



**MEASURING INSTRUMENTS
GENERAL CATALOG**

Ver.7

one step beyond tomorrow

MULTI MEASURING INSTRUMENTS CO.,LTD.

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Clamp Tester Selection Guide

(1) CLAMP TESTERS FOR AC/DC CURRENT

Model	CT (Jaw) Size	Display	AC Current	Resolution (ACA)	DC Current	Resolution (DCA)	Data Hold	Max. Hold	A/D Conversion	Conformity CE	Remarks	Page
230	23mmφ	LCD 1999	20A/200A	0.01A	20A/200A	0.01A	○	—	Average	—	Mini size, High accuracy	17
240	30mmφ	LCD 1999	20A/200A	0.01A	20A/200A	0.01A	○	—	Average	○	Mini size, Economy	17
250	40mmφ	LCD 1999	200A/1000A	0.1A	200A/1000A	0.1A	○	—	Average	○	Mini size, Economy	17
260	55mmφ	LCD 4000	400A/1000A	0.1A	400A/1000A	0.1A	○	—	Average	○	AC/DCA, AC/DC V,Ω, Hz ⓘ) ⚡	18
270	55mmφ	LCD 4000	400A/1000A	0.1A	400A/1000A	0.1A	○	—	True RMS	○	AC/DCA, AC/DC V,Ω, Hz ⓘ) ⚡	18
280	40mmφ	LCD 9999	1000A	0.1A	1000A	0.1A	○	○	Average	○	AC/DCA, AC/DC V,Ω	19
290RMS	30mmφ	LCD 4000	40A/400A	0.01A	40A/400A	0.01A	○	—	True RMS	○	AC/DCA, AC/DC V,Ω	19
600	20mmφ	LCD 1999	200mA/2000mA/10A	0.1mA	200mA/2000mA/10A	0.1mA	○	○	Average	○	High resolution, CT:Double Shielding	20
700	5mmφ	LCD 9999	100mA/1000mA/10A	0.01mA	100mA/1000mA	0.01mA	○	—	Average	○	High precision	21
730	30mmφ	LCD 9999	100mA/1000mA/10A	0.01mA	100mA/1000mA	0.01mA	○	—	Average	○	High precision	21
740	40mmφ	LCD 9999	100mA/1000mA/10A	0.01mA	100mA/1000mA	0.01mA	○	—	Average	○	High Precision	21
FCM-100	200mmφ	LCD 3200	3A/30A/300A/2500A	1mA	3A/30A/300A/2500A	1mA	○	—	Average	pending	Flexible CT	12

(2) CLAMP TESTERS FOR LINE CURRENT (HIGH-VOLTAGE CIRCUIT)

Model	CT (Jaw) Size	Display	AC Current	Resolution (ACA)	DC Current	Resolution (DCA)	Data Hold	Max. Hold	A/D Conversion	Conformity CE	Remarks	Page
HCL-3000	33mmφ	LCD 1999	200mA/20A/200A	1mA	—	—	○	—	Average	pending	For high voltage circuit	22
HCL-5000	33mmφ	LCD 1999	20/200/500A	0.01A	—	—	○	—	Average	pending	For high voltage circuit	22
HCL-5000D	40mmφ	LCD 1999	20A/500A	0.01A	—	—	○	—	Average	pending	For high voltage circuit	23
HCL-1000D	35mmφ	LCD 1999	20A/600A	0.01A	—	—	○	—	Average	pending	For high voltage circuit	23
HCL-9000S	35mmφ	LCD 1999	20A/600A	0.01A	—	—	○	—	Average	pending	For high voltage circuit,Optical isolation	24

Clamp Tester Selection Guide

(3) MINI CLAMP TESTERS FOR LEAKAGE CURRENT

Model	CT (Jaw) Size	Display	AC Current	Resolution (ACA)	DC Current	Resolution (DCA)	Data Hold	Max. Hold	A/D Conversion	Conformity CE	Remarks	Page
100	18mmφ	LCD 1999	200mA/20A	0.1mA	—	—	○	—	Average	○	Mini size,Earth Leakage	25
102	23mmφ	LCD 1999	200mA/100A	0.1mA	—	—	○	—	Average	—	Mini size,Earth Leakage	25
104	33mmφ	LCD 1999	200mA/150A	0.1mA	—	—	○	—	Average	—	Mini size,For small current measurement	25
110	30mmφ	LCD 1999	2mA/20mA/60A	1μA	—	—	○	—	Average	—	Mini size,High resolution	26
140	40mmφ	LCD 3200	30/300mA/30/300A	0.01mA	—	—	○	—	Average	○	Mini size, Wide ranges	27
140HC	40mmφ	LCD 3200	320mA/320A	0.01mA	—	—	○	—	Average	○	Mini size, Wide Phase Current	29
2002	40mmφ	LCD1999	200mA/2A/20A/200A	0.1mA	—	—	○	—	True RMS	○	2CT method	29
310	40mmφ	LCD 3200	30/300mA/30/300A	0.01mA	—	—	○	—	Average	—	Mini size, w/direct touch CT	30
340	40mmφ	LCD 1999	2mA/20mA/60A	1μA	—	—	○	—	Average	○	Mini size,High resolution	31

(4) CLAMP TESTERS FOR LEAKAGE CURRENT

Model	CT (Jaw) Size	Display	AC Current	Resolution (ACA)	DC Current	Resolution (DCA)	Data Hold	Max. Hold	A/D Conversion	Conformity CE	Remarks	Page
MCL-350	40mmφ	Taut band meter	10mA/50mA/500mA/1/5/50/500A	0.01mA	—	—	○	—	Analog meter	○	ACA, ACV,Ω	32
MCL-400D	40mmφ	LCD 1999	0.2/2/10/200/400A	0.1mA	—	—	○	—	Average	—	ACA, ACV,Ω	32
MCL-500RMS	40mmφ	LCD 4000	40/400mA/4/40/400A	0.01mA	—	—	○	○	True RMS	—	High speed sampling 20times/sec	33
MCM-400	40mmφ	LCD 4000	40/400mA/4/40/400A	0.01mA	—	—	○	○	Average	—	Memory function for printer	34
MCL-800D	80mmφ	LCD 1999	200mA/2/20A/200/1000A	0.1mA	—	—	○	—	Average	—	80mmCT, Data output	35
MCL-1100D	108mm	LCD 3200	200mA/2/20A/200/1000A	0.1mA	—	—	○	—	True RMS	○	Big Jaw	36
MCL-4000F	36mmφ	LCD 1999	200/2000mA/800A	0.1mA	—	—	○	—	Average	—	3CT/4CT Method	37
RLM-1	210mmφ	LCD 3200	3000mA/30A/300A/3000A	1mA	—	—	○	—	True RMS	pending	Flexible CT, Signal Output	11

(5) CLAMP TESTERS FOR IOR LEAKAGE CURRENT

Model	CT (Jaw) Size	Display	AC Current	Resolution (ACA)	DC Current	Resolution (DCA)	Data Hold	Max. Hold	A/D Conversion	Conformity CE	Remarks	Page
340IR	40mmφ	LCD 9999	10mA/100mA/1A	0.001mA	—	—	○	—	Average	○	Mini size,Ior Current	39
MCL-400IR	40mmφ	LCD 4000	40mA/400mA/4A/40A/300A	0.01mA	—	—	○	—	Average	○	Harmonic Current Voltage	39
MCL-500IR	40mmφ	LCD 4000	40mA/400mA/4A/40A/500A	0.01mA	—	—	○	—	True RMS	○	Ior Current, ACV	40
MCL-800IR	80mmφ	LCD 9999	10mA/100mA/1000mA/1A	0.001mA	—	—	○	—	True RMS	○	Ior Current, ACV	40

(6) CLAMP TESTERS FOR LINE CURRENT

Model	CT (Jaw) Size	Display	AC Current	Resolution (ACA)	DC Current	Resolution (DCA)	Data Hold	Max. Hold	A/D Conversion	Conformity CE	Remarks	Page
200	23mmφ	LCD 1999	20A/200A	0.01A	—	—	○	—	Average	—	Mini size, w/direct touch CT	41
210	23mmφ	LCD 1999	20A/200A	0.01A	—	—	○	—	Average	—	Mini size, Economy	41
220	33mmφ	LCD 1999	20A/200A	0.01A	—	—	○	—	Average	○	Mini size, Economy	42
225	40mmφ	LCD 1999	200A/600A	0.1A	—	—	○	—	Average	○	Mini size, Economy	42
2020	40mmφ	LCD 3200	30/300A	0.01A	—	—	○	—	Average	○	ACA, AC/DC V,Ω	43
3000	40mmφ	Taut band meter	6A/15A/50A/150A/600A	0.1A	—	—	○	—	Analog meter	○	ACA, ACV,Ω	43
2010	40mmφ	LCD 1999	20A/200A/600A	0.01A	—	—	○	—	Average	○	ACA, AC/DC V,Ω ⓘ) ⚡	44
2100	55mmφ	LCD 1999	20A/200A/2000A	0.01A	—	—	○	—	Average	○	ACA, AC/DC V,Ω ⓘ) ⚡	44
M-1800	80mmφ	LCD 1999	20/200A/1800A	0.01A	—	—	○	—	Average	—	80mmCT, Data output	35
MCL-3000D	108mm	LCD 3200	30/300/3000A	0.01A	—	—	○	—	True RMS	○	Big Jaw	36

FIELD MEASURING INSTRUMENTS FOR PV SYSTEMS

INSULATION RESISTANCE TESTERS

MIS-PV SERIES PATENT PENDING

Three Models Line-up according to the applications



MIS-PV1

PV OK

2
RANGE

- Can measure accurately during PV generating
- Safety – no need to short-circuit P & N phase
- Measurable from AC circuit to PV panels
- Switchover 2 ranges – 500/1000V



MIS-PV2

PV OK

4
RANGE

AC
VOLT

- Can measure accurately during PV generating
- Safety – no need to short-circuit P & N phase
- Measurable from low voltage circuit to PV panels
- Can measure AC voltage (AC0~599V)
- Switchover 4 ranges - 125/250/500/1000V



MIS-PVS

PV OK

2
RANGE

DC
VOLT

DETERIO
RATION

- Can measure accurately during PV generation
- Safety – no need to short-circuit P & N phase
- Measurable from AC circuit to PV panels
- With function to judge deterioration point (only for solar panel measurement)
- Measurable generated voltage (DC0~999V)
- Switchover 2 ranges – 500/1000V

FIELD MEASURING INSTRUMENTS FOR PV SYSTEMS

DIFFERENCE FROM ORDINARY INSULATION RESISTANCE TESTERS

Generally, PV systems are generating powers always during day time and the measurement of insulation resistance should be done under live line conditions.

In case of ordinary resistance testers, the generated voltage will have an influence on measured values and in addition, there is a possibility that the tester might be damaged caused by superimposed voltage. In order to solve this problem, there is a measuring method by short-circuit of P & N phase but it is necessary to prepare the short-circuit breaker, etc. and there is possible danger that electric arcs happen by mis-operation.

MIS-PV series have been developed by taking the above matters into consideration and can measure insulation resistance accurately & safely even during PV generation without short-circuit by its unique designs.

By using MIS-PV series, safer and more efficient works for insulation resistance measurement of PV generating panels can be realized.

SPECIFICATIONS

RATED VOLTAGE EFFECTIVE	MIS-PV1/MIS-PVS(500/1000V) MIS-PV2(125/250/500/1000v)			
	125V	250V	500V	1000V
MAX. DISPLAY	20MΩ	50MΩ	100MΩ	2000MΩ
CENTER	0.5MΩ	1MΩ	2MΩ	50MΩ
FIRST EFFECTIV	0.02MΩ~10MΩ	0.05MΩ~20MΩ	0.1MΩ~50MΩ	2MΩ~1000MΩ
TOLERANCE	Less than ±5%			
SECOND EFFECT.	0.01MΩ~less 0.02MΩ Over 10MΩ~20MΩ	0.02MΩ~less 0.05MΩ Over 20MΩ~50MΩ	0.05MΩ~less 0.1MΩ Over 50MΩ~100MΩ	1MΩ~less 2MΩ Over 1000MΩ~2000MΩ
TOLERANCE	Less than ±10%			
DETERIORATION (ONLY MIS-PVS)	Deterioration point will be displayed on LCD in case of insulation resistance less than 1MΩ. ※Only during measurement of PV panels, indicate P or N phase and or between modules.			
AC VOLTAGE(ONLY MIS-PV2)				
RANGE	AC0~599V (Min. Resolution 0.1V)			
TOLERANCE	±1.5%rdg±10dgt			
DC VOLTAGE(ONLY MIS-PVS)				
RANGE	DC0~999V (Min. Resolution 0.1V)			
TOLERANCE	±1.5%rdg±10dgt			

GENERAL

DISPLAY RANGE	3.200MΩ/32.00MΩ/320.0MΩ/3200MΩ (4 Range Auto)
OTHER FUNCTIONS	OVER RANGE DISPLAY, DATA HOLD, AUTO POWER OFF, BACKLIGHT, LOW BATTERY DISPLAY, AUTO DISCHARGE
STANDARD	JIS C 1302 Equivalent
OPERATING TEMP.	0~40°C, less than 80%RH (without condensing)
POWER SUPPLY	1.5V (AA size, LR6) alkali battery×6 pcs.
DIMENSION/WEIGHT	170(W)×105(D)×52(H)mm, approx. 350g (without batteries)
ACCESSORIES	MIS-PV1 : Line Cord×1, Earth Cord×1, Case for Cords MIS-PV2 : Line Cord×1, Earth Cord×1, Hard Case for Instrument×1 MIS-PVS : Line Cord×2, Earth Cord×1, Hard Case for Instrument×1 Common : Insulation Cap×1, Belt×1, LR6 battery×6, Instruction Manual×1

Model MIS-PVS TECHNICAL GUIDE

GENERAL

We developed the insulation resistance tester which can measure insulation resistance at solar panels easily under generating condition. (Patent Pending).

The ordinary insulation resistance testers cannot measure resistance correctly during generation but model MIS-PVS can make measurement easily regardless of generating or no power and also can display the insulation failure point. (at P phase side, N phase side or between modules).

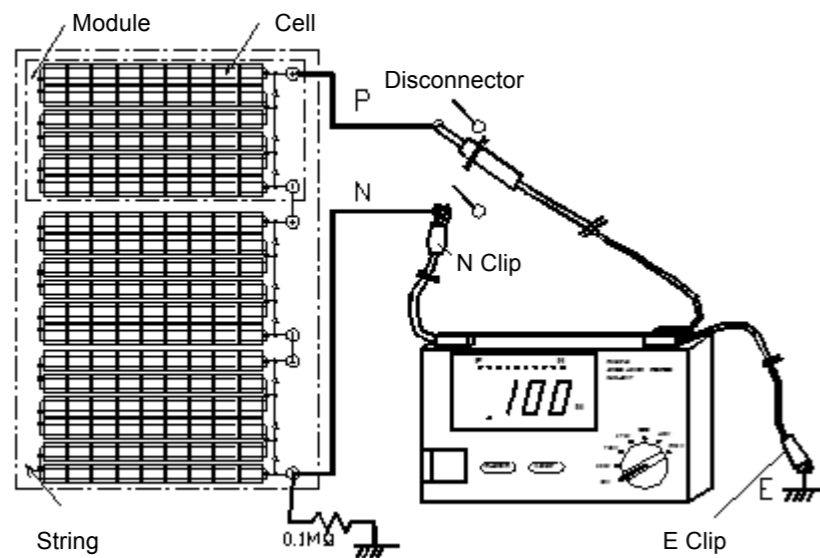
- (1) Can measure the insulation resistance at solar panel side under generating conditions.
- (2) Indicate the insulation failure point of PV systems.
- (3) Can measure the insulation resistance of ordinary electrical equipment.

MEASUREMENT

Make the disconnecter off and apply N clip of the tester to N phase side.

Then connect E clip to grounding earth side and apply the probe to P phase side of solar panel. Set the measuring switch of MIS-PVS on and the insulation resistance value is displayed on LCD.

In case of the measured value less than $1M\Omega$, P1~P12 on LCD display will be lightening. When P3 is lightening, there is an insulation failure at the place between 3/10 and 4/10 of whole modules. P1 will be lightening in case of the insulation failure at P phase side and P11 will be lightening in case of failure at N phase side.

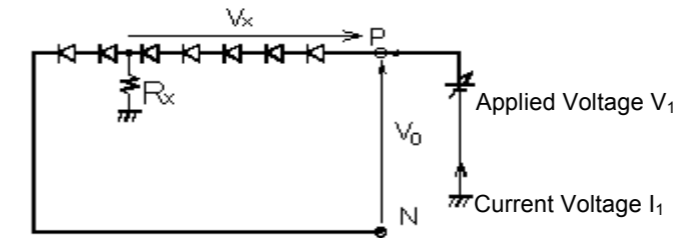


Drawing 1. How to display the insulation failure point

Model MIS-PVS TECHNICAL GUIDE

THEORY

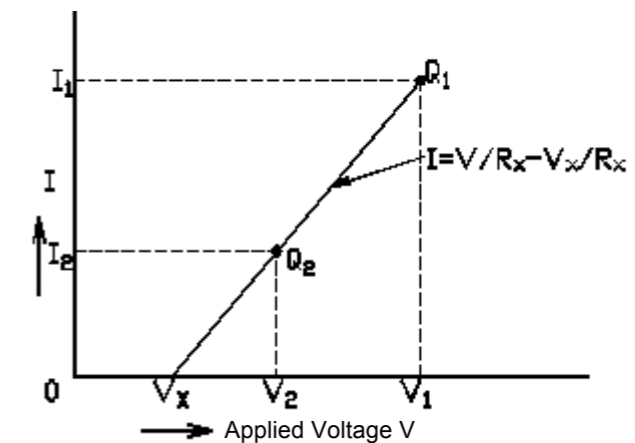
As shown on the drawing 2, considering that an insulation failure (R_x) happens between solar panel modules and provided that the generated voltage of PV system is V_0 and the voltage from insulation failure point to P phase terminal is V_x . Also, provided that applied voltage is V_1 and current is I_1 .



Drawing 2. Circuit Diagram in case of applying voltage to solar cell

When measuring the insulation resistance two times by changing voltage, provided that the first applied voltage is V_1 , current I_1 and the second applied voltage is V_2 , current I_2 , the drawing 4 is showing the relation between these applied voltages and currents.

The intersection point V_x with horizontal axis (current $I=0$) on the drawing 4 is showing the generated voltage of solar panel from P phase to the insulation failure point. The insulation failure point can be specified by the ratio of the generated voltage of solar panel V_0 to the generated voltage to failure point V_x .



Drawing 4. Relation between applied voltage, current value and insulation failure point

FIELD MEASURING INSTRUMENTS FOR PV SYSTEM

MULTI CIRCUIT DC CURRENT MONITOR (16 CHANNELS)

Model **MCM-1600PV**



Measuring + display of DC current values generated by PV systems and DC load current of related apparatus in multi circuit successively for a long term as well as memorizing the average current values between the intervals, of which data can be transmitted to PC in Excel File.

The circuits to be measured are max. 16 lines and in PV systems, can measure DC current per each string unit at the same time.

Using clamp type current sensors which enable safe and easy operation.

MEASURE · MEMORIZE · DISPLAY THE DC CURRENT OF MAX.16 CIRCUITS AT THE SAME TIME.
EASY FOR DATA MANAGEMENT (STORAGE BY CSV FORMULA).

GENERAL

1. MEASURING FUNCTION

By Connecting Optional CT Sensors, the instrument can Measure and memorize DC current of 16 circuit at the same time and the memorized data can be seen even During measurement.

2. LOGGING MEASURING FUNCTION

This instrument displays and memorizes the average current between the selected intervals.

