YOKOGAWA

Clamp-on Testers

300 Series and CL Series of Clamp-on Testers

30032A NEW Leakage Clamp-on Tester with a sharp low pass filter function

30031A NEW Leakage Clamp-on Tester capable of measuring from 1 mA AC

CL Series Rich lineup for various current measurements

CE

30032A

30031A

CL Series

Yokogawa Meters & Instruments Corporation

Bulletin CL-E

Selection Guide

■ For Leakage Current

Model		30031A	30032A	CL320	CL340	CL345	CL360
Diameter of measurable conductor		ø40mm	ø40mm	ø24mm	ø40mm	ø40mm	ø68mm
Method of detection		Mean value	Mean value	Mean value	Mean value	True RMS	Mean value
Frequency characteristics		50/60Hz	50/60Hz	40Hz to 400Hz	20Hz to 1kHz	20Hz to 1kHz	40Hz to 1kHz
AC current	Range	3/30mA, 30/60A	3/30mA, 30/60A	20/200mA,200A	40/400mA,400A	40/400mA,400A	200mA/2/20/200/1000A
	Resolution	0.001mA	0.001mA	0.01mA	0.01mA	0.01mA	0.1mA
Other measurement functions	AC voltage	–	–	–	–	–	–
	DC voltage	–	–	–	–	–	–
	Continuity check	–	–	–	–	–	–
	Frequency	–	–	–	–	–	–
	Temperature	–	–	–	–	–	–
	Data hold	○	○	○	○	○	○
	Peak hold	–	–	–	○	○	○
	Recorder output	–	–	–	–	–	○
	Mean value display	–	○*	–	–	–	–
	Filter Switch	–	○	○	○	○	○
	Waveform monitor output	–		–	–	–	○
Page		2	2	7	8	8	9

*Page1: Description of Harmonic Filter Function

■ For AC Current

Model		CL120	CL130	CL135	CL150	CL155
Diameter of measurable conductor		ø 24mm	ø 30mm	ø 30mm	ø 54mm	ø 54mm
Method of detection		Mean value	Mean value	True RMS	Mean value	True RMS
Frequency characteristics		40Hz to 1kHz	40Hz to 1kHz	40Hz to 1kHz	40Hz to 1kHz	40Hz to 1kHz
AC current	Range	20/200A	200/600A	200/600A	400/2000A	400/2000A
	Resolution	0.01A	0.1A	0.1A	0.1A	0.1A
DC current	Range	–	–	–	–	–
	Resolution	–	–	–	–	–
Other measurement functions	AC voltage	–	○	○	○	○
	DC voltage	–	–	–	○	○
	Continuity check	–	○	○	○	○
	Frequency	–	–	–	–	–
	Temperature	–	–	–	–	–
	Data hold	○	○	○	○	○
	Peak hold	–	–	–	○	○
	Recorder output	–	–	–	○	○
	Waveform monitor output	–	–	–	–	–
Page		3	3	4	4	5

■ For AC/DC Currents

Model		CL220	CL235	CL250	CL255
Diameter of measurable conductor		ø 24mm	ø 33mm	ø 55mm	ø 55mm
Method of detection		Mean value	True RMS	Mean value	True RMS
Frequency characteristics		20Hz to 1kHz	40Hz to 1kHz	40Hz to 1kHz	30Hz to 1kHz
AC current	Range	40/300A	400/600A	400/2000A	400/2000A
	Resolution	0.01A	0.1A	0.1A	0.1A
DC current	Range	40/300A	400/1000A	400/2000A	400/2000A
	Resolution	0.01A	0.1A	0.1A	0.1A
Other measurement functions	AC voltage	–	○	○	○
	DC voltage	–	○	○	○
	Continuity check	–	○	○	○
	Frequency	–	○	–	○
	Temperature	–	–	–	–
	Data hold	○	○	○	○
	Peak hold	–	○	–	○
	Recorder output	–	–	○	○
	Waveform monitor output	–	–	–	–
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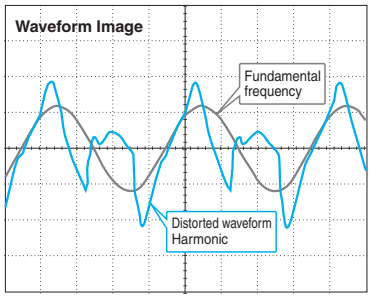
Description of Harmonic Filter Function

● Harmonic Filter Function (Only Available in the 30032A)

1. What is a Harmonic?

Harmonic refers to sinusoidal quantity having a frequency that is an integral multiple of the fundamental frequency (for example, the commercial frequency). When a harmonic is superimposed on the fundamental frequency, the waveform is distorted.



*Waveforms obtained when measuring a distribution board of a Yokogawa Meters & Instruments Corporation office

2. Why is it Necessary to Accurately Measure the Leakage Current of the Fundamental Frequency (Commercial Frequency)?

One problem when measuring the leakage current to check the isolation of electrical circuits in power distribution equipment is that the electrical isolation cannot be correctly understood due to the influence of a harmonic current. That is, the leakage current flowing from the electrical circuit to ground is very small so that, in order to check the isolation of electrical circuits by means of the leakage current, it is necessary to remove the harmonic component of the leak current and measure only the current of the fundamental frequency (commercial frequency).

3. The 30032A Employs a Harmonic Filter

Conventional leakage clamp-on testers could not sufficiently remove harmonic current components so measured leakage current values were often larger than the specified value due to the influence of a harmonic current. In this case, retesting with an insulation tester was required, resulting in increased effort and cost for the test. Under these circumstances, Yokogawa Meters & Instruments Corporation has developed the leakage clamp-on tester 30032A, which employs a high-performance harmonic filter that can accurately measure just the fundamental frequency component of the leakage current.

