YOKOGAWA

Digital Multimeter Series

734/733/732 Series

- **734** Series of 4.5-digit Handheld Multimeters
- **733/732** Series of 3.5-digit Handheld Multimeters

- **3.5-digit Digital Multimeter**

Bulletin DMM-E

Yokogawa M&C Corporation

Digital Multimeter Selection Guide

			Display						Measurement Items												Additional Functions							
Model	Type	Max. Value	Dual	Bar Graph	Back-lit	AC RMS	Voltage	AC + DC	Current	AC + DC A	Resistance	Continuity Check	Diode Test	Frequency	Temperature	Capacitance	Communication	Data Memory	Max./Min. Value Memory	Relative Value Computation	Logarithm Computation	Data Hold	Auto Hold	Peak Hold	Overvoltage Input Warning	Comparator	Auto Power Off	External View
73401	Handheld	50000	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●	
73402			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	
73301		4000		●			●		●		●	●	●		●					●		●	●		●		●	
73302				●			●		●		●	●	●	●	●	●				●		●	●		●		●	
73303				●		●	●		●		●	●	●	●	●	●				●		●	●		●		●	
73201		4300					●		●		●	●	●										●		◎		●	
73202							●		●		●	●	●			●							●		◎		●	
73203							●		●		●	●	●			●							●		◎		●	
73204							●				●	●	●										●		◎		●	
753603	Pocket-sized	3200		●			●				●	●	●									●					●	

◎ : Also functions as excessive current input warning.

734 Series

A New De Facto Standard for Handheld Digital Multimeters

Model

73401
73402

4.5 digits | 50,000 count | RS-232C | RMS | Terminal shutters | 0.020% (73402,DCV) | 0.040% (73401,DCV)

3-year Warranty

CE

Maximum Measurement Accuracy

0.020% rdg + 2 dgt (73402, DC voltage)
0.040% rdg + 2 dgt (73401, DC voltage)
RMS measurement for AC and AC+DC measurement
Superior frequency characteristic allows AC measurements from 10 Hz.

Highly Reliable

Calibration screws/dials eliminated

Performance not influenced over time by external factors such as vibration or degradation of electrical contacts of calibration screws/dials.

- Recommended calibration period: 1 year – double the time for conventional 4.5-digit DMMs

Easier Calibration

User calibration function

The 734 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 that could not be adjusted automatically in the past. The user calibration function leads to improved operation efficiency and cost reduction.

- External standard instrument required for calibration.

Full Support of Data Management

Measured data stored in internal memory

Storage Method:
50 data in manual-mode memory + 600 data in logging-mode memory

You can transmit stored data from internal memory to a personal computer, and process them using application software or spreadsheet software (Excel*)for data management.

Supports real-time measurement

Allows you to connect to a personal computer for storing large amounts of data that cannot be stored in DMM internal memory.

- Optional communication package sold separately (Model 92010: communication cable and DMM application software) is required for data transfer.
- The communication cable employs an infrared system, so the device is electrically insulated.

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

Safe Design

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.

Conforms to EN61010-1 safety standard

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

Loaded with Measurement Functions

Peak hold function (73402, for DC V/A measurement)

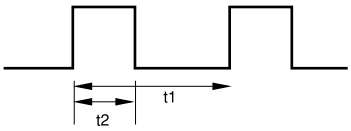
Supports waveforms of 1 ms or greater. You can capture instantaneous crest values not possible with ordinary maximum measurement functions.

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

Allows simultaneous display of frequency and voltage, frequency and duty ratio or decibels and voltage on dual 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.

Back-lit display (73402)

Shockproof elastomer casing

An elastomer material is used for the outer casing in order to provide shock absorption and a good grip, in keeping with the requirements of handheld devices.

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

Data Storage Method

Data storage to DMM's internal memory

50 data values in manual-mode memory
600 data values in logging-mode memory units

→ Transmit to a personal computer all at once
→ Print out with a printer (Model 97010)

Saving real-time measured data to personal computer

Real-time measured data (only logging measurements)

→ Transmit to a personal computer in real time
→ Print out with a printer (Model 97010)

The number of data that can be stored for real-time measurement depends more specifically on the life of the batteries in the DMM.
Reference: The cell life of alkaline batteries is approximately 100 hours when transmitting data in real time while measuring DC voltages at 1-second periods.

Data Management

Management with special application software

You can display measured data as a table and trend graphs. Real-time data transmission allows you to see moment-to-moment changes at a glance. In addition, when displaying DMM data on a PC screen they are enlarged to allow you to easily discern new data.

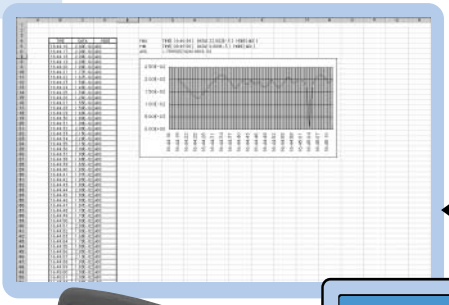
Data management with Excel* spreadsheet software

The 92010 is provided with a function to import data to an Excel* spreadsheet file, and graphs can be automatically drawn on the spreadsheet. This allows you to use Excel's extensive editing functions to prepare reports in original formats with ease.

