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# User's Manual

**Model 702921/702922**  
**PBDH0400 Differential Probe,**  
**Model 702923/702924 Differential Probe**

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# User Registration

YOKOGAWA provides registered users with useful information and services. Please allow us to serve you best by completing the user registration form accessible from our website.

**<https://tmi.yokogawa.com/support/>**



# Contact Us

If you want to resolve a technical support issue or need to contact YOKOGAWA, please fill out the inquiry form on our website.

**<https://tmi.yokogawa.com/contact/>**



Thank you for purchasing the Model 702921, 702922 PBDH0400 Differential Probe, or Model 702923, 702924 Differential Probe. This user’s manual explains features, usage, specifications, and the handling precautions of the 702921, 702922, 702923 and 702924. To ensure correct use, please read this manual thoroughly before beginning operation. After reading this manual, keep it in a safe place.

List of Manuals

The following manuals are provided for the instrument.

| Manual Title                                                                                                      | Manual No.       | Description                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Model 702921/702922<br>PBDH0400 Differential Probe,<br>Model 702923/702924<br>Differential Probe<br>User’s Manual | IM 702921-01EN   | This manual.<br>Explains features,<br>usage, specifications,<br>and the handling<br>precautions of the<br>702921, 702922,<br>702923 and 702924. |
| Safety Instruction Manual                                                                                         | IM 00C01C01-01Z1 | Safety manual<br>(European languages)                                                                                                           |

The “EN” and “Z1” in the manual numbers are the language codes.

Contact information of YOKOGAWA offices worldwide is provided on the following sheet.

| Document No. | Description                          |
|--------------|--------------------------------------|
| PIM 113-01Z2 | Inquiry (List of worldwide contacts) |

## Notes

- The contents of this manual are subject to change without prior notice as a result of improvements to the product's performance and functionality. Refer to our website to view our latest manuals.
- 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.

## Trademarks

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- In this manual, the ® and TM symbols do not accompany their respective registered trademark or trademark names.

## Revisions

- 1st Edition: November 2024
- 2nd Edition: September 2025

# Checking the Package Contents

The following items are included. If some of the contents are not correct or missing or if there is physical damage, contact the dealer that you purchased them from.

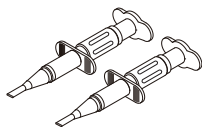
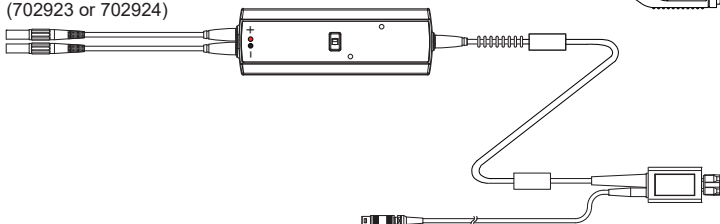
- Differential probe unit (702921, 702922, 702923 or 702924)
- Pincher tips x 2 (except for the option /NA)
- Manuals (see List of Manuals on page i)
- Carrying case
- Other accessories (depending on the options)

## **Standard accessories**

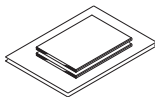
Differential probe  
(702921 or 702922)



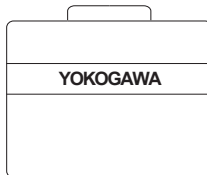
Differential probe  
(702923 or 702924)



Pincher tips

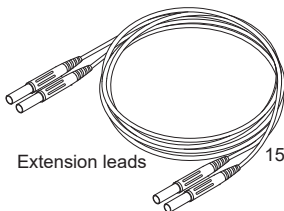


Manuals



Carrying case

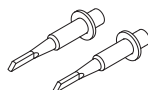
## **Other accessories (depending on the options)**



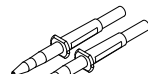
Extension leads



150-Ω resistor adapters



Pincher tips (small)



Test probes

**Model, Suffix Code**

The model and suffix code are printed on the nameplate on the probe unit. Pincher tips x 2 are included as standard accessories.

| Model        | Suffix Code | Notes                                                                                     |
|--------------|-------------|-------------------------------------------------------------------------------------------|
| 702921       |             | PBDH0400 differential probe, high-voltage type (1 kV), Yokogawa probe interface compliant |
| 702922       |             | PBDH0400 differential probe, high-voltage type (2 kV), Yokogawa probe interface compliant |
| 702923       |             | Differential probe, high-voltage type (1 kV), BNC                                         |
| 702924       |             | Differential probe, high-voltage type (2 kV), BNC                                         |
| Cable length | -02         | 2 m                                                                                       |
| Options      | /NA         | No standard accessories (pincher tips x 2 not included)                                   |
|              | /E1         | Extension leads (1m) x 2                                                                  |
|              | /E2         | 150-Ω resistance adapters x 2                                                             |
|              | /E3         | Pincher tips (small) x 2                                                                  |
|              | /E4         | Test probes x 2                                                                           |

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## 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.

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### **CAUTION**

Calls attention to actions or conditions that could cause light injury to the user or 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.

### **French**



Une manipulation ou une utilisation incorrectes risquent de blesser l'utilisateur ou d'endommager l'instrument. Ce symbole apparaît sur l'instrument pour indiquer à l'utilisateur qu'il doit se reporter au manuel de l'utilisateur afin d'y lire les instructions spécifiques correspondantes. Ce même symbole apparaît à la section correspondante du manuel de l'utilisateur pour signaler lesdites instructions. Dans le manuel de l'utilisateur, ce symbole est accompagné des termes AVERTISSEMENT et ATTENTION.