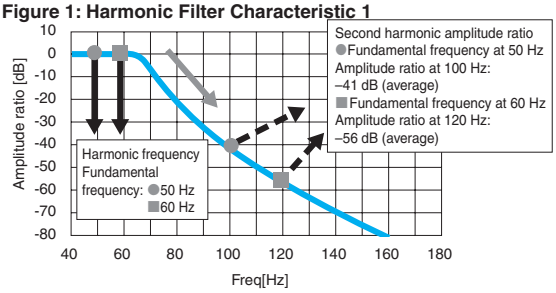
● Characteristics of Harmonic Filter

1. Filter Characteristic of the 30032A

When the frequency is more than 60 Hz, the sharp filter removes the harmonic component, leaving the fundamental frequency. For example, the level of 100 Hz is attenated to approx. 1%.

<Reference Figure 1: Harmonic Filter Characteristic 1>

Figure 1: Harmonic Filter Characteristic 1



2. Filter Comparison (between the On and Off States)

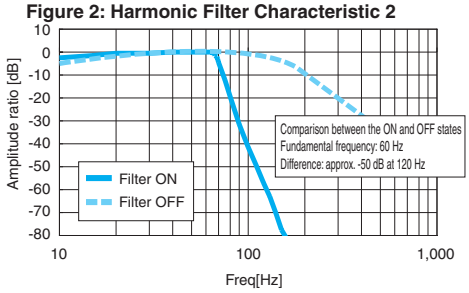
This is the filter characteristic in the On and Off states.

<Reference Figure 2: Harmonic Filter Characteristic 2>

<Reference> When the filter is in the On or Off state
Amplitude ratios in the range between the fundamental frequency and the third frequency
<Fundamental frequency: 60 Hz>

Filter state / Harmonic	On	Off
Fundamental	0 dB	0 dB
Second	-56 dB	-1.3 dB
Third	-80 dB or more	-6.7 dB

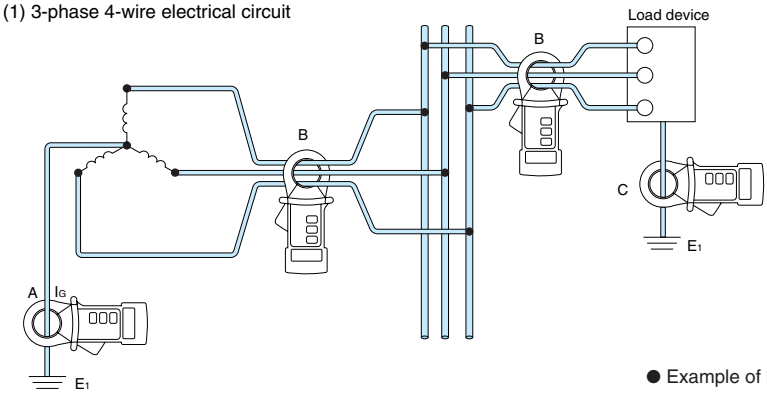
Figure 2: Harmonic Filter Characteristic 2



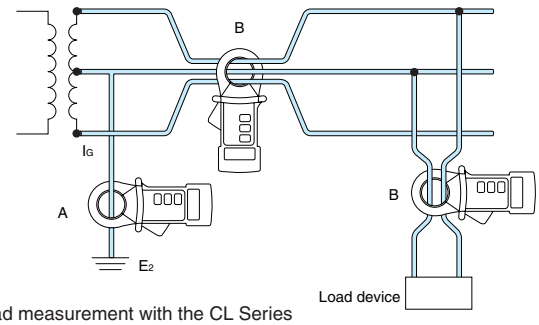
Measurement Example

●Measurement method of leakage current : Measurement location of leakage current A: Measurement of the grounding wire for the transformer class B grounding work B: Measurement of the electrical circuit C: Measurement of the grounding wire of electrical equipment

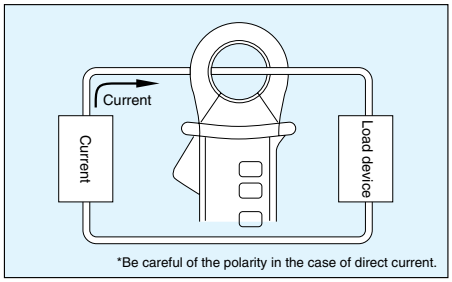
(1) 3-phase 4-wire electrical circuit



(2) Single-phase 3-wire electrical circuit



● In the case of load current



● Example of load measurement with the CL Series

Leakage Clamp-on Testers

30032A

AC Leakage

⌀40

AC/3mA~60A

Filter

30032A

- Can measure leakage AC currents of 1mA
- Filter function can cut off harmonics-currents components from 2nd order
- Filter function select on or off

AC current measurement

Filter function OFF

Accuracy: ± (% of reading + digits)

Range	Resolution	Accuracy	Maximum Allowable Current
3mA	0.001mA	0.010 <I ≤32.70mA:	3.270mA
30mA	0.01mA	1.0%+5	32.70mA
30A	0.01A	0.05 <I ≤50.0A:1.0%+5	32.70A
60A	0.1A	50.0 <I ≤60.6A:5.0%+5	60.6A

Filter function ON

Range	Resolution	Accuracy	Maximum Allowable Current
3mA	0.001mA	0.010 <I ≤32.70mA:	3.270mA
30mA	0.01mA	1.5%+5	32.70mA
30A	0.01A	0.05 <I ≤50.0A:1.5%+5	32.70A
60A	0.1A	50.0 <I ≤60.6A:5.5%+5	60.6A

