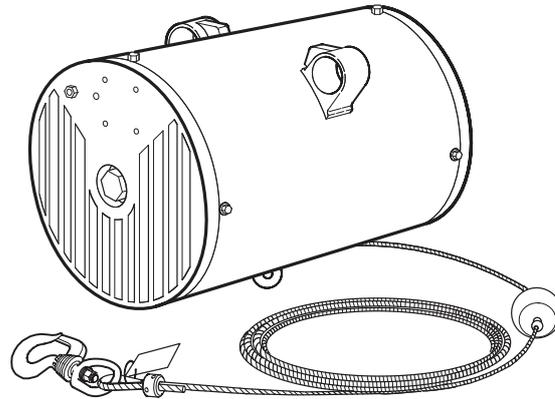


# Air Balancers

B, BA, EA and ZA Series



(Dwg. MHP2176)

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## Installation Information



**Save These Instructions**

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# Installation

Prior to installing the product, carefully inspect it for possible shipping damage.

## **⚠ WARNING**

**Prior to installation refer to Product Safety Information Manual for all sections of installation.**

## **⚠ CAUTION**

**Owners and users are advised to examine specific, local or other regulations, including American Society of Mechanical Engineers (ASME) and/or OSHA Regulations which may apply to a particular type of use of this product before installing or putting product to use.**

## Types of Balancer Mounting

Make certain the balancer is properly installed. A little extra time and effort in so doing can contribute a lot toward preventing accidents and helping you get the best service possible.

Always make certain the supporting member from which the balancer is suspended is strong enough to support the weight of the balancer plus the weight of a maximum rated load plus a generous factor of at least 300% of the combined weights.

### Hook Mounted Balancer Installation

The supporting member must rest completely within the saddle of the hook and be centered directly above the hook shank on balancers suspended by a top hook. Do not use a supporting member that tilts the balancer to one side or the other.

Place hook over mounting structure. Make sure hook gate is engaged.

### Trolley Mounted Balancer Installation

When installing the balancer and trolley, make certain the balancer is centered under the rail or beam. After installation, operate the trolley over the entire length of the rail or beam with a capacity load. Ensure rail or beam stops are installed before operating the balancer. Use Grade 5 or better bolts when attaching balancer to trolley assembly. Refer to Trolley Suspension Kit in Air Balancer Product Parts Information Manual 16598849.

## **⚠ CAUTION**

**To avoid an unbalanced load which may damage the trolley, the balancer must be centered under the trolley.**

### Rail Mounted Balancer Installation

For proper installation of the balancer on a rail system refer to Installation and Maintenance Manual for that rail system.

## Air System

The supply air must be clean and free from water or moisture. A minimum of 100 psi (6.9 bar/690 kPa) at the balancer is required to provide rated capacity. Do not exceed 100 psi (6.9 bar).

## **⚠ WARNING**

**Do not exceed 100 psi (6.9 bar) inlet pressure. Do not use a lubricator of any kind. Oil will damage internal components.**

### Air Lines

The inside diameter of the balancer air supply lines must not be smaller than 3/8 in. (10 mm) based on a maximum of 100 ft. (30 m) between the air supply and the Balancer. Contact the factory for recommended air line sizes for distances greater than 100 ft. (30 m). Before making final connections, all air supply lines should be purged before connecting to balancer inlet. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves, etc. cause a reduction in pressure due to

## Installation

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restrictions and surface friction in the lines. If quick-disconnect fittings are used at the inlet of the balancer, they must have at least a 3/8 in. (10 mm) air passage. Use of smaller fittings will reduce performance.

### Air Line Filter

It is recommended that an air line strainer/filter be installed as close as practical to the balancer air inlet port. The strainer/filter should provide 10 micron filtration and include a moisture trap. Clean the strainer/filter monthly to maintain its operating efficiency.

To maintain dry air, the frequency for draining the filter should also be based on the condition of the air supply. We suggest the filter be drained weekly at first. Depending on air supply condition, a proper filter drain schedule should be established.

### Moisture in Air Lines

Moisture that reaches the balancer through the supply lines is the chief factor in determining the length of time between service overhauls. Moisture traps can help to eliminate moisture. Other methods, such as an air receiver which collects moisture before it reaches the balancer controls or an aftercooler at the compressor that cools the air prior to distribution through the supply lines, are also helpful.

## General Operating Instructions

### ⚠ CAUTION

**Do not continuously rotate balancer in one direction. Air line damage will occur from continuous rotation potentially allowing the load to lower. Reverse direction with each cycle of the balancer to prevent twisting and damage to air lines.**

### Series ZA Basic Balancer

Refer to [Figure 9, p. 15](#).

Place balancer on a clean, sturdy work surface with end cap upright. Remove ZA control kit from its package and make certain O-ring (11) is in place on back of manifold. Install manifold (1) with Mounting screws and Lockwashers (2 and 3).

### Control Hose Installation

The control hose is pre-assembled to the control handle, but it must be attached to the manifold.

Control hose assemblies may either be gray and black straight hose, or yellow and black coiled tubing. The gray hose or yellow tube (6) must be connected to the down-side of the manifold. The black hose (5) must be connected to the up-side of the manifold.

