Instruction Manual

010-0165-00

P6007 PROBE

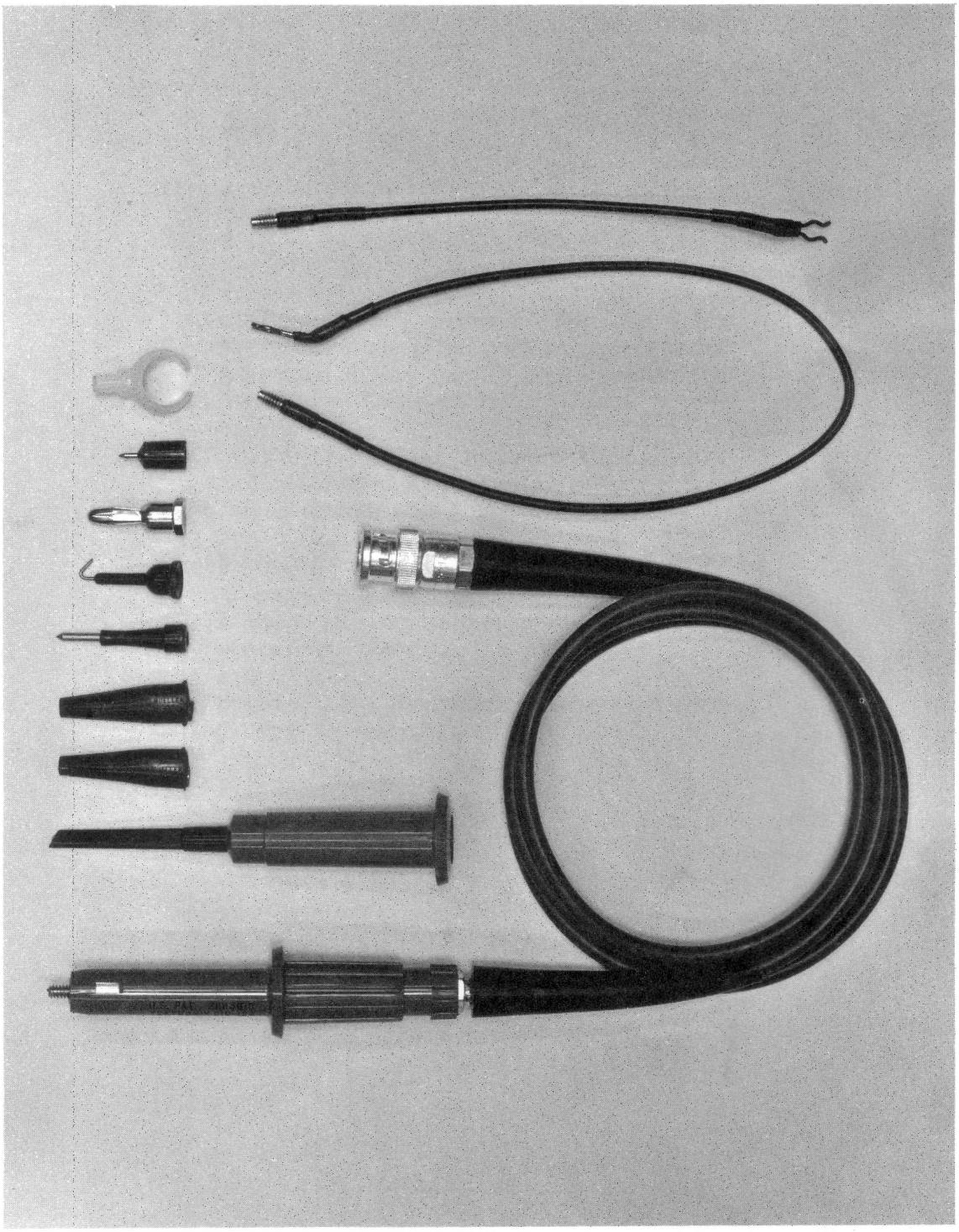
Tektronix, Inc. • P. O. Box 500 • Beaverton, Oregon 97077 • Phone 644-0161 • Cables: Tektronix

070-0388-01
Product Group 60

First Printing JAN 1967
Revised JAN 1982

TABLE OF CONTENTS

	Page
Introduction	1
Characteristics	1
Compensation	1
Derating Curves	2
Parts List	11
Schematic	23



The P6007 Probe With Standard Accessories

P6007 PROBE

Introduction

The P6007 is a passive probe with 100X attenuation, designed for oscilloscopes having input resistance of 1 megohm and input capacitance of up to 55 picofarads (pf). The probe decreases resistive and capacitive loading on the circuit under test.

Characteristics

Attenuation Factor	100X, ±3%
*Input Resistance	10 megohms, ±2%
Probe Resistance	9.9 megohms, ±2%
*Input Capacitance Risetime	See Table 1
Maximum Voltage Rating	1.5 kV dc or rms (2.1 kV peak or 4.2 kV peak-to-peak). Maximum voltage must be derated at higher frequencies; see derating curves, Figs. 2 through 5.
Cable Length	Nominally 3.5', 6', 9', or 12' measured between the bases of the cable strain reliefs.
Environmental Capacitance	The 9.9-megohm resistor has been factory adjusted in the probe body for the best transient response. To replace the 9.9-megohm resistor, a new probe body must be ordered through your local Tektronix Field Office.
Operating Temperature	The probe will operate normally at temperatures up to 75° C.

Compensation

The P6007 Probe should be compensated each time it is transferred from one oscilloscope or plug-in unit to another. This will insure accurate attenuation of transient and sine-wave signals.

To compensate the probe, touch the probe tip to the oscilloscope calibrator output connector and display several cycles. See Fig. 1(a). Adjust for the correct waveform by turning the probe body and tip assembly while holding the knurled section at the base of the probe. Fig. 1(b) shows waveforms for a line-frequency oscilloscope calibrator, and Fig. 1(c) shows waveforms for a 1-kHz oscilloscope calibrator. After obtaining the correct waveform, hold the probe body and tip assembly and carefully tighten the locking sleeve. Make the final adjustment by holding the locking sleeve and probe body while turning the probe base.

TABLE 1

Cable Length (ft)	Input Capacitance With		Risetime With	
	20 pf Plug-In	47 pf Plug-In	Probe Alone	530- or 540-Series Oscilloscope and K Unit
3.5	≈ 2.0 pf	≈ 2.3 pf	≈ 7 nsec	≈14 nsec
6	≈ 2.2 pf	≈ 2.5 pf	≈ 9 nsec	≈ 15 nsec
9	≈ 2.4 pf	≈ 2.7 pf	≈ 12 nsec	≈ 17 nsec
12	≈ 2.6 pf	≈ 2.8 pf	≈ 13.5 nsec	≈ 18 nsec

*Also see the R_p and X_p frequency curves.

Derating Curves

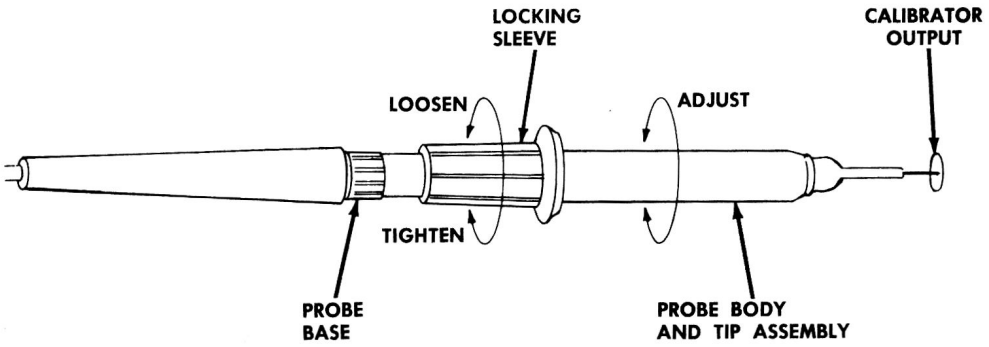
The derating curves show the maximum continuous-wave voltage that can be applied to the P6007 Probe at higher frequencies. When observing random pulse or combination of dc and ac, the approximate average power should be calculated and should not exceed 1/4 watt. With duty factors less than 0.1, the maximum input voltage can be determined from the following equation and the appropriate derating curve.

Maximum applied voltage at a particular frequency:

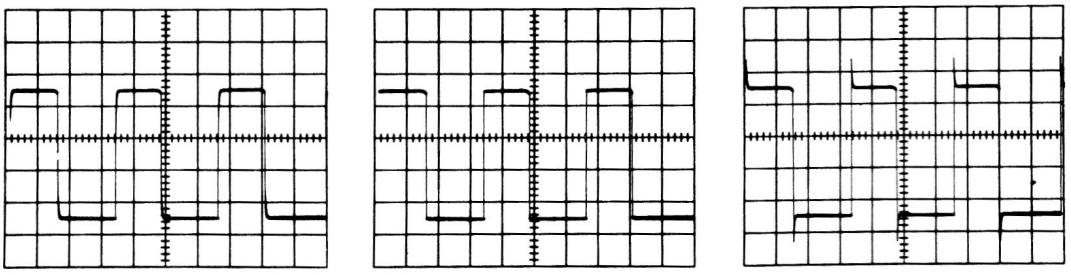
$$\frac{\text{Voltage from curve at CW frequency}}{\sqrt{\text{Duty Factor}}}$$

$$\text{Where: Duty Factor} = \frac{\text{pulse duration}}{\text{pulse period}}$$

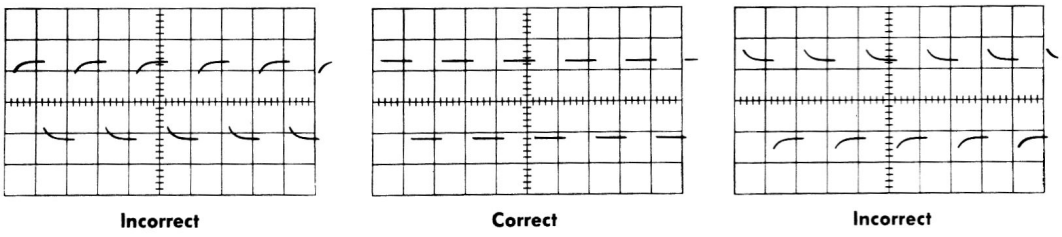
For pulse durations longer than 0.1 second, consider the signal as dc.



