

S.R.A.B.D. Single Route Auto-Belay Device



Operations Manual

Revised 8/2005

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Spectrum Sports Int'l

**Auto-Belay
Operations Manual
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2005**

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Welcome

It is with great pleasure that we congratulate you on the purchase of your automatic belay system for your Rock Climbing Structure and for your support of Spectrum Sports, Int'l (SSI) products. We are excited about our products and feel confident that through proper installation and proper operations and maintenance, the Single Route Auto Belay Device (SRABD) will be a rewarding and profitable purchase. Our company philosophy is centered on a commitment to excellence in meeting the needs of our customers through providing a product that is engineered correctly for the specific application, quality of product through manufacturing and a product designed to be safe, exciting and profitable.

Spectrum Sports Int'l part in making our team successful is:

- Commitment to proper, effective and profitable design. Each of our products is stamped by a certified engineer, which means that you can rest assured you have purchased a product that will be safe.
- Manufacturing to "ASTM F-24" safety standards for the amusement industry and Climbing Wall Association (CWA) for the institutional climbing industry.
- Testing products before shipments.
- Continued product development and improved design considerations.
- Experience. Since 1996, the Auto-Belay system has been used in the amusement industry for recreational climbing.

Your part in building a successful business using Spectrum Sports Int'l products is:

- Commitment to safe operation
- Consistent inspection for proper maintenance

We are looking forward to a long and prosperous relationship. Should you have any comments or questions, please do not hesitate in calling.

Sincerely,

Spectrum Sports Int'l

Copyright (1996 - 2005 Spectrum Sports Int'l.)

Reproduction or translation of any part of this work beyond that permitted by Section 107 or 108 of the 1976 United States Copyright Act without permission of the copyright owner is unlawful. Requests for permission or further information should be addressed to Rod Leishman at Spectrum Sports Int'l.

Confidentiality Agreement

This manual and the content within it are for the exclusive use and operation of the SRABD product by the owner of the respective product and its authorized personnel and for Spectrum Sports, Int'l. This manual is designed to provide accurate and authoritative information in regard to the subject matter covered. This manual may not be reproduced in whole or part in any form or by any means, without the prior written consent of Spectrum Sports, Int'l.

Confidentiality

This manual contains proprietary information belonging to Spectrum Sports, Int'l. It is to be viewed only by persons employed by Spectrum Sports, Int'l. and/or the SRABD owner and authorized personnel.

Distribution

This manual is not to be distributed to any other persons other than those actively engaged in the operating and/or marketing of the SRABD product and customers serviced by the owner of the SRABD climbing wall.

Disposition

This manual is the property of the SRABD owner and Spectrum Sports Int'l, and must be discarded or returned to Spectrum Sports Int'l upon receipt of an updated manual.

Revision

Spectrum Sports Int'l may make periodic additions, deletions and modifications to this manual. These updates will, in the judgment of Spectrum Sports, Inc., add to the quality of services offered. This manual must be kept up to date, and should reflect all updates currently in use.

Notice of Changes

In the event that revisions are made to this manual, Spectrum Sports Int'l will send the appropriate pages reflecting such changes as are deemed necessary and a revised document will be issued to the individual for replacement. Any pages that are then outdated must be destroyed and discarded.

In the event that replacement pages are sent, Spectrum Sports Int'l will provide a cover letter outlining the revision and the effective date of any procedural changes.

Receipt and Acknowledgment

This Operations Manual is an important document intended to help you become acquainted with the Single Route Auto Belay Device, Spectrum Sports Int'l and includes guidelines as to safe and recommended operation.

Please read the following statement. Respond to Spectrum Sports, Int'l in writing with any questions or if the intent of this document is unclear.

As an owner, I have received and read my copy of the SRABD Spectrum Sports, Int'l. Operations Manual. I understand that the information outlined in this manual is subject to change at the sole discretion of Spectrum Sports, Int'l at any time. It is further understood that as an owner of the SRABD, I have the responsibility to ensure that the correct and latest version of the manual is being used.

As an owner of the SRABD or authorized representative, it is my responsibility to keep this manual up-to-date with any changes that are made by Spectrum Sports Int'l. In addition, if there is anything about the product and/or this manual that is unclear or not understood, it is my responsibility to seek clarification and not use the product until the issue is understood.

Unless informed in writing, Spectrum Sports Int'l assumes that the customer understands the SRABD product and that there are no questions regarding the product and/or the contents of this document.

It is the customer's sole responsibility to clarify any question or concern with Spectrum Sports Int'l before use and/or operation.

Product Manual Overview

This manual is an introduction to the SRABD and its operation. The purpose of this manual is to provide a compilation of information that will assist you in proper and safe operation.

This manual is designed to aid in educating you and your associates. The sections within this manual are prerequisite to each other. In other words, the information in section one pertains to the information in section two.

The philosophy of Spectrum Sports, Int'l is centered on a commitment to excellence in meeting the needs of its customers and associates by providing them with the enclosed information.

The manual is designed to provide the Auto-Belay owner with the information, tips, and techniques that will help the owner and employees operate a climbing wall as effectively and safely as possible. This manual is no way a total representation of all facts. Safe operation of this product is the sole responsibility of the Auto-Belay owner/operator. Good and reasonable judgment must be used when traveling, promoting and/or operating the wall.

Spectrum Sports, Int'l. Company Overview

Company Overview - Spectrum Sports, Int'l., located in Logan, Utah, is a manufacturer of commercial interactive sports and fitness-fun equipment used in the amusement and recreational fitness markets. Safely engineered, SSI products provide maximum revenue while providing thousands of hours of safe and exciting entertainment for your customers. The following are the products offered by SSI:

- ClimbNdangle /DropARock - Portable, stationary and themed rock-climbing attractions
- 3 Kick – Interactive game and scoring sport
- Rascal Rocket launch ride mobile and stationary
- Rascal Racers kiddy go-carts
- Ascent rotational climbing walls 1-2 person models

To learn more about our entire product line please visit our web site at: www.spectrumsports.com

Vision Statement -Provide the best value and service for our customers.

Mission Statement: - Spectrum Sports, Int'l is the premier provider of portable and stationary amusement products under \$500,000. We utilize height, speed and/or adrenaline activities to the amusement park, carnival/fair and destination markets. We are committed to product innovation, customer satisfaction, corporate financial strength and operational processes and corporate integrity.

The Single Route Auto Belay Device (SRABD)

The first Auto-Belay product to be used was that of the ClimbNdangle (mobile climbing wall). Since its creation, other climbing products have been marketed - primarily to the amusement industry - for use in artificial climbing structures. These products are currently being used in many of the major amusement parks, shopping malls, public attractions and climbing gyms throughout the world.

Product Overview

As the originators and inventors of the Auto-Belay, Spectrum Sports Int'l products are industry leaders in innovation, safety, design, and customer satisfaction. Designed for the amusement, entertainment, and recreation industries, these products are engineered with safety, customer appeal and customer throughput in mind. Different from other Climbing Walls, routes using the auto belay do not use, what is commonly termed as a human belayer (a person who controls the rate of descent of a climber). With the Auto-Belay devices doing all of the belay work and ensuring safety, the person(s) operating the wall act more like a coach offering encouragement and direction. The SRABD is designed to meet ASTM F-24 and CWIG standards. This means that the SRABD is designed, manufactured, tested, and supported by comprehensive quality assurance and quality control measures to ensure product reliability and safety. The enclosed information is an outline as to the procedures for safe operation and set-up of the product.