Interval : 1 / 5 / 10 / 15 / 30 / 60 minutes

Contents of Memory : Measuring Time / Measuring Circuit / The average current value

Capacity of Memory : Approx. 20,000 data (72 days with 5 minutes interval)

3. OTHER FUNCTION

Over Range Indication : "OL" mark on LCD

Low Battery Indication : "B" mark on LCD

Logging Mode Indication : "R" mark on LCD

Auto Power Off : Approx. 10 minutes after last key operation. (this function will not be active in case of using AC adaptor, timer set on and logging mode)

SPECIFICATIONS

Number of Measuring Circuit : 16 circuits (channels)

Detection Method : Clamp-on CT method

Measuring Range : DC0~99.9A

Minimum Resolution : 0.1A

Measuring Accuracy : $\pm 3\%rdg \pm 5dgt$

Sampling : Approx. 20mS

Measuring Temperature: 0~50°C, less than 80%RH w/o condensing

Storage Temperature : -10~60°C, less than 80%RH w/o condensing

Measuring Circuit Voltage : less than DC600V (insulated conductor)

Insulation Resistance : more than 100MΩ by DC500V insulation tester(between input terminal and housing case) more than 50MΩ by DC500V insulation tester (between power supply source and housing case)

Withstanding Voltage : AC2200V (50 / 60Hz) one minute between power supply source and housing case

Power Supply : AC100V~240V with adapter

Internal Ni-hydrate Battery

Battery Life : Approx. 4 days at continuous use by full charge

Dimensions & Weight : 236(W)×170(H)×56(D)mm, approx. 840gs

Standard Accessories : Carrying Case, AC Adapter, USB Cable, Instruction Manual

Optional Accessories : CT-30PV Clamp CT with i.d. 30mm & 2.8m cable, CT Carrying Case (for max. 8 CTs)

FIELD MEASURING INSTRUMENTS FOR PV SYSTEMS

INSULATION RESISTANCE TESTER FOR DC CURRENT CIRCUIT

Model **MSEI-100C**



GENERAL

This model can measure insulation resistance of DC current circuit in PV systems (between PV module and power conditioner) on the live line and can distinguish the deteriorated part between Power Phase, Neutral Phase, P/N Phase and or PV modules.

SPECIFICATIONS

1. Detection Method

Measurement of DC voltage to the ground by standard resistor.

2. Measuring Function

Generated Voltage (DCV) /Insulation Resistance of P Phase/

Insulation Resistance of N Phase/Insulation Resistance of P.N

Phase/

Insulation Resistance between modules

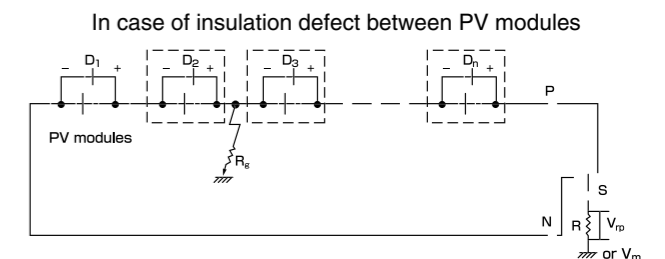
3. Measuring Range

Generation Voltage DC0.1V~599.9V

Insulation Resistance 0.01MΩ~19.99MΩ

4. Judgement Method

When the insulation resistance becomes less than 1MΩ at each phase, Red LED lamp will lighten at the point of insulation defect. In case of no problem for insulation resistance, Green Lamp will lighten.



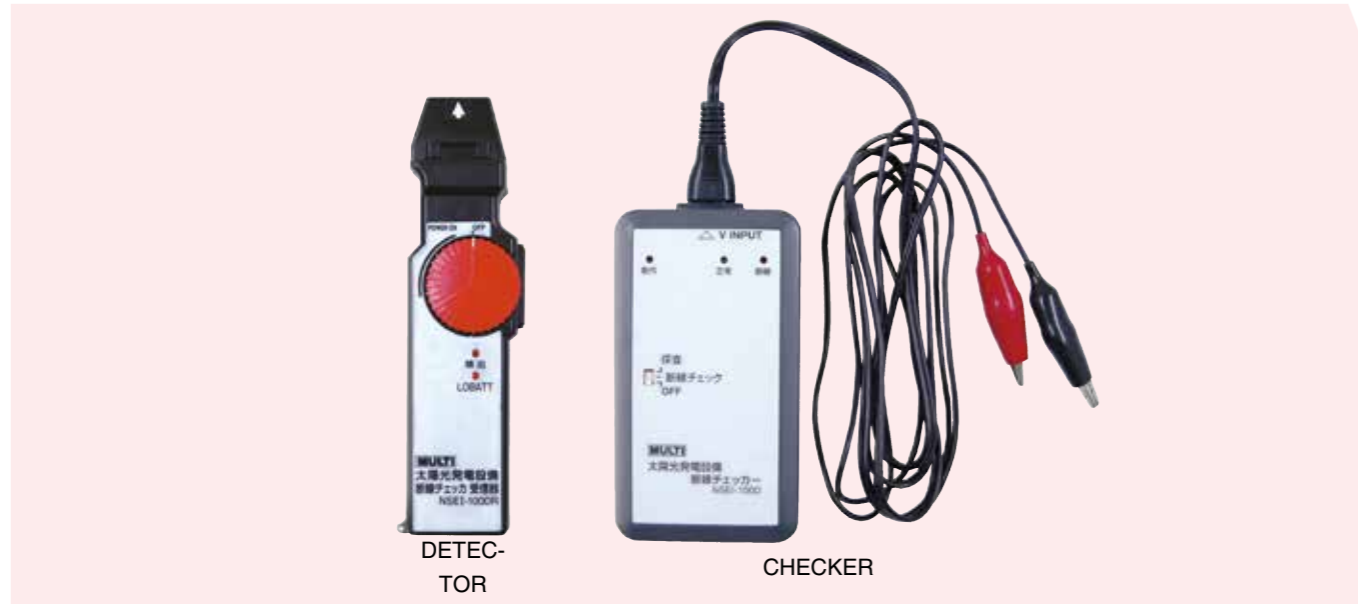
MEASURING METHOD

1. Connect the lead wires with Power Phase, Neutral Phase and Ground according to the circuit to be measured.
2. Memorize the internal standard resistance value.
3. Measure the generated voltage between Power and Neutral Phase.
4. Measure the insulation resistance of Power Phase.
5. Measure the insulation resistance of Neutral Phase.

FIELD MEASURING INSTRUMENTS FOR PV SYSTEMS

DISCONNECTION DETECTOR FOR DC CURRENT CIRCUIT

Model **NSEI-100D**



GENERAL

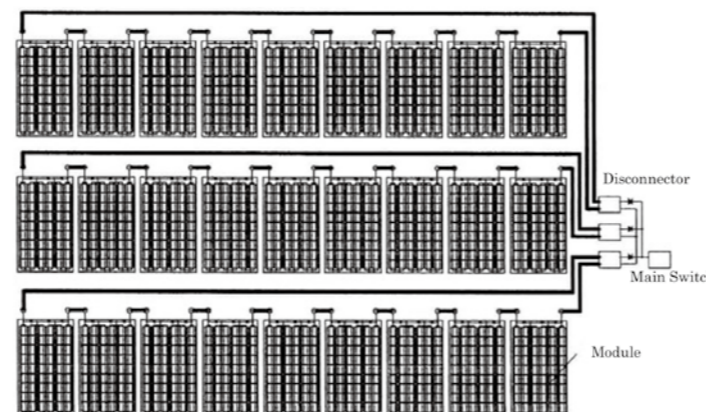
This device can detect the disconnected & broken point of DC current lines between PV panels and power conditioners in PV systems, without cutting power off and without climbing the roof where PV modules are located. Furthermore, this model can find out the disconnecting point by applying the attached detector to the specific PV module.

SPECIFICATIONS

- CHECKER**
 Applicable Voltage : DC0~440V±10%
 Applying Frequency : 5KHz
- DETECTOR**
 Detective of Magnetic Flux by Signal Current
 Detection Sensitivity : 4 steps by manual
 Continuity : LED lightening and intermittent beep by buzzer

MEASURING METHOD

- Switch off the disconnecter
- Connect lead wires of checker to the terminals at PV module side of disconnecter
- Switch on the disconnection checker
- In case of finding the disconnection, change the instrument to Detector (NSEI-100DR)
- Apply the Detector on PV modules and find out the disconnection point.
 At the disconnection point, LED and buzzer will stop.



FIELD MEASURING INSTRUMENTS FOR PV SYSTEMS

DC LEAKAGE CURRENT MONITOR

Model **MDLA-100**

GENERAL

This DC Leakage Current Monitor constantly observes leakage current of DC circuit like as PV generation system, etc. and lights up the warning lamp with signal output, when the leakage current exceeds the setting value.

COMPOSITION

- DC Leakage Current Monitor (MDLA-100)..... 1 (with power supply cord & magnet)
- DC Current Sensor (DCZCT-20)..... 1 (with input/output cable)
- Instruction Manual..... 1

SPECIFICATIONS

- SPEC. OF LEAKAGE CURRENT DETECTION**
 Numbers of Monitoring Circuit : 1 Channel
 Setting Current Values : 10/30/50/100/200mA
 Measurement : DC Leakage Current
 Detection Accuracy : within ±10%± 1mA to each range
 Detection Period : less than 2 sec. at the time of 120% of setting value
 Recovery Value : 80%± 5% of setting value
 Additional Time for Signal Output : 2-3 sec.
- SPEC. OF CT**
 Inside Diameter : φ20mm
 Structure : Non-Split Core Type ZCT
- SPEC. OF WARNING DISPLAY & SIGNAL OUTPUT**
 Warning Lamp (Red LED) lights and is kept lightening when leakage current exceeds the setting value for the period
 Numbers of Output Circuit : 1 circuit
 Output Method : Relay Contact (AC125V, 0.5A/DC24V, 1A), Resistance Loading
- GENERAL SPECIFICATION**
 Power Supply Voltage : AC100V±10%, 50/60Hz
 Operating Temperature : 0~50°C, less than 85%RH (w/o condensation)
 Storage Temperature : -20~60°C, less than 85%RH (w/o condensation)
 Withstanding Voltage : AC1000V, 1 minute between power input and case AC1000V, 1 minute between signal output and case
 Insulation Resistance : more than 100MΩ by DC500V insulation tester between power input and case more than 100MΩ by DC500V insulation tester between signal output and case
 Dimension & Weight : 85.5(H)×110(W)×5(D)mm, Approx. 300gs.
- OTHER SPECIFICATION**
 Test Function : By pushing test switch, warning lamp lights and output signal becomes ON.
 Reset Function : By pushing reset switch, warning lamp goes out and can reset it.
 In case of operating when reset, warning lamp lights again.



FLEXIBLE LEAKAGE/LINE CURRENT TESTER

AC CURRENT

Model **RLM-1**



FEATURES

- Freely Bending with Rogowski Method Flexible Clamp Sensor
- Useful for Difficult Access Locations with Wide Ranges
- Even Coreless Coil but Least Influence from External Magnetic Field and Residual Current
- Superior Flexible CT enables Leakage Current Measurement

SPECIFICATIONS

1) CURRENT DETECTION PART (CT SENSOR)

Sensing Method : Flexible Split-Core Type
 Inside Diameter : $\phi 210\text{mm}$ (total length approx. 650mm)
 Influence of Residual Current : Less than 0.5A (at AC 50A, the point where influence is most receivable)
 Withstanding Voltage : AC 2200V/1 minute
 Length of Lead Wire : Approx. 2m between CT and Measuring Part

2) MEASURING PART

Measuring Function : AC Line Current, AC Leakage Current
 Measuring Method : Dual Integration Mode
 Measuring Range : AC 3000mA/30A/300A/3000A (50/60 Hz)
 Range Selection : 4 Range Manual by Rotary Switch
 Sampling Rate : 2 Times/sec.
 Display : LCD max. 3200 reading with annunciators
 Over Range Indication : "OL" mark on LCD
 Data Hold Indication : "DH" mark on LCD
 Low Battery Indication : "B" mark on LCD
 Data Hold Function : by "DH" Switch
 Filter Function : by Filter Switch to cut hi-frequency (Low Pass Filter for cut off 150 Hz)
 Signal Output : DC 300mV full scale to each range (Output impedance : less than 10K Ω)

Auto Power Off : Approx. 10 minutes after power on (this function is cancelled in case of using recorder cable for signal output)

3) GENERAL SPECIFICATION

Circuit Voltage : Less than AC 600V
 Operating Temperature : 0~40°C, < 85%RH without condensation
 Storage Temperature : -10~60°C, < 70%RH without condensation
 Withstanding Voltage : AC 2200V/1 minute
 Power Supply : 1.5V ("AA" size, UM-3) \times 6
 Dimension (Measuring Part) : 159(W) \times 105(H) \times 53(D) mm
 Standard accessories : Battery (UM-3 \times 6), Instruction Manual, Carrying Case

4) ACCURACY (23°C \pm 5°C, less than 80%RH)

Range	Resolution	Accuracy
3000mA	1mA	$\pm 3\%$ rdg ± 10 dgt
30A	0.01A	$\pm 2.5\%$ rdg ± 5 dgt
300A	0.1A	
3000A	1A	
Signal Output		$\pm 2\%$ FS

FLEXIBLE LEAKAGE/LINE CURRENT TESTER

AC/DC CURRENT

Model **FCM-100**



FEATURES

- Freely Bending with Flexible Clamp Sensor
- Useful for Difficult Access Locations with Wide Ranges up to AC/DC 2500A With Minimum Resolution of 1mA
- Large Inside Diameter CT with 200mm

SPECIFICATIONS

1) CURRENT DETECTION PART (CT SENSOR)

Sensing Method : Flexible Split-Core Type
 Inside Diameter : $\phi 200\text{mm}$ (total length approx. 700mm, approx. 270g)
 Withstanding Voltage : AC 2200V/1 minute
 Length of Lead Wire : Approx. 2m between CT and Measuring Part

2) MEASURING PART

Measuring Function : AC/DC Line Current
 Measuring Method : Dual Integration Mode
 Measuring Range : AC/DC 3A/30A/300A/2500A (AC50/60 Hz & DC)
 Range Selection : 3 Range Manual by Rotary Switch
 Sampling Rate : 2 Times/sec.
 Display : LCD max. 3200 reading with annunciators
 Over Range Indication : "OL" mark on LCD
 Data Hold Indication : "DH" mark on LCD
 Low Battery Indication : "B" mark on LCD
 Data Hold Function : by "DH" Switch
 Zero Adjustment : for DC current range, by "0 SET" switch
 Auto Power Off : Approx. 10 minutes after power on

3) GENERAL SPECIFICATION

Circuit Voltage : Less than AC 600V
 Operating Temperature : 0-40°C, < 85%RH without condensation
 Storage Temperature : -10~60°C, < 70%RH without condensation
 Withstanding Voltage : AC 2200V/1 minute
 Power Supply : 1.5V (AA size, UM-3) \times 6
 Dimension (Measuring Part) : 159(W) \times 105(H) \times 53(D) mm
 Standard accessories : Battery (UM-3 \times 6), Instruction Manual, Carrying Case

4) ACCURACY (23°C \pm 5°C, less than 80%RH)

AC/DC Range	Resolution	Accuracy	
3A	0.001A	$\pm 3\%$ rdg ± 10 dgt	
30A	0.01A		
300A	0.1A		
2500A	1A	300A~2000A	$\pm 3\%$ rdg ± 10 dgt
		2001A~2500A	$\pm 10\%$ rdg ± 10 dgt

LIVE LINE CLAMP INSULATION RESISTANCE TESTER

The World First Live Line Clamp Insulation Resistance Tester

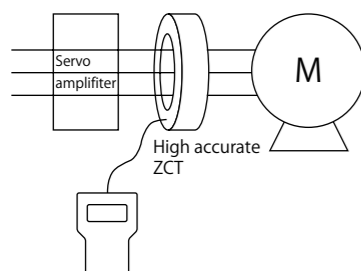
Model **MLIT-1**



FEATURES

- Easy and convenient live line insulation measurements for servomotor, equipments and power line.
- 10MΩ~20MΩ insulation resistance measurements with super accurate ZCT.
- The least influence from external magnetic field and noise.
- Phase voltage and leakage is also measurable.
- 99 sets of memory storage function for measured data.

Measuring example



For insulation resistance measurements of industrial robots



LIVE LINE CLAMP INSULATION RESISTANCE TESTER

The World First Live Line Clamp Insulation Resistance Tester

Model **MLIT-1**

PRIMARY SPECIFICATIONS

1. VOLTAGE INPUT SECTION

Voltage Input : Phase voltage (AC 50~500V)
Single phase detection
Phase Detection Method : (Single phase detection is also used for three phase circuit)
Input Impedance : More than 1MΩ
Input Frequency : 50Hz or 60Hz switchable
Resolution : 0.1V
Input Method : Direct input by test lead

2. CURRENT DETECTION SECTION

Detection Method : Split core type ZCT
CT Inside Size : φ30mm
CT Opening/Closing : Manual slide method
Withstanding Voltage : AC 2000V, 1 minute

3. MEASUREMENT SECTION

Measuring Function : AC Leakage current/line current, AC voltage, Insulation resistance
Measuring range
AC Leakage/Line Current : 0~AC 200.0μA/2mA/20mA/200mA (Auto-ranging)
AC Voltage : 0~500.0V (1 range)
Resolution
AC Leakage/Line Current : 0.1μA
AC Voltage : 0.1V
Insulation Resistance : Computation by current and voltage
Input Frequency : 45Hz 65Hz (50Hz/60Hz switchable)
A/D Conversion : Dual slope integration method
AC Conversion : Average sensing, true rms reading method
Display : LCD, max. 1999 count with annunciator
Over Range Indication : "OL" mark on LCD
Data Hold Indication : "DH" mark on LCD
Low Battery Indication : "B" mark on LCD
Sampling Rate : 2 times/sec (Without internal calibration)
Memory Storage : Measuring Data 99 sets
Operating Temperature : 0~40°C, < 85%RH (without condensation)
Storage Temperature : -10~60°C, < 70%RH (without condensation)
Withstanding Voltage : AC 2000V/1 minute (between CT and handle)
Limitation of Circuit Voltage : Less than AC 500V for insulated cable
Auto Power Off : Approx. 10 minutes after last key operation
Power Supply : LR6, AM-3 or AA size Alkaline battery×4

4. ACCURACY

Leakage (I_o), Line (I), Resistive (I_{or})

	Rang	Min Resolution	Accuracy (50/60Hz)
	Voltage	0.1V	0~499.9V±1.0%rdg±10dgt
I, I _o	200μA	0.1μA	0~199.9mV±1.0%rdg±10dgt
	2mA	0.001mA	0.200~1.999mV±1.0%rdg±10dgt
	20mA	0.01mA	2.00~19.99mV±1.0%rdg±10dgt
	200mA	0.1mA	20.0~220.0mV±1.0%rdg±10dgt
I _{or}	200μA	0.1μA	0~199.9mV±1.5%rdg±15dgt
	2mA	0.001mA	0.200~1.999mV±1.5%rdg±15dgt
	20mA	0.01mA	2.00~19.99mV±1.5%rdg±15dgt
	200mA	0.1mA	20.0~220.0mV±1.5%rdg±15dgt

CLAMP EARTH TESTER

Model MET-1



GENERAL

This Clamp Earth Tester Model MET-1/MET-2 measures the earth resistance by using two clamp CTs without disconnecting the earthing conductor and without using auxiliary ground rod and can measure only the objective earth resistance without any influence from other conductors.

FEATURES

- Completely different method from the ordinary Earth Testers.
- Just clamping two CTs to the earthing conductor and no need to use auxiliary earth rod.

APPLICATIONS FOR MEASUREMENT

1. Earth resistance for outer case of extra-high voltage equipment.
2. Earth resistance for arrester.
3. Earth resistance for secondary side of the extra-high voltage transformer.
4. Earth resistance for the conductors for equipotential bonding.
5. Static electricity protection equipment & appliance.
6. For single and multi-grounded systems.
7. Leakage current measurement.