(a) Probe adjustments



(b) Waveforms from line-frequency oscilloscope calibrator



(c) Waveforms from 1-kHz oscilloscope calibrator.

Fig. 1. Probe compensation.

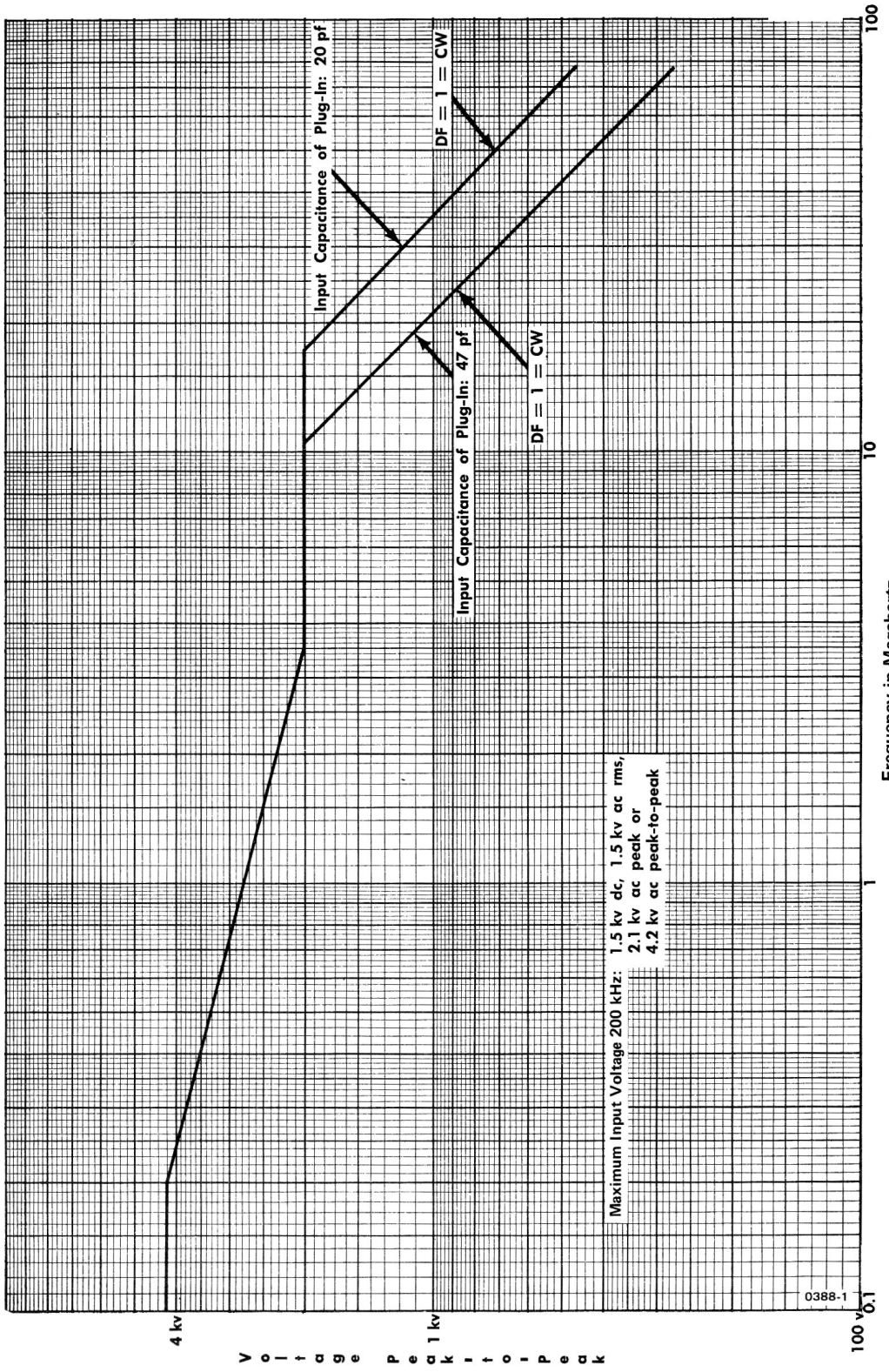


Fig. 2. P6007 derating curves (3.5-ft cable).

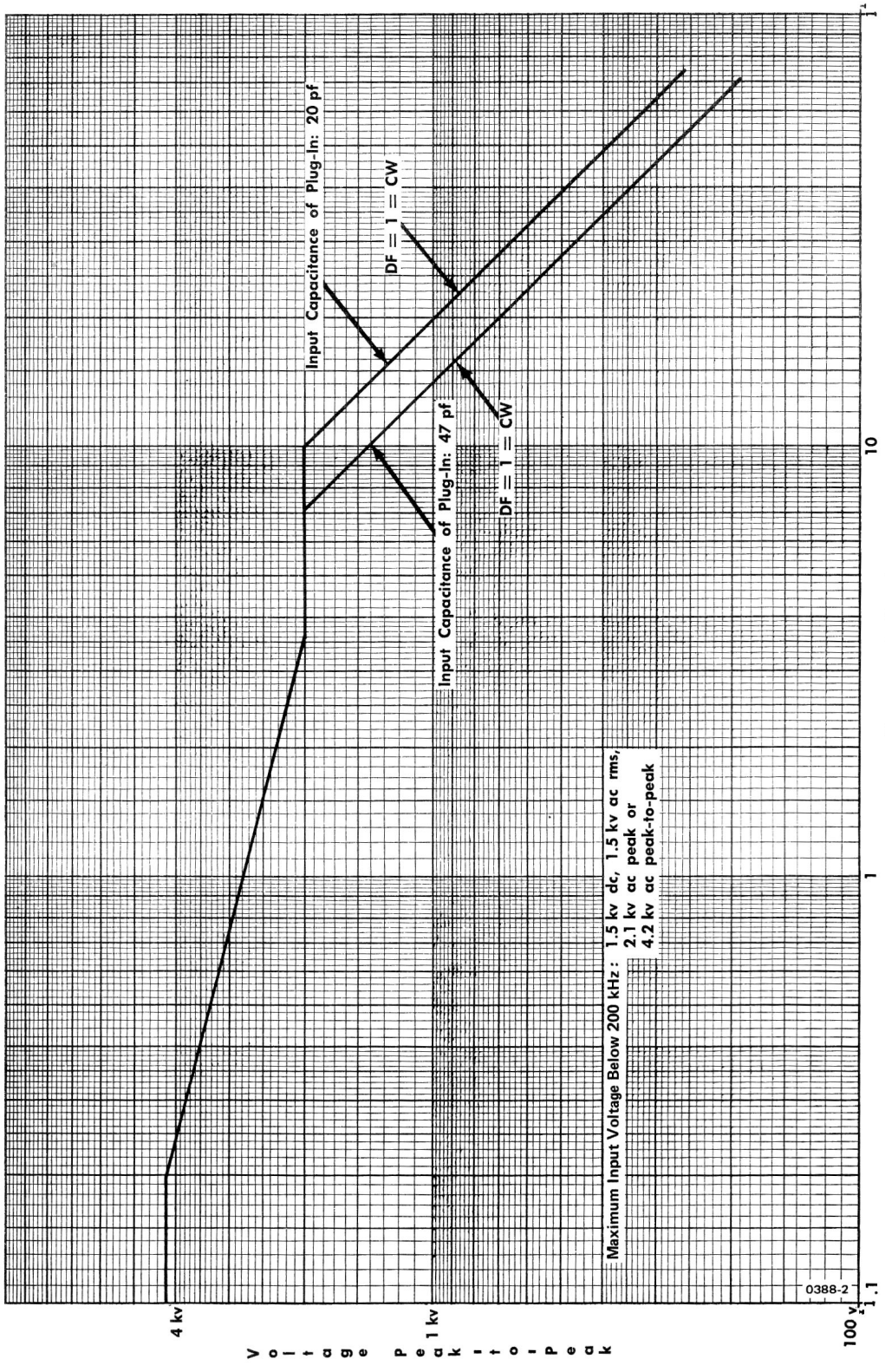


Fig. 3. P6007 derating curves (6-ft cable).

