Removing the matching -box cover

The cover of matching-box should be removed for calibration of high-frequency phase.

Push up the edge of cover to outer side as shown in Figure 9.

Figure 9. Removing matching-box cover

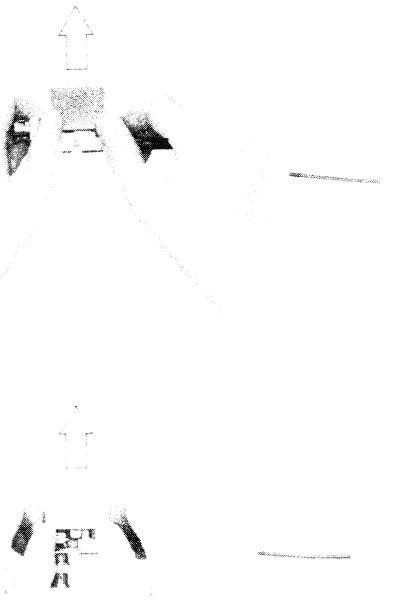


Figure 7. Controlers in matching-box (1)

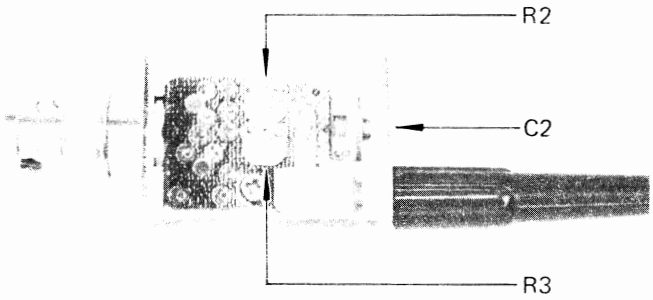


Figure 8. Controls in matching-box (2)

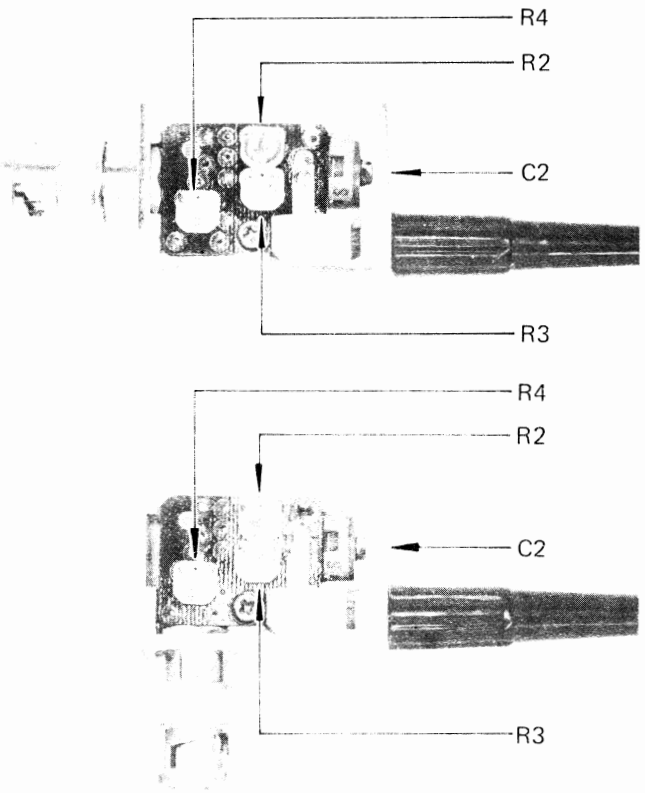
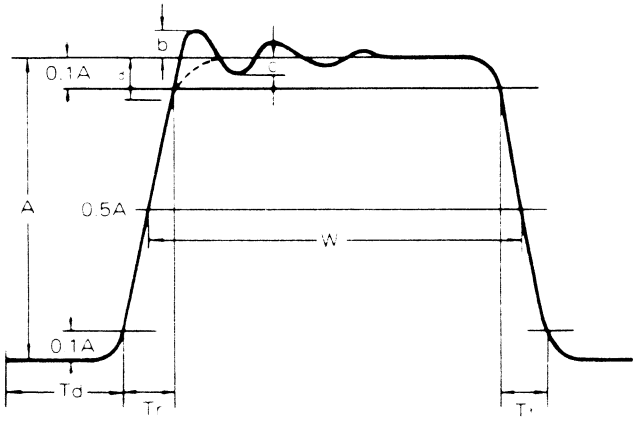
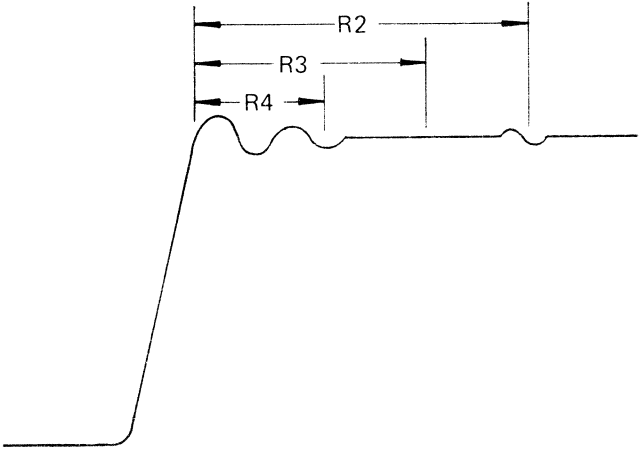