### Operational Adjustments

### ⚠ WARNING

**Prior to performing operational adjustments or servicing make sure air supply is off. Press down lever until wire rope is slack.**

1. Install manifold to end cap.
2. Connect black UP hose to UP port on manifold.
3. Connect gray hose/yellow tube (handling device applications) to DN port on manifold.

### NOTICE

**When wire rope is winding, air is entering the balancer through both the up and down flow controls. Therefore, down flow control also affects the speed when it is set for a minimal down speed.**

4. Connect main air supply to right side port of manifold.
5. Turn on main air supply. Adjust regulator to required air pressure.
6. Rotate hook balance screw clockwise **slowly** until wire rope begins to raise, move to the full up position, ensure Z-Brake does not engage.
7. Install load hook and handling device to wire rope in required position. Refer to ["Lash-Up," p. 11](#).

8. Rotate **UP** flow control clockwise until snug.
9. If wire rope is slack, ensure the Z-Brake does not engage.
10. Feather **UP** lever until tension is applied to wire rope, then fully depress **UP** lever until load is in the full up position.
11. Depress **DN** lever and check speed.
12. Adjust **DN** flow control on manifold counterclockwise to increase speed, clockwise to decrease speed, until desired speed is achieved.
13. Lower to bottom of normal travel with tension on wire rope.
14. Adjust **UP** flow control on manifold counterclockwise to increase speed, clockwise to decrease speed, until desired speed is achieved.

## Series BA Balancer

150 lb. (68 kg) Capacity

### Manifold Installation

Refer to [Figure 10, p. 15](#) and [Figure 11, p. 16](#).

Place balancer on a clean, sturdy work surface with end cap upright. Remove BA control kit from its package. Check to be sure O-ring (3) is in place on the back side of the manifold (2). Install manifold to end cap by using the four mounting screws and lockwashers (4 and 5) provided. Regulator is supplied with a hex nipple and a check valve. The hex nipple should be threaded into the hole on the manifold Connect air supply to check valve.

### NOTICE

**Arrow on check valve must be pointing toward balancer. If installed backwards balancer will not function.**

### Operational Adjustments

### ⚠ WARNING

**Prior to performing operational adjustments or servicing make sure air supply is off and wire rope is slack.**

1. Connect regulator to balancer.
2. Rotate regulator adjustment knob counterclockwise until it stops.
3. Turn on main air supply. Adjust regulator to required air pressure.
4. Rotate adjustment knob clockwise slowly until wire rope begins to raise, move to the full up position. (Ensure the Z-Brake does not engage - 150 lb. (68 kg) units only).
5. Install load hook and tooling or fixture to wire rope in the required position. Refer to ["Lash-Up," p. 11](#).
6. Rotate adjustment knob clockwise until load is suspended.
7. The correct setting will require equal effort to lift and lower the load.
8. If unit is required to raise the load out of the way, turn adjustment knob clockwise until desired speed is achieved.
9. Tighten jam nut just above adjustment knob to maintain proper setting.

## Series BA Z-Servo Control

200, 350 and 500 lb. (90, 158 and 227 kg) Capacity.

Refer to [Figure 12, p. 16](#).

### Z-Servo Installation

Refer to [Figure 1, p. 7, A. Adjusting Ring; B. Air Exhaust; C. Wire Rope](#).

Mount balancer on overhead suspension, with wire rope fully extended. Determine proper wire rope location for Z-Servo, refer to ["Lash-Up," p. 11](#). Attach Z-Servo valve to wire rope.

### Regulator Installation

Refer to [Figure 12, p. 16](#).

## Installation

Place balancer on a clean, sturdy work surface with end cap upright. Pull out wire rope until reel bottoms out. Remove BA control kit from package, check to ensure that O-ring is in correct position on back of EA regulator (2). Install regulator on end cap with four mounting screws and lockwashers (3, 4 and 5).

Control kit is supplied with a coil hose assembly (6). Connect coil hose to "A" port of regulator.

## Operational Adjustments

Refer to [Figure 12, p. 16](#).

### **⚠ WARNING**

**Prior to performing operational adjustment or servicing make sure air supply is off and wire rope is slack.**

### **NOTICE**

**A minimum of 70 psi (4.8 bar) is required to operate the regulator.**

1. Install regulator to balancer.
2. Install Z-Servo as close to but below the ball stop.
3. Rotate regulator adjustment knob counterclockwise until 1/2 in. (13 mm) of thread is visible.
4. Rotate trim valve clockwise until snug, then counterclockwise 2 full turns.
5. Rotate auxiliary flow valve clockwise until snug.
6. Turn on main air supply. Adjust regulator to required air pressure.
7. Rotate adjustment knob clockwise slowly until wire rope begins to raise, move to the full up position, ensure Z-Brake does not engage.