Note: Input current of 2nd-order and higher harmonics
: 150 mA rms maximum in the 3 mA/30 mA range
: 62 A rms maximum in the 30 A/60 A range

Filter specifications (3 mA and 30 mA ranges and 30 A and 60 A ranges)
Amplitude ratio at 100 Hz: -38 dB (1.26%) or less (typical: -41 dB)
Amplitude ratio at 120 Hz: -53 dB (0.22%) or less (typical: -56 dB)

Zero correction
3 mA range: Displays 0.000 mA (zero) when 0.010 mA < I
30 A range: Displays 0.00 A (zero) when 0.05 A < I

■General Specifications

Parameter	Specification
Method	Mean-value detection and rms-value calibration
Display	LCD (Digital reading 3200 counts) Bar graph (32 segments)
Range switching	Range selection Auto or Manual
Data Hold	On all Range
Operating temperature and humidity	0 to 50°C, 80% RH or less (no condensation)
Temperature coefficient	Following values must be added in the temperature range of either 0 to 18°C or 28 to 50°C 0 ≤ I ≤ 50.0A: ± (0.08% of reading/°C + 0.5 digits/°C) 50.0 < I ≤ 60.6A: ± (0.3% of reading/°C + 0.5 digits/° C)
Effect of external magnetic fields	0.0005%typical value (in terms of the magnitude of current in adjacent wires)
Safety standard	Conforms EN 61010-1, EN 61010-2-032 CAT. III 300V
Circuit voltage	300 Vrms or less
Withstanding voltage	3.7 kV AC for one minute
Power supply	CR2032 lithium battery × 1
Power consumption	6mW maximum
Battery life	Approx. 90 hours
Automatic power-off	Power approx. 10 minutes after the last switch operation.
Dimensions	Approx 70 (W) × 178 (H) × 25 (D) (mm)
Weight	Approx 200 g (including the battery)
Accessories	User's manual, Battery, Soft carrying case (RB057)

30031A

AC Leakage

⌀40

AC/3mA~60A

30031A

- Can measure leakage AC currents of 1mA
- Standard AC Leakage model

AC current measurement

Accuracy: ± (% of reading + digits)

Range	Resolution	Accuracy	Maximum Allowable Current
3mA	0.001mA	0.010 <I ≤32.70mA:	3.270mA
30mA	0.01mA	1.0%+5	32.70mA
30A	0.01A	0.05 <I ≤50.0A:1.0%+5	32.70A
60A	0.1A	50.0 <I ≤60.6A:5.0%+5	60.6A

Zero correction
3 mA range: Displays 0.000 mA (zero) when 0.010 mA < I
30 A range: Displays 0.00 A (zero) when 0.05 A < I

■General Specifications

Parameter	Specification
Method	Mean-value detection and rms-value calibration
Display	LCD (Digital reading 3200 counts) Bar graph (32 segments)
Range swiching	Range selection Auto or Manual
Data Hold	On all Range
Operating temperature and humidity	0 to 50°C, 80% RH or less (no condensation)
Temperature coefficient	Following values must be added in the temperature range of either 0 to 18°C or 28 to 50°C 0 ≤ I ≤ 50.0A: ± (0.08% of reading/°C + 0.5 digits/°C) 50.0 < I ≤ 60.6A: ± (0.3% of reading/°C + 0.5 digits/° C)
Effect of external magnetic fields:	0.0005%typical value (in terms of the magnitude of current in adjacent wires)
Safety standards	Conforms EN 61010-1, EN 61010-2-032 CAT. III 300V
Circuit voltage	300 Vrms or less
Withstanding voltage	3.7 kV AC for one minute
Power supply	CR2032 lithium battery × 1
Power consumption	6mW maximum
Battery life	Approx. 90 hours
Automatic power-off	Power approx. 10 minutes after the last switch operation.
Dimensions	Approx 70 (W) × 178 (H) × 25 (D) (mm)
Weight	Approx 200 g (including the battery)
Accessories	User's manual, Battery, Soft carrying case (RB057)

Clamp-on Testers

CL120

AC A

Ø24

AC/20~200A

CL120

- Light weight & compact design
- Mean value display
- Data hold function
- Approved for comformity to safety standards EN61010-1, EN61010-2-032 (CAT. III 300 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
AC current	20A	2.0+7 (50~1kHz)
	200A	2.0+5 (50/60Hz) 3.0+10 (40~1kHz)

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:1999 counts)
Response time	Approx. 2 seconds
Range switching	Manual-range
Data hold	On all range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	0.8A or less at 400A/m
Effect of conductor position	±2% or less
Safety standard	Conforms EN 61010-1, EN61010-2-032
Circuit voltage	300Vrms or less
Withstanding voltage	3.7kV AC for one minute
Power supply	LR-44×2(3V) or SR-44×2
Battery life	Approx. 100 hours (continuous)
Consumed current	Approx. 1mA
Auto power-off	Approx. 10 minutes
Diameter of measurable conductor	24mm diameter max.
Dimensions	Approx. 59(W)×148(H)×26(D)mm
Weight	Approx. 100g
Accessories	User's manual, batteries, carrying case(93033)

CL130

AC A

Ø30

AC/200~600A

AC V/Ω

CL130

- Mean value display
- Data hold function
- Approved for comformity to safety standards EN61010-1, EN61010-2-031, EN61010-2-032 (CAT. III 600 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
AC current	200A	1.5+6 (50/60Hz)
		2.0+5 (40~1kHz)
	600A	1.0+3 (50/60Hz)
		2.0+5 (40~1kHz)
AC voltage	200V/600V	1.0+2 (50/60Hz)
		1.5+4 (40~1kHz)
Resistance	200Ω	1.2+4, Beeps at below 30Ω (continuity check)

