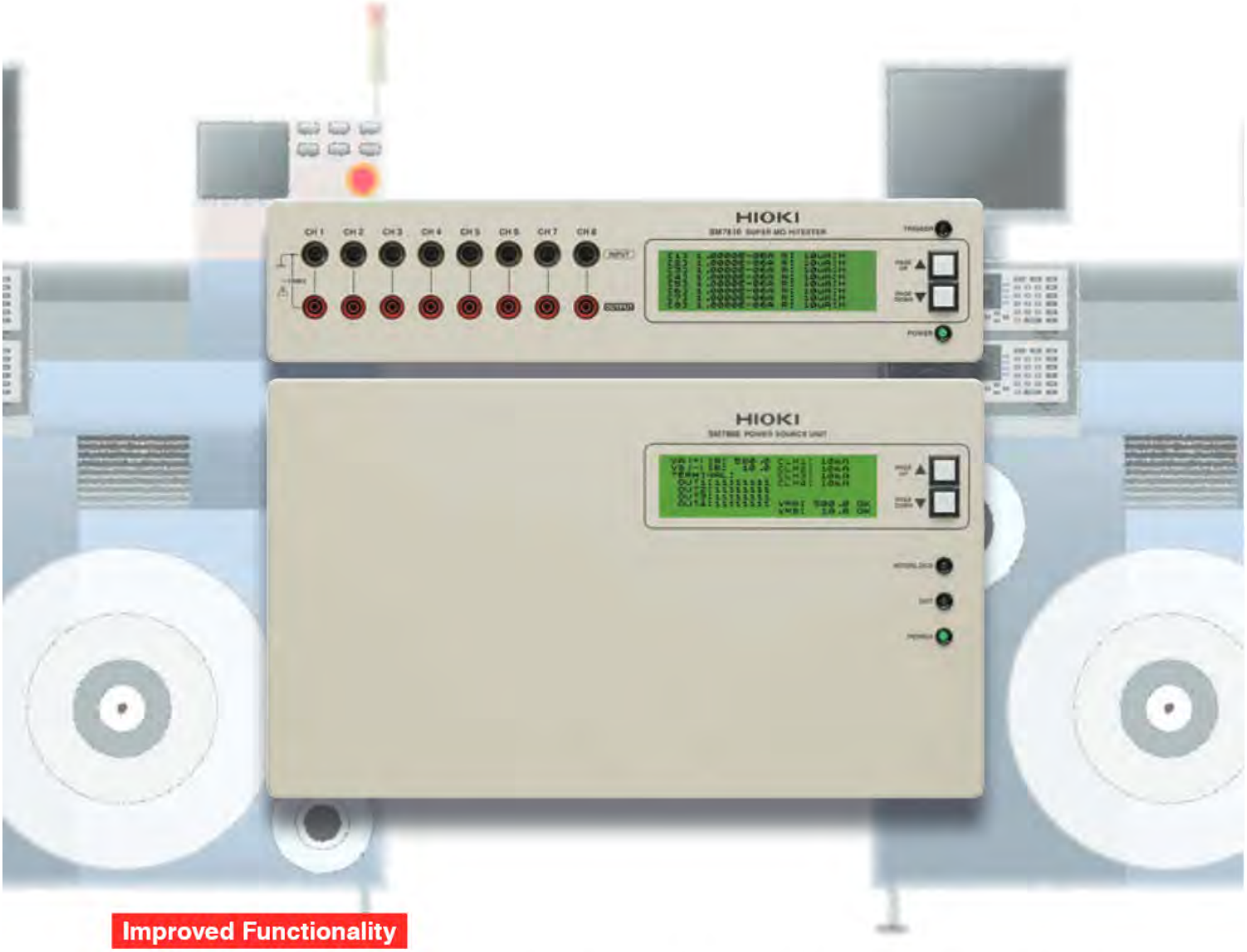
HIOKI

SUPER MΩ HiTESTER SM7810
POWER SOURCE UNIT SM7860



Improved Functionality

Providing Maximum Throughput for MLCC Testing

The Super MΩ HiTESTER SM7810 is a super megohm meter that supports the leakage current of MLCC (Multi-Layer Ceramic Capacitors) at a rapid speed of 6.8ms across 8 channels simultaneously in production lines.
With the dedicated POWER SOURCE UNIT SM7860 for multi-channel systems, you can expand your testing capabilities by applying voltage to a maximum of 32 channels using the 8-channel or 16-channel dual-line voltage setting function.
An inspection test system combining the SM7810 and SM7860 is ideal for integration into automated measurement systems to build the fastest and most optimized MLCC leakage current inspection line possible.

Not CE Marked 3 year Warranty

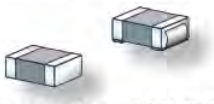
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Test System Ideal for MLCC Leakage Current Measurement

Features of MLCC Leakage Current Test System Combining the SM7810 and SM7860



- The **Super MΩ HiTESTER SM7810** can be used to build an MLCC leakage current test line capable of performing **8-channel simultaneous measurement at the industry's fastest speed of up to 6.8 ms, which helps to reduce the tact time of automated equipment** and thus MLCC manufacturing costs.
- Combined use of the **Super MΩ HiTESTER SM7810 and the Power Source Unit SM7860** enables building a test system ideal for integration into automated equipment. The power source unit can be selected depending on the maximum applied voltage and functionality to suit various types of test line, including the charge-and-discharge test line.



Examples of MLCC



■ Features of the Super MΩ HiTESTER SM7810

- Test the leakage current of MLCCs at the fastest speed of 6.8ms simultaneously over 8 channels
