ADCMT®

6240B
DC Voltage Current Source/Monitor

Capable of high-speed response pulse source, 5½-digit measurement and high-precision low-resistance measurement

- Source and measurement range
  Voltage: 0 to ±15 V, Current: 0 to ±4 A (1 A for DC)
- Source and measurement accuracy: ±0.02 %
- Measurement display of 5½ digits with resolution of 1 µV/100 pA
- Source/sink of ±4 A for the maximum pulse width of 20 ms
- Pulse measurement with minimum pulse width of 50 µs and 1 µs step
- Sink-enabled bipolar output
- Low-resistance measurement canceling thermal electromotive force for conductive materials

New

GPIB USB CE

http://www.adcmt-e.com

Semiconductor test with high-speed pulses avoiding heat generation
Contact resistance measurement that cancels thermal EMF

The DC Voltage Current Source/Monitor 6240B not only maintains the performance of the 6240A but also adopts newly high-speed response pulse source and measurement function and a low-resistance measurement function that cancels thermal EMF (electromotive force).

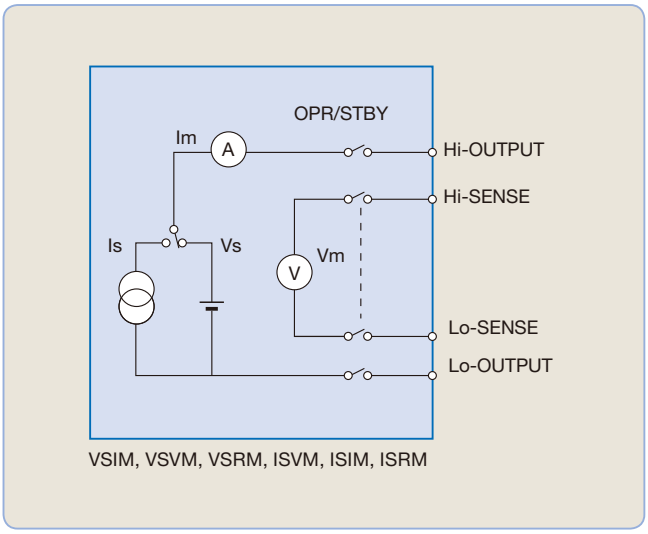
It has 4½-digit display for voltage and current source and 5½-digit display for measurement, and features high accuracy of ±0.02 %.

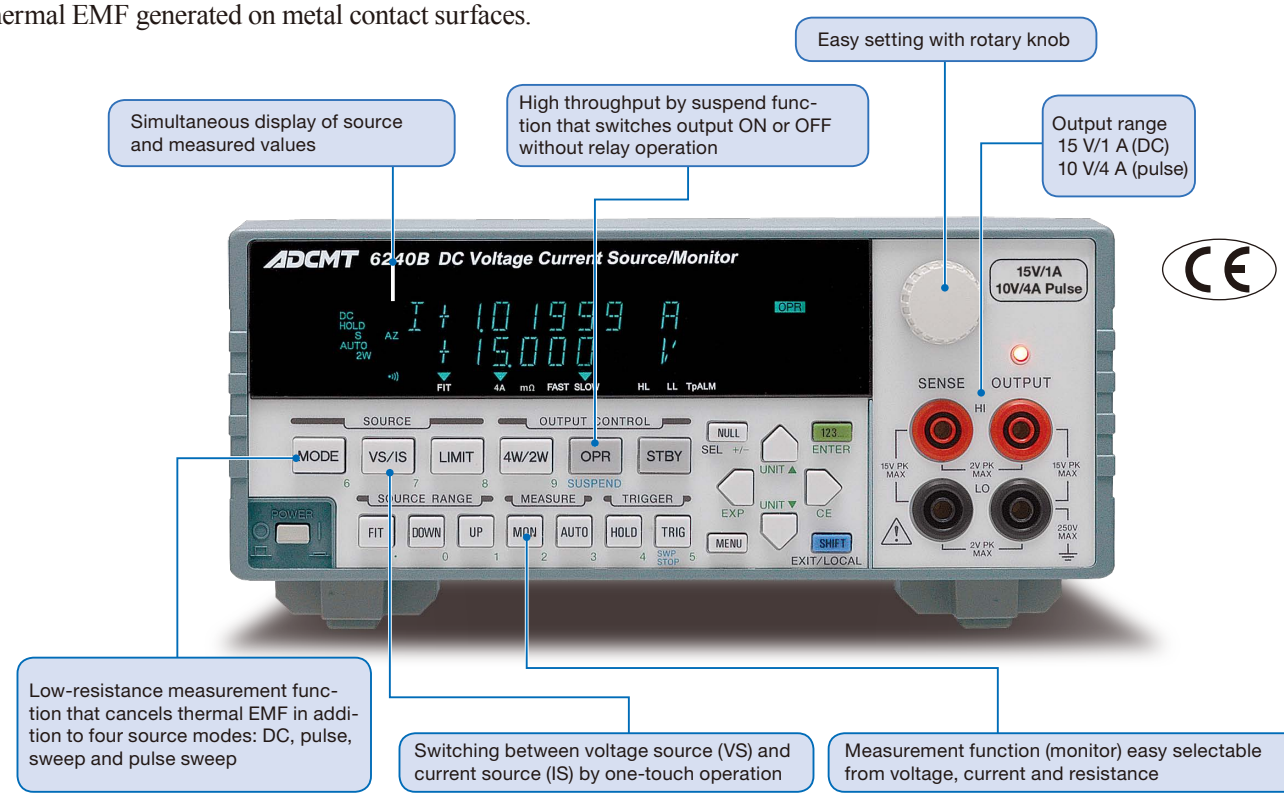
There are four types of sweep modes available: liner, fixed, random and 2-slope linear sweep, and also pulse measurement with a minimum pulse width of 50 µs is available. Thus, this model can be widely used as evaluation power supply for developing semiconductors and other electronic components and as power supply of characteristic test systems used in production lines.

