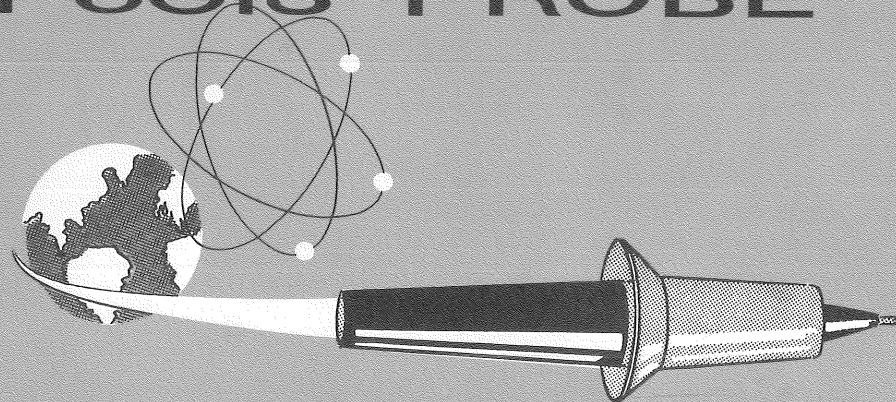


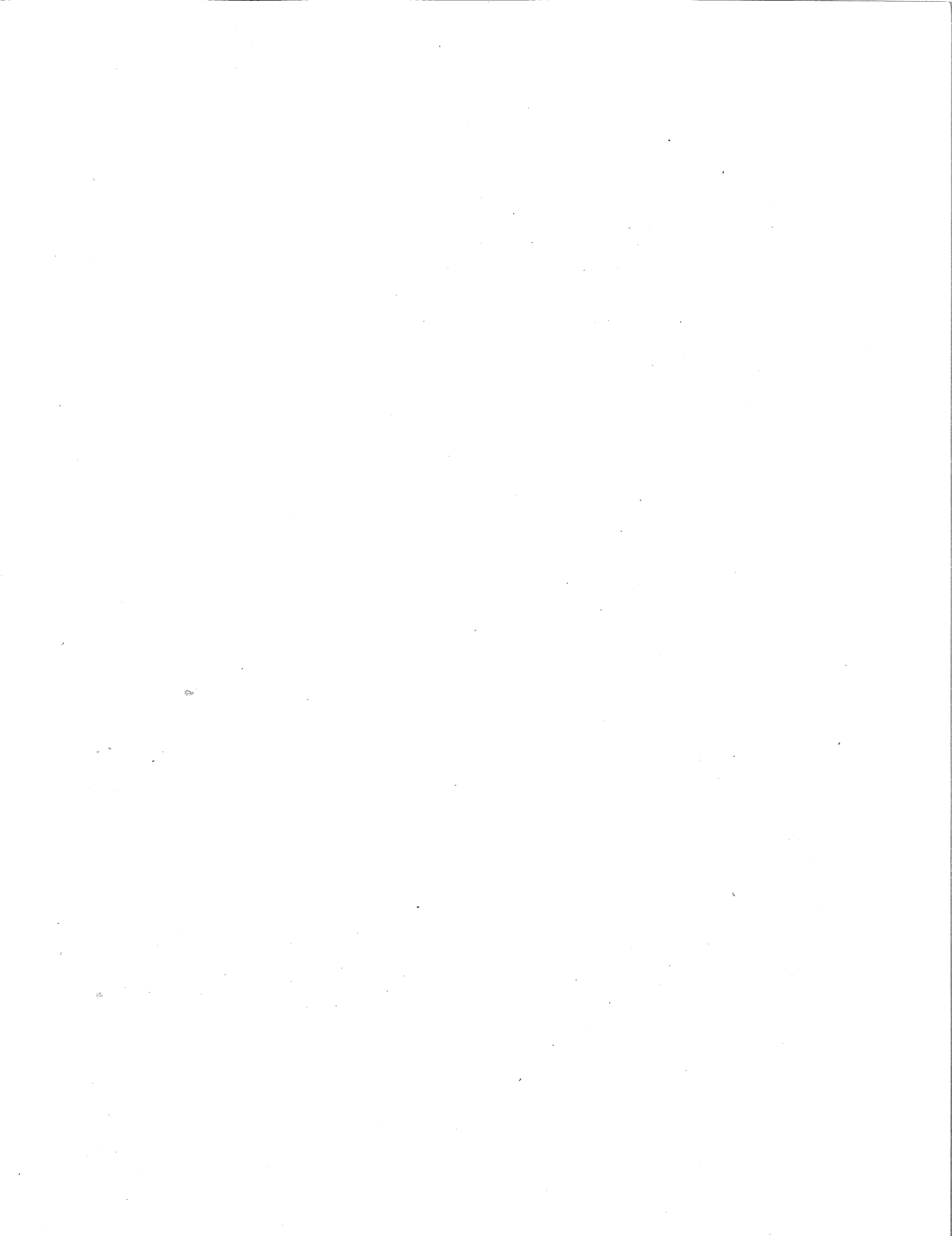
INSTRUCTION MANUAL

