

# POWER SENSORS

## RF Directional ThruLine

# 4028 SERIES



## High Accuracy for Precision High Power Applications

The Bird 4028 Series RF Directional ThruLine Power Sensors are designed specifically for use in high power LCD, TFT and Solar processing as well as other precision high power applications. Because accuracy is critical, these sensors are capable of  $\pm 2\%$  accuracy at the calibrated frequency and power level which can improve accuracy and long-term repeatability for significant improvements on your process yields. Multiple sensor models are available for measurement applications from 1 kW to 25 kW to over a 250 kHz to 30 MHz frequency range. Calibration is traceable to the National Institute of Standards and Technology (NIST), providing additional confidence in sensor measurement.

$\pm 2\%$  Accuracy, Precision  
Directional RF Power Sensors

### PRODUCT FEATURES

- Specifically designed for use in high power LCD, TFT and Solar processing and other precision high power applications up to 50 kW
- $\pm 2\%$  accuracy at specified frequencies and power levels minimizing poor production yields
- Models do not need to be field calibrated before use and only need to be calibrated once every year
- Plug and Play with the 4421A Series Multifunction Power Meter
- Dozens of connector options available
- Calibration traceable to the National Institute of Standards and Technology

### FOR USE WITH

- 4421A Multifunction Power Meters
- SCC8 Calibration Cart

# PRECISION RF DIRECTIONAL POWER SENSORS

# 4028 SERIES

# Specifications

## MEASUREMENT

|  |  |
|--|--|
| <b>Accuracy</b>  | ±2% at calibration frequencies and power levels<br>±3% at other frequency and power levels<br>Add 2% to uncertainty outside 25 ± 10 °C |
| <b>Accuracy, Rfl</b>                                       | Calculated from Fwd accuracy +<br>(Fwd Power/10 <sup>Δ</sup> {directivity/10})   |
| <b>Accuracy, VSWR</b>                                      | Calculated from Fwd and Rfl power<br>(VSWR = [1+√(Pr/Pf)] / [1-√(Pr/Pf)])  |
| <b>VSWR, Max</b>   | 1.05:1   |
| <b>Max Allowable Terminating VSWR</b>                      | 2.00:1   |
| <b>Directivity, Min</b>                                    | 28 dB  |
| <b>Insertion Loss, Max</b>                                 | 0.05 dB (with female 7/16 DIN connectors)  |
| <b>Impedance, Nominal</b>                                  | 50 Ohms  |
| <b>Speed</b>   | 2 readings per second  |
| <b>Repeatability, multiple measurements, single sensor</b> | ± 0.3% (95% c.l.) (with female 7/16 DIN connectors)  |
| <b>Calibration Power Level</b>                             | 1.7 kW   |

## CONNECTORS

|                         |                    |
|-------------------------|--------------------|
| <b>RF Connectors</b>    |                    |
| <b>A Series</b>         | Customer specified |
| <b>B Series</b>         | 1 5/8" EIA Flanged |
| <b>C Series</b>         | 3 1/8" EIA Flanged |
| <b>Sensor Interface</b> | Latch-n-Lock       |

## PRODUCT SELECTION GUIDE

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

## SYSTEM

|   |  |
|---|--|
| <b>Recommended Calibration Interval</b> | 1 year                                   |
| <b>Power Supply</b>                     | Supplied by power meter via sensor cable |

## ENVIRONMENTAL

|                              |                                   |
|------------------------------|-----------------------------------|
| <b>Operating Temperature</b> | 0 °C to 50 °C (32 °F to 122 °F)   |
| <b>Storage Temperature</b>   | -20 °C to 70 °C (-4 °F to 158 °F) |
| <b>Humidity</b>              | 95% max (non-condensing)          |
| <b>Altitude</b>              | 10,000 ft (3,000 m)               |

## PHYSICAL

|                                  |   |
|----------------------------------|---|
| <b>Size, Nom</b>                 |   |
| <b>A Series (w/o connectors)</b> | 4.7 in x 3.2 in x 3.8 in (120 mm x 82 mm x 97 mm)   |
| <b>B Series</b>                  | 6.8 in x 3.5 in x 4.8 in (171 mm x 89 mm x 121 mm)  |
| <b>C Series</b>                  | 8.0 in x 5.2 in x 6.4 in (203 mm x 131 mm x 162 mm) |
| <b>Weight, Nom</b>               |   |
| <b>A Series</b>                  | 1.7 lb (0.8 kg)                                     |
| <b>B Series</b>                  | 3.3 lb (1.5 kg)                                     |
| <b>C Series</b>                  | 7.3 lb (3.3 kg)                                     |

## CERTIFICATIONS

|            |                           |
|------------|---------------------------|
| <b>EMC</b> | Designed to carry CE mark |
|------------|---------------------------|

## [birdrf.com/products](http://birdrf.com/products)

The RF Experts | USA Sales : 30303 Aurora Rd, Solon, OH 44139 | [www.birdrf.com](http://www.birdrf.com)  
Phone: +1 440.248.1200 / 866.695.4569 [Toll Free] | Fax: +1 440.248.5426 / 866.546.4306 [Toll Free]

