ИСТОЧНИКИ-ИЗМЕРИТЕЛИ 6540/6541

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Астана (7172)727-132
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
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Иваново (4932)77-34-06
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Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
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Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
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Synchronous source and measurement across 4 channels

The 6540 and 6541 are 4-channel compact DC Voltage Current Source/Monitors with the same width of 212 mm as our former compact models.

The 6540 is a model designated for system use without a display, and is optimal for production lines or inspection lines. On the other hand, the 6541, that is a benchtop model equipped with a display and an operation panel, was designed for R&D use with the emphasis on visuality and operability.

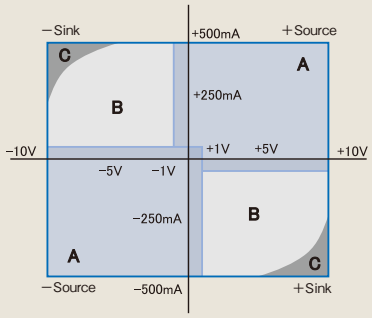
The 6540 and 6541 realize integration of multiple channels while having the low-noise feature that is ADC's strong point. It can be used as power supply to devices and as load at the same time, allowing pulse generation of the minimum pulse width of 50 µs, sweep operation and synchronous operation among multiple channels or units. These features contribute to precise measurements and shorter takt time.

In addition, the 6540 and 6541 can precisely measure periodically varying consumption current or leak current of mobile electronic devices by using A/D conversion adopting the variable-integration method, peak detection, current measurement resolution of 10 pA and other functions.

Optionally, GPIB and LAN interfaces are available on the 6541.

Model	6540	6541
Number of channels	4	
Output method	Bipolar	
Maximum power	±10 V / ±500 mA (1 A for 4 channels)	
Voltage measurement range	10 µV to 10.0999 V	
Voltage measurement accuracy (typical value)	±0.02 %	
Current measurement range	10 pA to 500.999 mA	
Current measurement accuracy (typical value)	±0.03 %	
Output noise (20 MHz or less)	4 mVp-p	
Minimum pulse width	50 µs	
Display	None (LED indicators only)	4.3 inch color LCD display
Interface	USB port per channel 4 USB ports in total	Single USB port GPIB port (option) LAN port (option)

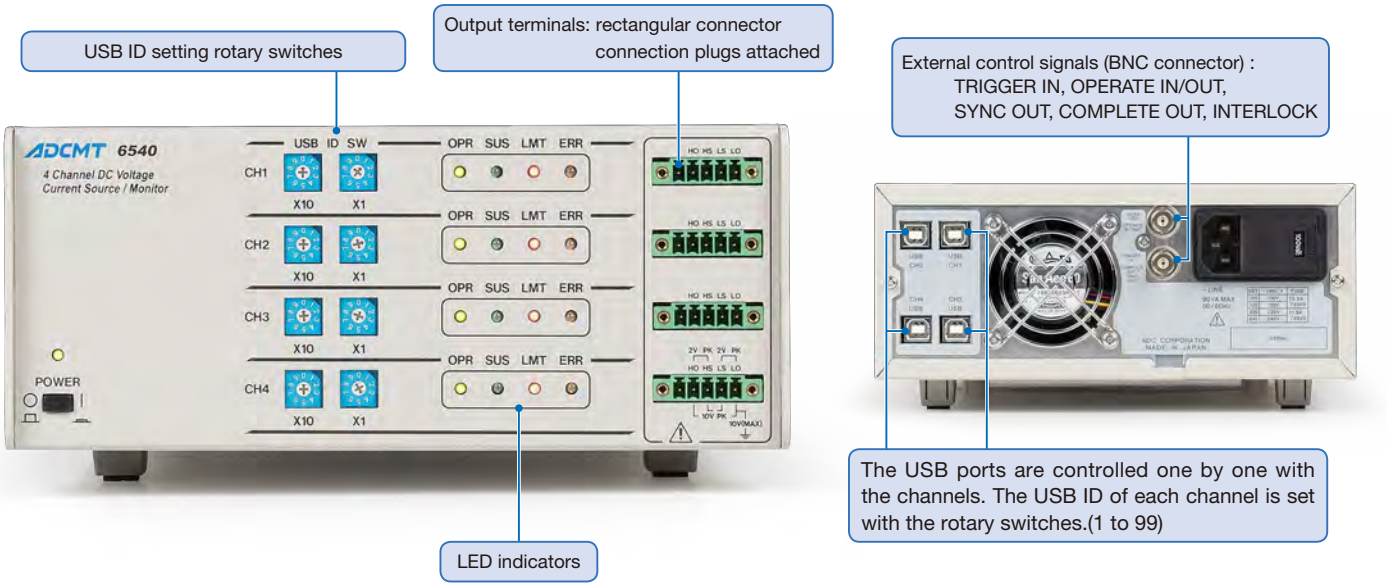
Output Range



Voltage: 0 to ±10 V
Current: 0 to ±500 mA
The source range is common to 4 channels. The maximum current for 4 channels is up to ±1 A

