Hand-held Digital Multimeters
DL-90 SERIES

Hand-held Digital Multimeters
DL-91 (Accuracy ±0.5%)

Hand-held Digital Multimeters
DL-92 (Accuracy ±0.3%)

Hand-held Digital Multimeters
DL-94 (Accuracy ±0.1%)

Hand-held Digital Multimeters
DL-97 (Accuracy ±0.06%)

OUTLINE

These four digital multimeters of the DL-90 Series have been designed to meet the diversifying needs users have for multimeters. Some of the most advanced functions incorporated in these models include the auto power-OFF function (which prevents wasting of battery power even if you forget to switch the power off) and current input connection alarm function which generates an alarm buzzer sound if you attempt to measure voltage while a test lead is left connected to the current input. An analog bar display is provided together with a digital display so the measurements can be identified a glance. Naturally, all models offer the basic measurement modes including DC voltage, AC voltage, DC current, AC current, resistance, diode checking and circuit continuity checking.

DL-91 **DL-92**

DL-90 SERIES

DL-91 FEATURES

3200 Full-Scale Digital Display plus Analog Bar Graph
A 7-segment LCD display and a 32-segment bar graph display are provided.

Versatile Measurement Modes
All fundamental measurements are available, including: DC V, AC V, DC A, AC A, Ω as well as diode checking and continuity testing modes.

Auto Power-OFF
The auto power-OFF circuit prevents wasteful consumption of battery power even when you forget to switch power off after measurement.

Auto/Manual Ranging Switchable
The measurement ranges in the DC V, AC V , Ω and measurements can be switched either automatically or manually.

Data Hold
This function stops measurement temporarily and maintains the previously-measured value on the display.

Battery Low Indication
When the voltage of the built-in batteries drops, the battery mark blinks to alert you.

Current Input Connection Alarm
When current measurement is switched to voltage measurement and, if the test lead used is left connected to the current input, hazard will occur because the measurement object is short-circuited at the moment the voltage measurement is started. To prevent this, a buzzer beeps when a test is lead is connected to the current input in measurement modes other than the current measurement modes.

DL-92 FEATURES

3999 Full-Scale Digital Display plus Analog Bar Graph
A 7-segment LCD display and a 40-segment bar graph display are provided.

Versatile Measurement Modes
In addition to the basic measurements including DC V, AC V, DC A, AC A, Ω and plus diode checking and continuity testing modes, frequency measurement and capacity measurement modes are also available.

Auto Power-OFF
The auto power-OFF circuit prevents wasteful consumption of battery power even when you forget to switch power off after measurement. In addition, it is also possible to defeat this circuit.

Auto/Manual Ranging Switchable
The measurement ranges in the DC V, AC V, Ω and measurements can be switched either automatically or manually.

Maximum and Minimum Data Memory
The maximum and minimum values are stored in memory. A buzzer beeps every time one of these values is updated.

Relative Computations
This function calculates the difference from a reference value so that, for example, it can eliminate the input lead resistance during resistance measurement.

Data Storage/Recall
Measured data can be stored or recalled in memory together with the measuring units.

[Common Features to DL-91]
●Data Hold ●Battery Low Indication ●Current Input Connection Alarm

DL-94 DL-97

DL-94 FEATURES

5000 Full-Scale Digital Display plus Analog Bar Graph
A 7-segment LCD display and a 50-segment bar graph display are provided.

Versatile Measurement Modes
In addition to the basic measurements including DC V, AC V, DC A, AC A, Ω and plus diode checking and continuity testing modes, the frequency measurement, capacity measurement and TTL logic level judgment modes are also available.

True rms Measurement
AC V measurement measures true rms values in place of obtaining values by conversion from the average values.

Auto power-OFF function
The instrument enters sleep mode in 15 minutes and the power goes OFF automatically in 15 more minutes. The auto power-OFF function can also be defeated.

Maximum and Minimum Data Memory
The maximum and minimum values are stored in memory and can be displayed. The elapsed time values at which these values are obtained are also displayed alternately.

Average Value Computation
The average value of measured values can be calculated and displayed. The elapsed time values are also displayed alternately.

Relative Computations (Δ, Δ/r)
The Δmode calculates the difference from a reference value and the Δ/r mode calculates the deviation when the reference value is assumed to be 100%.

dBm Measurement
The reference impedance can be selected from 20 selections between 4 and 1,200Ω in addition to 600Ω.

TTL Logic Level Judgment
This function displays the identified RHS level with ▲ and the RLS level with ▼.