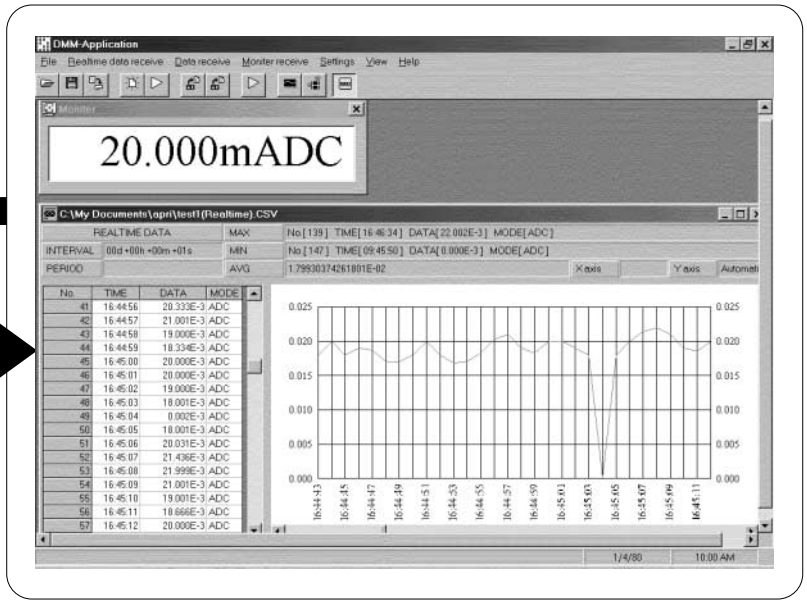
Note: During real-time measurement, importing data to an Excel spreadsheet generates only a table containing the measured values. Generation of a graph is possible after completion of measurement.

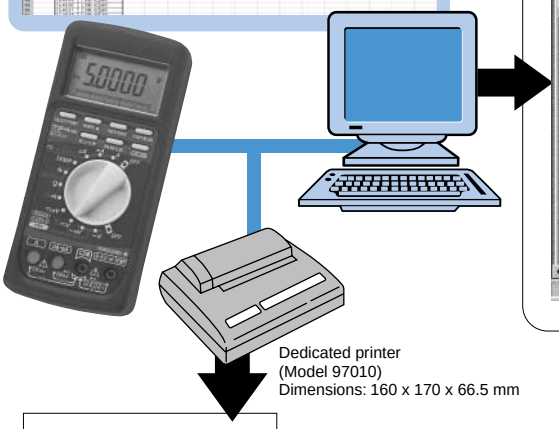
* Excel is a registered trademark of Microsoft Corporation, the United States.

Data Layout Example on Excel* Spreadsheet



Example of Document Windows in DMM Application Software





Dedicated printer
(Model 97010)
Dimensions: 160 x 170 x 66.5 mm

Example Printout of Stored Logging Data

```
L001  N,+0.9998 VDC
L003  N,+0.9997 VDC
L004  N,+0.9999 VDC
L005  N,+0.9999 VDC
L006  N,+0.9998 VDC
L007  N,+0.9998 VDC
L008  N,+0.9998 VDC
L009  N,+0.9998 VDC
L010  N,+0.9999 VDC
L011  N,+0.9998 VDC
L012  N,+0.9998 VDC
L013  N,+0.9998 VDC
L014  N,+1.0000 VDC
L015  N,+0.9999 VDC
L016  N,+1.0000 VDC
L017  N,+1.0000 VDC
L018  N,+0.0002 VDC
```

Characters represent the following information, starting from the left.

- L: Logging memory
- 3-digit numeral: Data number
- N: Normal measured value
  (O :"OL" indication on the DMM display)
- 5-digit numeral: Measured value
- VDC: Unit (example shows DC voltage)

92010 Communications Package Specifications

Communication cable

Cable length: Approximately 1.5 m
Connector on the side of the PC: D-sub 9-pin

• A separate RS-232C cable (Model 91015) is required for connection to a printer.

Application software

System requirements of PC	Model: PC/AT compatible Operating system: Windows* 98 or 95 CPU: Pentium 100 MHz or higher recommended Memory: 16 MB or larger recommended CRT: 800 x 500 pixels of resolution or higher recommended
Logging interval	Any setting from 1 second, minimum

• A computer with a higher CPU should be used if the computer fails to receive measured data.

* Windows is a registered trademark of Microsoft Corporation, the United States.

General Specifications of 73401 / 02

Additional Functions	RS-232C, data memory, max/mini value memory, relative /percentage value computation, logarithm computation, data/auto hold, peak hold (73402), overvoltage warning, backlight(73402)
Display	Digital display: 50,000-count digital reading and 51-segment bar graph
Measuring Rate	Digital display: 3 times/sec Bar graph display: 10 times/sec
Operating Temp. and Humidity	-10˚C to 50˚C; 80% RH or less at -10˚C to 40˚C, or 70% RH or less at 40˚C to 50˚C (no condensation)
Storage Temp. and Humidity	-25˚C to 60˚C, 70 RH or less (no condensation)
Temperature Coefficient	Add the accuracy 0.05/˚C to the basic accuracy at a temperature within -10˚C to 18˚C and 28˚C to 50˚C
Withstanding Voltage	5.55 kV, AC for 1 minute (between input terminals and casing)
Power Supply	Two AA (R6) dry cells
Battery Life	Approx. 120 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).
Dimensions	85 (W) x 191 (H) x 40 (D) mm
Weight	Approximately 450 g (including batteries)
Compliance with Standards	Safety EN61010-1 (1995); EN61010-2-031 (1995) (AC/DC 1000 V, CAT II; AC/DC600 V, CAT III) EMC EMI: EN55011 (1998); EN61326-1 (1998) + A1 (Class B, Group 1) EMS: EN50082-1 (1997); EN61326-1 (1998) + A1
Standard Accessories	Instruction manual:1, Test lead set (RD031):1, AA (R6) dry cells(built in):2

