

# DSI<sup>®</sup>

DESIGNED SECURITY, INC.

*A Detex Company*

## DSRD70 Security Revolving Door

Service & Installation Manual



*Note: Successful installation depends on reading this manual.*

**Important Note:** Please keep this service manual after installation. If an installation is done by a construction company or outside installer, please pass this book along to the end user.

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INS-DSRD70-210101

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Materials List for DSRD70

QTY	DESCRIPTION
1	ROTOR TREE ASSEMBLY
1	BOTTOM ROTOR FLANGE
1	BOTTOM ROTOR BEARING
5	STANDARD CAGE PANELS
1	SPECIAL CAGE PANEL WITH 3/4" PINS IN THE TOP & BOTTOM OF ONE EXTRUSION, THIS CAGE PANEL WILL BE USED AS THE SERVICE PANEL
9	3/4" X 90" SUPPORT RODS (THREADED BOTH ENDS) FOR CAGE PANELS
2	3/4" X 90" SUPPORT ROD HOLLOW (TREADED BOTH ENDS) FOR CAGE PANEL FOR ACCESS CONTROL CONDUIT
3	3/8" X 5" REMOVABLE BOLT TYPE FLAT HEAD PHILLIPS HEAD CONCRETE ANCHORS FOR BEARING FLANGE MOUNTING TO FLOOR
12	5/16 x 1/2" FLAT HEAD SCREWS TO SECURE DOOR VANES ONTO THE ROTOR
as needed	EPOXY GEL FOR ANCHORING RODS TO CONCRETE
1	CANOPY PLATE STEEL FRAME WITH ALUMINUM FACE
2	CANOPY WRAP 6" X 52 1/2" ALUMINUM (CUT TO FIT IN FIELD IF NECESSARY)
2	CANOPY WRAP 6" X 62 1/2" ALUMINUM (CUT TO FIT IN FIELD IF NECESSARY)
11	3/4" NUTS FOR THE TOP OF THE CAGE PANEL SUPPORT RODS
4	3/8" CONTROL HEAD NUTS
4	3/8" WASHERS FOR THE CONTROL HEAD
4	3/8" LOCK WASHERS FOR THE CONTROL HEAD
1	CONTROL HEAD PRECONFIGURED TO ORDER SPECIFICATIONS
1	EXTERNAL MOUNT HYDRAULIC SHOCK ABSORBER FOR CONTROL HEAD
4	5/16 x 3/4 BUTTON HEAD CAP SCREWS FOR EXTERNAL SHOCK MOUNTING
3	ROTOR COVER PANELS TO COVER ROTOR BETWEEN DOOR VANES
36	10 – 24 X 1/2" FLAT HEAD MACHINE SCREWS FOR ROTOR COVER PANELS
15	10 – 24 X 1/2" FLAT HEAD MACHINE SCREWS FOR CANOPY WRAP
3	ALUMINUM DOOR PANELS CONSTRUCTED WITH GLASS WINDOWS AND STAINLESS STEEL PUSH BAR HANDLES
3	CANOPY LIGHTS WITH LENS AND FASTENERS
1	ULTRASONIC SENSOR USED AS WRONG WAY SENSOR
1	LOOP RECORDER TO PLAY MESSAGE IN CASE OF WRONG WAY PASSAGE

## The DSRD70 Full-Height Turnstile • Interior Application

DSRD70

The DSRD70 Series is a stylish 3 vane revolving door type high security portal. It is designed for locations requiring improved visitor security or as the barrier between production and office areas. Instead of a traditional physical barrier to prevent passage in the wrong direction, the RD70 comes equipped with a high tech ultrasonic sensor. This sensor allows for a full door panel appearance while still enforcing standard turnstile passage flow.

### Measurements:

Exterior Height: 91"

Diameter: 72"

Pedestrian Clearance: 30"



Also available with  
integrated metal  
detection portal



# The DSRD70

DSRD70

## Full-Height Turnstile • Interior Application

### Applications:

The DSRD70 Series is a full security card access, tamper-resistant revolving door that's designed for locations requiring improved visitor security or as the barrier between production and office areas.

### Product Specifications:

#### Dimensions:

Exterior Height: 91"

Interior Height: 84"

Diameter: 72"

Pedestrian Clearance: 30"

#### Finish:

Standard anodized finish choices are clear and bronze. Other colors available upon request.

#### Construction:

##### Materials:

Various 6061 & 6063 extruded aluminum  
3/16" MR10 Lexan polycarbonate  
1/4" clear tempered glass  
7 & 11 gauge steel (mainframe/canopy)  
Anodized aluminum sheet, canopy wrap

##### Assembly and Hardware:

- All exposed fasteners stainless steel
- Canopy & outer cage panels secured to concrete with 3/4" threaded rods, epoxied into concrete
- Rotor pivots on a sealed load runner bearing, secured with stainless steel coupling anchored onto concrete
- Outer cage panels pre-assembled with concealed spring pins and solid rods
- Door panels and cosmetic covers secured with flat head screws

### Operation:

#### 6500 Series Control Head, featuring:

- Auto-indexing (self-centering) with adjustable hydraulic shock suppression
- Hardened tool steel locking bars, cam and roller assemblies
- Permanently lubricated bearings
- Nearly universal integration to any number of access control systems
- Your choice on each electronic direction of locking or unlocking on power failure

### RD70 Specific Features:

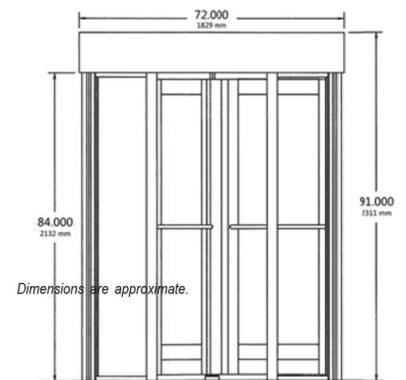
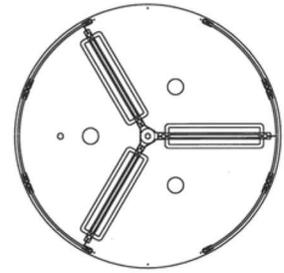
- Ultrasonic barrier detects if a presence enters the wrong area of the portal—and in that event, the turnstile will not allow the person to advance and will reverse allowing them only to exit thru the defined "unsecure" side.
- Audible message via loop recorder when ultrasonic sensor detects a presence
- Low voltage canopy lighting

### Options:

- Card reader mounting plates
- Daylight visible indicator lights
- 8 digit key resettable LCD counter with seven year lithium battery
- Metal detection portal
- Additional options available upon request

### Warranty:

Units are warranted against defects in materials and workmanship for a period of one year from date of delivery. See warranty information for specific details.



### Electrical Specifications:

Input Voltage: 100-240VAC Input  
Current: 1.3 - .55 A Frequency: 50/60 Hz

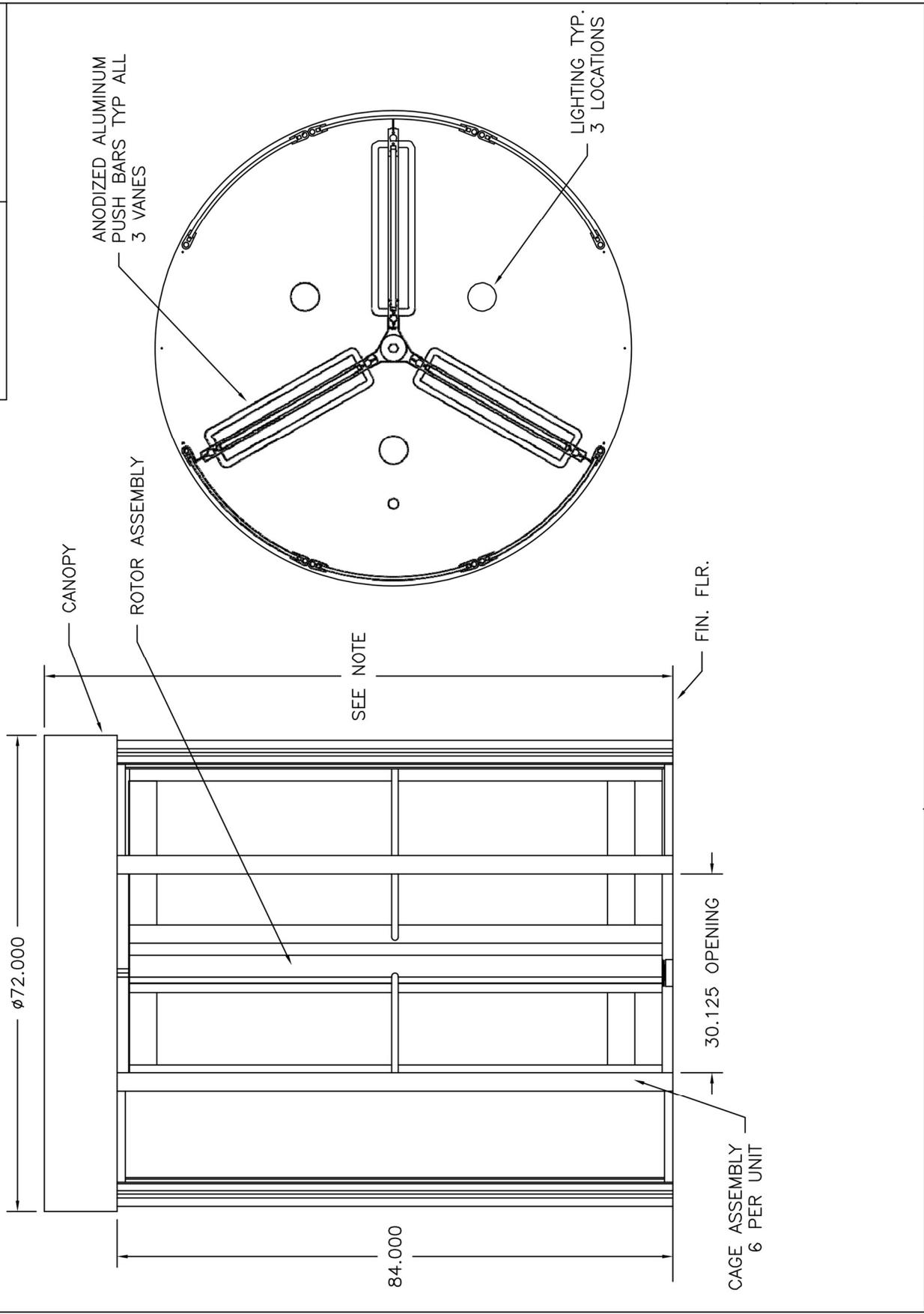
Storage Temperature: -4 to 158 °F

Operating Temperature: 32 to 122 °F Operating

Voltage: 24VDC

Operating Current: 1.2 A (typical)

DSRD70





## DSRD70 Theory of Operation

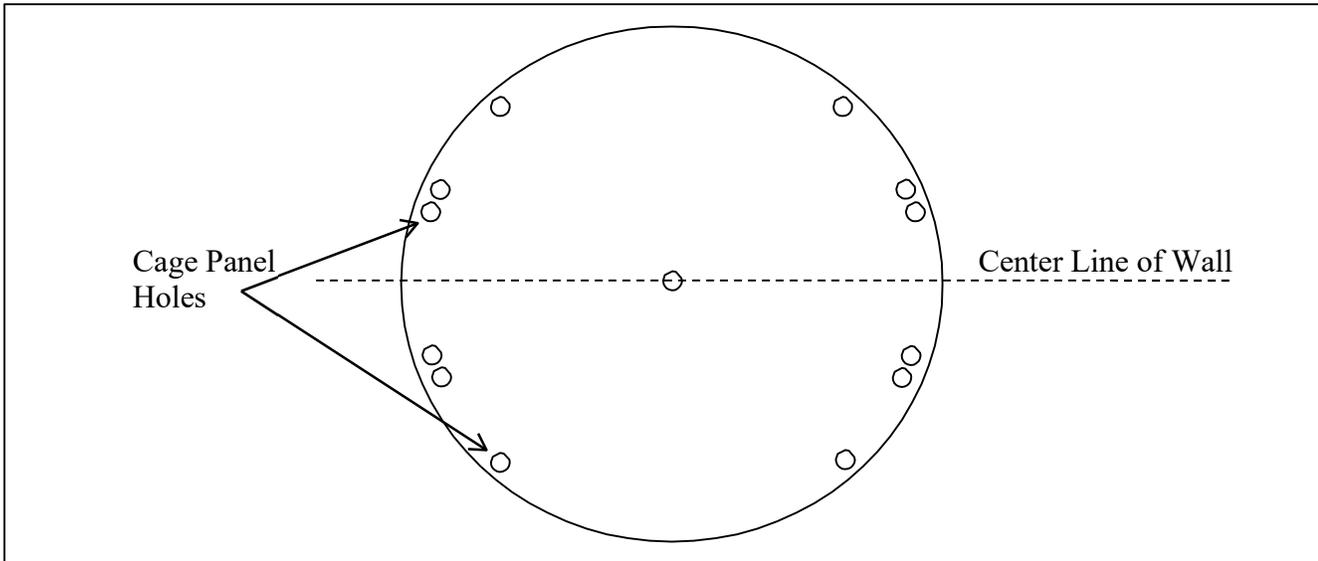
The DSRD70 security revolving door allows for an aesthetically pleasing solution to facility security. Unlike a traditional revolving door, the DSRD70 remains locked until access control is presented. After one user passes through, the DSRD70 will relock until another request to pass is presented. Traffic passes through on one side of the DSRD70 from both directions much like a traditional turnstile. However, an ultrasonic sensor exists within the canopy to act as a digital barrier to allow a full revolving door feel.

The DSRD70 can be configured for a multitude of functions. Upon loss of power, the door can be pre-configured in our factory to lock or unlock. One shot timers (which can be disabled if desired) come programmed directly into the control board. These one shot timers act as a buffer to prevent long signal lengths from card readers from allowing more than one person through on a single card swipe. An adjustable number of card swipes can be processed at a time, allowing for a quick flow of traffic through the unit. There is also an integrated fire alarm input which will unlock the DSRD70 in both directions until the alarm condition is finished. The previously mentioned digital barrier can be configured to back the turnstile up in either direction upon sensing, forcing the person in the wrong area of the turnstile back out into the unsecure side of the DSRD70. This sensor also has an adjustable sensing height as well as a time delay filter to ensure minimal false alarms.

