

**ARCHITECTURAL SPECIFICATION**

**MST-6X Full Height Bi-Directional Security Turnstile**

*(NOTE TO SPECIFIER: Select product model depending on desired finish)*

**AVAILABLE FINISHES**

**MST-6XSS – Stainless Steel**

**MST-6XGL – Galvanized Finish**

**MST-6XPF – Powder Coat Finish**

**SECTION 11 14 00 – Pedestrian Control Equipment**

**SECTION 28 10 00 – Electronic Access Control and Intrusion Detection**

**PART I – GENERAL**

**1.01 SECTION INCLUDES**

- A. This section covers the furnishing and installation of a single rotating section, electrically controlled, full height security turnstile.
- B. For further information, contact Alvarado at +1 909.591.8431, or email [information@alvaradomfg.com](mailto:information@alvaradomfg.com).

**1.02 REFERENCES**

- A. L.A. Testing Laboratories, per UL325.
- B. CE marked in accordance with appropriate European Directives

**1.03 QUALITY ASSURANCE**

- A. Manufacturer shall be a company specializing in the manufacture of full height security turnstiles for a minimum of 10 years.
- B. Installer shall have at least one year of experience installing security turnstiles, or shall supply a factory representative during installation of the product.

**1.04 SUBMITTALS**

- A. Submit manufacturer's descriptive literature for specified equipment, including options.
- B. Provide, upon request, site specific drawings showing product placement.
- C. Provide installation and operation manuals.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to job site in manufacturer's packaging undamaged, complete with installation instructions.
- B. Store off ground, under cover, protected from weather, construction activities and debris.
- C. Use forklift, pallet jack or equivalent equipment for moving.

**1.06 PROJECT/SITE CONDITIONS**

Install on a level concrete pad.

**1.07 WARRANTY**

Alvarado warrants its products against defects in material and workmanship for a period of one (1) year from the date of invoicing. The warranty covers defects in materials and workmanship. Obtain full warranty terms from Alvarado.

## **PART II – PRODUCTS**

### **2.01 MANUFACTURER**

Alvarado Mfg. Co., Inc. 12660 Colony Street, Chino, CA 91710.

### **2.02 PRODUCT**

MST-6X Full Height Security Turnstile, no substitutions.

### **2.03 CONSTRUCTION**

#### **A. Top Channel:**

1. The top channel frame shall be a 7" wide U-frame fabricated from 4-gauge steel, powder-coated in a zinc rich powder coat.
2. The top channel cover system shall slide apart horizontally, providing access to the interior of the top channel without having to lift the cover vertically when opening. The top channel cover shall be fabricated from 16-gauge, #304 stainless steel, regardless of turnstile finish.

#### **B. Yoke (Curved Section):**

1. The yoke (curved section) shall be an all welded single assembly, not multiple assemblies bolted together. It shall consist of 10 pieces of vertically aligned 1 3/4" OD 16-gauge steel tubing notched and welded to two curved, horizontal tubes. Two 3/16" x 1" steel straps shall be welded to the outside of the ten tubes for support. No external fasteners shall be used in the fabrication of the yoke section.
2. Two card reader plate receivers shall be welded to either side of the yoke.

#### **C. Roto (Rotating Section):**

1. The roto (rotating section) shall be an all welded single assembly, not multiple assemblies bolted together. It shall consist of three vertical groupings of arms, with each arm notched and welded vertically to a vertical 3" x 3/16" wall tube. Each grouping of arms shall be positioned 120 degrees apart from one another and shall consist of 13 arms (39 total arms per roto). Each arm shall be 14-gauge, 1 3/4" OD steel tubing. Arms shall have either welded metal caps (powder coated or stainless steel models) or ribbed, force-fit plastic caps (galvanized models). No external fasteners shall be used in the fabrication of the roto section.

#### **D. Bottom Bearing Assembly:**

1. The bottom bearing assembly shall consist of a sealed inter-ring bearing, a bearing shaft which fits into the underside of the roto, and bottom bearing housing and cover.

#### **E. OV (Barrier)**

1. The OV (barrier section) shall be an all welded single assembly which prevents passage in the reverse direction. It shall consist of 13 arms notched and then welded to a 3" OD x 3/16" wall steel vertical tube. The arms shall be constructed from 1 3/4" OD x 14-gauge #304 steel tubing. Arms shall have either welded metal caps (powder coated or stainless steel models) or ribbed, force-fit plastic caps (galvanized models). No external fasteners shall be used in the fabrication of the OV section.

#### **F. Yoke Guard Plate**

1. The yoke guard plate is a single piece of 16-gauge steel that bolts to the underside of the top channel assembly and the top of the yoke.

### **2.04 EQUIPMENT**

- A. General: The turnstile shall provide electric lock control in both directions. Upon receipt of an authorization signal from an access control system or a push button device, the roto will unlock and allow a single user to pass through the turnstile in the direction requested. The turnstile will reset after the user has passed through the turnstile or within 20 seconds if passage does not occur.