### **AVERTISSEMENT**

Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures graves (voire mortelles), et sur les précautions de sécurité pouvant prévenir de tels accidents.

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### **ATTENTION**

Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures légères ou d'endommager l'instrument ou les données de l'utilisateur, et sur les précautions de sécurité susceptibles de prévenir de tels accidents.

# 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.

In addition, before using the probe, read the manuals of the waveform measuring instrument to thoroughly familiarize yourself with its specifications and operation.

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.

## The following symbols are used on this instrument.



Handle with care. Refer to the user's 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



Hot surface

## French



À manipuler délicatement. Toujours se reporter aux manuel d'utilisation. Ce symbole a été apposé aux endroits dangereux de l'instrument pour lesquels des consignes spéciales d'utilisation ou de manipulation ont été émises. Le même symbole apparaît à l'endroit correspondant du manuel pour identifier les consignes qui s'y rapportent.



Risque de choc électrique



Surface très chaude

## Notes about Usage



### WARNING

#### Purpose of the product

The product is used in combination with a waveform measuring instrument to observe and measure electrical signals. Do not use for any other purpose.

**Ground the measuring instrument**

The protective grounding terminal of the waveform measuring instrument must be connected to ground.

**Check the grounding**

Before connecting the probe input terminal to the device under measurement, ensure that the waveform measuring instrument is properly grounded and that the probe's output connector is connected to the waveform measuring instrument input.

**Observe the maximum input voltage**

Do not apply a voltage exceeding the following maximum value between an input and ground.

|                    | <b>702921, 702923</b>            | <b>702922, 702924</b>            |
|--------------------|----------------------------------|----------------------------------|
| Max. input voltage | $\pm 1000 \text{ V (DC+ACpeak)}$ | $\pm 2000 \text{ V (DC+ACpeak)}$ |

**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 device under measurement.

**Avoid exposed circuitry**

To prevent electric shock, remove metal and jewelry such as watches and rings. Do not touch exposed connections or components when power is present on the device.

**Precautions when connecting and disconnecting the probe**

Do not disconnect the probe from the waveform measuring instrument while the probe is connected to the device under measurement. Doing so may cause electric shock.

**Do not operate in wet or damp conditions**

To prevent electric shock, do not operate the probe in wet or damp conditions.

**Do not operate in explosive atmosphere**

To prevent injury or fire hazard, do not operate the probe in an atmosphere of flammable or explosive gases or vapors.

**Do not operate with suspected failures**

Stop using the probe if you suspect that the probe is damaged. Consult your nearest Yokogawa dealer.

**Do not operate with a 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.

**Do not disassemble or modify**

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

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## CAUTION

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### **Application and design of the product**

The product has not been designed or manufactured for applications in which high reliability is required over a long period of time.

### **Protective structure**

The product is not dust or water resistant. Do not use it in areas with a lot of dust or near water.

### **Usage and storage environment**

Avoid using or storing the product in an environment that does not meet the specifications, such as direct sunlight, high temperature and humidity, or condensation. Deformation or insulation deterioration can occur resulting in failure to retain the product specifications.

### **Handling the probe**

Avoid vibration, shock, and static electricity when handling the probe. Do not bend or pull the cables excessively. Doing so may damage or disconnect the probe.

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## French

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## AVERTISSEMENT

### **But du produit**

Le produit est utilisé en association avec un instrument de mesure de forme d'onde pour observer et mesurer des signaux électriques. Ne l'utilisez pas à d'autres fins.

### **Mettez l'instrument de mesure à la terre**

La borne de terre de protection de l'instrument de mesure de forme d'onde doit être connectée à la terre.

### **Vérifiez la mise à la terre**

Avant de connecter la borne d'entrée de la sonde à l'appareil sous mesure, assurez-vous que l'instrument de mesure de forme d'onde est correctement mis à la terre et que le connecteur de sortie de la sonde est connecté à l'entrée de l'instrument de mesure de forme d'onde.

**Respecter la tension d'entrée maximale**

Ne pas appliquer de tension supérieure à la valeur maximale suivante entre une entrée et la terre.

|                  | <b>702921, 702923</b>             | <b>702922, 702924</b>             |
|------------------|-----------------------------------|-----------------------------------|
| Tension d'entrée | $\pm 1000 \text{ V (CC+CAcrête)}$ | $\pm 2000 \text{ V (CC+CAcrête)}$ |
|                  | max.                              |                                   |

**Faites attention au choc électrique**

N'utilisez jamais la sonde les mains mouillées ou lorsque la sonde elle-même est mouillée. Cela pourrait provoquer un choc électrique. Faites attention au choc électrique lorsque vous connectez la sonde à l'appareil à mesurer.

**Évitez les circuits exposés**

Pour éviter un choc électrique, retirez le métal et les bijoux tels que les montres et les bagues. Ne touchez pas les connexions ou composants exposés en présence de courant sur l'appareil.

**Précautions lors de la connexion et de la déconnexion de la sonde**

Ne déconnectez pas la sonde de l'instrument de mesure de forme d'onde lorsque la sonde est connectée à l'appareil en cours de mesure. Cela pourrait provoquer un choc électrique.

**N'opérez pas dans des conditions mouillées ou humides**

Pour éviter un choc électrique, ne faites pas fonctionner la sonde dans des conditions mouillées ou humides.

**N'opérez pas dans une atmosphère explosive**

Pour éviter les blessures et les risques d'incendie, n'utilisez pas la sonde dans une atmosphère de gaz ou des vapeurs inflammables ou explosifs.

