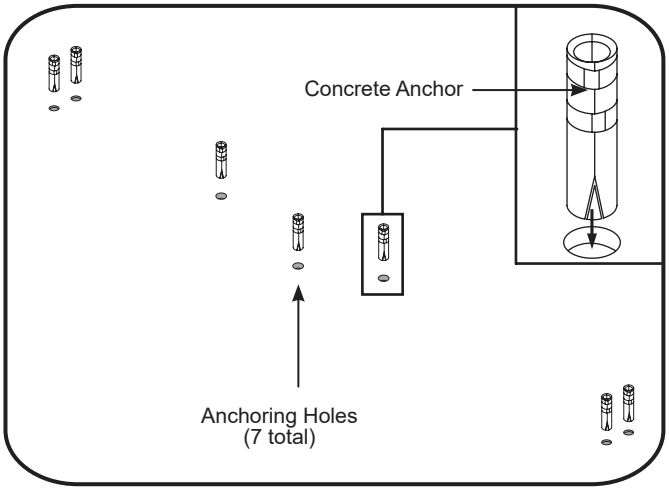


Fig. 11 Inserting Anchors



End Cover Installation

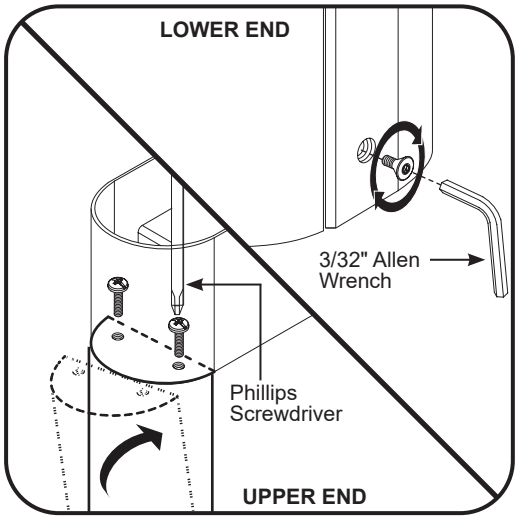
The end covers are shipped loosely attached to the SU5000 with the mounting hardware taped inside each cover.

NOTE

If installing an end cover that has a barcode reader installed, be sure to connect the barcode reader communication cable to your access control board before installing the end cover.

1. Gently push the lower end [**LOWER END** - Figure 12] of the end cover into place, aligning the mounting holes. Thread in two mounting screws [Figure 12].
2. Push the rest of the end cover into place. Align the upper end [**UPPER END** - Figure 12] mounting holes and insert the remaining two mounting screws and tighten using a Phillips screwdriver.
3. Using a 3/32"Allen wrench, tighten the lower mounting hardware.
4. Repeat Steps 1 - 3 for all end covers.

Fig. 12 Installing End Covers



Internal Card Reader Installation

Card readers used in connection with the site access control system are not included with the SU5000. The SU5000 has sufficient area for the installation of proximity card readers.

Most card readers do not require separate power inputs. In the event that your reader requires a separate power input – do not draw this power from the SU5000 power supply.

Due to the slim design of the SU5000, there is no space available to install circuit boards or other equipment associated with the access control system. Access control boards used in connection with the SU5000 are installed in locations exterior to the SU5000, in a wiring closet or other location.

1. Locate the card reader mounting bracket [Figure 13].
2. Using a Phillips head screwdriver, remove the status light board [Figure 13].
3. Using a Phillips head screwdriver, remove the three (3) mounting screws and remove the card reader mounting bracket.
4. Install the card reader per manufacturer's instructions.

NOTE

If the distance between the installed card reader and top channel lid exceeds the read range of the card reader, shims may be used to elevate the card reader by a maximum of 3/8" (9.5mm). **DO NOT** allow the card reader to touch the status light board.

5. Using a Phillips head screwdriver, insert and tighten three (3) mounting screws that secure the mounting bracket.
6. Place the status light board over the mounting standoffs and align the holes. Insert and tighten two (2) Phillips head mounting screws [Figure 14].
7. Route the output cable through the turnstile and connect to your access control system. [Figure 15A & 15B].

NOTES

- Output cable must be routed down through the access hole.
- When removing and reattaching the card reader mounting bracket and status light board, make sure to re-seat and check all wire harnesses for damage.

Fig. 13 **Removing Status Light Board**

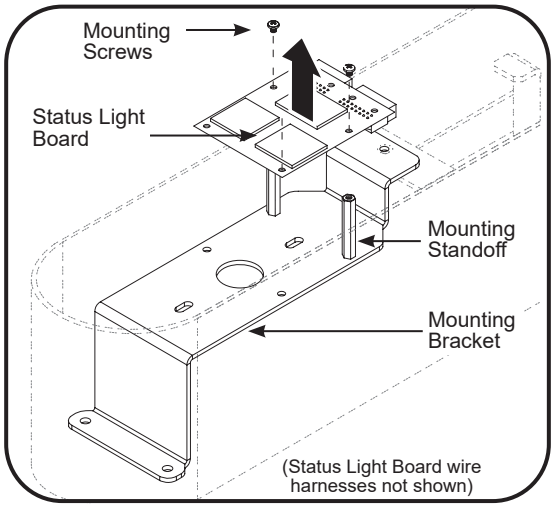


Fig. 14 **Mounting the Card Reader**

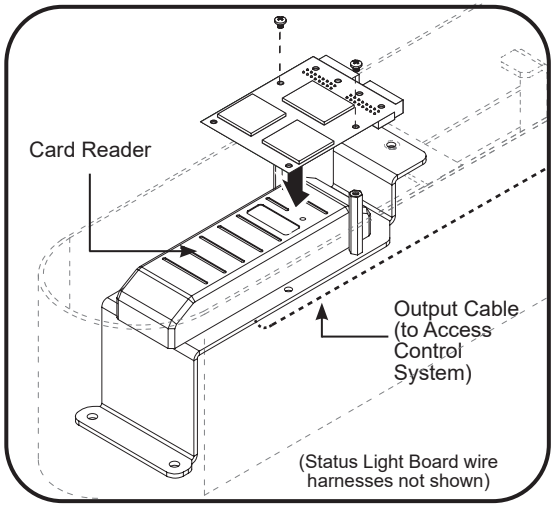


Fig. 15A **Routing the Output Cable**

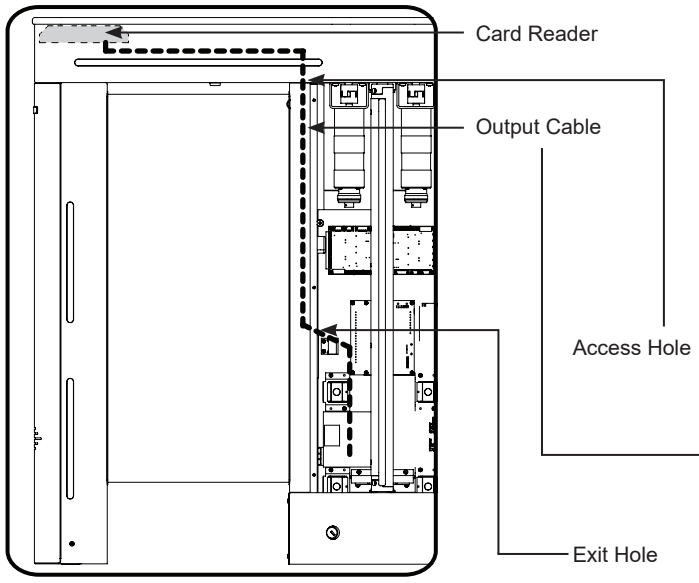
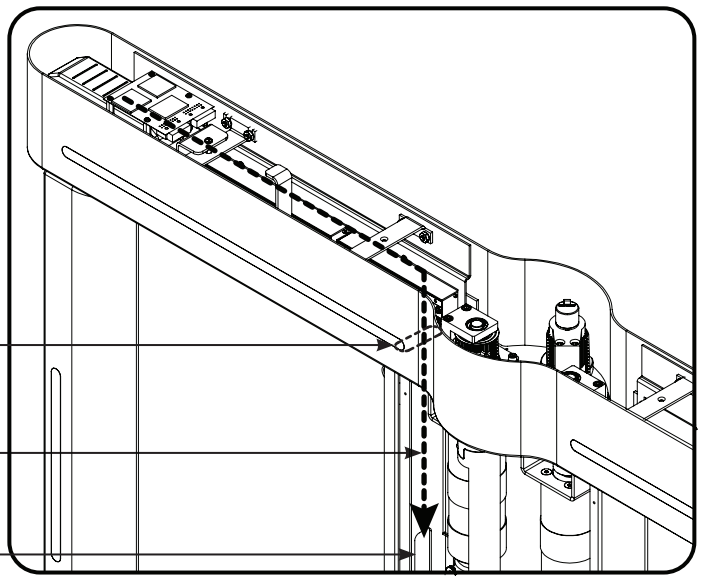


Fig. 15B **Routing the Output Cable**



Wiring Instructions

NOTE

FOR EXTERNAL DC POWER SUPPLY INSTALLATION INSTRUCTIONS, REFER TO APPENDIX D ON PAGE 35.

Primary Power

IMPORTANT

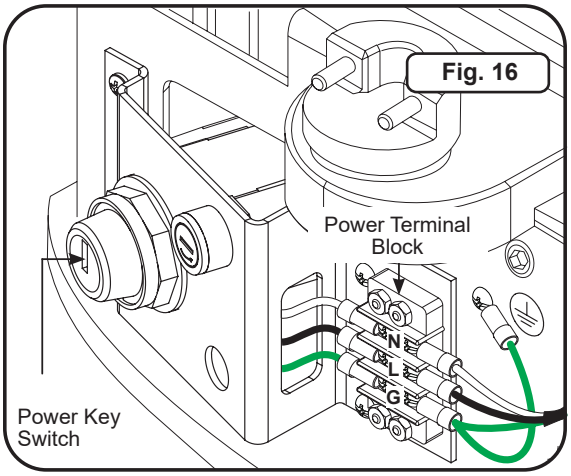
110VAC and 220VAC primary power must be hard wired in place. It is strongly recommended that a licensed electrician perform this procedure in accordance with applicable local codes.

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

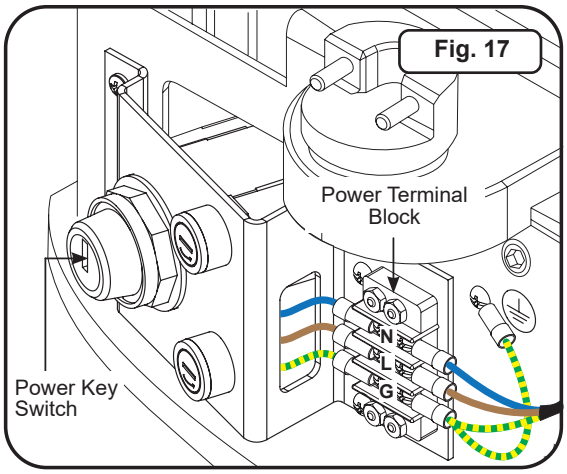
Terminal	110V	220V
Neutral	White	Blue
Line	Black	Brown
Ground	Green	Green/Yellow

1. Locate the pre-installed power terminal block and attached wiring (located next to the power key switch) [Figure 16].
2. Attach each power wire to the power terminal block with the corresponding color exiting on the other side [Figure 16 - 17].
3. Using a Phillips head screwdriver, tighten each terminal block connection.

110VAC



220VAC



Crossover Cable Connection

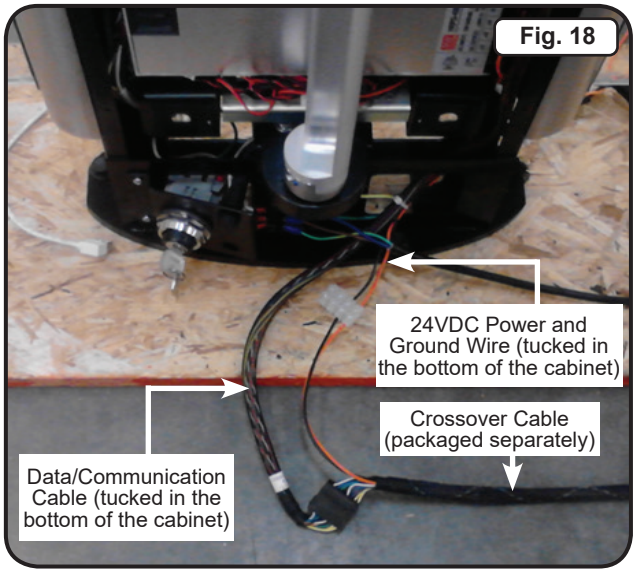
The included crossover cable interconnects communication signals and low-voltage 24VDC between the master and slave cabinets. The default length of the crossover cable included with the SU5000 is 8'. Optional crossover cable lengths of 13', 20' and 40' are available.

