MST / MSTX
MAXIMUM SECURITY TURNSTILE

INSTRUCTIONS AND MAINTENANCE GUIDE
Revision 1.3 - April 30, 2002

Serial Number: _____

Alvarado Manufacturing Company, Inc.

ALVARADO

TABLE OF CONTENTS

IMPORTANT SAFETY WARNINGS

WARNING: Always follow installation and operating precautions, including the following:

- Read this manual in its entirety before installing or operating the turnstile. If there are questions, you may contact Alvarado at (909) 561-8431 (US) during normal business hours.
- Use only skilled individuals to install and service the turnstile.
- The turnstile is not a toy. Do not allow children to play on or near the turnstile. Do not allow horseplay near the turnstile.
- Follow a proper maintenance schedule using skilled individuals.
- Do not operate the turnstile if it is damaged in any manner. Have the turnstile repaired or adjusted by a skilled service person before use.
- Do not alter the turnstile.
- For electrically controlled units, which do not have self-centering, do not remove or disable lock arms. If controlled access is desired in only one direction, install a pushbutton (available from Alvarado) to control access in the opposite direction.
- For electrically controlled units, which do not have self-centering, do not use mechanical key overrides to allow uncontrolled passage unless the access control system or turnstile is malfunctioning. Mechanical key overrides are intended for limited use in special situations under the direction of operating management (i.e. gate attendant). Have the access control system or turnstile repaired immediately.
- Do not operate the turnstile unless the friction brake is operating and adjusted correctly.
- If a self-centering option is utilized, do not operate the turnstile unless the self-centering unit is operating and adjusted correctly.
- Do not use non-Alvarado parts when repairing the turnstile.
- In access control application, train personnel that will be using the turnstile in the proper method of operation. Ensure that as new users are added, they are properly trained. (See Turnstile Operation/User Instructions Section)

SAVE THESE INSTRUCTIONS

COMPONENTS INCLUDED WITH ORDER

If your turnstile is an MST-1 or MST-2

1. Roto
2. Top Channel
3. Yoke Guard Plate
4. Yoke
5. OV
6. This Manual
7. Base Package
   - Qty 1 – Bottom bearing housing
   - Qty 1 – Base cover
   - Qty 1 – Bottom bearing
   - Qty 4 – ½ -13 x 1” hex head cap screw
   - Qty 2 – ½ -13 x 2¾ ” HHCS (all thread)
   - Qty 10 –#10 x ¾” round head Phillips sheet metal screw
   - Qty 6 – ½ - 13 hex nut
   - Qty 6 – ½ medium split lock washer
8. Anchor Package
   - Qty 11 – 3/8 anchors 2” length
   - Qty 3 – 3/8 -16 x 4½” HHCH
   - Qty 8 – 3/8 -16 x 4½” HHCH
   - Qty 11 – 3/8 flat washers

If your turnstile is an MST-3, an MSTX-4X, an MSTX-5X or MSTX-6X

1. Roto
2. Top Channel
3. Yoke Guard Plate
4. Yoke
5. OV
6. This Manual
7. Base Package
   - Qty 1 – Top bearing cover
   - Qty 1 – Bottom bearing housing
   - Qty 1 – Base cover
   - Qty 1 – Bottom bearing
   - Qty 5 – 10-32 x ½” allen head screw
   - Qty 1 – ½ -13 x 1” hex head cap screw
   - Qty 2 – ½ -13 x 1½” HHCS
   - Qty 2 – ½ -13 x 2¾” HHCS (all thread)
   - Qty 10 - #10 x ¾” round head Phillips sheet metal screw
   - Qty 5 – ½ - 13 hex nut
   - Qty 5 – ½ medium split lock washer
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   - Qty 11 – 3/8 anchors 2” length
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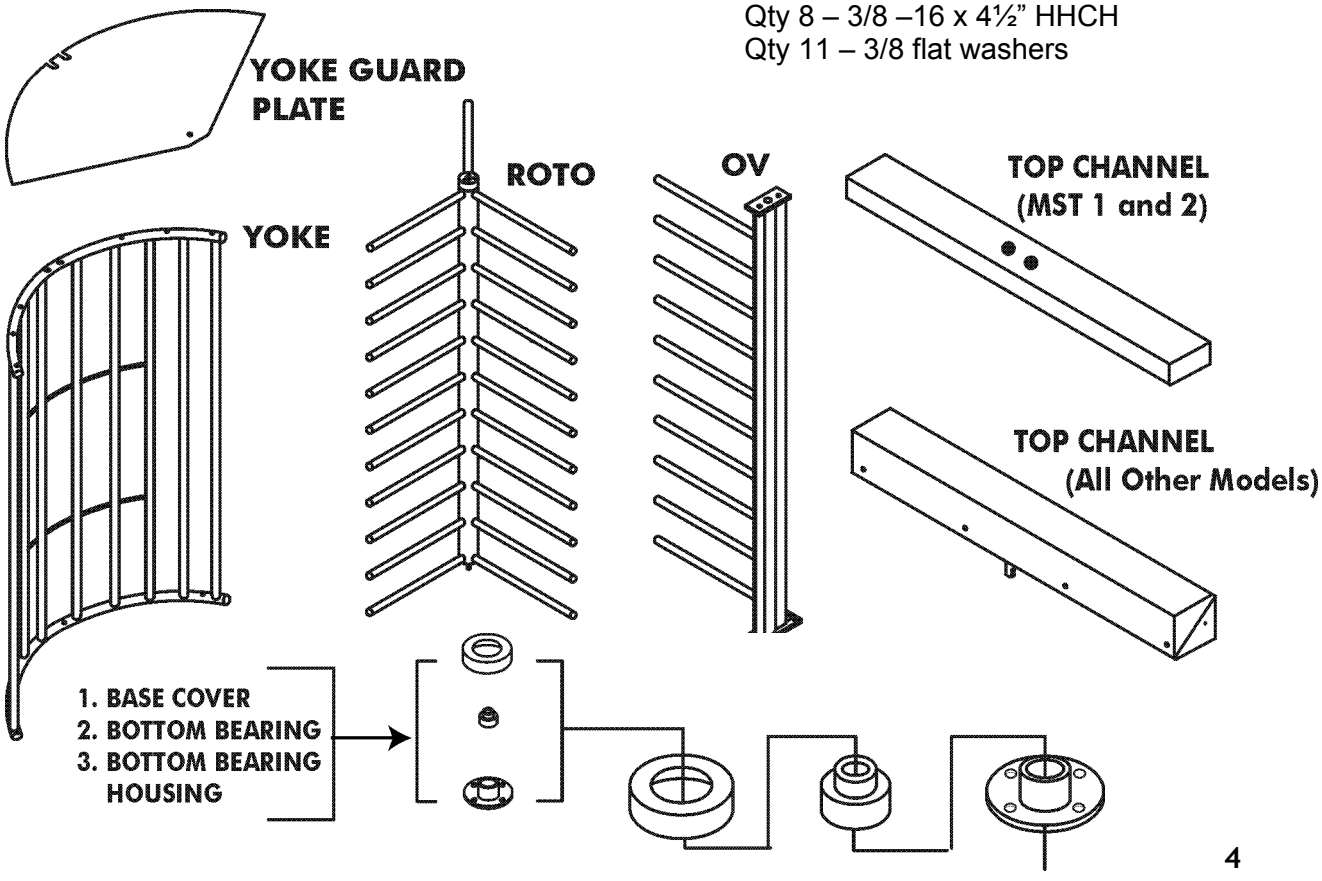
   - Qty 11 – 3/8 flat washers



INSTALLING THE MST TURNSTILE

TOOLS REQUIRED

Heavy Duty Drill
Or Roto Hammer
Twist Drill
Torque Wrench
5/8" Concrete Drill Bit
#25 (.1495) Drill Bit
9/16" Combination Wrench
Ratchet with 9/16" and
¾" Socket
Chalk
Tape Measure
1/8 Allen Wrench
Plumb Bob
Mallet
Torpedo Level
Shop Vac
Torpedo Level
Mobilgrease XHP 222
w/Moly or equivalent
Safety Glasses

OVERVIEW OF INSTALLATION

1. Determine turnstile location, taking into account the turnstile dimensions, power requirements and activation wiring.
2. Mark the installation location for the components using chalk.
3. Run turnstile wiring.
4. Anchor turnstile components.
5. Connect power.
6. Connect activation leads.

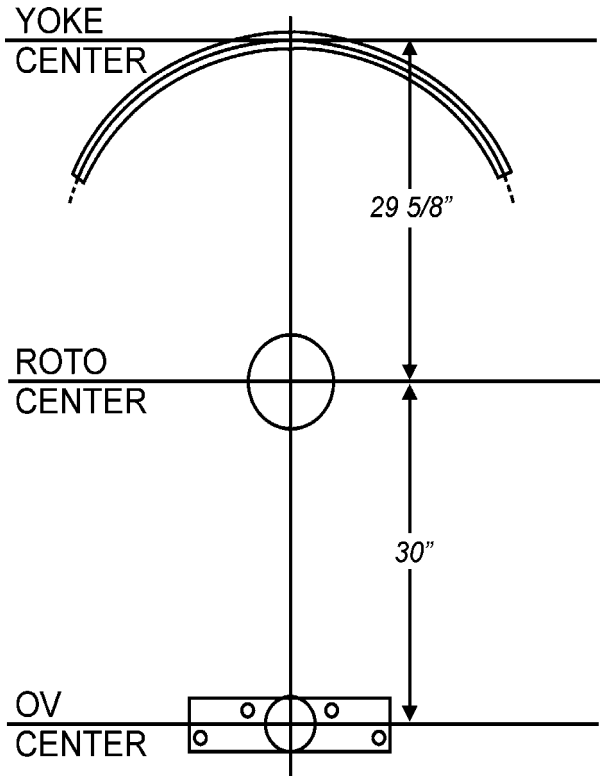
PAD REQUIREMENTS
6' x 6' LEVEL CONCRETE PAD - MINIMUM THICKNESS 4"
DO NOT INSTALL INTO ASPHALT

LAYOUT

1. Determine where to install the turnstile. Note the minimum width and height openings on detailed drawings. Draw a 6 ft. chalk line to mark the centerline of the turnstile. See Fig. 1.

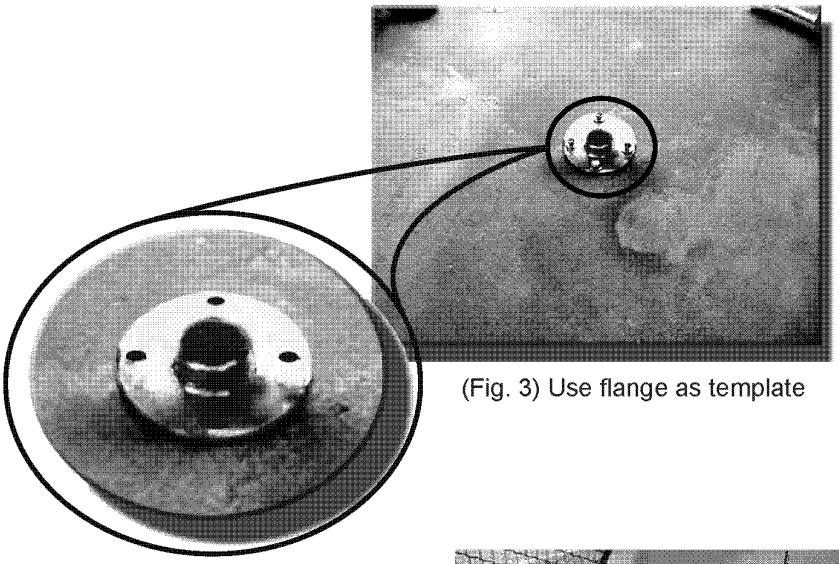
(Fig. 1) Locating and marking the general positions of the Yoke, Roto and OV section.

2. Using the turnstile anchoring view drawing on page 27, mark the exact locations (along the turnstile centerline) of the roto center, the center yoke hole, and the OV centerline. See also Fig. 2.



(Fig. 2) Anchoring locations.

INSTALLATION continued

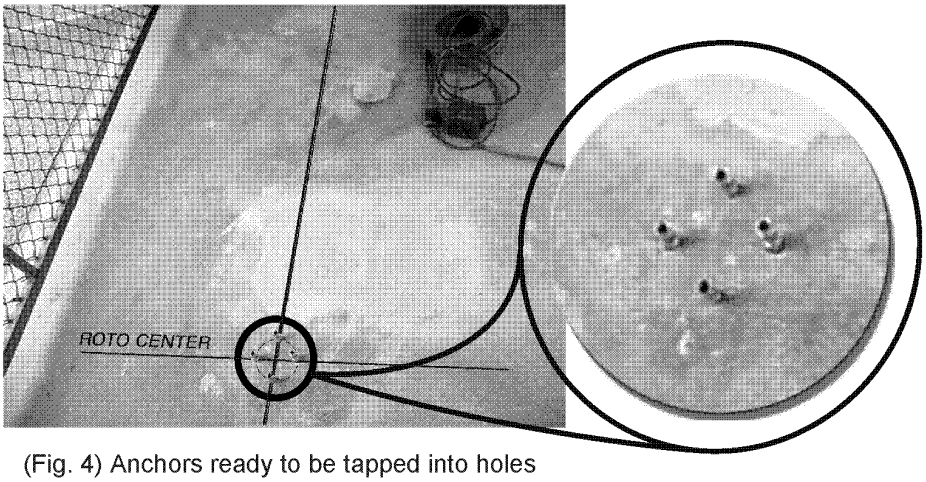


(Fig. 3) Use flange as template

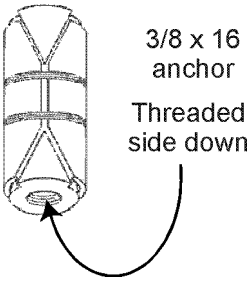
INSTALLATION OF ROTO BOTTOM BEARING HOUSING

3. Locate and chalk mark the four anchor holes for the roto bearing housing, using the bearing housing as a template. (See Fig. 3) Drill the four 5/8" dia. holes for the roto bearing housing. All holes should be drilled a minimum of 3" deep. Terrazzo, brick veneer, thick tile, see page 26 for additional instructions.

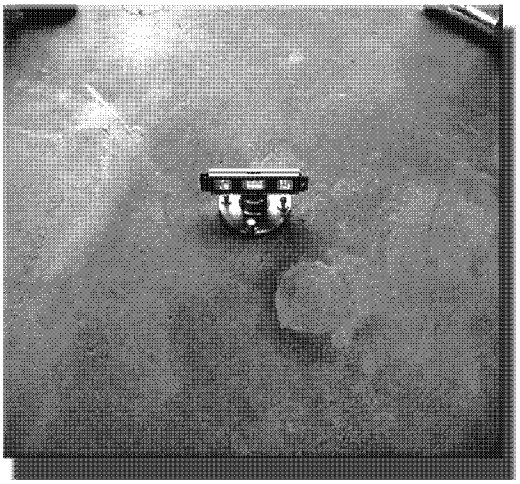
4. Clean the holes and insert one anchor in each hole flush with the floor. (See Fig. 4) NOTE: Insert anchors with threads down.



(Fig. 4) Anchors ready to be tapped into holes



5. Place the bearing housing over its respective anchor holes and anchor it using four (4) 3/8" x 2 ½" bolts and flat washers. Make sure that the housing is level. Shim as needed. (See Fig 5).

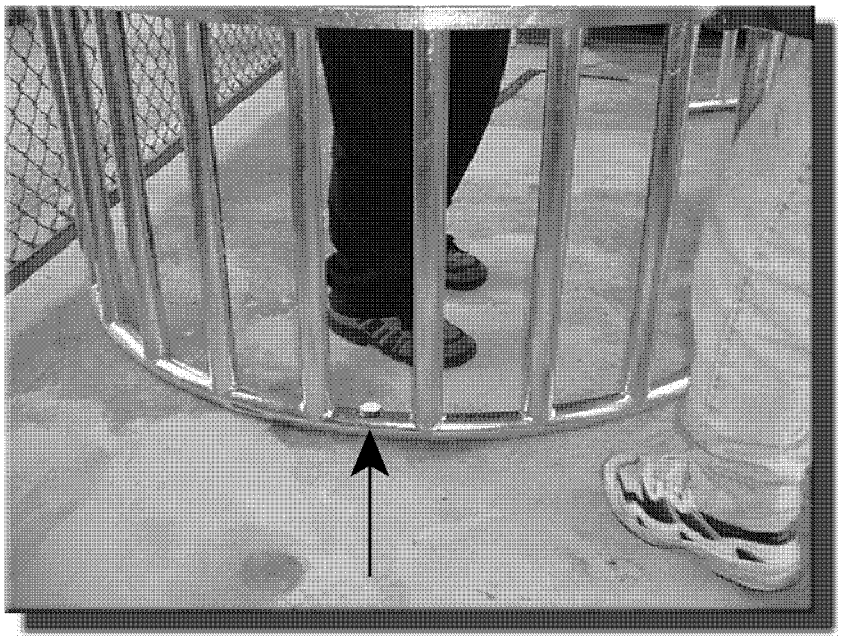


(Fig. 5) Lower bearing housing

INSTALLATION continued

INSTALLATION OF YOKE

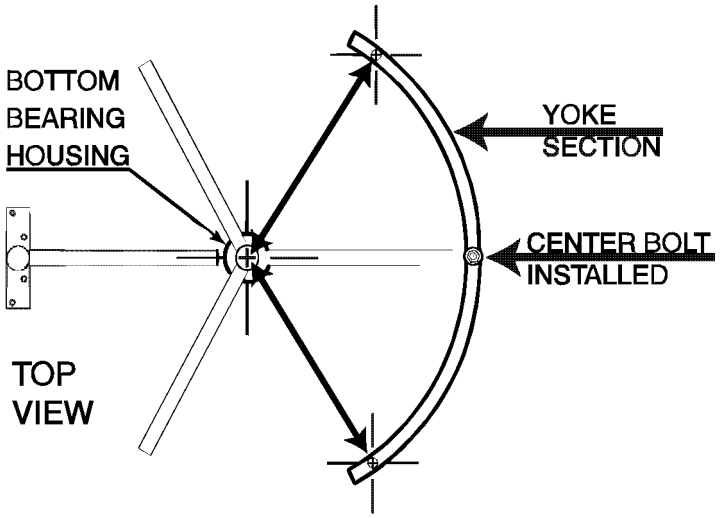
6. Drill a 5/8” hole 3” deep marked at the yoke center chalk line. Clean hole and install anchor. Install the yoke center bolt using a 3/8-16 x 4½” HHCS and washer through the hole of the yoke over the center anchor hole and hand tighten. (Fig. 6) Pivot the yoke and measure the distance from the center of the bottom bearing housing to the center of each of the other two yoke holes, making sure the distance is the same to each. This “sparing of the yoke” is necessary so that the entrance and exit are equal in distance. (See Fig 7)



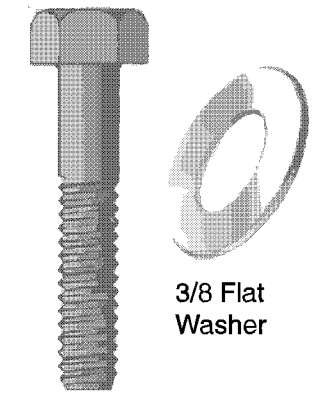
(Fig. 6) Yoke mounting with the center bolt only

7. Mark the yoke mounting holes. Drill and clean and insert one anchor into each hole. Pivot the yoke with the center bolt installed to clean, drill and install anchors. Anchor the yoke. Mount using three (3) 3/8-16 x 2½” HHCS and three (3) 3/8” flat washers.