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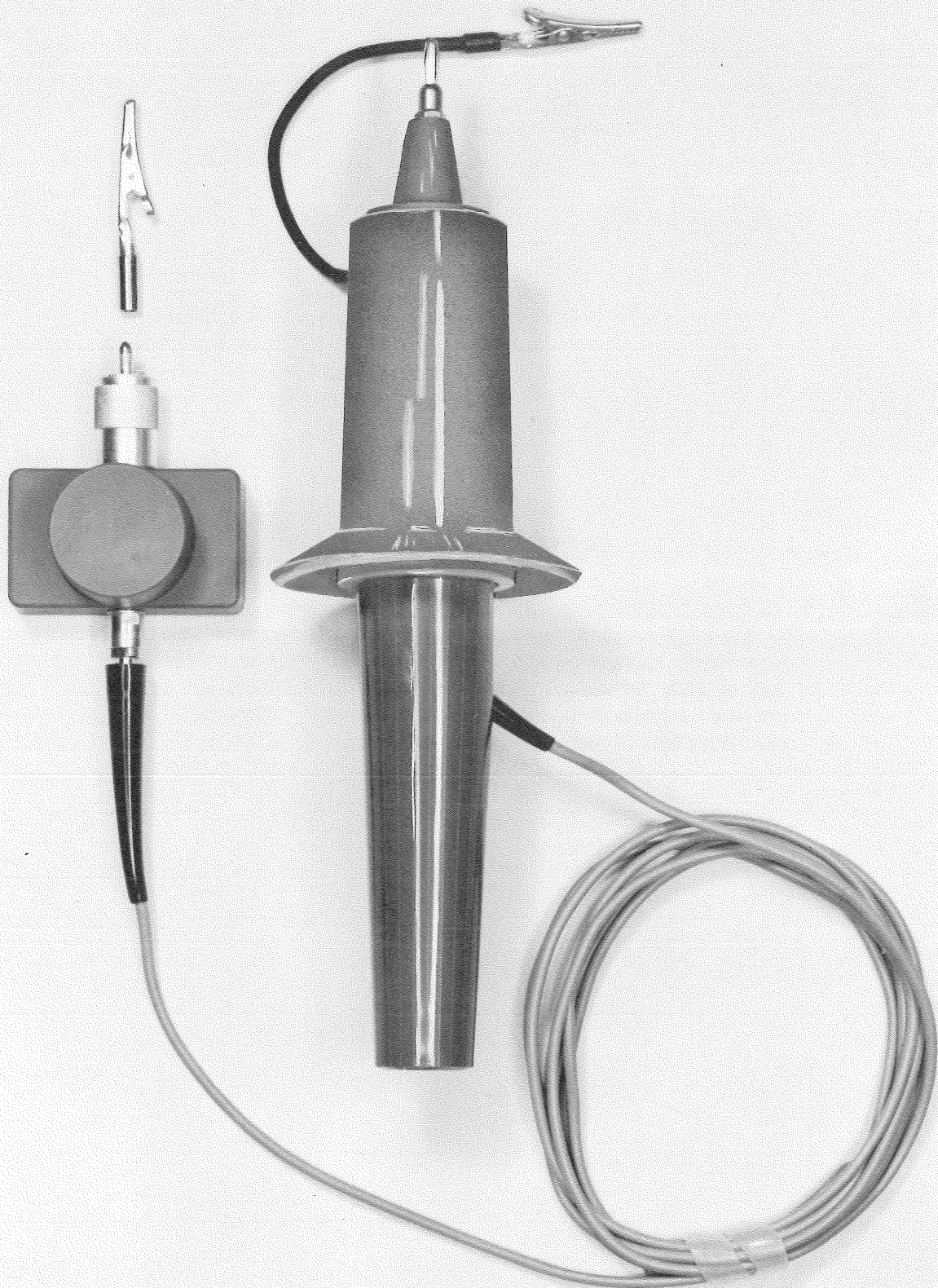
P6013 PROBE