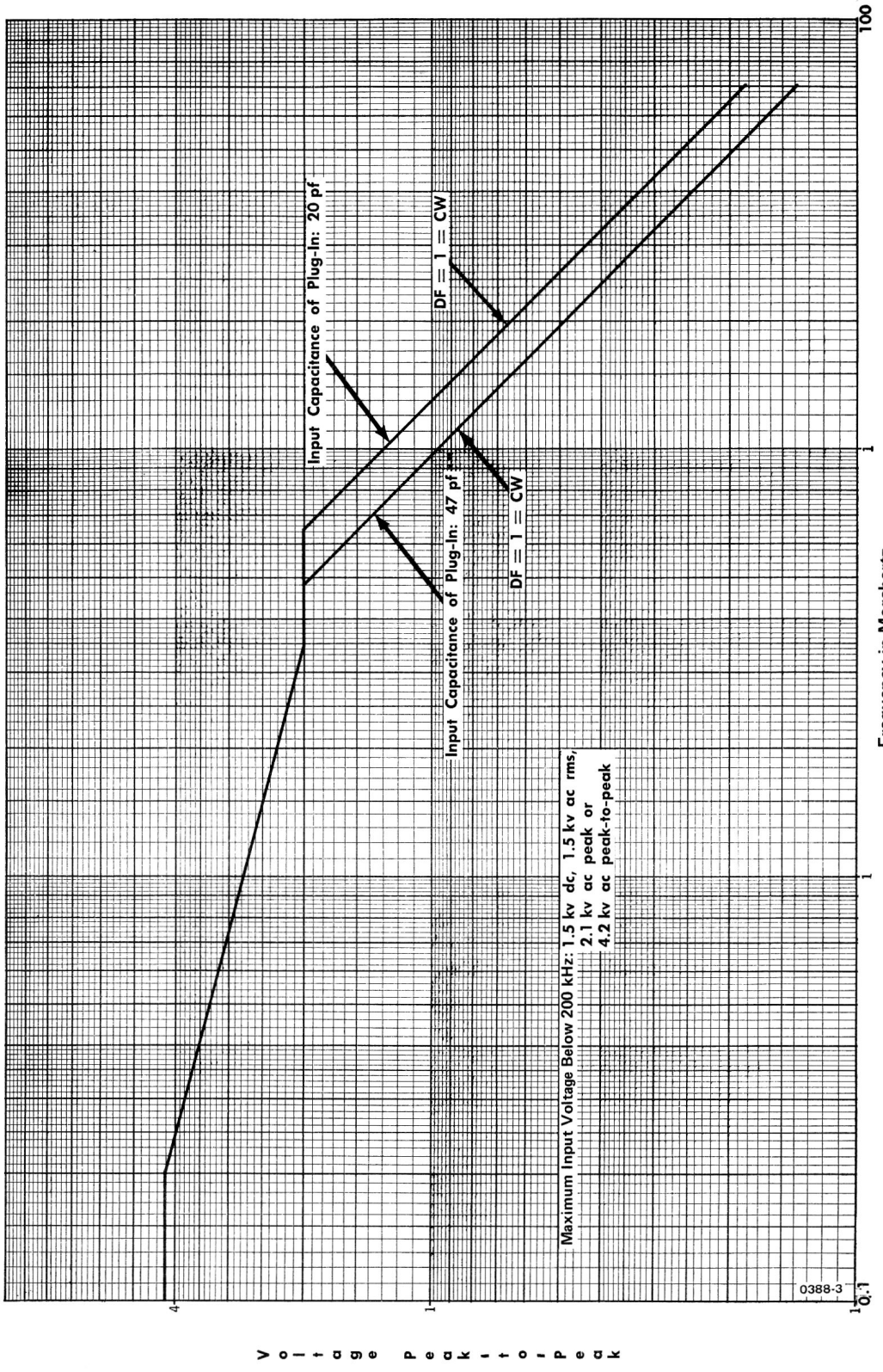


Fig. 4. P6007 derating curves (9-ft cable).

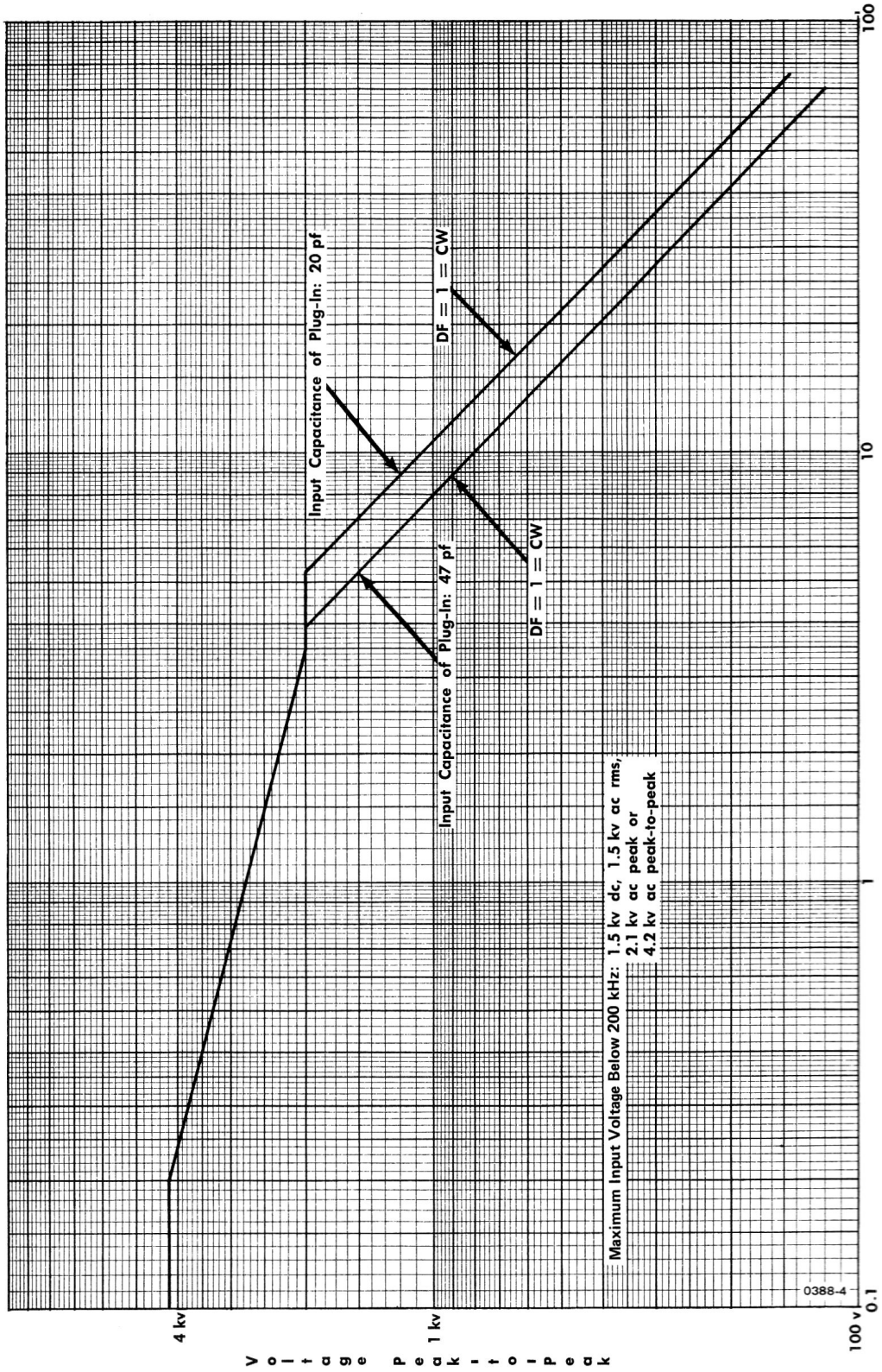


Fig. 5. P6007 derating curves (12-ft cable).

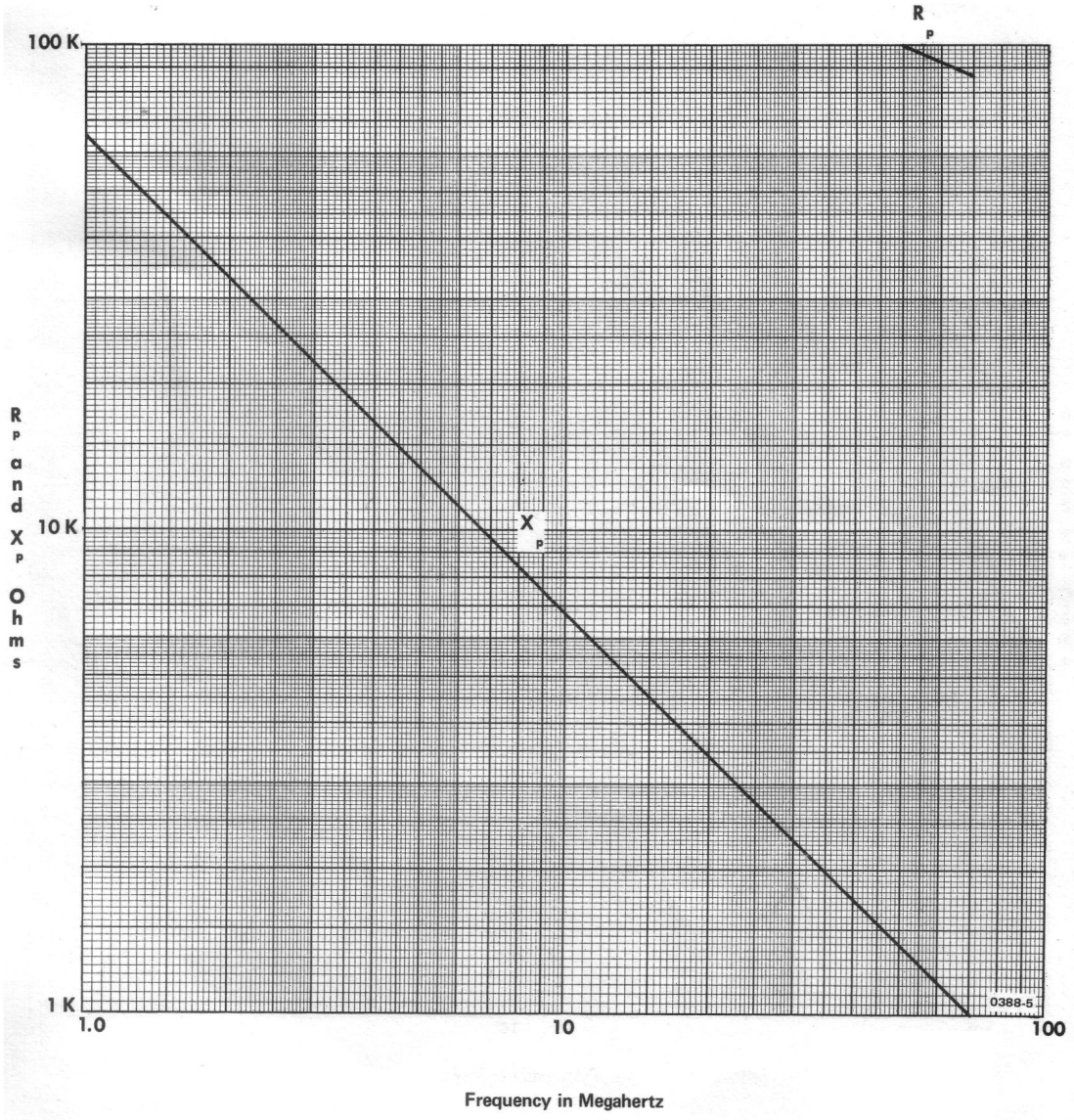


Fig. 6. P6007 input R_p and X_p vs frequency curves (3.5-ft cable).