8. Using a torpedo level ensure that the yoke is vertical. Shim as needed.



(Fig. 7) Measuring from center of bearing housing to outer yoke holes to equalize distance

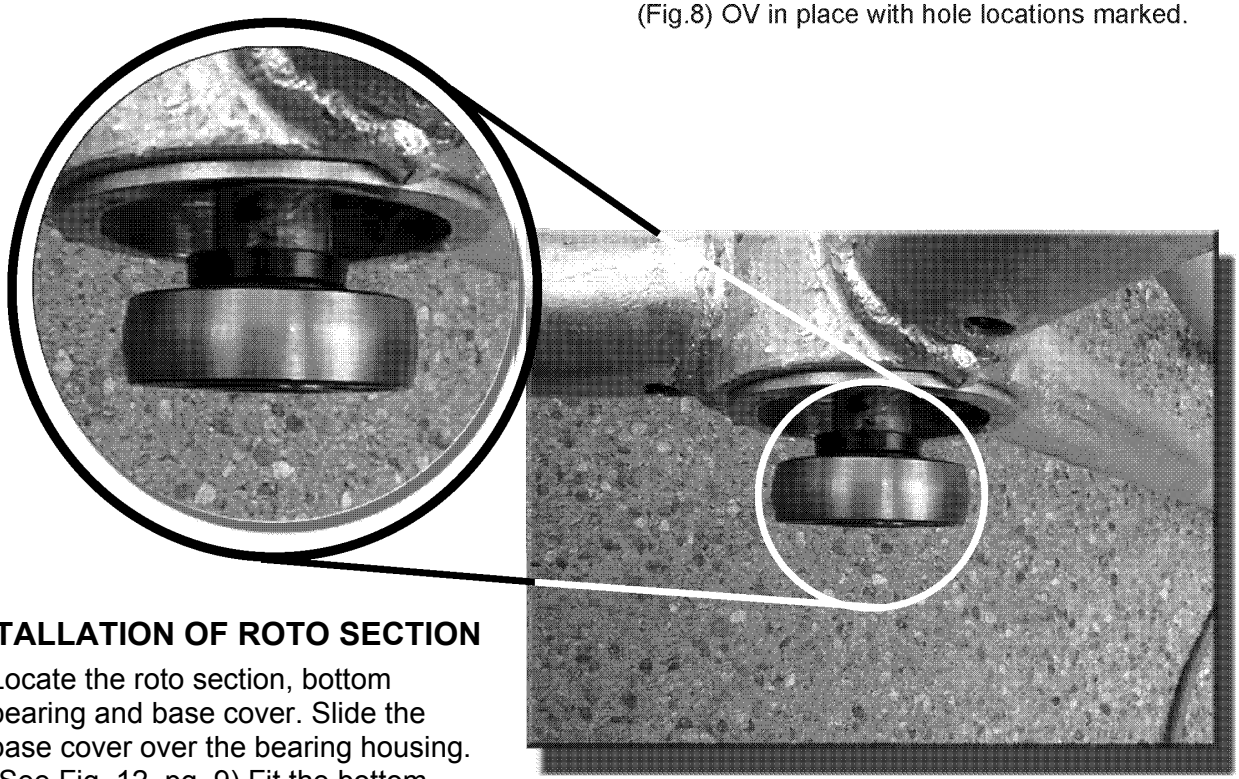


INSTALLATION continued

INSTALLATION OF OV

9. Slide the OV section into position. (See Fig. 8) (the position should have been marked when the first chalk lines were made.) Mark the location of the four anchoring holes for the OV. Remove the OV and drill the four marked holes (5/8" holes, 3" deep). Insert one anchor in each hole, tapping anchor flush with the ground so it is level. Then reposition OV over its anchoring locations. Anchor the OV using four (4) 3/8-16 x 2½" HHCS and washers. Check for level and plumb using a torpedo level.

(Fig.8) OV in place with hole locations marked.

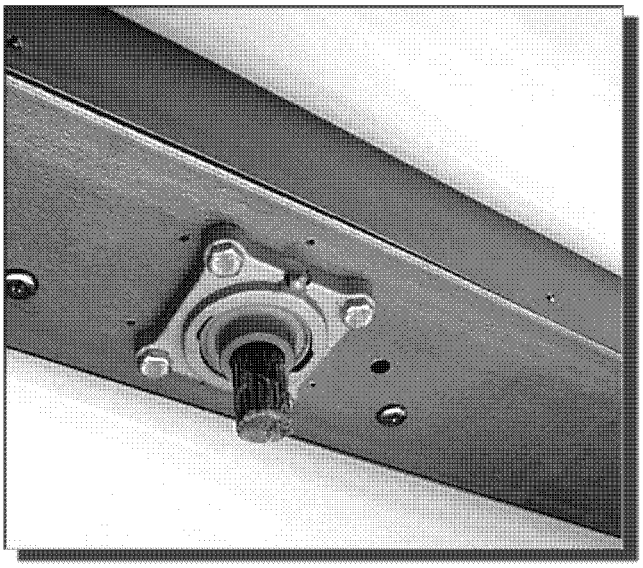


(Fig.9) Bottom bearing in correct position (flange "up")

INSTALLATION OF ROTO SECTION

10. Locate the roto section, bottom bearing and base cover. Slide the base cover over the bearing housing. (See Fig. 12, pg. 9) Fit the bottom bearing into the roto shaft. Note: the flange portion of the bearing fits "up" into the roto.

INSTALLATION continued

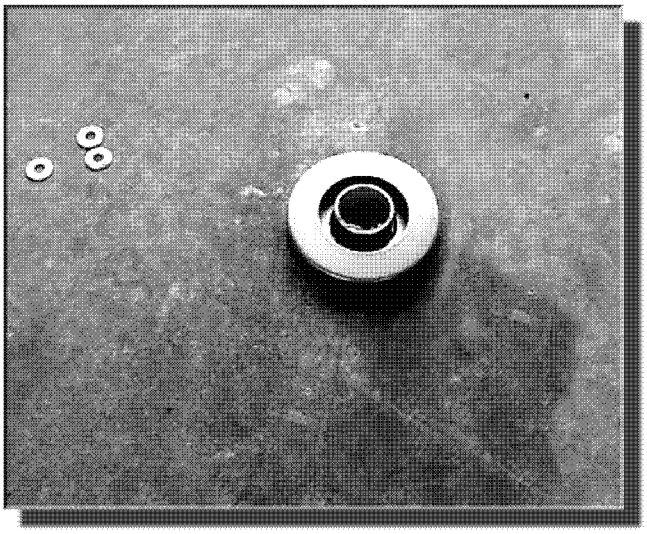


(Fig. 10) Shaft greased and ready to be set on turnstile.

11. Apply a light coating of grease to the shaft mounted on the channel and the interior spline of the roto to assist in the sliding together of these pieces. (See Figs. 10 & 11)

(Fig. 11) Greased roto section ready for install.

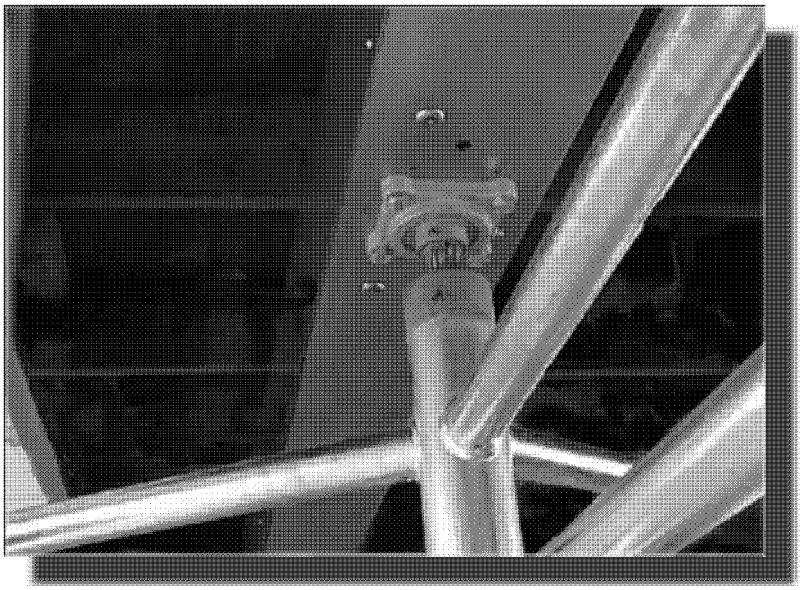
12. Grease interior portion of the bearing housing and place bearing housing cover over housing. (See Fig. 12)



(Fig. 12) Bearing housing and cover ready for roto section.

13. Place the roto section into the bearing housing. Make sure the bearings turn freely and there is no binding.

INSTALLATION continued



(Fig. 13) Top channel installation with splined shaft fitting into roto.

INSTALLATION OF TOP CHANNEL

14. With a person holding the roto section upright, lower the top channel on top of the yoke and the roto. (See Fig. 13 & note below)

NOTE: The shaft is missing a valley in the splines. Align this area with the additional ridges in the roto portions. The correct placement will have the roto unit with one set of arms directly in the middle part of the yoke section. The fit is often very tight. Use a mallet to seat the top channel and shaft while moving the roto.

PLEASE NOTE: Hit the shaft only on the center section of the shaft. Hitting the brake unit or the self-centering unit will only damage these parts and will not aid in installation.

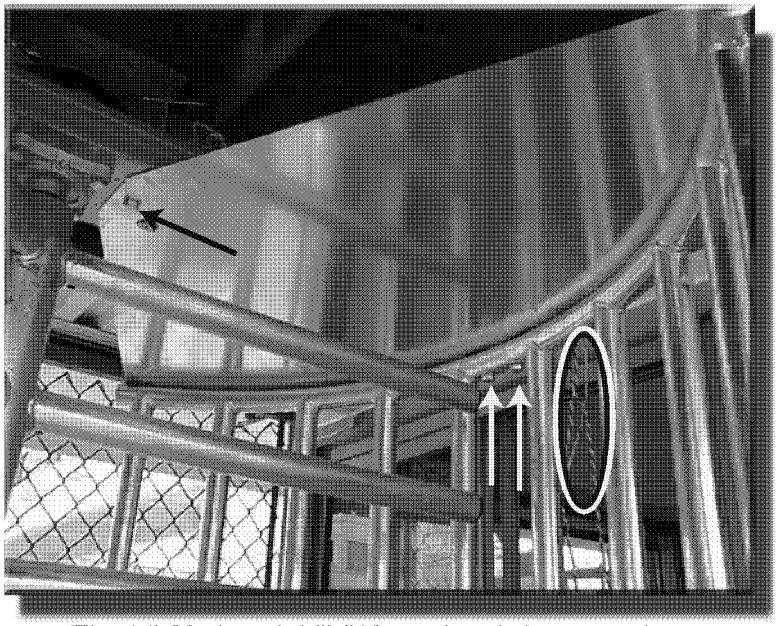
INSTALLATION continued

15. Attach the top channel to the yoke using two (2) ½ -13 x 1½" bolts, washers and nuts. (See white arrows in Fig. 14) Do not tighten at this point.

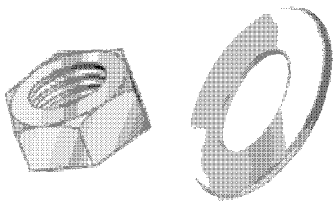
    Note: If turnstile has a card reader, run wires through the yoke with pre-installed feeder wire. Feed wires through to the inside of top channel. Use outer holes in top channel for wire placement. (See circled area in Fig. 14)

16. Attach the top channel to the OV section using two (2) ½ -13 x 1½" HHCS, nuts and washers.

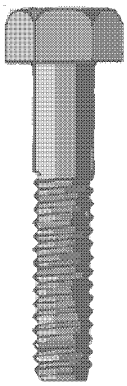
17. Slide the yoke guard plate slotted end first, between the top channel and the yoke. Ensure that the feeder wire is not being pinched between the top channel and the yoke and yoke plate. Secure using one (1) ½ -13 x 1" HHCS, nut and lockwasher. (See black arrow in Fig 14)



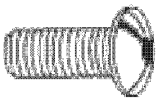
(Fig. 14) Mark and drill #10 pan head sheet metal screws. Yoke guard plate attached.



1/2" NUT 1/2" WASHER



1/2'-13 X 3 3/4 HHCS



10-32 x 1/2 Allen Head Screw

#10 x 3/4" Pan Head Sheet Metal Screw

18. Tighten all anchoring bolts to 20 ft-lbs. (11 total) to check the plumb of the turnstile. Shim as necessary, then tighten bolts securely.

19. Mark locations for six holes on the yoke guard plate. Drill a .1495" dia. (#25 drill bit) hole in the locations marked. Drill the pilot hole through both the yoke guard plate and the top of the upper yoke arm. Attach the yoke guard plate to the yoke arm with six (6) #10 x ¾" pan head slotted sheet metal screws.

20. Attach top bearing cover with five (5) 10-32 x ½" allen head screws.

21. Check friction break mechanism by holding the lock arm open and rotating the turnstile. There should be a small amount of drag (3 to 6 lbs). If adjustment is necessary, follow the instructions on page 31.
    NOTE: Friction brake is not present on self-centering units. See page 37 for self-centering adjustment information

22. For electrical connections, refer to wiring diagrams listed on pages 12 through 25.

23. Reattach the top channel cover

24. Recheck the brake tension approximately two weeks after installation and re-adjust if necessary.

ELECTRICAL AND ACTIVATION WIRING INSTRUCTIONS

TOOLS REQUIRED: Wire Stripper

PARTS REQUIRED: Wire Nuts

INSTRUCTIONS

(NOTE: USE ONLY SKILLED ELECTRICIANS TO CONNECT POWER)

1. **Make sure that primary power to the unit is off.**
2. Locate the drawing showing the appropriate turnstile version. (I.e. 5X failsafe, 5X fail lock)
3. Remove top channel cover.
4. Make electrical and necessary activation connections per the appropriate drawing and local electrical standards.
5. Review all electrical wiring and contacts for exposure to any metal parts that may lead to a short.
6. Manually rotate the turnstile and inspect microswitch contacts to ensure that switch arm is depressed but not distorted.
7. Attach cover.
8. Turn on primary power and test operation in each direction completely. If faillock verify that upon loss of power turnstile remains locked. If failsafe, verify that upon loss of power turnstile remains unlocked.

TURNSTILE CONFIGURATIONS

Non-Electric

MST-1

Turnstile is free rotating in one direction. Locked in opposite direction.

MST-2

Free rotating in both directions.

MST-3

Three-position key lock control allows turnstile to remain locked in both directions, unlocked in either direction or unlocked in both directions.

Electric

MST-4X

Electrically controlled in one direction. Locked in opposite direction.

MST-5X

Electrically controlled in one direction. Free rotating in the opposite direction. (Sold only with self-centering option) Do not use this configuration without a properly operating self-centering feature.

MST-6X

Electrically controlled in both directions.

OTHER OPTIONS

Fail Lock

Turnstile locks when power is removed (or lost). Turnstile will unlock when power is supplied. This is how the turnstile leaves the factory unless specified otherwise.

Fail Safe

Turnstile unlocks in the event of power loss, which permits free passage through the unit. Power must be supplied to the unit for re-locking.

Timed Delay Relay (TDR)

In a turnstile without this option, if a patron does not pass through after activation, the unit will remain unlocked indefinitely. This option provides the capability to make the unlocked time finite through the use of a field adjustable (0.3 to 30 sec.) time delay relay. Once activated, the unit unlocks and the timed cycle begins. If the turnstile is not operated before the end of this delay cycle it will relock, requiring another activation to allow passage.