### **⚠ CAUTION**

**Auxiliary flow valve is fully open when 1/8 in. (3.2 mm) of screw head protrudes from regulator body. Do not open beyond this point.**

### **NOTICE**

**Up and down speed should be the same for ease of adjustment.**

8. Install load hook and tooling or fixture to wire rope in the required position. Refer to "Lash-Up," p. 11.
9. Rotate regular adjustment knob clockwise until load raises to the full up position. The speed should be relatively slow. Pull down and release the load and check the speed.
10. Connect black tube to the "A" port on the regulator.
11. Rotate auxiliary flow valve counterclockwise until lowering speed is the same as the lifting speed. "Pinching" off the black tube will pressurize regulator to raise the load.
12. Raise and lower load two or three times to verify speeds are the same. If speed in one direction is much faster than the opposite direction the load will be difficult to move and may provide erratic operation.
13. Pinch off black tube and connect free end to the Z-Servo fitting.
14. Turn adjusting nut at the top of the servo until load is balanced. Rotating nut clockwise will increase balance setting or raise the load. Counterclockwise rotation of the nut will reduce balance setting and lower the load.
15. Lift and lower the load several times. Equal effort should be required to raise and lower the load. If load is hard to pull down, turn trim valve clockwise 1/2 turn and check. If load is hard to raise, turn trim valve counterclockwise 1/2 turn and check.

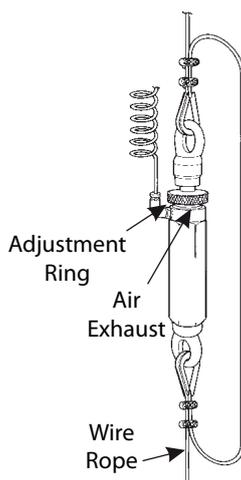
### **NOTICE**

**A small volume of air will exhaust at the Z-Servo while in operation.**

## Z-Servo Wire Rope Installation

Refer to [Figure 1, p. 7](#), A. Adjusting Nut; B. Air Exhaust; C. Wire Rope

Figure 1. MHP1354



1. Mount balancer on overhead suspension.
2. Position Z-Servo below travel range of wire rope.
3. Insert wire rope through top hole in Z-Servo. Install two clamps on wire rope 1-1/2 in. (38 mm) above top of Z-Servo and 1-1/2 in. (38 mm) apart. Leave 16 in. (40.64 cm) of wire rope free for Z-Servo to operate properly.
4. Insert wire rope through bottom hole in the Z-Servo. Install 2 clamps on wire rope 1-1/2 in. (38 mm) apart.
5. Install load hook.

### **NOTICE**

**You must leave enough slack in the wire rope to allow proper operation of the Z-Servo balancer.**

### Z-Servo Control

Refer to [Figure 12, p. 16](#).

The regulator is the primary control for the BA system. The Z-Servo bleeds off air. Therefore it works like an amplifier. If the pilot regulator must be readjusted for any reason, the auxiliary flow, trim valve and Z-Servo must be readjusted.

### Series EA Balancer

Refer to [Figure 14, p. 17](#).

### **⚠ CAUTION**

**The auxiliary flow valve is fully open when 1/8 in. (3.2 mm) of screw head protrudes from regulator body. Do not open beyond this point.**

### Series EA Regulator Installation

Place balancer on a clean, sturdy work surface with end cap upright. Pull out load wire rope until reel bottoms out. Remove EA control kit from package. Check to ensure that O-ring is in port on back of regulator (1). Install regulator on end cap with four mounting screws and lockwashers (2, 3 and 4). Connect control hose to port "A" on regulator and port on control handle.

### Operational Adjustments EA Basic

### **⚠ WARNING**

- **Prior to performing operational adjustments or servicing make sure air supply is off.**
- **Balancer may not support weight of empty handling device, or may raise device at a potentially hazardous rate. Extreme care must be used until control adjustments are complete.**

## Installation

### **NOTICE**

**A minimum of 70 psi (4.8 bar) is required to operate the regulator. Do not use an air line lubricator.**

1. Install regulator to balancer.

### **NOTICE**

**Auxiliary flow valve is fully open when 1/8 in. (3.2 mm) of screw head protrudes from regulator body. Do not open beyond this point.**

2. Install EA pendant to "A" port of regulator.
3. Rotate control handle to HI-LOAD position.
4. Rotate regulator adjustment knob counterclockwise until 1/2 in. (13 mm) of thread is visible.
5. Rotate trim valve clockwise until snug, then counterclockwise 2 full turns.
6. Rotate auxiliary flow valve clockwise until snug.
7. Turn on main air supply. Adjust regulator to required air pressure.
8. Rotate adjustment knob clockwise slowly until the wire rope begins to raise, move to the full up position, ensure Z-Brake does not engage.
9. Install load hook and tooling or handling device to wire rope in the required position. Refer to "Lash-Up," p. 11.
10. Rotate both LO-LOAD and UN-LOAD flow controls clockwise until snug.
11. Apply the heaviest load to the tooling or handling device.
12. Rotate auxiliary flow valve clockwise until snug, then counterclockwise until 1/8 inch (3.2 mm) of screw head protrudes from side of regulator body.
13. Rotate regulator adjustment knob clockwise until load is balanced.
14. Lift and lower load several times. Equal effort should be required to raise and lower load. If load is hard to pull down turn trim valve clockwise 1/2 turn and check. If load is hard to raise turn trim valve counterclockwise 1/2 turn and check.
15. Rotate pendant to LO-LOAD position.
16. Slowly rotate LO-LOAD flow control counterclockwise until load drifts to the floor or full down position. The wire rope should go slack.
17. Remove heaviest load from tooling or handling device.
18. Apply medium weight load to tooling or handling device.
19. Rotate LO-LOAD flow control clockwise until load is balanced.
20. Tighten jam nut to maintain proper setting.
21. Lift load to full up position.
22. Rotate pendant to UN-LOAD position.
23. Slowly rotate UN-LOAD flow control counterclockwise until load drifts to the floor or full down position. Allow wire rope to go slack.
24. Remove medium weight load from tooling or handling device.
25. Rotate UN-LOAD flow control clockwise until tooling or handling device is balanced.
26. Maneuver tooling or handling device to heaviest load and engage load.
27. Rotate pendant to HI-LOAD position.
28. The load should be in balance.
29. Set down the heaviest load and rotate pendant to UN-LOAD position.
30. Maneuver tooling or handling device to medium weight load and engage load.
31. Rotate pendant to LO-LOAD position.
32. The load should be in balance.
33. Set down medium load and rotate pendant to UN-LOAD position.

