

OWNER'S MANUAL
BREAK SPEED RADAR™
MODEL BSR364



SPORTS SENSORS, Inc

Features & Benefits	3
Using the Break Speed Radar®	4
Description	4
Installing Batteries	6
Instructions for Use with the BreakRAK	6
Using the Break Speed Radar® with BreakRAK	7
Remote Data Display	8
Use of the Break Speed Radar® for Bowler's Release Speed	8
Specifications	8
Emission & Safety Standards.....	9
Care of Your Break Speed Radar®	9
Problems/Troubleshooting.....	10
Warranty & Service.....	10

If used and cared for as described in this Manual, you should enjoy many hours of fun and constructive use as you strive to improve your break speed. Please read the descriptions and instructions in this Manual carefully to realize the full potential of the Break Speed Radar™

FEATURES & BENEFITS

The Break Speed Radar™ (BSR) is a small, inexpensive, very low power, short range, microwave Doppler radar velocity sensor. It measures the speed of the cue ball as it approaches the point ball simulated by The BreakRAK™ (BR). The BSR displays break speed to one-tenth of a mile per hour, within the speed range of 10 to 50 mph.

Affordably priced, the BSR and The BR are used by players of all ages and skill levels as they strive to improve the effectiveness of their break shot. An explosive break that produces a pocketed ball affords the player the opportunity to run the table before their opponent even has a chance to shoot. The BSR-BR combination provides a valuable practice and warm-up tool for professional players preparing for tournament play, as well as for recreational players working on improving their performance. It is the practical choice of instructors, as well as players, who want the flexibility and convenience of use on the road as well as at home or at their practice facilities.

The BSR is powered by three common AA batteries (not included) and features one-button operation to turn the unit on or off. After a period of 5 minutes without a speed measurement, the BSR automatically turns itself off to conserve battery life. A large Liquid Crystal Display clearly presents the measured speed data. After each speed measurement, the BSR is automatically ready for the next shot – no need for the user to reset it. The following shot speed replaces the previously displayed speed.

USING THE BREAK SPEED RADAR™

DESCRIPTION

Figure 1 depicts the front view of the BSR. The major features of interest are the Display that shows the measured speed to one-tenth of a mph; and the Function Button by which the user turns the unit on and off. The button is intentionally a hard push to prevent inadvertent functioning and loss of data.

An Elastic Band is placed on the BSR to assure that the Battery Cover on the rear of the case is held in place when hard impacts are experienced from high speed cue ball hits on The BreakRAK. The Band must be positioned immediately adjacent to the crease in the front case plastic so as to avoid interference with the radar emission.

Figure 1 – Front Case View

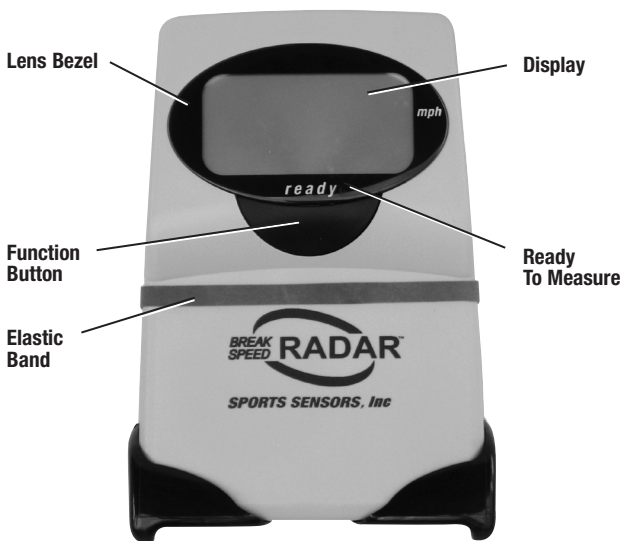


Figure 2 depicts the rear and bottom views of the BSR. The rear view shows the Battery Cover in place and removed to show the batteries in place in the Battery Compartment. The bottom view shows the Threaded insert which uses a standard tripod thread.

Figure 2 – Rear and Bottom Views



Battery Cover



Battery Compartment

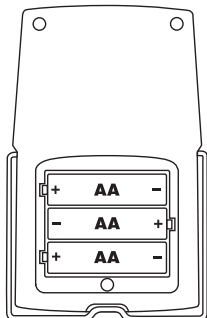


Threaded Insert

INSTALLING BATTERIES

Install three AA size batteries (not included) with the polarities shown engraved in the Battery compartment, and illustrated in the sketch of Figure 3. When the BSR is not in use, particularly for an extended period of time. It is wise to remove the batteries to prevent possible corrosive damage to the internal electronics.

Figure 3 – Polarity of AA Batteries



INSTRUCTIONS FOR USE WITH THE BREAKRAK

The BSR is very simple to use – just press the Function Button firmly and the unit is turned on, ready to measure speeds in the range of 10 mph to 50 mph. No need to reset it after each speed measurement – it is always ready for the next measurement and will continue to display the previous speed until a new speed is measured. The unit is turned off by firmly pressing the Function Button – or after 5 minutes of no measurements, it will turn itself off. There is a one and one-half second delay after a speed measurement to prevent a ball rebound from erasing the actual break speed reading.