# INSTALLATION INSTRUCTIONS FOR DSRD70 CARD ACCESS REVOLVING DOOR

## 1. PREPARATION

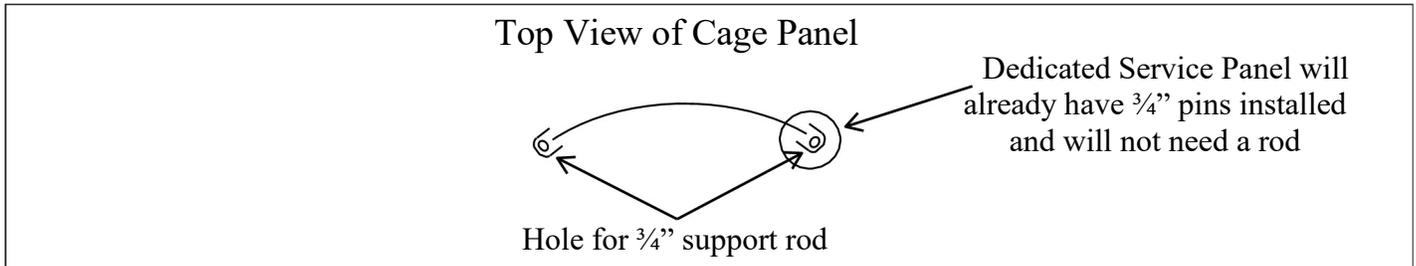
- 1.1 Put canopy plate on the ground where the turnstile will be installed.
- 1.2 Trace holes in canopy for cage rods as shown below.



- 1.3 Remove canopy and place aside for now
- 1.4 Drill twelve (12)  $\frac{7}{8}$ " holes to a depth of 4" for the cage panel anchors
- 1.5 Clean holes and remove all debris (use nylon brush if necessary)

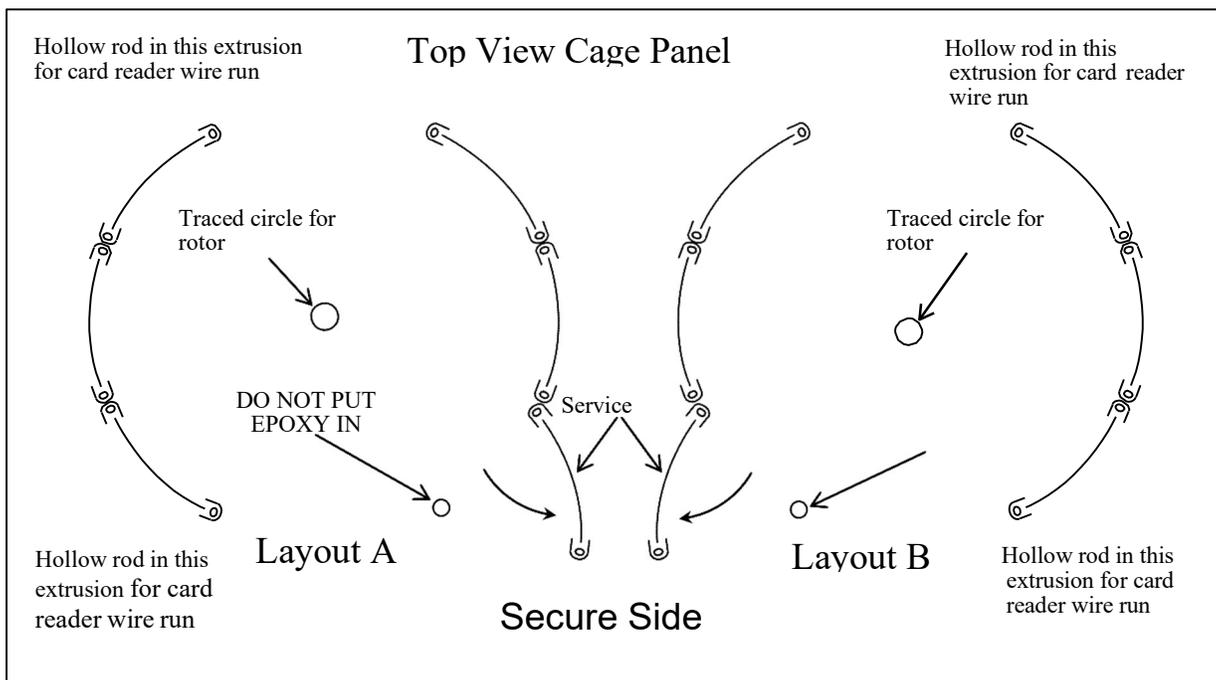
## 2. CAGE PANELS INSTALLATION

- 2.1 Place two (2) 3/4" X 90" rods (threaded on both ends) through the hole in the cage extrusions. One (1) panel for each turnstile will be dedicated as a service panel that will be able to swing out. Therefore the service panel will only have one rod because the other side already has 3/4" pins in the top and bottom. Each cage panel has two (2) extrusions, one on each end as shown below:



**CAUTION: DO NOT FILL THE 7/8" ANCHOR HOLE THAT IS FOR THE SERVICE PANEL WITH EPOXY ANCHORING GEL. ONE (1) PANEL WILL BE ABLE TO SWING OUT TO ALLOW THE ROTOR TO BE PLACED LATER**

- 2.2 Fill 11 of 12 7/8" anchor holes with Epoxy 1/2 full (not the service panel hole shown below (follow directions provided with epoxy anchoring gel)
- 2.3 There are six (6) cage panels for each turnstile, three (3) on each side as shown below. Each cage panel is made of two (2) extrusions. Two (2) extrusions total should be installed with hollow rods for card reader wiring access (if desired).



**CAUTION: BE SURE THAT THE HOLLOW RODS ARE USED IN THE CORRECT EXTRUSIONS**

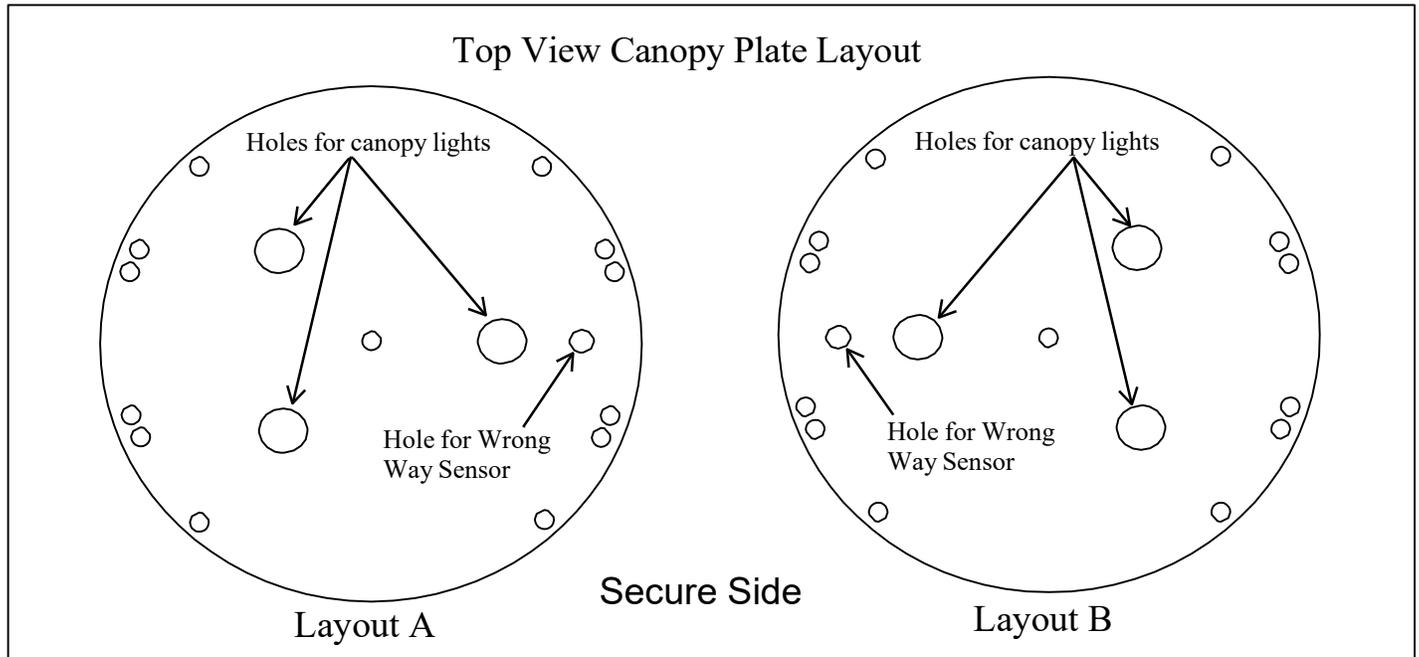
- 2.4 Move cage panels in place and allow the 3/4" cage panel support rods to drop into the anchor hole
- 2.5 Be sure to wipe up any epoxy that over flows as a result of the rod being placed in the hole

### 3. CANOPY INSTALLATION

3.1 Raise canopy plate above the cage panels

**CAUTION: BE SURE THAT THE CANOPY IS PLACED IN THE CORRECT ROTATION SO THAT THE HOLE FOR THE WRONG WAY SENSOR IS ABOVE THE CORRECT AREA. SEE BELOW FOR CANOPY ORIENTATION**

3.2 Line up correct holes with rods as shown below:



- 3.3 Allow canopy plate to come to rest on top of the cage panels with the support rods extending up through the holes
- 3.4 Place  $\frac{3}{4}$ " nut on the rod tops (do not tighten)
- 3.5 If necessary, shim cage panels in order to make turnstile level and square
- 3.6 Let the cage panels and the canopy set overnight so the epoxy anchor can cure

### 4. ROTOR INSTALLATION

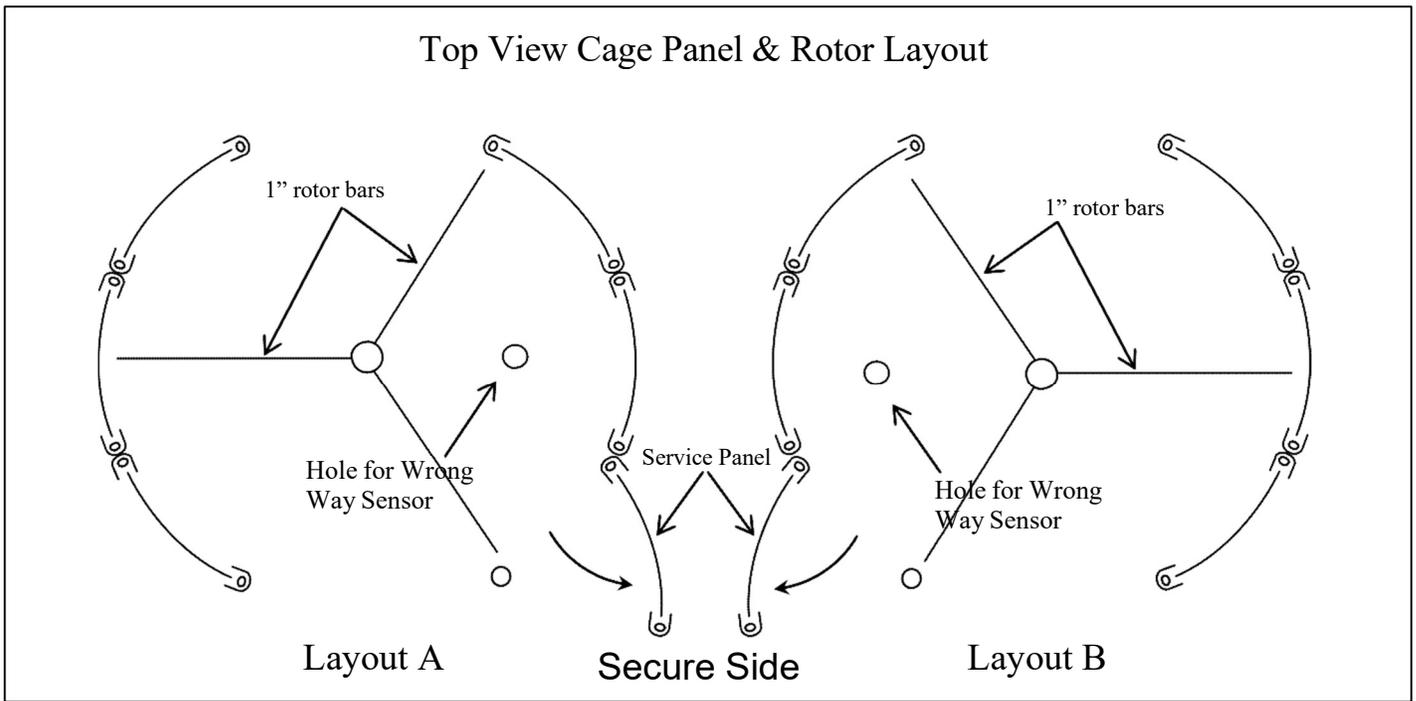
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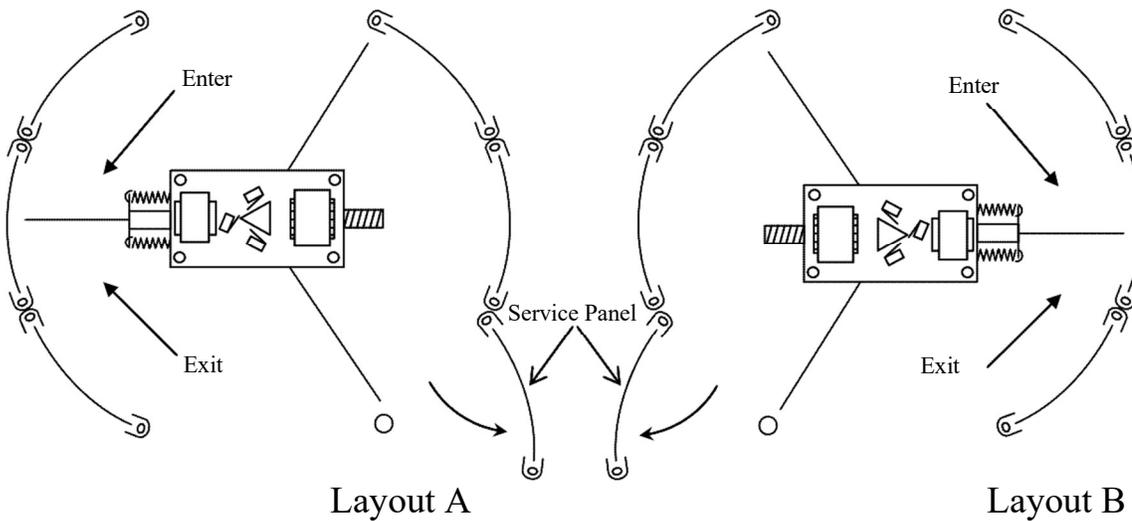
- 4.1 After ensuring canopy is level (shimming as needed) drop a plumb bob from rotor hole in canopy to mark rotor location onto concrete floor.
- 4.2 Using the bearing flange as a template, mark three holes for 3/8" concrete anchors on center of plumb bob markings.
- 4.3 Drill 3/8" holes into concrete for anchors and clean them (with a brush if necessary)
- 4.4 Position rotor bottom flange and bearing on floor above holes
- 4.5 Insert three (3) 3/8" X 5" anchors into holes through bearing flange and tighten
- 4.6 Open the service panel by loosening the screws that are holding the pins at the top and bottom
- 4.7 Slide 3/4" bottom pin up then tighten screw and slide the top pin down and tighten screw
- 4.8 Swing service panel open
- 4.9 Place the bottom of the rotor into the bottom flange and lift the canopy plate if necessary
- 4.10 Tighten the set screw at the bottom of the rotor, just above the 1" flange
- 4.11 Position the rotor so that the 1" protruding rods that are 120° apart are lined up as shown below:



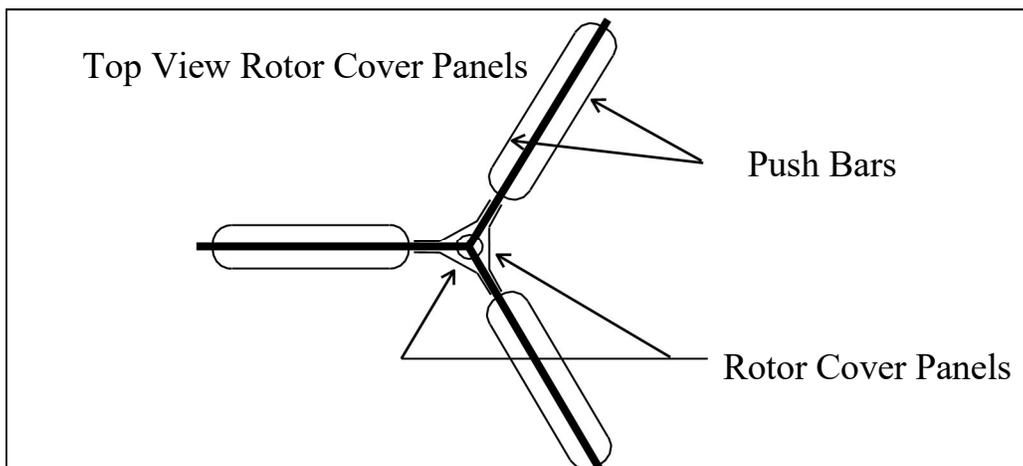
**Note: It is important that the rotor is aligned so that the rotor bars are not lined up underneath the ultrasonic wrong way sensor.**

4.10 Line up the Control Head as shown below:

### Top View Cage Panel & Rotor Layout



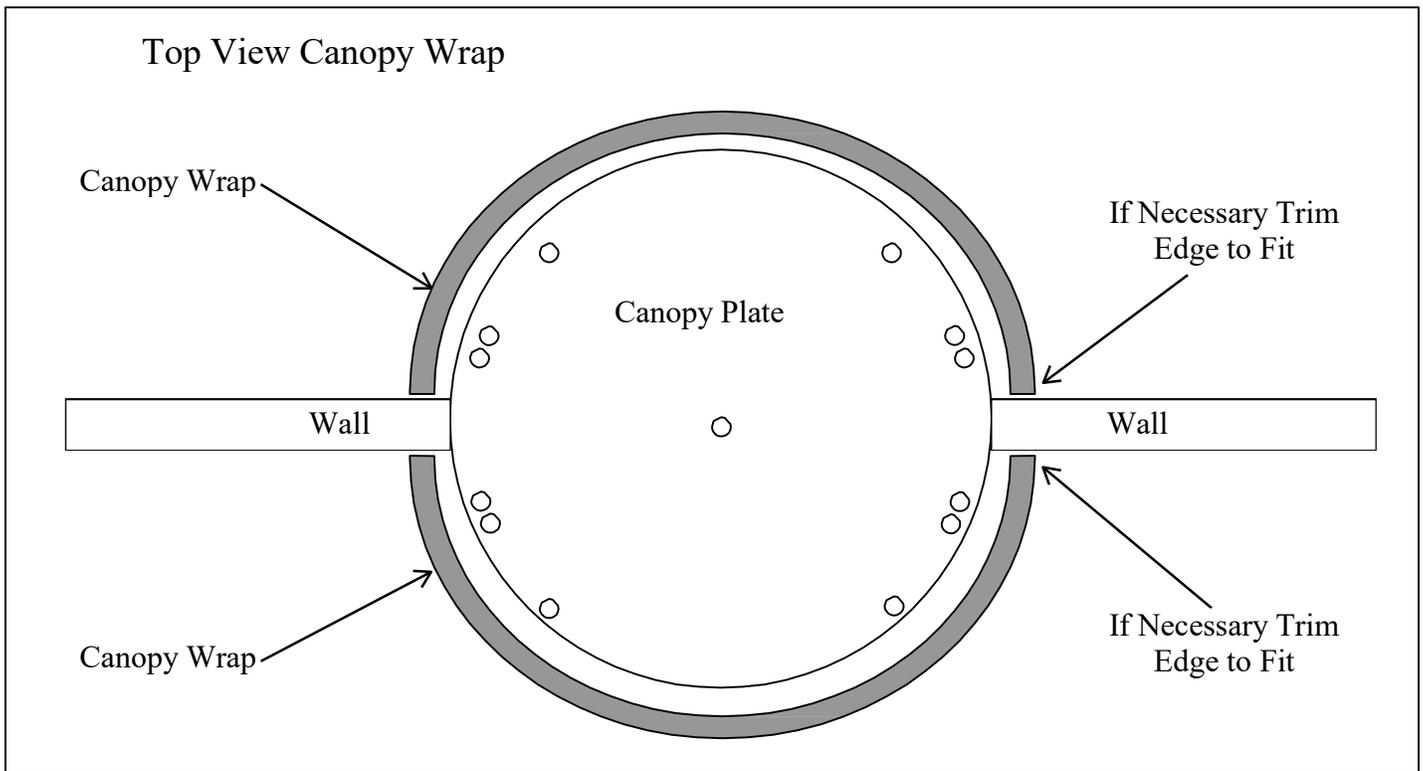
- 4.11 Move turnstile rotor and bars to make sure that the vanes come to rest in the position shown above.
- 4.12 Fit the cam shaft of the control head down into the rotor with  $\frac{3}{8}$ " studs protruding up through the control head on the four corners
- 4.13 Place  $\frac{3}{8}$ " washer and  $\frac{3}{8}$ " lock washer and  $\frac{3}{8}$ " nut on studs
- 4.14 Tighten down  $\frac{3}{8}$ " nuts to hold control head in place
- 4.15 Add additional springs to index pin and studs near existing index pin springs
- 4.16 Slide door vanes on to the 1" top and bottom bar with the tall metal extrusion kick plate toward the bottom.
- 4.17 To secure door vanes to rotor, screw flat head  $\frac{5}{16}$ " screws in two (2) pre-drilled places along the top metal extrusion and into two (2) pre-drilled places along the bottom metal extrusion
- 4.18 Place rotor cover panels between the door vanes as shown below and secure with twelve (12) 10-24 flat head machine screws into pre-drilled holes



4.19 Close the service panel and re-secure the pins to hold the panel in place

## 5 INSTALLATION OF THE CANOPY WRAP

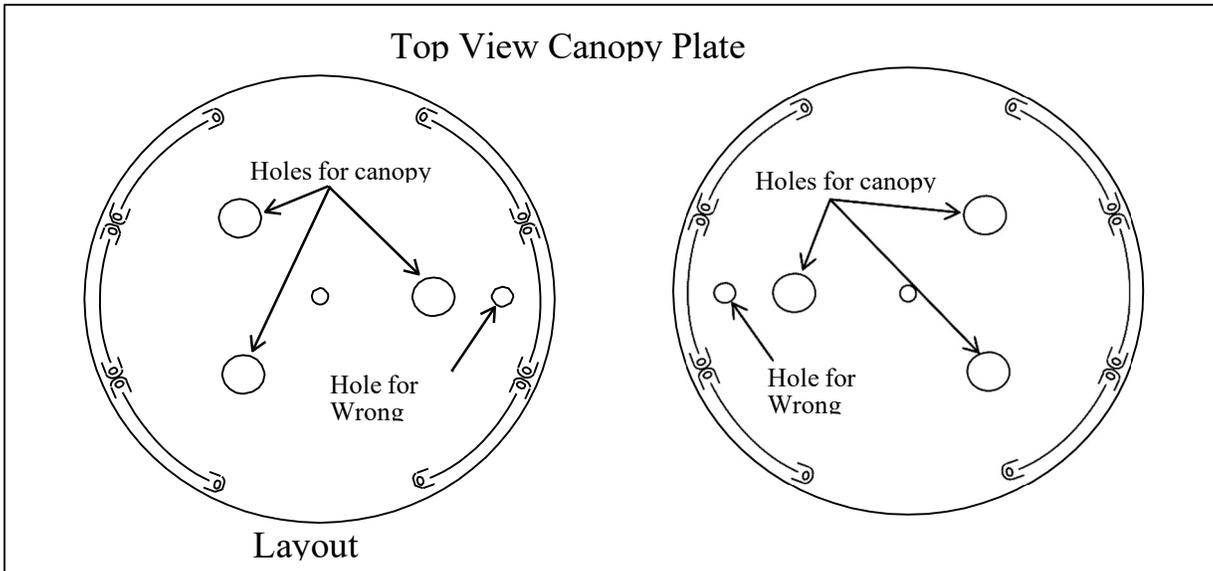
- 5.1 There are four (4) canopy wraps to a canopy, two for each side. If installing into a wall, trim the canopy wrap to around the wall.  
Fit canopy wrap as shown below:



- 5.2 Secure canopy wrap to the base of the canopy plate using 10-24 flat head machine screws in the existing holes on the canopy edges.
- 5.3 The shorter canopy wraps can be easily removed in the future for easier access to the control head.

## 6. ELECTRICAL INSTALLATION

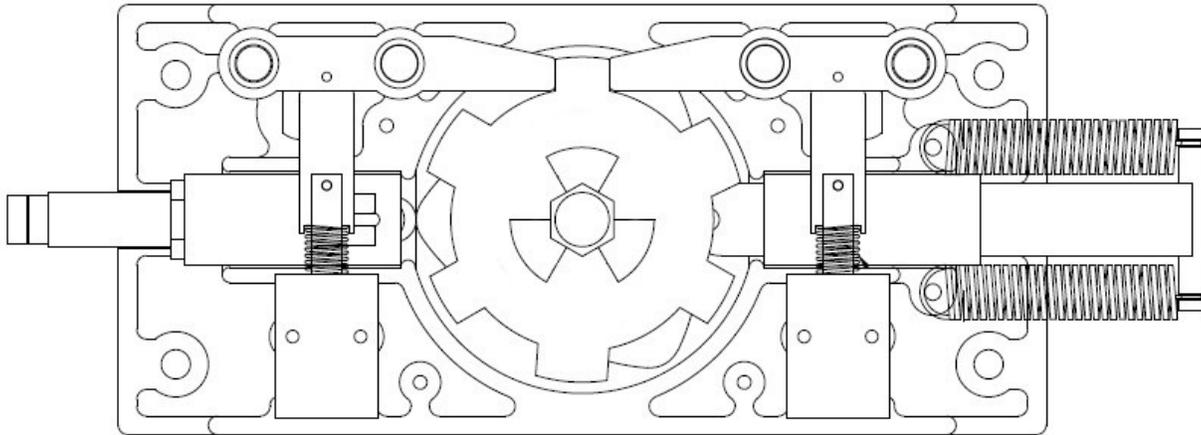
- 6.1 Mount ultrasonic sensor (wrong way sensor) on it's aluminum bracket to the canopy plate using the 10/24 studs welded into the canopy. Utilize the provided 3/8" long nylon spacers for proper height and secure using 10/24 nuts.
- 6.2 Mount three (3) canopy lights using 10/24 studs and secure with 10/24 nuts.



- 6.3 Wire access control, fire alarm, ultrasonic sensor, control head, and lights per wiring diagram

## 6500 Series Control Head Information

All of our turnstiles and ADA gates operate with a mechanism called the 6500 series control head. This sturdy and easy to maintain drive for the turnstile has replaced all previous model control heads. It is adaptable to any existing turnstile and comes with each new turnstile purchase. This control head can be configured in multiple ways to accommodate the security requirements of each individual job site.



*An internal view of an electronically controlled two-way 6500 series control head.*

While the head can be configured for mechanical (no electronics) operation, the turnstile's security potential is reached in the case of an electronic two way control head. In this instance, each rotational direction is independently unlocked. Configured properly, this control head will allow for one rotation per valid entry request. Our anti-backup cams are designed so that it is impossible to become trapped within the turnstile when properly installed.

Each control head comes pre-configured to your specific needs based off of a directional sheet that is filled out before shipment. The heads are delivered pre-wired, tested, and adjusted to our factory recommendations. Installation is simple: connect inputs from access control devices into the logic controller and plug the unit's power supply into a 110-240VAC receptacle. The power supply will automatically set itself to function on your local voltage and convert it to 24VDC.



*Note: Proper turnstile operation requires a dry, normally open momentary contact closure (of one second or less).*

# 6500 Series Control Head Configuration Information

The 6500 series can be configured in a number of different ways. All turnstiles operating with the 6500 series control head self center and hydraulically shock to the home position to prevent damage or injury.

**Manual both ways:** Turnstile rotates freely in both directions. This unsecure configuration is used as a means to direct traffic through one area. Full height turnstiles can be purchased with a lockout bar which would allow end user to lock the turnstile with a standard pad lock.

**Manual one way:** Turnstile rotates in one direction but not the other. This configuration is great for an exit way.

**Electronic one way with free exit:** Turnstile rotates freely in one direction and requires access credentials for the other. This configuration is suitable for secure entry and unsecure exit.