1. Locate the low-voltage terminal block tucked in the bottom of the base in the master cabinet [Figure 18].
2. Insert the 24VDC positive wire (orange) and the negative wire (black) into the terminal block, matching the colors with the other side and tighten [Figure 18].
3. Connect the data connector from the crossover cable to the data connector in the master cabinet [Figure 18].

NOTE

The crossover must connect from MASTER to SLAVE. Center cabinets have two crossover cable connectors tucked in the base: one labeled MASTER and one labeled SLAVE. Crossover cables are used to interconnect master and slave connectors. Refer to Appendix F for crossover cable connection diagrams.

4. Repeat Steps 1 – 3 for the slave cabinet.



⚠ CAUTION

DO NOT MODIFY CROSSOVER CABLE.

I/O Control Board

Signal Inputs and Outputs To / From Access Control System

Inputs

Signal inputs from outside systems are wired into the SU5000'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. MDC's must be at least 100ms in duration to register. While the SU5000 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 SU5000'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 cannot provide the specified MDCs, isolation relays should be used. NEVER connect signal lines containing voltage directly to the I/O control board.

LEGEND	
ITEM	NAME
J1	Input Terminals
J2	Output Terminals
JP1	RS485 Termination Resistor
JP2	RS485 Termination Resistor
JP3	Fire Alarm System 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

Fig. 19 Master Cabinet

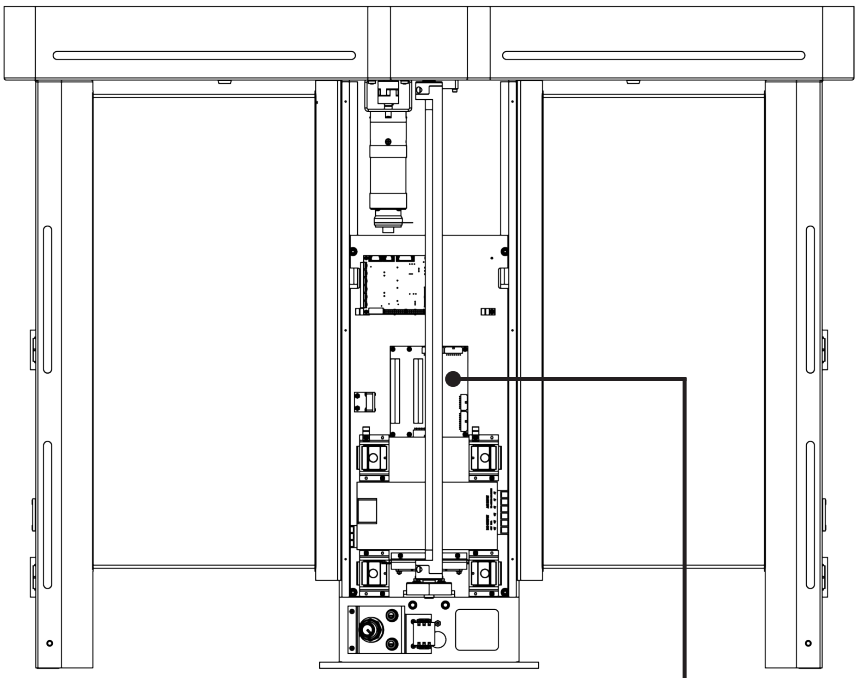
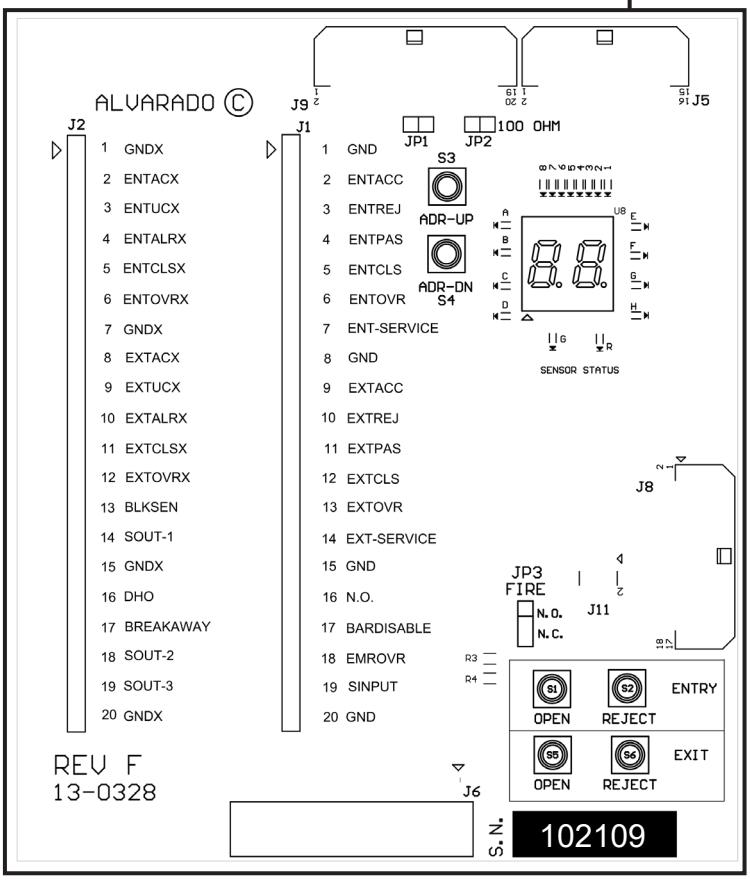


Fig. 19A I/O Control Board



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 signal ground.
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	An output occurs when there is entry into the lane area from the entry direction without authorization.	4	ENTPAS	Free Passage Entry	SDC	Sets the turnstile to Free Passage mode in the entry direction.
5	ENTCLSX	Tailgate Passage Entry	MDC	An output occurs when there is a tailgate passage in the entry direction.	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/Barrier Disabled Mode in both the entry and exit directions.
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	An output occurs when there is entry into the lane area from the exit direction without authorization.	10	EXTREJ	Bad Card Exit	MDC	Illuminates the exit direction RED User Status Icon for 2 seconds.
11	EXTCLSX	Tailgate Passage Exit	MDC	An output occurs when there is a tailgate passage in the exit direction.	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	Cross Passage Detection	MDC	An output occurs when a cross passage has been detected.	14	EXTSERVICE	Horizontal Arm Breakaway	N/A	Available on the SU3000 only.
15	GNDX	N/A	N/A	Common output signal ground.	15	GND	Ground	N/A	Common input ground signal.
16	DHO	Door Held Open	MDC	An output occurs when the barriers remain open after the allotted time to close after passage (default 12 seconds).	16	N/O	Normally Open Mode	N/A	Not available on the SU5000.
17	BREAKAWAY	Barrier Broken Away	MDC	An output occurs when the barrier holding force has been exceeded and the barriers give way.	17	BARDISABLE	Barrier Disable Mode	SDC	Sets the turnstile to Barrier Disabled mode for barrierless optical turnstile operation.
18	SOUT-2	Lid Alarm	MDC	An output occurs when the lid load sensors detect sufficient weight on the lid to prevent climbing over the cabinets.	18	EMROVR	Emergency Override	SDC (N.O. or N.C.)	Opens the barriers toward the unsecured side; barriers remain open and 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 SU5000 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. SU5000 passage modes are described on Page 23. Further information on the smart use of passage modes can be found in the *SU5000 User Guide (PUD3668)*.

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 26.

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)

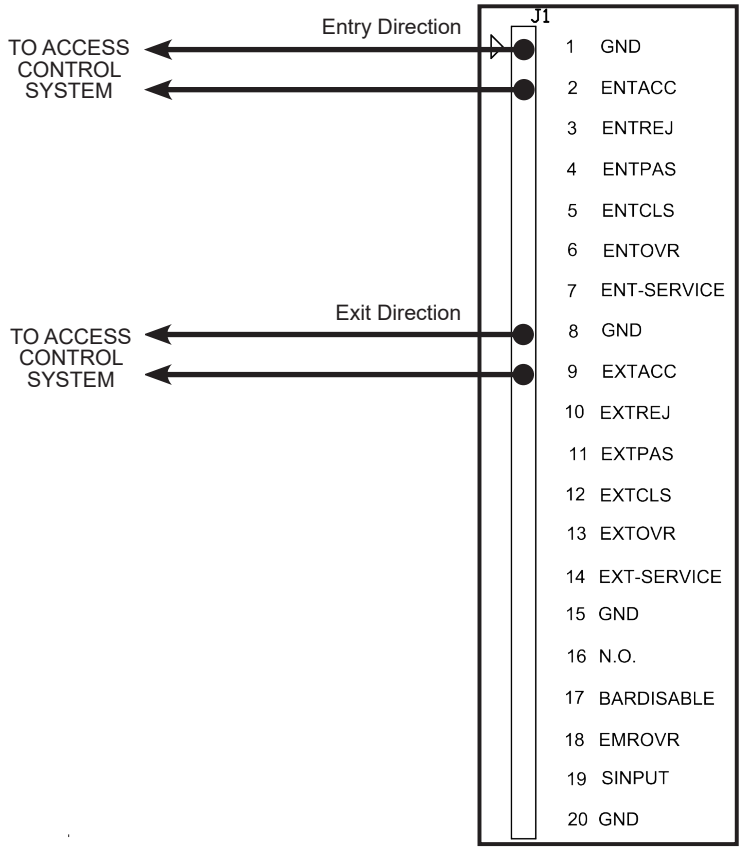
Entry Direction

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 20].

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 20].

Fig. 20



Setting Free Passage Mode (I/O Control Board)

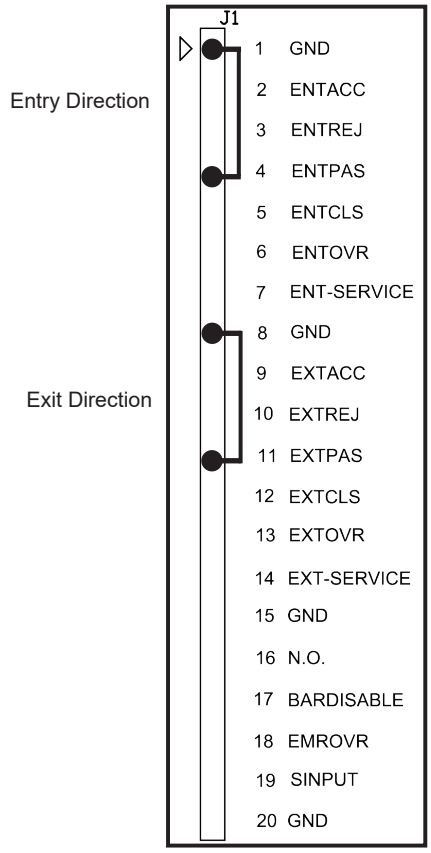
Entry Direction

1. Locate the ENTPAS and GND terminals.
2. Using a wire jumper, connect the ENTPAS and GND terminals [Figure 21].

Exit Direction

1. Locate the EXTPAS and GND terminals.
2. Use a wire jumper to connect the EXTPAS and GND terminals [Figure 21].

Fig. 21



Setting No Passage Mode (I/O Control Board)

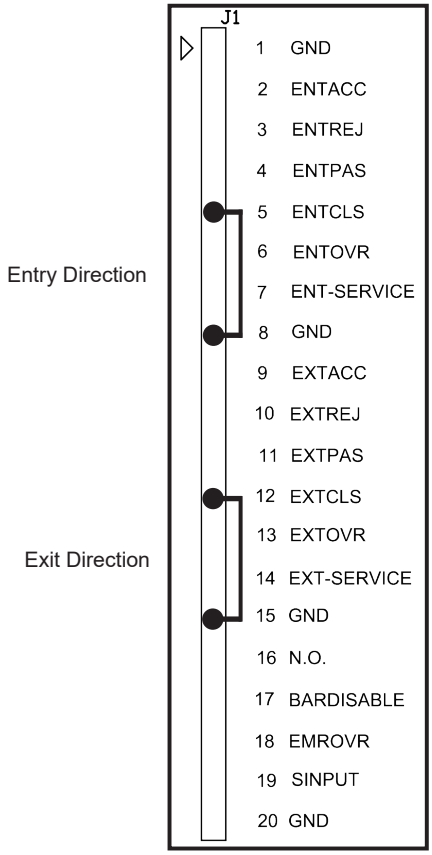
Entry Direction

1. Locate the ENTCLS and GND terminals.
2. Use a wire jumper to connect the ENTCLS and GND terminals [Figure 22].

Exit Direction

1. Locate the EXTCLS and GND terminals.
2. Using a wire jumper, connect the EXTCLS and GND terminals [Figure 22].

Fig. 22



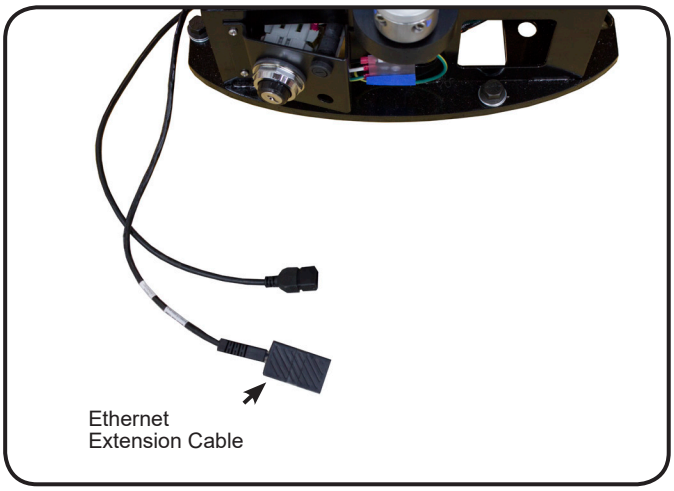
Ethernet Communication (Optional)

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 Ethernet extension cable tucked in the base of the master/center cabinet [Figure 23].
2. Connect the Ethernet cable to the Ethernet extension cable.
3. Tuck the Ethernet extension cable back into the base of the cabinet.