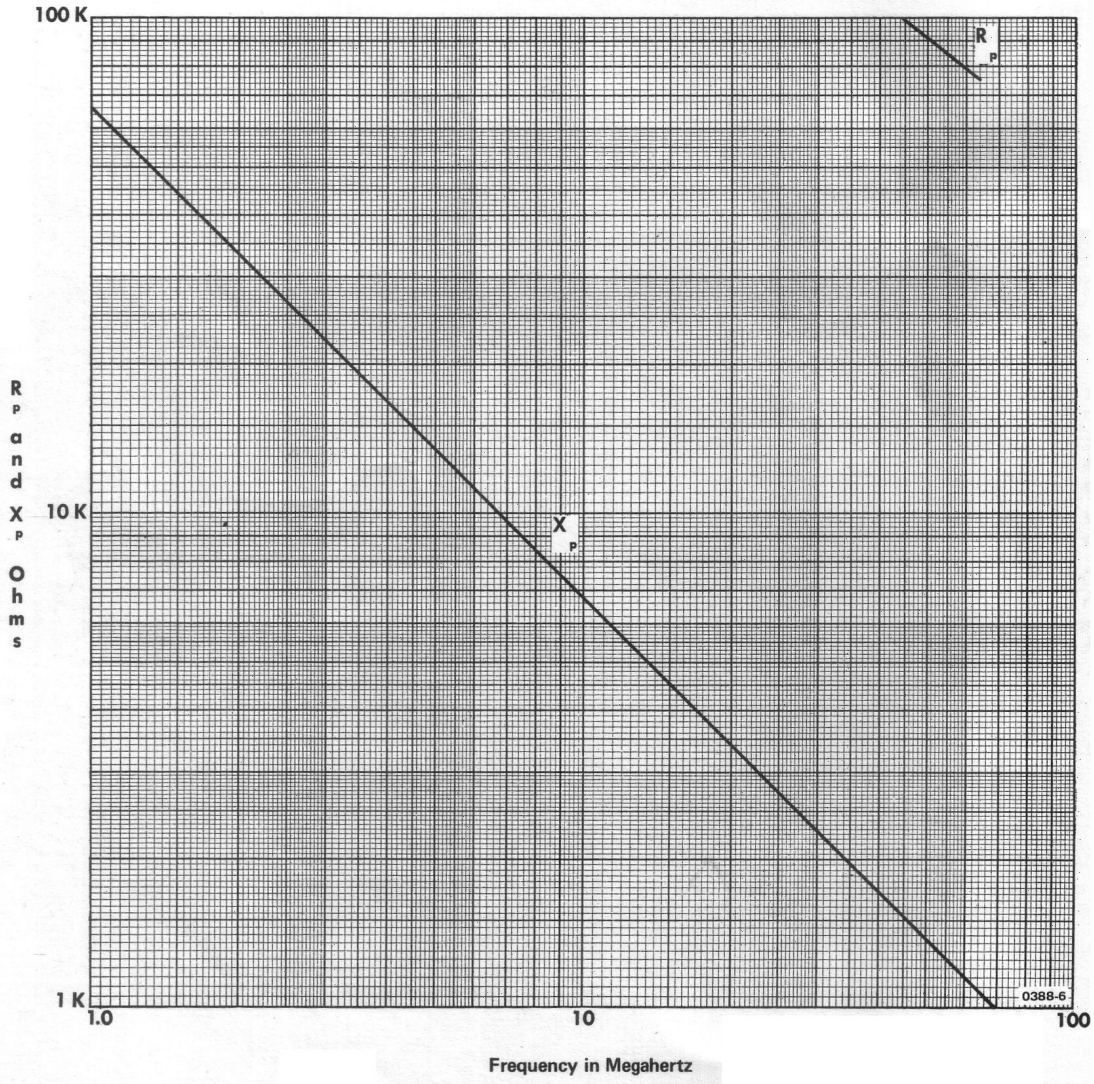


Fig. 7. P6007 input R_p and X_p vs frequency curves (6-ft cable).

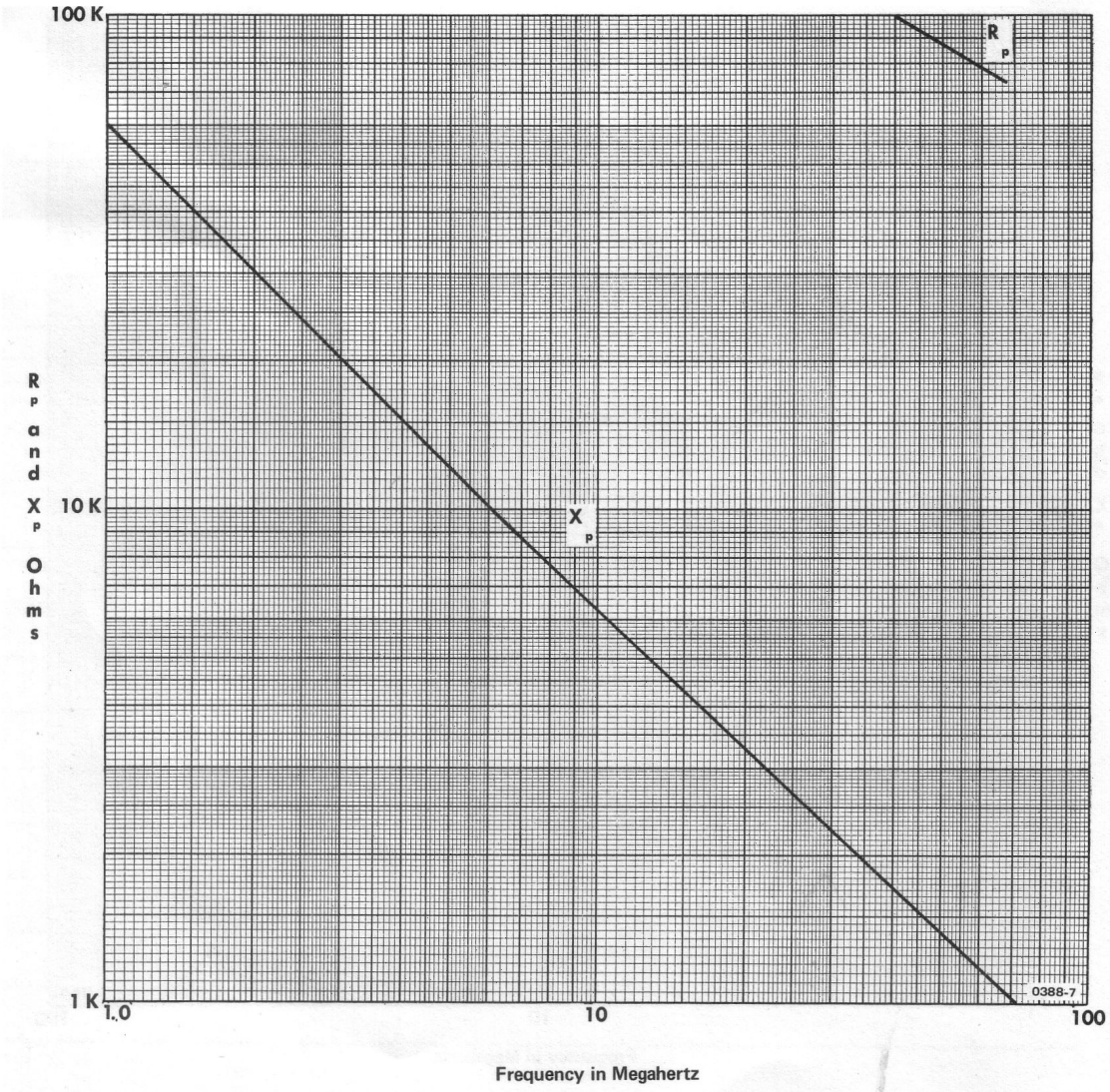


Fig. 8. P6007 input R_p and X_p vs frequency curves (9-ft cable).

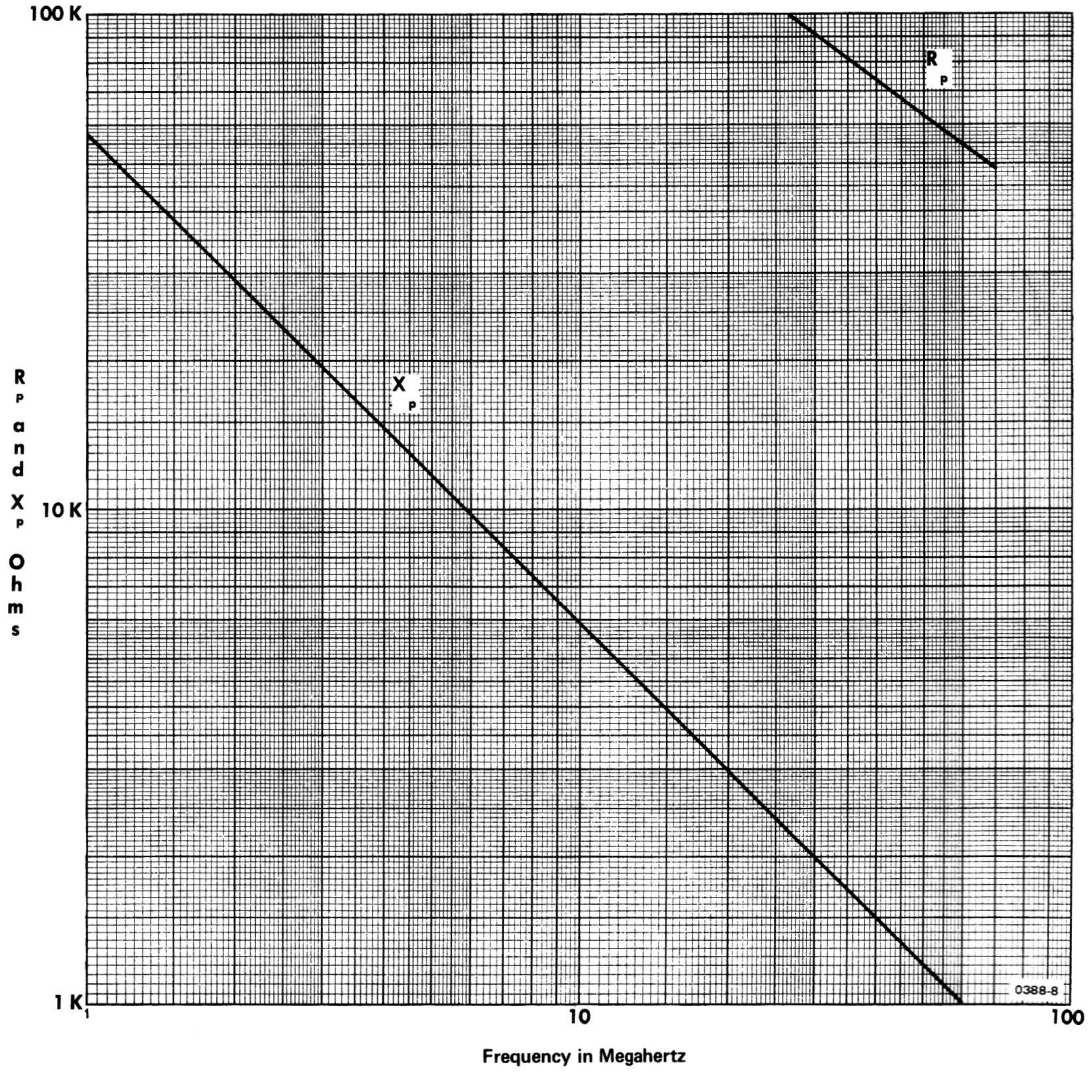


Fig. 9. P6007 input R_p and X_p vs frequency curves (12-ft cable).

