
**User's
Manual**

**Model 701941/701942
Miniature Passive Probe**

1. Introduction

This 701941/701942 miniature passive probe is designed for user's safety and excellent easy-to-use operability. The probe tip utilizes a spring mechanism to minimize the stress applied to a device to be inspected. Additionally, this spring mechanism is also effective to prevent the probe tip from slipping on the board surface. In particular, the spring mechanism is useful when using the probe with it inclined. The probe tip is changeable. Replacement tips are provided in the accessory pack. For details about how to change the probe tip, see Section 8, Maintenance.

A wide variety of optional accessories is available upon request.

Checking the Contents of the Package

If some of the contents are not correct, or if any items are missing or damaged, contact the dealer from which you purchased them.

- 701941 miniature passive probe main unit
- Accessories
- User's Manual (this manual): 1
- Accessory pack: 11 items (See also the list of accessories in Section 10, Replaceable Parts.)
 - Insulation cap
 - BNC adapter
 - Spring tip (ϕ : 0.80 mm)
 - Ground spring
 - Pincher tip
 - Color coding rings
 - IC cap
 - Rigid tip
 - Spring tip (ϕ : 0.38 mm)
 - Adjustment tool
 - Standard ground lead

Conventions Used in This Manual



Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

WARNING

Describes precautions that should be observed to prevent serious injury or death to the user.

CAUTION

Describes precautions that should be observed to prevent minor or moderate injury, or damage to the instrument.

Note

Provides important information for the proper operation of the instrument.

2. Safety Precautions

To safely operate this product and to fully utilize its functionality, strictly observe the following cautions.

This product complies with the requirements stated in measurement categories I and II, and pollution degree 2 defined in IEC61010-031.

If this probe is operated in a manner not specified in this manual, this may cause the protection capability of this product to lessen.

Additionally, YOKOGAWA shall not be held responsible for defects arising from negligence of such warning and caution, and also shall not guarantee the product in such case.

Before using this probe, thoroughly read the instruction manual for measuring instrument to fully understand the specifications and handling precautions for safe and correct operation.

WARNING

- **Grounding of the measuring instrument**
The protective grounding terminal of the measuring instrument must be connected to ground.
 - **Ground lead of the probe**
Make sure to connect the ground lead of the probe to the ground (ground potential).
 - **Connecting the object of measurement**
Make sure to avoid an electric shock when connecting the probe to the object of measurement. Do not remove the probe from the measuring instrument after the object of measurement is connected.
 - **Do not operate with suspected failures**
If you suspect that there is damage to this probe, have it inspect by a service personnel.
 - **Maximum input voltage**
Do not apply any voltages exceeding the maximum input voltage to the probe.
 - **Do not operate in wet/damp conditions**
To avoid electric shock, do not operate this probe in wet or damp conditions.
 - **Do not operate in explosive atmosphere**
To avoid injury or fire hazard, do not operate this probe in an explosive atmosphere.
 - **Avoid exposed circuitry**
To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.
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3. Waste Electrical and Electronic Equipment



Waste Electrical and Electronic Equipment (WEEE),
DIRECTIVE 2002/96/EC

(This directive is valid only in the EU.)

This product complies with the WEEE Directive (2002/96/EC) marking requirement. This marking indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category

With reference to the equipment types in the WEEE directive Annex I, this product is classified as a “Monitoring and control instruments” product.

Do not dispose in domestic household waste. When disposing products in the EU, contact your local Yokogawa Europe B. V. office.

4. Specifications

The specifications described in this section apply to the miniature passive probe connected to Yokogawa's oscilloscope model DL1740 and may vary depending on the type of oscilloscope connected. The preconditions for the following specifications are that the instrument should be warmed up for at least 20 minutes and the environmental conditions should not exceed the specified limits of the probe.

Electrical Specifications

Item	701941	701942
Attenuation Ratio ¹	10 : 1 \pm 2%	10 : 1 \pm 2%
Voltage Coefficient	0.0025%/V (typical value)	0.0025%/V (typical value)
System Bandwidth	500 MHz (-3 dB)	350 MHz (-3 dB)
Probe Rise Time	< 700 ps (10% to 90%)	< 1ns (10% to 90%)
Maximum Input Voltage ²	400 Vrms	400 Vrms

1 This specification value is obtained when the probe is connected to an oscilloscope having an input resistance of $1\text{ M}\Omega \pm 1\%$ and the input voltage is 100 V or less.