What is an "Auto-Belay"?

The Belay

In order to understand the term Auto-Belay, we must first define the term belayer respective to traditional rock-climbing. The act of belaying can be defined as a procedure of securing a climber by the use of a rope. In recreational sport climbing there are generally two people involved in a climb: a climber, the person climbing the intended surface or structure, and the person whom is providing the safety for the climber known as a belayer. The belayer's role is to use two hands on a braking device, which controls the descent of the climber. One of the functions of the belayer is to ensure the rope is stacked carefully to prevent the rope from tangling which would result in the climber dangling. Once the climber asks to come down, it is the function of the belayer to allow the rope to pass through the braking device such that the climber descends at a rate that is not too fast or too slow.

The biggest fears in manually lowering someone as a belayer, is that a belayer could drop the climber out of control, or let the end of the rope pass through the belay device such that the climber falls to the ground. Both of these mistakes have often happened, and to very experienced climbers. The lowering anchors must be within a half rope length for the climber to reach the ground. (Reference; How to Rock Climb, Second Edition, by John Long)

Auto-Belay

Spectrum Sports, Int'l uses the term "Auto-Belay" to describe its automated belaying process. Rather than a person acting as the belayer, Spectrum Sports Int'l has developed an air/oil hydraulic system that automatically controls the rate of descent when a climber falls or chooses to come down off the wall. The intended function of the automated belaying system is to take up the climbing cable as the person climbs. How this works is through the use of air pressure. As a climber climbs the wall, the climber will take weight off of the cable, in which the positive air pressure in the hydraulic system causes the cable to retract or to functionally take up the rope slack (or in our case, cable slack). A human person, in the sport of traditional rock climbing, generally performs this function. However, the Auto-Belay system by Spectrum Sports Int'l provides a system that automates this function. This automated system eliminates the need to rely upon a human belayer for every climber, rather; it allows a single person (belay) to

supervise all climbers ensuring safe and proper climbing. In addition, because the end of the cable is terminated on the back of the wall and the cable runs through a pulley guiding system over the top of the wall, a climber cannot climb past his/her anchor point. To understand the significance of this point, we need to review traditional rock climbing. If a belayer allows the climber to advance up the climbing surface without anchoring in, the belayer's function could be useless because of the distance between the climber and his/her anchor point is greater than the distance between the ground and anchor point. With the automated system by Spectrum Sports Int'l, we reduce the potential of this happening due to the fact that the air pressure in the system automatically retracts to the cable, in essence making every step the climber makes, a new anchor point.

Auto Belay Safety

Is the Auto-Belay safer than a human belayer? Spectrum Sports Int'l. answers this question by manufacturing their SRABD product with two hydraulic cylinders for every climber. Two cylinders mean that the SRABD is a redundant system, which will ensure that if one hydraulic cylinder fails, a second system running in parallel will take up the slack and function in a safe manner. To show the efficiency of the SRABD, in an apple-to-apple comparison for recreational climbing using manual belayer's, assuming 3 climbers at a time, you would need six manual belayer's to equal the same safety as our redundant system. Imagine the payroll requirement you would need on a manual belayed system compared with the safety and operational efficiency of the auto belay safety system of the SRABD. However, in fairness, rock climbing has its inherent risks. A participant climbing on the SRABD can be injured. Even though the SRABD system is automated, we require that a responsible person be assigned to ensure that the mechanical function of the SRABD is operating properly. As an owner of the SRABD it is your responsibility to make sure constant care and supervision is taken regarding the operation of this product.

Installing the SRABD

The SRABD can be installed into either an appropriate steel structure (perhaps the wall steel framework), or into a concrete floor with appropriately rated epoxy chemical anchors and anchor bolts. Under normal operations, the SRABD applies a maximum transient force of 400 lb (upward direction) to the structure. In the event of an Auto-Belay failure (ie. the Auto-Belay fails to take-up the cable and the climber falls some distance); the maximum up-force can be as high as 2000 lb. The Auto-Belay connection structure should be able to withstand the 2000 lb failure load with the same consideration given in UBC Allowable Stress Design – Alternate Basic Load Combinations (Section 1612.3.2, 1997 Uniform Building Code). The fatigue load is 400 lb of up-force.

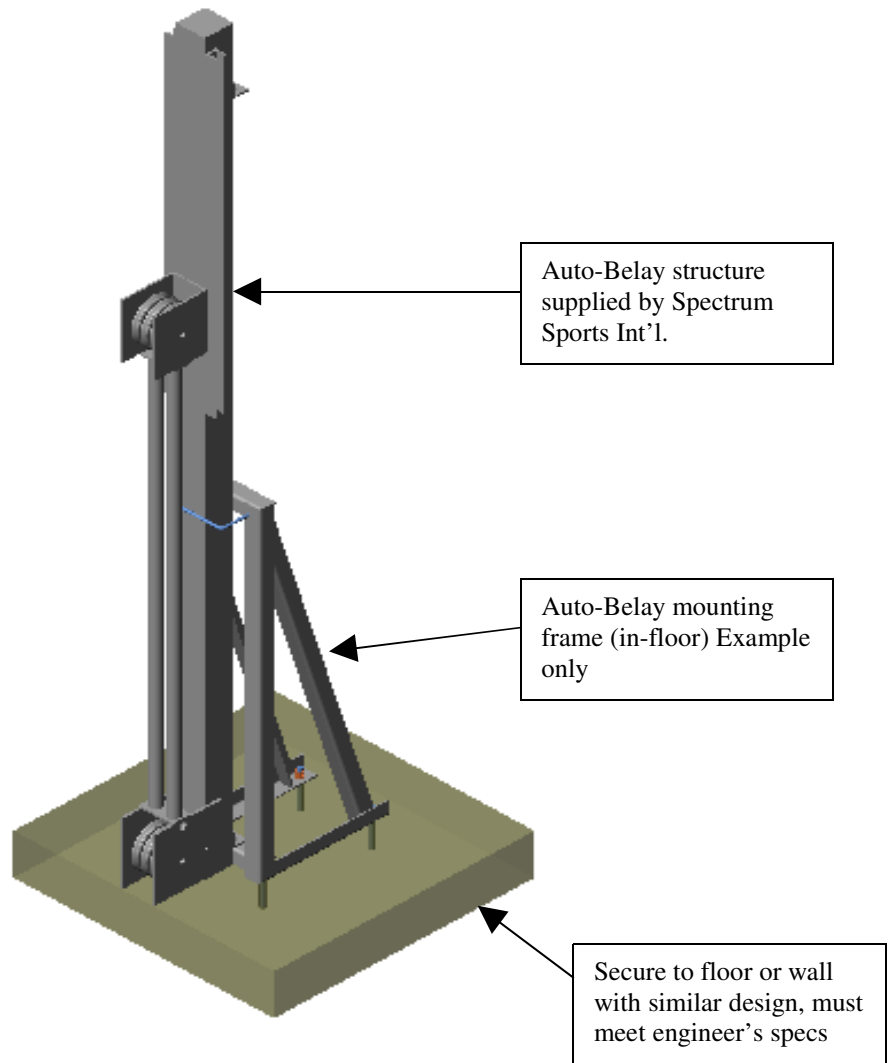
For attachment of the SRABD to a steel framework, the framework should be sufficient to withstand the following design loads. The framework should use the mounting holes on the SRABD as indicated on the SRABD drawings.

| <u>Load</u> | <u>Magnitude</u> | <u>Direction</u> |
|---------------------|------------------|------------------|
| Normal Design Load | 400 lb | upward |
| Failure Design Load | 2000 lb | upward |

The following figure shows a sample installation, and the associated detailed drawings can be found in Appendix E.

