

User's Manual

Model 702906 10:1 Passive Probe (Wide operating temperature range, for non-isolated BNC input)

Thank you for purchasing the 10:1 Passive Probe (Model 702906). To ensure correct use, please read this manual thoroughly before beginning operation. After reading this manual, keep it in a safe place.

The probe's lot number label is affixed to this user's manual. Store this manual and the probe together so that you can verify the probe's lot number.

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Lot No. _____

YOKOGAWA ◆

IM 702906-01EN
5th Edition

The 10:1 Passive Probe (702906) is a product of Yokogawa Test & Measurement Corporation. Contact information of Yokogawa offices worldwide is provided on the following sheet.

Document No.	Description
PIM 113-01Z2	List of worldwide contacts

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

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 cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.

Note

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

Safety Precautions

This product is designed to be used by a person with specialized knowledge.

1 Make sure to observe the following safety precautions when handling the probe. YOKOGAWA assumes no liability for the customer's failure to comply with these safety precautions. Before you use the probe, read the measuring instrument's manual to thoroughly familiarize yourself with the specifications and operations of the measuring instrument.

This manual is part of the product and contains important information. Store this manual in a safe place close to the instrument so that you can refer to it immediately. Keep this manual until you dispose of the instrument.

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.



Risk of electric shock

Make sure to observe the following safety precautions to prevent electric shock, personal injury, or damage to the instrument.



WARNING

Grounding of the measuring instrument

The protective grounding terminal of the oscilloscope must be connected to ground.

Safety ground lead of the probe

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

Stop use if you suspect damage

If you suspect that the probe is broken, consult your nearest YOKOGAWA dealer.

Observe the maximum input voltage

Do not apply voltage exceeding 1000 V peak between a pincher tip and safety ground lead. 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. Make sure not to exceed the oscilloscope's maximum input voltage.

Do not use in damp places

To prevent electric shock, do not use the probe in damp places.

Do not use in an explosive atmosphere

To prevent fire and injury, do not use the probe in a flammable or explosive atmosphere or near steam.

Do not touch exposed circuitry

To prevent injury, do not touch exposed live connections or components.

Do not disassemble or modify

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

Be careful of electric shock

Never use the probe with wet hands or when the probe itself is wet. Doing so may cause electric shock. Be careful of electric shock when you connect the probe to the circuit under measurement.

Be careful of burns and frostbite

When the probe is connected to a circuit under measurement that is hot or cold, do not touch the probe directly. In such situations, the probe will also be hot or cold, and touching it may cause burns or frostbite. Also, be careful of burns and frostbite when you connect the probe to such circuit.

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 apply any voltages exceeding the maximum input voltage to the probe.

Conditions of use

This product has not been designed or manufactured for applications in which high reliability is required over a long time period. This probe is not water or dust resistant. Do not use the probe in areas with a lot of dust or where water may be spilled.

Storage precautions

Avoid using or storing the probe in an environment that does not meet the operating or storage environment defined in the specifications. Deformation and insulation deterioration can occur causing the probe to no longer meet the specifications.

Handling precautions

- Avoid vibration, shock, and static electricity during shipping, handling, and using. Take extra care not to drop the probe.
- Do not connect and remove the pincher tip or 4Φ conversion adapter (sold separately) when the probe is hot or cold.
- Never twist or pull the cable or safety ground lead any more than necessary. The wire inside the cable or lead can break, causing malfunction.

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.

Ne pas utiliser en cas de défaillances suspectées

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

Respecter la tension d'entrée maximum

Ne pas appliquer une tension dépassant un pic de 1000 V entre une pointe de pince et un fil de terre de sécurité ou entre un fil de terre de sécurité et la terre.

Lorsque le couplage d'entrée de l'instrument de mesure est en CA, la tension en CC du même potentiel électrique que l'entrée de la sonde est appliquée à l'entrée de l'instrument de mesure. S'assurer de ne pas dépasser la tension d'entrée maximum de l'instrument de mesure. Observez la tension d'entrée maximum de l'instrument de mesure.

Ne pas utiliser dans des endroits humides

Pour éviter les chocs électriques, n'utilisez pas la sonde dans des endroits 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.

Éviter les circuits exposés

Ne pas toucher les connexions et les composants exposés après mise sous tension.

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.

Faire attention au choc électrique

Ne jamais utiliser la sonde avec des mains mouillées ou lorsque la sonde elle-même est mouillée. Ceci pourrait entraîner un choc électrique. Faire attention au choc électrique lors de la connexion de la sonde au circuit faisant l'objet de la mesure.

Faire attention aux brûlures et aux gelures

Lorsque la sonde est connectée à un circuit faisant l'objet d'une mesure, qui est chaud ou froid, ne pas toucher directement la sonde. Dans une telle situation, la sonde sera également chaude ou froide, et la toucher peut entraîner des brûlures ou des gelures. En outre, faire attention aux brûlures et aux gelures lors de la connexion de la sonde à un tel circuit.

