

BIRD DIAGNOSTIC SYSTEM

Inline Voltage & Current Probe

BDS2 SYSTEM

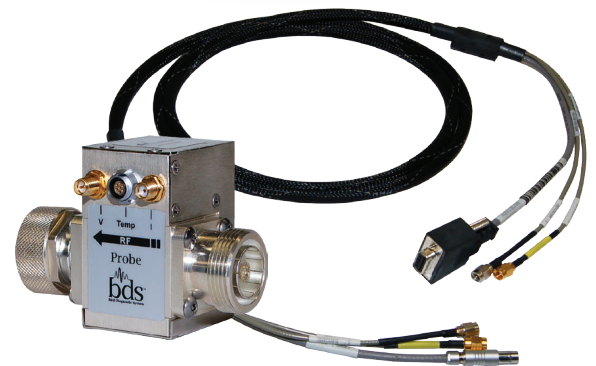


Identify & Minimize RF Process Variability

Using sophisticated parallel signal processing, the BDS2 simultaneously measures and reports voltage, current, and phase angle at multiple fundamental, harmonic and intermodulation frequencies.

A robust frequency tracking algorithm guarantees accurate measurements under dynamic signal conditions. With this data, power and impedance are calculated at each frequency, giving users the ability to identify small discrepancies that may make the difference between a successful and a failed process.

The optional Time-Domain mode allows exceptional visibility into the shape of pulsed RF waveforms in the non-50 ohm environment. Similar to an oscilloscope, the BDS2 will display a one-shot, triggered view of the pulse envelope. Uniquely, however, the BDS2 will display the waveform in voltage, current, phase, power, or impedance to the fully-specified accuracy of the system.



PRODUCT FEATURES

- 1% accurate measurement of RF voltage and current with a locked system
- Calculated impedance, RF power
- Multi-level pulse or CW waveforms
- 1-3 fundamental frequencies
- 4 harmonics per fundamental frequency
- 6 intermodulation products per fundamental pair
- Time-domain mode
- Tracking & Spectral search mode
- Ethernet enabled

APPLICATIONS

- Chamber to chamber matching
- RF process monitoring
- Impedance matching
- Troubleshooting RF delivery system
- Identify process drifts
- Harmonic levels up to 252 MHz are available for analysis
- Voltage, current, phase and delivered power comparison

SYSTEM COMPONENTS - UNLOCKED SYSTEM

Receiver 7001A900-2	BDS2 Single Ch. Receiver w/Ethernet
Calibrated Data Cable 7001B040-5M	RF/Data Cable Set 5 M straight
Sensor Options* 7001B550-1-xyyy	Sensor, BDS2, QC Connector (Choose xx yy options from chart below)
7001A550-2	Sensor, BDS2, Protruding Dielectric Connection

SYSTEM KITS - LOCKED SYSTEM

7001B500-1-xyyy	BDS2 Kit (Receiver, Cable and Sensor Kit), QC Connectors (Choose xx yy options from chart below)
7001A500-1-2	BDS2 Kit (Receiver, Cable and Sensor Kit), Protruding Dielectric Connection

CONNECTION OPTIONS**

Input Connector (xx)	Output Connector (yy)
01 = N(f)	01 = N(f)
02 = N(m)	02 = N(m)
12 = HN(f)	12 = HN(f)
13 = HN(m)	13 = HN(m)
14 = 7/16(f)	14 = 7/16(f)
15 = 7/16(m)	15 = 7/16(m)
34 = LC(f)	34 = LC(f)
35 = LC(m)	35 = LC(m)

