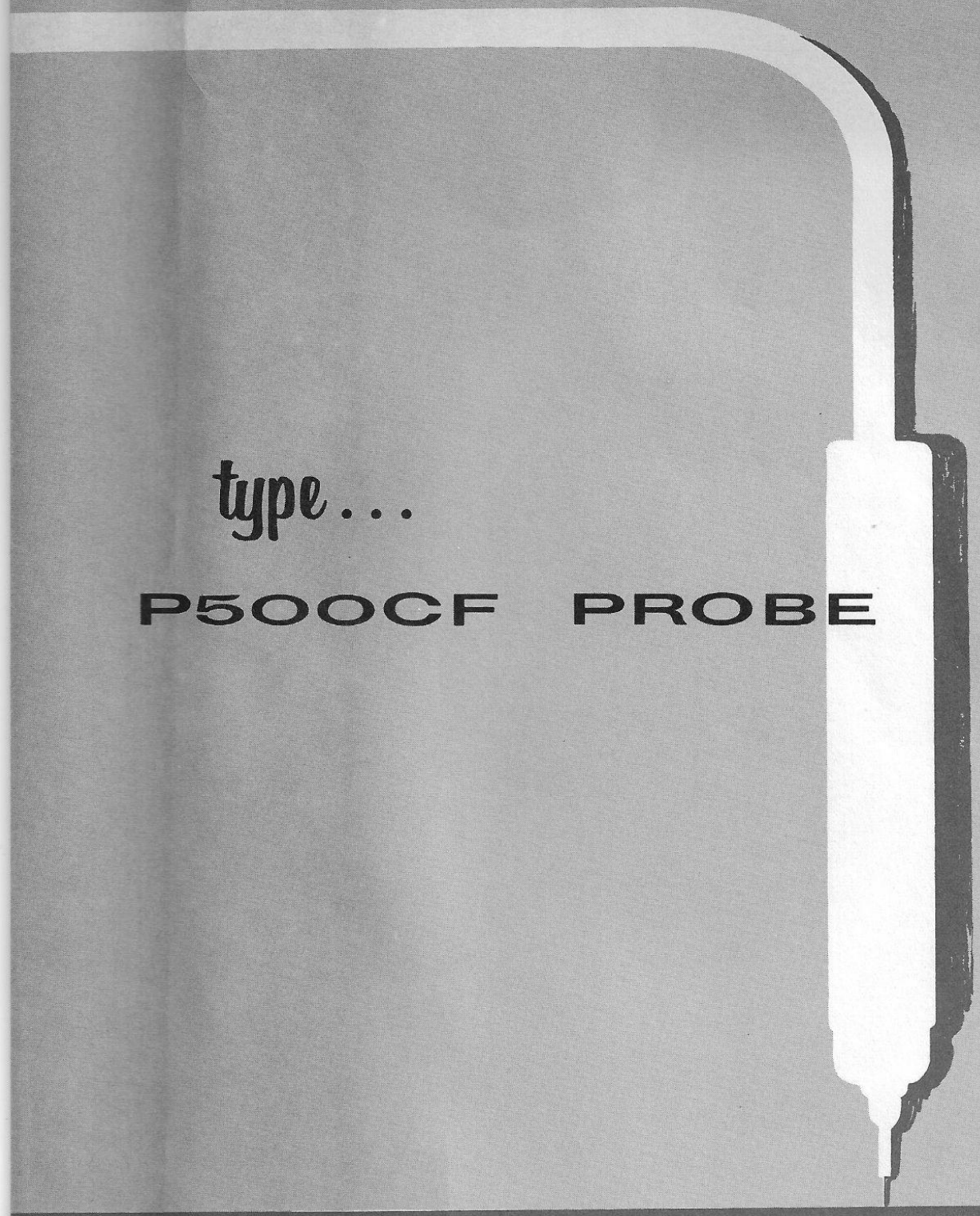
INSTRUCTION MANUAL



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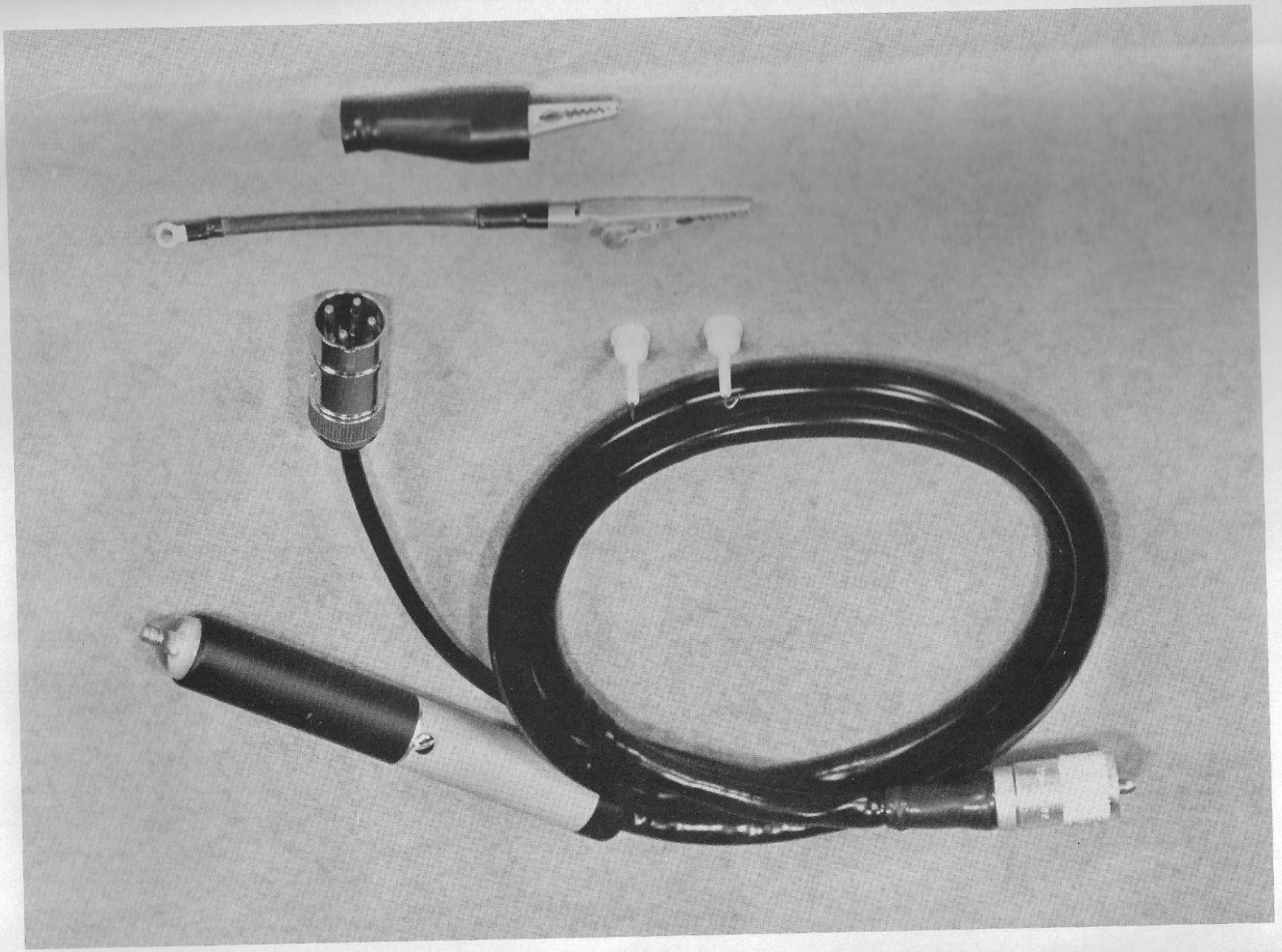
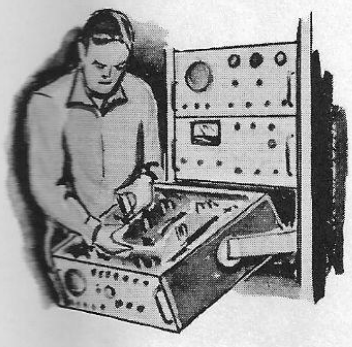
P500CF PROBE

MANUFACTURERS OF CATHODE-RAY OSCILLOSCOPES





OPERATING INSTRUCTIONS

The P500CF Probe presents low input capacitance with minimum attenuation. The Type 524AD Oscilloscopes currently in production are equipped with a front-panel connector for necessary probe voltages. Type 524AD Oscilloscopes were manufactured without a probe-power connector. A modification kit is available for installing a front-panel probe-power connector on these instruments. Contact your nearest Tektronix Field Office for information concerning this kit.

