Z1-005-152, IB022711
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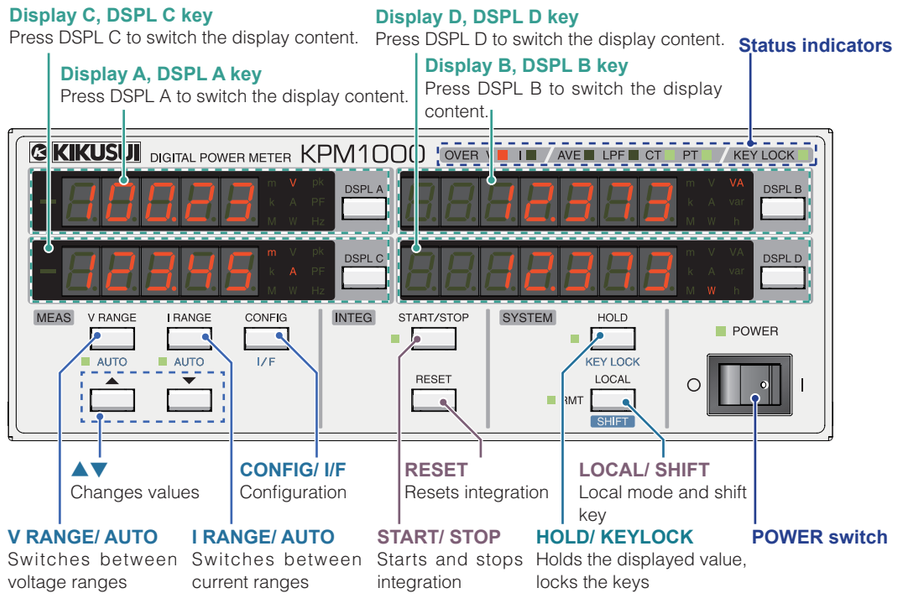
KPM1000
Quick Start

You can download the most recent manuals from the following website.
http://www.kikusui.co.jp/en



Status indicators

LEDs light when the KPM1000 is in the following states.

LED	Description
OVER V	This LED lights when the peak value of the voltage input waveform exceeds three times the range or when the rms value exceeds 1.3 times the range.
OVER I	This LED lights when the peak value of the current input waveform exceeds six times the range or when the rms value exceeds 1.3 times the range.
AVE	This LED lights when the average feature is enabled.
LPF	This LED lights when the low pass filter is enabled.
CT (current transformer)	This LED lights when the CT scaling feature is enabled.
PT (Power transformer)	This LED lights when the PT scaling feature is enabled.
KEY LOCK	This LED lights when the key lock is enabled.

Factory default settings

If you turn the POWER switch on while holding down SHIFT, the KPM1000 starts up with the factory default settings.

Range settings

• Voltage range

Press V RANGE, and then press ▲ and ▼ to change the range. Press V RANGE again to return to measurement mode. Press AUTO (SHIFT+V RANGE) to enable the auto range feature.

• Current range

Press I RANGE, and then press ▲ and ▼ to change the range. Press I RANGE again to return to measurement mode. Press AUTO (SHIFT+I RANGE) to enable the auto range feature.

Display value hold

Press HOLD to stop the display updating and hold the displayed values. Press the key again to release the held state. Measurement continues even when the display is held.

Display switching

Each time you press DSPL, the displayed items changes in order. The items that appear vary depending on the display.

Display item	Unit	
	Displays A and C	Displays B and D
Voltage	V	
Current	A	
Voltage peak	V、pk	---
Current peak	A、pk	---
Power factor	PF	---
Frequency	Hz	---
Active power	W	
Apparent power	---	VA
Reactive power	---	var
Integrated current (total)	---	A、h
Integrated power (total)	---	W、h
Integrated power (positive)	---	P[1]、W、h
Integrated power (negative)	---	n[1]、W
Integration time	---	h
Voltage crest factor	---	C[1]、V[2]
Current crest factor	---	C[1]、A[3]
Phase angle	---	d[1]

[1] Appears in the left most digit of the display
[2] Indicates voltage
[3] Indicates current

Configuration

Press CONFIG to configure the KPM1000. For information about the interface menu, see the communication interface manual (contained in the accompanying CD-ROM).

Displays A and C	Display B	Description
ConF.1	LPF	Turns the low pass filter on and off
ConF.2	F.FiLt	Turns the frequency filter on and off
ConF.3	AVErAGE	Average count
ConF.4	SCALE	Turns the CT and PT scaling features on and off[1]
ConF.5	Ct	Current transformation (CT) ratio
ConF.6	Pt	Power transformation (PT) ratio
ConF.7	SynC	Synchronization source
ConF.8	rEF.rAtE	Display update interval (in seconds)
ConF.9	intEG	Turns the integration timer on and off
ConF.10	intEG.t	Integration time (hour.minute)

[1] When Ct is displayed, current scaling is on. When Pt is displayed, voltage scaling is on. When botH is displayed, current scaling and voltage scaling are on.

