YOKOGAWA

Digital Multimeter Series

TY700/TY500/732/731 Series

- **TY700** Series of 4.5-digit Handheld Multimeters
- **TY500** Series of 3.5-digit Handheld Multimeters
- **732** Series of 3.5-digit Handheld Multimeters
- **73101** of 3.5-digit Pocket Digital Multimeter

73101

Pocket DMM
73101

TY720

0.020% Maximum Measurement Accuracy
TY720

TY530

0.09% Accuracy RMS Measurement
TY530

73203

Low-end Model
73203

Communication Package
92015

Yokogawa Meters & Instruments Corporation

Bulletin DMM-E

Glossary

Integral Action Time

Digital multimeters (DMMs) employ an A/D converter with a dual-integration system, which determines the measurement value by converting the input voltage into time using an integration AD converter. The interval to perform an integral action periodically is referred to as the integralaction time.

Measurement Accuracy

With DMMs, the measurement accuracy is generally expressed as: ±__% of reading + __digits. ("Reading" refers to the reading value, and is abbreviated as "rdg"; "digits" refers to the number displayed in the smallest decimal place, and is abbreviated as "dgt.") This expresses the range of values that a DMM may measure or represent for a given actual value.

Root Mean Square Value

The value most directly related to the energy of a given waveform. Refers to the square root of a value found by averaging the squares of instantaneous values of a waveform over a single cycle. (See Table 1,Figures 1 and 2.)

Mean Value

Refers to the average of the sum of instantaneous values, determined for a current half-wave. It is equivalent to calculating the surface area of a waveform.

Form Factor

Ratio of RMS value with respect to average value.
Form factor = RMS value/mean value (See Figures 1 and 2.)

Crest Factor

Ratio of maximum value to RMS value.
Crest factor = maximum value/RMS value(See Figures 1 and 2.)

Peak-to-Peak (P-P) value

Refers to the distance between the smallest and largest amplitudes in a waveform (see Figure 1).

Frequency Characteristic

Refers to a characteristic that shows variations in input, measurement, or response with frequency. When measuring alternating current signals, a measured signal does not have a simple frequency, but often includes various frequencies ranging from lower frequencies to higher harmonics. To measure such signals more accurately, it is preferable to use a measurement device that has a broader frequency characteristic range.

Input Impedance

To prevent the measured object from being influenced during voltage measurement, you should use a measurement device with an extremely high input impedance.

Decibel

A unit used for describing the change in electrical signal amplitude or noise level, or transmission systems in wired devices, etc. This parameter is also used to represent the level differences in voltage, current or related values, but is generally restricted to cases characterized by the relationship: $(I_1/I_2)^2 = (V_1/V_2)^2 = P_1/P_2$. In the abbreviation "dB," "d" (deci) denotes 1/10, and "B" (Bell) denotes logarithm.

Table 1. RMS Value, Average Value, Waveform Factor and Crest Factor for a Typical Periodic Waveform

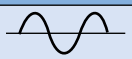
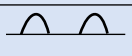
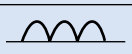
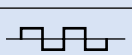
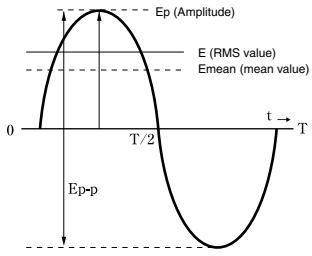
Item	Waveform	RMS	Mean value	Waveform factor	Crest factor
Sine wave		$\frac{1}{\sqrt{2}}$=0.707	$\frac{2}{\pi}$ =0.637	$\frac{\pi}{2\sqrt{2}}$ =1.11	$\sqrt{2}$ =1.414
Half rectification wave		$\frac{1}{2}$ =0.5	$\frac{1}{\pi}$ =0.318	$\frac{\pi}{2}$ =1.571	2
Full rectification wave		$\frac{1}{\sqrt{2}}$=0.707	$\frac{2}{\pi}$ =0.637	$\frac{\pi}{2\sqrt{2}}$ =1.11	$\sqrt{2}$ =1.414
Triangular wave		$\frac{1}{\sqrt{3}}$=0.577	$\frac{1}{2}$ =0.5	$\frac{2}{\sqrt{3}}$=1.155	$\sqrt{3}$ =1.732
Square wave		1	1	1	1

Figure 1. RMS and Mean Values of Sine Wave



RMS value

$$E=\sqrt{\frac{1}{T}\int_0^T e^2(t)\,dt} \quad \text{(energy)}$$

Mean value

$$Emean=\frac{1}{T}\int_0^T |e(t)|dt \quad \text{(surface area)}$$

Calibration of RMS value by mean value rectification

$$E=\frac{1}{\sqrt{2}}\,Ep=0.7071\cdot Ep$$

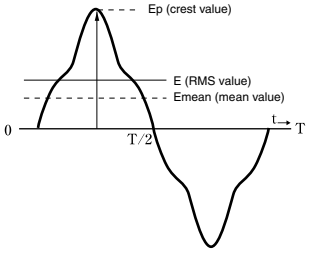
$$Emean=\frac{2}{\pi}\,Ep=0.6366\cdot Ep$$

$$E=\frac{\pi}{2\sqrt{2}}\,Emean=1.11\cdot Emean$$

P-P value

$$Ep\text{-}p=2\sqrt{2}\;E=2.828\cdot E$$

Figure 2. RMS of Distorted Waves



Instantaneous value and spectrum

$$e(t)=a_0+a_1\cos wt+\cdots+a_n\cos nwt+b_1\sin wt+\cdots+b_n\sin nwt$$

DC component — Fundamental wave component — Harmonic component

RMS of each spectrum

$$|En|=\frac{\sqrt{a_n^2+b_n^2}}{\sqrt{2}}$$

RMS value

$$E=\sqrt{E_0^2+|E_1|^2+|E_2|^2+\cdots+|E_n|^2}$$

Crest factor (CF)

$$CF=\frac{\text{Crest value}}{\text{RMS value}}$$

$$\text{Waveform factor}=\frac{\text{RMS value}}{\text{mean value}}$$

CE Mark

The products of Yokogawa Meters & Instruments Corporation are subjected to design and evaluation testing to ensure compliance with the safety and EMC standards in accordance with the directives issued by the EC.

Electromagnetic Compatibility (EMC)

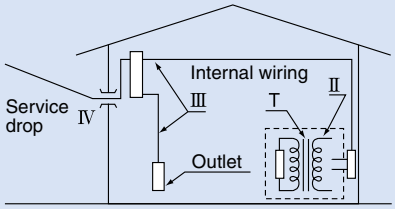
The parameters EMI and EMS are referred to as electromagnetic compatibility as they relate to compatibility within an electromagnetic environment.

Safety Standards

These standards lay out safety requirements that are to be met by a product with the objective of the preservation of human life and property. The applicable international standard is IEC 61010, and while a product must conform to this standard, there are also domestic standards laid out by individual countries. With these safety regulations, the range of use of a measurement device is specified by categorization in measurement categories I through IV to ensure the safety of the user. The designations "CAT II, 1000 V" or "CAT III, 600 V" at the input terminals of a measurement device, for example, indicates the applicable category and the maximum voltage for the device in terms of safety.

Measurement categories (CAT)

In order to ensure the safety of the user, IEC 60664 defines the ranges of use of measuring instruments by classifying power levels into measurement categories II through IV and O (None, other). This is because the excessive impulse or surge levels induced in a power line vary depending on the location of measurement (category). Categories with higher numerals designate locations that include larger surge voltages. Instruments that are designed for category III can thus withstand higher surge voltages than instruments designed for category II.



