



OPERATING INSTRUCTIONS

**DIGITAL POWER METER  
MODEL 5000**



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INSTRUCTION BOOK

**DIGITAL POWER METER  
MODEL 5000  
AND POWER SENSORS  
MODELS 5010, 5011,  
AND 5011-EF**

**BIRD<sup>®</sup>**

**Electronic Corporation  
Cleveland (Solon) Ohio USA**

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Instruction Book P/N 920-5000S Rev. E.

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of the Microsoft Corporation



## 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.

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

Operating personnel must at all times observe normal safety regulations. Do not replace components or make adjustments inside the equipment with high voltage turned on. To avoid casualties, always remove power.

### ***Shock Hazard***

Do not attempt to remove the RF transmission line while RF power is present. Radiated RF power is a potential health hazard.

### ***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.

### ***Chemical Hazard***

Dry cleaning solvents for cleaning parts may be potentially dangerous. Avoid inhalation of fumes or prolonged contact with skin.

### **Safety Earth Ground**

An uninterrupted 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.

### **Resuscitation**

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

### **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.

#### **WARNING**

Disconnect from external power before any disassembly. The potential for electric shock exists.

### **Caution Statements**

The following equipment cautions appear in the text whenever the equipment is in danger of damage, and are repeated here for emphasis.

#### **CAUTION**

When connecting the TPS, only turn the connector nut. Damage may occur if torque is applied to the sensor body.

#### **CAUTION**

Ground all instruments before connecting the TPS.  
Electric shock could damage the sensor.

#### **CAUTION**

Use a Bird adapter only and do not use the adapter with the batteries removed.

**CAUTION**

Do not exceed 2 W average or 125 W peak power for 5  $\mu$ s when using the TPS or TPS-EF. Doing so will render the sensor inoperative.

**CAUTION**

Harsh or abrasive detergents and some solvents can damage the display unit and information on the labels.

**CAUTION**

Always turn off the DPM before connecting or disconnecting a sensor.

**CAUTION**

Replace only with Ni-MH rechargeable A batteries. Nominal Voltage 1.2V; Capacity 2700mAh.

**Safety Statements**



**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 PROIZIONE  
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.



RF VOLTAGE MAY BE PRESENT IN RF ELEMENT SOCKET - KEEP ELEMENT IN SOCKET DURING OPERATION.

DE LA TENSION H.F. PEUT ÊTRE PRÉSENTE DANS LA PRISE DE L'ÉLÉMENT H.F. - CONSERVER L'ÉLÉMENT DANS LA PRISE LORS DE L'EMPLOI.

HF-SPANNUNG KANN IN DER HF-ELEMENT-BUCHSE ANSTEHEN - ELEMENT WÄHREND DES BETRIEBS EINGESTÖPSELT LASSEN.

PUEDA HABER VOLTAJE RF EN EL ENCHUFE DEL ELEMENTO RF - MANTENGA EL ELEMENTO EN EL ENCHUFE DURANTE LA OPERACION.

IL PORTAELEMENTO RF PUÒ PRESENTARE VOLTAGGIO RF - TENERE L'ELEMENTO NELLA PRESA DURANTE IL FUNZIONAMENTO.

## About This Manual

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This instruction manual guides users through the operation and maintenance of the Bird 5000 Digital Power Meter (DPM), as well as the Bird 5010 Directional Power Sensor (DPS) and Bird 5011 and 5011-EF Terminating Power Sensors (TPS).

### ***Typography***

There are two types of keys on the DPM. A hard key has a specific function which is indicated on the key. The key names for hard keys are set in bold typeface, e.g. *Press the **ON** key.*

Speed keys, which appear under the display, have a different label depending upon the function selected. The names appear at the bottom of the display, directly above the corresponding key. The key names for speed keys are set in bold italic typeface, e.g. *Press the **SCALE** Key.* In this manual, speed keys will also be referred to by number, with speed key 1 being the key on the left. Figure 2 on page 2 shows these speed key numbers.

### ***Chapter Layout***

**Introduction** — Identifies the parts of the DPM, describes the functions of the various keys, and explains the meaning of the indicators which may be displayed. Also lists the items supplied and optional equipment available.

**Installation** — Gives directions for connecting the DPM, and discusses the various power sources.

**Operation** — Explains how to make measurements with the DPM, and the special functions used with specific sensors.

**Maintenance** — Lists routine maintenance tasks for the Digital Power Meter, and troubleshooting tips for common problems. Specifications and battery information are also included.