**NOTICE**

**If, for any reason, the pilot regulator must be readjusted, the needle valves will have to be adjusted also.**

**Operational Adjustments EA 2PS**

Refer to [Figure 15, p. 18](#).

**⚠ WARNING**

**The balancer may not support the weight of the empty handling device, or may raise device at a potentially hazardous rate. Extreme care must be used until control adjustments are complete.**

1. Install regulator and 2PS valve to balancer.
2. Rotate regulator adjustment knob counterclockwise until 1/2 in. (13 mm) of thread is visible.
3. Rotate trim valve clockwise until snug, then counterclockwise 2 full turns.
4. Rotate auxiliary flow valve clockwise until snug, then counterclockwise until 1/8 in. (3.2 mm) of screw head protrudes from side of regulator body.
5. Rotate 2PS-flow control clockwise until snug, then counterclockwise 1 turn.
6. Ensure tube is connected at the 2PS valve and handling device.
7. Turn on main air supply. Adjust regulator to required air pressure.
8. Rotate adjustment knob clockwise slowly until wire rope begins to raise, move to the full up position, ensure the Z-Brake does not engage.
9. Install load hook and tooling or handling device to wire rope in required position. Refer to "Lash-Up," p. 11.
10. Engage load with tooling or handling device.
11. Rotate regulator adjustment knob clockwise until load is balanced.
12. Lift and lower load several times. Equal effort should be required to raise and lower load. If load is hard to pull down turn trim valve clockwise 1/2 turn and check. If load is hard to raise turn trim valve counterclockwise 1/2 turn and check.
13. Lower part to set down position. Rotate 2PS-flow control counterclockwise one full turn. Tooling or handling device may raise or lower unexpectedly when part is released. Ensure you are clear of the vertical path at all times during adjustments.
14. Release part from tooling or handling device. Rotate 2PS-flow control counterclockwise if tooling or handling device raises or counterclockwise if it lowers until tooling or handling device is balanced.
15. Lift and lower load several times. Equal effort should be required to raise and lower load. If load is hard to pull down, turn 2PS-flow control counterclockwise 1/2 turn and check. If load is hard to raise turn trim valve clockwise 1/2 turn and check.
16. Engage and disengage the part checking the balance condition of both the loaded and unloaded tooling or handling device.

**Tandem Control Balancer****Tandem Control Installation**

Refer to [Figure 17, p. 19](#).

1. Install master manifold (1) behind EA, ZA or BA control kit.
2. Install slave manifold (2) to second balancer.
3. Install tandem hose assembly (10) between master (1) and slave (2) manifolds.

# Interlock Adjustments

Refer to [Figure 16, p. 18](#).

1. Raise handling device/fixture to a mid travel position, so balancer is supporting the entire weight. The Interlock screw threads into the aluminum housing that will rotate with the screw. Hold aluminum housing while turning the screw.
2. Turn screw counterclockwise until interlock light illuminates (green light) or until 1-1/2 in. (38 mm) of thread is visible.
3. Depress and release (repeatedly) the clamp/vacuum release button while rotating Interlock screw clockwise until clamp opens or blow off air is heard at vacuum cups or interlock indicator extinguishes.
4. Raise and lower handling device/fixture several times. Check for proper operation of clamp and vacuum controls.
5. Raise handling device/fixture to the full up position.
6. Depress and hold up lever of the ZA control for three seconds. This will simulate an additional load on the balancer.
7. Depress and release clamp/vacuum release button. Clamp should remain closed or not blow off air to vacuum cups.
8. Check that interlock indicator has illuminated (green light).
9. Lower handling device/fixture and engage a part with the end effector.
10. Raise load 1 in. (26 mm) above pick up point.
11. Depress and release clamp/vacuum release button. Part should remain attached to end effector.
12. Lower handling device/fixture and release part at the pick up point.
13. Hold aluminum housing and tighten jam nut on Interlock screw to prevent setting from changing.

