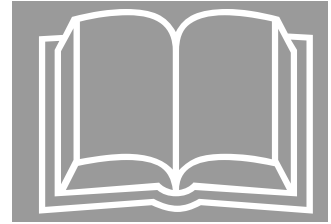


APRIL 4, 2007

**UNITEC®**

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**UT-ID 23.6-8**



# Uni-Lock™ Mechanical Door Restrictor (4-Bar Linkage Version)

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## Introduction

The 4-bar linkage version of the mechanical door restrictor has many advantages over the traditional version, which uses interference between an angle bracket on the car and angles in the hoistway.

The new device mounts to the car door and does not require installation at every landing.

When passengers are trapped, the device can be easily disengaged by a mechanic.

The device can be easily disabled when performing maintenance.

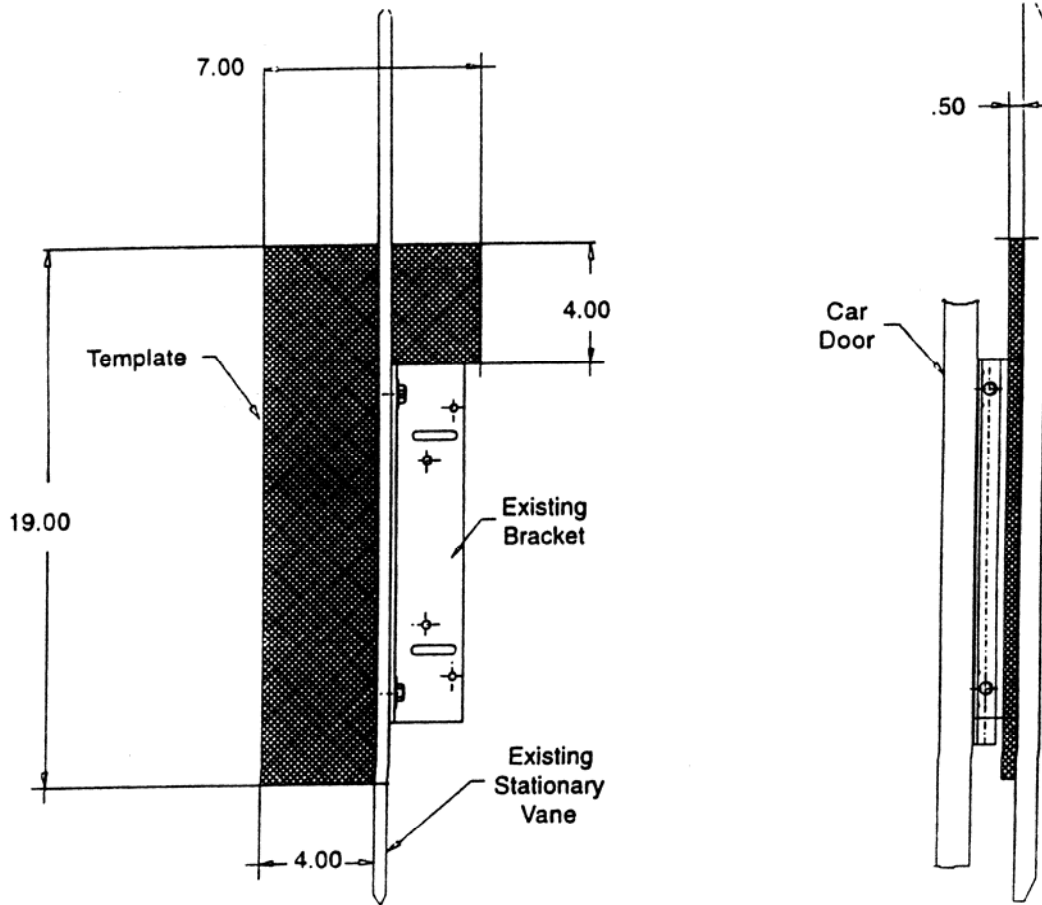
The device eliminates the use of protruding hoistway brackets, which could be a snag-hazard to workers on top of the car.

