INSTRUCTION SHEET

RF DIRECTIONAL THRULINE® PRECISION FILTERED POWER SENSORS 4027F SERIES

Instruction Book Part Number 920-4027FS Rev. E

Specifications

CAUTION
Changing the sensor's connectors will invalidate calibration data, and may reduce the maximum power rating of the unit.

Frequency Range	
4027F2M	1.8 – 2.2 MHz
4027F10M	12 – 15 MHz
4027F60M	57 – 63 MHz
RF Power Range	
4027F2M	0.1 – 10 kW
4027F10M	0.1 – 10 kW
4027F60M	0.1 – 3 kW
Accuracy, Fwd, Best Case*	± 1.0% (2σ)
Accuracy, Reflected	Calculated from FWD accuracy and power $\text{RFL Accuracy} = \text{FWD Accuracy} + \frac{\text{FWD Power}}{10^{\text{Directivity}/10}}$
Accuracy, VSWR	Calculated from FWD and RFL power $\text{VSWR} = \left(1 + \sqrt{\frac{P_R}{P_F}}\right) \Big/ \left(1 - \sqrt{\frac{P_R}{P_F}}\right)$
Repeatability, Multiple Measurements, Single Sensor	± 0.3% (2σ) (with female "N" connectors) Determined by connector repeatability

* Best case assumes calibration frequency, calibration power, and 25 ± 5 °C. For other conditions see Uncertainty Budget.

Harmonic Rejection, Min	
4027F2M	26 dB @ 3.6 – 3.8 MHz 30 dB @ > 3.8 MHz
4027F10M	30 dB @ > 25 MHz
4027F60M	30 dB @ > 114 MHz
Low Freq. Rejection, Min	
4027F10M	30 dB @ < 1 MHz
4027F60M	30 dB @ < 15 MHz
Max Error Induced by 10% AM	
4027F2M, 4027F10M	0.2% @ < 5 kW 1.0% @ 5 – 10 kW
4027F60M	0.2% @ < 1.5 kW 1.0% @ 1.5 – 3 kW
VSWR, Max	1.05:1
Insertion Loss, Max	0.05 dB (with female "N" connectors)
Directivity, Min	28 dB
Impedance, Nominal	50 ohms
Max. Allowable Terminating VSWR	2.00:1
Calibration Technique	Frequency-specific calibration factors stored in nonvolatile memory in each sensor. Sensor output corrected for frequency and temperature within specified ranges.
Cal. Frequencies, Typical*	
4027F2M	1.8, 2.0, 2.17 MHz
4027F10M	12.0, 12.5, 13.56, 14.0, 15.0 MHz
4027F60M	57.0, 58.5, 60.0, 61.5, 63.0 MHz
Cal. Power, Typical	1.7 kW
Cal. Cycle, Nominal	6 months

* Other calibration frequencies available upon request

Connectors	Customer specified from "QC" list, appropriate for frequency and power.
Operating Power	Supplied by power meter via sensor cable
Sampling Rate, Nominal	2 readings / second
Temperature	
Operating*	0 to 50 °C (32 to 122 °F)
Storage	–20 to +70 °C (–4 to +158 °F)
Humidity, Max	95% (non-condensing)
Altitude, Max	10,000 ft. (3,000 m)
CE	CE Compliant. Refer to Declaration of Conformity for specific standards
Dimensions, Nominal†	5.2"L x 2.5"W x 3.25"H (137 x 64 x 83 mm)
Weight, Nominal†	1 lb. 13 oz. (0.8 kg)

* Derated accuracy outside 25 ± 5 °C, see Uncertainty Budget
† Values for units with female "N" connectors

