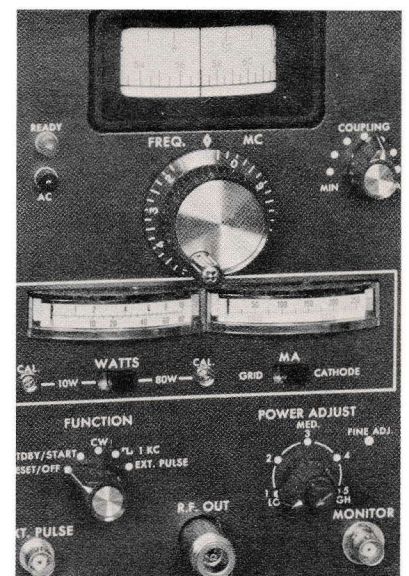
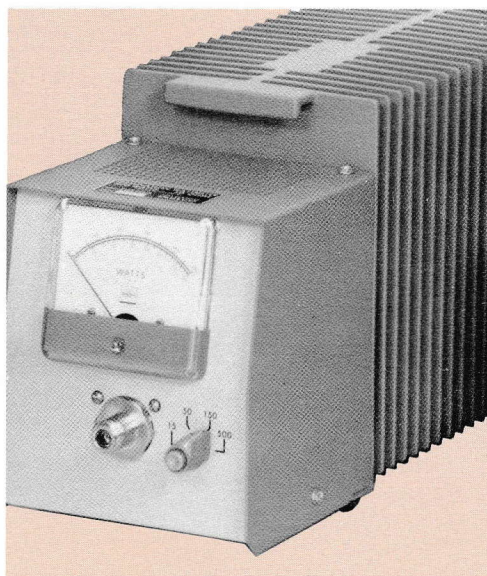
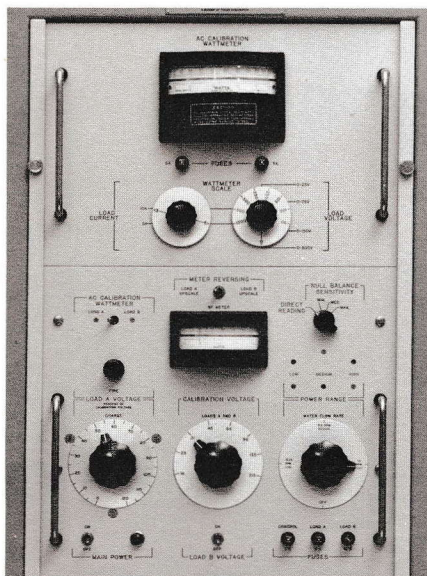


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POWER GENERATION and MEASUREMENT EQUIPMENT

PHILCO 



High-Power Signal Generators

The Model 470A Series high-power signal generators are used for any application which requires a stable source of controllable r-f power higher than that obtainable from milliwatt-level signal generators. Applications include testing and calibration of VHF, UHF, and microwave power-measuring equipment and other r-f devices such as filters, detectors, antenna systems, attenuators, and couplers. They are excellent drivers for power amplifiers and signal sources in RFI testing applications.

The five instruments in this Series cover the frequency range 50 MHz to 2500 MHz. Maximum power output is highest (approximately 70 watts) at 400 MHz and lowest (15 watts) at 2500 MHz. Both the power output and the grid and cathode currents are monitored on front-panel meters.

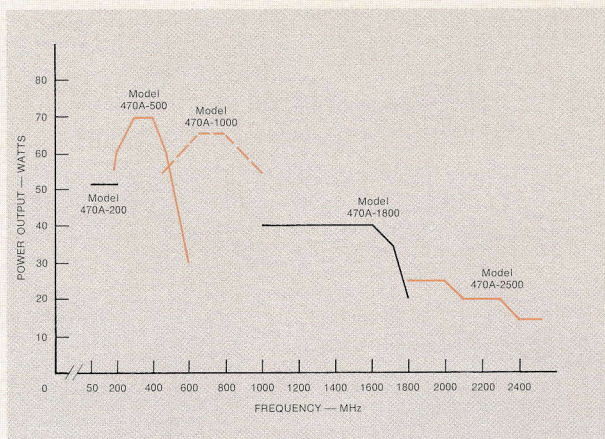
These instruments are capable of either CW, internal or external square-wave, or pulse-modulated outputs. A monitor output jack provides a signal approximately 35 dB down from the main output which is particularly useful for wave form analysis and frequency calibration. Frequency stability of the main output is 0.003% per ten minutes or 0.01% per hour average. Power level stability is ± 0.2 dB per hour after warmup. All filament and high-voltage power supplies are regulated. Reliability is enhanced by use of all solid-state components (except power output tube) and a unique SCR output power control.

Simplified maintenance is assured by the use of a standard, readily available tube type in the final power output stage. Only a few minutes are required to replace the tube. Disassembly of the cavity is not necessary. In addition, the tube is protected against excessive grid current caused by overload or no-load conditions. A relay circuit with manual reset provides automatic protection.

The Model 470A signal generators weigh approximately forty pounds each. All models are of uniform dimensions and have identical front-panel configurations.

Performance specifications for the 470A Series are summarized on these pages. Individual data sheets containing more detailed specifications are available on request.





