

User's Manual

Model 700925 Differential Probe for the DL Series

Thank you for purchasing the Differential Probe (Model 700925) for the DL series. 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 700925-01E
14th Edition

Safety Precautions

Make sure to comply with the safety precautions mentioned hereafter when handling the probe. Yokogawa Electric Corporation 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.

The following symbols are used on this instrument.

-  Warning: 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 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.

Earth cable of the probe

Make sure to connect the earth cable of the probe to the ground (grounding potential).

Do not operate with suspected failures

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

Observe maximum working voltage

To avoid any injury, do not use the probe above 1000 V_{peak} between each input lead and earth or between the two inputs.

This voltage rating applies to both 1/10 and 1/100 settings.

Must be grounded

This probe must be grounded with the BNC shell and an auxiliary grounding terminal, through the grounding conductor of the power cord of the measuring instrument or other appropriate grounding conductor. Before making connections to the input terminals of the product, ensure that the output connector is attached to the BNC connector of the measuring instrument and the auxiliary grounding terminal is connected to a proper ground, while the measuring instrument is properly grounded.

Do not operate without cover

To avoid electric shock or fire hazard, do not operate this probe with the cover removed.

Do not operate in wet/damp conditions

To avoid electric shock, do not operate this probe in wet or damp conditions.

Do not operate in explosive atmosphere

To avoid injury or fire hazard, do not operate this probe in an explosive atmosphere.

Avoid exposed circuitry

To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

Do not disassemble or modify

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



CAUTION

Maximum input voltage

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

Correct use of the power supply

Operating the probe under a power supply greater than the voltage specified may cause damage to the instrument.

Connecting the external power supply to the probe

Always turn OFF the probe's power switch when connecting or disconnecting the external power supply. Also, do not install the dry cells when using an external power supply.

Conditions of use

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

Operating environment limitations

See below for operating environment limitations.

CAUTION

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.

Waste Electrical and Electronic Equipment



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

(This directive is only valid in the EU.)

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

Product Category

With reference to the equipment types in the WEEE directive Annex 1, 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.

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.

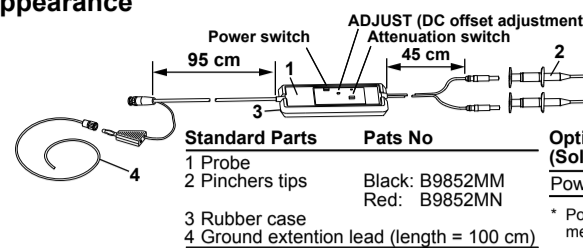
Note

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

1 Description

By using this device, oscilloscopes with single-ended input can be easily used as oscilloscopes with differential inputs.

2 Appearance



Standard Parts	Parts No	Optional Accessories (Sold Separately)	Parts No
1 Probe		Power Cable (Length: 150 cm)	B9852MJ
2 Pinchers tips	Black: B9852MM Red: B9852MN		
3 Rubber case			
4 Ground extension lead (length = 100 cm)			

* Power can be supplied from the YOKOGAWA measuring instruments, 700938, or 701934.

3 Installing/Replacing the Dry Cells

After having removed the outer rubber case, shift the lid at the back side of the probe and install/replace the four dry cells. The dry cells are not installed on receipt of the instrument.

4 Operation

1. Install four AA cells. When using an external power supply, do not install the dry cells. Supply power only through the external power supply.
2. Simply plug-in the BNC output connector to the vertical input of a oscilloscope, and connect the auxiliary grounding terminal to a proper ground. If necessary, use a ground extension lead.
3. Turn the power switch ON, and warm up the probe for at least 30 minutes.
4. Select the proper range setting. For higher resolution and less noise when measuring signals below 50V, switch the attenuation to 1/10. Otherwise, set the attenuation to 1/100 when measuring signals above 50V.
5. If the offset voltage is large, short the top of input leads, and turn the ADJUST variable resistor (DC voltage adjustment) using a flat-head screwdriver to adjust the offset voltage.
6. Connect the input to the circuits under measurement.



WARNING

- To protect against electric shock the ground side of the output cable (the shielded side of the BNC connector) must be grounded.
- 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 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.
- When replacing batteries or connecting an external power supply, first turn OFF the power to the circuit under measurement. Then, remove the input lead from the circuit under measurement.



