

User's Manual

Model 701940 10 MHz Passive Probe (Switchable attenuation ratio of 10:1 and 1:1)

Thank you for purchasing the Model 701940 10 MHz Passive Probe. To ensure correct use, please read this manual thoroughly before beginning operation. After reading the manual, keep it in a safe place.

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YOKOGAWA

IM 701940-01E
9th Edition

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the product's performance and functionality. The figures given in this manual may differ from those that actually appear on your product.
- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the software's performance and functions. The figures given in this manual may differ from those that actually appear on your screen.
- Copying or reproducing all or any part of the contents of this manual without the permission of YOKOGAWA is strictly prohibited.

The following symbols are 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

Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

CAUTION

Calls attention to actions or conditions that could cause light injury to the user or damage to the instrument or the user's data, and precautions that can be taken to prevent such occurrences.

Note

Calls attention to information that is important for proper operation of the instrument.

Safety Precautions

This product is designed to be used by a person with specialized knowledge. To use this product correctly and safely, the general safety precautions described herein must be observed during all phases of operation. YOKOGAWA assumes no liability for the customer's failure to comply with these requirements.

This manual is part of the product and contains important information. Keep this manual in a safe place so that you can refer to it immediately when using the product until you dispose of the product. In addition, before using the probe, read the manuals of the oscilloscope to thoroughly familiarize yourself with its specifications and operations.

The following symbols are used on this instrument.

- Handle with care. Refer to the user's manual or service manual. This symbol appears on dangerous locations on the instrument which require special instructions for proper handling or use. The same symbol appears in the corresponding place in the manual to identify those instructions.

Notes about Usage



WARNING

Grounding of the measuring instrument

Make sure to connect the protective grounding of the measuring instrument.

Ground lead of the probe

Make sure to connect the ground lead of the probe to the grounding 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.

Handling of the passive probe

Do not touch the probe's input terminal or the probe itself with wet hands.

Make sure not to exceed the oscilloscope's maximum input voltage in the following cases:

- When the probe attenuation ratio is 1:1
 - When the oscilloscope's input coupling is AC
- DC voltage of the same electric potential as the probe's input is applied to the oscilloscope's input.

Do not operate with suspected failures

If you suspect that there is damage to this probe, contact your nearest YOKOGAWA dealer or sales representative.

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.

Do not disassemble or modify

Do not disassemble or modify the product. YOKOGAWA assumes no liability if you disassemble or modify the product.

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.

Damaged Signal Cable

If the signal cable is torn and the inner metal is exposed or if a color different from the outer sheath appears, stop using the cable immediately.



CAUTION

Maximum input voltage

Do not supply any voltages exceeding the maximum input voltage to the probe.

French



AVERTISSEMENT

Mise à la terre de l'instrument de mesure

S'assurer de connecter la mise à la terre protectrice de l'instrument de mesure.

Fil de terre de la sonde

S'assurer de connecter le fil de terre de la sonde au potentiel de mise à la terre.

Connexion de l'objet de la mesure

S'assurer d'éviter un choc électrique lors de la connexion de la sonde à l'objet de la mesure. Ne pas retirer la sonde de l'instrument de mesure après avoir connecté l'objet de la mesure.

Manipulation de la sonde passive

Ne pas toucher le terminal d'entrée de la sonde ou la sonde elle-même avec des mains mouillées.

S'assurer de ne pas dépasser la tension d'entrée maximum de l'oscilloscope dans les cas suivants

- Lorsque le ratio d'atténuation de la sonde est 1:1
- Lorsque le couplage d'entrée de l'oscilloscope est en CA.
La tension en CC du même potentiel électrique que l'entrée de la sonde est appliquée à l'entrée de l'oscilloscope.

Ne pas utiliser en cas de défaillances suspectées

Si vous suspectez que la sonde est endommagée, contactez votre revendeur ou représentant commercial YOKOGAWA.

Ne pas utiliser dans des conditions humides

Afin d'éviter un choc électrique, ne pas utiliser cette sonde dans des conditions humides."

Ne pas utiliser dans une atmosphère explosive

Afin d'éviter des risques de blessures ou d'incendie, ne pas utiliser cette sonde dans une atmosphère explosive.

Ne pas démonter ou modifier

Ne pas démonter ou modifier le produit. YOKOGAWA se dégage de toute responsabilité si vous démontez ou modifiez le produit.

Éviter les circuits exposés

Afin d'éviter des blessures, retirer les bijoux comme les bagues, montres et autres objets métalliques. Ne pas toucher les connexions et les composants exposés après mise sous tension.

Câble de signal endommagé

Si le câble de signal est déchiré et que le métal intérieur est exposé ou si une couleur différente de la gaine externe est visible, arrêter immédiatement d'utiliser ce câble.



