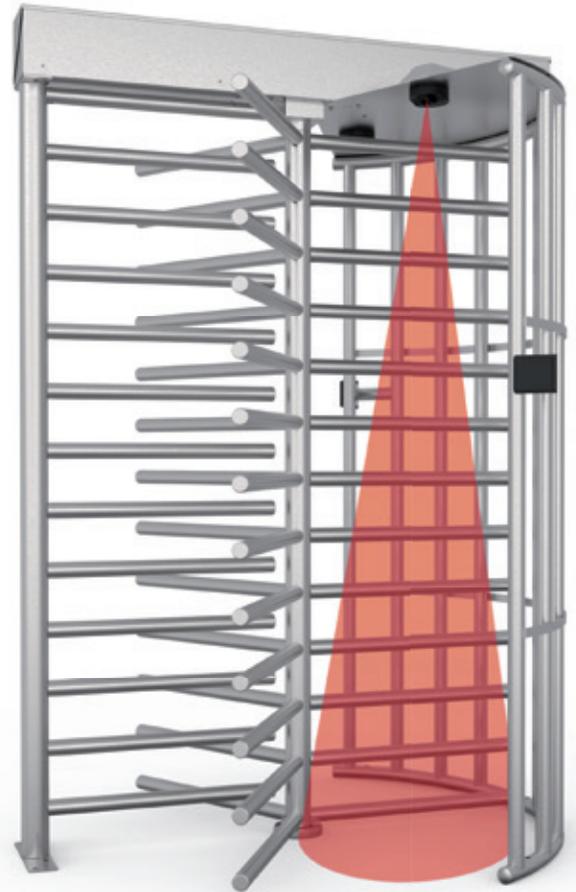


# MST-TE

## TOUCHLESS FULL HEIGHT TURNSTILE

The MST-TE is a motorized full height turnstile providing true touchless operation for employees and guests. The MST-TE integrates with any access control system and offers key features and benefits available only from the world's leading full height turnstile manufacturer.



### COMMON APPLICATIONS

- Touchless Employee Entry
- Perimeter Control/Fence Line Security
- Time and Attendance Integration
- Loss Prevention
- Employee and Visitor Access Control
- Unmanned Point of Entry
- Single Direction Control and/or One-Way Exiting

### TYPICAL INSTALLATION SITES

- Military Installations
- Refineries and Power Distribution Centers
- Ports, Harbors and Airports
- Construction Sites
- Correctional Institutions
- Manufacturing and Distribution Centers
- Stadiums, Parks and Amusement Facilities

## FUNCTION

MST-TE turnstiles provide bi-directional access control or controlled entry and free exit modes of operation. In controlled passage mode, the receipt of a valid signal from an access control system enables a touchless sensor. The enabling of the sensor allows the authorized user to enter the turnstile, starting a motorized movement of the rotating section. At the conclusion of the rotation, the user exits the passageway and the rotating section smoothly relocks for the next user. In free exit mode, a user simply enters the turnstile to start the touchless rotation.

During the rotation process, if the rotating section encounters an obstruction in the rotating path, the MST-TE's closed loop motor control detects the obstruction and minimizes impact.

The turnstile includes touchless sensors on both the entry and exit sides to enable complete hands-free operation. Through a simple wiring change, however, the turnstile can also be configured to operate without the touch free sensors.

The turnstile has various user modifiable features, as described in this document. These features can be configured via dip switches on the turnstile control board.

## AVAILABLE CONFIGURATIONS

### MST-6XTE

Provides separate electric lock control for each rotation direction. Includes key locks on the underside of the turnstile top channel to configure the turnstile to provide free passage in both directions; free passage in one direction and restricted passage (locked) in the opposite direction or restricted passage (locked) in both directions.

## AVAILABLE FINISHES

### GALVANIZED

All exterior steel materials are hot-dip galvanized to ASTM Standards A123/A153. Galvanized units, like all Alvarado MSTs, have stainless steel top channel covers.

### POWDER COATED

All exterior steel materials are powder coated. Powder coating is available in a variety of colors.

### STAINLESS STEEL

All external materials are fabricated from #304 stainless steel polished to a #4 satin finish. Exterior welds are electro-polished.

### POWDER COATED OVER GALVANIZED OR STAINLESS STEEL

External galvanized or stainless steel materials are powder coated. Powder coating is available in a variety of colors.

## MATERIALS

### TOP CHANNEL

The exterior housing is fabricated from 16-gauge #304 stainless steel, regardless of finish. The interior top channel frame is a 7" wide U-frame fabricated from 4-gauge powder coated steel. The top channel houses the control mechanism, motor assembly and electrical components.