The maximum 4 A pulse source or pulse load function is suitable for evaluating small devices with larger current capacities, and the HI/LO limiter separate setting function has an advantage for evaluating LEDs, batteries and power ICs. Also, low-resistance test of connectors and low-resistance measurement of conductive materials according to JIS are possible. Moreover, the 6240B is capable of high-precision contact resistance measurement that cancels thermal EMF generated on metal contact surfaces.

Source and Measurement Function

The source and measurement functions are selectable from voltage source, current source, voltage measurement, current measurement and resistance measurement.

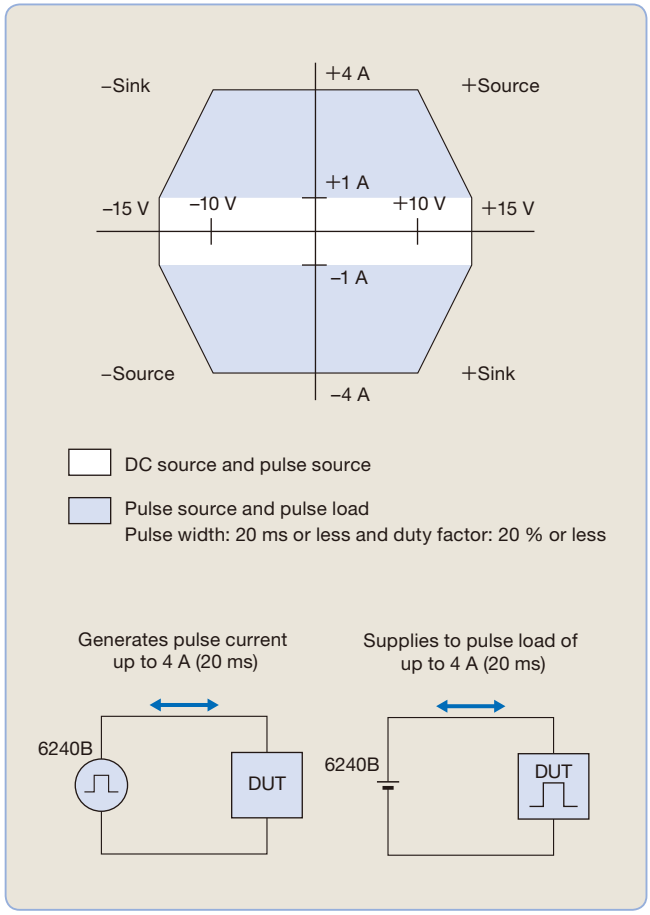




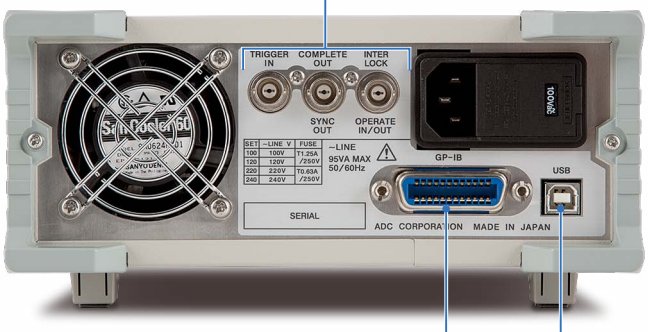
High Performance DC Voltage C

Wider applications with various voltage and current source modes and limiter separate setting

Output Range



TRIGGER IN/SYNC OUT signal to perform synchronous operation of multi-units or synchronous control on external measuring instruments and to output comparison operation results, and INTERLOCK signal to prevent malfunction



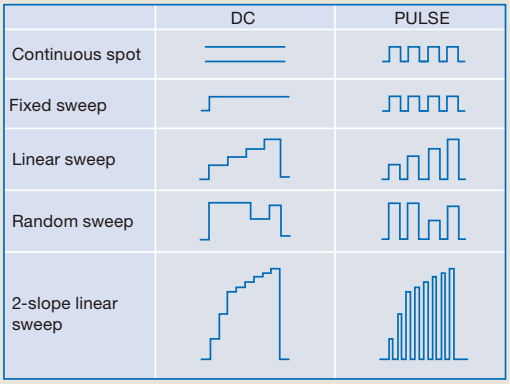
6240B rear panel

GPIB interface

USB interface

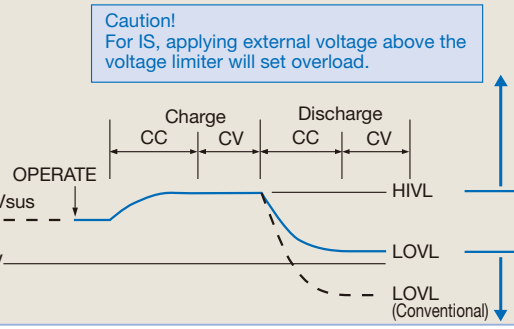
Voltage and Current Source Mode

There are four source modes; DC, pulse, DC sweep, pulse sweep. Then, the sweep modes are classified into four sweep types: fixed sweep, linear sweep, random sweep (arbitrary waveform generation by user programming), 2-slope linear sweep (linear sweep with step value switching).
The minimum pulse width is 50 µs.
The minimum cycle is 2 ms, or 500 µs without measurement.



