



CD800a DIGITAL MULTIMETER INSTRUCTION MANUAL

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[1] SAFETY PRECAUTIONS

Before use, read the following safety precautions. This instruction manual explains how to use your new digital multimeter CD800a safely. Before use, please read this manual thoroughly. After reading it, keep it together with the product for reference to it when necessary.

1-1 Explanation of Warning Symbols

The meaning of the symbols used in this manual and attached to the product is as follows.

Very important instruction for safe use.

The warning messages are intended to prevent accidents to operating personnel such as burn and electrical shock. The caution messages are intended to prevent damage to the instrument.

- Ground symbol, Diode symbol, Fuse symbol, Buzzer symbol, Capacitance symbol, Resistance symbol, Direct current(DC) symbol, Frequency symbol, Duty cycle symbol, Alternating current(AC) symbol, Double insulation(Protection Class) symbol, Plus input symbol, Minus input symbol.

1-2 Warning Instruction for Safe Use

WARNING To ensure the meter is used safely, be sure to observe the instruction when using the instrument.

- 1. Never use meter on the electric circuits that exceed 3kVA. 2. Never apply an input signal exceeding the maximum rating input value. 3. Never use meter if the meter or test leads are damaged or broken. 4. Pay special attention when measuring the voltage of AC 30Vrms(42.4V peak) or DC60V or more to avoid injury. 5. Never use meter for measuring the line connected with equipment (i.e. motors) that generates induced or surge voltage since it may exceed the maximum allowable voltage. 6. Never use unsealed meter. 7. Be sure to use a fuse of the specified rating or type. Never use a substitute of the fuse or never make a short circuit of the fuse. 8. When connecting and disconnecting the test leads, first connecting the ground lead(black one). When disconnecting them, the ground lead must be disconnected last. 9. Always keep your fingers behind the finger guards on the probe when making measurements.

- 10. Be sure to disconnect the test pins from the circuit when changing the function. 11. Before starting measurement, make sure that the function and range are properly set in accordance with the measurement. 12. Never use meter with wet hands or in a damp environment. 13. Never open tester case except when replacing batteries or fuse. Do not attempt any alteration of original specifications. 14. Do not use the device near an item of strong electromagnetic generation or a charged item. 15. To ensure safety and maintain accuracy, calibrate and check the tester at least once a year. 16. The multimeter is for indoor use only.

1-3 Overload protections

Table with 4 columns: Function, Input terminals, Maximum rating input value, Maximum overload protection input. Rows include V, Hz/%, and mA.

AC voltage is regulated by rms, value of sinusoidal wave.

[2] APPLICATION AND FEATURES

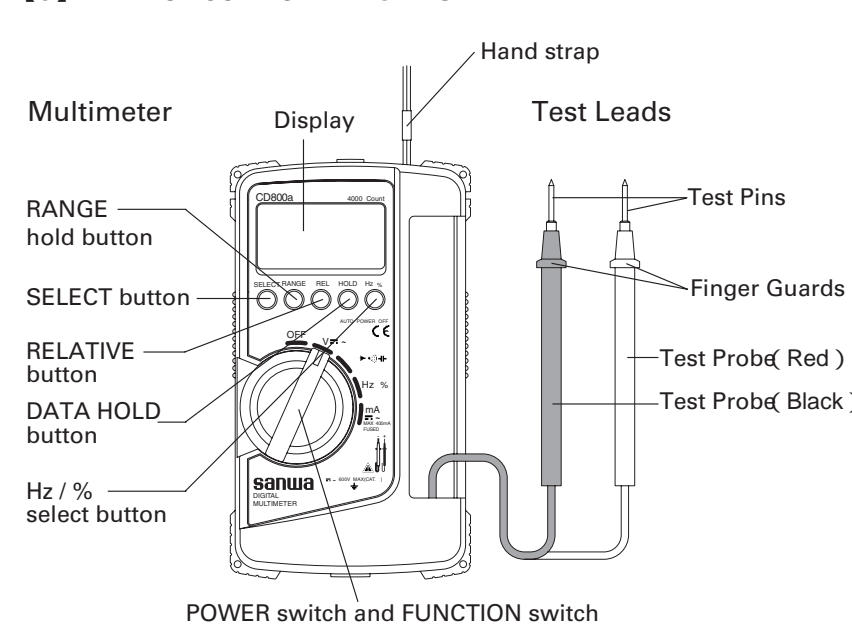
2-1 Applications

This instrument is portable digital multimeter designed for measurement of weak current circuits. It plays an important role in circuitry analysis by using additional functions as well as measurements of small type communication equipment, electrical home appliance, lighting voltage and batteries of various type.

