

# **BR-3503**

## **User Manual**

(North America)



Rev. 01

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## **Important Safety Instructions**

- 1. Carefully read all of the instructions provided and save them for later use. Heed all warnings and instructions marked on the BR-3503.**
- 2. Do not place the BR-3503 on an unstable stand or surface as it may fall resulting in serious damage.**
- 3. The BR-3503 must be operated from 115 Volts AC 60Hz. Operating voltage is factory set.**
- 4. The BR-3503 power cord is equipped with a three-prong grounding plug that will only fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact a qualified person to replace the obsolete outlet. Do not tamper with the grounding prong to force fit into the outlet.**
- 5. Do not allow any objects to rest on the power cord or place the BR-3503 where the power cord will be trampled on.**
- 6. If an extension cord is used with the BR-3503, make sure that the total ampere ratings of the devices plugged into the extension cord do not exceed the extension cord ampere rating.**
- 7. Do NOT plug in, turn on or attempt to operate an obviously damaged unit.**
- 8. When connecting the equipment to the AC power line, the socket-outlet shall be installed near the equipment and shall be easily accessible.**
- 9. The BR-3503 radar unit does not have a power on switch. The unit can only be switched off by disconnecting the power cord from the wall AC outlet.**
- 10. No operator serviceable parts inside the BR-3503 radar unit. Please refer servicing to service qualified personnel.**

## 1. General

The BR-3503 radar can be used to measure the radial velocity of any moving object located in the radar beam coverage. The output of the radar is an analog signal with a frequency and amplitude proportional to the radial velocity and distance of the moving object.

## 2. Microwave Safety Warning



**Based on limits specified by the Federal Communication Commission (FCC) on Radio Frequency (RF) emissions in a general population environment, continued exposure to radiation should be avoided within 1.0 meter in front of the radar. Radiation levels outside this region fall within regulations of 1 mW/cm<sup>2</sup> and are not considered safety hazards. When setting up the antenna, special care should be taken to avoid situations where the antenna radiates towards individuals. The antenna should be positioned such that bystanders are located behind the antenna. During antenna setup, the antenna power cord should be unplugged to avoid accidental hazardous exposures to radiations. Always turn the antenna transmitter off during periods of inactivity. Direct visual contact with the radar when transmitting should be avoided at all times.**

## 3. Specifications

Description	Specification
Power Requirement	115 Vac, 0.3 Amp, 60 Hz (North America Model)
Nominal Frequency	35.5 GHz
Nominal Transmitting Power	100 mW
Antenna Gain	28 dBi
Transmitter Stability	±1.0%
Beamwidth	12° x 12°
Operating Temperature	-20degC to 45degC

## 4. Installation

The BR-3503 radar system includes the following two components:

- Radar antenna head
- Power supply / amplifier unit

The radar head has one (1) 1/4" mounting holes that can be used to install the head at specific locations in your test setup. The head is connected to the power supply / amplifier unit using a two (2) meter shielded cable which provides flexibility in positioning it for optimum results.

## 5. Operation

The BR-3503 is powered on 115Vac 60Hz. The connection to the power line outlet is done using a permanently attached power cord. It is interfaced to a Doppler processor unit using a single four-wire cable equipped with military connectors. This cable is used to carry the radar Doppler signal to the processing unit and the antenna transmission control signals. You should connect your radar cable from this connector to the appropriate radar input on your processing unit.

It is important to note that the BR-3503 does not have a power on switch. Consequently, the unit is on as soon as it is connected to the wall AC outlet. The transmitter is controlled by software and is switched off when in standby mode. To completely switch the unit off, the power cord needs to be disconnected from the wall power outlet.

## 6. Maintenance

The BR-3503 radar does not require much maintenance. Attention should however be paid to a few points:

- Keep the connectors clean from dirt and moisture to avoid corrosion and bad connections.
- Now and then wipe the radar enclosure with a soft and dry cloth.

The main fuses are located inside the power supply / amplifier unit. To replace them, refer the radar system to qualified personnel.



Warning: No operator serviceable parts inside the radar unit. Please refer servicing to service qualified personnel

## 7. Antenna Connectors Specification

Connector type: ITT CANNON MS3124E16-8P

Pin	Description
A	Not Connected
B	Not Connected
C	Not Connected
D	Remote Make for Antenna Transmitter Control (+ 5 Vdc source, 2 kOhm output resistance)
E	Make Ground
F	Doppler Signal + (5 Vpp max.)
G	Doppler Signal - (5 Vpp max.)
H	Ground

The remote activation of the transmitter is done by the processor by short circuiting pins D and E of the connector. When the antenna interface cable is not connected, the radar unit does not transmit.

**LIMITED WARRANTY.** Infinition Inc. products are warranted against defects in materials and workmanship for a limited period of time from the date Infinition Inc. ships the products to the customer as follows: interface hardware (one (1) year); cables, cable reels, radar antennas and acoustic sensors (ninety (90) days); and software medium (ninety (90) days). All software products sold by Infinition Inc. are licensed to the customer under the terms of the product software license agreement. Replacement products will be warranted for the longer of, the remainder of the original warranty period or thirty (30) days. Expenses for shipment of repaired or replacement products to and from Infinition Inc. shall be the responsibility of the customer. After examining and testing a returned product, if Infinition Inc. concludes that the product is not defective, the customer will be notified and the product will be returned to the customer with an additional charge for shipping, examination and testing. This limited warranty is void if failure of the products has resulted from accident, abuse, misuse, improper hardware connection or unauthorized maintenance or repair.

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## Safety Warning Justification BR-3503 Doppler Radar

Safety warning contained in the BR-3503 User Manual:

“Based on limits specified by the Federal Communication Commission (FCC) on Radio Frequency (RF) emissions in a general population environment, continued exposure to radiation should be avoided within 0.5 meter in front of the radar. Radiation levels outside this region fall within regulations of 1 mW/cm<sup>2</sup> and are not considered safety hazards. When setting up the antenna, special care should be taken to avoid situations where the antenna radiates towards individuals. The antenna should be positioned such that bystanders are located behind the antenna. During antenna setup, the antenna power cord should be unplugged to avoid accidental hazardous exposures to radiations. Always turn the antenna transmitter off during periods of inactivity. Direct visual contact with the radar when transmitting should be avoided at all times.”

The maximum permissible exposure for general population / uncontrolled situations is obtained as follow:

### Radar Specifications

Transmitter Frequency: 35.5 GHz  
 Transmitter Power: 100 mW or 0.1 W  
 Antenna Gain: 28 dBi

### Limits for General Population/Uncontrolled Exposure

Frequency Range: 1500 – 100000 MHz  
 Power Density: 1 mW/cm<sup>2</sup> or 10 W/m<sup>2</sup>  
 Averaging Time: 30 minutes

Based on the radar equation, the power density at a given distance can be calculated as follow:

$$\frac{10^{G/10} * P}{4 * \pi * R^2} = PD$$

where            G            is the antenna gain [dBi]  
                   P            Transmitter Power [W]  
                   R            Range [m]  
                   PD          Power Density [W/m<sup>2</sup>]

The minimum range for a safe exposure based on the radar specifications is given by:

$$R \geq \sqrt{\frac{10^{G/10} * P}{PD * 4 * \pi}} = \sqrt{\frac{10^{28/10} * 0.1}{10 * 4 * \pi}} = 0.70m$$

where            G = 28 dBi  
                   P = 0.1 W  
                   PD = 10 W/m<sup>2</sup>

Exposure to radiation should be avoided within 0.70 meter in front of the radar. For additional safety, the minimum range specified in the safety warning has been increased to 1.0 meter.