OWNER'S MANUAL
PAINTBALL RADARchron®
RATE-OF-FIRE

MODEL NO. PBRROF365

SPORTS SENSORS, Inc.

CONTENTS

Congratulations on purchasing your Paintball RADARchron® Rate-Of-Fire (PBR-ROF). If used and cared-for as described in this Manual, you should enjoy many hours of fun and constructive use. **Please read the INSTRUCTIONS section of this Manual carefully to realize the full potential of the PBR-ROF!**

FEATURES & BENEFITS

The PBR-ROF is a small, sophisticated, inexpensive microwave Doppler radar that measures the shot characteristics of the latest state-of-the art paintball markers with high rates-of-fire, as well as single-shot markers. It is capable of the following:

- Measures the Velocity (speed) of individual paintballs shot in a burst, from a minimum of 150 feet per second (fps) to a maximum of 450 fps. Displays average fps, minimum fps and maximum fps of a burst of paintballs shot at velocities within this range.
- Measures Rate-of-Fire (ROF) of a burst of paintballs, from a minimum of 1 ball per second (bps) to over 30 bps . Displays average bps, minimum bps and maximum bps of a burst of paintballs shot within this ROF bps range.
- Measures the total Number of Balls (balls) shot in a burst, from 1 to a maximum of 255.
- Measures the Velocity, in fps, of a single paintball shot, from 150 to 450 fps.

Figure 1 depicts the front view of the PBR-ROF. The major features of interest are the Display that shows the measurements data; the Lens Bezel with the pertinent symbols that relate to the Display, indicating the modes of operation and units of measure; and the Function Button by which the user turns the unit on and off and selects the measurements of interest.

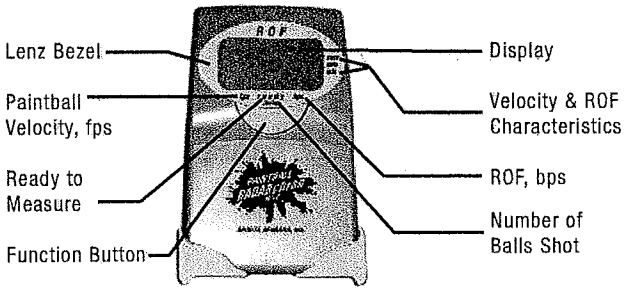


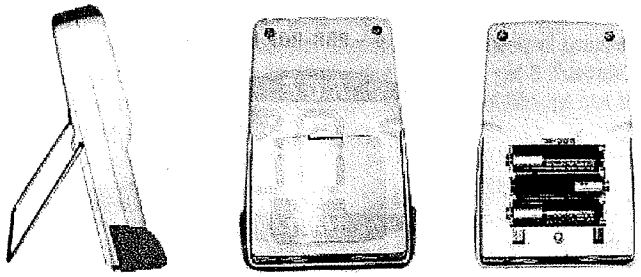
Figure 1 - Front Case View

FEATURES AND DESCRIPTION (CONT'D)

DESCRIPTION

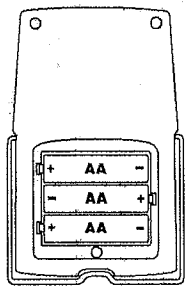
Figure 2 depicts the side and rear views of the PBR-ROF. The major feature of interest in the side view is the Wire Bale that provides the support against which the PBR-ROF rests when placed on a horizontal surface. The rear view shows the Battery Door that is easily removed to access the Compartment for the three AA size batteries, also shown. Inscriptions on the Battery Door include the applicable FCC Certification numbers and Part 15 Rules synopsis.

Figure 2 – Side and Rear Views



Install the three AA size batteries with the polarities shown in the sketch of Figure 3.When the PBR-ROF is not in use, particularly for extended periods, it is wise to remove the batteries to prevent corrosive damage to the internal electronics.

Figure 3 – Polarity of AA Batteries



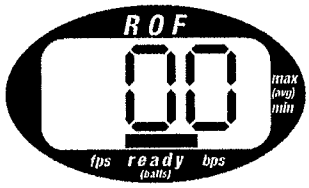
INSTRUCTIONS FOR USE

PLEASE READ THESE INSTRUCTIONS CAREFULLY TO REALIZE THE FULL POTENTIAL OF YOUR PAINTBALL RADARCHRON® RATE-OF-FIRE

The PBR-ROF is turned On by pressing the center of the yellow Function Button that is located just below the Display, as shown in Figure 1. The various measurement functions, displayed on the Display, are selected by repeatedly pressing the center of the Function Button until the desired characteristics are displayed.