### ***Changes to this Manual***

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

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## Items Supplied

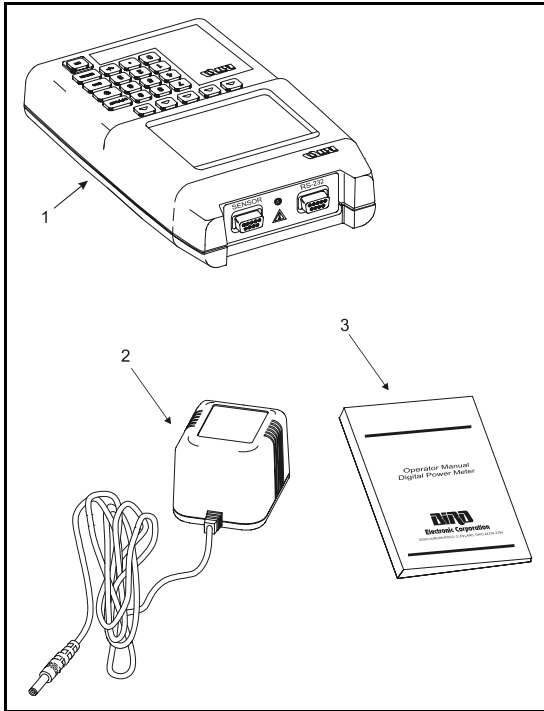


Figure 1 Supplied Items

1. Bird Digital Power Meter (DPM)
2. AC Mains Adapter
3. Instruction Book

## Component Description

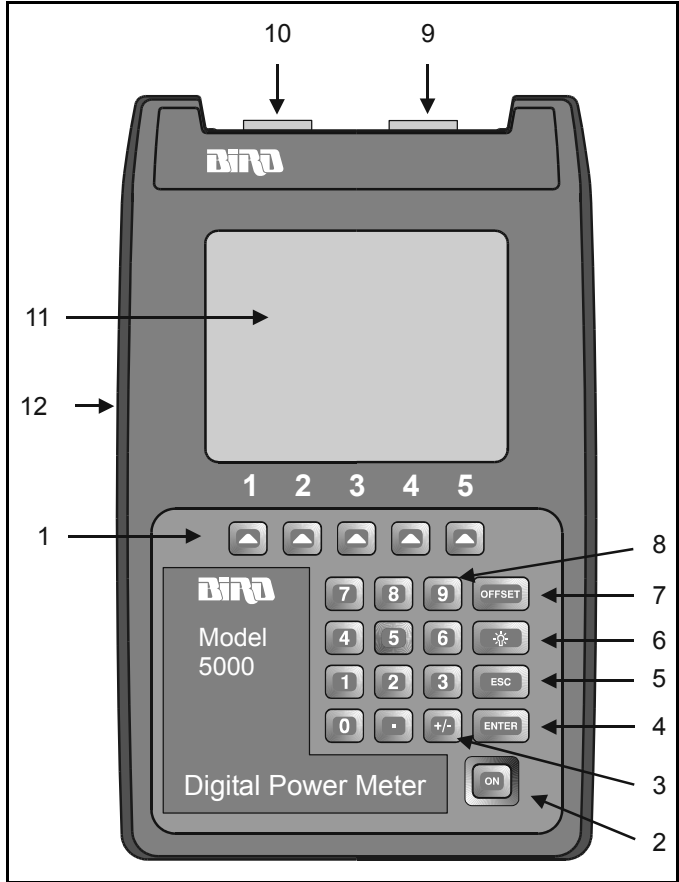


Figure 2 Component Description



1. **Speed Keys**      Activates the command displayed above it.
2. **On Key**            Turns the DPM on or off.
3. **+/- Key**            Toggles between positive and negative numbers.
4. **Enter Key**        Completes data entry.
5. **Escape Key**        Aborts data entry without accepting changes.
6. **Backlight Key**    Turns the backlight on momentarily.
7. **Offset Key**        Enter offset values in dB.
8. **Numeric Keys**    Input numeric values.
9. **Sensor Port**        Connection for power sensors.
10. **RS-232 Port**      Connection for an optional PC 9-pin RS-232 (DB9) connector, compatible with PC serial port. 9600 baud, 8 data bits, 1 stop bit, and no parity.
11. **LCD Display**      Backlit liquid crystal display.
12. **External DC Connector**    Connect either the ac adapter or the cigarette lighter adapter. External supplies power the unit and charge the internal battery.