CHARACTERISTICS

Probe with 524D or 524AD

Gain	
Probe	Approximately 0.8 attenuation
Input Impedance	
Probe	40 megohms shunted by 4 $\mu\mu$f
With 10X head	10 megohms shunted by 2 $\mu\mu$f
Frequency Response	
High	Additional 1/2 db down at 10 mc with scope set for NORMAL response. Additional 2% down at 5 mc with scope set for FLAT response.
Low	3 db down at 5 cps
Amplitude Distortion	
Probe	Less than 3% for unidirectional signals up to 5 v amplitude.
With 10X head	Up to 50 v amplitude
Hum Level	Less than 1.5 millivolts (1 mm of deflection at maximum sensitivity)

OPERATION

(With Type 524 or Type 524AD)

Connect the probe power plug to the front-panel connector and the probe output cable to the lower oscilloscope input. (Be careful. the heater supply, pins 1 and 2, is at +120 v relative to the chassis.) The probe output level is 11 v positive so switch the INPUT SELECTOR to the AC position.

If you want to make amplitude measurements with the probe set the CAL VOLTAGE control at some convenient voltage, say 5 volts peak to peak, and touch the probe to the CAL OUTPUT. Set the VOLTS/CM control to 1.5-.5 and adjust the VARIABLE ATTEN so the displayed waveform is 5 cm in amplitude. The overall sensitivity will then be 1 volt/cm which is twice the figure indicated by the VOLTS/CM control.

If you are going to measure pulse amplitudes follow the above procedure but adjust the CAL DUTY CYCLE control to produce pulses of the anticipated polarity.

For observing signals over about 5 volts unidirectional or 10 volts peak to peak use the 10X attenuator head. This head contains a 10-times frequency-compensated attenuator

and will allow you to observe signals up to 50 volts unidirectional or 100 volts peak to peak.

ADJUSTMENT

There is only one adjustment to be made as a regular maintenance item and that is to balance the heater-supply dc level to minimize the hum output. With the probe grounded and the oscilloscope's vertical amplifier set to maximum sensitivity adjust the HUM BALANCE potentiometer for minimum amplitude of the displayed hum signal. The HUM BALANCE control is located on a bracket fastened to the right side of the oscilloscope's sub-panel.

The attenuator head is compensated at the factory for its associated probe. If the head compensation should ever need adjustment use the calibrator signal. Connect the probe with head attached to the CAL OUTPUT and display about 10 cycles of the waveform. Insert a scriber or similar pointed tool through the slot in the side of the attenuator case, into the small hole in the adjusting trimmer capacitor and turn the trimmer until the square wave has a flat top.

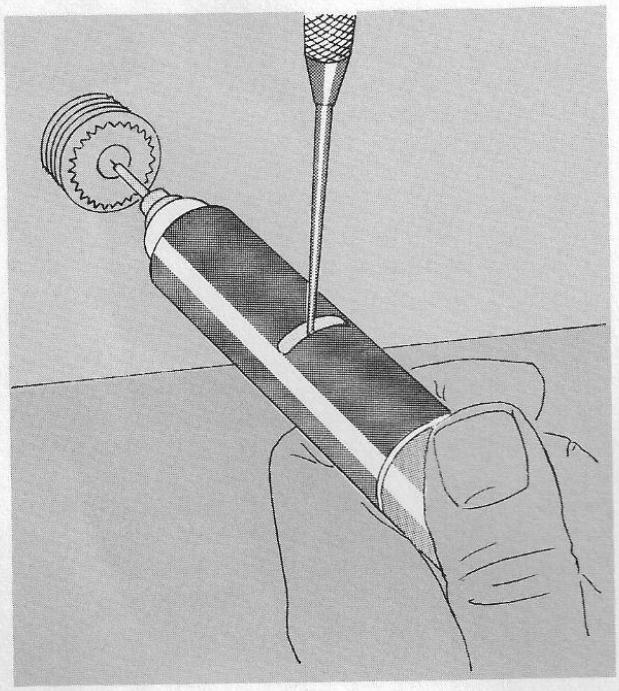


Fig. 1 Adjusting the probe compensation with the square wave from the oscilloscope calibrator.