Self-Centering

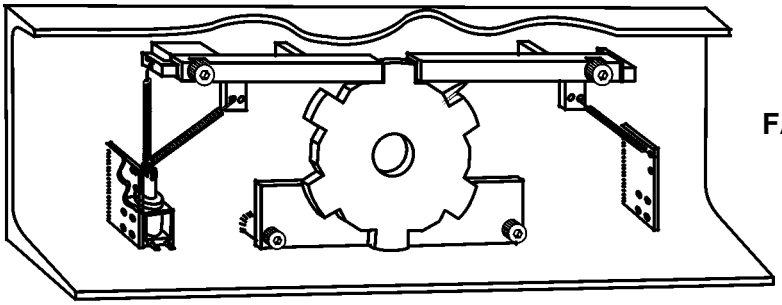
Provides for correction of under or over traveling of the turnstile arms following completion of a passage cycle. One of the three center section arms will center in parallel with the top channel.

Key Override

Allows one or both directions of passage to be mechanically unlocked with a key. Locks are located on the underside of channel near the bearing housing. When both directions are specified to have key overrides, locks are keyed alike. **Note:** For electrically controlled units, mechanical key overrides are intended for temporary use when the turnstile or access control system has malfunctioned and under the direction of operating management. Have the access control system or turnstile repaired immediately.

Interface Relay (IFR)

The momentary dry contact (less than 0.5 sec.) required to activate the turnstile cannot be provided by some access control systems. The purpose of the momentary pulse relay is to convert the maintained signal provided by the access system to a momentary signal, which can be used to activate the turnstile



STATE SHOWN WITH POWER OFF

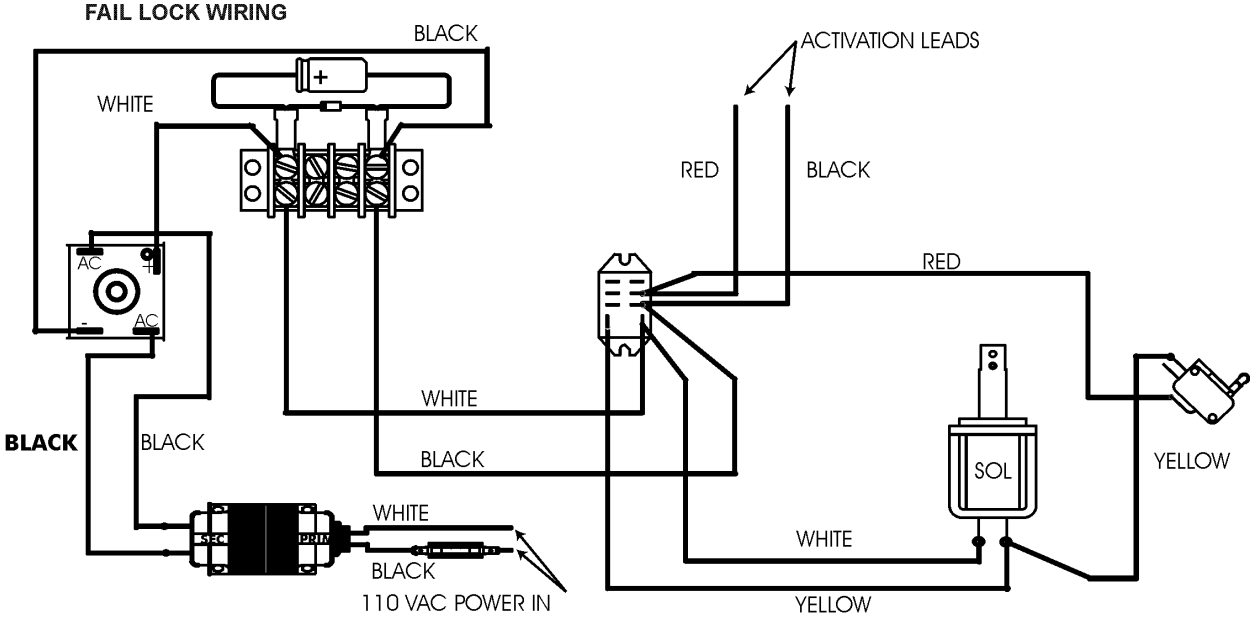
MST 4X

CHANNEL CONFIGURATION
FAIL LOCK COUNTER-CLOCKWISE

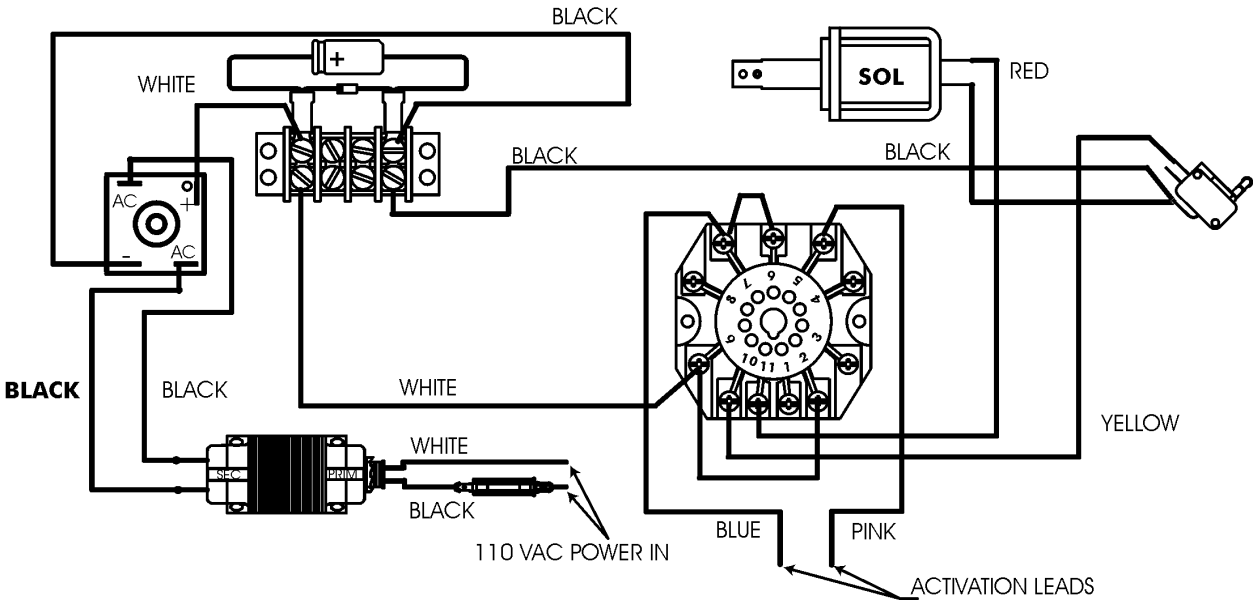
FAIL LOCK WIRING DIAGRAM

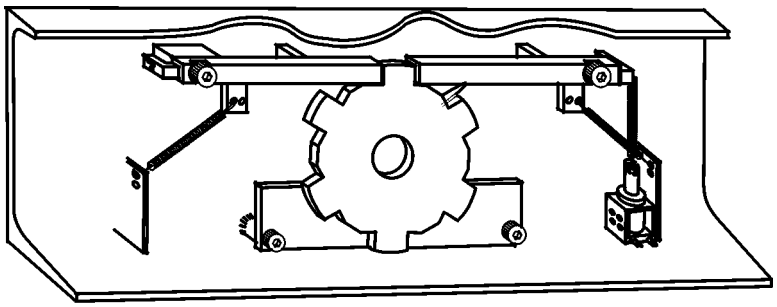
FAIL LOCK TIME DELAY RELAY WIRING DIAGRAM