### YOKE GUARD PLATE (COVER)

A 16-gauge steel (or #304 stainless steel) sheet securely fastens to the top channel and yoke.

### YOKE (CURVED SECTION)

The yoke is a fully welded single assembly consisting of 10 vertical tubes notched and welded to two upper and lower horizontal tubes. Two 3/16" x 1" steel straps are welded to the vertical tubes for support. Vertical tubes and upper and lower horizontal tubes are 1.75" OD x 16-gauge steel (or #304 stainless steel) tubing. The Yoke includes card reader plate receivers welded to the outside vertical yoke tube. Card reader attachment plates mount to the receivers to allow easy attachment of access control readers to the turnstile.

### ROTO (ROTATING SECTION)

The roto is a fully welded single assembly consisting of 13 arms per section (total of 39 arms per roto) notched and welded to a vertical tube. Arms are 1.75" OD x 14-gauge steel (or 16-gauge #304 stainless steel) tubing. Arms have either a welded metal cap (powder coated or stainless steel models) or a ribbed, force-fit plastic cap (galvanized models). The vertical tube is 3" OD x 6-gauge steel (or #304 stainless steel) tubing. No external fasteners are used in the construction of the roto.

### OV (BARRIER SECTION)

The OV is a fully welded single assembly consisting of 13 arms notched and welded to a vertical tube. Arms are 1.75" OD x 14-gauge steel (or 16-gauge #304 stainless steel) tubing. The vertical tube is 3" OD x 6-gauge steel (or #304 stainless steel) tubing. Arms have either a welded metal cap (powder coated or stainless steel models) or a ribbed, force fit plastic cap (galvanized models). No external fasteners are used in the construction of the OV.

## CONTROLS, OPERATIONAL MODES AND FUNCTIONALITY

### CONTROL MECHANISMS

#### Turnstile Control Board (TCB)

The turnstile control board (TCB) is a controller that controls activation and turnstile functions. Activation for either direction of operation is achieved by supplying a momentary dry contact to the TCB. Terminal strips on the board provide access to the available I/O. Communication between the turnstile and access control system is in the form of dry contact inputs and outputs.

## DESCRIPTIVE SPECIFICATION MST-TE FULL HEIGHT TURNSTILE

<b>Power Supply</b>	A UL listed, weatherized, power supply located in the turnstile top channel provides appropriate low voltage power to the TCB.
<b>Motor Assembly</b>	Movement of the rotating section is accomplished via brushless DC motor assembly working in conjunction with a digital position encoder and the TCB.
<b>Cam Shaft Assembly (Splined Connection)</b>	The cam and shaft assembly in the top channel consists of a stainless steel, investment cast lobed cam welded to a splined shaft. The splined shaft fits into a reciprocal splined coupling in the top of the roto, creating a solid non-slip connection that ensures very precise movement and reduces mechanism wear. The design makes it mechanically impossible to improperly install the roto.
<b>Enclosed Bearing Assemblies</b>	The cam and shaft assembly housed in the top channel rotates in a bearing assembly consisting of two outdoor-rated precision bearings. The upper visible bearing is protected by a sheet metal cover. The roto is installed on an outdoor-rated lower bearing assembly also protected by a sheet metal cover.
<b>Card Reader Plate Receivers</b>	Card reader plate receivers are welded on both the entry and exit sides of the yoke. Optional card reader attachment plates attach to the receivers to allow easy attachment of access control devices to the turnstile. Feeder wires are provided to simplify the process of running cable through the turnstile yoke up into the turnstile top channel.
<b>Rotation Activation Sensors</b>	Activation sensors are strategically located underneath both sides of the guard plate to facilitate touchless rotating section activation.

### PASSAGE MODES

Electrically controlled touchless turnstiles offer the following user configurable passage modes:

<b>Controlled Passage</b>	The roto is locked in place in the home position. Upon receipt of an authorization signal from an access control system, the user enters the turnstile and is detected by the overhead sensor, activating rotation without contact and allowing a single passage in the authorized direction. As the user exits, the rotating section returns to the closed or home position and relocks, ready for the next passage. Controlled passage can be in either or both rotation directions.
<b>Free Passage</b>	An authorization signal is not required for a user to pass through the turnstile. The user enters the turnstile and is detected by the overhead sensor, activating rotation without contact and allowing a single passage in the authorized direction. Either rotation direction can be set to free passage using the key locks located on the underside of the top channel.
<b>No Passage</b>	No passage is allowed. The roto is locked in place. Valid electronic credentials are ignored.
<b>Remote Passage Mode Configuration</b>	The above passage modes can be controlled remotely through inputs on the TCB. The access control system uses these inputs to set the desired mode. Alvarado also offers an optional 3-position key switch (Remote Turnstile Mode Key Switch Option) that is field wired into the TCB. Turning the key to one of three positions places the turnstile in Controlled Passage mode, Free Passage mode or No Passage mode. A separate key switch is required for each rotation direction.