Optional Accessories

Name	Model	Specification
DMM communication package	92010-E	RS-232C cable + DMM software
	92010-E/P	As above + Model 91015
Temperature probe	90050	For liquids: -50˚C to 600˚C
	90051	For liquids: -50˚C to 600˚C
	90055	For surfaces: -20˚C to 250˚C
	90056	For surfaces: -20˚C to 500˚C
Carrying case (hard)	B9646HH	Houses the DMM and test leads.
	93014	Houses the DMM, probes, and RS-232C cable.
Test leads	RD031	Red / black (1 set)
Fuse	A1518EF	500 mA/600 V
	A1519EF	15 A/600 V
Printer	97010	
AC adapter for printer	94006	For Europe
	94007	For USA
Thermal printing paper	97080	10 rolls
RS-232C cable	91015	For printer connection (male-male; 9-pin D-sub)

Performance

Test conditions: Temperature and humidity = 23˚C ± 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	Accuracy 73401	Accuracy 73402	Input Resistance	Maximum Input Voltage
50.000 mV	0.1 + 10	0.05 + 10	Approx.100 MΩ	1000 Vrms AC, 1000 V DC
500.00 mV	0.04 + 2	0.02 + 2		
240.00 mV				
5.0000 V	0.07 + 2	0.025 + 5	10 MΩ	
50.000 V		0.03 + 2		
500.00 V				
1000.0 V				

Response time: 1 second or less
NMRR: 80 dB or greater for 50/60 Hz ± 0.1%
CMRR: 120 dB or greater for 50/60 Hz (Rs = 1 kΩ)

• AC Voltage Measurement (~V)

Model 73401 — AC coupling, RMS detection, crest factor: <3

Range	Accuracy 10 – 20 Hz	20 Hz – 1 kHz	1 – 10 kHz	10 – 20 kHz	Input Impedance	Maximum Input Voltage
500.00 mV	*1 1.5+30	*1 0.7+30	*1 0.7+30	*2 2+50	11 MΩ, <50 pF	1000 Vrms AC, 1000 V DC
5.0000 V						
50.000 V					10 MΩ, <50 pF	
500.00 V						
1000.0 V	*2	*2	3 + 30 *2	—		

Model 73402 — AC coupling, RMS detection, crest factor: <3

Range	Accuracy 10 – 20 Hz	20 Hz – 1 kHz	1 – 10 kHz	10 – 20 kHz	20 – 50 kHz	50 – 100 kHz	Input Impedance	Maximum Input Voltage
500.00 mV	*1 1 + 30	*1 0.4 + 30	*1 0.4 + 30	*1 1 + 40	*2 2 + 70	*2 5 + 200	11 MΩ, <50 pF	1000 Vrms AC, 1000 V DC
5.0000 V								
50.000 V							10 MΩ, <50 pF	
500.00 V								
1000.0 V	*2	*2	3 + 30*2	—				

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

• DC Voltage + AC Voltage (⎓ V + ~V)

Model 73401 — Maximum effective display: 5000; crest factor: <3

Range	Accuracy DC, 10 – 20 Hz	DC, 20 Hz – 1 kHz	DC, 1 – 10 kHz	DC, 10 – 20 kHz	Input Impedance	Maximum Input Voltage
5.000 V	*1 1.5 + 10	*1 1 + 10	*1 1 + 10	*1 2 + 10	11 MΩ, <50 pF	1000 Vrms AC, 1000 V DC
50.00 V					11 MΩ, <50 pF	
500.0 V						
1000 V	*2	*2	—			

Model 73402 — Maximum effective display: 5000; crest factor: <3

Range	Accuracy 10 – 20 Hz	20 Hz – 1 kHz	1 – 10 kHz	10 – 20 kHz	20 – 50 kHz	50 – 100 kHz	Input Impedance	Maximum Input Voltage
5.000 V	*1 1.5 + 10	*1 0.5 + 10	*1 0.5 + 10	*1 1 + 10	*2 2 + 10	*2 5 + 20	11 MΩ, <50 pF	1000 Vrms AC, 1000 V DC
50.00 V							10 MΩ, <50 pF	
500.0 V								
1000 V	*2	*2	—					

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

• AC Current Measurement (~A)

Model 73401 — Crest factor: <3

Range	Accuracy 10 – 20 Hz	20 Hz – 1 kHz	Voltage Drop	Maximum Input Current
500.00 µA	1.5 + 20	1 + 20	<0.11 mV/µA	500 mA (fuse-protected)
5000.0 µA				
50.000 mA			<4 mV/mA	
500.00 mA				
5.0000 A			<0.1 V/A	15 A (fuse-protected)
10.000 A				

Model 73402 — Crest factor: <3

Range	Accuracy 10 – 20 Hz	20 Hz – 1 kHz	1 – 5 kHz	Voltage Drop	Maximum Input Current
500.00 µA	1 + 20	0.75 + 20	1 + 30	<0.11 mV/µA	500 mA (fuse-protected)
5000.0 µA					
50.000 mA				<4 mV/mA	
500.00 mA					
5.0000 A	1.5 + 20	1 + 20	2 + 30	<0.1 V/A	15 A (fuse-protected)
10.000 A					

Shown above are the accuracy at 5 to 100% of range (10 to 100% for 10 A range).
Response time: 2 seconds or less

• DC Current Measurement (⎓ A)