CAUTION

- This probe is to carry out differential measurement between two points on the circuit under measurement. This probe is not for electrically insulating the circuit under measurement and the measuring instrument.
- Use a soft cloth to clean the dirt. Prevent damage to the probe. Avoid immersing the probe. Avoid using abrasive cleaners. Avoid using chemicals contains benzene or similar solvents.

Note

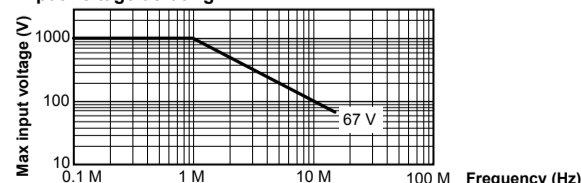
- Connect the BNC connector to the input terminal of the oscilloscope and for two point measurement (differential measurement), connect both input leads. Because the performance declines in case you carry out measurements with only one input lead connected, make sure to always connect both.
- Accurate measurement may not be possible near objects with strong electric fields (such as cordless equipment, transformers, or circuits with large currents).
- Before use, flip the attenuation switch back and forth several times. The switch's electrical contacts can weaken if not used for long periods of time.
- To take accurate measurements, we recommend that you calibrate the probe once a year.

5 Specifications

Item	Specifications
Frequency bandwidth ^{1,2}	DC to 15 MHz (-3dB)
Input type	Balancing difference input
Attenuation ratio	switched ratios of 10:1 and 100:1
Output offset voltage ^{2,3}	±7.5 mV (value after the ADJUST variable resistor is adjusted)
Input resistance and capacity ⁴	4 MΩ + 10 pF each side to ground
Differential allowable voltage (between + - terminal)	±500 V (DC + ACpeak) or 350 Vrms at 100:1 attenuation ±50 V (DC + ACpeak) or 35 Vrms at 10:1 attenuation
Max common mode voltage	±500 V (DC + ACpeak) or 350 Vrms
Max input voltage(to ground) ⁵	±1000 V (DC + ACpeak) or 700 Vrms
CMRR (typical) ^{1,4}	60 Hz: less than -86 dB; 20 kHz: less than -66 dB; 200 kHz: less than -56 dB; 1 MHz: less than -40 dB
Output voltage ^{1,2}	±5 V (DC + ACpeak). Value when the probe is used in combination with a measuring instrument
Output impedance	Using 1 MΩ input system oscilloscope
Gain accuracy ^{1,2,3}	±2% (not include offset and noise)
Operating environment	5 to 40°C, 25 to 85% (no condensation)
Storage environment	-30 to 60°C, 25 to 85% (no condensation)
Operating altitude	2,000 m or less
Storage altitude	3,000 m or less
Power requirements ⁶	Internal battery: four dry cells (AA, R6) External power supply: 6 VDC/200 mA or higher or 9 VDC/150 mA or higher, with a positive center pin. Power is supplied through the dedicated cable B9852MJ from a YOKOGAWA measuring instrument's probe power supply terminal or from a 700938 or 701934 probe power supply.
Cell life time	In continuous duty, approx. 8 hours
Warm-up time	At least 30 minutes
Dimensions	170 mm × 63 mm × 20 mm (excluding battery and rubber case, connector and cable)
Weight	Approx. 290 g (excluding the dry cells and rubber case)
Withstanding voltage	2000 VACrms (between input terminal and BNC-ground), for 5 minutes
Safety standards	Complying standards EN61010-031 Measurement category III ⁷ : 1000 V (DC + ACpeak) Pollution degree 2 ⁸
Emission	Complying standards EN61326-1 Class A EN55011 Class A, Group 1 C-Tick EN55011 Class A, Group 1 This product is a Class A (for industrial environment) product. Operation of this product in a residential area may cause radio interference in which case the user is required to correct the interference.
Immunity	Complying standards EN61326-1 Table 1

- 1 When the power supply voltage from the dry cells is 5 V or more, or when using an external power supply.
- 2 Ambient temperature 23±5°C, humidity 55% ± 10% RH, 30 minutes after the power is turned on.
- 3 The accuracy is the total of the gain accuracy and offset voltage
- 4 Typical values are typical or mean values. They are not strictly guaranteed.
- 5 Frequency derating (load reduction) applies.

Input voltage derating



- 6 When the capacity of dry cells goes down LED blinks. In such a case, replace the dry cells. Also, do not install the dry cells when using an external power supply.
- 7 This equipment is for measurement category III (CAT III). Do not use it with measurement category IV (CAT IV). 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.
- 8 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).