TRI-MOTION
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MAINTENANCE MANUAL

FOR PRO-AIR BAL-TROLS®.

(Model numbers beginning with PH or PV)

** Steps which can be skipped if seals do not need to be replaced **
~ Steps which can be skipped if bearings do not need to be replaced ~

Section A.

Replacing Cable (& Seals, & Bearings) :

1) Release any trapped air pressure as follows:

   For Balancer Control: Bring the load all the way down to the floor, or onto a surface capable of supporting the full weight of the load. Turn the regulator knob to full decrease. Disconnect the shop air pressure supply line. Pull the cable out until there is no more cable left in the unit.

   For Dual-Acting Controls: Use the control to raise the empty hook all the way up. This will ensure there is no air pressure trapped in the dual-acting feature at the rear of the unit. Detach the "push-to-connect" style hose from the back head. This will disable the dual-acting feature. Put the control in "down" mode until there is no pressure left inside the unit. Disconnect the shop air pressure supply line.

   For all other controls: Put the control in "down" mode until there is no pressure left inside the unit. Disconnect the shop air pressure supply line.

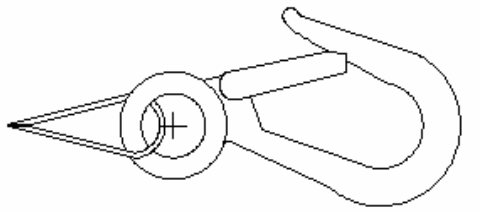
2) Move the Bal-Trol to a clean work bench.
3) Remove the 4 bolts at the cable end of the unit, so that the fixed pulley block can be removed from the end of the tube.
4) Slide the pulley blocks out of the tube, separating the tube, and exposing all pulleys and cable.
5) Note the existing cable arrangement so that the new cable can be installed and routed in the same way.
6) Cut the old cable off above the crimps or wire rope clips. Keep any reusable wire rope clips for reuse with new cable.

7) Unscrew the cable guide to access the cable seal behind it. Take care not to damage the seal if it is going to be reused. Note the orientation of the cable seal so that the seal can be installed and oriented in the same way.
8) Cut off the old cable, and slide out all the pieces. Remove the last piece of cable by unscrewing the pipe plug and sliding the last piece out through the anchor sleeve.
9) Turn each of the pulleys by hand. If they do not turn easily and smoothly, or if you notice a metal on metal sound, then the bearings should be replaced. (Since the bearings are pressed in, special tools would be required to get them out. It is easier to also replace the pulleys.)
10) ~Note the arrangement of all pulleys, spacers, and thrust washers before removing them.
11) ~Remove the spider clips from the ends of the pulley shafts.
12) ~Slide the shafts out from within the pulleys and spacers.
13) ~Check the hardened steel shafts for wear marks. If they are noticeably scored then they should be replaced also.
14) ~Generously lubricate the shafts and bearings with grease.
15) ~Slide the shafts back in place, taking care to put the pulleys, spacers, and thrust washers in the exact positions that they were before.
16) ~Replace the spider clips.
17) *Note the direction of the u-cup seal on the moving pulley blocks, so that the new seal can be installed and oriented in the same way.
18) *Remove the old seals and wear bands, and replace with new.
19) *Lubricate all seals with STP® oil treatment or equivalent.
20) *Clean and lubricate the inside of the tube.
21) The new cable will already be swaged at one end. Slide it through the anchor sleeve, and route the cable over the pulleys exactly as before.
22) Set the tube up on end vertically, with the cable end up.
23) Slide the moving pulley block down into the tube, allowing it to drop all the way to the bottom. Slide the fixed pulley block into the top of the tube.
24) Replace the 4 bolts to reconnect the fixed pulley block to the tube, hand tightening them only at this point.
25) Pull on the cable to ensure alignment of the pulleys.
26) Tighten the 4 bolts evenly, alternating diagonally as you go.
27) Install the cable seal, oriented exactly as before, by gently tucking the lip of the seal into the sealing cavity.
28) Replace the cable guide, and secure with screws.
29) Clean away the old thread sealant on the pipe plug, and inside the pipe plug hole.
30) Apply new thread sealant to the pipe plug, reinstall, and tighten.
31) If you do not have your own crimping hardware or screw-on cable termination, then refer to Section B. Installing Cable Clips.