Range	Accuracy 73401/02	Voltage Drop	Maximum Input Current
500.00 µA	0.2 + 2	<0.11 mV/µA	500 mA (fuse-protected)
5000.0 µA			
50.000 mA		<4 mV/mA	
500.00 mA			
5.0000 A	0.6 + 2	<0.1 V/A	15 A (fuse-protected)
10.000 A			

Response time: 1 second or less

• DC Current + AC Current (⎓ A + ~A)

Model 73401 — Maximum effective reading: 5000; crest factor: <3

Range	Accuracy DC, 10 – 20 Hz	DC, 20 Hz – 1 kHz	Voltage Drop	Maximum Input Current
500.0 µA	2 + 10	1.5 + 10	<0.11 mV/µA	500 mA (fuse-protected)
5000 µA				
50.00 mA			<4 mV/mA	
500.0 mA				
5.000 A			<0.1 V/A	15 A (fuse-protected)
10.00 A				

Model 73402 — Maximum effective reading: 5000; crest factor: <3

Range	Accuracy DC, 10 – 20 Hz	DC, 20 Hz – 1 kHz	DC, 1 – 5 kHz	Voltage Drop	Maximum Input Current
500.0 µA	1.5 + 10	1 + 10	1.5 + 10	<0.11 mV/µA	500 mA (fuse-protected)
5000 µA					
50.00 mA				<4 mV/mA	
500.0 mA					
5.000 A	2 + 10	1.5 + 10	3 + 10	<0.1 V/A	15 A (fuse-protected)
10.00 A					

Shown above is the accuracy at 5 to 100% of range (10 to 100% for 10 A range).
Response time: Approximately 5 seconds

• Resistance Measurement (Ω)

Range	Accuracy 73401	Accuracy 73402	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
500.00 Ω	*1 0.1 + 2	*1 0.05 + 2	<1 mA	<2.5 V	600 Vrms
5.0000 kΩ			<0.25 mA		
50.000 kΩ			<25 µA		
500.00 kΩ			<2.5 µA		
5.0000 MΩ	0.5 + 2		<1.5 µA		
50.000 MΩ	1 + 2		<0.13 µA		

*1: Accuracy after zero calibration
Response time: 3 seconds or less for 500 Ω to 500 kΩ, 10 seconds or less for 5 MΩ to 50 MΩ

• Continuity Check (•))

Maximum effective display: 5000

Range	Continuity Beeper	Testing Current	Open-circuit Voltage	Input Protection Voltage
500.0 Ω	Buzzer sounds at 100 ± 50 Ω or less.	Approx. 0.5 mA	<5 V	600 Vrms

• Diode Test (⊣◁⊢)

Range	Accuracy	Testing Current (Vf = 0.6 V)	Open-circuit Voltage	Input Protection Voltage
2.4000 V	1 + 2	Approx. 0.5 mA	<5 V	600 Vrms

• Temperature Measurement (TEMP)

Range	Accuracy	Input Protection Voltage
-50.0˚C to 800.0˚C	1 + 1.5˚C	600 Vrms

Temperature probe:
Type K thermocouple sensor (optional)

• Capacitance Measurement (⊣⊢)

Maximum effective display: 5000

Range	Accuracy	Input Protection Voltage
5.000 nF	*1 1 + 5	600 Vrms
50.00 nF		
500.0 nF		
5.000 µF		
50.00 µF		
500.0 µF	2 + 5	
5.000 mF	3 + 5	
50.00 mF		

*1: Accuracy after zero calibration

• Frequency Measurement (Hz)

Maximum effective display: 9999

Range (auto-ranging)	Accuracy	Input Range
2.000 – 9.999 Hz	0.02 + 1	10 to 100% of range
9.00 – 99.99 Hz		
90.0 – 999.9 Hz		
900 – 9999 Hz		
9.00 – 99.99 kHz		40 to 100% of range

Coupling type: AC coupling

• Duty Cycle Measurement (%)

Range	Accuracy	Input Range
10 – 90%	±1% *1	40 to 100% of range

*1: For input of a square wave with a frequency within10.00 to 500.0 Hz

• Peak Hold Function (PH)

(73402 only) Maximum effective display: 5000

Range	Accuracy	Response Time
DC V, DC A	±100 digits	>1 ms

733 Series

Provides Safety Levels Demanded in Field Work

Model

73301
73302
73303

3.5 digits | 4000 count | RMS (73303) | Terminal shutters | 0.2% (73302/03,DCV) | 0.3% (73301,DCV)

3-year Warranty

CE

RMS and Mean Value Measurement Models Available

0.2% rdg + 1 dgt (73302/03, for DC voltage)
0.3% rdg + 1 dgt (73301, for DC voltage)
AC RMS value measurement (73303)

Increased Safety for Use in the Field Safe Design Prevents Human Error

Terminal shutters prevent erroneous insertion of test leads into current measurement terminals

If the function is switched to voltage measurement while a test lead is left inserted into a current measurement terminal, neither the fuse built into the current measurement circuit of the DMM nor the input protection circuit for voltage measurement can protect the circuits. The terminal shutters prevent the rotary switch from being moved from the current measurement function while a test lead is inserted into a current measurement terminal, thus preventing erroneous settings due to human error and ensuring the safety of the user. The terminal shutters open and close with operation of the function select (rotary) switch, so operation efficiency is not sacrificed.

Current measurement

Set to a current measurement function.

Terminal shutters are open.

Measurement other than current

Set to a function other than current measurement.

Terminal shutters are closed.

Employs high-performance fuses rated at 100 kA

Uses withstand current fuses with an arc extinguishing material for an assured prearcing time-current characteristic in the event of an excessive current.