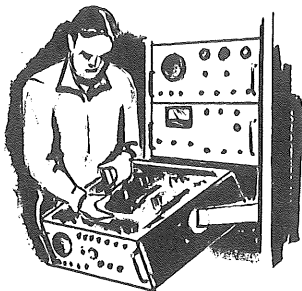


MANUFACTURERS OF CATHODE-RAY OSCILLOSCOPES



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OPERATING INSTRUCTIONS

General

The P6013 probe was developed to provide a means of observing waveforms of high amplitude on a conventional oscilloscope. The 1000:1 attenuation factor incorporated into the P6013 enables the user to observe waveforms or pulses with a peak amplitude of as much as 12 KV up to 100 KC in frequency, or DC voltages up to 12 KV without damage to the probe or the oscilloscope.

General Description

The P6013 Probe is designed for electrical and mechanical protection of its internal components, and is covered with thermoplastic offering high impact strength. Weight of the probe alone is 10 ounces, and of the probe, cable assembly and compensating box together, 18 1/2 ounces. The 10-foot cable has a resistive center conductor, with the value of the resistance chosen to provide optimum performance of the probe. The cable assembly may be removed and replaced. UHF connectors are standard on the P6013 probe.

Electrical Characteristics

Attenuation	1000:1
Input Impedance	100 megohms, 3 pf
Risetime (with Type 545 Oscilloscope and Type K Plug-in)	14 nanoseconds
Maximum Voltage Rating (below 100 KC)	
Max. DC	12 KV
Max. Peak Pulse	12 KV
Max. Peak AC	12 KV

Maximum Voltage Rating (above 100 KC) refer to Derating Curves, page 2.