- Conduct high-speed leakage current testing of large-capacity MLCCs in the high current range (1mA)
- Improve testing reliability using the contact check function
- Build a flexible system by making best use of the individual settings of each channel

Performance Improvement

6.8 ms measurement time (from the acceptance of the trigger to INDEX output)

Measurement finishes in just 6.8 ms, including the contact check and decision (when the measurement speed is FAST). The measurement time was reduced by 30% compared to HIOKI's conventional model, which helps to reduce the machine tact time.

Make individual settings for each channel

The range, measurement voltage, and comparator can be set for each channel. Simultaneous measurement can be performed in a combination of 8-channel × 1-stage, 4-channel × 2-stage, or 2-channel × 4-stage according to the system configuration, which provides flexibility to adapt to the configuration of the automated equipment.

Reliability Improvement

Improve reliability using contact check

Perform contact check despite the high-speed measurement. Elimination of judgment errors resulting from contact failure of the probe improves testing reliability.



Normal contact



Contact error

■ SM7810 Specifications (Accuracy Specifications)

(Accuracy guaranteed for 1 year)

● Guaranteed accuracy conditions

Warm-up time	At least 1 hour
Guaranteed accuracy temperature and humidity ranges	23°C ±5°C (73°F ±9°F), 80% RH or less (No condensation)
Averaging function	OFF
Guaranteed accuracy period	1 year

● Measurement time INDEX [ms]
(from the acceptance of the trigger to the end of the analog measurement)

Power supply frequency	FAST	MED	SLOW	SLOW2
50Hz	6.8	26.0	100.0	320.0
60Hz	6.8	23.0	90.0	320.0

When measured value display mode is Current, current measurement range is Hold, comparison measurement is ON, and contact check is ON

● Measurement accuracy (current accuracy): ± (% of reading)