Rated breaking current: 100 kA for both

500mA/600V

15A/600V

Elastomer material used for impact absorption

An elastomer material that provides better grip and impact resistance than conventional ABS resin or polycarbonate is used for the casing of the meter thus improving both safety and ease of use.

To highlight the elastomer construction it is colored in this photograph.

Conforms to EN61010-10 Safety Standard

Conforms to overvoltage category AC/DC 1000 V, CAT II, and AC/DC 600 V CATIII.

Satisfying Performance with Concentrated Functionality

AC voltage measurement method selectable between RMS value and mean value measurement (73303)

You can compare the waveform of the measured AC voltage with a sine wave to check for distortion. If the measured RMS value is not equal to the measured mean value, you can conclude that the waveform deviates from the sine wave.

Relative and percentage value computation

Displays the measured values as relative values with respect to a reference measurement or as the percentages with respect to the reference measurement.

102.0 V — Sets currently measured value as reference value.

- 12.0 V — Displays only the differential (the voltage has decreased to 90 V).

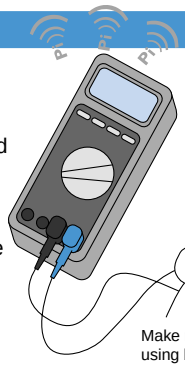
- 11.8 % — Displays the change as a percentage (%).

Zero calibration for stray capacitance when checking capacitors (73302/03)

The stray capacitance of the instrument can be zeroed by using this function with the test leads open (only when the 10 nF range is selected).

Auto hold function

Just removing the test leads from the measured object retains the measured value. Because the measurement is held, there is no need to operate the hold switch for each measurement, freeing both hands for performing safe and accurate measurements with the test leads.



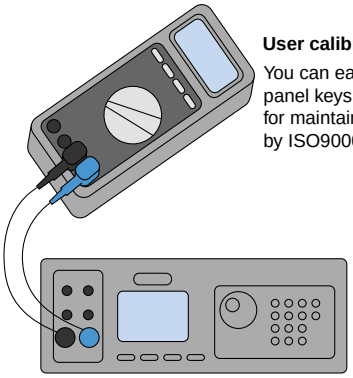
Emits intermittent beeps when measurement has stabilized.

Data is retained by simply removing test leads.

Make reliable measurements using both hands

User calibration

You can easily perform calibration and adjustment using the panel keys on the multimeter and standard instrument—optimal for maintaining accuracy of measurement instruments required by ISO9000 international standards for quality systems.



Standard Instrument

CAL — The calibration mode is enabled by powering up the multimeter using special procedures.

Input the standard value

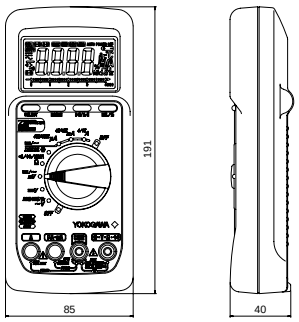
3800 — Adjustment is performed with a single key operation.

General Specifications of 73301 / 02 / 03

Additional Functions	Relative and percentage value computation, data / auto hold, overvoltage warning
Display	Digital display: 4,000-count digital reading; 40-segment bar graph
Measuring Rate	Digital display: 2.3 times/sec Bar graph display: 23 times/sec
Operating Temp. and Humidity	-10˚C to 50˚C; 80% RH or less at -10˚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 the accuracy (0.1/˚C to the basic accuracy at a temperature within -10˚C to 18˚C and 28˚C to 50˚C
Withstanding Voltage	5.55 kV AC for 1 minute (between input terminals and casing)
Power Supply	Two AA (R6) dry cells
Battery Life	73301: Approx. 1000 hours (for continuous DC voltage measurement with alkaline cells) 73302/03: Approx. 350 hours
Auto Power Off	The power is automatically turned off when no operation is made for approx. 20 minutes (can be disabled).
Dimensions	85 (W) x 191 (H) x 40 (D) mm
Weight	Approximately 450 g (including batteries)
Compliance with Standards	Safety EN61010-1 (1995); EN61010-2-031 (1995) (AC/DC 1000 V, CAT II; AC/DC 600 V, CAT III) EMC EMI: EN55011 (1998); EN61326-1 (1998) + A1(Class B, Group 1) EMS: EN50082-1 (1997); EN61326-1 (1998) + A1
Standard Accessories	Instruction manual:1, Test lead set (RD031):1, AA (R6) dry cells(built in):2

Optional Accessories

Name	Model	Specification
Fuse	A1518EF	500 mA/600 V
	A1519EF	15 A/600 V
Test leads	RD031	Red / black (1 set)
Thermistor probe	234901	-50˚C to 150˚C
Carrying case (hard)	B9646HH	Houses the DMM and test leads



Performance

Test conditions: Temperature and humidity = 23˚C ± 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	Accuracy 73301	Accuracy 73302/03	Input Resistance	Maximum Input Voltage
400.0 mV fixed	0.3% + 1	0.2% + 1	10 MΩ	1000 Vrms AC, 1000 V DC
4.000 V			11 MΩ	
40.00 V			10 MΩ	
400.0 V				
1000 V				

Response time: 1 second or less

• AC Voltage Measurement (~V)

Model 73301 — Mean-value detection and RMS-value calibration

Range	Accuracy 50/60 Hz	Accuracy 50 – 500 Hz	Accuracy 500 Hz – 1 kHz	Input Impedance	Maximum Input Voltage
400.0 mV fixed	0.5% + 2	1% + 2	1.5% + 4	10 MΩ, <50 pF	1000 Vrms AC, 1000 V DC
4.000 V				11 MΩ, <50 pF	
40.00 V				10 MΩ, <50 pF	
400.0 V					
1000 V			——		

