

User's Manual

Model 701943 PB500 500 MHz Passive Probe (10:1)

Thank you for purchasing the PB500 500 MHz Passive Probe. To ensure correct use, please read this manual thoroughly before beginning operation. After reading the manual, keep it in a convenient location for quick reference whenever a question arises during operation.

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YOKOGAWA ◆

IM 701943-01E
9th Edition

The instrument comes with the following manuals. Please keep them in a safe place.

Manual Title	Manual No	Notes
500 MHz Passive Probe (10:1) User's Manual	IM701943-01E	This manual.
Safety Instruction Manual	IM 00C01C01-01Z1	Safety manual (European languages)
Inquiries	PIM113-01Z2	List of worldwide contacts

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.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
- 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 attentions 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. Make sure to comply with the safety precautions mentioned hereafter when handling the probe. YOKOGAWA assumes no responsibility for any consequences resulting from failure to comply with these safety precautions. Also, read the User's Manual of the measuring instrument thoroughly so that you are fully aware of its specifications and handling, before starting to use the probe. 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.

Make sure to comply with the following safety precautions in order to prevent accidents such as an electric shock which impose serious health risks to the user and damage to the instrument.



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 grounding potential.

Handling of the passive probe

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

Do not operated with suspected failures

If you suspect that there is damage to this probe, have it inspect by a service personnel.

Observe maximum working voltage

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 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.

Manipulation de la sonde passive

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

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

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.

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.

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

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.

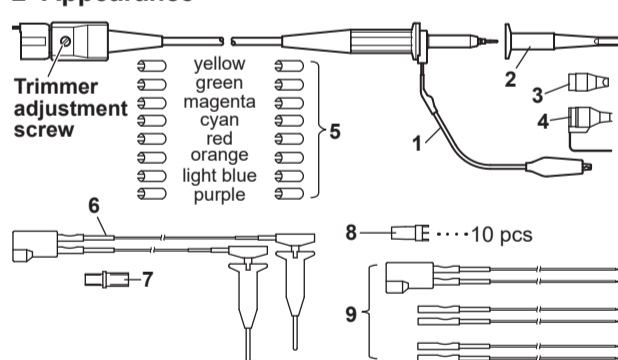
Disposal

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

1 Description

PB500 is a 500 MHz passive probe with probe ID pin and attenuation ratio of 10:1. This probe can be used for oscilloscopes with input impedances of 1 MΩ.

2 Appearance



Standard Accessories

Name	Part No.
1 Ground lead	B9852BD
2 Pinchers tip	B9852BE
3 IC test tip	B9852BF
4 Ground attachment	B9852BG
5 Marker tip	—

Optional Accessories (Sold Separately)

Name	Model
6 Mini clip adapter	700971
7 BNC adapter	700972
8 Printed circuit board adapter	366945
9 Solder-in adapter	366946

3 Operation



WARNING

- Use this probe only with YOKOGAWA's oscilloscopes. Even with YOKOGAWA's oscilloscopes, this probe can be used only when specified as an accessory.
- 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.
- When the oscilloscope's input coupling is AC, a DC voltage is applied to the oscilloscope's input at the same electric potential as the probe's input. Make sure not to exceed the oscilloscope's maximum input voltage.
- This probe cannot be used to measure the voltage between two points floating from the ground potential. Consider using a differential probe.
- When disconnecting the probe BNC output connector, first turn OFF the power to the circuit under measurement. Then, disconnect the probe from the high voltage parts of the circuit under measurement.

CAUTION

- Avoid shock to the probe body. Do not bend or pull the cables excessively. Doing so may damage or disconnect the probe.
- Use a soft cloth to clean the dirt. Prevent damage to the probe. Avoid immersing the probe, using abrasive cleaners, and using chemicals contains benzene or similar solvents.

French



AVERTISSEMENT

- Utilisez la sonde uniquement avec les oscilloscopes de YOKOGAWA. Même avec les oscilloscopes de YOKOGAWA, la sonde ne peut être utilisée que si spécifiée comme accessoire.
- 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.
- Lorsque le couplage d'entrée de l'oscilloscope est AC, une tension DC est appliquée à l'entrée de l'oscilloscope au même potentiel électrique que l'entrée de la sonde. Assurez-vous de ne pas dépasser la tension d'entrée maximale de l'oscilloscope.
- La sonde ne peut être utilisée pour mesurer la tension entre deux points flottant du potentiel de terre. Pensez à utiliser une sonde différentielle.
- 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. Puis déconnecter la sonde des parties à haute tension du circuit faisant l'objet de la mesure.