HI/LO Limiter Separate Setting

In voltage or current source, the HI/LO limiter settings are very important. For current source, the limiter voltage must be higher than the applied voltage. When voltage higher than the limiter voltage is applied from the outside, the instrument detects overload and sets standby. When a capacitor is discharged after being charged at a constant current with the positive and negative limiters being set to the same value, overload occurs if the limiter voltage is lowered. In addition, it is discharged down to negative voltage when applying reverse polarity current.
However, the 6240B allows separate setting of HI and LO limiters. Furthermore, for the voltage-limiter, both HI and LO limiters can be set homo-polar. This prevents a capacitor or a battery from being over-discharged. Also, it is suitable for evaluating devices that are used at a constant current and do not tolerate reverse voltage application.



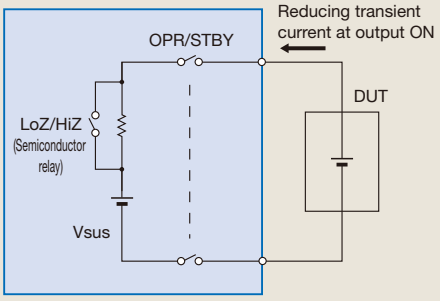
High-speed response, low-noise and high-precision testing Suitable for system architect by output ON/OFF without relay switching

Suspend Function

The 6240B can select from three output OFF statuses; STBY (output relay OFF), HiZ (output relay ON and high resistance), and LoZ (output relay ON and low resistance). Using this function can omit unnecessary relay ON/OFF operations, and consequently solve conventional problems:

- Prevents throughput reduction due to relay operating time.
- Extends relay lifetime and increases product reliability.

In addition, the setting of a suspend voltage (voltage in HiZ and LoZ status) can prevent transient current from being generated when connecting voltage sourcing devices such as batteries.



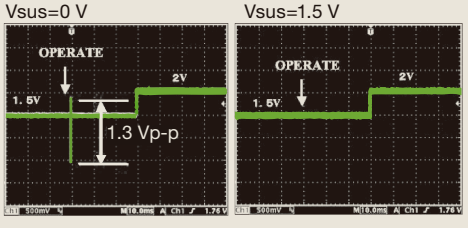
Output OFF status	Output relay	Output status	Current limiter setting value
LoZ	ON	Vsus, low resistance	VS: Setting current limiter (IL) IS: 300 digits in the setting current range
HiZ	ON	Vsus, high resistance	300 nA
STBY	OFF	Open	—

Vsus: Setting suspend voltage (default: 0 V)

When a conventional generator or electronic load is connected with a battery, the output voltage is 0 V, and then the setting current starts flowing. In this case, the moment that it is connected, transient current sink occurs, causing unnecessary battery discharge. On the other hand, by setting the suspend voltage, the 6240BD is connected in high-impedance state at the specified voltage and then the setting current flows. This prevents unnecessary discharge at the connection to the battery.

Comparison of transient current at output ON

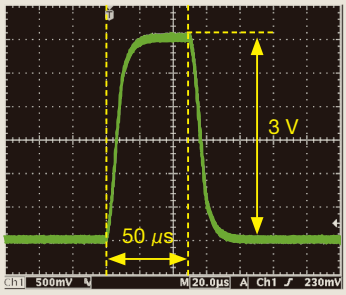
The following shows the comparison of transient current when the output status is set to Operate with IS=500 mA, VL=±3 V, Vbatt=1.5 V and load resistance = 1 Ω.
When setting Vsus = 0 V, transient current of 1.3 A flows at 1.3 V. When setting to Vsus = 1.5 V, it becomes almost 0 A.



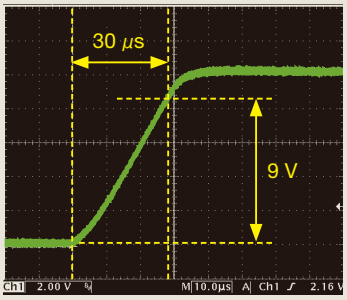
High-Speed Response and Low Noise

The following shows a representative response waveform and output noise. The response between 0 V and 10 V is approximately 30 µs at 0 to 90 % rising time and the output noise is approximately 2.4 mV p-p from DC to 20 MHz.

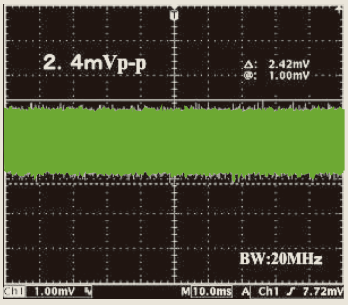
- High-speed pulse generation
  0-3 V,
  Pulse width : 50 µs,
  Period : 500 µs



- Response waveform
  0-10 V

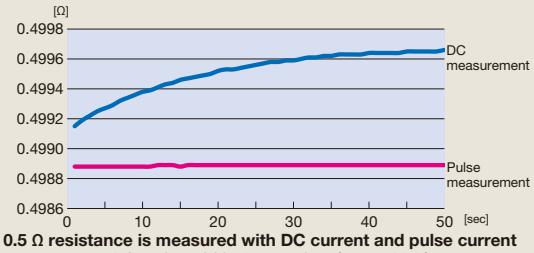


- Output nose



Low-Resistance Measurement with Pulse Current Unaffected by Heat

The 6240B achieves low-resistance measurement without being affected by self-heating of DUTs by using pulse current application, bringing more precise measured values with little errors.

