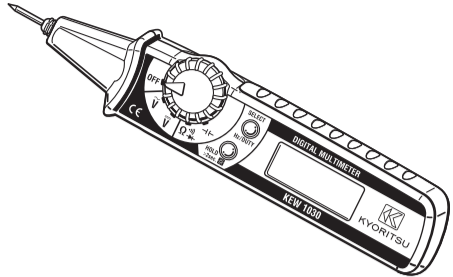


INSTRUCTION MANUAL



PEN TYPE DIGITAL MULTIMETER

KEW 1030

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.

1. Safety warnings

This instrument has been designed, manufactured and tested according to IEC 61010: Safety requirements for Electronic Measuring apparatus, and delivered in the best condition after passed the inspection. This instruction manual contains warnings and safety rules which must be observed by the user to ensure safe operation of the instrument and retain it in safe condition. Therefore, read through these operating instructions before using the instrument.

WARNING

- Read through and understand the instructions contained in this manual before using the instrument.
- Save and keep the manual at hand to enable quick reference whenever necessary.
- The instrument is to be used only in its intended applications.
- Understand and follow all the safety instructions contained in the manual.
- The RESPONSIBLE BODY shall be made aware that, if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Failure to follow the instructions may cause injury, instrument damage and/or damage to equipment under test. Kyoritsu is by no means liable for any damage resulting from the instrument in contradiction to this cautionary note.

The symbol indicated on the instrument means that the user must refer to the related parts in the manual for safe operation of the instrument. Be sure to carefully read the instructions following each symbol in the manual.

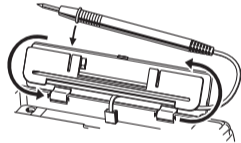
DANGER : is reserved for conditions and actions that are likely to cause serious or fatal injury.
WARNING : is reserved for conditions and actions that can cause serious or fatal injury.
CAUTION : is reserved for conditions and actions that can cause injury or instrument damage.

Please refer to following explanation of the symbols used on the instrument and in this manual.

	User must refer to the explanations in the instruction manual.
	Instrument with double or reinforced insulation
	AC
	DC
	This instrument satisfies the marking requirement defined in the WEEE Directive (2002/96/EC). This symbol indicates separate collection for electrical and electronic equipment.

4-3 Method of storing the test lead

Test lead is stored in the rear side compartment of the instrument. Cord is wound around the cord holder.



5. Functions

Auto-ranging (AUTO)
 A function to automatically select the appropriate measurement range based on the input signal. The "AUTO" mark is displayed on the LCD while this function is activated. This function is not available in Diode check, Continuity check and Duty ratio measurements. The "AUTO" mark is not displayed.

Hold function (H)
 A function to freeze the measured value on the LCD. (Not available in Frequency measurement)
 The "H" mark is displayed on the LCD when the HOLD key is pressed. Then the measured value is frozen. Press this key again or switch the measurement function to others to release the Hold function.

REL function (Δ)
 A function to display the difference between the measured values (relative value) on the LCD at DCV and Capacitance functions. The "Δ" mark is displayed on the LCD when the HOLD key is pressed. Then the value being measured is stored. After that, the difference between the stored value and the measured value is displayed on the LCD. Press this key again or switch the measurement function to others to release the REL function.

Auto-power-off function
 A function to turn off the instrument when 30 min. have elapsed after the Function switch is switched from OFF to the other measurement function. Press the HOLD key again or switch the measurement function to others to restore from the Auto-power-off state.

Over-range indication
 When the measured value exceeds the max. indication range, "OL" is displayed on the LCD. (This indication is not displayed at AC/DC 600V range.) This indication is not displayed while the Hold function is activated.

Low battery warning (BATT)
 When the battery voltage drops to 2.4V±0.2V or less, the "BATT" mark is displayed on the LCD.

Penlight
 Set the Function switch to "LIGHT" position. Turn the switch to any desirable function position. (Measurement cannot be performed when the switch is in "LIGHT" position.) Turn the switch to "OFF" position to turn off the light.

LCD backlight
 The LCD backlight lights up by pressing down the HOLD key at any measurement function other than OFF at least 2 sec. Press down this key again at least 2 sec. or turn the Function switch to OFF once to turn off the light.

Note
 • Penlight and LCD backlight are not turned off automatically. Be sure to turn them off when they are not in use.
 • When turning on/off the LCD backlight, the "H" mark is displayed on the LCD and the Hold function is activated. Press the HOLD button for a while to release the function and perform the next measurement.

6. Measurement

DANGER

To prevent electrical shock to person and damage to the instrument, following instructions must be observed.