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.

Conditions d'utilisation

Ce produit n'est pas conçu ou fabriqué pour des applications nécessitant une fiabilité élevée sur une longue période. Cette sonde ne résiste ni à l'eau ni à la poussière. Ne pas utiliser la sonde dans des endroits pleins de poussière ou susceptibles d'être éclaboussés.

Précautions de stockage

Éviter d'utiliser ou de stocker la sonde dans un environnement ne correspondant pas à l'environnement d'utilisation ou de stockage défini dans les spécifications. Une déformation et une détérioration de l'isolation peuvent survenir, faisant que la sonde ne répond plus aux spécifications.

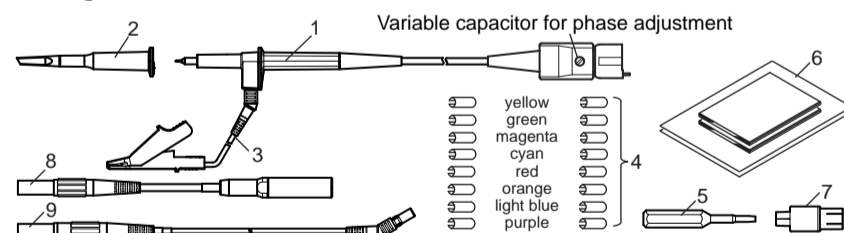
Précautions de manipulation

- Éviter les vibrations, les chocs et l'électricité statique durant le transport et la manipulation. Prendre garde de ne pas faire tomber la sonde.
- Ne pas connecter ou retirer la pointe de la pince ou l'adaptateur de conversion 4Φ (vendu séparément) lorsque la sonde est chaude ou froide.
- Ne jamais tordre ou tirer sur le câble ou le fil de terre de sécurité plus que nécessaire. Le fil à l'intérieur du câble ou du fil de terre peut se casser, entraînant un mauvais fonctionnement.

1. Overview

The 702906 (10:1 passive probe) is a passive probe with probe ID pin and attenuation ratio of 1/10. It can be used for oscilloscopes with input impedances of 1 MΩ. It can be used over a wide temperature range (-40°C to +85°C).

2. Configuration and Part Names



Standard Parts	Part No.	Optional Accessories (Sold separately)	Part No.
1. Probe	—	7. BNC adapter (40 V or less)	B8099MT
2. Pincher tip	B8099MR	8. 4Φ conversion adapter (pincher tip end)	B8099NL
3. Safety ground lead	B8099NK	9. 4Φ conversion adapter (safety ground lead end)	B8099NM
4. Marker tip	—	10. Safety miniclip (hook type)	B9852MM(black) B9852MN(red)
5. Adjustment screwdriver	—	11. Alligator clip adapter	758929
6. Manuals*	—	12. Fork terminal adapter	758921

* Manuals

Manual Title	Manual No.	Description
Model 702906 10:1 Passive Probe (Wide operating temperature range, for non-isolated BNC input) User's Manual	IM 702906-01EN	This manual. This manual explains the handling precautions, basic usage, and specifications of the probe.
Model 702906 10:1 パッシブプローブ (広温度動作範囲 非絶縁型 BNC 用)	IM 702906-01JA	The Japanese version of the above manual
Model 702906 10:1 Passive Probe (Wide operating temperature range, for non-isolated BNC input)	IM 702906-92Z1	Document for China
Inquiries	PIM 113-01Z2	List of worldwide contacts

The "EN", "JA", "Z1", and "Z2" in the manual number is the language codes.

- The operating temperature range of optional accessories is -40°C to $+85^{\circ}\text{C}$.
- The measurement category varies depending on the accessory. When using devices or accessories with different measurement categories, the lower measurement category applies.
- To order standard parts and optional accessories, contact your nearest YOKOGAWA dealer.

3. How to Use

Before using the probe, be sure to adjust it. Turn the variable capacitor for phase adjustment with a screwdriver to obtain a proper waveform.

Adjustment

1. Connect the probe connector to the input of the oscilloscope, and connect the tip of the probe to the CAL terminal or the COMP terminal of the oscilloscope.
2. Control the vertical and time scales on the oscilloscope as necessary, and adjust the variable capacitor for phase adjustment with the adjustment screwdriver that comes with the probe to obtain the correct waveform shown below.



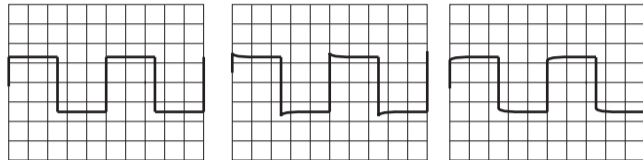
CAUTION

When you adjust the variable capacitor for phase adjustment with the adjustment screwdriver, do not turn the variable capacitor with strong force. Doing so may damage the variable capacitor.