#### **B. Mechanical Operation:**

1. Roto / Top Channel Connection: The connection between the roto and the top channel shall be accomplished through the use of a multiple grooved splined shaft and coupling.
2. Turnstile Locking / Unlocking: A solenoid/spring assembly shall move the lock arms into the "locked" or "unlocked" position. Each lock arm shall be controlled independently to allow bi-directional control.
3. Top Bearings: The top bearings shall be fully concealed from view by a cover fabricated from #304 stainless steel material.

4. Self-Adjusting Speed Control / Self-Centering: The turnstile shall have self-adjusting speed control which automatically increases or decreases resistance depending on the pushing force of the user. The turnstile shall also self-center, automatically returning to the "home" position after rotation. Self-centering shall be controlled. When lock arms are disengaged, the turnstile shall rotate only once when the roto is spun with force. A roto that self-centers through spinning and settling is not acceptable.

C. Electrical Operation:

1. The turnstile top channel shall contain a fused junction box into which the installer wires primary power (110VAC or optional 220VAC).
2. The power junction box shall contain an on/off switch. When the switch is in the "on" position, a green LED shall illuminate on the turnstile controller.
3. A UL-rated transformer shall be joined to the junction box and shall step down the primary power to low voltage, 12VDC operation.
4. The turnstile shall be fail-lock in the entry direction, and fail-safe in the exit direction.
5. Solenoids shall be continuous-duty rated and shall be activated using a firing current of 12VDC and held in place using a lower holding current of approximately 6VDC. The purpose of the lowered holding current is to reduce overall power consumption of the turnstile and to lengthen the life of the solenoids.
6. The turnstile shall have key overrides allowing the operating technician to override the access control system and unlock one or both directions of the turnstile. Key overrides to be installed in the bottom of the top channel, one for each direction of operation.
7. Electrical operation of the turnstile shall be tested and approved by Los Angeles Testing Laboratories.

D. Turnstile Control:

1. The turnstile shall have a microprocessor-based turnstile controller which shall be conformal coated to provide protection against environmental damage.
2. All inputs and outputs of the controller shall be opto-isolated to provide significant protection from power surges, electrical noise, ground loops, and damage from remote lightning strikes.
3. The turnstile shall accept a momentary dry contact activation signal of 1 second or less.
4. Once the turnstile is activated (unlocked) the user is allowed a defined time to pass through the turnstile after activation, before the turnstile automatically relocks. The turnstile shall ship with a default setting of 20 seconds. Additional settings of 5, 10 and 15 seconds shall be user selectable through dip switch settings on the turnstile controller.
5. When a rotation of the turnstile occurs, rotation shall be detected by an electrical opto-interrupter. No mechanical microswitches shall be used in the operation of the turnstile.
6. Upon rotation, the turnstile shall provide a momentary dry contact output to signify a rotation has occurred. The dry contact is provided as a "feedback" signal that a passage has occurred. One output per rotation direction.
7. The turnstile shall have two solenoids, one per direction of operation.
8. In the event the turnstile needs to be converted from fail-safe to fail-lock, or vice versa, it shall be possible to convert the turnstile from fail-safe to fail-lock and vice versa without removing the top channel.
9. The turnstile shall have two test buttons, one per direction of rotation, that simulate the control system interface signal. The purpose of the test buttons is to provide the installer a simple method of troubleshooting by isolating turnstile functionality from the activation system.
10. It shall be possible to maintain either rotation direction in a continuous unlocked state through the application of a sustained dry contact that is independent from the standard "unlock" activation signal.

## 2.05 SECURITY EQUIPMENT

- A. Reader or Activation Device Integration: Card readers or activation devices are to be installed in the field by installer on card reader mounting plates provided by the turnstile manufacturer. Readers and installation are not part of the product.

## 2.06 FINISHES

*(NOTE TO SPECIFIER: Select the finish desired)*

- A. Stainless Steel (Model MST-6XSS): All exterior components, including top and bottom bearing covers are to be fabricated from #304 stainless steel material, polished to a satin (#4) finish.

- B. Hot-Dip Galvanized (Model MST-6XGL): All exterior components, except the top channel cover and top and bottom bearing covers (which are #304 stainless steel) are hot-dip galvanized to ASTM Standard A 123/A 123M-02.
- C. Powder Coat (Model MST-6XPF): All exterior components, including top and bottom bearing covers are painted in a powder coat color specified by the project requirements.
- D. Powder Coat over Galvanized or Powder Coat over Stainless Steel: All exterior components, including top and bottom bearing covers are painted in a powder coat color specified by the project requirements.