**N'opérez pas en cas de défaillances suspectées**

Arrêtez d'utiliser la sonde si vous pensez qu'elle est endommagée. Consultez votre revendeur Yokogawa le plus proche.

**N'opérez pas avec le câble de signal endommagé**

Si le câble de signal est coupé et que le métal interne est exposé ou si une couleur différente de la gaine extérieure apparaît, arrêtez d'utiliser le câble.

**Ne démontez ou modifiez pas**

Ne démontez ou modifiez pas le produit. YOKOGAWA n'assume aucune responsabilité si vous démontez ou modifiez le produit.

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## ATTENTION

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### **Application et conception du produit**

Le produit n'a pas été conçu ou fabriqué pour des applications dans lesquelles une fiabilité élevée est requise sur une longue période.

### **Structure de protection**

Le produit n'est pas résistant à la poussière ou à l'eau. Ne l'utilisez pas dans des zones très poussiéreuses ou près de l'eau.

### **Environnement d'utilisation et de stockage**

Évitez d'utiliser ou de stocker le produit dans un environnement qui ne répond pas aux spécifications, comme la lumière directe du soleil, les températures et l'humidité élevées ou la condensation. Une déformation ou une détérioration de l'isolation peut se produire, entraînant le non-respect des spécifications du produit.

### **Manipulation de la sonde**

Évitez les vibrations, les chocs et l'électricité statique lors de la manipulation du produit. Ne pliez pas et ne tirez pas les câbles de manière excessive. Cela pourrait endommager ou déconnecter la sonde.

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## **Operating environmental limitations**

Please note the following operating environmental limitations.

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## CAUTION

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This product is a Class A (for industrial environments) product. Operation of this product in a residential area may cause radio interference in which case the user will be required to correct the interference.

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## **French**

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## ATTENTION

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Ce produit est un produit de classe A (pour les environnements industriels). Le fonctionnement de ce produit dans une zone résidentielle peut provoquer des interférences radio, auquel cas l'utilisateur devra corriger les interférences.

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# 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 Regulations 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

## 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.

## 产品中有害物质的名称及含有的信息表

This section is valid only in China.

| 部件名称        | 有害物质      |           |           |                  |                   |                     |                            |                             |                            |                                    |
|-------------|-----------|-----------|-----------|------------------|-------------------|---------------------|----------------------------|-----------------------------|----------------------------|------------------------------------|
|             | 铅<br>(Pb) | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr (VI)) | 多溴<br>联苯<br>(PBB) | 多溴<br>二苯醚<br>(PBDE) | 邻苯二<br>甲酸二<br>正丁酯<br>(DBP) | 邻苯二<br>甲酸二<br>异丁酯<br>(DIBP) | 邻苯二<br>甲酸丁<br>基苯酯<br>(BBP) | 邻苯二甲酸<br>二 (2-乙<br>基) 己酯<br>(DEHP) |
| 框架 (塑料)     | ×         | ○         | ○         | ○                | ○                 | ○                   | ○                          | ○                           | ○                          | ○                                  |
| 框架 (金属)     | ×         | ○         | ○         | ○                | ○                 | ○                   | ○                          | ○                           | ○                          | ○                                  |
| 线路板部件<br>组装 | ×         | ○         | ○         | ○                | ○                 | ○                   | ○                          | ○                           | ○                          | ○                                  |
| 电缆          | ×         | ○         | ○         | ○                | ○                 | ○                   | ○                          | ○                           | ○                          | ○                                  |
| 配件          | ×         | ○         | ○         | ○                | ○                 | ○                   | ○                          | ○                           | ○                          | ○                                  |

注 1:

○: 表示该有害物质在该部件所有均质材料中的含量均不超出电器电子产品有害物质限制使用国家标准要求。

×: 表示该有害物质至少在该部件的某一均质材料中的含量超出电器电子产品有害物质限制使用国家标准要求。

注 2: 以上未列出的部件, 表明其有害物质含量均不超出电器电子产品有害物质限制使用国家标准要求。

## 环保使用期限



该标识适用于国家标准中所述, 在中华人民共和国销售的电器电子产品的环保使用期限。

只要您遵守该产品相关的安全及使用注意事项, 在自制造日起算的年限内, 则不会因产品中有有害物质泄漏或突发变异, 而造成对环境的污染或对人体及财产产生恶劣影响。

注) 该年数为“环保使用期限”, 并非产品的质量保质期。零件更换的推荐周期, 请参照使用说明书。

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# 1. Product Overview

## Features of the Product

PBDH0400 differential probe (model 702921, 702922) and differential probe (model 702923, 702924) are differential input active probes with a wide bandwidth (DC to 400 MHz) and are compatible with high voltage. The probe also features excellent common mode signal rejection capability and allows simple floating measuring.

The 702921 and 702922 are equipped with a Yokogawa dedicated probe interface. When connected to a Yokogawa oscilloscope with probe interface\*, the probe is automatically detected and power is supplied via the probe interface.

Otherwise, the 702923 and 702924 are equipped with a BNC connector and can be connected to an oscilloscope or waveform measuring instrument.

We offer various accessory options and other accessories sold separately so that you can combine the probe according to the device and environment under measurement.

- \* For information about oscilloscopes with Yokogawa dedicated probe interface, contact your nearest Yokogawa dealer.