Fig. 23 I/O Control Board



Barrier Installation

NOTE

The barriers are shipped unattached to the turnstile. The clamp bars and hardware are packaged in the box labeled "HARDWARE ENCLOSED."



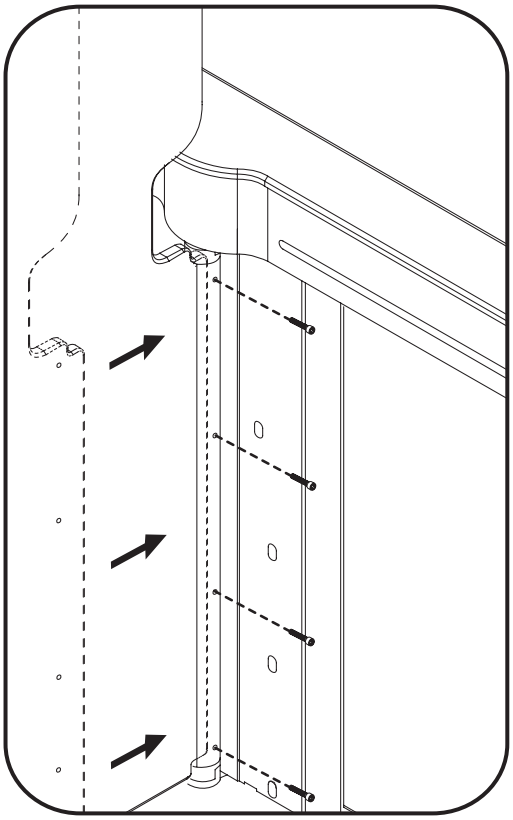
This installation requires two people: One person will need to hold the barrier while the other person inserts and tightens the mounting screws.

1. Insert the barrier edge into the mounting groove on the spindle, aligning the barrier and spindle mounting holes [Figure 24].

NOTE

- Exercise care not to scratch the barriers during handling. Do not lay or lean the barriers on an abrasive surface. If the barriers are going to be cleaned, use only a soft cloth and a cleaner suitable for acrylic surfaces.
- Barriers must be attached prior to testing. Abnormal behavior may result if tested without the barriers attached.

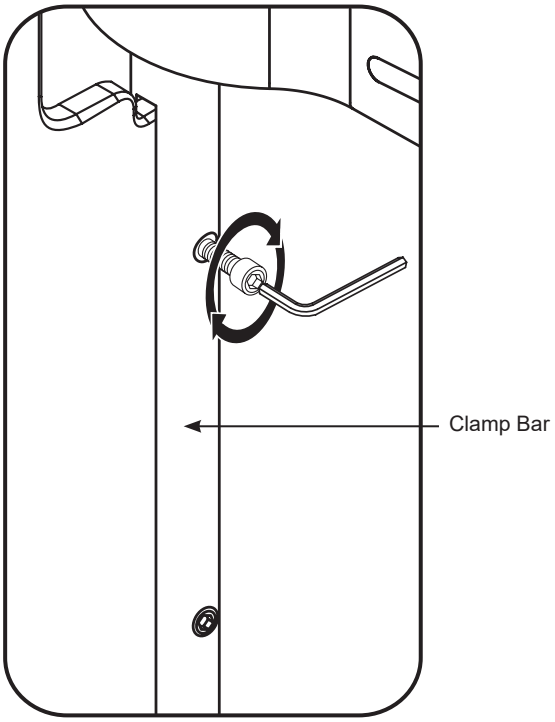
Fig. 24 Inserting Barrier Edge



Barrier Installation (cont.)

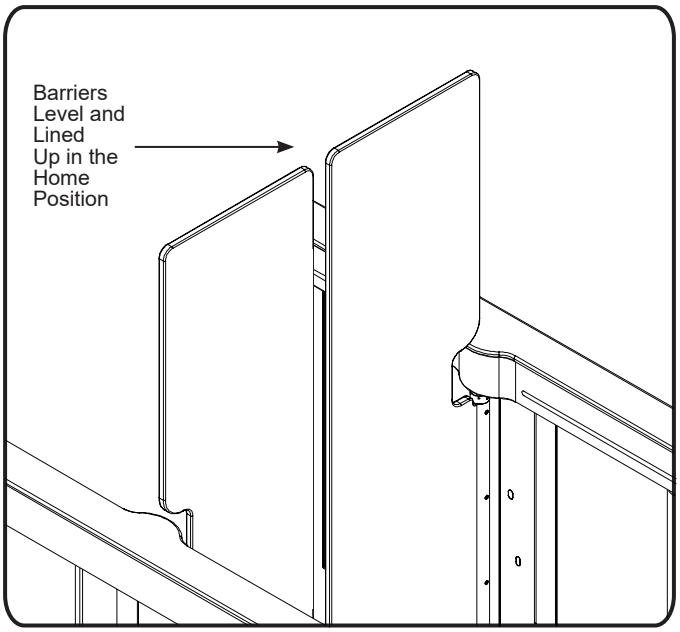
2. Position the clamp bar on the barrier. Insert and tighten the mounting screws and clamp bar to 44 in-lbs. Test to make sure the barrier does not wiggle [Figure 25].

Fig. 25 **Tightening Mounting Screws**



3. Once the barriers have been installed, check that they are level and lined up properly in the Home position. If the barriers do not line up in the Home position, the cabinets may not be level. Insert shims as needed to level barriers. Refer to Page 13 for instructions on leveling and squaring the cabinets.

Fig. 26 **Checking that Barriers are Level**



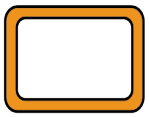
NOTE: The barriers below are shown in the Home Position.

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 SU5000 passage modes. More information on SU5000 passage modes can be found in the *SU5000 User Guide (PUD3668)*.

Passage Mode	Description	User Status Display	Open / Closed Status Light
Controlled Passage	The barriers are closed, securing the turnstile. Upon receipt of an authorization signal from an access control system the barriers move away from the user to the open position, allowing a single passage in the authorized direction. The barriers will close after the user has passed through the turnstile or the time delay reset (6 second default) has expired. **This is the default passage mode the SU5000s are set to before leaving the factory.**		 Green
Free Passage	An access control authorization signal is not required for a user to pass through the turnstile. Barriers are closed until a user enters the turnstile at which time the barriers automatically open in the direction of travel. The barriers will close after the user has passed through the turnstile or the time delay reset (6 second default) has expired.	 (Flashing)	 Green
No Passage	No passage is allowed. The barriers are closed and remain closed. Valid electronic credentials are ignored and passage is not allowed. The barriers will still open in the exit direction if a fire alarm or life safety input is received.		 Red

Powering On

NOTE

The keys to power the turnstile ON/OFF are packaged in the hardware box that was shipped with the turnstile.

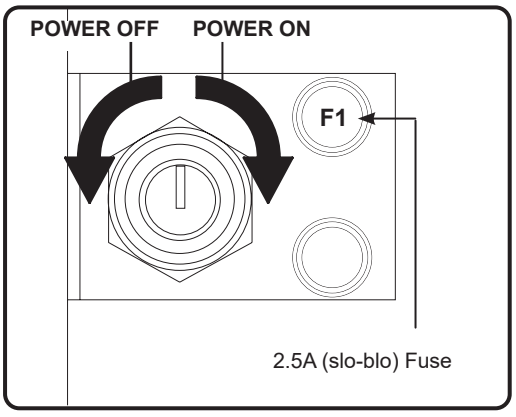
There is a power key switch on the inside of the base cover of all master and center cabinets.

1. Turn on AC power using the power key switch [Figure 27]. The power-up cycle will take less than one minute to complete.
2. After the power-up sequence has completed, the SU5000 barriers will move to the Home position and the SU5000 will enter into Controlled Passage mode, for both the entry and exit directions.

NOTE

Barriers are pre-aligned at the factory. However, they may need slight adjustment after installation. Refer to Appendix A on Page 32 for instructions on setting the barrier Home position.

Fig. 27 **Power Key Switch**



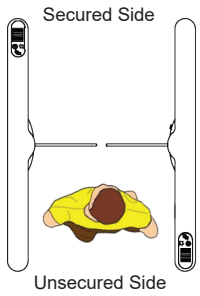
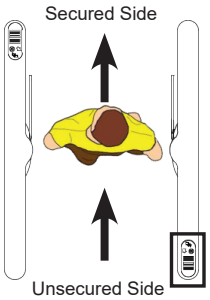
Testing Turnstile Functionality

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):

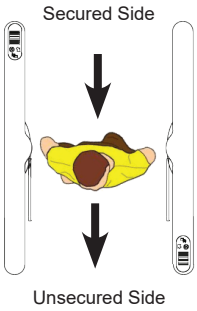
- The access control system is operational and all access control wiring to the turnstile is connected.
- Valid access cards are on hand for activating the turnstile.

CONTROLLED PASSAGE MODE

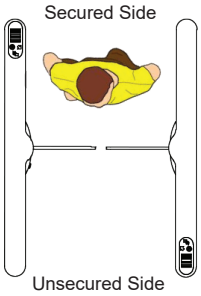
TEST	PROCEDURE	TURNSTILE RESPONSE
Unauthorized Entry / Exit  (Unauthorized Entry shown)	Enter the turnstile without authorization.	• Unauthorized Entry / Exit alarm sounds. • Red stop icon flashes on the User Status Display in the direction of the violation. • Open / Closed Status Light turns red in the direction of the violation. • Barriers remain closed.
Authorized Entry / Exit  (Authorized Entry shown)	Using a valid card, activate the turnstile. Walk through the turnstile. Verify the barriers close upon passage completion.	• Authorized Entry chime sounds. • Green arrow icon illuminates on the User Status Display in the entry / exit direction, respectively. • Barriers move to the open position, and close upon passage completion or the timeout period is reached.

Testing Turnstile Functionality (cont.)

FREE PASSAGE MODE

Free Passage Entry / Exit  (Free Passage Exit shown)	Enter the turnstile and complete a passage.	• User Status Light green arrow is flashing. • Barriers open away from the user entering the turnstile. • Barriers close after passage completion.

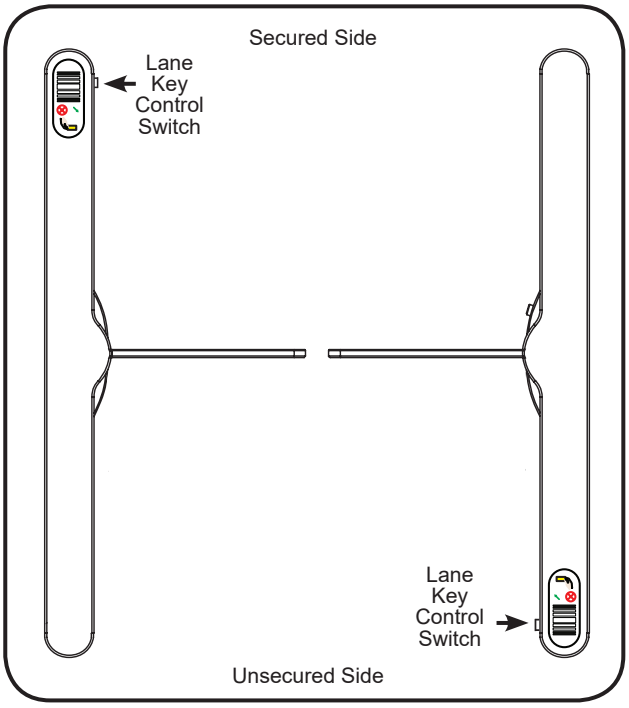
NO PASSAGE MODE

No Passage Entry / Exit  (No Passage Exit shown)	Enter the turnstile.	• User Status Light red icon is illuminated. • Open / Closed Status Light is red. • No alarms sound when standing in the turnstile. • Barriers remain closed.