## Display Description

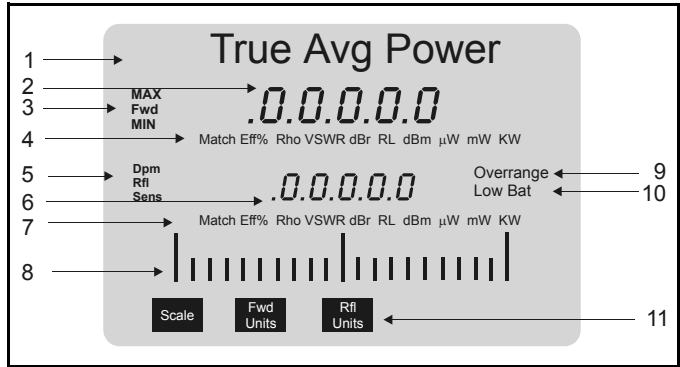


Figure 3 Display Description

- |                                     |  |
|-------------------------------------|--|
| 1. <b>Field Indicator</b>           | Indicates the type of power being measured.                              |
| 2. <b>Major Display</b>             | Displays forward power or match efficiency, rho, VSWR, or return loss.   |
| 3. <b>Major Display Annunciator</b> | Indicates function being measured.                                       |
| 4. <b>Major Display Unit</b>        | Unit of measure for the major display.                                   |
| 5. <b>Minor Display</b>             | Displays reflected power or match efficiency, rho, VSWR, or return loss. |
| 6. <b>Minor Display Annunciator</b> | Indicates function being measured.                                       |
| 7. <b>Minor Display Unit</b>        | Unit of measure for the minor display.                                   |

- |                                  |   |
|----------------------------------|---|
| <b>8. Analog Bar Graph</b>       | Proportional to the major display. Minimum at 0 W or -20 dBm. Max at full scale power.              |
| <b>9. Overrange Indicator</b>    | Turns on when the forward power exceeds 100% of scale or the reflected power exceeds 120% of scale. |
| <b>10. Low battery Indicator</b> | Turns on when the batteries need charged. Refer to “Charging Batteries” on page 17.                 |
| <b>11. Menu Speed Key Labels</b> | Defines the function of the speed keys.   |

## Speed Keys

**Scale** — For element-based sensors, sets the forward full scale power. This is listed on the forward element’s nameplate. Reflected full scale power is automatically set to 10 dB below the forward full scale. This speed key is disabled for non-element-based sensors.

**Fwd Units** — Selects the units for the major display.

**Rfl Units** — Selects the units for the minor display. This speed key is disabled for terminating sensors.

**Recall Setup (Speed Key 4)** — This speed key is only enabled for the Directional Power Sensor, although the label is never displayed. Enter a setup number to load a stored setup. 0 returns to the default setups. Setups are stored in the DPM using the optional PCTool software. For more information, refer to the help files in the PCTool Software.

## ***Indicators***

**Dashes** — When no sensor is connected or if communication with the sensor fails the display will show a line of dashes and the bar scale will be blank.

**Overrange Indicator** — If the forward power exceeds 100% of full scale, “Overrange” will be displayed. If forward or reflected power exceeds 120% of full scale, the display will show a line of dashes and the bar scale will be filled.

**Low Battery Indicator** — “Low Bat” is displayed when the battery needs recharging. Refer to “Charging Batteries” on page 17 for more information. The display will change to “Bat Error” when a Terminating Power Sensor is connected and the battery is very low.

**Offset Indicator** — “Fwd” will blink when an offset has been applied.

## ***Features***

**Compatibility** — The DPM is compatible with Bird ThruLine or Terminating Power Sensors, and with Bird VSWR Alarm and Broadcast Power Monitor products with the use of an accessory adapter.

**Serial Communication Link** — Built-in serial port and optional software let you download data to a personal computer for analysis and storage.

**Forward and Reflected Power at a Glance** — Forward and reflected power are easily read on the major and minor display.

## **Optional Equipment**

**Directional Power Sensor (DPS)** — Bird 5010, requires two DPM Elements. As a ThruLine Sensor, the DPS measures both forward and reverse power, enabling the DPM to display VSWR and other match measurements. Includes interface cable.

**Terminating Power Sensors (TPS)**— Highly accurate terminating sensors; do not require elements. The Bird 5011 frequency range is 40 MHz – 4 GHz. The 5011-EF frequency range is 40 MHz – 12 GHz. Includes interface cable.

**Automobile Cigarette Lighter Adapter** — (P/N 5A2238-1) Connects the DPM to a standard 12V automotive cigarette lighter jack.

**Soft Carry Case** — (P/N 5000-030) Convenient and protective. Cutouts allow for operation without removal from the case.

**Hard Carry Case** — (P/N 5000-035) Protective case holds DPM, sensor, and accessories.

**Attenuators & Accessories** — A variety of attenuators and connectors for measuring large powers with the TPS. For a complete list, see page 23.


**Interface Software** — (P/N 4397A040) PC software with real time display of DPM measurements. Can also log data for analysis, printing, or storage.