Figure 5. Definition of pulse terms
(According to MEA-27 by Japanese Electro Mechanical Industry Association)



A	:	Basic amplitude	T	:	Rise time
b/A	:	Overshoot	Tf	:	Fall time
c/A	:	Ringing	d/A	:	Rounding
W	:	Pulsewidth	Td	:	Signal delay time

Figure 6. Pulse waveform and adjustment point of high-frequency phase



oscilloscope.

(11) Check and confirm whether the signal amplitude on the CRT screen is 5.4 to 6.6 div (±1 dB for amplitude 6 div) or 5.1 to 6.9 div (±1.5 dB for amplitude 6 div.).

(12) If the above checking indicated that either one or both of square wave characteristics and frequency bandwidth do not satisfy the specification, or if the performance is to be improved, calibrated it as in the following.

< Calibration >

(1) Remove the cover of matching-box and check the procedures from (2) to (6) indicated in check list.

(2) Adjust the controls in matching-box with the adjusting screw-driver of accessory.

(3) Adjust so that the rising edge of pulse wave becomes sharp, or distortion such as overshoot, undershoot, or ringing is minimized as possible.

(4) Check the following items (8) through (11) indicated in check list for inspecting frequency bandwidth.

distortion such as overshoot, undershoot, ringing, or sag.

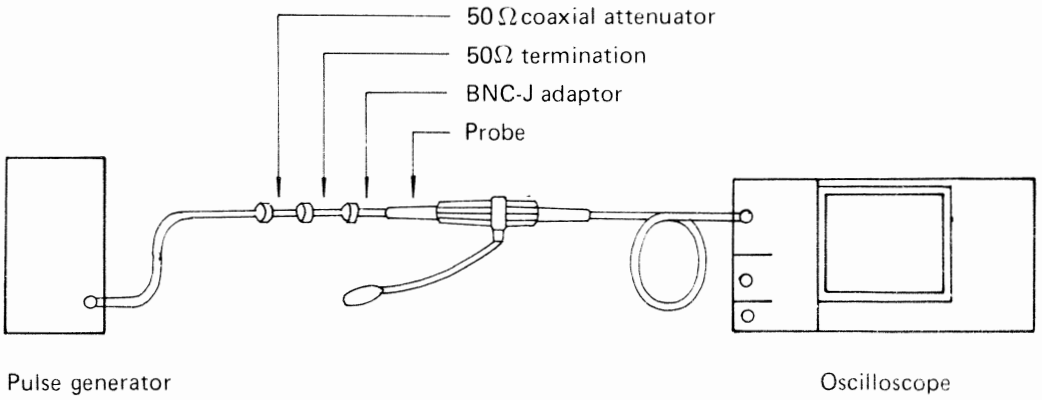
(7) Disconnect the probe from signal input connector of oscilloscope and connect the output connector of the standard signal generator through the 20dB coaxial attenuator (AA-20B).