## Main Differences in Specifications

| Model            |                                    | Rated input voltage |        |
|------------------|------------------------------------|---------------------|--------|
|                  |                                    | 1000 V              | 2000 V |
| Output connector | Yokogawa dedicated probe interface | 702921              | 702922 |
|                  | BNC                                | 702923              | 702924 |

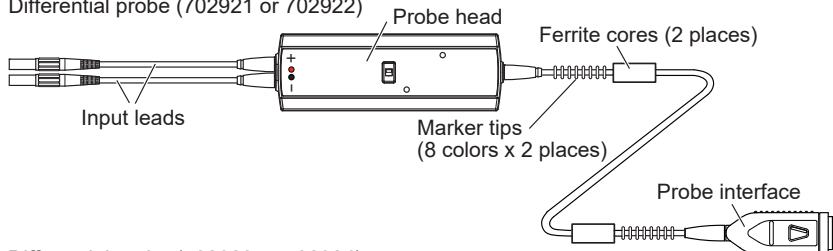
## 2. Configuration and Functions

### Configuration and Part Names

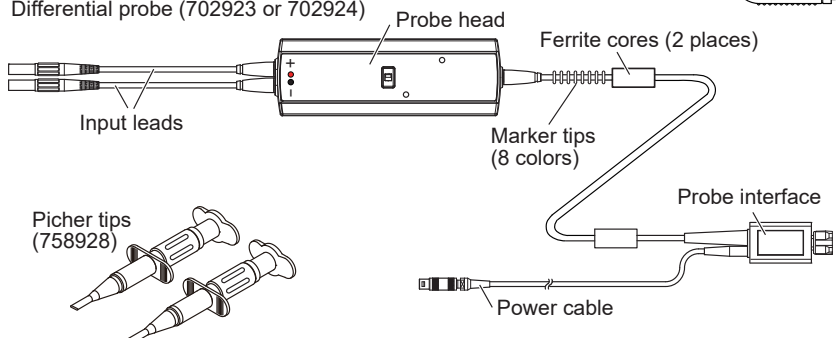
The product configuration and names of each part are as shown in the following figure.

#### Standard accessories

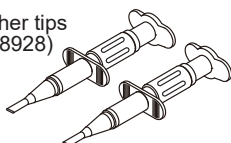
Differential probe (702921 or 702922)



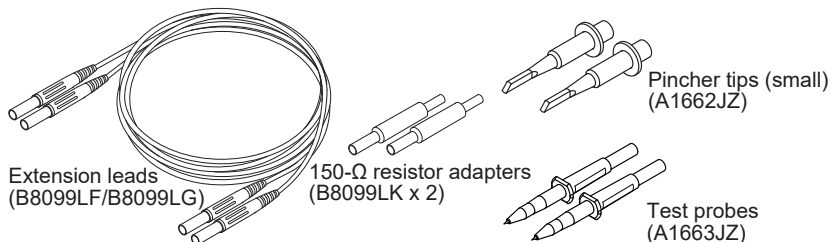
Differential probe (702923 or 702924)



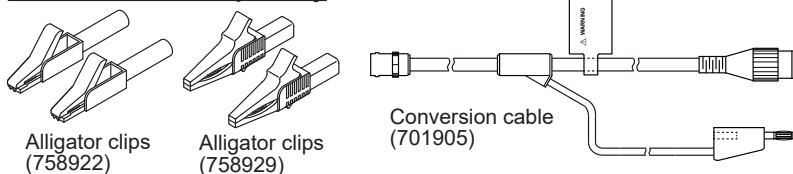
Picher tips  
(758928)



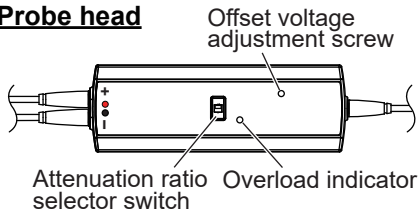
#### Accessories sold separately (or included as accessory options)



#### Accessories sold separately

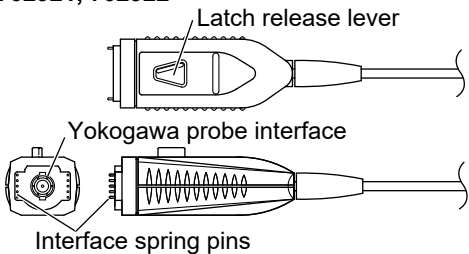


**Probe head**

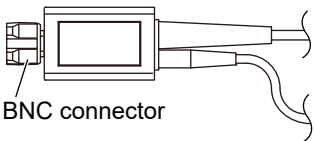


**Probe interface**

**702921, 702922**



**702923, 702924**



**Standard Accessories**

| Item         | Model  | Notes                                                             |
|--------------|--------|-------------------------------------------------------------------|
| Pincher tips | 758928 | Red/black, rating 1000 V CAT III,<br>Not included with option /NA |

**Accessories Sold Separately**

| Item                          | Model<br>(Parts Number)           | Notes                                                                        |
|-------------------------------|-----------------------------------|------------------------------------------------------------------------------|
| Pincher tips                  | 758928                            | Same as the standard accessories                                             |
| Extension leads*              | B8099LF (black)/<br>B8099LG (red) | Cable length 1 m<br>Included with option /E1                                 |
| 150-Ω resistance<br>adapters* | B8099LK                           | 150 Ω<br>Two included with option /E2                                        |
| Pincher tips (small)          | A1662JZ                           | Red/black, rating 600 V CAT II<br>Included with option /E3                   |
| Test probes                   | A1663JZ                           | Tip pin type<br>Red/black, rating 1000 V CAT III<br>Included with option /E4 |
| Alligator clips               | 758922                            | Red/black, rating 300 V CAT II                                               |
| Alligator clips               | 758929                            | Red/black, rating 1000 V CAT II                                              |
| Conversion cable              | 701905                            | For use with isolation module                                                |

\* Using extension leads, you will also need two 150-Ω resistance adapters.