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:1999 counts)
Response time	Approx. 1 second (approx. 2 seconds on resistance renge)
Range switching	Manual-range
Data hold	On all range
Operating temperature and humidity	-10-50℃, (no condensation)
	up to 30℃, 90%RH or less
	up to 40℃, 75%RH or less
	up to 50℃, 45%RH or less
Temperature coefficient	—
Effect of external magnetic field	2A or less at 400A/m
Effect of conductor position	±2% or less
Safety standard	Conforms EN 61010-1, EN61010-2-031, EN61010-2-032
Circuit voltage	600Vrms or less
Withstanding voltage	5.55kV AC for one minute
Power supply	6F22(006P)9V×1 or 6LR61×2
Battery life	Approx. 200 hours (continuous)
Consumed current	Approx. 2mA
Auto power-off	Approx. 10 minutes
Diameter of measurable conductor	30mm diameter max.
Dimensions	Approx. 93(W)×210(H)×40(D)mm
Weight	Approx. 400g
Accessories	User's manual, batteries, carrying case(93032)

Clamp-on Testers

CL135

AC A
Ø30
AC/200~600A
RMS
AC V/Ω

CL135

- True RMS Display
- Data hold function
- Approved for comformity to safety standard EN61010-1, EN61010-2-031, EN61010-2-032 (CAT. III 600 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
AC current	200A	1.5+4 (50/60Hz)
		2.0+5 (40～1kHz)
	600A	1.5+4 (50/60Hz)
		2.0+5 (40～1kHz)
AC voltage	200V/600V	1.0+2 (50/60Hz)
		1.5+4 (40～1kHz)
Crest factor		≤3 (50/60Hz)
Resistance	200Ω	1.2+4 , Beeps at below 30Ω(continuity check)

■General Specifications

Parameter	Specification
Method of detection	True RMS
Display	LCD(Digital display:1999 counts)
Response time	Approx. 1 second (approx. 2 seconds on resistance renge)
Range switching	Manual-range
Data hold	On all range
Operating temperature and humidity	-10-50℃, (no condensation)
	up to 30℃, 90%RH or less
	up to 40℃, 75%RH or less
	up to 50℃, 45%RH or less
Temperature coefficient	—
Effect of external magnetic field	2A or less at 400A/m
Effect of conductor position	±3% or less
Safety standard	Conforms EN61010-1, EN61010-2-031, EN61010-2-032
Circuit voltage	600Vrms or less
Withstanding voltage	5.55kV AC for one minute
Power supply	6F22(006P)9V×1 or 6LR61×2
Battery life	Approx. 200 hours (continuous)
Consumed current	Approx. 2mA
Auto power-off	Approx. 10 minutes
Diameter of measurable conductor	30mm at maximum
Dimensions	Approx. 93(W)×210(H)×40(D)mm
Weight	Approx. 400g
Accessories	User's manual, batteries, carrying case (93032)

CL150

AC A
Ø54
AC/400~2000A
AC V/DC V/Ω

CL150

- Mean value display
- DC output function
- Data hold function
- Sleep function
- Approved for comformity to safety standards EN61010-1, EN61010-2-031, EN61010-2-032 (CAT. III 600 V, CAT. II 1000 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
AC current	400A	1.0+3 (50/60Hz)
		2.0+3 (40～1kHz)
	2000A(0～1500A)	1.0+3 (50/60Hz)
		3.0+3 (40～1kHz)
	2000A(1500～2000A)	3.0(50/60Hz)
AC voltage	40/400/750V	1.0+2 (50/60Hz) 1.5+3 (40～1kHz)
DC voltage	40/400/1000V	1.0+2
Resistance	400/4k/40k/400kΩ	1.5+2 , Beeps at below 50±35Ω(continuity check)
DC output	400A(0～400mV)	±1.5% rdg ±0.5mV (50/60Hz)
		±2.5% rdg ±0.5mV (40～1kHz)
	2000A(0～150mV/0～1500A)	±1.5% rdg ±0.5mV (50/60Hz)
		±3.5% rdg ±0.5mV (40～1kHz)
	2000A(150～200mV/1500～2000A)	±3.5% rdg (50/60Hz)

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:4000 counts)
Response time	Approx. 2 seconds
Range switching	Manual-range(on AC current range)/ Auto-range(on AC voltage range, resistance range)
Data hold	On all range
Peak hold	On AC current range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	1A or less at 400A/m
Effect of conductor position	±(2.0% rdg + 3dgt) or less
Safety standard	Conforms EN61010-1, EN61010-2-031, EN61010-2-032
Circuit voltage	1000Vrms or less
Withstanding voltage	5.55kV AC for one minute
Power supply	R6P(SUM-3)×2 or LR6×2
Battery life	Approx. 150 hours (continuous)
Consumed current	Approx. 5mA
Sleep function	Automatically powered down in about 10 minutes after the last switch operation
Diameter of measurable conductor	54mm at maximum
Dimensions	Approx. 105(W)×247(H)×49(D)mm
Weight	Approx. 470g
Accessories	User's manual, batteries, carrying case (93034)