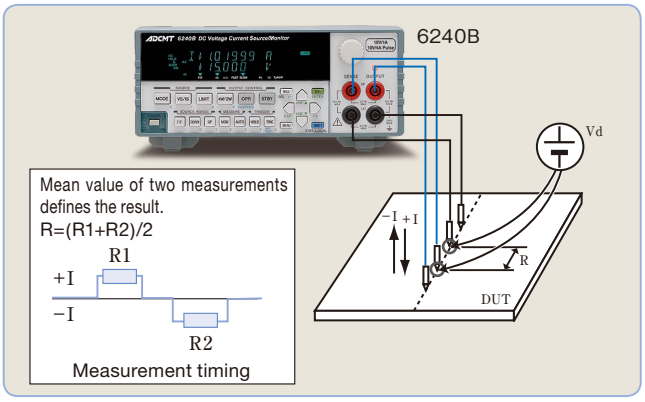


If 0.5 Ω resistance is measured with DC current and pulse current
Source current: 1 A, pulse width: 25 ms, duty factor: 10 %
In DC measurement, the measured values fluctuate due to self-heating of the resistor. In pulse measurement, the measured values are not affected by the self-heating

From characteristic test of semiconductors, new-energy devices and sensors to contact resistance measurement of connectors, wire harnesses and shunt resistors

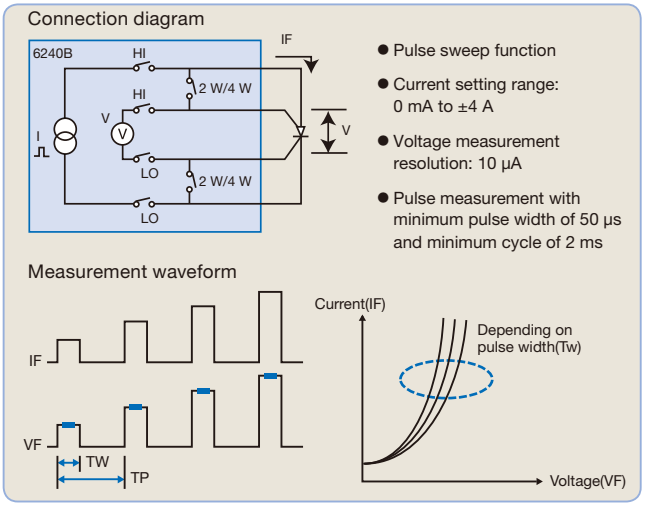
Low Resistance Measurement of Conductive Materials

The 6240B newly adopts the low-resistance measurement function.
When there is a temperature difference between the measurement cable and the DUT, thermal EMF (voltage: Vd) will be generated.
Such thermal EMF becomes a significant cause of errors in low-resistance measurement at mΩ order or less. These errors can be canceled by switching the polarity of measurement current.
Former models use sample software to cancel thermal EMF in measurement, however the 6240B can cancel it without the software. Consequently, low-resistance test of connectors and low-resistance measurement of conductive materials are possible. Moreover, the 6240B is capable of high-precision contact resistance measurement that cancels thermal EMF generated on the contact surfaces of metals such as wire harness.



Diode Temperature Dependence Evaluation

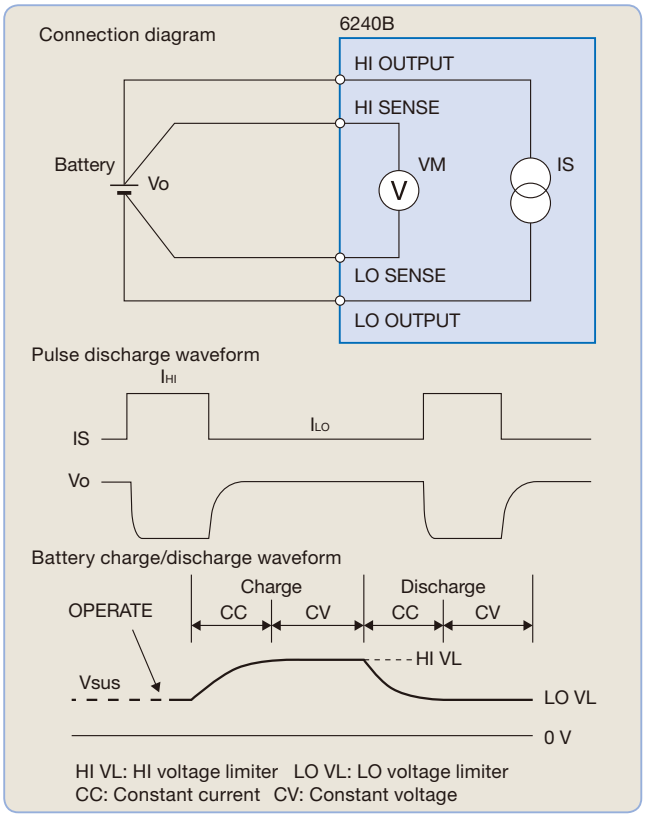
In I-V characteristic test on devices that generate heat when current flows, applying pulse current is effective for avoiding the influence of the self-heating.
By using the current pulse sweep function and voltage measurement in synchronous with pulses, precise VF characteristic test with large current is available.



- Pulse sweep function
- Current setting range: 0 mA to ±4 A
- Voltage measurement resolution: 10 µA
- Pulse measurement with minimum pulse width of 50 µs and minimum cycle of 2 ms

Battery Charge/Discharge Tests and Power Device Evaluation

The 6240B handles bipolar output and is capable of ± source and ± sink operations. Therefore, it has achieved 0 V sink operation which cannot be done by general electronic loads. With its pulse source function, it can be used for evaluation of batteries and power supply devices used for various portable devices.