# Functions of Components

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## Probe head

Connect to the device under measurement through the input leads. Equipped with attenuation ratio selector switch, offset voltage adjustment screw, and overload indicator.

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## Input leads

Depending on the device and environment under measurement, attach pincher tips or other accessories to the tip and connect to the device under measurement. Extension leads can also be connected.

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## Attenuation ratio selector switch (ATTENUATION RATIO)

The attenuation ratio is switched according to the differential input voltage under measurement.

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## Offset voltage adjustment screw (ADJUST)

A variable resistor inside. Use a suitable screwdriver to adjust the residual offset voltage. See Offset Voltage Adjustment for details.

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## Overload indicator (OVERRANGE)

During normal measurement, the LED lights up green. If the differential input voltage exceeds 110% of the rated value, the LED lights up red. If the differential input voltage exceeds 110% of the rated value with the smaller attenuation ratio, the LED will either light up red or flash alternately red and green depending on the differential input voltage value. In that case, try switching to the larger attenuation ratio.

|                |        | Green light          | Red light         |
|----------------|--------|----------------------|-------------------|
| 702921, 702923 | 50:1   | $\leq 110\text{ V}$  | $> 110\text{ V}$  |
|                | 500:1  | $\leq 1100\text{ V}$ | $> 1100\text{ V}$ |
| 702922, 702924 | 100:1  | $\leq 220\text{ V}$  | $> 220\text{ V}$  |
|                | 1000:1 | $\leq 2200\text{ V}$ | $> 2200\text{ V}$ |

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## Marker tips

Eight-color marker tips are attached to the cable (two places on the 702921 and 702922). Matching the tip color to the display color of the connected waveform measuring instrument channel makes it easy to identify the probe.

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## Probe interface

Connect the output connector of the tip to a waveform measuring instrument. The 702921 and 702922 are equipped with a latch release lever.

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**Output connector and interface spring pins**

Connect the output connector to a waveform measuring instrument's input terminal.

The 702921 and 702922 have a Yokogawa probe interface function. When connected to a Yokogawa oscilloscope with a probe interface, the interface spring pins touch the pad on the input terminal of the oscilloscope and the probe is automatically detected. The power for the probe is also supplied from these pins.

The 702923 and 702924 have a BNC connector, and no interface spring pins. A separate power supply is required for the probe.

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**Power cable**

The 702923 and 702924 are equipped with this cable for power supply to the probe. Connect it to the probe power terminal of the oscilloscope or waveform measuring instrument to be connected, or to a separately prepared probe power unit (sold separately: 701934).

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**Latch release lever**

The 702921 and 702922 are equipped with the latch release lever. When you connect the output connector to the oscilloscope input terminal, you will hear a latch sound and it will be locked. To release the lock, push the latch release lever to the UNLOCK side.

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## 3. How to Use

### Operating Precautions



#### WARNING

- Use this probe only with a Yokogawa waveform measuring instrument. Additionally, this probe can only be used when it is designated as an accessory for the Yokogawa waveform measuring instrument.
- Use this probe only in combination with standard accessories or other accessories sold separately listed in this manual.
- This probe can be directly connected to a non-isolation module of a Yokogawa waveform measuring instrument, but do not connect it directly to an isolation module. Doing so may cause high voltage to appear between the input terminals of this probe. When using this probe in combination with an isolation module, be sure to connect it via the separately sold conversion cable 701905 and connect the grounding plug of the 701905 to the functional grounding terminal of the waveform measuring instrument. For connection instructions, see the 701905 manual.
- Do not apply a voltage exceeding the following maximum value between an input and ground.

|                    | <b>702921, 702923</b>           | <b>702922, 702924</b>           |
|--------------------|---------------------------------|---------------------------------|
| Max. input voltage | $\pm 1000\text{ V (DC+ACpeak)}$ | $\pm 2000\text{ V (DC+ACpeak)}$ |

- When using the probe, first connect it to the waveform measuring instrument, and then connect to the device under measurement. After use, turn off the power to the device under measurement, and first disconnect the probe from the device under measurement, and then disconnect from the waveform measuring instrument.

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## CAUTION

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- This probe is designed to measure the voltage difference between two points on the device under measurement. It does not electrically isolate the device under measurement from the measuring instrument.
  - When using multiple probes simultaneously, do not stack the probe heads. Prolonged use may cause insufficient heat dissipation, leading to increased internal temperatures. This will activate the overheat protection circuit, causing the output to stop. In that case, do not input signals, disconnect the probes from the waveform measuring instrument, and wait until the probes cool down.
  - If the probe head becomes too hot, the overheat protection circuit may stop the output. Move the probe head away from heat sources or insulate it from direct heat transfer.
  - Be sure to connect the power cable of the 702923 and 702924 to the probe power terminal of a Yokogawa waveform measuring instrument or to a probe power unit (sold separately, model 701934) to supply power.
  - The metal part of the probe interface of the 702923 and 702924 may become hot. Do not touch it during measurement, and after use, turn off the power and wait for sufficient time before removing it.
  - Since the tips of the test probes are very sharp, handle them with care.
  - When cleaning the probe, wipe with a piece of soft cloth to prevent damaging the probe. Do not immerse the probe body in liquid. Do not use abrasive cleaners or volatile solvents such as benzene on the probe.
-