(8) Set the sweep time of oscilloscope to one range from 0.1 mS/div to 10 μS/div. Set the frequency of standard signal generator to upper limit frequency of bandwidth of probe.

(9) Adjust the output voltage of standard signal generator so that an amplitude of 6 div is obtained on the CRT screen.

(10) Disconnect the 20dB coaxial attenuator. Connect the probe (in a similar manner as of pulse generator) and feed the output voltage of standard signal generator to

Figure 4. Connection of probe to oscilloscope and pulse generator



Pulse generator

Rise time	300pS or faster
Output voltage	Approximately 0 to 1 Vp-p
Pulse width	300nS or more
Waveform distortion	As small as possible
	Example : IWATSU PG-10P/10N

Standard signal generator

Frequency range	50kHz to 350MHz
Output voltage	Appoximately 10mV to 1V

Oscilloscope

Frequency bandwidth	
	DC to 50MHz
	DC to 30MHz
Input capacity	26 to 38pF
	20 to 40pF
	Example : IWATSU SS-5710
	SS-5310P

50 Ω coaxial cable

50Ω terminator Example : IWATSU BB50M1

BNC-J connector Example : IWATSU BNC-J adaptor

50 Ω coaxial attenuator (6dB, 10dB, 20dB)

Example : IWATSU AA-06B
AA-10B
AA-20B

< Caution >

- Measuring instruments need to be calibrated.
- Probe also needs to be calibrated if it is to be connected to other instruments. Otherwise, there will not be any difficulty in calibrating the probe to connect with measuring instruments in uses.

< Check>

(1) Check for proper calibration of low-frequency phase. If phase is not calibrated correctly, adjust it.

(2) Connect the probe, oscilloscope, and pulse generator (see Figure 4), and turn on the power switch.

(3) Set the oscilloscope as follows:

VOLTS/DIV : 10mV/div
VARIABLE : CAL

(4) Adjust the output voltage of pulse generator so that an amplitude of pulse waveform becomes 4 to 5 div. on the CRT screen. If the output voltage is excessively high, attenuate the voltage to adequate level by 50 Ω coaxial attenuator.

(5) Set the sweep time of oscilloscope so as to observe a rising edge of pulse waveform.

(6) Check whether the waveform on screen recognizes any

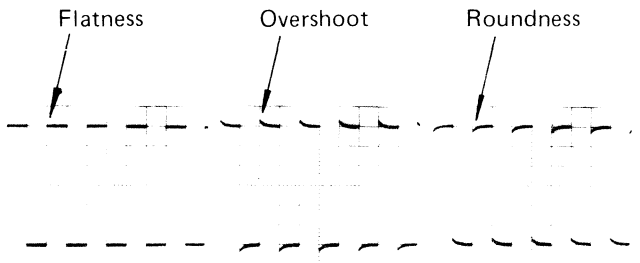
CHECK AND CALIBRATION OF SQUARE WAVE CHARACTERISTICS

Check and calibration of low-frequency phase

(1) Connect the BNC connector on matching-box side of probe to signal input connector of instrument.

(2) Apply the square wave of 1 kHz of the square wave generator or the CAL OUT of oscilloscope to the tip of probe.

Figure 3. Waveform of low-frequency phase



(a) Correct waveform (b) Excessive compensation (c) Insufficient compensation

(3) Set the input sensitivity of instrument to the highest range, and adjust the output signal amplitude of square wave generator so that an amplitude of 4 to 6 div. is obtained on the CRT screen.

(4) Check whether the correct square waveform as shown in Figure 3 (a) can be obtain. If destortion appears as shown in Figure 3 (b) or (c), adjust C2 with the adjusting screw driver through the adjusting hole of matching-box so as to obtain a flat waveform.

Check and calibration of high-frequency phase

Check high-frequency phase whenever necessary and calibrate if it is unacceptable. An abnormal high-frequency phase may cause error in measurements of signals with high-frequency components.