## Required Conditions to Install Device

- Must have 6940 interlocks
- Advanced door opening (ADO) must be less than 12 in.
- If existing vane is movable (i.e., monkey-motion vane), proper performance of elevator door linkage and door protection device must be maintained when vane is replaced with a stationary vane.
- Stationary vane must extend above top of car door, except in the case of high cab and high car doors and standard opening heights at all landings. The device (particularly the locking bracket) should not protrude into the opening.
- Must have room to install device (see Figure 1 on p. 2).
- Must align all 6940 interlock rollers to obtain uniform running clearance to unlocking vane.
- Must retrofit to LAMBDA III if all of the following apply:
  - Have Otis enhanced LAMBDA,
  - Door opening is 48 in. or greater,
  - Have monkey-motion vane.

**Room to Install Device**

Use dimension in Figure 1 to build a template to place next to the stationary vane in order to determine if necessary window exists or can be created.



**Figure 1: Dimension for Installing Device**

## General Description

### *Normal Travel Mode*

The device operates as shown in Figure 2 with doors closed. A constant distance is maintained between the existing stationary vane and the movable vane allowing the 6940 interlock roller to pass through. The movable vane is held by the incline on the locking plate pushing against the roller attached to the movable vane.

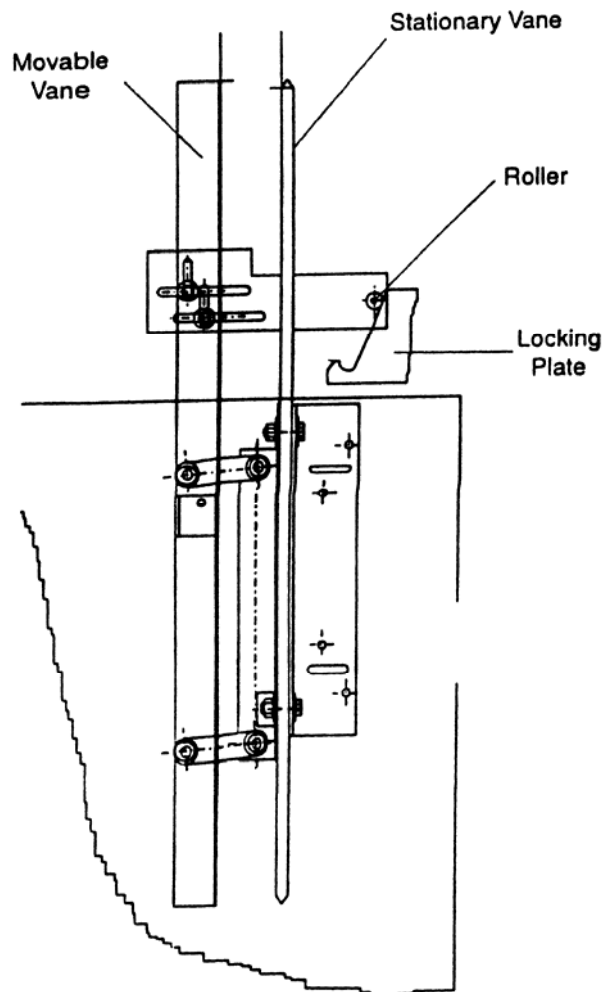


Figure 2: Normal Travel Mode

### *Door Open Mode*

At the landing, the device operates as shown in Figure 3. The car door starts to open, allowing the roller to roll down the locking plate incline, which allows the movable vane to lower. The movable vane lowers until the 6940 interlock roller is contacted. At this point, the 6940 interlock roller maintains a constant distance between the movable vane and the stationary vane, while the car door opens. Notice the roller does not get caught in the depression of the locking plate.