Summary Specifications

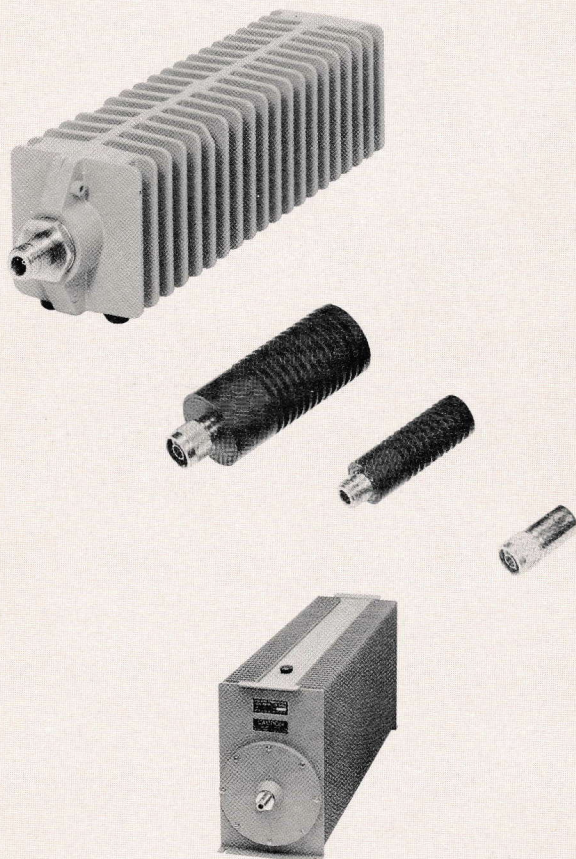
Model	Frequency Range (MHz)	Power Output (Watts)	Frequency Stability	Power Output Stability	Size (inches) and Weight
470A-200	50-200	greater than 50	0.02%/hr after warmup	±0.2 dB/hr after warmup	6¾ W, 10 H, 18½ L, 45 lbs.
470A-500	200-500*	55 @ 190 MHz 60 @ 200 MHz 70 @ 300 MHz 70 @ 400 MHz 60 @ 500 MHz 30 @ 600 MHz	0.02%/hr after warmup	±0.2 dB/hr after warmup	6¾ W, 10 H, 18½ L, 37 lbs.
470A-1000	470-1000	55 @ 470 MHz 60 @ 600 MHz 65 @ 700 MHz 65 @ 800 MHz 60 @ 900 MHz 55 @ 1000 MHz	0.005%/hr after warmup	±0.2 dB/hr after warmup	6¾ W, 10 H, 18½ L, 35 lbs.
470A-1800	1000-1800	40 @ 1000 MHz 40 @ 1100 MHz 40 @ 1200 MHz 40 @ 1300 MHz 40 @ 1400 MHz 40 @ 1500 MHz 40 @ 1600 MHz 35 @ 1700 MHz 20 @ 1800 MHz	0.01%/hr after warmup	±0.2 dB/hr after warmup	6¾ W, 10 H, 18½ L, 36 lbs.
470A-2500	1800-2500	25 @ 1800 MHz 25 @ 1900 MHz 25 @ 2000 MHz 20 @ 2100 MHz 20 @ 2200 MHz 20 @ 2300 MHz 15 @ 2400 MHz 15 @ 2500 MHz	0.01%/hr after warmup	±0.2 dB/hr after warmup	6¾ W, 10 H, 18½ L, 37 lbs.

* Usable range 190-600 MHz.

Coaxial R-F Terminations for 50-ohm Systems

These coaxial loads provide stable termination of r-f power with nominal 50-ohm impedance and low VSWR. They are used with CW, AM, FM, TV, and radar transmitters and power sources. They permit completely normal operation of the transmitter, except that no r-f signal is radiated.

Many of the terminations described here are equipped with "Twist-Off" r-f connectors. These readily replaceable connectors permit a choice of eight different connector types and provide the flexibility of changing connectors quickly and easily in the field.



Model 160 Series Dry Coaxial Loads

- Power ratings to 100 watts
- Broad frequency ranges
- Dry construction; no dielectric coolant

Summary Specifications

Model	Avg. Power Rating (Watts)	Overload Avg. Pwr. Minutes		Connector Types	Frequency Range	Maximum VSWR	Size (inches) and Weight
160-1	1	5	1	N	DC-11 GHz	1.1 DC-4 GHz 1.15 4-6 GHz 1.25 6-11 GHz	3/4 D, 1 3/4 L, 3 oz.
160-5	5	5	1	N	DC-11 GHz	1.1 DC-4 GHz 1.2 4-6 GHz 1.5 6-11 GHz	1 D, 3 1/8 L, 4 1/2 oz.
160-20	20	5	1	N	DC-6 GHz	1.1 DC-1 GHz 1.15 1-4 GHz 1.5 4-6 GHz	1 5/8 D, 4 1/2 L, 8 oz.
160-50D	50	5	1	Twist-Off*	DC-5 GHz	1.1 DC-1 GHz 1.2 1-4 GHz 1.4 4-5 GHz	2 1/4 W, 2 1/2 H, 7 3/8 L, 1 1/2 lbs.
160-100D	100	5	1	Twist-Off*	DC-5 GHz	1.1 DC-1 GHz 1.2 1-4 GHz 1.4 4-5 GHz	3 W, 3 3/4 H, 11 1/2 L, 3 1/2 lbs.