SPECIFICATIONS

Measuring function	: Earth Resistance, AC Current (Line & Leakage)
Measuring method	: Dual integration mode, Clamping Two CTs
Display	: LCD, 16 letters/characters×2 lines with contrast adjustor
Safety standard	: Meets the requirements for double insulation to IEC 61010-1 installation CategoryII. 600V phase to earth.
Sampling	: Approx. 2 times/second for AC current
Measuring Time	: Approx. 30 second for earth resistance
Over range indication	: "OVER" on LCD readout both for AC current & earth resistance
Low battery indication	: "B" mark on LCD readout
Auto power off	: The meter is set to power off mode, approx. 5 minutes after the power swith on.
Data hold function	: "DH" mark on LCD readout.
Accuracy	: 23°C ± 5°C, 80%RH max.

Earth Resistance (MET-1)

Range	Resolution	Accuracy
200Ω	0.1 Ω	0~10Ω : ± 0.2 Ω 10~50Ω : ± 1.0 Ω 50~200Ω : ± 5.0 Ω

AC Current

Range	Resolution	Accuracy
200mA	0.1mA	2%rdg±8dgt
2000mA	1mA	
20A	0.01mA	

CT for detection : 340mm
 CT for superposition : 340mm, auto sweep 4KHz~400KHz (MET-1) 4KHz~200KHz(MET-2)
 superposing leve : approx.160mVp(MET-1) approx. 320mVp(MET-2)

Storage temperature : -10°C~60°C<80% RH without condensation
 Operating temperature : 0°C~40°C,<80% RH without condensation
 Circuit voltage : less than 500V
 Withstanding voltage : AC 3700V, 1minute between operation handle and CT core.

Power Supply : AC100V~240V (50/60Hz) with adaptor
 Internal Ni-Cd battery (1.2V×5)

Battery life : 400 times measurement under full charged condition (according to the times of charging and discharging).

Size & weight
 CT for detection : 90.5(W)×165(H)×38(D)mm, approx. 460g
 CT for superposition : 90.5(W)×165(H)×38(D)mm, approx. 440g
 Instrument body : 190(W)×140(H)×42(D)mm, approx. 800g
 Standard accessories : Detection Clamp CT..... 1
 Superposition Clamp CT.... 1
 AC Adaptor 1
 Carrying case..... 1
 Instruction Manual..... 1
 Subsidiary lead wire 1

CLAMP EARTH TESTER

Model MET-2



GENERAL

This Clamp Earth Tester Model MET-1/MET-2 measures the earth resistance by using two clamp CTs without disconnecting the earthing conductor and without using auxiliary ground rod and can measure only the objective earth resistance without any influence from other conductors.

FEATURES

- Completely different method from the ordinary Earth Testers.
- Just clamping two CTs to the earthing conductor and no need to use auxiliary earth rod.

APPLICATIONS FOR MEASUREMENT

1. Earth resistance for outer case of extra-high voltage equipment.
2. Earth resistance for arrester.
3. Earth resistance for secondary side of the extra-high voltage transformer.
4. Earth resistance for the conductors for equipotential bonding.
5. Static electricity protection equipment & appliance.
6. For single and multi-grounded systems.
7. Leakage current measurement.

SPECIFICATIONS

Measuring function	: Earth Resistance, AC Current (Line & Leakage)
Measuring method	: Dual integration mode, Clamping Two CTs
Display	: LCD, 16 letters/characters×2 lines with contrast adjustor
Safety standard	: Meets the requirements for double insulation to IEC 61010-1 installation CategoryII. 600V phase to earth.
Sampling	: Approx. 2 times/second for AC current
Measuring Time	: Approx. 30 second for earth resistance
Over range indication	: "OVER" on LCD readout both for AC current & earth resistance
Low battery indication	: "B" mark on LCD readout
Auto power off	: The meter is set to power off mode, approx. 5 minutes after the power swith on.
Data hold function	: "DH" mark on LCD readout.
Accuracy	: 23°C ± 5°C, 80%RH max.

Earth Resistance (MET-2)

Range	Resolution	Accuracy
10Ω	0.01Ω	0.1~1Ω : ±0.1Ω 1~10Ω : ±0.5Ω
300Ω	0.1 Ω	10~50Ω : ±2.0Ω 50~150Ω : ±5.0Ω 150~200Ω : ±20Ω 200~300Ω : ±30Ω

AC Current

Range	Resolution	Accuracy
200mA	0.1mA	3%rdg±8dgt
2000mA	1mA	2%rdg±8dgt
20A	0.01mA	2%rdg±8dgt

CT for detection : 340mm
 CT for superposition : 340mm, auto sweep 4KHz~400KHz (MET-1) 4KHz~200KHz(MET-2)
 superposing leve : approx.160mVp(MET-1) approx. 320mVp(MET-2)

Storage temperature : -10°C~60°C<80% RH without condensation
 Operating temperature : 0°C~40°C,<80% RH without condensation
 Circuit voltage : less than 500V
 Withstanding voltage : AC 3700V, 1minute between operation handle and CT core.

Power Supply : AC100V~240V (50/60Hz) with adaptor
 Internal Ni-Cd battery (1.2V×5)
 Battery life : 400 times measurement under full charged condition (according to the times of charging and discharging).

Size & weight
 CT for detection : 90.5(W)×165(H)×38(D)mm, approx. 460g
 CT for superposition : 90.5(W)×165(H)×38(D)mm, approx. 440g
 Instrument body : 190(W)×140(H)×42(D)mm, approx. 800g
 Standard accessories : Detection Clamp CT..... 1
 Superposition Clamp CT.... 1
 AC Adaptor 1
 Carrying case..... 1
 Instruction Manual..... 1
 Subsidiary lead wire 1

MINI DIGITAL CLAMP TESTER

AC/DC CURRENT

Model 230

AC-DC 20A-200A
23mmφ CT



FEATURES

- Useful for DC A measurement for automobile service.
- Data-hold function. Especially useful when working in dark or hard to get areas.
- Accurate gearing mechanism for closing of CT.
- Ultra compact size.

SPECIFICATIONS

Model	230		240		250	
Measuring method	Dual integration mode					
Display	3.5 digit LCD					
Range (AC Current)	20A	200A	20A	200A	200A	1000A
Resolution	10mA	100mA	10mA	100mA	100mA	1A
Accuracy AC Current (50/60Hz) (23°C±5°C, 80% RH or less)	±1.0%rdg±5dgt	±1.5%rdg±5dgt (0~150.0A) ±2.5%rdg±5dgt (150.0~199.9A)	±1.5%rdg±5dgt	±1.5%rdg±5dgt (0~150.0A) ±3.0%rdg±5dgt (150~199.9A)	±1.5%rdg±5dgt	±1.5%rdg±5dgt
Accuracy DC Current	±1.0%rdg±3dgt	±1.5%rdg±3dgt (0~±150.0A) ±2.5%rdg±3dgt (±150~±199.9A)	±1.5%rdg±3dgt	±2.0%rdg±3dgt (0~150.0A) ±3.0%rdg±3dgt (150~199.9A)	±1.5%rdg±5dgt	±1.5%rdg±5dgt
Jaw opening capability	23mmφ		30mmφ		40mmφ	
Overload indication	Blanking of all digits except MSD1					
Maximum indication	1999					
Low battery indication	"B" mark on LCD readout					
Sampling	2 times/s					
Limitation of circuit voltage	Less than AC 600V					
Operating temperature	0 °C to 40°C, <80% RH					
Storage temperature	-10 °C to 60°C, <70% RH					
Power supply	SR-44(1.55V)×2 or LR-44×2					
Power consumption	3mW					
Battery life	SR-44 : 200 hours, LR-44 : 100 hours					
Size	48(W)×146(H)×20(D)mm		44(W)×146(H)×20(D)mm(H)		54(W)×155(H)×20(D)mm	
Weight	Approx. 100g Approx. 80g Approx. 170g Approx. 80g Approx. 170g					
Accessories	Soft case1 Instruction manual1 Batteries(LR-44)2					

Model 240

AC-DC 0-20A/200A
30mmφ CT



FEATURES

- Ultra compact size and high accuracy AC/DC clamp-on tester.
- Data hold function. Especially useful when working in dark or hard to get areas.
- Wide range of current measurements from AC/DC 0.01A to 200A with 30mmφ CT.
- Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002) installation CategoryII 600V phase to earth, CategoryIII 300V phase to earth.
- E.M.C. standard : The instrument meets EN 61326 (2006).

Model 250

AC-DC 200A-1000A
40mmφ CT



DIGITAL CLAMP TESTER

AC/DC CURRENT

Model 260

Average reading
55mmφ CT



- Over range indication : Blanking of all digits except MSD1 (Except AC/DC 2000A range)
- Low battery indication : "B" mark on LCD readout
- Sampling : 2 times/s
- Data hold indication : "DH" mark on LCD readout
- Auto power off : The meter is set to power off mode approx. 10 minutes after the power switch on.
- Operating temperature : 0°C to 40°C, <80%RH (Non-condensing)
- Storage temperature : -10°C to 60°C, <70%RH (Non-condensing)
- Power supply : 1.5V ("AAA" size R03)×2
- Power consumption and battery life : Approx. 14mW, 100 hours continuous.
- Size : 85(W)×240(H)×34(D)mm
- Weight : Approx. 350g
- Accessories : Carrying case.....1 Instruction manual.....1 Batteries.....2 Test lead.....1 set

Measuring ranges (23°C±5°C, < 80%RH) :

Range	Resolution	Accuracy	Max. input
~A (50/60Hz) ∴ A Manual range	40A	± 2% rdg ± 8 dgt	AC/DC 2000A
	400A		
	2000A	± 1.5% rdg ± 8 dgt	
~V (50/60Hz) ∴ V Auto/Manual range	400mV	± 1.2% rdg ± 8 dgt (50/60Hz)	AC/DC 600V rms
	4V		
	40V		
	400V		
Hz Frequency Auto range	100Hz	± 0.5% rdg ± 3dgt	AC/DC 600V rms
	1000Hz		
	10kHz		
	100kHz		
	1000kHz		
Ω (Resistance) Auto/Manual range	400Ω	± 1.5% rdg ± 8dgt	input protection
	4kΩ		
	40kΩ		
	400kΩ		
	4000kΩ		± 3% rdg ± 10dgt
Continuity check	400Ω	0.01Ω	250V rms
Diode test	3V	0.001V	± 10% rdg ± 3dgt

Model 270

True rms reading
55mmφ CT

FEATURES

- Low cost high performance and average reading AC/DC clamp tester.
- 4000 count full scale display.
- Additional AC/DC voltage, resistance, frequency test, continuity check and diode test function.
- Auto power off and data hold function.
- Convenient push switch for auto zero adjustment in DC current measurement.

SPECIFICATIONS

- AC conversion : Average sensing RMS reading
- Safety standard : Meets the requirements for double insulation to IEC 61010-1(2010), IEC 61010-2-032 (2002) installation CategoryIII 600V phase to earth.
- E.M.C. standard : The instrument meets EN 61326 (2006).
- Withstanding voltage : AC 5500V, 1minute (Between outer case and core of CT)
- Measuring method : Dual integration mode
- Jaw opening capability : 55mmφ
- Display : 3.5 digit LCD max. reading of 3999 and annunciators

MINI DIGITAL CLAMP TESTER

AC/DC CURRENT AC/DC VOLTAGE RESISTANCE

Model 280

meets safety Standard CAT.II 600V and CAT.III 300V



FEATURES

- 30mmφ CT window and ultra compact size
- Conform to IEC safety requirements.
- Low cost and multi-function clamp tester.
- Max. & Min.hold function
- Data-hold function and auto power off.
- One push zero adjust function for DC current range

SPECIFICATIONS

Measuring method	: Successive approximation mode
Display	: 4 digit LCD max. reading of 9999
Measuring range	: AC Current 1000A DC Current 1000A AC Voltage 500V DC Voltage 500V Resistance 600Ω
Accuracy	: 23°C±5°C 80%RH or less
AC Current (ACA)	: 0~600A±1.5%rdg±8dgt, 600.1~999.9A ±3%rdg±8dgt
DC Current (DCA)	: 0~600A±1.5%rdg±6dgt, 600.1~999.9A ±3%rdg±6dgt
AC Voltage(ACV)	: 0~500V±1.0%rdg±8dgt
DC Voltage (DCV)	: 0~500V±1.0%rdg±6dgt
Resistance (Ω)	: 0~600Ω±1.5%rdg±8dgt
Jaw opening capability	: 30mmφ
Over range indication	: "OL" mark on LCD.
Low battery indication	: "B" mark on LCD
Data hold indication	: "DH" mark on LCD
Max. display function	: "Max" mark on display, indicating max. value during measurement.
Min. display function	: "Min" mark on display, indicating min. value during measurement.
O adjustment	: for DC current range, can make display to 0 by ADJ switch.
Sampling time	: 2 times/sec
Circuit voltage	: less than AC/DC 500V.
Withstanding voltage	: AC 3700V 1 minute max. (Between the core of CT and outer case)
Operating temperature	: 0°Cto~40°C<80%RH (without condensing)
Storage temperature	: -10°Cto~60°C<70%RH (without condensing)
Power supply	: SR-44(1.55V)×2 or LR-44×2
Battery life	: SR-44, LR-44
Power Consumption	: Approx.12mW
Size	: 44.5 (W)×177(H)×24(D)mm
Weight	: Approx. 95g
Accessories	: Soft case 1 Instruction manual 1 Batteries, LR-44(1.55V) ·2 Test Lead 1

Model 290 RMS

True rms reading



FEATURES

- 30mmφ CT window and compact size.
- 4000 count full scale display and true-rms reading for AC current.
- Conform to IEC safety requirements (IEC 61010-1, 61010-2-032 CAT II 600V).
- One push zero adjust function for DC current range.

SPECIFICATIONS

Measuring function	: AC/DC current, AC/DC voltage and Resistance
Measuring method	: Clamp CT
Jaw opening capability	: 30mmφ
Measuring ranges	: AC/DC 40A/400A manual, AC/DC 60V/600V auto, Resistance 0-1000Ω
Change of measuring range	: By rotary switch
AC current detection	: True RMS detection
A/D conversion	: Successive approximation method
Display	: Max. 4000 count on LCD with annunciator
Over range indication	: "OL" mark on LCD
Data hold indication	: "DH" mark on LCD
Zero adjustment	: For DC current range, by "O ADJ" switch
Sampling rate	: 2 times/sec.
Low battery indication	: "B" mark on LCD
Circuit voltage	: less than AC/DC 500V
Operating temperature	: 0~40°C, < 80%RH (without condensation)
Storage temperature	: -10~60°C, < 70%RH (without condensation)
Withstanding voltage	: AC 3700V/1 minute between CT and outer case
Auto power off	: Approx. 10 minutes after power on
Power supply	: UM-4×3
Dimension	: 44(W)×180(H)×24(D)mm
Accessories	: Soft Case, Test Lead, Batteries, Instruction Manual
Accuracy (2°C±35°C, less than 80%RH)	

Range	Resolution	Accuracy
DC 40A	0.01A	±1.5%rdg±3dgt
DC 400A	0.1A	±1.5%rdg±5dgt
AC 40A	0.01A	±1.5%rdg±5dgt(50/60Hz)
AC 400A	0.1A	±1.5%rdg±8dgt(50/60Hz)
AC 60/600V	0.01V	±1.0%rdg±8dgt
DC 60/600V	0.01V	±1.0%rdg±6dgt
Ω	0.1Ω	±1.5%rdg±8dgt

Crest Factor : less than 2.5

DIGITAL CLAMP TESTER

AC/DC CURRENT/LEAKAGE

Model 600

The world first high accurate AC/DC leakage current clamp-on tester.

AC/DC 0~200mA/2000mA/10A



FEATURES

- Wide application for process control and automotive service.
- The world first AC/DC leakage current clamp tester with 0.1mA resolution.
- The least influence from the external magnetic field and noise with double shielding CT.
- Memory Function for MAX. and MIN. Value.
- For measurements of 4~20 mA current loop signal of transmission control.

SPECIFICATIONS

Safety standard	: Compliant with IEC 61010-1 (2010), IEC 61010-2-032 (2002) CAT 300V.
Measuring method	: Dual integration method with true RMS reading.
Measuring function	: DC current, AC current (true RMS reading) with automatic zero adjustment, max. hold, min. hold, data hold, auto power off
Display	: 3.5 digit LCD, max. reading of 1999
Range	: AC/DC 200mA, 2000mA, 10A
Jaw opening capability	: 20mmφ
Sampling	: 1.6 times/s
Over range indication	: "OL" mark on LCD
Data hold indication	: "DH" mark on LCD
Low battery indication	: "B" mark on LCD
Resolution	: 0.1mA/1mA/0.01A
Accuracy	: DC current;±1% rdg ±3dgt (200/2000mA), ±1%±10dgt(10A)
(23°C±5°C,<80% RH)	: AC current (50/60Hz); ±1%rdg ±5dgt (200/2000mA), ±1%±10dgt(10A)
Limitation of circuit voltage	: Less than AC/DC 300V
Withstanding voltage	: AC 2300V/1 minute max. between the core of CT and outer case.
Operating temperature	: 0°C~50°C, <80% RH (Non-condensing)
Storage temperature	: -20°C~60°C, <75% RH (Non-condensing)
Power supply	: 1.5V ("AA" size, UM-3)×2
Battery life	: 120 hours or more (Alkaline)
Auto power off	: The meter is set to power off mode approx. 10 minutes after the power switch on.
Size	: 76(W)×194(H)×30(D)mm
Weight	: Approx. 340g
Accessories	: Carrying case 1 Instruction manual 1 Batteries 2

PRECISE AC/DC LEAKAGE CURRENT TESTER

AC/DC CURRENT

Model **700/730/740**



INSTRUMENT BODY CTP-05DC For M-700 CTP-30DC For M-730 CTP-40DC For M-740

FEATURES

- The World First High Accurate AC/DC Leakage Current Testers.
- High Sensitive for Low Range Leakage Current.
- Suitable for Measurement of 4-20mA DC Controlled Circuit.
- DC mV Analog Signal Output.
- Lowest Influence from Magnetization & Terrestrial Magnetism.
- Wide Measuring Ranges - up to DC 1000mA & AC 10A.