Measurement category	Description	Remarks
O (None, other)	Other circuits that are not directly connect to MEAINS.	
CAT.II	For measurement performed on circuits directly connected to the low-voltage installation.	Appliances, portable equipments, etc.
CAT.III	For measurement performed in the building installation.	Switchboard, circuit breaker, etc.
CAT.IV	For measurement performed at the source of the low-voltage installation.	Overhead wire, cable systems, etc.

Digital Multimeter Selection Guide

Model	Type	Max. Value	Display: Dual	Display: Bar Graph	Display: Back-lit	Measurement Items: AC RMS	Measurement Items: Voltage	Measurement Items: AC + DC	Measurement Items: Current	Measurement Items: AC + DC A	Measurement Items: Resistance	Measurement Items: Continuity Check	Measurement Items: Diode Test	Measurement Items: Frequency	Measurement Items: Temperature	Measurement Items: Capacitance	Measurement Items: Filter	Additional Functions: Communication	Additional Functions: Data Memory	Additional Functions: Max./Min. Value Memory	Additional Functions: Relative Value Computation	Additional Functions: Logarithm Computation	Additional Functions: Data Hold	Additional Functions: Auto Hold	Additional Functions: Peak Hold	Additional Functions: Overvoltage Input Warning	Additional Functions: PC Connection	Additional Functions: Auto Power Off	External View
TY710	Handheld	50000	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	●	
TY720			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
TY520		6000		●	●	●	●		●		●	●	●	●	●	●	●			●		●	●		●			●	
TY530				●	●	●	●		●		●	●	●	●	●	●	●	●	●	●		●	●		●	●	●	
73201		4300					●		●		●	●	●										●		◎		●	
73202							●		●		●	●	●			●							●		◎		●	
73203							●		●		●	●	●			●							●		◎		●	
73204							●				●	●	●										●		◎		●	
73101	Pocket-sized	4300					●				●	●	●										●				●	

◎ : Also functions as excessive current input warning.

TY700 Series

Most Reliable Handheld Digital Multimeters

Model

TY720
TY710

4.5 digits | 50,000 count | RMS | USB | Terminal shutters | 0.020% (DCV) | LPF (TY720) | AC50mV (TY720)

3-year Warranty

c UL us LISTED

CE

Maximum Measurement Accuracy

0.020% rdg + 2 dgt (DC voltage)
True RMS measurement

Safe Design

Conforms to EN61010-1 safety standard

Conforms to measurement category 1000 V AC/DC, CAT Ⅲ and 600 V AC/DC, CAT Ⅳ

Shutters prevent erroneous insertion of test leads into current measurementterminals (terminal shutters)

The current terminals have terminal shutters that prevent erroneous setting of the measurement function and leadwire connections resulting from operational errors. The terminal shutters open and close according to the function switch position.

Closed Case Calibration

User calibration function

The TY series, simply performing special operations via front panel allows for quick and reliable adjustment. In addition, the series allows for one-touch adjustment of AC voltage- and AC current-to-frequency characteristics. The user calibration function leads to improved operation efficiency and cost reduction.

• External standard instrument required for calibration.

Full Support for Data Management

Two memory modes

- SAVE-mode memory
  A mode for manually saving any data
- Logging-mode memory
  A mode for automatically saving data at a specified interval
  Logging interval: 1 second to 30 minutes

	Memory capacity	
Model	SAVE-mode memory*	Logging-mode memory*
TY710	100	1000
TY720		10000

* Saved data can be checked on the display.

Real-time measurement

The optional communication package*1 sold separately (Model 92015) allows you to connect to a PC for transmitting large amounts of data that cannot be saved in the DMM internal memory.
You can transmit the saved data from the internal memory to a PC and process it using application software or spreadsheet software (Excel*2) for data management.

*1 Communication cable and application software are included.
*2 Excel is a registered trademark of Microsoft Corporation in the United States.
*3 The communication cable employs an infrared system, so the device is electrically insolated.

For details of the application software, refer to page 7.

Loaded with Measurement Functions

Peak hold function (TY720, for DC V/A measurement)

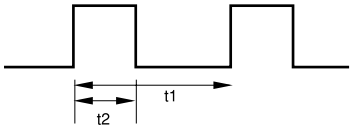
Supports waveforms of 1 ms or greater. You can capture instantaneous crest values not possible with ordinary maximum measurement functions.

Relative and percentage value computation

Can display the measured values as the values relative to a reference value (defined by the REL key; even after data hold) or as the percentages of the reference value.
Percentage calculation: (Measured value – reference value) / (reference value), expressed as percentage.

Duty ratio (%) measurement

Displays the duty ratio of a pulse waveform:
(High level period/1 cycle of waveform) x 100 = (t2/t1) x 100 [%]



AC+DC measurement

Measures RMS of a waveform in which ripple waveforms are superimposed on a direct current.

Auto hold

Automatically hold the data measured when the test leads are disconnected from the measured object, thus freeing both hands for performing reliable measurement.

Minimum/maximum/average display

Allows recording of minimum, maximum and average values along with their respective times (time passed since the start of measurement)

Decibel calculation

Computes the logarithm of an alternating current, and uses it together with the relative value computation to display the relative value. You can select the standard resistance according to the application, such as audio or communication circuit signal measurement.

* Selectable standard resistance values:
4/8/16/32/50/75/93/110/125/135/150/200/250/300/500/600/800/900/1000/1200Ω

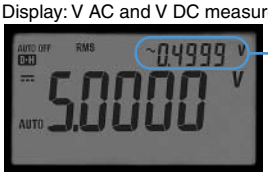
Full Display Functions

50,000-count, 51-segment bar graph display

Backlight provided as standard for when working in dark places.

Simultaneous display of frequency and voltage, frequency and duty ratio or decibels and voltage on the dual display.

Display: V AC and V DC measurements



In addition to the above, the sub-display can display the reference value for differential calculation, memory storage numbers for measured data, minimum/maximum/average value recording times, and standard resistance during decibel calculation.

TY700 General Specifications

Measurement Functions :DC voltage, AC voltage, DCV+ACV, DC current, AC current, DCA+ACA, resistance, frequency, temperature, capacitance, duty cycle, decibel calculation, continuity check, diode test, low-power resistance (TY720 only)
For AC voltage/current, RMS/MEAN detection can be switched (TY720 only).
For AC voltage/current, the low-pass filter can be turned on/off (TY720 only).

Additional Functions :Data hold/auto hold/peak hold (TY720 only), range hold, maximum/minimum/average values resistance, capacitance zero, relative and percentage value calculation, manual-mode memory, logging-mode memory, auto power off, backlight (white LED)

Display :5-digit LCD: ····· 7-segment
Digital display: ····· Main display; [50,000] counts
Sub-display ; [50,000] counts
Bar graph display: ····· 51-segment
Polarity indicator: ····· "-" appears automatically when the polarity is negative
Overrange indicator: ····· "OL"
Low-battery indicator: ····· " ⊟ " appears at or below the minimum operating voltage.