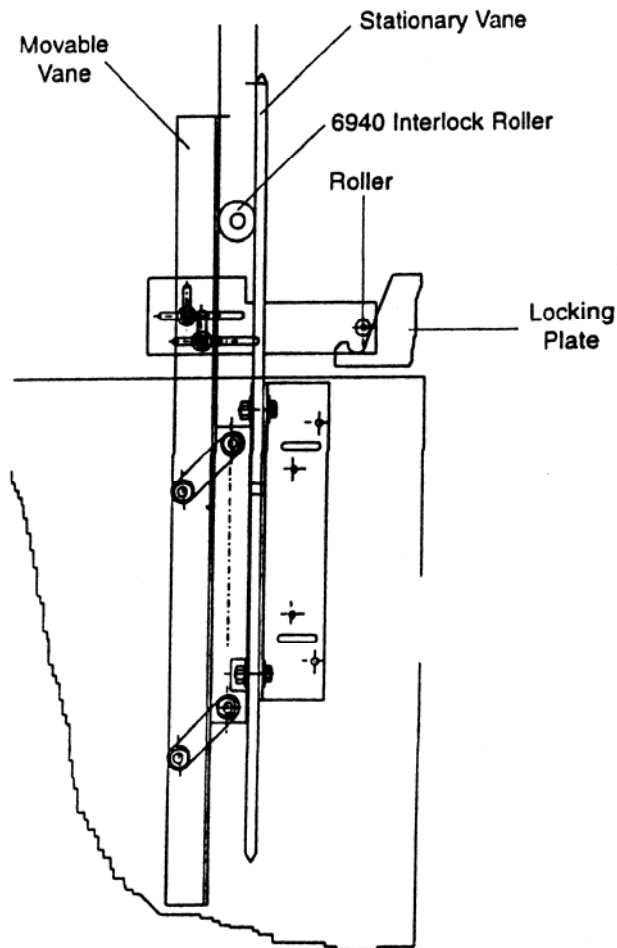
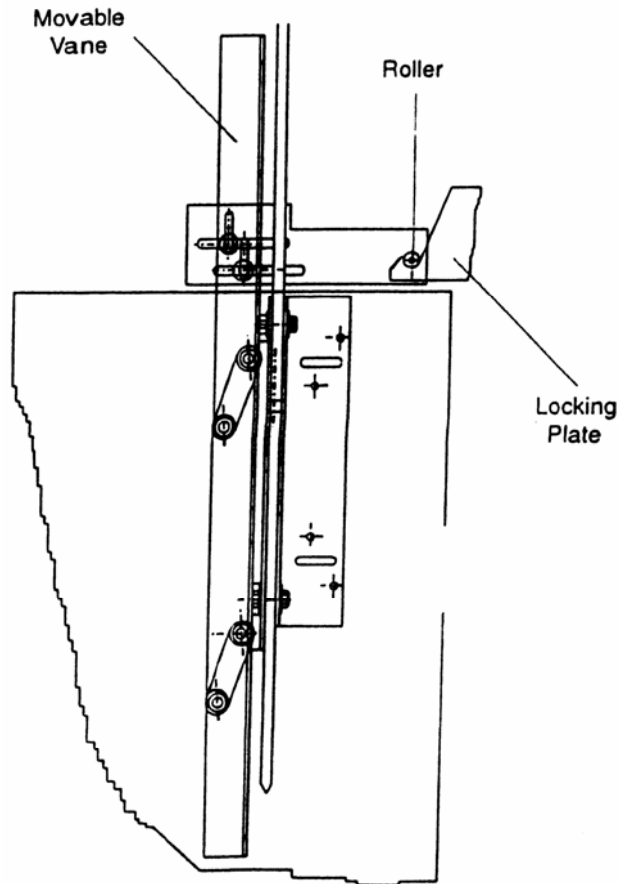


Figure 3: Door Open Mode

### ***Door Locked Mode***

Between landings or outside of the safe unlocking zone, the device operates as shown in Figure 4. The car door starts to open, allowing the roller to roll down the locking bracket incline, which allows the movable vane to lower until the roller gets caught in the depression (or cavity) of the locking plate, and the car door is unable to open any further.



**Figure 4: Door Locked Mode**

### **Installing the Device**

1. Determine the feasibility of the site for mechanical door restrictor (see the required conditions on p. 3).
2. Check that interlock rollers are aligned at every landing and are not excessively worn. Standard running clearance from the interlock roller vane is 1/2 in. (see Figure 7). The minimum running clearance is 3/8 in. The interlock roller diameter must be 1-7/16 in. to 1-1/2 in. If it is less than 1-7/16 in., the interlock roller must be replaced.
3. Position the car at the landing with keyswitch or drop key access.

4. Position the car approximately half way below the landing for easy access to the door vane.
5. **Lock out and tag out the elevator. Test and verify following all safety procedures.**
6. If the door vane is movable (monkey-motion vane), replace it with a stationary vane (included in p/n ACA6940BS4-6).
7. Measure and record the clearance of the front edge of the door vane to the hoistway sill nose. Mark (scribe on the angle bracket) the location of the stationary vane relative to the existing door mounted angle bracket.
8. The existing door mounted bracket must be positioned near the leading edge of the door (as shown in Figure 5). If necessary, flip the bracket. The exact position of the stationary vane must be maintained in order to retain proper clearance to the interlock rollers.