Testing Lane Key Control (Optional)

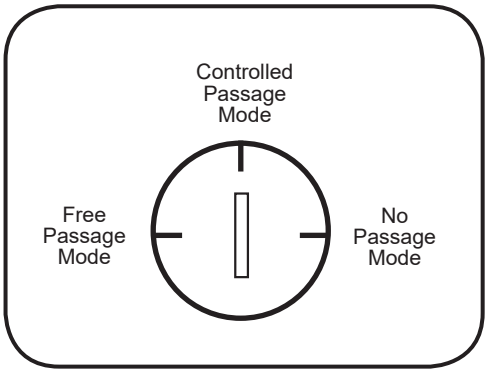
Optional 3-position lane key control switches can be selected during the ordering process. Lane key control switches are used to change passage modes for both directions of travel. Two (2) lane key control switches are installed per turnstile in the bottom end legs as shown in [Figure 28].

Fig. 28 **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 [Figure 29]. Refer to the Passage Modes section on Page 23 for more information.

Fig. 29 **Lane Key Control Switch**



NOTE

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

Testing Ethernet Communication (Optional)

NOTE

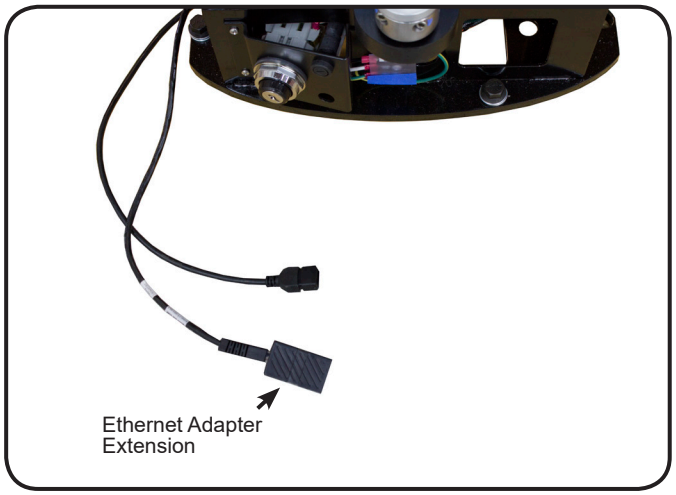
The following procedure is applicable to non-networked (standalone) turnstiles. For instructions on testing Ethernet communication over a facility network, please refer to the *SU5000 User Guide (PUD3668)*.

Required Items:

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

1. Locate the Ethernet Adapter extension tucked in the base of the master/center cabinet [Figure 30].
2. Connect the Ethernet cable to the Ethernet adapter extension.
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.XXX.XXX,** where XXX.XXX.XXX.XXX is the IP address of the turnstile [Figure 29].

Fig. 30 **Ethernet Adapter**

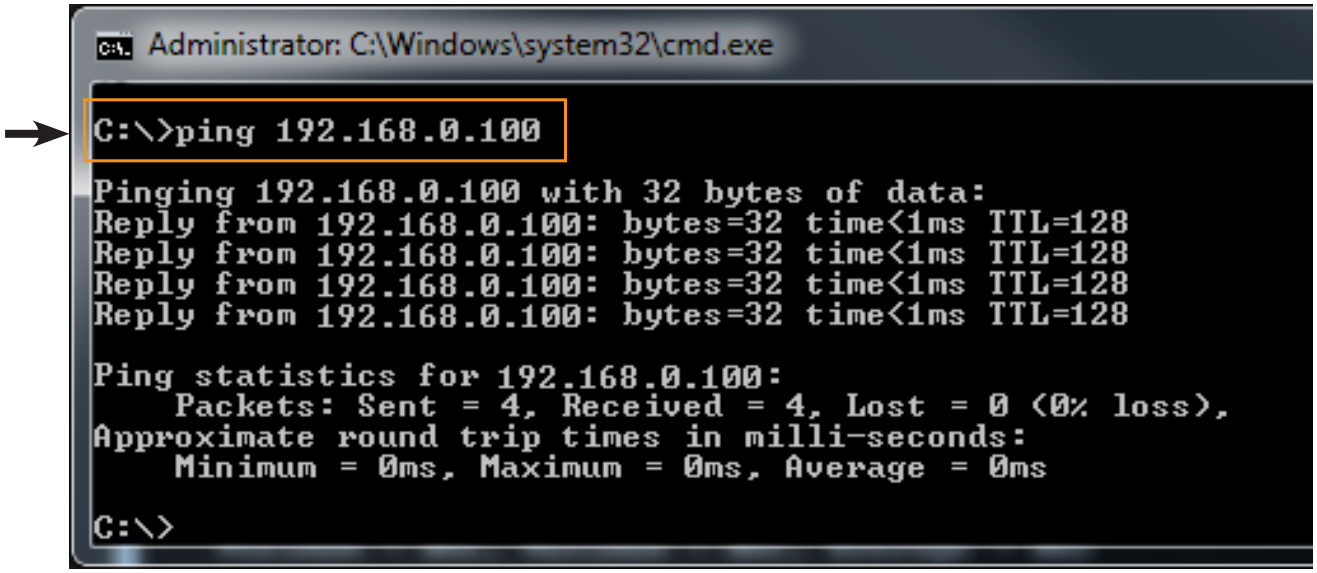


NOTE

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 31]:

Fig. 31 **Ping Results**



Finish the Installation

Cabinet Lid Installation

NOTE

Due to limited access, use the 4mm Allen 'stubby' wrench provided. (The wrench is taped to the underside of all **end cabinet lids**.)

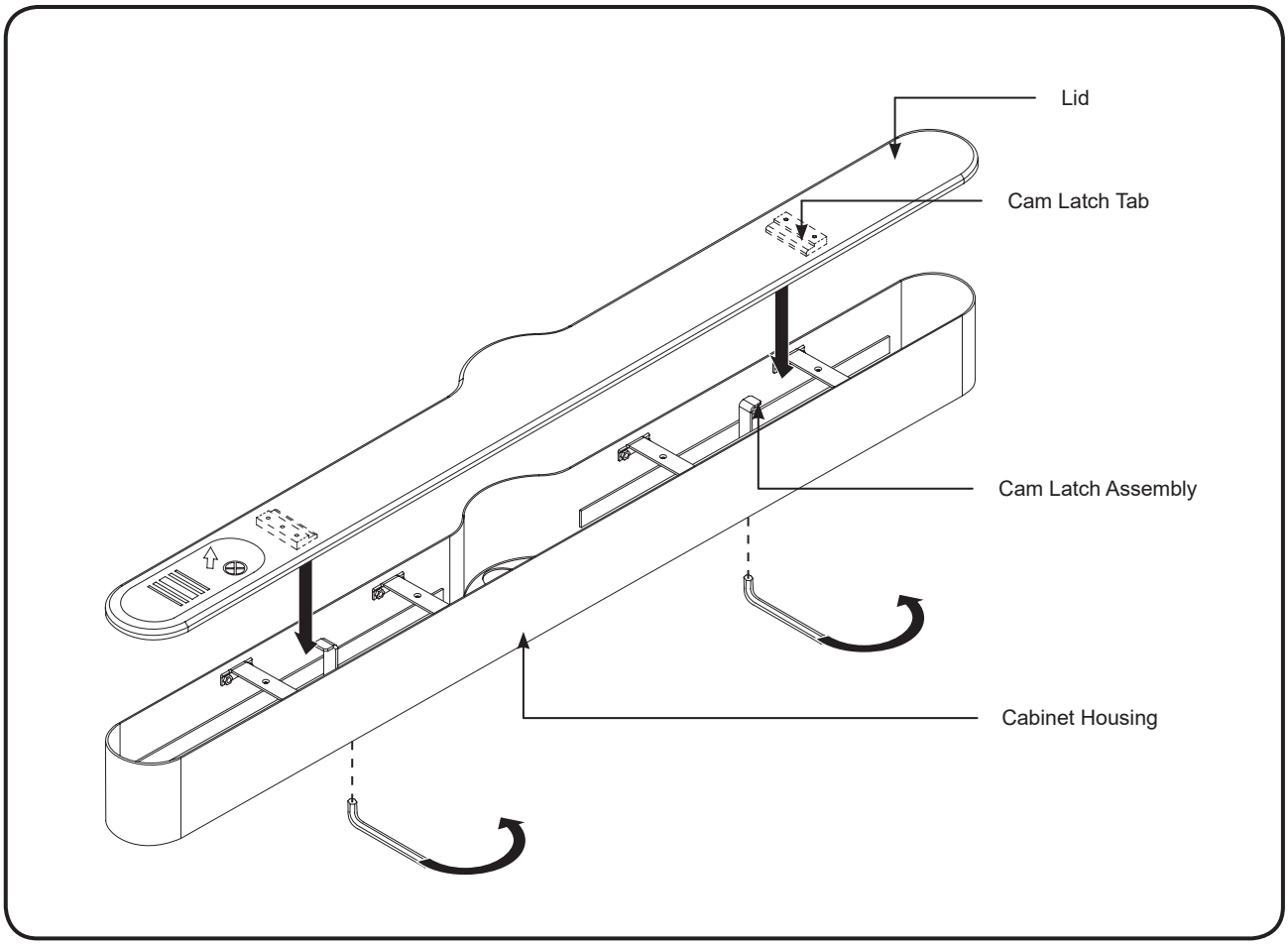
1. Lower the lid onto the cabinet housing [Figure 32].

⚠ WARNING

Do not force the lid into place. Doing so may damage the lid.

2. Insert the 4mm 'stubby' Allen wrench into the cam latch assembly (located under the cabinet housing) and turn 180° counter-clockwise until there is no movement in the lid [Figure 32].
3. Repeat steps 1 and 2 to install the remaining cabinet lid(s).

Fig. 32 **Cabinet Lid Installation**



Cabinet Panel Installation

1. Orient the cabinet panel so the sensor windows are at the bottom and gently slide the cabinet panel into position.
2. Using a Phillips screwdriver, insert and tighten the six (6) mounting screws that secure the cabinet panel to the cabinet [Figure 33].
3. Repeat steps 1 and 2 to install the remaining cabinet panel(s).

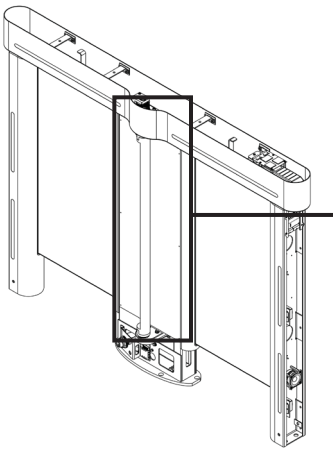
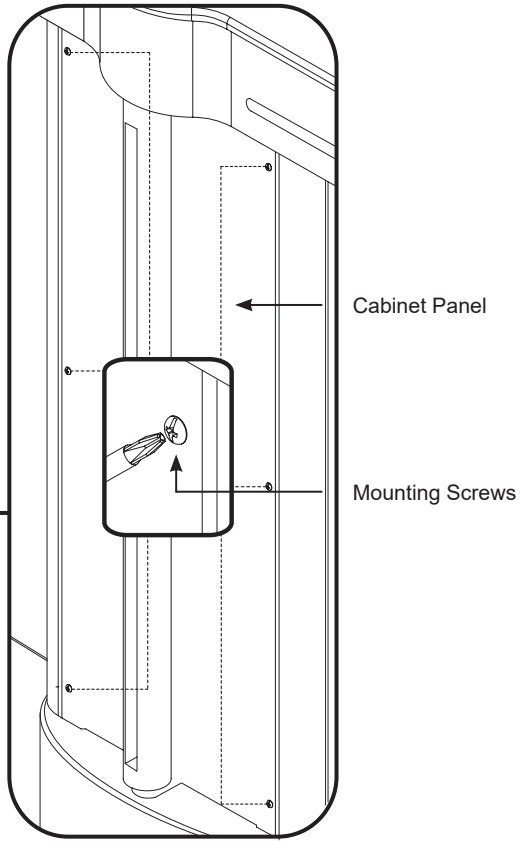


Fig. 33 **Cabinet Panel Installation**



(Barriers not shown)

Base Cover Installation

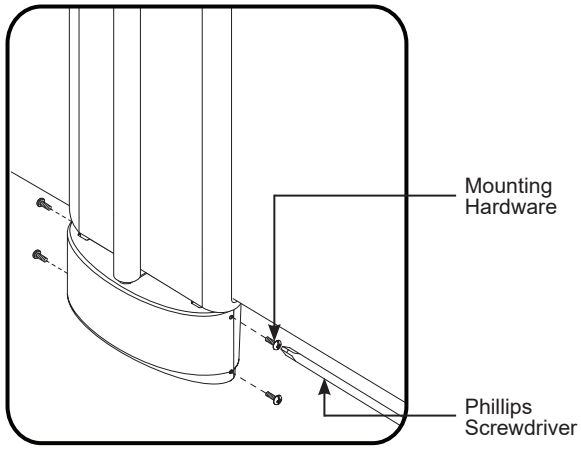
1. Place the base covers in position. The opening for the power key switch must be facing towards the interior of the lane.