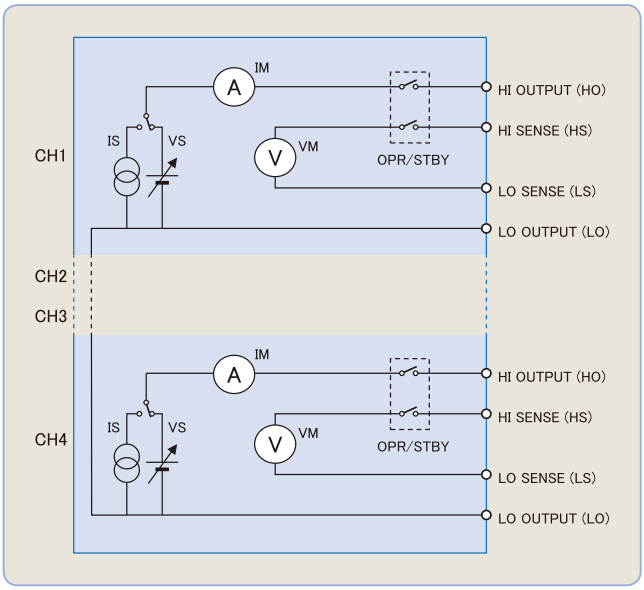
Operating temperature range
A: 0 °C to + 50 °C
(0.5 W/ch or less at current sink)
B: 0 °C to + 40 °C
(2.5 W/ch or less at current sink)
C: 0 °C to + 35 °C
(5 W/ch or less at current sink)

System Use Type 6540



Source and Measurement Function

Voltage or current source, and voltage, current or resistance measurement can be selected by specifying the source and measurement functions. The LO terminals internally connected.

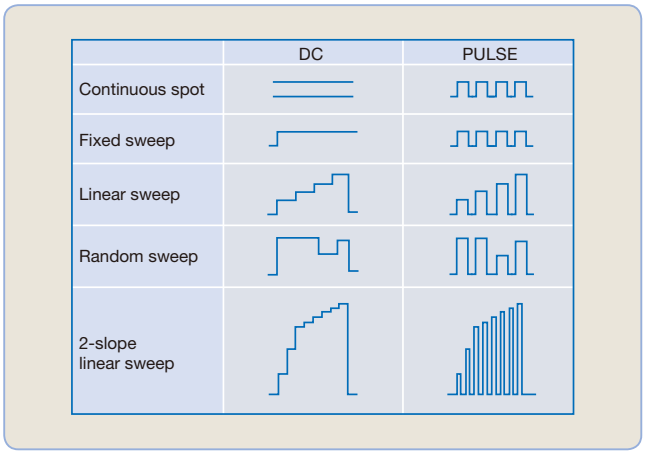


Voltage and Current Source Mode

There are four voltage or current 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 500 µs, or 100 µs without measurement.