Clamp-on Testers

CL155

AC A

⌀54

AC/400~2000A

RMS

AC V/DC V/Ω

CL155

- True RMS display
- DC output function
- Data hold function
- Sleep function
- Approved for comformity to safety standards EN61010-1, EN61010-2-031, EN61010-2-032 (CAT. IV 300 V, CAT. III 600 V, CAT. II 1000 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
AC current	400A	1.0+3 (50/60Hz)
		2.0+3 (40～1kHz)
	2000A(0～1500A)	1.0+3 (50/60Hz)
		3.0+3 (40～1kHz)
	2000A(1500～2000A)	3.0(50/60Hz)
AC voltage	40/400/750V	1.0+2 (50/60Hz) 1.5+3 (40～1kHz)
DC voltage	40/400/1000V	1.0+2
Resistance	400/4k/40k/400kΩ	1.5+2 , Beeps at below 50±35Ω(continuity check)
DC output	400A(0～400mV)	±1.5% rdg ±0.5mV (50/60Hz)
		±2.5% rdg ±0.5mV (40～1kHz)
	2000A(0～150mV/0～1500A)	±1.5% rdg ±0.5mV (50/60Hz)
		±3.5% rdg ±0.5mV (40～1kHz)
	2000A(150～200mV/1500～2000A)	±3.5% rdg (50/60Hz)

■General Specifications

Parameter	Specification
Method of detection	True RMS
Display	LCD(Digital display:4000 counts)
Response time	Approx. 2 seconds
Range switching	Manual-range(on AC current range)/ Auto-range(on AC voltage range, resistance range)
Data hold	On all range
Peak hold	On AC current range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	–
Effect of external magnetic field	1A or less at 400A/m
Effect of conductor position	±(2.0% rdg + 3dgt) or less
Safety standard	Conforms EN61010-1, EN61010-2-031, EN61010-2-032
Circuit voltage	1000Vrms or less
Withstanding voltage	5.55kV AC for one minute
Power supply	R6P(SUM-3)×2 or LR6×2
Battery life	Approx. 80 hours (continuous)
Consumed current	Approx. 7mA
Sleep function	Automatically powered down in about 10 minutes after the last switch operation
Diameter of measurable conductor	54mm at maximum
Dimensions	Approx. 105(W)×247(H)×49(D)mm
Weight	Approx. 470g
Accessories	User's manual, batteries, carrying case (93034)

CL220

AC A/DC A

⌀24

AC/40~300A

DC/40~300A

CL220

- Light weight & compact design
- Mean value display
- Sleep function
- Approved for comformity to safety standards EN61010-1, EN61010-2-032 (CAT. III 300 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
DC current	40A	1.0+4
	300A(±20～±200A)	1.5+4
	300A(±200～±300A)	3.0
AC current	40A	1.0+4 (50/60Hz)
		2.5+4 (20～1kHz)
	300A(20～200A)	1.5+4 (50/60Hz)
		2.5+4 (20～1kHz)
	300A(200～300A)	3.5 (50/60Hz)
		4.0 (20～1kHz)

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:4000 counts)
Response time	Approx. 2 seconds
Range switching	Auto-range
Data hold	On all range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	–
Effect of external magnetic field	1A or less at 400A/m
Effect of conductor position	±(2.0% rdg + 5dgt) or less
Safety standard	Conforms EN61010-1, EN61010-2-032
Circuit voltage	300Vrms or less
Withstanding voltage	3.7kV AC for one minute
Power supply	LR-44×2(3V) or SR-44×2
Battery life	Approx. 11 hours (continuous)
Consumed current	Approx. 9mA
Sleep function	Automatically powered down in about 5 minutes after the last switch operation
Diameter of measurable conductor	24mm at maximum
Dimensions	Approx. 59(W)×147(H)×25(D)mm
Weight	Approx. 100g
Accessories	User's manual, batteries, carrying case(93033)

Clamp-on Testers

CL235

- AC A/DC A
- ∅33
- AC/400~600A
- RMS
- DC/400~1000A
- DC V/AC V/ Ω /Hz

CL235

- True RMS display
- Sleep function
- Data hold function
- Approved for comformity to safety standards EN61010-1, EN61010-2-031, EN61010-2-032 (CAT. III 600 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
AC current	400/600A	1.5+5 (50/60Hz) 3.5+5 (40～1kHz)
DC current	400/1000A	1.0+5
AC voltage	40/400/600V	1.5+5 (50/60Hz)
		3.5+5 (40～1kHz)
DC voltage	40/400/600V	1.0+5
Crest factor		≦3
Resistance	400/4000Ω	1.0+5, Beeps at below 20Ω(continuity check)
Frequency	10～3000Hz	1.5+5

■General Specifications

Parameter	Specification
Method of detection	True RMS
Display	LCD(Digital display:3999 counts)
Response time	Approx. 2 second
Range switching	Auto-range
Data hold	On all range
Peak hold	On AC/DC current range, AC/DC voltage range
Average measurement	—
Operating temperature and humidity	0-40℃, 90% RH or less (no condensation)
Temperture coefficient	—
Effect of external magnetic field	—
Effect of conductor position	±2% or less
Safety standard	Conforms EN61010-1, EN61010-2-031, EN61010-2-032
Circuit voltage	600Vrms or less
Withstanding voltage	5.55kV AC for one minute
Power supply	6F22(006P)9V×1 or 6LR61×1
Battery life	Approx. 15 hours (continuous)
Consumed current	Approx. 15mA
Sleep function	Automatically powered down in about 30 minutes after the last switch operation
Diameter of measurable conductor	33mm at maximum
Dimensions	Approx. 91(W)×210(H)×40(D)mm
Weight	Approx. 450g
Accessories	User's manual, batteries, carrying case(93032)