System requirements: IBM PC or equivalent; Windows 95 or later, 2 MB free hard disk space; VGA monitor, open Com port. Includes interface cable.

**Serial to USB Adapter**— (P/N DC-DB9-U) Converts the serial cable to USB. Lets the DPM be connected to a PC's USB port if the serial port is unavailable.

### **Power Supply**

The DPM uses a rechargeable Nickel-Metal Hydride battery pack. Charge life is a minimum of 100 hours continuous usage. “Low Bat” is displayed when the batteries require charging.

 **NOTE:** For optimum battery life, charge the batteries only after “Low Bat” is displayed.

The DPM can use an external power source. Using the DPM with the ac adapter or the 12V cigarette lighter adapter will also charge the battery. Charging time from full discharge is 8 hours using the ac adapter. When using the cigarette lighter adapter, charge time will depend on the car battery charge.

#### **CAUTION**

Use a Bird adapter only and do not use the adapter with the batteries removed.

- **AC Mains Adapter** — To use the ac adapter, insert the adapter’s barrel connector into the DPM’s external dc connector (See Figure 2 on page 2). Insert the adapter plug into a wall receptacle.
- **Automobile Cigarette Lighter Adapter** — Insert the adapter’s barrel connector into the DPM’s external dc connector. Insert the adapter plug into a cigarette lighter jack.

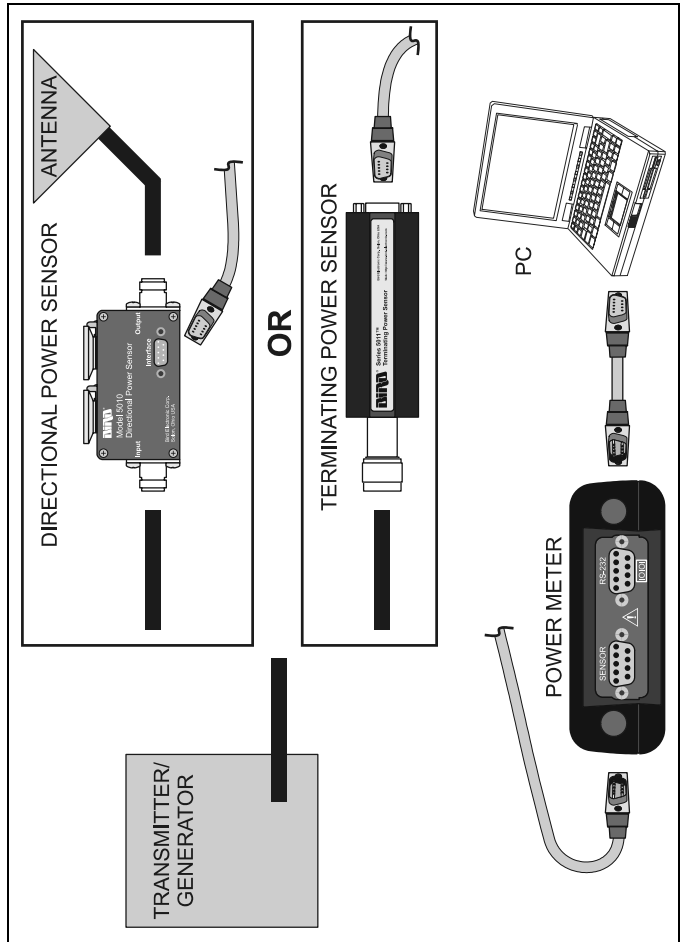


Figure 4 DPM Connections



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## **DPM Connection**

**CAUTION**

Always turn off the DPM before connecting or disconnecting a sensor.

Although unlikely, it is possible to corrupt the power sensor firmware by connecting it to the DPM while the DPM is on. To prevent this, always turn the DPM off before connecting or disconnecting a sensor.

Connect the power sensor to the “Sensor” port on the DPM using the sensor cable provided. If you are using the optional PCTool software, connect the PC’s serial port to the “RS-232” port on the DPM.

## **RF Connections**

**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.

### **Directional Power Sensor (DPS)**

Connect the DPS to the RF line so that the arrow on the DPS points towards the load. The element in the forward socket should be inserted with its arrow pointing in the direction of forward power, as shown below. The reflected element should point in the direction of reverse power. The forward element’s power rating must be 10x the reverse element’s rating.

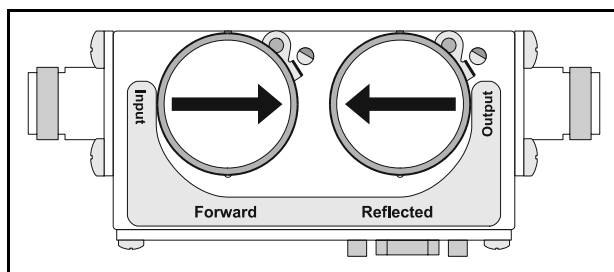


Figure 5 DPS Element Orientation

### Terminating Power Sensor (TPS)

#### CAUTION

Ground all instruments before connecting the TPS(-EF). Electric shock could damage the sensor.