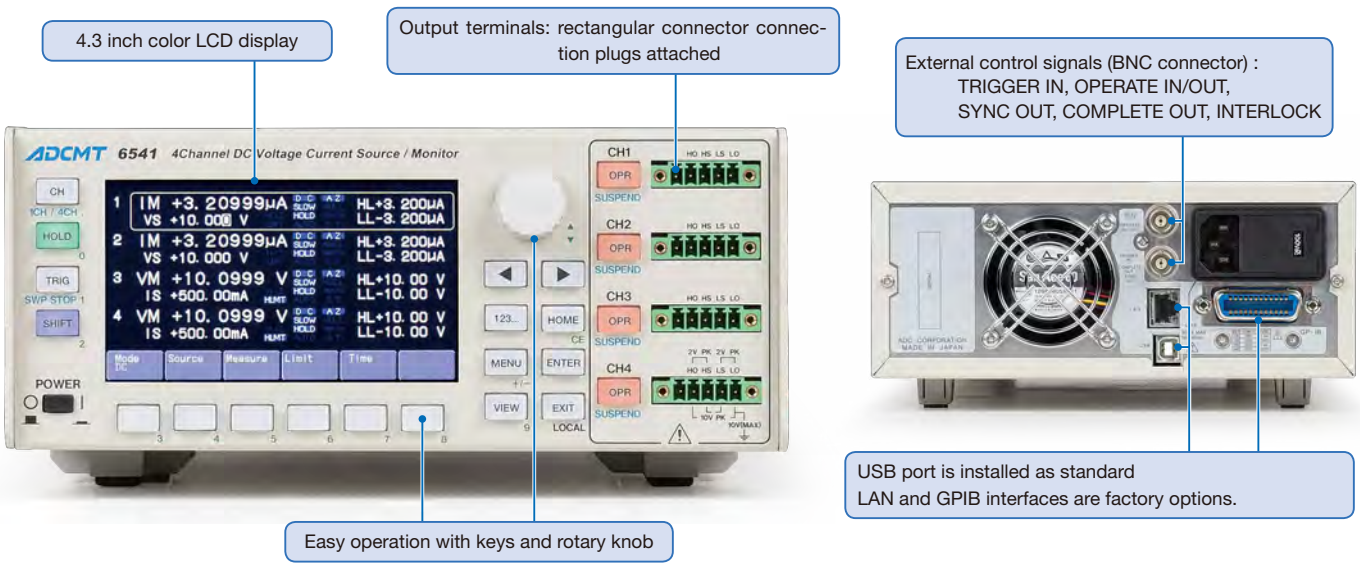


HI/LO Limit Separate Setting

In voltage or current source, the HI/LO limit settings are very important. For current source, the limit (compliance) voltage must be higher than the applied voltage. When voltage higher than the limit 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 limits being set to the same value, overload occurs if the limit voltage is lowered. In addition, it is discharged down to negative voltage when applying reverse polarity current.

However, the 6540/6541 has a function that can set the HI and LO limits individually. Furthermore, for the voltage limit, both HI and LO limits can be set homo-polar. This prevents capacitors or batteries from being over-discharged. Also, it is suitable for evaluating devices such as LDs that are used at a constant current and do not tolerate reverse voltage application.

Benchtop Type 6541



Suspend Function

The 6540/6541 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). Consequently, unnecessary relay ON/OFF operations can be omitted.

Using this function will prevent throughput reduction due to relay operating time, and extend relay lifetime dramatically, increasing 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 limit setting value
LoZ	ON	Vsus, low resistance	VS: Setting current limit (IL) IS: 30 digits in the setting current range (100 digits for the 3 µA range)
HiZ	ON	Vsus, high resistance	100 nA
STBY	OFF	Open	—

Vsus: Setting suspend voltage (default: 0V)

6540 Standard Control Software

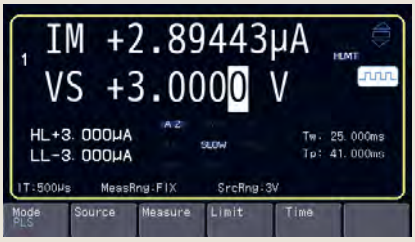
The 6540 has no control panel because of its system-use structure, but it has a control program so to be operated externally from a PC via USB.

This software makes it possible the basic operations including source, measurement and limit control.

Display Screen

The 6541 adopts a 4.3-inch color LCD display. The home screen is selectable from two types: 1-channel display and 4-channel display. Also, each channel can be set by using soft keys and rotary knob.

[1-channel view]



Displays various information such as source ranges, periods and integration time in addition to source voltage or current, measurement voltage, current or resistance, and limit voltage or current values.

[4-channel view]

Displays source voltage or current, measurement voltage, current or resistance, and limit voltage or current values of all channels.

[Time setting view]

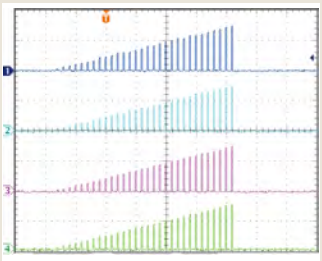
Measurement time setting is very important for pulse or sweep measurement.

Using the time setting screen allows easier and more sensuous operations than former models.

Synchronous Source and Measurement

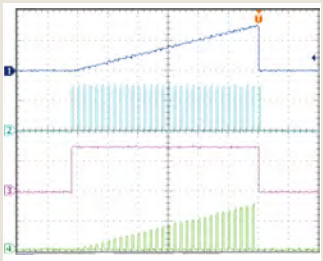
The 6540/6541 can synchronize measurements in the DC source mode, and sources and measurements in the pulse source or sweep source mode. Not only the same waveforms but also different waveforms can be generated or measured. Arbitrary master channel and slave channels are selectable.