FAIL LOCK WIRING



FAIL LOCK TIME DELAY RELAY WIRING





STATE SHOWN WITH POWER OFF

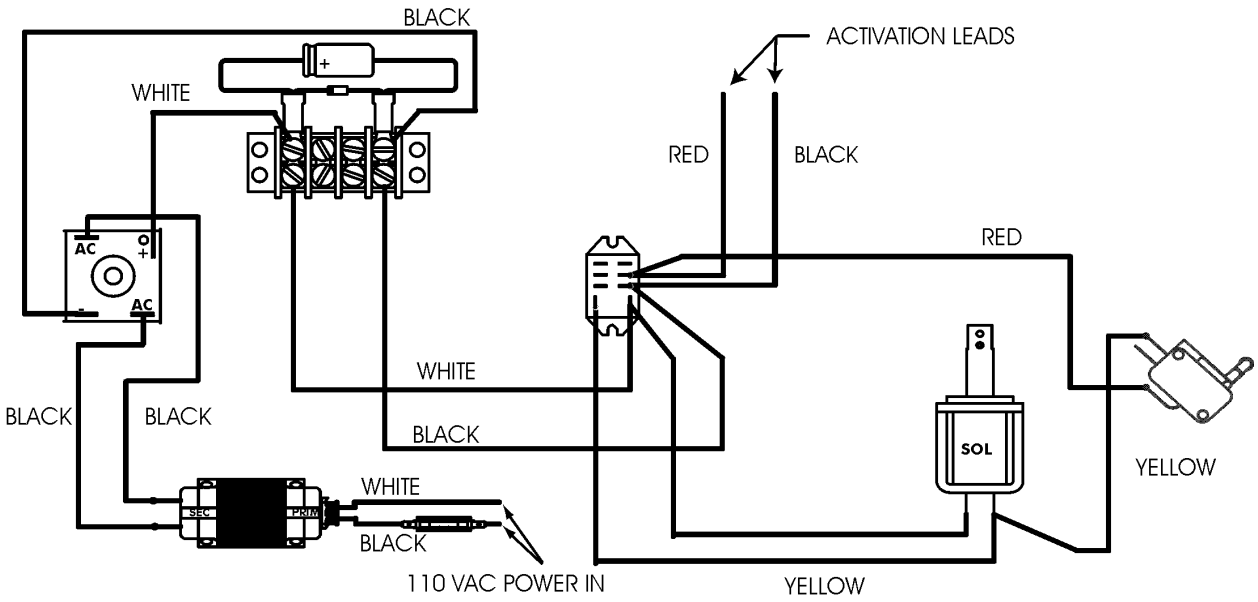
MST 4X

CHANNEL CONFIGURATION
FAIL LOCK CLOCKWISE

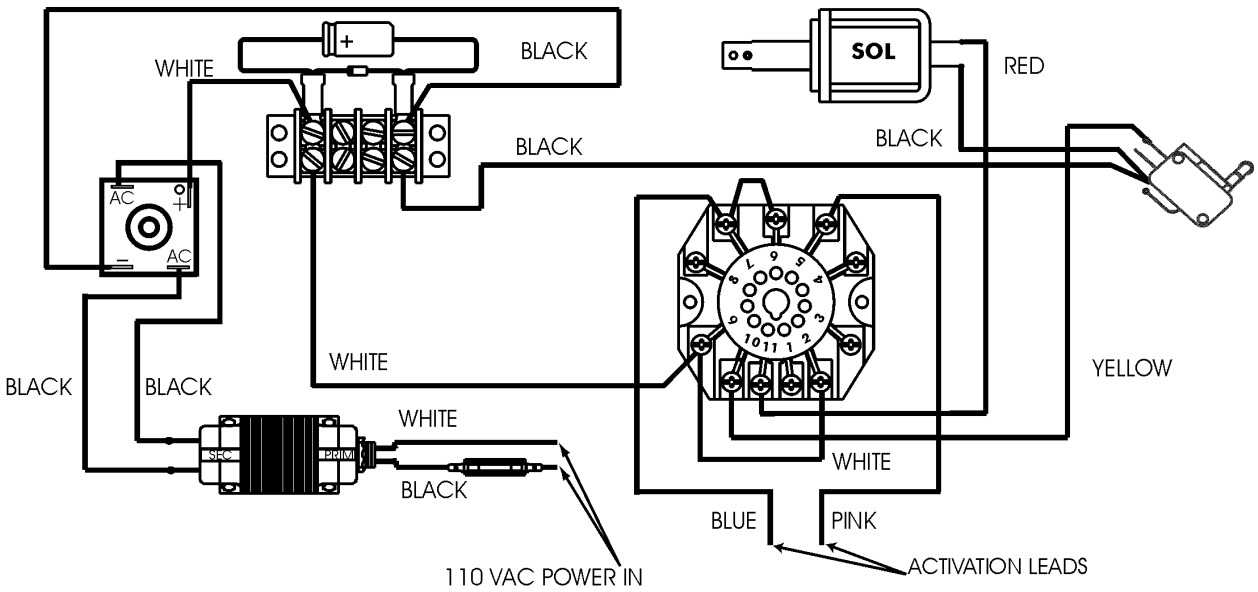
FAIL LOCK WIRING DIAGRAM

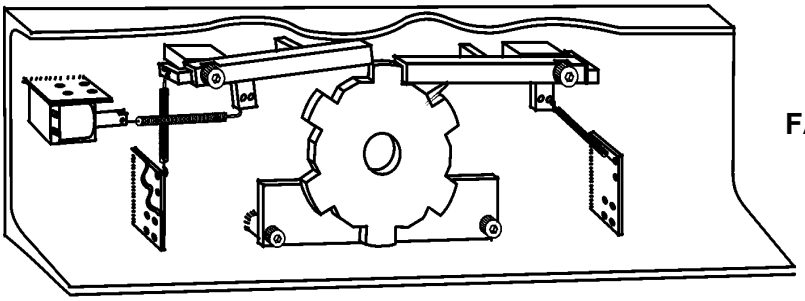
FAIL LOCK TIME DELAY RELAY WIRING DIAGRAM

FAIL LOCK WIRING



FAIL LOCK TIME DELAY RELAY WIRING





STATE SHOWN WITH POWER OFF

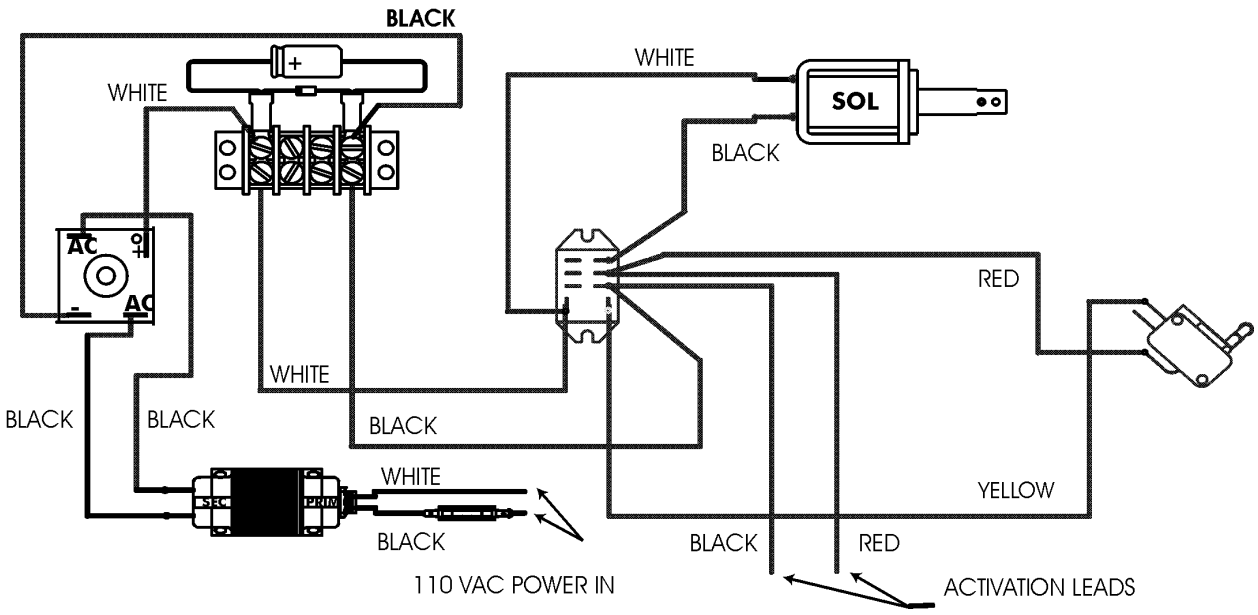
MST 4X

CHANNEL CONFIGURATION
FAIL SAFE COUNTER_CLOCKWISE

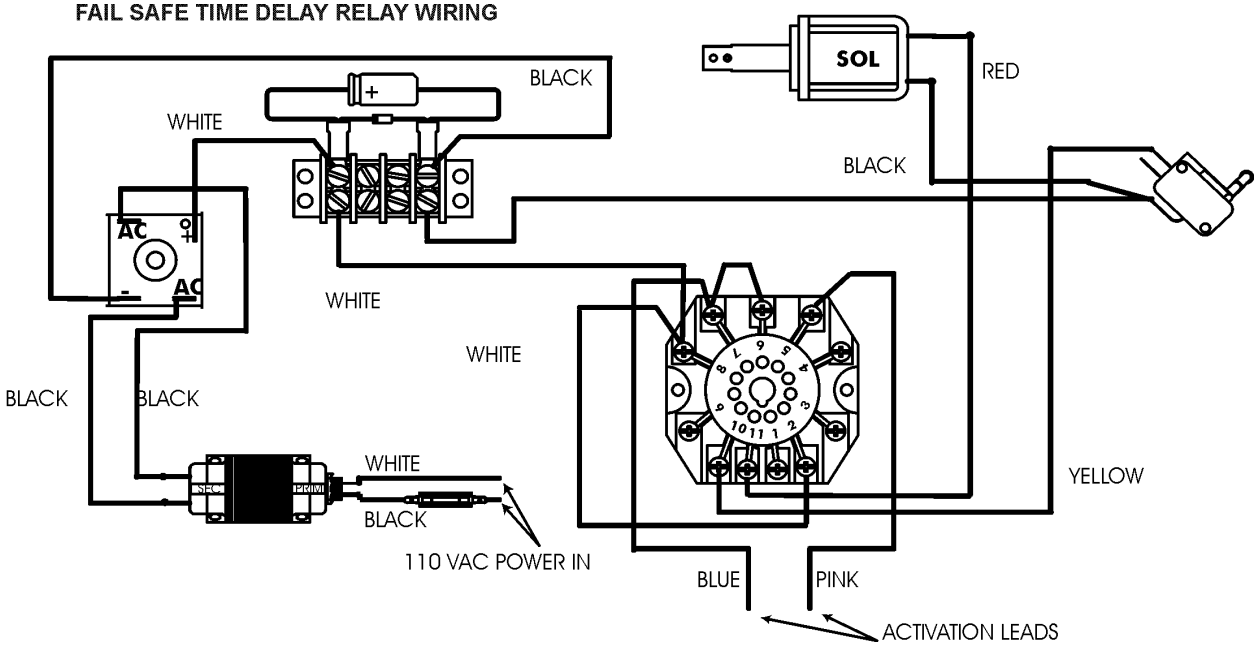
FAIL SAFE WIRING DIAGRAM

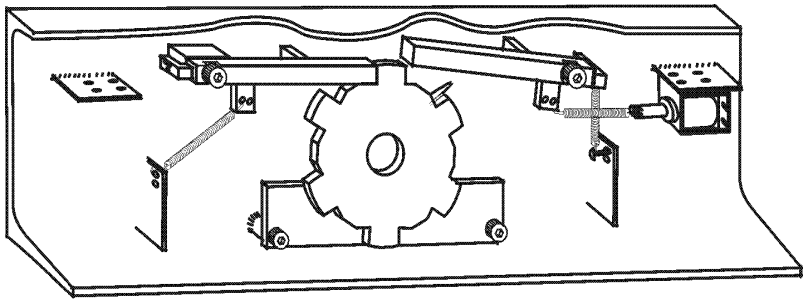
FAIL SAFE TIME DELAY RELAY WIRING DIAGRAM

FAIL SAFE WIRING



FAIL SAFE TIME DELAY RELAY WIRING





STATE SHOWN WITH POWER OFF

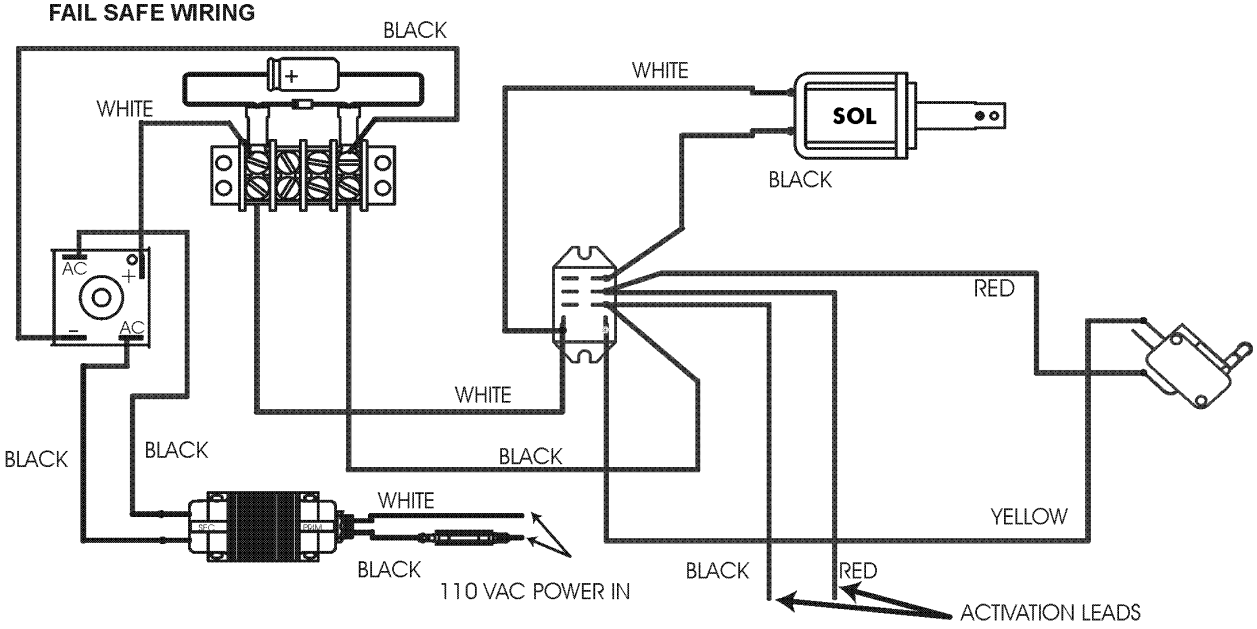
MST 4X

CHANNEL CONFIGURATION
FAIL SAFE CLOCKWISE

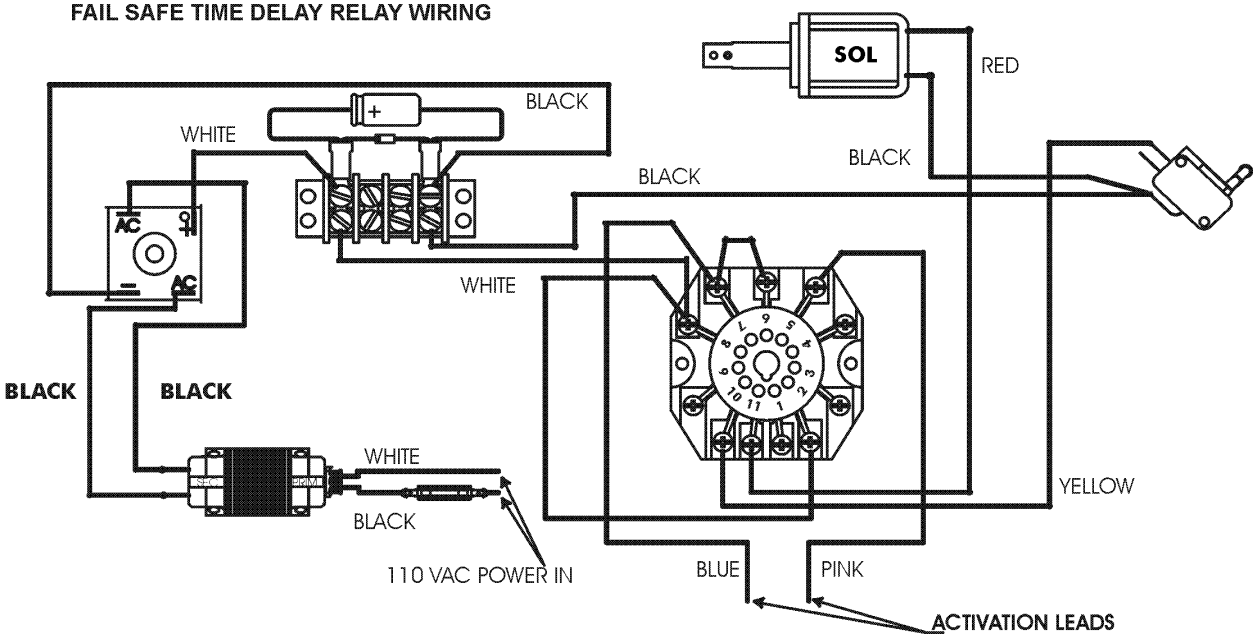
FAIL SAFE WIRING DIAGRAM

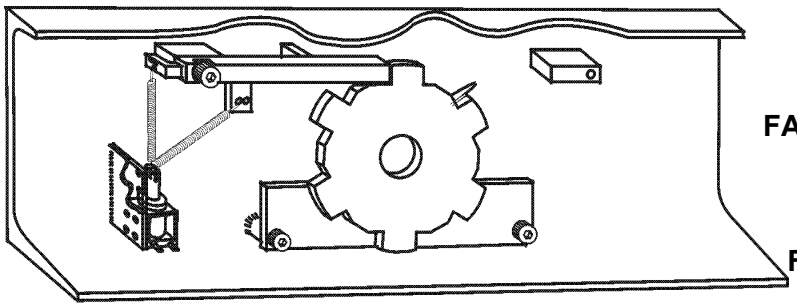
FAIL SAFE TIME DELAY RELAY WIRING DIAGRAM

FAIL SAFE WIRING



FAIL SAFE TIME DELAY RELAY WIRING





STATE SHOWN WITH POWER OFF

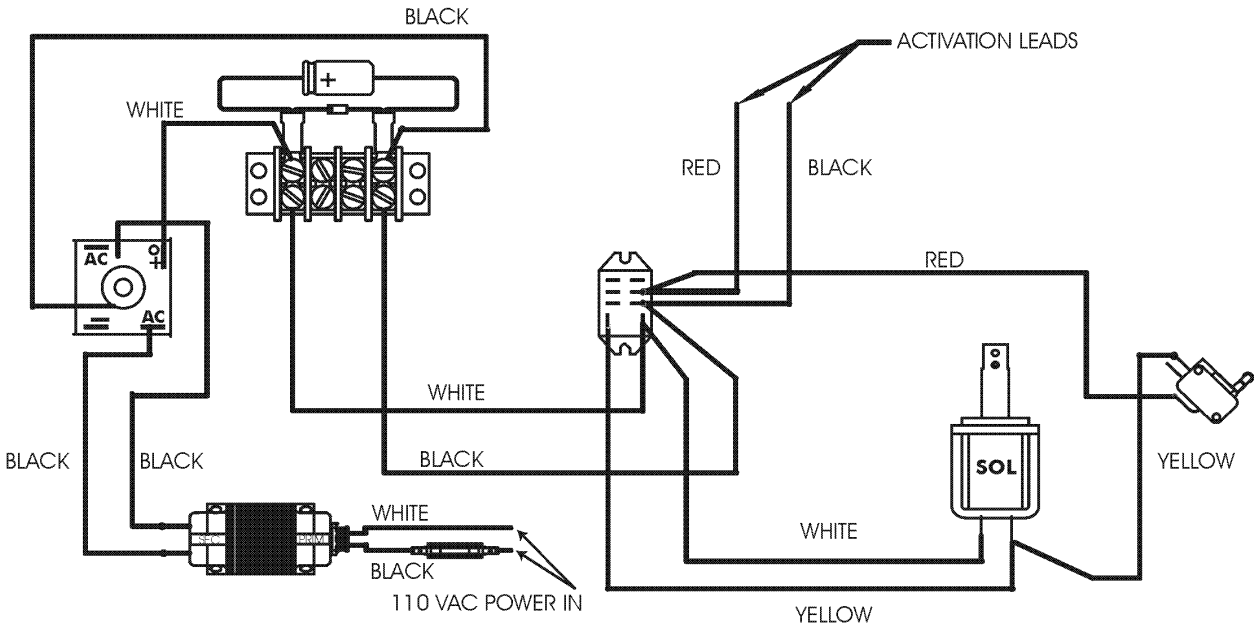
MST 5X

CHANNEL CONFIGURATION
FAIL LOCK COUNTER-CLOCKWISE

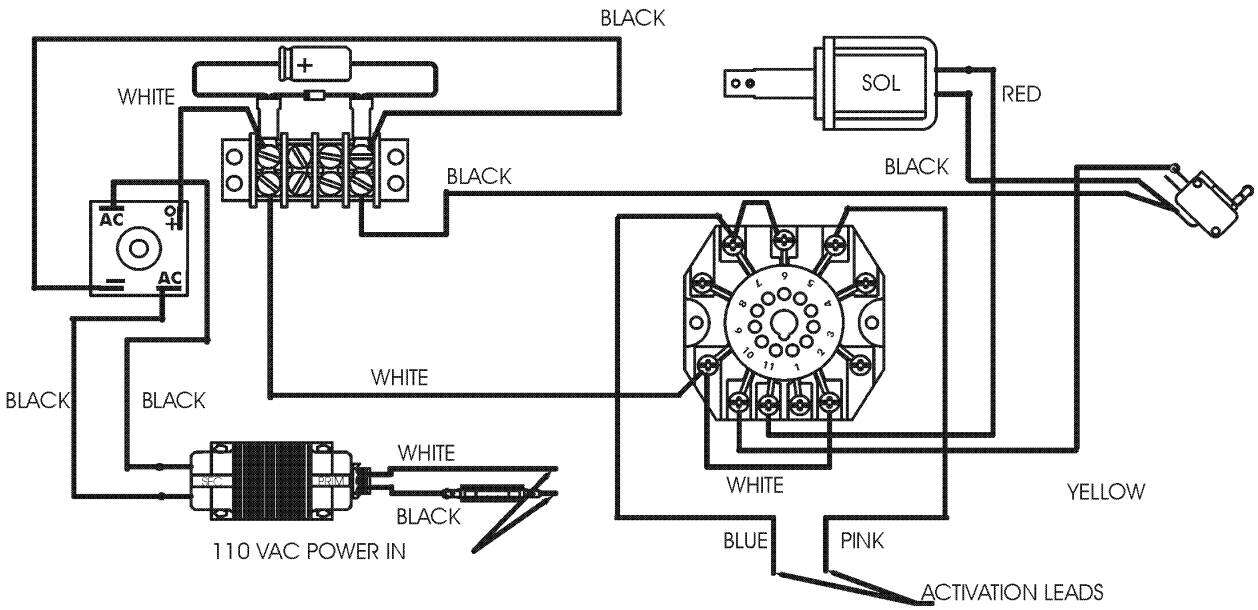
FAIL LOCK WIRING DIAGRAM

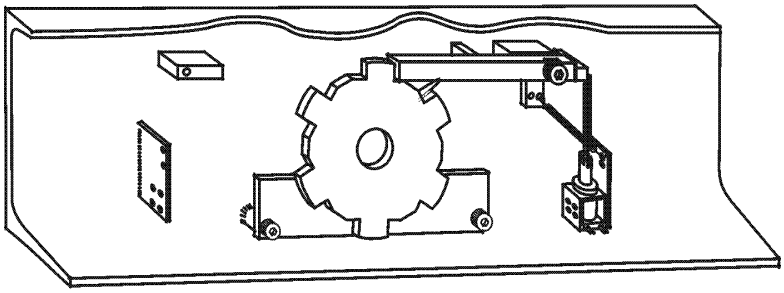
FAIL LOCK TIME DELAY RELAY WIRING DIAGRAM (SELF-CENTERING ONLY)

FAIL LOCK WIRING



FAIL LOCK TIME DELAY RELAY WIRING





STATE SHOWN WITH POWER OFF

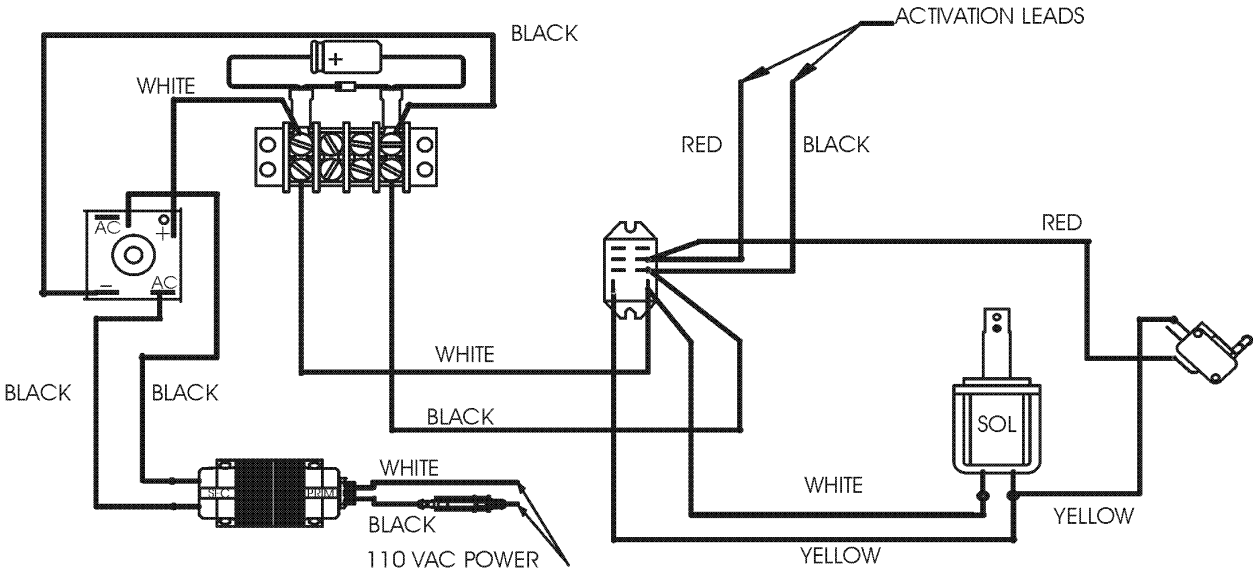
MST 5X

CHANNEL CONFIGURATION
FAIL LOCK CLOCKWISE

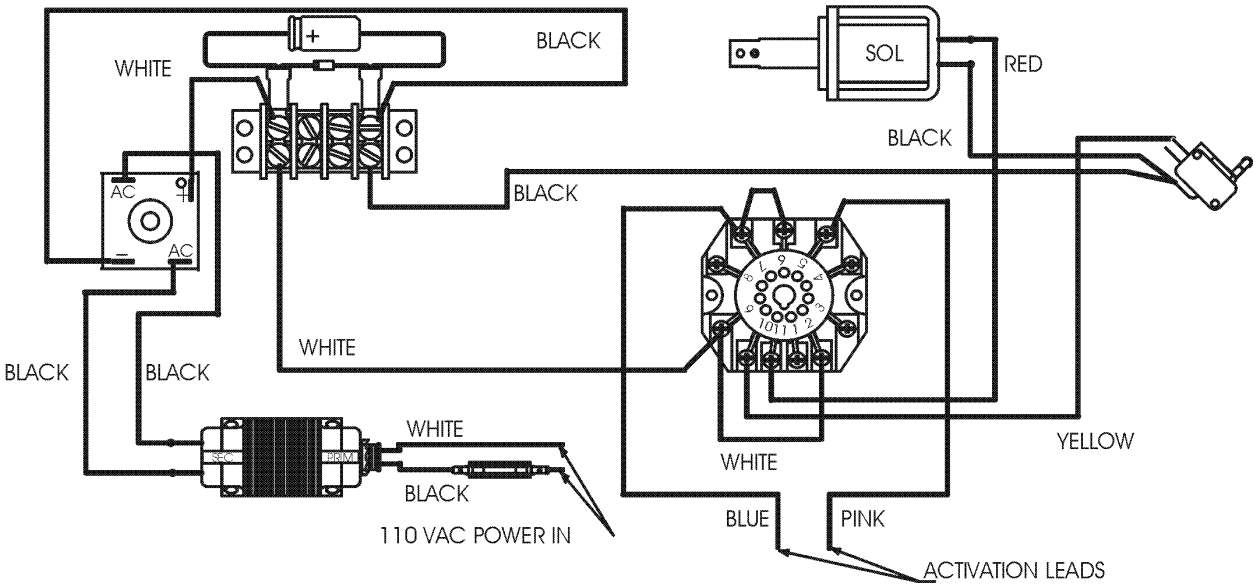
FAIL LOCK WIRING DIAGRAM

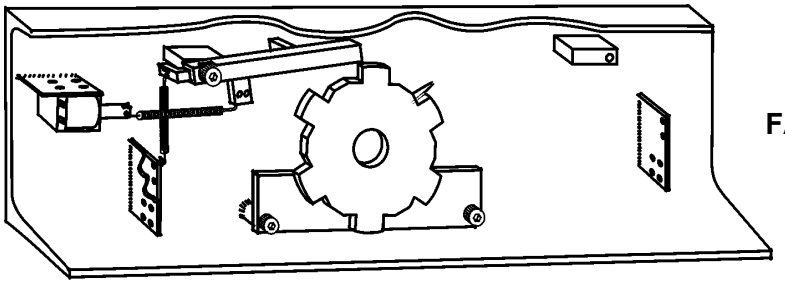
FAIL LOCK TIME DELAY RELAY WIRING DIAGRAM (SELF-CENTERING ONLY)