ATTENTION

Lors de l'ajustement du condensateur variable pour l'ajustement des phases à l'aide d'un tournevis, ne pas tourner le condensateur variable avec force. Ceci pourrait endommager le condensateur variable.



Correct Waveform Over Compensation Inadequate Compensation

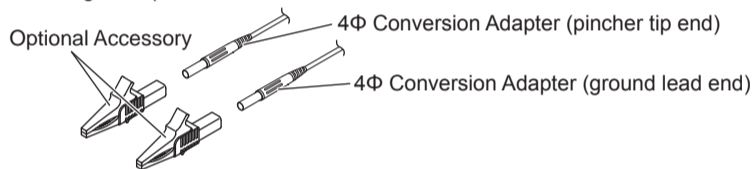
Connecting the Optional Accessory

The optional miniclips or adapters listed below can be connected directly to the 4Φ conversion adapter (pincher tip end and safety ground lead end).

- Safety miniclip (hook type, B9852MM, B96852MN)
- Alligator clip adapter (758929)
- Fork terminal adapter (758921)

We offer a variety of adapters. For details about adapters, contact your nearest YOKOGAWA dealer.

Connecting example



WARNING

- When connecting the probe to the object under measurement, be careful of electric shock, burns, and frostbite.
- When disconnecting the probe BNC output connector, first turn OFF the power to the circuit under measurement and disconnect the probe from the high voltage parts of the circuit under measurement. Then, disconnect the probe BNC output connector.
- Use the probe only with the YOKOGAWA oscilloscope.
- EN61010-031 is a safety standard that applies to the probe alone. For the actual compliant safety standards and operating conditions, observe the conditions for the measurement instrument. Failure to observe them may cause accidents, such as electric shock and damage to the instrument.



CAUTION

- Use a soft cloth to clean the probe. Be careful not to break the probe. Do not immerse the probe in liquid or use abrasive cleaners on the probe. Do not use benzene or other solvents on the probe.



AVERTISSEMENT

- Lors de la connexion de la sonde à l'objet faisant l'objet de la mesure, faire attention au choc électrique, aux brûlures et aux gelures.
- Lors de la déconnexion du connecteur de sortie BNC de la sonde, mettre d'abord HORS tension le circuit faisant l'objet de la mesure, et déconnecter la sonde des parties à haute tension du circuit. Puis déconnecter la sonde des parties à haute tension du circuit faisant l'objet de la mesure.
- Utilisez la sonde uniquement avec l'oscilloscope YOKOGAWA.
- EN61010-031 is a safety standard that applies to the probe alone. For the actual compliant safety standards and operating conditions, observe the conditions for the measurement instrument. Failure to observe them may cause accidents, such as electric shock and damage to the instrument.



ATTENTION

- Utiliser un chiffon doux pour nettoyer la sonde. Faire attention de ne pas casser la sonde. Ne pas immerger la sonde dans un liquide ni utiliser de nettoyants abrasifs sur la sonde. Ne pas utiliser de benzène ni d'autres solvants sur la sonde.

Note

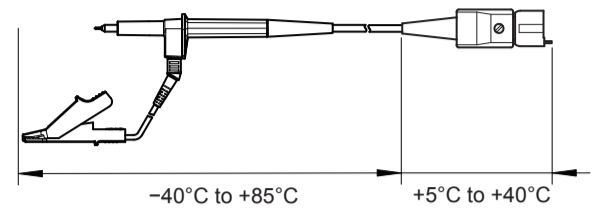
Accurate measurements may not be possible near objects with strong electromagnetic fields such as transformers, large current circuits, and wireless equipment.

4. Specifications

Electrical Specifications

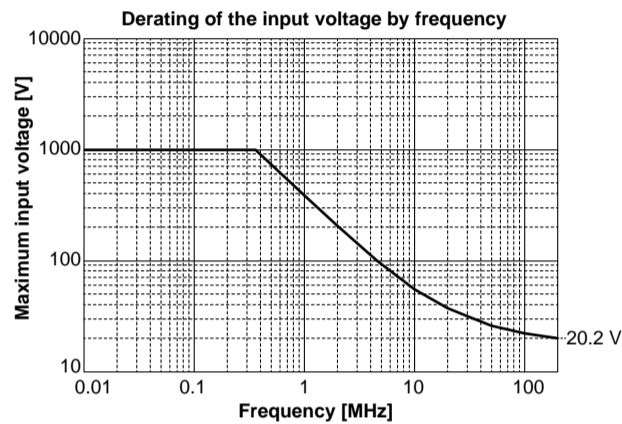
Item	Specifications
Probe length	2500 mm \pm 50 mm (including the pincher tip)
Connector type	BNC
Input resistance	10M Ω \pm 2% (typical ¹) In conjunction with an oscilloscope with an input impedance of 1M Ω \pm 1%.
Input capacitance	16.0 pF (typical ¹) In conjunction with an oscilloscope with an input impedance of 1M Ω \pm 1%.
Attenuation ratio	1/10 \pm 2% ($+5^{\circ}\text{C}$ to $+40^{\circ}\text{C}$) 1/10 \pm 3% (-40°C to $+5^{\circ}\text{C}$, $+40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$) In conjunction with an oscilloscope with an input impedance of 1M Ω \pm 1%.