Measuring Rate :6 times/sec (Frequency: 1 time/sec, Capacitance: max. 0.03 times/sec (50mF), Resistance: 4 times/sec)
Bar graph display: 15 times/sec

Operating Temp. and Humidity :-20 to 55°C; 80% RH or less (no condensation) 40 to 55°C: 70% RH or less

Storage Temp. and Humidity :-40 to 70°C; 70% RH or less (no condensation)

Temperature Coefficient :Add the accuracy 0.05/°C to the basic accuracy at a temperature within -20 to 18°C and 28 to 55°C. For continuous measurements, add 1 digit/°C for DC voltage (DCV) and DC current (DCA). (Add 3 digits/°C for 50mV, 5A, and 10A ranges)

Power Supply :Four AA (R6) dry cells

Battery Life :Approx. 120 hours (for continuous DC voltage measurement with alkaline cells)

Withstanding Voltage :6.88kV for 5 seconds (between input terminals and casing)

Dimensions :Approx. 90(W) x 192(H) x 49(D) mm

Weight :Approx. 560g (including batteries)

Compliance with Standards :Safety EN61010-1, EN61010-2-030, EN61010-031, 1000V CAT Ⅲ, 600V CAT Ⅳ, pollution level 2, indoor, 2000m max. above sea level
UL 61010-1, CAN/CSA-C22.2 No. 61010-1,
UL 61010-031, CAN/CSA-C22.2 No. 61010-031
EMC: EN61326-1 Class B, EN55011 Class B Group 1, EN61326-2-2

Standard Accessories :AA (R6) dry cells: 4, Test lead set (98015): 1, Fuse (installed) 440mA/1000V and 10A/1000V, Instruction manual: 1

Model and Specification Code

Name	Model
Digital Multimeter	TY710
	TY720

Optional Accessories

Name	Model	Specification
DMM communication package	92015	USB communication adapter + USB communication cable + Application software
Test leads	98073	1000V CAT Ⅲ, 600V CAT Ⅳ Red/black (1 set)
Test leads with Alligator Clip	99014	1000V CAT Ⅲ, 600V CAT Ⅳ Red/black (1 set)
Fuse	99015	440 mA/1000V (1 piece/1 unit)
	99016	10 A/1000 V (1 piece/1 unit)
TC-K temperature probe	90050	-50 to 600°C (For liquids)
	90051	-50 to 600°C (For liquids)
	90055	-20 to 250°C (For surfaces)
	90056	-20 to 500°C (For surfaces)
Current clamp probe	96001	For 400A, AC Output: 10mV/A, AC
Carrying case	93029	Hard type (Houses the DMM, the test leads and communication cable)

Performance

Test conditions: Temperature and humidity = 23 ± 5°C, 80% RH or less; Accuracy = ± (% rdg + dgt).
Note: A response time is the time required for achieving the accuracy specified for the corresponding range.

DC Voltage Measurement(⎓V)

Range	Resolution	Accuracy TY710,TY720	Input Resistance	Maximum Input Voltage
50mV	0.001mV	0.05+10	Approx. 100MΩ	1000V DC 1000V rms AC
500mV	0.01mV	0.02+2		
2400mV	0.1mV			
5V	0.0001V	0.025+5	10MΩ	
50V	0.001V	0.03+2		
500V	0.01V			
1000V	0.1V			

NMRR: 80dB or greater for 50/60Hz ± 0.1%At 50mV of range, 70dB or greater for 50/60Hz ± 0.1%
CMRR: 100dB or greater for 50/60Hz(Rs=1kΩ) Response time: 0.3 seconds or less

DC Current Measurement (⎓A)

Range	Resolution	Accuracy TY710,TY720	Voltage Drop	Maximum Input Current
500µA	0.01µA	0.2+5	<0.11mV/µA	440mA fuse-protected
5000µA	0.1µA			
50mA	0.001mA		<4mV/mA	
500mA *3	0.01mA			
5A	0.0001A	0.6+10	<0.1V/A	10A fuse-protected
10A	0.001A	0.6+5		

Response time: 0.3 seconds or less *3: Maximum testing current at 500mA of range is 440mA

AC Voltage Measurement [RMS] (~V) AC coupling, RMS detection, crest factor for 1000V of range: 1.5 ; crest factor for ranges other than 1000V: 3

Range	Resolution	Accuracy (Upper: TY710; Lower: TY720; the display of "—" is not specified) 10 - 20Hz	20Hz - 1kHz	1k - 10kHz	10k - 20kHz	20k - 50kHz	50k - 100kHz	Input Impedance	Maximum Input Voltage
50mV	0.001mV	— 2+80*2	— 0.4+40*2	— 5+40*2	— 5.5+40*2	— 15+40*2		11MΩ<50pF	1000V rms AC 1000V DC
500mV	0.01mV								
5V	0.0001V	1.5+30*1	0.7+30*1		2+50*2	—	—		
50V	0.001V	1+30*1	0.4+30*1		1+40*1	2+70*2	5+200*2		
500V	0.01V								
1000V	0.1V	*2 *2	*2 *2	3+30*2 3+30*2	—			10MΩ<50pF	

*1: At 5 to 100% of range *2: At 10 to100% of range CMRR: 80dB or greater for DC to 60Hz(Rs= 1kΩ) Response time: 1 second or less

AC Current Measurement [RMS] (~A) RMS detection crest factor: 3

Range	Resolution	Accuracy (Upper: TY710; Lower: TY720; the display of "—" is not specified) 10 - 20Hz	20Hz - 1kHz	1k - 5kHz	Voltage Drop	Maximum Input Current
500µA	0.01µA	1.5+20 1+20	1+20 0.75+20	— 1+30	<0.11mV/µA	440mA fuse-protected
5000µA	0.1µA					
50mA	0.001mA				<4mV/mA	
500mA *3	0.01mA					
5A	0.0001A	1.5+20	1+20	—	<0.1V/A	10A fuse-protected
10A	0.001A	1.5+20	1+20	2+30		

Shown above is the accuracy at 5 to 100% of range (10 to 100% for 10A range). Response time: 1 second or less
*3: Maximum testing current at 500mA of range is 440mA.

AC Voltage Measurement [MEAN] (~V) AC coupling, Mean-value detection and RMS-value calibration (sinusoidal wave)

Range	Resolution	Accuracy TY720 10 - 20Hz	20 - 500Hz	500 - 1kHz	Input Impedance	Maximum Input Voltage
50mV	0.001mV	4+80*2	1.5+30*2	5+30*2	11MΩ<50pF	1000V rms AC 1000V DC
500mV	0.01mV	2+30*1	1+30*1	3+30*1		
5V	0.0001V					
50V	0.001V				10MΩ<50pF	
500V	0.01V					
1000V	0.1V	*2	*2	*2		

*1: At 5 to 100% of range *2: At 10 to 100% of range CMRR: 80dB or greater for DC to 60Hz (Rs= 1kΩ) Response time: 1 second or less

AC Voltage Measurement [MEAN] (~A) Mean-value detection and RMS-value calibration (sinusoidal wave)

Range	Resolution	Accuracy TY720 10 - 20Hz	20 - 500Hz	500Hz - 1kHz	Voltage Drop	Maximum Input Current
500µA	0.01µA	2+20	1.5+20	2+30	<0.11mV/µA	440mA fuse-protected
5000µA	0.1µA					
50mA	0.001mA				<4mV/mA	
500mA *3	0.01mA					
5A	0.0001A	3+20	2+20	4+30	<0.1V/A	10A fuse-protected
10A	0.001A					

Shown above is the accuracy at 5 to 100% of range (10 to 100% for 10A range). Response time: Approx. second or less
*3: Maximum testing current at 500mA of range is 440mA.

