



NON-DIRECTIONAL POWER SENSOR

MODEL 4044 SERIES

OPERATION MANUAL

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INSTRUCTION BOOK PART NUMBER 920-4044 REV. G

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## Safety Precautions

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The following are general safety precautions that are not necessarily related to any specific part or procedure, and do not necessarily appear elsewhere in this publication. These precautions must be thoroughly understood and apply to all phases of operation and maintenance.

### **WARNING**

#### **Keep Away From Live Circuits**

Operating Personnel must at all times observe general safety precautions. Do not replace components or make adjustments to the inside of the test equipment with the high voltage supply turned on. To avoid casualties, always remove power.

### **WARNING**

#### **Shock Hazard**

Do not attempt to remove the RF transmission line while RF power is present.

### **WARNING**

#### **Do Not Service Or Adjust Alone**

Under no circumstances should any person reach into an enclosure for the purpose of service or adjustment of equipment except in the presence of someone who is capable of rendering aid.

### **WARNING**

#### **Safety Earth Ground**

An uninterruptible earth safety ground must be supplied from the main power source to test instruments. Grounding one conductor of a two conductor power cable is not sufficient protection. Serious injury or death can occur if this grounding is not properly supplied.

### **WARNING**

#### **Resuscitation**

Personnel working with or near high voltages should be familiar with modern methods of resuscitation.

### **WARNING**

#### **Remove Power**

Observe general safety precautions. Do not open the instrument with the power applied.

## Safety Symbols

### WARNING

Warning notes call attention to a procedure, which if not correctly performed, could result in personal injury.

### CAUTION

Caution notes call attention to a procedure, which if not correctly performed, could result in damage to the instrument.



The caution symbol appears on the equipment indicating there is important information in the instruction manual regarding that particular area

**Note:** *Calls attention to supplemental information.*

## Warning Statements

The following safety warnings appear in the text where there is danger to operating and maintenance personnel, and are repeated here for emphasis.

### WARNING

Never attempt to connect or disconnect RF equipment from the transmission line while RF power is being applied.  
Leaking RF energy is a potential health hazard.

Refer to page 3.

## **Safety Statements**

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### **USAGE**

ANY USE OF THIS INSTRUMENT IN A MANNER NOT SPECIFIED BY THE MANUFACTURER MAY IMPAIR THE INSTRUMENT'S SAFETY PROTECTION.

### **USO**

EL USO DE ESTE INSTRUMENTO DE MANERA NO ESPECIFICADA POR EL FABRICANTE, PUEDE ANULAR LA PROTECCIÓN DE SEGURIDAD DEL INSTRUMENTO.

### **BENUTZUNG**

WIRD DAS GERÄT AUF ANDERE WEISE VERWENDET ALS VOM HERSTELLER BESCHRIEBEN, KANN DIE GERÄTESICHERHEIT BEEINTRÄCHTIGT WERDEN.

### **UTILISATION**

TOUTE UTILISATION DE CET INSTRUMENT QUI N'EST PAS EXPLICITEMENT PRÉVUE PAR LE FABRICANT PEUT ENDOMMAGER LE DISPOSITIF DE PROTECTION DE L'INSTRUMENT.

### **IMPIEGO**

QUALORA QUESTO STRUMENTO VENISSE UTILIZZATO IN MODO DIVERSO DA COME SPECIFICATO DAL PRODUTTORE LA PROZIONE DI SICUREZZA POTREBBE VENIRNE COMPROMESSA.

## **SERVICE**

SERVICING INSTRUCTIONS ARE FOR USE BY SERVICE - TRAINED PERSONNEL ONLY. TO AVOID DANGEROUS ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING UNLESS QUALIFIED TO DO SO.

## **SERVICIO**

LAS INSTRUCCIONES DE SERVICIO SON PARA USO EXCLUSIVO DEL PERSONAL DE SERVICIO CAPACITADO. PARA EVITAR EL PELIGRO DE DESCARGAS ELÉCTRICAS, NO REALICE NINGÚN SERVICIO A MENOS QUE ESTÉ CAPACITADO PARA HACERLO.