ATTENTION

- Évitez les chocs sur le corps de la sonde. Ne pliez pas et ne tirez pas les câbles de manière excessive. Cela pourrait endommager ou déconnecter la sonde.
- 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.

How to Connect the Probe

1. Connect the BNC connector of the probe to the input of the oscilloscope with the input impedances of 1 M Ω . Set the input impedance of the oscilloscope to 1 M Ω .
2. The probe ID pin is automatically detected, and the oscilloscope attenuation ratio is automatically set to 10:1. If it is not set automatically, set it manually.
3. Use adequate attachment suitable for the point to measure.

How to Adjust the Probe Phase

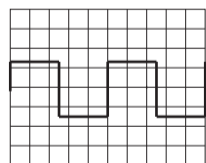
CAUTION

Do not apply excessive force to the phase adjustment screw. Doing so may damage the internal variable capacitor.

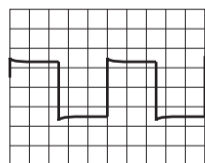
ATTENTION

N'appliquez pas une force excessive sur la vis de réglage de phase. Cela pourrait endommager le condensateur variable interne.

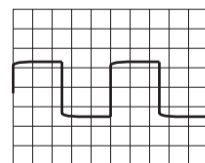
1. Connect the probe connector to the input of the oscilloscope, and connect the tip of the probe to the CAL signal output terminal.
2. Change the Time/Div and the V/Div to get the display shown below. And tune the trimmer to get the correct waveform.



Correct Waveform



Over Compensation



Inadequate Compensation

Note

Accurate measurement may not be possible near objects with strong electric fields (such as cordless equipment, transformers, or circuits with large currents).

4 Specifications

Item	Specifications
Probe length	Approx. 1.5 m
Connector type	BNC
Input resistance	10 M Ω \pm 2% In conjunction with an oscilloscope with an input impedance of 1 M Ω \pm 1%.
Input capacitance	12.5 pF (typical) ¹ In conjunction with an oscilloscope with an input impedance of 1 M Ω \pm 1%.
Attenuation ratio	10:1 \pm 2% In conjunction with an oscilloscope with an input impedance of 1 M Ω \pm 1%.
Frequency Bandwidth (\geq -3 dB)	DC to 500 MHz (-3 dB or less) Subject to change depending on type of oscilloscope used.
Rise time	700 ps max. (typical) ¹ Subject to change depending on type of oscilloscope used.
Max input voltage ²	600 V (DC + ACpeak) or 424 Vrms
Operating temperature	5 to 40°C
Operating maximum relative humidity	80% RH at a temperature of up to 31°C, decreasing linearly to 50% RH at 40°C if the temperature is 31°C or higher.
Operating altitude	3000 m or less
Storage temperature	-20 to 70°C
Storage humidity	90%RH or less (-20 to 55°C) 45%RH or less (55 to 70°C)
Storage altitude	4600 m or less
Matching input capacitance	Approx. 15 to 25 pF
Safety standards	Complying standards EN61010-031 Measurement category II ³ : 600 V (DC + ACpeak) Pollution degree 2 ⁴
Environmental standards ⁵	EU RoHS Directive compliant

¹ Typical (or average) value; not guaranteed.

² The maximum allowable input decreases depending on the frequency. Refer to the derating curve.

³ This equipment 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)"	Measurement category O (Other) applies to measurement of a circuit that is not connected directly to the main power source.
Measurement category II (CAT II)	CAT II 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)	CAT III applies to measurement at the distribution level, that is, building wiring, fixed installations.
Measurement category IV (CAT IV)	CAT IV 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 (with only non-conductive pollution).

⁵ For conformity to environmental regulations and/or standards other than EU, contact your nearest YOKOGAWA office (PIM113-01Z2).

Input voltage derating