NOTE

Master and center cabinet base covers can be identified by the power key switch hole.

2. Align the four (4) mounting holes (located on each side of the base cover) [Figure 34].
3. Using a Phillips screwdriver, insert and tighten the mounting hardware [Figure 34].
4. Repeat Steps 1 - 3 to install the remaining base covers.

Fig. 34 **Base Cover Installation**



(Barriers not shown)

Post-Installation Checklist

1. Power On
   - ☐ SU5000 boots up successfully as confirmed by two audible chimes.
2. Lane Functionality
   - ☐ User status displays and open / closed status lights are functioning properly.
   - ☐ Auditory alarms are playing back correctly.
   - ☐ Barriers move smoothly between the open and closed positions.
3. Access Control Integration
   - ☐ Installed card readers are successfully reading credentials.
   - ☐ Valid credentials are activating the turnstile.
4. Barrier Alignment
   - ☐ Barriers are properly aligned in both the open and closed positions.
   - ☐ Barriers aligned in the Home position.
5. Attachment
   - ☐ Barriers, cabinet lids, end covers, and base covers are securely fastened to the turnstile.
6. Wipe Down Turnstile
   - ☐ Acrylic - Wipe down acrylic barriers using a soft cloth and cleaner suitable for acrylic surfaces. We recommend Brillianize and Novus #1 acrylic cleaners.
   - ☐ Stainless Steel – Wipe down stainless steel with a damp cloth or use Alvarado's recommended commercial products (see *SU5000 User Guide - PUD3668*).
   - ☐ Powder Coated - Wipe down power coated surfaces with a damp cloth.
7. Manuals Handoff
   - ☐ Provide both these *SU5000 Installation Instructions* and the *SU5000 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 further troubleshooting assistance, contact Alvarado Technical Support for the Optical Troubleshooting Document.

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 the red STATUS LED is lit or flickering. If it is, the most likely problem is a loose or improper communication connection. Disconnect the black 16-pin connectors from the I/O control board and motor control boards, 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.
Barriers operate erratically	Digital position encoder is not in place	Verify the digital position encoder is secured to the pulley shaft with all the locks tabs in place. [Figure 35]. **NOTE: After re-seating the digital position encoder, the barrier Home Position must be reset PRIOR to power cycling the turnstile. Refer to Appendix A for instructions to set the Home Position.**
Barriers do not move.	Blown 24VDC fuse on the motor controller board.	Locate the motor controller board fuses [Figure 36]. Using a multimeter, check the 24VDC 6.3A fuse for continuity. If the fuse is blown, contact Alvarado for replacement 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 ADR-UP and ADR-DN buttons on the I/O control board to perform diagnostics on sensors.
Barriers either stay open or start to close then open back up	Safety sensor blocked	Check for a stray wire or cable in front of the individual transmit and receive safety sensors. 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 ADR-UP and ADR-DN buttons on the I/O control board to perform diagnostics on sensors.
Barriers do not align in closed position	Home position needs to be reset	Follow the Setting the Home Position instructions in Appendix A on Page 32.
System does not boot.	Motor controller board fuse is blown.	Locate the motor controller board fuses [Figure 36]. Using a multimeter, check the 5VDC 3A and 12VDC 2A fuses for continuity. If a fuse is blown, contact Alvarado for a replacement. **NOTES: If a user status display or open / closed status light is out, this may indicate the 5VDC 3A fuse is blown. If the motor controller board LEDs are out, this indicates the 12VDC 2A fuse is blown.**

Fig. 35 **Digital Position Encoder**

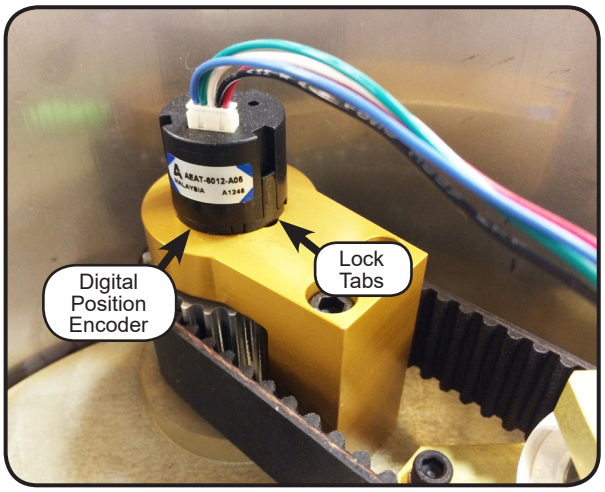
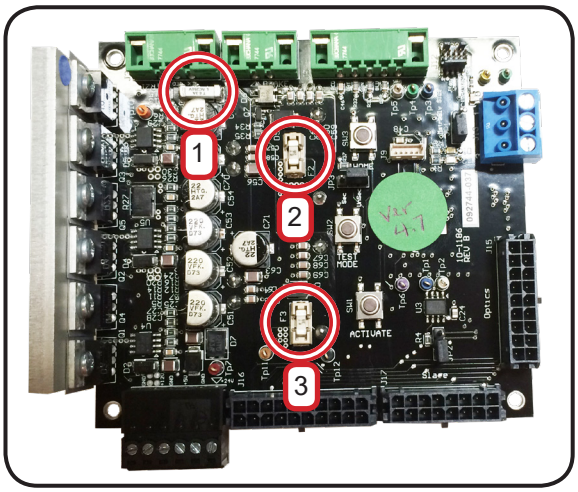


Fig. 36 **Motor Controller Board Fuses**



FUSES

1) 24VDC 6.3A 2) 12VDC 2A 3) 5VDC 3A

Appendix A - Setting the Home Position

1. Locate the motor controller board in the master or center cabinet [Figure A1 or A2] respectively. The (D2) LED will be blinking indicating normal operation mode.
2. Press the 'Test Mode' button for two seconds. The (D2) LED will be lit solid. You are now in test mode [Figure A1].
3. Move the barrier a couple of inches in both directions and then place it in the home position [Figure A3].
4. Press the 'Home' button to set.
5. Press the 'Test Mode' button for two seconds to exit test mode. The (D2) LED will return to blinking status indicating normal operation mode.
6. Locate the slave motor controller board in the slave or center cabinet.

NOTE

On center cabinets, the slave motor controller board controls the slave barrier on the other side of the cabinet (the adjacent lane).

7. Repeat Steps 1 through 5 for the slave barrier.

Fig. A1 **Master Cabinet - Motor Controller Board**

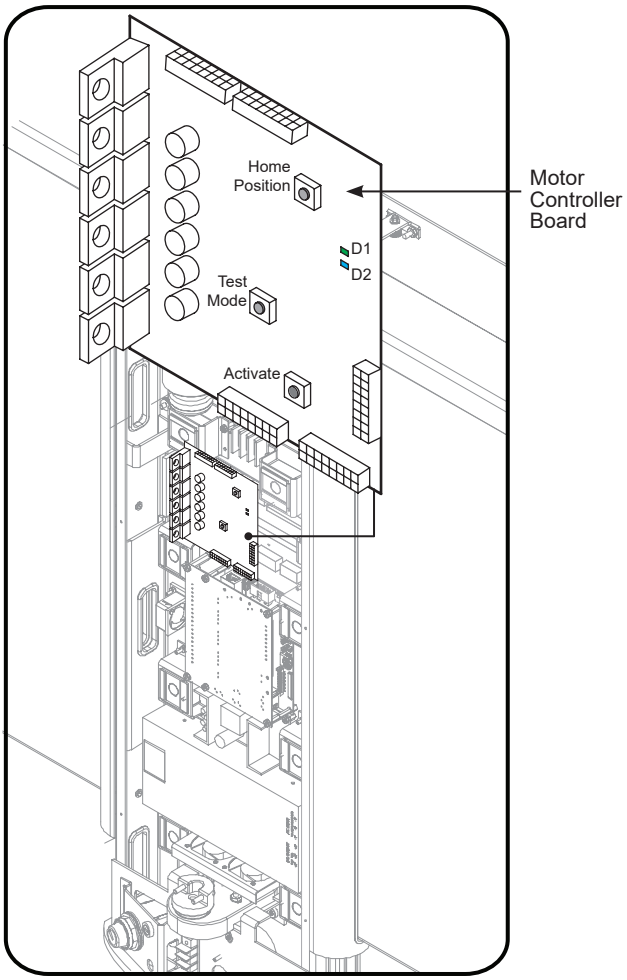


Fig. A2 **Center Cabinet - Motor Controller Boards**

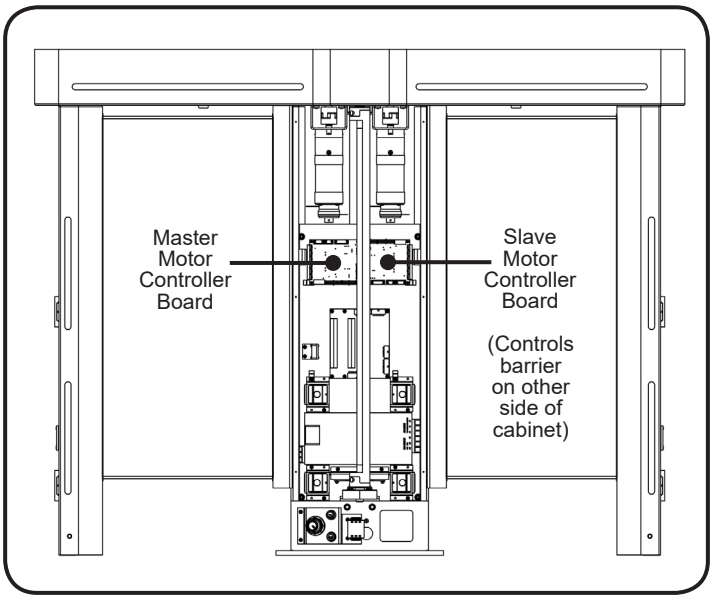
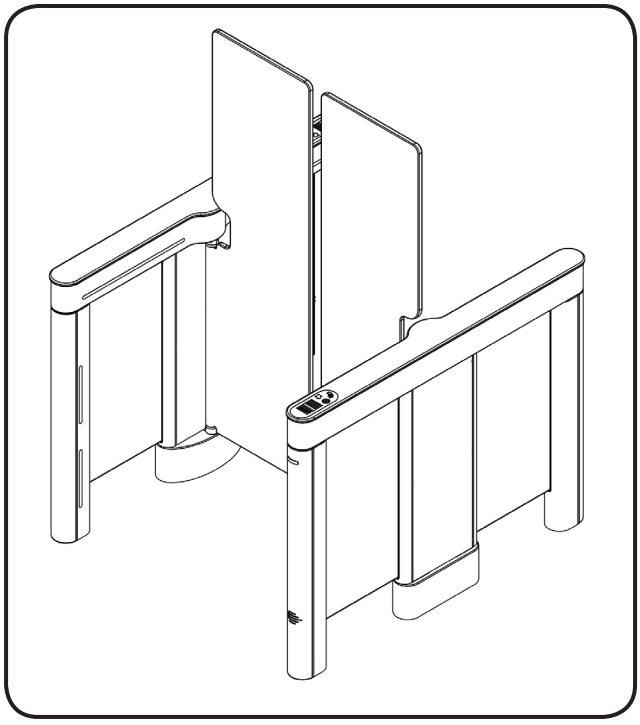
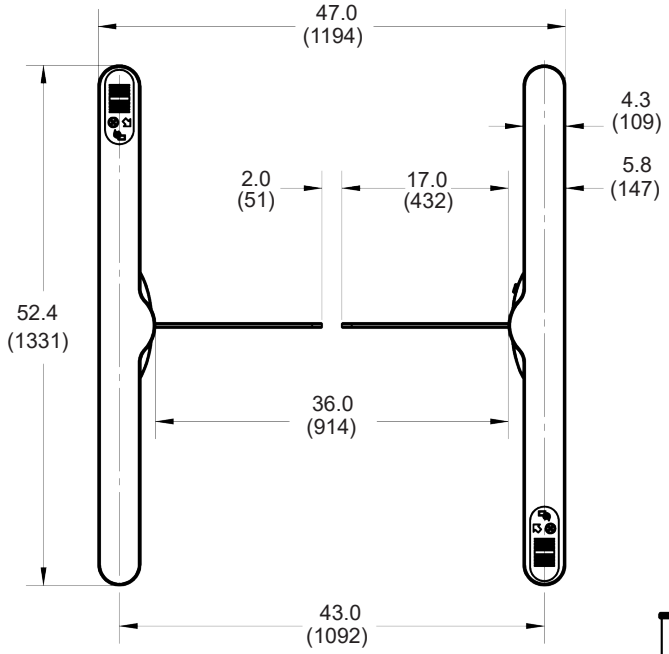