Response time: 2 seconds or less

Model 73302 — Mean-value detection and RMS-value calibration

Range	Accuracy 50/60 Hz	Accuracy 50 – 500 Hz	Accuracy 500 Hz – 1 kHz	Input Impedance	Maximum Input Voltage
400.0 mV fixed	0.5% + 2	0.75% + 2	1.5% + 4	10 MΩ, <50 pF	1000 Vrms AC, 1000 V DC
4.000 V				11 MΩ, <50 pF	
40.00 V				10 MΩ, <50 pF	
400.0 V					
1000 V			——		

Response time: 2 seconds or less

Model 73303 — RMS detection, and mean-value detection and RMS-value calibration(except 400 mV range)

Range	Accuracy 50/60 Hz	Accuracy 50 – 500 Hz	Accuracy 500 Hz – 1 kHz	Input Impedance	Maximum Input Voltage
400.0 mV fixed	0.5% + 5 *1	1% + 5 *1	1.5% + 5 *1	10 MΩ, <50 pF	1000 Vrms AC, 1000 V DC
4.000 V				11 MΩ, <50 pF	
40.00 V				10 MΩ, <50 pF	
400.0 V					
1000 V			——		

Response time: 2 seconds or less; crest factor: <3
*1: 5 to 100% of F.S., or 200 to 1000 V for 1000 V range:

• DC Current Measurement (⎓ A)

Range	Accuracy 73301	Accuracy 73302/03	Voltage Drop	Maximum Input Current
400.0 µA	1% + 2	0.5% + 2	<0.11 mV/µA	400 mA (500 mA/600 V fuse-protected)
4000 µA				
40.00 mA			<2.5 mV/mA	
400.0 mA				
4.000 A	1.2% + 2		<0.1 V/A	10 A (15 A/600 V fuse-protected)
10.00 A				

Response time: 1 second or less

• AC Current Measurement (~A)

Model 73301 — Mean-value detection and RMS calibration

Range	Accuracy 50/60 Hz	Accuracy 40 Hz – 1 kHz	Voltage Drop	Maximum Input Current
400.0 µA	1% + 5	1.5% + 5	<0.11 mV/µA	400 mA (500 mA/600 V fuse-protected)
4000 µA				
40.00 mA			<2.5 mV/mA	
400.0 mA				
4.000 A	1.2% + 5		<0.1 V/A	10 A (15 A/600 V fuse-protected)
10.00 A				

Response time: 2 seconds or less

• AC Current Measurement (~AC)

Models 73302/03 — RMS-value detection (73303 only), and mean-value detection and RMS calibration

Range	Accuracy 50/60 Hz	Accuracy 40 Hz – 1 kHz	Voltage Drop	Maximum Input Current
400.0 µA	0.75% + 5 *1	1.5% + 5 *1	<0.11 mV/µA	400 mA (500 mA/600 V fuse-protected)
4000 µA				
40.00 mA			<2.5 mV/mA	
400.0 mA				
4.000 A	1% + 5 *1		<0.1 V/A	10 A (15 A/600 V fuse-protected)
10.00 A				

Response time: 3 sec or less; crest factor: <3 (73303 only)
*1: 5 to 100% of F.S., 2 – 10 A for 10 A range (73303 only)

• Resistance Measurement (Ω)

Range	Accuracy 73301	Accuracy 73302/03	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
400.0 Ω	0.5% + 1*	0.4% + 1*	<1.4 mA	<2.5 V	600 Vrms
4.000 kΩ			<120 µA	<1.3 V	
40.00 kΩ			<13 µA		
400.0 kΩ			<1.3 µA		
4.000 MΩ		0.5% + 1	<130 nA		
40.00 MΩ	1% + 2				

Response time: 2 seconds or less for 400 Ω range, 10 seconds or less for 4 MΩ range or greater
*: Accuracy after zero calibration for 400 Ω range

• Continuity Check (•))

Range	Continuity Beeper	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
400.0 Ω	Buzzer sounds at 20 Ω or less.	0.8 mA	<3.4 V	600 Vrms

• Diode Test (→|◄)

Range	Accuracy	Testing Current (Vf = 0.6 V)	Open-circuit Voltage	Input Protection Voltage
2.000 V	1% + 2	Approximately 0.5 mA	<3.4 V	600 Vrms

• Temperature Measurement (TEMP)

Range	Accuracy	Input Protection Voltage
-50.0˚C to 150.0˚C	0˚C to 70.0˚C: ± 1˚C -30.0˚C to 0˚C or 70.0˚C to 150.0˚C: ± 2˚C	600 Vrms

Accuracy when used in combination with optional thermistor probe (234901)

• Capacitor Check (⊣⊢)

Models 73302/03 (function not available with 73301)

Range	Accuracy	Input Protection Voltage
10.00 nF	2% + 10 (after zero calibration)	600 Vrms
100.0 nF	2% + 5	
1000 nF		
10.00 µF		
100.0 µF	3% + 5	
1000 µF		

• Frequency Measurement (Hz)

Models 73302/03 (function not available with 73301)

Range	Accuracy 73302/03	Input Voltage Range	Maximum Input Voltage
10.00 – 99.99 Hz	0.02% + 1	0.2 – 400 Vrms	600 Vrms
90.0 – 999.9 Hz			
900 – 9999 Hz		0.4 – 400 Vrms	
9.00 – 99.99 kHz		0.8 – 100 Vrms	100 Vrms

Coupling type: AC coupling

Low-cost Handheld DMM

732 Series

Model

73201
73202
73203
73204

3.5 digits

4300 count

3-year Warranty

• Photo shows the 73203 with optional rubber case.