*"Twist-Off" connectors available: Type C, N, HN, LC, BNC, TNC, UHF, 1 5/8-inch rigid line, male and female.

Model 160 — 1600

Conventional 50-ohm termination for high power dissipation . . .

- Dissipates 1600 watts with free convection cooling
- VSWR 1.15, DC to 1 GHz
- "Twist-Off" connectors to fit wide range of applications

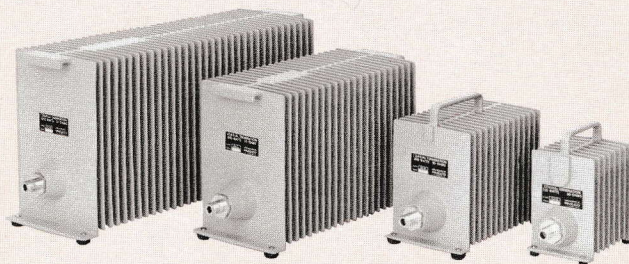
Model 160B Series Silicone Dielectric Coaxial Loads

- Frequency coverage to 5 GHz
- Sealed aluminum construction permits optimum heat transfer
- Silicone dielectric fluid for long life
- "Twist-Off" connectors on all models

Summary Specifications

Model	Avg. Power Rating (Watts)	Overload Avg. Pwr. Minutes		Frequency Range	Maximum VSWR	Size (inches) and Weight
160B-150	150	10	5	DC-4 GHz	1.1 DC-500 MHz 1.2 500 MHz-4 GHz	3 1/2 W, 6 H, 6 1/2 L, 2 3/4 lbs.
160B-300	300	10	5	DC-4 GHz	1.1 DC-1 GHz 1.2 1-4 GHz	4 7/8 W, 7 3/8 H, 9 3/4 L, 6 3/4 lbs.
160B-600	600	10	5	DC-5 GHz	1.1 DC-1 GHz 1.2 1-3 GHz 1.5 3-5 GHz	6 W, 8 1/4 H, 14 L, 15 1/2 lbs.
160B-1000	1000	10	5	DC-5 GHz	1.1 DC-1 GHz 1.2 1-3 GHz 1.5 3-5 GHz	6 3/8 W, 9 3/8 H, 20 L, 29 1/2 lbs.

All models in Series 160B are fitted with "Twist-Off" connectors. Connector options available are: Type N, UHF, C, LC, HN, BNC, TNC, and 1 5/8-inch rigid line, male or female.



Model 460A Series

Conduction-Cooled Coaxial Loads

The novel design concept utilized in the 460A Series permits the construction of high-power terminations in the smallest, lightest-weight packages available.

These dry terminations are designed specifically for use in space vehicles, missiles, and other applications which require high power dissipation but do not permit convection cooling. They are unaffected by high-altitude conditions or mounting position. Their rugged construction permits operation in unfavorable environments.

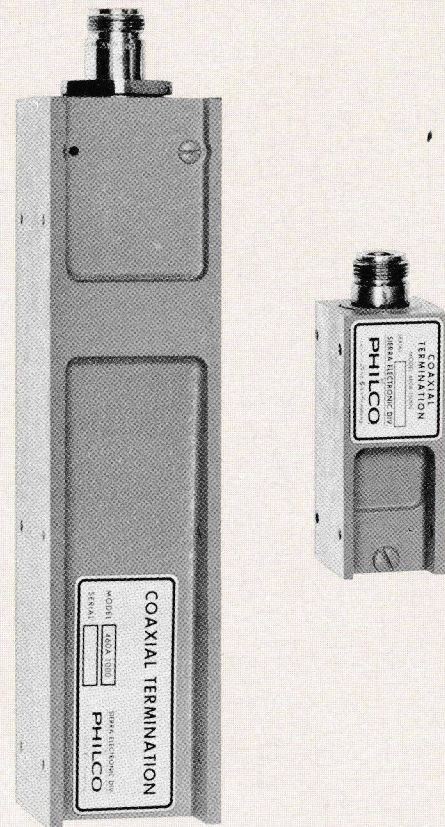
Model 460A loads may be attached directly to an equipment cabinet, bulkhead, air-frame, or other structure which can serve as a heat sink. They operate in any position and in any atmosphere.

"Twist-Off" r-f connectors on 1000-watt models give the user the added flexibility of changing connectors quickly and easily in the field.

Summary Specifications

Model	Power Rating — Watts Heat Sink both sides at 55° C	Heat Sink one side at 55° C	Frequency Range	Maximum VSWR	Size (inches) and Weight
460A-150	150	120	DC-4 GHz	1.1 DC-500 MHz 1.15 500-MHz-1 GHz 1.2 1-2 GHz 1.25 2-4 GHz	1.281 W, 1.140 H, 3.5 L, 6 oz.
460A-1000	1000	700	DC-4 GHz	1.1 DC-500 MHz 1.15 500-MHz-1 GHz 1.2 1-2 GHz 1.25 2-4 GHz	2.032 W, 1.765 H, 8.375 L, 1 lb. 10 oz.