Fig. A3 **Barrier Home Position**

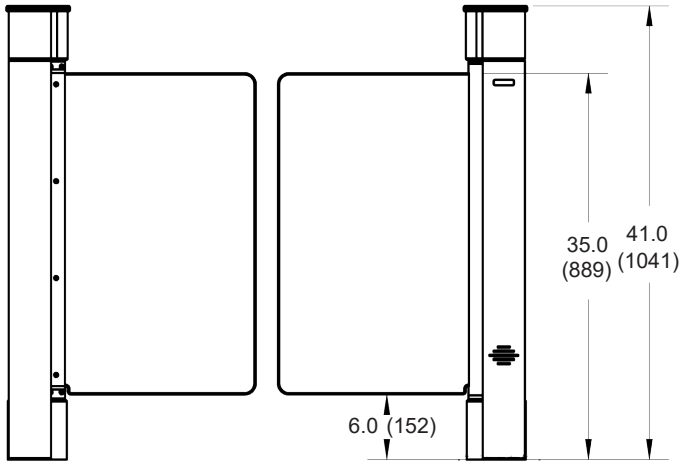


Appendix B - 36" Single Lane - Plan, Elevation & Footprint Drawing

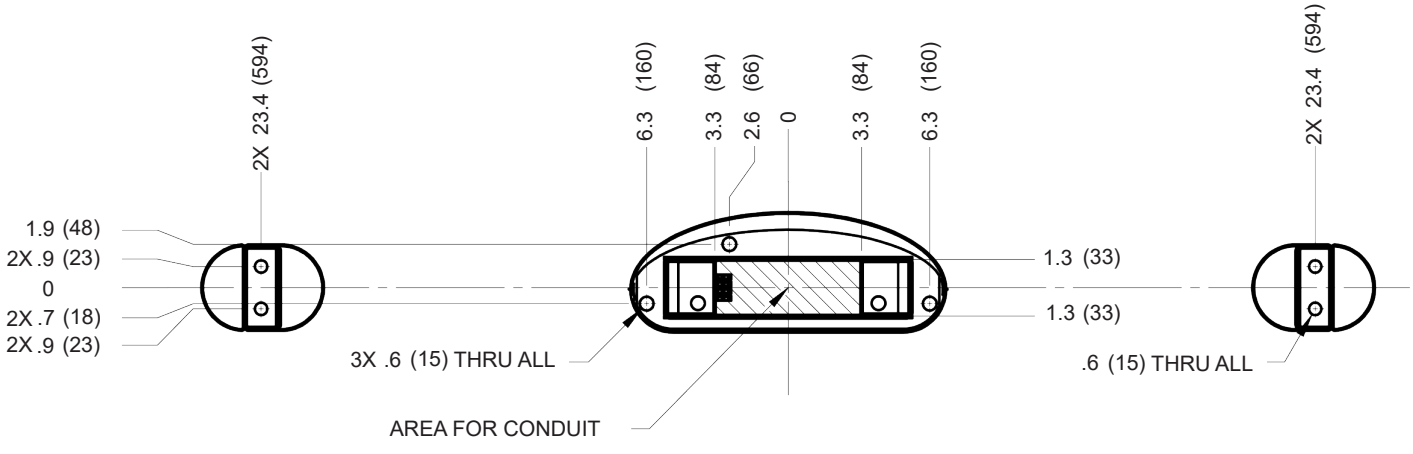
Plan View



Elevation View



Footprint



Appendix C - 28" & 36" Baseplate Dimensions

Fig. C1 **28" Baseplate Dimensions**

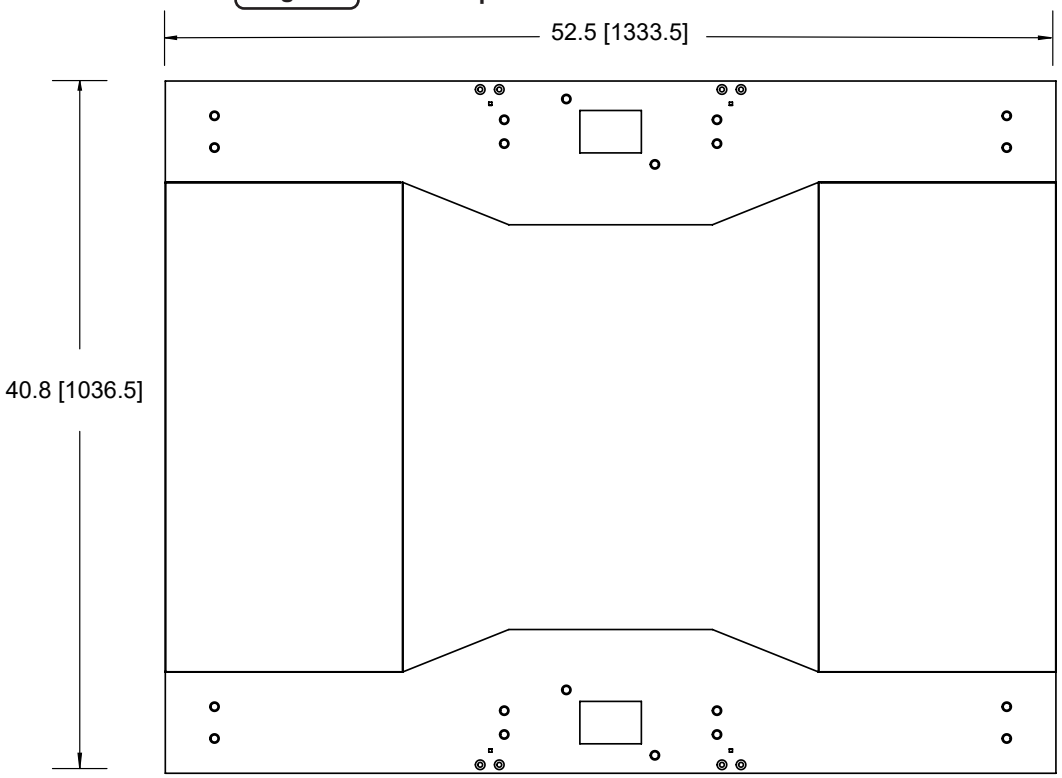
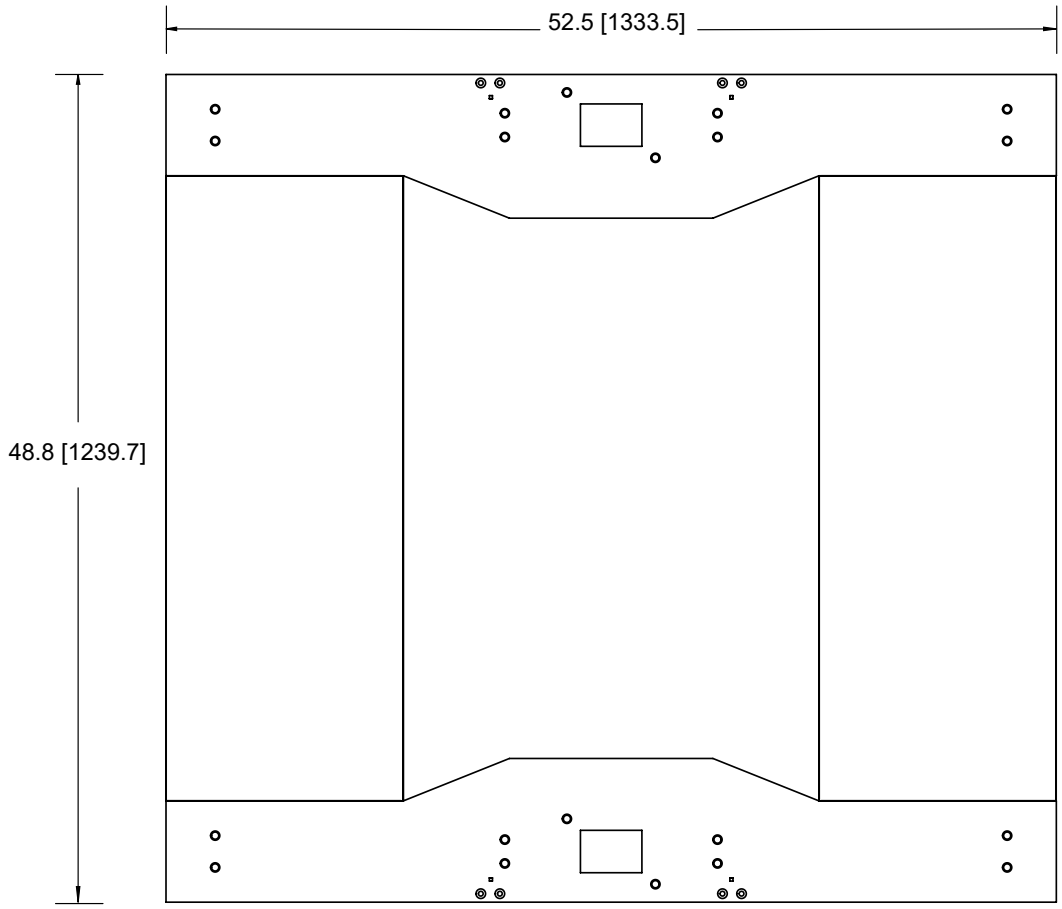


Fig. C2 **36" Baseplate Dimensions**



Appendix D - External DC Power Supply Installation (Optional)

THESE INSTRUCTIONS ARE APPLICABLE FOR EXTERNAL DC POWER SUPPLY INSTALLATIONS ONLY.

Before You Begin

- One power supply is required per lane. Each power supply enclosure can house up to three power supplies. The power supplies are pre-installed at Alvarado prior to shipping. Make sure to locate all required components, and verify the correct number of power supplies are present prior to beginning installation.
- It is assumed that conduit has been run to the master/center cabinet for each lane for low-voltage 24VDC power wiring. Refer to Conduit Requirements section on Page 9 for more information.
- Due to the various mounting methods and surfaces available for mounting the enclosure, mounting hardware and detailed mounting instructions are not provided.
- Wire gauge recommendations for 30, 50, and 100 ft. runs are provided on Page 37. If your installation requires runs beyond 100 ft, ensure wire gauge is appropriate and in compliance with local electrical codes.
- The location of the power supply enclosure must adhere to the Environmental Requirements section found on Page 9. Controlled environments such as an electronics closet are ideal.
- See Page 39 for power supply enclosure dimensions.
- It is strongly recommended that a licensed electrician perform this procedure in accordance with applicable local electrical codes.
- Throughout this document, the power supply enclosure is shown with three power supplies installed. The instructions are the same for single and dual power supply installations.

Locate and Mount the Enclosure(s)

⚠ WARNING ENSURE PRIMARY POWER IS SHUT OFF AT THE BREAKER.

1. Determine the installation location for the power supply enclosure(s). If mounting the enclosures to a wall or other surface, use the five (5) provided mounting holes and appropriate hardware [Figure D1].
2. Using a 5/64" Allen wrench, remove the four (4) cover screws and remove the cover [Figure D2].

