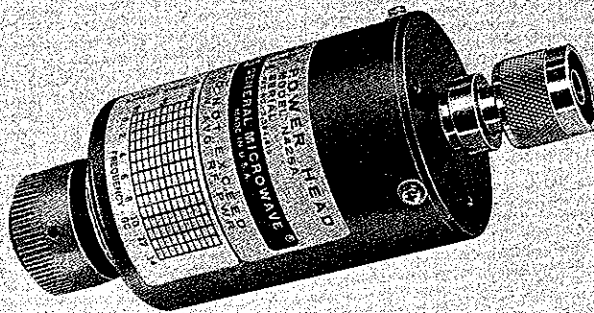
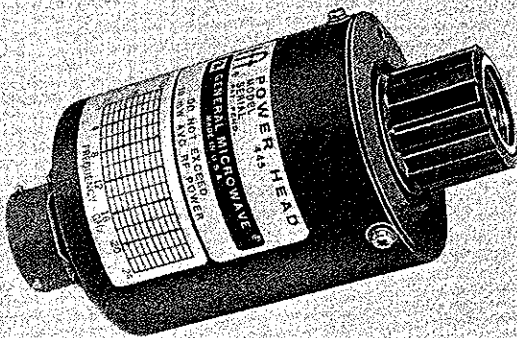


# Models N445A, N446A, N425B, N426B, N427B Integrated Thermoelectric Power Monitors

- Amplifier and power sensor in a single, compact package
- 0.01 to 18 GHz frequency range
- 30 dB dynamic power range
- $\pm 1\%$  accuracy
- $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  temperature range
- 0.02% F.S. (p-p) noise
- 0.02% F.S./ $^{\circ}\text{C}$  drift



Model N445A, N446A: 0.01 to 18 GHz  
Models N425B, N426B, N427B: 0.01 to 12.4 GHz

These power monitors are compact, integrated assemblies of thermoelectric power sensors and dc amplifiers specially designed for system power monitoring at local or remote locations. Small size and light weight make them ideal for difficult systems packaging requirements, and choice of readout type and location is flexible — all this is accomplished without sacrificing high accuracy, excellent stability or economy.

Modulated, pulsed, or cw signals from 0.01 to 18 GHz are measured over a 30 dB dynamic range covered in three convenient decade steps. Power levels as low as  $-30$  dBm ( $1\mu\text{W}$ ) and as high as  $+20$  dBm (100 mW) can be measured. Provisions for remote range selection and zero setting are included.

