

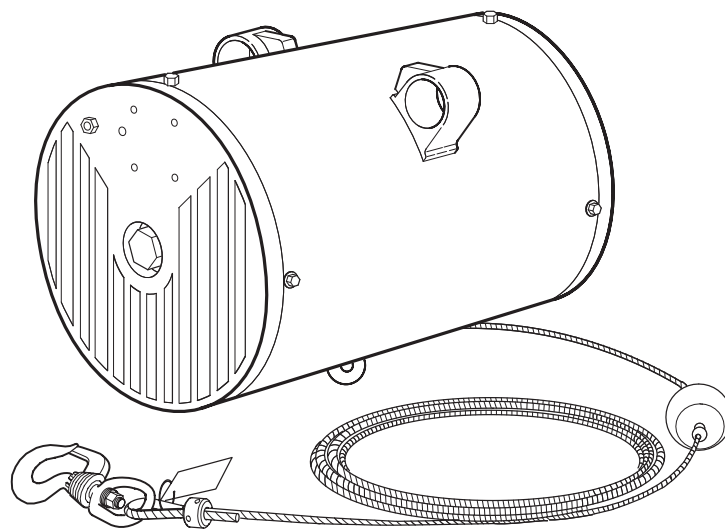
# Product Maintenance Information



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## Air Balancers

Series  
ZA, EA, and BA



(Dwg. MHP2176)



**Save These Instructions**

Only allow **Ingersoll Rand** trained technicians to perform maintenance on this product. For additional information contact **Ingersoll Rand** factory or nearest Distributor.

For additional supporting documentation refer to Table 1 'Product Information Manuals' on page 2. Manuals can be downloaded from [www.ingersollrandproducts.com](http://www.ingersollrandproducts.com).

The use of other than genuine **Ingersoll Rand** replacement parts may result in safety hazards, decreased performance and increased maintenance and will invalidate all warranties. Original instructions are in English. Other languages are a translation of the original instructions. Refer all communications to the nearest **Ingersoll Rand** Office or Distributor.

Table 1: Product Information Manuals

Publication	Part/Document Number	Publication	Part/Document Number
Product Safety Information Manual	16598831	Product Information Manual	54072541
Product Parts Information Manual	16598849		

## MAINTENANCE INFORMATION

### ⚠ WARNING

- Always wear eye protection when operating or performing maintenance on this Product.
- Always shut off main air supply and bleed down before disconnecting air supply hose before installing, removing or adjusting any accessory on this Products, or before performing any maintenance on this Product.
- Never perform maintenance on the Product while it is supporting a load.
- Before performing maintenance, tag controls: **WARNING - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.**
- Only allow personnel trained in service and repair of this Product to perform maintenance.
- After performing any maintenance on the Product, test Product before returning Product to service.
- The lower sheave block or hook assembly must be lying on the floor or a maintenance platform before beginning service.

### NOTICE

- When reading the instructions, refer to exploded diagrams in Parts Information Manuals when applicable.

### ■ General Maintenance Instructions

### ⚠ CAUTION

- Use of replacement parts other than genuine **Ingersoll Rand** original parts could result in damage to the product and invalidate the warranty.

### NOTICE

- It is recommend that maintenance work be performed by an **Ingersoll Rand** service repair center.

### ■ Series ZA Manifold

#### ■ Removal From Balancer

Refer to Dwg. MHP1899.

1. Lower suspended load to floor. Turn off air supply to balancer.
2. Press down lever until wire rope is slack and all air is exhausted from balancer.
3. Remove air supply (4) and hoses (5 and 6) from manifold (1).
4. Remove the four screws (2 and 3) holding manifold to end cap.

#### ■ Disassembly

Refer to Dwg. MHP1904.

1. Remove the two adjustment screws (7). Pull out when threads have disengaged.
2. Remove hook balance adjustment screw (11) and spring (12).
3. Remove piston (9) by grasping raised center with needle nose pliers and pulling straight out.
4. Remove seat (5), valve (4) and spring (6). Use a No. 2 Phillips screwdriver to loosen seat (5).
5. To take out ball check (2), remove down side hose fitting and retainer ring (1).

#### ■ Assembly

Refer to Dwg. MHP1904.

1. Thoroughly clean manifold body and all internal parts before reassembly. Replace all worn parts.
2. Apply a light coat of lubricant (Lubriplate) to O-rings (8), U-cup (10), and threaded adjustments before reassembly.

3. Assemble manifold in reverse order of disassembly.
4. Use U-cup insertion tool, part number 54041777, to install seal to prevent damage from threaded hole.

### ■ Series ZA Pendant

#### ■ Removal From Balancer

Refer to Dwg MHP1899.

1. Lower suspended load to floor. Turn off air supply to balancer.
2. Press down lever until wire rope is slack and all air is exhausted from balancer.
3. Disconnect twin hose (5 and 6) at handle (9).

#### ■ Disassembly

Refer to Dwg MHP2916.

1. Remove Pin (11) and UP and DOWN levers (5 and 6).
2. Remove Capscrews (2 and 3).
3. Remove the two full flow valve assemblies (15) and spool body (8) by grasping with needle nose pliers and pulling straight out. remove guard (9).
4. Remove two springs (7). Check valve springs for breakage or loss of tension. Replace springs, if necessary. Examine O-rings (14) for signs of wear or deterioration. Clean housing (10).
5. Remove pin (1) and pull out handle (4).
6. Replace O-rings (14) and all worn parts.

#### ■ Assembly

Refer to Dwg MHP2916.

1. Control handle is assembled in the reverse order of disassembly.
2. Apply a light coat of lubricant (10885) to O-rings and threaded connections before reassembly.

### ■ Series ZA Control Handle (Ergonomic)

#### ■ Removal From Balancer

Refer to Dwg. MHP1899.

1. Lower suspended load to floor. Turn off air supply to balancer.
2. Press down lever until wire rope is slack and all air is exhausted from balancer.
3. Disconnect twin hose (5 and 6) at handle (9).

#### ■ Disassembly

Refer to Dwg. MHP1907.

1. Remove pin (1) from UP and DOWN levers.
2. Remove screw (2).
3. Remove two insert valve assemblies (3) by pulling them straight out.
4. Remove two springs (4). Clean valve body. Check valve springs for breakage or loss of tension. Replace springs, if necessary. Examine rubber seat on end of valve stem. Examine O-rings for signs of wear or deterioration.
5. Replace all worn parts.

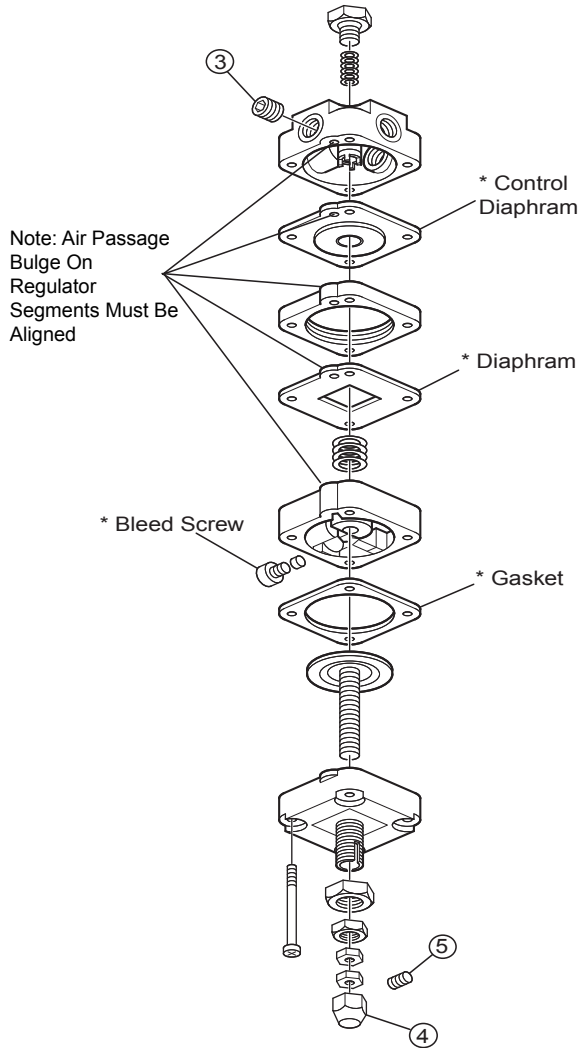
#### ■ Assembly

Refer to Dwg. MHP1907.