#### CAUTION

When connecting the TPS or the TPS-EF, only turn the connector nut. Damage may occur if torque is applied to the sensor body.


#### CAUTION

Do not exceed 2 W average or 125 W peak power for 5  $\mu$ s when using the TPS or the TPS-EF. Doing so will render the sensor inoperative.

RF connections are the same for the TPS-EF and the TPS. In most cases, the TPS should be connected to an attenuator or a directional coupler. For example, to measure a transmitter with power output between 0.1 and 50 Watts, use a 40 dB, 50 Watt attenuator. Insert the attenuator between the TPS and the RF source. Only connect the TPS directly to the source if the RF power will be less than 10 mW.

The Bird Digital Power Meter is very easy to operate. Once a sensor is connected, turn the DPM on and take a reading. Additional commands are available, depending on the sensor used.

### ***Normal Operation***

- Connect the sensor.
  - Turn on the DPM.
  - Set the measurement units by pressing ***FWD Units*** and ***RFL Units***.
  - If you know the system loss or are using an attenuator, add the losses (in dB) of all components in the system. For attenuators and other frequency-dependent components, use the loss at the measured frequency. Then, press **OFFSET** and enter the total loss in dB. This will allow you to read the actual line power. The DPM accepts offsets from 0 to 100 dB.
  - Turn on the RF source.
  - Read the power level on the display.
-  **NOTE:** The analog bar graph will respond immediately to changes in the RF power. The major and minor displays will respond after a delay of 1 to 13 seconds, depending on the power level.

## Loading Setups

When used with the optional PCTool software, setups can be stored in the DPM. Loading a setup will set the forward scale (for the DPS only) and the offset (for both the DPS and the TPS).

- Press **Speed Key 4**.
  - Enter the number of the setup you want to load.
- 👉 NOTE: Entering 0 returns the DPM to its default scale and offset.

## Directional Power Sensor

The Directional Power Sensor (DPS) uses Bird Plug-In Elements. These are labeled with a max power and a frequency range. The transmitter frequency should be within the element range, and the forward element power should be 10x the reverse element power.

## Setting Forward Scale

For the DPS, the forward full scale power must be entered manually. The reflected full scale power is automatically set to 1/10 of the forward full scale.

- Press **SCALE**.
  - Change the units with the **FWD Units** key until the DPM units match the units on the forward element.
  - Use the numeric keypad to enter the maximum power of the element in the forward element socket.
- 👉 NOTE: The element's max power is listed on the element nameplate.
- Press **ENTER**.

---

## Terminating Power Sensor

### CAUTION

Do not exceed 2 W average or 125 W peak power for 5  $\mu$ s when using the TPS or the TPS-EF. Doing so will render the sensor inoperative.

## Zeroing Sensor

Over time, the sensor's "zero value" (reading with no applied RF power) can drift, making all readings inaccurate by this value. For example, if the zero value is  $-2 \mu$ W, measuring a 5 mW signal will give a reading of 4.998 mW, a 0.04% error. Measuring a 50  $\mu$ W signal will give a reading of 48  $\mu$ W, a 4% error. If the drift would be a significant error, rezero the sensor:

- Make sure the sensor has been connected to the DPM and the DPM turned on for at least 5 minutes.
- Make sure no RF power is applied to the sensor.
- Press and hold **0** for at least three seconds. "CAL 0" will be displayed and calibration will begin.
- Zeroing the sensor takes 60 seconds. The bar graph will display calibration progress. When complete, "0 CAL PASS" should be displayed. Press **ENTER** to return to normal operation. If "0 CAL FAIL" is displayed, make sure no RF power is applied to the sensor, press **ENTER** and zero the sensor again.

## TPS-EF

The Bird 5011-EF uses frequency correction factors to provide more accurate measurements. To use these, look at the label on the side of the sensor and find the correction factor for the frequency being measured. Add the correction factor to the other attenuation or coupling factors and enter this as an offset.



### **Cleaning**


**CAUTION**

Harsh or abrasive detergents and some solvents can damage the display unit and information on the labels.

Clean the Bird Digital Power Meter and its display with a soft cloth dampened with mild detergent and water only. Clean sensors with a dry cleaning solvent that leaves no residue.