DCV + ACV (⎓+~) AC coupling, RMS detection crest factor for 1000V of range: 1.5 ; crest factor for ranges other than 1000 V: 3

Range	Resolution	Accuracy (Upper: TY710; Lower: TY720; the display of "—" is not specified) DC,10 - 20Hz	DC,20Hz - 1kHz	DC,1k - 10kHz	DC,10k - 20kHz	DC,20k - 50kHz	DC,50k - 100kHz	Input Impedance	Maximum Input Voltage
5V	0.0001V	1.5+10*1	1+10*1		2+10*2	—	—	11MΩ<50pF	1000V rms AC 1000V DC
50V	0.001V	1.5+10*1	0.5+10*1		1+10*1	2+10*2	5+20*2	10MΩ<50pF	
500V	0.01V								
1000V	0.1V	*2 *2	*2 *2	—					

*1: At 5 to 100% of range *2: At 10 to 100% of range CMRR: 80dB or greater for DC to 60Hz (Rs = 1kΩ) Response time: Approx. 2 seconds

DCA + ACA (⎓+~) Maximum effective display: 50,000, crest factor: 3

Range	Resolution	Accuracy (Upper: TY710; Lower: TY720; the display of "—" is not specified) DC,10 - 20Hz	DC,20Hz - 1kHz	DC,1k - 5kHz	Voltage Drop	Maximum Input Current
500µA	0.01µA	2+10 1.5+10	1.5+10 1+10	— 1.5+10	<0.11mV/µA	440mA fuse-protected
5000µA	0.1µA					
50mA	0.001mA				<4mV/mA	
500mA *3	0.01mA					
5A	0.0001A	2+10	1.5+10	—	<0.1V/A	10A fuse-protected
10A	0.001A	2+10	1.5+10	3+10		

Shown above is the accuracy at 5 to 100% of range (10 to 100% for 10A range). Response time: Approx. 2 seconds *3: Maximum testing current for 500mA of range is 440mA.

Resistance Measurement (Ω)

Range	Resolution	Accuracy TY710	Accuracy TY720	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
500Ω	0.01Ω	0.1+2*1	0.05+2*1	<1mA	<2.5V	1000V rms
5kΩ	0.0001kΩ			<0.25mA		
50kΩ	0.001kΩ			<25µA		
500kΩ	0.01kΩ			<2.5µA		
5MΩ	0.0001MΩ	0.5+2		<1.5µA		
50MΩ	0.001MΩ	1+2		<0.13µA		

*1: Accuracy after zero calibration Response time: 1 second or less for 500Ω to 500kΩ, 5 seconds or less for 5MΩ to 50MΩ

Diode Test (⊣◇⊢)

Range	Resolution	Accuracy TY710,TY720	Testing Current (Vf = 0.6 V)	Open-circuit Voltage	Input Protection Voltage
2.4V	0.0001V	1 + 2	Approx. 0.5mA	<5V	1000V rms

Low-power Resistance Measurement (LP-Ω) Maximum effective display: 5000

Range	Resolution	Accuracy TY720	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
5kΩ	0.001kΩ	0.2+3	<10µA	<0.7V	1000V rms
50kΩ	0.01kΩ		<1.0µA		
500kΩ	0.1kΩ		<0.6µA		
5MΩ	0.001MΩ	1+3	<0.05µA		

Continuity Check (◁))))

Range	Resolution	Continuity Beeper TY710, TY720	Testing Current	Open-circuit Voltage	Input Protection Voltage
500Ω	0.1Ω	Buzzer sounds at 100 ± 50Ω or less.	Approx. 0.5mA	<5V	1000V rms

Temperature Measurement (TEMP)

Range	Resolution	AccuracyTY710,TY720	Input Protection Voltage
-200 - 1372°C	0.1°C	1+1.5°C	1000V rms

Temperature probe: Type K thermocouple sensor (optional)

Capacitance (⊣⊢) Maximum effective display:5000

Range	Resolution	AccuracyTY710,TY720	Input Protection Voltage
5nF	0.001nF	1+5*1	1000V rms
50nF	0.01nF		
500nF	0.1nF		
5µF	0.001µF		
50µF	0.01µF		
500µF	0.1µF	2+5	
5mF	0.001mF	3+5	
50mF	0.01mF		

*1: Accuracy after zero calibration

Frequency Measurement (Hz) AC coupling, Maximum effective display: 9999

Range (auto-ranging)	Resolution	Accuracy TY710,TY720
2.000 - 9.999Hz	0.001Hz	0.02+1*1
9.00 - 99.99Hz	0.01Hz	
90.0 - 999.9Hz	0.1Hz	
0.900 - 9.999kHz	0.001kHz	
9.00 - 99.99kHz	0.01kHz	*2

*1: At 10 to 100% of input voltage or current range
*2: At 40 to 100% of input voltage or current range

Duty Cycle (%)

Range	Resolution	Accuracy TY710,TY720
10 - 90%	1%	± 1%*1

*1: For input of a square wave with a frequency within 10.00 to 500.0Hz At 40 to 100% of input voltage or current range

Peak Hold Function (PH) TY720 only Maximum effective display: 5000

Range	Accuracy TY720	Response Time
DCV, DCA	± 100 digit	>250µs

TY500 Series

Safe design and supports various maintenance applications.

Model

TY530
TY520

3.5 digits | 6000 count | RMS | USB (TY530) | Terminal shutters | 0.09% (DCV) | Sensor | LPF

3-year Warranty

c UL us LISTED

CE

Maximum Reliability and Safety

Reliability

High accuracy and safety

Accuracy: 0.09% rdg + 2 dgt (DC voltage)
True RMS measurement
Only TY530 can switch RMS and mean detection.

Safe Design

Conforms to EN61010-1 safety standard.

Conforms to overvoltage category 1000 V AC/DC, CAT Ⅲ and 600 V AC/DC, CAT IV.

Shutters prevent erroneous insertion of test leads into current measurement terminals (terminal shutters).

If the function is switched to other than current measurement while a test lead remains inserted in a current measurement terminal, the fuse built into the DMM can not protect the circuits. The terminal shutters prevent such accidental errors.

Closed Case Calibration

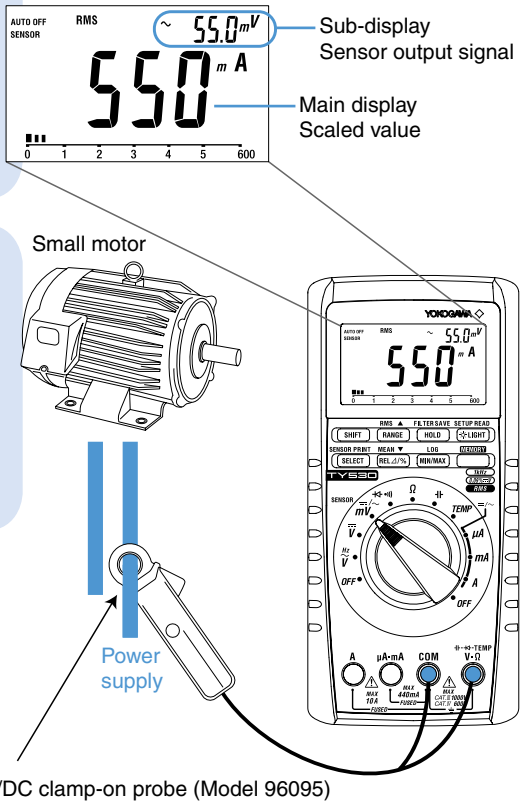
User calibration function

The TY series, simply performing special operations via front panel allows for quick and reliable adjustment. In addition, the series allows for one-touch adjustment of AC voltage- and AC current-to-frequency characteristics. The user calibration function leads to improved operation efficiency and cost reduction.