After the batteries are inserted, all segments of the Display will briefly appear, followed by a stationary display of two zeros and the ready bar, as shown in Figure 4.

Figure 4 – PBR-ROF is Ready



Single Shot

When a single shot is measured, a 01 will briefly appear, Figure 5, followed by the velocity of the paintball shot by the marker, as illustrated as 239 fps in Figure 6. This is a stationary display of the velocity value for the one shot. Pressing the Function Button will not change the display. The velocity of the next single shot will be displayed in the same manner.

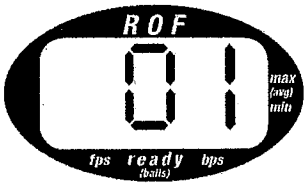


Figure 5
Single Shot Number of Balls

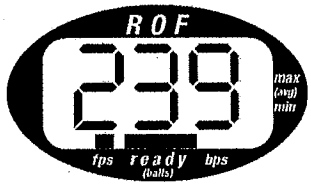


Figure 6
Ball Speed of Single Shot

Multiple Shot Burst

Average Velocity and Average Rate-of-Fire Display

When the PBR-ROF detects the first paintball of a burst, the ready bar and fps icon will extinguish and the Display will show 01, indicating one paintball shot has been measured. As additional paintballs are shot, at a minimum rate of one ball per second, and a maximum rate of 30 balls per second, the display will increment upward for each ball shot, up to a total of 255 balls. After 255 paintballs are shot, or after a burst of fewer shots have been completed, the results of the measurements will be displayed. First, the average (avg) speed of all balls measured will be displayed, with the fps icon. This display will be shown for one second, immediately followed by a display of the average (avg) rate-of-fire of all balls measured, with the bps icon, also for one second. The bps icon is a decimal point, so the bps rate is displayed to one-tenth of a bps. Figures 7 and 8 illustrate two measurements that display an average ball velocity of 285 fps and an average rate-of-fire of 16.7 bps respectively.

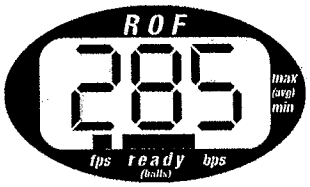


Figure 7
Average Ball Speed of a Shot Burst

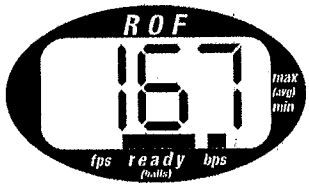


Figure 8
Average Rate-of-Fire of Shot Burst

The display of the average fps and average bps will continue to toggle from one to the other until the Function Button is pressed for the next display of measured data for that burst, or a following burst of shots is measured.

Minimum and Maximum Ball Velocity

Pressing the Function Button once will switch the toggling display from average fps and bps data to minimum and maximum ball velocity measurements. The fps icon will appear and the velocity display will toggle, with the min icon accompanying the minimum speed reading and the max icon shown with the maximum measured velocity of the burst. Figures 9 and 10 illustrate a minimum measurement of 270 fps and a maximum reading of 296 fps respectively.

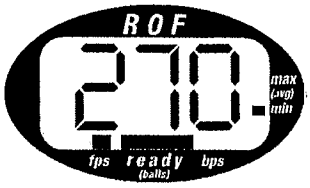


Figure 9
Minimum Ball Speed of Burst

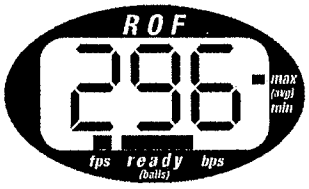


Figure 10
Maximum Ball Speed of Burst

The display of the minimum and maximum ball velocity will continue to toggle from one to the other until the Function Button is pressed for the next display of measured data for that burst, or a following burst of shots is measured.

Minimum and Maximum Rate-of-Fire

Pressing the Function Button again will switch the toggling display of minimum and maximum velocity data to toggling minimum and maximum Rate-of-Fire measurements in bps. The bps icon will appear on the display; the min icon will accompany the minimum bps reading; and the max icon will be shown with the maximum bps measured for the shot burst. The bps icon is also a decimal point, so the bps data is displayed to the nearest one-tenth of a bps. Figures 11 and 12 illustrate examples of a minimum of 15.7 bps and a maximum of 18.3 bps respectively.