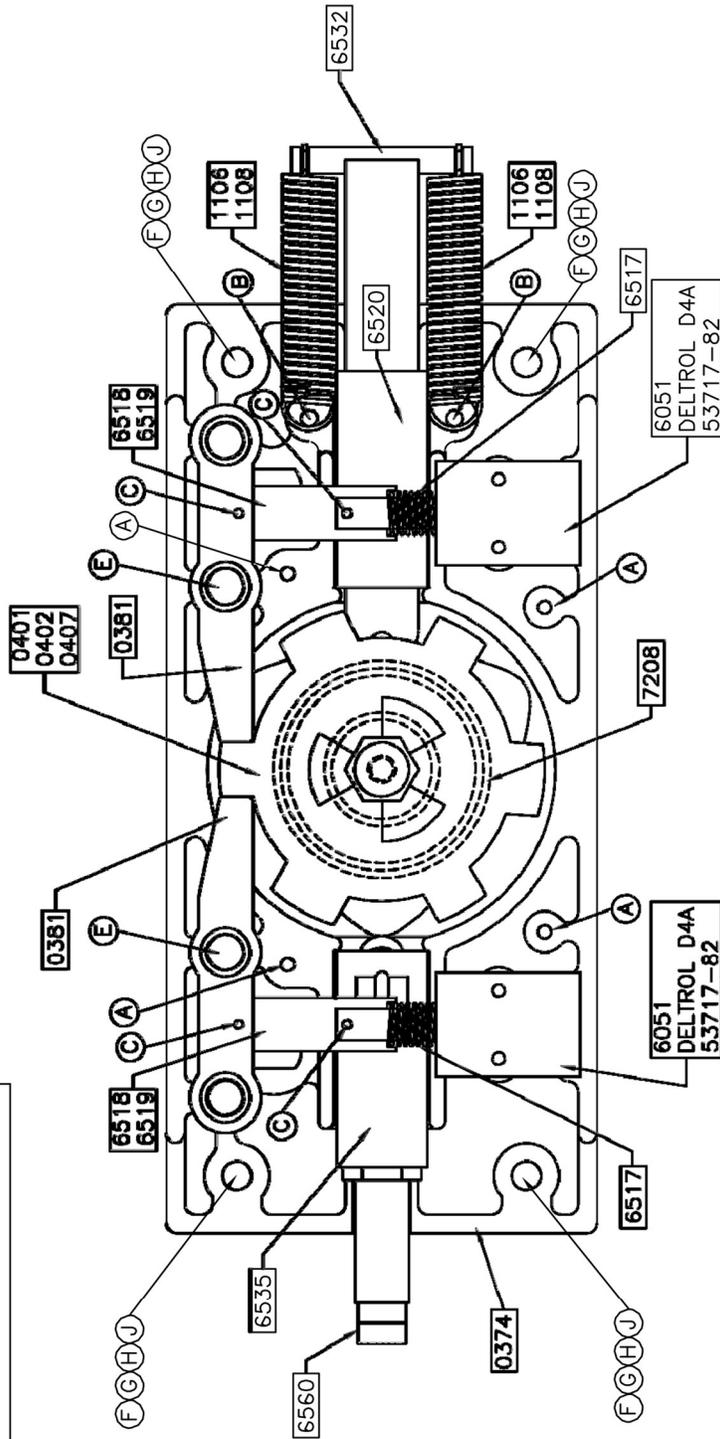
**Electronic one way with no exit:** Turnstile requires access credentials for one direction and allows no passage in the other. This configuration is suitable for a secured entryway with an alternate means of exit.

**Electronic two way:** Turnstile requires access credentials for both directions. This configuration is perfect for locations requiring secured entry and exit passage.

**Fail open:** Upon power failure, turnstile will remain unlocked in one or both directions. This is convertible to fail lock by ordering an alternate linkage. This can also be known as fail safe.

**Key override:** This option is for a location that the security requirements may change. The key override option is not intended for everyday use.

TOP CASTING REMOVED



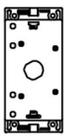
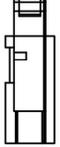
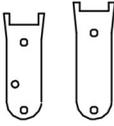
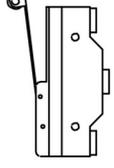
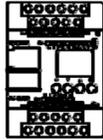
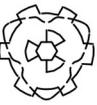
ALL ELECTRICAL COMPONENTS UL CERTIFIED

NOTE:  
ALL WIRE AWG 18 GAUGE 300 VAC  
UL 1007/1569

SYM	QTY	DESCRIPTION
(A)	4	1/4-20 x 1" SOCKET HEAD
(B)	2	1/4"φ x 1 1/4" SPRING PIN
(C)	4	1/8"φ x 5/8" SPRING PIN
(E)	2	1/2"φ X 2 1/4" DOWEL PIN

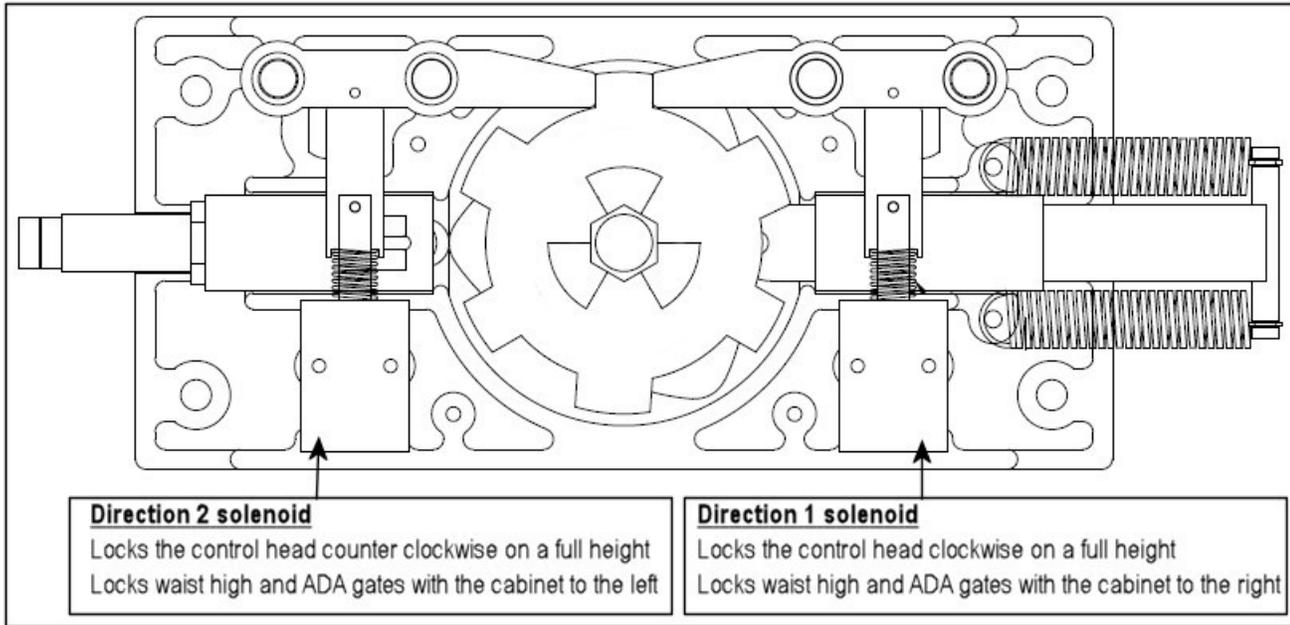
WAIST HIGH UNITS	
(F)	4 5/16 x 1-1/2" SS CARRIAGE BOLT
(G)	4 5/16 SS FLAT WASHER
(H)	4 5/16 SS LOCK WASHER
(J)	4 5/16 SS HEX NUT

FULL HEIGHT UNITS	
(F)	4 3/8" x 1-1/2" SS CARRIAGE BOLT
(G)	4 3/8 SS FLAT WASHER
(H)	4 3/8 SS LOCK WASHER
(J)	4 3/8 SS HEX NUT

<p>Index Pin Assembly 6549</p> 	<p>Index Pin Tubing All Models 6520</p> 	<p>Index Spring WH Models: 1106 FH Models: 1108 ADA Gates: 1107</p> 
<p>Control Head Casting Top Casting: 0372 Bottom Casting: 0373</p> 	<p>Top Casting Bearing All Models 1641 (1641-2RSNR)</p> 	<p>Bottom Casting Bearing All Models 7208 (6007RSNR)</p> 
<p>Hydraulic Shock Absorber 6547 (MA 4525 S)</p>	<p>Shock Housing 6546</p> 	<p>WH Arm Adapter Proximity Sensor Cam 2030</p> 
<p>Solenoid All Models 6051 (Detroit D4A53717-83)</p>	<p>Locking Bar Linkage Fail Lock: 6518 Fail Open: 6519</p> 	<p>Locking Bar All Models 0381</p>
<p>Solenoid Springs Fail Open: 6510 Fail Lock: 6016</p> 	<p>Limit Switch Cam Standard: 2267 ADA Gate: 2268 One-Way: 2269</p> 	<p>Limit Switch Standard: 2180 OMRON Z-15GW2-B7-K One-Way: 1700 OMRON BZ2RW825-A2</p> 
<p>Logic Controller 6789 (KEYENCE KV16DR)</p> 	<p>Cam Assembly (specify limit/prox) 427/430/T80/WH: 0401 7/8" Hex 439/448/P60: 0407 1-1/4" Hex ADA Gate (specify model): 0402 7/8" Hex</p> 	
<p>Proximity Sensor(PNP) 7211 (SICK 1040765)</p> 	<p>Power Supply 100-240VAC 24VDC 2.1 AMP 0781 (KEYENCE M52-H50)</p>  <p>Proximity Sensor Bracket 6589</p> 	

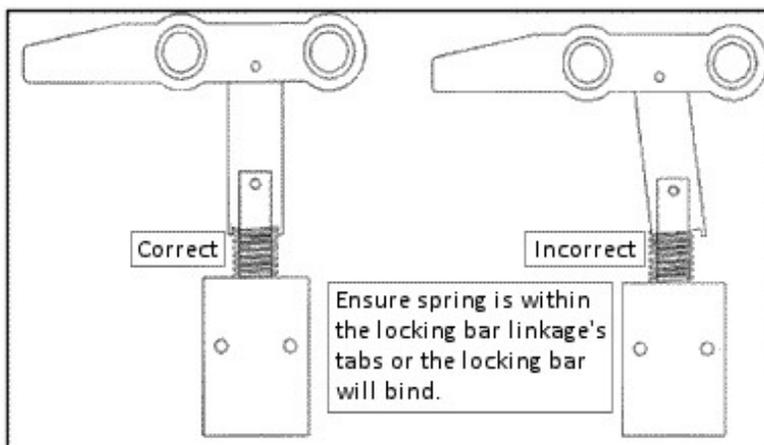
# 6500 Series Control Head Locking Bar Information

Any number of configurations is possible on the 6500 series control head. In the case of an electronic two way head, two independent locking mechanisms are in place. The following diagram indicates which direction unlocks from which locking mechanism. A logic controller or key override is needed to unlock the control head in each direction it is configured to lock in.



If removing the locking bar becomes necessary for any reason, two methods can be used. The easiest method is to punch the 1/2" dowel pin out from the bottom side of the control head. This releases the locking bar from the casting. An alternate approach would be to remove the (4) 1/4-20 socket head cap screws from the casting and remove the lid.

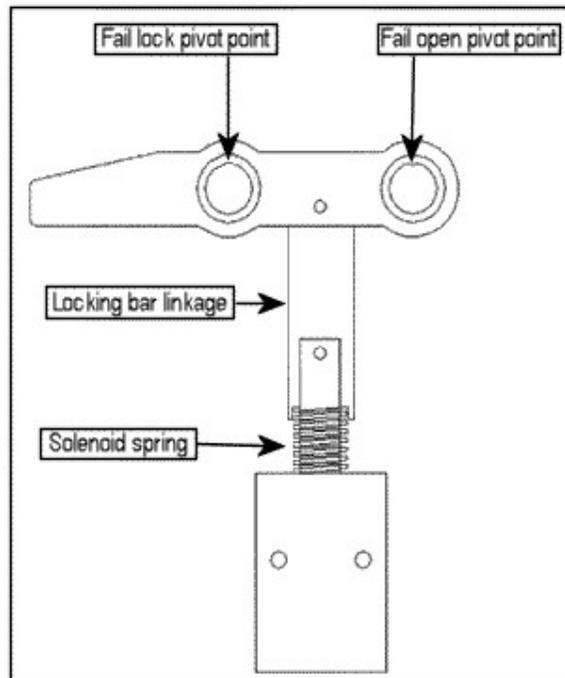
When installing or replacing the locking bars into the control head, be sure to take special care to align the solenoid spring (shown below) or it will not pivot properly.



## Power Failure State Configuration (Fail Lock / Fail Open)

Each direction on a control head can be independently configured to open or lock upon power failure. The fail status configuration is based on the pivot point used on the locking bar as well as the linkage and solenoid spring used. Control heads are preconfigured in our factory before shipment based on a direction sheet filled out by the end user. In the event a fail status field change is needed, a different linkage and spring will be required (the part numbers are noted in a table below). Control heads can also be returned to the factory for reconfiguration for a fee of parts plus approximately 1 hour of labor if desired.

Description	Part Number
Fail lock linkage	6518
Fail open linkage	6519
Fail open solenoid spring	6510
Fail lock solenoid spring	6016



*Note: As a reference, it may be important to know that some vendors use different terms for fail status. Fail open is also known as fail safe, while fail lock is also known as fail secure.*

## 6500 Series Control Head Shock Adjustment

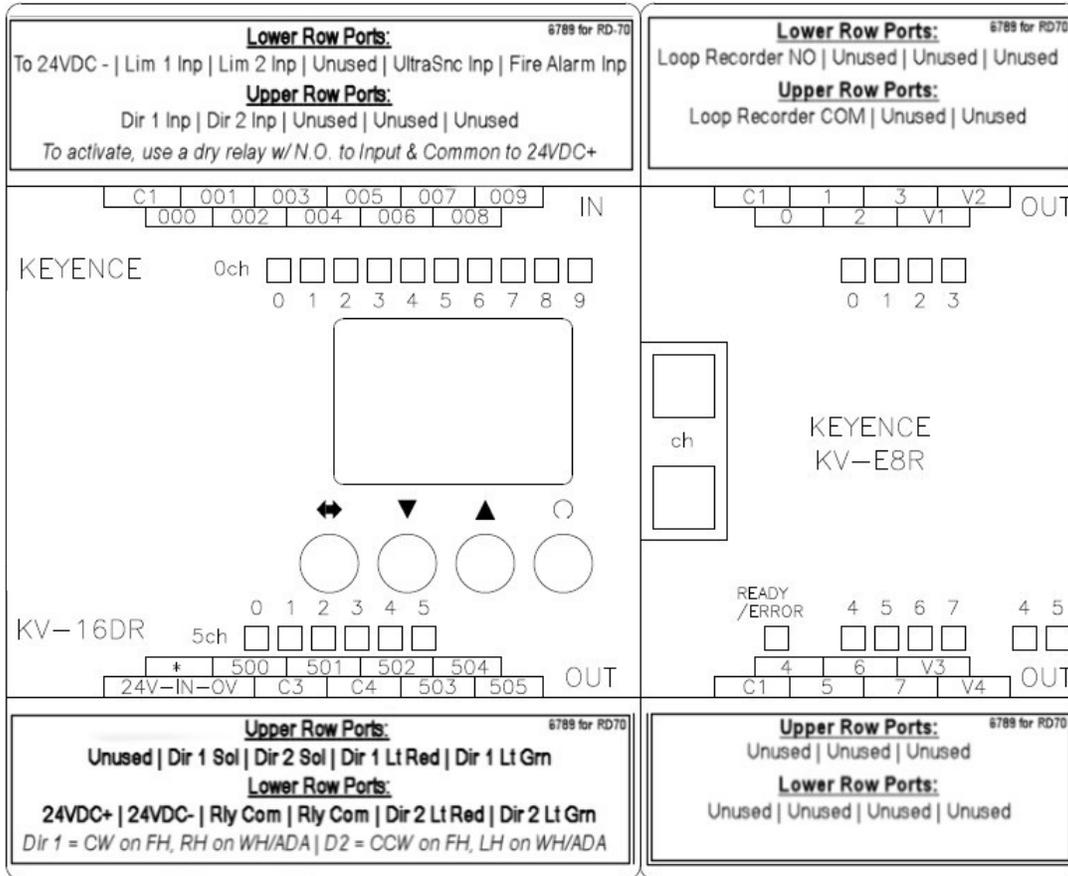
Our turnstiles come with hydraulic shocks in order to alleviate wear on the control head. These shocks allow the turnstile to return to the center position without slamming into place. Although we adjust these in the factory, different environments may require additional field adjustment.