# DESCRIPTIVE SPECIFICATION MST-TE FULL HEIGHT TURNSTILE

## FUNCTIONALITY - OTHER FEATURES AND TOOLS

Operational Configuration	The standard electric lock configuration is fail-lock (CCW)/fail-safe (CW). Other configurations are available including fail-lock in both directions or fail-safe in both directions.
Field Configuration Changes	Our turnstile design makes it very easy to change configurations in the field. Competitor turnstiles require removing and returning the entire top channel to the factory for configuration changes.
Automatic Turnstile Relock	This feature adjusts the time a user may pass through the turnstile after an activation (unlock) signal has been received. The default setting is 20 seconds before the turnstile automatically relocks. Additional settings are 5, 10 and 15 seconds.
Independent Turnstile Testing	The turnstile control board includes test activation buttons which allow the unlocking function to be tested independent of the access control system. This is an excellent tool for troubleshooting.
Junction Box	The UL Listed power supply in the turnstile top channel is wired into a fused junction box.

## CARD READERS / PHYSICAL ACCESS DEVICES

Electrically controlled models come with card reader plate receivers welded to the outside vertical yoke tube. Alvarado offers optional card reader attachment plates that attach to the receivers. The card reader/physical access devices attach directly to the card reader attachment plates. Feeder wires are provided to simplify the process of running cable through the turnstile yoke up into the turnstile top channel.

Alvarado can also custom fabricate large plates and enclosures that are welded to the turnstile yoke to accommodate large devices or custom applications.

## TURNSTILE INTERFACE TO ACCESS CONTROL SYSTEM

A dry contact allows an access control system to operate with the turnstile:

Dry Contact	Single passage activation is achieved by supplying an isolated, voltage-free, momentary dry contact of 1 second or less to the appropriate location on the turnstile control board. An output is provided when the turnstile is rotated. A description of available input and output signals is provided below.
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A description of the available input and output signals (dry contacts) from the turnstile control board are provided below:

Input Signal	Entry / Exit
Passage Direction Closed	√
Passage Direction Open	√
Good Card (Single Activation)	√
Bad Card (Used with JS3 Light Option)	√
Fire Alarm / Life Safety	√

Output Signal	Entry / Exit
Rotational Signal	√

## OPTIONS

### 220VAC

Turnstiles are provided with a 220-240 VAC, 50 Hz power supply and EU wiring scheme.

### BATTERY BACKUP

A trickle charge battery system is installed in the top channel to provide limited duration operation if primary power to the turnstile is lost.

### 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 for more information.

### CHANNEL COVER MONITOR

Provides an output when the top channel cover is removed.

### ENHANCED ENVIRONMENTAL PROTECTION

Additional protection measures are available for installation in harsh environments. These include additional sealing and heating inside the top channel. Contact Alvarado for more information.

### EXPEDITED MANUFACTURING TIMES

Expedited manufacturing times are available. Contact Alvarado for more information.

### FAIL-LOCK / FAIL-LOCK OPERATION

Both sides of the turnstile will remain locked upon loss of power. Key overrides (which are standard) can still be used to unlock the turnstile. The MST-6XTE unit is supplied in a fail-lock (entry)/fail-safe (exit) mode as default.

### FAIL-SAFE / FAIL-SAFE OPERATION

Both sides of the turnstile will unlock upon loss of power and provide free passage in both directions. The MST-6XTE unit is supplied in a fail-lock (entry)/fail-safe (exit) mode as default.

### LOCK ARM MONITOR

Provides an output when either lock arm is engaged. Monitors are required for each direction of operation.

### OPEN / CLOSED STATUS LIGHTS

Highly visible red/green lights are flush installed in the turnstile top channel in the controlled directions. An illuminated green light indicates the turnstile is open for controlled operation or free passage. An illuminated red light indicates that no passage will be allowed through the turnstile. This option is often used in conjunction with the Turnstile Mode Key Switch (option RKO-3). The lights can also be controlled through most access control systems.

## OPTIONS (CONT.)

### OUT OF SERVICE LOCK BRACKET

Enables the turnstile to be secured with a padlock when the turnstile is out of service.