ATTENTION

Tension d'entrée maximum

Ne pas appliquer à la sonde de tension dépassant la tension d'entrée maximum.

Regulations and Sales in Various Countries and Regions

Waste Electrical and Electronic Equipment (WEEE)



(EU WEEE Directive valid only in the EEA* and UK WEEE Regulation in the UK)

This product complies with the WEEE marking requirement. This marking indicates that you must not discard this electrical/electronic product in domestic household waste. When disposing of products in the EEA or UK, contact your local Yokogawa office in the EEA or UK respectively.

* EEA: European Economic Area

UKCA Marking



This product complies with the UKCA (UK Conformity Assessed) marking.

Authorized Representative in the EEA (AR)

Yokogawa Europe B.V. is the authorized representative of Yokogawa Test & Measurement Corporation for this product in the EEA. To contact Yokogawa Europe B.V., see the separate list of worldwide contacts, PIM 113-01Z2.

Disposal

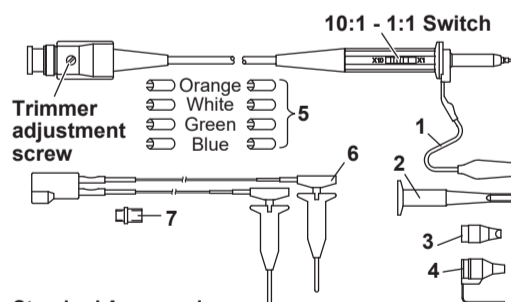
When disposing of YOKOGAWA products, follow the laws and ordinances of the country or region where the product will be disposed of.

Description

The model 701940 is a 10 MHz passive probe with switchable attenuation ratio of 10:1 and 1:1. This probe can be used for oscilloscopes with input impedances of 1 MΩ.

Appearance

This probe is composed of the probe and its accessories. Optional accessories are available to meet various applications.



Standard Accessories

Name	Part No.
1 Ground lead	B9852CW
2 Pinchers tip	B9852CX
3 IC test tip	-
4 Ground attachment	B9852CZ
5 Marker tip	-

Optional Accessories (Sold Separately)

Name	Part No.
6 Mini clip converter	B9852CR
7 BNC adapter	B9852CS

Manual Title	Manual No.	Description
Model 701940 10 MHz Passive Probe Switchable attenuation ratio of 10:1 and 1:1 User's Manual	IM 701940-01E	This manual. Explains usage, specifications, and the handling precautions of the 701940.
Model 701940 10 MHz Passive Probe Switchable attenuation ratio of 10:1 and 1:1	IM 701940-92	Document for China
Safety Instruction Manual	IM 00C01C01-01Z1	Safety manual (European languages)
Inquiries	PIM 113-01Z2	List of worldwide contacts

The "E", "Z1", and "Z2" in the manual numbers are the language codes.

Specifications

Item	Specifications	Conditions
Probe length	1.5 m	
Connector type	BNC	
Input resistance ¹	10 MΩ ±2%	In conjunction with an oscilloscope with an input impedance of 1 MΩ ±1%
Matching Input Capacity (at 10:1)	Approx. 17 pF to 46 pF	Oscilloscope measurement input capacity
Input capacitance		
At attenuation ratio of 10:1	22 pF ±10%	In conjunction with an oscilloscope with an input impedance of 1 MΩ ±1%
At attenuation ratio of 1:1	200 pF max.	Probe only
Attenuation ratio ¹	(10:1) ±2% or less	In conjunction with an oscilloscope with an input impedance of 1 MΩ ±1%
Bandwidth		
At attenuation ratio of 10:1	10 MHz (-3 dB)	Subject to change depending on type of oscilloscope used
At attenuation ratio of 1:1	DC to 6 MHz (-3 dB, typical ²)	Subject to change depending on type of oscilloscope used and measurement conditions
Rise time		
At attenuation ratio of 10:1	35 ns max.	Subject to change depending on type of oscilloscope used
At attenuation ratio of 1:1	58 ns max. (typical ²)	Subject to change depending on type of oscilloscope used and measurement conditions
Maximum input voltage ¹	600 V (DC+ACpeak) or 42 V (DC+AC peak)	This voltage acceptable if the oscilloscope input is non-isolated (the GND part of the input has the same electric potential as the protective grounding), and the attenuation factor is 10:1. If the attenuation factor is 1:1, the acceptable voltage is the max. input voltage on the oscilloscope.
Operating environment	Temperature +5°C to +40°C Humidity 20% RH to 80% RH	
Storage environment	Temperature -20°C to +70°C Humidity 80% RH or less	
Operating altitude	2000 m or less	
Safety standard	EN 61010-031 Measurement category II, ³ 600 V (DC+ACpeak) Pollution degree 2 ⁴	
Environmental standards ⁵	EU RoHS Directive compliant	

1 In case of selecting the attenuation as 10:1. The maximum allowable input decreases depending on the frequency. Refer to the derating curve.