### **Charging Batteries**

Fully charged batteries provide a minimum of 100 hours of continuous operation. Charging time is typically 8 hours using the ac adapter. The batteries charge whenever the DPM is connected to either ac or dc power sources, using either the ac Mains adapter or the automobile cigarette lighter adapter. The unit will charge with its power turned either on or off.

 **NOTE:** For optimum battery life, charge the batteries only after “Low Bat” is displayed.

## Troubleshooting

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>REMEDY</b>
Nothing shown on display	Unit is off	Momentarily press the ON key.
	Batteries are drained	Use external power source. (page 9) Replace the batteries. (page 20)
	DPM firmware corrupted	Update firmware.
Display shows dashes; bar scale is blank	No sensor connected	Connect a sensor.
	Sensor communication has failed	Use a different cable. Use a different sensor.
	Sensor calibration corrupted	Return sensor to Bird for recalibration. Turn off the DPM before connecting or disconnecting a sensor.
Display shows “Bat Error” or dashes and “Low Bat”; bar scale is blank	Batteries are drained	Use external power source. (page 9)
Display shows dashes and “Overrange”; bar scale is full	Unit is overrange	Use higher power elements (if applicable), or reduce RF power.



<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>REMEDY</b>
Erratic power readings	Element contact out of alignment (DPS)	Align the contact. It must be far enough out to make good contact with the element, but must not restrict entry of the element body.
	Damaged element (DPS)	Replace element.
	Sensor has lost its zero (TPS)	Rezero sensor.
	Sensor is damaged	Replace sensor.
	Sensor calibration corrupted	Return sensor to Bird for recalibration. Turn off the DPM before connecting or disconnecting a sensor.

## Battery Replacement

The Nickel-Metal Hydride (Ni-MH) batteries do not normally need to be replaced. If necessary, however, follow these instructions (see Figure 6).

### WARNING

Disconnect from external power before any disassembly. The potential for electric shock exists.

### CAUTION

Replace only with Ni-MH rechargeable A batteries. Nominal Voltage 1.2V; Capacity 2700mAh.

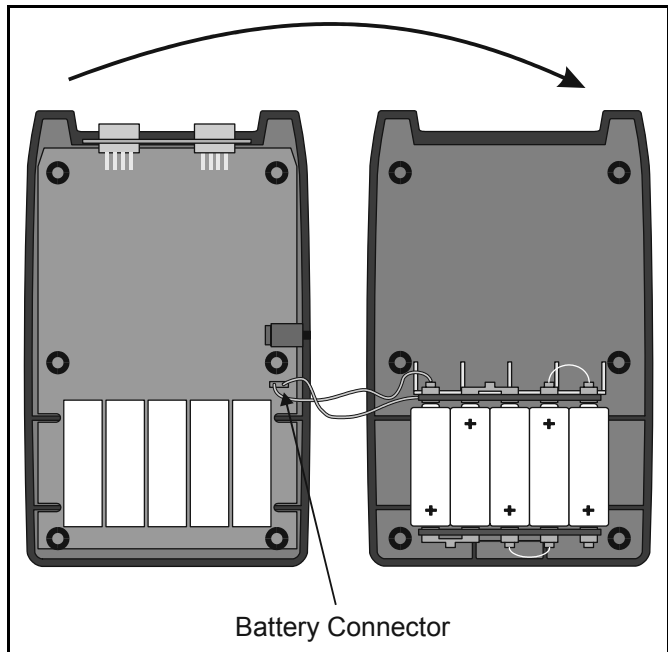


Figure 6 Back Cover Removal

- Lay the DPM, display side down, on a clean surface.
- Use a small screwdriver to remove all six screws from the back cover.
- Taking care to not disconnect the battery connector, lift the back cover off, flip it over, and lay it, battery side up, next to the front cover.
- Remove the old batteries.
- Install the new batteries checking the orientation of the positive and negative terminals.
- Make sure the battery connector is connected.
- Taking care to not pinch the connector wires, put the covers back together and screw into place.

## **Customer Service**

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

If you need to return the unit for any reason, contact the Bird Service Center for a return authorization. All instruments returned must be shipped prepaid and to the attention of Bird Service Center.