Cable Alignment

When installing the SRABD, the cable alignment between the upper pulley box and the rear pulley on the DAVIT need to be in plump with each other. If not the cable/rope can wear prematurely, or cause the SRABD to operate improperly. Please call Spectrum Sports Int'l for answers to any questions.



“Auto-Belay Mounting into concrete foundations.”

Structural Approval

The SRABD is basically the same safety device as that used on our standard amusement related products. However, rather than using a stand-alone trailer or stationary back-support for stabilization, the SRABD must be properly installed within the structure of the climbing structure itself or through concrete anchors. The SRABD must be secured to a solid surface, generally steel or cement, being welded, bolted or with the use of appropriately rated epoxy chemical anchors and anchor bolts. Before installation of the SRABD, please make sure that you understand the installation for this product. In addition, before public use of the SRABD, you should have received an Engineering certificate and/or approval specific to your structure and complaint with any local government, agency or governing body. Spectrum Sports Int'l highly advise, if not require, that each site and/or installation have an engineering stamp of approval by a certified structural engineer before the wall can be used for climbing. It is the responsibility of the customer/wall owner to ensure that this is done; however, if requested, Spectrum Sports Int'l can provide a seal of approval depending upon the state for a competitively priced fee.

Inspections and Preventive Maintenance

During operation of the SRABD, inspections must occur on both a daily and weekly basis to ensure continued, safe operation. The appropriate inspections are listed below in this section.

Auto-Belay Function

With one operator on the front of the wall, using a rope, manually extend the cable to the top of the wall while a second person inspects the retraction of the cable to ensure there is NO SLACK behind the wall. Ensure that all pulleys turn when the cable is in motion and that cable drag is minimal. For proper and safe Auto-Belay function, it is **important** that the Auto-Belay is properly pressurized. For walls/Auto-Belays manufactured or received **before March 1, 2001**, make sure the air pressure is between 65 - 70 psi for 24' walls/Auto-Belays and between 85 - 90 psi for 32' walls/Auto-Belays. For Auto-Belays manufactured or received **after March 1, 2001**, proper air pressure should be 85 – 90 psi for both 24' and 32' walls/Auto-Belays and 103 – 108 psi for a 40' wall/Auto-Belay. THESE ARE STANDARD AIR PRESSURES, DEPENDING ON THE INSTALLTION AND THE ROPE ROUTE; MORE AIR PRESSURE MAY BE REQUIRED. Inspect daily for oil leaks, should a leak occur call Spectrum Sports Int'l for details. The amount of fluid for proper fluid level in an Auto-Belay system is 8 quarts per Auto-Belay and the fluid type is ISO 32. The fluid should be visible in the oil lens. REMEMBER, FLUID LEVELS SHOULD BE CHECKED WHEN ALL AUTO-BELAY ROUTES ARE ANCHORED TO THE BOTTOM OF THE WALL (meaning that the carabineer-end of the cable/rope must be in the "start climbing position"). If any questions, please call Spectrum Sports, Int'l.

Daily Inspections

(See Appendix B for Inspection Form and inspection guidelines) Please note that these inspections guidelines are a minimum. Please take caution and ensure that any and all working parts and safety related products are thoroughly inspected and that all bolts are secure before use.

As a means of properly maintaining the SRABD and ensuring proper safety for the climber, a daily inspection is required. The following routine should be adhered to daily:

Weekly Inspections

Weekly inspections are intended to be more in-depth than daily inspections. On the auto-belay, no component will fail without first revealing warning signs due to wear or damage. In conjunction with the daily inspections, the weekly inspections should be sufficient to find any potential problem well before failure becomes imminent.

Pulleys

(See Appendix B for inspection form) Inspect all pulleys once a month for abnormal wear in the groove and for bearing integrity. This is accomplished by rotating the pulley and inspecting the groove for wear depth. The pulley bearing should not allow the pulley to wobble / wiggle side-to-side during operation. The guide pulleys at the top of the wall must be inspected by climbing up the front of the wall and inspecting from the front. For convenience, you may want to top anchor, in addition to the Auto-Belay, so that your belayer may hold your weight so that both hands are free for pulley inspection. Top roping can be accomplished by climbing the structure, using the Auto-Belay for safety, and using a climbing approved climbing knot, tying one end of a belay rope (customer supply) to the Carabineer end used by the climber and looping the rope through a CWA approved anchor and down to a belayer using an approved manual belay device and physical belayer. For this purpose, inspection of both the pulleys and cable travel can be accomplished, while exercising maximum safety. After proper inspection of the pulleys, make sure there is a smooth ascent and descent (retraction of cable). The purpose of this exercise is to ensure that the mechanical function of the Auto-Belay is operating properly. If you experience any slack, call Spectrum Sports Int'l for advice and instructions.

Inspection of the Auto-Belay pulleys should be accomplished from ground level if possible. If this is not possible, then it is up to you as the customer to ensure that there is some method of safe inspection. Please check applicable OSHA codes if using a ladder above 6' or any other regulatory guidelines for proper inspection if the Auto-Belays are at a height above eyesight.

Cylinders

The hydraulic cylinders should be inspected for leaks, wear and damage on a weekly basis. Some seepage from the cylinders under normal use is expected. However, if the seepage becomes significant, the Auto-Belay fluid levels will drop below acceptable normal levels and may result in malfunction of the device. The cylinder rod should be inspected for pitting and abrasions. All hydraulic hoses should be inspected for wear. Oil Containment Systems OCS is available at an additional cost if you want to maintain a clean environment. Call Spectrum Sports Int'l for questions on the oil seepage.

Hydraulic Fluid

Oil lens should have fluid in it, blue tint in color. If no fluid is visible, Add if need. ISO 32 fluid is required; the following name brand fluid is available: Mobile DTE-24, TEXACO RANDO-32, and CHEVRON AW-32

Cables

The cables should be inspected as outlined in Appendix B on a weekly basis. Individual wires in the cable need to be examined for wear. Careful examination of the cable terminations (ends) should be performed to ensure cable integrity in these areas.

Ropes

The Ropes should be inspected as outlined in Appendix B on a weekly basis. Inspection should be performed by a qualified individual, only SSI/NICROS approved rope is recognized. Careful examination of the rope terminations (ends) should be performed to ensure rope integrity in these areas.

Wear Dated Items

The following items are wear-dated items along with suggested guidelines for replacement:

- *Carabineers* - It is well known that equipment deteriorates progressively with use. It is difficult to give a precise lifetime because it depends on the environment where it is being used. Surface damage, corrosive wear, mechanical wear, or impairment of the mechanical function of the product is easily observed.
- *Swivels* - Again, the same warning for the Carabineers applies to the swivels.
- *Pulleys* - Replace when worn
- *Cables* – Annually at a minimum, or when other inspection techniques as shown in Appendix B require changes
- *Ropes* --Please refer to the rope manufacturer for advice and recommendations in this matter.
- *Auto-Belay cylinder seals* – are not covered under warranty
- *Hardware (pulley hardware)* – replace every 2 years (recommend)

Warranty

The warranty is established from the date of invoice.