[Common Features to DL-91]
●Data Hold ●Current Input Connection Alarm

DL-97 FEATURES

Back-lighted LCD Display
The back light can be turned on to allow easy checking of the measured values even under low light.

Dual Display
Two measurement value display sections are provided so it is possible to display the voltage and frequency or the DC and AC components simultaneously.

4000/40000 Full-Scale Digital Display plus Analog Bar Graph
A 7-segment LCD display and a 20-segment x 4 bar graph display are provided. The full scale can be switched to 40000 increasing the display resolution by 1 digit.

Versatile Measurement Modes
In addition to the basic measurements including DC V, AC V, DC A, AC A, Ω and plus diode checking and continuity testing modes, the frequency measurement, capacity measurement, duty cycle measurement, pulse duration measurement and temperature measurement modes are also available. It is also possible to measure AC in which DCs are superimposed.

High Accuracy/True rms Measurement
The accuracy is as high as ±0.6% of reading 3 digits with DC voltage measurement. The AC V and AC C measurement measures true rms values in place of obtaining values by conversion from the average values.

1 msec Peak Hold
The capability of capturing the waveform peak value makes it possible to calculate the crest factor when combined with the true rms measurement function.

Communications Function
The optional OP-597 allows the DL-97 to interface with a computer through RS-232C and to store the data measured with it in the computer.

Square Wave Output
The square wave frequency can be selected from 16 selections between 0.5 Hz and 4.8 kHz. The duty ratio is also variable between 1% and 99% in 1% steps.

Timer Function
The timer can be set up to 99,999 seconds. The timer output is switched between four types and the TTL level makes it possible to be applied to a variety of applications.

[Common Features to DL-94]
●Auto power-OFF. ●Auto/manual ranging switching. ●Maximum and minimum value memory (with recording time display). ●Average value computation (with elapsed time display). ●Relative computations. ●Data hold. ●Current input connection alarm.

DL-91 SPECIFICATIONS

DC Voltage (Auto/manual ranging)

Range	Resolution	Accuracy	Input Impedance
320mV	100µV	±(0.5% of rdg +2dgt)	Approx. 1000MΩ
3.2V	1mV		Approx. 11MΩ
32V	10mV		Approx. 10MΩ
320V	100mV		
1000V	1V	±(0.6% of rdg +4dgt)	

Maximum voltage: ±1000V DC, 750V AC rms

AC Voltage (Auto/manual ranging)

Range	Resolution	Accuracy	Input Impedance
3.2V	1mV	50Hz-400Hz ±(1.5% of rdg+5dgt)	Approx. 11MΩ// 50pF max.
32V	10mV	50Hz-1kHz ±(1.5% of rdg+5dgt)	Approx. 10MΩ// 50pF max.
320V	100mV		
750V	1V	50Hz-400Hz ±(1.5% of rdg+5dgt)	

Maximum voltage: ±1000V DC, 750V AC rms
Average value detection, rms calibration

DC Current (Manual ranging)

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
320µA	0.1µA	±(1.5% of rdg+3dgt)	630mA/250V quick-blow fuse	0.2V
3200µA	1µA			2V
32mA	0.01mA			0.2V
320mA	0.1mA			2V
10A	10mA	±(2.0% of rdg+3dgt)	10A/250V quick-blow fuse	0.4V

AC Current (Manual ranging)

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
320µA	0.1µA	50Hz-1kHz ±(2.5% of rdg+5dgt)	630mA/250V quick-blow fuse	0.2V
3200µA	1µA			2V
32mA	0.01mA			0.2V
320mA	0.1mA			2V
10A	10mA		10A/250V quick-blow fuse	0.4V

Average value detection, rms calibration

Resistance

Range	Resolution	Accuracy	Measuring Current	Open-circuit Voltage
320Ω	0.1Ω	±(1.2% of rdg+4dgt)	0.4mA (Rx=10Ω)	Approx. 1.35V
3.2kΩ	1Ω		0.1mA (Rx=100Ω)	
32kΩ	10Ω		0.01mA (Rx=1kΩ)	
320kΩ	100Ω		1µA (Rx=100kΩ)	
3.2MΩ	1kΩ	±(1.8% of rdg+4dgt)	0.1µA (Rx=100kΩ)	
32MΩ	10kΩ	±(2.5% of rdg+3dgt)	0.1µA (Rx=1MΩ)	

Maximum voltage: 500V rms

Diode check

Range	Resolution	Accuracy	Measuring Current	Measuring Voltage
	1mV	±(1.5% of rdg+3dgt)	Approx. 0.4mA	Approx. 3V