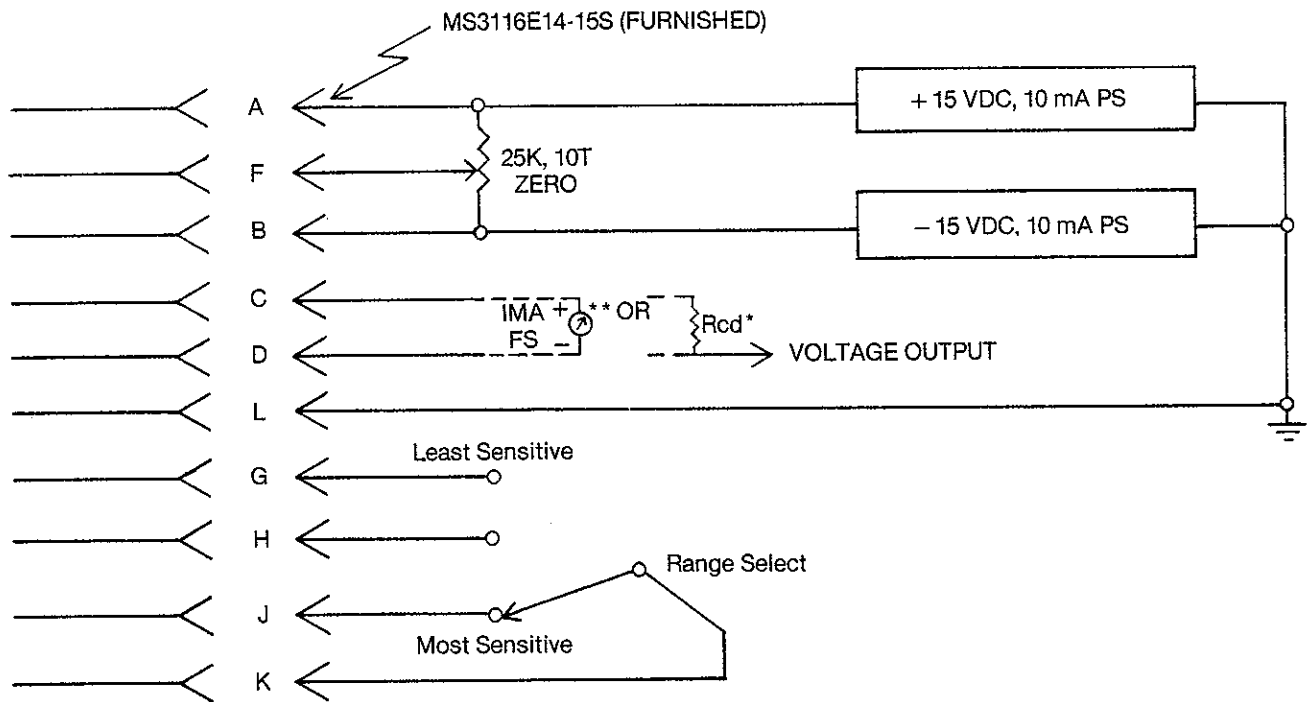
The monitor output is a dc analog signal which may be connected to readouts in either a constant current or constant voltage mode, directly scaleable in milliwatts. The constant current output is 1 milliamper full scale, and the constant voltage output is adjustable up to  $-10$  volts full scale. For remote readout distances up to many hundreds of feet, the constant current connection provides a stable reading free from errors caused by long line wire resistance values. Where the readout device is a voltmeter, or for such applications as sweep generator levelling, the constant voltage mode of operation is available.

The carefully designed amplifier section, when combined with the excellent stability of the thermoelectric power sensor, assures exceptionally low noise and drift. A wide operating temperature range of  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  is also featured.

The Type N rf connector conforms to MIL-C-39012, and the dc and signal output connector mates with a furnished MS3116E plug connector. Rugged construction is featured throughout.



# Models N445A, N446A, N425B, N426B, N427B Integrated Thermoelectric Power Monitors



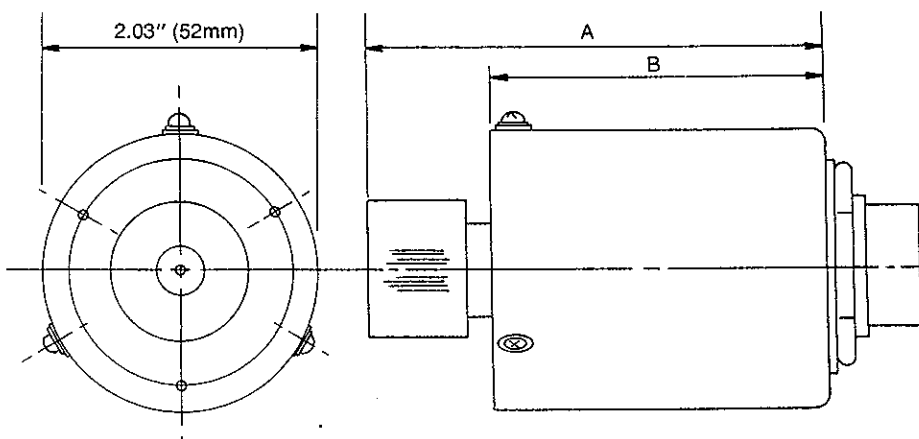
PIN	N445A, N425B	N446A, N426B	N427B
G	+ 10 dBm	+ 20 dBm	0 dBm
H	0 dBm	+ 10 dBm	- 10 dBm
J	- 10 dBm	0 dBm	- 20 dBm

\* When voltage output is used, connect resistor (Rcd) between pins C and D. Output between pins D and L will be - 1 Volt per 1000 ohms of resistance of Rcd with a maximum value of - 10V (i.e. - 10,000 ohms). Simultaneous use of voltage and current modes is also possible.