Product Warranty - 90 days. After 90 days per the following:

- Steel Frame – Life Time on upper pulley cart and Belay tank. Does not include any frame damage due to improper installation or damage due to misuse.
- Powder Coating – 90 Days. DOES NOT include any paint blemish due to normal and/or abusive use. Warranty is limited.
- Hydraulic Cylinder(s) - 3 months per manufacturer specifications. Void if determined that any other Hydraulic Fluid, other than what has been specified by manufacturer, has been used. If questions, please call Spectrum Sports Int'l.

General warranty conditions do NOT include shipping cost to Spectrum Sports Int'l. On items that can be shipped by US Postal and/or overnight parcel carriers, Spectrum Sports Int'l will pay for the same class or rate of service on return shipment as it was received from customer. Spectrum Sports Int'l uses fabricators, distributors and/or service agents local to customer for steel, fiberglass and hydraulic parts to determine cause and/or repair of this particular part. Should it be determined that the defect is due to abuse or misuse, any and all warranty rights or responsibilities are void. Spectrum Sports Int'l reserves the right to void warranty service on any modification to product done by customer

Please refer to Appendix I for the Limited Warranty Acknowledgement. **Warranty will NOT be effective unless registered, by completing this form and mailing to Spectrum Sports Int'l within 15 days of purchase.**

Conclusion

This guideline has been written to assist in the proper installation and operation of the SRABD. Spectrum Sports Int'l has tried in its best effort to address relative issues; however, there will be additional information learned or situations that occur that we are unaware of at this time. Please, do not hesitate to call with any technical question. Remember, there may be questions, issues and/or concerns that may arise through the use of this product that are not listed or addressed in this manual, please keep us informed. It is the responsibility of the owner and/or operator of this product to contact Spectrum Sports Int'l if any questions or concerns arise. As with any amusement device, physical harm can occur and operators and participants must realize that this product is a physical activity and that proper care should be taken to ensure safety. Please exercise good common sense and good judgment while operating the SRABD.

Phone 888-563-0163

www.spectrumsports.com

Appendix A

SRABD Preventative Maintenance Schedule

Inspection Date: _____

Inspected by: _____

Daily

- Auto-Belay Cable/Rope - Check every inch of cable/rope for fraying, if frayed, replace cable/rope immediately. If any broken wires are found, replace the cable/rope immediately.
- Auto-Belay Cable Ends - Ensure that there are no broken strands by crimp.
- Auto-Belay Cables are tracking along pulleys without restriction.
- Ensure there is no cable slack in front or behind the wall.
- Harness Stitching
- Auto-Belays manufactured from 12/2000 to present should read between 85 psi - 95 psi for 24' and 32' Auto-Belays and between 105 psi – 110 psi for 40 foot Auto-Belays. **THESE ARE STANDARD AIR PRESSURES, DEPENDING ON THE INSTALLTION AND THE ROPE ROUTE; MORE AIR PRESSURE MAY BE REQUIRED.**
- Hydraulic Fluid level should be visible in oil lens
- Carabineer - If the auto locking Carabineer is not locking positively or sticking open, replace immediately.
- Ensure the swivel turns freely.

Weekly

- All of the above plus the following:
- Pulley Wear - Inspect pulley's closely to ensure proper function, replace if worn.
- Hydraulic Hose
- Cable/Rope Slack - test the full length to ensure proper Auto-Belay function.
- Cable/Rope Wear – spot check the cable/rope for wear following the cable inspection techniques shown below.

3 MONTHS

- All of the above plus the following:
- Check all mounting hardware on SRABD and Davit

Note: At a minimum, please make copies from this page and use as directed!
Thank you and have fun!

Appendix B

Cable Inspections Techniques

A rigorous inspection routine is not only recommended, but required. Proper inspection will eliminate the chance of using a wire rope beyond its useful life. The inspection routine listed is the procedure that should be followed rigorously. This inspection method is visual and adheres to the applicable standards published in the United States.

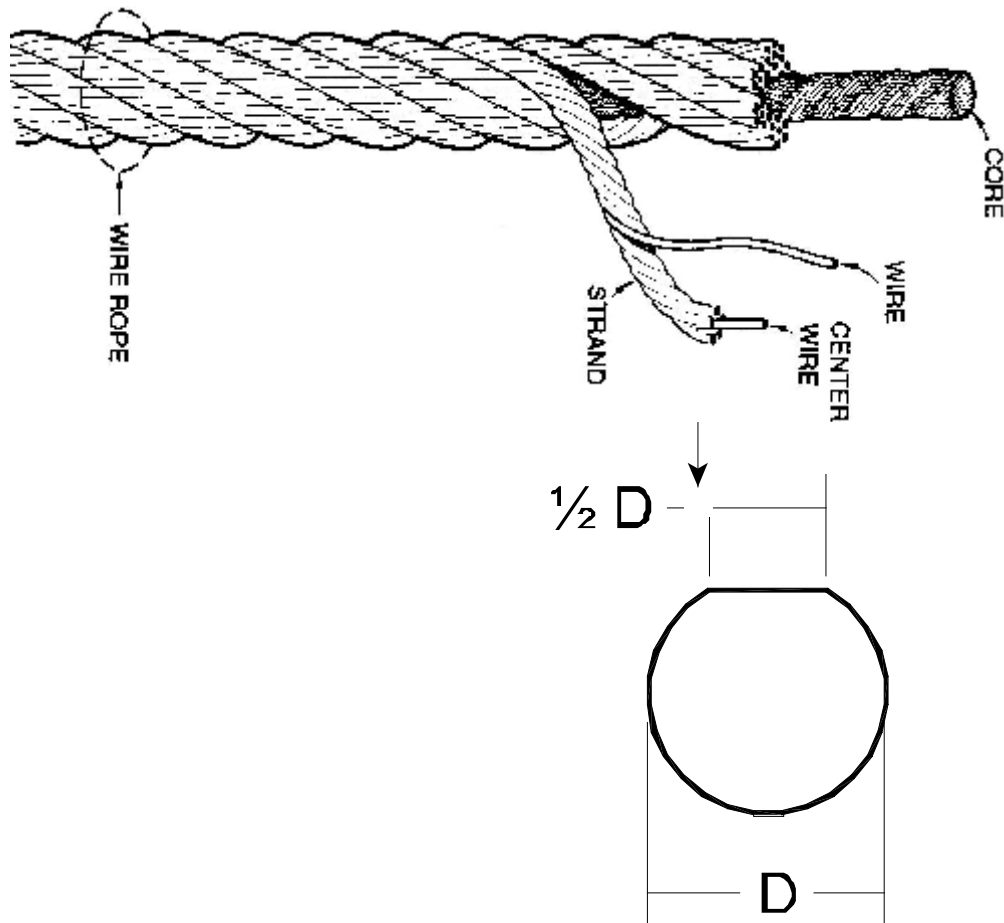


Figure 1. Single Wire Inspection Criteria for the Auto-Belay Wire Ropes.

REPLACE THE WIRE ROPE IF ANY OF THE FOLLOWING CONDITIONS ARE TRUE:

(Refer to Figure 1 above.)

1. If any of the individual wires in a strand have a flat spot of more than ½ the diameter of the smallest wire as shown in the figure above.
2. If there is a single broken wire in any strand.
3. If there are 50,000 or more cycles on a wall.
4. If the cables have been on a ride for 1 year (12 months).
5. If there are any twists, frays, kinks or bird-caging.