NOTES

PARTS LIST AND SCHEMATICS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix Field Office.

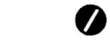
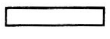
Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number including any suffix, instrument type, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix Field Office will contact you concerning any change in part number.

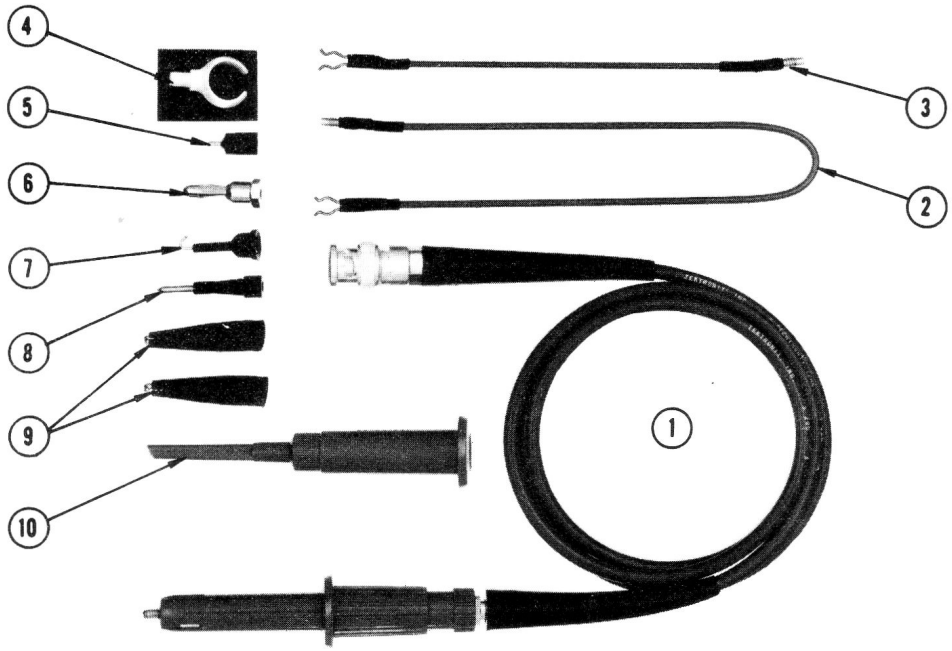
ABBREVIATIONS AND SYMBOLS

a or amp	amperes	mm	millimeter
BHS	binding head steel	meg or M	megohms or mega (10^6)
C	carbon	met.	metal
cer	ceramic	μ	micro, or 10^{-6}
cm	centimeter	n	nano, or 10^{-9}
comp	composition	Ω	ohm
cps	cycles per second	OD	outside diameter
crt	cathode-ray tube	OHS	oval head steel
CSK	counter sunk	p	pico, or 10^{-12}
dia	diameter	PHS	pan head steel
div	division	piv	peak inverse voltage
EMC	electrolytic, metal cased	plstc	plastic
EMT	electroyltic, metal tubular	PMC	paper, metal cased
ext	external	poly	polystyrene
f	farad	Prec	precision
F & I	focus and intensity	PT	paper tubular
FHS	flat head steel	PTM	paper or plastic, tubular, molded
Fil HS	fillister head steel	RHS	round head steel
g or G	giga, or 10^9	rms	root mean square
Ge	germanium	sec	second
GMV	guaranteed minimum value	Si	silicon
h	henry	S/N	serial number
hex	hexagonal	t or T	tera, or 10^{12}
HHS	hex head steel	TD	toroid
HSS	hex socket steel	THS	truss head steel
HV	high voltage	tub.	tubular
ID	inside diameter	v or V	volt
incd	incandescent	Var	variable
int	internal	w	watt
k or K	kilohms or kilo (10^3)	w/	with
kc	kilocycle	w/o	without
m	milli, or 10^{-3}	WW	wire-wound
mc	megacycle		

SPECIAL NOTES AND SYMBOLS

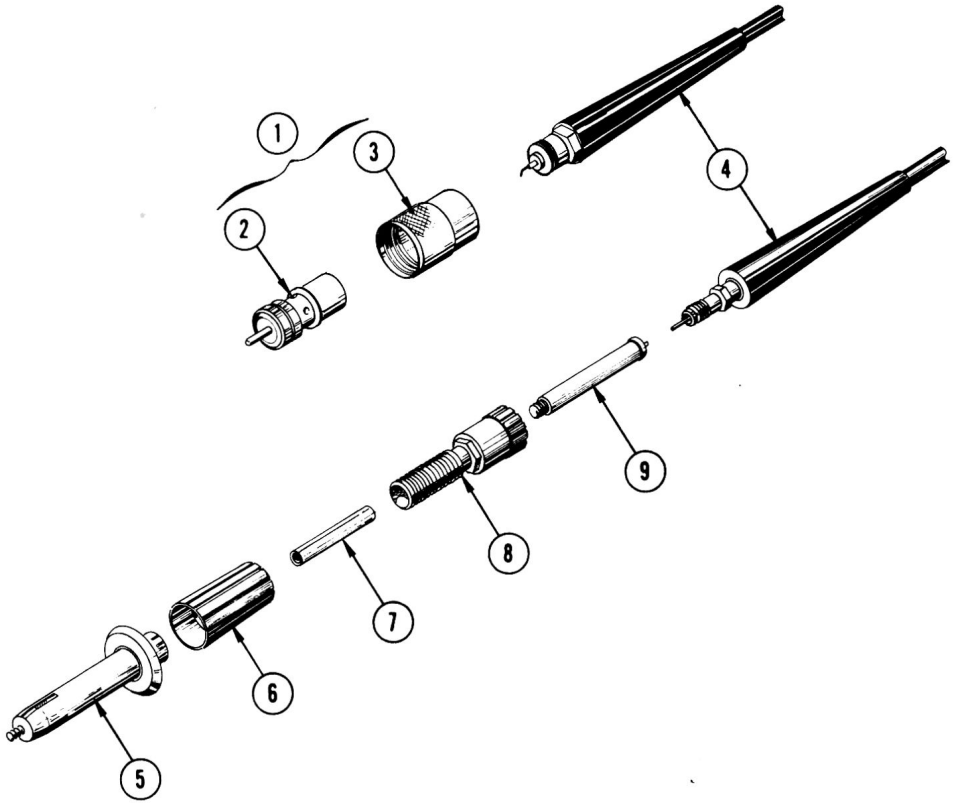
X000	Part first added at this serial number.
000X	Part removed after this serial number.
*000-000	Asterisk preceding Tektronix Part Number indicates manufactured by or for Tektronix, or reworked or checked components.
Use 000-000	Part number indicated is direct replacement.
	Internal screwdriver adjustment.
	Front-panel adjustment or connector.

PROBE WITH ACCESSORIES



REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
PROBE PACKAGE					
1—9	010-0134-00				PROBE PACKAGE, P6007, 3.5 ft UHF
	010-0150-00				PROBE PACKAGE, P6007, 3.5 ft BNC
	010-0162-00				PROBE PACKAGE, P6007, 6 ft UHF
	010-0165-00				PROBE PACKAGE, P6007, 6 ft BNC
	010-0136-00				PROBE PACKAGE, P6007, 9 ft UHF
	010-0152-00				PROBE PACKAGE, P6007, 9 ft BNC
	010-0138-00				PROBE PACKAGE, P6007, 12 ft UHF
	010-0154-00				PROBE PACKAGE, P6007, 12 ft BNC
	- - - - - -			-	probe package includes:
PROBE ONLY					
1	010-0135-00			1	PROBE, P6007, 3.5 ft UHF
	010-0151-00			1	PROBE, P6007, 3.5 ft BNC
	010-0163-00			1	PROBE, P6007, 6 ft UHF
	010-0166-00			1	PROBE, P6007, 6 ft BNC
	010-0137-00			1	PROBE, P6007, 9 ft UHF
	010-0153-00			1	PROBE, P6007, 9 ft BNC
	010-0139-00			1	PROBE, P6007, 12 ft UHF
	010-0155-00			1	PROBE, P6007, 12 ft BNC
STANDARD ACCESSORIES					
2	175-0125-00			1	CABLE, ground lead, 12 inches
3	175-0124-00			1	CABLE, ground lead, 5 inches
4	352-0090-00			1	HOLDER, probe
5	206-0015-00			1	TIP, straight, BNC
6	134-0013-00			1	PLUG, banana
7	206-0105-00			1	TIP, probe, hook
8	206-0060-00			1	TIP, probe spring
9	344-0046-00			2	CLIP, probe
10	013-0071-00			1	PINCHER TIP
	070-0388-01			1	MANUAL, instruction (not shown)