Maximum voltage: 500V rms

Continuity test

Range	Resolution	Threshold level	Open-circuit Voltage
	0.1Ω	Built-in buzzer beeps at below approx. 20Ω	Approx. 0.4mA

Maximum voltage: 500V rms

General Specifications

Measurement Functions ··· DC voltage, AC voltage, DC current, AC current, resistance, diode check, continuity check
Sampling Rate ····· Digital display: 2 times/sec
Bar graph: 12.5 time/sec
Display ····· LCD display
Maximum display ····· 3200
Polarity display ····· Automatic switching. "-" displayed with negative polarity.
Over-range display ····· "OL" is displayed.
Computations ····· HOLD (Data Hold)
Power-Save Function ····· Auto power-OFF is activated in approx. 10 minutes later.
Temperature/Humidity for characteristics in spec. ··· 23℃, ±5℃, 75% RH or less
Operating Temperature /Humidity Ranges ···· 5 to 40℃, 70% RH or less
Storage Temperature /Humidity Ranges ····· −10 to 55℃, 80% RH or less (without battery)
Temperature Coefficient ··· Add 0.15×(Accuracy at 23±5℃)/℃ at 0 to 18 ℃ and 28℃ to 40 ℃
Power source ····· 1.5V DC (SUM-3/IEC R6/LR6 manganese battery or alkaline battery×2)
Battery Life ····· Approx. 1,000 hours (DC V measurement using manganese batteries)
Dimensions ····· Approx. 77 (W)×34 (H)×162 (D) mm
Weight ····· Approx. 290 g (including battery)
Accessories ····· Instruction manual (1), test lead set (1 set), batteries (IEC R6) (2)
Complying Standards ····· EN55011 (1991) CLASS B
IEC801-2 (1991) 8kVAD
IEC801-3 (1984) 3V/m
IEC801-4 (1988) 1kV, 5/50 µs, 5kHz

DL-92 SPECIFICATIONS

DC Voltage (Auto/manual ranging)

Range	Resolution	Accuracy	Input Impedance
400mV	100µV	±(0.3% of rdg +2dgt)	Approx. 100MΩ
4V	1mV	±(0.5% of rdg +2dgt)	Approx. 10MΩ
40V	10mV		Approx. 9.1MΩ
400V	100mV		
1000V	1V	±(0.7% of rdg +2dgt)	

Maximum voltage: ±1000V DC, 750V AC rms

AC Voltage (Auto/manual ranging except for 400mV range)

Range	Resolution	Accuracy	Input Impedance
400mV	100µV	50Hz-100Hz ±(1.5% of rdg+5dgt)	Approx. 100MΩ// 50pF
4V	1mV	50Hz-500Hz ±(1.0% of rdg+5dgt)	Approx. 10MΩ// 50pF
40V	10mV		
400V	100mV	50Hz-1kHz ±(1.5% of rdg+5dgt)	Approx. 9.1MΩ// 50pF
750V	1V		

Maximum voltage: ±1000V DC, 750V AC rms
Average value detection, rms calibration

DC Current (Manual ranging)

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
4mA	1µA	±(1.0% of rdg+2dgt)	630mA/250V quick-blow fuse	≦600mV
40mA	10µA			≦1V
400mA	0.1mA			
10A	10mA	±(1.5% of rdg+3dgt)	10A/250V quick-blow fuse	≦600mV

Average value detection, rms calibration

AC Current (Manual ranging)

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
4mA	1μA	50Hz-1kHz	630mA/250V	≦600mV
40mA	10μA	±(1.2% of rdg+5dgt)	quick-blow fuse	≦1V
400mA	0.1mA			
10A	10mA	50Hz-1kHz ±(2.0% of rdg+5dgt)	10A/250V quick-blow fuse	≦600mV

Average value detection, rms calibration

Resistance (Automatic ranging)

Range	Resolution	Accuracy	Measuring Current	Open-circuit Voltage
400Ω	0.1Ω	±(1.0% of rdg+4dgt)	Approx. 130μA	Approx. 0.4V
4kΩ	1Ω	±(0.7% of rdg+3dgt)	Approx. 100μA	
40kΩ	10Ω		Approx. 30μA	
400kΩ	100Ω		Approx. 3μA	
4MΩ	1kΩ	±(1.0% of rdg+4dgt)	Approx. 300nA	
40MΩ	10kΩ	±(2.0% of rdg+3dgt)	Approx. 30nA	

Maximum voltage: 500V rms

Frequency (Automatic ranging)