1. Control handle is assembled in reverse order of disassembly.
2. Apply a light coat of lubricant (10886) to O-rings and threaded connections before reassembly.

## Series BA Regulator

Refer to Dwg. MHP1258.



(Dwg. MHP1258)

## Z-Servo Control

Refer to Dwg. MHP1908, MHP1909, and MHP1910.

### Removal From Balancer

1. Place suitable stand or platform under the suspended load. The stand or platform should be high enough for the load to rest on when the balancer is at the bottom of its travel.
2. Slowly turn pilot regulator screw counterclockwise until wire rope is slack. Remove the load, and load hook from wire rope.
3. Turn off air supply.
4. Disconnect control hose from Z-Servo control. Remove wire rope clamps at top and bottom of Z-Servo control to complete removal of control. Refer to "Series EA, BA Z-Servo Regulator" Section on page 3 to repair EA regulator.

### Disassembly

Refer to Dwg. MHP1910.

1. Remove spring pin (13).
2. Remove cap (11).
3. Loosen setscrew (15) and remove knurled adjusting nut (10).
4. Slide valve (2) and body (1) from bolt. Remove valve from body and check seal (3) and O-ring (4) for deforming or wear.
5. Remove pin (14) and cap (12). This permits removal of plunger (9) and spring (7).

### Assembly

1. Slide washer (6) (flat side up) onto plunger (9). Slide spring (7) and washer (5) onto plunger (9). Insert this assembly into housing (8).
2. Apply a light coat of lubricant (10885) to O-ring (4) and insert in valve groove (1).
3. Install seal (3) on valve stem (2), with flat side of seal against shoulder of stem. Insert it into valve (1). Slide this assembly onto plunger (9).

4. Thread adjusting nut (10) onto plunger (9), grooved side first. Tighten to allow cap (11) to be started. Install pin (13).
5. Tighten nut (12). Align hole in nut with hole in housing.
6. Insert spring pin (14).
7. Tighten adjusting nut (10). Control is now ready for installation to balancer. Refer to 'Z-Servo Installation' section in Product Information Manual.

## Series EA Control Handle

### Removal From Balancer

Refer to Dwg. MHP1911.

1. Place suitable stand or platform under suspended load. Stand or platform should be high enough for load to rest on when balancer is at bottom of its travel.
2. Slowly turn pilot regulator screw counterclockwise. This will release tension on wire rope for load removal.
3. Turn off air supply.
4. Disconnect control hose (5) from EA Handle. Refer to "Series EA, BA Z-Servo Regulator" Section on page 3 to repair EA regulator.

### Disassembly

Refer to Dwg. MHP1912.

1. Remove two button head screws (17). Remove rotor control valve assembly (01851) or (01850) from bracket (18).
2. Drive out spring pin (16).
3. Remove screw (15), be cautious these are spring loaded parts.
4. Remove and replace any worn or broken parts in rotor valve (2) or (2A).
5. Remove floating seal assembly (11), spring (13), ball detent (9) and spring (10).
6. Inspect seal (11) and O-ring (12) for wear. The face of the seal should be smooth. If it is not, polish seal on crocus cloth. O-ring (12) must be free of nicks and cuts. Replace all worn parts.
7. Remove and inspect two needle valves (3) for damage to their tapered tips. Replace damaged valves.

### Assembly

Refer to Dwg. MHP1912.

1. If pin (1) has been removed, reinstall it into 1/8 in. (3.2 mm) hole in the rotor (2) or (2A). Pin must protrude 3/32 in. (2.4 mm) above surface.
2. Install setscrew (7), spring (10) and ball detent (9) in small hole in valve body (4).
3. Insert washer (5), spring (13) and floating seal (11) with O-ring (12) into large hole in valve body (4). Apply a small amount of lubricant to O-ring (12).
4. For rotor (2A) only, insert spring (10) and locator (6) in slot in rotor valve. Locator should slide in and out freely. Apply small amount of light grease in slot if necessary.
5. Insert screw (15) through rotor. Mate this assembly with valve body assembly. Tighten screw until hole in screw is aligned with hole in body.
6. Insert pin (16).
7. Thread two needle valves (3) into rotor body.
8. Adjust setscrew (7) to give proper detent feel to rotor.
9. Install and tighten setscrew (8).
10. Install and tighten setscrew (14).
11. Attach rotor control valve assembly (2) or (2A) to handle bracket (18).
12. Reinstall to control hose. Refer to "EA Basic Installation" Section in Product Information Manual.
13. Perform EA Basic Operational Adjustments.

## NOTICE

- If new screw (15) is installed, it must be drilled to accept pin (16).

## Series EA, BA Z-Servo Regulator

### Removal From Balancer

Refer to Dwg. MHP1909, MHP1911 and MHP1915.

1. Place suitable stand or platform under suspended load. Stand or platform should be high enough for load to rest on when balancer is at bottom of its travel.
2. Slowly turn pilot regulator screw counterclockwise until wire rope is slack. Remove load from hook.
3. Turn off air supply.
4. Disconnect all hose connections from EA regulator.
5. Remove mounting screws.

### Disassembly

Refer to Dwg. MHP1914.

1. Remove filter assembly (6). Check for dirt or loose filter media.
2. Remove check valve assembly by removing plug (12) and pushing piston (10) out from opposite side with a blunt punch. Assembly consists of the hexagon plug (12), spring (13) and piston (10), O-rings (2), (9) and seal (11). Inspect check valve O-ring (2), seal (11), and piston O-ring (9) for wear.
3. Remove guide assembly (1). This consists of three different size O-rings (2), (3) and (4), a valve stem (14) and spring (15). Two O-rings (2) are located inside guide assembly. Check O-rings and valve stem for wear. Check inside valve for possible clogging of small pressure balance hole.
4. To remove bonnet (30) and diaphragm (31), push on brass ball, visible through hole in valve seat (5), with an instrument softer than brass.
5. Check rubber diaphragm for cracks or cuts. Replace it if necessary. Make sure brass ball pin is free to rotate.

### NOTICE

- Brass ball pin must not have end play. If end play is found, adjust setscrew on opposite side of diaphragm. Apply a light coat of thread-locking compound to prevent screw from turning. End play in pin will cause slow exhaust or erratic operation.
6. Remove four self tap screws (26) from pilot regulator bonnet (25).
  7. Remove pilot piston assembly (22). Check U-cup (23) and O-ring (24) for wear.
  8. Check opening in brass tube of piston assembly (22) to make sure it is clear.
  9. To inspect valve assembly (18), valve seat (19) and spring (20), remove seat with a #2 Phillips screwdriver or 3/8 in. (10 mm) socket wrench. Check rubber insert on valve (18) for wear. Replace if necessary.
  10. Remove valve (17) and O-ring (16). Check O-ring for wear and trim valve tip for possible damage.

### NOTICE

- Refer to Dwg. MHP1909, MHP1911 and MHP1915 in Product Information Manual for auxiliary flow control valve and trim valve locations.
11. Clean regulator body (7) and components thoroughly. Replace all worn parts.