Note: Model 460A-1000 is available with "Twist-Off" connectors, Types N, C, HN, LC, BNC, TNC, UHF, and 1/8-inch rigid line, male or female.



Approximately 1/2 actual size

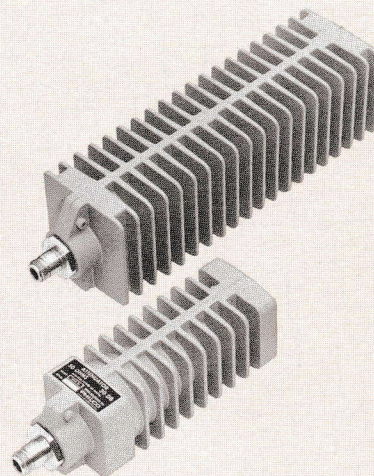
Coaxial Power Attenuators

Designed for 50-ohm systems, the Model 660 Series of attenuators are dry, unidirectional attenuators operating up to 1 GHz. They extend the range of a low-power calorimeter or power meter by a factor of 100 or 1,000. They are also useful for signal monitoring and sampling purposes, producing an output that is 20 or 30 dB below the input signal.

Summary Specifications

Model	Attenuation	Power Rating (Watts)	Frequency Range	Accuracy	Maximum VSWR	Size (inches) and Weight
661A-20	20 dB	50	DC-1 GHz	±1 dB	1.1 DC-1 GHz	2 1/4 W, 2 1/2 H, 8 1/4 L, 1 lb. 10 oz.
661A-30	30 dB	50	DC-1 GHz	±1 dB	1.1 DC-1 GHz	2 1/4 W, 2 1/2 H, 8 1/4 L, 1 lb. 10 oz.
662A-20	20 dB	100	DC-1 GHz	±1 dB	1.1 DC-1 GHz	3 W, 3 1/4 H, 12 1/4 L, 3 lbs. 10 oz.
662A-30	30 dB	100	DC-1 GHz	±1 dB	1.1 DC-1 GHz	3 W, 3 1/4 H, 12 1/4 L, 3 lbs. 10 oz.

Note: R-f input connectors are "Twist-Off", Types N, C, BNC, TNC, HN, LC (male and female), and 1/8-inch rigid line. R-f output connectors are Type N female.

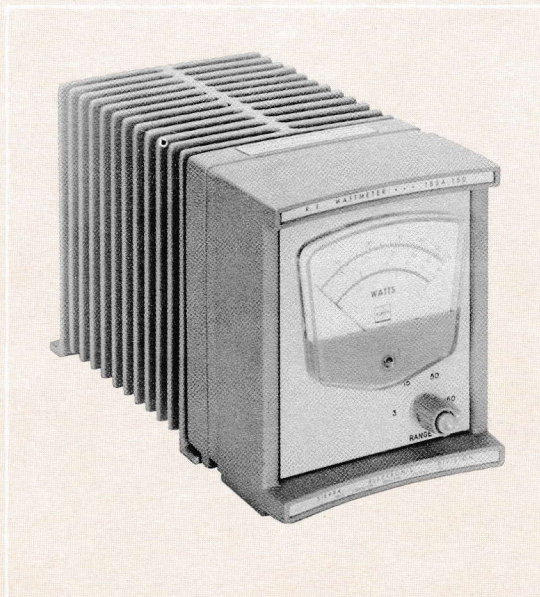


R-F Termination Wattmeters

These termination wattmeters are direct-reading instruments which absorb and measure r-f power up to 500 watts at frequencies from 2 to 500 MHz. They are designed for use with 50-ohm coaxial systems.

These instruments provide exceptional versatility of application. On all except the smallest models, any one of four power ranges can be selected with a front-panel switch. Dynamic range of 500 to 1 makes it possible for the user to read meter indications as low as 1 watt on the Model 401A-500, and 0.5 watt on the Model 401A-250.

The clean, uncluttered design of the front panel lends itself further to rapid, accurate operation of the instrument. The r-f connector, range selector switch, and large meter with partially expanded scale for easy reading are the only elements on the panel. To measure power with the instrument, it is only necessary to connect the coaxial line and switch to the appropriate power range.