Range	Resolution	Accuracy	Input sensitivity	Minimum input frequency	Maximum Voltage
100Hz	0.01Hz	±(0.2% of rdg+4dgt)	100mVrms	10Hz	500Vrms but less than 10^6VHz
1000Hz	0.1Hz				
10kHz	1Hz				
100kHz	100Hz		200mVrms		
1MHz	1kHz				

Diode check

Range	Resolution	Accuracy	Measuring Current	Measuring Voltage
	1mV	±(1.0% of rdg+3dgt)	Approx. 0.8mA	≦3.3V

Continuity test

Range	Resolution	Threshold level	Measuring Current	Open-circuit Voltage
	0.1Ω	Built-in buzzer beeps at below approx. 40Ω	Approx. 130μA	Approx. 0.4V

Maximum voltage: 500V rms

Static Capacity (Automatic ranging)

Range	Resolution	Accuracy	Maximum voltage
4nF	1pF	±(1.0% of rdg +5dgt)	500Vrms
40nF	10pF		
400nF	100pF		
4μF	1nF	±(1.2% of rdg +5dgt)	
40μF	10nF	±(3.0% of rdg +5dgt)	

When a film capacitor or an object with no more leakage than it is measured.

ADP (For DC voltage adapter such as a clamp type current probe)

Range	Resolution	Accuracy	Input Impedance
DC400mV	0.1mV	±(0.5% of rdg +3dgt)	Approx. 100MΩ

Maximum voltage: 500V rms
Display between 0 and ±3999 with respect to input between 0 and ±399.9 mV.

General Specifications

Measurement Functions ··· DC voltage, AC voltage, DC current, AC current, resistance, frequency, static capacity, diode check, continuity check, adaptor input
Sampling Rate ··· Digital display: 2 times/sec (1 time with C measurement)
Bar graph: 20 times/sec
Display ··· LCD display
Maximum display ··· 3999/40-segment bar graph
Polarity display ··· Automatic switching. "-" displayed with negative polarity.
Over-range display ··· The highest digit/"4" is displayed and blink
Computations ··· HOLD (Data Hold), STORE/RECALL (Data storage/recall),MAX/MIN (Maximum/Minimum), REL (Relative value = difference from the reference value).
Power-Save Function ··· Auto power-OFF is activated in approx. 30 minutes later. This function can be defeated.
Temperature/Humidity for characteristics in spec. ··· 23℃, ±5℃, 70% RH or less
Operating Temperature /Humidity Ranges ··· 5 to 40℃, 70% RH or less
Storage Temperature /Humidity Ranges ··· −10 to 55℃, 80% RH or less (without battery)
Temperature Coefficient ··· Add 0.15×(Accuracy at 23±5℃)/℃ at 0 to 18 ℃ and 28℃ to 40 ℃
Power source ··· 1.5V DC (SUM-3/IEC R6/LR6 manganese battery or alkaline battery×2)
Battery Life ··· Approx. 500 hours (DC V measurement using manganese batteries)
Approx. 1,000 hours (DC V measurement using alkaline batteries)
Dimensions ··· Approx. 77 (W)×34 (H)×162 (D) mm
Weight ··· Approx. 290 g (including battery)
Accessories ··· Instruction manual (1), test lead set (1 set), batteries (IEC R6) (2)
Complying Standards ··· EN55011 (1991) CLASS B
IEC801-2 (1991) 8kVAD
IEC801-3 (1984) 3V/m
IEC801-4 (1988) 1kV, 5/50 μs, 5kHz

DL-94 SPECIFICATIONS

DC Voltage (Auto/manual ranging except for 500 mV range)

Range	Resolution	Accuracy	Input Impedance
500mV	100μV	±(0.1% of rdg +2dgt)	Approx. 1000MΩ
5V	1mV		Approx. 11MΩ
50V	10mV		Approx. 10MΩ
500V	100mV		
1000V	1V		

Maximum voltage: ±1200V DC, 850V AC rms (5V to 100V ranges)

AC Voltage (Auto/manual ranging except for 500 mV range)

Range	Resolution	Accuracy
500mV	100μV	50Hz- 60Hz : ±(1.0% of rdg+5dgt)
5V	1mV	45Hz- 5kHz : ±(1.5% of rdg+5dgt)
50V	10mV	5kHz-20kHz : ±(3.0% of rdg+5dgt)
500V	100mV	50kHz- 60Hz : ±(1.0% of rdg+5dgt)
750V	1V	45kHz-1kHz : ±(2.0% of rdg+5dgt)

Type : True r.m.s.
Maximum voltage : ±1200V DC or 850V AC rms (5V to 100V ranges)
±500V DC or 350V AC rms (500mV range)
Input Impedance : Approx. 1000MΩ//100pF max. (500mV range)
Approx. 10MΩ//100pF max. (5V to 100V range)