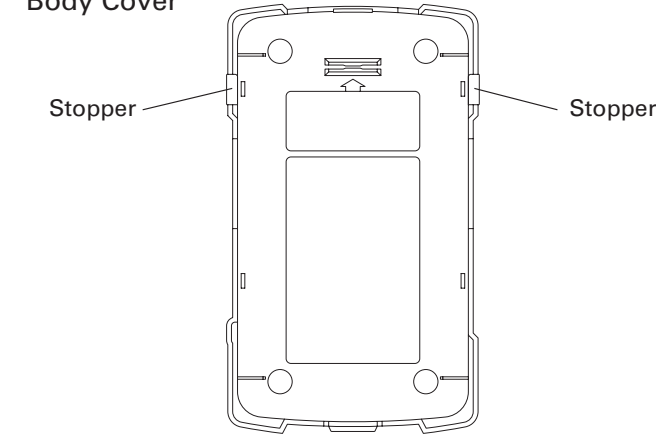
2-2 Features

The instrument has been designed in accordance with the safety standard IEC 61010-1. Sharp contrast LCD with character 17.5mm high is employed, and unit symbols are displayed on the screen of the LCD. Frequency, capacitance and duty cycle measurement function. Attachment body cover is used for protection of the meter and as a tilt stand. The current function is protected by a fuse.

[3] NEME OF COMPONENT UNITS



Body Cover



[4] DESCRIPTION OF FUNCTIONS

WARNING

In the case of action or cancel that function as follows, do not turn the function switch in the condition applied input.

4-1 Function Switch

Turn this switch, to turn on and off the power and to select the functions of V, Hz/%, REL, DATA HOLD, Hz/% select button.

4-2 SELECT : Measurement Function Select

When the SELECT button is pressed (), the functions change as follows. In the case of V, mA, the modes change as: In the case of Hz/%, the modes change as: In the case of REL, the modes change as: In the case of DATA HOLD, the modes change as: In the case of Hz/% select button, the modes change as: In the case of Hz/% select button, the modes change as:

4-3 RANGE : Range Hold

Press the RANGE button momentarily to set the manual range mode, then 'AUTO' disappears in the display. In manual range mode, press the button again to step through the ranges. To return to the auto mode, press the button for 1 sec. or more, then 'AUTO' is shown. Manual mode is not available in Hz, Hz, duty measurement, diode check, cont. buzzer functions.

4-4 REL : Relative Mode

Relative zero allows the user to offset the meter consecutive measurements with the displaying reading as the reference value. Press the REL button momentarily to activate and to exit relative zero mode.

4-5 HOLD : Data Hold

When the HOLD button is pressed, the display is hold ('DH' is shown on the display). The display will not be changed while the function is active. Press the button again to cancel the function. ('DH' on the display disappears.) DATA HOLD function does not work when measuring frequency.

4-6 Hz/% : Frequency and duty cycle select button

Frequency and duty cycle measurement functions are activated alternately by pressing the button. In the case of the mode change as Hz/%.

4-7 Auto Power Off

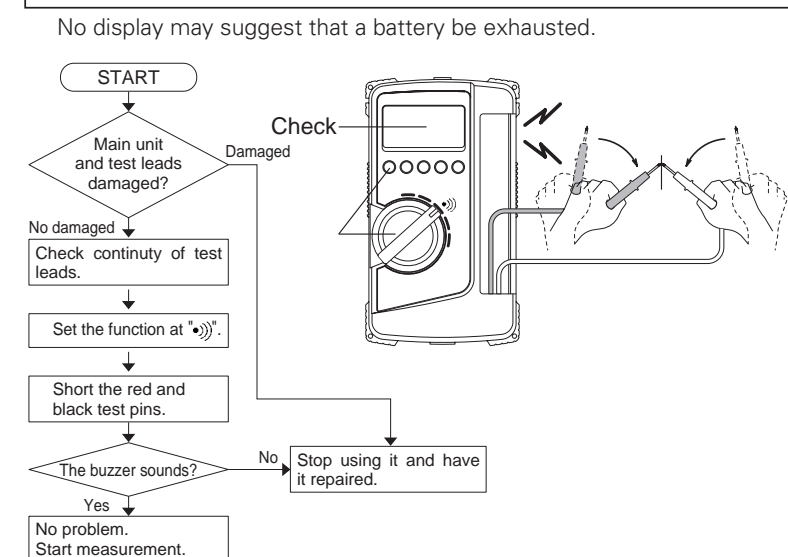
The meter will enter a low power consumption sleep mode automatically to extend battery life after approximately 30 minutes of no function switch or push button operations. To wake up the meter from Auto Power Off, press any buttons momentarily or turn the function switch to the OFF position. Then turn back on again. To disable the Auto Power Off feature, press the SELECT button while turning the function switch on. Always turn the function switch to the OFF position when the meter is not in use.

