



# RF Directional Thruline Precision Power Sensors

## 4028 Series



### The RF Experts

Bird's® 4028 Series Power Sensors are a family of high accuracy sensors for use in high power LCD, TFT and Solar processing and other precision high power applications. Intended for use with the industry standard Bird Precision Laboratory Power Meter Model 4421, these products can provide a threefold improvement in long-term unit-to-unit accuracy.

- Achieve tighter, more consistent RF power measurements for improved yield.
- $\pm 2\%$  accuracy at specified calibration frequencies and power levels.
- Direct, plug-in operation with the industry standard Bird Model 4421 RF Power Meter.
- Multiple sensors provide for measurement of 1 kW to 25 kW over a 250 kHz to 30 MHz frequency range.

#### PROBLEMS/SOLUTIONS

Very high power RF measurements required

- Measures power levels up to 50kW

Need very high degree of accuracy

- Capable of 2% accuracy

Require custom connectors

- 4028A Series sensor can be configured with a wide range of connectors.

#### APPLICATIONS

Periodically, power delivery systems used in high power LCD, TTA and Solar processes, as well as other precision applications, must be calibrated against an accurate RF power standard. This calibration is used to correct for any drift that may occur in the system. Integrating a 4028 Series Power sensor in your calibration process may improve accuracy and long-term repeatability that can yield significant improvements on your process yields.

# RF Directional ThruLine Precision Power Sensors

## 4028 Series

### SPECIFICATIONS

<b>VSWR, Max.</b>	1.05:1
<b>Insertion Loss, Max.</b>	0.05 dB (with female 7-16 DIN connectors)
<b>Directivity, Min.</b>	28 dB
<b>Connectors</b>	A Series Customer specified from QC connector, appropriate for frequency and power. B Series 1 5/8" EIA Flanged C Series 3 1/8" EIA Flanged
<b>Impedanc, Nominal</b>	50 Ohms
<b>Max. Allowable Terminating VSWR</b>	2.00:1
<b>Calibration Technique</b>	1 yearsensor.
<b>Accuracy, Rfl</b>	= Fwd accuracy + (Fwd Power/ 10 <sup>{directivity/10}</sup> )
<b>Accuracy, VSWR</b>	Calculated from Fwd and Rfl power (VSWR = [1+ $\sqrt{\text{Pr/Pf}}$ ] / [1- $\sqrt{\text{Pr/Pf}}$ ] / [1- $\sqrt{\text{Pr/Pf}}$ ])
<b>Sampling Rate, Nominal</b>	2 readings / second
<b>Operating Power</b>	Supplied by power meter via sensor cable
<b>Temp, Operating</b>	0 to 50 °C (32 to 122 °F)
<b>Temp, Storage</b>	-20 to +70 °C (-4 to + 158 °F)
<b>Humidity, Max.</b>	95% non-condensing
<b>Altitude, Max.</b>	10,000 ft (3,000 m)
<b>Repeatability, multiple measurements, single sensor</b>	± 0.3% (95% c.l.) (with female 7-16 DIN connectors)
<b>Dimensions, Nominal</b>	A Series 4.7"L x 3.2"W x 3.8"H (120 x 82 x97 mm) (without connectors) B Series 6.8"L x 3.5"W x 4.8"H (171 x 89 x 121 mm) C Series 8.0"L x 5.2"W x 6.4" H (203 x 131 x 162 mm)
<b>Weight, Nominal</b>	A Series 1.7 lbs (.8 kg) B Series 3.3 lbs (1.5 kg) C Series 7.3 lbs (3.3 kg)

Model	Freq Range	RF Power	Calibration Freq., Typical	Calibration Power, Typical	Accuracy*	Accuracy, Outside Cal.* Power and Frequency
4028A250K	250-400 kHz	1.0-20 kW	250, 400 kHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028A400K	400-550 kHz	1.0-20 kW	400 kHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028A2M	1.5-2.5 MHz	1.0-25 kW	1.8, 2.0, 2.17 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028A3M	2.5-3.5 MHz	1.0-25 kW	2.5, 3.2, 3.5 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028A4M	3.5-4.5 MHz	1.0-25 kW	3.5, 4.0 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028A10M	10-15 MHz	1.0-25 kW	10.0, 13.56, 15.0 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028A25M	25-30 MHz	1.0-25 kW	25.76, 27.12, 28.48 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028B3M	2.5-4 MHz	1.0-25 kW	2.5, 3.2, 3.5 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028B10M	10-15 MHz	1.0-25 kW	10.0, 13.56, 15.0 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )
4028C10M	10-15 MHz	500 W-50 kW	10.0, 13.56, 15.0 MHz	1.7 kW	± 2.0% (2 $\sigma$ )	± 3.0% (2 $\sigma$ )