DC Current (Manual ranging)

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
5000μA	1μA	±(0.5% of rdg+2dgt)	1A/600V quick-blow fuse	1.1V
500mA	0.1mA	±(1.5% of rdg+3dgt)		
10A	10mA		15A/600V quick-blow fuse	0.4V

AC Current (Manual ranging)

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
5000μA	1μA	45Hz-2kHz	1A/600V	1.1V
500mA	0.1mA	±(1.5% of rdg+5dgt)	quick-blow fuse	
10A	10mA		10A/250V quick-blow fuse	0.4V

Average value detection, rms calibration

Resistance (Automatic ranging)

Range	Resolution	Accuracy	Open-circuit Voltage	Maximum Voltage
500Ω	0.1Ω	±(0.5% of rdg+3dgt)	3.3V	500V DC or 500Vrms
5kΩ	1Ω	±(0.6% of rdg+2dgt)	1.28V	
50kΩ	10Ω			
500kΩ	100Ω			
5MΩ	1kΩ	±(0.8% of rdg+2dgt)		
50MΩ	10kΩ	±(3.0% of rdg+5dgt)		

Frequency (Automatic ranging, minimum input frequency: 10Hz)

Range	Resolution	Accuracy	Input sensitivity	Maximum Voltage
100Hz	0.01Hz	±(0.02% of rdg+2dgt)	300mVrms to 5Vrms	500Vrms but less than 10^6VHz
1000Hz	0.1Hz			
10kHz	1Hz			
100kHz	10Hz			
1MHz	100Hz			
10MHz	1kHz		500mVrms to 5Vrms	

Diode check/Continuity test

Range	Resolution	Accuracy	Measuring Current	Open-circuit Voltage
	1mV	±(1.0% of rdg+3dgt) Built-in buzzer beeps at below approx. 100mV	Approx. 1.65mA	≦3.3V

Maximum voltage: 500V DC or 500V AC rms

TTL Logic

Range	Threshold level	Maximum voltage
▲	Display value of 2.00 V	500V DC or 500V AC rms
▼	Display value of 0.80 V	

Static Capacity (Auto/manual ranging)

Range	Resolution	Accuracy	Maximum voltage
5nF	1pF	±(2.0% of rdg +4dgt)	500V DC or 500V AC rms
50nF	10pF		
500nF	100pF		
5000nF	1nF		
50μF	10nF		
500μF	100nF		
5000μF	1μF	±(3.0% of rdg +5dgt)/At no more than 2mF (No value specified for above 2mF.)	
50mF	10μF		

When a film capacitor or an object with no more leakage than it is measured.
Add 0.15 × (Accuracy at 23±5℃)/℃(5nF to 500nF).
Add 0.3 × (Accuracy at 23±5℃)/℃(5000nF to 50mF).

dBm (Auto ranging)

Range	Resolution	Accuracy	Reference impedance
50dBm	0.01dBm	±0.3dBm	20 selections 4Ω to 1200Ω
>50dBm	0.1dBm		

Reference impedance: 4Ω, 8Ω, 16Ω, 32Ω, 50Ω, 75Ω, 93Ω, 110Ω, 125Ω, 135Ω, 150Ω, 200Ω, 250Ω, 300Ω, 500Ω, 600Ω, 800Ω, 900Ω, 1000Ω, 1200Ω

General Specifications

Measurement Functions ··· DC voltage, AC voltage, DC current, AC current, resistance, frequency, static capacity, logic level, diode check, continuity check
Sampling Rate ····· Digital display: 3.3 times/sec
Display ····· LCD display
Maximum display ····· 5000/50-segment bar graph
Polarity display ····· Automatic switching. "-" displayed with negative polarity.
Over-range display ····· "OL" is displayed.
Computations ····· HOLD (Data Hold), MAX (Maximum), AVG (Average), MIN (Minimum), dBm (dBm display), Δ (Difference from reference value), Δ/r (Deviation from reference value, %)
Power-Save Function ····· Enters sleep mode in approximately 15 minutes, then auto power-OFF is activated in approx. 15 more minutes later. This function can be defeated.
Temperature/Humidity for characteristics in spec. ··· 23℃, ±5℃, 70% RH or less
Operating Temperature /Humidity Ranges ···· 0 to 50℃, 70% RH or less
Storage Temperature /Humidity Ranges ····· −20 to 60℃, 80% RH or less (without battery)
Temperature Coefficient ··· Add 0.15×(Accuracy at 23±5℃)/℃ at 0 to 18 ℃ and 28℃ to 40 ℃
Power source ····· 9V DC (JIS 006P, IEC 6F22 manganese battery or alkaline battery×1)
Battery Life ····· Approx. 50 hours (DC V measurement using manganese batteries)
Approx. 90 hours (DC V measurement using alkaline batteries)
Dimensions ····· Approx. 90 (W)×37 (H)×191 (D) mm
Weight ····· Approx. 440 g (including battery)
Accessories ····· Instruction manual (1), test lead set (1 set), 9 V battery (JIS 006P/IEC 6F22) (1)
Complying Standards ····· EN55011 (1991) CLASS B
IEC801-2 (1991) 8kVAD
IEC801-3 (1984) 3V/m
IEC801-4 (1988) 1kV, 5/50 μs, 5kHz