The shock is located adjacent to the index pin. The DSRD70 uses a different shock than all of our other models due to the weight of the door panels. Instead of a threaded shock, the DSRD70 uses an external mounted to a plate. This shock is adjusted with an allen key to turn a set screw. Although you should never need to replace it, the part number is 6547.



# 6500 Series Control Head Electrical Information

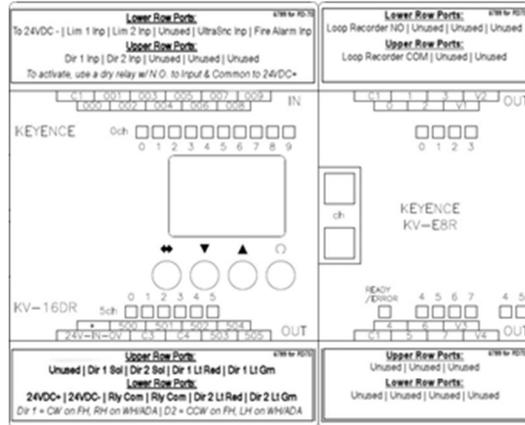
Each DSRD70 control head comes with a power supply, a programmable logic controller (PLC), limit switches and solenoids. For safety purposes, it is recommended that you read all literature on the electrical components before attempting to install the control head into a turnstile.



*Note: Access control devices need to provide a momentary, normally open dry contact of one second or less. A longer signal can cause more than one person to be able to pass through the turnstile. If you are unable to provide a contact of one second or less, an onboard signal converter will automatically change the signal length to .1 seconds. However, the ability to hold the relay open is lost while that feature is active.*

# 6500 Series Control Head Wiring Legend

Since each control head comes pre-wired, only the ultrasonic sensor, access control and fire alarm should need to be connected to the board. If you are unable to fit wires for access control on the 24VDC+ input on the board, the voltage can be picked up directly from the power supply or from the relay commons (C3 & C4) on the board (C4 may not have voltage depending on options purchased. There will be a red jumper to C4 if there is). You may also run a jumper from 24VDC+ to any unused input to give additional contacts if needed.



## DSRD70 Wiring Legend

### Definitions:

- Direction 1: Clockwise Spin
- Direction 2: Counter Clockwise Spin
- Limit 1: Cancels direction 1 trigger
- Limit 2: Cancels direction 2 trigger
- Fire Alarm: Unlocks both directions while active.
- Ultrasonic Sensor: Digital barrier which forces rotation to unsecure direction on sensing.

All inputs are triggered with 24VDC+ signals (PNP). Use dry, normally open contacts to run 24VDC+ through to trigger inputs. Your relay will have the common port to 24VDC+ voltage and normally open port to the desired input.

**BE SURE TO DISCONNECT POWER BEFORE WIRING THE BOARD**

### Input Side of KV-16DR

- C1: To 24VDC -
- 000: Direction 1 Input
- 001: Limit 1 Input
- 002: Direction 2 Input
- 003: Limit 2 Input
- 004: Unused
- 005: Unused
- 006: Unused
- 007: Ultrasonic Sensor Input
- 008: Unused
- 009: Fire Alarm Input

### Output Side of KV-16DR

- \*: Unused
- 24V-IN-0V: Input voltage
- C3: Common for 500 & 501 Outputs
- C4: Common for 502-505 Outputs
- 500: Direction 1 Solenoid
- 501: Direction 2 Solenoid
- 502: Direction 1 Status - Locked
- 503: Direction 1 Status - Unlocked
- 504: Direction 2 Status - Locked
- 505: Direction 2 Status - Unlocked

### KV-E8R Top Side

- C1: Loop Recorder
- Normally Open Lead
- 0: Loop Recorder Common
- All other ports are unused.



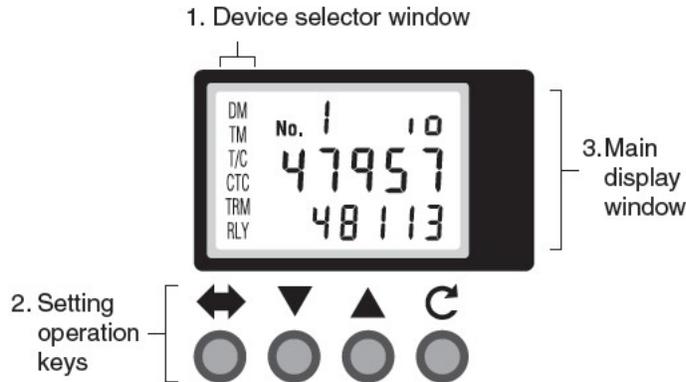
*Note: Directional status outputs are unaffected by optional key overrides as the override occurs outside of the logic controller.*

The canopy lights require 24VDC voltage to light up and may be wired into the power supply or off of the board if desired.

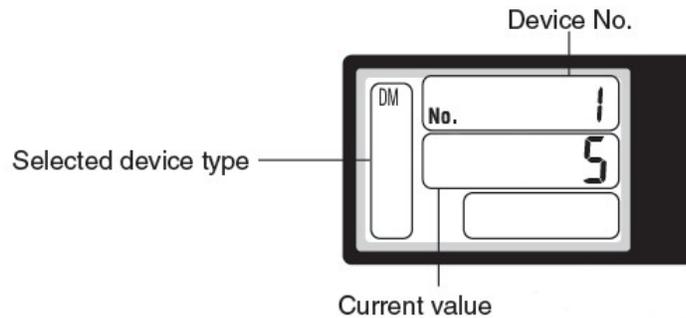


# Overview of the Access Window

On the logic controller, an access window is available to change and adjust many different values. Each value is referred to as a “device”. The window comprises of 3 primary areas: The device selector window, operation keys, and the main display window.



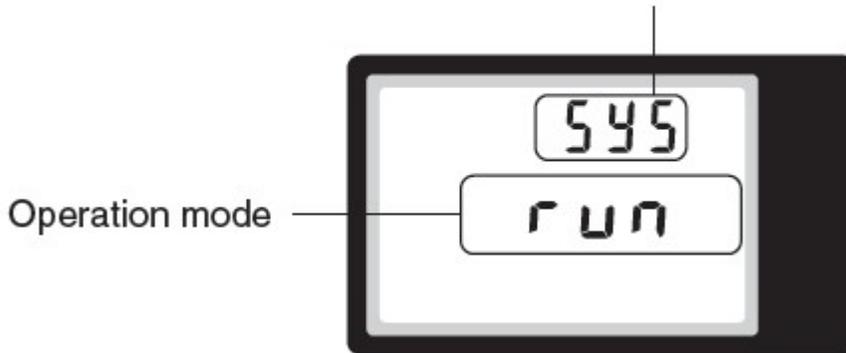
Although the logic controller is capable of many functions, all of the devices that the control head operates from are accessed in “Device Mode”. When device mode is active, the display screen will show DM in the top left corner.



That being said, it is possible to stray from the device mode settings. In the selected device type section of the access window, DM, TM, T/C, CTC, TRM, and RLY are all possible selections to load. Again, we are only using DM (device mode) with the 6500 series control head.

In addition to the device mode window, system mode can be accessed as well.

Indicates that the system mode is selected.



Although under normal circumstances you should never encounter this window, if by accident you should happen to come across it, simply press the up or down arrow until the window reads “run”. Press and hold the **C** button for 3 seconds, and the display will return to device mode.

Additionally, should for any reason the display lettering become red instead of green, you will need to access system mode to run the program in this fashion. Holding the **↔** key while pressing up and down allows you to change between system mode and device mode. A third mode, which will display TRM on the left side of the screen, can also be accessed. Cycle through until the appropriate mode is displayed.

Finally, it is possible to lock the keypad. Should you inadvertently do so, press and hold the **↔** button and an arrow key together for 3 seconds to unlock the keypad again.

# Device Settings of the DSRD70

While working within device mode, two primary values should be considered. On the top of the display, the selected device is shown. The DSRD70 control head settings can be adjusted with devices 0 – 9. Pressing the up or down arrows allow you to select which device you wish to modify. Pressing and holding the **C** key for 3 seconds loads the modification window. While modifying, the digits on the window begin to flash. Pressing **↔** will move the cursor in a digit. Select the correct digit to modify, then use the arrows to change the value. Once finished, hold the **C** button for 3 seconds and your adjustment will save.

Should a value inputted not fall within the specified range of the device being modified, the value will automatically adjust to the highest possible value. A description of each device setting is:

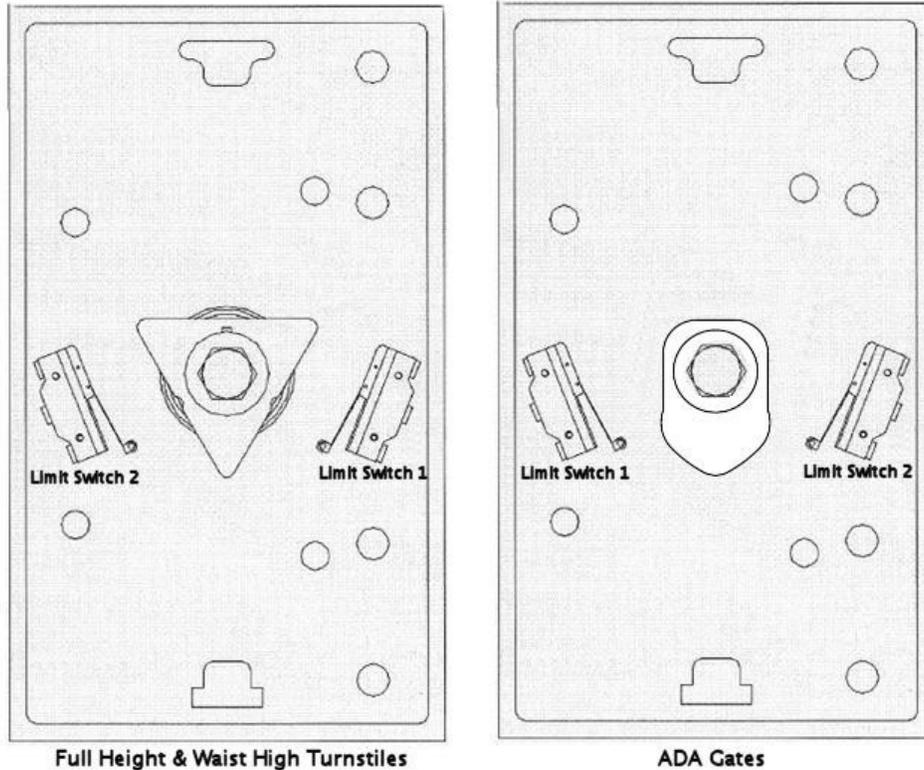
- **DM0:** Timer value for Direction 1. The range of this setting is 1 – 60 seconds. This is how long the direction will remain open for if a user does not pass through the direction. The default setting is 7 seconds.
- **DM1:** Timer value for Direction 2. The range of this setting is 1 – 60 seconds. This is how long the direction will remain open for if a user does not pass through the direction. The default setting is 7 seconds.
- **DM2:** Direction 1 fail status. This determines when the solenoid receives power and is preconfigured based on each individual order. 0 means the direction is fail lock & 1 means the direction is fail open. This setting is not affected by factory reset.
- **DM3:** Direction 2 fail status. This determines when the solenoid receives power and is preconfigured based on each individual order. 0 means the direction is fail lock & 1 means the direction is fail open. This setting is not affected by factory reset.
- **DM4:** Direction 1 one-shot timer: This setting determines whether or not the access control input length is ignored and converted to a .1 second pulse internally. Enabling this allows the turnstile to ignore access control from allowing too many users pass through the turnstile. Disabling it allows access control to hold the direction open. 0 means the one-shot timer is inactive & 1 means the one-shot timer is active.
- **DM5:** Direction 2 one-shot timer: This setting determines whether or not the access control input length is ignored and converted to a .1 second pulse internally. Enabling this allows the turnstile to ignore access control from allowing too many users pass through the turnstile. Disabling it allows access control to hold the direction open. 0 means the one-shot timer is inactive & 1 means the one-shot timer is active.
- **DM6:** Direction 1 multi-swipe: This setting allows more than one access control request to be processed at a time to allow a faster flow of traffic. The range is 1-3. As each access control request is processed, each rotation subtracts from the total, allowing a constant flow of traffic. Most installations would benefit from a value of 2, which is the default setting.
- **DM7:** Direction 2 multi-swipe: This setting allows more than one access control request to be processed at a time to allow a faster flow of traffic. The range is 1-3. As each access control request is processed, each rotation subtracts from the total, allowing a constant flow of traffic. Most installations would benefit from a value of 2, which is the default setting.