• External standard instrument required for calibration.

Direct reading of various sensor output signals

The DMM can directly read the various sensor output signals (mV DC/AC) at any scaling. The units can be changed (16 units are available). Output signal and scaled value are simultaneously displayed.



AC/DC clamp-on probe (Model 96095)
Reads maximum 60 A when used with the TY500 series.

Data Storage Method

Two memory modes (TY530 only)
Selectable from 2 types of memory mode to suit field needs.

- SAVE-mode memory
  A mode for manually saving any data
- Logging-mode memory
  A mode for automatically saving data at a specified interval

	Memory capacity	
Model	SAVE-mode memory	Logging-mode memory
TY530	100	1600

Real-time measurement

The optional communication package*1 sold separately (Model 92015) allows you to connect to a PC for transmitting large amounts of data that cannot be saved in the DMM internal memory.
You can transmit the saved data from the internal memory to a PC and process it using application software or spreadsheet software (Excel*2) for data management.

*1 Communication cable and application software are included.
*2 Excel is a registered trademark of Microsoft Corporation in the United States.
*3 The communication cable employs an infrared system, so the device is electrically insolated.

For details of the application software, refer to page 7.

TY500 General Specifications

Measurement Functions :DC Voltage, AC voltage, DC current, AC current, resistance, frequency, temperature, capacitance, continuity check, diode test For AC voltage/current, RMS/MEAN detection can be switched (TY530 only).
Low-pass filter can be switched on/off
Additional Functions :Data hold/auto hold/range hold, maximum/minimum/average values (TY530 only), resistance, relative and percentage value calculation, memory function (TY530 only), communication function (TY530 only), logging-mode memory (TY530 only), auto power off, backlight
Display :3.5-digit LCD: ····· 7-segment
Digital display: ····· [6000] counts
Bar graph display: ····· 31-segment
Polarity indicator: ····· "-" appears when the polarity is negative
Overrange indicator: ····· "OL"
Low-battery indicator: ····· " ⊟ " appears at or below the minimum operating voltage.
Measuring Rate :5 times/sec (Frequency: 1 time/sec, Capacitance: max. 0.14 times/sec (1000μF), Resistance: 2.5 times/sec, Temperature: 0.7 times/sec), Bar graph display: 25 times/sec (DC voltage, diode test: 5 times/sec)
Operating Temp. and Humidity :-10 to 55°C; 80% RH or less (no condensation) 40 to 55°C; 70% RH or less
Storage Temp. and Humidity :-30 to 70°C; 70% RH or less (no condensation)
Temperature Coefficient :Add the accuracy 0.1/°C to the basic accuracy at a temperature within -10 to 18°C and 28 to 55°C.
Power Supply :Four AA (R6) dry cells
Battery Life :Approx. 300 hours (for continuous DC voltage measurement with alkaline cells)
Withstanding Voltage :6.88kV for 5 seconds (between input terminals and casing)
Dimensions :Approx. 90(W) x 192(H) x 49(D) mm
Weight :Approx. 570g (including batteries)
Compliance with Standards :Safety EN61010-1, EN61010-2-030, EN61010-031, 1000V CAT Ⅲ, 600V CAT Ⅳ, pollution level 2, 2000m max. above sea level
UL 61010-1, CAN/CSA-C22.2 No. 61010-1,
UL 61010-031, CAN/CSA-C22.2 No. 61010-031
EMC: EN61326-1 Class B, EN55011 Class B Group 1, EN61326-2-1
Standard Accessories :AA (R6) dry cells: 4, Test lead set (98015): 1, Fuse (installed) 440mA/1000V and 10A/1000V, Instruction manual: 1

Model and Specification Code

Name	Model
Digital Multimeter	TY520
	TY530

Optional Accessories

Name	Model	Specification
DMM communication package	92015	USB communication adapter + USB communication cable + Application software
Communication package for printer	97016	Printer adapter + Printer cable
Test leads	98073	1000V CAT Ⅲ, 600V CAT Ⅳ Red/black (1 set)
Test leads with Alligator Clip	99014	1000V CAT Ⅲ, 600V CAT Ⅳ Red/black (1 set)
Fuse	99015	440mA/1000V (1 piece/1 unit)
	99016	10A/1000V (1 piece/1 unit)
TC-K temperature probe	90050	-50 to 600°C (For liquids)
TC-K temperature probe	90051	-50 to 600°C (For liquids)
	90055	-20 to 250°C (For surfaces)
	90056	-20 to 500°C (For surfaces)
Current clamp probe	96001	For 400A,AC Output: 10mV/A, AC
	96030	200A,AC
	96031	500A,AC
	96032	700A,AC
	96033	50A,AC
	96034	3000A,AC
	96035	3000A,AC
Carrying case	93029	Hard type (Houses the DMM, the test leads and communication cable)

Performance

Test conditions: Temperature and humidity = 23 ± 5°C, 80% RH or less; Accuracy = ± (% rdg + dgt).
Note: A response time is the time required for achieving the accuracy specified for the corresponding range.

DC Voltage Measurement(⎓V)

Range	Resolution	Accuracy TY520, TY530	Input Resistance	Maximum Input Voltage
600mV	0.1mV	0.09+2	10MΩ	1000V DC 1000V rms AC
6V	0.001V		11MΩ	
60V	0.01V		10MΩ	
600V	0.1V			
1000V	1V	0.15+2		

NMRR: 60dB or greater for 50/60Hz ± 0.1%
CMRR: 120dB or greater for 50/60Hz (Rs = 1kΩ) Response time: 1 second or less

DC Current Measurement (⎓A)

Range	Resolution	Accuracy	Voltage Drop	Maximum Input Current
600μA	0.1μA	0.2+2	<0.12mV/μA	440mA fuse-protected
6000μA	1μA			
60mA	0.01mA		<3.3mV/mA	
600mA	0.1mA	0.5+5		
6A	0.001A		<0.1V/A	10A fuse-protected
10A	0.01A			

Maximum testing current at 600mA of range is 440mA. Response time: 1 second or less.

AC Voltage Measurement (~V) AC coupling, RMS detection (TY530, TY520) crest factor: 3/mean-value detection (TY530 only) sinusoidal wave

Range	Resolution	Accuracy 50/60Hz	Accuracy 40-500Hz	Accuracy 500Hz - 1kHz	Input Impedance	Maximum Input Voltage
600mV	0.1mV	0.5+5	1+5	1.5+5	10MΩ, <200pF	1000V rms AC 1000V DC
6V	0.001V				11MΩ, <50pF	
60V	0.01V				10MΩ, <50pF	
600V	0.1V					
1000V	1V			-		

Shown above is the accuracy at 5 to 100% of range (200 to 1000V for 1000V range, peak 1500V or less). Response time: 2 seconds or less
Add accuracy = ±(2% of reading + 2% of F.S.), except for sinusoidal wave. CMRR: 60dB or greater for DC to 60Hz (Rs = 1kΩ). 4 counts or less is corrected to 0.

AC Current Measurement (~A) RMS detection crest factor: 3

Range	Resolution	Accuracy 50/60Hz	Accuracy 40Hz - 1kHz	Voltage Drop	Maximum Input Current
600μA	0.1μA	0.75+5	1.5+5	<0.12mV/μA	440mA fuse-protected
6000μA	1μA				
60mA	0.01mA			<3.3mV/mA	
600mA	0.1mA				
6A	0.001A			<0.1V/A	10A fuse-protected
10A	0.01A				

Shown above is the accuracy at 5 to 100% of range (2 to 10A for 10A range). Response time: 3 seconds or less
Add accuracy = ± (2% of reading + 2% of F.S.), except for sinusoidal wave. 4 counts or less is corrected to 0.