### **Bird Service Center**

30303 Aurora Road

Cleveland (Solon), Ohio 44139-2794

Phone: (440) 519-2298

Fax: (440) 519-2326

E-mail: [bsc@bird-technologies.com](mailto:bsc@bird-technologies.com)

For the location of the Sales Office nearest you, give us a call or visit our Web site at:

*<http://www.bird-electronic.com>*

## **Parts List**

<b>Part Name</b>	<b>Part Number</b>
Digital Power Meter	5000
AC adapter 120V ac	5A2229
230V ac	5A2226
Cigarette Lighter Adapter	5A2238-1
Directional Power Sensor	5010
DPM Elements See P/N 871-DPM-019-901, the DPM Element Guide, for a complete list of elements	Various
Terminating Power Sensor 40 MHz – 4 GHz	5011
40 MHz – 12 GHz	5011-EF
Soft Carry Case	5000-030
Hard Carry Case	5000-035
PC Interface Software	4397A040
Serial to USB Adapter	DC-DB9-U
Instruction manual	920-5000S

## Attenuators & Accessories

N(F) – N(M) Attenuators (RF power range with TPS)	
30 dB (10 mW – 10 W)	8353A030–10
40 db (100 mW – 50 W)	8353A040–50
DC Block	5011A035–1
N(F) – N(M) Test Cable, 1.5 m	TC–MNFN–1.5–G
N(F) – N(M) Armored, Phase Stable Test Cable	
1.5 m	TC–MNFN–1.5
3.0 m	TC–MNFN–3.0
Calibration Data	5011–CALDATA
Recommended for attenuators, test cables, dc block, and right angle adapter	

Adapters			
N(F)–N(F)	4240-500-1	N(F)–N(M) Right Angle	4240-500-3
N(F)–SMA(F)	4240-500-4	N(F)–SMA(M)	4240-500-5
N(F)–7/16 DIN(F)	PA-FNFE	N(F)–7/16 DIN(M)	PA-FNME

## Specifications

### Bird 5000 Digital Power Meter

Display	Backlit LCD with major and minor displays and analog bar graph
Major Display	5 digits, 5/16" High
Minor Display	5 digits, 1/4" High
Analog Bar Graph	20 segment, horizontal orientation. Tracks the major digital display
Measurement Modes	Average power, true average power, or peak power as determined by the element or sensor.
Sensor Interface	9-pin D-shell RS-232 serial connector. Sensor is powered from the DPM.
PC Interface	9-pin RS-232 serial port
Dimensions	8.0"H x 4.625"W x 2.0"D (203 x 118 x 51 mm)
Weight	2 lbs. (0.9 kg) nominal
Power Supply	Rechargeable Nickel-Metal Hydride (NiMH) battery. Meter may be operated from ac mains using supplied adapter.
Battery Life	100 hours, minimum, per charge.
Battery Charge Time	8 hours for full charge.
Operating Temp.	32 to 122 ° F (0 to +50 °C)

*Maintenance*

Storage Temp.	-4 to 122 ° F (-20 to +50 °C)
Humidity	95% ± 5% max. (non-condensing)
Altitude	15,000 ft. (4572 m) operating
EMC	Complies with directive 92/31/EEC with exceptions noted:  Emissions: EN-55011:1991, Class B  EN-61000-3-2:1995  EN-61000-3-3:1995  Immunity: EN-50082-2:1997
Safety	Complies with EN-61010, IAW Council Directives 73/23/EEC and 93/68/EEC
Mechanical Shock	MIL-T-28800D Class 3
Vibration	MIL-T-28800D Class 3

### Bird 5010 Sensor

Sensor Type / Elements*	Bird Thruline directional dual-element line section. Uses two Bird DPM Elements.
Power†	0.1 to 1,000 W
Frequency Range†	2 MHz to 3600 MHz
Accuracy	With DPM Elements: ±5% of reading 15 to 35 °C RSS ±7% of reading -10 to 50 °C RSS
Peak / Average	10 dB maximum with DPM Elements.
Settling Time	< 2.5 seconds
Connectors	QC Type, Female N normally supplied
Insertion VSWR	1.05:1 up to 1 GHz (with N connectors).
Dimensions	2.5"H x 5.0"W x 2.0"D (58 x 127 x 51 mm)
Weight	1.25 lb. (0.57 kg) nominal with elements.

\* RFL element power must be 1/10 of FWD power.

† Power and frequency range based on selected elements.



**Bird 5011 and 5011-EF Sensors**

Sensor Type	Diode based terminated true average power measurement
Power	10 $\mu$ W to 10 mW (-20 dBm to +10 dBm)
Maximum Power	2 W avg. 125 W peak for 5 $\mu$ s
Frequency Range	
5011	40 MHz to 4 GHz
5011-EF	40 MHz to 12 GHz
Accuracy	$\pm$ (5% of reading* + 1.0 $\mu$ W) (excluding mismatch uncertainty) (with correction factors for 5011-EF)
Peak / Average	12 dB max
Input Connector	
5011	N Male
5011-EF	Precision N Male
Output Connector	Male DB-9 to host instrument
Input Impedance	50 Ohms (nominal)
Input VSWR:	
5011	
Typical	1.03 (36.6 dB return loss)
Maximum	1.20 (20.8 dB return loss)
5011-EF	
Typical	1.05 (32.0 dB return loss)
Maximum	1.25 (19.1 dB return loss)