- The max. rated voltage to ground is AC/DC600V. Never attempt to make measurement on a circuit in which electrical potential to the ground exceeding this voltage exists.
- The max. input voltage is DC600V/AC600Vrms (sin). Never attempt to make any measurement on a circuit in which electrical potential exceeding this voltage exists.
- Do not operate the Function switch during a measurement.
- Never make a measurement with the Bottom case is removed.
- Keep your fingers and hand behind the barrier (see 4-1) of the instrument and test lead.
- Be careful not to short-circuit the line under test with the metal part of the instrument or the test lead during a measurement.
- Never make measurement on an energized circuit at Resistance, Diode check, Continuity check and Capacitance function of this instrument.
- Always attach the cap firmly when using the test lead under CAT III environment. When the test lead is connected to the instrument, the lower category either of them belongs to is applied.
- Keep your fingers and hands behind the protective fingerguard during measurement.

Read through the following safety instructions contained in this manual before using the instrument.

DANGER

- Never make measurement on a circuit in which electrical potential to ground over 600V exists.
- Do not attempt to make measurement in the presence of flammable gases. Otherwise, the use of the instrument may cause sparking, which can lead to an explosion.
- Never attempt to use the instrument if its surface or your hand is wet. Otherwise, you may get electrical shock.
- Never open the Bottom case and Battery cover during a measurement.
- Do not exceed the maximum allowable input of any measuring range.
- Never try to make measurement if any abnormal conditions, such as broken case is noted.
- The instrument should be used only in its intended applications or conditions. Otherwise, safety functions equipped with the instrument do not work, and instrument damage or serious personal injury may be caused.
- Verify proper operation on a known source before use or taking action as a result indication of the instrument.
- Keep your fingers and hands behind the protective fingerguard during measurement.

WARNING

- Never attempt to make any measurement if any abnormal conditions, such as broken case and exposed metal parts are present on the instrument or test lead.
- Do not install substitute parts or make any modification to the instrument. Return the instrument to your local Kyoritsu distributor for repair or re-calibration.
- Do not turn the function switch with plugged in test leads connected to the circuit under test.
- Do not try to replace the batteries if the surface of the instrument is wet.
- Always switch off the instrument before opening the battery compartment cover for battery replacement.
- Stop using the test lead if the outer jacket is damaged and the inner metal or color jacket is exposed.

CAUTION

- Always set the Function switch to the appropriate position before making measurement.
- Do not expose the instrument to the direct sun, high temperatures and humidity or dew.
- This instrument is designed for in-door use. It can be used under the temperature between 0°C and 40°C without impairing its safety characteristics.
- This instrument doesn't have dust/water-proof construction. Do not use the instrument in dusty area or where it easily gets wet. It may lead to failure of the instrument.
- Be sure to set the function selector switch to the "OFF" position after use. When the instrument will not be in use for a long period of time, place it in storage after removing the battery.
- Use a damp cloth and detergent for cleaning the instrument. Do not use abrasives or solvents.

Measurement categories (Over-voltage categories)
 To ensure safe operation of measuring instruments, IEC61010 establishes safety standards for various electrical environments, categorized as O to CAT IV, and called measurement categories. These are defined as indicated below. Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measuring instrument designed for CAT III environments can endure greater momentary energy than one designed for CAT II.

CAT II : Primary electrical circuits of equipment connected to an AC electrical outlet by a power cord.
 CAT III : Primary electrical circuits of the equipment connected directly to the distribution panel, and feeders from the distribution panel to outlets.

Designed to meet CAT III 600V when the cap and protective cover is attached to the test lead and to meet CAT II 600V when the cap and protective cover is not attached to the test lead.

2. Features

This instrument is a pen-type digital multimeter and can measure: AC/DC voltage, resistance, capacitance and frequency/duty ratio. It also provides continuity check and diode check functions.

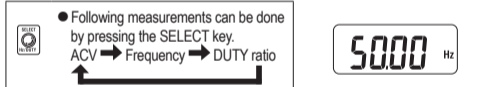
- Designed to meet the following safety standards. IEC61010-1 measurement category (CAT) III 600V IEC61010-031 (for hand-held Probe assemblies)
- Double molded main body and Function switch provide comfortable single handed grip.
- Penlight illuminates brightly the point to be measured.
- Backlight LCD is highly visible, even in darkness.
- REL function to check the difference (DCV/CAP).
- Auto-power-off function to save battery.
- Data hold function
- All ranges including Ohm range are protected against overload voltage of 600V.
- Test lead is wrapped in its rear side compartment without difficulty.
- Test pin can be covered by a unique cover mechanism for safety.