Wire Rope Inspection Criteria Recommended by Various Agencies and Manufacturers

Governing agencies in the United States have published guidelines pertaining to wire rope use, maintenance, inspection and general specifications. Further, most wire rope manufacturers have additional guidelines for the use, maintenance and inspection of their cables. These guidelines and codes set precedence for the industry standard methods of use, maintenance and inspection of wire ropes. Deviation from these recommendations would be viewed as questionable by most engineers with experience in the industry.

To justify the inspection method recommended by Spectrum Sports Int'l, the most noted codes and guidelines have been obtained and read by SAE Inc engineers. The codes obtained by SAE Inc engineers include:

a. ASME (American Society of Mechanical Engineers) International Publication

ASME/B30.5c - Mobile and Locomotive Cranes, 1998, ISBN#: 0791822753

This code is a revision of the ASME/ANSI B30.5-1989. It applies specifically to applications similar to the Space Shot™ ride.

b. Wire Rope Technical Board

Wire Rope Users Manual, Third Edition, 1993

This text gives a summary compilation of the recommended practices for wire rope use in general applications.

c. OSHA Wire Rope Excerpts - General Standards, Vol 37, Number 202, October 1972.

This general standard is a compilation of the ASME/ANSI standards that exist now as the ASME/B30.XX series. These are the forerunner to current standards.

d. Leeschen Wire Rope Company

“Wire Rope Inspection”, Report #107. This report gives guidelines to the inspection methods appropriate to identify wire rope damage.

Each of these codes specifies, in general, the same criteria for inspection of wire ropes. Additional ASME codes specify inspection criteria for additional applications including, but not limited to, personnel hoist (elevators), overhead cranes, material hoist etc. The ASME code governing Mobile and Locomotive Cranes is very stringent. It is the most stringent code that has any applicability to the Auto-Belay. The highlights of the inspection guidelines/codes listed above are included in the next table of this document to set a comparison reference for Spectrum Sports Int'l guidelines. Note that the inspection procedures outlined in the referenced codes are all visual inspections.

Comparison of Wire Rope Inspection Criteria.

| Inspection Criteria Requiring Rope Replacement | ASME/B30.5c Cranes | Wire Rope Users Guide, 3rd Edition |
|---|---|--|
| Length of Wire Rope Service | no specification given | no specification given |
| Abrasion | 1/3 diameter worn on any wire. (See figure below) | 1/3 diameter worn on any wire, see specific governing code |
| Rope Stretch | no specification given | when the rate of stretch increases after initial break-in period |
| Reduction in Rope Diameter | 1/48 inch on cables 1/4" diameter | when accompanied with significant rope stretch; otherwise not specific |
| Corrosion | not specific | if accompanied by metal pitting; if rust exists |
| Kinks, Twists, Crushing | any - replace wire rope | any - replace unless cable is repairable |
| “Bird Caging” | any defect - replace unless defect can be removed | any defect - replace unless defect can be removed |
| Heat / Electrical | any - replace | if wires are fused or discolored |
| Broken Strands | rotation resistant ropes: 2 wires in 6 rope diameters - and 4 wires in 30 rope diameters New criteria: 4 broken wires in one lay-length and 2 broken wires within 1 strand within 1 lay-length | see specific code |
| Damaged End Attachments | if non-repairable - replace wire rope | see specific code |
| Non-destructive | none specified | none specified |

The ASME/B30.5 inspection criterion is very specific on the visual inspections required. The code is specifically designed to allow an inspector to accurately infer the status of the wire rope core from a thorough inspection of the wire rope’s broken wires in a strand, abrasion of the wires in the strands, and the change in the diameter of the overall rope. The inspection criterion requires a thorough visual inspection of the rope.

The number of broken strands is a key aspect of all of the ASME codes. A summary of the ASME code allowable broken strands is included here due to the primary role it plays in determining the integrity of the rope core.

ASME CODE GOVERNING WHEN TO REPLACE WIRE ROPE- BASED ON NUMBER OF BROKEN WIRES

| ASME Standard | Equipment Connection | Number of Broken Wires | | Number of Broken Wires | |
|-----------------------------|---|---|------------------|--------------------------|------------------|
| | | <u>In Running Ropes</u> | | <u>In Standing Ropes</u> | |
| | | In One Rope Lay | In One Strand | In One Rope Lay | In One Strand |
| ASME/B30.2 | Overhead & Gantry Cranes | 12** | 4 | Not Specified | |
| ASME/B30.4 | Portal, Tower & Pillar Cranes | 6** | 3 | 3 | 2 |
| ASME/B30.5 rev b | Crawler, Locomotive & Truck Cranes Rotation Resistant Rope | Retirement criteria based on number of broken wires found in length of rope equal to 6 times rope dia- meter— 2 broken wires maximum, and 30 times rope diameter—4 broken wires maximum. | | | |
| ASME/B30.5 2 | Running Rope | 6** | 3 | 3 | |
| ASME/B30.6 | Derricks | 6** | 3 | 3 | 2 |
| ASME/B30.7 | Base Mounted Drum Hoists | 6** | 3 | 3 | 2 |
| ASME/B30.8 | Floating Cranes & Derricks | 6** | 3 | 3 | 2 |
| ASME/B30.16 | Overhead Hoists | 12** | 4 | Not Specified | |
| ANSI/A10.4 | Personnel Hoists | 6** | 3 | 2** | 2 |
| ANSI/A10.5 | Material Hoists | 6** | Not Specified | Not Specified | |

** Also remove for 1 valley break

Appendix C

Trouble Shooting Guide

Problem: *Auto-Belay cable will not retract*

Q: check the air pressure in the tank

If NO;

- Charge tank to the appropriate psi, and then check for air leaks by using soapy water.

If YES;

- Check cable/rope routing to ensure there is no cable obstructions.
- Check pulleys and the pulley cart to ensure the pulleys are turning freely and that the cable/rope pulley cart is free from obstructions.
- Ensure the ram alignment is true.

Q: When proper air pressure, does the tracking pulley cart seem to stop at a point and not track??

IF NO;

- Spectrum Sports Int'l for advice 888 563 0163

IF YES;

- Check bearing for proper turning/tightness or track is clear of debris

Problem: *Grinding or loud rubbing noise*

Cable is rubbing somewhere. Determine where the cable/rope is rubbing and call Spectrum Sports Int'l for direction.

Problem: *Hydraulic leak*

Locate the source of the leak (i.e. shaft-end of cylinder, brass breather vent of cylinder, hydraulic hose and/or fitting, or tank)

- If cylinder-end where chrome shaft goes in and out? Then worn seals. Call Spectrum Sports Int'l for reorder and installation instructions.
- If cylinder-end with brass colored breather vent? Please note that small amounts are normal for the purpose of lubricating the sliding cylinder head. However, large amounts can mean a torn seal, excessive wear or some other abnormality. Please contact Spectrum Sports Int'l for details.

Problem: *SRABD won't hold air pressure*

With soapy water, check all fittings for proper seal

- If fittings, tighten fitting and check again. If problem continues, call for assistance
- If Air Gauge or Schrader valve, tighten and re-check. If problem continues, call for assistance.

Should you encounter a problem not listed or need technical assistance, please call:

- Spectrum Sports Int'l at 888-563-0163 or fax your questions to 435-792-3884

Appendix D

The following form is the SRABD order form for replacement or accessory needs. Please refer to the attached parts list if ordering a replacement item or with warranty questions.