<Instruments and accessories required>

The following instruments and accessories are required for check and calibration of high-frequency phase.

Measurement of input signal voltage

Amplitude of input signal is attenuated to 1/10 by feeding the signal into measuring instrument through a probe with an attenuation ratio of 10 : 1.

Input signal voltage can be calculated from waveform displayed on the CRT screen of a oscilloscope in which signal to be measured is fed, as in the following formula.

Input signal voltage (V) = Indicated value of input sensitivity (VOLTS/DIV) of the instrument x amplitude of input signal on the CRT screen (div) x reciprocal of attenuation of probe.

Measurement of high-frequency signal

The earth pin of accessory is used for measuring high-frequency signals. Wrong waveform may be observed by incorrect earthing between signal source and probe which would attenuate high-frequency components.

Measurement of high voltage

While the probe can measure voltage up to 600V (DC + peak AC), it can also measure ripples superimposed on DC voltage higher than 600V feeding the signal through a high voltage capacitor connected to the tip of probe.

Figure 2. (2) L-shaped probe unit and its standard/option accesories

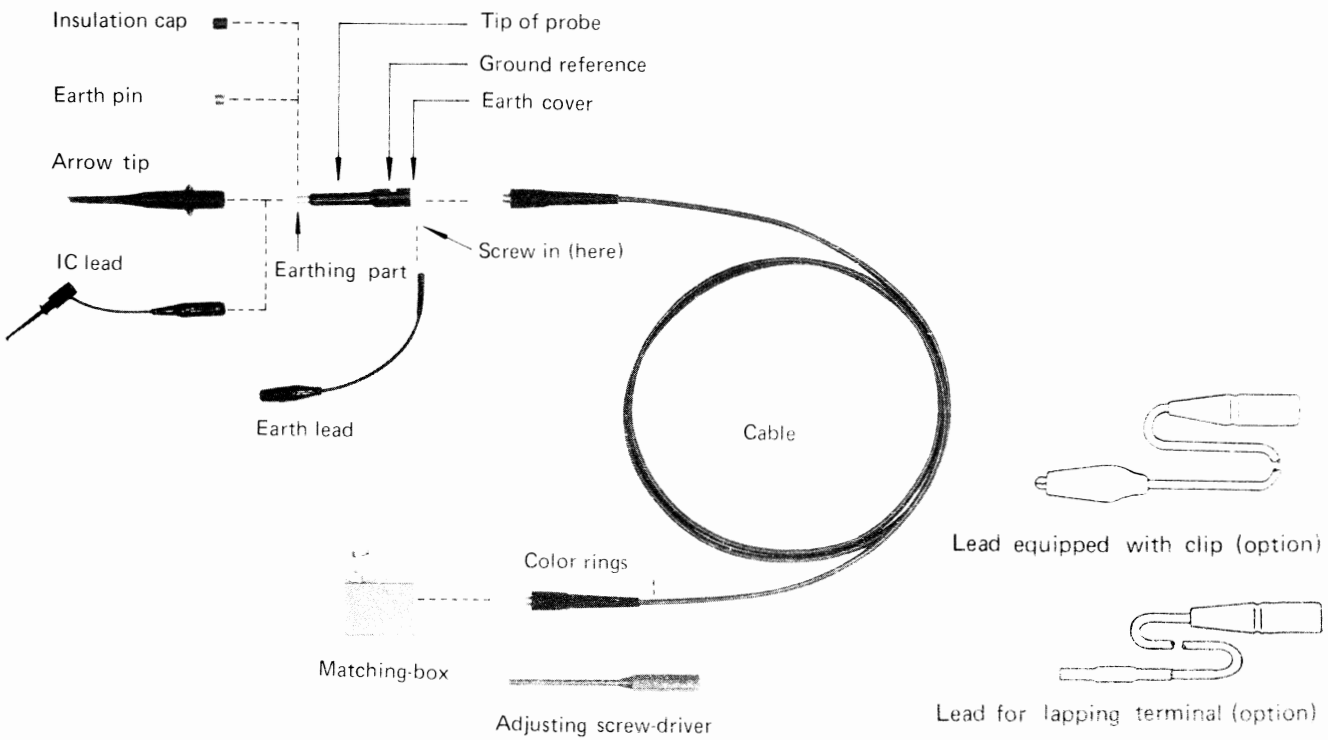
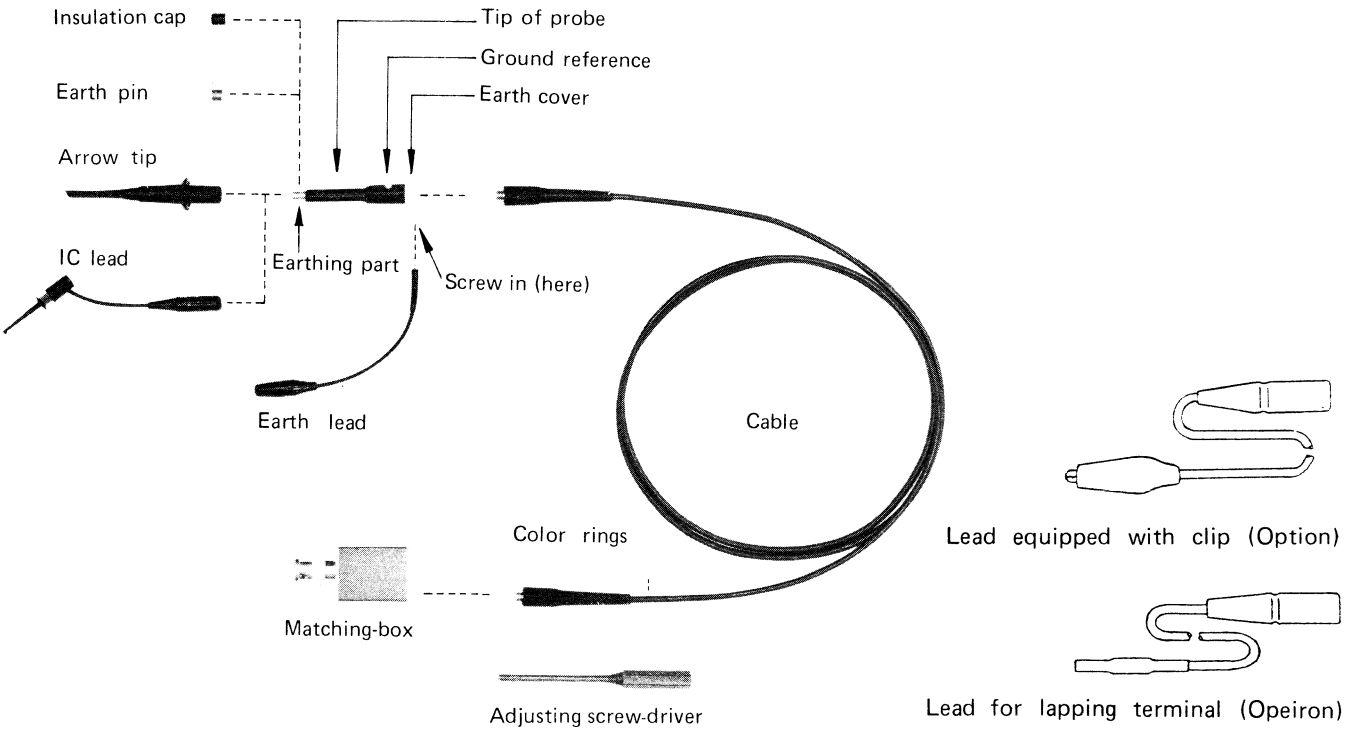


Figure 2. (1) Straight form probe unit and its standard/option accessories



Use of accessories

Arrow tip

The arrow tip is used for fastening the tip of probe to the point to be measured.

Cover it on the probe tip and pull the flange so as to expose the hook contactor at the tip. Hook the contactor to signal source and fasten it firmly.

IC lead

The IC lead is ued for measuring signal from IC pin. Pull the flange of clip so as to expose hook contactor. Connect it to IC pin. Turn off the power supply, or keep the contactor among from adjascent IC pins when connecting the hook to IC pin.

