

SERVICE

BULLETIN

Subject: Motor Drive Screw Interference Problem

Date: 2/25/00

Distribution: Auto BallWall Customers

Letter No. CEB00-2

A motor drive screw interference problem may exist with some of the automated BallWall actuators. Failure to check and/or adjust the drive screw can cause damage to the actuator motor.

Supplied with this bulletin are the instructions and a gage to allow you to properly check for the interference problem. If the interference exist, the instructions will instruct you how to make the correct adjustments to prevent any future problems.



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Inspect and Correct A Drive Pin Interference - Automated BallWall Systems

The following procedures list the steps required to inspect for and then correct an unacceptable interference between the actuator motor drive screw and the yoke pin on the mechanical linkage. These steps should be accomplished after the components have been initially installed (i.e., mechanical linkages are connected, bumpers close beneath lane surface, etc.). Refer to *Figure 1*.

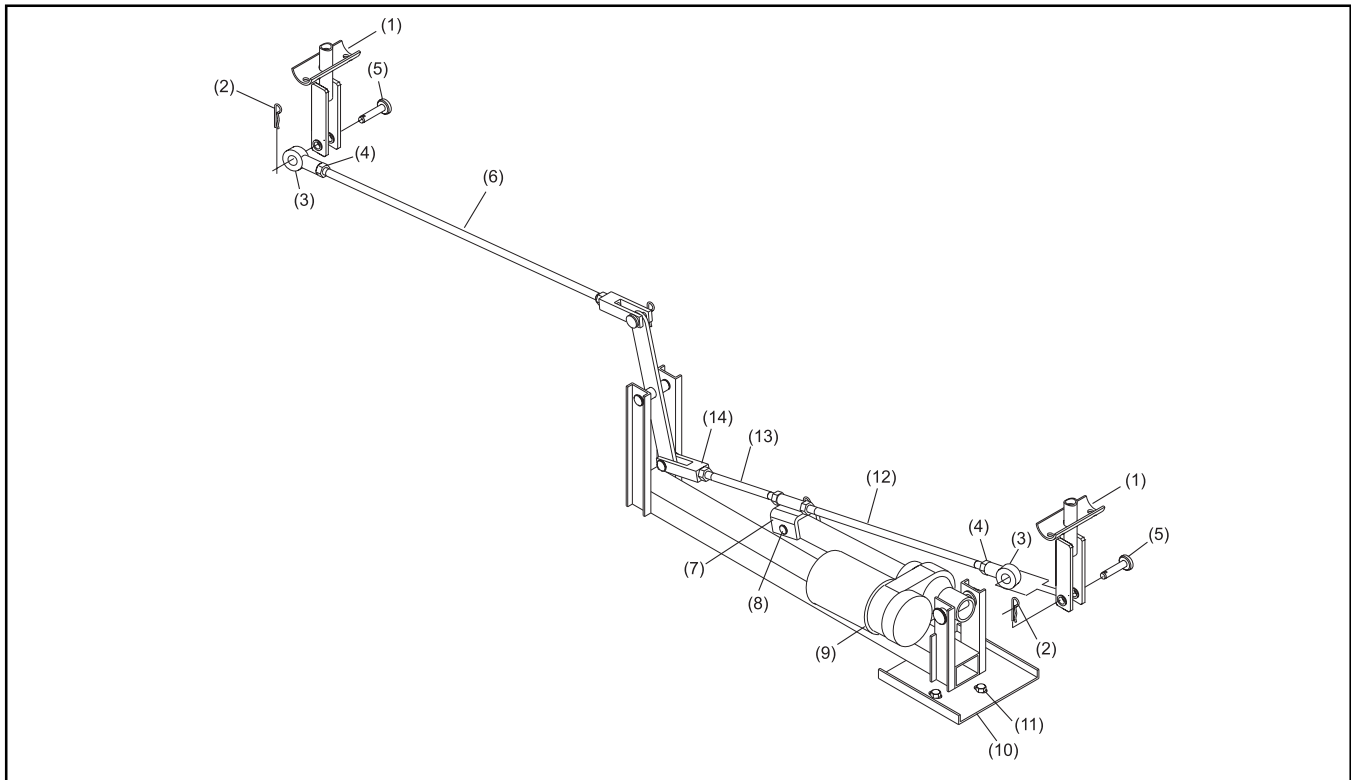


Figure 1. Component Identification

- | | | |
|----------------------------|---------------------------|------------------------------|
| (1) GUTTER CLEVIS ASSEMBLY | (2) HITCH PIN | (3) TURN BUCKLE |
| (4) JAM NUT | (5) CLEVIS PIN | (6) LEFT-HAND CONNECTING ROD |
| (7) DRIVE YOKE | (8) YOKE PIN | (9) ACTUATOR MOTOR |
| (10) MOUNTING PLATE | (11) BASE MOUNTING SCREWS | (12) LONG ROD |
| (13) SHORT ROD | (14) CLEVIS | |