## French



### AVERTISSEMENT

- Utilisez cette sonde uniquement avec un instrument de mesure de forme d'onde Yokogawa. De plus, cette sonde ne peut être utilisée que lorsqu'elle est désignée comme accessoire pour l'instrument de mesure de forme d'onde Yokogawa.
- Utilisez cette sonde uniquement en combinaison avec des accessoires standard ou d'autres accessoires vendus séparément répertoriés dans ce manuel.
- Cette sonde peut être connectée directement à un module non isolé d'un instrument de mesure de forme d'onde Yokogawa, mais ne la connectez pas directement à un module isolé. Cela pourrait entraîner une haute tension entre les bornes d'entrée de cette sonde. Lorsque vous utilisez cette sonde avec un module d'isolation, veillez à la connecter via le câble de conversion 701905 vendu séparément et à connecter la fiche de mise à la terre du 701905 à la borne de mise à la terre fonctionnelle de l'instrument de mesure de forme d'onde. Pour les instructions de connexion, consultez le manuel du 701905.
- Ne pas appliquer de tension supérieure à la valeur maximale suivante entre une entrée et la terre.

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|                       | <b>702921, 702923</b> | <b>702922, 702924</b> |
|-----------------------|-----------------------|-----------------------|
| Tension d'entrée max. | ±1000 V (CC+CAcrête)  | ±2000 V (CC+CAcrête)  |

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- Lors de l'utilisation de la sonde, connectez-la d'abord à l'instrument de mesure de forme d'onde, puis connectez l'appareil à mesurer. Après utilisation, coupez l'alimentation de l'appareil à mesurer et déconnectez d'abord la sonde de l'appareil à mesurer, puis déconnectez-la de l'instrument de mesure de forme d'onde.
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## ATTENTION

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- Cette sonde est conçue pour mesurer la différence de tension entre deux points de l'appareil mesuré. Elle n'isole pas électriquement l'appareil mesuré de l'instrument de mesure.
- Lorsque vous utilisez plusieurs sondes simultanément, n'empilez pas les têtes de sonde. Une utilisation prolongée peut entraîner une dissipation thermique insuffisante et une augmentation de la température interne. Cela activera le circuit de protection contre la surchauffe, provoquant l'arrêt de la sortie. Dans ce cas, n'entrez pas de signaux, déconnectez les sondes de l'instrument de mesure de forme d'onde et attendez qu'elles refroidissent.
- Si la tête de la sonde devient trop chaude, le circuit de protection contre la surchauffe peut arrêter la sortie. Éloignez la tête de la sonde des sources de chaleur ou isolez-la du transfert de chaleur direct.
- Assurez-vous de connecter le câble d'alimentation des modèles 702923 et 702924 à la borne d'alimentation de la sonde d'un instrument de mesure de forme d'onde Yokogawa ou à une unité d'alimentation de sonde (vendue séparément, modèle 701934) pour fournir l'alimentation.
- La partie métallique de l'interface de la sonde des modèles 702923 et 702924 peut devenir chaude. Ne la touchez pas pendant la mesure et, après utilisation, coupez l'alimentation et attendez suffisamment longtemps avant de la retirer.
- Les pointes des sondes de test étant très pointues, manipulez-les avec précaution.
- Lors du nettoyage de la sonde, essuyez avec un morceau de chiffon doux pour éviter d'endommager la sonde. Ne plongez pas le corps de la sonde dans un liquide. N'utilisez pas de nettoyeurs abrasifs ni de solvants volatils tels que la benzine sur la sonde.

## Operating Procedure

1. Prepare a Yokogawa oscilloscope with probe interface or a Yokogawa waveform measuring instrument.
2. Switch the probe's attenuation ratio selector switch according to the differential input voltage under measurement.

|                |               |
|----------------|---------------|
| 702921, 702923 | 50:1, 500:1   |
| 702922, 702924 | 100:1, 1000:1 |

3. Insert the output connector completely into the waveform measuring instrument input. For the 702921 and 702922, confirm that the connector and interface spring pin are securely fastened. The latch click will be heard when the connector lock into place.  
  
To remove the output connector from the oscilloscope input, push the latch release lever towards UNLOCK to unlock it.
4. For the 702921 and 702922, the probe interface automatically detects the probe and automatically configures the attenuation ratio and input coupling on the oscilloscope. If this does not occur, set them manually.
5. For the 702923 and 702924, connect the power cable to the probe power terminal of the waveform measuring instrument or to the probe power supply unit (sold separately, 701934).
6. If necessary, attach pincher tips or accessories to the ends of the input leads and connect them to the device under measurement. When connecting extension leads, see "Connecting Extension Leads."
7. Warm up for at least 30 minutes. If necessary, adjust the offset voltage. See "Offset Voltage Adjustment" for details.

### Note

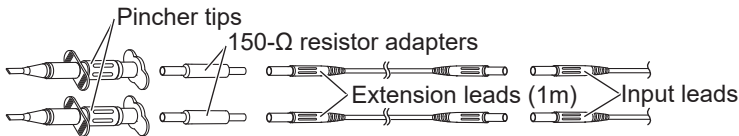
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- For the 702923 and 702924, connecting the BNC connector to a Yokogawa oscilloscope with probe interface will not automatically cause the probe to be detected. Power for the probe is also not supplied via the BNC connector.
  - Accurate measurements may not be possible near objects with strong electromagnetic fields such as transformers, large current circuits, or wireless equipment.
-

## Connecting Extension Leads

If the probe head is affected by the environment of the device under measurement, you can extend the input leads by connecting extension leads (sold separately, 1 m) to the ends of the input leads.

In this case, connect 150  $\Omega$  resistor adapters (sold separately) between the extension leads and the pincher tips (or other accessories).