Resistance Measurement (Ω)

Range	Resolution	Accuracy	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
600Ω	0.1Ω	0.4+1*1	<1.2mA	<3.5V	1000V rms
6kΩ	0.001kΩ		<110μA	<1.3V	
60kΩ	0.01kΩ		<13μA		
600kΩ	0.1kΩ		<1.3μA		
6MΩ	0.001MΩ	0.5+1	<130nA		
60MΩ	0.01MΩ	1+2(0-40MΩ) 2+2(40-60MΩ)			

*1: Accuracy after zero calibration for 600Ω to 6kΩ range. Response time: 2 seconds or less for 600Ω to 600kΩ, 10 seconds or less for 6MΩ to 60MΩ.

Diode Test(⊣◁)

Range	Resolution	Accuracy	Testing Current (Vf=0.6V)	Open-circuit Voltage	Input Protection Voltage
2V	0.001V	1+2	Approx. 0.5mA	<3.5V	1000V rms

Continuity Check(•))

Range	Resolution	Accuracy	Testing Current (Vf=0.6V)	Open-circuit Voltage	Input Protection Voltage
600Ω	0.1Ω	Buzzer sounds at 50+30Ω or less	Approx. 1.2mA	<3.5V	1000V rms

Frequency Measurement (Hz) AC coupling, Maximum effective display: 9999

Range (auto-ranging)	Resolution	Accuracy	Input Voltage Range
10.00 - 99.99Hz	0.01Hz	0.02+1	0.2 - 600V rms
90.0 - 999.9Hz	0.1Hz		
0.900 - 9.999Hz	0.001kHz		0.4 - 600V rms
9.00 - 99.99kHz	0.01kHz		0.8 - 100V rms

Capacitance(⊣⊢)

Range	Resolution	Accuracy	Input Protection Voltage
10nF	0.01nF	2+10*1	1000V rms
100nF	0.1nF	2+5	
1μF	0.001μF		
10μF	0.01μF		
100μF	0.1μF	3+5	
1000μF	1μF		

*1: Accuracy after zero calibration for 10nF to 1μF range.

Temperature Measurement (TEMP)

Range	Resolution	Accuracy	Input Protection Voltage
-50 - 600°C	0.1°C	2+2°C	1000V rms

Temperature probe: Type K thermocouple sensor (optional)

NEW Accessory AC/DC clamp-on probe (Model 96095)

Features

A compact, light, and portable device with 12-mm caliber useful for tangled wiring.
When used with this probe*1, the DMM can measure and display current (which it otherwise cannot do by itself). The TY500 series can directly read up to 60 A when used with the probe (in sensor mode).

Specifications

Model	96095		
Diameter of measurable conductor	12 mm max.		
Basic performance: Current to measure	Output voltage	Accuracy (at 23°C ± 5°C)	
		50/60 Hz	40 Hz to 1 kHz
AC 0.1 to 130 A	Output: 10 mV/A AC (AC 1 to 1300 mVrms)	1.2%+0.4 mV	2.5%+0.4 mV
DC 0 to ± 180 A	Output: DC10 mV/A (DC 0 to ± 1800 mV)	1.2% + 0.4 mV	
General specifications			
Operating temperature and humidity	–10 to 55°C, 80%RH or less (no condensation)		
Storage temperature and humidity	–30 to 70°C, 85%RH or less (no condensation)		
Power supply	AAA alkaline cell × 2 Power alert: LED light on at 2.2 V ± 0.2 V Auto power off at 1.9 V ± 0.2 V		
Battery life	Approx. 35 hours (continuous) (until LED light on)*2		
Dimensions and weight	127(L) × 42(W) × 22(D) mm Cable length: 1200 mm Weight: Approx. 140 g (including cells)		
Safety standard	EN61010-1: CAT III 300V, pollution degree 2, operation at maximum altitude of 2,000 m, EN61010-2-032 EN61326-1: Class B, EN61326-2-2, EN55011 Class B Group 1		
Accessories	Soft carrying case (93040), Battery, User's manual		

*1 Readings must be converted when used with the DMM.
*2 After the battery alert, approx. 5 hours remain to automatic power-off.

Communication Functions and Application Software Allow Analyses and Management of Measurement Data

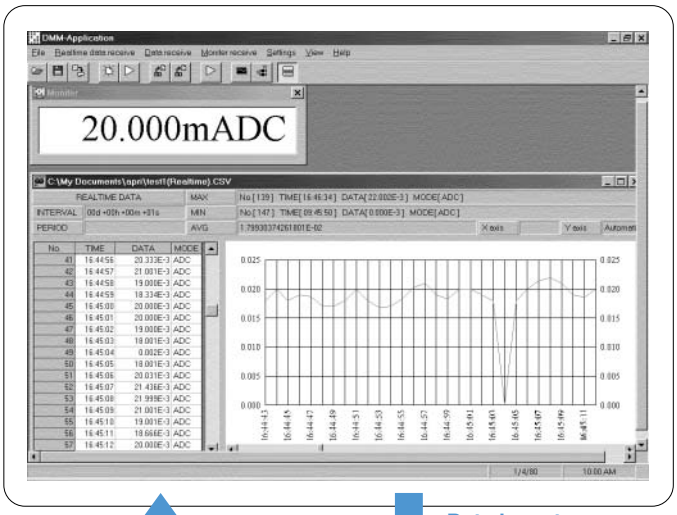
Data management by dedicated application software

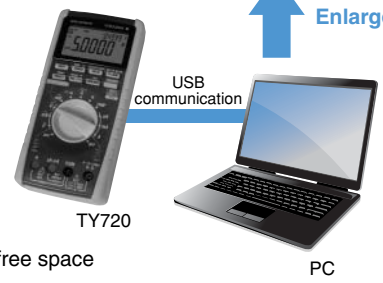
Data saved in the DMM can be managed by the dedicated application software (Model 92015).

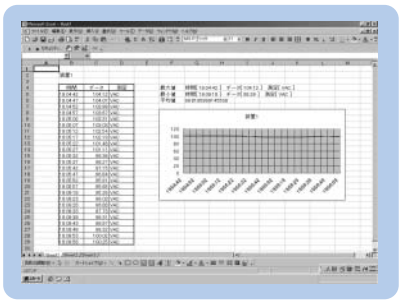
- Saved data can be transmitted from the internal memory to a PC.
  Data collected in SAVE-memory mode or logging-memory mode
- Measurements by the DMM can be monitored on a PC in real time.
- Large amounts of data that cannot be saved in the DMM internal memory can be transmitted to a PC in real time.
  Data can be written to an Excel* spreadsheet.
  Maximum number of real-time data transmission: 32767
- Measurement data can be laid out in an Excel spreadsheet.
  Graphs can be automatically created on a spreadsheet.

* Excel is a registered trademark of Microsoft Corporation in the United States.