DL-97 SPECIFICATIONS

DC Voltage

Range	Resolution	Accuracy	Input Impedance
40mV	10μV/1μV	±(0.08% of rdg +5dgt)	Approx. 1000MΩ
400mV	0.1mV/10μV	±(0.06% of rdg +3dgt)	
4V	1mV/0.1mV		Approx. 10MΩ
40V	10mV/1mV		
400V	0.1V/10mV		
1000V	1V/0.1V		

Maximum voltage : ±1200V DC, 850V AC rms (4V to 750V ranges)
±500V DC, 350V AC rms (40mV, 400mV ranges)

AC Voltage

Range	Resolution	Accuracy
40mV	10μV/1μV	50Hz- 60Hz : ±(0.7% of rdg+5dgt)
400mV	0.1mV/10μV	45Hz- 5kHz : ±(1.5% of rdg+5dgt)
4V	1mV/0.1mV	5kHz- 20kHz : ±(2.0% of rdg+5dgt)
40V	10mV/1mV	
400V	0.1V/10mV	
750V	1V/0.1V	50Hz- 60Hz : ±(0.7% of rdg+5dgt)
		45kHz-5kHz : ±(3.0% of rdg+5dgt)
		5kHz- 20kHz : no spec

Type : True r.m.s. Crest factor: >3:1
Maximum voltage : ±1200V DC or 850V AC rms (4V to 750V ranges)
±500V DC or 350V AC rms (40mV, 400mV ranges)
Input Impedance : Approx. 1000MΩ//100pF max. (40mV, 400mV ranges)
Approx. 10MΩ//100pF max. (4V to 750V ranges)

DC+AC Voltage

Range	Resolution	Accuracy
40mV	10μV/1μV	50Hz- 60Hz : ±(0.8% of rdg+10dgt)
400mV	0.1mV/10μV	45Hz- 5kHz : ±(1.6% of rdg+10dgt)
4V	1mV/0.1mV	5kHz- 20kHz : ±(2.1% of rdg+10dgt)
40V	10mV/1mV	
400V	0.1V/10mV	
750V	1V/0.1V	50Hz- 60Hz : ±(0.8% of rdg+10dgt)
		45kHz-5kHz : ±(3.0% of rdg+10dgt)
		5kHz- 20kHz : no spec

Type : True r.m.s. Crest factor: >3:1
Maximum voltage : ±1200V DC or 850V AC rms (4V to 750V ranges)
±500V DC or 350V AC rms (40mV, 400mV ranges)
Input Impedance : Approx. 1000MΩ//100pF max. (40mV, 400mV ranges)
Approx. 10MΩ//100pF max. (4V to 750V ranges)

DC Current

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
400μA	0.1μA/10nA	±(0.2% of rdg+3dgt)	1A/600V quick-blow fuse	1.1V
4mA	1μA/0.1μA			
40mA	10μA/1μA			
400mA	0.1mA/10μA			
4A	1mA/0.1mA		15A/600V quick-blow fuse	0.4V
10A	10mA/1mA			

AC Current

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
400μA	0.1μA/10nA	45Hz to 2kHz ±(0.1% of rdg+5dgt)	1A/600V quick-blow fuse	1.1V
4mA	1μA/0.1μA			
40mA	10μA/1μA			
400mA	0.1mA/10μA			
4A	1mA/0.1mA		15A/600V quick-blow fuse	0.4V
10A	10mA/1mA			

Type : True r.m.s. Crest factor: >3:1

DC+AC Current

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
400μA	0.1μA/10nA	45Hz to 2kHz ±(1.2% of rdg+10dgt)	1A/600V quick-blow fuse	1.1V
4mA	1μA/0.1μA			
40mA	10μA/1μA			
400mA	0.1mA/10μA			
4A	1mA/0.1mA		15A/600V quick-blow fuse	0.4V
10A	10mA/1mA			