## Warm-up and Offset Voltage Adjustment

### Warm-up

Immediately after connecting the probe, the heat emitted by the probe itself causes the offset voltage to drift. After turning on the power, warm up the probe for at least 30 minutes to stabilize it.

### Offset Voltage Adjustment

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#### CAUTION

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- Do not apply excessive force to the offset voltage adjustment screw. Doing so may damage the internal variable resistor.
  - Use an appropriate screwdriver that fits the adjustment screw. Using a screwdriver with a large grip or an extremely small tip may damage the probe.
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## French

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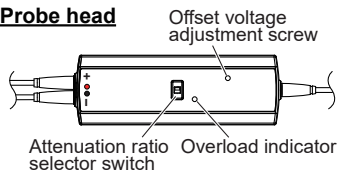
### **ATTENTION**

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- N'appliquez pas une force excessive sur la vis de réglage de la tension de décalage. Cela pourrait endommager la résistance variable interne.
  - Utilisez un tournevis adapté à la vis de réglage. L'utilisation d'un tournevis à large manche ou à pointe extrêmement petite peut endommager la sonde.
- 

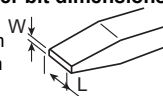
Adjust the residual offset voltage that remains even after warm-up. While checking the input signal on a waveform measuring instrument, turn the offset voltage adjustment screw on the probe head by using an appropriate adjustment screwdriver (supplied by the customer).

#### **Probe head**



#### **Recommended screwdriver bit dimensions**

Thickness (W): 0.3 to 0.5 mm  
Width (L): 1.6 to 2.0 mm  
Shape: flat



### ***Note***

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- The offset voltage drifts depending on the ambient temperature. Pay attention to changes in the ambient temperature when making continuous measurements.
  - Only use the offset voltage adjustment screw to adjust the residual offset voltage. If you deliberately change the offset voltage for some other purpose, the probe may no longer meet the specifications.
-

## 4. Product Specifications

### Electrical Specifications

The specifications apply when used with a waveform measuring instrument with 50  $\Omega$  input resistance.

| Item                                                     | 702921, 702923                                           | 702922, 702924                                             |
|----------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------|
| Frequency band (-3dB) <sup>1</sup>                       | DC to 400 MHz                                            |                                                            |
| Attenuation ratio                                        | 50:1, 500:1                                              | 100:1, 1000:1                                              |
| DC gain accuracy <sup>1,2</sup>                          | $\pm 0.7\%$                                              |                                                            |
| Differential input voltage range (between +/- terminals) | 50:1<br>100 V (DC+ACpeak)<br>500:1<br>1000 V (DC+ACpeak) | 100:1<br>200 V (DC+ACpeak)<br>1000:1<br>2000 V (DC+ACpeak) |
| Maximum input voltage (to ground) <sup>3</sup>           | $\pm 1000$ V (DC+ACpeak)                                 | $\pm 2000$ V (DC+ACpeak)                                   |
| Maximum non-destructive voltage (to ground) <sup>4</sup> | $\pm 1500$ V (DC+ACpeak),<br>< 5 s                       | $\pm 3000$ V (DC+ACpeak),<br>< 5 s                         |
| Common mode rejection ratio (CMRR) <sup>1,5</sup>        | DC                                                       | -80 dB                                                     |
|                                                          | 60 Hz                                                    | -80 dB                                                     |
|                                                          | 100 kHz                                                  | -70 dB                                                     |
|                                                          | 1 MHz                                                    | -70 dB                                                     |
|                                                          | 2 MHz                                                    | -60 dB                                                     |
|                                                          | 10 MHz                                                   | -50 dB                                                     |
|                                                          | 50 MHz                                                   | -40 dB                                                     |
|                                                          | 100 MHz                                                  | -30 dB                                                     |
|                                                          | 400 MHz                                                  | -20 dB                                                     |
| Input conversion noise <sup>5</sup>                      | 250 mVrms                                                | 500 mVrms                                                  |
| Input capacitance <sup>5</sup> to ground                 | 5 pF                                                     |                                                            |
|                                                          | between +/- terminals                                    | 2.5 pF                                                     |
| Input impedance <sup>5</sup> to ground                   | 6 M $\Omega$                                             |                                                            |
|                                                          | between +/- terminals                                    | 12 M $\Omega$                                              |
| Output impedance <sup>5</sup>                            | 50 $\Omega$                                              |                                                            |
| Rise/fall time <sup>5</sup>                              | 1.0 ns                                                   |                                                            |
| Delay time <sup>5</sup>                                  | 14.5 ns                                                  |                                                            |
| Warm-up time                                             | 30 minutes or more                                       |                                                            |

1 Standard operating environment: 23  $\pm 5$  °C, 55  $\pm 10\%$  RH, 30 minutes or more after power-on.

2 When either +/- input is 0 V. When neither is 0 V, no specification applies because the CMRR characteristics (typical) are relevant.

3 Maximum input voltage derating by frequency applies (see next page).

4 Instantaneous maximum voltage that does not cause the probe to break. The probe will become hot, so wait until it has cooled sufficiently before applying the next input.

5 Typical values

## Maximum Input Voltage Derating



### WARNING

As the frequency of the input signal increases, the maximum input voltage of the probe decreases.