2 See the compatible standards shown below. See also Section 5, Voltage Derating.

Electrical Characteristics

Input Resistance (system)	10 $\text{M}\Omega \pm 2\%$
Input Capacitance (system)	701941:10 pF (typical value), 701942: 18 pF (typical value)
Input Impedance (system)	See also Section 6, Input Impedance.
Compensation Range	10 pF to 25 pF (typical value)

Mechanical Characteristics

Weight (probe only)	Approximately 43 g
Cable Length	701941:Approximately 1.2 m, 701942: Approximately 3 m

Environmental Specifications

Altitude	Operating:	Up to 2000 m
	Storage:	Up to 15000 m
Temperature Range	Operating:	0 °C to 50 °C
	Storage:	-40 °C to 71 °C
Maximum Relative Humidity	Operating:	Relative humidity of 80% at a temperature of up to 31 °C, decreasing linearly to relative humidity of 40% at 50 °C if the temperature is 31 °C or higher.

Standards Compliance

This product is compliance with the following categories of IEC61010-031:

Measurement Category I	400 Vrms, 1250 V transient over-voltage
Measurement Category II	300 Vrms
Pollution Degree 2	Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

5. Definitions and Examples of IEC Measurement Category

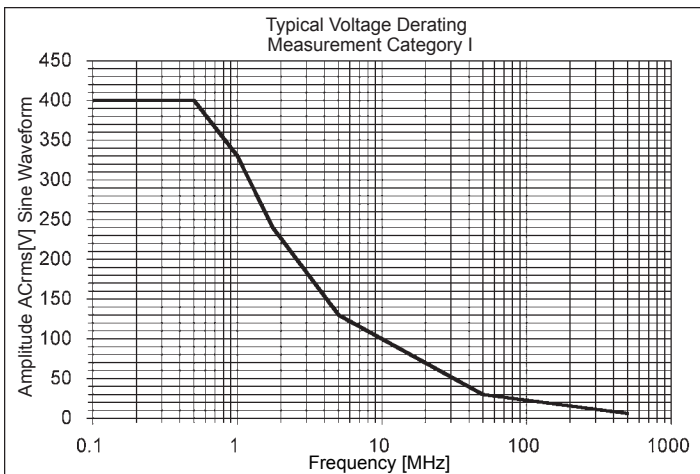
Measurement category II (CAT II)	Definition: Measurement category II is for measurements performed on circuits directly connected to the low voltage installation.
	Examples: Measurement on household appliances, portable tools, and similar devices.
Measurement category I	Definition: Measurement category I is for measurements performed on circuits not directly connected to a main supply.
	Examples: Measurements in circuits not derived from a main supply and specially protected (internal) circuits derived from a main supply.

6. Voltage Derating



CAUTION

As the frequency of the input signal increases, the maximum rating of the input voltage of the probe decreases. For details about appropriate input voltage, see Section 3, Specifications.

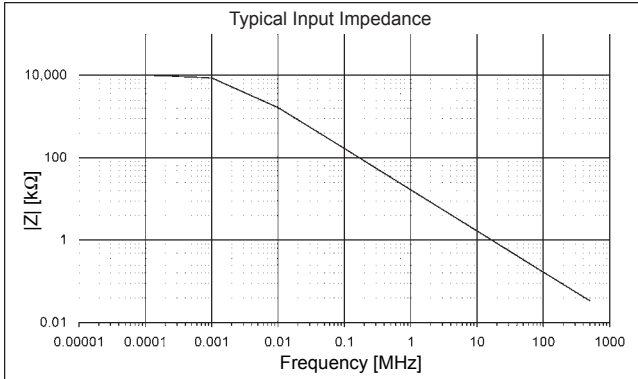


7. Input Impedance



CAUTION

As the frequency of the input signal increases, the input impedance of the probe decreases.



8. Handling



CAUTION

Since the spring type contact tip is very thin and sharp, great care should be taken to prevent personal injury when the contact tip is mounted. In particular, handle the spring type contact tip with great care. The probe cable is a delicate part of the probe. If the probe cable is bent or pulled forcibly, this may cause the cable to break. To keep the accuracy and protect the product, do not apply any impact or shock to the product.

9. Maintenance

Cleaning

When cleaning the exterior of the probe, clean it using a soft cloth rag moistened with either water or isopropyl alcohol. In this case, dry the probe completely before starting the measurement.