COMPENSATING THE PROBE

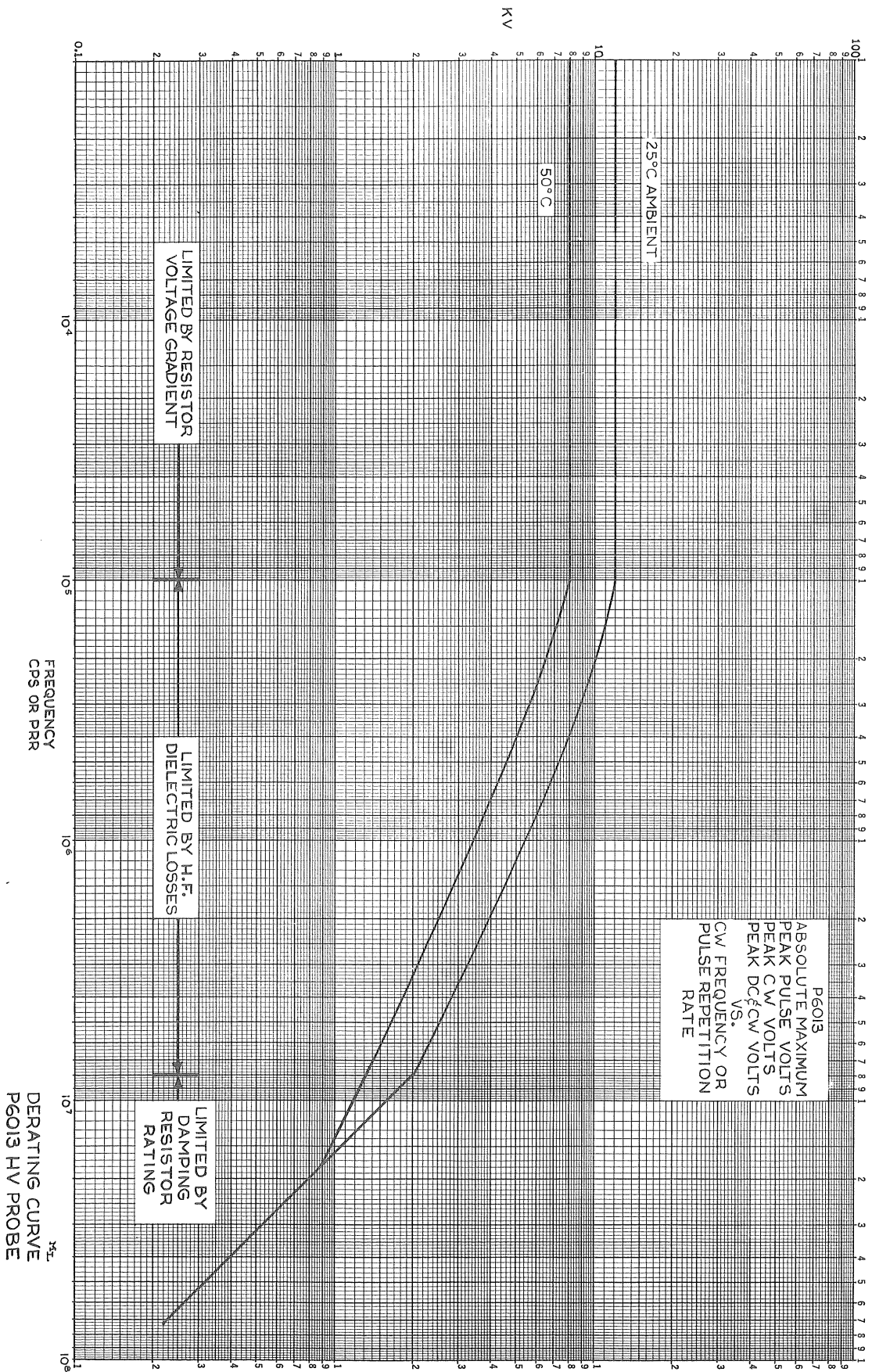
The electrical components in the Compensating Box of the Type P6013 probe include four variable trimmer capacitors and two potentiometers. The RC networks in the box are arranged to affect the observed shape of the waveform at different but overlapping points during the first 300 μ seconds of the pulse.

Five of these adjustments compensate for variations in input capacitance from one instrument to another. For accuracy in pulse and transient measurements, the probe should be checked frequently.

To check the probe, connect it to the INPUT connector of the oscilloscope. Set the calibrator control for an output signal of suitable amplitude. Touch the probe tip to the CAL. OUT connector, and adjust the oscilloscope controls for a display of several cycles. Optimum response is indicated by a flat-top square-wave.

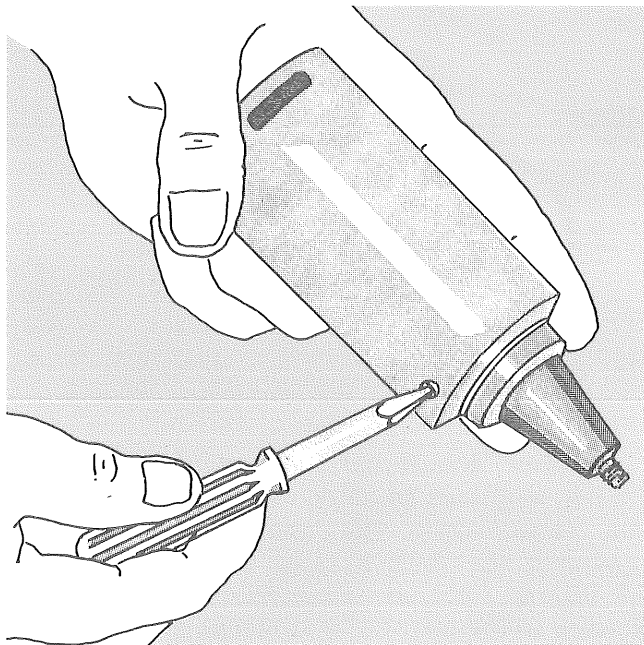
Attenuation--All models with R8017

Before compensating the probe, the attenuation of the probe must be checked. To do this set the VOLTS/DIV. of the oscilloscope or plug-in to .05 V/DIV. and the CALIBRATOR control to 100 volts. Touch the probe tip to the CAL. OUT connector and check for two major graticule divisions of deflection on the crt screen. If the deflection is more or less than two major divisions adjust R8017 until exactly two major divisions are obtained.