# Load Hook, Lash-Up and Yarding

## Lash-Up

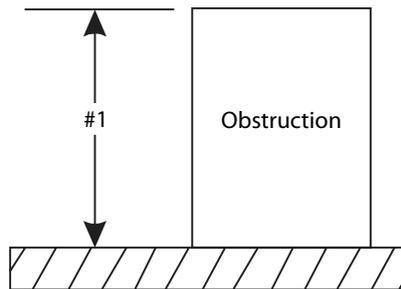
To properly install load hook to wire rope you must determine the following:

Refer to [Figure 2, p. 11, A. Obstruction.](#)

Refer to [Figure 3, p. 11, A. Load.](#)

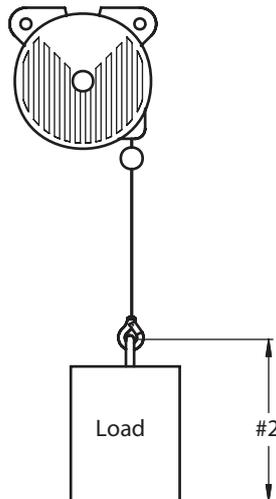
1. Highest point which load must clear from floor.
2. Distance from hook throat to bottom of load.
3. Add number 1 dimension to number 2 dimension, then add 3-1/2 in. (89 mm).
4. Measuring from the floor with the wire rope fully retracted, install hook using the dimension from number 3 to the floor.

**Figure 2. MHP1358**



5. Verify coverage is correct. Use wire cutter part number 01942 to remove excess wire rope.

**Figure 3. MHP1924**



### **⚠ CAUTION**

- **Do not operate balancer if load is not centered under wire rope. Yarding of the wire rope will cause premature wire rope failure and undue wear of internal balancer parts and may void warranty.**
- **Do not continuously rotate balancer in one direction. Air line damage will occur from continuous rotation potentially allowing the load to lower. Reverse direction with each cycle of the balancer to prevent twisting and damage to air lines.**

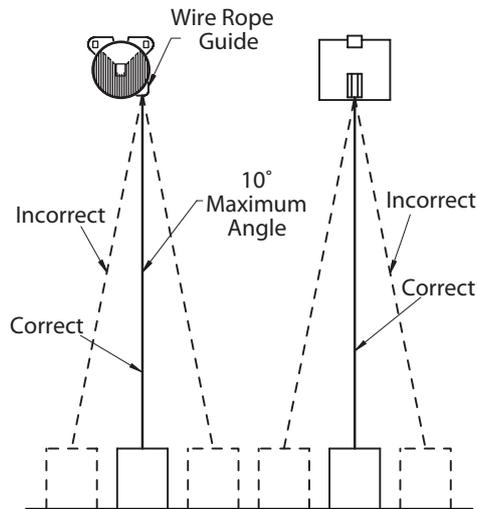
## Yarding

Wire rope should not be yarded more than 10 degrees from vertical center line of wire rope guide. Excessive Yarding will cause increased wear on balancer and decrease working life of components.

## Wire Rope Guide

Refer to [Figure 4, p. 12](#), **A. Correct**; **B. Incorrect**; **C. Wire Rope Guide**.

**Figure 4. MHP1925**



## Hook Assembly

Refer to [Figure 5, p. 12](#) and [Figure 6, p. 13](#).

**Figure 5. MHP1926**

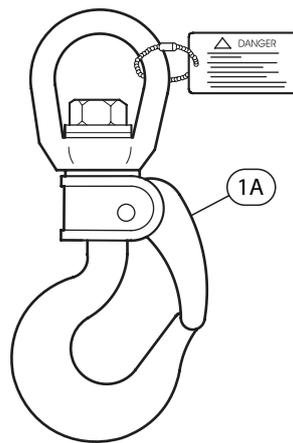
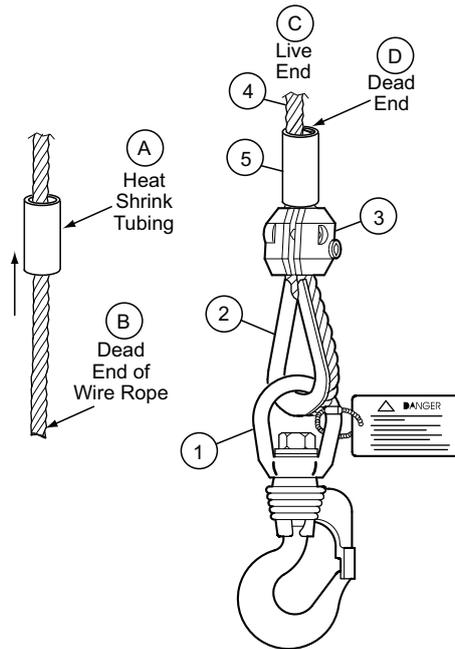


Figure 6. MHP3219



## Assembly

Refer to Figure 6, p. 13. **A.** Heat Shrink Tubing; **B.** Dead End; **C.** Live End; **D.** Dead End

1. Cut wire rope to desired length for drop, allowing for up to a foot (12 in.) extra, to wrap around the thimble.
2. Install hook (1) in seat of thimble (2).
3. Install heat shrink tubing (5) on to dead end of wire rope, ensure shrink tubing is pushed up far enough to allow wrap around thimble and addition of clamp.
4. Wrap wire rope around thimble (2). Wire rope should be securely seated in groove.
5. Place both halves of clamp around wire rope and loosely secure with first capscrew, but do not tighten. Ensure wire rope is secure between both halves and a minimum of 1 in. of extra wire rope at dead end is extended past clamp.
6. Take up slack of wire rope around the thimble. Ensure wire rope is seated in center of clamp.
7. Install second capscrew and alternately tighten capscrews, torque to 7 ft. lb.