SPECIFICATIONS

Safety Standard : IEC61010-1/61010-2-032 CATII 600V or CATIII 300V
 Measuring function : AC/DC current
 Measuring method : Clamp CT (CTP-05DC:Slide/Hook Type)
 Jaw opening capability : 5mmφ (CTP-05DC), 30mmφ (CTP-30DC), 40mmφ (CTP-40DC)
 Measuring ranges : DC 100mA/1000mA, AC 100mA/1000mA/10A (45Hz~65Hz)
 AC current detection : Average sensing
 A/D conversion : Dual integration method
 Display : Max. 2000 count on LCD with annunciator
 Over range indication : "OL" mark on LCD
 Data hold indication : "DH" mark on LCD
 Zero adjustment : For DC current range, by "0 ADJ" switch
 Sampling rate : 1 time/sec. for DC and 6 times/sec. for AC
 Low battery indication : "B" mark on LCD
 Signal Output : DC 100mV full scale to each range (output impedance: less than 10KΩ)
 Circuit voltage : less than AC/DC 500V
 Operating temperature : 0~50°C, < 85%RH (without condensation)
 Storage temperature : -10~60°C, < 70%RH (without condensation)
 Withstanding voltage : AC 3700V/1 minute between CT and outer case
 Auto power off : Approx. 10 minutes after power on and can absolve this function by switch
 Power supply : UM-4×4
 Consumption Current : Approx. 9mA (approx. 200h for continuous use)

Dimension : Display Part 78(W)×155(H)×32(D)mm, approx. 280g
 CT (CTP-05DC) 19(W)×133(H)×28(D)mm, approx. 100g
 CT (CTP-30DC) 33(W)×170(H)×24(D)mm, approx. 165g
 CT (CTP-40DC) 64(W)×162(H)×23(D)mm, approx. 130g
 Accessories : Soft Case, Batteries, Instruction Manual
 Option : Cable for Recorder

Accuracy (23°C±5°C, less than 85%RH)

DC Current (After zero adjustment by 0 ADJ switch)

Range	Measuring Range	Resolution	Accuracy
100mA	0.1~±99.99mA	0.01mA	±1%rdg±10dgt
1000mA	1.0~±300mA	0.1mA	±1%rdg±10dgt
	±300.1~±700.0mA		±2%rdg±10dgt
	±700.1~±999.9mA		±3%rdg±10dgt

- ※ Influence of Terrestrial Magnetism : Less than ±2.0mA
- ※ Influence of Magnetization : Less than ±2.0mA by DC 1.5A on/off
- ※ Influence of CT Open/Close : Less than ±3.0mA
- ※ Max Input Current : DC 1.5A (In case of over input more than DC 1.5A, output of CT will be lowered and the display will not become "OL")

AC Current

Range	Measuring Range	Resolution	Accuracy
100mA	0~99.99mA	0.01mA	±1%rdg±10dgt (50/60Hz)
1000mA	0~999.9mA	0.1mA	±1%rdg±10dgt (50/60Hz)
10A	0~9.999A	0.001A	±1%rdg±10dgt (50/60Hz)

※ Max Input Current : AC 20A

DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE, AC CURRENT

Model **HCL-3000**

2000mA/20A/200A 3ranges
33mmφ CT



SPECIFICATIONS

Model	HCL-3000			HCL-5000		
Measuring method	Dual integration mode					
Display	3.5 digit LCD					
Range	2000mA	20A	200A	20A	200A	500A
Resolution	1mA	10mA	0.1A	10mA	100mA	1A
Accuracy *	±2.0% rdg ±5 dgt(50/60Hz)			20/200A±2.0% rdg ±5 dgt(0~400A,50/60Hz) 500A±2.5% rdg ±5 dgt(50/60Hz)		
Jaw opening capability	33mmφ					
Overload indication	Blanking of all digits except MSD1					
Maximum indication	1999					
Low battery indication	"B" mark on LCD readout					
Sampling	2 times/s					
Limitation of circuit voltage	Less than AC 7000V (50/60Hz)					
Withstanding voltage	AC 14KV, 1minute (Between handle and core of CT)					
Insulation resistance	100MΩ or more (Between handle and core of CT)					
Operating temperature	0°C to 40°C, <80% RH					
Storage temperature	10°C to 60°C, <70% RH					
Power supply	UM-3(1.5V)×2					
Size	315(L)mm×54mmφ					
Weight	Approx.240g (Excluding batteries)					
Accessories	Carrying case.....1 Instruction manual1 Batteries(UM-3).....2					
Optional accessory	Rubber handle cover					

* 23°C ± 5, 80% RH or less

Safety Operation
for High Voltage Circuit

FEATURES

- Provides the wide range of current measurement from 1mA/10mA to 200A/500A (HCL-3000/HCL-5000).
- Useful one hand operation with the extended safety handle.
- Provides the safety current measurements on circuits having internal voltage from AC 80V to AC 7000V.
- Data-hold function is especially useful when working in dark or hard to get areas.
- AC 14kV (1minute) withstanding voltage between jaw core and handle.

Model **HCL-5000**

20A/200A/500A 3ranges
33mmφ CT



DIGITAL CLAMP TESTER

AC CURRENT FOR HI-VOLTAGE CIRCUIT

Model **HCL-5000D**



FEATURES

- Wide Range Measurement of 0.1A~600A.
- Easy Operation - Push & Pull Auto Opening/ closing CT
- Safety Design & Function
- Auto Power off Function & Waterdrop Proof Structure.

SPECIFICATIONS

Measuring Function : AC line current
 Measuring Method : Dual integration mode
 Display : 3.5 digit LCD max. reading of 1999 with annunciators
 Measuring Range : 0~20A/600A manual (50Hz or 60Hz)
 Jaw opening Capability : ϕ 35mm
 Accuracy : 23°C±5°C 80%RH or less

Range	Resolution	Accuracy
20A	0.01A	±2%rdg±8dgt
600A	1A	0~400A±2%rdg±8dgt 400A~600A±3%rdg±8dgt

Data hold Function : "DH" mark on LCD
 Auto Power off : Automatically power off mode, approx. 5minutes after the power switch on.
 Sampling time : 2 times/sec
 Low Battery Indication : [B] mark on LCD.
 Operating Temperature : 0~40°C, less than 80%RH without condensing
 Power supply : Battery UM-4×2
 Size & Weight : 70(W)×356(H)×68(D)mm, approx. 400gs.
 Accessories : Batteries, UM-4 2pcs.
 Carrying Case 1pce.
 Instruction manual 1pce.

Model **HCL-1000D**



FEATURES

- Safe AC current measurement by hot stick on circuit having internal voltage from AC 80V to AC 33KV.
- Provides wide range of current measurement from AC 0.01A to 600A.
- Peak Hold Function and with UNIVERSAL adapter for attachment of hot stick.

SPECIFICATIONS

Measuring method : Dual integration mode
 Measuring function : AC line current
 Display : 3.5 digit LCD, max. reading of 1999 with annunciators
 Range : 0-20A / 600A (50/60Hz)
 Ranging : 2 manual ranging
 Accuracy : 23°C~40°C±5°C, 80RH or less

Range	Resolution	Accuracy
20A	0.01A	±2%rdg±8dgt
600A	1A	0~400A ±2.5%rdg±8dgt 400A~600A ±3%rdg±8dgt

Jaw opening capability : 35mm ϕ
 Low battery indication : "B" mark on LCD readout
 Over range indication : Blanking of all digits except MSD1 (Except 600A range)
 Sampling : 2 times/sec.
 Peak Hold Function : LED lamp is lightning when push the peak hold switch.
 Insulation resistance : 100M Ω or more by DC 1000V insulation tester (Between operation handle and core of CT)
 Withstanding voltage : AC 40kV, 1 minute (Between operation handle and core of CT)
 Limitation of circuit voltage : AC 80V to 23kV
 Power supply : 1.5V ("AAA" size)×2
 Constructure : Water resistance rankII (Japanese standard)
 Size : 70(W)×290(H)×32(D)mm (When retracted)
 Weight : Approx. 350gs including batteries
 Accessories : Carrying case 1
 Instruction manual 1
 Batteries 2

DIGITAL CLAMP TESTER

AC CURRENT FOR HI-VOLTAGE CIRCUIT

Model **HCL-9000S**



FEATURES

- Safe AC current measurement by optical isolated transmission method on circuit having internal voltage from AC 80V to AC 23kV.
- Provides wide range of current measurement from AC 0.01A to 600A.
- Useful analog signal data output for the recorder.
- Sealed to withstand water and contaminants.
- Provides the smooth and easy clamping for the cable with special made "PUSH TO OPEN" mechanism.

SPECIFICATIONS

Measuring method : Dual integration mode
 Measuring function : AC line current
 Structure : Optically isolated between CT part and display/grip part.
 Display : 3.5 digit LCD, max. reading of 1999 with annunciators
 Range : 0~20A/600A (50/60Hz)
 Ranging : 2 manual ranging
 Accuracy : 23°C±5°C, 80RH or less

Range	Resolution	Accuracy(45~65Hz)
20A	0.01A	±2.5% rdg ±8 dgt
600A	1A	0~400A±2.5% rdg ±8 dgt 400~600A±3% rdg ±8 dgt

Jaw opening capability : 35mm ϕ
 Low battery indication : CT part; Red LED lamp
 Display/grip part; "B" mark on LCD readout
 Optical transmission : Infrared LED and photo diode
 Over range indication : Blanking of all digits except MSD1 (Except 600A range)
 Sampling : 2 times/sec.
 Data hold indication : "DH" mark on LCD readout
 Data output : DC 100mA (Full count)
 DC 30mA (600A range)
 Data output accuracy; ±1% of full count
 Output impedance; 10k Ω or less
 Insulation resistance : 1000M Ω or more by DC 1000V insulation tester (Between operation handle and core of CT)
 Withstanding voltage : AC 46kV, 5 minute (Between operation handle and core of CT)
 Power supply : CT part; 1.5V ("AAA" size)×3
 Display/grip part; 1.5V ("AAA" size)×2
 Power consumption : CT part; 5mA
 Display/grip part; 3mA
 Constructure : Water resistance rankII (Japanese standard)
 Size : 70(W)×550(H)×48(D)mm (When retracted)
 70(W)×1110(H)×48(D)mm (When steretched)
 Weight : Approx. 800g
 Accessories : Carrying case 1
 Instruction manual 1
 Batteries 5

MINI DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model 100

AC Current/ Leakage
200mA/20A 18mmφ CT



FEATURES

- Model 100 is a clamp-on type ammeter which is least affected by the external magnetic field and which is capable of measuring leakage current.
- Very small electric current flowing into a grounded wire can be measured by high sensitive current transducer.
- The current transducer uses a special alloy that resists rust over long period of use and ensures stable, high accuracy measurements with very slight influence from aging.

SPECIFICATIONS

Model	100		102		104	
Measuring method	Dual integration mode					
Display	3.5 digit LCD					
Range	200mA	20A	200mA	100A	200mA	150A
Resolution	0.1mA	10mA	0.1mA	0.1A	0.1mA	0.1A
Accuracy (50/60Hz) (23°C±5°C, 80% RH or less)	± 1.0% rdg ± 5 dgt		± 2.0% rdg ± 5 dgt			
Jaw opening capability	18mmφ		23mmφ		33mmφ	
Overload indication	Blanking of all digits except MSD1					
Maximum indication	1999					
Low battery indication	"B" mark on LCD readout					
Sampling	2 times/s					
Limitation of circuit voltage	Less than AC 600V					
Operating temperature	0°C to 40°C, <80% RH					
Storage temperature	-10°C to 60°C, <70% RH					
Power supply	SR-44(1.55V)×2 or LR-44×2					
Power consumption	3mW					
Battery life	SR-44 : 200 hours, LR-44 : 100 hours					
Size	45(W)×140(H)×20(D)mm		48(W)×146(H)×20(D)mm(H)		54(W)×155(H)×20(D)mm	
Weight	Approx. 80g					
Accessories	Soft case.....1 Instruction manual.....1 Batteries(LR-44).....2					

Model 102

AC Current/ Leakage
200mA/100A 23mmφ CT



FEATURES

- Useful 200mA and 100A ranges.
- Data-hold function. Especially useful when working in dark or hard to get areas.
- Ultra compact size.

Model 104

AC Current/ Leakage
200mA/150A 33mmφ CT



FEATURES

- 33mmφ CT enables the leakage measurement for 60mm square cable.
- Data-hold function. Especially useful when working in dark or hard to get areas.
- Ultra compact size.

MINI DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model 110

2mA/20mA/60A 30mmφ CT



FEATURES

- Model 110 is a clamp-on type ammeter which is least affected by external magnetic fields.
- 30mmφ CT enables the leakage current measurement for SV cable (38mm²)
- Data hold function. Especially useful when working in dark or hard to get areas.
- Pocket sized and light weight.

SPECIFICATIONS

Measuring method : Dual integration mode
 Display : 3.5 digit LCD, max. reading of 1999
 Range : 0~2mA/20mA/60A (50/60Hz)
 Ranging : Manual ranging
 Accuracy : 50/60Hz, 23°C±5°C, 80% RH max

Range	Mini.Resolution	Accuracy
2mA	1μA	±1.0% rdg ±5 dgt
20mA	10μA	
60A	100mA	±1.0% rdg ±5 dgt(0~50A) ±5% rdg ±5 dgt (50A~60A)

Jaw opening capability : 30mmφ
 Over range indication : Blanking of all digits except MSD1
 Maximum indication : 1999
 Low battery indication : "B" mark on LCD readout
 Data hold indication : "DH" mark on LCD readout
 Sampling : Approx. 2 times/s.
 Limitation of circuit voltage : Less than AC 600V
 Operating temperature : 0°C to 40°C, <70% RH (Non-condensing)
 Storage temperature : -10°C to 60°C, <70% RH (Non-condensing)
 Power supply : LR-44 or SR-44×2
 Power consumption : Approx. 3mW
 Battery Life : Approx. 100 hours (LR-44)
 Approx. 200 hours (SR-44)
 Size : 58.5(W)×158(H)×23(D)mm
 Weight : Approx. 120g
 Accessories : Batteries (LR-44) 2
 Instruction manual 1
 Carrying case 1

MINI DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model **140**

AC Current/Leakage
30/300mA, 30/300A 40mmφ CT



FEATURES

- Wide range of current measurements (AC 0.01A~300A).

SPECIFICATIONS

Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002) installation CategoryII 600V phase to earth, CategoryIII 300V phase to earth.

E.M.C. standard : The instrument meets EN 61326 (2006).

Measuring method : Dual integration mode

Measuring function : Leakage current and load current

Display : 3.5 digital LCD, max. reading of 3200

Range : 0~30mA/300mA/30A/300A (50/60Hz)

Ranging : 2 ranges manuals

Accuracy : 23°C±5°C, 80% RH max.

Range	Mini.Resolution	Accuracy
30/300mA	0.01mA	±1.2% rdg ±5dgt
30/300A	0.01A	0~200A : ±1.2% rdg ±5dgt 200~250A : ±3.0% rdg ±5dgt 250~300A : ±5.0% rdg ±5dgt

Jaw opening capability : 40mmφ

Over range indication : "OL" mark on LCD readout

Maximum indication : 3200 counts

Low battery indication : 2.5V~2.7V; "BAT" mark on LCD readout

Sampling : Approx. 2 times/s.(Digital display)

Approx. 12 times/s. (Bargraph display)

Data hold indication : "DH" mark on LCD readout

Auto power off : The meter is set to power off mode approx. 10 minutes after the power switch on.

Withstanding voltage : AC3700V 1 minute max. (Between the core of CT and outer case)

Operating temperature : 0°C to 40°C, <80% RH (Non-condensing)

Storage temperature : -10°C to 60°C, <70% RH (Non-condensing)

Power supply : LR-44 or SR-44×2

Power consumption : Approx. 5mW

Battery life : Approx. 50 hours (LR44)

Size : 64(W)×162(H)×23(D)mm

Weight : Approx. 125g

Accessories : Carrying case.....1

Instruction manual.....1

Batteries.....2

MINI DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE WITH PHASE CURRENT DETECTION

Model **140HC**

AC Current/Leakage
Phase current 0~320mA, 320A 40mmφ CT



FEATURES

- Can measure load current of CVT cable just by putting CT head without clamping
- Can measure load current of 3 phase CV cable by clamping CT in a lump
- Can judge approximate cable length from charging current & cable diameter (no loading condition)

SPECIFICATIONS

Measuring Functions : AC Leakage Current, AC Line Current
Phase Current of High Voltage Circuit(at shielded part with grounding)

Max. Applicable Conductor Diameter : φ40m

Measuring Range : AC Current: 0~320mA/320A(50/60Hz)
Phase Current: CVT Cable 0~16A, CV Cable 0~48A

Range Switch : mA, A, CVT Phase Current, CV Phase Current

Measuring Method : Dual Integration Mode

Display : Max.3200_reading_with_annunciators

Sampling Rate : 2 times/sec.

Length Display Switch : At Phase current range, approx.
length of high voltage line will be displayed
according to phase current value
at the time of cutting off load.

Other Functions : Data Hold, Low Battery Indication, Auto Power Off,
Over Range Display

Circuit Voltage : Less than AC600V (insulated conductors)

Withstanding Voltage : AC2000V/1 minute between outer case & core

Operating Temperature : 0~40°C, less than 80%RH (w/o condensation)

Power Supply : AAA alkali battery×3

Dimension/Weight : 64(W)×193(H)×24(D)mm, approx. 190gs.

Standard Accessories : Battery×3 (installed), soft carrying case, instruction manual

Accuracy

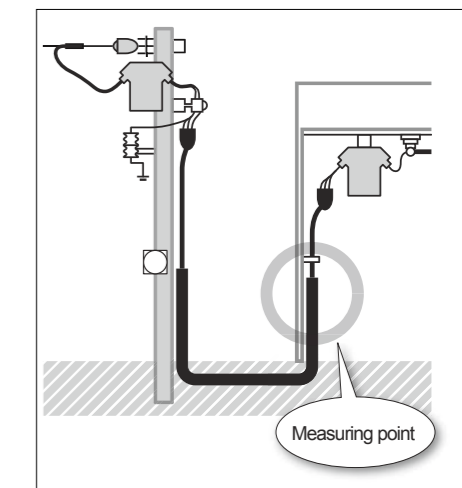
Range	Mini.Resolution	Accuracy
mA	0.01mA	±1.2%rdg±5dgt
A	0.01A	0~200A ±1.2%rdg±5dgt 200~250A ±3%rdg±5dgt 250~300A ±5%rdg±5dgt
Phase Current CVT		Estimated Value
Phase Current CV		Estimated Value

*Current of CV/CVT measurement is estimated value. *Do not apply to high voltage cable without shield.

Field Measurement Examples

	At the time of loading	At the time of no loading
Example 1	13.9A	112.5mA
Example 2	10.6A	131.5mA
Example 3	14.1A	100.5mA

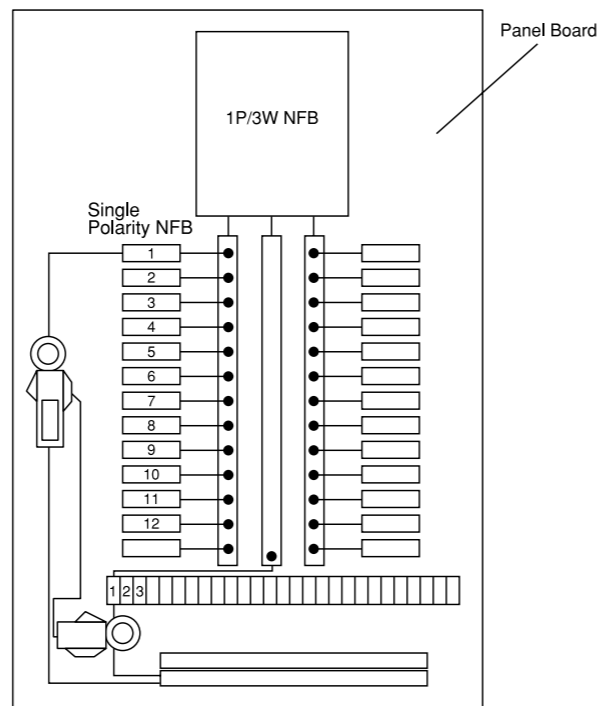
The current values between loading and no loading are largely different and the safety security can be confirmed sufficiently.



2CT METHOD MINI DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model **2002**



Model 2002 can measure load and leakage current by general method in the same manner as ordinary clamp meters but also can detect leakage current by using 2CT method in combination with optional CT sensor even in the fields where CT cannot be clamped to two wires in the single phase system.