Uncertainty Budget

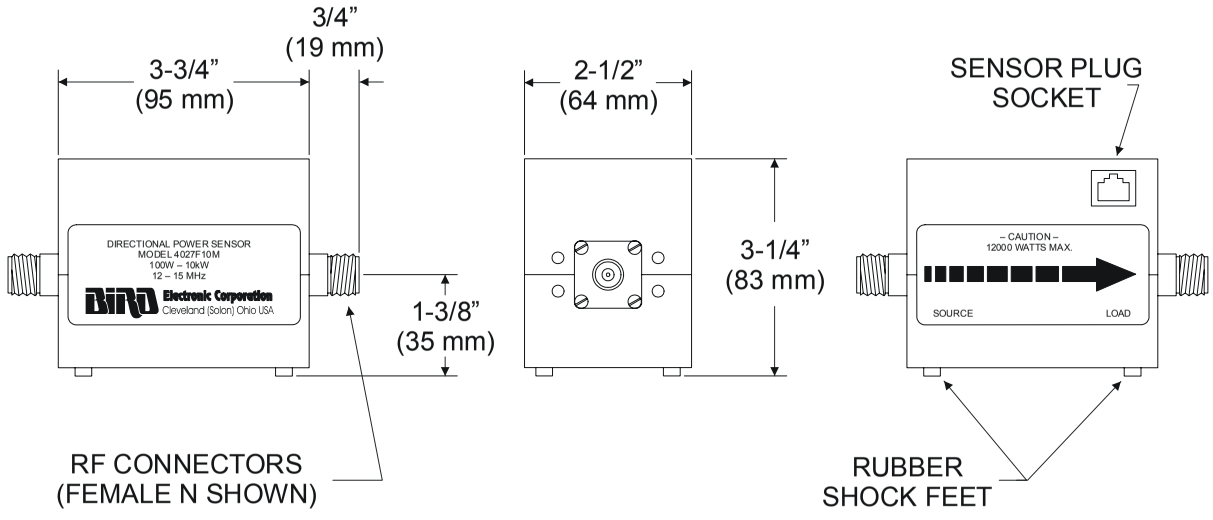
		4027F2M*	4027F10M*	4027F60M*
Frequency Error...	at cal freq	± 0.1%	± 0.1%	± 0.1%
	not at cal freq	± 0.5%	± 1.5%	± 0.5%
Power Linearity...	at cal power	± 0.1%	± 0.1%	± 0.1%
	not at cal power	± 1.0%	± 0.5%	± 1.0%
Temperature Uncert...	within 20 to 30°C	± 0.65%	± 0.6%	± 0.5%
	outside 20 to 30°C	± 3.2%	–3.0, +0.75%	± 2.9%
Calibration Uncertainty		± 0.6%	± 0.6%	± 0.6%
Resolution Uncert...	at cal power	± 0.06%	± 0.06%	± 0.06%
	not at cal power†	± 0.34%	± 0.34%	± 0.34%
Other sources of error		± 0.4%	± 0.5%	± 0.6%
Best Case RSS Uncertainty		± 1.0%	± 1.0%	± 1.0%

* All values 2σ

† Resolution uncertainty is error due to limited display digits. Actual uncertainty can be calculated as:

± (1 in least significant digit) / Reading

For a 3.5-digit display, worst case is at 300W. Least significant digit is one watt, uncertainty is ± 1W out of 300 or 0.34%. For a 4.5-digit display, least significant digit is 0.1W, so the uncertainty is 0.034%


3/4”
(19 mm)
3-3/4”
(95 mm)
DIRECTIONAL POWER SENSOR
MODEL 4027F10M
100W – 10kW
12 – 15 MHz
BIRD Electronic Corporation
Cleveland (Solon) Ohio USA
1-3/8”
(35 mm)
RF CONNECTORS
(FEMALE N SHOWN)
2-1/2”
(64 mm)
3-1/4”
(83 mm)
SENSOR PLUG
SOCKET
– CAUTION –
12000 WATTS MAX.
SOURCE
LOAD
RUBBER
SHOCK FEET

Special Lifetime Warranty – Series 4027F Power Sensor Head

In addition to its standard warranty, the Bird Electronic Corporation warrants its Series 4027F Thruline® Power Sensor Heads for lifetime to original purchaser. This extended warranty is against burnout. For the warranty to apply, the Sensor Head must be used with the correct Bird Electronic Corporation Display Unit, the maximum power rating of the Sensor must not be exceeded, the Sensor RF circuit must be properly terminated and the Sensor not subjected to physical abuse.

Bird Electronic Corporation, at its option, will repair or replace the defective Sensor at its world Headquarters at 30303 Aurora Road, Solon, Ohio 44139.

The customer is responsible to pay transportation charges to return the defective sensor to Bird.