Earth lead

The earth lead is used for providing common ground of signal source and instrument. Screw in the threaded part to earth cover, and engage the clipper to ground point close to signal source.

Earth pin

The earth pin is covered on metallic part (earthing part) at the tip for grounding when the contactor at the tip of probe directly is in contact with the signal source with frequency components higher than 30 MHz.

Insulation cap

Insulation cap is used for covering metallic part (earthing part) at the tip of probe when the contactor at the tip directly is in contact with the signal source.

Color rings

Attach rings of same color to identify the connecting channel of probe by color.

Adjusting screw-driver

Used to probe phase adjustment.

Non-induction screw-driver.

Option

Lead equipped with clip

Used for fastening lead to projection such as self-standing terminal by engaging alligator clip to it.

Lead for lapping terminal

Used for fastening lead by inserting it into lapping terminal.

Connection

(1) Connect BNC connector on the matching box side to signal input connector of measuring instrument.

(2) Connect alligator clip of earth lead to the earth point close to the signal source.

(3) Touch the probe tip (or with arrow tip, or IC lead) to signal source.

Correct use

o < Low frequency phase > and < high frequency phase> should be correctly calibrated for measurement of input signal.

o Connect the earth lead of accessory to ground at a point as close to the signal source as possible for correct measurement of input signal. The earth pin of accessory should be used for measuring signal higher than 30 MHz.

Advantages in the use of probe

o A high input impedance is achieved which reduces load effect to the signal source .

o Inductive interference in observed waveform due to external electric field is greatly eliminated.

o Connection to signal source can be done more simply and accurately.

Use of GND REF

Push the GND REF. (Ground reference) button on the tip of probe. Reference ground level to the measurement is detected without making any contact with the tip of probe to ground.