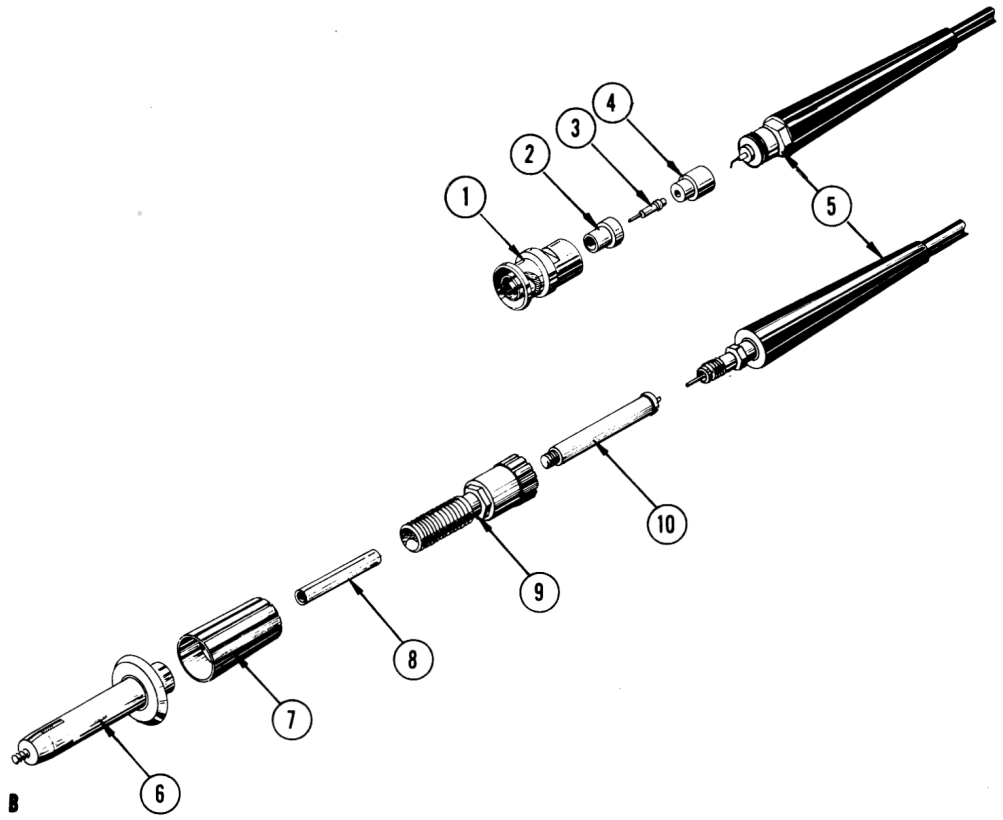
REPLACEABLE PARTS



B

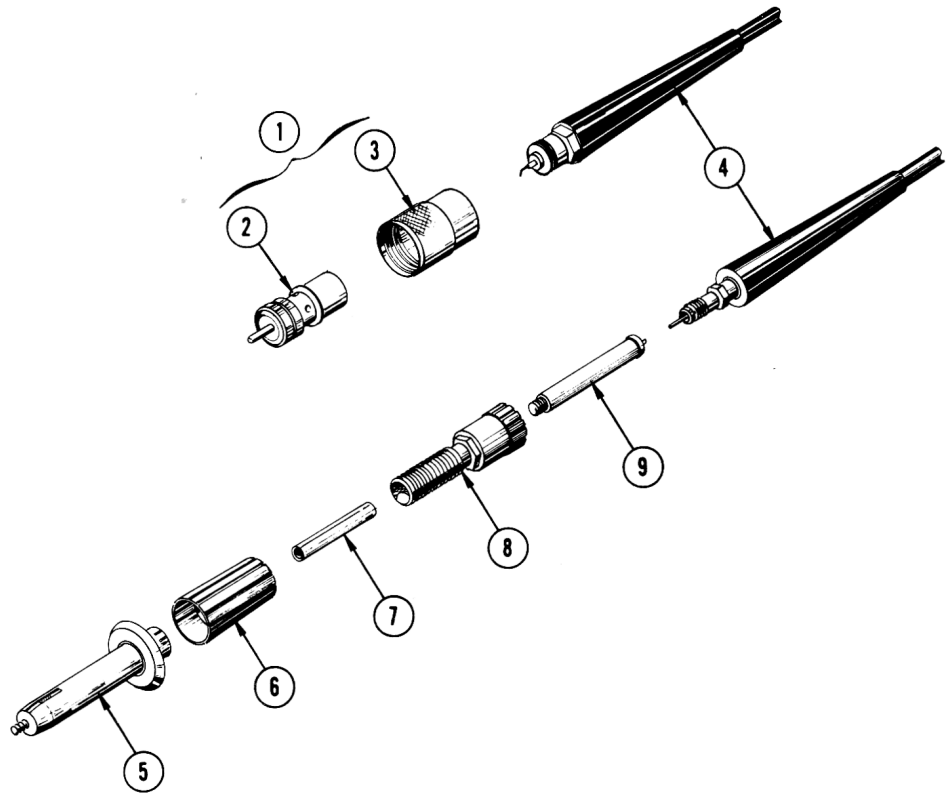
REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0135-00			1	PROBE, P6007, 3.5 ft UHF
	- - - - - -			-	probe includes:
1	131-0058-00			1	ASSEMBLY, connector
	- - - - - -			-	assembly includes:
2	131-0196-00			1	CONNECTOR, coaxial, cable end, male
3	200-0026-00			1	COVER, coaxial connector
4	175-0261-00			1	CABLE ASSEMBLY, 3.5 ft UHF
5	204-0188-00			1	BODY, assembly w/resistor
6	166-0285-00			1	SLEEVE, locking
7	166-0349-00			1	SLEEVE
8	358-0194-00			1	BUSHING, base
9	358-0192-00			1	BUSHING, inner base

REPLACEABLE PARTS



REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0151-00			1	PROBE, P6007, 3.5 ft BNC
	- - - - - -			-	probe includes:
1	134-0044-00			1	PLUG, probe
2	358-0072-00			1	BUSHING, insulator
3	214-0109-00			1	PIN, probe contact, male
4	361-0022-00			1	SPACER, w/center hole
5	175-0272-00			1	CABLE ASSEMBLY, 3.5 ft BNC
6	204-0192-00			1	BODY, assembly w/resistor
7	166-0285-00			1	SLEEVE, locking
8	166-0349-00			1	SLEEVE
9	358-0194-00			1	BUSHING, base
10	358-0192-00			1	BUSHING, inner base
	131-1098-02			1	CONTACT, electrical, readout (not shown)