## **WARTUNG**

ANWEISUNGEN FÜR DIE WARTUNG DES GERÄTES GELTEN NUR FÜR GESCHULTES FACHPERSONAL. ZUR VERMEIDUNG GEFÄHRLICHE, ELEKTRISCHE SCHOCKS, SIND WARTUNGSARBEITEN AUSSCHLIEßLICH VON QUALIFIZIERTEM SERVICEPERSONAL DURCHZUFÜHREN.

## **ENTRETIEN**

L'EMPLOI DES INSTRUCTIONS D'ENTRETIEN DOIT ÊTRE RÉSERVÉ AU PERSONNEL FORMÉ AUX OPÉRATIONS D'ENTRETIEN. POUR PRÉVENIR UN CHOC ÉLECTRIQUE DANGEREUX, NE PAS EFFECTUER D'ENTRETIEN SI L'ON N'A PAS ÉTÉ QUALIFIÉ POUR CE FAIRE.

## **ASSISTENZA TECNICA**

LE ISTRUZIONI RELATIVE ALL'ASSISTENZA SONO PREVISTE ESCLUSIVAMENTE PER IL PERSONALE OPPORTUNAMENTE ADDESTRATO. PER EVITARE PERICOLOSE SCOSSE ELETTRICHE NON EFFETTUARRE ALCUNA RIPARAZIONE A MENO CHE QUALIFICATI A FARLA.

## **About This Manual**

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This manual covers the operating and maintenance instructions for the following models:

4044 Series - Non-Directional Power Sensors

## **Changes to this Manual**

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We have made every effort to ensure this manual is accurate. If you discover any errors, or if you have suggestions for improving this manual, please send your comments to our Solon, Ohio factory. This manual may be periodically updated. When inquiring about updates to this manual refer to the part number and revision on the title page.

## **Chapter Layout**

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**Introduction** — This section provides a general description of the 4044 Series Non-Directional Power Sensors.

**Installation** — The installation section provides an example connection diagram and steps required for a typical installation.

**Maintenance** — This section provides contact information for the Bird Service Center and provides a list of the specifications for the 4044 Series Non-Directional Power Sensors.

# TABLE OF CONTENTS

<b>Safety Precautions</b> .....	<b>i</b>
Safety Symbols .....	ii
Warning Statements .....	ii
Safety Statements .....	iii
<b>About This Manual</b> .....	<b>v</b>
Changes to this Manual .....	v
Chapter Layout .....	v
<b>Chapter 1 Introduction</b> .....	<b>1</b>
<b>Chapter 2 Installation</b> .....	<b>2</b>
Power Sensor Installation .....	3
<b>Chapter 3 Maintenance</b> .....	<b>4</b>
Customer Service .....	4
.....	4
Specifications .....	5
Mismatch Uncertainty .....	6
Model Identification .....	7
<b>Limited Warranty</b> .....	<b>8</b>

The Bird 4044 Series Non-Directional Power Sensors are analog power sensors designed for use with the Bird Channel Power Monitor (CPM).

The 4044 Series power sensors are typically used to measure forward average power on a 50 ohm RF transmission line with a maximum 125 watt forward power level in a frequency band with an overall range of 118 to 960 MHz. See ["Model Identification" on page 7](#) for specific frequency ranges and model features.