- Capable of handling various pulses of cell phones with a minimum pulse width of 50 µs and 1 µs step
- Capable of CV/CC operation for both charge and discharge

  Both the HI and LO voltage limiters can be set to positive values (or negative values) at the same time. If HI is set to +1.8 V and LO to +1.2 V, for instance, the mode becomes constant voltage operation when the battery voltage reaches +1.8 V, and discharging terminates when it reaches +1.2 V.
- Avoids unnecessary discharge at output ON

  A general power supply is at 0 V or in open status of 0 V when output is OFF, and a low impedance state of 0 V always occurs when output is ON. At this time, the battery is being discharged unnecessarily for a moment. However, by setting the suspend voltage of the 6240B to +1.2 V, for instance, unnecessary discharge can be avoided since the voltage of the output terminal is +1.2 V the same as that of the battery, even in a temporary low impedance state that occurs when the output is ON. This function is also useful for preventing FET from being set to ON instantaneously at output ON when it is used as a gate voltage of J-FET or GaAsFET.

Specifications

All accuracy specifications are guaranteed for one year at a temperature of 23 ±5°C and a relative humidity of 85 % or less.

●Voltage source/measurement range:

Range	Source range	Setting resolution	Measurement range	Measurement resolution
300 mV	0 to ±320.00 mV	10 μV	0 to ±320.999 mV	1 μV
3 V	0 to ±3.2000 V	100 μV	0 to ±3.20999 V	10 μV
15 V	0 to ±15.000 V	1 mV	0 to ±15.1999 V	100 μV

●Current source/measurement range:

Range	Source range	Setting resolution	Measurement range	Measurement resolution
30 μA	0 to ±32.000 μA	1 nA	0 to ±32.0999 μA	100 pA
300 μA	0 to ±320.00 μA	10 nA	0 to ±320.999 μA	1 nA
3 mA	0 to ±3.2000 mA	100 nA	0 to ±3.20999 mA	10 nA
30 mA	0 to ±32.000 mA	1 μA	0 to ±32.0999 mA	100 nA
300 mA	0 to ±320.00 mA	10 μA	0 to ±320.999 mA	1 μA
1 A	0 to ±1.0000 A	100 μA	0 to ±1.01999 A	10 μA
4 A	0 to ±4.0000 A	200 μA	0 to ±4.01999 A	10 μA

The source range in the 4 A range is limited by the duty factor condition.
For 4 A range pulse source, maximum pulse width 20 ms/duty factor ≤ 20 %

The measurement resolution with integration time of 100 μs, 500 μs and S/H (Sample Hold) will be as follows:

Integration time	100 μs	500 μs	S/H(100 μs)
Measurement resolution(digits)	10	2	10

●Resistance measurement range:

Range	Measurement range	Measurement resolution
Determined by voltage range/current range calculations	0 Ω to 0.75 GΩ	Minimum 0.25 μΩ

●Voltage limiter (compliance) range:

Setting range	Setting resolution*1
0 V to 320 mV	100 μV
320.1 mV to 3.2 V	1 mV
3.201 V to 15 V	10 mV

●Current limiter (compliance) range:

Setting range	Setting resolution*1
100 nA to 32 μA	10 nA
32.01 μA to 320 μA	100 nA
320.1 μA to 3.2 mA	1 μA
3.201 mA to 32 mA	10 μA
32.01 mA to 320 mA	100 μA
320.1 mA to 1 A	1 mA
1.001 A to 4 A	1 mA

*1: Where, (Hi limiter value - Lo limiter value) ≥ 60 digits

●Accuracy: Includes calibration accuracy, 1-day stability, temperature coefficient, and linearity.
●1-day stability: At constant power and load
●Temperature coefficient: At temperature of 0 to 50 °C

Voltage source

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of setting+V)		±(ppm of setting+V)/°C
300 mV	0.02+150 μV	0.01+70 μV	15+15 μV
3 V	0.02+350 μV	0.01+200 μV	15+30 μV
15 V	0.02+3 mV*2	0.01+2 mV	15+300 μV

Voltage limiter

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of setting+V)		±(ppm of setting+V)/°C
300 mV	0.1+1 mV	0.05+200 μV	100+50 μV
3 V	0.05+8 mV	0.01+1 mV	15+100 μV
15 V	0.07+80 mV	0.01+10 mV	15+1 mV

Voltage limiter additional error: When Hi limiter is set to a negative value and Lo limiter is set to a positive value, an error of ± 0.1 % of setting is added.

Current source

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of setting+A+A×Vo/1 V)		±(ppm of setting+A+A×Vo/1 V)/°C
30 μA	0.03+10 nA+300 pA	0.01+5 nA+100 pA	20+1 nA+10 pA
300 μA	0.03+80 nA+3 nA	0.01+40 nA+1 nA	20+10 nA+100 pA
3 mA	0.03+800 nA+30 nA	0.01+400 nA+10 nA	20+100 nA+1 nA
30 mA	0.03+8 μA+300 nA	0.01+4 μA+100 nA	20+1 μA+10 nA
300 mA	0.045+80 μA+3 μA	0.01+40 μA+1 μA	20+10 μA+100 nA
1 A	0.05+0.8 mA+30 μA	0.02+0.4 mA+10 μA	35+100 μA+1 μA
4 A	0.25+1 mA+55 μA	0.08+0.4 mA+10 μA	35+100 μA+2 μA

Vo : Compliance voltage (− 15 V to + 15 V)