- **DM8:** Ultrasonic Delay: This setting allows for a time delay filter on the ultrasonic sensor which detects a presence in the section of the revolving door that should not be occupied. This filter acts as an additional fail safe towards the sensor's sensing distance to ensure it is not triggered under false circumstances. The default setting is .5 seconds, with a maximum of 3 seconds.
- **DM9:** Ultrasonic Reverse Direction: This sets the direction in which the ultrasonic sensor forces the unit to be rotated backwards to the unsecure side. 0 for clockwise, 1 for counter clockwise.
- **DM10:** Direction 1 Count: Displays how many valid rotations were made in direction 1. This has a max value of 60,000 and will reset to 0 once that number is reached. This will not count fire alarm, hold open or key override rotations. This count is for maintenance and repair logging purposes.
- **DM11:** Direction 2 Count: Displays how many valid rotations were made in direction 2. This has a max value of 60,000 and will reset to 0 once that number is reached. This will not count fire alarm, hold open or key override rotations. This count is for maintenance and repair logging purposes.

Additionally, scrolling downward past DM0 will allow you access to **DM1999**, which resets all settings to factory defaults (except for solenoid fail status settings and ultrasonic reverse direction). Choose any value greater than 0 to perform the factory reset.

# 6500 Series Full Height Control Head Limit Switches

## Limit Switch Information



*Note: When replacing a switch, be sure to utilize the normally open and common screw terminals. Normally open should go into the PLC's Limit Inputs and Common should go to 24VDC+.*

Direction 1 is canceled by limit switch 1 and direction 2 is canceled by limit switch 2. As the unit rotates, both limit switches are triggered. However, only the limit switch designated for that direction is utilized to relock the unit. The switch is triggered towards the end of the rotation. Once it is triggered, the locking mechanism returns to the locked position, but users may still proceed until the home position is reached.

A minor exception to this is in the case of an ADA swing gate. The limit switch is triggered towards the beginning of the swing, which allows the locking bar to prevent the gate from over swinging. In this instance, the limit switches are designated backwards from those on a standard turnstile. Refer to the above diagram to illustrate which is which.



*Note: The control head will not operate properly if the limit switches and top cam are not adjusted properly or altered from factory shipment.*

# 6500 Series Control Head & Turnstile Maintenance & Cleaning

To ensure long life on any turnstile, the following maintenance is recommended.

- Annual
  - If you have a full height turnstile: On the bottom of each rotor, you should find a grease fitting. Utilize this fitting to re-grease the bearing that the rotor rests on.
  - Make sure all nuts are securely fastened on all parts of the turnstile.
  - On the control head, remove the index pin and apply white lithium grease. Use 3 in 1 oil on the index pin roller. The index pin is easily removed from the control head by disconnecting the springs from it.
  
  - Remove the lid from the control head. Clean any debris and apply grease to the shock roller assembly. Use 3 in 1 oil on the shock piston roller.
  - Apply 3 in 1 oil to the bronze bushing on the locking bars.
  - Inspect control head parts for wear and tear, replace parts as needed.
  - Reassemble control head. Using a removable strength (blue) thread sealer (such as Loctite) on the head bolts will help the control head remain sturdy.
  
- Cleaning
  - Galvanized turnstiles can be cleaned with soap and water. Galvanized finish may fade in color over time, but this is normal.
  - Powder coated turnstiles should be cleaned with a non-abrasive cleanser such as Formula 409. Be sure to inspect for chips on the powder coating and touch them up, or the exposed steel may rust.
  - Stainless steel turnstiles should be polished with a stainless steel wax or polish. **In harsh environments, such as facilities near the ocean or within a chemical plant, stainless steel turnstiles should be waxed with a simple car wax to prevent surface discoloration on an annual basis.** Discoloration and surface rust can be easily removed with a rust penetrating product, such as P.B. Blaster, along with non-scratching scouring pads.

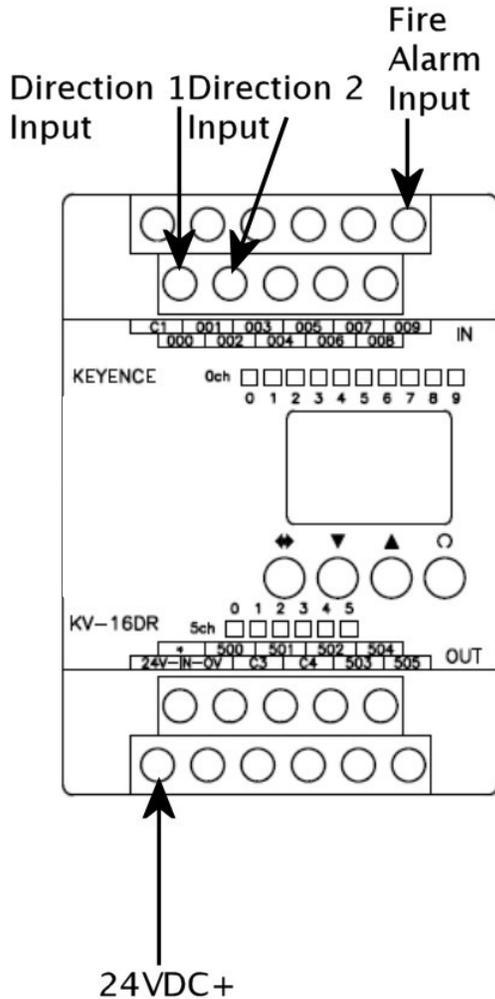
Control heads can be removed from the turnstile and shipped to the factory at any time for repairs and maintenance. Please include contact information so we can call to discuss any issues your control head may have.



*Note: The recommended time frames are assuming a maximum of 75000 passages per year. Turnstiles with heavier traffic should be maintained more frequently.*

# 6500 Series Control Head Testing

## 6500 Series Testing Procedures



To test whether or not your control head is functioning properly...

- Unplug power supply from outlet
- Disconnect access control and fire alarm system from inputs 000, 002, and 009 (if applicable)
- Plug the power supply back into the outlet
- Using a length of 18 gauge wire, momentarily touch the the 24VDC+ screw terminal with one end, and input 000 with the other. The solenoid should engage
- Trigger limit switch 1 and the unit should relock. It will also relock when the timer expires
- Repeat this step with 24VDC+ and input 002. The alternate solenoid should engage
- Trigger limit switch 2 and the unit should relock
- If desired, test the fire alarm by jumping and holding input 009 to 24VDC+ and both directions should unlock

## 6500 Series Control Head Troubleshooting

Symptom	Cause	Solution
Turnstile does not unlock.	Power supply is not receiving input voltage.	Verify outlet receptacle installed in mainframe is operating correctly and that the power supply is plugged in.
	Loose wiring from power supply to logic controller.	Refer to pages 23-25 for wiring information.
	Power supply is not producing voltage.	Check output voltage from power supply. It should be 24VDC.
	Logic controller program is not running. This can be determined by the color of the lettering on the logic controller display screen. If it is red, it is not running.	Refer to the "Overview of the Access Window" section on pages 26-27 and "run" the program.
	Access control device malfunction.	Disconnect access control from circuit board. Momentarily jump directional inputs. If the turnstile works properly, contact manufacturer of access control device.
	Control head requiring maintenance.	Refer to page 31.
More than one person can get through turnstile.	Access control device output set too long.	This can be avoided by enabling the one-shot timers built into the logic controller program. If this is undesirable, ensure the output from the access control system is 1 second or less. Refer to pages 28-29.
	Loose wiring to the logic controller from limit switches.	Refer to pages 23-25 for wiring information.
	Limit switches are broken.	Inspect limit switches for breakage, replace as needed.

	Limit switches are missing the triangular top cam.	Adjust the top cam to the proper height and or tweak the triggers on the limit switch. Refer to page 30 for parts locations.
Unable to hold direction open to allow multiple people to pass through the turnstile.	One-shot timers are enabled.	Disable the one shot timer settings on the logic controller. Be sure that your access control output is one second or less during regular secure operation or extra people may be able to pass through. Refer to pages 28-29.
People are becoming trapped inside of the turnstile (Full Height).	Rotor was installed backwards.	Refer to page 12 installation for visual diagram on how to install rotor properly.
Turnstile only rotates 30 degrees.	Limit switches wired incorrectly.	Refer to pages 23-25 for wiring information and page 30 for limit switch placement.
	Top cam is misaligned.	The top cam should have one point facing the control board. If this is not the case, readjust the top cam. Refer to page 30 for top cam information.
	Fail open / fail lock configuration is wrong.	Change fail open / fail lock mode on each direction as appropriate.
Turnstile is slamming into the closed position.	Shock either needs adjusted or replaced.	Refer to page 22 for more information.
Turnstile is not centering properly.	Shock needs adjusted.	Refer to page 22 for more information.
	Binding in control head.	See next troubleshooting hint.
Turnstile seems to be binding mechanically.	Rotor is not plumb / turnstile body is not level.	Refer to the installation instructions for more information.

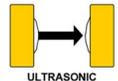
	Control head requires maintenance.	Refer to page 31 for more information.
Turnstile rotating the wrong direction.	Improperly filled out direction sheet.	In some cases, the control head can be reconfigured in the field to operate as needed. Refer to pages 16-20 for information about how the control head operates. If needed, control heads can be returned to the factory for reconfiguration for a fee of labor plus parts (if required). Please contact us before returning a control head in this instance.
	Directional inputs wired incorrectly.	Refer to wiring legend for direction port explanations
Turnstile fails lock when needed to fail open or vice versa.	Improperly filled out direction sheet.	Refer to page 21 for more information. Additional parts will be required to convert operation. The control head can be returned for reconfiguration for a fee of labor plus parts (if required). Please contact us before returning a control head in this instance.
Other problems.		Please contact us for any other issues.

# U-GAGE® T30UX Series with Discrete Output

Ultrasonic Sensor with TEACH-Mode Configuration



- 1, 2 and 3 m (3.28, 6.56, and 9.84 ft) versions with short dead zones (10% of max range)
- Built-in temperature compensation
- Fast, easy-to-use TEACH-Mode programming; no potentiometer adjustments
- Remote TEACH for security and convenience
- Wide operating temperature range of -40° to +70° C (-40° to +158° F)
- Outputs can be set for either NPN (sinking) or PNP (sourcing), Normally Open (N.O.) or Normally Closed (N.C.)
- Compact, self-contained, right-angle sensor package with fully encapsulated electronics



## Models

Models	Range and Frequency	Cable <sup>1</sup>		Discrete Output	Response Time
T30UXDA	100 mm to 1 m (3.9 in to 39 in) 224 kHz	Standard 2 m (6.5 ft) cable	10 to 30V dc	NPN, PNP, NO, NC, Selectable	45 ms
T30UXDB	200 mm to 2 m (7.8 in to 78 in) 174 kHz				92 ms
T30UXDC	300 mm to 3 m (11.8 in to 118 in) 114 kHz				135 ms



### WARNING: Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death. This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

<sup>1</sup> Only standard 2 m (6.5 ft) cable models are listed. For 4-Pin Euro-Style integral QD, add suffix “Q8” to the model number (for example, T30UXDAQ8). For 150 mm (6 in) PUR pigtail cable with 4-Pin threaded Euro-Style QD, add suffix “QPMA” to the model number (for example, T30UXDAQPMA). For 9 m (30 ft) cable, add suffix “W/30” to the model number (for example, T30UXDA W/30). A model with a QD connector requires a mating cable; see [Quick-Disconnect Cables](#) on page 11.

## Overview

The U-GAGE® T30UX is an easy-to-use ultrasonic sensor with extended range and built-in temperature compensation. Simple push button configuration provides flexibility for a variety of applications.

Easy-to-see indicator LEDs communicate the status of the sensor. The Green “Power” LED ON indicates that the sensor is in Run Mode (the sensor’s normal operating condition). The Red “Signal” LED indicates the target signal strength. The Amber “Output” LED indicates that the output is enabled and the sensor is receiving a signal within the window limits (depending on NO or NC). The Amber “Mode” LED indicates the currently selected mode.



Figure 1. Features

## Principles of Operation

Ultrasonic sensors emit one or multiple pulses of ultrasonic energy, which travel through the air at the speed of sound. A portion of this energy reflects off the target and travels back to the sensor. The sensor measures the total time required for the energy to reach the target and return to the sensor. The distance to the object is then calculated using the following formula:

$$D = \frac{ct}{2}$$

**D** = distance from the sensor to the target

**c** = speed of sound in air

**t** = transit time for the ultrasonic pulse

To improve accuracy, an ultrasonic sensor may average the results of several pulses before outputting a new value.

### Temperature Effects

The speed of sound is dependent upon the composition, pressure and temperature of the gas in which it is traveling. For most ultrasonic applications, the composition and pressure of the gas are relatively fixed, while the temperature may fluctuate.

In air, the speed of sound varies with temperature according to the following approximation:

In metric units:  $C_{m/s} = 20 \sqrt{273 + T_C}$

In English units:  $C_{ft/s} = 49 \sqrt{460 + T_F}$

$C_{m/s}$  = speed of sound in meters per second

$C_{ft/s}$  = speed of sound in feet per second

$T_C$  = temperature in °C

$T_F$  = temperature in °F

### Temperature Compensation

Changes in air temperature affect the speed of sound, which in turn affects the total time for the echo measured by the sensor. An increase in air temperature shifts both sensing window limits closer to the sensor. Conversely, a decrease in air temperature shifts both limits farther away from the sensor. This shift is approximately 3.5% of the limit distance for a 20° C change in temperature.

The T30UX series ultrasonic sensors are temperature compensated. This reduces the error due to temperature by about 90%. The sensor will maintain its window limits to within 2.2% over the -40° to +70° C (-40° to +158° F) operating range of the sensor.



#### NOTE:

- Exposure to direct sunlight can affect the sensor’s ability to accurately compensate for changes in temperature.
- If the sensor is measuring across a temperature gradient, the compensation will be less effective.

## Sensor Configuration

Two TEACH methods may be used to configure the sensor:

- Teach individual minimum and maximum limits, or
- Use Auto-Window feature to center a sensing window around the taught position.

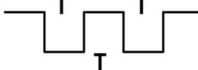
The sensor may be configured either via its push button, or via a remote switch. Remote configuration also may be used to disable the push button, preventing unauthorized personnel from adjusting the configuration settings. To access this feature, connect the white wire of the sensor to 0V dc, with a remote configuration switch between the sensor and the voltage.

Configuration is accomplished by following the sequence of input pulses. The duration of each pulse (corresponding to a push button “click”), and the period between multiple pulses, are as “T”: **0.04 seconds < T < 0.8 seconds**

Remote line configuration requires a greater than 1 second pause between pulse sequences.

## Mode Setup - Output Configuration

Sensors can be set up for either NPN (sinking) or PNP (sourcing). In addition, the user can select between Normally Open (N.O.) and Normally Closed (N.C.) operation. Normally Open is defined as the output energizing when the target is present. Normally Closed is defined as the output energizing when the target is absent (see *Figure 2. Teaching independent minimum and maximum limits* on page 4).