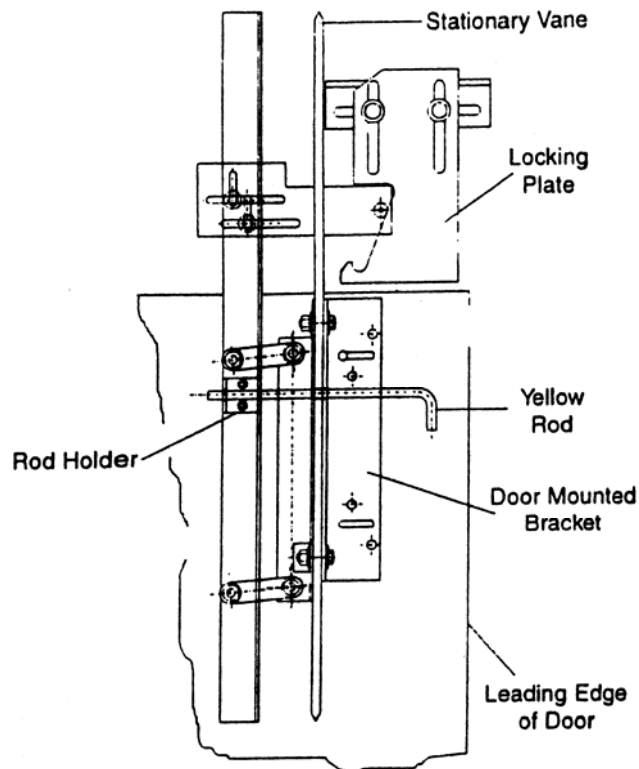


Figure 5

9. Replace the existing 3/8 in. bolts in the door mounted bracket with longer fin bolts (1-1/8 in.). Both coarse and fine threaded bolts are supplied.



10. Temporarily mount the 4-bar linkage in position. Check that both vanes are flush with each other. If they are not flat, either the door vane is not straight and must be replaced or the 4-bar linkage is defective and should be replaced.
11. With the rod holder in place on the new vane and with the new vane in the “lifted” position as shown in Figure 5, insert the yellow rod level and into the new vane. The end face should contact the existing vane and bracket. Mark the location of the hole on the stationary vane for the yellow rod.
12. Remove the 4-bar linkage and drill 1/2 in. hole through the stationary vane and bracket at the mark.
13. Install the 4-bar linkage.

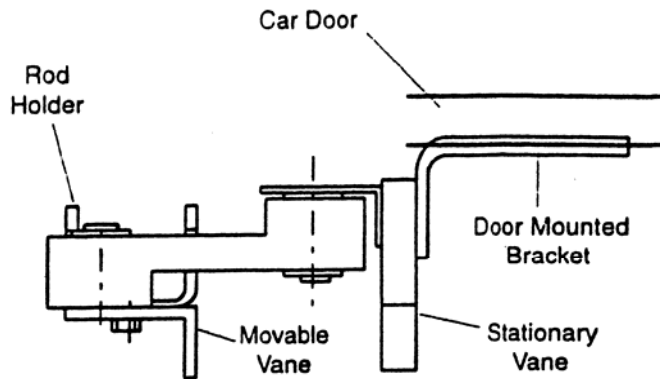


Figure 6: The 4-Bar Linkage

14. Check the clearance of the front edge of both vanes to confirm it matches the original measurement from step 7.
15. Install the rod holder onto the back side of the movable vane (see Figures 5 and 6).
16. Install the yellow rod.

17. Snug the roller arm so it is perpendicular with vanes and close enough towards the stationary vane to avoid protruding into the opening. The bend in the roller arm should clear stationary vane (see Figure 7). It may be necessary to use shims for alignment.