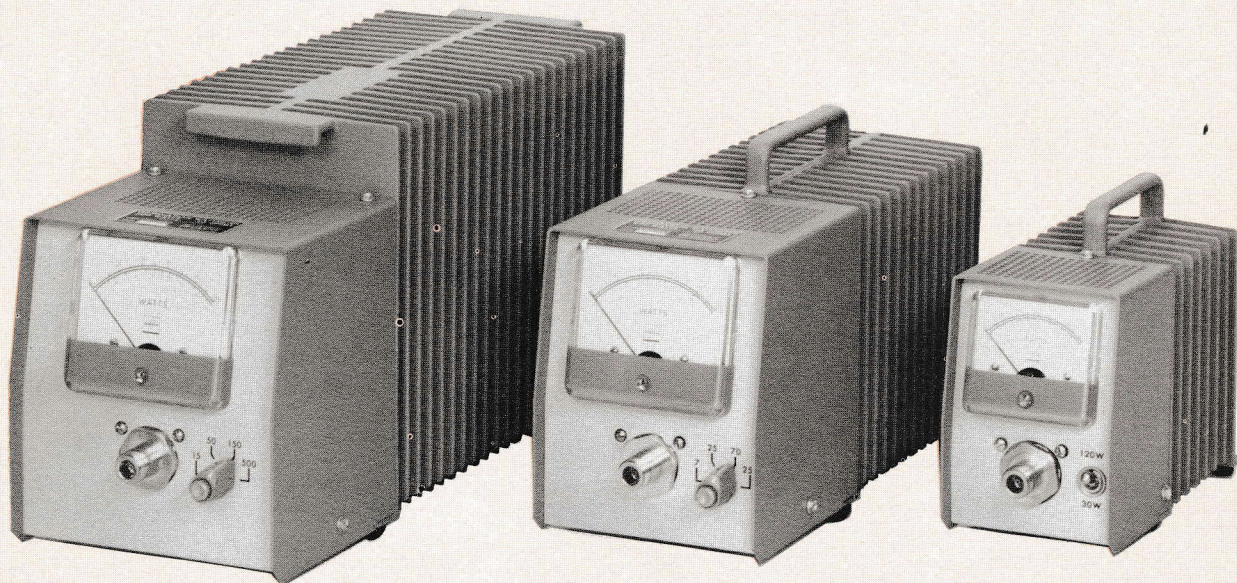


"Twist-Off" r-f connectors are used on all termination wattmeters except the Model 185A. This permits the user a choice of eight different connector types and provides the added flexibility of changing connectors quickly and easily in the field.

These termination wattmeters are ruggedly constructed to withstand years of use under the environmental conditions of field operation. The termination, or power-dissipating element, is sturdy cast aluminum. Infrared heat distribution patterns show this construction to be more effective than conventionally fabricated loads in transferring heat from the load resistor to the ambient air. Non-carbonizing silicone fluid is used instead of the conventional oil dielectric, providing longer life under repeated heat cycling. The termination itself is sealed, with no bellows or air vents. This minimizes the possibility of coolant leakage and prevents contamination of the coolant by atmospheric impurities.

Performance specifications are shown on these pages. Individual data sheets on each model or series are available on request.

Model 185A-150 combines broad frequency coverage with unusual power-measurement flexibility. Four power ranges enable the user to make r-f measurements from a fraction of a watt to 150 watts with ease. Frequency coverage of 20 MHz to 1000 MHz permits the Model 185A-150 to be used with equipment operating in the HF, VHF, and UHF bands.



Summary Specifications

Model	Maximum Power Rating (Watts)	Power Ranges (Watts)	Frequency Range (MHz)	Accuracy % Full Scale	Maximum VSWR	Size (inches) and Weight
401A-120M	120	0-30 0-120	30-500	±5%	1.2	3½ W, 6 H, 8⅝ L, 4⅞ lbs.
401A-250M	250	0-7 0-25 0-70 0-250	30-500	±5%	1.2	4⅞ W, 7⅜ H, 13 L, 9 lbs.
401A-500M	500	0-15 0-50 0-150 0-500	30-500	±5%	1.2	6 W, 8¼ H, 17¼ L, 18 lbs.
185A-150	150	0-3 0-15 0-50 0-150	20-1000	±5%	1.2	5¼ W, 6⅞ H, 11¾ L, 10¾ lbs.

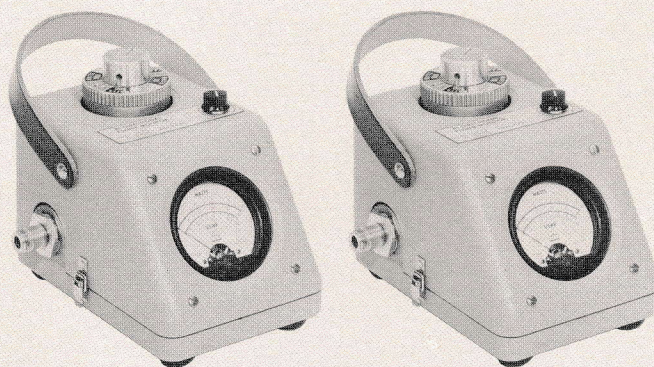
Note: "Twist-Off" connectors are available for Model 401A Series Wattmeters in Types N, UHF, C, LC, HN, BNC, TNC, and 1⅝-inch rigid coaxial line. Model 185A-150 is furnished with female Type N r-f input connector.

In-Line R-F Wattmeters

In-line r-f wattmeters are portable test instruments which are used in 50-ohm transmission systems for the measurement of both forward and reflected power. Two separate models are available for use with either CW or pulsed systems.

These instruments provide direct power measurements in watts. They permit antennas or loads to be matched to transmitters or other power sources simply by monitoring the reflected power during actual operation. Tuning the equipment for the best possible match has been obtained.

These in-line r-f wattmeters are also equipped with direct-reading VSWR meter scales. This feature makes it possible to read the voltage standing wave ratio in a transmission system directly from the wattmeter, without the use of formulas or calculations.



Model 164B In-Line R-F Wattmeter

This instrument is used for power measurements in all types of CW systems. It connects directly into the transmission line and measures power delivered to the load as well as power reflected from the load. It is not necessary to change r-f connections in order to reverse the direction of power measurement.