### ⚠ CAUTION

- **When assembled both halves of clamp should not meet when torqued to the proper value. Clamp is designed for a wire rope diameter of 5 mm.**
- **If both halves are flush against each other a smaller size of clamp is necessary.**

8. Secure dead end of wire rope with electrical tape to keep it from fraying.
9. Slide heat shrink tubing, over dead end of wire rope, ensure it seats close to clamp.
10. Apply heat (140 degree C maximum) evenly around the shrink tubing until tube is takes form of the wire rope end. Allow the shrink wrap to cool and harden.

### ⚠ WARNING

**Do not use a torch or any flame to shrink tubing. Use of a torch or flame could cause damage to the live end of wire rope.**

11. Capscrews must be retightened again:
  - a. 1 hour after installation.
  - b. 2 times during first 24 hours, at reasonable breaks.
  - c. Approximately 1 month after installation.

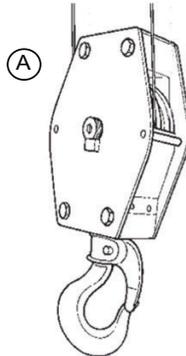
**Note:** Hook shown is the spring lock. Refer to Product Parts Information Manual for other hook options.

# Load Blocks

## Load Block Installation

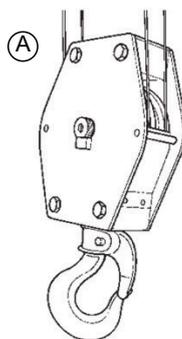
Refer to [Figure 7, p. 14, A. Load Block, Single Sheave Cable](#); and [Figure 8, p. 14, A. Load Block, Double Sheave Cable](#);

**Figure 7. MHP1363**



Load Block (10202)  
Single Sheave Cable

**Figure 8. MHP1364**



Load Block (ZHS10203)  
Double Sheave Cable

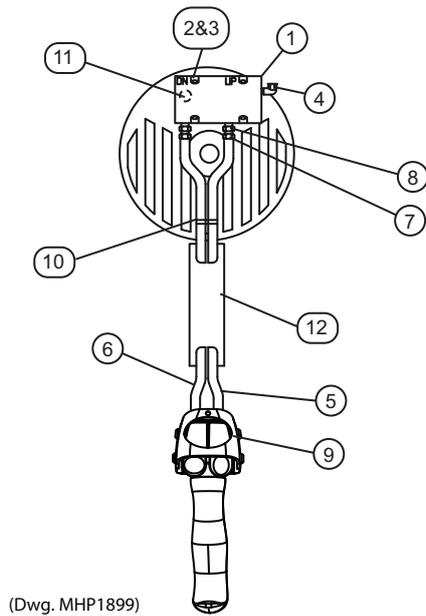
1. Thread wire rope through and around pulley(s) in Load Block.
2. Bring excess wire rope back up to bottom eye pad of balancer.
3. Install thimble on eye pad.
4. Loop wire rope around thimble.
5. Tighten wire rope and install clamps.