Current limiter

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of setting+A+A×Vo/1 V)		±(ppm of setting+A+A×Vo/1 V)/°C
30 μA	0.045+70 nA+300 pA	0.01+10 nA+100 pA	20+8 nA+10 pA
300 μA	0.045+700 nA+3 nA	0.01+100 nA+1 nA	20+20 nA+100 pA
3 mA	0.045+7.0 μA+30 nA	0.01+1 μA+10 nA	20+200 nA+1 nA
30 mA	0.045+70 μA+300 nA	0.01+10 μA+100 nA	20+2 μA+10 nA
300 mA	0.055+700 μA+3 μA	0.01+100 μA+1 μA	20+20 μA+100 nA
1 A	0.1+7.0 mA+30 μA	0.02+1 mA+10 μA	40+200 μA+1 μA
4 A	0.25+12 mA+55 μA	0.08+1 mA+10 μA	40+200 μA+2 μA

Vo : Compliance voltage (− 15 V to + 15 V)

Voltage measurement (Auto zero: ON, integration time: 1 PLC to 200 ms)

Range	Accuracy	1-day stability	Temperature coefficient
	±(% of reading+V)		±(ppm of reading+V)/°C
300 mV	0.02+75 μV	0.008+50 μV	15+15 μV
3 V	0.02+120 μV	0.008+60 μV	15+15 μV
15 V	0.02+1.2 mV*2	0.008+400 μV	15+150 μV

*2: In the 15 V range, 200 μV is added per 0.1 V remote sensing voltage.

Current measurement (Auto zero: ON, integration time: 1 PLC to 200 ms)

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of reading+A+A×Vo/1 V)		±(ppm of reading+A+A×Vo/1 V)/°C
30 μA	0.03+8 nA+300 pA	0.01+4 nA+100 pA	20+1 nA+10 pA
300 μA	0.03+70 nA+3 nA	0.01+35 nA+1 nA	20+7 nA+100 pA
3 mA	0.03+700 nA+30 nA	0.01+350 nA+10 nA	20+70 nA+1 nA
30 mA	0.03+7 μA+300 nA	0.01+3.5 μA+100 nA	20+700 nA+10 nA
300 mA	0.045+70 μA+3 μA	0.01+35 μA+1 μA	20+7 μA+100 nA
1 A	0.05+0.7 mA+30 μA	0.02+0.35 mA+10 μA	35+70 μA+1 μA
4 A	0.25+0.8 mA+55 μA	0.08+0.35 mA+10 μA	35+70 μA+2 μA

Vo:Compliance voltage (− 15 V to + 15 V)

Resistance measurement (Auto zero: ON, integration time: 1 PLC to 200 ms)

Condition	Accuracy	1-day stability	Temperature coefficient
	±(% of reading) ±(digits+digits+digits)		±(ppm of reading) ±(digits+digits+digits)/°C
Voltage source	Reading item: (Voltage source setting item + Current measurement reading item) Full-scale item: (Voltage source full-scale item digit value + current measurement full-scale item digit value + CMV item digit value)*3		
Current source	Reading item: (Current source setting item + Voltage measurement reading item) Full-scale item: (Current source full-scale item digit value + Voltage measurement full-scale item digit value + CMV item digit value)*3		
Low-resistance measurement (4-wire connection)	Reading item: (Current source setting item + Voltage measurement reading item) Full-scale item: *4		

*3: CMV item = (A × Vo/1 V); "source or measurement current" × "source or measurement voltage"/1 V digit value
Vo: Compliance voltage (-15 V to +15 V)
*4: Full-scale item = (A + Rm × B)/Is

A: Voltage limiter range tolerance

Voltage limiter range	A
300 mV	10 μV
3 V	50 μV
15 V	1 mV

Rm: Resistance measured value
B: Current value tolerance due to current source linearity
±3 digits worth (±5 digits worth in the 4 A range)
Is: Current source setting value

The full-scale item tolerances listed below are added to the integration time 100 μs to 10 ms, S/H measurement accuracy and 1-day stability.

Measurement range		Integration time Unit: digits (at 5 ½ digit display)					
		10 ms	5 ms	1 ms	500 μs	100 μs	S/H
Voltage measurement	300 mV	10	15	20	30	60	200
	3 V, 15 V	5	8	10	15	30	50
Current measurement	30 μA	200	300	300	300	300	300
	300 μA	20	30	30	30	70	100
	3 mA	10	30	30	30	50	80
	30 mA	10	30	30	30	50	100
	300 mA	10	15	15	15	50	100
	1 A	20	30	75	75	250	500
	4 A	20	30	75	75	250	500

S/H: Measurement in the sample hold mode (integration time: 100 μs)
When LO OUTPUT is grounded to the chassis, the additional error of integration time in 30 μA range is the same as that in 300 μA range.

●Source linearity: ±3 digits or less (±5 digits or less in the 4 A range)
●Maximum output current: 0 to ±15 V; ±1 A (DC) 0 to ±10 V; ±4 A (maximum pulse width 20 ms/duty factor ≤ 20 %)
●Maximum compliance voltage: Up to 1 A (DC); 0 to ±15 V Up to 4 A (pulse); 0 to ±10 V

● Output noise: For voltage source, within the range from no load to the maximum load [Vp-p]
For current source, at the following load [Ap-p]

Voltage source

Range	Load resistance	Low frequency noise		High frequency noise
		DC to 100 Hz	DC to 10 kHz	DC to 20 MHz
300 mV	—	50 μV	200 μV	3 mV
3 V	—	50 μV	300 μV	3 mV
15 V	—	500 μV	2 mV	4 mV