Item	Specifications
Frequency Band (\leq -3 dB)	DC to 200 MHz ²
Rise time	1.8 ns max. (typical ¹) ²
Propagation delay	12.0 ns (typical ¹)
Maximum input voltage	\pm 1000 V (DC + ACpeak) ³
Operating environment	-40°C to $+85^{\circ}\text{C}$ (no condensation) For the temperature, see the temperature vs. humidity derating curve. ⁴ Also $+5^{\circ}\text{C}$ to $+40^{\circ}\text{C}$, 20 to 80% (no condensation) on the phase adjustment side

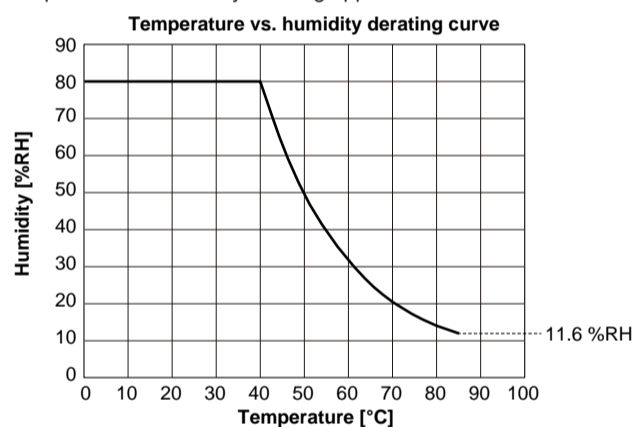


Operating altitude	3,000 m or less
Storage environment	-40°C to $+85^{\circ}\text{C}$ (no condensation) For the temperature, see the temperature vs. humidity derating curve. ⁴
Storage altitude	3,000 m or less
Matching input capacitance	15 pF to 25 pF
Safety standards	Complying standards EN61010-031 Measurement category I, II ⁵ 1000 V (DC + ACpeak) Pollution degree 2 ⁶
Environmental standard	Compliant Standard EN50581 Monitoring and control instruments

- 1 Typical (or average) value; not guaranteed.
- 2 The frequency band varies depending on the oscilloscope that the probe is used with.
- 3 Frequency derating applies.



- 4 Temperature vs. humidity derating applies.



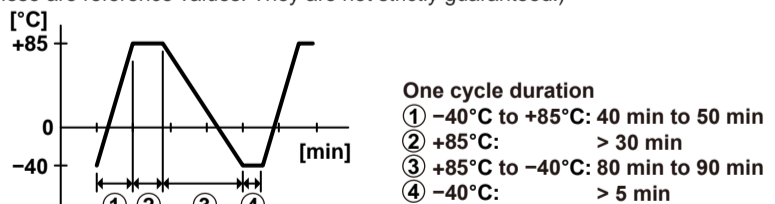
- 5 This equipment is for measurement category I (CAT I) and category II (CAT II). Do not use it with measurement category III (CAT III), nor measurement category IV (CAT IV). CAT I applies to electrical equipment on a circuit that is not connected directly to the power source and measurement performed on such wiring. CAT II applies to electrical equipment that is powered through a fixed installation such as a wall outlet wired to a distribution board and measurement performed on such wiring. CAT III applies to measurement of the distribution level, that is, building wiring, fixed installations. CAT IV applies to measurement of the primary supply level, that is, overhead lines, cable systems, and so on. When using devices or accessories with different measurement categories, the lower measurement category applies.
- 6 Pollution degree refers 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 (with only non-conductive pollution).

5. Appendix

Temperature Cycle Reference Values

It has been verified that the probe can withstand at least 500 repetitions of the following temperature cycle in a resting state.

(These are reference values. They are not strictly guaranteed.)



Waste Electrical and Electronic Equipment



Waste Electrical and Electronic Equipment (WEEE)

(This directive is valid only in the EU.)

This product complies with the WEEE Directive 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, this product is classified as a "Monitoring and Control instrumentation" product.

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

Authorized Representative in the EEA

Yokogawa Europe B. V. is Authorized Representative of Yokogawa Test & Measurement Corporation in the EEA for this Product. To contact Yokogawa Europe B. V., see the separate list of worldwide contacts, PIM 113-0122.