Fig. D1 **Mounting Holes (Side View)**

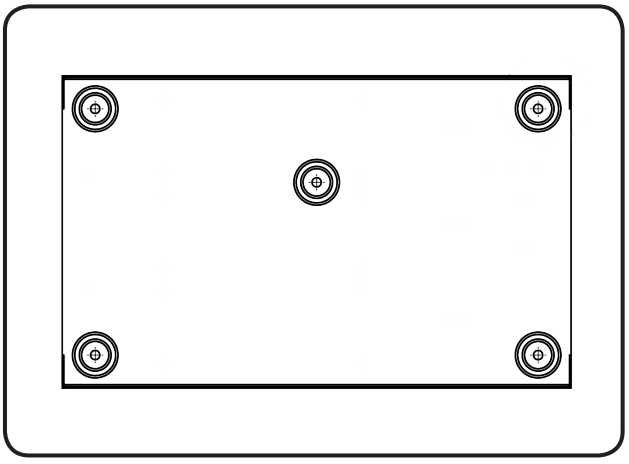
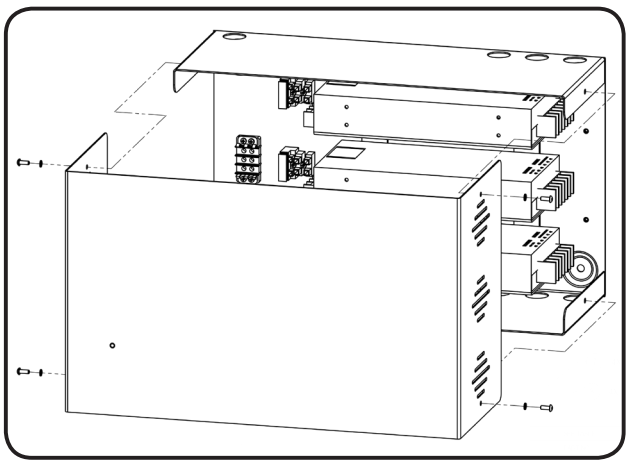


Fig. D2 **Removing Cover Screws**



Connect Primary Power to Enclosure(s)

NOTE

Primary power wiring and connectors are not supplied by Alvarado.

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

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

3. Route primary power conduit to one of the supplied conduit holes on the enclosure [Figure D3].
4. Locate the pre-installed primary power terminal block [Figure D3]. There is one primary power terminal block per enclosure.
5. Attach each primary power wire to the primary power terminal block according to the table above [Figure D3A].
6. Using a Phillips-head screwdriver, tighten each terminal block connection.
7. Attach the supplied protective cover on the terminial block.
8. Repeat Steps 3 for 7 for additional power supply enclosures.

Fig. D3 **Primary Power Terminal Block**

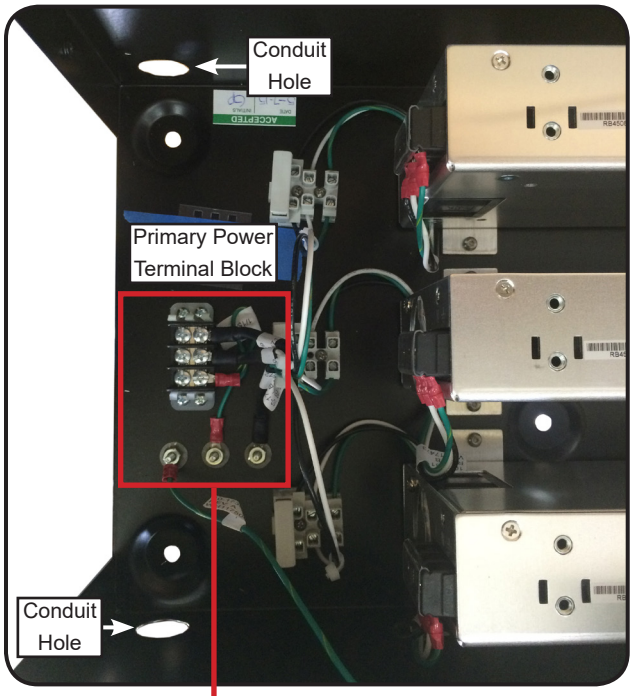
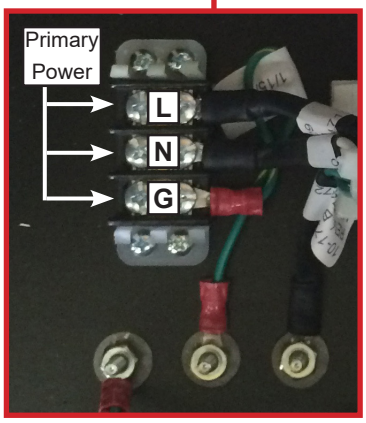


Fig. D3A



Connect Low-Voltage 24VDC from Enclosure to Turnstile(s)

NOTE

Twelve (12) ring connectors are supplied by Alvarado for connecting low-voltage 24VDC power to the turnstiles. If you do not require all twelve connectors, only use what is needed.

Due to the differences of each installation scenario, 24VDC wire is not supplied by Alvarado. See the recommendations below for selecting the best wire for your installation.

DISTANCE	GAUGE
30 ft (9.14m)	16 AWG
50 ft (15.24m)	14 AWG
100 ft (30.48m)	12 AWG

9. Route 24VDC power conduit(s) to supplied conduit holes on the enclosure. See [Figure D7] on Page 39 for location of 24VDC conduit holes.

TIP

If connecting to multiple turnstiles, it is recommended to label each power supply i.e. Lane 1, Lane 2, Lane 3, etc.

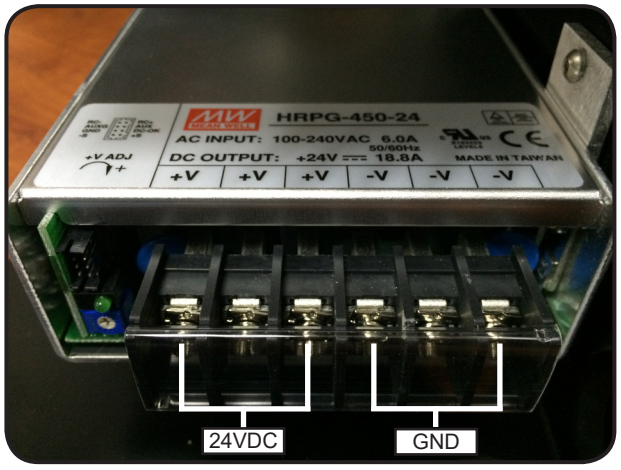
10. For each power supply to be connected, locate the output terminal block [Figure D4]. Each terminal block has three (3) 24VDC (+V) and three (3) ground (-V) terminals. You will only require one (+V) and one (-V) per lane.

NOTE

The 24VDC (+V) and GND (-V) terminals are common.

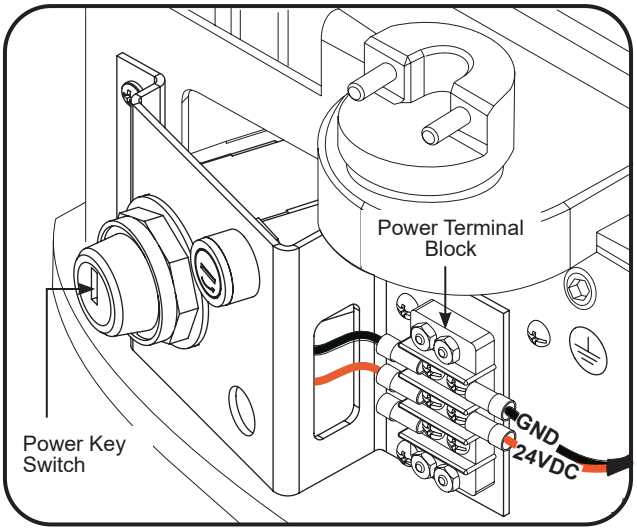
11. Using the supplied connectors, connect the 24VDC (+V) and ground (-V) wires to the output terminal block [Figure D4].

Fig. D4 **Power Supply Output Terminal Block**



12. At the turnstile, using the supplied connectors, connect the 24VDC and GND wires to the power terminal block as shown in [Figure D5].
13. Repeat Steps 9 - 12 for additional power supplies and turnstiles.

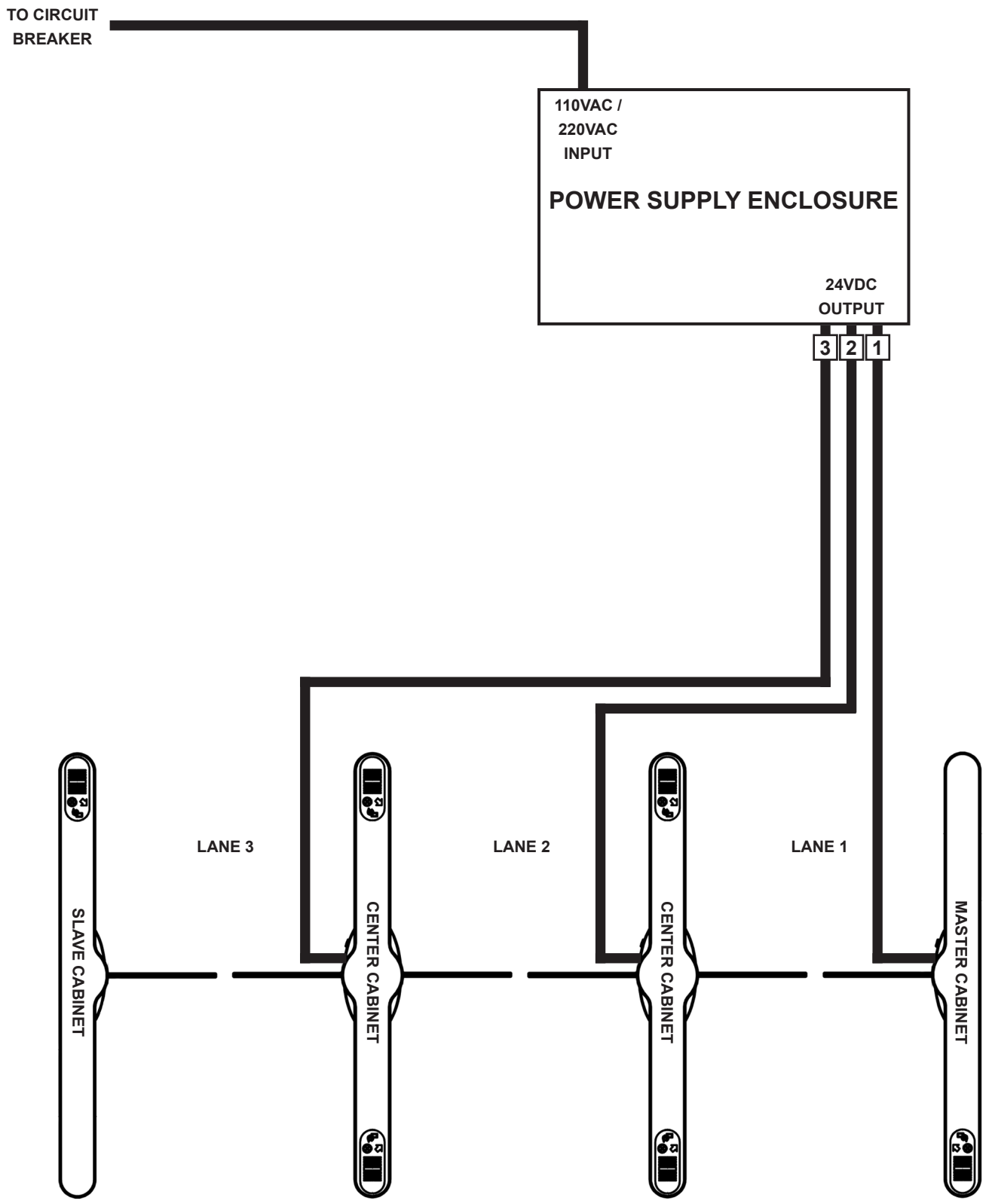
Fig. D5 **Turnstile Power Terminal Block**



Return to Crossover Cable Connection section located on Page 16 to continue the installation.