Current source

Range	Load resistance	Low frequency noise		High frequency noise
		DC to 100 Hz	DC to 10 kHz	DC to 20 MHz
30 μA	10 kΩ	10 nA	60 nA	500 nA
300 μA	10 kΩ	30 nA	150 nA	600 nA
3 mA	1 kΩ	200 nA	2 μA	6 μA
30 mA	1 kΩ	2 μA	15 μA	20 μA
300 mA	1 kΩ	20 μA	100 μA	150 μA
1 A	10 Ω	500 μA	1 mA	10 mA
4 A	10 Ω	500 μA	1 mA	10 mA

Switching noise

		Typical value [p-p]	Load resistance
Output ON/OFF noise	Voltage source	600 mV	At 100 kΩ
	Current source	600 mV	At 100 kΩ
Range switching noise	Voltage source	50 mV	—
	Current source	fast : 100 digits+50 mV*5	—
	Current limiter	slow : 300 digits+50 mV*5	
	Voltage limiter	50 mV*6	—
	Voltage measurement	50 mV*6	—
	Current measurement	50 mV*6	—
Response switching noise		80 mV	—
Power OFF noise		600 mV	At 100 kΩ

*5: "digits" indicates current source 4½ digit values. Double these values in the 4 A range.
*6: The Limiter is inactive. While the limiter is active, it is the same as the current source range switching noise

● Settling time : Time to reach the final value ±0.1 % when varying from zero to the full scale.
Setting conditions: Source values and limit values are full-scale settings.
Load conditions: Pure resistance load, and load capacitance of 200 pF or less.

	Source range	Limiter range	Settling time (Output response) FAST	Settling time (Output response) SLOW
Voltage source (Output current: 4 A 1 A in the 15 V range)	300 mV	4 A	200 μs or less	1 ms or less
	3 V		100 μs or less	300 μs or less
	15 V		300 μs or less	700 μs or less
Current source (Output voltage: 15 V 10 V in the 4 A range)	30 μA	15 V	1.5 ms or less	2 ms or less
	300 μA		400 μs or less	700 μs or less
	3 mA			
	30 mA			
	300 mA			
	1 A		1 ms or less	2 msor less
	4 A		450 μs or less	700 μs or less

(Typical value)	Source range	Limiter range	Settling time (Output response) FAST	Settling time (Output response) SLOW
Voltage source (Output current: 20 % or less of full sale)	300 mV	3m A to 300 mA	50 μs or less	200 μs or less
	3 V		30 μs or less	100 μs or less
	15 V		100 μs or less	300 μs or less
Current source (Output voltage: 1 V)	300 μA	3 V	50 μs or less	100 μs or less
	3 mA			
	30 mA			
	300 mA			
	1 A		100 μs or less	200 μs or less
	4 A		50 μs or less	150 μs or less

● Over shoot: ±0.1 % or less under pure resistance load, at the standard cable end and with the output response SLOW (30 μA, 300 μA, 1 A and 4 A ranges excluded)
● Line regulation: ±0.003 % of range or less
● Load regulation: Voltage source: ±0.003 % of range or less
(at 4-wire connection under the maximum load)
Current source: Depending on the accuracy CMV (A × Vo/1 V)
● Output resistance: At 2-wire connection (Output cable not included)

● Maximum load capacitance: Maximum load capacitance that does not generate oscillation in voltage source or voltage limiter status

Current range	Output resistance (Ω) Voltage source	Output resistance (Ω) Current source	Maximum load capacitance
30 μA	500 mΩ or less	1000 MΩ or higher	1 μF
300 μA	100 mΩ or less	1000 MΩ or higher	1 μF
3 mA	10 mΩ or less	100 MΩ or higher	100 μF
30 mA	10 mΩ or less	10 MΩ or higher	100 μF
300 mA	10 mΩ or less	1 MΩ or higher	2000 μF
1 A/4 A	10 mΩ or less	100 kΩ/50 kΩ or higher	2000 μF

Supplied cable resistance: 100 mΩ or less

● Maximum inductive load: Maximum inductive load that does not generate oscillation in current source or current limiter status

Current source range/ current limiter range	Respons	30 μA	300 μA	3 mA to 4 A
Maximum inductive load	FAST	100 μH	200 μH	1 mH
	SLOW	500 μH	1 mH	

● Effective CMRR: At unbalanced impedance1 kΩ
In DC and AC 50/60 Hz ± 0.08 %

	Integration time 100 μs to 10 ms	Integration time 1 PLC to 200 ms
Voltage measurement/ current measurement	60 dB	120 dB

● NMRR: In AC 50/60 Hz ± 0.08 %

	Integration time 100 μs to 10 ms	Integration time 1 PLC to 200 ms
Voltage measurement/ current measurement	0 dB	60 dB