Main specifications

• Input

Signal lines	Single phase two wire (Measurement Category CAT II[1])
Input terminal	Voltage input: safety terminal, current input: M6 terminal block
Measurement voltage rating	300 Vrms
Measurement current rating	20 Arms

[1] Applies to measurements on circuits directly connected to the low-voltage installation. This category applies to measurements on circuits of equipment on the primary side of a transformer. Such pieces of equipment have a power cord connected to a power outlet. Examples are household appliances and portable tools.

• Displays

Display update rate	100 ms/ 200 ms/ 500 ms/ 1 s/ 2 s/ 5 s/ 10 s

• Voltage measurement

The effective input range is 1 % to 120 % of the range.

Range	150 V, 300 V (auto range available)
Allowable crest factor	3
Basic accuracy[1] (45 Hz ≤ f ≤ 66 Hz)	±(0.1 % of reading + 0.1 % of range)

[1] Within the effective input range, within six months after calibration, temperature in the range of 23 °C ± 5 °C, sine wave, power factor of 1, common-mode voltage of 0 V. Errors will be present for asymmetrical waveforms.

• Current measurement

The effective input range is 1 % to 120 % of the range.

Range	Direct input: 5 mA, 10 mA, 20 mA, 50 mA, 100 mA, 200 mA, 500 mA, 1 A, 2 A, 5 A, 10 A, 20 A (auto range available)
Allowable crest factor	6
Basic accuracy[1] (45 Hz ≤ f ≤ 66 Hz)	±(0.1 % of reading + 0.1 % of range)

[1] Within the effective input range, within six months after calibration, temperature in the range of 23 °C ± 5 °C, sine wave, power factor of 1, common-mode voltage of 0 V. Errors will be present for asymmetrical waveforms.

• Power measurement

The effective input range is 1 % to 144 % of the range.

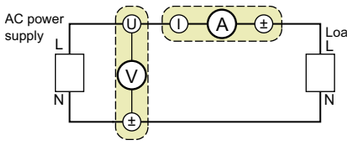
Range[1]	750 mW/ 1.5 W/ 3 W/ 6 W/ 7.5 W/ 15 W/ 30 W/ 60 W/ 75 W/ 150 W/ 300 W/ 600 W/ 750 W/ 1.5 kW/ 3 kW/ 6 kW
Basic accuracy[2] (45 Hz ≤ f ≤ 66 Hz)	±(0.1 % of reading + 0.1 % of range)

[1] Voltage range and current range combined
[2] Within the effective input range, within six months after calibration, temperature in the range of 23 °C ± 5 °C, sine wave, power factor of 1, common-mode voltage of 0 V. Errors will be present for asymmetrical waveforms.

Measuring the integrated power of an LCD TV

This page contains an example of how you would measure the standby power of an LCD TV.
For information about how to wire devices for other types of measurements, see the user's manual on the accompanying CD-ROM.

測定回路の配線



Because we are measuring the small amount of current that flows when the LCD TV is in standby, we connect the current input terminal to the load side. This wiring method is used to minimize the effects of current that flows through the voltage input resistor.

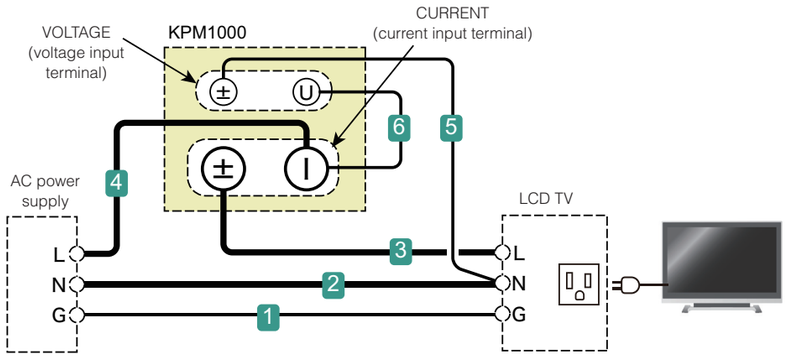
	Start point	—	Stop point
1	AC power output G terminal	—	Load G terminal (ground electrode)
2	AC power output N terminal	—	Load N terminal
3	Load L terminal	—	KPM1000 current input ± terminal
4	KPM1000 current input I terminal	—	AC power output L terminal
5	KPM1000 voltage input ± terminal	—	Load N terminal
6	KPM1000 voltage input U terminal	—	KPM1000 current input I terminal