- **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)
Compliance with Standards	Safety EN61010-1 (1995) + Amend; EN61010-2-031 (1995) (600 V, CAT II; 300 V, CAT III; contamination level 2, indoor use: 73201,73202, 73203) (600 V, CAT III; contamination level 2, indoor use: 73204) EMC EMI: EN55011 (1991) (Class B, Group 1) EMS: EN50082-1 (1997)
Standard Accessories	Instruction 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

Options

Option Code	Specification
732□□/R	With rubber case

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 73201	Accuracy 73202/04	Accuracy 73203	Input Resistance	Maximum Input Voltage
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 73201	Accuracy 73202	Accuracy 73203/04	Input Resistance	Maximum Input Voltage
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 73201	Accuracy 73202	Accuracy 73203	Voltage Drop	Maximum Input Current
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) 73201	Accuracy (40 – 500 Hz) 73202	Accuracy (40 – 500 Hz) 73203	Voltage Drop	Maximum Input Current
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 73201 to 73204	Maximum Testing Current	Open-circuit Voltage	Input Protection Voltage
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 73201 to 73204	Open-circuit Voltage	Input Protection Voltage
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 73201 to 73204	Open-circuit Voltage	Input Protection Voltage
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 73201/04	Accuracy 73202	Accuracy 73203	Input Protection
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

Model
753603

3.5 digits | 3200 count

Refer to page 9 for optional accessories.

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

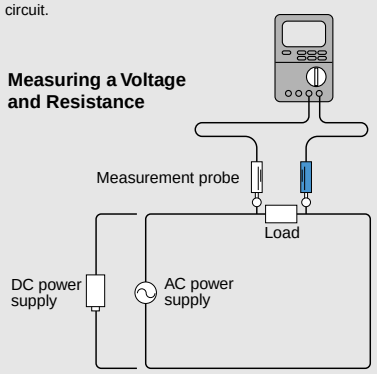
Model		753603
Display		Digital display: 3200-count digital reading; bar graph: 32 segments
Measuring Rate		Digital display: 2 times/sec; bar graph: 12 times/sec
Measurement Functions	DC Voltage (basic accuracy)	300.0 mV – 450 V (0.7 % + 2)
	AC Voltage (basic accuracy)	3.000 – 450 V (2.3% + 5)
	Resistance (basic accuracy)	300.0 Ω – 30.00 MΩ (2% + 2)
Continuity Check		Buzzer sounds at approximately 20 Ω or less.
Additional Functions		Data hold, diode test
Usable Circuit Voltage		250 V or less
Power Supply		Two LR44 or SR44 dry cells
Battery Life		Approx. 250 hours (for continuous DC voltage measurement with SR44 cells)
Auto Power Off		The power is automatically turned off when no operation is made forapproximately 10 minutes (can be disabled).
Dimensions		51 (W) x 106 (H) x 10 (D) mm
Weight		Approx. 110 g (including batteries and case)
Safety Standards		Conforms to EN61010-1 safety standard
Standard Accessories		Instruction manual: 1, LR44 cells: 2, Pocketbook-style case: 1

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.

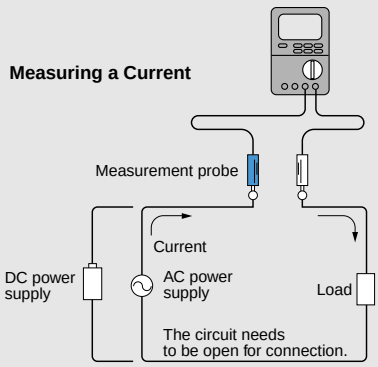
Measuring a Voltage and Resistance



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.