Climbing Wall Accessories Order Form



Spectrum Sports, Inc Accessories & Parts
720 West 200 South, Logan, Utah 84321
Tel: (888)563-0163 (435)792-3883 Fax: (435)792-3884
http://www.spectrumsports.com

| | | | |
|---|----------------|---|--|
| SHIP TO: (If different than Bill To address, please indicate!) | | BILL TO: | |
| Date: _____ | Contact: _____ | Company: _____ | Address: _____ |
| Company: _____ | | Address: _____ | |
| Address: _____ | | Attn: _____ Phone: _____ | |
| Phone: _____ Fax: _____ | | PRODUCT INFORMATION: | |
| <input type="checkbox"/> Check box if you are the original owner of wall. | | CND _____ DAR _____ 24' _____ 32' _____ | Stationary _____ Mobile _____ Serial # _____ |
| Order Taken By: _____ | | Year Manufactured: _____ | |
| Date Order Shipped: _____ | | Comments: _____ | |

Payment Type: C.O.D. _____ CC _____ Card #: _____ Exp Date: _____

Name on Credit Card: _____ **Address on Card:** _____

Shipping: UPS _____ Fed Ex _____ **Via:** Ground _____ 3-day _____ 2-day _____ Overnight _____ Other _____

| Description | Quantity | Unit Price | Total |
|--|----------|------------|-------|
| Quick Harness | | \$ 79 | |
| Child Harness | | \$ 54 | |
| Jack w/ Bolt on Plate | | \$ 150 | |
| Rear Jack Sliding Attachment | | \$ 80 | |
| FrontJack Attachment | | \$ 30 | |
| Buzzer (Complete unit, includes pocket) | | \$ 70 | |
| Buzzer contacts | | \$ 29 | |
| Cylinder (Specify date manuf.) | | \$ 225 | |
| Cylinder Seal Kit | | \$ 45 | |
| Regular Handholds & Hardware (Each) (Specify size and color) | | \$ 7 | |
| Handhold Wrench (T Handle) | | \$ 19 | |
| Swivels | | \$ 80 | |
| Carabineers-auto locking | | \$ 19 | |
| Quick Link | | \$ 5 | |
| Remote to Hydraulic Lift (folding-4 button) | | \$ 300 | |
| Remote to Hydraulic Lift (non folding-2 button) | | \$ 200 | |
| Replacement Pulleys (6 inch) | | \$ 19 | |
| Certified Cable with BOTH ends crimped for 24' wall (Specify length) (Lengths) _____ | | \$ 150 | |
| Certified Cable with BOTH ends crimped for 32' wall (Specify length) (Lengths) _____ | | \$ 175 | |
| Rules Sign (Each) | | \$ 25 | |
| Warning Sign (Each) | | \$ 25 | |
| Operator / Owners Manual (for DAR, CND or Auto-Belay's) | | \$ 25 | |
| "Closed Sign" - Prevention Cover / DAR or CND | | \$ 390 | |
| Trailer Jack Handle Repair Kit | | \$ 15 | |
| Trailer Jack Gear Kit | | \$ 16 | |
| Oil Containment System | | \$ 135 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

All other replacement parts available. Call for prices.

Appendix E

Spectrum Sports Int'l

Limited Warranty, Limited Remedy and Liability Release
(It is important to read all the components of this manual and form)

Limited Warranty

Spectrum Sports, Int'l warranties and obligations set forth below are in lieu of any other express warranties or obligations of Spectrum Sports Int'l, its distributors, or resellers/retailers. The warranties and limitations extend only to the person for whom originally purchased the product.

Per the warranty section of this manual, Spectrum Sports Int'l for a period of 90-days, 180-days, 1-year or 3-years, depending upon the item or stated claim (see Warranty section) from date of purchase will at manufacturer's option, repair or replace at no charge, any Spectrum Sports Int'l SRABD which breaks or is defective in materials or workmanship. Damage due to misuse, abuse or modification is excluded ... as is normal wear (such as indicated in the warranty section), dings, scratches, etc.

Cleaning and Maintenance

Under no circumstances should the unit be serviced by any unqualified person(s). Any work to the steel frame, hydraulic Auto-Belay or cabling/roping should be performed by an experienced person in the field of service who is certified, bonded, etc., to perform the work. It is the owners' responsibility to ask for such certification and/or bonding verification. Cleaning of the unit should be similar to an automobile (i.e. car wash with spray washers and mild detergents).

Limitation of Remedy

During the period of warranty, Spectrum Sports Int'l will at its option, either repair or replace defective parts or items. To obtain repair or replacement, call or fax Spectrum Sports Int'l customer service for a return authorization number. Include the following information: name, address, date of purchase, address where the product is currently being used, office phone or mobile phone (if at an event), and your product model and serial number. At your expense, ship or deliver the product to Spectrum Sports Int'l, 720 West 200 South, Logan, Utah 84321. Replaced or repaired items will be shipped back to you at no cost and will be shipped in the same manner as it was received (i.e., overnight, ground, etc.). For items that must be received before the defective part is sent to Spectrum Sports Int'l it is REQUIRED that a valid credit card be charged for the warranty item before Spectrum Sports Int'l will ship. Once Spectrum Sports Int'l receives the old part, a credit will be issued back to the credit card.

Release of Liability

I understand and am aware that the use of climbing walls with Auto-Belays is a hazardous activity. I understand that I am solely responsible for safe operation, daily inspection and maintenance and customer adherence to the rules. I understand that rock climbing involves a risk of injury to any and all parts of my body and the customers who use this product. I HEREBY AGREE TO FREELY AND EXPRESSLY ASSUME AND ACCEPT ANY AND ALL RISKS OF INJURY OR DEATH TO THE USER OF THIS EQUIPMENT.

Initials: _____

I will agree that I will release Spectrum Sports Int'l its manufacturer, its distributors and retailers from any and all responsibility or liability for injuries or damages to the user of the Climbing products I am purchasing, or to any other person. I agree not to make a claim against or sue Spectrum Sports Int'l, its manufacturers, its distributors or retailers for injuries or damages relating to use of the equipment, other than such claims as are allowed by the limited warranty set forth above.

Initials: _____

Agreement

I understand how to operate the climbing product safely. This means that I do understand, but not necessarily limited to, how the Auto-Belay works on the climbing products, how to perform daily safety inspections, the rules, and in general manage crowd and staffing operational issues.

Initials: _____

Acknowledgement

I have carefully read this limited warranty, limited remedy, and release of liability and fully understand its contents. I am aware that this is a release of liability and a contract between me and Spectrum Sports Int'l and its manufacturers, distributors and retailers and I sign it of my own free will.

Serial #: _____

Date: _____

Customer's Name: _____

Customer Business Name: _____

Customer's Signature: _____

LIMITED LIABILITY WARRANTY

Equipment manufactured by Spectrum Sports Int'l, 720 West 200 South, Logan, UT 84321, is warranted free from defect in material and workmanship for a period of 90 days from the date of purchase.

Equipment not manufactured by Spectrum Sports Int'l is covered to the extent of warranty provided by the original manufacturer and this warranty does not cover any equipment, new or used, purchased from anyone other than Spectrum Sports, Int'l. All replacement parts shall be covered under warranty for a period of 90 days from date of purchase. SPECTRUM SPORTS, INT'L MAKES NO OTHER REPRESENTATION OF WARRANTY OF ANY OTHER KIND, EXPRESSED OR IMPLIED, WITH RESPECT TO THE GOODS SOLD HEREUNDER, WHETHER AS TO MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHERWISE.