Model 164B covers a power range of 1 to 5000 watts and a frequency range of 2 to 1000 MHz. The specific power and frequency which can be measured depend on the plug-in element used. Each of the ten available plug-in elements covers a relatively wide frequency range and provides four full-scale power ranges. Measurements can be made over a wide dynamic range without changing the plug-in element. This means the user can switch to a lower range when observing reflected power, thus increasing reading accuracy.

To increase the utility of the 164B, the plug-in elements can be readily calibrated in the field. It is not necessary to return them to the factory for calibration. A simple adjustment with a screwdriver and Allen wrench is all that is required. This feature considerably increases the usefulness of the instrument in field operations.

The Model 164B is furnished with "Twist-Off" r-f connectors. Eight different connector types may be interchanged to accommodate virtually all 50-ohm transmission lines.

A rugged carrying case, Model 164-CC, is available to house the wattmeter and three additional plug-in elements. A transmission line section, Model 164-LS, is also available as an accessory to prevent detuning due to changes in line length when the power monitor is removed after tuning a transmitter operating into a line which is not flat.

Summary Specifications

Model 164B Wattmeter only

Insertion VSWR

With Type N connectors, less than 1.08 except on 1-watt ranges.

Accuracy $\pm 5\%$ full scale, all ranges

Impedance 50 ohms

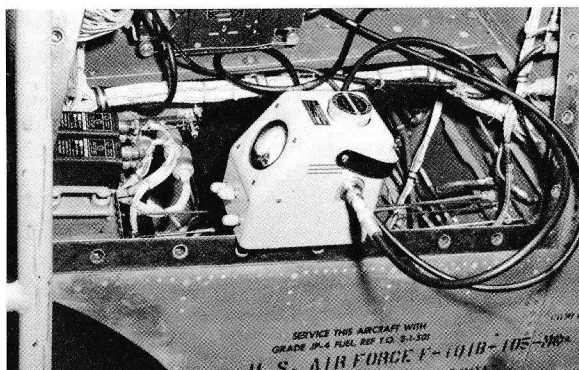
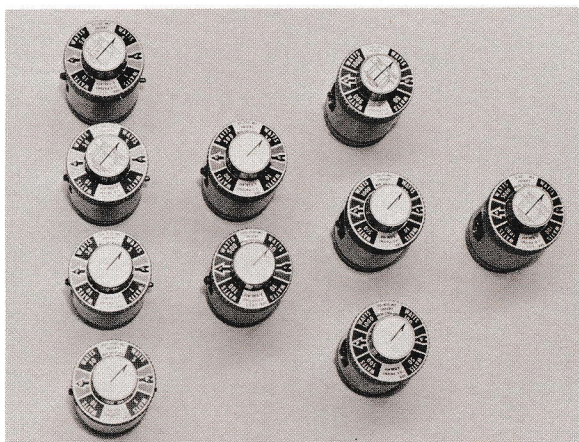
Weight 7½ pounds with one plug-in element

Connectors "Twist-Off" (see note)

Note: Type N connectors are normally furnished unless specified otherwise. "Twist-Off" connectors available are Types N, UHF, LC, HN, C, BNC, TNC, and 1½ inch rigid line, male or female.

Plug-in Elements for 164B Wattmeter

Model	Frequency Range (MHz)	Power Ranges (Watts)
180A-52	25-52	1, 5, 10, 50
180A-148	50-148	1, 5, 10, 50
180A-470	144-470	1, 5, 10, 50
180A-1000	460-1000	1, 5, 10, 50
181A-250	25-250	10, 50, 100, 500
181A-1000	200-1000	10, 50, 100, 500
270A-30	2-30	50, 100, 500, 1000
270A-75	10-75	50, 100, 500, 1000
270A-470	70-470	50, 100, 500, 1000
271A-30	2-30	100, 500, 1000, 5000



Model 400A in use during testing of jet aircraft antenna. The two peak power ranges of the instrument permit it to measure both incident and reflected energy in medium-power applications such as that shown.

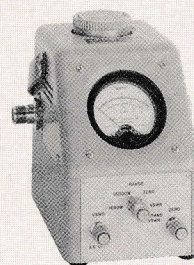
Photo courtesy of U.S. Air Force.

Model 400A Peak R-F Wattmeter

Model 400A is used to monitor both incident and reflected peak pulse power in 50-ohm transmission systems operating between 960 and 1215 MHz. The instrument is furnished with two peak power ranges. The lower range (0 to 500 watts) permits accurate measurement of low-power reflected waves. The higher range (0 to 5000 watts) covers most medium-power measurement applications. The monitor will accept pulses as narrow as 0.1 microsecond at duty cycles as low as 0.01%.

The Model 400A is equipped with a direct-reading VSWR scale for use when the incident power is 500 watts or higher. A VSWR graph is provided for lower incident power levels.

Applications for Model 400A include monitoring the performance of pulsed r-f systems such as TACAN, DME, transponders, and other navigational aids. The instrument is self-contained and does not require auxiliary equipment.