Figure 1. Input voltage

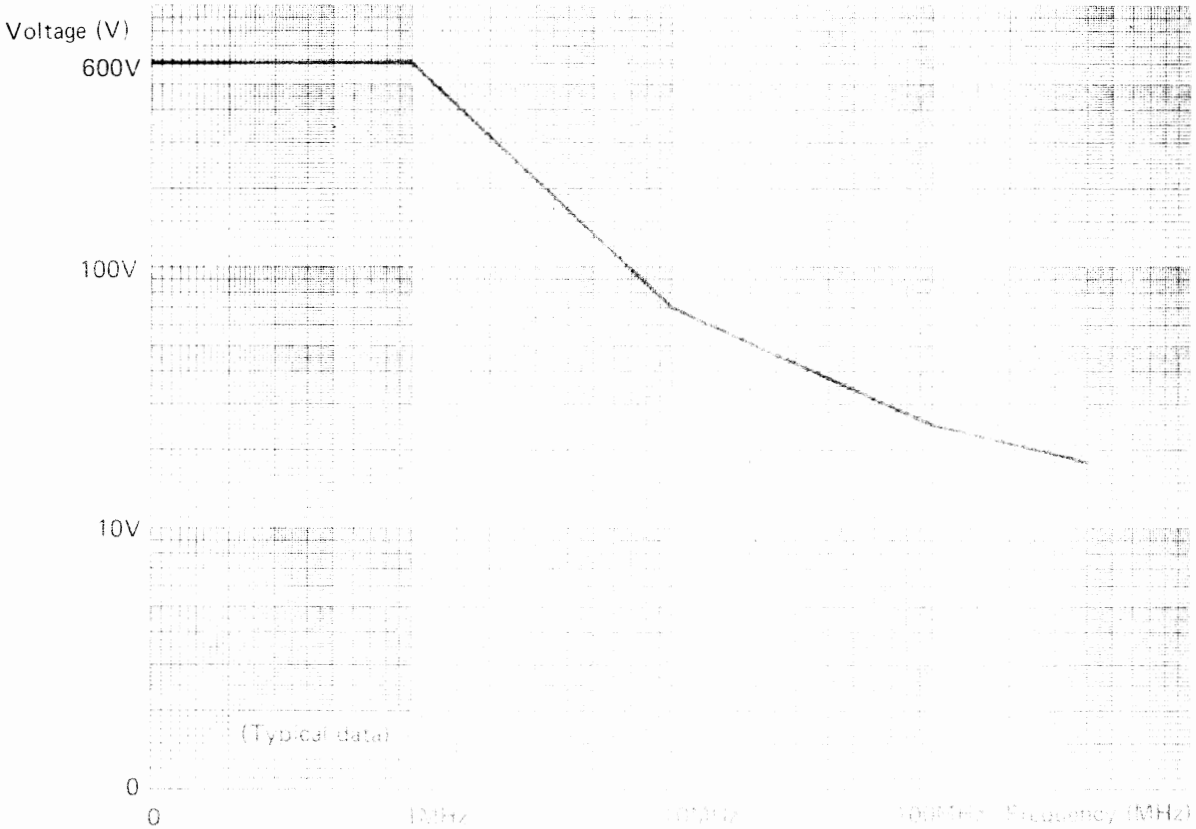


Table 1. Specifications of SS-0011/0011L/0040/0041/0041L

SPECIFICATIONS	SS–0011	SS–0011L	SS–0040	SS–0041	SS–0041L	
Attenuation ratio	10 : 1 ±2%	10 : 1 ±2%	10 : 1 ±2%	10 : 1 ±2%	10 : 1 ±2%	
Input capacity	15pF ± 3pF	15pF ± 3pF	17pF±3pF	17pF ±3pF	17pF ± 3pF	
Matching input capacity	28 to 36 pF	26 to 38pF	20 to 40pF	28 to 36 pF	26 to 38pF	
Frequency bandwidth	DC to 60 MHz ±1 dB	DC to 50MHz ± 1dB	DC to 30 MHz ±1.5 dB	DC to 60 MHz ±1.5 dB	DC to 50MHz ± 1.5dB	
Input voltage	See Figure 1.	See Figure 1.	See Figure 1.	See Figure 1.	See Figure 1.	
GND REF	Equipped	Equipped	Equipped	Equipped	Equipped	
Probe length	1.5m	1.5m	2m	2m	2m	
Type of connector	BNC type	BNC type	BNC type	BNC type	BNC type	
Form of matching box	Straight	L-shaped	Straight form	Straight form	L-shaped	
Major applicable types of instrument	SS-5710	SS-5510 SS-3510 MS-5511	SS-5310P SS-4100G		SS-5510 SS-3510	

<Note>: The data for input capacity, frequency bandwidth, and allowable input voltage are referred to single probe.

SUMMARY

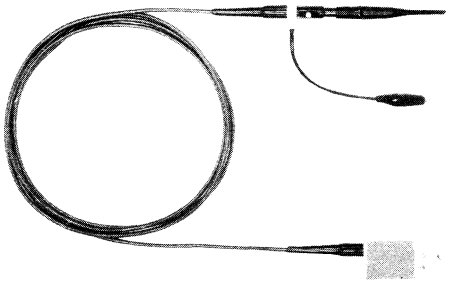
Models SS-0011/0011L/0040/0041/0041L are small probes of passive type with attenuation ratio 10 : 1 used for providing electric signals to electronic measuring instruments with input impedance of 1 M Ω.

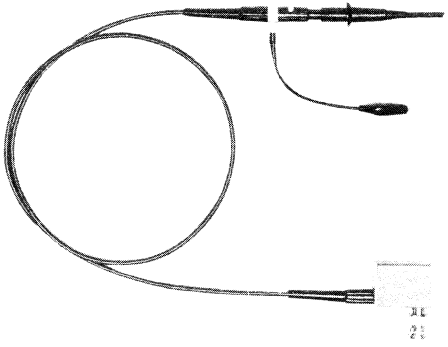
SS-0011/0040/0041 are suited for use by connecting to measuring instrument with input signal connector installed on its front panel since their matching boxes are in straight form.

SS-0011L/0041L are suitably connected to measuring instrument with input signal connector installed on its upper or side panel since their matching boxed are L-shaped.