### NOTICE

- If more than 2 or 3 items require replacement, it is generally advisable to thoroughly clean regulator and install a Part Number 15900 repair kit.

#### ■ Assembly

Refer to Dwg. MHP1914.

1. Apply a very light coat of lubricant (10885) to all O-rings during reassembly.
2. Install valve (17) and O-ring (16). Turn until head of valve protrudes 1/16 in. to 1/8 in. (1.6 to 3.2 mm) from regulator body.

3. Install valves (17) and O-ring (16). Turn clockwise until closed.

### NOTICE

- Refer to Dwg. MHP1909, MHP1911 and MHP1915 in Product Information Manual for auxiliary flow control valve and trim valve locations.
4. Install pilot regulator components. Insert spring (20) into hole. Position valve (18) in place. Make sure rubber insert of valve faces away from spring.
  5. Insert valve seat (19) and carefully tighten.
  6. Insert O-rings (4) and (3) into guide (1). Apply a light coat of lubricant (10885) on outside diameter of valve stem (14). Slide spring (15) over small end of valve stem. Insert this assembly into guide assembly (1). Place completed guide and valve assembly into center hole of regulator body (7) and tighten.
  7. Insert filter assembly (6) into hole above port B and tighten.
  8. Insert stem of check valve assembly (10) seal end first into hole above port A. Insert spring (13) and hexagon plug (12).
  9. Place O-ring (24) into groove in regulator body between ports A and B. Insert spring (28) into regulator screw (29). Lubricate U-cup (23) with lubricant (10885). Insert it with piston assembly (22) into pilot regulator bonnet (25). Make sure brass stem goes through center of valve seat (19).
  10. Insert and tighten four screws (26). This completes the pilot regulator assembly.
  11. Connect air supply to regulator and turn on.
  12. Check pilot regulator operation by turning regulator screw (29) clockwise until air pressure flows through small hole located on back of regulator body, at edge of bonnet (30) opening.

### NOTICE

- After checking for air flow, turn adjustment knob counterclockwise until air flow stops. Disconnect air supply.
13. Insert diaphragm assembly (31), bonnet (30) and O-ring (33).

## BALANCER REBUILD

### ■ Disassembly for 6.5 and 10 inch Balancers - All Series

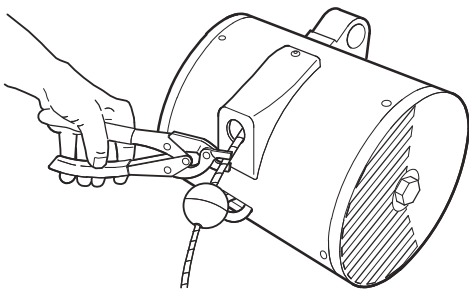
#### ⚠ WARNING

- Turn off air supply to balancer and be sure wire rope is slack before attempting any disassembly operations. Refer to Parts List manual for specific balancer.

### NOTICE

- The balancer shown in the following instructions has 120 in. (305 cm) travel with all controls removed.

1. Place balancer on a bench or suitable clean work area.
2. Remove Z-Stop if installed. Refer to section "Z-STOP INSTALLATION AND TEST" on page 10.
3. Cut load wire rope above ball stop (if used). Refer to Dwg. MHP1935 on page 4.
4. Remove load hook and wire rope guide.
5. Loosen center bolt in end cap and end cover. Do not remove.



(Dwg. MHP1935)

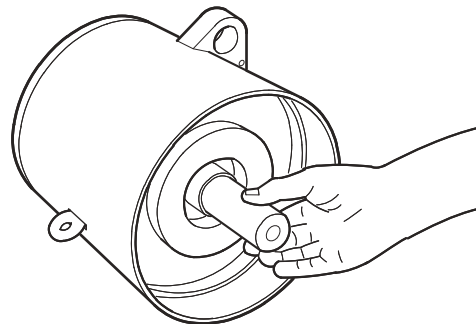
6. Remove screws (if applicable) around outside diameter of end cap. Remove hex head bolt in center of end cap.
7. To remove end cap pull on wire rope. This will force piston against end cap and push end cap and piston out of housing.

### NOTICE

- DO NOT run reel off end of ball screw or ball bearings will drop out.
  - Most balancers are equipped with thin metal shims inside the ball screw cap to assure an air tight fit of seal (10061). Do not lose shims.
8. Remove ball screw cap by slipping it off the ball screw. Refer to Dwg. MHP1936 on page 4.

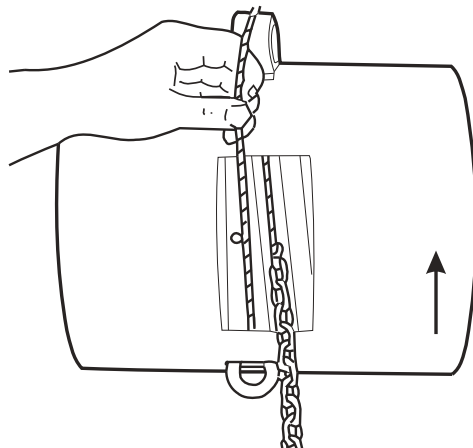
### NOTICE

- Wire rope anchor hole in reel should be visible at this time. If not, rotate reel slightly, winding up wire rope, until hole is visible. Swaged fitting on the end of wire rope has a shank which fits into anchor hole. The fit should not be tight. If fit is tight, be careful not to damage reel assembly when removing wire rope. Refer to Dwg. MHP1368 and Dwg. MHP1937 on page 5.

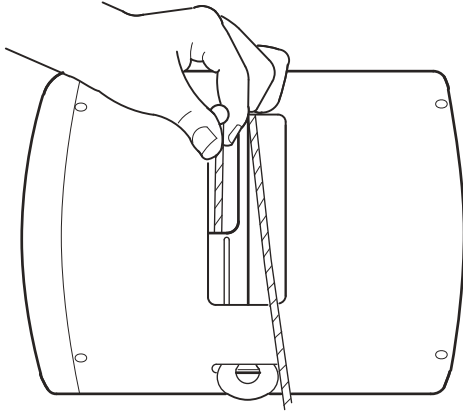


(Dwg. MHP1936)

9. Push wire rope into balancer until swaged fitting is exposed. Pull on swaged fitting to remove wire rope. Refer to Dwg. MHP1938 on page 5.

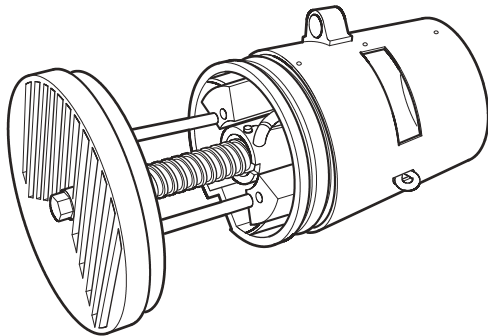


(Dwg. MHP1368)



(Dwg. MHP1937)

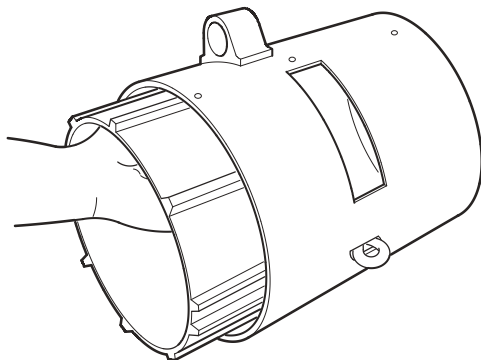
10. Remove all screws around outside diameter of end cover.
11. Remove end cover and ball screw-reel assembly by pushing on piston end of ball screw. Refer to Dwg. MHP1938 on page 5.



(Dwg. MHP1938)

#### NOTICE

- Use suitable marking pen to index ball screw notch with end cover spring pin to prevent misalignment of reel.
12. Remove end cover and brake from ball screw and reel assembly, by removing center bolt from end cover.