OPERATION

(With Type 128 Probe Power Supply)

To place the Type 128 into operation, connect the power cord to a 117-volt 60-cycle source and plug in one or two Type P500CF Probes. Connect the probe to the oscilloscope and place the oscilloscope AC-DC switch in the AC position.

To obtain the best transient response and bandwidth with minimum distortion, the input signal to the Type P500CF Probe should be limited to about 5 volts at 10 megacycles and to about 2 volts at 30 megacycles without the attenuator head, and to 50 volts and 20 volts, respectively, with the 10X attenuator attached. Under these conditions the probe will cause an additional loss of approximately 0.5 db at 30 megacycles when used with a Tektronix Type 545A Oscilloscope and a Type K Plug-In Unit. The high-frequency response of the probe is slightly affected by the input capacitance of the oscilloscope. Low-frequency response of the probe is down 3 db at 5 cycles.

To read waveform voltages directly from the crt display, it is first necessary to calibrate the oscilloscope vertical-deflection system. The oscilloscope square-wave calibrator provides a convenient source of waveforms of known amplitude for this purpose and the VARIABLE VOLTS/CM control provides a method for adjusting the vertical-deflection factor.

For example, to calibrate the oscilloscope-probe combination for a vertical-deflection factor of .5 volt/cm, set the calibrator controls for an output of 2 volts, touch the probe tip to the calibrator output connector, set the VOLTS/CM control to .2 and adjust the VARIABLE control for exactly 4 centimeters of deflection. Adding the 10X attenuator head to the probe after completing this calibration procedure will increase the vertical-deflection factor to 5 volts/cm.

NOTE

The probe output is elevated to about +11 volts dc, and you will experience difficulty in positioning the display if the plug-in AC-DC switch is not placed in the AC position.

USE OF P500CF CATHODE-FOLLOWER PROBE WITH TYPE 513D OSCILLOSCOPE

When Type P500CF Probe is used with Type 513D, there are two wiring changes that must be made at the probe-power receptacle.

Locate the probe-power receptacle on the front panel. Remove the two +225 Volt leads (red and white stripe) from pin #4. Place a two inch length of Temflex sleeving over one of these leads. Splice them together and slip the sleeving over the soldered junction. Solder a bare wire from pin #4 to pin #1.

This completes the necessary wiring changes for proper operation of the P500CF Probe with the 513D.

POWER SUPPLY REQUIREMENTS FOR P500CF PROBES

DC Output Voltages

+120 volts regulated, at 25 milliamperes.
+6.3 volts unregulated, at 150 milliamperes.
+6.3 volts unregulated, at 150 milliamperes.

Ripple

Ripple on the +120-volt supply is no more than 5 millivolts peak-to-peak, and no more than 75 millivolts, peak-to-peak, on the +6.3-volt supplies.