FAIL LOCK WIRING



FAIL LOCK TIME DELAY RELAY WIRING





STATE SHOWN WITH POWER OFF

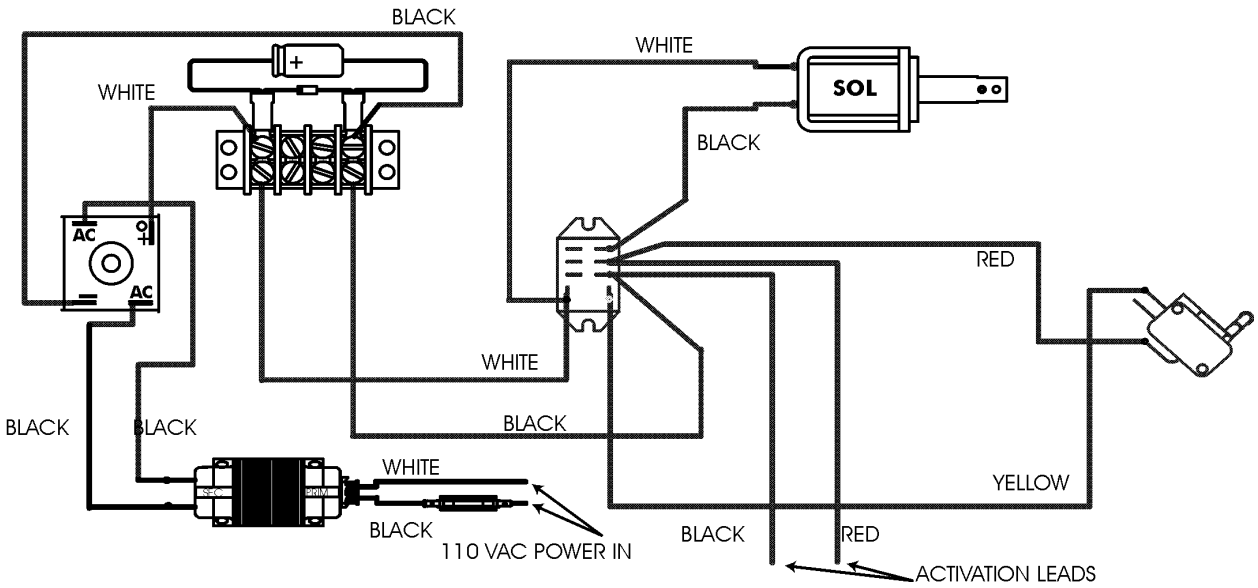
MST 5X

CHANNEL CONFIGURATION
FAIL SAFE COUNTER-CLOCKWISE

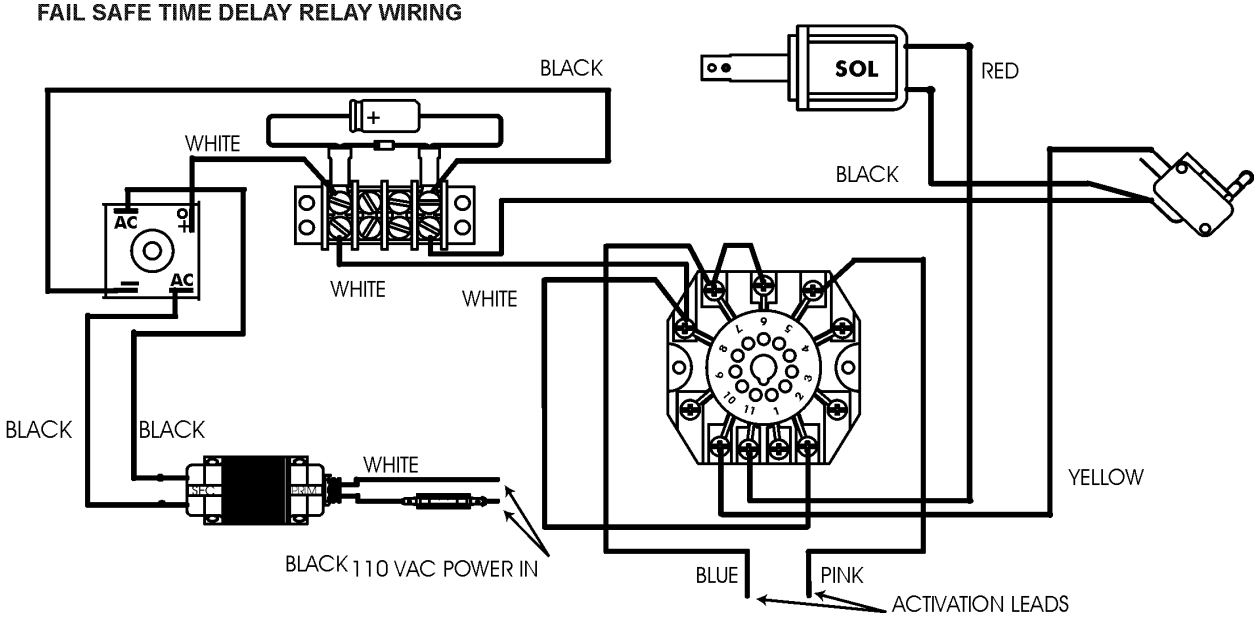
FAIL SAFE WIRING DIAGRAM

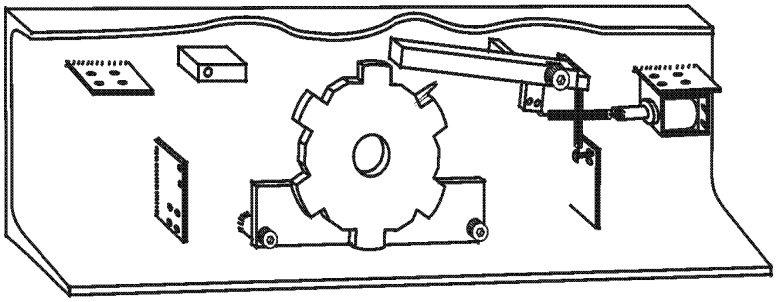
FAIL SAFE TIME DELAY RELAY WIRING DIAGRAM (SELF-CENTERING ONLY)

FAIL SAFE WIRING



FAIL SAFE TIME DELAY RELAY WIRING





STATE SHOWN WITH POWER OFF

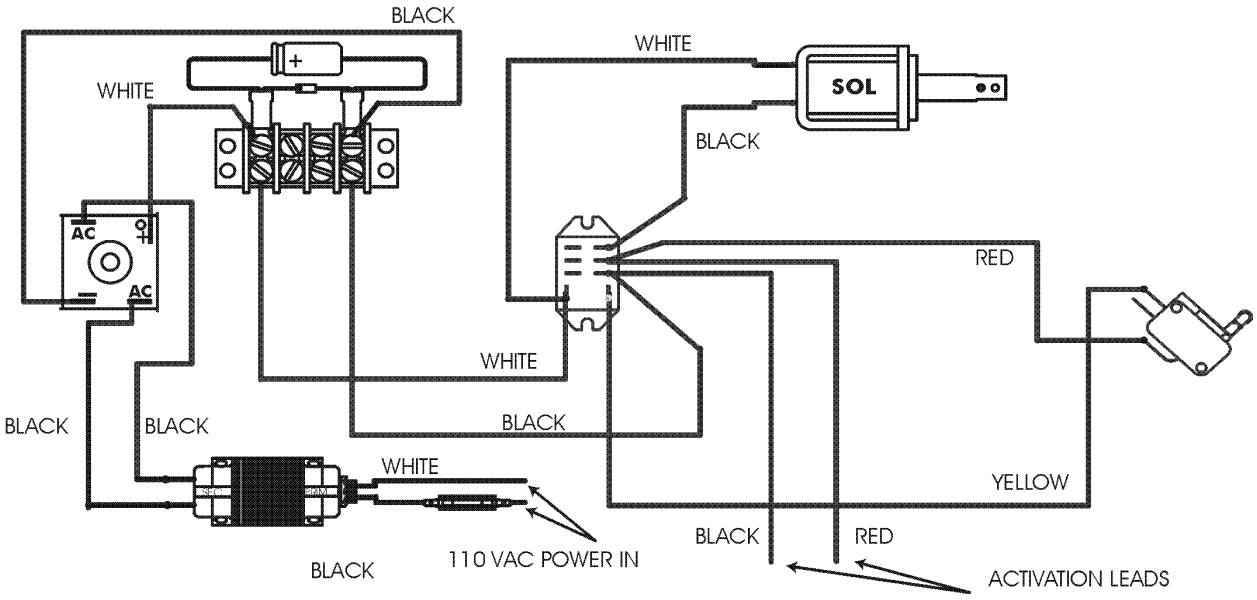
MST 5X

CHANNEL CONFIGURATION
FAIL SAFE CLOCKWISE

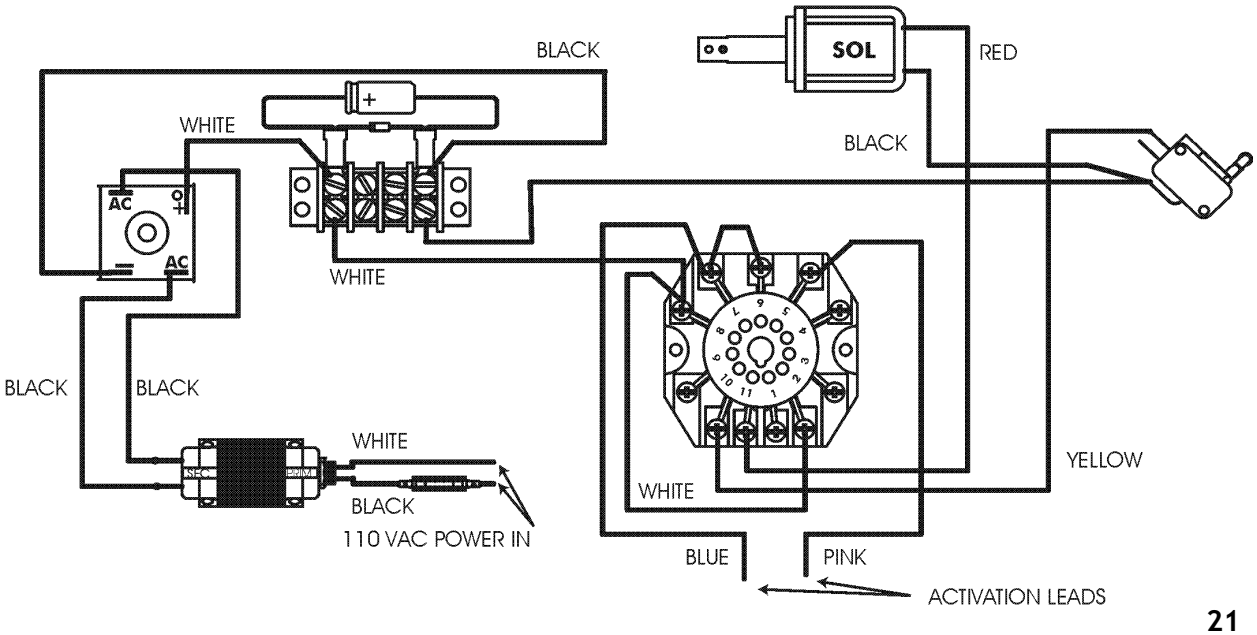
FAIL SAFE WIRING DIAGRAM

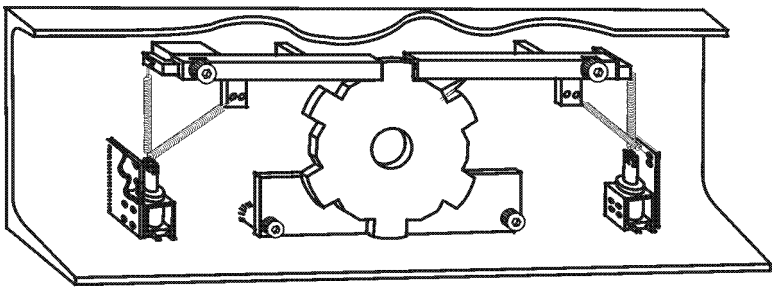
FAIL SAFE TIME DELAY RELAY WIRING DIAGRAM (SELF-CENTERING ONLY)