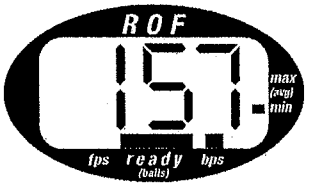


Figure 11
Minimum Burst Rate-of-Fire

Figure 12
Maximum Burst Rate-of-Fire

The display of the minimum and maximum Rate-of-Fire will continue to toggle from one to the other until the Function Button is pressed again for the next display of measured data for that burst, or a following burst of shots is measured.

Number of Balls Shot in the Measured Burst

Pressing the Function Button again will result in the display of the number of balls measured in the shot burst. The fps, bps, max and min icons will all be absent during this display. Up to 255 balls in one burst can be measured for the previously-described characteristics. Figure 13 illustrates the display of 28 total balls measured in the shot burst.

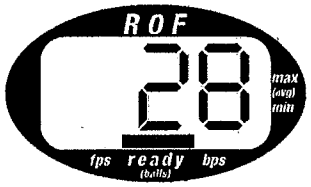


Figure 13
Single Shot Number of Balls

Summary of Shot Burst Characteristics

The results of the shot burst illustrated in the examples above are as follows:

- The average Velocity of the burst was 285 fps
- The average Rate-of-Fire for the burst was 16.7 bps
- The minimum Velocity of balls in the burst was 270 fps
- The maximum Velocity of balls in the burst was 296 fps
- The minimum Rate-of-Fire for the burst was 15.7 bps
- The maximum Rate-of-Fire for the burst was 18.3 bps
- The total number of paintballs measured in the burst was 28

Pressing the Function Button again will begin the cycle of data display described above.

Turning the PBR-ROF On and Off

The PBR-ROF automatically turns off after five minutes of inactivity. It can also be turned off manually by pressing and holding the Function Button until the display is extinguished.

To turn the PBR-ROF back on, press the Function Button until the display re-appears and release the button. The data from the last single shot or shot burst will be displayed. When the ready bar appears, the PBR-ROF is ready to measure new shots.

Regardless of what data is being displayed, the presence of the ready bar indicates that the PBR-ROF is ready to measure new shots.

Positioning the PBR-ROF and Marker for Optimum Data Measurements

The PBR-ROF should be positioned about 1 inch behind the paintball exit of the barrel of the marker being measured, and 1/2 to one inch below the barrel. Do not rest the barrel on top of the PBR-ROF. Direct the paintball shot slightly downward in front of the PBR-ROF.

The marker can also be positioned on either side of the PBR-ROF, with the barrel within 1/2 to 1 inch from the side, about even horizontally with the PBR-ROF Display. The barrel should extend about one inch in front of the PBR-ROF. Direct the paintball shot in front of the PBR-ROF, not away from it. Figure 14 illustrates these positions.

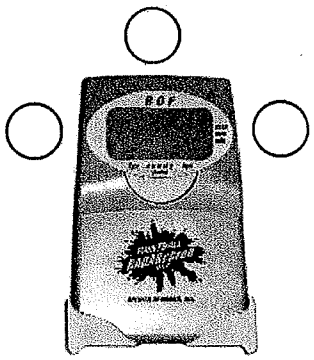


Figure 14 – Positions of Marker Barrel Relative to the PBR-ROF

A custom stand is also available from Sports Sensors, Inc. for accommodating the PBR-ROF as a check-in station. Call 888-542-9246 for more information.

SPECIFICATIONS

The specifications of the Paintball RADARchron® Rate-of-Fire are summarized as:

Size: 3 3/4" w; 5 1/2" lg; 1 5/16" th.
Weight: 11 oz.
Display Type: 3 Segment LCD
Speed Units: Feet per second (fps)
Speed Range: 150 fps to 450 fps
Speed Accuracy: Nominally within 1%
Rate of Fire (ROF) Units: Balls per second (bps)
ROF Range: 1 bps to over 30 bps
ROF Accuracy: Nominally within one-tenth of a bps
Batteries: Three AA batteries, (not included)
Operating Temperature: 40-110 degrees F
Storage Temperature: 32-120 degrees F

Related Patents:

U.S.: 5,864,061; 6,079,269; 6,378,367
Canada: 2,248,114
Japan: 3,237,857

EMISSION AND SAFETY STANDARDS

The Paintball RADARchron Rate-of-Fire has been tested and certified to meet requirements established by the Federal Communications Commission. The FCC ID is NVE 365. "This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation."