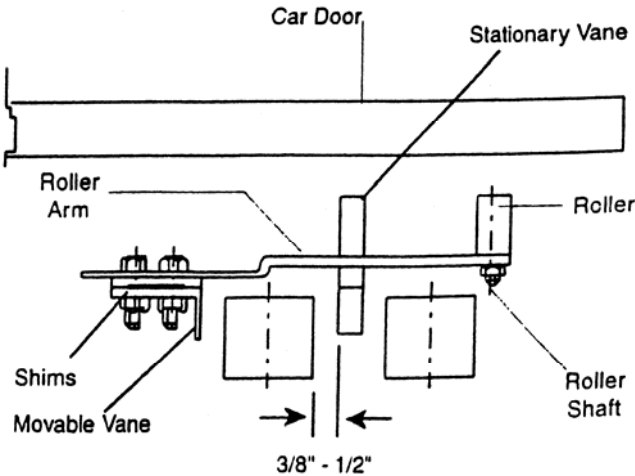


Figure 7: Stationary Vane

18. Attach the roller to the roller arm. The roller shaft may be mounted on either side and must clear the interlock rollers. The roller must spin freely to prevent accelerated wear.
19. Fully close the doors.
20. Attach the appropriate locking plate.
- For single-slide and two-speed doors, locate the locking plate approximately as shown in Figure 8 and attach the mounting bracket to the top of car (two bolts are sufficient). Attach the locking plate to the mounting bracket.

## UNI-LOCK™ MECHANICAL DOOR RESTRICTOR

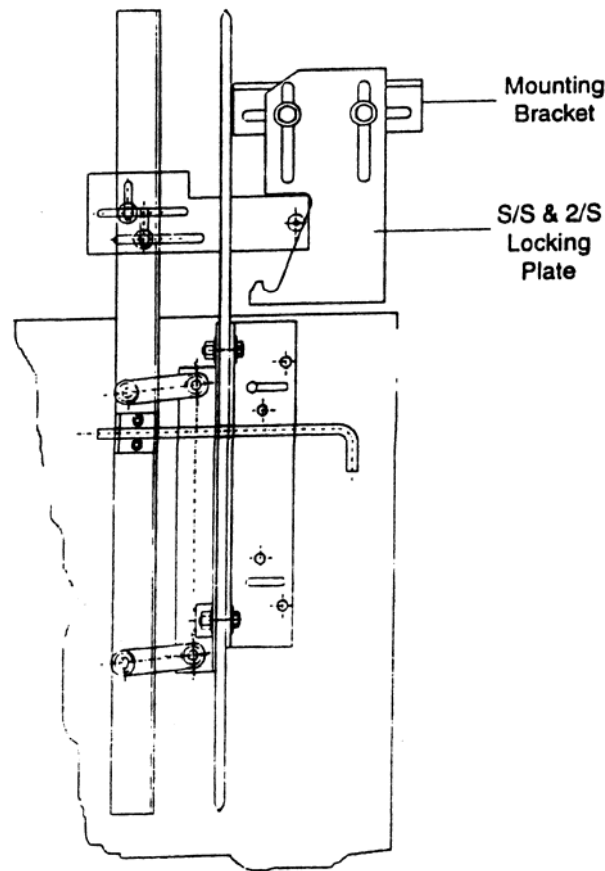


Figure 8

- b. For center-opening doors, drill and tap 5/16-18 in. threaded holes to position the locking plate and spacers on the hanger in line with the roller arm approximately as shown in Figure 9. It may be necessary to use shims with spacers for alignment.
- c. For center-opening doors, in the unusual case where there are high cab and high car doors and standard opening heights at all landings, install four 5/16-18 inserts (p/n 251CJ6) to position the locking plate and spacers on the car door in line with the roller arm approximately as shown in Figure 9. It may be necessary to use shims with spacers for alignment.

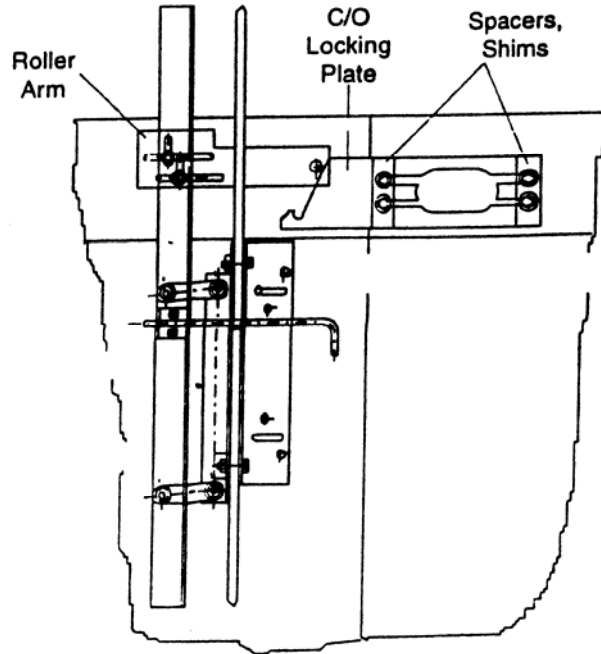


Figure 9

21. Remove the yellow rod.
22. Close the doors and position the locking plate so that the roller is near the top of the incline, not at the top (see Figure 10). Depthwise, the locking plate should hold the middle of the roller span.