### **⚠ CAUTION**

**Balancers using load blocks should not have ball stops on wire rope.**

# Balancer Reference Drawings

**Figure 9. ZA Basic Balancer Control Kit Assembly**



**Figure 10. BA Basic Balancer Control Kit Assembly**

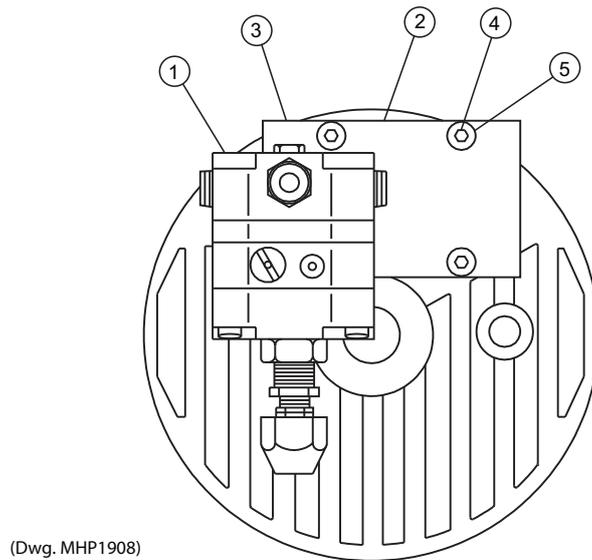


Figure 11. BA Regulator Assembly

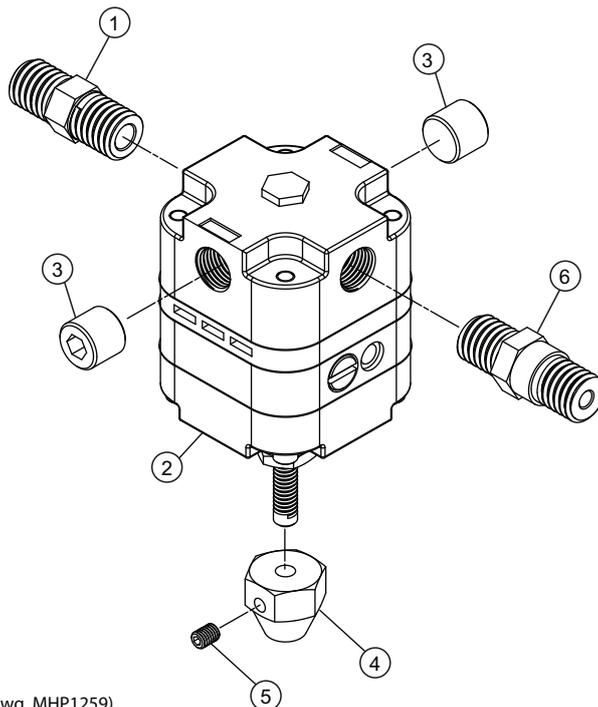


Figure 12. BA Z-Servo Control Assembly

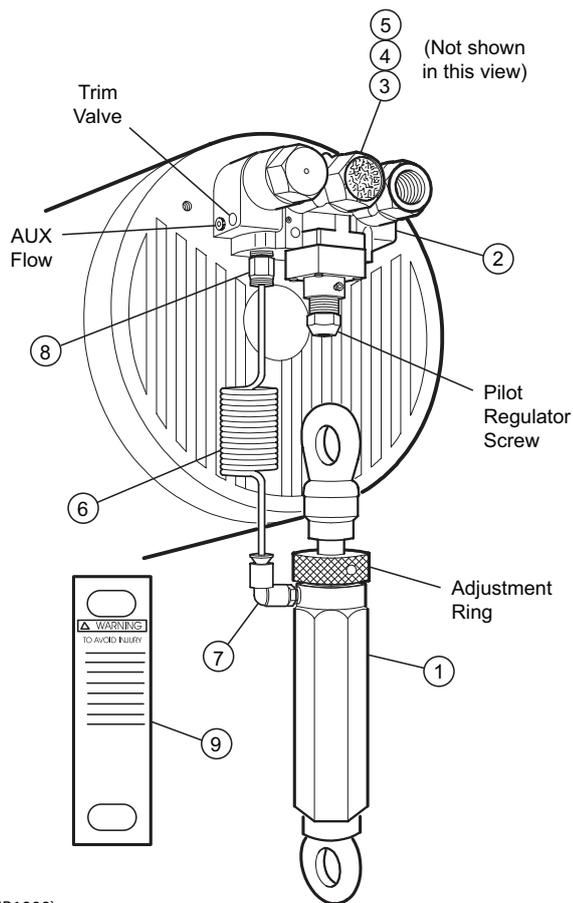
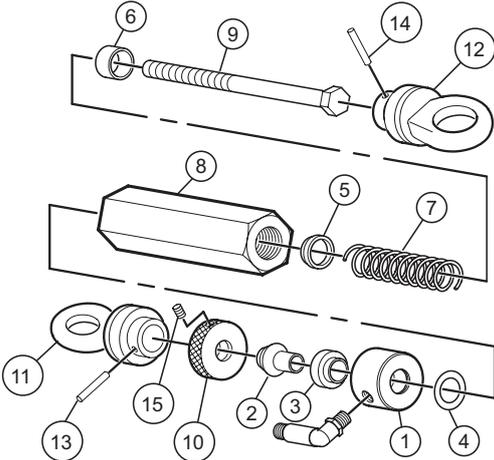
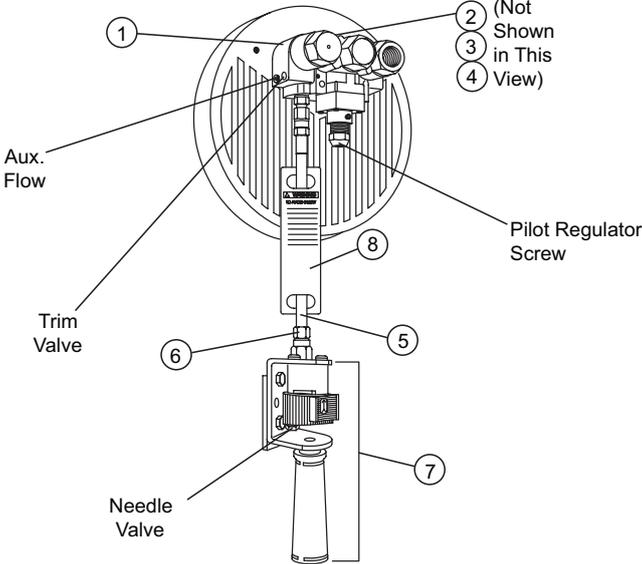