Compensation

To compensate the probe, start by first adjusting the screw labeled "1" in the lower left hand corner of the compensating box. This setting affects the front corner and general level of that portion of the waveshape that can be compensated -- in other words, the first 300 microseconds of the waveform. After positioning the front corner, adjust the remaining screws, moving clockwise around the face of the compensating box in numerical order. Adjusting screw no. 2 affects the waveshape from .5 to 100 microseconds. No. 3 affects the waveshape from 2 microseconds to 120 microseconds, and the fourth screw affects the waveshape from 5 microseconds to 150 microseconds. Since there is interaction between the adjustments of the trimmer capacitors, it will be necessary to repeat the sequence.



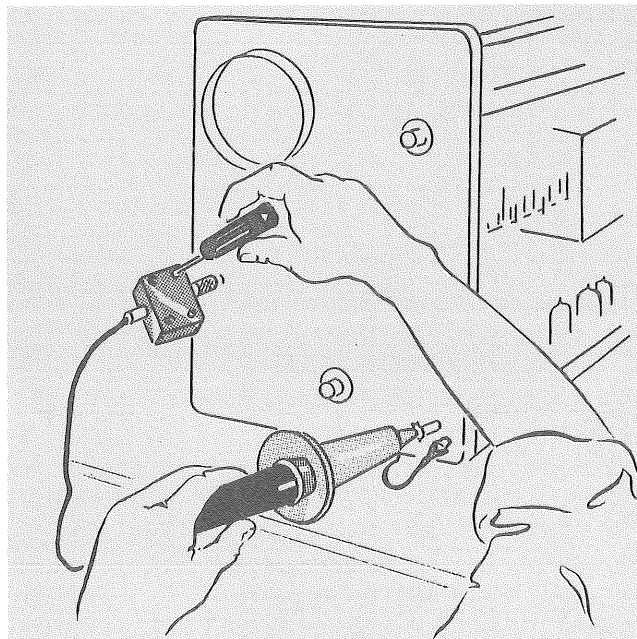
A variable peaking resistor (R8012) is provided to compensate the first .3 microsecond of the waveshape. To make this adjustment, the cover of the compensating box must be removed. Adjustment of this resistance requires the use of a Tektronix Type 105 Square-Wave Generator, or another square-wave generator capable of producing a pulse with a risetime of 15 nanoseconds or less.

If the compensation has been properly adjusted for an oscilloscope of 20 pf input capacitance, adjustment for another input capacitance can generally be achieved by readjusting the first screw only.

MAINTENANCE

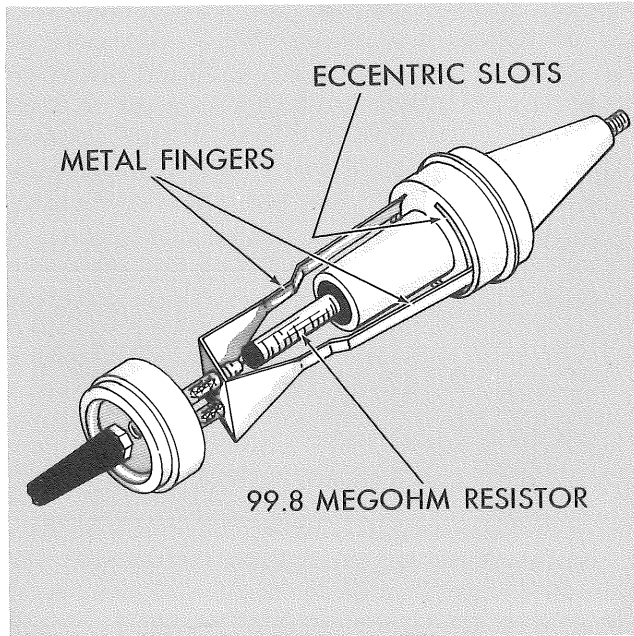
Circuit troubles that might be expected in the Type P6013 generally fall into three categories. The troubles and their remedies include:

(1) Open center conductor in cable. This is found by connecting the UHF connector on the Compensating Box to the INPUT connector of the Oscilloscope plug-in and touching the probe tip to the CAL. OUT connector. An open center conductor is indicated if no signal appears on the Oscilloscope screen with 100 volts out of the Calibrator. Replace cable assembly.



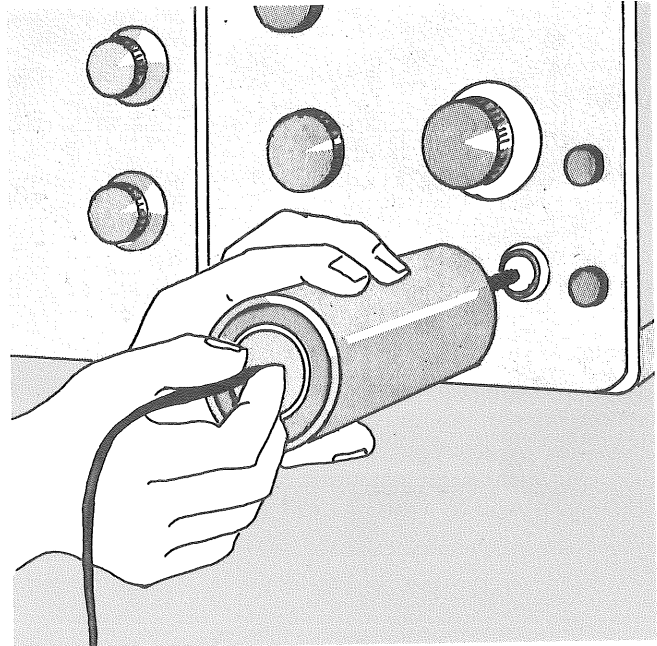
(2) Open 99.8 megohms resistor in probe body. This results in AC coupling and is indicated by decay of the CAL. signal. To replace the 99.8 megohms resistor, dismantle the probe by unscrewing the handle and pushing the metal barrel out of the body cover. Then remove the screws from both ends of the barrel and slide the nose and base assembly out. Insert the replacement nose assembly into the base assembly, being sure that the metal capacitor fingers of the base assembly fit properly into the eccentric circular slots in the nose assembly. Do not bend the metal fingers any more than absolutely necessary in getting them inserted into the slots. When this has been done, reinsert the base and nose assembly into the barrel. You will notice that at the nose end, the nose assembly has six screw holes in the light-colored plastic portion, while the barrel has only three screw holes.

This is for compensation purposes. When the nose and base have been re-inserted in the barrel, line up the screw holes at the nose end, and, while holding the assembly firmly together as shown in Fig. (2) insert one screw and snug it down firmly. At the base end, insert the three screws in the slotted holes, but do not tighten them clear down yet.



Connect the probe for use and insert the tip in the CAL. OUT connector. Compensate the waveform as nearly as possible with the trimmers in the compensating box. If a dip or rise continues to appear in the waveform beyond the portion compensated by No. 4 screw, this can normally be compensated by rotating the base portion of the internal probe assembly, using the two screw heads in the base to turn it. It is possible that complete compensation can only be done by removing the screw from

the nose end of the probe and rotating the nose assembly within the barrel to the next position. This should enable you to completely compensate the waveform to a perfect square wave. When compensation is completed in this manner, insert the remainder of the screws in the nose end and tighten down all screws at both nose and base. Re-insert the barrel into the probe body and again test the wave shape with a CAL. signal. Minor compensations of the compensating box may again be necessary after complete re-assembly of the probe.



(3) Open connection in compensating box. This is indicated by an obvious error in attenuation ratio. Open the compensating box by removing the four screws in the corners of the cover. Replace or reconnect internal components in the conventional manner.