[5] MEASUREMENT PROCEDURE

5-1 Start-Up Inspection

WARNING

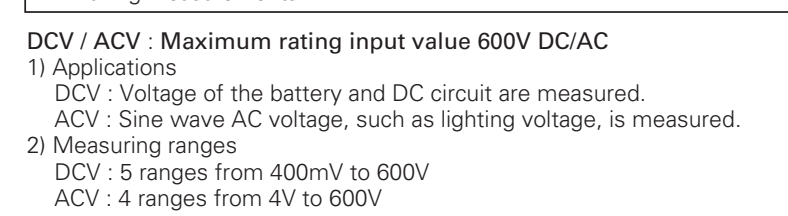
- 1. Make sure that no low battery indication appear in the display. 2. Never use meter if the meter or test leads are damaged or broken. 3. Check continuity of test leads & fuse.



5-2 Voltage measurement

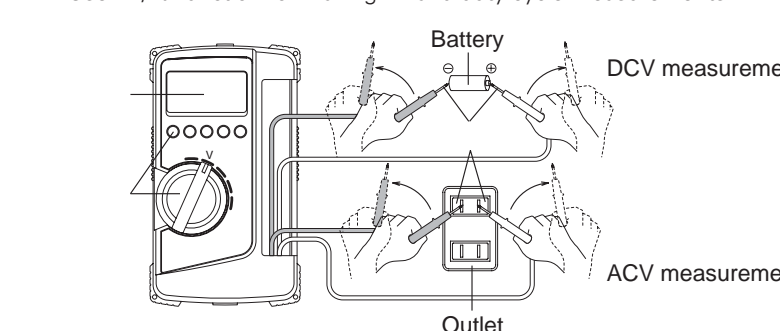
WARNING

- 1. Never apply an input signal exceeding the maximum rating input value. 2. Be sure to disconnect the test pins from the circuit when changing the function. 3. Always keep your fingers behind the finger guards on the probe when making measurements.



3) Measurement procedure

Set the FUNCTION switch at 'V' and select either DC or AC with the SELECT button. Apply the red and black test pins to the circuit to measure. For measurement of DCV, apply the black test pin to the negative potential side of the circuit to measure and the red test pin to the positive potential side. For measurement of ACV, apply the red and black test pins to the circuit to measure. The reading of Voltage is shown on the display. After measurement, release the red and black test pins from the object measured. Readings are unstable when test leads are opened. Accuracy is guaranteed in the case of sine wave (Bandwidth 40 ~ 400Hz) 400mV AC range is not specified. In the manual mode of the ACV function, the CD800a can be set to the 400mV range and shows an approximate value. But its accuracy is not guaranteed. In the AC4V range, a figure of about 3 ~ 9 counts will stay on even if no input signal is present. But it is not malfunction. Use Hz/% function for making Hz and duty cycle measurements.



5-3 Resistance Measurement ()

WARNING

Never apply voltage to the input terminals.

- 1) Applications Resistance of resistors and circuits are measured. 2) Measuring ranges DCV : 5 ranges from 400mV to 600V ACV : 4 ranges from 4V to 600V

5-5 Checking Continuity ()

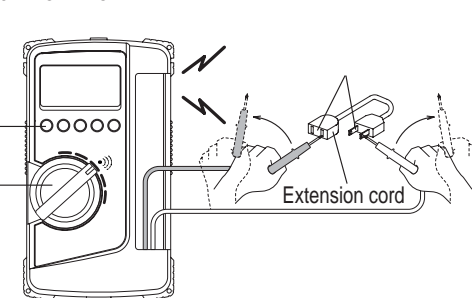
WARNING

Never apply voltage to the input terminals.