Figure 4 illustrates a three-digit speed reading. The last digit to the right is in tenths of a mph.

Figure 4 — Speed Display in MPH



USING THE BSR WITH THE BREAKRAK

Any radar – not just the BSR, must be positioned such that the radar transmit/receive vector is directly aligned with the velocity vector of the object being measured. Any mis-alignment results in an angle between vectors which reduces the speed reading by the cosine of the angle formed by the two vectors. Therefore, to accurately measure break speed, the BSR is attached to The BreakRAK by custom hardware that positions the BSR in the proper manner to optimize cue ball speed measurement accuracy. The attachment method of the BSR to the BR, and custom hardware, are shown in a separate pictorial illustration and description, external from this Manual.

Use of the BSR without the BR is not recommended because of the difficulty of properly positioning the BSR for accurate speed measurements.

REMOTE DATA DISPLAY

A new accessory, the Radar Data Link™ (RDL), transmits the radar speed data to any remotely located Bluetooth-enabled android device. The RDL range is about 100 feet. Cell phones – mobile devices and tablets, as well as laptops and desktops are excellent data display devices, as are Bluetooth-enabled monitors. Non-android system compatibility will soon be offered.

USE OF THE BSR FOR BOWLER'S BALL RELEASE SPEED

Since the BSR measures speeds in the 10 mph to 50 mph range, commensurate with the speeds of bowling balls, some bowlers and instructors use the BSR to obtain the bowler's release speed. This speed is slightly higher than that measured by multiple optical sensors located down lane, close to the pins. The difference is due to deceleration of the rolling ball and depends upon many factors, including the lane conditions as well as ball sizes, weight, material, spin/roll etc.

To use the BSR to measure release speed, set it up resting on the Wire Bail and place it on the foul line, next to the gutter, facing down lane in the direction of the rolling ball. Right handers will place it next to the right gutter – left handers to the left.

Since the BSR display is facing away from the bowler, the Radar Data Link™, briefly described above, is convenient to use.

SPECIFICATIONS

The specifications of the Break Speed Radar™ 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: Miles-Per-Hour (mph)

Speed Range: 10 mph to 50 mph

Accuracy: Nominally within $\pm 1\%$

Batteries: Three AA batteries, (not included)

Operating Temperature: 40-110 degrees F

Storage Temperature: 32-120 degrees

Related Patents:

U.S. Patents: 5,864,061; 6,079,269; 6,378,367; 425,435; 6,666,089; 6,898,971 B2; 8,007,367 B2. Canadian Patents: 2,248,114; 2,406,070. Japan Patent: 3,237,857

EMISSION AND SAFETY STANDARDS

The Break Speed Radar™ transmitter is identical to the Swing Speed Radar® that has been tested and certified to meet requirements established by the Federal Communications Commission.

The FCC ID is NVE 364. “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 Break Speed Radar™ 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. The transmission power level of the BSR is well below that of most mobile devices, including cell phones, portable phones, tablets and other common wireless devices in widespread use.

Use of the Break Speed Radar™, 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 BREAK SPEED RADAR™

The Break Speed Radar™ is a unique electronics product intended for training and practice situations. Although the rugged design will withstand the rigors of normal use, it should be protected from cue ball 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 Break Speed Radar™ in typical in-house environments, avoiding excessive temperature extremes, humidity, dust and dirt.

The accompanying nylon pouch will afford modest protection from scratches, nicks and defacement from normal handling activities. Remove the three AA batteries if the unit will not be used for extended periods. Replace the batteries when low power is indicated.

The Break Speed Radar™ can be cleaned with a slightly dampened, soft cloth. Do not use alcohol, solvents, or chemical cleaners which can cause permanent damage.

With proper care, the Break Speed Radar™ will provide many hours of service and fun for the users.

PROBLEMS/TROUBLESHOOTING

The Break Speed Radar™ 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.

WARRANTY & SERVICE

What is covered? – This limited warranty covers all defects in workmanship or materials in your Break Speed Radar™ that is purchased directly from Sports Sensors, Inc. or from an authorized reseller. This warranty applies only to defects that occur while your Break Speed Radar™ 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, 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 Break Speed Radar™, 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 Break Speed Radar™, as shown on your purchase receipt.

What will Sports Sensors Inc. do? – If your Break Speed Radar™ 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 Break Speed Radar™.

How can you get service? – You must send the Break Speed Radar™, appropriately protected and packaged, shipping charges prepaid, to Sports Sensors, Inc., 11351 Embassy Drive, Cincinnati, OH 45240. 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 and include your name, address and telephone number inside the package.

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:

(888) 542-9246 or (800) 394-6650

For ordering information, or other non-technical questions, call toll-free: (888) 542-9246. Visit our Web Site for the latest information about the Break Speed Radar™ and other new products at:

www.sportssensors.com

***ENJOY YOUR BREAK SPEED RADAR™
AND CONTINUE TO IMPROVE YOUR GAME!***

***THE LEADER IN AFFORDABLE
MICROWAVE DOPPLER RADARS FOR SPORTS.***

**Sports Sensors, Inc.
11351 Embassy Drive
Cincinnati, OH 45240
TEL 888-542-9246
FAX 513-825-8532
www.sportssensors.com**



SPORTS SENSORS, INC.