Type : True r.m.s. Crest factor: >3:1

dBm (Auto ranging)

Range	Resolution	Accuracy	Reference impedance
−80.79dBm to 81.48dBm	0.01dBm	±0.3dBm	20 selections 4Ω to 1200Ω

Reference impedance: 4Ω, 8Ω, 16Ω, 32Ω, 50Ω, 75Ω, 93Ω, 110Ω, 125Ω, 135Ω, 150Ω, 200Ω, 250Ω, 300Ω, 500Ω, 600Ω, 800Ω, 900Ω, 1000Ω, 1200Ω

1 ms Peak Hold (voltage)

Range	Resolution	Accuracy	Input impedance	Maximum Voltage
40mV	10μV/1μV	±(2.0% of rdg+43dgt)	Approx. 1000MΩ	±500V DC 350V AC rms
400mV	0.1mV/10μV			
4V	1mV/0.1mV		Approx. 10MΩ	±1200V DC 850V AC rms
40V	10mV/1mV			
400V	0.1V/10mV			
1000V	1V/0.1V			

1 ms Peak Hold (current)

Range	Resolution	Accuracy	Input protection	Voltage drop between terminals
400μA	0.1μA/10nA	±(2.0% of rdg+43dgt)	1A/600V quick-blow fuse	1.1V
4mA	1μA/0.1μA			
40mA	10μA/1μA			
400mA	0.1mA/10μA			
4A	1mA/0.1mA		15A/600V quick-blow fuse	0.4V
10A	10mA/1mA			

Resistance

Range	Resolution	Accuracy	Open-circuit Voltage	Maximum Voltage
400Ω	0.1/0.01Ω	±(0.2% of rdg+3dgt)	≦3.3V	600V DC or 600Vrms
4kΩ	1/0.1Ω		≦1.28V	
40kΩ	10/1Ω			
400kΩ	100/10Ω			
4MΩ	1k/0.1kΩ			
40MΩ	10k/1kΩ	±(1.0% of rdg+5dgt)		
40nS	0.01/0.001nS	±(1.0% of rdg+10dgt)		

Static Capacity

Range	Resolution	Accuracy	Maximum voltage
4nF	1pF	±(2.5% of rdg +4dgt)	600V DC or 600V AC rms
40nF	10pF		
400nF	100pF	±(2.0% of rdg +4dgt)	
4μF	1nF		
40μF	10nF		
400μF	100nF		
9999μF	1μF	±(3.0% of rdg +4dgt)/At no more than 2 mF(No value specified for above 2 mF.)	

When a film capacitor or an object with no more leakage than it is measured.

Diode check/Continuity test

Range	Resolution	Accuracy/ Threshold level	Measuring Current	Open-circuit Voltage
	1mV/ 0.1mV	±(1.0% of rdg+2dgt)/ Approx. 100mV or less	Approx. 1.65mA	≦3.3V

Maximum voltage: 600V DC or 600V AC rms

Frequency (at voltage measurement)

Range	Resolution	Accuracy	Minimum input Frequency	Maximum Voltage
100Hz	0.01/0.001Hz	±(0.02% of rdg+2dgt)	10Hz	1200V DC 850V rms 10^6VHz
1kHz	0.1/0.01Hz			
10kHz	1/0.1Hz			
100kHz	10/1Hz			
200Hz	100/10Hz			

Input Sensitivity

Input range	Input level (sine wave)	
	40Hz-20kHz	10Hz-200kHz
40mV	10mV to 400mV	No minimum sensitivity specification but up to 400 mV.
400mV	30mV to 4V	40mV to 4V
4V	0.3V to 40V	0.4V to 40V
40V	3V to 400V	4V to 400V
400V	30V to 1000V	40V (＜100kHz) to 1000V
1000V	300V to 1000V	400V (＜100kHz) to 1000V

In 4 V DC range, with 5 Vp-p square wave.
- Duty cycle range: 5% to 95%
- Duty cycle accuracy: ±(0.3% per kHz +0.3%) of full scale
- Pulse duration measuring range: 0.1 ms to 1999 ms
- Pulse duration measuring accuracy: ±(0.2% of rdg+3dgt)

The pulse duration measurement range is dependent on the input signal frequency.