2 Typical (or average) value; not guaranteed.

3 The product is for measurement category II (CAT II). Do not use it with measurement category III (CAT III), nor measurement category IV (CAT IV). When using devices or accessories with different measurement categories, the lower measurement category applies. See below for definitions of measurement categories.

Measurement Category	Definition
Measurement category "O" (Other)	It applies to measurement of a circuit that is not connected directly to the main power source.
Measurement category II (CAT II)	It applies to measurement of electrical equipment that is powered through a fixed installation such as a wall outlet wired to a distribution board and measurement on such wiring.
Measurement category III (CAT III)	It applies to measurement at the distribution level, that is, building wiring, fixed installations.
Measurement category IV (CAT IV)	It applies to measurement at the primary supply level, that is, overhead lines, cable systems.

4 Pollution degree applies to the degree of adhesion of a solid, liquid, or gas which deteriorates withstand voltage or surface resistivity. Pollution Degree 2 applies to normal indoor atmospheres (usually with only non-conductive pollution).

5 For conformity to environmental regulations and/or standards other than EU, contact your nearest Yokogawa office (PIM 113-01Z2).



WARNING

- The maximum input voltage for isolated input is more strictly limited than for non-isolated input. This is due to the fact that, unlike non-isolated input in which GND is protected by a protective grounding potential, the GND for isolated input is floating (insulated), so any protection via protective grounding is disabled.
- When using this probe for isolated input, you must use it with 42 V or less for both the H and L sides. In particular, the GND shell has exposed metal so there is a high risk of electric shock. Even when a high potential only exists on the H side, high voltage can still occur on the L side creating a very dangerous condition.
- Even when the voltage of the non-isolated input is within the maximum, to ensure that current flows to the protective grounding circuit the protective grounding (from the power supply's 3-prong terminal) of the main unit must be enabled, and for plug-in modules, the module attachment screws must be securely fastened.
- This probe has a 10:1 - 1:1 switch. Be sure to heed the following cautions when switching the probe.
 - Confirm the oscilloscope's maximum input voltage when switching the probe to 1:1. Accidentally introducing excessive input can damage the input section.
 - Do not switch the probe while voltage is being input. This is extremely hazardous.

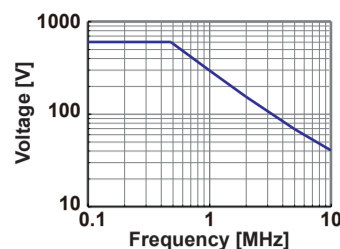
French



AVERTISSEMENT

- La tension d'entrée maximum pour une entrée isolée est strictement plus limitée que pour une entrée non isolée. Ceci est dû au fait que, contrairement à une entrée non isolée dans laquelle le GND est protégé par un potentiel protecteur de mise à la terre, le GND pour une entrée isolée est flottant (isolé), désactivant ainsi toute protection via une mise à la terre protectrice.
- Lors de l'utilisation de cette sonde pour une entrée isolée, vous devez l'utiliser en 42 V ou moins pour les côtés H et L. En particulier, la coque GND possède des parties métalliques exposées, d'où un risque de choc électrique élevé. Même lorsqu'un potentiel élevé existe uniquement sur le côté H, une haute tension peut tout de même être présente sur le côté L, créant ainsi une condition très dangereuse.
- Même lorsque la tension de l'entrée non isolée ne dépasse pas le maximum, afin de s'assurer que le courant passe jusqu'au circuit protecteur de mise à la terre, la mise à la terre protectrice (du terminal à 3 broches de l'alimentation électrique) de l'unité principale doit être activée, et pour les modules enfichables, les vis de fixation du module doivent être bien serrées.
- Cette sonde possède un commutateur 10:1 - 1:1. S'assurer de respecter les précautions suivantes lors de l'allumage de la sonde.
 - Confirmer la tension d'entrée maximum de l'oscilloscope lors de l'allumage de la sonde sur 1:1. Introduire accidentellement une entrée trop élevée peut endommager la section d'entrée.
 - Ne pas allumer la sonde au moment de la mise sous tension. Ceci est extrêmement dangereux.

Maximum Input Voltage Derating Curve



Operation

Use adequate attachment suitable for the point to measure. Before using the probe with attenuation ratio of 10:1, adjust its capacitance by tuning the trimmer.

The attenuation can be selected using the 10:1 - 1:1 switch.

Make sure the maximum input voltage of oscilloscope when the attenuation is selected as 1:1.

Adjustment

- Connect the probe connector to the input of the oscilloscope, and connect the tip of the probe to the CAL signal output terminal.
- Change the Time/Div and the V/Div to get the display shown below. And tune the trimmer to get the correct waveform.