6-1 AC voltage(ACV), Frequency and DUTY ratio measurement

- Set the Function switch to "V" position.
- Connect the Test pin and test lead to AC circuit as shown in the figure below to measure AC voltage (ACV).



- Press the SELECT key and select the Frequency range to measure a frequency. In this case, the unit "Hz" is displayed on the LCD.



- Press the SELECT key and select the DUTY ratio range to measure a DUTY ratio (Pulse width/ Pulse cycle). In this case, the unit "%" is displayed on the LCD.



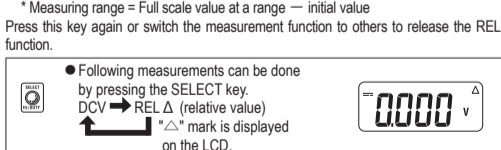
Note
 • At ACV function, a few dgts may remain displayed on the LCD after removing the input.
 • Connect the test lead (minus terminal) to the earth side of the circuit under test. When the circuit under test does not have the earth, any connection is allowed.
 • At Frequency and DUTY ratio measurement, the measurable min. input is approx. 1.5Vrms.

6-2 DC voltage(DCV) measurement

- Set the Function switch to "V" position.
- Connect the Test pin to the positive (+) side of the equipment under test and the test lead to the negative (-) side as shown in the figure below. When test lead is connected to the positive (+) side, the "±" mark is displayed on the LCD.



- Press the SELECT key to display a REL value (relative value). Press this key and store the initial measured value. After that, the difference between the stored value and the measured value is displayed on the LCD. Auto-ranging function doesn't activate when this function is enabled. The first selected range will be held. The relative measurement is allowed in the following range.
 * Measuring range = Full scale value at a range — initial value
 Press this key again or switch the measurement function to others to release the REL function.



6-3 Resistance (Ω) measurement, Diode/ Continuity check

- Set the Function switch to "Ω" position.
- Connect the Test pin and test lead to the equipment under test as shown in the figure below.



3. Specification

Function	Range	Accuracy	Max. input voltage
ACV Auto-ranging(*2)	4V	±1.3%rdg ± 5dgt (50/60Hz)	DC 600V AC 600Vrms(sin)
	40V	±1.7%rdg ± 5dgt (~400Hz)	
	400V	±1.6%rdg ± 5dgt (50/60Hz)	
	600V	±2.0%rdg ± 5dgt (~400Hz)	
DCV Auto-ranging(*2)	400mV	±0.8%rdg ± 5dgt	
	4V		
	40V		
	400V		
Ω Auto-ranging	400 Ω	±1.0%rdg ± 5dgt	
	4k Ω		
	40k Ω		
	400k Ω		
Diode check/ Continuity Check	40M Ω	±2.5%rdg ± 5dgt	
	4k Ω		
	400 Ω		
	40M Ω		
Capacitance Auto-ranging	50nF	±3.5%rdg ± 10dgt	
	500nF		
	5μF		
	50μF		
Frequency Auto-ranging	100μF	±4.5%rdg ± 5dgt	
	5Hz		
	50Hz		
	500Hz		
DUTY(pulsewidth/ pulse cycle)	500kHz	±0.1%rdg ± 5dgt	
	200kHz		
	50kHz		
	200kHz		
		Measurable input: 1.5Vrms or more	
		±2.5%rdg ± 5dgt(Accuracy is guaranteed up to 10kHz.)	

Note:
 Following abbreviations are used in above table.
 • **rdg** is an abbreviation of "reading", and it means the indicated value at a measurement.
 • **dgt** is an abbreviation of "digit", and it means the figure to be displayed at the rightmost digit.
 • (*1) Except for 40MΩ range at Ohm function.
 • (*2) At Voltage function, the Auto-ranging function is released by pressing the SELECT key. To measure a voltage again, turn the Function switch to the "OFF" position once. Then set it to the Voltage function again.

3-2 General specification
 • Method of operation : ∑ method
 • Display : Liquid crystal display (max. 3999 counts)/Units/ Marks
 • Location for use : OFF/ACV/DCV/Ω/Capacitance
 • Key : HOLD/Hz DUTY/Hz/REL Δ (only at DCV and Capacitance ranges)
 • Power source : Button type battery LR44(SR44) 1.5V x 2
 • Low battery warning : "BATT" mark is displayed at 2.4V±0.2V or less.
 • Dimension : 190(L) x 39(W) x 31(D)mm
 • Weight : Approx. 100g (including batteries)
 • Location for use : Altitude up to 2000m. in-door use
 • Operating temperature & humidity range : 0~40°C, relative humidity 85% or less (no condensation)
 • Storage temperature & humidity range : -20~60°C, relative humidity 85% or less (no condensation)
 • Carrying case : M-9130 x 1
 • Button type battery : LR44(1.5V) x 2
 • Instruction manual : x 1
 • IEC/EN 61010-1, IEC/EN 61010-2-033 Measurement category (CAT) III 600V Pollution degree 2
 • IEC/EN 61010-031
 • EN61326 (EMC)