- 1) Applications Checking the continuity of wiring and selecting wires.

2) How to use

Set the FUNCTION switch at Hz/% select button. Select by pressing the SELECT button. Apply the red and black test pins to a circuit or conductor to measure. The continuity can be judged by whether the buzzer sounds or not. After measurement, release the red and black test pins from the object measured. Threshold : 10 ~ 120



5-6 Capacitance Measurement ()

WARNING

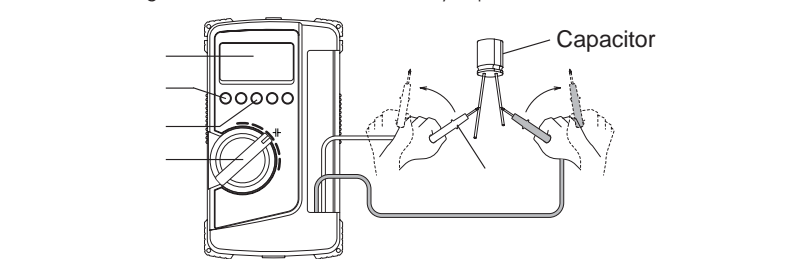
Never apply voltage to the input terminals.

- 1. Discharge the capacitance before measurement. 2. This is not suitable for measurement of electrolytic condenser such as a large leakage condenser. 3. It takes a while to measure large capacitance.

- 1) Applications Measures capacitance of low leakage condenser such as film condenser. 2) Measuring ranges 5 ranges from 50.00nF to 100.0 uF (Auto range).

3) Measurement procedure

Set the FUNCTION switch at Hz/% select button. Select by pressing the SELECT button. Press the REL button for zero setting (00.00nF). Apply the red and black test pins to a conductor to measure. Read the value on the display. After measurement, release the red and black test pins from the object measured. Manual range is not available in capacitance measurement. Readings are unstable because of stray capacitance in test leads or noise.

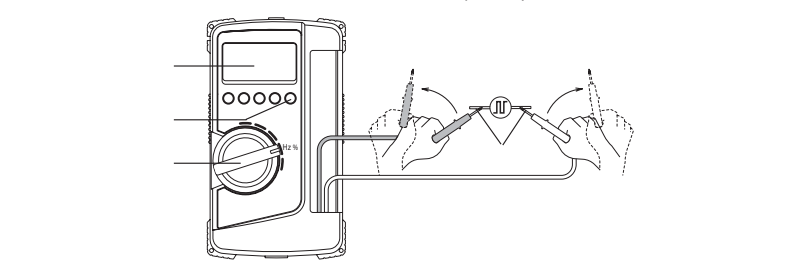


5-7 Hz / % Measurements (Hz / %)

WARNING

Never apply an input signal exceeding the maximum rating input value.

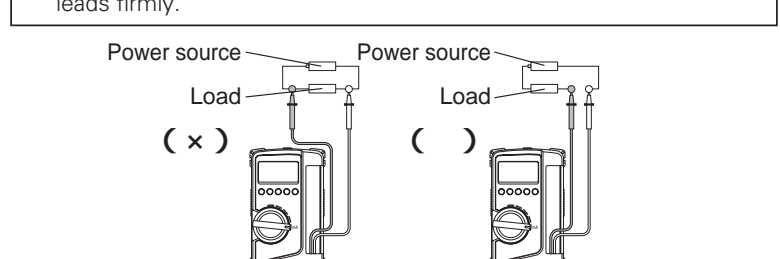
- 1) Applications Measures frequency and duty of any circuit. 2) Measuring ranges 6 ranges from 5Hz to 100kHz (Auto range) Duty Cycle : 20% ~ 80% 3) Measurement procedure Set the function switch at Hz / % function. Select Hz by pressing Hz/% selection button. Apply the red and black test pins to a conductor to measure. Read the value on the display. After measurement, release the red and black test pins from the object measured. HOLD function does not work in Frequency measurement function.