⚠ WARNING

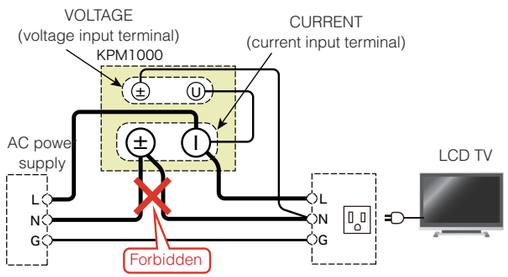
Possible electric shock. Remove the AC power supply's power cord, or turn off the distribution board that the power cord is connected to.

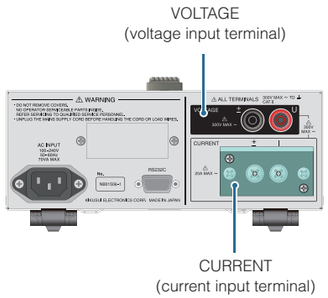
⚠ CAUTION

Overcurrent can damage the KPM1000. Do not connect voltage circuits to the current input terminals.



Incorrect wiring





Connecting the current input terminal

Attach crimping terminals (6 mm hole diameter) to the ends of wires.

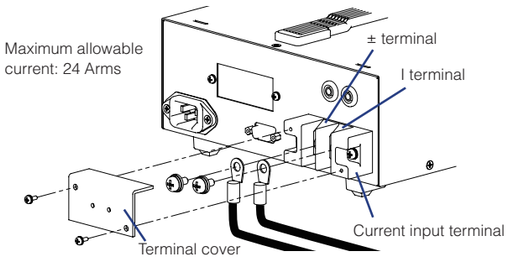
To prevent electric shock, be sure to attach the terminal cover.

Select the wires that are appropriate for the input current of the EUT (load). Make sure that the wires' withstanding voltage is sufficiently greater than the maximum rated input voltage.

Nominal cross-sectional area (mm^2)	AWG	(reference cross-sectional area; mm^2)	Allowable current[1] A (Ta = 30 °C)
0.9	18	(0.82)	17
1.25	16	(1.31)	19
2	14	(2.08)	27
3.5	12	(3.31)	37
5.5	10	(5.26)	49

[1]Excerpt from Japanese laws related to electrical equipment.

Maximum allowable current: 24 Arms



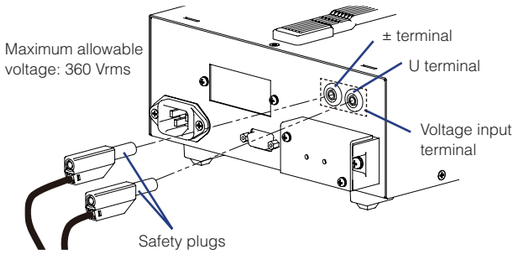
Connecting the voltage input terminal

⚠ WARNING

Possible electric shock. The voltage input terminal is designed specifically for safety plugs. Do not use plugs that have exposed conducting parts (such as banana plugs).

Make sure that the wires' withstanding voltage is sufficiently greater than the maximum rated input voltage.

Maximum allowable voltage: 360 Vrms



Measuring the Integrated Power

Run the LCD TV for an hour. Measure the power consumption during this time period.

1. **Turn the KPM1000 on.**
2. **Set the AC power supply voltage and frequency, and turn the output on.**
3. **Turn the LCD TV on, and adjust the input signal, brightness, volume, and other settings.**
4. **Set the KPM1000's voltage range and current range.**
5. **Use CONFIG settings to turn the low pass filter (ConF.1 LPF) on.**
   The low pass filter, when used on a comparatively small amount of current (100 mA or less), suppresses the noise that the AC power supply generates. This leads to accurate measurements.
6. **Use CONFIG settings to turn the integration timer (ConF.9 intEG) on and set the integration time (ConF.10 intEG.t) to one hour (1.0).**
7. **Press DSPL B or DSPL D to select the integration display.**
8. **Press START/STOP to start integration.**
   After one hour elapses, integration will stop.
   While integration is in progress, you cannot change the voltage range, current range, CONFIG settings, or INTERFACE settings.
   If you press START/STOP while integration is in progress, integration pauses.
9. **Check the integrated power. Then press RESET to clear the integration.**
   When you do so, all keys become available. Check the displayed integrated power. When you clear the integration, measurement results are deleted.
10. **After you finish the test, turn the LCD TV off if necessary, and turn the AC power output off.**