1. Check for interference between the actuator motor drive screw and yoke pin of mechanical linkage rods.

NOTE: *DO NOT* proceed unless the cam switch indicates a “closed” state when bumpers are closed. If cam switch does not indicate a “closed” state, perform cam switch adjustment following steps in “Actuator Adjustment-Motor Limit Switch Cams” paragraph in the *Automated BallWall System Operations and Service Manual*.

- a. If not already done, place the bumpers in the closed position. Activation of bumpers may be accomplished through the use of the Diagnostics menu on the Frameworkx scorer or the Stand-Alone Controller (no Frameworkx scorers).

- b. Verify that the outboard (CLOSE) cam switch is in the closed state. Perform one of the following actions based on your center's configuration:
- Frameworkx Scorers - Check "Switch and Motor Status" screen under Diagnostics menu. Refer to "Operational Check of System" for required procedure.
 - Stand-Alone Controller - Place bumpers in the closed position and check the LED status on the automated bumper controller PCB for a "closed state" indication.
- c. If switch indication is not "closed" , proceed to step 2 to make a switch adjustment. If switch is in closed state, proceed to step d.
- d. Insert a go-no-go gage (part number 17-300270-000) into the slot of sleeve casting. Refer to *Figure 2*. If gage fits into slot as shown, and end of gage contacts the drive screw, no drive pin interference exists and additional adjustments are NOT necessary. If the gage does not fit into slot or contact the drive screw, proceed to step 2 to make cam switch adjustment.