Frequency (Division factor 1)

Range	Resolution	Accuracy	Sensitivity	Minimum input Frequency
100Hz	0.01/0.001Hz	±(0.002% of rdg+1dgt)	100mV rms	1Hz
1kHz	0.1/0.01Hz			
10kHz	1/0.1Hz			
100kHz	10/1Hz			
200Hz	100/10Hz			

Frequency (Division factor 10)

Range	Resolution	Accuracy	Sensitivity	Minimum input Frequency
100Hz	0.01/0.001Hz	±(0.002% of rdg+1dgt)	100mV rms	50Hz
1kHz	0.1/0.01Hz			
10kHz	1/0.1Hz			
100kHz	10/1Hz			
1MHz	100/10Hz		500mV rms	
10MHz	100/10Hz			

- Maximum voltage: 1200V DC/850V rms; 10^6V • Hz

In 5 Vp-p square wave.
- Duty cycle range: 0.1% to 99.9%
- Duty cycle accuracy: ±(0.3% per kHz +0.3%) of full scale
- Pulse duration measuring range: 0.1 ms to 1999 ms
- Pulse duration measuring accuracy: ±(0.2% of rdg+3dgt)

The pulse duration measurement range is dependent on the input signal frequency.

Temperature Measurement (Main unit only)

Range	Resolution	Accuracy	Maximum Input Voltage
−40℃ to 1372℃	1℃	±(0.3% of rdg +3℃)	500V DC or 500V AC rms
−40F to 2502F	1F	±(0.3% of rdg +6F)	

- Temperature Probe (Optional PC-597)
  Measuring range : −40℃ to 204℃
  Measuring accuracy: Larger value of ±0.75% and ±2.2℃ (0℃ to 204℃)
  Larger value of ±2% and ±2.2℃ (−40℃ to 0℃)

Square-wave Output

		Accuracy
Frequency	0.5Hz, 1Hz, 2Hz, 10Hz, 50Hz, 60Hz, 75Hz, 100Hz, 150Hz, 200Hz, 300Hz, 600Hz, 1200Hz, 1600Hz, 2400Hz, 4800Hz,	±0.4%
Duty cycle	1% to 99%	±0.4%
Amplitude	0V to 3V fixed	±0.2V
Output impedance	3.5kΩ max.	

Timer Output

		Accuracy
Maximum time	99.999 sec.	±0.4%
Amplitude	0V to 3V fixed	±0.2%
Output impedance	3.5kΩ max.	
Output signal	1. High to Low 2. Low Pulse 3. Low to High 4. High Pulse	3V to 0V Approx. 3msec. 0V to 3V Approx. 3msec.

General Specifications

Measurement Functions ··· DC voltage, AC voltage, DC+AC voltage, DC current, AC current, DC+AC current, resistance, frequency, static capacity, diode check, continuity check, temperature
Sampling Rate ··· Digital display: 3 times/sec (4000 full scale)
1 times/sec (40000 full scale)
Display ··· LCD display
Back light ··· ON/OFF switchable
Maximum display ··· 5000/20×4-segment bar graph
Polarity display ··· Automatic switching. "-" displayed with negative polarity.
Over-range display ··· "OL" is displayed.
Computations ··· HOLD (Data Hold), MAX (Maximum), AVG (Average), MIN (Minimum), dBm (dBm display), Δ (Difference from reference value), Δ/r (Deviation from reference value)
Output Functions ··· Square wave output, timer output
Power-Save Function ··· Enters sleep mode in approximately 15 minutes, then auto power-OFF is activated in approx. 15 more minutes later. This function can be defeated.
Temperature/Humidity for characteristics in spec. ··· 23℃, ±5℃, 80% RH or less
Operating Temperature /Humidity Ranges ··· 0 to 50℃, 80% RH or less
Storage Temperature /Humidity Ranges ··· −20 to 60℃, 80% RH or less (without battery)
Temperature Coefficient ··· Add 0.15×(Accuracy at 23±5℃)/℃ at 0 to 18 ℃ and 28℃ to 40 ℃
Power source ··· 9V DC (JIS 006P, IEC 6F22 manganese battery or alkaline battery×1)
Battery Life ··· Approx. 50 hours (DC V measurement using manganese batteries)
Approx. 90 hours (DC V measurement using alkaline batteries)
Dimensions ··· Approx. 90 (W)×37 (H)×191 (D) mm
Weight ··· Approx.440 g (including battery)
Accessories ··· Instruction manual (1), test lead set (1 set), 9 V battery (JIS 006P/IEC 6F22) (1), holster (1)
Complying Standards ··· EN55011 (1991) CLASS B
IEC801-2 (1991) 8kVAD
IEC801-3 (1984) 3V/m
IEC801-4 (1988) 1kV, 5/50 µs, 5kHz