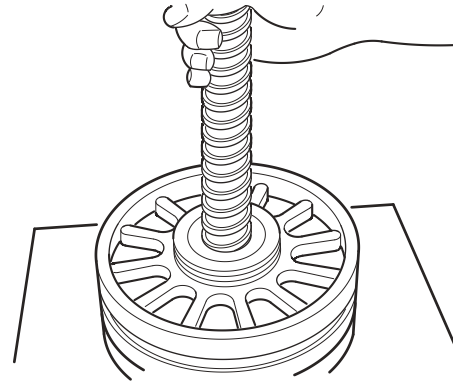


(Dwg. MHP1939)

### ■ Disassembly of Ball Screw

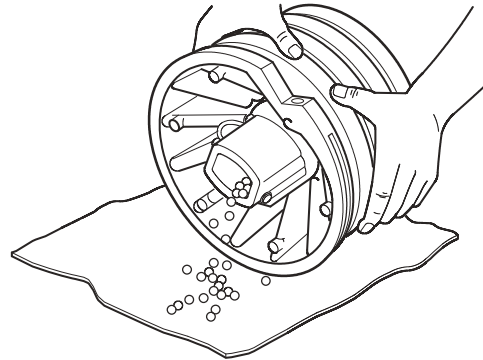
#### NOTICE

- If ball screw or ball nut do not show signs of excessive wear, disassembly of ball screw is not required.
1. Place ball screw and reel assembly on a shop towel, with thrust bearing facing upwards.
  2. Rotate ball screw counterclockwise, removing it from reel assembly. Refer to Dwg. MHP1940 on page 5.



(Dwg. MHP1940)

3. Grasp reel with both hands and gently lift up. Ball bearings will fall on shop towel. There are 64 ball bearings for models 150, 200 and 350. There are 84 ball bearings for model 500. Lightly tap reel to remove any remaining ball bearings. If all balls do not fall out, it may be necessary to insert a wire through the ball return tubes to push out any balls which may be lodged inside. Refer to Dwg. MHP1941 on page 5.



(Dwg. MHP1941)

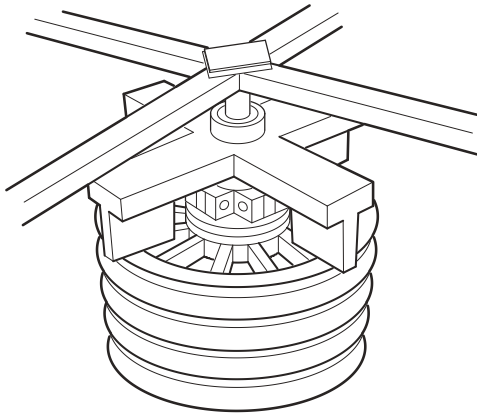
### ■ Cleaning and Inspection

Now that the basic balancer is completely disassembled, the components should be thoroughly cleaned and inspected.

1. Examine cylinder bore surface for excessive wear. Some small scuff marks may be removed with fine emery cloth. If wear is too excessive, housing must be replaced. If balancer has a liner, it should also be inspected for wear or possible cracking.
2. Check piston for cracks and wear of flexible sealing lips. Check steel backing plate for cracks and wear.
3. Inspect ball screw and thrust bearing for excessive wear, pitting, rusting and security in reel assembly.
4. Check wire rope guide for wear. Excessively worn or grooved wire rope guides should be replaced.
5. Inspect reel assembly for cracks and wear of "V" grooves, and anchor hole for deformation.

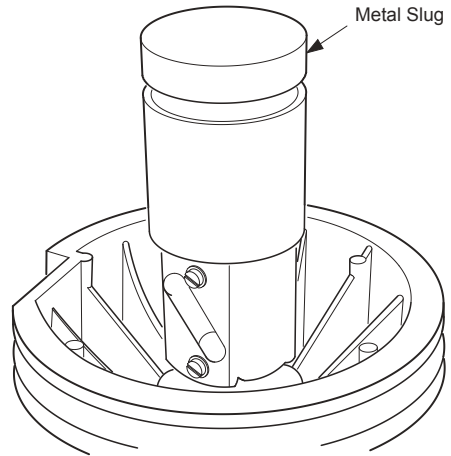
### ■ Ball Screw and Thrust Bearing Replacement

1. **Removing Thrust Bearing.** Thrust bearing is attached to reel with a retainer pressed into the hub of the reel approximately 1/4 in. (6.4 mm). To remove, use a bearing puller to engage under-cut at bottom of retainer inside diameter. Refer to Dwg. MHP1942 on page 6.



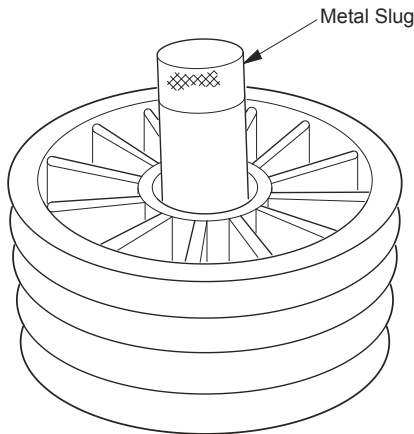
(Dwg. MHP1942)

2. **Removing Ball Screw Nut.** Ball screw nut can be pressed out of reel using a cylindrical metal slug 2 inches (50.8 mm) in diameter. Support reel along outer portion to allow ball nut to be removed. Press out ball screw nut, being careful not to damage reel. Refer to Dwg. MHP1943 on page 6.



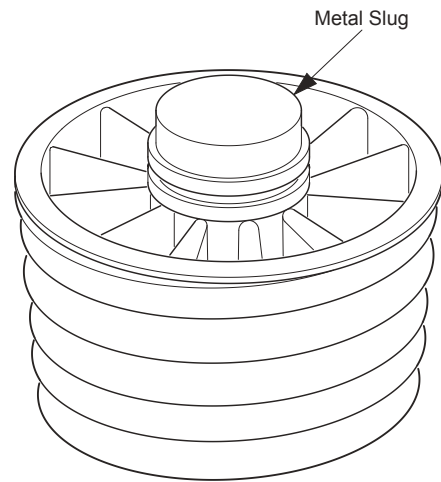
(Dwg. MHP1945)

4. **Installing New Thrust Bearing.** To install thrust bearing, place ground inside diameter side of bearing race against reel, place retainer through thrust bearing and press it into reel. After retainer is pressed in, check outer bearing race to be sure it rotates freely. Thrust bearing retainer should be 0.008 to 0.012 in. (0.2 to 0.3 mm) below surface of outer bearing race. Refer to Dwg. MHP1946 on page 6.



(Dwg. MHP1943)

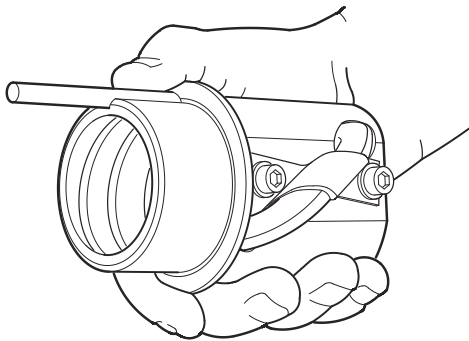
3. **Installing New Ball Screw Nut.** To install ball screw nut, position washer over small diameter of nut. Place pin in position. Align pin with groove in reel and press in nut. Refer to Dwg. MHP1944 and MHP1945 on page 6.