Standards (Safety)
 • EU RoHS directive compliant

3-3 Electrical characteristics
 • Temperature & humidity range : 23°C±5°C, relative humidity 85% or less (no condensation)
 • Supply voltage range (guaranteed accuracy) : 3.4V till the "BATT" mark is displayed.
 • Insulation resistance : 10MΩ or more/ DC1000V (between electrical circuit and case enclosure)
 • Withstand voltage : AC515Vrms, sine wave (50/60Hz for 5 sec.) (between electrical circuit and case enclosure)
 • Overload protection (Over-voltage protection) : 720V (AC/DC) for 10 sec. at voltage function 600V (AC/DC) for 10 sec. at all functions other than voltage function
 • Rated supply voltage : DC3.0V
 • Rated power : Approx. 4mVA (when battery voltage is 3.0V)
 • Max. rated power : Approx. 30mVA (when lights are on)
 • Continuous operating time : Approx. 80 hours (DCV measurement)
 • Approx. 15 hours (A operation; turning the light on for 10 sec. and off for 20 sec., is repeated.)

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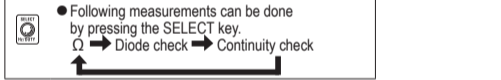
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Press the SELECT key to conduct the Diode check. Connect the Test pin and the test lead to the equipment under test. When following indication is confirmed, the diode is good.



1.Forward direction
 (Example) Forward voltage is displayed. 0.530 V

2.Backward direction
 (Example) "OL" is displayed. OL V

Note
 • When the forward voltage of diode is out of the range of 0.3V~1.5V, measurement may not be done. (Zener diode, LED and etc.)

Press the SELECT key to conduct the Continuity check. Connect the Test pin and the test lead to the equipment under test. Buzzer sounds when continuity is ok. (120Ω or less) Resistance value of 400Ω or less is displayed on the LCD.



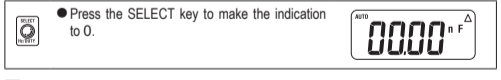
Note
 • Indicated value may not be "0" after shorting the tip of the test lead. However, this is because of the resistance of the test lead and not a failure.

6-4 Capacitance measurement (nF, μF)

- Set the Function switch to "F" position.



- Press the SELECT key to make the indicated value to "0" before connecting the test lead to the equipment under test.

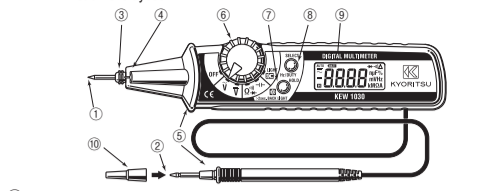


Note
 • Measuring time varies depending on the capacitance to be measured.

Capacitance to be measured	< 4 μF	< 40 μF	< 100 μF
Measuring time	2 sec.	7 sec.	15 sec.

4. Instrument layout

4-1 Instrument layout



- Test pin (input terminal (+): red)
- Test lead (input terminal (-): black)
- Connected to the negative (-) side or the earth of the circuit.
- Protective cover
- Covering the Test pin for safety purpose.
- Penlight
- Protective fingerguard : It is a part providing protection against electrical shock and ensuring the minimum required air and creepage distances.
- Function switch

OFF : Power off (Battery will not be wasted)
 V AC voltage (ACV) → Frequency (Hz) → DUTY(%)

Switches by pressing the "SELECT" key.
 V DC voltage (DCV) → REL Δ (relative value display)

Switches by pressing the "SELECT" key.
 Ω Resistance → Diode check → Continuity check

Switches by pressing the "SELECT" key.
 F Capacitance → REL Δ (relative value)

Switches by pressing the "SELECT" key.
 LIGHT : Turning on the Penlight. Set the Function switch to this position first, and then turn it to any desirable function position. Then the Penlight turned on and illuminates the test point. (Measurement cannot be performed in this switch position.)

HOLD key
 • Freezing the indicated value.
 • Turning on the LCD backlight. (Press this key at least 2 sec.)

SELECT key
 • Switching the measurement modes. (V/Hz/DUTY and Ω/→/←/Δ)
 • Enable/Disable the REL Δ function. (Only at DCV/Capacitance)



Cap : Test leads can be used under the CAT II and CAT III environments by attaching a protective cap as illustrated below. Use of our protective cap offers