*Bird Model 5000 Digital Power Meter*

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Power Supply	From host instrument via cable connection
Operating Temp.	-10 to +50 °C (+14 to +122 °F)
Storage Temp.	-40 to +80 °C (-40 to +176 °F)
Humidity	95% max. (non-condensing)
Altitude	15,000 ft operating
Size	6" long max . (including connectors) 1.5" diameter nominal
Weight	3/4 lb. (0.35 kg) max.
Recommended Calibration Interval	12 Months

- \* 5011: Above 40 °C, when making measurements at frequencies between 40 and 100 MHz, add 1%.  
5011-EF: Above 40 °C or below 10 °C, add 1%.

## 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.

## DECLARATION OF CONFORMITY

Manufacturer: Bird Electronic Corporation  
30303 Aurora Road  
Cleveland, Ohio 44139-2794

Product: Digital Power Meter and Power Sensor  
Models: 5000 5010

The undersigned hereby declares, on behalf of Bird Electronic Corporation of Cleveland, Ohio, that the above-referenced product, to which this declaration relates, is in conformity with the provisions of the following standards with exceptions noted;

- European Standard EN 55011:1991 - Emissions: Class B
- European Standard EN 61000-3-2:1995 - Emissions
- European Standard EN 61000-3-3:1995 - Emissions
- European Standard EN 50082-2:1997 - Immunity

These standards are in accordance with Council Directive 89/336/EEC, on Electromagnetic Compatibility, as amended by Council Directive 92/31/EEC.

- European Standard EN 61010-1:1993 - Safety, Group II Including Amendment 2: 1995

This standard is in accordance with Council Directive 73/23/EEC and 93/68/EEC.

The technical documentation file required by this directive is maintained at the corporate headquarters of Bird Electronic Corporation, 30303 Aurora Road, Cleveland, Ohio 44139.



Bob Gardiner  
Director of Quality  
Bird Electronic Corporation

## DECLARATION OF CONFORMITY

Manufacturer: Bird Electronic Corporation  
30303 Aurora Road  
Cleveland, Ohio 44139-2794

Product: Terminating Power Sensor  
Models: 5011

The undersigned hereby declares, on behalf of Bird Electronic Corporation of Cleveland, Ohio, that the above-referenced product, to which this declaration relates, is in conformity with the provisions of the following standards with exceptions noted;

- European Standard EN 55011:1998 - Radiated Emissions
- European Standard EN 61000-4-2:1995 - ESD Immunity
- European Standard EN 61000-4-3:1995 - Radiated RF / EMF Immunity
- European Standard EN 61000-4-4:1995 - Fast Transient / Burst Immunity
- European Standard EN 61000-4-6:1995 - Conducted Immunity

These standards are in accordance with EMC Directive (89/336/EEC). Electrical equipment for measurement, control and laboratory use, EN 61326-1, 1997 edition.

- European Standard EN 61010-1:1993 - Part 1: General Requirements Including Amendment 2: 1995

This standard is in accordance with Low Voltage Directive (73/23/EEC), 1973

The technical documentation file required by this directive is maintained at the corporate headquarters of Bird Electronic Corporation, 30303 Aurora Road, Cleveland, Ohio 44139.



Bob Gardiner  
Director of Quality  
Bird Electronic Corporation

## DECLARATION OF CONFORMITY

Manufacturer: Bird Electronic Corporation  
30303 Aurora Road  
Cleveland, Ohio 44139-2794

Product: Terminating Power Sensor  
Models: 5011-EF

The undersigned hereby declares, on behalf of Bird Electronic Corporation of Cleveland, Ohio, that the above referenced product, to which this declaration relates, is in conformity with the provisions of the following standards;

- European Standard EN 61326-1:1997 - Electronic Equipment for Measurement, Control and Laboratory Use - EMC Requirements
- European Standard EN 55011:1998 - Radiated Emissions
- European Standard EN 61000-4-2:1995 - ESD Immunity
- European Standard EN 61000-4-3:1995 - Radiated RF / EMF Immunity
- European Standard EN 61000-4-4:1995 - Fast Transient / Burst Immunity
- European Standard EN 61000-4-6:1995 - Conducted Immunity

These standards are in accordance with EMC Directive (89/336/EEC).

- European Standard EN 61010-1:1993 - Part 1: General Requirements Including Amendment 2: 1995

This standard is in accordance with Low Voltage Directive (73/23/EEC), 1973

The technical documentation supporting compliance with these directives is maintained at Bird Electronic Corporation, 30303 Aurora Road, Cleveland, Ohio 44139.



Bob Gardiner  
Director of Quality  
Bird Electronic Corporation



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