### READER PLATE RECEIVER COVER

A small aluminum plate used to cover an unused reader plate receiver.

### RKO-3 (REMOTE TURNSTILE MODE KEY SWITCH)

A 3-position key switch is provided that allows the turnstile to be placed in one of three operational modes. A key switch is required for each direction of operation:

<b>Controlled Passage</b>	The roto is locked in place in the home position. Upon receipt of an authorization signal from an access control system, the turnstile unlocks in the appropriate direction, allowing a single passage in the authorized direction. The roto returns to the closed position after the user has passed through the turnstile or the user defined time frame allowed for an entry to occur expires. Controlled passage can be either single direction or bi-directional.
<b>Free Passage</b>	An authorization signal is not required for a user to pass through the turnstile.
<b>No Passage</b>	No passage is allowed. The roto is locked in place. Valid electronic credentials are ignored.

### USER NOTIFICATION ACTIVATION LIGHTS (JS-3 LIGHTS)

Available for use with TE models, an LED array in a weatherized housing is located on the turnstile yoke slightly above and behind the card reader plate receiver area. The JS-3 option allows the user to select one of two signal arrays: red/green or yellow/green/red. The user selection is made via a jumper on the turnstile control board. The light arrays function in one of the following manners:

#### RED / GREEN SELECTION

<b>Red Light</b>	Normal "ready" state; indicates the turnstile is locked and ready for card presentation.
<b>Green Light</b>	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 the turnstile is rotated or the time for passage expires.

#### YELLOW / GREEN / RED SELECTION

<b>Yellow Light</b>	Normal "ready" state; indicates the turnstile is locked and ready for card presentation.
<b>Green Light</b>	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 the turnstile is rotated or the time for passage expires.
<b>Red Light</b>	Illuminates when the access control system provides an "unauthorized" input. The turnstile remains locked.

**SHIPPING AND SITE PREPARATION**

**SHIPPING**

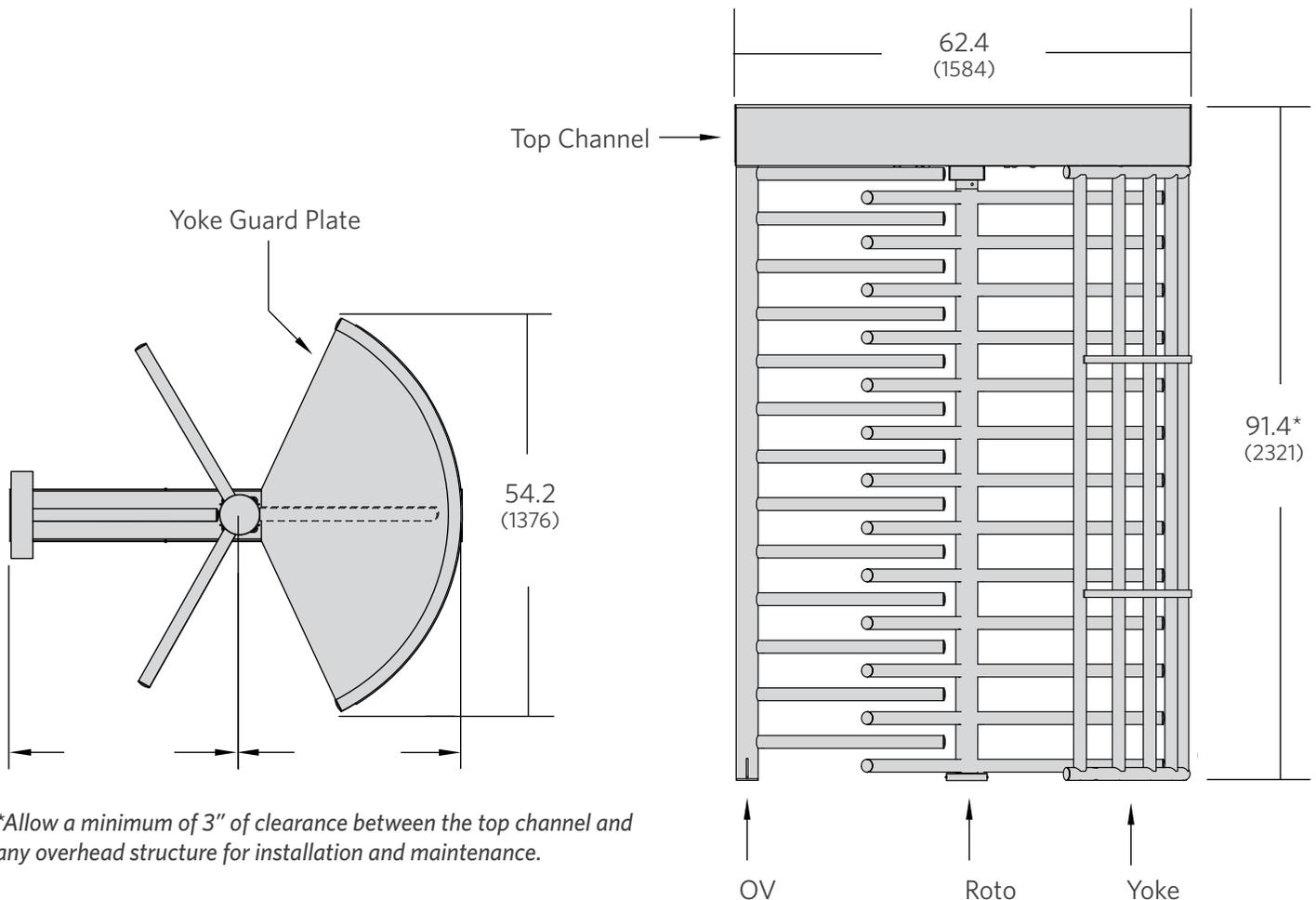
MST-TE turnstiles are shipped in five main sections: the top channel, the yoke, the roto, the OV and the yoke guard plate.