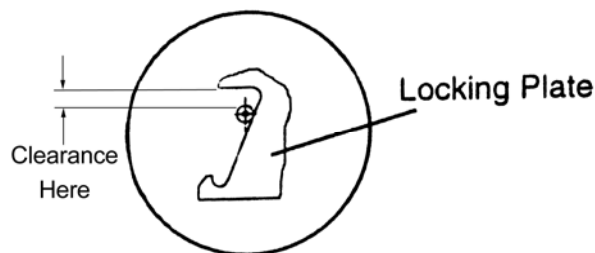


Figure 10

23. Hold 1-1/2 in. diameter cylinder (supplied with the kit) between the vanes.
24. Open the doors a few inches in order to allow the vanes to capture the cylinder.

25. As you move the car door back and forth, align the device to obtain 1/32 in. to 1/16 in. clearance between the locking roller and the catch on the locking plate (see Figure 11).

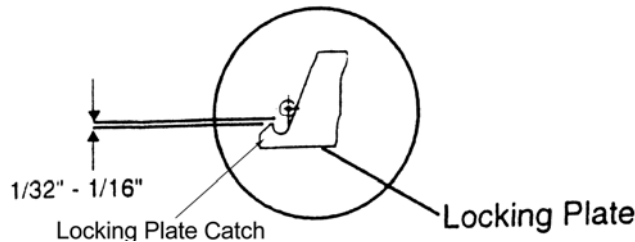


Figure 11

26. Remove 1-1/2 in. diameter cylinder from between the vanes.
27. Manually close the doors. For single-slide doors, there should be clearance at the top of incline (see Figure 10).
28. Desired interlock roller running clearance will require adjustment of the distance between the vanes (see Figure 7). For 1/2 in. running clearance, distance between the vanes should be 2-5/16 in. to 2-3/8 in. For 3/8 in. running clearance, the distance between the vanes should be 2-1/6 in. to 2-1/4 in.
29. Open the doors manually.
30. The achievable opening dimension between the doors or from the leading edge of the door to strike jamb may range from 1-15/16 in. to 2-1/8 in. with the roller caught in the depression (see Figure 12). The doors should not be able to open any further. If dimensions are not achieved, redo steps 23–29.

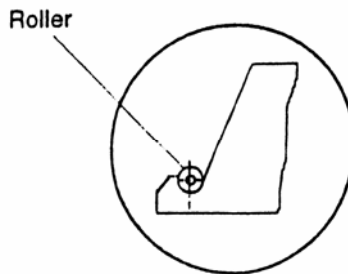


Figure 12

31. Open and close the door one last time to check clearance, making sure everything is free and clear.
32. Tighten all bolts.

**UNI-LOCK™ MECHANICAL DOOR RESTRICTOR**

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33. Attach the yellow rod to the car in accessible spot. Tie wraps may be used to secure the rod and prevent it from rattling on the car top.
34. You may need to readjust door motor closing/holding torque.
35. Make the car operational.
36. Gain safe access to the car top.  
**NOTE:** With keyswitch access, you must first insert the yellow rod.
37. At inspection speed, ride the car top up to the floor level engaging the interlock rollers. Check for proper clearance. At inspection speed ride the car up and down the hoistway from the car top checking clearances at each landing.
38. In normal operation ride the car up and down the hoistway from inside the car listening for unacceptable noises. Adjustment of final door close speeds may be necessary to obtain the most acceptable operation and noise level.
39. Pin the locking plate and the roller arm in two places each. The device will come loose and not operate correctly if pinning is not done.
40. Put the car back in service.

**Disabling the Device for Maintenance**

The mechanic can disable the device using the yellow rod if he needs to open the car door between the landings to perform maintenance. Yellow rod holds the normal travel distance between the two vanes, preventing the locking roller from catching in the depression.