Spare CT CT-05-2
Inside diameter : $\phi 5\text{mm}$
Dimension : 25(W) \times 113(H) \times 19(D)



Spare CT ZCT-18-2 (Option)
Inside diameter : $\phi 18\text{mm}$
Dimension : 45(W) \times 140(H) \times 20(D)



FEATURES

- Leakage current detection by 2CT method
- 40mm ϕ CT window and compact size
- Wide ranges from mA up to 200A and true-rms reading
- Conform to IEC safety requirements (CAT II 600V)

SPECIFICATIONS

1) CURRENT DETECTION PART (Instrument CT)

Inside diameter : $\phi 40\text{mm}$
Withstanding voltage : AC 2000V/1 minute between CT core and grip

2) MEASURING PART

Measuring function : Line Current, Leakage Current, 2CT Leakage Current
Measuring method : Clamp CT
Measuring range : Leakage Current 0~200mA/2000mA (50/60 Hz)
Line Current 0~20A/200A (50/60 Hz)
Range selection : 4 range manual
AC current detection : True RMS
A/D conversion : Equivalent dual integration mode
Sampling rate : 2 times/sec.
Display : Max. 1999 reading with annunciators
Over range indication : "OL" mark on LCD
Data hold indication : "DH" mark on LCD
Low battery indication : "B" mark on LCD

3) GENERAL SPECIFICATION

Circuit voltage : less than AC 600V
Operating temperature : 0°C~40°C < 85%RH without condensation
Storage temperature : -10°C~60°C, < 80%RH without condensation
Withstanding voltage : AC 2000V/1 minute between CT core and grip
Power supply : LR03 \times 3 pcs.
Dimension : 64(W) \times 195(H) \times 24(D)mm
Standard accessories : LR03 battery...3 (installed in the body case),
Instruction manual...1, Soft Case...1,
Spare CT (CT-05-2)...1
Option : Spare CT ZCT-18-2

4) ACCURACY (23°C \pm 5°C, less than 85%RH)

Range	Resolution	Accuracy(50Hz/60Hz)
AC 1000mA	0.01mA	$\pm 1\% \text{rdg} \pm 10 \text{dgt}$
AC 10A	0.001A	
AC 20A	0.01A	
AC 200A	0.1A	Primary Current 0~100A $\pm 1\% \text{rdg} \pm 10 \text{dgt}$
		Primary Current 101~150A $\pm 3\% \text{rdg} \pm 10 \text{dgt}$
		Primary Current 151~200A $\pm 5\% \text{rdg} \pm 10 \text{dgt}$

MINI DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model **310**

AC Current/Leakage
30/300mA, 30/300A 40mm ϕ CT & "U" Type CT



FEATURES

- The unique "U" type direct touch CT enables to measure the current of single & three phase circuit just by touching the conductors and it is suitable for the AC current measurement of narrow & congested circuit.

SPECIFICATIONS

Measuring method : Dual integration mode
Measuring function : Leakage current and load current
Display : 3.5 digital LCD, max. reading of 3200
Over range indication : "OL" mark on LCD readout
Maximum indication : 3200 counts
Low battery indication : 2.5V~ 2.7V; "B" mark on LCD readout
Sampling : Approx.2 times/s. (Digital display)
Approx.2 times/s. (Bargraph display)
Data hold indication : "DH" mark on LCD readout
Auto power off : The meter is set to power off mode approx. 10 minutes after the power switch on.
Operating temperature : 0°C to 40°C, < 80% RH (Non-condensing)
Storage temperature : -10°C to 60°C, < 70% RH (Non-condensing)
Power supply : LR-44 or SR-44 \times 2
Power consumption : Approx. 5mW
Battery life : Approx. 50 hours (LR44)
Size : 64(W) \times 180(H) \times 21(D)
Weight : Approx.135g
Accessories : Carrying case...1
instruction manual...1
Batteries...2

40mm ϕ CT

Range : 0 ~ 30mA/300mA/30A/300A(50/60Hz)
Ranging : 2 ranges manuals
Accuracy : 23°C \pm 5°C, 80% RH max.

Range	Resolution	Accuracy
30/300mA	0.01mA	$\pm 1.2\% \text{rdg} \pm 5 \text{dgt}$
30/300A	0.01A	0~200A : $\pm 1.2\% \text{rdg} \pm 5 \text{dgt}$
		200~250A : $\pm 3.0\% \text{rdg} \pm 5 \text{dgt}$
		250~300A : $\pm 5.0\% \text{rdg} \pm 5 \text{dgt}$

Jaw opening capability : 40mm ϕ

"U" Type CT

Range : 300A (Resolutoin 0.1A)
Accuracy : 23°C \pm 5°C, 80% RH max.

Single Phase IV Conductor	$\pm 5\%$
Parallel VVF Conductor	$\pm 5\%$
Three Phase VVR Conductor	Estimated Value

Max Measurement Conductor : 20mm ϕ

MINI DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model 340

2mA/20mA/60A 40mmφ CT



FEATURES

- Model 340 is a clamp-on type ammeter which is least affected by external magnetic fields.
- Enabled high resolution measurement with 40 mmφ CT by our new CT technology.

SPECIFICATIONS

Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002) installation Category II 600V phase to earth, Category III 300V phase to earth.

Measuring method : Dual integration mode
 Display : 3.5 digit LCD, max. reading of 1999
 Range : 0~2mA/20mA/60A (50Hz)
 Ranging : Manual ranging
 Accuracy : 50/60Hz, 23°C±5°C80% RH max.

Range	Mini.Resolution	Accuracy
2mA	1μA	±1.0% rdg ±5 dgt
20mA	10μA	
60A	100mA	±1.0% rdg ±5 dgt(0~50A) ±5% rdg ±5 dgt (50A~60A)

Jaw opening capability : 40mmφ
 Over range indication : Blanking of all digits except MSD1
 Maximum indication : 1999
 Low battery indication : "B" mark on LCD readout
 Data hold indication : "DH" mark on LCD readout
 Sampling : Approx. 2 times/s.
 Operating temperature : 0°C to 40°C, <70% RH (Non-condensing)
 Storage temperature : -10°C to 60°C, <70% RH (Non-condensing)
 Power supply : LR-44 or SR-44×2
 Power consumption : Approx. 3.5mW
 Battery life : Approx. 80 hours (LR-44)
 Approx. 160 hours (SR-44)
 Size : 68.5(W)×175(H)×23(D)mm
 Weight : Approx. 145g
 Accessories : Batteries (LR-44)2
 Instruction manual.....1
 Carrying case.....1

CLAMP TESTER

AC CURRENT/LEAKAGE

Model MCL-350

10mA~500A 7ranges
40mmφ CT



FEATURES

- High accuracy analog display with strong taut band meter.
- 3 years long battery life.
- Meter lock function and data output for recorder.
- Filter circuit for high frequency noise rejection.

SPECIFICATIONS

Current	AC 0~10mA/50mA/500mA/1A 5A/50A/500A
Accuracy	±3% of F.S. (50/60Hz)
Voltage	AC 0~500V
Accuracy	±3% of F.S. (50/60Hz)
Resistance	0~1KΩ(25Ωcenter)
Accuracy	±3% of scale length
Data output	DC 100mV (Full scale)
Affection of magnetic field	3mA or less (At 100A near by conductor)
Safety standard	Meets the requirements for double insulation to IEC 61010-1 (2001), IEC 61010-2-032 (2002) installation Category II 600 volts phase to earth, Category III 300 volts phase to earth.
E.M.C. standard	The instrument meets EN 61326 (2004).
Operating temperature	0°C to 40°C, <80% RH
Storage temperature	-10°C to 60°C, <70% RH
Power supply	1.5V ("AAA" size, UM-4)×2
Size	65(W)×210(H)×34(D)mm
Weight	Approx. 400g (Included batteries)
Accessories	Carrying case1 Instruction manual1 Batteries (UM-4)2 Spare fuse1 Test lead.....1set

Model MCL-400D

0.2A~400A 5ranges
40mmφ CT



FEATURES

- Digital clamp-on tester with wide range of current measurement from 0.1A to 400A.

SPECIFICATIONS

Measuring method	Dual integration mode		
Display	3.5digit LCD		
Accuracy	(23°C±5°C, 80% RH or less)		
AC Current (50/60Hz)	Range	Resolution	Accuracy ±1.0% rdg ±5 dgt
	0.2A	0.1mA	
	2A	1mA	
	20A	0.01A	
	200A	0.1A	
AC Voltage	600V	1V	±1.0% rdg ±3.0% of F.S.
	2KΩ	1Ω	
Resistance	2KΩ	1KΩ	
Jaw opening capability	40mmφ		
Overload indication	Blanking of all digits except MSD1		
Maximum indication	1999		
Low battery indication	"B" mark on LCD readout		
Sampling	2 times/s		
Limitation of circuit voltage	Less than AC 600V		
Data hold indication	"D·H" mark on LCD readout		
Affection of magnetic field	3mA or less (at 100A near by conductor)		
Power supply	1.5V ("AAA" size, UM-4)×2		
Size	69(W)×197(H)×32(D)mm		
Weight	Approx. 370g (Included batteries)		
Accessories	Carrying case1 Instruction manual1 Batteries(UM-4)2 Test lead.....1set		

DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model MCL-500RMS

50mA~500A 5ranges
True RMS 40mmφ CT



FEATURES

- 20 times/sec.high speed sampling with True RMS reading.
- High speed response for max hold enables the measurement for the instantaneous tripping leakage current of the circuit breaker.

SPECIFICATIONS

Measuring method	Dual integration mode		
Display	3 1/4 digit LCD		
Accuracy	(23°C±5°C, 80% RH or less)		
	Range	Resolution	Accuracy
	50mA	0.01A	±1.0% rdg ±5dgt (50/60Hz)
	500mA	0.1mA	
	50A	0.01A	
	500A	0.1A	
	ACV (0~600V) /Resistance (0~2KHz)	0.1V/1Ω	±1.0% rdg ±5dgt (50/60Hz)
A/D conversion	True rms reading		
Jaw opening capability	40mmφ		
Overload indication	"OL" mark on LCD readout		
Maximum indication	5000		
Low battery indication	"B" mark on LCD readout		
Data hold indication	"DATA" mark on LCD readout		
Max.hold indication	"MAX" mark on LCD readout		
Affection of magnetic field	3mA or less (At 100A near by conductor)		
Sampling	20 times/s		
Limitation of circuit voltage	Less than AC 600V		
Operating temperature	0 °C to 40 °C, <80% RH		
Storage temperature	-10°C to 60°C, <70% RH		
Power supply	6LR61 or AC adaptor		
Withstanding voltage	AC2000V, 1minute		
Size	69(W)×207(H)×33(D)mm		
Weight	Approx.450g		
Accessories	Carrying case1	
	Instruction manual1	
Optional accessory	AC adaptor (DC9V)		

DIGITAL CLAMP MONITOR

AC CURRENT/LEAKAGE

Model MCM-400

Max Hold Function
Memory Function 40mmφ CT



[Printing Format]

```
***** MONITOR LIST *****
START DAY 08-27 13:03
STOP DAY 08-27 17:02
LEVEL 1.000 A
RATIO 0001
COUNT 018
DATA 01 START 08-27 17:02
STOP 08-27 17:02
AUG 1.875 A
MAX 3.009 A
DATA 02 START 08-27 16:55
STOP 08-27 17:01
AUG 1.963 A
MAX 2.000 A
DATA 03 START 08-27 16:33
STOP 08-27 16:50
AUG 2.453 A
MAX 4.302 A
DATA 04 START 08-27 16:31
STOP 08-27 16:33
AUG 2.246 A
MAX 2.299 A
DATA 05 START 08-27 16:10
STOP 08-27 16:16
AUG 2.250 A
MAX 2.299 A
DATA 06 START 08-27 16:08
STOP 08-27 16:08
AUG 1.055 A
MAX 1.297 A
DATA 07 START 08-27 15:53
STOP 08-27 15:56
AUG 1.278 A
MAX 1.299 A
DATA 08 START 08-27 15:49
STOP 08-27 15:49
AUG 1.241 A
MAX 1.937 A
DATA 09 START 08-27 15:45
STOP 08-27 15:47
AUG 3.269 A
MAX 3.424 A
DATA 10 START 08-27 15:29
STOP 08-27 15:42
AUG 1.237 A
MAX 2.219 A
DATA 11 START 08-27 15:26
STOP 08-27 15:26
AUG 1.178 A
MAX 1.454 A
DATA 12 START 08-27 15:10
STOP 08-27 15:20
AUG 2.477 A
MAX 2.524 A
DATA 13 START 08-27 14:58
STOP 08-27 14:58
AUG 1.211 A
MAX 1.514 A
***** E N D *****
CURRENT MONITOR
```

GENERAL

This intelligent clamp-on monitor was designed to measure and monitor the maximum current of the circuit.

Also, it is useful to measure and monitor the leakage current of the circuit.

When the measured current exceeded the setting value, the data of "Memory start Time", "Memory stop Time", "Acquired Average Current" and "Acquired Maximum Current" are stored into the memory and displayed.

The memorized data can be printed out in connection with optionally available DPU- 201G printer.

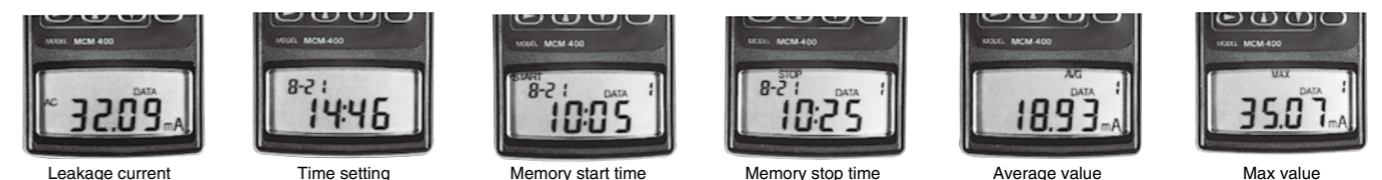
FEATURES

- Monitoring for maximum current.
- Monitoring for leakage current.
- AC current/ leakage clamp-on tester.

SUPER FUNCTIONS

- 13 data can be stored and displayed.
- The memory is backed up 5 days.
- The measuring range is extendable by using LAD-800 clamp-on adaptor.
- The number of acquisition is displayed up to 255.

[Example of Display]



DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model MCL-800D

200mA~1000A 5ranges
80mmφ CT



FEATURES

- 80mmφCT window.
- DC mV analog data output for recorder.
- The least affection from external magnetic field.
- Continuous long time measurement and useful data hold function.

SPECIFICATIONS

Measuring method		Dual integration mode	
Display		3.5 digit LCD	
Accuracy (23°C±5°C, 80% RH or less)			
Range	Resolution	Accuracy	
200mA	0.1mA	±2.0% rdg ±5dgt (50/60Hz)	
2A	1mA		
20A	10mA		
200A	0.1A		
1000A	1A		
Jaw opening capability		80mmφ	
Overload indication		Blanking of all digits except MSD1	
Maximum indication		1999	
Low battery indication		"B" mark on LCD readout	
Sampling		2 times/s	
Data hold indication		"D·H" mark on LCD readout	
Data output		DC 100mV (Full count)	
Withstanding voltage		AC2000V	
Limitation of circuit voltage		Less than AC 600V	
Operating temperature		0°C to 40°C, <80% RH	
Storage temperature		-10°C to 60°C, <70% RH	
Power supply		UM-4 (1.5V)×2	
Power consumption		3mW	
Battery life		350hours (By alkaline batteries)	
Size		138(W)×225(H)×37(D)mm	
Weight		Approx. 500g	
Accessories		Carrying case1 Instruction manual1 Batteries(UM-4)2	

Model M-1800

20A/2000A/1800A/ 5ranges
80mmφ CT



FEATURES

- 80mmφCT window and continuous long time measurement.
- DC mV analog data output for recorder.

SPECIFICATIONS

Measuring method		Dual integration mode	
Display		3.5 digit LCD	
Accuracy (23°C±5°C, 80% RH or less)			
Range	Resolution	Accuracy	
20A	10mA	±3.0% rdg ±3dgt (50/60Hz)	
200A	0.1A		
1800A	1A		
Jaw opening capability		80mmφ	
Overload indication		Blanking of all digits except MSD1	
Maximum indication		1999	
Low battery indication		"B" mark on LCD readout	
Sampling		2 times/s	
Data hold indication		"D·H" mark on LCD readout	
Data output		DC 100mV (Full count)	
Withstanding voltage		AC2000V	
Limitation of circuit voltage		Less than AC 600V	
Operating temperature		0°C to 40°C, <80% RH	
Storage temperature		-10°C to 60°C, <70% RH	
Power supply		UM-4(1.5V)×2	
Power consumption		3mW	
Battery life		350hours (By alkaline batteries)	
Size		138(W)×225(H)×37(D)mm	
Weight		Approx. 500g	
Accessories		Carrying case1 Instruction manual1 Batteries(UM-4)2	

BIG WINDOW DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE

Model MCL-1100D

1mA~3000A 5ranges



FEATURES

- 108×128mm big CT window.
- DC mV analog data output for recorder.
- Wide ranges for 0.1mA~3000A
Safety Standavd : CAT.II 600V

SPECIFICATIONS

Measuring method		True RMS reading	
Display		3.5 digit LCD	
Accuracy (23°C±5°C, 80% RH or less)			
Range	Resolution	Accuracy	
300mA	0.1mA	±1.5% rdg ±8dgt (50/60Hz)	
3A	0.001A		
30A	0.01A		
300A	0.1A		
3000A	1A		
Jaw opening capability		108mmφ	
Overload indication		"OL" mark	
Maximum indication		3200	
Low battery indication		"B" mark on LCD readout	
Sampling		2 times/s	
Data hold indication		"D·H" mark on LCD readout	
Data output		DC 300mV (Full count)	
Withstanding voltage		AC3700V	
Limitation of circuit voltage		Less than AC 500V	
Operating temperature		0°C to 40°C, <80% RH	
Storage temperature		-10°C to 60°C, <70% RH	
Power supply		UM-4(1.5V)×2	
Power consumption		6mW	
Battery life		200hours (By alkaline batteries)	
Size		194(W)×341.5(H)×52(D)mm	
Weight		Approx. 1900g	
Accessories		Carrying case1 Instruction manual1 Batteries(UM-4)2	

Model MCL-3000D

30A/300A/3000A 3ranges



FEATURES

- 108×128mm big CT window.
- DC mV analog data output for recorder.
- Wide ranges for 0.1mA~3000A
Safety Standavd : CAT.III 600V

SPECIFICATIONS

Measuring method		True RMS reading	
Display		3.5 digit LCD	
Accuracy (23°C±5°C, 80% RH or less)			
Range	Resolution	Accuracy	
30A	0.01A	±1.5% rdg ±8dgt (50/60Hz)	
300A	0.1A		
3000A	1A		
Jaw opening capability		108mmφ	
Overload indication		On the LCD readout	
Maximum indication		3200	
Low battery indication		"B" mark on LCD readout	
Sampling		2 times/s	
Data hold indication		"D·H" mark on LCD readout	
Data output		DC 300mV (Full count)	
Withstanding voltage		AC5550V	
Limitation of circuit voltage		Less than AC 500V	
Operating temperature		0°C to 40°C, <80% RH	
Storage temperature		-10°C to 60°C, <70% RH	
Power supply		UM-4(1.5V)×2	
Power consumption		6mW	
Battery life		200hours (By alkaline batteries)	
Size		194(W)×341.5(H)×52(D)mm	
Weight		Approx. 1850g	
Accessories		Carrying case1 Instruction manual1 Batteries(UM-4)2	

3CT METHOD LEAKAGE CURRENT METER

AC CURRENT/LEAKAGE

Model **MCL-4000F**



New Method-Can Measure Leakage Current by clamping 3 or 4 CTs respectively to the conductors

GENERAL

Most suitable to measure the leakage current in the fields where one CT cannot be clamped to the wires en bloc and also, this model can measure each line current up to AC 800A.

SPECIFICATIONS

(Display Part)

Measuring Range : AC 0~2000mA/0~800A
 Accuracy : $\pm 1\% \text{rdg} \pm 5 \text{dgt}$
 Measuring Method : Dual integration mode
 Sampling Rate : 2 times/sec.
 Filter Function : Hi-Frequency Cut (LPF=130Hz)
 DC mV Output : 100mV F.S.
 Power Supply : UM-4 (1.5V)×2
 Size & Weight : 130×200×38mm, 500g

(CT Part)

Diameter : $\phi 36 \text{mm}$
 Applicable Current : less than AC 800A
 Circuit Voltage : less than 600V
 Remanence : less than 10mA at 100A
 Size & Weight : 100×130×25mm, 420g
 Cable Length : 3m

Accessories

3 CTs, Carrying Case, Batteries and Instruction Manual
 Option : CT for 3P/4W. (Model No. MCL-4000F-NCT)

LEAKAGE CLAMP METER FOR ARRESTER

Model **ALCL-40/ALCL-40L**



GENERAL

This model ALCL-40 mainly measures very small leakage current of grounding line connected with Arresters, etc. The CT which is applied to this model is hardly affected by external magnetic field and therefore, model ALCL-40 can measure leakage current very accurately in high magnetic and electric field.