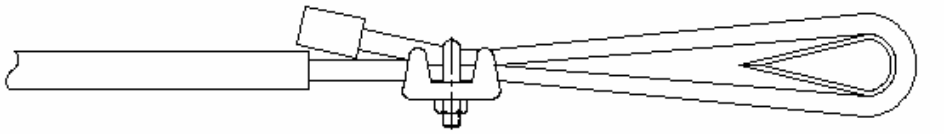
Section B.

Installing Cable Clips:

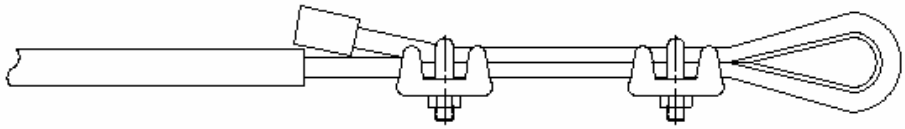
For applications that require a hook to be installed directly into the thimble, (As is the case with the Speed Handle Control,) pry the thimble apart just enough to wedge the hook in place, as shown:



Leave about 1/2" of nylon on the cable end so that there will not be any sharp wire strands sticking out. From there, strip the specified amount of nylon off the cable. Loop the stripped cable over the thimble, and through the hook, (if the hook is present). Apply the first clip as shown. The base or "saddle" should be on the live end of the cable, and the u-bolt should be on the short end. Leave about 3/4" of cable (including the coated tip) extending from the top u-bolt. Tighten nuts evenly, alternating from one to the other, until reaching the specified torque.



Center the thimble in the loop, and apply the second clip as close to the thimble as possible. Try to keep cable lengths as straight and even as possible. Tighten nuts evenly, alternating from one to the other, until reaching the specified torque.



Apply the initial load, inspect nuts, and retighten. Inspect all cables and clips periodically, and replace upon first signs of fatigue. We recommend our safety chains and Drop-Stop ® load arrestors for safety of personnel and product. For longer cable life, purchase a crimping tool and use oval copper sleeves instead of these cable clips.

Stripped cable diameter:	Torque:	Strip Length:
1/16" - 1/8" cable:	4.5 foot pounds	9"
5/32" - 3/16" cable:	7.5 foot pounds	9"
1/4" cable:	15 foot pounds	13"
5/16" cable:	30 foot pounds	13"

Section C.
General Warnings:

 **Regular Inspections** Inspect cables regularly for visible damage and fraying. Do not cover any part of the cable with tape, as this makes proper inspection difficult or impossible. **Do not operate Bal-Trol® with damaged, twisted, or frayed cable.** Inspect eyebolts regularly for visible damage, bending, cracks, wear, elongation, rust, etc. **Do not operate Bal-Trol® with damaged eyebolts.** The need for visual inspection cannot be overemphasized. **No product can keep operating at its rated capacity indefinitely.** Periodic inspections help determine when to replace parts such as cables and eyebolts, and thereby reduce possible hazards. Keep inspection records to help ensure periodic inspection intervals. Due to the diversity of applications, load weights, number of cycles, mounting arrangements, speed requirements, and environmental conditions, blanket recommendations for inspection procedures and frequency are not possible. **When in doubt, inspect prior to each use.** Carefully check for frayed strands, lumpy appearance forming underneath the coating of the cable, wear, deformation, cracks, elongation or bending of the eyebolts – sure signs of imminent failure. Immediately withdraw such items from use, and replace them. If down time is a concern, then keep spare parts or spare Bal-Trols® on site. Replacement cables and parts are available from Tri-Motion.

 **Regular Maintenance** **Do not attempt to operate a damaged or malfunctioning Bal-Trol®.** If the Bal-Trol® leaks air, allows a load to gradually drift downward, malfunctions, or does not operate smoothly, this is an indication that it requires maintenance. If return authorization is obtained first, then such units can be sent back to Tri-Motion for thorough evaluation and repair. Tri-Motion also offers cable replacement kits and seal kits which can be installed in the field by qualified personnel. The disassembly procedure provides an excellent opportunity to inspect the moving parts which are inside the Bal-Trol®. Sheaves should be checked to verify that they turn easily, and if not then new sheave bearings must be installed. Preventative maintenance can be performed on a scheduled basis, before the Bal-Trol® begins to malfunction or leak. Keep maintenance records to help ensure periodic maintenance intervals. Due to the diversity of applications, load weights, number of cycles, mounting arrangements, speed requirements, and environmental conditions, blanket recommendations for maintenance frequency are not possible. **When in doubt, schedule preventative maintenance more frequently.**