FAIL SAFE WIRING



FAIL SAFE TIME DELAY RELAY WIRING





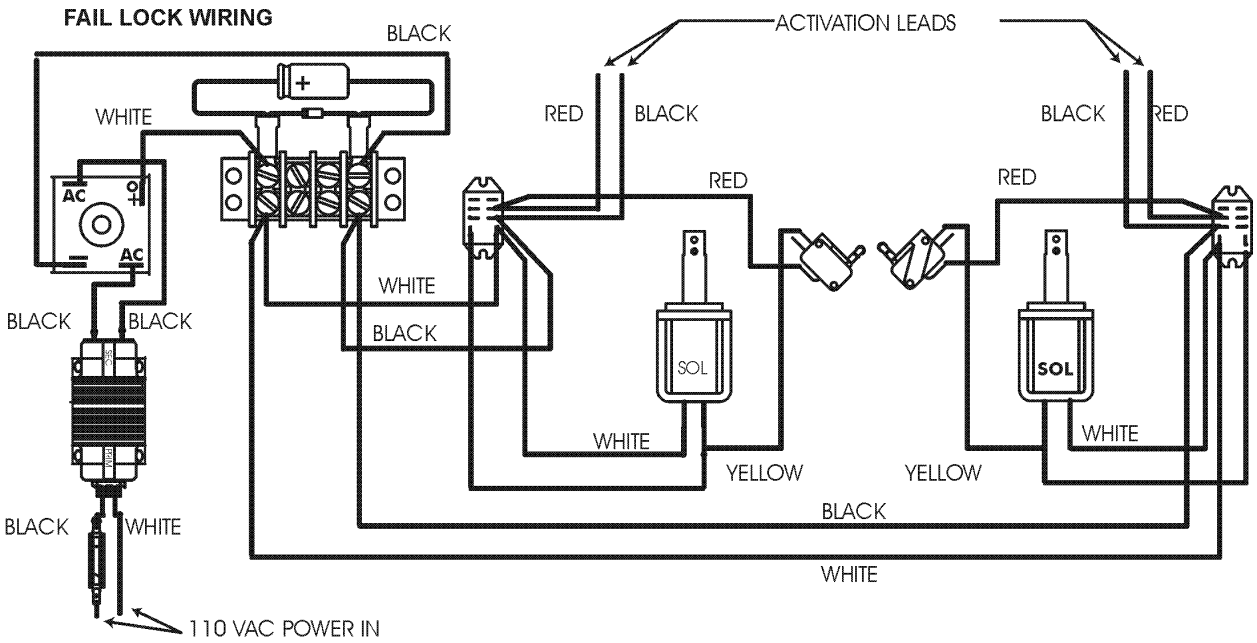
STATE SHOWN WITH POWER OFF

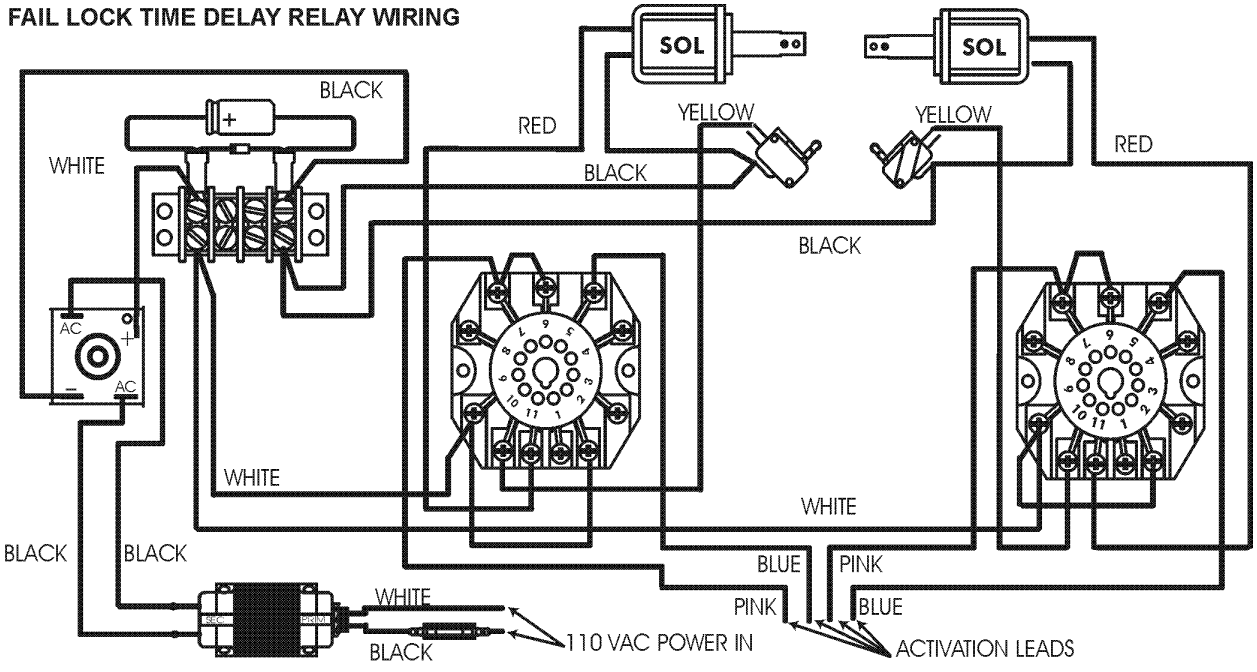
MST 6X

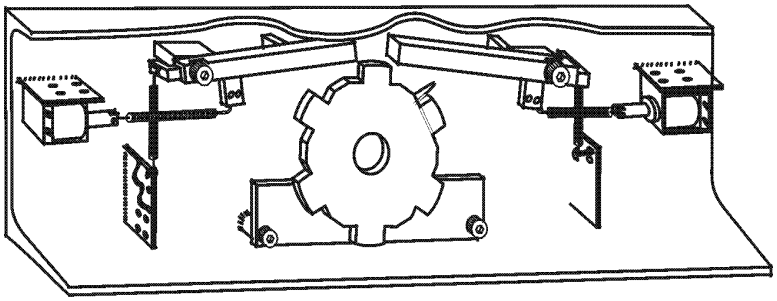
CHANNEL CONFIGURATION
FAIL LOCK BOTH DIRECTIONS

FAIL LOCK WIRING DIAGRAM

FAIL LOCK TIME DELAY RELAY WIRING DIAGRAM







STATE SHOWN WITH POWER OFF

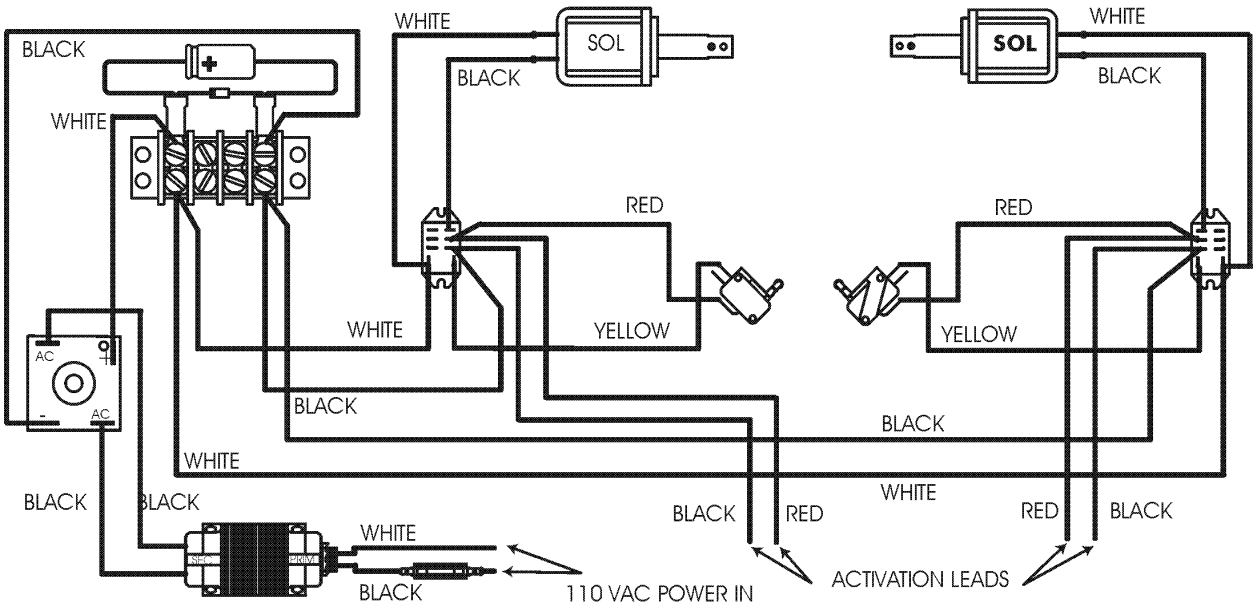
MST 6X

CHANNEL CONFIGURATION
FAIL SAFE BOTH DIRECTIONS

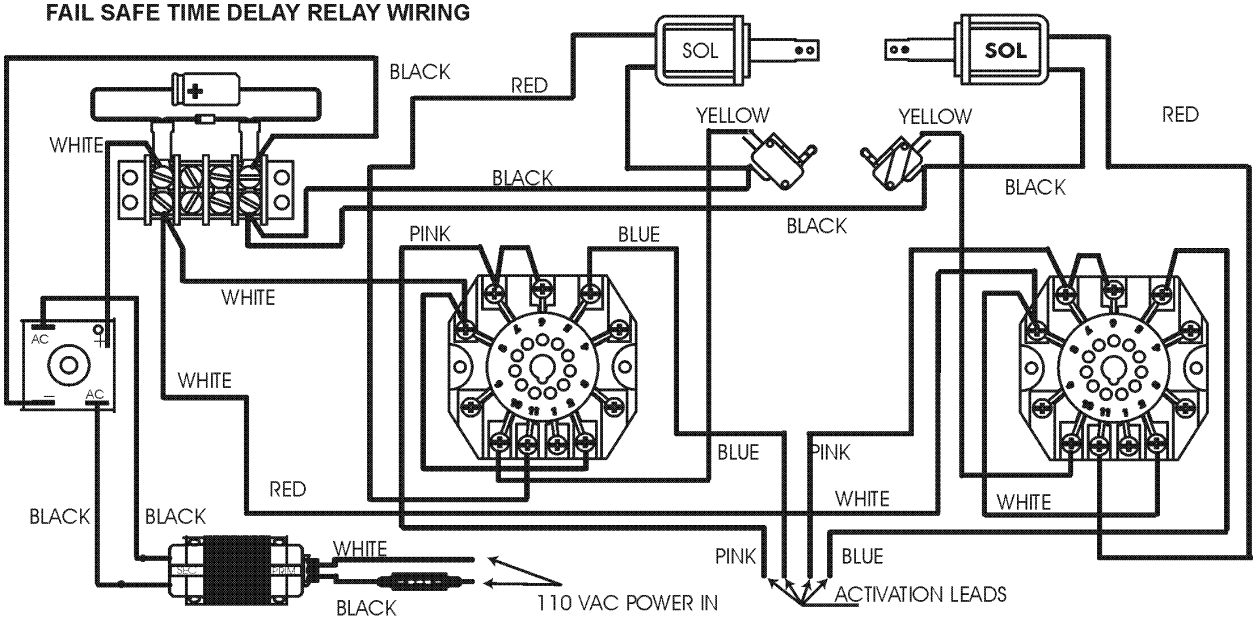
FAIL SAFE WIRING DIAGRAM

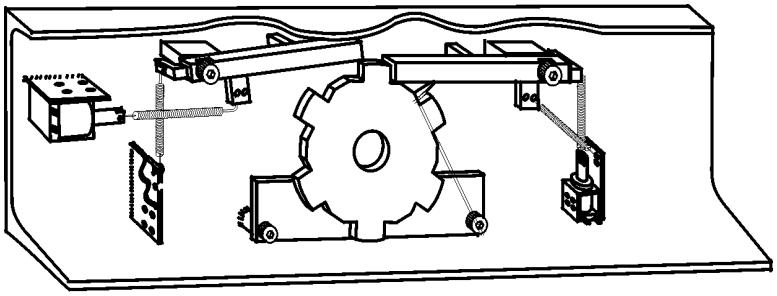
FAIL SAFE TIME DELAY RELAY WIRING DIAGRAM

FAIL SAFE WIRING



FAIL SAFE TIME DELAY RELAY WIRING





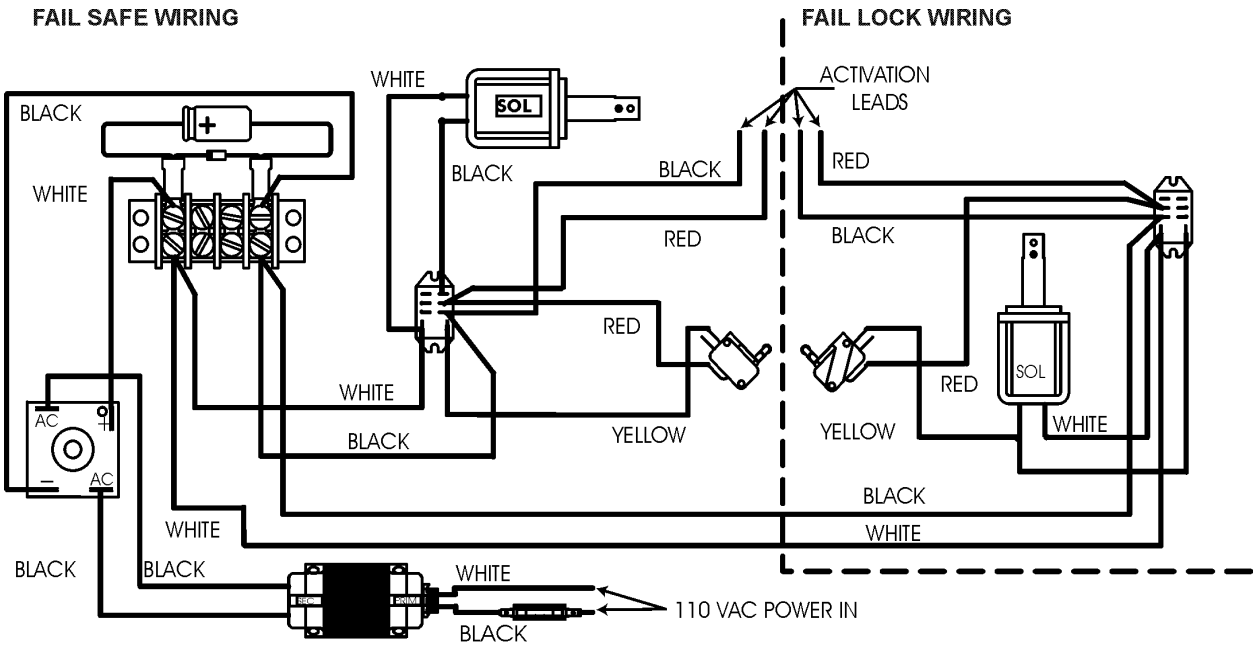
STATE SHOWN WITH POWER OFF

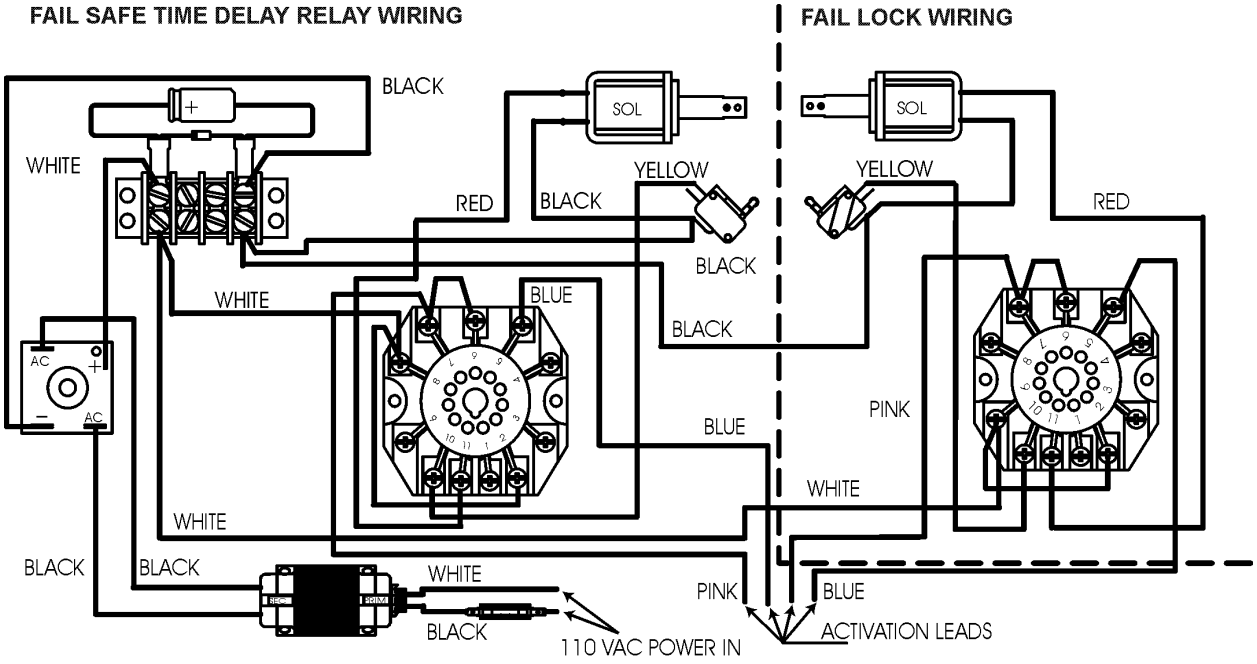
MST 6X

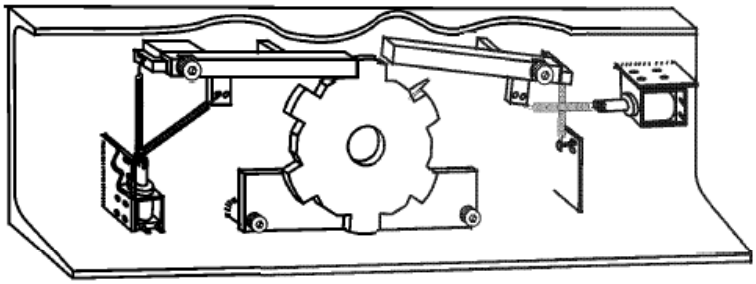
CHANNEL CONFIGURATION
FAIL SAFE COUNTER-CLOCWISE
FAIL LOCK CLOCWISE

WIRING DIAGRAM
FAIL SAFE / FAIL LOCK

TIME DELAY RELAY WIRING DIAGRAM FAIL SAFE / FAIL LOCK