Figure 13. Z-Servo Control Assembly



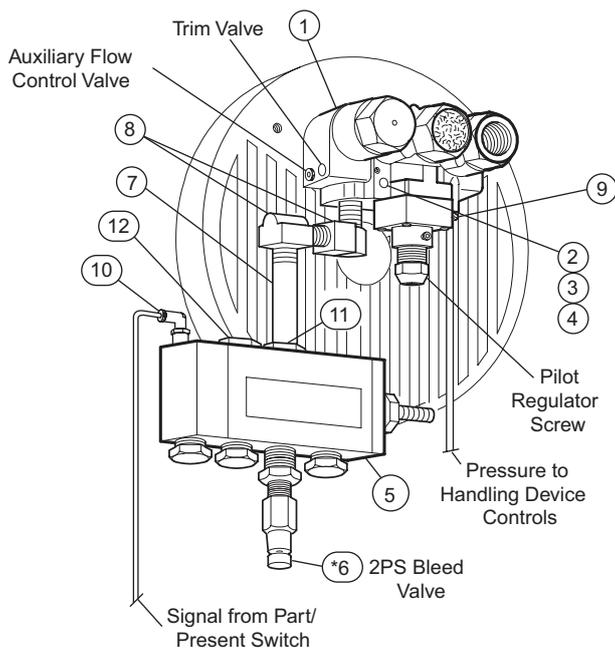
(Dwg. MHP1910)

Figure 14. EA Balancer Assembly



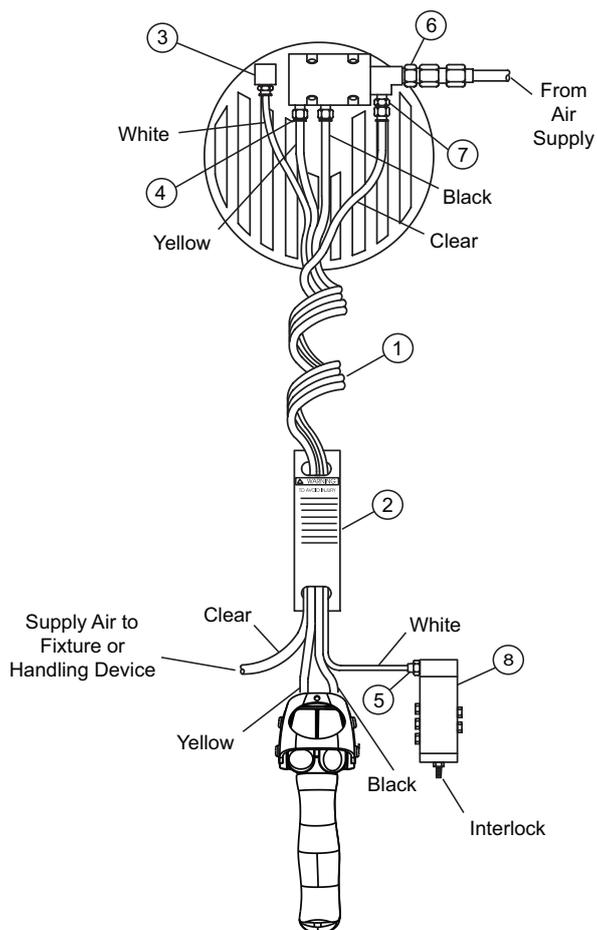
(Dwg. MHP1911)

**Figure 15. EA 2PS Balancer Assembly**



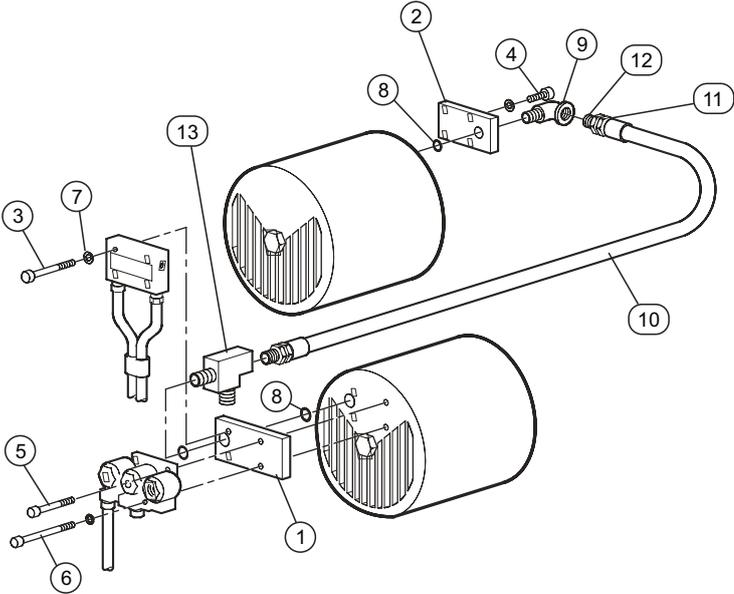
(Dwg. MHP1915)

**Figure 16. Quad-Coil Hose and Interlock Assembly**



(Dwg. MHP1920)

Figure 17. Tandem Control Balancer Assembly



(Dwg. MHP1923)



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