Spectrum Sports, Int'l sole obligation under this warranty shall be to repair or replace any part or parts which, to Spectrum Sports, Int'l satisfaction, prove to be defective upon prepaid return to Spectrum Sports Int'l, 720 West 200 South, Logan, UT 84321. In such a case, once the necessary repair(s) has/have been made or a replacement part secured, Spectrum Sports Int'l. will pay the cost to return the item back to the customer. This obligation does not, however, include labor to install replacement parts, nor does it cover any failure due to accident, abuse, neglect, or use in disregard of instructions furnished by Spectrum Sports Int'l. In no event shall damages for defective goods exceed the purchase price of the goods, and SPECTRUM SPORTS INT'L. SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER.

All claims in regard to the parts or equipment must be made within ten (10) days after Purchaser learns of the facts upon which the claim is based. Authorization must be obtained from Spectrum Sports Int'l prior to returning any equipment, components, or parts. This warranty is voided by failure to comply with these notice requirements.

Production output is dependent on feed stock, input, and many other variables beyond the control of Spectrum Sports Int'l; therefore, Spectrum Sports Int'l makes no guarantees expressed or implied as to production performance.

NOTICE

The warranty on Spectrum Sports Int'l equipment remains valid only when genuine Spectrum Sports Int'l. replacement parts are employed. If purchaser defaults in making payment for any parts or equipment, this warranty shall be void and shall not apply to such parts and equipment. No late payment or cure of default in payment shall extend the warranty period provided herein.

Spectrum Sports Int'l is not responsible for damage to any associated instruments, equipment or apparatus nor will Spectrum Sports Int'l. be held liable for loss of profit or other special damages for any reason. The Buyer, their employees, agents and successors in interest assume all risks and liabilities for the operation, use and/or misuse of the product(s) described herein and agree to indemnify, hold harmless and defend the seller from any and all claims and actions arising from any cause whatsoever, including sellers negligence for personal injury incurred in connection with the use of said product(s) and any and all damages proximately resulting therefrom.

CAUTION

Only technically qualified individuals who have fully read and understand the provided instructions should operate the equipment. The equipment should be operated only in accordance with these instructions. The operator should follow all of the warnings and cautions set forth in the manual and the operator should follow and employ all applicable standard laboratory safety procedures.

Appendix F

Changing an Auto-Belay Cylinder

This procedure is for the current 2001 Auto-Belay design with 4 x 4 tank installed on stationary 24' and 32' walls. The mobile procedure would be a little different.

Two people are recommended.

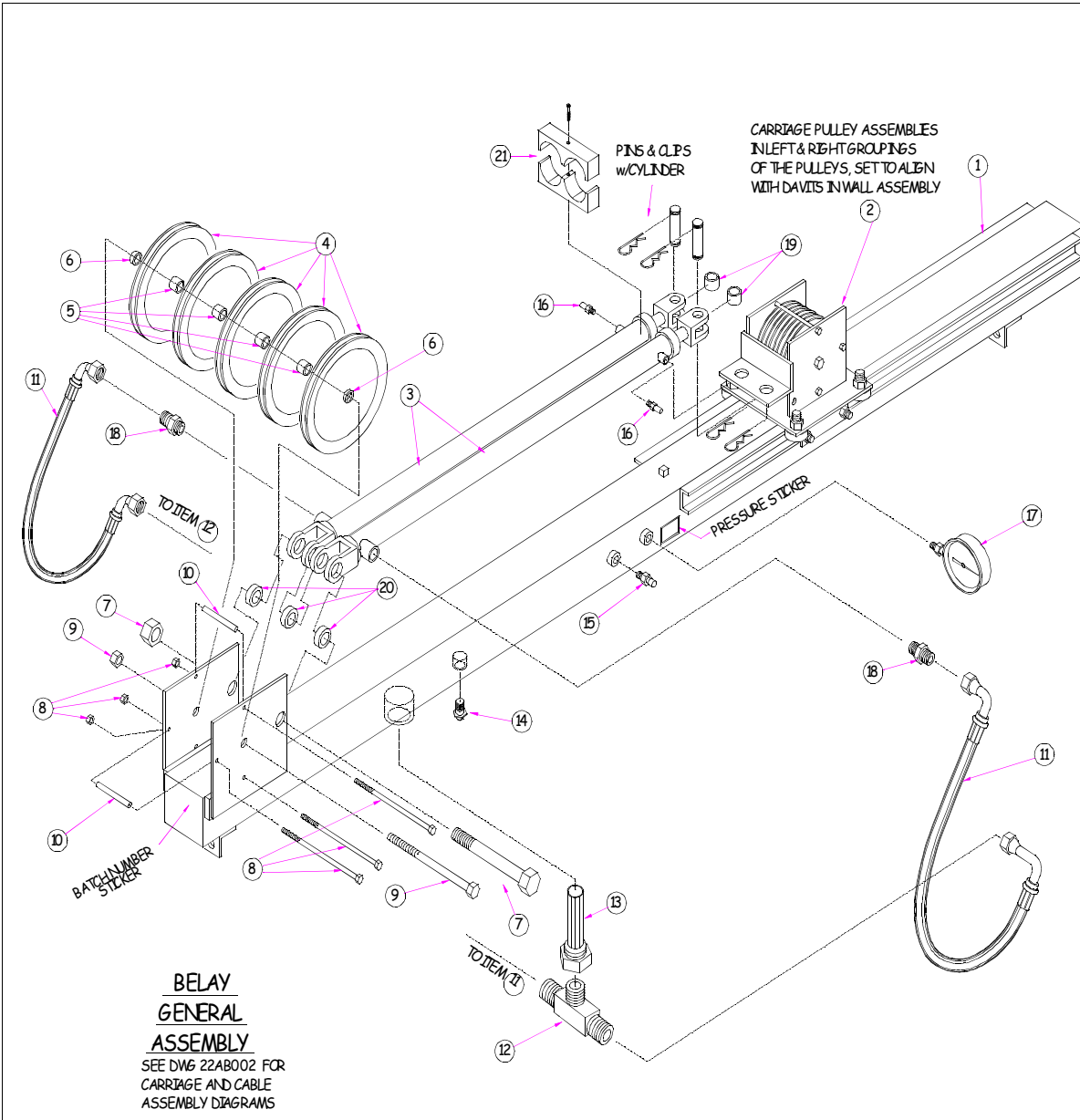
TOOLS REQUIRED ARE:

- ***TWO ADJUSTABLE WRENCHES CAPABLE TO OPEN TO 1 1/2" OR TWO 11/2" AND ONE 11/8" OPEN END WRENCHES***
- ***AIR CHUCK***
- ***7/8" OPEN END WRENCH***
- ***9/16" OPEN WRENCH***
- ***ISO 32 OIL***
- ***RAGS TO ABSORB OIL***

1. Pull cable all the way down to bottom of wall panel to fully retract cylinders (3) to force oil from the cylinder tube.
2. Depressurize the Auto-Belay tank (1) entirely. Depress the center of the schrader valve (15) with a schrader valve air chuck.
3. Use the wrench to remove 1" nut (5) from 1" bolt (7). Remove 1" bolt (7) on bottom pulley bracket. Keep the spacer (20) from between cylinders on 32' Auto-Belays to put it back on later.
4. Remove breather (18) from old cylinder and install it on the new cylinder.
5. Use the wrench to remove hose (11) and check valve (20) from cylinder that you are replacing. Loosen hose fitting than check valve (20), repeat this until the check valve is removed. Now it takes two people, one person to hold a CLEAN rag over the check valve (20) to keep oil from escaping. Oil can be replaced afterwards. The second person can do the next steps while the other one holds a rag over check valve.
6. At the top of cylinder (rod end) remove bottom clip from pin so pin can be pulled out. Keep any spacer (19) to reinstall as you put new cylinder on.
7. Cylinder can now be removed.
8. Work backwards from here repeat steps 5 thru 3 to attach new cylinder.
9. Once everything is in place add air to the Auto-Belay tank till it reads 90 psi. The procedure is the same for 24' and 32' walls.