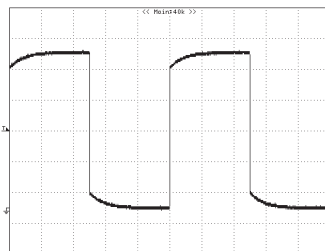
Changing the Probe Tip

To change the probe tip, grip the tip firmly with pliers and carefully pull it straight out of its contact socket along the axis of the probe.

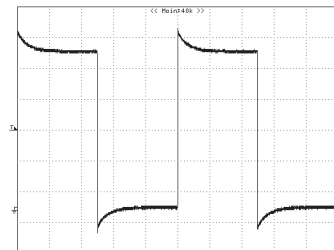
10. Adjustment Procedures

LF Compensation

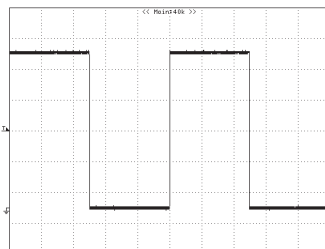
Connect the probe to the CAL-output on the oscilloscope and adjust the “kHz” trimmer (see also the Figs. next page.) so that the observation waveform becomes the optimum square waveform.



Under Compensated



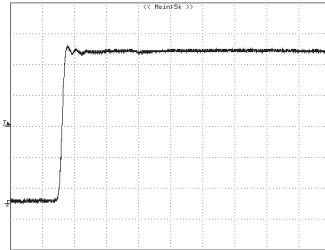
Overcompensated



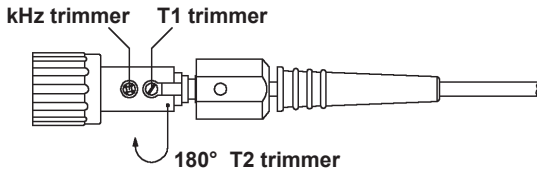
Correct Waveform

HF Compensation

Before shipment from the factory, this probe has been correctly adjusted to Yokogawa's digital oscilloscope DL1740 with the signal generator having 300 ps-rise time so that the optimum square waveform is obtained. If the HF adjustment needs to be performed, two trimmers (T1 and T2, see also the following Figs.) are used. The T1 trimmer is used to adjust the rise time while the T2 trimmer is used to adjust the response time of the probe.



Optimally Compensated Waveform (sample characteristics)



11. Replaceable Parts

Replaceable parts are prepared as sets shown in the Table below. When ordering any replaceable part set, inform a desired set name and its part number.

	Basic Set (Part No.: B9852HA)	Accessories Basic (Part No.: B9852HF)	Accessories Set SMD (Part No.: B9852HG)	Accessories Delux (Part No.: B9852HH)	Accessories Micro clip (Part No.: B9852HJ)	Accessories 1 (Part No.: B9852HP)	Accessories 2 (Part No.: B9852HQ)	Accessories 3 (Part No.: B9852HR)	Accessories 4 (Part No.: B9852HS)
Probe	1								
Pincher tip	1	2		2		2			
Standard ground lead (L: 11 cm)	1	2		2			2		
Adjustment tool	1	1		1					
Rigid tip (f: 0.80 mm)	1	2	2	2					
Spring tip (f: 0.80 mm)	1	2	2	2					
Spring tip (f: 0.38 mm)	1	2	2	2					
Color coding rings	1	2	1	2					
Insulating cap	1	2	1	2					
IC cap	1	2	1	2					
PCB adapter			2	3				2	
Ground spring	1	2	1	3					2
Single adapter lead			1	1	1				
Dual adapter lead			1	1	1				
Pico hook			2	1	2				
Micro clip long			2	2	2				
Micro clip short				2					
Adapter 2 mm plug				1					
Adapter 4 mm plug				1					
Ground lead with mini clip (L: 11 cm)			1	1	1				
Ground lead with 0.8 mm socket (L: 11 cm)			1	1	1				
Ground lead with 2 mm plug (L: 22 cm)				1					
Ground lead with 4 mm plug (L: 22 cm)				1					
HF-compensated ground lead (L: 22 cm)			1	1					
BNC adapter	1	1		2					
Connector lead (L: 5 cm)			2	1					
Connector lead (L: 10 cm)			2	1					
User's manual (this manual)	1								

The rating of the BNC adapter is 100 Vrms CAT II and the pollution degree is 1.
The safety of the accessories supplied with the probe has been tested.