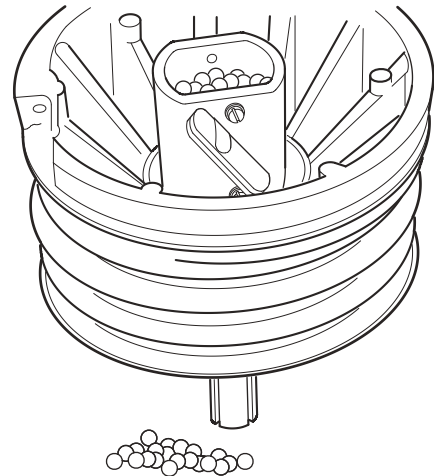
(Dwg. MHP1946)

### ■ Ball Screw Reassembly

1. Plug hole on slotted end of ball screw with a small piece of paper towel, to prevent ball bearings from dropping into threaded hole.
2. Insert plugged end of ball screw into ball nut from thrust bearing side.
3. Turn ball screw clockwise to thread into ball nut. Thread ball screw to within 1-1/2 in. (38 mm) of ball nut end.
4. Stand assembly on ball screw and drop in approximately half of ball bearings. Refer to Dwg. MHP1947 on page 6.

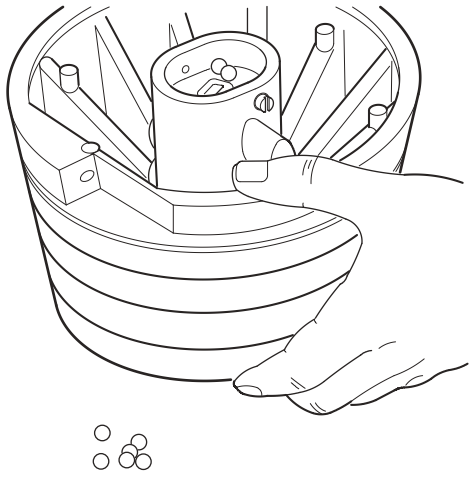


(Dwg. MHP1944)



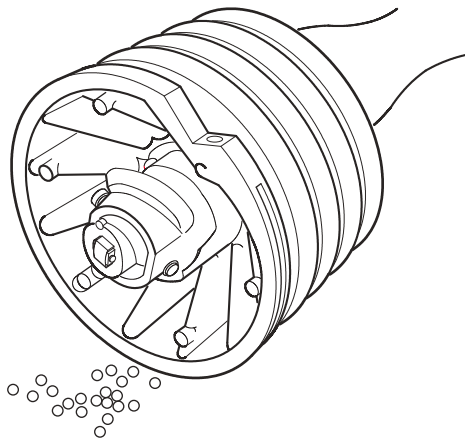
(Dwg. MHP1947)

5. With one hand holding ball screw, rotate reel down and up until all ball bearings have rolled into the tubes of the ball nut. Refer to Dwg. MHP1948 on page 7.



(Dwg. MHP1948)

6. Lay reel down on its side with ball screw in a horizontal position. Rotate ball screw three or four times to seat ball bearings in proper location. Refer to Dwg. MHP1949 on page 7.



(Dwg. MHP1949)

7. Repeat steps 4, 5 and 6 until all ball bearings are reinstalled into ball nut.
8. Remove paper plug from end of ball screw.

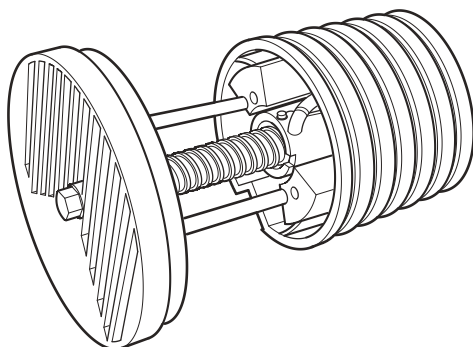
#### ■ Z-Brake Inspection

1. Remove balancer from service.
2. Remove end cover of balancer.
3. Perform Z-Brake Preventive Maintenance. Refer to "Preventive Maintenance Schedule" section in Parts Information Manual.
4. Check engagement.
5. Grasp brake rods and rotate clockwise with a rapid motion. The brake shoe should engage the end cover and stop rotation. Refer to "Z-Brake Adjustment" section on page 9 if unable to engage brake.

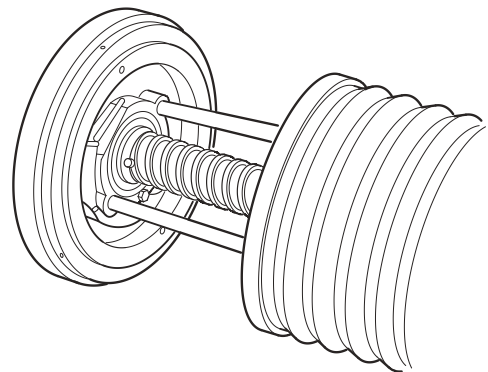
## ASSEMBLY

### NOTICE

- Before assembly, make sure all internal parts are clean, properly lubricated and all worn parts have been replaced.



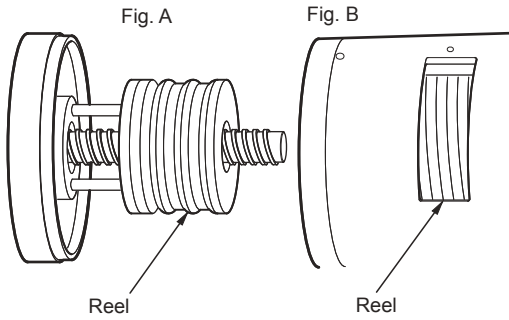
(Dwg. MHP1950)



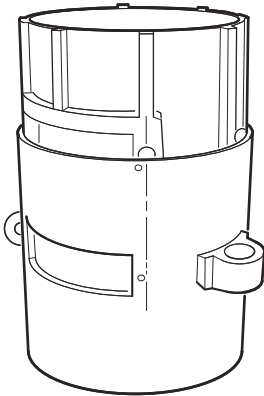
(Dwg. MHP1951)

1. Align and insert brake rods into holes in reel. Refer to Dwg. MHP1950 on page 7. Anti-rotation pins in end cover must line up with slots in ball screw (refer to Dwg. MHP1951 on page 7 and protrude 1/8 to 5/32 in. (3.2 to 4 mm)) from inside surface of end cover. Insert shorter bolt through end cover and thread it into ball screw. Hand tighten bolt until ball screw is held firmly against end cover.
2. Lubricate ball screw and thrust bearing with lubricant (10885).

Dwg. MHP1952 on page 8, Figure 'B' illustrates reel and end cover assembly inserted into housing.

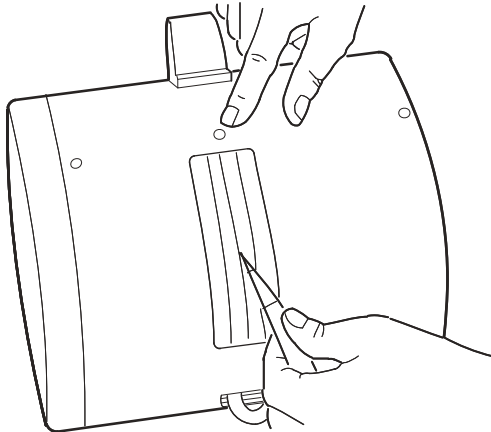


(Dwg. MHP1952)



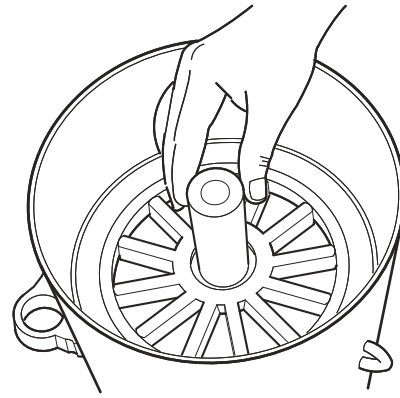
(Dwg. MHP1953)

3. Position housing as shown. Insert liner, if so equipped. Be sure to align round hole in liner at top of cut out with wire rope guide bolt hole in housing. Refer to Dwg. MHP1953 on page 8.