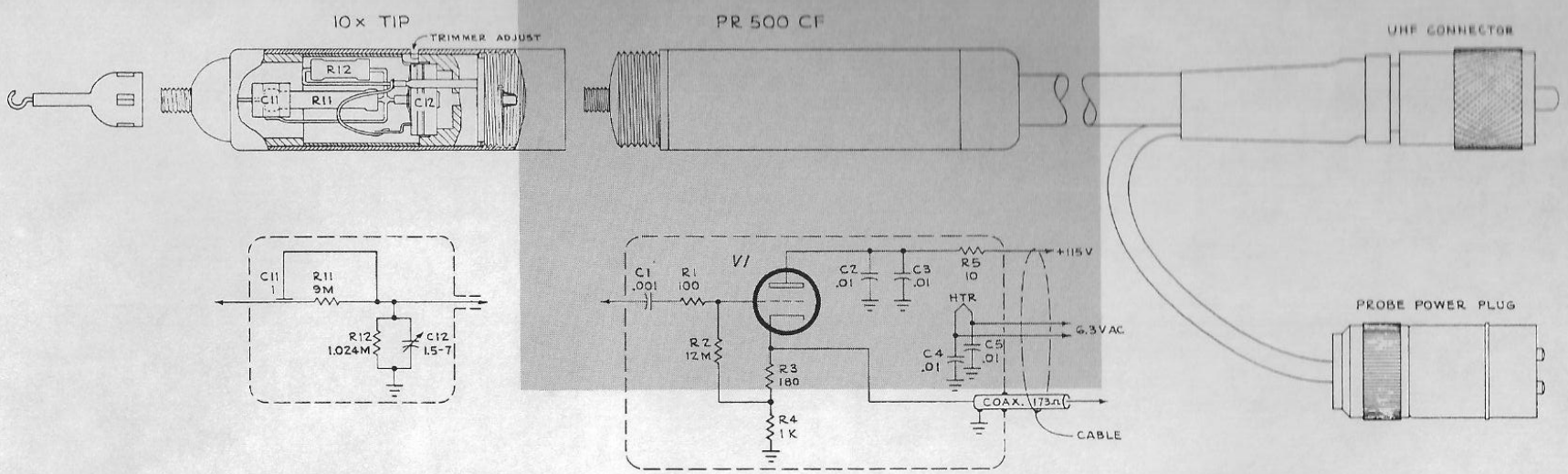
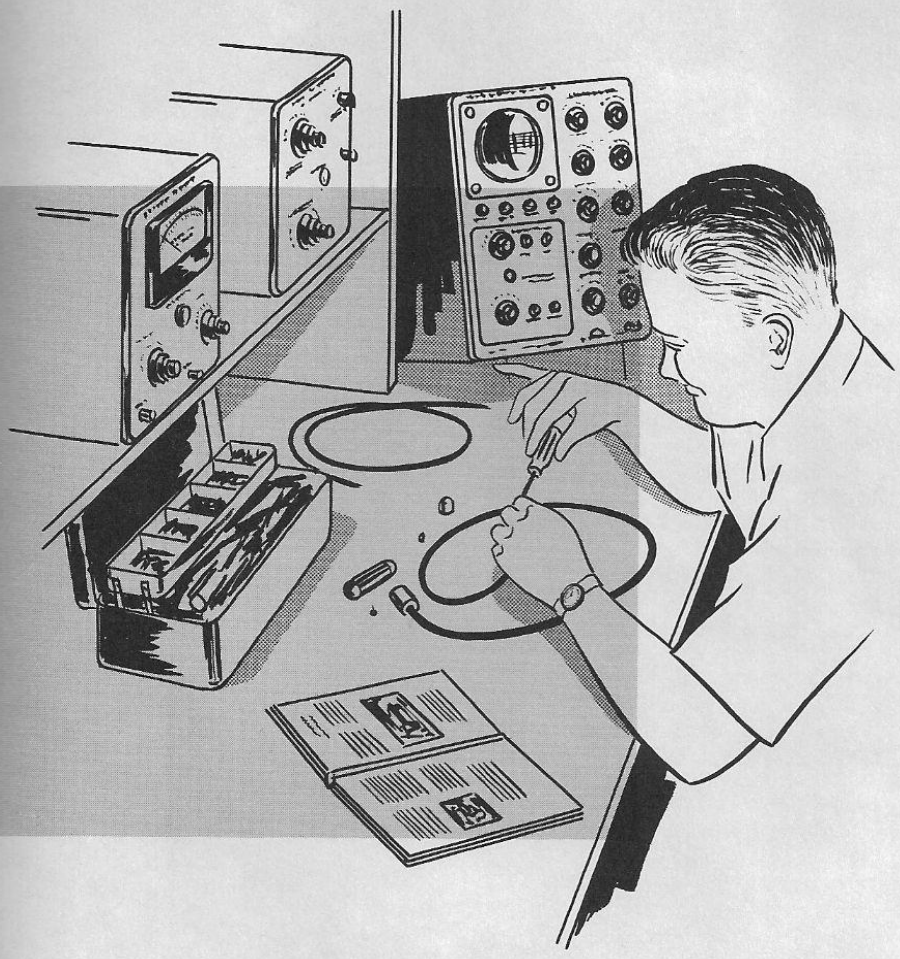


Fig. 2 Constructional details and schematic diagram of the Type P500 probe.



NOTE: In case of failure we suggest that you contact your local Tektronix Field Office. A list of Tektronix Field Offices will be found on the back of this manual.