Configurable Power Sensor

Operations Manual

Model CPS series

The information within this manual is as complete as possible at the time of printing. Bird Electronic Corporation is not liable for errors. Specifications, limits, and text are subject to change without notice.

Instruction Book Part Number 920-CPS Rev. P1

Safety Precautions

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 uniterruptible 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 on.

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.

☞ **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
Disconnect the unit from the RF power source and the ac line before any disassembly. The potential for electrical shock exists.

Refer to page 9.

Caution Statements

The following equipment cautions appear in the text and are repeated here for emphasis.

CAUTION
Pin 4 must be connected to power supply ground, other grounds can be left open if desired.

Refer to page 4.

CAUTION
Do not use harsh or abrasive detergents for cleaning.

Refer to page 9.

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 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 HACERIO.

WARTUNG

ANWEISUNGEN FÜR DIE WARTUNG DES GERÄTES GELTEN NUR FÜR GESCHULTES FACHPERSONAL.

ZUR VERMEIDUNG GEFÄHRLICHE, ELEKTRISCHE SCHOCKS, SIND WARTUNGSARBEITEN AUSSCHLIEßLICH VON QUALIFIZIERTEM SERVICEPERSONAL DURCHZUFÜHREN.

ENTRENTIEN

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.

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

All CPS series

Changes to this Manual

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.

Contents

Chapter Layout

Introduction - Describes the purpose and function of the CPS as well as a general overview of the product.

Installing & Operating Instructions - Describes the features of the Transmitter Power Monitor and provides power-up instructions.

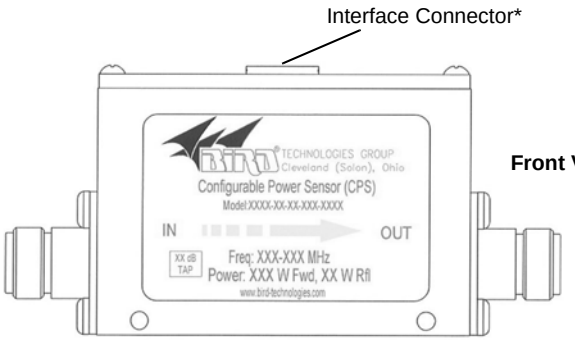
Performance Specifications - Specifications and parts information are also listed.

Table of Contents

Bird® proudly announces our New line of Configurable Power Sensors (CPS) for monitoring power and VSWR in your RF communication system. These sensors provide an economic option for keeping the health of your system in check, yet exhibit performance and measurement characteristics of higher cost competitive products. With this new line of sensors, there's no need to compromise anymore!

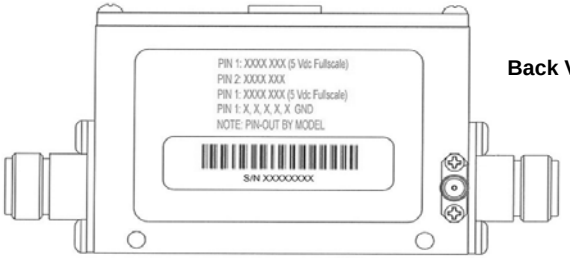
Purpose and Function

The CPS is used to measure power signals in broadcast systems. It is used directly in line with the system being tested. It's output provides a linear DC voltage output (depending on model number) allowing for a wide variety of interface options.



Front View

☞ *** -** *DC Voltage/Output connector*



Back View

☞ **Note:** *The label on the front of the unit identifies the connectors and ports. They are defined as follows:*

IN	Connect to the source of the RF signal (transmitter side)
OUT	Connect to the load of the RF signal (antenna/dummy load)
INTERFACE CONNECTOR	A DC In/Output connector. This connector is used to supply a power supply voltage and also used as an output for Forward and Reflected voltages, depending on configuration.
TEST (not shown)	A non directional sample port. No termination is required. (Not on all models)

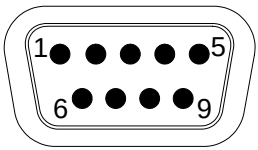
Installing the CPS

The CPS has two RF connectors (In and Out) that connect to the transmission line.

1. Do the following:
   - Connect the RF connector labeled In to the transmitter side of the transmission line.
   - Connect the RF connector labeled Out to the antenna or load side of the transmission line.
2. Connect the interface cable to an appropriate power supply and voltmeters that will indicate the forward and reflected power.

   ☞ **Note:** *The chart below Figure 1 identifies the use of each pin of the DB-9 connector.*
   The chart below Figure 2 identifies the use of each pin of the RJ45 connector.

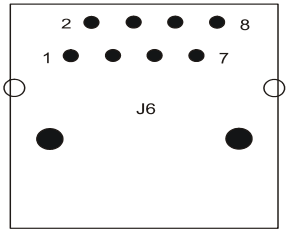
Figure 1 DB-9 Connector



CAUTION
Pin 4 must be connected to power supply ground, other grounds can be left open if desired.