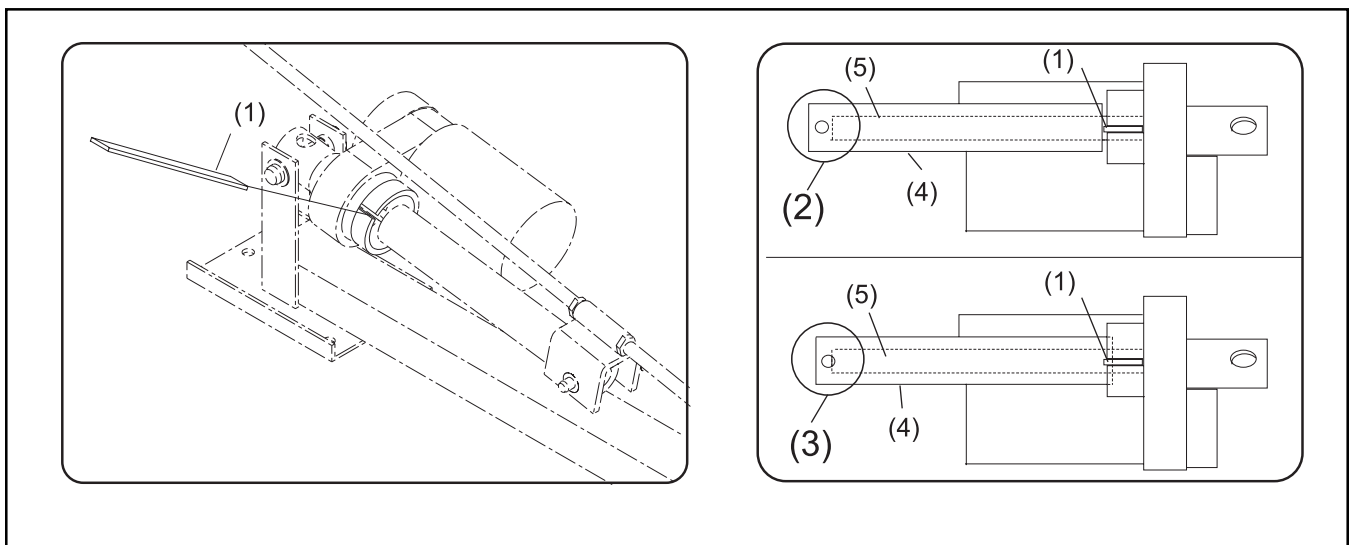


Figure 2. Use Gage to Determine if Interference Exists

- | | | |
|------------|---|---|
| (1) GAGE | (2) NO INTERFERENCE EXISTS - GAGE ISN'T BLOCKED BY SLEEVE | (3) INTERFERENCE EXISTS - GAGE IS BLOCKED BY SLEEVE |
| (4) SLEEVE | (5) ACTUATOR MOTOR DRIVE SCREW | |

2. Adjust motor cam switch to increase clearance.

- a. Make cam switch adjustment following steps in "Actuator Adjustments - Motor Limit Switch Cams" paragraph in the Automated BallWall System Operations and Service Manual until the switch indicates a "closed" state.

- b. Raise the bumpers and then lower until the cam switch indicates a “closed” state.
- c. Verify that the bumpers are below the lane surface. If bumpers are below the lane surface, rotate the cam switch back off the lobe and repeat step b. Repeat this process until bumpers are above the lane surface when cycled to the “close” position. Adjust cam switch back to where the switch indicates a “closed” position.
- d. Insert the go-no-go gage (part number 17-300270-000) into the slot of motor sleeve casting. Refer to *Figure 2*. If gage can be inserted and contacts the drive screw, remove gage and cycle the bumpers (raise and lower) several times while verifying that the cam switch indicates correct open or closed bumper status. If gage does NOT insert into the motor sleeve casting, go to step 3.

3. Adjust mechanical linkage:

NOTE: *DO NOT proceed unless the cam switch indicates a “closed” state when bumpers are closed. If cam switch does not indicate a “closed” state, perform cam switch adjustment following steps in “Actuator Adjustment-Motor Limit Switch Cams” paragraph.*

- a. Place the bumpers in the open (up) position.
- b. Disconnect power cord from the automated bumper controller.
- c. Remove the Ball Wall curtains as necessary to gain access to gutter pivots.
- d. Disconnect clevis pins from the gutter clevis assemblies for both gutters. Refer to *Figure 1*.
- e. Mark position of the actuator motor base by tracing an outline with marker on the floor.
- f. Remove actuator motor base mount bolts and retain for reinstallation.
- g. Lift the actuator motor above the lane for easy access to linkages.
- h. Disconnect the yoke pin from the center pivot point and the motor sleeve. Refer to *Figure 3*. Visually inspect pin for evidence of wear. If wear is present, the pin was most likely interfering with motor drive screw. Retain all pins and retainers for reinstallation.

NOTE: Replace yoke pin if excessive wear is present.