CL250

- AC A/DC A
- ∅55
- AC/400~2000A
- DC/400~2000A
- AC V/DC V/ Ω

CL250

- Mean value display
- Sleep function
- Data hold function
- Approved for comformity to safety standards EN61010-1, EN61010-2-031, EN61010-2-032 (CAT. IV 600 V, CAT. III 1000 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
DC current	400/2000A	1.5+2
AC current	400A/2000A(0～1000A)	1.5+2 (50/60Hz)
		3.0+4 (40～500Hz)
		5.0+4 (500～1kHz)
	2000A(1001～2000A)	3.0+2 (50/60Hz)
DC voltage	400/1000V	1.0+2
AC voltage	400/750V	1.5+2 (50/60Hz)
		1.5+4 (40～1kHz)
Resistance	400/4000Ω	1.5+2, Beeps at below 50±35Ω(continuity check)
DC output	DC400A(0～400mV)	±1.5% rdg ±3mV
	DC2000A(0～200mV)	±1.5% rdg ±3mV
	AC400A(0～400mV) AC2000A(0～100mV/0～1000A)	±1.5% rdg ±3mV (50/60Hz) ±3.0% rdg ±3mV (40～500Hz) ±5.0% rdg ±3mV (500～1kHz)
	AC2000A(100.1～200mV/1001～2000A)	±3.0% rdg ±3mV (50/60Hz)

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:3999 counts)
Response time	Approx. 2 seconds
Range switching	Manual-range(on current, voltage range) /Auto-range(on resistance range)
Peak hold	On all range
Max hold	On current/voltage range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	4A or less at 400A/m
Effect of conductor position	±(1.5% rdg + 3dgt) or less
Safety standard	Conforms EN61010-1, EN61010-2-031, EN61010-2-032
Circuit voltage	1000Vrms or less
Withstanding voltage	5.55kV AC for one minute
Power supply	R6P(SUM-3)×2 or LR6×2
Battery life	Approx. 100 hours (continuous)
Consumed current	Approx. 9mA
Sleep function	Automatically powered down in about 10 minutes after the last switch operation
Diameter of measurable conductor	55mm at maximum
Dimensions	Approx. 105(W)×250(H)×49(D)mm
Weight	Approx. 530g
Accessories	User's manual, Test Lead(98011), Output plug(98012), batteries, carrying case(93034)

Clamp-on Testers

CL255

AC A/DC A

⌀55

AC/400~2000A

DC/400~2000A

RMS

AC V/DC V/ Ω /Hz

CL255

- True RMS display
- Sleep function
- Data hold function
- Approved for comformity to safety standards EN61010-1, EN61010-2-031, EN61010-2-032 (CAT. III 600 V, CAT. II 1000 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy
DC current	400/2000A	1.5+2
AC current	400A/2000A(150～1700A)	1.5+3 (50/60Hz) 3.0+4 (30～1kHz)
	2000A(1701～2000A)	3.5+3 (50/60Hz)
DC voltage	40/400/1000V	1.0+2
AC voltage	40/400/750V	1.5+3 (50/60Hz) 2.0+4 (30～1kHz)
Crest factor		≤3
Resistance	400/4000Ω	1.5+2, Beeps at below 20Ω(continuity check)
Frequency	10～3999Hz	1.5+5
DC output	DC400A(0～400mV)	±1.5% rdg ±3mV
	DC2000A(15～200mV)	±1.5% rdg ±3mV
	AC400A(0～400mV) /AC2000A(15～170mV/150～1700A)	±1.5% rdg ±3mV (50/60Hz) ±3.0% rdg ±3mV (40～1kHz)
	AC2000A(170.1～200mV/1701～2000A)	±3.5% rdg ±3mV (50/60Hz)

■General Specifications

Parameter	Specification
Method of detection	True RMS
Display	LCD(Digital display:3999 counts)
Response time	Approx. 1 second(on DC current/voltage range), Approx. 2 seconds(AC current/voltage range, resistance range)
Range switching	Auto-range
Data hold	On all range (without peak hold)
Peak hold	On current/voltage range
Average Measeurement	On current/voltage range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	4A or less at 400A/m
Effect of conductorposition	±(1.5% rdg + 3dgt) or less
Safety standard	Conforms EN61010-1, EN61010-2-031, EN61010-2-032
Circuit voltage	1000Vrms or less
Withstanding voltage	5.55kV AC for one minute
Power supply	6F22(006P)9V×1 or 6LR61×1
Battery life	Approx. 15 hours (continuous)
Consumed current	Approx. 15mA
Sleep function	Automatically powered down in about 10 minutes after the last switch operation
Diameter of measurable conductor	55mm at maximum
Dimensions	Approx. 105(W)×250(H)×49(D)mm
Weight	Approx. 540g
Accessories	User's manual, Test Lead(98011), Output plug(98012), batteries, carrying case(93034)

Leakage Clamp-on Testers

CL320

AC Leakage

⌀24

AC/20mA~200A

CL320

- Mean value display
- Auto power-off
- Manual range switching
- Approved for comformity to safety standards EN61010-1, EN61010-2-032 (CAT. III 300 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy	
		WIDE(40～400Hz)	50/60Hz
AC current	20mA/200mA 200A(0～100A)	2.0+4 (50/60Hz) 5.0+6 (40～400Hz)	3.0+5 (50/60Hz)
	200A(100.1～200A)	5.0+4 (50/60Hz)	5.0+5 (50/60Hz)