**SITE PREPARATION**

All turnstiles must be installed on a firm foundation in a manner that allows the required power and activation signal cabling to be pulled into the top channel. Optional conduit may be run through the OV base. The recommended slab platform is 72" square by 4" deep, level concrete. Concrete anchors, bolts and washers are included with each turnstile. Installation should be performed by a skilled installer following the manufacturer's directions and instructions. Detailed drawings and installation manuals are available online. For ease of installation and maintenance, a minimum 3" header clearance is recommended.

**TECHNICAL DIMENSIONS**

Dimensions are shown in inches (mm). All measurements are approximate.



*\*Allow a minimum of 3" of clearance between the top channel and any overhead structure for installation and maintenance.*

Electrical	Description	
UL Rated Transformer	110-120VAC, 60 Hz or 220-240VAC, 50 Hz (optional)	
Power Requirements	Maximum power consumption is 100W per turnstile with all available electrical options.	
Operational Voltage	Primary power is stepped down and rectified for low voltage 12VDC/5VDC operation.	
On/Off Switch	An on/off switch is located on each power junction box inside the MST-TE top channel. A visible green LED is illuminated on the TCB when the power is "on".	
Surge Protection	The TCB uses Transient Voltage Suppressor (TVS) devices to provide superior lightning and surge protection. The TCB is rated to 500A (6kV) for lightning and industrial surges (per IEC 61000-4-5). Protection against ESD is provided (per IEC 61000-4-4). Control signal lines are protected by bi-directional TVS devices up to 600W per input.	
Turnstile Control Board (TCB) Weatherization	The TCB is conformal coated to protect electronic circuitry from environmental damage.	
Bi-Directional Solenoid Drivers	Each TCB provides one solenoid driver per rotation direction.	
Ultrasonic Sensor	6.5ft detection range. Detection angle can be adjusted to initiate rotation earlier or later.	
Weights and Environmental		
Product Weight	550 lbs.	250 kg
Shipping Weight	750 lbs.	341 kg   Includes weight of shipping crate(s)
Operating temperature	-20° to 150° F	-29 to 66° C
Storage Temperature	-30° to 160° F	-34 to 71° C
Relative Humidity	0-90% (non-condensing)	--

**WARRANTY**

For a period of one year from the date of shipping, Alvarado will replace or repair, at Alvarado’s option, any products or parts which are defective in materials or workmanship, provided recommended installation and maintenance procedures are followed. This warranty is void if damage is due to improper installation, maintenance or use. This warranty is limited to parts only, and does not cover labor or shipping charges incurred in connection with the removal or replacement of warranted products or parts.

This warranty is expressly made in lieu of any and all other warranties, expressed or implied, including, but not limited to implied warranties of merchantability and fitness for a particular purpose. Alvarado shall not be liable for any loss or damage, directly or indirectly, arising from the use of purchased products. In no event shall Alvarado be liable to buyer for consequential damages, special damages, incidental damages, loss of use, business interruption, loss of profits, or damages of any kind arising out of the use or inability to use a purchased product. In NO event shall Alvarado be liable for damages which exceed the purchase price of a covered product.