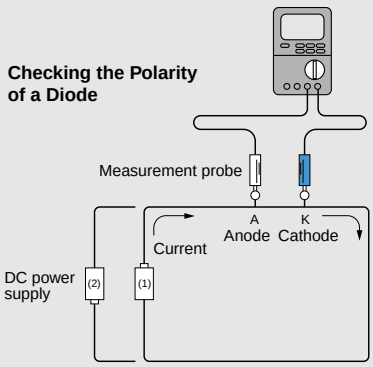
Measuring a Current



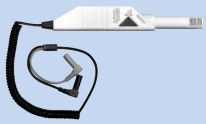
Diode Test

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

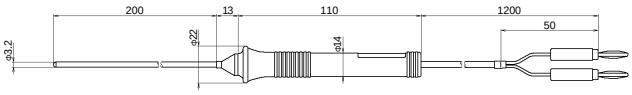


Optional Accessories and Spare Parts

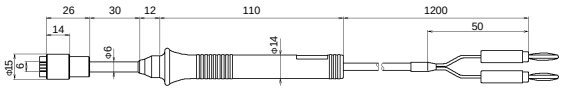
Name	Model	Specification	Applicable DMM Models	Appearance
DMM communication package	92010-E	Communication cable (D-Sub 9-pin female) + software	734 series	
	92010-E/P	Above + RS 232 cable for printer (Model 91015)	734 series	
Printer	97010	Thermal printer (paper width: 112 mm)	734 series	
AC adapter for printer	94006 94007	(For Europe) 230 VAC ± 10% (For USA) 120 VAC ± 10%	734 series	
Thermal print paper	97080	One package of 10 rolls	734 series	
Test leads	RD031	L-plug, Red / black(1set)	All models except 7536	
	B9646HA	Red / black(1set)	753603	
Alligator clips	B9646HF	Red / black(1set)	All models	
Fuse	F02	15 A/250 V	73201 / 73202 / 73203	
	F05	500 mA/250 V	73201 / 73202 / 73203	
	A1518EF	500 mA/600 V	733 / 734 series	
	A1519EF		733 / 734 series	
Rubber case	93007		732 series	
Carrying Case	B9646GB	Hard case	732 series	
	B9646HH	Hard case	733 / 734 series	
	93014	Hard case (also for housing RS-232C cable)	734 series	
Pocketbook-style case	B9646HB	Hard case	753603	
Thermistor probe	234901	-50˚C to 150˚C (for liquid)	733 series	
Temperature (thermocouple type K) probe	90050	-50˚C to 600˚C (for liquid)	734 series	
	90051	-50˚C to 600˚C (for liquid)	734 series	
	90055	-20˚C to 250˚C (for surface)	734 series	
	90056	-20˚C to 500˚C (for surface)	734 series	
Current clamp probe	96001	For 400 A AC; 10 mV/A AC output Note: Use AC voltage range of the DMM. Note: Need to convert the meter reading. EX) read the DMM indication of 1 V as 100 A.	All models except 7536	
Hygrothermal probe	90001	0 to 95% RH; 1 mV/% RH output -10˚C to 50˚C; 1 mV/˚C output Note: Use DC mV range of the DMM. Note: Need to convert the meter reading. EX) read the DMM indication of 50 mV as 50% RH.	All models except 7536	

Detailed Specification and Dimentions of Temperature probe

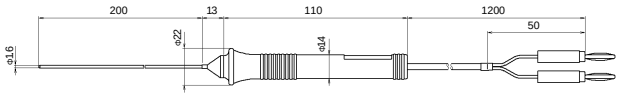
Model and Ordering code	Probe type	Measuring range	Sensor Diameter	Sensor Length	Accuracy
90050	Rounded end	-50 to 600˚C [-58 to 1112 F]	3.2 mm dia	200 mm long sheath	0.4% or ± 1.5˚C (± 2.7 F)
90051	Rounded end	-50 to 600˚C [-58 to 1112 F]	1.6 mm dia	150 mm long sheath	0.4% or ± 1.5˚C (± 2.7 F)
90055	Surface straight	-20 to 250˚C [-4 to 482 F]	Diameter of temp. sensing portion 15 mm		0.75% or ± 2.5˚C (± 4.5 F)
90056	Surface straight	-20 to 500˚C [-4 to 932 F]			0.75% or ± 2.5˚C (± 4.5 F)



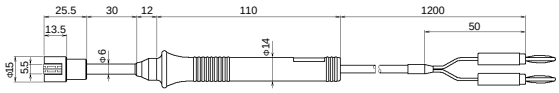
90050



90055



90051



90056

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

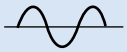
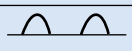
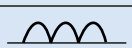
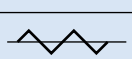
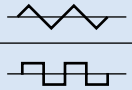
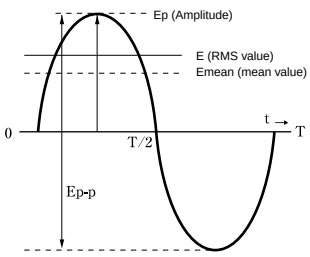
Item	Waveform	RMS	Mean value	Waveform factor	Crest factor
Sine wave		$\frac{1}{\sqrt{2}}=0.707$	$\frac{2}{\pi}=0.637$	$\frac{\pi}{2\sqrt{2}}=1.11$	$\sqrt{2}=1.414$
Half rectification wave		$\frac{1}{2}=0.5$	$\frac{1}{\pi}=0.318$	$\frac{\pi}{2}=1.571$	2
Full rectification wave		$\frac{1}{\sqrt{2}}=0.707$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

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

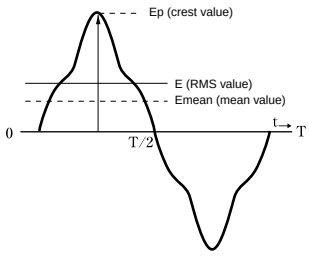
$$Emean=\frac{2}{\pi}\,Ep=0.6366\cdot Ep$$

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

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 M&C 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)

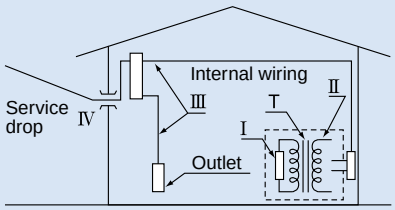
The parameters EMI and EMS are referred to as electromagnetic compatibility as they relate to compatibility within an electromagnetic environment.

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 overvoltage 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.

Overvoltage 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 overvoltage categories I through IV. 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.



Overvoltage category I (CAT I):
Secondary circuits connected to an outlet via a power transformer.

Overvoltage category II (CAT II):
Primary circuits of a device connected to an outlet with a power cord.

Overvoltage category III (CAT III):
Primary circuits of a device to which power is directly supplied from the power distribution panel, and circuits from the distribution panel to outlets.

Overvoltage category IV (CAT IV):
All service line entrance circuits through the power distribution panel

YOKOGAWA

Yokogawa M&C Corporation

World Wide Web site at
http://www.yokogawa.com/MCC

⚠NOTICE

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

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