Pin	Description
1	Forward Voltage Output, dependant on model type
2	Ground
3	Reflected Voltage Output, dependant on model type
4	Power Supply Ground
5	DC Power Input, +11 to +18 VDC, <0.1 A current draw
6	Ground
7	Ground
8	Ground

Figure 2 RJ45 Connector



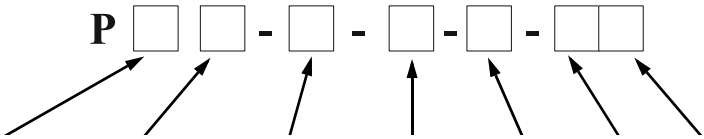
Pin	Description
1	Reflected Output, dependant on model type
2	Power Supply Ground
3	DC Power Input, +11 tp +18 VDC, <0.1 a current draw
4	Ground
5	Forward Output, dependant on model type
6	Ground
7	Ground
8	Ground
9	Ground
10	Ground

Normal Operation

1. Install the CPS to the transmission line. Refer to "Installing the CPS" on page 4**.**
2. Apply RF power to the CPS.
3. Use a voltmeter to measure the forward voltage and reflected voltage.

   ☞ **Note:** *These voltages will vary, depending on model of CPS in use. The forward and reflected voltages are linear.*

Model Naming Table



Power Range (Fwd/Rfd)	Frequency Range	RF Input Connector	RF Input Connector	Monitor/ DC Output Connector	DC Output	RF Sample
C = 10/1 W	A = 25-60 MHz	NF = N female	NF = N female	DB9 = DB9	4 = 0-4V	(Blank) =None
D = 20/2 W	B = 50-125 MHz	NM = N male	NM = N male	RJ = RJ45	5 = 0-5V	S = SMA
E = 30/3 W	C = 100-250 MHz	DF = 7/16 DIN female	DF = 7/16 DIN female		10 = 0-10V	
F = 40/4 W	CA = 136-144 MHz	DM = 7/16 DIN male	DM = 7/16 DIN male			
F1 = 60/6 W	D = 200-500 MHz	SF = SMA female	SF = SMA female			
H = 75/7.5 W	DA = 350-512 MHz	SM = SMA male	SM = SMA male			
J = 100/10 W	EA = 935-960 MHz					
J1 = 100/20 W	EB = 406-420 MHz					
M = 200/25 W	EC = 850-870 MHz					
P = 250/25 W	ED = 806-960 MHz					
T = 500/50 W	EE = 740-960 MHz					
W=1000/100W	EF = 890-960 MHz					
	EG = 800-1000 MHz					
	A2 = 824-896 MHz					
	LA = 1805-1880 MHz					
	A1 = 1870-1950 MHz					
	LB = 1930-1990 MHz					
	LC = 2110-2170 MHz					
	LD = 1710-1880 MHz					
	LE = 1920-2170 MHz					

Specifications

Power Sensor Specifications	
Accuracy:	+/- 1.0 dB
Sensor Directivity:	25 dB min
Sensor Insertion Loss:	< 0.1 dB
Sensor Insertion VSWR:	<1.1
Power Supply:	+9 to +24 VDC @100mA
Operating Temperature:	0 to 50°C
Dimensions:	4-7/8” x 1-1/4” x 2-1/2” (with “N” type connector)

Inspection and Cleaning

This unit requires only simple and routine maintenance.

> WARNING
> Disconnect the unit from the RF power source and the ac line before any disassembly. The potential for electrical shock exists.

> CAUTION
> Do not use harsh or abrasive detergents for cleaning.

- Wipe off dust and dirt regularly with a soft, clean cloth dampened with a mild detergent.

Check connectors, connector pins, and cables for damage. If needed, clean the connectors using a self-drying contact cleaner that leaves no residue.

ROHS

Part Name	**Toxic or hazardous Substances and Elements**					
	Lead (Pb)	**Mercury (Hg)**	**Cadmium (Cd)**	**Hexavalent Chromium (Cr(VI))**	**Polybrominated biphenyls (PBB)**	**Polybrominated diphenyl ethers (PBDE)**
Copper Alloy	X	O	O	O	O	O

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirements in SJ/T11363-2006.

Troubleshooting

The CPS has no operator serviceable parts. Any required service must be performed at an authorized service facility.

The table below contains troubleshooting information for problems which can occur during normal operation. This manual cannot list all malfunctions that may occur or their corrective actions. If a problem is not listed or is not corrected by the listed actions, notify a qualified service center.

Configurable Power Sensor		
Problem	**Possible Cause**	**Correction**
Power LED does not illuminate	No DC power	Check power source, and cable
	Defective LED	Return the unit to an authorized service center
High VSWR	Dirty connectors	Clean connectors
	Defective connectors	Replace connectors
	Shorted or open transmission line	Have the line serviced.

Limited Warranty

All products manufactured by Seller are warranted to be free from defects in material and workmanship for a period of one 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 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.