TY700 Series

Most Reliable Handheld Digital Multimeters

Model
TY720
TY710

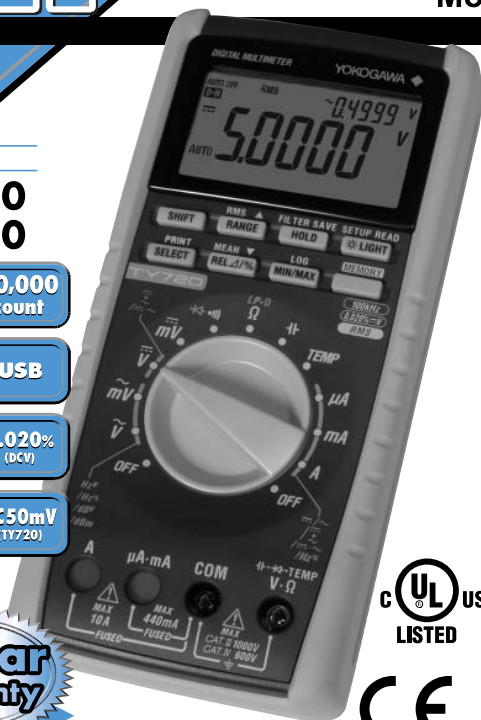- 4.5 digits
- 50,000 count
- RMS
- USB
- Terminal shutters
- 0.020% (DCV)
- LPF (TY720)
- AC50mV (TY720)

3-year Warranty

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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

Model	Memory capacity	
	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 [%]
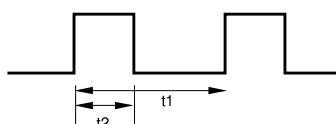
AC+DC measurement

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
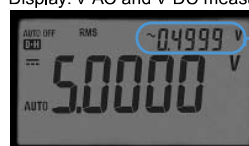
Sub-display

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
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) 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	
500mV	0.01mV	0.02+2		
2400mV	0.1mV			1000V DC
5V	0.0001V	0.025+5		
50V	0.001V		10MΩ	1000V rms AC
500V	0.01V	0.03+2		
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	*2	*2	3+30*2	—			10MΩ<50pF	
1000V	0.1V	*2	*2	3+30*2					

*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		<0.11mV/µA	440mA fuse-protected
5000µA	0.1µA			1+30		
50mA	0.001mA	1+20	0.75+20		<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					
5V	0.0001V	2+30*1	1+30*1	3+30*1		
50V	0.001V					
500V	0.01V	*2			10MΩ<50pF	
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)
AC coupling, 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	
50V	0.001V								1000V rms AC
500V	0.01V	1.5+10*1	0.5+10*1	1+10*1	2+10*2	5+20*2		10MΩ<50pF	1000V DC
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: 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	—	<0.11mV/µA	440mA fuse-protected
5000µA	0.1µA			1.5+10		
50mA	0.001mA	1.5+10	1+10		<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		
5kΩ	0.0001kΩ			<0.25mA		
50kΩ	0.001kΩ			<25µA	<2.5V	1000V rms
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

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		
50kΩ	0.01kΩ		<1.0µA	<0.7V	1000V rms
500kΩ	0.1kΩ		<0.6µA		
5MΩ	0.001MΩ	1+3	<0.05µA		

Continuity Check (•))
Maximum effective display: 5000

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

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

Temperature Measurement (TEMP)

Range	Resolution	Accuracy TY710,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	Accuracy TY710,TY720	Input Protection Voltage
5nF	0.001nF	1+5*1	
50nF	0.01nF		
500nF	0.1nF		
5µF	0.001µF		1000V rms
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	
9.00 - 99.99Hz	0.01Hz	
90.0 - 999.9Hz	0.1Hz	0.02+1*1
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