SPECIFICATIONS

- CT Sensor
 Inside Diameter of CT : 40mm
 Structure : Apart from Measuring Part
- Measuring Part
 Measuring Function : Leakage Current, Harmonic Current (Dominant & Third Wave)
 Measuring Method : CT Clamp-on Method
 Measuring Range : 0-300 μ A/3mA/30mA (3range manual)
 Input Frequency : 45-60Hz (Dominant Wave Frequency)
 AC Conversion : RMS Detection Method
 A/D Conversion : Double Integration Method
 Display : 3200 count max.,LCD
 Sampling Rate : 2 times/second
 Over Indication : "OL" on the display
 Low Battery Indication : "B" sign on the display
 Data Hold Function : "DH" sign on the display
 Auto Power Off : Approx.10 minutes after power on
 Other Function : Motor Drive Switch for CT open/close
- General Specs.
 Power Supply : AA size Alkaline battery×4
 Operating Circuit Voltage : Less than 500V AC
 Operating Temperature : 0~40°C, less than 80%RH, w/o condensation
 Storage Temperature : -10~60°C, less than 70%RH, w/o condensation

4) Accuracy (23°C)5°C, less than 80%RH)

4-1 AC Current

Range	Resolution	Accuracy(45~65Hz)	Max.Applicable Current
300 μ A	100nA(0.1 μ A)	1.2% \pm 8digit	40A rms
3mA	1 μ A(0.001mA)		
30mA	10 μ A(0.01mA)		

AC Conversion : RMS Detection Method
 Crest Factor : <3 (0~50% of the range)
 <2 (50~100% of the range)

4-2 Harmonic Current(Dominant Current, 3rd Harmonic Current)

Detection Method : Automatic Tuned Filter
 Min. Dominant Current Input : more than 3% of each range
 Accuracy : (1% \pm 5digit) \pm (AC Current Accuracy) – (Tolerance influenced by adjacent frequency)

* In case that the harmonic current is more than 4% of the dominant wave
 Tolerance influenced by adjacent frequency : 1.5%

Io/Ior MINI DIGITAL LEAKAGE CLAMP TESTER

Io Ior AC CURRENT/LEAKAGE

Model **340IR**



FEATURES

- Detection for resistive leakage current (Ior)
- Compact size and light weight
- Conform to IEC safety requirements (IEC1010-1, CAT II 600V)

SPECIFICATIONS

1. CURRENT DETECTION ZCT

Inside diameter : ϕ 40mm
 Method : Split core type ZCT
 Secondary windings : 2000 turns
 Withstanding voltage : AC 2200V/1 minute between CT core and grip

2. MEASURING PART

Measuring function : Leakage current (Io), Line current, Resistive leakage current (Ior)
 Measuring Method : Clamp CT (in case of Ior, based on voltage standard)
 Measuring range : Io 0-10mA/100mA/1000mA, Ior 0-10mA/100mA
 Input frequency range : 45-65Hz (with switch for 50/60Hz)
 AC current detection : Dual integration mode
 AD conversion : Successive approximation method
 Display : LCD, max.9999 reading with annunciator
 Data hold indication : "DH" mark on LCD
 Sampling rate : 2 times/sec.
 Low battery indication : "B" mark on LCD
 Circuit voltage : less than AC 600V
 Operating temperature : 0~50°C, < 80%RH (without condensation)
 Storage temperature : -10~60°C, < 70%RH (without condensation)
 Auto power off : Approx. 10 minutes after power on
 Power supply : LR03x3
 Dimension : 44(W)x197(H)x24(D)mm
 Accessories : Soft Case, Test Lead, Batteries, Instruction Manual

Accuracy (23°C±5°C, less than 80%RH)

	Range	Resolution	Accuracy
Ior	10mA	0.001mA	±1.5%rdg ±10dgt
	100mA	0.01mA	±1.2%rdg ±10dgt
Io	10mA	0.001mA	±1.0%rdg ±10dgt
	100mA	0.01mA	±1.0%rdg ±10dgt
	1000mA	0.1mA	±1.0%rdg ±10dgt

Model **MCL-400IR**



FEATURES

- Can measure the resistive leakage current (Ior) of the grounding lines and other electric circuit without voltage input.

SPECIFICATIONS

1) CT Sensor

Inside Diameter of CT : 40mm
 Influence of External Magnetic Field : less than 5mA nearby 100A conductor.
 Withstanding Voltage: AC2200V, 1 minute

2) Measuring Part

Measuring Function : load current, leakage current (Io), resistive leakage current (Ior), harmonics current & voltage (fundamental, 3rd, 5th, 7th, 11th, & 13th), AC voltage.

Measuring Method : CT clamp-on method
 Measuring Range : 0-40mA, 400mA, 4A, 40A, 300A, 0~500V
 Input Frequency : 45-65Hz
 Detection Method : RMS detection through average rectification
 A/D Conversion : double integration method
 Display : 3.5 digit LCD, max. reading of 4000
 Sampling Rate : 2 times/second, 1 time/6 seconds for Ior
 Over Range Indication : "OL" mark on LCD readout
 Low Battery Indication : Battery mark on LCD readout
 Auto Power Off : automatically power off approx. 10 minutes after the final key operation
 Data Hold Indication : "DH" mark on LCD readout
 Power Supply : 1.5V ("AAA" size, um-4)x3 or AC adaptor (option)
 Power Consumption : Approx. 8mA (approx.60 hours with continuous use).
 Limitation of Circuit Voltage: Less than AC 500V
 Operating Temperature: 0°C~40°C, <80%RH (non-condensing)
 Storage Temperature : -10°C~60°C, <70%RH (non-condensing)
 Size & Weight : 70(W)x223(H)x34(D)mm
 Approx. 440gs including batteries

Range	Resolution	Accuracy
AC 40mA	0.01mA	±1.0% rdg ± 8 dgt
AC 400mA	0.1mA	
AC 4A	0.001mA	
AC 40A	0.01A	±1.0% rdg ± 1%FS
AC 300A	0.1A	
AC 600V	0.1V	±1.0% rdg ± 8 dgt

Io/Ior DIGITAL CLAMP TESTER

AC CURRENT/LEAKAGE/VOLTAGE

Model **MCL-500IR**



FEATURES

- Can measure the resistive leakage current (Ior) accurately by voltage input.
- Wide ranges for the measurement of AC load current, leakage current (Io), resistive leakage current (Ior), and AC voltage.

SPECIFICATIONS

1) CT Sensor

Inside Diameter of CT : 40mm
 Influence of External Magnetic Field : less than 5mA nearby 100A conductor.
 Withstanding Voltage : AC2200V, 1 minute

2) Measuring Part

Measuring Function : load current, leakage current (Io), resistive leakage current (Ior), AC voltage. (0~500V)
 Measuring Method : CT clamp-on method
 Measuring Range : 0-40mA, 400mA, 4A, 40A, 300A, 500A
 Input Frequency : 50/60Hz
 Detection Method : True RMS detection by analog operation
 A/D Conversion : successive comparator method
 Display : 3.5 digit LCD, max. reading of 4000
 Sampling Rate : 2 times/second
 Over Range Indication : "OL" mark on LCD readout Low
 Battery Indication : Battery mark on LCD readout
 Auto Power Off : automatically power off approx. 10 minutes after the final key operation
 Data Hold Indication : "DH" mark on LCD readout
 Ior Switch : pressing this key, Ior value will be displayed. pressing again, display will return to Io value.
 Power Supply : 1.5V ("AAA" size, um-4)x3 or AC adaptor (option)
 Power Consumption : Approx. 14mA (approx.45 hours with continuous use).
 Limitation of Circuit Voltage : Less than AC 500V
 Operating Temperature: 0°C~40°C, <80%RH(non-condensing)
 Storage Temperature: -10°C~60°C, <70%RH(non-condensing)
 Size & Weight : 70(W)x223(H)x34(D)mm
 Approx. 440gs including batteries
 Accessories : Battery (LR03)..... 3 (installed into the body case)
 Voltage input test lead 1
 Carrying Case 1
 Instruction Manual 1

3) Measuring Ranges and Accuracy

	Range	Resolution	Accuracy
I.Io	40mA	0.01mA	0.40mA~39.99mA ±1.0%rdg ±10dgt
	400mA	0.1mA	40.0mA~399.9mA ±1.0%rdg ±10dgt
	4A	0.001A	0.4A~3.999A ±1.0%rdg ±10dgt
	40A	0.01A	4.0A~39.99A ±1.0%rdg ±10dgt
Ior	40mA	0.01mA	0.40mA~39.99mA ±1.5%rdg ±15dgt
	400mA	0.1mA	4.0mA~399.9mA ±1.2%rdg ±15dgt
V	4A	0.001A	0.04A~3.999mA ±1.2%rdg ±15dgt
	500V	0.1V	10.0V~499.9V ±1.0%rdg ±8dgt

Model **MCL-800IR**

High Precision - Big Window CT - Wide Ranges
 Lowest Influence from External Magnetic Fields and Residual Current.



FEATURES

- Can measure the resistive leakage current (Ior) accurately by voltage input with minimum resolution of 0.001mA.
- Wide ranges for the measurement of AC load current, leakage current (Io), resistive leakage current (Ior), and AC voltage.
- MΩ Display on LCD up to 9.999MΩ

SPECIFICATIONS

1) CT Sensor

Inside Diameter of CT : 80mm
 Withstanding Voltage: AC2200V, 1 minute

2) Measuring Part

Measuring Function : load current, leakage current (Io), resistive leakage current (Ior), AC voltage.
 Measuring Method : CT clamp-on method
 Measuring Range : 0-10mA, 100mA, 1000mA, 10Am (auto) ACV:10V~500V,MΩ: 0.001MΩ~9.999MΩ
 Input Frequency : 50/60Hz (manual)
 Detection Method : RMS detection through average rectification
 A/D Conversion : successive comparator method
 Display : LCD, max. reading of 9999
 Sampling Rate : 2 times/second
 Over Range Indication : "OL" mark on LCD readout
 Low Battery Indication : Battery mark on LCD readout
 Auto Power Off : automatically power off approx. 10 minutes after the final key operation
 Data Hold Indication : "DH" mark on LCD readout
 Power Supply : 1.5V ("AAA" size, um-4)x3 or AC adaptor (option)
 Power Consumption : Approx. 14mA (approx.48 hours with continuous use).
 Limitation of Circuit Voltage: Less than AC 500V
 Operating Temperature: 0°C~50°C, <80%RH(non-condensing)
 Storage Temperature: -10°C~60°C, <70%RH(non-condensing)
 Size & Weight : 71(W)x315(H)x37(D)mm, approx 750g
 Accessories : Battery (LR03)..... 3pcs. (installed into the body case)
 Voltage input test lead..... 1set
 Carrying Case..... 1pce.
 Instruction Manual 1pce.

3) Measuring Ranges and Accuracy

Measuring Function	Range	Resolution	Accuracy
Io AC Current	10mA	0.001mA	±1.0%rdg±10dgt
	100mA	0.01mA	
	1000mA	0.1mA	
Ior AC Current	10mA	0.001mA	±1.5%rdg±20dgt
	100mA	0.01mA	±1.5%rdg±15dgt
	1000mA	0.1mA	
AC Voltage	500V	0.1V	±1.0%rdg±10dgt

MINI DIGITAL CLAMP TESTER

AC CURRENT

Model 200

AC Current
20A/200A 33mmφ CT & "U" Type CT



FEATURES

- with "U" Type Direct Touch CT enables AC current measurement of Single & Three Phase Circuit just by touching CT to conductor.

SPECIFICATIONS

Measuring method : Dual integration mode
 Display : 3.5 digit LCD max. reading of 1999
 Over range indication : Blanking of all digits except MSD1
 Maximum indication : 1999
 Low battery indication : "B" mark on LCD
 Data hold indication : "DH" mark on LCD
 Sampling time : 2 times/sec
 Operating temperature : 0°C to +40°C, < 80% RH
 Storage temperature : -10°C to +60°C, < 70% RH
 Power supply : SR-44 (1.55V)×2 or LR-44×2
 Power consumption : 2.5 mW
 Battery life : SR-44 (200 hours), LR-44 (100 hours)
 Size : 54(W)×170(H)×21(D)mm
 Weight : Approx. 100g
 Accessories : Soft case 1
 instruction manual 1
 Batteries, LR-44 (1.55V) .. 2

33mmφCT

Range : 0~20/200A
 Accuracy : 23°C ± 5°C 80% RH or less

Range	Resolution	Accuracy
20A	10mA	±1.2% rdg ± 5dgt (50/60Hz)
200A	100mA	

"U" Type CT

Range : 300A (Resolution 0.1A)
 Accuracy : 23°C ± 5°C, 80% RH max.

Single Phase IV Conductor	±5%
Parallel VVF Conductor	±5%
Three Phase VVR Conductor	Estimated Value

Max Measurement Conductor : 20mmφ

Model 210

AC Current
20A/200A 33mmφ CT



FEATURES

- Ultra compact size with 23mmφCT.
- Most suitable for the use of the narrow & congested circuit.

SPECIFICATIONS

Measuring method : Dual integration mode
 Display : 3.5 digit LCD max. reading of 1999
 Range : 0~20/200A
 Accuracy : 23°C ± 5°C 80% RH or less

Range	Resolution	Accuracy
20A	10mA	±1.2% rdg ± 5dgt (50/60Hz)
200A	100mA	

Jaw opening capability : 23mmφ
 Over range indication : Blanking of all digits except MSD1
 Maximum indication : 1999
 Low battery indication : "B" mark on LCD
 Data hold indication : "DH" mark on LCD
 Sampling time : 2 times/sec
 Operating temperature : 0°C to +40°C < 80% RH
 Storage temperature : -10°C to +60°C < 70% RH
 Power supply : SR-44 (1.55V)×2 or LR-44×2
 Power consumption : 2.5 mW
 Battery life : SR-44 (200 hours), LR-44 (100 hours)
 Size : 48(W)×146(H)×20(D)mm
 Weight : Approx. 80g
 Accessories : Soft case 1
 instruction manual 1
 Batteries, LR-44 (1.55V) .. 2

MINI DIGITAL CLAMP TESTER

AC CURRENT

Model 220

AC Current
20A/200A 33mmφ CT



FEATURES

- 33mmφ CT window, and ultra compact size
- Data-hold function. Especially useful when working in dark or hard to get areas.
- Conform to IEC safety requirements.

SPECIFICATIONS

Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002) installation CategoryII 600V phase to earth, CategoryIII 300V phase to earth.
 E.M.C. standard : The instrument meets EN 61326 (2006).
 Measuring method : Dual integration mode
 Display : .5 digit LCD max. reading of 1999
 Accuracy : (23±5, 80% RH or less)

Range	Resolution	Accuracy
20A	10mA	±1.2% rdg ±5dgt (50/60Hz)
200A	100mA	

Jaw opening capability : 33mmφ
 Over range indication : Blanking of all digits except MSD1
 Maximum indication : 1999
 Low battery indication : "B" mark on LCD
 Data hold indication : "DH" mark on LCD
 Sampling time : 2 times/sec
 Withstanding voltage : AC 3700V 1 minute max. (Between the core of CT and outer case)
 Operating temperature : 0°C to +40°C<80%RH
 Storage temperature : -10°C to +60°C<70%RH
 Power supply : SR-44 (1.55V)×2 or LR-44×2
 Power consumption : 3mW
 Battery life : SR-44 (200 hours), LR-44(100 hours)
 Size : 54(W)×167(H)×23(D)mm
 Weight : Approx. 100g
 Accessories : Soft case 1
 instruction manual 1
 Batteries,LR-44(1.55V) .. 2

Model 225

AC Current
200A/600A 40mmφ CT



FEATURES

- 40mmφ CT window, and ultra compact size.
- Data hold function. Especially useful when working in dark or hard to get areas.
- Conform to IEC safety requirements.

SPECIFICATIONS

Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002) installation CategoryII 600V phase to earth, CategoryIII 300V phase to earth.
 E.M.C. standard : The instrument meets EN 61326 (2006).
 Measuring method : Dual integration mode
 Display : 3.5 digit LCD max. reading of 1999
 Accuracy : (23°C±5°C, 80% RH or less)

Range	Resolution	Accuracy
200A	100mA	±1.5% rdg ±5dgt
600A	1A	

Jaw opening capability : 40mmφ
 Over range indication : Blanking of all digits except MSD1
 Maximum indication : 1999
 Low battery indication : "B" mark on LCD readout
 Data hold indication : "DH" mark on LCD readout
 Sampling time : 2 times/sec
 Withstanding voltage : AC 3700V 1 minute max. (Between the core of CT and outer case)
 Operating temperature : 0°C to 40°C, 80% RH max. (Non-condensing)
 Storage temperature : -10°C to 60°C, 70% RH max. (Non-condensing)
 Power supply : 1.55V (SR-44 LR-44)×2
 Power consumption : 5mW
 Battery life : SR-44 (200 hours), LR-44 (100 hours)
 Size : 64 (W)×175(H)×23(D)mm
 Weight : Approx. 115g
 Accessories : Soft case 1
 instruction manual 1
 Batteries,LR-44(1.55V) .. 2

MINI DIGITAL & ANALOG CLAMP TESTER

AC CURRENT AC/DC VOLTAGE RESISTANCE

Model 2020

meets safety Standard CAT.II 600V and CAT.III 300V



FEATURES

- 40mmφ CT window and ultra compact size
- Low cost and multi-function clamp tester.
- Data-hold function and auto power off.
- Conform to IEC safety requirements.

Measuring range : AC Current 30A/300A (2 range auto), AC Voltage 3V~500V (4 ranges auto, 50/60Hz), DC Voltage 300mV~500V(5 range auto), Resistance 300Ω/3000Ω (2 range auto)

Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002), installation CategoryII 600V phase to earth, CategoryIII 300V phase to earth.

SPECIFICATIONS

AC Current (ACA) : 0~300A 2%rdg±8dgt
 AC Voltage(ACV) : 0~500V 2.3%rdg±6dgt
 DC Voltage (DCV) : 0~500V 1.3%rdg±3dgt
 Resistance (Ω) : 0~3000Ω 2%rdg±5dgt
 Measuring method : Dual integration mode
 Display : 3.5 digit LCD max. reading of 3200
 Accuracy : 23°C±5°C 80%RH or less
 Jaw opening capability : 40mm φ
 Over range indication : "OL" mark on LCD.
 Auto power off : Automatically power off mode approx.10 minutes after the power switch on.
 Low battery indication : "B" mark on LCD
 Data hold indication : "DH" mark on LCD
 Sampling time : 2 times/sec
 Circuit voltage : less than AC 500V.
 Withstanding voltage : AC 3700V 1 minute max. (Between the core of CT and outer case)
 Operating temperature : 0°C to ~ 40°C<80%RH (without condensing)
 Storage temperature : -10°C to ~ 60°C<70%RH (without condensing)
 Power supply : 1.55V (SR-44 LR-44)×2
 Power consumption : 5mW
 Battery life : SR-44 (200 hours), LR-44 (100 hours)
 Size : 64(W)×193(H)×24(D)mm
 Weight : Approx. 100g
 Accessories : Soft case 1
 : Instruction manual 1
 : Batteries,LR-44(1.55V) ··2
 : Test Lead 1

Model 3000

6A~600A 5 ranges
40mmφ CT



FEATURES

- High accuracy analog display with taut band meter.
- Meter hold function.
- AC/DC voltage and resistance measurements.