Source and measurement function

DC source / measurement: Source and measurement of DC voltage and current
Pulse source / measurement: Source and measurement of pulse voltage and current
(Measurement auto range in pulse source is impossible)
DC sweep source / measurement: Source and measurement by Linear, 2-slope linear, Random and Fixed levels
Pulse sweep source / measurement: Source and measurement by Linear, 2-slope linear, Random and Fixed levels
(Measurement auto range in pulse source is impossible)
Low-resistance measurement: By pulse current source voltage measurement
Integration time: 9 types available: 100 μs, 500 μs, 1 ms, 5 ms, 10 ms, 1 PLC, 100 ms, 200 ms and S/H
S/H: Sample hold (integration time: 100 μs) measurement
(Enabled only in the pulse source or pulse sweep source mode.)
(PLC: Power Line Cycle 50 Hz: 20 ms, 60 Hz: 16.66 ms)
Sweep mode: Reverse ON (round) / OFF (one way)
Sweep repeat count: 1 to 1000 times or infinite
Max number of sweep steps: 8000 steps
Max random sweep memory: 8000 data
Measurement data memory: 8000 data
Measurement auto range: Available only in VSIM or ISVM
Measurement function link mode: Links the source function to the measurement function. (VSIM or ISVM)
ON/OFF available
Limiter: The HI and LO limiters can be set individually.
(Current limiters of the same polarity are not allowed.)
Calculation function: NULL calculation
Comparator calculation (HI, GO, or LO)
Scaling calculation
MAX, MIN, AVE, TOTAL calculations
Trigger style: Auto trigger, External trigger
Output terminal: Front; Safety socket
HI OUTPUT, HI SENSE, LO OUTPUT, LO SENSE
Max input: 15 V peak (between HI-LO)
2 V peak (between OUTPUT and SENSE)
250 V maximum (between LO and chassis)
Max remote sensing voltage: ±1 V Max; HI OUTPUT - HI SENSE, LO OUTPUT - LO SENSE
(The voltage between HI SENSE and LO SENSE must be within the maximum output voltage range.)
Voltage measurement input resistance: 1 GΩ or higher
Voltage measurement input leak current: ±1 nA or lower

Interface Function

GPIB: Compliant with IEEE-488.2-1987
Interface function; SH1, AH1, T5, L4, SR1, RL1, PP0, DC1, DT1, C0, E2
Connector; Amphenol 24 pin
USB interface: USB 2.0 Full-speed
Connector; Type B
External control signal: TRIGGER IN, INTERLOCK, OPERATE IN, OPERATE OUT, SYNC OUT
Connector; BNC

Setting Time

Minimum pulse width: 50 μs
Minimum step (repeat) time: Under fixed source/measurement range, integration time of 100 μs, the minimum measurement or source delay time, calculation function OFF, and voltage/current measurement

Measurement	Memory mode	Minimum step time
OFF	–	0.5 ms
ON	BURST	2 ms
	NORMAL	10 ms
	OFF	

Source delay time:

Setting range	Resolution*7	Setting accuracy
0.030 ms to 60.000 ms	1 μs	±(0.1 %+10 μs)
60.01 ms to 600.00 ms	10 μs	
600.1 ms to 6000.0 ms	100 μs	
6001 ms to 59998 ms	1 ms	

Period (pulse cycle):

Setting range	Resolution*7	Setting accuracy
0.500 ms to 60.000 ms	1 μs	±(0.1 %+10 μs)
60.01 ms to 600.00 ms	10 μs	
600.1 ms to 6000.0 ms	100 μs	
6001 ms to 60000 ms	1 ms	

Pulse width:

Setting range	Resolution*7	Setting accuracy
0.050 ms to 60.000 ms	1 μs	±(0.1 %+10 μs)
60.01 ms to 600.00 ms	10 μs	
600.1 ms to 6000.0 ms	100 μs	
6001 ms to 59998 ms	1 ms	

Measurement delay time:

Setting range	Resolution*7	Setting accuracy
0.050 ms to 60.000 ms	1 μs	±(0.1 %+10 μs)
60.01 ms to 600.00 ms	10 μs	
600.1 ms to 6000.0 ms	100 μs	
6001 ms to 59998 ms	1 ms	

*7: The setting resolution is determined by the period time resolution.

Hold time :

Setting range	Resolution	Setting accuracy
1 ms to 60000 ms	1 ms	±(2 %+3 ms)

Auto range delay time :

Setting range	Resolution	Setting accuracy
0 ms to 500 ms	1 ms	±(2 %+3 ms)

General Specifications

Operating environment: Temperature: 0° C to +50° C
Relative humidity: 85% or less, no condensation
Storage environment: Temperature: -25° C to +70° C
Relative humidity: 85% or less, no condensation
Warm-up time: 60 minutes or more
Display: 16 segments x 12 digits vacuum fluorescent display
Power supply: AC power supply 100V/120V/220V/240V (User selectable)

Option number	Standard	OPT.32	OPT.42	OPT.44
Power voltage	100 V	120 V	220 V	240 V

Specify the option when ordering.
Use a power cable and a fuse that are compliant with the safety standard when changing the power supply voltage.

Line frequency: 50 Hz/60 Hz
Power consumption: 85 VA or less
Dimensions: Approx. 212 (W) x 88 (H) x 400 (D) mm
Mass: 5 kg or less
Safety: Compliant with IEC61010-1 Ed.3
EMI: EN61326-1 class A
Vibration proof: Compliant with IEC60068-2-6 2G

Supplied accessories

Name	Model	Quantity
Power cable	A01402	1
Input/output cable (safety plug)	A01044	1

Optional accessories

Name	Model
Test fixture	12701A
Input cable (test probe)	A01041
Input/output cable (safety plug)	A01044
Banana adapter (for A01044)	A08531
Alligator clip adapter (for A01044)	A08532
Input/output cable (high current 0.5 m)	A01047-01
Input/output cable (high current 1m)	A01047-02
Input/output cable (high current 1.5m)	A01047-03
Input/output cable (high current 2m)	A01047-04
BNC-BNC cable (1.5m)	A01036-1500
Rack mount set (JIS 2U half)	A02263
Rack mount set (JIS 2U half twin)	A02264
Rack mount set (EIA 2U half)	A02463
Rack mount set (EIA 2U half twin)	A02464
Panel mount set (2U half)	A02039
Panel mount set (2U half twin)	A02040

Note: When mounting the instrument on a rack, install a shelf plate or support bar as necessary

• Please read through the operation manual carefully before using the products.
• All specifications are subject to change without notice.

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