	Push Button 0.04 sec. < “click” < 0.8 sec.		Remote Line 0.04 sec. < T < 0.8 sec.	
	Procedure	Result	Procedure	Result
<b>Output Configuration Mode</b>	Push and hold MODE push button for > 2 seconds 	<b>Power LED:</b> OFF <b>Mode LED:</b> Flashing Amber shows previously selected mode	Double-pulse the remote line 	<b>Power LED:</b> OFF <b>Mode LED:</b> Flashing Amber shows previously selected mode
<b>Select Output</b>	“Click” the MODE push button to cycle to correct selection:  <ul style="list-style-type: none"> <li>• NPN - Normally Open</li> <li>• NPN - Normally Closed</li> <li>• PNP - Normally Open</li> <li>• PNP - Normally Closed</li> </ul>	<b>Power LED:</b> OFF <b>Mode LED:</b> Flashes to indicate currently selected mode (120 second time out <sup>2</sup> )	<ul style="list-style-type: none"> <li>• Single-pulse for NPN - Normally Open</li> <li>• Double-pulse for NPN - Normally Closed</li> <li>• Triple-pulse for PNP - Normally Open</li> <li>• Quad-pulse for PNP - Normally Closed</li> </ul>	<b>Power LED:</b> ON Green <b>Mode LED:</b> ON to indicate currently selected mode (Sensor returns to RUN mode)
<b>Save and Activate Mode</b>	Push and hold MODE push button for > 2 seconds 	<b>Power LED:</b> ON Green <b>Mode LED:</b> ON Amber for selected mode	No action required; sensor will return to Run Mode	None

## Teaching Minimum and Maximum Limits

### General Notes on Teaching

- The sensor will return to RUN mode if the first TEACH condition is not registered within 120 seconds after the initial 2 second hold on the Discrete push button.
- To exit TEACH mode without saving any changes, press and hold the Discrete push button or remote line longer than 2 seconds (before teaching the second limit). The sensor will revert to the last saved limits.

<sup>2</sup> The sensor will revert to previously saved configuration and return to RUN mode if TEACH is inactive for 120 seconds after the initial 2 second hold on push button

- After the first limit is taught, the sensor will remain in TEACH mode until the TEACH sequence is finished or exited by a 2 second hold on the Discrete push button or remote line.

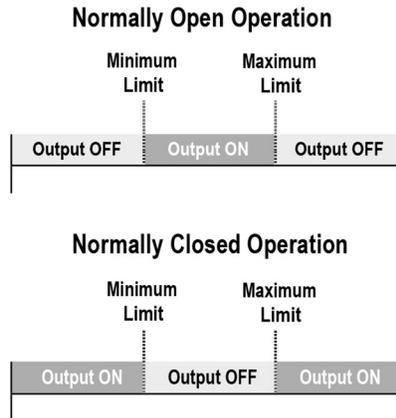


Figure 2. Teaching independent minimum and maximum limits

	Push Button 0.04 sec. < "click" < 0.8 sec.		Remote Line 0.04 sec. < T < 0.8 sec.	
	Procedure	Result	Procedure	Result
<b>TEACH Mode</b>	Push and hold the Discrete push button longer than 2 seconds	<b>Power LED:</b> OFF <b>Output LED:</b> ON	No action required; sensor is ready for first limit teach	None
<b>Teach First Limit</b>	Position the target for the first limit (120 second time out)	<b>Signal LED:</b> Must be ON Red or Flashing Red <sup>3</sup>	Position the target for the first limit	<b>Signal LED:</b> Must be ON Red or Flashing Red <sup>3</sup>
	"Click" the Discrete push button	<b>Teach Accepted</b> <b>Power LED:</b> OFF <b>Output LED:</b> Flashing <b>Teach Not Accepted</b> <b>Output LED:</b> ON	Single-pulse the remote line 	<b>Teach Accepted</b> <b>Power LED:</b> OFF <b>Output LED:</b> Flashing <b>Teach Not Accepted</b> <b>Power LED:</b> ON
<b>Teach Second Limit</b>	Position the target for the second limit (no time out)	<b>Signal LED:</b> Must be ON Red or Flashing Red	Position the target for the second limit (no time out)	<b>Signal LED:</b> Must be ON Red or Flashing Red
	"Click" the Discrete push button	<b>Teach Accepted</b> <b>Output LED:</b> ON or OFF, depending on NO or NC Mode <b>Power LED:</b> ON <b>Teach Not Accepted</b> <b>Output LED:</b> Flashing <b>Power LED:</b> OFF	Single-pulse the remote line 	<b>Teach Accepted</b> <b>Output LED:</b> ON or OFF, depending on NO or NC Mode <b>Power LED:</b> ON <b>Teach Not Accepted</b> <b>Output LED:</b> Flashing <b>Power LED:</b> OFF

## Teaching Limits Using the Auto-Window Feature

Teaching the same limit twice automatically centers a window on the taught position (see *Figure 4. Window Size* on page 5 for window sizes).

### General Notes on Teaching

- The sensor will return to RUN mode if the TEACH condition is not registered within 120 seconds after the initial 2 second hold on the Discrete push button.
- To exit TEACH mode without saving any changes, press and hold the Discrete push button or remote line longer than 2 seconds (before teaching the second limit). The sensor will revert to the last saved limits.
- After the first limit is taught, the sensor will remain in TEACH mode until the TEACH sequence is finished or exited by a 2 second hold on the Discrete push button or remote line.

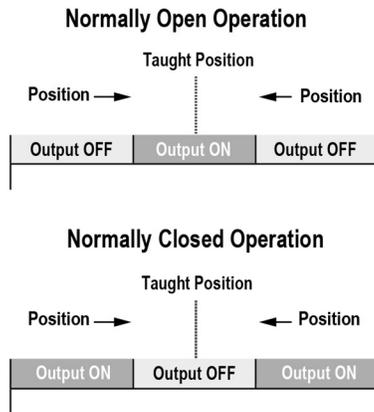


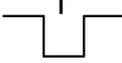
Figure 3. Using the Auto-Window feature for teaching each output

Models	Window
"A" suffix	± 10 mm (0.4 in)
"B" suffix	± 20 mm (0.8 in)
"A" suffix	± 30 mm (1.2 in)

Figure 4. Window Size

	Push Button 0.04 sec. < "click" < 0.8 sec.		Remote Line 0.04 sec. < T < 0.8 sec.	
	Procedure	Result	Procedure	Result
<b>TEACH Mode</b>	Push and hold the Discrete push button longer than 2 seconds 	<b>Power LED:</b> OFF <b>Output LED:</b> ON	No action required; sensor is ready for first limit teach	None
<b>Teach First Limit</b>	Position the target for the center of window (120 second time out)	<b>Signal LED:</b> Must be ON Red or Flashing Red <sup>4</sup>	Position the target for the center of window	<b>Signal LED:</b> Must be ON Red or Flashing Red <sup>4</sup>
	"Click" the Discrete push button 	<b>Teach Accepted</b> <b>Power LED:</b> OFF <b>Output LED:</b> Flashing <b>Teach Not Accepted</b> <b>Output LED:</b> ON	Single-pulse the remote line 	<b>Teach Accepted</b> <b>Power LED:</b> OFF <b>Output LED:</b> Flashing <b>Teach Not Accepted</b> <b>Output LED:</b> ON
<b>Re-Teach Limit</b>	Without moving the target, "click" the Discrete push button again 	<b>Teach Accepted</b> <b>Output LED:</b> ON or OFF, depending on NO or NC Mode	Without moving the target, single-pulse the remote line again	<b>Teach Accepted</b> <b>Output LED:</b> ON or OFF, depending on NO or NC Mode

<sup>4</sup> Sensor will not Teach or indicate "Teach Not Accepted" when there is no signal present (Signal LED Red or Flashing Red)

	Push Button 0.04 sec. < “click” < 0.8 sec.		Remote Line 0.04 sec. < T < 0.8 sec.	
	Procedure	Result	Procedure	Result
		Power LED: ON Teach Not Accepted Output LED: Flashing Power LED: OFF		Power LED: ON Teach Not Accepted Output LED: Flashing Power LED: OFF

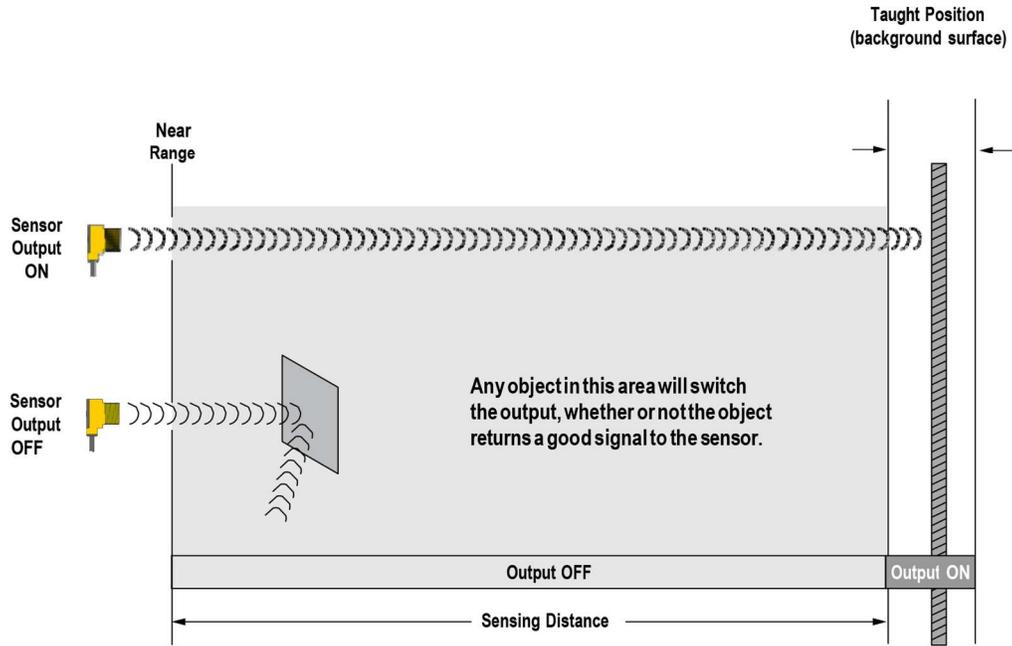


Figure 5. An application for the Auto-Window feature (retroreflective mode)

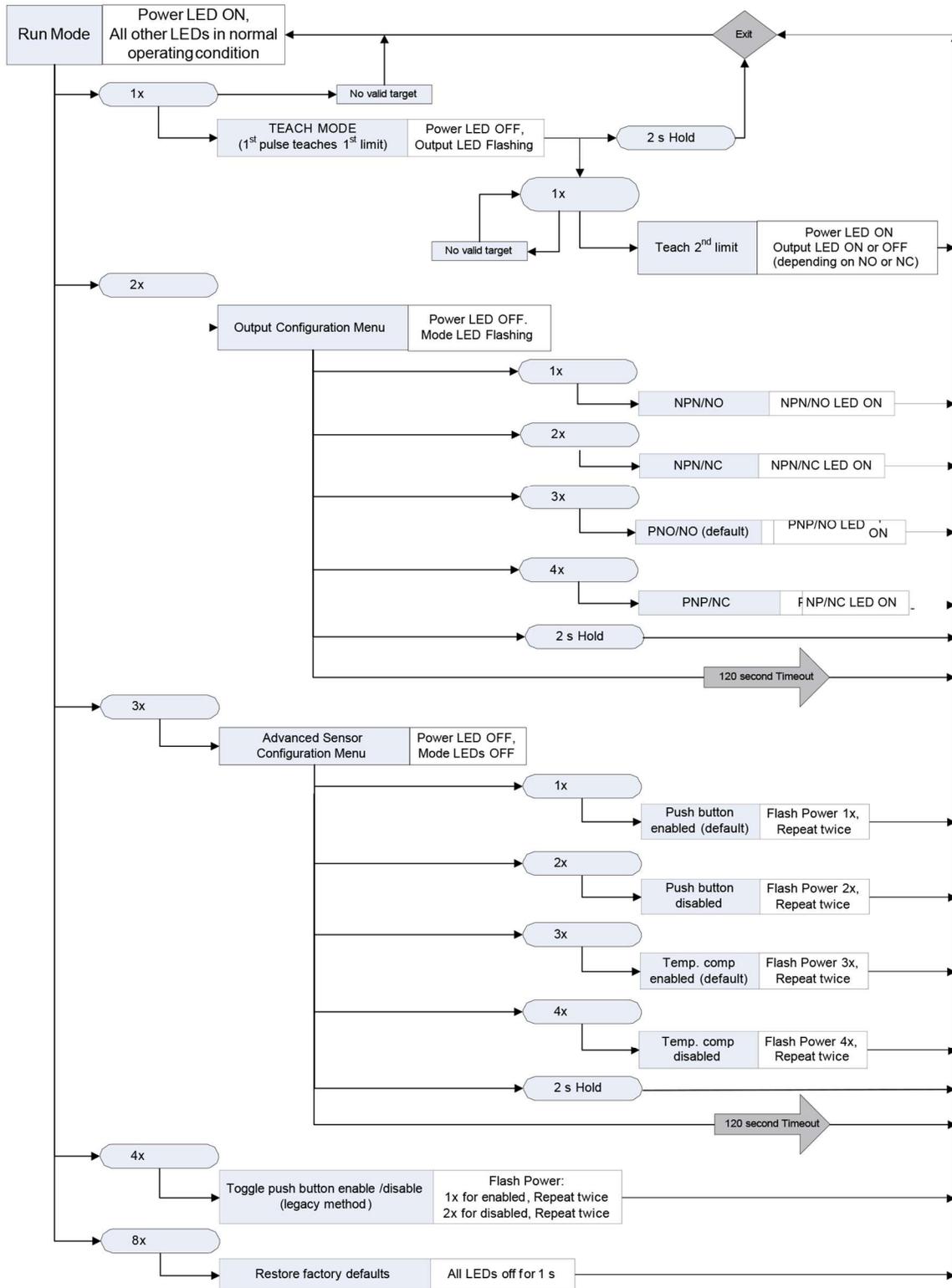
## Remote Line TEACH

### General Notes

- Run Mode is the sensor’s normal operating condition
- The duration of each Pulse is defined as “T”: **0.04 < T < 0.8 s**



- A Hold will exit TEACH MODE and return to Run Mode with previously saved changes. The duration of a Hold is: **T > 2 s**
- A Timeout will occur if a condition is not registered within 120 seconds, causing the sensor to return to Run Mode (during sensor configuration only)
- Sensor configuration user feedback shown on Green LED. See flowchart.
- The Red Signal LED will be ON whenever the target is in view.