SPECIFICATIONS

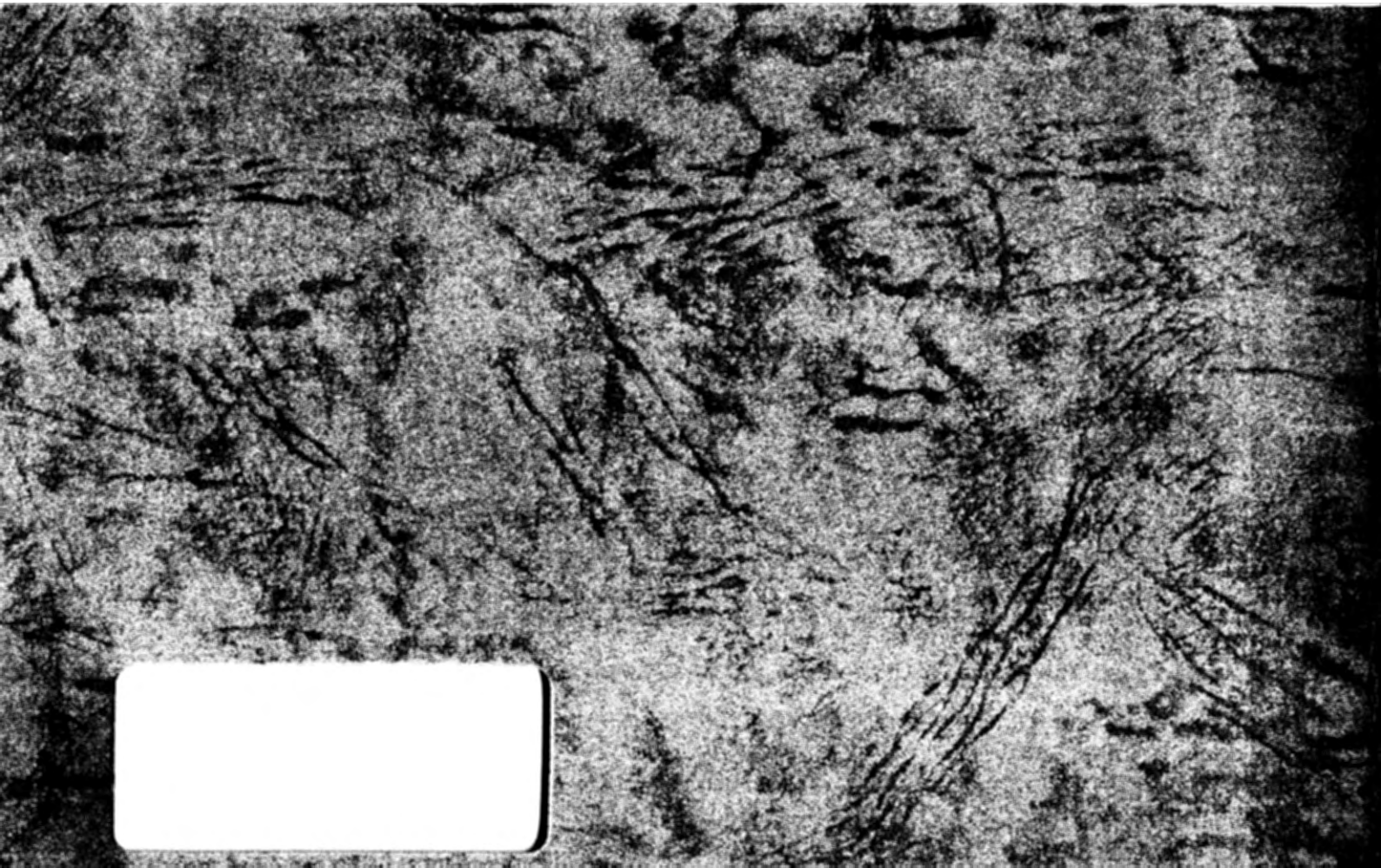
The specifications for probes SS-0011/0011L/0040/0041/0041L are shown in Table 1.





INSTRUCTION
MANUAL

PROBE
SS-0011L/0011
SS-0040
SS-0041L/0041



INSTRUCTION MANUAL

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