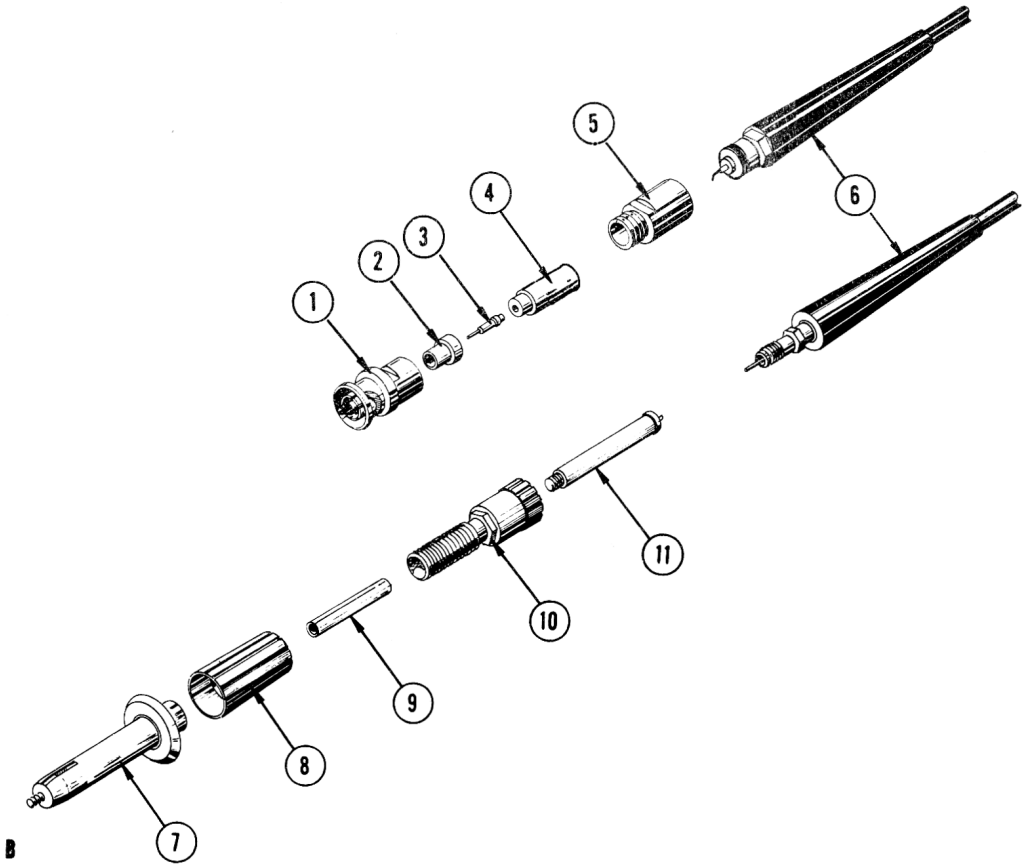
REPLACEABLE PARTS



B

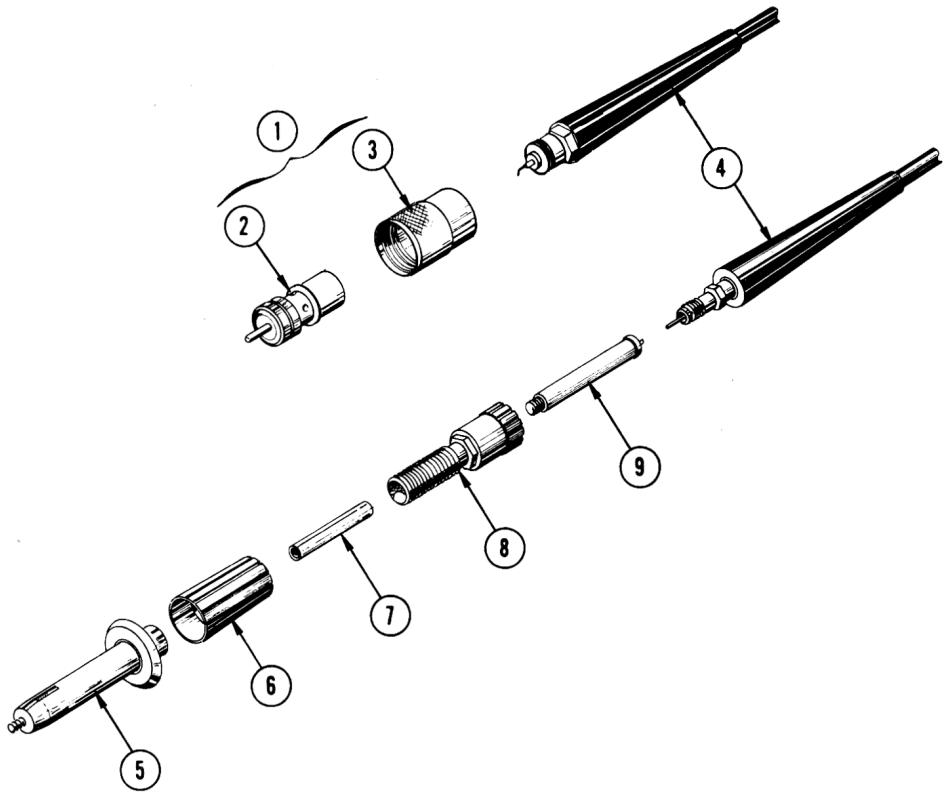
REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0163-00			1	PROBE, P6007, 6 ft UHF
	- - - - - -			-	probe includes:
1	131-0058-00			1	ASSEMBLY, connector
	- - - - - -			-	assembly includes:
2	131-0196-00			1	CONNECTOR, coaxial, cable end, male
3	200-0026-00			1	COVER, coaxial connector
4	175-0278-00			1	CABLE ASSEMBLY, 6 ft UHF
5	204-0189-00			1	BODY, assembly w/resistor
6	166-0285-00			1	SLEEVE, locking
7	166-0349-00			1	SLEEVE
8	358-0194-00			1	BUSHING, base
9	358-0195-00			1	BUSHING, inner base

REPLACEABLE PARTS



NO. REF.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0166-00			1	PROBE, P6007, 6 ft BNC
	- - - - - -			1	probe includes:
1	134-0044-00			1	PLUG, probe
2	358-0072-00			1	BUSHING, insulator
3	214-0109-00			1	PIN, probe contact, male
4	166-0326-00			1	SLEEVE, adapter
5	131-0270-00			1	ADAPTER
6	175-0279-00			1	CABLE ASSEMBLY, 6 ft BNC
7	204-0193-00			1	BODY, assembly w/resistor
8	166-0285-00			1	SLEEVE, locking
9	166-0349-00			1	SLEEVE
10	358-0194-00			1	BUSHING, base
11	358-0192-00			1	BUSHING, inner base
	131-1098-02			1	CONTACT, electrical, readout (not shown)

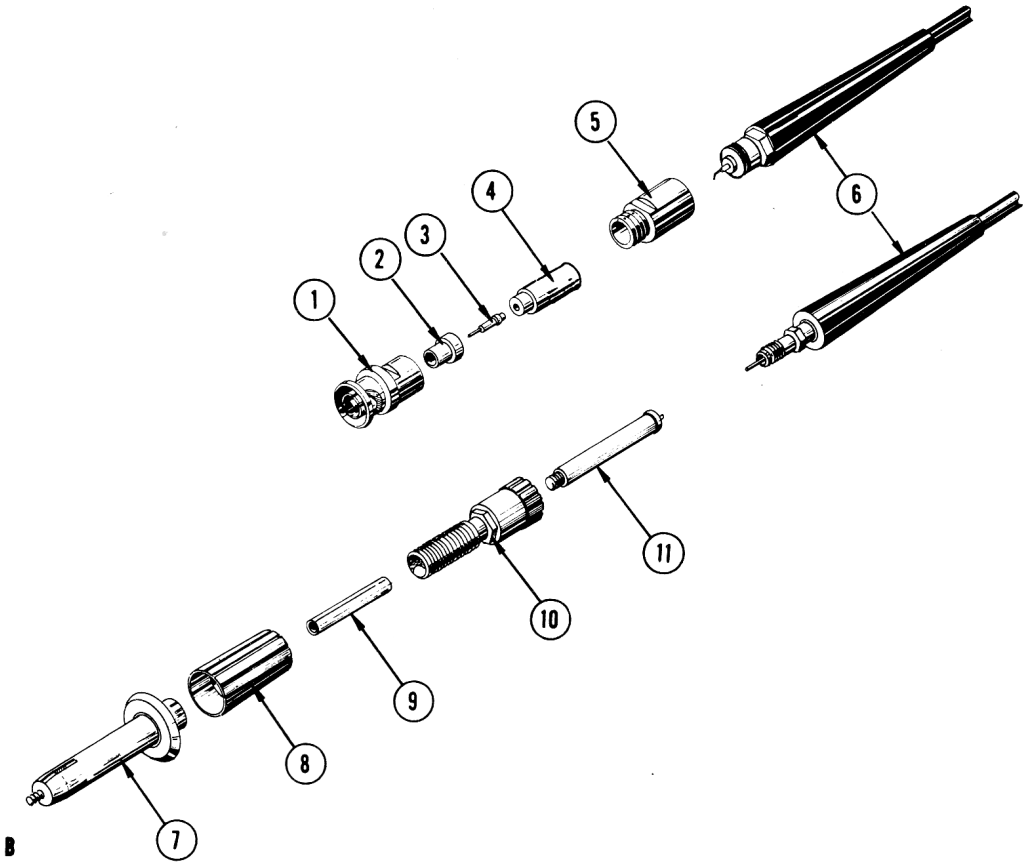
REPLACEABLE PARTS



B

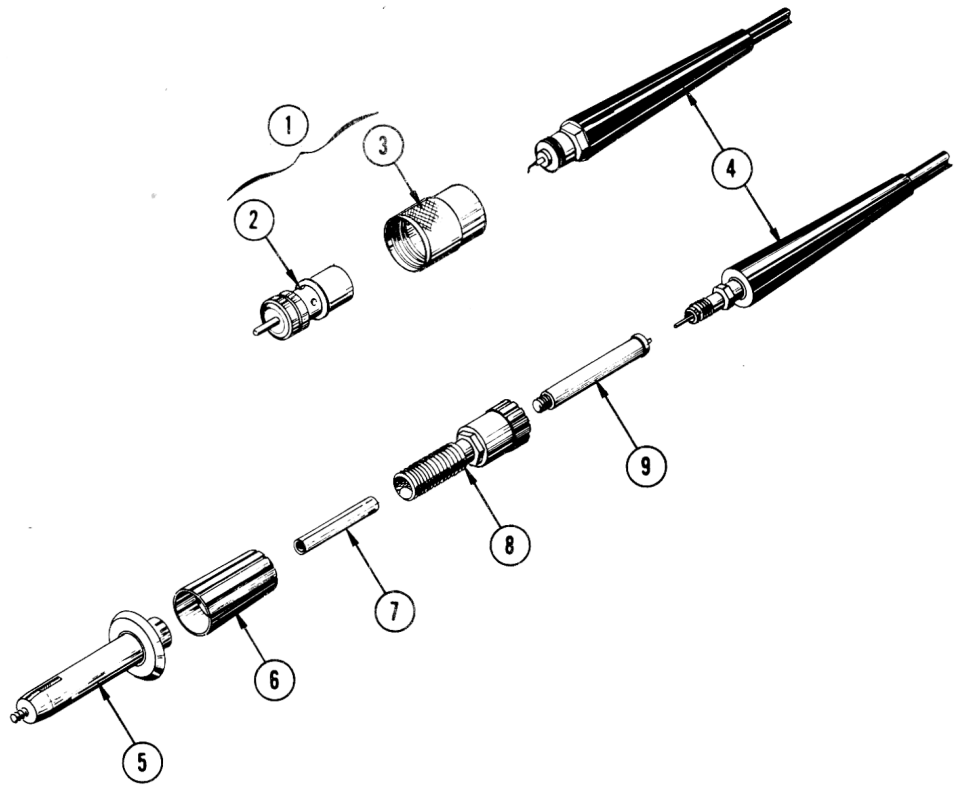
REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0137-00			1	PROBE, P6007, 9 ft UHF
	- - - - - -			-	probe includes:
1	131-0058-00			1	ASSEMBLY, connector
	- - - - - -			-	assembly includes:
2	131-0196-00			1	CONNECTOR, coaxial, cable end, male
3	200-0026-00			1	COVER, coaxial connector
4	175-0266-00			1	CABLE ASSEMBLY, 9 ft UHF
5	204-0190-00			1	BODY, assembly w/resistor
6	166-0285-00			1	SLEEVE, locking
7	166-0349-00			1	SLEEVE
8	358-0194-00			1	BUSHING, base
9	358-0192-00			1	BUSHING, inner base

REPLACEABLE PARTS



REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0153-00			1	PROBE, P6007, 9 ft BNC
	- - - - - -			-	probe includes:
1	134-0044-00			1	PLUG, probe
2	358-0072-00			1	BUSHING, insulator
3	214-0109-00			1	PIN, probe contact, male
4	166-0326-00			1	SLEEVE, adapter
5	131-0270-00			1	ADAPTER
6	175-0280-00			1	CABLE ASSEMBLY, 9 ft BNC
7	204-0194-00			1	BODY, assembly w/resistor
8	166-0285-00			1	SLEEVE, locking
9	166-0349-00			1	SLEEVE
10	358-0194-00			1	BUSHING, base
11	358-0192-00			1	BUSHING, inner base
	131-1098-02			1	CONTACT, electrical, readout (not shown)