Range	FAST	MED	SLOW	SLOW2
100 pA	——	$5.0 + 15 \times 10^{-11}$/Im	$3.0 + 15 \times 10^{-11}$/Im	$1.5 + 6 \times 10^{-11}$/Im
1 nA	$4.0 + 15 \times 10^{-10}$/Im	$3.0 + 6 \times 10^{-10}$/Im	$2.0 + 6 \times 10^{-10}$/Im	$0.6 + 6 \times 10^{-10}$/Im
10 nA	$2.0 + 8 \times 10^{-9}$/Im	$1.0 + 6 \times 10^{-9}$/Im	$0.6 + 6 \times 10^{-9}$/Im	$0.4 + 5 \times 10^{-9}$/Im
100 nA	$2.0 + 5 \times 10^{-8}$/Im	$1.0 + 5 \times 10^{-8}$/Im	$0.6 + 5 \times 10^{-8}$/Im	$0.4 + 5 \times 10^{-8}$/Im
1 μA	$2.0 + 5 \times 10^{-7}$/Im	$1.0 + 5 \times 10^{-7}$/Im	$0.6 + 5 \times 10^{-7}$/Im	$0.4 + 5 \times 10^{-7}$/Im
10 μA	$2.0 + 5 \times 10^{-6}$/Im	$1.0 + 5 \times 10^{-6}$/Im	$0.6 + 5 \times 10^{-6}$/Im	$0.4 + 5 \times 10^{-6}$/Im
100 μA	$2.0 + 5 \times 10^{-5}$/Im	$1.0 + 5 \times 10^{-5}$/Im	$0.6 + 5 \times 10^{-5}$/Im	——
1 mA	$2.0 + 5 \times 10^{-4}$/Im	——	——	——

(Note) Im in the table: Measured current value [A]

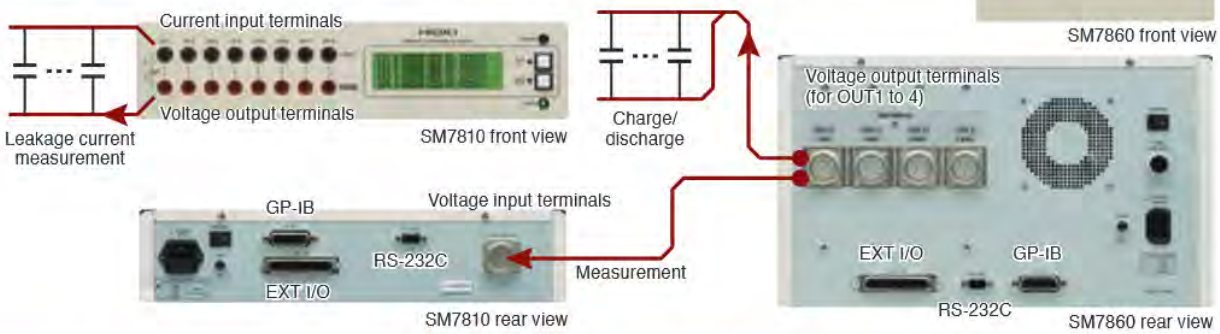
● Measurement accuracy (resistance accuracy):
Current accuracy + Voltage generation accuracy of external power supply

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Interface and Input/Output Terminals

*Rack mountable. For details on the dimensions and mounting method, please contact your local HIOKI representative.


SM7860 front view



Features of the Power Source Unit SM7860

- Up to 32-channel output, 8-channel or 16-channel dual-line output voltage setting, and support for multi-channel systems
- Positive and negative polarities required for the MLCC test line included in a single unit
- Output ON/OFF and current limitation can be performed for each channel
- Large current output of 50 mA/channel[*1] allows for reducing the number of backup charges
- Support for the discharge of the charge capacitor
- Output voltage of 1 kV is available[*1]

*1: Output voltage of 1 kV is limited to 10 mA/channel.

Reducing the Number of External Circuits of Automated Equipment Measurement Systems

ON/OFF and current limitation (charge/discharge) can be performed for all channels individually

An output ON/OFF switch is provided for each channel, allowing you to control the voltage without using an external circuit.Furthermore, the switches are semiconductor switching devices so they do not require maintenance. In addition, current limitation (50 mA/channel[*1]) can be performed for each channel. A short-circuit in a workpiece does not affect measurements on other channels.