Example of document windows in DMM application software







Data layout example on Excel spreadsheet

92015 Communications Package Specifications

Specifications

Communication cable

Communication cable:	IR communication adapter, USB communication cable: 1
Cable length:	2 m
Interface:	USB 1.1
Supported models:	TY710, TY720, TY530

Application software

System requirements of PC

Operating system:	WindowsXP/Vista(*)/7
CPU:	Pentium 133 MHz or higher
Memory:	64 MB or larger
Storage device:	Hard disk with 10 MB or more free space CD-ROM drive: 1
Excel:	Excel2003 or later(*)
Contents:	CD-ROM software: 1 Communication cable (communication adapter included): 1 User's manual

* Windows and Excel is a registered trademark of Microsoft Corporation in the United States.

Optional Accessories*

* For TY710, TY720, and TY530 only

Item	Model	Specification
DMM communication package	92015	USB communication cable (adaptor included), application software

732 Series

Low-cost Handheld DMM

Model

73201
73202
73203
73204

3.5 digits

4300 count

- **Compact size, ideal for carrying**
- **Large display for easy viewing**
- **Safe design allows measurement in excess of 20 A (excluding 73204)**
- **Special model for voltage measurement (73204)**
- **Simple auto hold function**
- **Capacitors can be checked (73202/73203)**

General Specifications 73201 / 02 / 03 / 04

Additional Functions :Auto hold, overvoltage and current warning
Display :Digital display: 4300-count digital reading
Measuring Rate :Digital display: Approx. 2 times/sec
Operating Temp.and Humidity :0 to 50˚C; 80% RH or less at 0˚C to 40˚C, or 70% RH or less at 40˚C to 50˚C (no condensation)
Storage Temp.and Humidity :-20˚C to 60˚C, 70 RH or less (no condensation)
Temperature Coefficient :Add accuracy x 0.1/ ˚C to the basic accuracy at a temperature within 0˚C to 18˚C and 28˚C to 50˚C
Withstanding Voltage :3.7 kV AC for 1 minute
(between input terminals and casing, for 73201,73202, 73203)
5.55 kV AC for 1 minute
(between input terminals and casing, for 73204)
Power Supply :Two AAA (LR03 or R03) dry cells
Battery Life :Approx. 600 hours
(for continuous DC voltage measurement with alkaline cells)
Auto Power Off :The power is automatically turned off when no operation is made for approx. 20 minutes (can be disabled). N/A for 73204
Dimensions :74 (W) x 155 (H) x 31 (D) mm
Weight :Approx. 240 g (including batteries)
Standard Accessories :User's manual: 1
Test lead set (RD031): 1
AAA (LR03/R03) dry cells (built in): 2
Spare fuse F05 (500 mA/250 V, not included for 73204): 1
Spare fuse F02 (15 A/250 V, not included for 73204): 1

Optional Accessories

Name	Model	Specification
Fuse	F05	500 mA/600 V
	F02	15 A/600 V
Test leads	RD031	Red / black (1 set)
Carrying case (hard)	B9646GB	Houses the DMM and test leads
Rubber case	93007	For DMM

Performance

Test conditions: Temperature and humidity = 23˚C ± 5˚C, 80% RH or less;Accuracy = ±(% of reading + digits).
Note: Response time is the time required for achieving accuracy specified for the corresponding range.

DC Voltage Measurement (⎓ V)

Range	Accuracy			Input Resistance	Maximum Input Voltage
	73201	73202/04	73203		
400.0 mV	0.5% + 1	0.5% + 1	0.3% + 1	>100 MΩ	600 V
4.000 V				11 MΩ	
40.00 V	0.75% + 1			10 MΩ	
400.0 V					
600 V					

Response time: 1.5 seconds or less for 400 mV range, 1 seconds or less for all other ranges

AC Voltage Measurement (~ V) Mean-value detection and RMS-value calibration

Range	Accuracy			Input Resistance	Maximum Input Voltage
	73201	73202	73203/04		
4.000 V	1% + 5		0.75% + 5	>11 MΩ, <50 pF	600 Vrms
40.00 V				>10 MΩ, <50 pF	
400.0 V					
600 V					

Response time: 2 seconds or less

DC Current Measurement (⎓ A)
Not available with 73204

Range	Accuracy			Voltage Drop	Maximum Input Current
	73201	73202	73203		
400.0 µA *1	1% + 2			<0.17 mV/µA	400 mA (500 mA/600 V fuse-protected)
4000 µA					
40.00 mA *1				<3 mV/mA	
400.0 mA					
4.000 A	2% + 2			<0.04 V/A	10 A (15 A/600 V fuse-protected)
10.00 A *2					

*1: Drift in the least significant digit may occur.
*2: Measurement of 11 to 20 A can be performed within 30 seconds. A warning buzzer sounds when 30 seconds have passed.
Response time: 1 second or less

AC Current Measurement (~ A)
Not available with 73204 Mean-value detection and RMS-value calibration

Range	Accuracy (40 - 500 Hz)			Voltage Drop	Maximum Input Current
	73201	73202	73203		
400.0 µA *1	2% + 20			<0.17 mV/µA	400 mA (500 mA/600 V fuse-protected)
4000 µA	2% + 5				
40.00 mA *1	2% + 20			<3 mV/mA	
400.0 mA	2% + 5				
4.000 A	2.5% + 20			<0.04 V/A	10 A (15 A/600 V fuse-protected)
10.00 A *2					

*1: Drift in the least significant digit may occur.
*2: Measurement of 11 to 20 A can be performed within 30 seconds. A warning buzzer sounds when 30 seconds have passed.
Response time: 2 second or less

Resistance Measurement (Ω)

Range	Accuracy	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
	73201 to 73204			
400.0 Ω	0.75% + 2	<1 mA	<3.4 V	600 V
4.000 kΩ	0.75% + 1	<0.5 mA	<1.0 V	
40.00 kΩ		<70 µA	<0.7 V	
400.0 kΩ		<7 µA		
4.000 MΩ	2% + 1	<0.7 µA		
40.00 MΩ	5% + 2	<70 µA		

Response time: 1 second or less for 400 kΩ range or less, 5 seconds or less for 4 MΩ range, 15 seconds or less for 40 MΩ range

Continuity Check (·)))

Range	Continuity Beeper	Open-circuit Voltage	Input Protection Voltage
	73201 to 73204		
400.0 Ω	Buzzer sounds at 50 ± 20 Ω or less	<3.4 V	600 V

Response time: 0.2 second or less (buzzer response)

Diode Test (⊣◁⊢)

Range	Accuracy	Open-circuit Voltage	Input Protection Voltage
	73201 to 73204		
2.00 V	1% + 1 (testing current 1 mA or less)	<3.4 V	600 V

Response time: 1 second or less

Capacitor Check (⊣⊢)

Range	Accuracy			Input Protection
	73201/04	73202	73203	
20.00 nF	Not available	2% + 5, typical (20 nF range: Accuracy after zero calibration)		500 mA/250 V fuse-protected
200.0 nF				
2.000 µF				
20.00 µF				
200.0 µF				

Response time: 1 second or less

Pocket DMM with Superb Portability

General Specifications 73101

Model
73101

3.5 digits

4300 count

CE

Additional Functions :Auto hold
Display :Digital display: 4300-count digital reading
Measuring Rate :Digital display: Approx. 2 times/sec
Operating Temp.and Humidity :0 to 50°C; 80% RH or less (no condensation)
Storage Temp.and Humidity :-10°C to 60°C, 70 RH or less (no condensation)
Power Supply :Two LR44 dry cell
Battery Life :Approx. 200 hours
(for continuous DC voltage measurement)
Auto Power Off :The power is automatically turned off when no operation is made for approx. 20 minutes (can be disabled).
Dimensions :76 (W) x 117 (H) x 18 (D) mm
Weight :Approx. 110 g (including batteries)
Compliance with Standards :Safety EN61010-2-30, EN61010-031, EN61010-1
(300 V, CAT II; contamination level 2)
EMC EN61326-1, EN61326-2-2
EN55011 Class B Group 1
Standard Accessories :User's manual: 1
LR44 dry cells: 2

Performance

Test conditions: Temperature and humidity = 23°C ± 5°C, 80% RH or less;Accuracy = ±(% of reading + digits).