SPECIFICATIONS

E.M.C. standard : The instrument meets EN 61326 (2006).
 Current : AC 6A/15A/50A/150A/600A
 Accuracy; ±3% of F.S. (50/60Hz)
 Voltage : AC 0~300V/600V
 DC 0~60V
 Accuracy; ±3% of F.S. (50/60Hz)
 Resistance : 0~1kΩ/100kΩ (50Ω/5kΩ center)
 Accuracy; ±3% of scale length
 Temperature : -50°C to 200°C (Thermister sensor)
 Withstanding voltage : AC 5500V, 1 minute (between outer case and core of CT)
 Operating temperature : 0°C to 40°C, <80%RH
 Storage temperature : -10°C to 60°C, <70%RH
 Power supply : 1.5V ("AAA" size, R03)×2
 Size : 69(W)×210(H)×34(D)mm
 Weight : Approx. 400g (Including batteries)
 Accessories : Carrying case 1
 : Instruction manual 1
 : Batteries 2
 : Test Lead 1 set
 Optional Accessories : MT-3000 Thermister sensor probe

DIGITAL CLAMP TESTER

AC CURRENT

Model 2010

20A / 200A / 600A
40mmφ CT



FEATURES

- Wide range of current measurements with tear drop style CT up to 2000A range.

SPECIFICATIONS

Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002) Installation CategoryIII 600V phase to earth.

E.M.C. standard : The instrument meets EN 61326 (2006).
 Measuring method : Dual integration mode
 Display : 3½ digit LCD max. reading of 1999 and annunciators
 Over range indication : Blanking of all digits except MSD1
 Low battery indication : "B" mark on LCD readout
 Sampling : 2 times/s
 Data hold indication : "DH" mark on LCD readout
 Auto power off : The meter is set to power off mode approx. 10 minutes after the power switch on.

Range	Accuracy	Max. input
~A (50/60Hz) Manual range	20A ± 1.5% rdg ± 10 dgt	AC 600A
	200A ± 1.5% rdg ± 10 dgt	
	600A ± 1.0% rdg ± 8 dgt	
~V (50/60Hz) Auto range	2V ± 0.7% rdg ± 5 dgt	AC/DC 600V rms
	20V ± 1.2% rdg ± 5 dgt	
	200V ± 1.2% rdg ± 5 dgt	
	600V ± 1.2% rdg ± 5 dgt	
Ω (OHM) Auto range	200Ω ± 1.2% rdg ± 5 dgt	Input protection 250V rms
	2KΩ ± 1.2% rdg ± 5 dgt	
	20KΩ ± 1.2% rdg ± 5 dgt	
	200KΩ ± 1.2% rdg ± 5 dgt	
	2000KΩ ± 1.2% rdg ± 5 dgt	
20MΩ ± 3% rdg ± 10 dgt		
·) Continuity check	2KΩ Continuity beeper <Approx. 300Ω	250V rms
· > Diode Test	2V ± 10% rdg ± 3 dgt	250V rms

Model 2100

20A / 200A / 2000A
55mmφ CT



- Additional AC/DC voltage, resistance, diode test and continuity check.
- Data hold and auto power off function.

Operating temperature : 0°C to 40°C, <80%RH
 Storage temperature : -10°C to 60°C, <70%RH
 Power supply : "AAA" size, (1.5V)×2
 Power consumption and battery life : Approx. 3.5mW, 500 hours continuous.
 Size : 85(W)×240(H)×34(D)mm
 Weight : Approx. 350g
 Accessories : Carrying case 1
 : Test lead 1 set
 : Instruction manual 1
 : Batteries 2

Range	Accuracy	Max. input
~A (50/60Hz) Manual range	20A ± 1.2% rdg ± 10 dgt	AC 2000A (30 seconds)
	200A ± 1.2% rdg ± 10 dgt	
	2000A ± 1.2% rdg ± 8 dgt	
~V (50/60Hz) Auto range	2V ± 0.7% rdg ± 5 dgt	AC/DC 600V rms
	20V ± 1.2% rdg ± 5 dgt	
	200V ± 1.2% rdg ± 5 dgt	
	600V ± 1.2% rdg ± 5 dgt	
Ω (OHM) Auto range	200Ω ± 1.2% rdg ± 5 dgt	Input protection 250V rms (30 seconds)
	2KΩ ± 1.2% rdg ± 5 dgt	
	20KΩ ± 1.2% rdg ± 5 dgt	
	200KΩ ± 1.2% rdg ± 5 dgt	
	2000KΩ ± 1.2% rdg ± 5 dgt	
20MΩ ± 3% rdg ± 10 dgt		
·) Continuity check	2KΩ Continuity beeper <Approx. 300 Ω	250V rms
· > Diode Test	2V ± 10% rdg ± 3 dgt	250V rms

DIGITAL HARMONICS TESTER

Model **HWT-300** Measurement for harmonics on current



FEATURES

- The best monitor for determining harmonic distortion levels in the field use.
- Measures harmonics current flow up to the 25th harmonic.

- Small size, light weight, low cost.
- Easy to use with clamp-on operation.

SPECIFICATIONS

General Specification

Safety standard : Compliant with IEC 61010-1 (2010), IEC
 Measuring method : Dual integration mode with true rms reading
 Measuring function : Load current & leakage current (All pass mode), harmonics current (Harmonics mode)
 Display : 3.5 digit LCD, max. reading of 4000
 Range : 0~400mA/4A/40A/300A
 Input frequency : 45Hz~65Hz
 Jaw opening capability : 40mmφ
 Over range indication : "OL" mark on LCD readout
 Low battery indication : "BAT" mark on LCD readout
 Sampling time : 2 times/s
 Data hold indication : "DH" mark on LCD readout
 Data output : DC 100mV for full scale (400mA/4A/40A range)
 DC 75mV for full scale (300A range)
 Accuracy; ±1% (Full scale)
 Output impedance; 10kΩ or less
 Affection of magnetic fields : Less than 3mA (100A nearby conductor)
 Auto power off : The meter is set to power off mode approx. 10 minutes after the power switch on.
 Withstanding voltage : AC 2200V, 1 minute max. (Between the core of CT and outer case)
 Limitation of circuit voltage : Less than AC 600V
 Operating temperature : 0°C±40°C, <80%RH (Non-condensing)
 Storage temperature : -10°C±60°C, <70%RH (Non-condensing)

Power supply : 1.5V ("AAA" size, R03)×3 or AC adaptor (Optional)
 Power consumption : Approx. 13mA
 Battery life : Approx. 50 hours (Manganese battery)
 Size : 68(W)×207(H)×33(D)mm
 Weight : Approx. 430g
 Accessories : Carrying case..... 1
 Instruction manual..... 1
 Batteries 3

Measuring Mode

- All pass mode accuracy : 400mA, 4A, 40A range; ±1% rdg ±8 dgt
 300A range; ±1% of full scale
- Harmonics mode
 Measuring method : Synchronous filter
 Measurable harmonics : Fundamental frequency to 25th harmonics
 Minimum fundamental input current: More than 5% of full scale in each range
 Accuracy (23°C±5°C) : 1% rdg ±5 dgt
 Error by neighboring harmonics

Harmonics	*Harmonics component ratio of the neighboring frequency	Typical accuracy
5th	65%	±3% rdg ±5 dgt
7th	41%	±3.5% rdg ±5 dgt
11·13th	20%	±4% rdg ±5 dgt
15~23rd	10%	±5% rdg ±5 dgt

*For example : The neighboring frequency of 5th harmonic means 4th harmonic and 6th harmonic. If the harmonic component ratio of 4th harmonic and 6th harmonic is 65%, the typical accuracy will be ±3% rdg ±5dgt.

DIGITAL HARMONICS TESTER

Model **HWT-301** Harmonics measurements on current and voltage for the electric line



FEATURES

- The best monitor for determining harmonic distortion levels in the field use.
- Measures harmonics voltage and harmonics current flow up to the 25th harmonic.
- Measures leakage current, load current, voltage with true rms reading.
- Small size, light weight, low cost.
- Easy to use with clamp-on operation.

SPECIFICATIONS

General Specification
 Measuring method : Dual integration mode with true rms reading
 Measuring function : Load current, leakage current, harmonics current, voltage, harmonics voltage, resistance
 Safety standard : Meets the requirements for double insulation to IEC 61010-1 (2010), IEC 61010-2-032 (2002) installation CategoryII 600V phase to earth, CategoryIII 300V phase to earth.
 E.M.C. standard : The instrument meets EN 61326 (2006).
 Affection of magnetic fields : Less than 3mA (100A nearby conductor)
 Display : 3¾ digit LCD, max. reading of 4000
 Input frequency : 45Hz~65Hz
 Sampling time : 2 times/s
 Over range indication : "OL" mark on LCD readout
 Low battery indication : "BAT" mark on LCD readout
 Data hold indication : "DH" mark on LCD readout
 Jaw opening capability : 40mmφ
 Withstanding voltage : AC 3700V/1 minute max. (Between the core of CT and outer case)

Operating temperature : 0°C±40°C, <80%RH (Non-condensing)
 Storage temperature : -10°C~60°C, <70%RH (Non-condensing)
 Power supply : 1.5V ("AAA" size, R03)×3
 Power consumption : Approx. 13mA
 Auto power off : The meter is set to power off mode at approx. 20 minutes after the power switch on.
 Battery life : Approx. 50 hours continuous (By manganese battery)
 Size : 70(W)×223(H)×34(D)mm
 Weight : Approx. 440g
 Accessories : Batteries 3
 Carrying case 1
 Instruction manual..... 1
 Measuring Ranges
 Note : Electrical characteristic (18°C~28°C, 80%RH max)

All pass mode

AC Current (True rms)

Range	Resolution	Accuracy
400mA	0.1mA	±1.0% rdg ±8dgt
4A	1mA	
40A	10mA	
300A	100mA	±1.0% rdg ±1% of full scale

AC Voltage (True rms)

Range	Resolution	Accuracy	Input impedance	Max. input voltage
400mV	0.1mV	±1.0% rdg ±8dgt	>10MΩ	AC 250V rms
400V	100mV	±1.0% rdg ±8dgt		AC 450V rms

Resistance

Range	Resolution	Accuracy	Max. test current	Open circuit voltage
4000Ω	1Ω	±1.0% rdg ±8dgt	70μA	1.5V

*Input protection : 400V rms

Harmonics Mode

Measuring method : Synchronous filter
 Measurable harmonics : Fundamental frequency to 25th harmonics.
 Minimum fundamental input : More than 5% of full scale in each range.

Harmonics	Accuracy (In case of more than 4% harmonics are included against fundamental input)
1~9th	(±1% rdg ±5dgt)±(Basic accuracy of ACA or ACV)-(Error by neighboring harmonics)
10~19th	(±2% rdg ±5dgt)±(Basic accuracy of ACA or ACV)-(Error by neighboring harmonics)
20~25th	(±5% rdg ±5dgt)±(Basic accuracy of ACA or ACV)-(Error by neighboring harmonics)

POCKET TYPE DIGITAL MULTIMETER

Model **MCD-107**



FEATURES

- Ultra compact size and weight
- Easy operation with rotary switch
- 4000count full scale with autoranging
- Auto Power Off Function.

SPECIFICATIONS

Display	: LCD, max. reading of 4000
Polarity	: Automatic (-)negative indication
Over range indication	: "OL" mark on LCD readout
Low battery indication	: "B" mark is displayed when the battery voltage drops below operating voltage
Sampling	: 3 times/sec.
Operating temperature	: 0~40°C, <80%RH (non-condensing)
Storage temperature	: -10~50°C, <70%RH (non-condensing)
Power Supply	: Lithium battery CR2032(3V)×1
Power consumption	: Approx.6.0mW(typical at DVC)
Size & Weight	: 98(H)×59(W)×9.5(D)mm
Accessories	: Book type Cover case 1 Instruction Manual..... 1 Battery 1

MEASURING RANGES & ACCURACY

(23±5±, °C80%RH no-condensing)

Function	Range	Accuracy	Input Resistance	Remark
DC Voltage	400.0mV	±(0.7%rdg+3dgt)	more than 100MΩ	
	4.000V		approx.11MΩ	
	40.00V		Approx.10MΩ	
	400.0V			
AC Voltage	500V	±(1.3%rdg+3dgt)	Approx.10MΩ	
	4.000V			
	40.00V			
	400.0V			
Resistance	500V	±(2.3%rdg+5dgt)	approx.11MΩ	
	4.000V			
	40.00V			
	400.0V			
Capacitance	400.0Ω	±(2.0%rdg+5dgt)	approx.11MΩ	Opening Voltage : Approx.0.4V Current Voltage is changing up to resistance value to be measured
	4.000KΩ			
	40.00KΩ			
	4.000MΩ			
	40.00MΩ			
Frequency	40.00nF	±(5.0%rdg+10dgt)	approx.10MΩ	Accuracy : after cancelled the display value by relative function
	400.0nF			
	4.000μF			
	40.00μF			
Duty	100.0μF	±(10%rdg+15dgt)		★at AC sine wave Sensitivity of input voltage 9.999Hz~9.999MHz : more than 10Vrms 99.99KHz : more than 40Vrms
	9.999Hz			
	99.99Hz			
	999.9Hz			
Duty	9.999Hz	±(0.7%rdg+5dgt)		Input Sensitivity & Frequency Characteristic (Rectangular Wave Input Duty 50%) 2.5V 0 to peak input≥1KHz 6V 0 to peak input≥10KHz 40V 0 to peak input≥70KHz
	99.99KHz			
	0.1~99%			
	0.1~99%			
Continuity Check		Beeping 10~60Ω·Opening Voltage : approx. 0.4V		
Diode Test		Opening Voltage : approx.1.5V		

POCKET TYPE DIGITAL MULTIMETER

Model **MCD-006**

meets safety standard CAT.II 500V



FEATURES

- Ultra compact size and light weight.
- Easy operation with rotary switch.
- AC/DC voltage, resistance, continuity check and diode test with full autoranging operation.

SPECIFICATIONS

Display	: 3½ digit LCD, max. reading of 3200
Polarity	: Automatic, (-) negative polarity indication.
Over range indication	: "OL" mark on LCD readout
Low battery indication	: "B" mark is displayed when the battery voltage drops below operating voltage
Sampling	: 2 times/sec.
Auto power off	: The meter is set to power off mode approx. 10minutes after the power switch on.
Operating temperature	: 0°C to 40°C, <70% RH (Non-condensing)
Storage temperature	: 20°C to 60°C, <80%RH (Non-condensing)

Measuring ranges (23°C±5°C, > 80% RH or less)

DC Voltage

Range	Resolution	Accuracy	Input resistance	Max. input
320mV	100μV	±1.3% rdg ±3dgt	>1000MΩ	500V DC or AC rms
3.2V	1mV		Approx. 11MΩ	
32V	10mV	±1.3% rdg ±3dgt	Approx. 10MΩ	
320V	100mV			
500V	1V			

AC Voltage (50/60Hz)

Range	Resolution	Accuracy	Input resistance	Max. input
3.2V	1mV	±2.3% rdg ±6dgt	Approx. 11MΩ	500V DC or AC rms
32V	10mV		Approx. 10MΩ	
320V	100mV			
500V	1V			

Resistance

Range	Resolution	Accuracy	Test current	Input protection
320Ω	100mΩ	±2.0% rdg ±5dgt	< 0.7mA	500V DC or AC rms
3.2KΩ	1Ω		< 0.13mA	
32KΩ	10Ω	±2.0% rdg ±3dgt	< 13μA	
320KΩ	100Ω		< 1.3μA	
3.2MΩ	1KΩ		< 0.13μA	
32MΩ	10KΩ	±10% rdg ±10dgt		

Diode Test

Range	Resolution	Accuracy	Test current	Input protection
3.2V	1mV	±10% rdg ±3dgt	Approx. 0.7mA (Vf=0.6V)	500V DC or AC rms

Continuity Check

Range	Resolution	Accuracy	Test current	Input protection
320Ω	100mΩ	< Approx.20Ω	< 0.7mA	500V DC or AC rms

Model **MCD-007**



- 3200 count full scale with bargraph display.
- Low power consumption with auto power off function.

Power supply	: LR-44 (1.55V)×2
Power consumption	: 5.0mW
Size	: MCD-007 110(H)×60(W)×9.5(D)mm MCD-006 120(H)×80(W)×10.5(D)mm
Weight	: Approx. 86g (MCD-007) Approx. 93g (MCD-006) (Including batteries and case)
Accessories	: Hard cover case..... 1 Instruction manual..... 1 Batteries..... 2

POCKET TYPE DIGITAL MULTIMETER

Model **MCD-008**



GENERAL

with the NEW & UNIQUE FUNCTION CORD REEL TEST LEAD TYPE Test Lead Wires can be internally rolled up into the body case by one touch switch.

FEATURES

- Ultra compact size and light weight.
- Easy operation with rotary switch.
- AC/DC voltage, resistance, continuity check and diode test with full autoranging operation.
- 3200 count full scale with bargraph display.
- Low power consumption with auto power off function.

SPECIFICATIONS

Display	: 3 1/2 digit LCD, max. reading of 3200
Polarity	: Automatic, (-)negative polarity indication.
Over range indication	: "OL" mark on LCD readout
Low battery indication	: "⎓" mark is displayed when the battery voltage drops below operating voltage.
Sampling	: 2 times/sec.
Auto power off	: The meter is set to power off mode approx. 10 minutes after the power switch on.
Operatin temperature	: 0°C to 40°C, < 70% RH(Non-condensing)
Storage temperature	: 20°C to 60°C, < 80% RH(Non-condensing)
Power supply	: LR-44 (1.55V)×2
Power consumption	: 5.0 mW
Size	: 72(W)×114(H)×22.5(D)mm
Weight	: Approx. x100g (Including batteries)
Accessories	: Instruction manual..... 1 Batteries..... 2

Measuring ranges (23°C±5°C, > 80% RH or less)

DC Voltage

Range	Resolution	Accuracy	Input resistance	Max. input
320mV	100µV	±1.3% rdg ±3dgt	>1000MΩ	500V DC or AC rms
3.2V	1mV	±0.7% rdg ± dgt	Approx. 11MΩ	
32V	10mV	±1.3% rdg ±3dgt	Approx. 10MΩ	
320V	100mV			
500V	1V			

AC Voltage (50/60Hz)

Range	Resolution	Accuracy	Input resistance	Max. input
3.2V	1mV	±2.3% rdg ±6dgt	Approx. 11MΩ	500V DC or AC rms
32V	10mV		Approx. 10MΩ	
320V	100mV			
500V	1V			

Resistance

Range	Resolution	Accuracy	Test current	Input protection
320Ω	100mΩ	±2.0% rdg ±5dgt	< 0.7mA	500V DC or AC rms
3.2KΩ	1Ω	±2.0% rdg ±3dgt	< 0.13mA	
32KΩ	10Ω		< 13µA	
320KΩ	100Ω		< 1.3µA	
3.2MΩ	1KΩ	±6.0% rdg ±4dgt	< 0.13µA	
32MΩ	10KΩ	±10% rdg ±10dgt		

Diode Test

Range	Resolution	Accuracy	Test current	Input protection
3.2V	1mV	±10% rdg ±3dgt	Approx. 0.7mA (Vf=0.6V)	500V DC or AC rms

Continuity Check

Range	Resolution	Accuracy	Test current	Input protection
320Ω	100mΩ	< Approx.20Ω	< 0.7mA	500V DC or AC rms

POCKET TYPE DIGITAL MULTIMETER

TRUE RMS READING

Model **MCD-009**



- * Book Case Type
- * Size : 60(W)×110(H)×9.5(D)mm
- * Weight : Approx. 86g

FEATURES

- Ultra compact size and light weight.
- Easy operation with rotary switch.
- AC/DC voltage, resistance, continuity check and diode test with full autoranging operation.
- 3200 count full scale with bargraph display.
- Low power consumption with auto power off function.