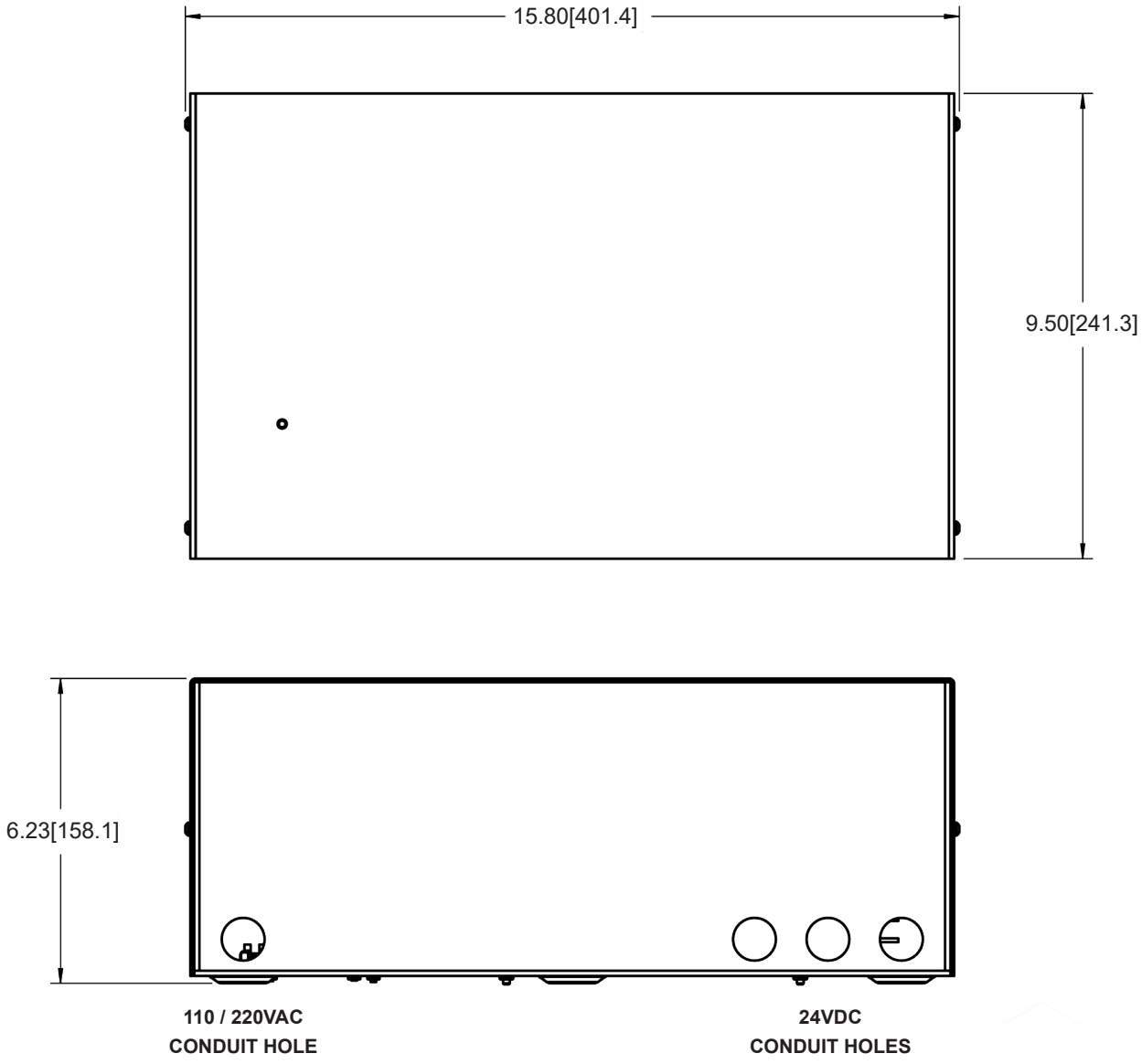
External DC Power Supply Connection Diagram

Fig. D6 **Connection Diagram**



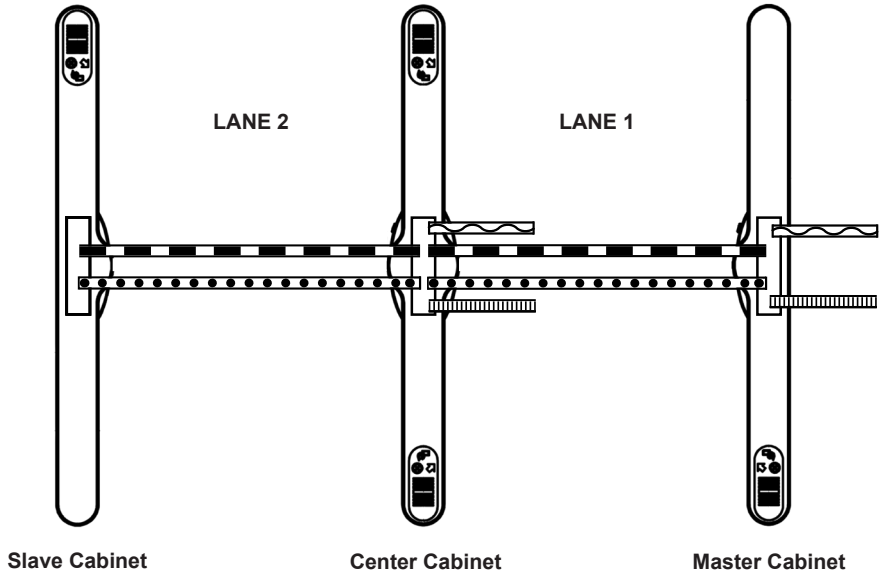
Power Supply Enclosure Dimensions

Fig. D7 **Dimensions**

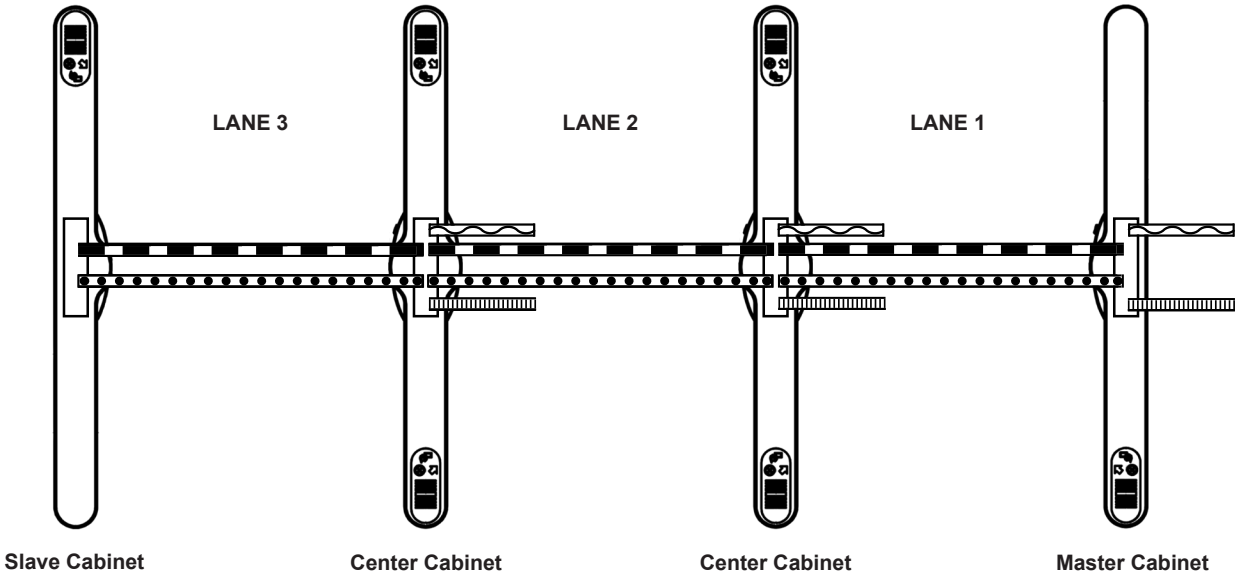


Appendix E - Multi-Lane Conduit Requirements

Two-Lane Configuration



Three-Lane Configuration

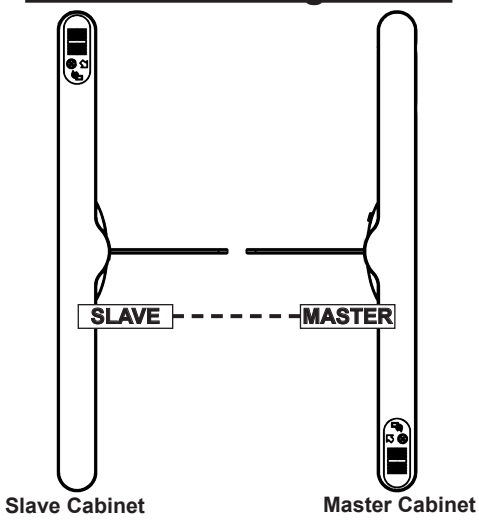


Symbology	Description	Conduit Size
	Primary Power**	3/4”
	Access Control / Ethernet	3/4”
	Access Control	3/4”
	Crossover Cable	1.5”

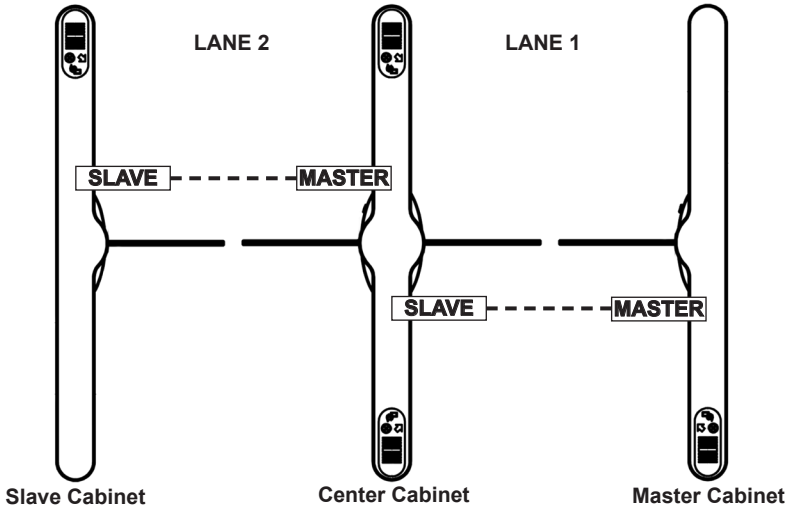
****If the External DC Power Supply option was ordered, use this conduit to route 24VDC.**

Appendix F - Crossover Cable Connection Diagrams

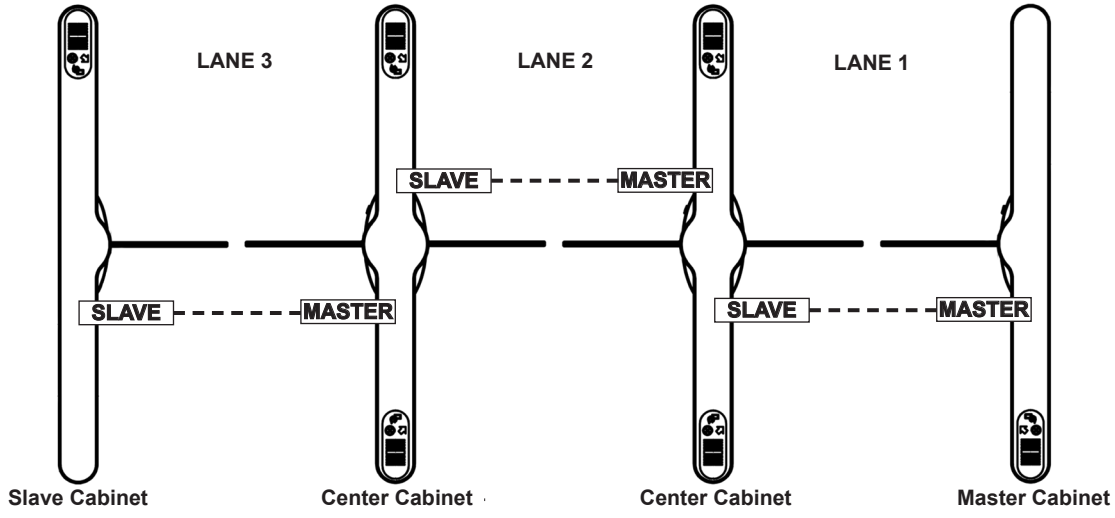
One-Lane Configuration



Two-Lane Configuration



Three-Lane Configuration



Revision History

Revision	Date	Author	Description
1-0	07/14/14	A. Flores	Initial creation. Replaces *SU5000 Installation and Operation Instructions (PUD3297R2-6).*
1-1	10/29/14	A. Flores	Added Baseplate installation instructions.
1-2	04/30/15	A. Flores	Added instructions for leveling cabinets and checking barriers for straightness.
1-3	06/09/15	A. Flores	Added Appendix D - External DC Power Supply Installation Instructions, and Appendix E - Multi-Lane Conduit Requirements.
1-4	11/13/15	A. Flores	Updated standard crossover cable length to 8'. Added Appendix F - Crossover Cable Connection Diagrams.
1-5	03/24/16	A. Flores	UL 2593 and CSA C22.2 #247 Certifcations
1-6	08/25/16	A. Flores	Updated imager specifications for Barcode Reader Requirements. Removed UL 325 Listing.
1-7	12/12/17	C.Maynez	Updated Baseplate images.
1-8	1/8/19	C.Maynez	Updated IO Terminal Listing, Removed Brake Shim section, correct page number call outs, and included Crossover cable warning and 13' length option.

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