DC Voltage Measurement (⎓ V)

Range	Accuracy	Input Resistance	Maximum Input Voltage
400.0 mV	1.2 + 2	>100 MΩ	600 V DC
4.000 V	0.7 + 1	11 MΩ	
40.00 V	1.2 + 1	10 MΩ	
400.0 V			
600 V			

AC Voltage Measurement (~ V) Mean-value detection and RMS-value calibration

Range	Accuracy	Input Resistance	Maximum Input Voltage
4.000 V	2.0 + 5	>11 MΩ, <50 pF	600 Vrms
40.00 V		>10 MΩ, <50 pF	
400.0 V			
600 V			

Resistance Measurement (Ω)

Range	Accuracy	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
400.0 Ω	1.2 + 2	<1 mA	<3.4 V	600 V
4.000 kΩ		<0.5 mA	<1.0 V	
40.00 kΩ		<70 µA	<0.7 V	
400.0 kΩ		<7 µA		
4.000 MΩ	2.0 + 3	<0.7 µA		
40.00 MΩ	5.0 + 3	<70 nA		

Continuity Check (·)))

Range	Continuity Beeper	Open-circuit Voltage	Input Protection Voltage
400.0 Ω	50 ± 20 Ω	<3.4 V	600 V

Diode Test (⊣◁⊢)

Range	Accuracy	Testing Current	Open-circuit Voltage	Input Protection Voltage
2.00 V	1.5 + 1	<1.0 mA	<3.4 V	600 V

Optional Accessories and Spare Parts

Name	Model	Specification	Applicable DMM Models	Appearance
DMM communication package	92015	USB communication adapter + USB communication cable + Application software	TY700 series TY530	
Test leads	98073	1000V CAT.III 600V CAT.IV Red/black (1set)	All models except 73101	
	RD031	L-plug, Red/black (1set)	732 series	
Test leads with Alligator Clip	99014	1000V CAT.III 600V CAT.IV Red/black (1set)	All models except 73101	
Alligator clips	B9646HF	Red/black(1set)	All models	
Fuse	F02	15A/250V (3pcs/1set)	73201/73202/73203	
	F05	500mA/250V(3pcs/1set)		
	99015	440mA/1000V(1pc/1set)	TY700/TY500 series	
	99016	10A/1000V(1pc/1set)		
Rubber case	93007		732 series	
Carrying case	B9646GB	Hard case		
	93029	Hard case (Houses the DMM, the test leads and communication cable)	TY700/TY500 series	
Temperature (thermocouple type K) probe	90050	-50°C to 600°C(for liquid)	TY700/TY500 series	
	90051	-50°C to 600°C(for liquid)		
	90055	-20°C to 250°C(for surface)		
	90056	-20°C to 500°C(for surface)		
Current clamp probe	96001	For 400A AC; 10mV/A AC output	All models except 73101 (with TY500 series upto 60A can be read directly)	
	96095	For 130A AC/180A DC; 10mV/A AC/DC output		

Current Clamp Probe:TY700/TY500 series (Direct reading is possible for TY500 series)

Name	96036	96033	96030	96031	96032	96034	96035
Current Clamp Probe							
Measurable Conductor Diameter	dia. 40mm	dia. 18mm	dia. 30mm	dia. 30mm	dia. 65mm	dia. 65 x 100mm	dia. 170mm
Measurement Range	2A,AC	50A,AC	200A,AC	500A,AC	700A,AC (1000A for 5 minutes)	1000A, 2000A, 3000A, AC	300 - 3000A,AC
Output Voltage	50mV,AC	500mV,AC	500mV,AC	500mV,AC	250mV,AC	500mV,AC	500mV,AC
Accuracy *varies according to input/Amplitude	±0.5% of rdg	±0.5% of rdg	±0.5% of rdg	±0.5% of rdg	±1.0% of rdg	±1.0% of rdg	±1.0% of rdg
Frequency Range	20Hz - 5kHz	20Hz - 20kHz	20Hz - 20kHz	20Hz - 5kHz	45Hz - 66Hz	30Hz - 1.5kHz	10Hz - 20kHz
Maximum Circuit Voltage	50V,AC	300V,AC	600V,AC	600V,AC	600V,AC	600V,AC	1000V,AC (pri)

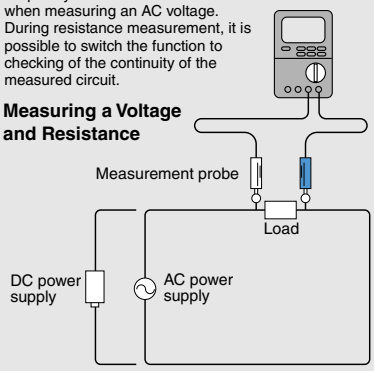
Note:Use AC voltage range of the DMM.
Note:Need to covert the meter reading except TY500series.

Basic Usage Digital Multimeters

Voltage/Resistance Measurement

The COM terminal and V/Ω terminal are used. To measure a voltage, set the dial to voltage measurement. To measure a resistance, set the dial to resistance measurement. Some DMM models can also display the frequency and calculated decibel value at the same time when measuring an AC voltage. During resistance measurement, it is possible to switch the function to checking of the continuity of the measured circuit.

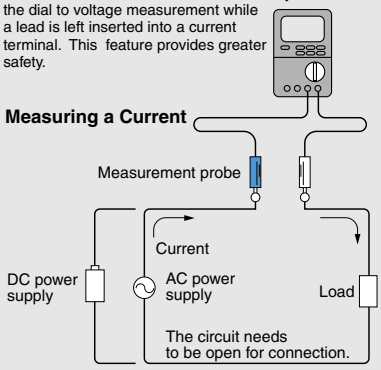
Measuring a Voltage and Resistance



Current Measurement

The COM terminal, and A, μA or mA terminal are used. Some models have shutters for preventing erroneous insertion into the current terminals and allow a contact of a lead to a current terminal only when the dial is set to current measurement. For these models, you cannot set the dial to voltage measurement while a lead is left inserted into a current terminal. This feature provides greater safety.

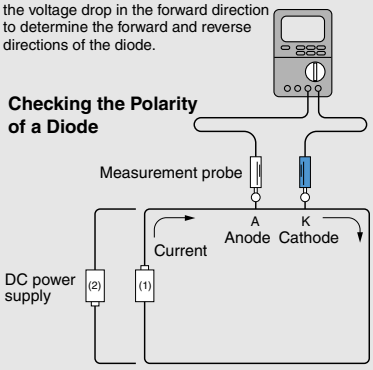
Measuring a Current



Diode Test

A current flows through a diode when the power supply is connected as (1) below, while, almost no current flows when the power supply is connected as (2). The diode test function applies an adequate forward voltage across a diode to make a constant current flow and measures the voltage drop in the forward direction to determine the forward and reverse directions of the diode.

Checking the Polarity of a Diode



YOKOGAWA

Yokogawa Meters & Instruments Corporation

World Wide Web site at
http://tmi.yokogawa.com

⚠NOTICE
- Before using the product, read the instruction manual carefully to ensure proper and safe operation

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