Reducing the Number of MLCC Charges

Output current capacity of 50 mA/channel[*1]

Current capacity of 50 mA/channel[*1] allows for charging a large capacity MLCC quickly. The reduced number of total charges helps to minimize automated equipment costs.

Vary the Current Limit Value As Needed New!

Set the current limit as required and vary it to evaluate characteristics. Choose any level from 2mA to 50mA[*2] in order to minimize damage to the DUT.

*2 2mA to 10mA when output is 1000V

Up to 32-channel output and dual-line voltage setting

The SM7860 allows for setting the dual-line output voltage on 8 channels or 16 channels, and enables up to 32-channel output. Select a power source unit combining positive and negative power source (1 kV/500 V), discharge, and low-voltage power source (10 V) modules to build a power source ideal for the leakage current test system.

SM7860 output channel configuration

SM7860-XX[*3]		-51 / -61	-52 / -62	-53 / -63	-54 / -64	-55 / -65	-56 / -66	-57 / -67	-58 / -68
OUT1 to 4 output content	OUT1 OUT2	+500V +500V	+1kV +1kV	+500V +500V	+1kV +1kV	+500V discharge	+1kV discharge	+10V +10V	+500V +500V
	OUT3 OUT4	+500V +500V	+1kV +1kV	−500V −500V	−1kV −1kV	−500V discharge	−1kV discharge	+10V discharge	+500V discharge
Overview (Total number of channels and output voltage)		32ch +500V	32ch +1000V	32ch ±500V	32ch ±1000V	32ch ±500V, discharge	32ch ±1000V, discharge	32ch +10V, discharge	32ch +500V
Line A	Number of OUT1 channels	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch
	OUT1 output voltage range[*4]	+1.0 V to +500.0 V	+250.0 V to +1000.0 V	+1.0 V to +500.0 V	+250.0 V to +1000.0 V	+1.0 V to +500.0 V	+250.0 V to +1000.0 V	+1.0 V to +10.0 V	+1.0 V to +500.0 V
	Number of OUT2 channels	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch
	OUT2 output voltage range[*4]	+1.0 V to +500.0 V	+250.0 V to +1000.0 V	+1.0 V to +500.0 V	+250.0 V to +1000.0 V	discharge	discharge	+1.0 V to +10.0 V	+1.0 V to +500.0 V
	Current limitation	±50 mA/ch	±10 mA/ch	±50 mA/ch	±10 mA/ch	±50 mA/ch	±10 mA/ch	±50 mA/ch	±50 mA/ch
	Maximum output current[*5]	430 mA (200 VA)	100 mA (100 VA)	430 mA (200 VA)	100 mA (100 VA)	430 mA (200 VA)	100 mA (100 VA)	430 mA (4 VA)	430 mA (200 VA)
Line B	Number of OUT1 channels	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch
	OUT1 output voltage range[*4]	+1.0 V to +500.0 V	+250.0 V to +1000.0 V	-1.0 V to -500.0 V	-250.0 V to -1000.0 V	-1.0 V to -500.0 V	-250.0 V to -1000.0 V	+1.0 V to +10.0 V	+1.0 V to +500.0 V
	Number of OUT2 channels	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch	8 ch
	OUT2 output voltage range[*4]	+1.0 V to +500.0 V	+250.0 V to +1000.0 V	-1.0 V to -500.0 V	-250.0 V to -1000.0 V	discharge	discharge	discharge	discharge
	Current limitation	±50 mA/ch	±10 mA/ch	±50 mA/ch	±10 mA/ch	±50 mA/ch	±10 mA/ch	±50 mA/ch	±50 mA/ch
	Maximum output current[*5]	430 mA (200 VA)	100 mA (100 VA)	430 mA (200 VA)	100 mA(100 VA)	430 mA (200 VA)	100 mA (100 VA)	430 mA (4 VA)	430 mA (200 VA)

*3 The power supply voltage for the SM7860-01 to -07 is 100 VAC, and that for the SM7860-21 to -27 is 220 VAC. *4 The resolution of the output voltage range is 0.1 V.
*5 Only when the operating conditions as stated in the restriction warnings of the specifications are met.