## Specifications

### Sensing Range

- “A” suffix models: 100 mm to 1 m (3.9 in to 39 in)
- “B” suffix models: 200 mm to 2 m (7.8 in to 78 in)
- “C” suffix models: 300 mm to 3 m (11.8 in to 118 in)

### Ultrasonic Frequency

- “A” suffix models: 224 kHz
- “B” suffix models: 174 kHz
- “C” suffix models: 114 kHz

### Supply Voltage

10 to 30V dc (10% max. ripple) at 40 mA, exclusive of load

### Supply Protection Circuitry

Protected against reverse polarity and transient voltages

### Output Configuration

**Discrete (switched) output models:** SPST solid-state switch. Configurable as NPN (sinking) or PNP (sourcing) via Mode push button. Normally Open (NO) or Normally Closed (NC) operation is also selectable via Mode push button (see [Mode Setup - Output Configuration](#) on page 3).  
The default setting is PNP/NO

### Output Rating

- Discrete output models:** 100 mA max.
- OFF-state leakage current:** NPN: < 200  $\mu$ A at 30V dc (see NOTE 1); PNP: < 10  $\mu$ A at 30V dc
- ON-state saturation voltage:** NPN: < 1.6V at 100 mA; PNP: < 3V at 100 mA

### Output Protection Circuitry

Protected against short circuit conditions

### Output Response Time

- “A” suffix models: 45 ms
- “B” suffix models: 92 ms
- “C” suffix models: 135 ms

### Delay at Power-up

500 ms

### Temperature Effect

0.02% of distance/ $^{\circ}$ C

### Repeatability

- “A” suffix models: 0.1% of distance (0.5 mm min.)
- “B” suffix models: 0.1% of distance (1.0 mm min.)
- “C” suffix models: 0.1% of distance (1.5 mm min.)

### Sensing Hysteresis

- “A” suffix models: 2 mm
- “B” suffix models: 3 mm
- “C” suffix models: 4 mm

### Minimum Window Size

10 mm (0.4 in)

### Adjustments

**Sensing window limits:** TEACH-Mode of near and far window limits may be set using the push button or remotely via TEACH input.

**Output Configuration:** NPN, PNP, Normally Open (NO), Normally Closed (NC) select (see [Mode Setup - Output Configuration](#) on page 3 or [Remote Line TEACH](#) on page 6).

**Advanced configuration options:** Push button enabled/disabled, temperature compensation enabled/disabled (see [Remote Line TEACH](#) on page 6)

### Indicators

See [Figure 1. Features](#) on page 2

### Construction

- Housing:** PBT polyester
- Push buttons:** polyester
- Transducer:** epoxy /ceramic composite

### Environmental Rating

Leakproof design, rated IP67 (NEMA 6)

### Connections

2 m (6.5 ft) or 9 m (30 ft) shielded 4-conductor (with drain) PVC cable, 150 mm (6 in) PUR Euro-style pigtail (QPMA), or 4-pin integral Euro-style connector (Q8)

### Operating Conditions

- Temperature:**  $-40^{\circ}$  to  $+70^{\circ}$  C ( $-40^{\circ}$  to  $+158^{\circ}$  F)
- Humidity:** 95% at  $+50^{\circ}$  C (non-condensing)

### Vibration and Mechanical Shock

All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06 in, max acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration, half sine wave

### Application Note

The temperature warmup drift upon power-up is less than 1% of the sensing distance.

### Certifications

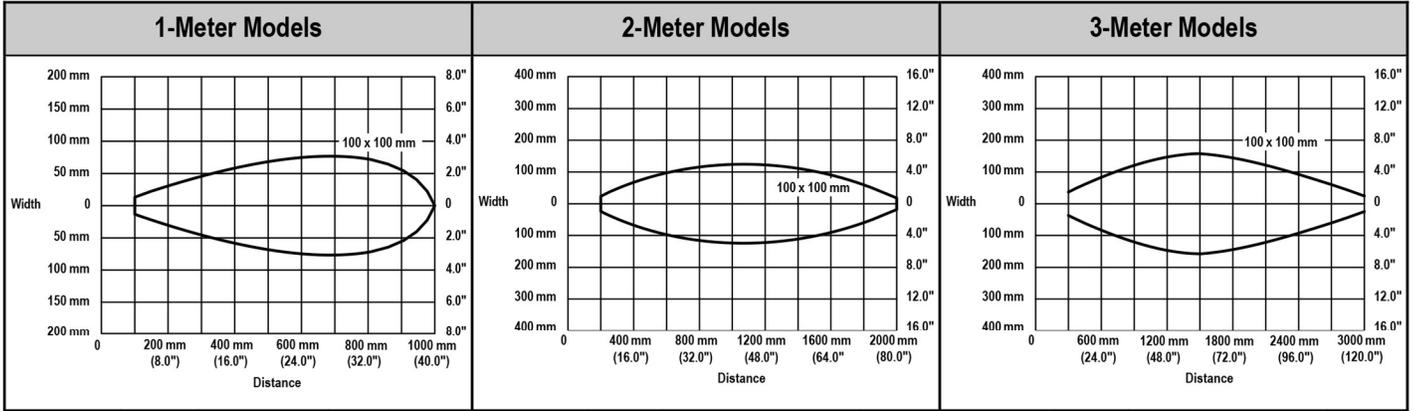
CE Pending



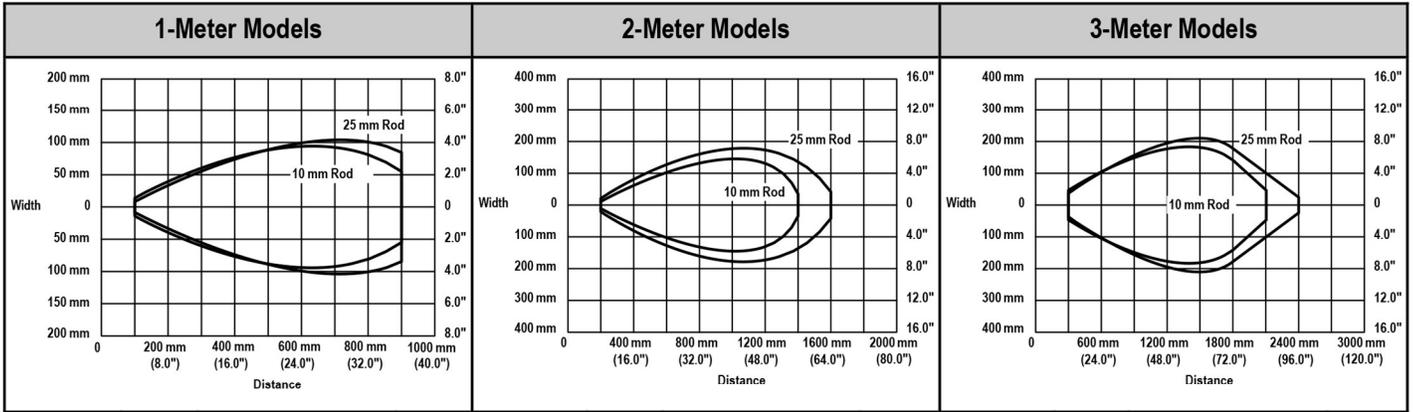
**NOTE 1:** NPN < 200  $\mu$ A for load impedance > 3 k $\Omega$ ; for load current of 100 mA, leakage < 1% of load current

## Performance Curves

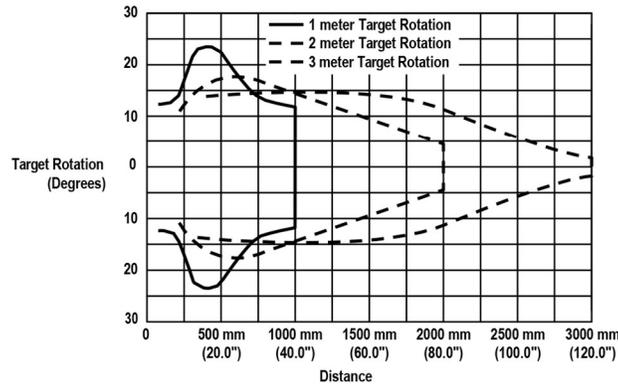
### With Plate Target (Typical)



### With Rod Target (Typical)

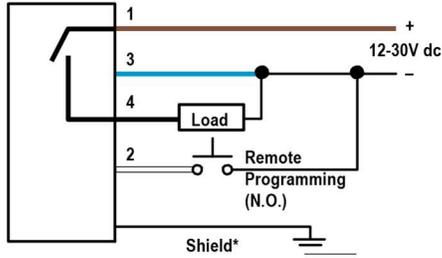


## Maximum Target Rotation Angle



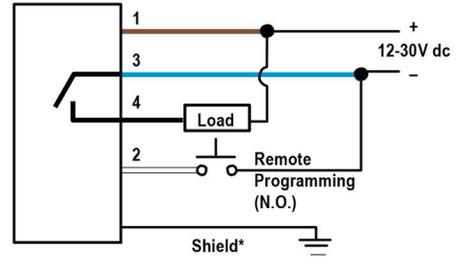
# Hookups

## NPN (Sinking) Output Selected



\* It is recommended that the shield wire be connected to either earth ground or DC common.

## PNP (Sourcing) Output Selected

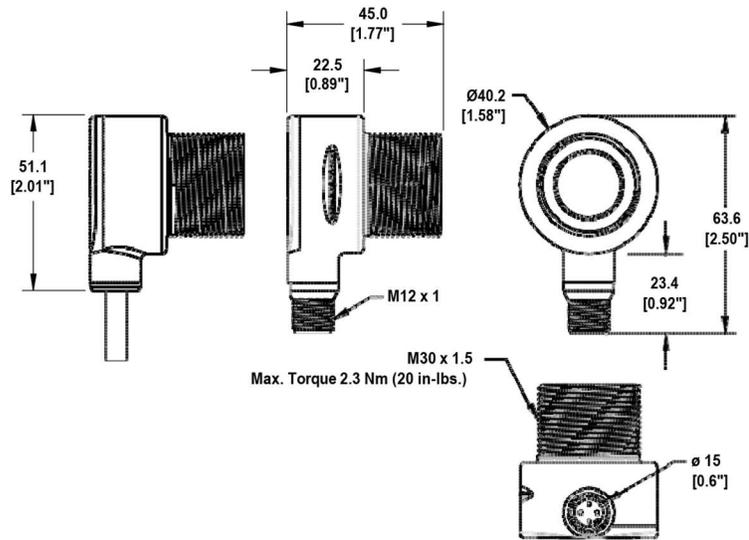


\* It is recommended that the shield wire be connected to either earth ground or DC common.

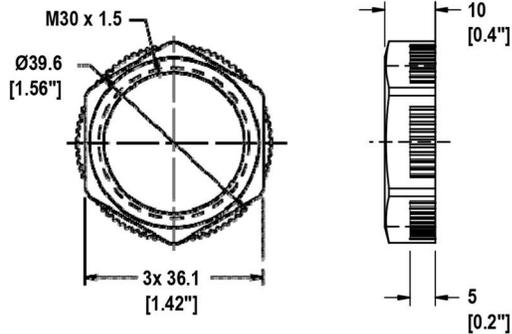
Cable and QD hookups are functionally identical.

It is recommended that the shield wire be connected to earth ground. Shielded cordsets are recommended for all QD models.

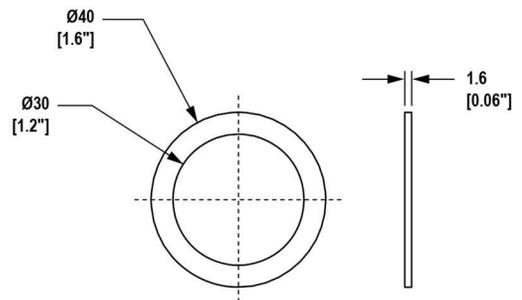
# Dimensions



## Locknut (included with all models)



## Washer (included with all models)



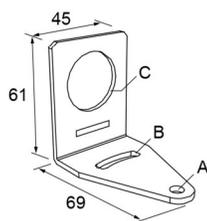
## Quick-Disconnect Cables

4-Pin Threaded M12/Euro-Style Cordsets with Shield				
Model	Length	Style	Dimensions	Pinout
MQDEC2-406	1.83 m (6 ft)	Straight		<p>1 = Brown 2 = White 3 = Blue 4 = Black</p>
MQDEC2-430	9.14 m (30 ft)			
MQDEC2-406RA	1.83 m (6 ft)	Right-Angle		
MQDEC2-415RA	4.57 m (15 ft)			
MQDEC2-430RA	9.14 m (30 ft)			

## Brackets

### SMB30A

- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (1/4 in) hardware
- Mounting hole for 30 mm sensor
- 12-ga. stainless steel

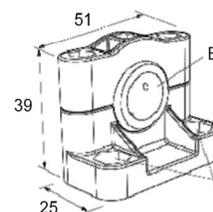


**Hole center spacing:** A to B=40

**Hole size:** A=∅ 6.3, B= 27.1 x 6.3, C=∅

### SMB1815SF

- Swivel with set screws for mounting sensors by the cable hub
- Black reinforced thermo-plastic polyester
- Stainless steel swivel locking hardware and hex wrench included

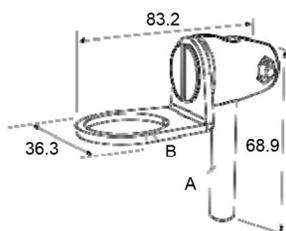


**Hole center spacing:** A = 36.0

**Hole size:** A = ∅ 5.0, B = ∅

### SMB30FA

- Swivel bracket with tilt and pan movement for precise adjustment
- Mounting hole for 30 mm sensor
- 12-ga. 304 stainless steel
- Easy sensor mounting to extrude rail T-slot
- Metric and inch size bolt available

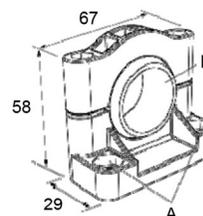


**Bolt thread:** SMB30FA, A= 3/8 - 16 x 2 in; SMB30FAM10, A= M10 - 1.5 x 50

**Hole size:** B= ∅ 30.1

### SMB30SC

- Swivel bracket with 30 mm mounting hole for sensor
- Black reinforced thermo-plastic polyester
- Stainless steel mounting and swivel locking hardware included



**Hole center spacing:** A=∅ 50.8

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