- (1) DRIVE YOKE
- (2) DRIVE YOKE PIN
- (3) DRIVE SCREW
- (4) SLEEVE

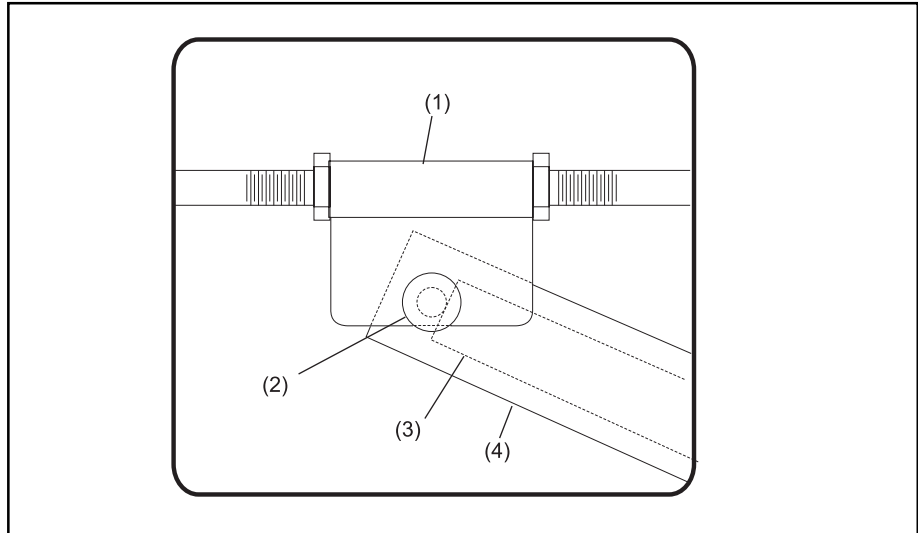


Figure 3. Check For Interference

- i. Measure the overall length between centers of the turnbuckle and clevis. Refer to *Figure 4*. **Note this measurement for future use!** Manufacturer's set length is 28.37" from center to center but this length may have been altered during initial installation of components.

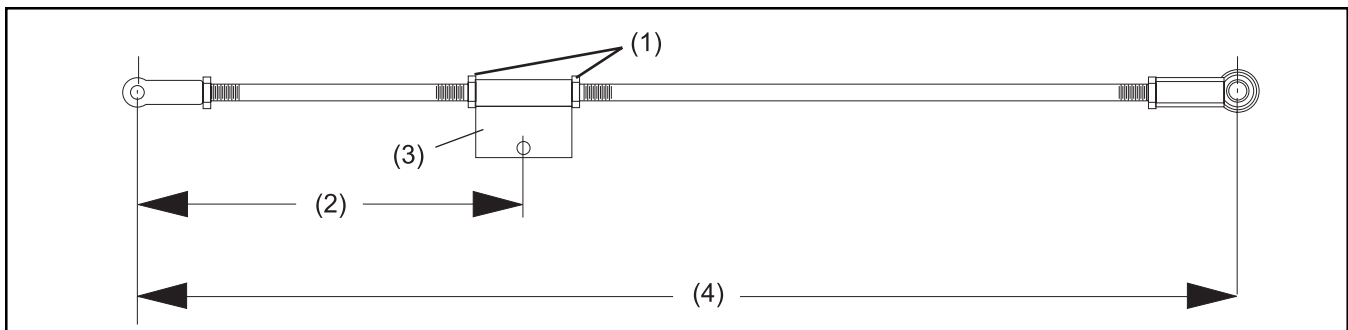


Figure 4. Note Measurement for Reinstallation

- (1) JAM NUTS
- (2) NOTE MEASUREMENT FOR REINSTALLATION

(2) 10" MINIMUM

(3) DRIVE YOKE

- j. Loosen the jam nuts on both sides of the black drive yoke that attaches the drive link to the motor sleeve. Refer to *Figure 4*.
- k. Thread the short rod into the yoke to reduce the distance between centers of the yoke and the clevis end of linkage. Refer to *Figure 4*.

- l. Unscrew the long rod from the yoke the same distance that the short rod was threaded into black drive yoke. The overall length of drive linkage rods as measured in step i. above **must** be kept so if short rod is threaded in by 1/4" (6.35 mm), 1/4" (6.35 mm) must be added to length of long rod to maintain same overall length of linkages.
- m. Measure from the center of the pin hole on the yoke to the center of the pin hole on the short rod clevis. Factory-set length is 10-1/4" (260.35 mm) but after adjustments, must NOT be less than 10" (254 mm) provided that there is adequate thread engagement at the longer rod end.

NOTE: Threaded engagement at any connection on linkages **MUST** be at least 3/8" (9.52 mm).

- n. Tighten all jam nuts and reinstall the yoke pin on the actuator motor sleeve.
- o. Lower the actuator motor assembly beneath lane.
- p. Align the actuator motor base with the outline on the floor and reinstall mount screws to secure actuator.
- q. Connect and pin the clevis and turnbuckle ends of the linkage to the gutter clevis assemblies.
- r. Plug the power cord in for automated bumper controller.
- s. Repeat steps 1a through 1d to check for drive pin interference.