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:1999 counts)
Response time	Approx. 2 seconds
Range switching	Manual-range
Data hold	On all range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	10mA or less in proximity to a 14.4mm-dia conductor carrying 100A
Effect of conductor position	Within 5dgt for 0 to 50A, or 2% for 50 to 200A (10mm-dia conductor at inside the jaw)
Effect of residual current	10mA or less in proximity to a 10mm-dia conductor carrying 50A
Safety standard	Conforms EN61010-1, EN61010-2-032
Circuit voltage	300Vrms or less
Withstanding voltage	3.7kV AC for one minute
Power supply	LR-44×2(3V) or SR-44×2
Battery life	Approx. 15 hours (continuous)
Consumed current	Approx. 5mA
Auto power-off	Approx. 10 minutes
Diameter of measurable conductor	24mm at maximum
Dimensions	Approx. 60(W)×149(H)×26(D)mm
Weight	Approx. 120g
Accessories	User's manual, batteries, carrying case(93033)

Leakage Clamp-on Testers

CL340

AC Leakage

⌀40

AC/40mA~400A

CL340

- Mean value display
- Auto power-off
- Manual range switching
- Approved for comformity to safety standards EN61010-1, EN61010-2-032 (CAT. III 300 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy	
		WIDE(20Hz～)	50/60Hz
AC current	40mA/400mA	2.5+10 (20～1kHz)	1.0+5 (50/60Hz)
	400A(0～350A)	2.5+10 (40～1kHz)	1.0+5 (50/60Hz)
	400A(350～400A)	5.0 (40～1kHz)	2.0 (50/60Hz)

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:3999 counts)*
Response time	Approx. 2 seconds
Range switching	Manual-range
Data hold	On all range
Peak hold	On all range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	10mA or less in proximity to a 15mm-dia conductor carrying 100A
Effect of conductor position	40/400mA range:Within 5dgt at every part inside the jaw400A range, 0 to 250A:Within ±0.5%rdg ±5dgt at every part inside the jaw section
Effect of residual current	12mA or less in proximity to a 10mm-dia conductor carrying 100A
Safety standard	Conforms EN61010-1, EN61010-2-032
Circuit voltage	300Vrms or less
Withstanding voltage	3.7kV AC for one minute
Power supply	R0-3(UM-4) × 2 or LR03 × 2
Battery life	Approx. 40 hours (continuous)
Consumed current	Approx. 13mA
Auto power-off	Approx. 10 minutes
Diameter of measurable conductor	40mm at maximum
Dimensions	Approx. 81(W)×185(H)×40(D)mm
Weight	Approx. 270g
Accessories	User's manual, batteries, carrying case(93030)

*6000 counts (40/400mA range)

CL345

AC Leakage

⌀40

AC/40mA~400A

RMS

CL345

- True RMS display
- Auto power-off
- Manual range switching
- Approved for comformity to safety standards EN61010-1, EN61010-2-032 (CAT. III 300 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy	
		WIDE(20Hz～)	50/60Hz
AC current	40mA/400mA	2.5+10 (20～1kHz)	1.0+5 (50/60Hz)
	400A(0～300A)	2.5+10 (40～1kHz)	1.0+5 (50/60Hz)
	400A(300～400A)	5.0 (40～1kHz)	2.0 (50/60Hz)

■General Specifications

Parameter	Specification
Method of detection	True RMS
Display	LCD(Digital display:4200 counts)*
Response time	Approx. 2 seconds
Range switching	Manual-range
Data hold	On all range
Peak hold	On all range
Operating temperature and humidity	0-40℃, 85% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	10mA or less in proximity to a 15mm-dia conductor carrying 100A
Effect of conductor position	40/400mA range:Within 5dgt at every part inside the jaw400A range, 0 to 250A:Within ±0.5%rdg ±5dgt at every part inside the jaw section
Effect of residual current	12mA or less in proximity to a 10mm-dia conductor carrying 100A
Safety standard	Conforms EN61010-1, EN61010-2-032
Circuit voltage	300Vrms or less
Withstanding voltage	3.7kV AC for one minute
Power supply	R0-3(UM-4) × 2 or LR03 × 2
Battery life	Approx. 24 hours (continuous)
Consumed current	Approx. 21mA
Auto power-off	Approx. 10 minutes
Diameter of measurable conductor	40mm at maximum
Dimensions	Approx. 81(W)×185(H)×32(D)mm
Weight	Approx. 270g
Accessories	User's manual, batteries, carrying case(93030)

*6000 counts (40/400mA range)

Leakage Clamp-on Testers

CL360

AC Leakage

⌀68

AC/200mA~1000A

CL360

- Approved for conformity to safety standards EN 61010-1, EN 61010-2-032 (CAT. III 300 V, CAT. II 600 V)

■Specifications

At 23℃±5℃, 75%RH or less
Accuracy:±(% of reading + digits)

Parameter	Range	Accuracy	
		WIDE(40～1kHz)	50/60Hz
AC current	200mA/2A/20A	1.0+2 (50/60Hz) 3.0+2 (40～1kHz)	1.5+2
	200A	1.5+2 (50/60Hz) 3.5+2 (40～1kHz)	2.0+2
	1000A(0～500A)	1.5+2 (50/60Hz) 3.5+2 (40～1kHz)	2.0+2
	1000A(501～1000A)*	5.0 (50/60Hz) 10.0 (40～1kHz)	5.5
AC output	200mA/2A/20A(0～200mV)	2.0	2.0
	200A(0～200mV)	2.5	2.5
	1000A/(0～50mV/0～500A)	3.0	3.0
	1000A/(50～100mV/501～1000A)	5.0	5.0
DC output	200mA/2A/20A(0～200mV)	3.0	3.5
	200A(0～200mV)	3.5	4.0
	1000A/(0～50mV/0～500A)	5.0	5.5
	1000A/(50～100mV/501～1000A)	7.0	7.5

*Measurement of 501 to 1000A can be performed within 10 minutes.