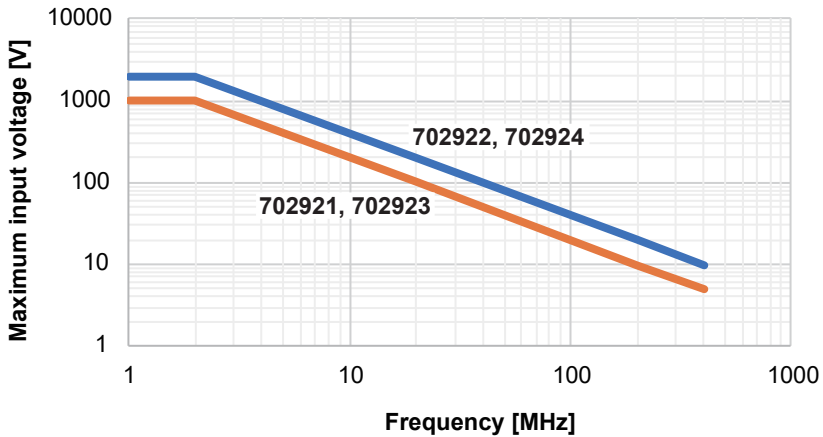
## French



### AVERTISSEMENT

Lorsque la fréquence du signal d'entrée augmente, la tension d'entrée maximale de la sonde diminue.

## Input Voltage Derating

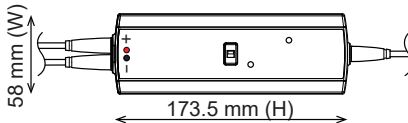


## General Specifications

| Item                                              |              | 702921, 702922                                                                               | 702923, 702924                |
|---------------------------------------------------|--------------|----------------------------------------------------------------------------------------------|-------------------------------|
| Operating environment                             | Temperature  | +5 to +40 °C                                                                                 |                               |
|                                                   | Humidity     | 20 to 80 % RH (no condensation)                                                              |                               |
|                                                   | Altitude     | 2000 m or less                                                                               |                               |
|                                                   | Installation | Indoor use                                                                                   |                               |
| Storage environment                               | Temperature  | −30 to +60 °C                                                                                |                               |
|                                                   | Humidity     | 20 to 80 % RH (no condensation)                                                              |                               |
|                                                   | Altitude     | 3000 m or less                                                                               |                               |
| Power supply voltage*                             |              | ±(12.0 ±0.6) V                                                                               |                               |
| Power consumption                                 |              | 250 mA or less                                                                               |                               |
| Recommended calibration period                    |              | 1 year                                                                                       |                               |
| Input connector type                              |              | Φ4 banana (plug)                                                                             |                               |
| Output connector type                             | Interface    | Yokogawa dedicated probe interface                                                           | BNC                           |
|                                                   | Power cable  | —                                                                                            | LEMO connector                |
| External dimensions (not including protrusions)   | Head         | 173.5 (H) x 58 (W) x 26.5 (D) mm                                                             |                               |
|                                                   | Interface    | 80 (H) x 29 (W) x 24 (D) mm                                                                  | 46.5 (H) x 30 (W) x 17 (D) mm |
| Length                                            | Total length | 2420 ±30 mm                                                                                  |                               |
|                                                   | Input lead   | 200 ±10 mm                                                                                   |                               |
|                                                   | Power cable  | —                                                                                            | 1000 ±30 mm                   |
| Weight (not including pincher tips)               |              | Approx. 300 g                                                                                |                               |
| Overvoltage display function (overload indicator) |              | Normal: Green light<br>Overvoltage input: Red light on or red and green flashing alternately |                               |

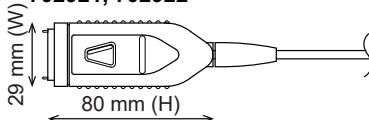
\* The power is supplied from the probe interface when connected to a Yokogawa oscilloscope with probe interface.

### Probe head

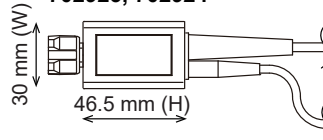


### Probe interface

702921, 702922



702923, 702924



# Compliant Standards

| Item                                 |                       | 702921/702922/702923/702924 (common)                 |
|--------------------------------------|-----------------------|------------------------------------------------------|
| Safety standard <sup>1,2</sup>       |                       | EN 61010-031                                         |
|                                      |                       | Measurement category II 1000 V                       |
|                                      |                       | Measurement category III 600 V                       |
|                                      |                       | Measurement category IV 300 V                        |
|                                      |                       | (702922, 702924 only) Measurement category O         |
|                                      |                       | 2000 V, transient overvoltage 0 V                    |
|                                      |                       | Pollution degree 2                                   |
| EMC standards                        | Emission <sup>3</sup> | EN 61326-1 Class A Group 1                           |
|                                      | Immunity              | EN 61326-1 Table 2 (for use in industrial locations) |
| Environmental standards <sup>4</sup> |                       | EU RoHS Directive compliant                          |

- 1 Use within the appropriate voltage range according to the measurement category. When combining with devices or accessories with different measurement categories, the lower measurement category applies.

| Measurement Category               | Definition                                                                                                                                                                             |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measurement category Other "O"     | Measurement category Other "O" 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.                                                                                     |

- 2 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).
- 3 This product is a Class A (for industrial environments) product. Operation of this product in a residential area may cause radio interference in which case the user will be required to correct the interference.
- 4 For conformity to environmental regulations and/or standards other than EU, contact your local Yokogawa office (PIM 113-01Z2).

## Note

The 702922 and 702924 (rated input voltage 2000 V) can measure up to 2000 V using 758928 pincher tips, A1663JZ test probes, or 758929 alligator clips, provided the measurement category is O (no measurement category). When measuring high voltage in measurement category O, ensure the measurement point is not energized before attaching or detaching the probe from the device under measurement. Also, keep a safe distance from the probe during measurement and do not touch it.