10. Purge the air out of cylinders by repeatedly pulling cable down and allow rising by hand until resistance is felt through out the entire down stroke. Now check oil level.

11. If oil has to be added to make oil level in middle of sight gage, repeat step 2. Remove fill plug at top of tank with a 7/8" wrench or a 5/16" Allen wrench. Add oil than tighten fill plug and repeat step 9. Check oil level again. Repeat if necessary to acquire oil level to be in the middle of sight gage.



**BELAY
GENERAL
ASSEMBLY**
SEE DWG 22AB002 FOR
CARRIAGE AND CABLE
ASSEMBLY DIAGRAMS

| BILL OF MATERIAL | | | |
|------------------|-----|---|--------------------------------|
| ITEM | QTY | DESCRIPTION | REMARKS |
| 1 | 1 | BELAY RESERVOIR TUBE WELDMENT | 22AB005 |
| 2 | 1 | CARRIAGE PULLEY ASSEMBLY | 22AB002 |
| 3 | 2 | HYDRAULIC CYLINDER 1 1/2" ϕ x 39" STROKE | 401-22AB-1007 |
| 4 | 5 | PULLEY 6" ϕ w/5/8" ϕ BEARINGS | 401-22AB-1020 |
| 5 | 4 | SPACER 5/8" ϕ x 1/2" LG | 22AB114 |
| 6 | 2 | SPACER 5/8" ϕ x 1/4" LG | 22AB116 |
| 7 | 1 | HEX BOLT 1" ϕ -8NC x 6 1/2" LG GR5 w/NYLOCK NUT | 101-100086.55 102-10008NYL5 |
| 8 | 3 | HEX BOLT 1/4" ϕ -20NC x 5 1/2" LG GR5 w/NYLOCK NUT | 101-250205.55 102-25020NYL5 |
| 9 | 1 | HEX BOLT 5/8" ϕ 11NC x 7" LG GR5 w/NYLOCK NUT | 101-625117.05 102-62511NYL5 |
| 10 | 2 | SPACER 1/4" ϕ x 5" LG | 22AB117 |
| 11 | 2 | HYDRAULIC HOSE ASSEMBLY | 22LFHH06 |
| 12 | 1 | TEE FITING- AEROQUIP FF2001T-0808S | 401-22AB-1031 |
| 13 | 1 | HYDRAULIC FLUID FILTER- ZINGA TFS-0310-2-0 | 401-22AB-1032 |
| 14 | 1 | SIGHT GLASS- ZINGA OE-0102 | 401-22AB-1033 |
| 15 | 1 | SCHRADER VALVE 1/4" NPT MALE | 401-22AB-1002 |
| 16 | 1 | BREATHER 1/4" NPT MALE | 401-22AB-1006 |
| 17 | 1 | PRESSURE GAUGE 0-160 PSI 1/4" NPT MALE | 401-22AB-1001 |
| 18 | 1 | 0.065 ORIFICE CHECK VALVE SAE # 10 MALE/MALE | 401-22AB-1005 |
| 19 | 2 | SPACER 1" ϕ x 3/4" LG | 22AB118 |
| 20 | 3 | SPACER 3/8" ϕ x 1" LG | 22AB119 |
| 21 | 1 | CYLINDER SUPPORT- 32' MODELS ONLY | 22AB005 |

NOTE:
LOCKTITE HYDRAULIC FITTING T-READ
SEALANT MUST BE USED AT THE
FOLLOWING FITTINGS:

- (15)
- (17)
- (12) AT FILTER END OF TEE

AIR PRESSURE
80-90 PSI

HYDRAULIC FLUID
FILL RESERVOIR TUBE WITH
ISO 32 HYDRAULIC FLUID
UP TO MID LEVEL OF SIGHT
TUBE WITH BELAY SETUP
IN VERTICAL POSITION
APPROX 7 QUARTS.

| | | | |
|----------------------------|-----|--|----------|
| 1 | JRO | GENERAL REVISIONS PER TONY A. - ECD# 21402 | 03/08/02 |
| D | JR | ISSUE FOR FABRICATION | XXXX |
| REV | BY | DESCRIPTION | DATE |
| UNLESS OTHERWISE SPECIFIED | | USORNT | DATE |
| DIMENSIONS IN INCHES | | JAR | 10/26/01 |
| TOLERANCES | | DRAWN | DATE |
| FRACTIONS: +/- 1/16 | | XXX | XX/XX/XX |
| DECIMALS | | APPROVED | DATE |
| X +/- 0.00 | | XXX | XX/XX/XX |
| .XX +/- 0.00 | | CLIENT | |
| .XXX +/- 0.000 | | 87 E. 200 N HYRUMUTAH TEL(435)245-3128 | |
| ANGLES: +/- 30 DEGS | | PROJECT | |
| MACHINE FINISH | | ACTION AMUSEMENTS, INC. | |
| DONUT SCALE | | CLIMBING WALL AUTO BELAYS | |
| CUSTOM UNITS: INCHES / | | TITLE | |
| | | 24/32 AUTO BELAY EXPLODED FINAL ASSEMBLY GENERAL ARRANGEMENT (5x4) | |
| | | DRAWING NUMBER | |
| | | 22AB001 | |
| | | REV | |
| | | | |

Receipt and Acknowledgment

For Auto-Belay

This Operations Manual and training is an important tool intended to help you become acquainted with the Auto-Belay Climbing System and Spectrum Sports Int'l. It also includes guidelines as to safe and recommended operation.

Please read the following statement. Respond to Spectrum Sports Int'l in writing with any questions or if the intent of this document is unclear.

As Owner/Manager, I have received and read my copy of the Auto-Belay, Spectrum Sports Int'l. Operations Manual. I understand that the information outlined in this manual is subject to change at the sole discretion of Spectrum Sports Int'l at any time. It is further understood that as an owner of the Auto-Belay, I have the responsibility to ensure that the correct and latest version of the manual is being used.

As an owner of the Auto-Belay or authorized representative, it is my responsibility to keep this manual current with any changes that are made by Spectrum Sports Int'l. In addition, if there is anything about the product and/or this manual that is unclear or not understood, it is my responsibility to seek clarification and not use the product until the issue is understood.

Unless informed in writing, Spectrum Sports Int'l assumes that the customer understands the Auto-Belay and that there are no questions regarding the product and/or the contents of this document.

It is the customer's sole responsibility to clarify any question or concern with Spectrum Sports Int'l before use and/or operation.

X _____
(Authorized Signature)

Date _____

X _____

Date _____