■General Specifications

Parameter	Specification
Method of detection	Mean value
Display	LCD(Digital display:1999 counts)
Response time	Approx. 1 second
Range switching	Manual-range
Data hold	On all range
Peak hold	On all range
Operating temperature and humidity	-10-50℃, 80% RH or less (no condensation)
Temperature coefficient	—
Effect of external magnetic field	15mA or less in proximity to a 10mm-dia conductor carrying 100A
Effect of conductor position	2% or less
Effect of residual current	10mA or less in proximity to a 10mm-dia conductor carrying 100A
Safety standard	Conforms EN61010-1, EN61010-2-032
Circuit voltage	600Vrms or less
Withstanding voltage	3.7kV AC for one minute
Power supply	6F22(006P)9V×1 or 6LR61×1
Battery life	Approx. 60 hours (continuous)
Consumed current	Approx. 5mA
Diameter of measurable conductor	68mm at maximum
Dimensions	Approx. 129(W)×248(H)×55(D)mm
Weight	Approx. 570g
Accessories	User's manual, batteries, carrying case(93031)

Clamp-on Testers

96001

20Hz~20kHz

AC A

⌀33

96001

- Compact and light with high-performance
- 20Hz to 20kHz wide frequency characteristics
- Can be connected to a digital multimeter
- Need not be connected to a power source
- Fit to waveform measurement using oscilloscopes and oscillographic recorders

■Specifications

Measuring range		0 to 400 A ACrms (600 A peak)
Output voltage		0 to 4 V ACrms (10mV/A)
Accuracy (at 23℃±5℃, sine wave input)	(amplitude)	±1.5% of rdg ±0.4mV (20Hz to 40Hz)
		±1.0% of rdg ±0.2mV (40Hz to 1kHz)
		±(0.8+0.2 × f kHz)% of rdg ±(0.2+0.04 × f kHz)mV (1 to 20kHz)
	(phase)	Within ±3.0℃ (40Hz to 1kHz)
Temperature coefficient		0.05% fs/℃ in a range of 0℃ to 18℃ and 28℃ to 50℃
Output impedance		Approximately 30Ω
Load impedance Effect of external magnetic field		100kΩ min.//100 pF max. 2mV(0.2A)or less at 400A/m
Voltage of circuit under measurement		600V ACrms maximum
Diameter of applicable conductor		Maximum diameter of 33 mm
Operating temperature and humidity limits		0℃ to 50℃, 80% R.H. max.(non-condensing)
Storage temperature limits		-20℃ to 60℃(non-condensing)
Withstanding voltage		3.7kV AC for one minute (core and case, and core and output terminals)
Safety		Conforms EN61010-1, EN61010-2-032
External dimensions		Approximately 73(W)×130(H)×30(D)mm
Weight		Approximately 220g
Output cord length		Approximately 2.5 meters(with banana plug)
Accessories		One portable case and one User's manual

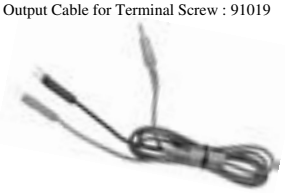
Accessories

■ 99025 Specifications

Item	Specifications
Measuring Range	0～AC3000A
Ratio/Range	10:1 (input to output)
Accuracy	±2% of input ±0.5A
Allowable Measurement Time	0～1000A(continuous),1000～1500A(10 minutes max.), 3000A(30 seconds max.)
Conductor Size	ϕ100mm max. (100×150mm)
Frequency Response	50Hz/60Hz
Safety Standard	EN61010-1 CAT.III300V Pollution Degree 2
Withstand Voltage	AC3700V for 1 minute
Dimensions	150(W)×317(H)×33(D)mm 40(W)×45(H)×10(D)mm Output coil
Weight	Approx. 750g
Accessories	93035(Carrying Case)
For use with following models	

Clamp Adapter : 99025

Output Cable for Terminal Screw : 91019



Output Cable with Banana Plug : 91020

■ Optional Accessories

Item	Model	Specification	Applicable model
Output Cable for Terminal Screw	91019	Cable length: approx.1.1m	CL150,CL155 CL250,CL255
Output Cable with Banana Plug	91020	Cable length: approx.2.0m	CL360
Clamp Adapter	99025	Ratio/Range = 10:1/3000A	CL120,CL130,CL135,CL150, CL155,CL220,CL235,CL250, CL255,CL320,CL340,CL345

■ Supplementary Products

Item	Model	Specification	Applicable model
Test Lead	98010	Angle Plug type	CL130,CL135,CL235
Test Lead	98011	Straight Plug type	CL150,CL155,CL250,CL255
Output Pllug	98012	3pcs/set	CL150,CL155,CL250,CL255
Carrying Case	93030	Hard type	CL340,CL345
Carrying Case	93031	Soft type	CL360
Carrying Case	93032	Soft type	CL130,CL135,CL235
Carrying Case	93033	Soft type	CL120,CL220,CL320
Carrying Case	93034	Soft type	CL150,CL155,CL250,CL255
Carrying Case	93035	Hard type	99025
Carrying Case	RB057	Soft type	30031A/30032A

Test lead : 98010

Test lead : 98011

Output Plug : 98012

Carrying case : 93030

Carrying case : 93031

Carrying case : 93032

Carrying case : 93033

Carrying case : 93034

Carrying case : 93035

YOKOGAWA

Yokogawa Meters & Instruments Corporation

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

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

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MIK-ES15

Subject to change without notice.
[Ed: 09/b]
Printed in Japan: Jun. 2008(B)/3,000(KP)