Summary Specifications

Model 400A Peak R-F Wattmeter

Peak Power Ranges 0-500 watts, 0-5000 watts
 Minimum Duty Cycle 0.01%
 Minimum Pulse Width 0.1 microsecond
 Accuracy $\pm 10\%$ of full scale
 Frequency Range 960-1215 MHz
 Insertion VSWR 1.15 maximum
 Connectors Type N
 Power Required 115 or 230 VAC $\pm 10\%$, 50-1000Hz
 Weight 11 pounds

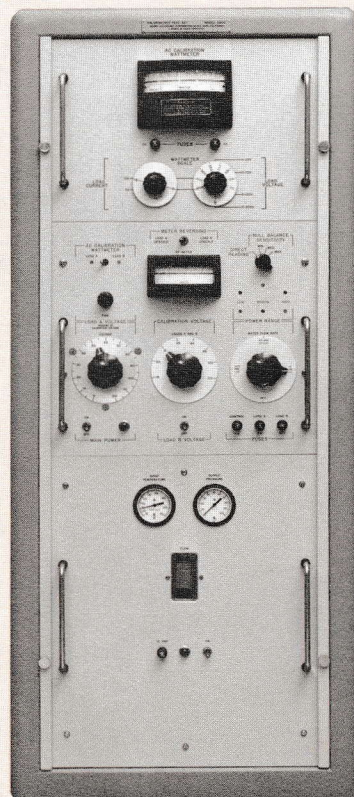
R-F Calorimeters

R-F calorimeters are used for precise measurement of r-f power levels ranging from 10 watts to 1500 watts, at frequencies from DC to 12.4 GHz.

For laboratory precision and highest measurement accuracy, the Model 290D calorimeter is unexcelled by any system available to the industry. This instrument, with its associated balanced, dual water loads, operates with a total limit error of only $\pm 1.0\%$, ± 0.1 watt, at any frequency up to 12.4 GHz.

The design of Model 290D utilizes a balanced measurement configuration. Three measurement modes are available: null-balance for maximum accuracy, direct-reading for maximum speed, and a differential mode for measurements where expanded-scale readings are advantageous.

The complete test system consists of the Model 290D calorimeter and an appropriate Model 286 or 287 series dual-load unit. The 290D includes the heat exchanger, calorimeter, and wattmeter assemblies, mounted in an enclosed cabinet. The wattmeter panel contains an a-c wattmeter with certified accuracy of 0.25% full scale. The dual-load units consist of two identical r-f terminations (either coaxial or waveguide), a 90-element differential thermopile, and associated components.



Summary Specifications

Model 290D R-F Calorimeter

Full-Scale Measurement Limits

Null-balance mode	30-1000 watts
Direct-reading mode	10-1500 watts
Differential mode	30-1000 watts

Accuracy $\pm 1.0\%$, ± 0.1 watt limit of error

Calibration Power Variable up to 1200 watts to each individual load

AC Wattmeter Ranges 50, 100, 125, 250, 500, 1000 watts

Galvanometer Ranges Variable between 15 and 1500 watts full scale

Dimensions

Height	57 inches
Width	23 1/4 inches
Depth	22 inches

Dual Water Loads

Model	Frequency Range (GHz)	Maximum VSWR	Connectors	Dimensions (inches)
286B	DC-4.0	1.25	Type N female	9 1/4 W, 10 5/8 H, 21 L
287A-SC	4.0-5.8	1.10	UG-149A/U	9 1/2 W, 9 3/8 H, 32 1/2 L
287A-C	5.8-8.2	1.10	UG-344/U	9 1/4 W, 10 5/8 H, 25 1/4 L
287A-XB	7.0-10.0	1.10	UG-51/U	9 1/4 W, 10 5/8 H, 25 1/4 L
287A-X	8.2-12.4	1.10	UG-39/U	9 1/4 W, 10 5/8 H, 20 1/2 L

General Information

ACCURACY: Most average-reading r-f wattmeters employing diode detection have accuracies within $\pm 5\%$ of full scale. Any reading on a specific wattage range is accurate to within $\pm 5\%$ of the full scale value for that range. For example, a reading of 20 watts on the 50-watt range would be accurate to within ± 2.5 watts ($\pm 5\%$ of 50 watts). All r-f power-measuring equipment is calibrated with a Model 290 calorimeter accurate within $\pm 1\%$.

OUT-OF-BAND OPERATION: Wattmeter accuracy is seriously degraded when the instrument is operated outside of the specified frequency range. Correction curves do not serve to compensate for these inaccuracies because the degradation varies with each instrument. Terminations may be operated beyond their frequency limits with probable increases in VSWR.

OVERLOAD CONDITIONS: Conservative short-time overload specifications are shown for Model 160 and 160B terminations. Excessive overloading of a termination will not

necessarily cause complete failure; however, high VSWR can result from permanent changes in the impedance of the device.

OPERATING POSITION OF TERMINATIONS:

Dry loads such as the 160 Series can usually be operated in any position. Dielectric-filled loads must be operated with the feet down. It is always good practice to operate a convection-cooled load with the fins in a vertical plane. Series 460A conduction-cooled loads are designed for continuous operation in any position.

FIELD CALIBRATION: Model 164 with plug-ins and Model 401 and 185 termination wattmeters can be calibrated in the field. Another Model 164 with plug-in, known to be in calibration, is used as a working standard. This instrument is connected in series with the meter to be calibrated.