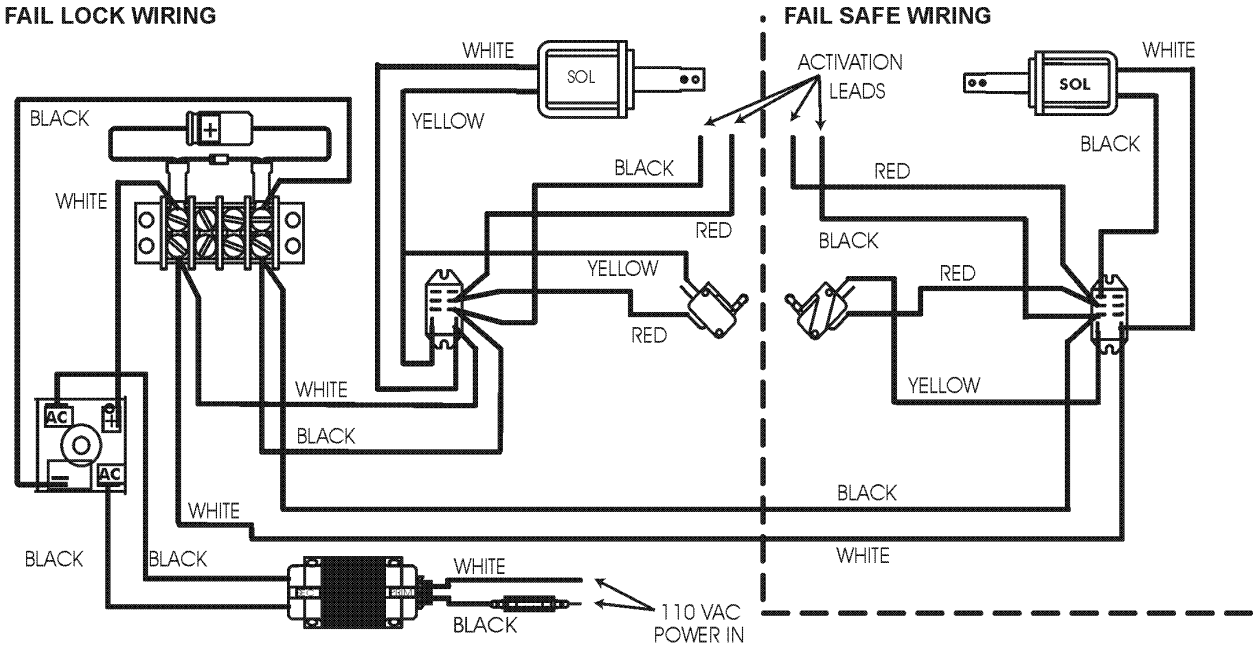
STATE SHOWN WITH POWER OFF

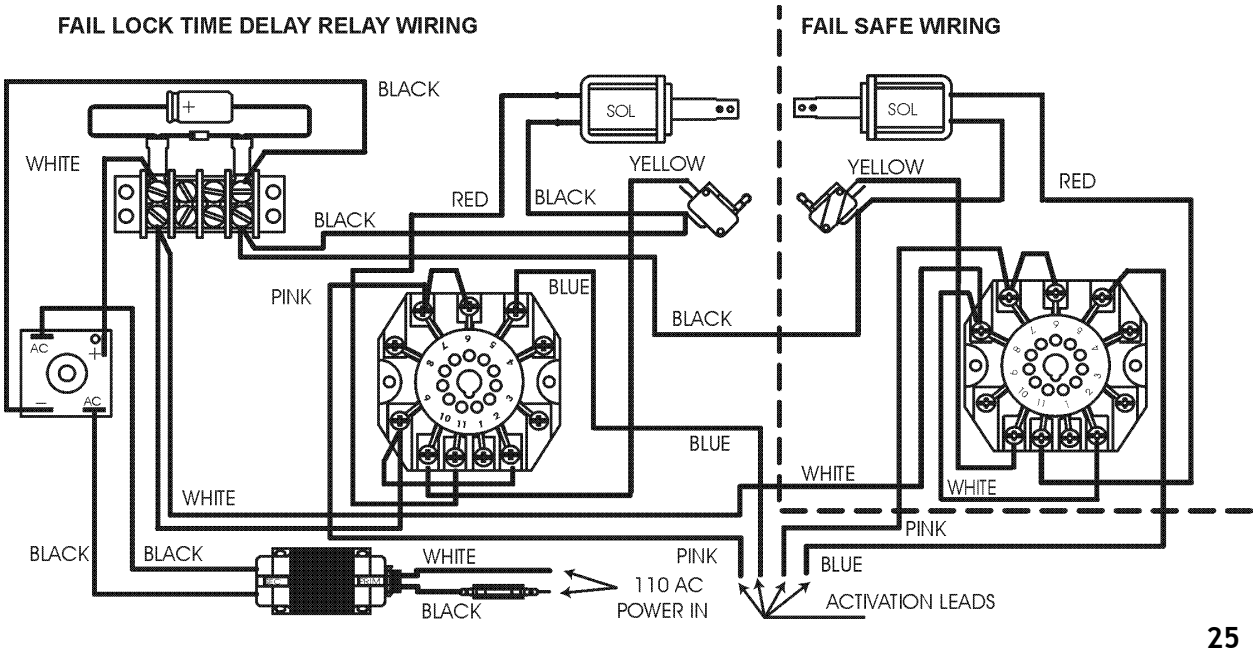
MST 6X

CHANNEL CONFIGURATION
FAIL SAFE CLOCKWISE
FAIL LOCK COUNTER CLOCWISE

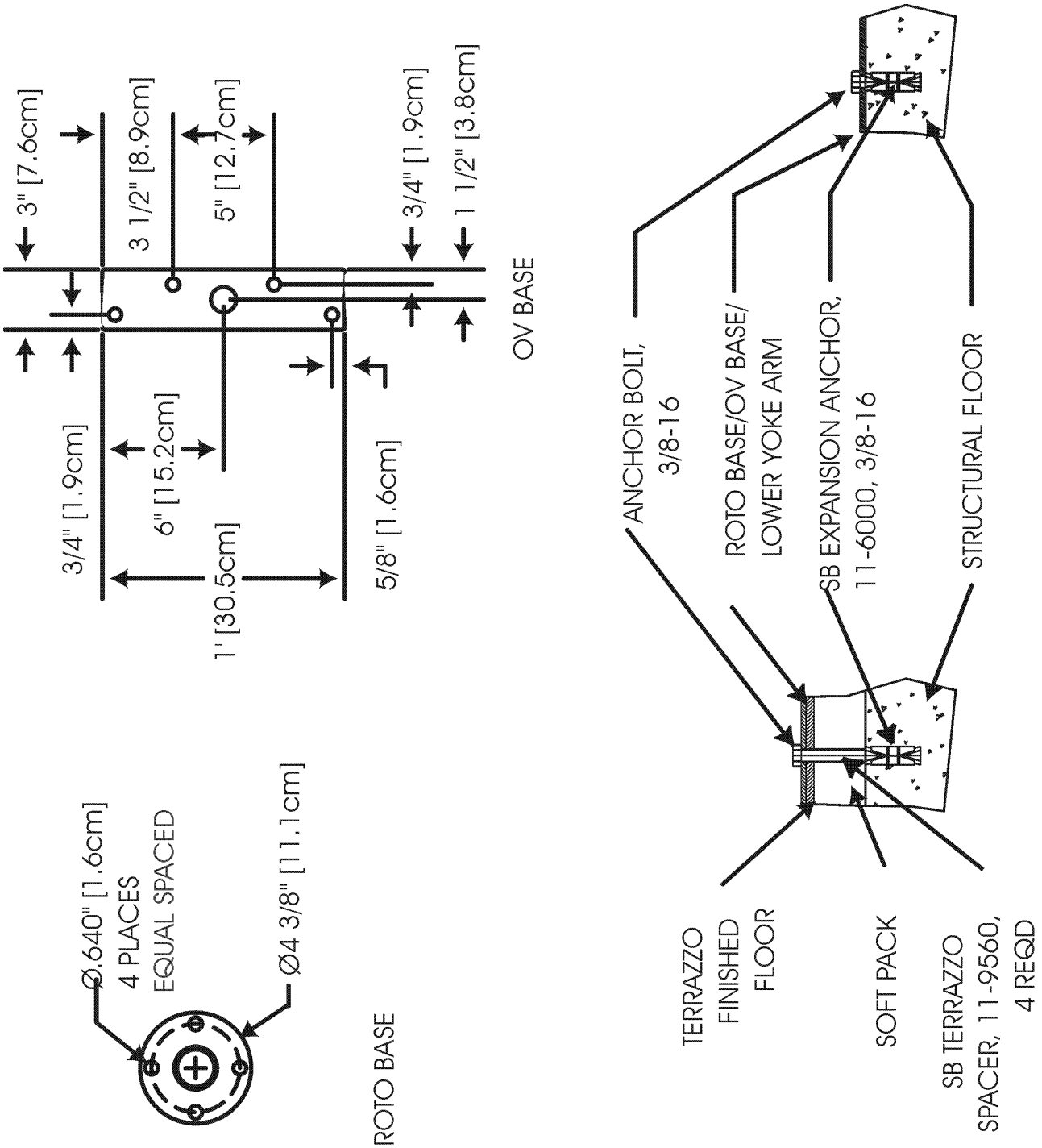
WIRING DIAGRAM
FAIL SAFE / FAIL LOCK

TIME DELAY RELAY WIRING DIAGRAM FAIL SAFE / FAIL LOCK

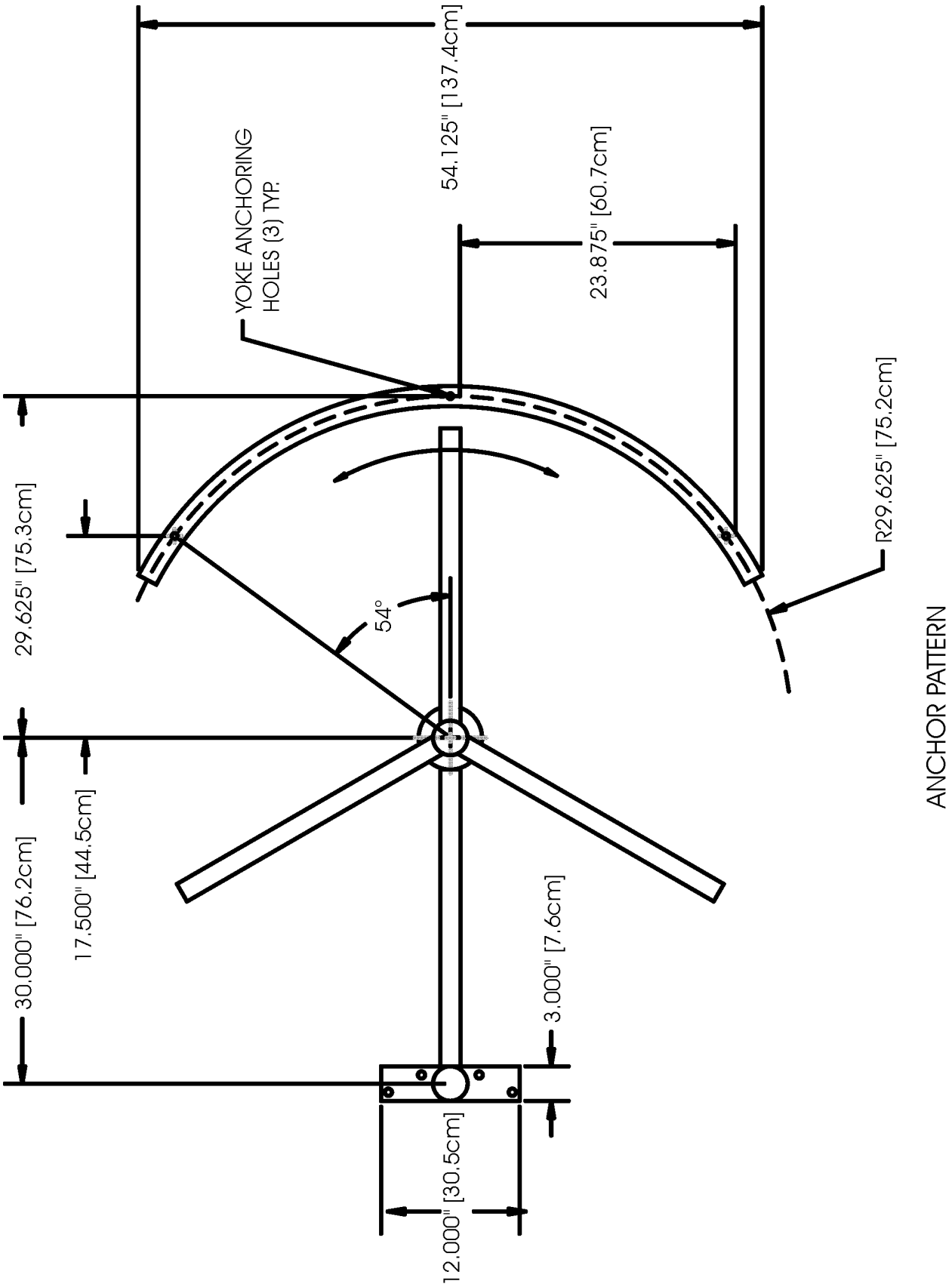




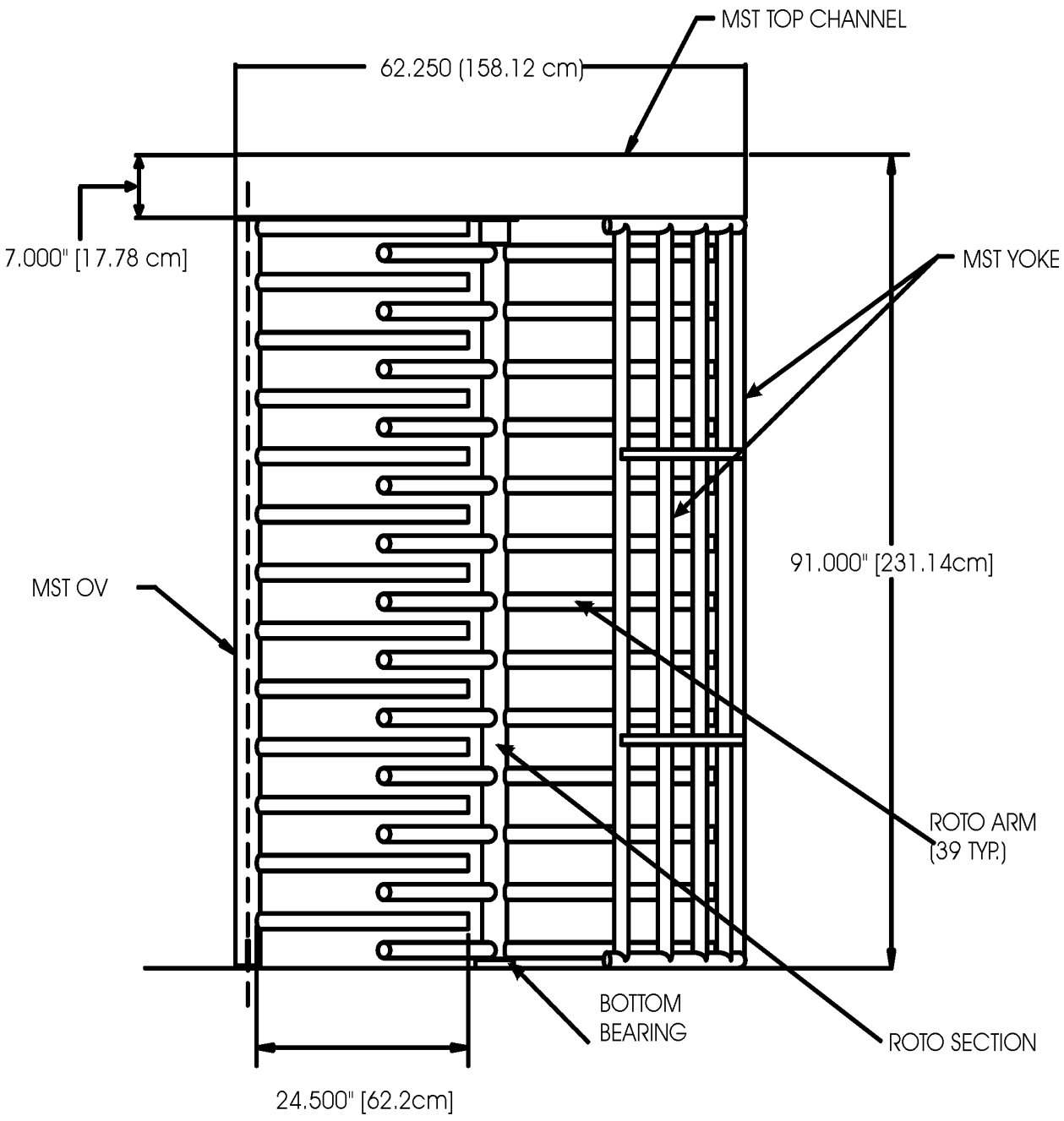
TURNSTILE (MOUNTING VIEW)



TURNSTILE (ANCHOR VIEW)

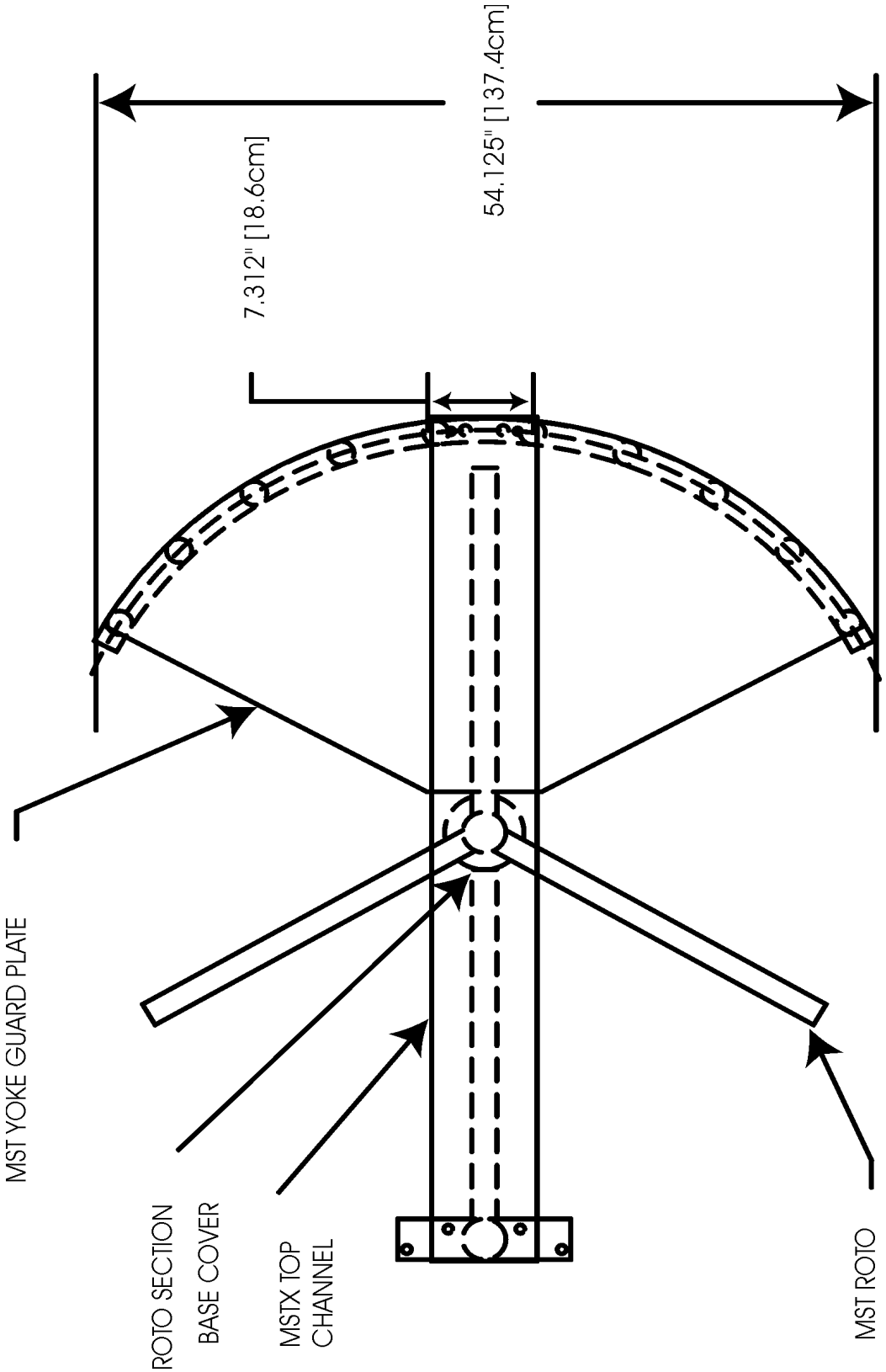


TURNSTILE (ELEVATION VIEW)



ELEVATION VIEW

TURNSTILE (TOP VIEW)



MAINTENANCE

Perform basic maintenance 60 days after installation. Thereafter, the frequency of maintenance will depend on usage and the environment. We suggest exterior inspection and cleaning once per month. Interior inspection and lubrication should be performed at least twice a year and more frequently in heavy use applications or in dusty or humid environments.