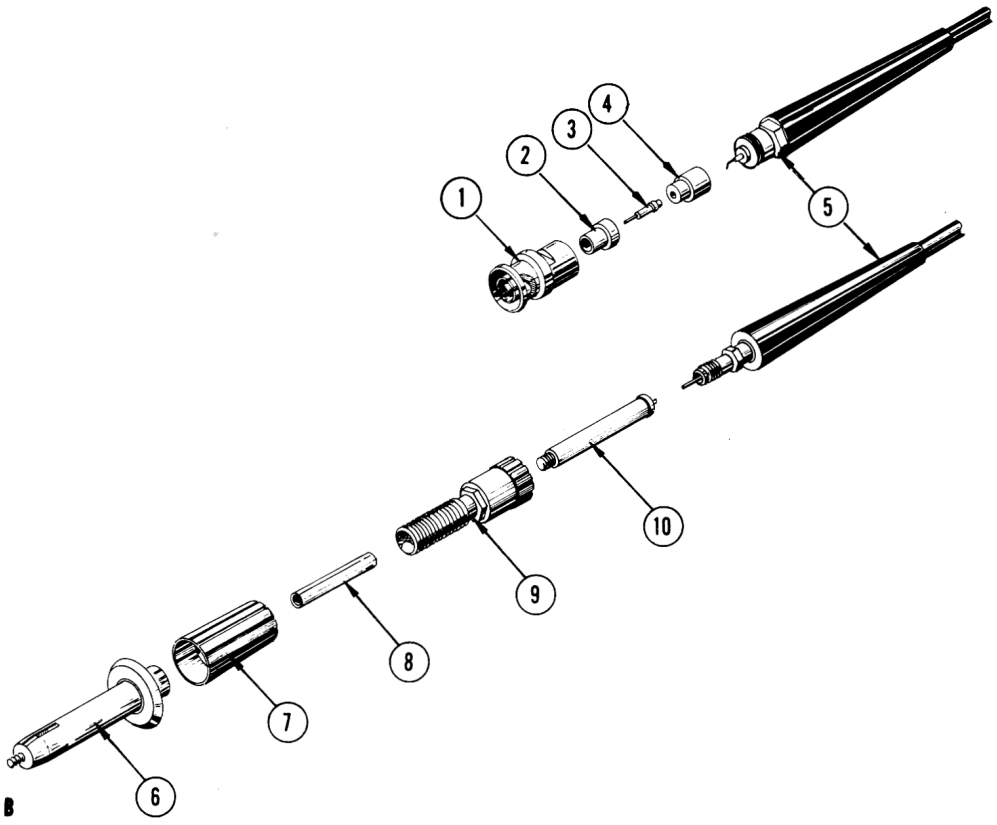
REPLACEABLE PARTS



B

REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0139-00			1	PROBE, P6007, 12 ft UHF
	- - - - - -			-	probe includes:
1	131-0058-00			1	ASSEMBLY, connector
	- - - - - -			-	assembly includes:
2	131-0196-00			1	CONNECTOR, coaxial, cable end, male
3	200-0026-00			1	COVER, coaxial, connector
4	175-0282-00			1	CABLE ASSEMBLY, 12 ft UHF
5	204-0191-00			1	BODY, assembly w/resistor
6	166-0285-00			1	SLEEVE, locking
7	166-0349-00			1	SLEEVE
8	358-0194-00			1	BUSHING, base
9	358-0192-00			1	BUSHING, inner base

REPLACEABLE PARTS



REF. NO.	TEKTRONIX PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY. 1 2 3 4 5	DESCRIPTION
	010-0155-00			1	PROBE, P6007, 12 ft BNC
	- - - - - -			-	probe includes:
1	134-0044-00			1	PLUG, probe
2	358-0072-00			1	BUSHING, insulator
3	214-0109-00			1	PIN, probe contact, male
4	361-0022-00			1	SPACER, w/center hole
5	175-0283-00			1	CABLE ASSEMBLY, 12 ft BNC
6	204-0195-00			1	BODY, assembly w/resistor
7	166-0285-00			1	SLEEVE, locking
8	166-0349-00			1	SLEEVE
9	358-0194-00			1	BUSHING, base
10	358-0192-00			1	BUSHING, inner base
	131-1098-02			1	CONTACT, electrical, readout (not shown)

ELECTRICAL PARTS

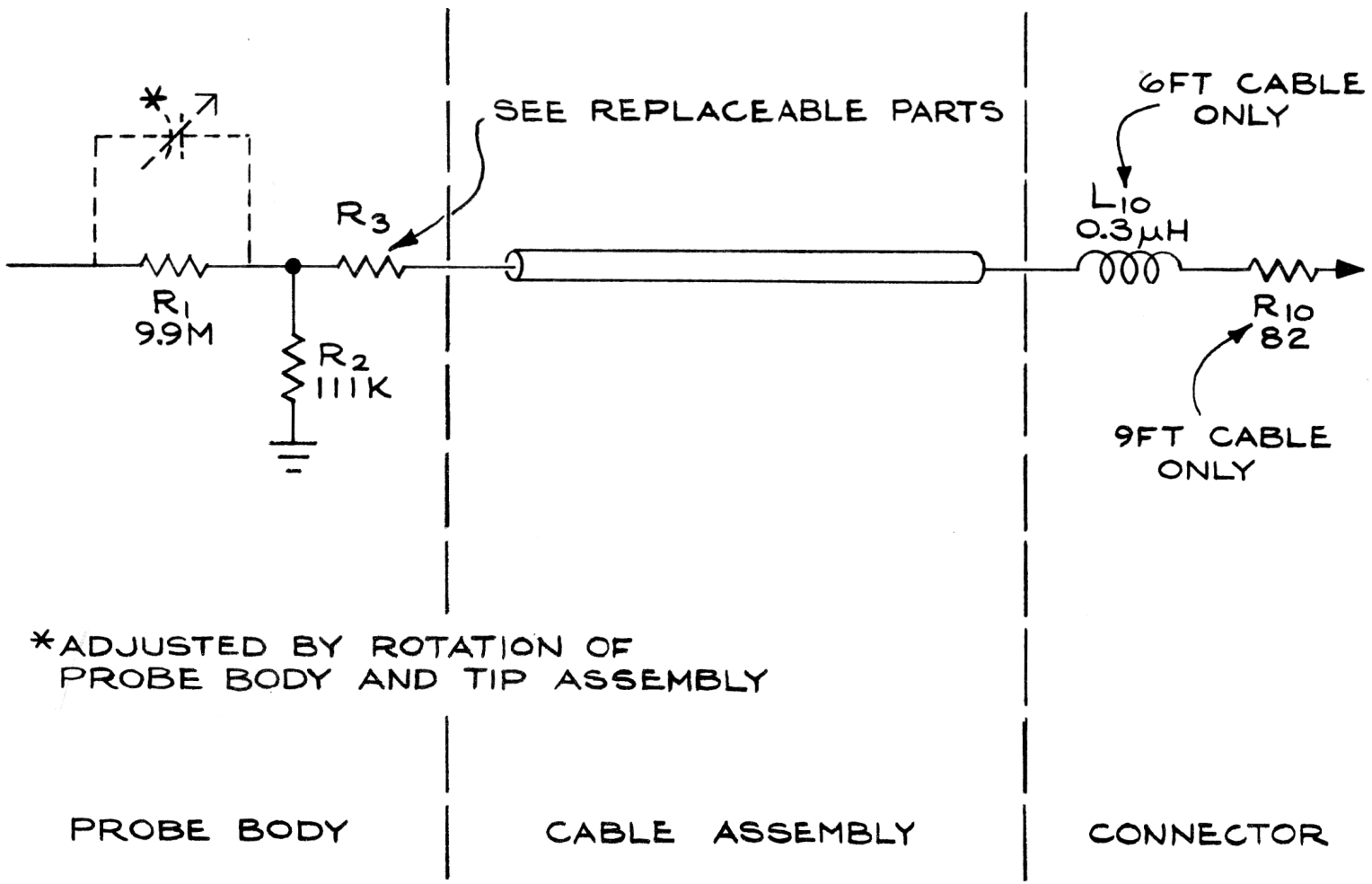
Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Description			
		P6007 Probe—3.5 Foot UHF			
		Resistors			
C1) [1]		Contact Spring			
R1)		9.9 MΩ	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	302-0391-00	390 Ω	1/2 W		10%
		P6007 Probe—3.5 Foot BNC			
		Resistors			
C1) [2]		Contact Spring			
R1)		9.9 M	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	302-0391-00	390 Ω	1/2 W		10%
		P6007 Probe—6 Foot UHF			
		Resistors			
C1) [3]		Contact Spring			
R1)		9.9 MΩ	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	301-0431-00	430 Ω	1/2 W		5%
		Inductor			
L10	*108-0182-00	0.3 μH			
		P6007 Probe—6 Foot BNC			
		Resistors			
C1) [4]		Contact Spring			
R1)		9.9 MΩ	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	301-0431-00	430 Ω	1/2 W		5%
		Inductor			
L10	*108-0182-00	0.3 μH			

[1]Furnished as a unit with *204-0188-00 (Probe Body Ass'y).
[2]Furnished as a unit with *204-0192-00 (Probe Body Ass'y).
[3]Furnished as a unit with *204-0189-00 (Probe Body Ass'y).
[4]Furnished as a unit with *204-0193-00 (Probe Body Ass'y).

Ckt. No.	Tektronix Part No.	Description			
		P6007 Probe—9 Foot UHF			
		Resistors			
C1 }[5]		Contact Spring			
R1 }		9.9 MΩ	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	302-0681-00	680 Ω	1/2 W		10%
R10	302-0820-00	82 Ω	1/2 W		10%
		P6007 Probe—9 Foot BNC			
		Resistors			
C1 }[6]		Contact Spring			
R1 }		9.9 MΩ	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	302-0681-00	680 Ω	1/2 W		10%
R10	302-0820-00	82 Ω	1/2 W		10%
		P6007 Probe—12 Foot UHF			
		Resistors			
C1 }[7]		Contact Spring			
R1 }		9.9 MΩ	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	302-0561-00	560 Ω	1/2 W		10%
		P6007 Probe—12 Foot BNC			
		Resistors			
C1 }[8]		Contact Spring			
R1 }		9.9 MΩ	1/4 W	Prec	2%
R2	318-0006-00	111 kΩ	1/8 W	Prec	1%
R3	302-0561-00	560 Ω	1/2 W		10%

[5]Furnished as a unit with *204-0190-00 (Probe Body Ass'y).
[6]Furnished as a unit with *204-0194-00 (Probe Body Ass'y).
[7]Furnished as a unit with *204-0191-00 (Probe Body Ass'y).
[8]Furnished as a unit with *204-0195-00 (Probe Body Ass'y).


SEE REPLACEABLE PARTS
6FT CABLE ONLY
L10
0.3µH
R3
R1
9.9M
R2
111K
R10
82
9FT CABLE ONLY
*ADJUSTED BY ROTATION OF PROBE BODY AND TIP ASSEMBLY
PROBE BODY
CABLE ASSEMBLY
CONNECTOR

P6007