SYSTEM PROFILES

Parameter	Voltage	Current	Phase Angle
Measurement	RF: 1 to 3000V _{rms} (Note 1)	0.1 to 100 A _{rms} (Note 1)	-180° to + 180°
Resolution	IEEE 754 Single Precision Floating Point		
Uncertainty 307 kHz - 1 MHz Locked System (Note 2)	for F _n , ± 0.5 V or 1% of reading whichever is greater for F _n , ± 1.0 V or 2% of reading, whichever is greater (95% confidence interval)	for F _n , ± 0.05 A or 1% of reading whichever is greater for F _n , ± 0.1 A or 2% of reading, whichever is greater (95% confidence interval)	Absolute Angle: F _n ≥ 10 V, 1A: ±1° F _n < 10 V, 1A: ±4° F _n ≥ 10 V, 1A: ±2° F _n < 10 V, 1A: ±6° (95% confidence interval)
Uncertainty 1-252 MHz Locked System (Note 2)	for F _n , ± 0.1 V or 1% of reading whichever is greater for F _n , ± 0.2 V or 2% of reading, whichever is greater (95% confidence interval)	for F _n , ± 0.01 A or 1% of reading whichever is greater for F _n , ± 0.02 A or 2% of reading, whichever is greater (95% confidence interval)	
Uncertainty 307 kHz - 1 MHz Unlocked System (Note 2)	for F _n , ± 1.0 V or 2% of reading whichever is greater for F _n , ± 2.0 V or 4% of reading, whichever is greater (95% confidence interval)	for F _n , ± 0.1 A or 2% of reading whichever is greater for F _n , ± 0.2 A or 4% of reading, whichever is greater (95% confidence interval)	Absolute Angle: F _n ≥ 10 V, 1A: ±1° F _n < 10 V, 1A: ±4° F _n ≥ 10 V, 1A: ±2° F _n < 10 V, 1A: ±6° (95% confidence interval)
Uncertainty 1-252 MHz Unlocked System (Note 2)	for F _n , ± 0.2 V or 2% of reading whichever is greater for F _n , ± 0.4 V or 4% of reading, whichever is greater (95% confidence interval)	for F _n , ± 0.02 A or 2% of reading whichever is greater for F _n , ± 0.04 A or 4% of reading, whichever is greater (95% confidence interval)	

*Contact factory for a custom designed sensor and custom frequency combinations.

** Contact factory for additional connector options.

Note 1: Maximum power is limited by the size of the RF frequency (25 kW max average power at 13.56 MHz).

Note 2: At customer specified frequencies.

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MEASUREMENT

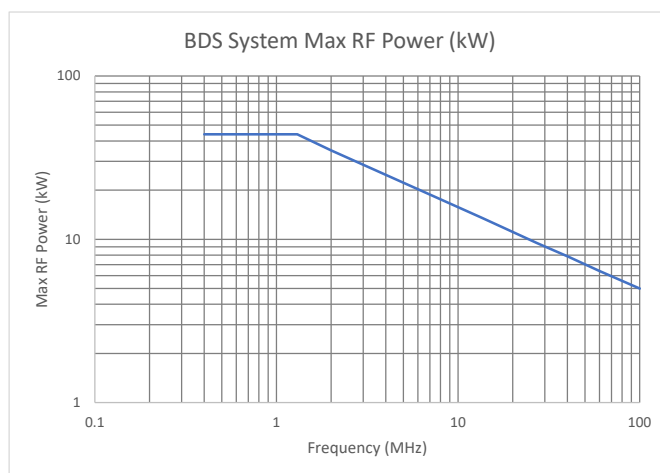
Measurements	Voltage, current, phase, frequency, impedance, power at frequencies selected by user
Frequency Range	307 kHz - 252 MHz (Sensor Dependent)
Frequency Resolution	100 Hz
Frequency Accuracy	± 1 kHz
Number of Fundamentals	Up to 3 simultaneously. For more than 1 fundamental, choose from the following (or contact the factory for custom combinations): - 0.4, 13.56, 160 MHz - 0.4, 60 MHz - 1, 13.56 MHz - 2, 27.12, 60 MHz - 3.2, 40.68 MHz - 3.2, 60 MHz - 12.88, 40.68 MHz - 13.56, 100 MHz
Tracking Frequency Slew Rate	2 GHz/sec
Tracking Minimum Pulse Width	5 µsec
Number of Harmonics	4 harmonics per fundamental, 6 intermodulation products per pair of fundamentals up to 252 MHz Limited by the maximum number of measurement channels Tracking & Spectral search mode: 12 harmonics standard mode 6 in time domain mode
Update Rates	100 Hz typical
Network Protocol	Ethernet
RF Power Max	Determined by RF sensor, (Typically 10kW or higher)
RF Connector	Custom or QC
Operating Modes	Tracking mode, Spectral Search mode

ENVIRONMENTAL

Receiver Operating Temperature	20 °C to 40 °C (68 °F to 104 °F)
Receiver Storage Temperature	-20 °C to 80 °C (-4 °F to 176 °F)
Cable Operating Temperature	0 °C to 100 °C (32 °F to 212 °F)
Cable Storage Temperature	-20 °C to 100 °C (-4 °F to 212 °F)
Sensor Operating/Storage Temperature	Refer to sensor specification
Humidity	85% maximum (non-condensing)
Air Pressure	745 mbar (equivalent to 2,500 m/ 8,200 ft max altitude)

POWER

Operating Power	15 VDC, 2.5 A nominal
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- The chart above is based on the standard BDS Sensor's line section
- Further reduction in max power may apply depending on the selection of the sensor's RF connectors

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