Accessories Supplied with Probe

Banana Plug Tip	134-016
7 inch Ground Strap	175-192
Alligator Tip	344-033

Accessories that may be Purchased

Special wrench 7/16 one end and 1/2 other end. For disassembly purposes.	003-211
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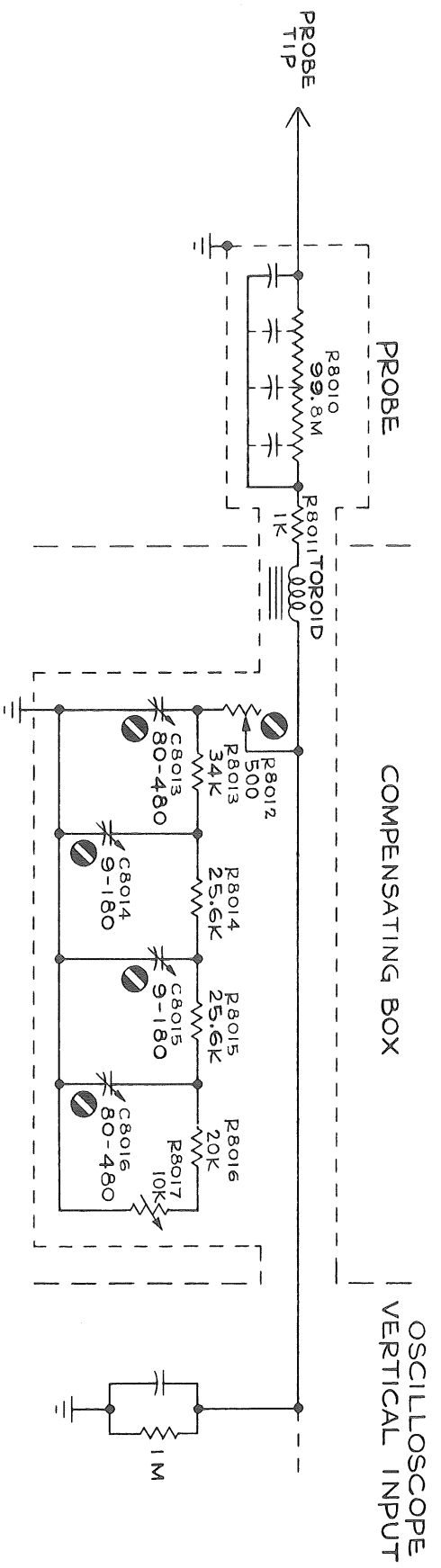
TYPE P6013 PROBE

TABLE I ELECTRICAL PARTS

Ckt. No.	Model No.	Value	Description			Tektronix Part No.
C8013	All	80-480 pf	Mica	Var	500v	281-044
C8014	All	9-180 pf	Mica	Var	500v	281-023
C8015	All	9-180 pf	Mica	Var	500v	281-023
C8016	All	80-480 pf	Mica	Var	500v	281-044
R8010		99.8 meg	See Mechanical Parts Table II			
R8011	All	1 k	Comp	1/2 w	10%	302-102
R8012	All	500 Ω	Comp	Var	20%	311-150
R8013	All	34 k	Prec	1/2 w	1%	309-129
R8014	All	25.6 k	Prec	1/2 w	1%	309-136
R8015	All	25.6 k	Prec	1/2 w	1%	309-136
R8016	Last part of Model 1 and all of Model 2.	20 k	Prec	1/2 w	1%	309-153
R8017	Last part of Model 1 and all of Model 2.	10 k	Comp	Var	20%	311-245
Toroid			See Mechanical Parts Table II			

TABLE II MECHANICAL PARTS

Item No.	Model No.	Part Title	Tektronix Part No.
1	All	Probe Body	204-036
2	All	Nose Assembly with 99.8 meg	206-033
3	All	Metal adjustment arms	015-023
4	All	Inner Body, Alum tube	205-006
5	All	Cable Assembly	175-188
6	All	Handle for probe	367-017
7	All	Compensator housing cover	200-201
8	All	Compensator chassis	441-309
9	All	Red fiber toroid retainer	200-217
10	All	Connector UHF	131-176
11	All	Toriod core (2 needed)	276-519
12	All	Compensator housing	432-027



TYPE P6013 PROBE

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