SM7860 Specifications (Accuracy Specifications)

(Accuracy guaranteed for 1 year)

● Guaranteed accuracy conditions

Warm-up time	At least 1 hour
Guaranteed accuracy temperature and humidity ranges	23°C ±5°C (73°F ±9°F), 80% RH or less (No condensation)
Temperature coefficient	Add 0.1/°C for 0 to 18°C and 28 to 40°C
Guaranteed accuracy period	1 year

● Accuracy

Generation accuracy	Output voltage accuracy: ±2% of set value ± 0.5 V (with no load) Inter-channel error: ± 0.01 V or less (between outputs on the same line with no load)
Voltage monitoring accuracy	±2% of output voltage ± 0.5 V

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SM7810 Specifications

Number of channels	8
Measurement method	Apply voltage to object under test and measure current
Applied voltage	Supply voltage from external power source (voltage input terminal on the rear panel)
Ammeter input resistance	1 kΩ
Input/output terminals	Current input terminal (front): HIOKI MΩ HiTESTER input connector Voltage output terminal (front): Plug-in terminal (safety terminal) Voltage input terminal (rear): Circular connector
External interface (Condition setting and operation)	GP-IB, RS-232C, EXT I/O (Condition setting and operation except for GP-IB address setting are all performed from external interface)
Applicable power source	SM7860 series
Measured value display mode	Resistance/current
Measurement speed	FAST, MED, SLOW, SLOW2
Measurement range	Current: 1 pA to 1 mA, Resistance: 1×10^{7} Ω to 1×10^{15} Ω
Range switching	HOLD / AUTO
Trigger delay	0 ms to 9999 ms (Resolution: 1 ms)
Averaging function	Averaging method: Moving average,OFF / ON (1 to 255) / AUTO
Power supply frequency setting	50 Hz / 60 Hz (Affects the measurement time)
Measurement voltage setting	0.1 V to 1000.0 V (Resolution: 0.1 V)
Measured value comparison and judgment	Compare measured value and reference value Judgment: HI, IN, LO Judgment criterion setting range: -9.9999E30 to 9.9999E30
Functionality	Contact check, jig capacity open correction, jig resistance open correction functions
Operating temperature and humidity ranges	0°C (32°F) to 40°C (104°F), 80% RH or less (No condensation)
Storage temperature and humidity ranges	-10°C (14°F) to 55°C (131°F), 80% RH or less (No condensation)
Operating location	Indoors, Contamination class: 2, Altitude: 2,000 m (6,562 ft)or less
Rated power supply voltage	SM7810: 100 VAC, 110 V ±10%, SM7810-20: 220 VAC ±10%
Rated power supply frequency	50 / 60Hz
Maximum rated power	30 VA
Withstand voltage	1.69 kVAC, 15 s, cutoff current 10 mA Between all power supply terminals and the protective ground, interface, and measurement terminals
Dimensions	Approx. 425 mm (16.73 in) W × 99 mm (3.90 in) H × 488 mm (19.21 in) D
Mass	Approx. 10.5 kg (370.4 oz)
Accessories	Power cord ×1, Instruction manual ×1, Voltage input connector L2220 ×1, Spare fuse (built into inlet) ×1, Rubber feet ×4