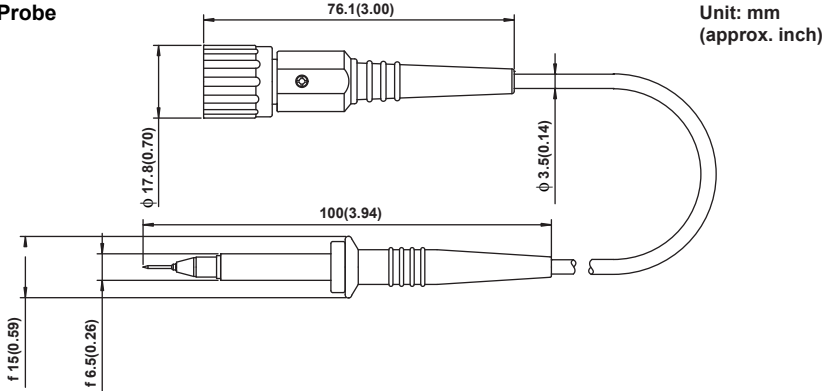
List of Accessories



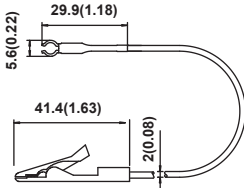
CAUTION

- Use ground lead only for grounding connections.
- Do not use any accessories other than those “originally” provided.

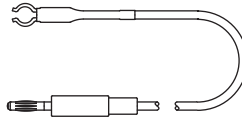
Probe



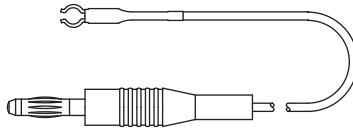
Standard ground lead (L: 11 cm)



Adapter 2 mm plug (L: 22 cm)



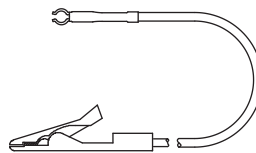
Adapter 4 mm plug (L: 22 cm)



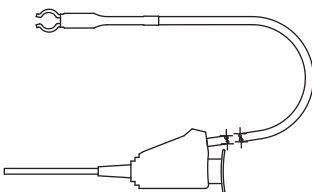
Ground spring



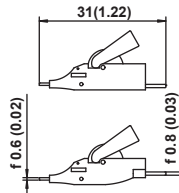
HF-compensated ground lead (L: 22 cm)



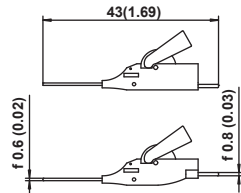
Ground lead with mini clip (L: 11 cm)



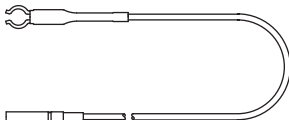
Micro clip short



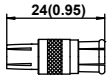
Micro clip long



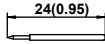
Ground lead with 0.8 mm socket (L: 11 cm)



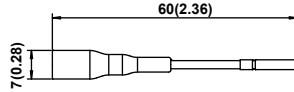
BNC adapter



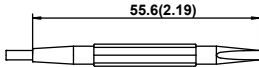
Rigid tip
(ϕ : 0.80 mm)



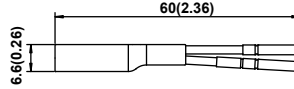
Single adapter lead



Adjustment tool



Dual adapter lead



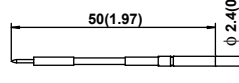
IC cap



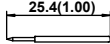
Insulating cap



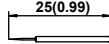
Connector lead (L: 5 cm)



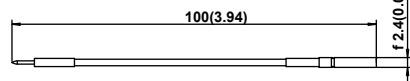
Spring tip
(ϕ : 0.80 mm)



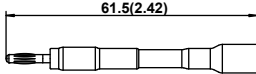
Spring tip
(ϕ : 0.38 mm)



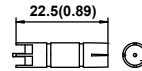
Connector lead (L: 10 cm)



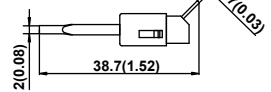
Ground lead with 2 mm plug



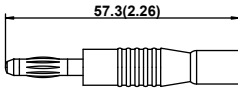
PCB adapter



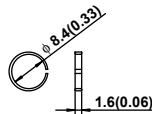
Pico hook



Ground lead with 4 mm plug



Color coding rings (9 colors* x 2)



*Colors: Brown, red, orange, yellow, green, blue, purple, gray, white

Pincher tip