## 2.07 OPTIONS

*(NOTE TO SPECIFIER: The following options are available - delete or use the following as desired)*

- A. User Notification Activation Lights (JS-3 Lights): An LED array in a weatherized housing is located on the turnstile yoke slightly above and behind the card reader plated receiver area. The JS-3 option allows the user to select, via a jumper on the turnstile control board, one of two signal arrays: red / green or yellow / green / red. The two available methods of operation are:
  - 1. Two-Light Operation
    - a. Red Light – Normal “ready” state; indicates the turnstile is locked and ready for card presentation.
    - b. Green Light – Illuminates when the access control system provides the turnstile controller an “authorized” input. When the green light illuminates, the turnstile will unlock and remain unlocked until user passage, or the time for passage expires.
  - 2. Three-Light Operation
    - a. Yellow Light – Normal “ready” state; indicates the turnstile is locked and ready for card presentation.
    - b. Green Light – Illuminates when the access control system provides the turnstile controller an “authorized” input. When the green light illuminates, the turnstile will unlock and remain unlocked until user passage, or the time for passage expires.
    - c. Red Light – Indicates the access control system provides the turnstile controller an “unauthorized” input. The turnstile remains locked.
- B. Open/Closed Status Lights: Highly visible red/green lights are flush installed in the turnstile top channel in the controlled directions. The turnstile provide an interface, in the form of a sustained dry contact, that allows a third party device or system to notify the turnstile when the turnstile is either "open" (available or use) or "closed" (will not accept an activation signal). Operation of the lights is as follows:
  - 1. An illuminated green light indicates the turnstile is open for controlled operation or for free passage.
  - 2. An illuminated red light indicates that no passage will be allowed through the turnstile.
- C. Padded Heel/Arm Guards: Snug-fitting padded arm guards at pushing and / or heel level.
- D. Full Guard Plate: The standard guard plate is replaced with a guard plate that covers a larger area at the top of the turnstile.
- E. Out of Service Lock Bracket: Enables the turnstile to be secured with a padlock.
- F. Top Channel Stabilizer: Increases the rigidity between the OV and top channel assemblies.
- G. Computerized Counting: Each turnstile rotation outputs a count to GateWatch, Alvarado's Windows-based facility counting software program.
- H. Battery Backup: Trickle charge battery system installed in top channel to provide power to the turnstile in the event of primary power loss.
- I. Card Reader Attachment Plates: 6" x 6" card reader attachment plates allow the attachment of the majority of card readers used. Custom designed plates and enclosures are available – contact Alvarado.
- J. Reader Plate Receiver Cover: A small aluminum plate is used to cover an unused reader plate receiver.
- K. Fail-Safe / Fail-Safe Operation: Both sides of the turnstile will unlock upon loss of power and provide free passage on both directions.

- L. Fail-Lock / Fail-Lock Operation: Both sides of the turnstile remain locked upon loss of power. Key overrides (which are standard) can still be used to unlock the turnstile.
- M. 220VAC: A 220VAC, 50 – 60 Hz transformer is substituted for standard 110VAC transformer.
- N. RKO-3 (Remote Turnstile Mode Key Switch): A loose three-position switch is provided that allows the turnstile to be placed in one of three operational modes: controlled passage mode, free passage mode, no passage mode. A key switch is required for each direction of operation.
- O. Push Button Assembly: Loose supplied or turnstile mounted stainless steel push button assembly unlocks the turnstile for single passage.
- P. Lock Arm Monitor: Provides an output when either lock arm is engaged. Monitors required for each direction of operation.
- Q. Top Channel Cover Monitor: Provides an output when the top channel cover is removed.
- R. Serial Interface: The standard turnstile controller is substituted for a turnstile controller that accepts an RS-232 or RS-485 serial communication activation signal. Contact Alvarado for additional information.
- S. Enhanced Environmental Protection: Additional protection measures are added to the top channel for harsh installation environments. Available options include:
  - 1. Sealed top channel.
  - 2. Sealed top channel; enclosed turnstile controller.
  - 3. Sealed top channel; enclosed turnstile controller; heater installed in top channel.

## **2.08 FACTORY TESTING**

- A. Product shall be fully tested at the factory prior to shipment.
- B. Check all mechanical connections.
- C. Check all electrical connections.
- D. Provide factory burn in testing.
- E. Inspect product finish. Touch up prior to shipment.

## **PART III – EXECUTION**

### **3.01 SITE EXAMINATION**

- A. Inspection: Installer must examine the installation location and advise the Contractor of any site conditions inconsistent with proper installation of the product. Installation shall not begin until unacceptable conditions are rectified. These conditions include but are not limited to the following:
  - 1. Turnstile must be installed on a level concrete pad.
  - 2. Primary power must be installed prior to turnstile installation.
  - 3. Power and control wiring to come from the ground through conduit stub up locations per manufacturer direction, or via alternative methods if manufacturer is contacted and approves.
- B. Installation: Install turnstiles in accordance with manufacturer's instructions.
- C. Adjustment: Installer shall adjust turnstiles for proper performance after installation.
- D. Instruction: A factory trained installer shall demonstrate to the owner's maintenance crew, or designated representative, the proper operation and the necessary service requirements of the equipment, including exterior maintenance.
- E. Cleaning: Clean turnstile and area carefully after installation to remove excess caulk, dirt and labels.

**Note: Alvarado Mfg. Co., Inc. reserves the right to change this specification at any time without notice.**