\*\* Any number of 1 mA meters may be connected in series provided total pins C-D loop resistance does not exceed 10,000 ohms.

TYPICAL SET-UP FOR OPERATION

## OUTLINE DIMENSIONS



Unit	Dimensions	
	A	B
N445A, N446A	3.60" (92mm)	2.60" (66mm)
N425B, N426B, N427B	4.34" (111mm)	3.10" (79mm)



# Models N445A, N446A, N425B, N426B, N427B Specifications

MODEL	N445A		N446A		N425B		N426B		N427B	
Frequency Range	0.01 to 18 GHz				0.01 to 12.4 GHz					
Full Scale Ranges:	dBm	mW	dBm	mW	dBm	mW	dBm	mW	dBm	mW
Range 1	+10	10	+20	100	+10	10	+20	100	0	1
Range 2	0	1	+10	10	0	1	+10	10	-10	0.1
Range 3	-10	0.1	0	1	-10	0.1	0	1	-20	0.01
Input Impedance	50 ohms									
Max. VSWR	1.35 <sup>(1)</sup> to 10 GHz, 1.6 from 10 GHz to 18 GHz				1.5 <sup>(2)</sup>					
Accuracy <sup>(3)</sup>	± 1% of full scale									
Operating Temperature Range	-54°C to +85°C <sup>(8)</sup>		-54°C to +85°C <sup>(8)</sup>		-54°C to +85°C <sup>(8)</sup>		-54°C to +85°C <sup>(8)</sup>		-54°C to +85°C <sup>(10)</sup>	
Zero Drift <sup>(4)(6)</sup>	0.02% F.S./°C								0.035% F.S./°C	
Noise <sup>(4)</sup>	0.02% F.S. (p-p)								0.035% F.S. (p-p)	
Element Temperature Sensitivity	0.1%/°C									
Field-Replaceable Elements	TL-4A		TL-5		TL-0A		TL-1A		TL-2A	
CW Overload Rating <sup>(7)</sup>	300%		200%		300%					
Max. Pulse Energy at +25°C (W μ-sec)	5		30		15		150		1.5	
Max. Pulse Power at +25°C (W)	1		15		3		30		0.3	
Max. Pulse Duration at +25°C (μ-sec) <sup>(6)</sup>	5		2		5					
Max. dc Voltage (volts)	10		30		10		30		3	
Output:	1 mA full scale, each range									
Current Mode	-10 volts full scale (maximum), each range									
Voltage Mode										
Power Supply Requirements	± 6V to ± 18V, 10 mA, 0.1% regulation									
Weight	8 oz. (227 gm.)									

## ENVIRONMENTAL RATINGS

- Shock . . . . . MIL-STD-202F, Method 213B, Cond. B (75G, 6 msec)
- Vibration . . . . . MIL-STD-202F, Method 204D, Cond. B (.06" double amplitude or 15G, whichever is less)
- Altitude . . . . . MIL-STD-202F, Method 105C, Cond. B (50,000 ft.)
- Temp. Cycling . . . . . MIL-STD-202F, Method 107D, Cond. A, 5 cycles

- (1) Except in the range from 0.010 to 0.015 GHz, where VSWR may rise to 1.5.
- (2) Except in the range from 0.010 to 0.015 GHz, where VSWR may rise to 1.75.
- (3) Excluding RF calibration error.
- (4) On least sensitive range. Proportionately more on lower power ranges.
- (5) Over temperature range from -25°C to +85°C.  
Over full temperature range:  
Models N445A, N446A, N425B and N426B: 0.03% F.S./°C.  
Model N427B: 0.05% F.S./°C.
- (6) At maximum pulse power.
- (7) While the units will take overloads for short periods of time, extended periods of operation at overload levels may result in permanent change in the element characteristics or even burnout. Maximum care should be exercised to avoid such an occurrence.
- (8) Derate at 0.2 mW/°C from +60°C to +85°C.
- (9) Derate at 1.4 mW/°C from +50°C to +85°C.
- (10) Derate at 0.02 mW/°C from +60°C to +85°C