5-8 Current Measurement

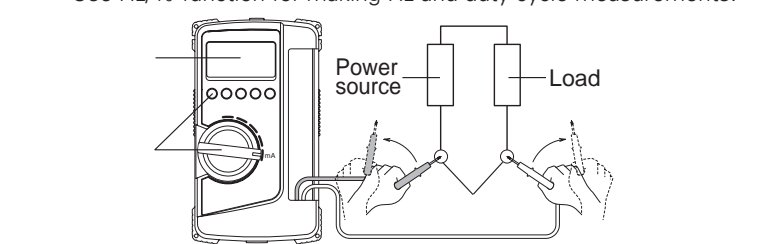
WARNING

- 1. Never apply voltage to the input terminals. 2. Be sure to make a series connection via load. 3. Do not apply an input exceeding the maximum rated current to the input terminals. 4. Before starting measurement, turn OFF the power switch of the circuit to separate the measuring part, and then connect the test leads firmly.



DCmA : Maximum rating input value 400mADC ACmA : Maximum rating input value 400mAAC

- 1) Applications DCA : Current in batteries and DC circuits is measured. ACA : Current in AC circuits is measured. 2) Measuring ranges DC/ACmA : 2 ranges for 400.0mA and 40.00mA. 3) Measurement procedure Set the function switch at 'mA' and select either DC or AC with the SELECT button. In the circuit to measure and apply the red and black test pins in series with load. For measurement of DCA, apply the black test pin to the negative potential side of the circuit to measure and the red test pin to the positive potential side in series with load. For measurement of ACV, apply the red and black test pins to the circuit to measure in series with load. Read the value on the display. After measurement, remove the red and black test pins from the circuit measured. Use Hz/% function for making Hz and duty cycle measurements.



[6] MAINTENANCE

WARNING

- 1. The section is very important for safety. Read and understand the following instruction fully and maintain your instrument properly. 2. The instrument must be calibrated and inspected at least once a year to maintain the safety and accuracy.

6-1 Maintenance and inspection

- 1) Appearance Is the appearance not damaged by falling? Is the cord wire not exposed at any place of the test leads? Is the core wire not exposed at any place of the test leads? Note : If the built-in fuse is blown, only the current measurement becomes impossible. Make sure that the test leads are not cut, referring to the section 5-1. 2) Calibration The manufacturer may conduct the calibration and inspection. For more information, please contact the dealers. 3) Battery and Fuse Replacement

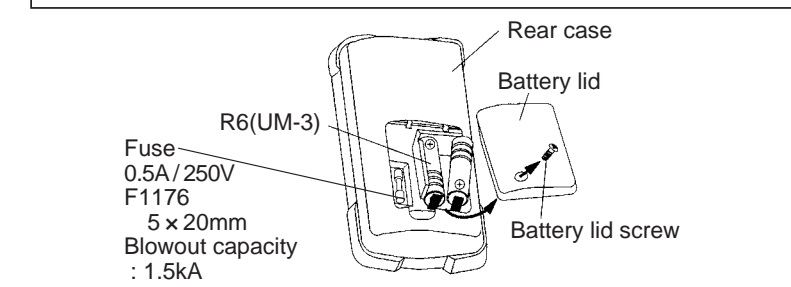
WARNING

- 1. If the rear case or the battery lid is removed with input applied to the input terminals, you may get electrical shock. Before starting the work, always make sure that no input is applied. 2. Before starting the work, be sure to turn OFF the main input power and release the test leads from the circuit. 3. Be sure to use a fuse of the specified rating or type. Never use a substitute of the fuse or never make a short circuit of the fuse.

Remove the battery lid screw with a screwdriver. Take out the battery or fuse and replace it with a new one. Attach the battery lid and fix with the screw.

CAUTION

Set battery with its polarities facing in the correct directions.



6-4 Storage

CAUTION

- 1. The panel and the case are not resistant to volatile solvent and must not be cleaned with thinner or alcohol. 2. For cleaning, use dry, soft cloth and wipe it lightly. 3. The panel and the case are not resistant to heat. Do not place the instrument near heat-generating devices (such as a soldering iron). 4. Do not store the instrument, in a place where it may be subjected to vibration or from where it may fall. 5. For storing the instrument, avoid hot, cold or humid places or places under direct sunlight or where condensation is anticipated.