SM7860 Specifications

Input/output terminal	Voltage output terminal (rear): Circular connector (for 8 channels)
External interface (Condition setting and operation)	GP-IB, RS-232C, EXT I/O (Condition setting and operation except for GP-IB address setting are all performed from external interface)
Applicable model	Super MΩ HiTESTER SM7810, SM7420
Functionality	Voltage output
Operation method	Support sink/source and charge/discharge systems
Generation control	Output when OUTPUT signals of EXT I/O are ON
Output ON/OFF	Settable for each channel
Voltage error alarm	Alarm is generated when the monitoring voltage is outside the set range Settable range: ± 2 to ± 19% (Resolution 1%)
Current limitation	Method: Limiting for each channel Current limiting direction: Current can be limited in two ways
Voltage monitoring	Measure and display output voltage for each line
Restrictions	Object to which voltage is applied: MLCC Number of channels for charging: 8 or less/line Operating conditions: There are restrictions on the charging interval. For details, please contact your HIOKI representative.
Operating temperature and humidity ranges	0°C (32°F) to 40°C (104°F), 80% RH or less (No condensation)
Storage temperature and humidity ranges	-10°C (14°F) to 55°C (131°F), 80% RH or less (No condensation)
Operating location	Indoors, Contamination class 2, Altitude: 2,000 m (6,562 ft) or less
Rated power supply voltage	SM7860-51, 52, 53, 54, 55, 56, 57, 58: 100 VAC ±10% SM7860-61, 62, 63, 64, 65, 66, 67, 68: 220 VAC ±10%
Rated power supply frequency	50 / 60 Hz
Maximum rated power	860 VA
Withstand voltage	1.62 kVAC, 60 s, cutoff current 10 mA Between all power supply terminals and the protective ground, and between the power line and the neutral line
Dimensions	Approx. 425 mm (16.73 in) W × 249 mm (9.80 in) H × 581 mm (22.87 in) D
Mass	Approx. 45 kg (1587.3 oz) (SM7860-57 / -67: Approx. 32 kg (1128.7 oz))
Accessories	Power cable ×1, Instruction manual ×1, Operating precautions ×1



Model No. (Order Code) **SM7810** (100/110V AC power supply)
SM7810-20 (220V AC power supply)

*The Super MΩ HiTESTER SM7810 is produced to order. An input/output terminal connection cable*1 is required separately. Please contact your local HIOKI representative.*
**1 Input/output terminal connector/plug and connection cable*
• Current input terminal connector and voltage output terminal plug are not included. Voltage input terminal connector is included
• Input/output terminal connection cables are available in various lengths to suit HIOKI measurement systems. Please consult with your HIOKI representative.

Input/Output Cables

MEASURING LEAD (BLACK) 0GA00018, 5 m (16.41 ft) length

MEASURING LEAD (RED) 0GA00019, 1 m (3.28 ft) length

MEASURING LEAD (RED) 0GA00021, 2 m (6.56 ft) length

MEASURING LEAD (RED) 0GA00027, 5 m (16.41 ft) length

PC communication

RS-232C CABLE 9637, For the PC, 9pin - 9pin, cross, 1.8m (5.91 ft) length

GP-IB CONNECTOR CABLE 9151-02, 2 m (6.56 ft) length

Binding Accessories

CONNECTOR L2220, Voltage input connector for SM7810



Model No. (Order Code) **SM7860-51 /-52 /-53 /-54 /-55 /-56 /-57 /-58** (100V AC power supply)
SM7860-61 /-62 /-63 /-64 /-65 /-66 /-67 /-68 (220V AC power supply)

*The Power Source Unit SM7860 is produced to order. An output terminal connection cable*2 is required separately. Please contact your local HIOKI representative, or if you need to use a power supply voltage other than 100VAC or 220VAC.*
**2 Output terminal cable*
•Voltage output terminal connection cables are available in various lengths to suit HIOKI measurement systems. Please consult with your HIOKI representative.

Other

CONNECTOR L2221, Voltage output connector for SM7860

Related product



4CH, Microcurrent measurement

Model No. (Order Code) **SM7420** (4ch, Dedicated micro current measurement)

Note: Measurement leads are not included. Purchase the appropriate lead option for your application separately.

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