MST-1 or MST-2

Interior and Exterior

1. If rotation is not smooth, remove top channel cover, unbolt clutch housing and lubricate clutch rollers with a light amount of grease. We recommend using Mobilgrease XHP 222 premium lubricating grease with Moly or equivalent.
2. Tighten anchor bolts and any external nuts, bolts or screws. Clean away accumulated dust and dirt.

MST-3, MSTX-4X, MSTX-5X, MSTX-6X

Interior

Interior maintenance requires removal of the turnstile cover. Disconnect power to the turnstile prior to removing the cover.

Lock Arm Bolt and Lock Arm

1. Remove turnstile cover.
2. Check the Lock Arm Bolt (referenced as a “Stripper Bolt” in item #18 in the exploded drawing and explanation pages). If it does not move freely, clean and oil. If the Lock Arm Bolt is loose, apply thread locking compound to the threads, tighten and test. After tightening, the Lock Arm should move freely, except for the pressure of the return spring.

Springs

3. Check all springs for tension or unusual wear and replace any worn or damaged springs. **Note:** Each spring type is specifically designed. Springs **are not** interchangeable and should be used only in their designated locations.
4. Lubricate spring contact points with a light lubricant such as Tri-Flow or 3-in-1 oil using a tube extension applicator. **Note:** It is acceptable to lubricate the contact point where the spring connects to the solenoid plunger. Do not, however, lubricate the solenoid plunger arm. It is designed to operate “dry”.

Microswitches

5. Check adjustment of the microswitch arms.

Explanation: There are three pins on the bottom of the main cam assembly. These pins make contact with a Microswitch arm (#26) which activates a Microswitch (#27). The activation releases the relay controlling the solenoid plunger. When properly adjusted, each pin activates the microswitch arm in one direction and allows the roller, on the other end of the microswitch arm, to fold out of the way in the opposite direction. When properly adjusted, the cam pin will depress the microswitch arm (to activate the switch button) but will not cause the microswitch to come in contact with the body of the microswitch.

To adjust the microswitch, loosen the screws to the appropriate Adjustable Micro Plate (#25) and slide the plate toward or away from the main cam as necessary. If adjusted too close the cam, the pin on the cam assembly may damage the microswitch arm. After proper adjustment, tighten all screws.

MAINTENANCE continued…

6. Lubricate the microswitch roller with Tri-Flow or 3-in-1 oil (using a tube extension applicator).

Friction Brake

7. Check the brake tension on the Brake Assembly (#21) by holding the lock arm open (either manually or through use of the key override switch) and rotating the turnstile. There should be a slight drag of approximately 3-6 lbs. during the rotation. If adjustment is desired, unhook the two W Cam Follower Springs (#15) that are attached to the MST Brake Spring Screw (#19). Rotate the screw to tighten or loosen the spring (thereby increasing or decreasing brake tension).

   If more substantial adjustment is required, remove the cotter pin from the top of the brake unit. Rotate the tension adjustment clockwise to increase the tension or counterclockwise to decrease the tension. Replace the cotter pin and test.

Lubrication

8. Lubricate spring contact areas as noted above. See #4.
9. Lubricate the two grease nipples near the bottom and top bearings. Attach a grease gun to nipples and lubricate using quality grease.
10. Lubricate the microswitch roller as noted above. See #6.
11. Lubricate Lock Arms. See #16 & 17.

Electrical

12. Inspect all electrical wires and contacts for exposure to metal parts that may lead to a short.
13. Relays as well as other electrical components can be tested using a volt/ohm meter.

Self-Centering Mechanism

14. If required, make adjustments using the fine adjustment knob.

Exterior

15. Check and tighten anchor bolts and any external nuts, bolts or screws. Clean away accumulated dust and dirt.

Finishes

- Stainless Steel: Clean using any commercially available stainless steel polish or cleaner. For heavier scratches or marks, use a metal blend and finish pad (3M or equivalent).
- Color Powdercoat: Clean using a soft damp cloth. Any deep scratches or chips should be touched up to prevent a rust spot from forming. If left untreated, rust will spread under the surface. Touch up paint is available from Alvarado.
- Galvanized: Paint with a commercial galvanized paint if necessary.

TURNSTILE OPERATION/USER INSTRUCTIONS

SAFETY CONSIDERATIONS

- Always walk slowly through the turnstile
- Always use caution when using the turnstile
- Instruct users in proper operation

The following steps provide a guide to proper turnstile use

1. If not in “Home” position, manually position the Roto Section (the arms) to the “Home” position. See Fig. 1.

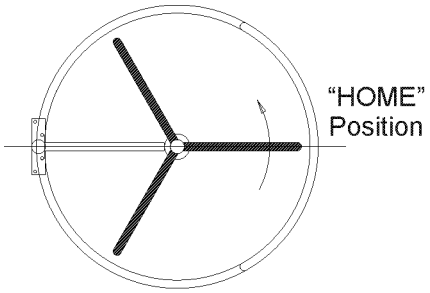


Figure 1

2. Activate turnstile and listen for turnstile to unlock and/or look for green light.
3. Immediately step into turnstile as shown in figure 2.

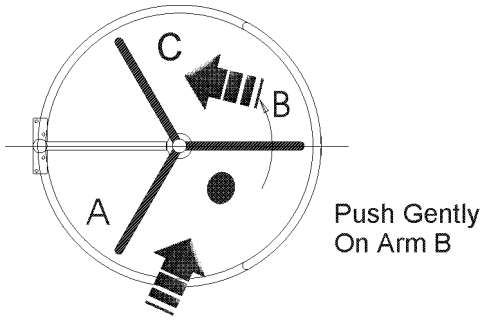


Figure 2

WARNING: Do not grab the Roto Section (A) and pull it in front of you. This will cause the Roto section to stop suddenly when the user is halfway through the turnstile.

TURNSTILE OPERATION/USER INFORMATION continued

4. Keeping arms extended push gently on the Roto Arms (B) and slowly pass through the turnstile. Stay near the Yoke and take short steps. Once through the passage area move out of the way.

   WARNING: After the user walks through the turnstile, there will be a trailing arm section (A – Fig. 2). Taking long steps could cause the trailing arms to strike the heels of the user. Heel and arm guards may be purchased from Alvarado.

5. Step out of the turnstile upon passage.

OTHER OPERATIONAL CONSIDERATIONS

If the TDR (time delay relay) option is purchased, Alvarado recommends the maximum time setting (approximately 35 seconds) be used. After activation, if entry is not completed within the set time, the turnstile will stop suddenly when the user is halfway through the turnstile.

WARNING: If the TDR is used, warn users that after activating the turnstile they have only a set period of time to pass through the turnstile before it relocks and that if the entry is not completed before the set time, the turnstile will stop suddenly when the user is halfway through the turnstile.

TROUBLESHOOTING – MST

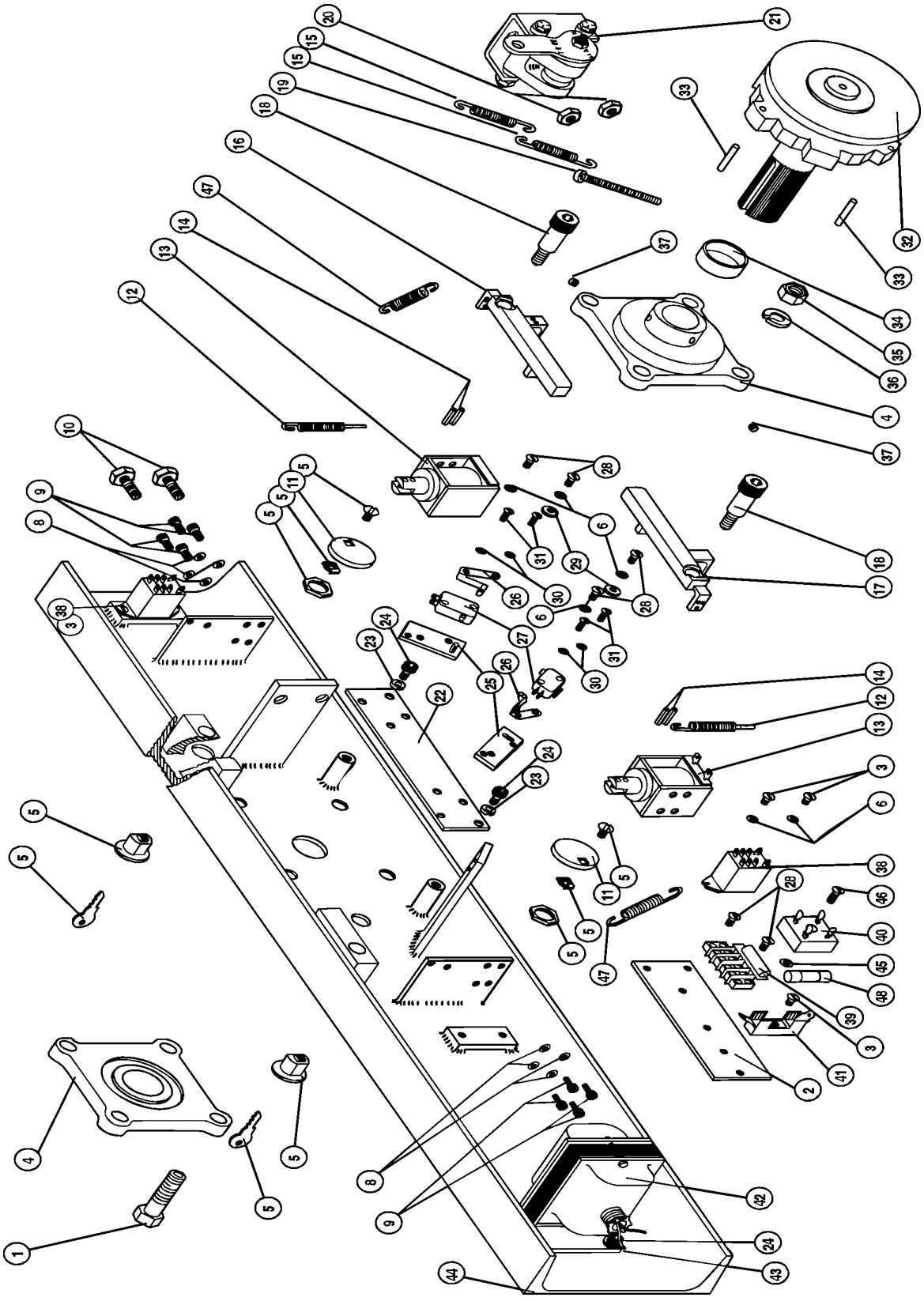
Symptom	*Possible Cause*	*Solution*
Turnstile does not unlock	Activation signal missing/incorrect type.[1]	*Provide proper activation signal.*[2]
	No power (fail lock unit)	*Provide proper power*
	Weak power (fail lock unit)	*Test at solenoid to ensure at least 24VDC*
	Broken lock arm spring	*Replace spring*
	Relay/solenoid defective	*Test and replace as necessary*[3]
Turnstile does not relock or more than one person can enter per activation	No power (fail safe unit)	*Provide proper power*
	Activation signal more than .5 second contact	*Install interface relay (IFR)*[3]
	IFR relay set to longer than.33 second contact	*Set IFR to minimum setting - turn down all the way*
	Micro-switch not engaging	*Adjust micro-switch*[4]
	Micro-switch/micro-switch arm bent and/or broken	*Adjust arm or replace micro-switch*
	Micro-switch faulty[6]	*Replace micro-switch*
	Lock arm spring missing/broken	*Replace spring*
	Lock arm sticking/binding in unlocked position	*Clean and lubricate*

Other items to check:

- Ice cube relays – check for proper operation
- Debris in or around the solenoid plunger (**do not lubricate the solenoid plunger.** It is designed to operate "dry")

1. To verify the turnstile activation operation, touch the two signal control wires together momentarily. If activation occurs, turnstile activation is ok.
2. The MSTX is designed to receive a momentary dry contact closure. The duration of the contact must be ½ second or less.
3. Test solenoid by activating turnstile. If solenoid does not pull in, check for appropriate voltage at the solenoid using a volt/ohm meter (24VDC required). If appropriate voltage exists, replace solenoid.
4. If the activation time period is longer than ½ second, the turnstile will assume that there is a new activation and unlock again.
5. The microswitch arm should activate but should not depress into the body of the microswitch. Adjusting the switch arm to depress beyond the activation point may damage the switch.
6. To test the micro-switch, activate the turnstile, and then press the activation button on the appropriate microswitch with fingers. If unit relocks, the switch is good.

CHANNEL ASSEMBLY / EXPLODED PARTS VIEW



NUMBERED PARTS LISTING ON PAGE 36

CHANNEL ASSEMBLY / EXPLODED PARTS NUMERICAL LISTING

I.D.	QTY.	PART NO.	DESCRIPTION
1	4	91-1303	1/2-13x2" HEX HEAD CAP SCREW
2	1	10-4070	RECTIFIER MOUNTING BOARD
3	4	91-1023	6-32x1/4 ROUND HEAD SCREW
4	2	11-4010	MSTX TOP BEARING
5	2	11-9400	KEY LOCK - SHORT (OPTIONAL)
6	6	91-3051	#6 INTERNSL TOOTH LOCKWASHER
7	1	91-1025	6-32x3/4 ROUND HEAD SCREW
8	8	91-3100	#8 INTERNAL TOOTH LOCKWASHER[a]
9	8	91-1054	8-32x3/8 SOCKET HEAD CAP SCREW[a]
10	2	91-1231	5/16-18x1" HEX HEAD CAP SCREW
11	2	11-9402	CAM KEY OVERRIDE
12	2	11-5210	MSTX SOLENOID SPRING
13	2	10-1000	24 VDC SOLENOID
14	4	91-8101	1/8 x 1/2 SPIRAL PIN
15	2	11-5100	"W" CAM FOLLOWER SPRING [b]
16	1	04-2050	MSTX LOCK ARM RIGHT
17	1	04-2040	MSTX LOCK ARM LEFT
18	2	11-1661	1/2 x 1" STRIPPER BOLT
19	1	04-2056	MST BRAKE SPRING SCREW
20	2	91-2252	5/16-18 LOCK NUT
21	1	04-2055	MSTX BRAKE ASSEMBLY
22	1	04-2017	MSTX MICRO PLATE
23	2	91-3200	1/4 HICOLLAR LOCK WASHER
24	3	91-1160	1/4-20x5/8 SOCKET HEAD CAP SCREW
25	2	04-2015	MSTX ADJUSTABLE MICRO PLATE
26	2	10-1450	MICRO SWITCH ARM
27	2	10-1400	MICRO SWITCH
28	6	91-1021	6-32x1/2 ROUND HEAD SCREW
29	2	91-3102	#8 FLAT WASHER
30	4		#4 INTERNAL TOOTH LOCKWASHER
31	4		4-40x9/16 ROUND HEAD SCREW
32	1	04-2068	MSTX CAM & SHAFT ASSEMBLY W/ SPLINE
33	3	91-8102	1/8x1" ROLL PIN
34	1	04-2090	MSTX THRUST WASHER
35	4	91-2400	1/2-13 HEX NUT
36	4	91-3400	1/2 MED SPLIT LOCK WASHER
37	4		5/16-24x1/4 SOCKET SET SCREW
38	2	10-1210	24 VDC RELAY
39	1	10-4050	24 VDC CAPACITOR ASSEMBLY
40	1	10-4001	24 AMP RECTIFIER
41	1	10-4031	FUSE HOLDER
42	1	10-3000	120/18-24 VAC TRANSFORMER
43	2	91-3202	1/4 SPLIT LOCK WASHER
44	1	04-2001	MSTX TOP CHANNEL (SHOWN WITHOUT FAILSAFE SOLENOID BRACKETS)
45	1	91-3150	#10 INTERNAL TOOTH LOCKWASHER
46	1	91-1025	6-32x3/4 ROUND HEAD SCREW
47	2	11-5350	EDC FAILSAFE SOLENOID RETURN SPRING
48	1	91-0442	3A6 SLO BLO 3/4 AMP FUSE

[a] SUPPLIED WITH SWITCH ARM

[b] SUPPLIED WITH BEARING

EXPLODED PARTS VIEW ON PAGE 21

SELF CENTERING ADJUSTMENTS