(Dwg. MHP1954)

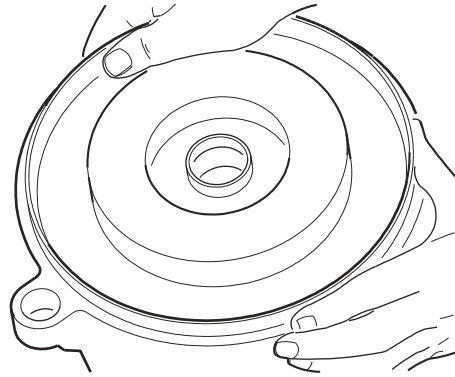
4. Slide reel and end cover assembly into housing. Align screw holes in end cover with holes in housing. Check to see that bottom of reel 'V' groove is aligned with tapped hole or stud at top of wire rope guide opening. If it is not in line refer to Dwg. MHP1954 on page 8, rotate end cover in either direction until groove is aligned and bolt holes on outside diameter of end cover are in line with bolt holes in housing. Insert two screws on opposite sides of housing. Check reel alignment did not change when screws were inserted. If alignment is correct, insert remaining end cover screws.



(Dwg. MHP1955)

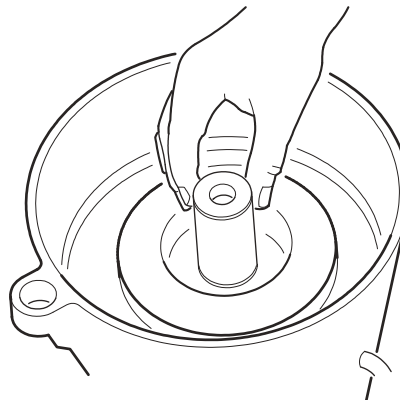
**NOTICE**

- Most balancers have metal shims inside the ball screw cap, between end of ball screw and ball screw cap, to obtain air tight fit. If balancer is so equipped, be sure shims are in place.
5. Stand balancer on end. Place shims on end of ball screw. Place ball screw cap over ball screw. Refer to Dwg. MHP1955 on page 8 .
  6. Apply a very light, even coat of Lubricant (10885) to housing cylinder bore and outside diameter of ball screw cap.



(Dwg. MHP1956)

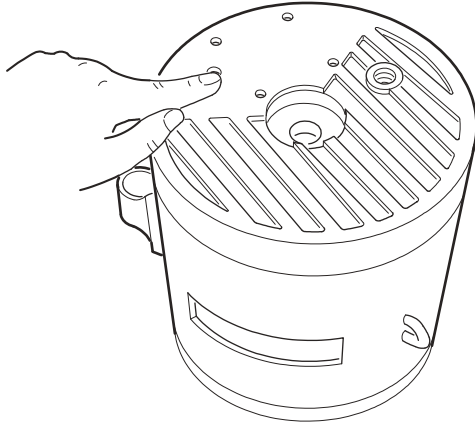
7. Insert piston into housing, steel side first and push it down until it contacts thrust bearing. Refer to Dwg. MHP1956 on page 8.
8. Apply a light coat of Lubricant (10885) to end cap O-ring and insert it in groove of end cap.



(Dwg. MHP1957)

9. Apply a coat of lubricant (10885) to one side of seal (10061). Press lubricated side onto end of ball screw cap. Refer to Dwg. MHP1958 on page 9. Lubrication helps hold seal in place while end cap is positioned.





(Dwg. MHP1958)

**NOTICE**

- Be careful not to damage O-ring during this operation.
10. Install end cap. Tapped holes for screws around outside diameter of end cap must be aligned with corresponding holes in housing. Make sure control kit mounting holes are at top of balancer. When end cap is properly aligned, use a soft hammer to tap it into housing. Refer to Dwg. MHP1958 on page 9.
  11. Make sure seal (10061) has not moved during installation of end cap. Inside diameter of seal should not be visible through hole in center of end cap.
  12. Insert bolt into center of end cap and hand tighten.
  13. Insert screws around outside diameter of end cap.
  14. Tighten end cap and cover center bolts to 90-100 ft./lb. (12.4-13.8 kN/m).

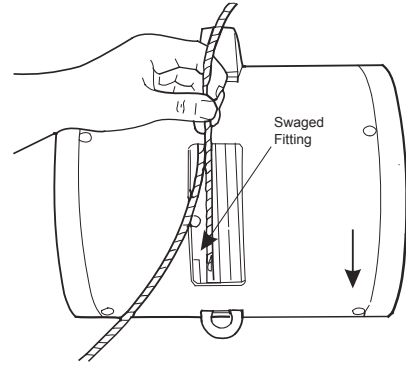
**■ Installing Wire Rope**

**⚠ CAUTION**

- Use of wire rope other than Ingersoll Rand wire rope assembly should be avoided. Internal damage to the balancer may result.
1. Install new wire rope assembly, by first rotating reel down (direction of arrow in Dwg. MHP1366 on page 9.) until anchor hole in reel is visible.

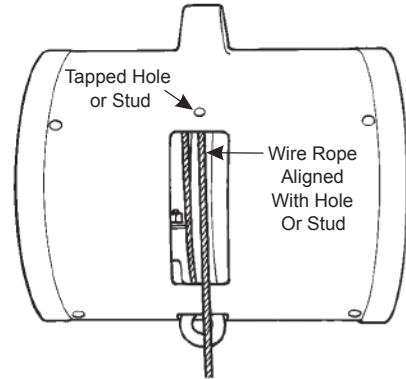
**NOTICE**

- Wire rope must be wrapped by hand twice around reel for proper operation.
2. End of wire rope is inserted down through anchor hole in reel and into groove. Continue pushing wire rope into groove until end appears at top of reel. Grasp this end and pull until swaged fitting on end of wire rope is pulled into anchor hole in reel. Refer to Dwg. MHP1366 on page 9.



(Dwg. MHP1366)

3. Wrap wire rope around reel one more time, as described in step 2. Wire rope should be centered in opening of housing. Refer to Dwg. MHP1367 on page 9.



(Dwg. MHP1367)

**■ Installing Ball Stop**

1. To install ball stop, the control package must be installed.
2. Turn on air to balancer and slowly wind as much wire rope as possible into balancer.
3. Slide ball stop (10165) and wire rope stop (10200) onto wire rope and up to balancer. Correct clearance between the wire rope guide and ball stop is 1/8 to 1/4 in. (3.2 to 6.4 mm).
4. Use swage tool, part number 01927 to secure stop in position.

**Z-BRAKE ADJUSTMENTS AND RESETTING**

**⚠ WARNING**

- Balancers with capacities of 150 lbs (68 kg) or greater are equipped with the Z-Brake, a centrifugal brake that is designed to stop uncontrolled upward travel of wire rope in the event of a sudden release or loss of load, and limit excessive upward acceleration of empty hook. Brake MUST NOT be used as a travel limiting stop or up stop. Failure to follow these instructions will result in damage to brake and the balancer. Continuous use of brake will cause internal damage to balancer and could result in damaging balancer beyond repair.