SPECIFICATIONS

Display	: 3 1/2 digit LCD, max. reading of 3200
Polarity	: Automatic, (-)negative polarity indication.

Measuring ranges (23°C±5°C, > 80% RH or less)

DC Voltage

Range	Resolution	Accuracy	Input resistance	Max. input
320mV	100µV	±1.3% rdg ±3 dgt	>1000MΩ	500V DC or AC rms
3.2V	1mV	±0.7% rdg ±3 dgt	Approx. 11MΩ	
32V	10mV	±1.3% rdg ±3 dgt	Approx. 10MΩ	
320V	100mV			
500V	1V			

AC Voltage (50/60Hz)

Range	Resolution	Accuracy	Input resistance	Max. input
3.2V	1mV	±1.3% rdg ±5 dgt	Approx. 11MΩ	500V DC or AC rms
32V	10mV	±2.0% rdg ±6 dgt	Approx. 10MΩ	
320V	100mV			
500V	1V			

Resistance

Range	Resolution	Accuracy	Test current	Input protection
320Ω	100mΩ	±2.0% rdg ±5 dgt	< 0.7mA	500V DC or AC rms
3.2KΩ	1Ω	±2.0% rdg ±3 dgt	< 0.13mA	
32KΩ	10Ω		< 13µA	
320KΩ	100Ω		< 1.3µA	
3.2MΩ	1KΩ	±6.0% rdg ±4 dgt	< 0.13µA	
32MΩ	10KΩ	±10% rdg ±10 dgt		

Diode Test

Range	Resolution	Accuracy	Test current	Input protection
3.2V	1mV	±10% rdg ±3 dgt	Approx. 0.7mA (Vf=0.6V)	500V DC or AC rms

Continuity Check

Range	Resolution	Accuracy	Test current	Input protection
320Ω	100mΩ	< Approx.20Ω	< 0.7mA	500V DC or AC rms

Model **MCD-010**



- * Cord Reel Type
- * Size : 72(W)×114(H)×22.5(D)mm
- * Weight : Approx. 110g

- Over range indication : "OL" mark on LCD readout
- Low battery indication : "⎓" mark is displayed when the battery voltage drops below operating voltage
- Sampling : 2 times/sec.
- Auto power off : The meter is set to power off mode approx. 10 minutes after the power switch on.

Operating temperature	: 0°C to 40°C, <70% RH(Non-condensing)
Storage temperature	: 20°C to 60°C, <80%RH(Non-condensing)
Power supply	: LR-44 (1.55V)×2
Power consumption	: 5.0mW
Accessories	: Instruction manual..... 1 Batteries..... 2

ANALOG INSULATION RESISTANCE TESTER

Single Scale Indicator for 3 Range Insulation Measurements

Model MIS-1A

50V/10MΩ, 125V/20MΩ
250V/50MΩ

Model MIS-2A

25V/ 20MΩ, 250V/ 50MΩ
500V/100MΩ

Model MIS-3A

125V/ 20MΩ, 250V/ 50MΩ
1000V/2000MΩ

Model MIS-4A

250V/ 50MΩ, 500V/ 100MΩ
1000V/2000MΩ



FEATURES

- The single and fluorescent scale indicator for 3 ranges insulation measurements enabled easy observation. Especially useful when working in dark place.
- Hand free and continuous measurements with custom made switch.
- Safe design with built in automatic discharging function for any capacitors present in the circuit.
- The voltage in the circuit can be pre-checked without any switch operation for safe insulation measurements.
- Compact, light weight and heavy duty rugged case.

SPECIFICATIONS

Function	: Insulation resistance, AC voltage, battery check
Meter movement	: 100μA, 870Ω, taut band meter.
Safety standard	: Meets the requirements for double insulation to IEC 61010-1 (2001), IEC 61010-2-032 (2002) installation Category II, 600V phase to earth.
E.M.C. standard	: The instrument meets EN 61326 (2006)
Constructional standard	: In accordance with IEC 1557-2 or JIS C1302(1994)
Insulation resistance	: DC 500V-50MΩ or more (MIS-1A, MIS-2A) DC 1000V-50MΩ or more (MIS-3A, MIS-4A)
Withstanding voltage	: AC 3700V, 1 minute (Between input terminal and outer case)
Overload protection	: 120% of the highest nominal output voltage (10sec.)
Battery check	: DC 6.3V~9.5V
Low battery limit	: DC 6.3V
Temperature characteristics (0~40°C)	: ±5%rdg of specified accuracy
Operating temperature	: 0°C to 40°C, 80% RH max. (Non-condensing)
Storage temperature	: -10°C to 60°C 80% RH max. (Non-condensing)
Power supply	: 1.5V ("AA" size, R6)×6
Size	: 170(W)×105(D)×54(H)mm
Weight	: Approx. 330g (Excluding batteries)
Accessories	: Line test lead 1 Earth test lead 1 Batteries 6 Test lead case 1 Belt 1 Instruction manual 1
Optional accessory	: Remote switch test lead

Measuring Ranges and Technical Data

Insulation resistance measurement

Model	MIS-1A	MIS-2A	MIS-3A	MIS-4A
Rated voltage & effective measuring range	50V-10MΩ 125V-20MΩ 250V-50MΩ	125V- 20MΩ 250V- 50MΩ 500V-100MΩ	125V-20MΩ 250V-50MΩ 1000V-2000MΩ	250V-50MΩ 500V-100MΩ 1000V-2000MΩ
Center scale	0.2MΩ/0.5MΩ/1MΩ	0.5MΩ/1MΩ/50MΩ	0.5MΩ/1MΩ/2MΩ	1MΩ/2MΩ/50MΩ
Minimum measurable resistance at rated voltage	0.05 MΩ 0.125MΩ 0.25 MΩ	0.125MΩ 0.25MΩ 0.5 MΩ	0.125MΩ 0.25MΩ 1MΩ	0.25MΩ 0.5MΩ 1MΩ
Rated current	1mA+20%-0%			
Maximum no-load voltage	Rated voltage+30%-0%			
Short circuit current	<2mA			

Accuracy

Rated voltage	DC 50V	DC 125V	DC 250V	DC 500V	DC 1000V
First effective range	0.01MΩ~5MΩ ±5%rdg	0.02MΩ~10MΩ ±5%rdg	0.05MΩ~20MΩ ±5%rdg	0.1MΩ~50MΩ ±5%rdg	2MΩ~1000MΩ ±5%rdg
Second effective range	0.005MΩ~0.01MΩ 5MΩ~10MΩ ±10%rdg	0.01MΩ~0.02MΩ 10MΩ~20MΩ ±10%rdg	0.02MΩ~0.05MΩ 20MΩ~50MΩ ±10%rdg	0.05MΩ~0.1MΩ 50MΩ~100MΩ ±10%rdg	1MΩ~2MΩ 1000MΩ~2000MΩ ±10%rdg
	10MΩ~50MΩ ±30%rdg	20MΩ~100MΩ ±30%rdg	50MΩ~100MΩ ±30%rdg		

AC voltage measurement (50/60Hz)

Range	Accuracy	Input impedance	Maximum input voltage
AC 600V	±2.5% of full scale	Approx. 1.5MΩ	AC 600V rms

DIGITAL INSULATION RESISTANCE TESTER

For 3 Range Insulation Measurements

Model MIS-2D

25V/20MΩ, 250V/50MΩ
500V/100MΩ

Model MIS-3D

25V/ 20MΩ, 250V/ 50MΩ
1000V/2000MΩ

Model MIS-4D

125V/ 20MΩ, 250V/ 50MΩ
1000V/2000MΩ



FEATURES

- The big digital and bargraph LCD display with back light enabled easy observation. Especially useful when working in dark place.
- Hand free and continuous measurements with custom made switch.
- Safe design with built in automatic discharging function for any capacitors present in the circuit.
- The voltage in the circuit or capacitor can be checked by warning lamp for safe insulation measurements.
- Data hold and auto power off function.
- Compact, light weight and heavy duty rugged case.

SPECIFICATIONS

Function	: Insulation resistance, AC voltage
Display	: 3½ digit LCD with bargraph display, max. reading of 3200 count and annunciators
Response time	: Less than 5 sec. (Auto ranging)
Data hold indication	: "DH" mark on LCD readout
Infinity indication	: "OL(∞)" mark on LCD readout (Over 3200 count)
Safety standard	: Meets the requirements for double insulation to IEC 61010-1 (2001), IEC 61010-2-032 (2002) installation Category II, 600V phase to earth.
E.M.C. standard	: The instrument meets EN 61326 (2004)
Constructional standard	: In accordance with IEC 1557-2 or JIS C1302 (1994)
Insulation resistance	: DC 500V-50MΩ or more (MIS-2D) DC 1000V-50MΩ or more (MIS-3D, MIS-4D)
Withstanding voltage	: AC 3700V, 1 minute (Between input terminal and outer case)
Overload protection	: 120% of the highest nominal output voltage (10sec.)
Low battery indication	: "B" mark on LCD readout
Temperature characteristics (0~40°C)	: ±5%rdg of specified accuracy
Operating temperature	: 0°C to 40°C, 80% RH max. (Non-condensing)
Storage temperature	: -10°C to 60°C, 80% RH max. (Non-condensing)
Power supply	: 1.5V ("AA" size, LR6)×6
Size	: 170 (W)×105(D)×54(H)mm
Weight	: Approx. 365g (Excluding batteries)
Accessories	: Line test lead 1 Earth test lead 1 Batteries 6 Test lead case 1 Belt 1 Instruction manual 1
Optional accessory	: Remote switch test lead

Measuring Ranges and Technical Data

Insulation resistance measurement

Model	MIS-2D	MIS-3D	MIS-4D
Rated voltage & effective measuring range	125V- 20MΩ 250V- 50MΩ 500V-100MΩ	125V-20MΩ 250V-50MΩ 1000V-2000MΩ	125V-20MΩ 250V-50MΩ 1000V-2000MΩ
Minimum measurable resistance at rated voltage	0.125MΩ 0.25MΩ 0.5MΩ	0.25MΩ 0.5MΩ 1MΩ	0.125MΩ 0.25MΩ 1MΩ
Rated current	1mA+20%-0%		
Maximum no-load voltage	Rated voltage+30%-0%		
Short circuit current	<2mA		

Accuracy

Rated voltage	DC 125V	DC 125V	DC 250V	DC 500V
First effective range	0~20MΩ~OL(∞) 0.02MΩ~10MΩ <±5%rdg	0~50MΩ~OL(∞) 0.05MΩ~20MΩ <±5%rdg	0~100MΩ~OL(∞) 0.1MΩ~50MΩ <±5%rdg	0~2000MΩ~OL(∞) 2MΩ~1000MΩ ±5%rdg
Second effective range	0.01MΩ~0.02MΩ 10MΩ~100MΩ <±10%rdg	0.02MΩ~0.05MΩ 20MΩ~100MΩ <±10%rdg	0.05MΩ~0.1MΩ 50MΩ~100MΩ <±10%rdg	1MΩ~2MΩ 1000MΩ~2000MΩ <±10%rdg
Other range	100MΩ~OL(∞) Not specified			2000MΩ~OL(∞) Not specified

AC voltage measurement (50/60Hz)

Range	Accuracy	Input impedance	Maximum input voltage
AC 600V	±2.5% of full scale	Approx. 2.0MΩ	AC 600V rms

VOLTAGE DETECTOR

AC and AC/DC Low Voltage

Model LV-1



FEATURES

- New Function to avoid Electric Shock.
- Using Conductive Rubber for Detector Tip free from short circuit.
- With Slip Stopper for the safety.

SPECIFICATIONS

Model : LV-1 (for AC low voltage only)
 Voltage range : On the cover of wire AC50~500V (50/60Hz common use)
 On the Bare terminal AC0~300V (50/60Hz common use)
 Isolation resistance : Over 10M Ω by DC500V Insulation Tester (between detecting tip and clip)
 Isolation withstanding : One minute by AC1500V Insulation Tester (between detecting tip and clip)
 Minimum responsible voltage to ground : Sensitivity adjustable. (initial adjustment for standard / AC40V with detecting tip in contact with insulated wire 1V 2mm)
 Value for judgement of isolation defect : More than 10uA, floating to the human body ("L" lamp will turn on a light)
 Display of indication Visual : intermittent flashing red light for the both of voltage detect & isolation defect.
 Audio : intermittent beeper sound
 Battery Alkaline button cell : LR-44×2 Pcs.
 Operating temperature : 0°C~40°C
 Size & weight : 20(W)×129(H)×19.5(D)mm approx. 30gs
 Accessories : Batteries(LR-44) 2 Pcs.
 Alligator clip for the eath 1 Pce.
 Instruction manual 1 Pce.

Model V-550



FEATURES

- LCD display of voltage with voltage detective function (beeper sound).
- Can measure voltage from the cover of conductor (estimated value).
- Accurate & safety measurement on the bare terminal, etc. free from short circuit.

SPECIFICATIONS

Max. measuring voltage : AC500V
 Auto power off : 5 minutes after switch on
 Date hold : "DH" mark on LCD readout
 Low battery indication : "B" mark on LCD
 Power supply : 1.55V (LR-44)×2
 Power Consumption : Continuous approx.60hours
 Size : 130(L)×30(W)×14(D)mm, approx.37g
 Accessories : Battery 2
 Soft case 1
 Instruction Manual · 1
 Accuracy : 23°C ± 5°C, 80% RH or less

Range H	Range L
Bare terminal, Outlet bare conductor, etc.	on the insulated vinyl, rubber cover of conductor
Accuracy : ± 3% rdg	estimated value(according to materials, condition of wires, etc

Display of volatage detection : 3 1/2 digit on LCD and beeper sound over 15V.
 Measuring circuit voltage : less than AC600V (50/60Hz)

Model VD-320



FEATURES

- Can measure AC/DC voltage of the bare terminal easily by one-hand operation and can judge the polarity of DC voltage.
- Can measure voltage even from the cover of conductor by touching the tip for 30 second. (Estimated value).
- Using conductive rubber tip, free from short circuit.
- Can measure DC voltage from 1.5V to 400V as well as AC voltage up to 500V.
- No effect on the measurement due to insulation ground condition, etc.

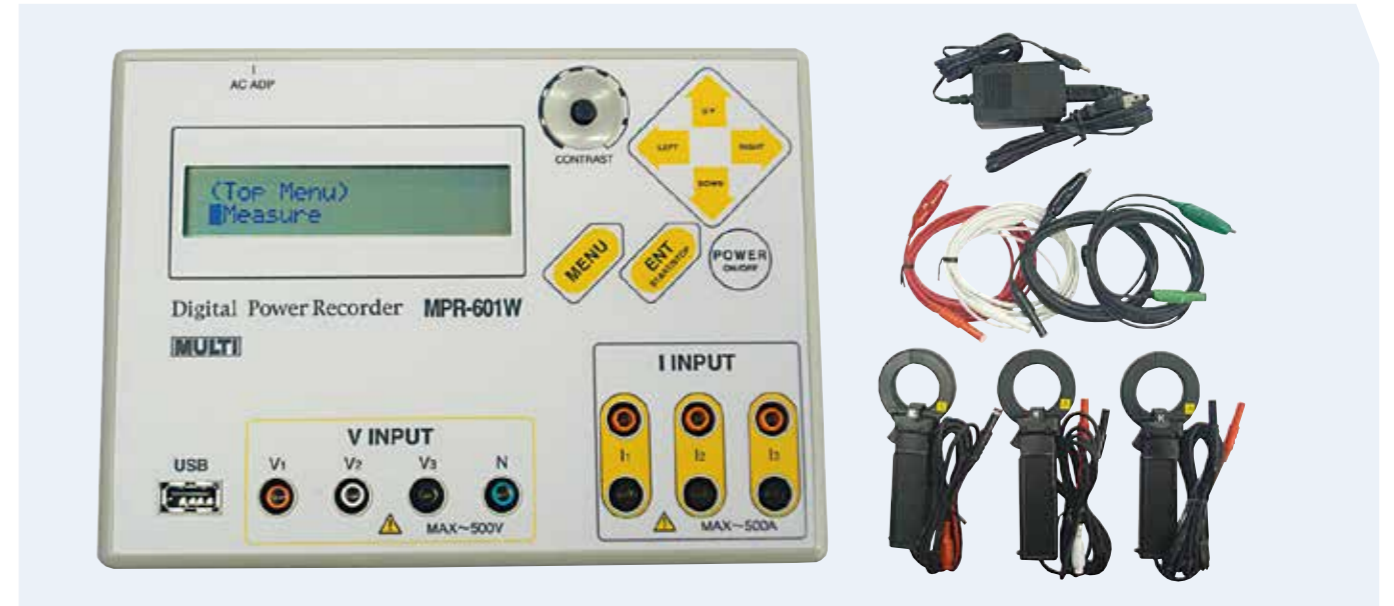
SPECIFICATIONS

Measurement circuit voltage : less than 600V
 Data hold : "DH" mark on LCD readout
 Low battery indication : "B" mark on LCD readout
 Power supply : 1.55V(LR-44)×2
 Power consumption : Continuous approx. 60 hours
 Size : 153(L)×34(W)×24(D)mm, approx.60g
 Accessories : Battery 2
 Soft case 1
 Instruction manual · 1
 Accuracy : 23°C ± 5°C, 80% RH or less

Range	DC Voltage	AC Voltage
Range	400V/200V manual	500V (50/60Hz)
Polarity	"+" or "-" indication	Earth side/no indication Hot side/voltage value
Accuracy	± 5% rdg	± 5% rdg

DIGITAL POWER RECORDER

Model MPR-601W



GENERAL

This digital power recorder can measure voltage, current, active power, power factor which are necessary for power line management and can store all measured data to USB flash memory. After finished the measurement, pull out the flash memory from the instrument and insert it to the USB port of PC, so that you can take all data into PC and can manage them very easily.

SPECIFICATIONS

Measurement Line : Single-phase/two wires, Single-phase/three wires, Three-phase/three wires, Three-phase/four wires
 Measurement Items : Voltage, Current, Active Power, Apparent Power, Power Factor, Frequency, Power integral (KWh).
 Measuring Method : Voltage : Standard Clip Sensor for direct source
 Current : CT Clamp sensor
 Standard/CT-40PB φ40mm max. 600A
 Option/CT-80PB φ80mm max. 1000A
 Measurement Range : Voltage : 0~500V
 Current : 10/50/100/600A (Auto-range)
 Active Power : depends on combination of V & A range
 Power Factor : 0~100%
 Frequency : 45~65Hz
 Setting of PT : 1~9999
 Setting of CT : 1~9999
 Sampling Rate : 2 times/sec.
 AC/DC conversion : True RMS
 Crest Factor : Voltage/less than 2 at input voltage more than AC400V Current/less than 2 at full scale input
 Display : LCD 20 letters×2 lines
 Measurement Interval : 1/5/10/15/30/60 minutes
 Memory factor : Measuring Time, Conditions and Average Voltage/Current/Active Power/Power integral/Power Factor or measuring interval. Memory Output : USB Flash Memory
 Other Functions : Measurement Start/End setting, Clock display, Battery Power Warning display, PT/CT ratio setting
 Power supply : ①AC Adaptor
 ②LR-6×4
 Measurement Temp. & Hum. : 0°C~50°C /under 80%RH (without condensing)
 Storage Temp. & Hum. : -10°C~60°C /under 80%RH (without condensing)
 Dimension & Weight : 90(W)×140(H)×42(D)mm, approx. 800gs
 Standard Accessories : Voltage Clip Sensor (Red, Black, White, Green) /1 set Clamp-on CTφ40mm /3 pcs.
 AC adaptor/1pce.
 Instruction Manual/1 pce.
 Hand Carrying Case/1pce.
 Optional Accessories : CT-80PB Current Sensor

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