**Figure 1 Bird 4044 Series Power Sensor**

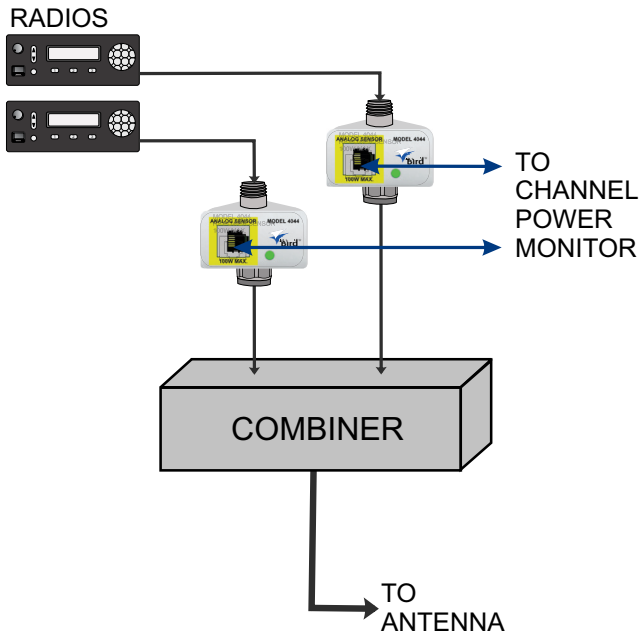


<b>Features</b>	
Input RF connector	N-Type (female) connector (shown), other connector types available, see <a href="#">"Model Identification" on page 7</a> .
Output RF connector	N-Type (male) connector (shown), other connector types available, see <a href="#">"Model Identification" on page 7</a> .
Data Connector	RJ-25 connector supplies power and data connection.
LED (green)	LED illuminates when power is applied to the sensor.



The Bird 4044 Series Non-Directional Power Sensors are designed to be used for continuous power monitoring in multiple Land Mobile Radio (LMR) systems. When used with the Bird CPM the 4044 can provide real-time RF power measurements.

**Figure 2 Connection Diagram**



## **Power Sensor Installation**

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This procedure is an example of one possible cable configuration, based on the [Connection Diagram](#).

**WARNING**

Never attempt to connect or disconnect RF equipment from the transmission line while RF power is being applied.  
Leaking RF energy is a potential health hazard.

1. Disable RF power for transmission lines to be disconnected.
2. Connect transmitter RF output cable to the 4044 RF input.
3. Connect 4044's RF output connector to the Combiner input.
4. Repeat step 1 through 3 for any additional 4044 power sensors.
5. Connect a data/power cable from the CPM to each 4044 power sensor.
6. Configure the CPM. Refer to the CPM Operation Manual.

There is no user maintenance for the 4044 power sensor, contact the Bird Service Center in the event the power sensor requires maintenance.

## Customer Service

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Any maintenance or service procedure beyond the scope of those in this chapter should be referred to a qualified service center.

If the unit needs to be returned for any reason, request an Return Material Authorization (RMA) through the Bird Technologies website. All instruments returned must be shipped prepaid and to the attention of the RMA number.

### **Bird Service Center**

30303 Aurora Road  
Cleveland (Solon), Ohio 44139-2794  
Fax: (440) 248-5426  
E-mail: [bsc@birdrf.com](mailto:bsc@birdrf.com)

For the location of the Sales Office nearest you, visit our Web site at:

<http://www.birdrf.com>

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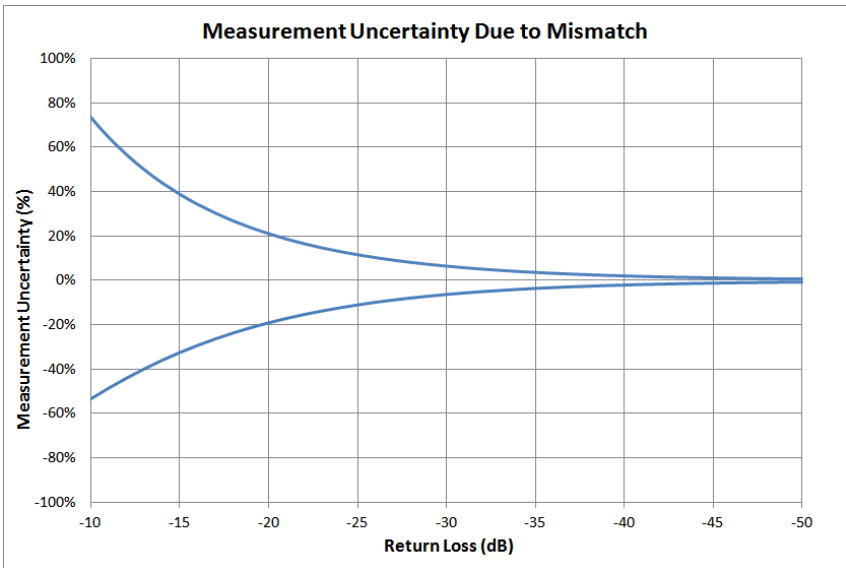
## Specifications