The Paintball RADARchron® Rate-of-Fire complies with current standards established for safety levels of human exposure to radio frequency energy, including the requirements of C95.1-1992.2 defined by the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE); and those of the Canadian Department of Health and Welfare, Safety Code 6.

Use of the PBR-ROF, or any other radiating device, may create problems when in close proximity to electronic medical devices, such as heart monitoring equipment or pacemakers/regulators. Avoid such use.

CARE OF YOUR PAINTBALL RADARCHRON® RATE-OF-FIRE

The PBR-ROF is a unique electronics product intended for use by players, referees, field owners, tournament officials and any users of paintball markers/guns to provide measurements data by which markers/guns can be assessed relative to prescribed safety limits. Although the rugged design will withstand the rigors of normal use, it should be protected from paintball impacts; should not be dropped or thrown; or exposed to precipitation, or immersed in water or other liquids. Do not use or leave outdoors during inclement weather. Store the PBR-ROF in typical in-house environments, avoiding excessive temperature extremes, humidity, dust and dirt.

Remove the three AA batteries if the unit will not be used for extended periods. Replace the batteries when low power is indicated.

The PBR-ROF can be cleaned with a slightly damped, soft cloth. Do not use alcohol, solvents, or chemical cleaners which can cause permanent damage.

With proper care, the PBR-ROF will provide many hours of service and fun for the users.

Referees and other users may find the PBR-ROF Holster to be a convenient way to carry the unit. Call Sports Sensors, Inc. for more information on 888-542-9246.

Always keep the Display-side of the PBR-ROF from facing the direction from which a paintball might hit the unit.

PROBLEMS/TROUBLESHOOTING

The PBR-ROF is designed to provide trouble-free performance when used properly, and given proper care. Battery replacement is the primary corrective action that can be taken by the user. Symptoms of low or dead batteries are no display, a dim display, or an erratic display after the Function Button has been pressed. Other abnormal operating characteristics can also be caused by weak or loose batteries. Nearby sources that are "electrically noisy", such as fluorescent lights, electric motors, or high power transmission lines, for example, can cause the spontaneous display of anomalous readings. Avoid close proximity to such sources when using the PBR-ROF.

WARRANTY & SERVICE

What is covered? – This limited warranty covers all defects in workmanship or materials in your Paintball RADARchron® Rate-of-Fire that is purchased directly from Sports Sensors, Inc. or from an authorized reseller. This warranty applies only to defects that occur while your PBR-ROF is being used in the normal manner described herein. This warranty does not apply to any defects that are caused by misuse, abuse, neglect or improper storage, paintball impacts, handling or maintenance, or any modifications or repairs performed by anyone other than Sports Sensors, Inc. Except as expressly stated in this warranty, Sports Sensors Inc. makes no implied warranties, whether of merchantability or fitness for a particular purpose or use or otherwise with respect to the Paintball RADARchron® Rate-of-Fire, for more than one year from the purchase date.

How long is the coverage period? – This limited warranty runs for one year from the date that you buy the PBR-ROF, as shown on your purchase receipt.

What will Sports Sensors Inc. do? – If your PBR-ROF fails during the warranty period and you return it before the end of this period, Sports Sensors Inc. will, at its discretion, and at no additional charge, repair or replace the defective unit. In no event shall Sports Sensors Inc. be liable for, or pay, any indirect, special, incidental or consequential damages in connection with your Paintball RADARchron® Rate-of-Fire.

How can you get service?--You must send the PBR-ROF, appropriately protected and packaged, shipping charges prepaid, to Sports Sensors, Inc.,c/o Electronics Development Corp., 9055F Guilford Rd., Columbia, MD 21046. Evidence of date and place of purchase, such as a copy of your sales receipt or other "proof of purchase", must accompany the returned unit. Please describe the nature of the problem or reason for return. Include your return address inside the returned package in the event that the shipping label is defaced.

How does state law apply?--This warranty gives you specific legal rights which vary from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty is governed by the State of Ohio.

For technical support or service information, call, toll-free: (800) 394-6650 or (888) 542-9246. For ordering information, or to relate usage experience, please call toll -free: (888) 542-9246. Visit our Web Site for the latest information about the PBR-ROF, or other new products, at: www.paintballradar.com

ENJOY YOUR PAINTBALL RADARCHRON® RATE-OF-FIRE, AND ALWAYS PLAY SAFE!!!

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