[7] AFTER-SALE SERVICE

7-1 Warranty and Provision

Sanwa offers comprehensive warranty services to its end-users and to its product resellers. Under Sanwa's general warranty policy, each instrument is warranted to be free from defects in workmanship or material under normal use for the period of one (1) year from the date of purchase. This warranty policy is valid within the country of purchase only, and applied only to the product purchased from Sanwa authorized agent or distributor. Sanwa reserves the right to inspect all warranty claims to determine the extent to which the warranty policy shall apply. This warranty shall not apply to fuses, disposable batteries, or any product or parts, which have been subject to one of the following causes: 1. A failure due to improper handling or use that deviates from the instruction manual. 2. A failure due to inadequate repair or modification by people other than Sanwa service personnel. 3. A failure due to causes not attributable to this product such as fire, flood and other natural disaster. 4. Non-operation due to a discharged battery. 5. A failure or damage due to transportation, relocation or dropping after the purchase. 7-2 Repair Customers are asked to provide the following information when requesting services: 1. Customer name, address, and contact information 2. Description of problem 3. Description of product configuration 4. Model Number 5. Product Serial Number 6. Proof of Date-of-Purchase 7. Where you purchased the product Please contact Sanwa authorized agent / distributor / service provider, listed in our website, in your country with above information. An instrument sent to Sanwa / agent / distributor without those information will be returned to the customer. Note: 1) Prior to requesting repair, please check the following: Capacity of the built-in battery, polarity of installation and discontinuity of the test leads.

- 2) Repair during the warranty period: The failed meter will be repaired in accordance with the conditions stipulated in 7-1 Warranty and Provision. 3) Repair after the warranty period has expired: In some cases, repair and transportation cost may become higher than the price of the product. Please contact Sanwa authorized agent / service provider in advance. The minimum retention period of service functional parts is 6 years after the discontinuation of manufacture. This retention period is the repair warranty period. Please note, however, if such functional parts become unavailable for reasons of discontinuation of manufacture, etc., the retention period may become shorter accordingly. 4) Precautions when sending the product to be repaired: To ensure the safety of the product during transportation, place the product in a box that is larger than the product 5 times or more in volume and fill cushion materials fully and then clearly mark "Repair Product Enclosed" on the box surface. The cost of sending and returning the product shall be borne by the customer.

7-3 SANWA Website

http://www.sanwa-meter.co.jp E-mail: exp_sales@sanwa-meter.co.jp

[8] SPECIFICATIONS

8-1 General Specification

Table with 2 columns: Measuring method, method. Rows include Display, Sampling Rate, Range Selection, Over ranging Indication, Polarity Indication, Low Battery Indication, Environmental Condition, Operating temperature, Storage temperature / humidity range, Power Supply, AC sensing, Battery Life, Safety, Dimension, Weight, Power consumption, Battery life, Fuse, Accessories.

OVERVOLTAGE CATEGORY

- CAT : Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device. CAT : Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord. CAT : Primary electrical circuits of heavy equipment connected directly to the distribution panel, and feeders from the distribution panel to outlets.

8-2 測定範囲及び精度 / Measurement Range and Accuracy

精度保証範囲 : 温度23 ± 5 湿度 : 80%R.H.以下 結露のないこと Accuracy assurance range : 23 ± 5 %less than 80% R.H. No Condensation

rdg(reading) : 読取値、dgt(digit) : 最終桁のカウント数

Table with 4 columns: Functions&Range, Accuracy, Input Impedance, Remarks. Rows include DCV, ACV, Resistance, Impedance, Capacitance.

Table with 2 columns: Measurement Range and Accuracy, Accuracy. Rows include Frequency, Duty Cycle, DC current, AC current, Checking Continuity, Testing Diode.

トランスや大電流回路など強磁界の発生している近く、また無線機など強電界の発生している近くでは正常な測定ができない場合があります。

精度計算方法 / Accuracy calculation 例) 直流電圧測定(DCVmV) / For example...Measurement 400mVDC Range. 表示値 / Display value : 100.0[mV] レンジ / Range : 400.0[mV] 精度保証範囲 / Accuracy : ±(0.3%rdg+4dgt) 誤差 / Error : ±(100.0[mV] × 0.3%rdg+4dgt) = ± 0.7[mV] 計算式 / Calculation : 100.0[mV] / (100.0[mV] / 100.7[mV]の範囲内) 真値 / True value : In a range of 0.99.3[mV] ~ 100.7[mV]の範囲内、400.0[mV]レンジにおける4dgtとは、0.4[mV]に相当します。4[dgt] in the 400.0[mV] range correspond to 0.4[mV]

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