CONNECTOR OPTIONS: The r-f connectors shown below can be readily interchanged in the field on instruments fitted with "Twist-Off" connectors. Stock numbers are shown for ordering convenience.

"Twist-Off" R-F Connectors

Type	Stock Number	Type	Stock Number	Type	Stock Number	Type	Stock Number
N	914600012 male 914600013 female	UHF	914600022 male 914600023 female	LC	914600080 male 914600075 female	TNC	914600085 male 914600084 female
C	914600082 male 914600081 female	HN	914600078 male 914600079 female	BNC	914600083 male 914600076 female	1 5/8" rigid line	914600071

A complete line of telecommunications measurement equipment is also available.
Specification sheets on all products are available from the sales department.

All data are subject to change without notice.

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- ☐ Ship C.O.D. and bill me on arrival. My purchase order number is _____

50-OHM COAXIAL LOADS

✓	Model Number	Shipping Weight	Unit Price	Order Quantity	Total (\$s)
	160-1	3 oz.	\$ 20.00		
	160-5	4½ oz.	\$ 25.00		
	160-20	8 oz.	\$ 30.00		
	160-50D	1½ lbs.	\$ 49.00		
	160-100D	3½ lbs.	\$ 75.00		

CONNECTORS For Model 160 Loads

✓	Type ¹	Specify Male or Female	Unit Price	Order Quantity	Total (\$s)
	N		Note 2		
	UHF		Note 2		
	C		\$ 10.00		
	HN		\$ 10.00		
	BNC		\$ 10.00		
	LC		\$ 30.00		
	TNC		\$ 30.00		

¹ Refer to table below in selecting connectors for specified loads.

² Type N or UHF connectors, male or female, included in price of termination.

50-OHM COAXIAL LOADS

✓	Model Number	Shipping Weight	Unit Price	Order Quantity	Total (\$s)
	160B-150	2¾ lbs.	\$ 70.00		
	160B-300	6¾ lbs.	\$ 95.00		
	160B-600	15½ lbs.	\$155.00		
	160B-1000	29½ lbs.	\$265.00		

CONNECTORS For Model 160B Loads

✓	Type	Specify Male or Female	Unit Price	Order Quantity	Total (\$s)
	N		Note 2		
	UHF		Note 2		
	C		\$ 10.00		
	HN		\$ 10.00		
	BNC		\$ 10.00		
	LC		\$ 30.00		
	TNC		\$ 30.00		
	1½" rigid line		\$ 70.00		

Model 160 Connector Availability:

Model Number	N	C	BNC	TNC	HN	LC	UHF	1½" Line
160-1	Yes	No	No	No	No	No	No	No
160-5	Yes	No	No	No	No	No	No	No
160-20	Yes	No	No	No	No	No	No	No
160-50D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
160-100D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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IN-LINE R-F WATTMETER

✓	Model Number	Shipping Weight	Unit Price	Order Quantity	Total (\$s)
	164B	7½ lbs. ³	\$ 95.00 ⁴		

³With one plug-in element.⁴In standard FMN configuration.**CONNECTORS (2 required)**

✓	Type	Specify Male or Female	Price for 2 Connectors	Order Quantity	Total (\$s)
	N		Note 5		
	UHF		Note 5		
	C		\$ 20.00		
	HN		\$ 20.00		
	BNC		\$ 20.00		
	LC		\$ 60.00		
	TNC		\$ 60.00		
	1½" rigid line		\$140.00		

⁵Type N or UHF connectors, male or female, included in price of instrument.**PLUG-IN ELEMENTS**

✓	Model Number	Unit Price	Order Quantity	Total (\$s)
	180A-52	\$110.00		
	180A-148	\$110.00		
	180A-470	\$110.00		
	180A-1000	\$110.00		
	181A-250	\$ 75.00		
	181A-1000	\$ 75.00		
	270A-30	\$115.00		
	270A-75	\$115.00		
	270A-470	\$115.00		
	271A-30	\$125.00		

TERMINATION WATTMETERS

✓	Model Number	Shipping Weight	Unit Price	Order Quantity	Total (\$s)
	401A-120M	6¼ lbs.	\$195.00		
	401A-250M	11 lbs.	\$275.00		
	401A-500M	21 lbs.	\$325.00		
	185A-150 ⁶	12¾ lbs.	\$260.00		

⁶Available with Type N connector, female only.⁷Type N or UHF connectors, male or female, included in price of instrument.**CONNECTORS For Model 401A**

✓	Type	Specify Male or Female	Unit Price	Order Quantity	Total (\$s)
	N		Note 7		
	UHF		Note 7		
	C		\$ 10.00		
	HN		\$ 10.00		
	BNC		\$ 10.00		
	LC		\$ 30.00		
	TNC		\$ 30.00		
	1½" rigid line		\$ 70.00		

Prices and terms apply only to orders shipped to points within the territorial limits of the United States of America. For information concerning shipment outside the United States, contact International Sales Manager at Sierra/Philco-Ford. All prepaid orders shipped by surface from Menlo Park, California. Prices and data subject to change without notice.

Name _____

Company _____

Address _____

City, State, Zip _____



SIERRA ELECTRONIC OPERATION
Philco-Ford Corporation
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