**■ Z-Brake Reset Procedure**

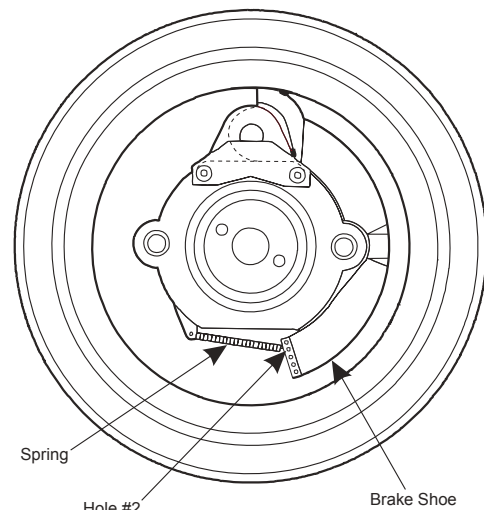
**■ ZA Controls**

1. Ensure vertical path of load is clear.
2. Press down lever and release air in balancer until load begins to lower.
3. Resume operation.
4. If brake engages when a load is attached or it interferes with standard operation, brake must be adjusted. Refer to "Z-Brake Adjustment Procedure" section on page 10 for further instructions.

**■ BA and EA Controls**

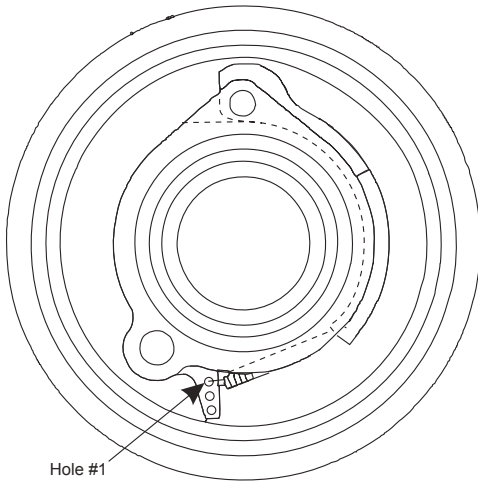
1. Ensure vertical path of load is clear.
2. Grasp load hook at lifting eye pad and pull down on wire rope. Carefully and slowly release load hook.
3. Attempt to resume operation.
4. If brake is still engaged rotate pilot regulator screw of regulator until load begins to lower. This will change settings on control.
5. Follow appropriate control adjustments to ensure proper operation of balancer.
6. Resume operation.
7. If brake engages when a load is attached or it interferes with standard operation brake must be adjusted. Refer to "Z-Brake Adjustment Procedure" section on page 10 for further instructions.

91, 158, 227 kg (200, 300, 500 lb.) Balancer



(Dwg. MHP1369)

## 68 kg (150 lb.) Balancer



(Dwg. MHP1370)

### **WARNING**

- Be sure air supply is off and wire rope has slack.

### ■ Adjusting Procedure

1. Remove balancer from overhead suspension.

## Z-STOP INSTALLATION AND TEST

Refer to Dwg. MHP2178.

1. Lower the load completely.
2. Disconnect/shut off air supply.  
**If installing as a retrofit kit:**
  - a. Remove end cover from balancer.
  - b. Install new end cover. Ensure brake shafts align with corresponding holes in reel assembly.
  - c. Align end cover with outer housing holes, and install four each bolts.
  - d. Tighten the end cover center bolt to 100 ft. lb. (14 kg/m) of torque.
3. Connect air supply to air fitting (4) on end cover using yellow 5/32 in. tubing.
4. Connect red 5/32 in. tubing to balancer interlock port to air fitting (4) on Z-Stop.
5. Connect/turn on air supply.
6. Check for leakage at all air fitting connections. Repair any leaks found.

### ■ Removal

1. Remove balancer from overhead suspension.
2. Place balancer on a clean, dry work bench.
3. Remove control regulator from balancer.
4. Stand balancer on end cap (control end).
5. Remove wire rope guide.

2. Place balancer on a clean, dry work bench.
3. Remove control regulator from balancer.
4. Stand balancer on end cap (control end).
5. Loosen hex bolt in center of end cover.
6. Remove bolts around the diameter of housing.
7. Remove center bolt from end cover.
8. Remove end cover Z-Brake assembly.

### **NOTICE**

- Note position of bearing retainer between end cover and ball screw. Bearing retainer not required for 200 lb. (90 kg) balancer.

9. Place end cover on work bench so that rods are pointing up.
10. With needle nose pliers remove end of spring on brake shoe and place in desired hole. The farther from the center of balancer spring is set, the less sensitive it will become.

### ■ Assembly

1. Place balancer on its side so wire rope guide is facing you.
2. With your fingers rotate reel so it moves toward end cover. Wire rope will retract.
3. Hold end cover and align rods with holes in reel. The 150 lb. (68 kg) balancer has only one rod.

### **NOTICE**

- Be sure bearing retainer is in place between ball screw and brake assembly.

4. Slide rod(s) and end cover assembly into hole(s) in reel until the 9/32 in. (7.14 mm) diameter holes in housing and anti-rotation notches on ball screw line up with pins in end cover.
5. Install bolts on end cover outside diameter.
6. Install end cover center bolt and torque to 90-100 ft./lb. (12.45-13.83 kg/m).
7. Install controls and perform operational adjustments as necessary.

6. Disconnect red and yellow (7 and 8) tubes at fittings (4).
7. Remove screws (1 and 2) from Z-Stop housing (3).
8. Remove spring (18).
9. Grasp engagement pin (17) with needle nose pliers and pull straight out. If the pin is engaged in the plate, rotate the reel **SLOWLY** in either direction through the wire rope guide opening to release.
10. Install in reverse order.
11. Lubricate O-rings (14, 15 and 16) with part number 10885.

### ■ Testing

1. Run balancer through range of motion in work cell to ensure proper operation.
2. With handling device/fixture in mid-point of travel disconnect/shut off air supply to balancer.
3. Balancer should be locked out of operation, the handling device/fixture may drift down a small amount until Z-Stop locks out.
4. Attempt to raise or lower the handling device/fixture. No movement should be detected.
5. Connect/turn on air supply to balancer.
6. Slowly move handling device fixture up and down. The handling device/fixture should respond to inputs from controls.

## TROUBLESHOOTING GUIDE

**Table 2: Series ZA Troubleshooting Guide**

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Balancer will not lift or hold load. Air leaking from inside housing.	End cap O-ring leaking.	Replace O-ring.
	Ball screw cap, seal leaking air.	Tighten hex head bolt in center of end cap. Remove if leak continues and replace seal.
	Air leak around piston.	Replace piston.
	Cap (ball screw) may be damaged.	Replace cap (ball screw).
Balancer will not lift load. No air leaking from the balancer.	Z-Brake engaged.	Lower load, refer to "Z-BRAKE ADJUSTMENT AND RESETTING" section on page 9.
Balancer lifts but will not lower.	Control hoses installed backwards.	Reverse hoses. Refer to Dwg. MHP1899 in the Parts Information Manual.

**Table 3: Troubleshooting Guide ZA Basic Control**

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Balancer will lift, but will not hold load.	Air leak between manifold and balancer end cap.	Replace O-ring (15751).
	Air leak around up/down adjustment screws on manifold.	Replace O-ring (15751).
	Air leak around hook balance adjustment screw on manifold.	Replace U-cup (15086) or replace ball (ZHS15049).
	Worn or cut control air lines.	Replace control air line.
	Improper assembly of hose fittings (leakage).	Check and tighten fittings. Apply pipe sealant if necessary.
	Air leaks around or through "down" valve assembly in control handle.	Clean and inspect assembly. Replace worn parts.
Balancer lifts load without up lever being actuated.	Hook balance adjustment set too high.	Turn adjusting screw (15081) counterclockwise until screw head is flush with top of manifold. If problem continues rebuild manifold. Refer to Dwg. MHP1904 in the Parts Information Manual.
	Air leak around or through "UP" valve assembly in control handle.	Clean and inspect assembly. Replace worn parts.