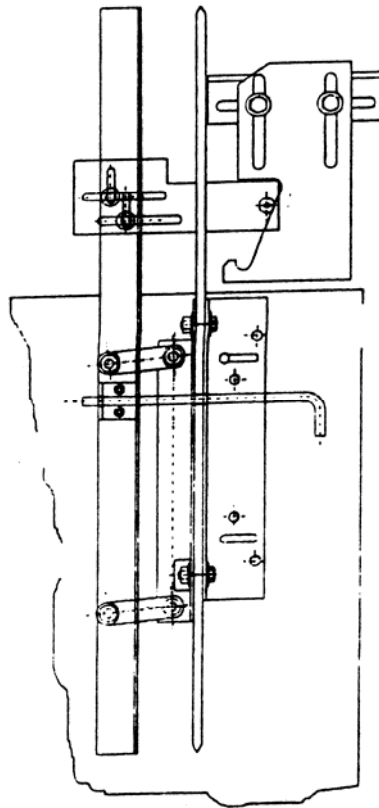
**NOTE:** The yellow rod must be removed before putting the car back in service for the public.

**Disabling the Device for Passenger Entrapment**

If passengers are trapped and the elevator can not be moved to a landing with access, the device can easily be disengaged by a mechanic on top of the car during rescue. The movable vane can be raised while the doors are pushed open.

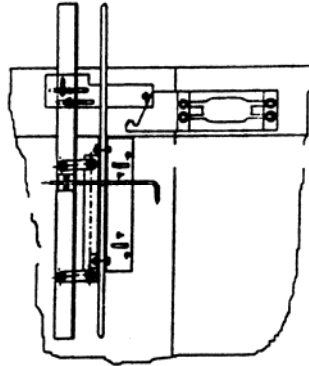
**Table 1: Single-Slide and Two-Speed Door Arrangements**

Part Numbers	Description
ACA6940BS1	Right Hand Single-Slide or Two-Speed Doors with Existing Stationary Vane
ACA6940BS2	Left Hand Single-Slide or Two-Speed Doors with Existing Stationary Vane
ACA6940BS4	Movable Vane Retrofit for ACA6940BS1; Includes: 45.75 in. Cam and Bracket
ACA6940BS5	Movable Vane Retrofit for ACA6940BS2; Includes: 45.75 in. Cam and Bracket

**Figure 13: Single-Slide or Two-Speed with Locking Plate Mounted on Top of Car**

**Table 2: Center-Opening Door Arrangements**

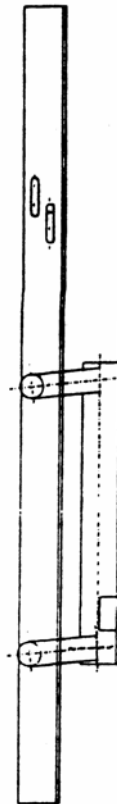
Part Numbers	Description
ACA6940BS3	Center-Opening Doors with Existing Stationary Vane
ACA6940BS6	Movable Vane Retrofit for ACA6940BS3; Includes: 45.75 in. Cam and Bracket

**Figure 14: Center-Opening with Locking Plate Mounted on Door or Hanger**



**Table 3: Replacement Parts for Uni-Lock™ Mechanical Door Restrictor**

Part Number	Description	Quantity
ACA6940BS7	Service Replacement Vane Assembly (see Figure 15) for ACA6940BS1 and ACA6940BS3 Right Hand Single-Slide, Two-Speed, and Center-Opening	1
ACA6940BS8	Service Replacement Vane Assembly (see Figure 15) for ACA6940BS2 (Left Hand Single-Slide and Two-Speed)	1
ABA288ABA2	Roller Arm for 5/16 Shaft	1
AAA494LW2	Roller Shaft, 5/16 Thread	1
AAA456XN2	Roller for 5/16 Shaft	1
AAA456XN3	Retrofit Kit for 10-32 Threaded Shaft	1
AAA98HS1	Yellow Rod	1
172DR4	Retaining Ring (for Pivot Arm Shaft)	4
AAA327NT1	Cam (Stationary Vane)	1
283FP1	Angle Formed (for Door Mounted Bracket)	1
109P2	Screw Threaded-Rolling (for Door Mounted Bracket)	5
AAA27BA1	Cylinder	1

**Figure 15: Service Replacement Vane Assembly (p/n ACA6940BS7 and 8)**