Specification	Value
Power Requirements	
Input Voltage	15 VDC (supplied by CPM via RJ25 Jack)
Operating Power	< 5 mA
Operating Characteristics	
Frequency Range	118 to 960 MHz, " <a href="#">Model Identification</a> " on page 7 for specific frequency ranges of each model.
Average Forward Power	125 W Max.
Accuracy	±5% of reading
Impedance	50 Ohm
Insertion Loss	< 0.1 dB
Insertion VSWR	< 1.10:1
Instrument Interface	0 to 4 VDC (via RJ25 Jack)
Interface Connections	
RF Connectors	
Input	Type-N (male), or Type 4.3-10 (male)
Output	Type-N (female), or Type 4.3-10 (female)
Sensor Data/Power	One RJ25 Jack
Environmental Requirements	
Operating Temperature	0° C to +50° C (32° F to 122° F)
Storage Temperature	-40° C to +80° C (-40° F to 176° F)
Humidity, Max	95% Non-Condensing
Altitude, Max	4572 m (15,000 ft)
Physical Characteristics	
Dimensions (D, W, H)	5.6 cm x 5.0 cm x 4.3 cm (2.2" x 2.3" x 1.7")
Weight	0.09 kg (0.2 lbs.)

## Mismatch Uncertainty

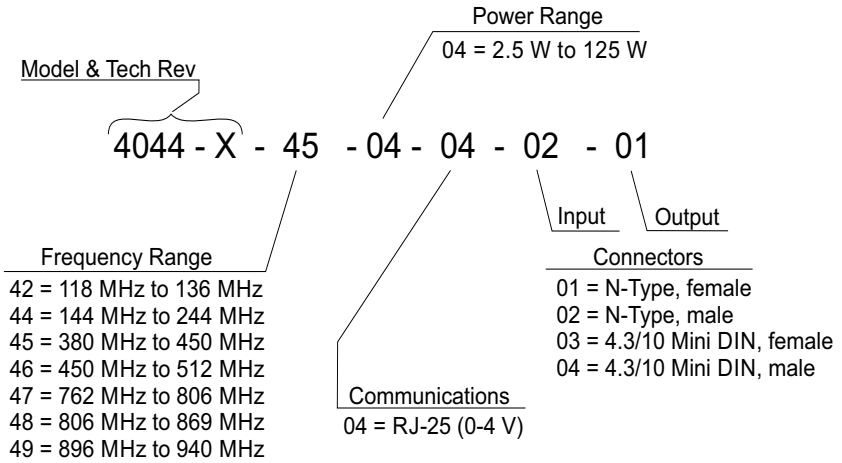
Mismatch uncertainty is a factor that can affect measurement accuracy. When a source and an antenna have different impedances, some signal will be reflected back to the source. The non-directional power sensor does not differentiate between forward and reflected power, so any mismatch will impact the measurement. The larger the reflected energy level the greater the uncertainty of the measurement, due to high VSWR and poor Return Loss. See [Figure 3](#) for calculations affecting accuracy.

**Figure 3** Mismatch Uncertainty



## Model Identification

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# Limited Warranty

All products manufactured by Seller are warranted to be free from defects in material and workmanship for a period of one (1) year, unless otherwise specified, from date of shipment and to conform to applicable specifications, drawings, blueprints and/or samples. Seller's sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by Seller.

If Seller's products are claimed to be defective in material or workmanship or not to conform to specifications, drawings, blueprints and/or samples, Seller shall, upon prompt notice thereof, either examine the products where they are located or issue shipping instructions for return to Seller (transportation-charges prepaid by Buyer). In the event any of our products are proved to be other than as warranted, transportation costs (cheapest way) to and from Seller's plant, will be borne by Seller and reimbursement or credit will be made for amounts so expended by Buyer. Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing within ten (10) days from the date of discovery of the defect.

The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's request and/or to Buyer's specifications. Routine (regularly required) calibration is not covered under this limited warranty. In addition, Seller's warranties do not extend to the failure of tubes, transistors, fuses and batteries, or to other equipment and parts manufactured by others except to the extent of the original manufacturer's warranty to Seller.

The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR SELLER ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.