**Table 4: Series BA Troubleshooting Guide**

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Balancer will not lift load. <i>Make sure load does not exceed capacity of balancer.</i>	Check valve installed backwards.	Install check valve properly, arrow toward regulator.
	Regulator adjustment set low.	Turn adjustment clockwise until load rises.
	Insufficient air pressure.	Increase pressure to 100 psi (6.9 bar).
	Excessive leakage around piston, O-ring or seal on end cap.	Check for damaged piston, seal or O-ring. Replace worn parts.
	Binding of ball screw assembly, or thrust bearing.	Clean and lubricate ball screw assembly and thrust bearing, or replace if excessively worn.
Load rises but is hard to pull down.	Regulator adjustment set too high.	Back off adjustment (counterclockwise) until load is balanced.
	Exhaust hole in regulator bleed screw plugged.	Clean exhaust hole using fine wire, or replace bleed screw.
Air constantly blowing out of exhaust ports on regulator.	Ruptured diaphragm in regulator.	Replace diaphragm.
Erratic, jerky operation.	Fluctuating air supply pressure.	Install line regulator set at highest maintainable pressure. Do not exceed 100 psi (6.9 bar).
	Dirt or oil clogging inlet valve or bleed screw orifice.	Clean thoroughly and lubricate.
	Ball screw and thrust bearing dirty.	Clean parts thoroughly.

## TROUBLESHOOTING GUIDE

**Table 5: Series BA Z-Servo Troubleshooting Guide**

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Balancer will not balance or lift load - no air bleeding from Z-Servo control.	No air supply to balancer.	Turn on air. Set line regulator between 70 psi (4.8 bar) minimum and maximum 100 psi (6.9 bar).
	Air supply check valve holding.	Low air pressure (should be 70 psi (4.8 bar) minimum).
	Pilot regulator pressure set low.	Adjust until load rises or is in balance.
	Load over capacity of balancer.	Check weight of load. 100 psi (6.9 bar) is required to operate balancer at maximum capacity.
	Trim valve closed.	Adjust to manual specification. Refer to 'BA Z-SERVO OPERATIONAL ADJUSTMENTS' section in the Product Information Manual.
	Filter assembly plugged.	Remove and clean or replace.
	Pilot regulator contaminated with oil, water or dirt.	Remove, replace or clean. Check all parts for wear.
	Air blowing from inside of balancer.	Piston leaking - install new piston. Clean and lubricate cylinder bore.
	Leakage in control line.	Replace hose, fittings as required.
	Air leaking around end bolt.	Replace seal (10061) and tighten end bolt to 100 ft. lb. (13.83 kg/m).
	Air leaking around O.D. of end cap.	Replace O-ring (15020).
	Thrust bearing, worn or tight. Will not rotate.	Remove ball screw and reel assembly. Replace or free up bearing as required. Lubricate with #10885.
	Reel and nut assembly do not turn.	Check for rust, dirt, wear, or the lack of lubrication. Clean and lubricate as required.
Balancer will not balance or lower the load.	Air supply check valve holding.	Low air pressure - adjust to 70 psi (4.8 bar), minimum and 100 psi (6.9 bar) maximum.
	Excessive air flow through trim valve.	Close trim valve (clockwise) slowly until load floats down.
	Air does not bleed from control line fitting at port "A" of regulator.	Auxiliary flow control valve closed.
	Foreign matter in fittings at regulator or Z-Servo.	Remove and check for blockage.
	Control line pinched or has air flow restriction.	Make sure control line is unobstructed so air can flow.
Erratic operation.	Z-Servo not adjusted properly at adjustment ring.	Adjust - tighten adjusting nut (10620).
	Worn seal on Z-Servo.	Replace seal.
	Worn O-ring on Z-Servo.	Replace O-ring.
	Damaged regulator.	Replace regulator - return to shop for repair.
	Fluctuating air supply pressure.	Install pressure regulator in supply line. Set at 70 psi (4.8 bar) minimum. Do not exceed 100 psi (6.9 bar).
	Air contaminated with water, oil, dirt, etc.	Install 5 micron self-straining type filter.
	Trim valve not open enough.	Rotate trim valve counterclockwise in 1/4 turn increments until operation is smooth.
Damaged regulator.	Replace regulator repair as necessary. Refer to "Series BA Regulator" on page 3.	
Load hard to pull down.	Z-Servo adjustment ring too tight.	Loosen ring until air flow is evident.
	Trim valve open too much.	Rotate trim valve clockwise in 1/4 turn increments until load is easy to pull down.
	Wire rope does not have enough slack - holding Z-Servo closed.	Perform Z-Servo removal. Loosen bottom wire rope clamp and pull wire rope up. Retighten clamp.
	Auxiliary flow control valve closed too much.	Rotate auxiliary flow control counterclockwise increment until load is easy to pull down.

## TROUBLESHOOTING GUIDE

**Table 6: Series EA Troubleshooting Guide**

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Balancer will not lift load. Control handle in hi-load position	No air supply to balancer.	Turn on air. Set line regulator at maximum maintainable pressure not to exceed 100 psi (6.9 bar)
	Air supply check valve holding.	Low air pressure (should be 70 psi (4.8 bar) minimum).
	Pilot regulator pressure set low.	Adjust until load rises.
	Load over capacity of balancer.	Check weight of load including handling device. 100 psi (6.9 bar) is required to operate balancer at maximum capacity
	Trim valve closed.	Adjust to manual specification. Refer to Product Information Manual.
	Filter assembly plugged.	Remove and clean or replace.
	Pilot regulator full of oil, water or dirt.	Remove, replace or clean. Check all parts for wear. Replace worn items.
	Air blowing from inside of balancer.	Piston leaking - install new piston. Clean and lubricate cylinder bore.
	Leakage in control line or handle.	Replace hose, fittings or handle parts as required.
	Air leaking around end cap bolt.	Replace seal (10061) and tighten end cap bolt to 100 ft. lb. (13.83 kg/m).
	Air leaking around outside diameter of end cap.	Replace O-ring (15020) or (15520).
	Thrust bearing, worn or tight, will not rotate.	Remove ball screw and reel assembly. Replace or free up bearing as required. Lubricate with P/N 10885.
	Reel and ball nut assembly do not turn.	Check for rust, dirt, wear, or the lack of lubrication. Clean and lubricate as required.
Balancer will not balance or lower the load. Control handle in lo-load position	Lo-load needle valve closed.	Refer to EA Basic Operational Adjustments in the Product Information Manual.
	Air supply check valve holding.	Low air pressure - should be 70 psi (4.8 bar), minimum.
	Excessive air flow through trim valve.	Close trim valve (clockwise) slowly.
	Air does not bleed from control line fitting at "A" port of EA regulator.	Refer to EA Basic Operational Adjustments, Trim Valve and Auxiliary Flow Valve Settings in the Product Information Manual.
	Control line pinched or has air flow restriction.	Make sure control line is unobstructed so air can flow
	Foreign matter in fittings at EA regulator, handle, or bleed parts in handle.	Make sure air passages are open for air flow.
Balancer will not un-load. Control handle in un-load position.	Air supply check valve holding.	Check for sufficient air supply pressure, 70 psi (4.8 bar) minimum.
	Un-load needle valve closed.	Open needle valve slowly.
	Excessive air flow through trim valve.	Close trim valve (clockwise) slowly until empty hook is balanced.
	Foreign matter in fittings at EA regulator, handle, or bleed parts in handle	Make sure air passages are open for air flow.
Erratic Operation	Fluctuating air supply pressure.	Install pressure regulator in supply line. Set at low end of pressure fluctuation. Do not exceed 100 psi (6.9 bar).
	Air contaminated with water, oil, dirt, etc.	Install 5 micron self-draining type filters.
	Damaged EA regulator.	Replace regulator or repair as necessary. Refer to 'EA Regulator disassembly' on page 3.

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**SERVICE NOTES**

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**SERVICE NOTES**

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