[Setting example 1]



Master : ch1
(Pulse linear sweep)
Slave : ch2
(Pulse linear sweep)
Slave : ch3
(Pulse linear sweep)
Slave : ch4
(Pulse linear sweep)

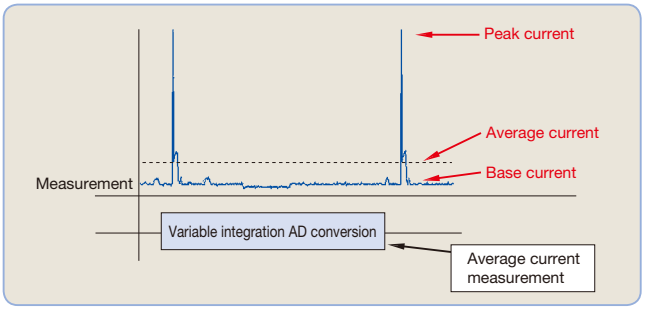
[Setting example 2]



Master : ch4
(Pulse linear sweep)
Slave : ch1
(DC linear sweep)
Slave : ch2
(Pulse)
Slave : ch3
(Fixed sweep)

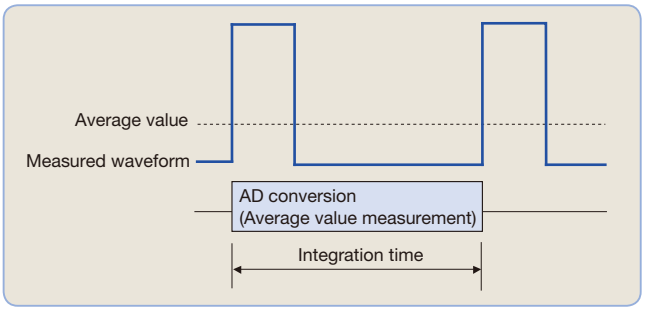
Peak Current and Average Current Measurements for Mobile Phones

In the standby state of mobile phones, the base current usually flows and the peak current flows at a constant period. To measure the average current precisely, it is necessary to measure all current passing during the standby state.
The 6540/6541 is capable of accurate average current measurement by measuring the peak current and using the variable integration function.



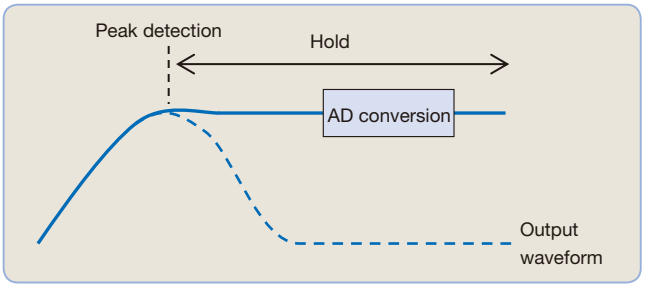
Average Current Measurement [Variable Integration Function]

The 6540/6541 allows you to set the integration time arbitrarily from 100 µs to 740 ms. This makes it measure easily the average current consumption of mobiles phones and LCDs.
As the integration time of the AD converter itself can be set, and analog integration is adopted, there are no omissions in waveforms differently from digital integration, resulting in precise average measurement.



Peak Current Measurement [Peak Hold Measurement Function]

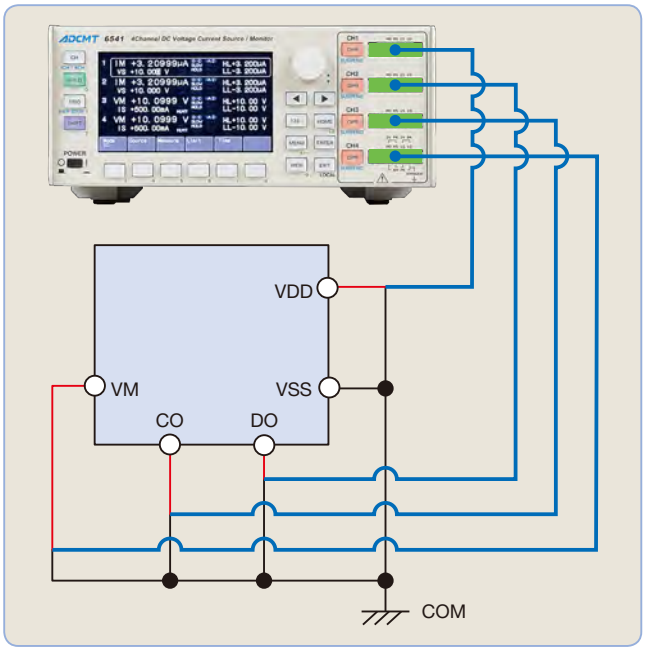
The 6540/6541 is capable of peak hold measurement at pulse generation.
The peak hold measurement function detects and measures the maximum value in a pulse at a frequency of up to 20 kHz. The integration time is 1 ms and the maximum executable period is 600 ms.



Battery Management IC Evaluation

To evaluate various ICs such as battery management IC, the 6540/6541 generates constant voltage or current and also measures voltage and current.
It measures how DO or CO operates when varying VDD or VM, and measures current against applied voltage to each terminal.

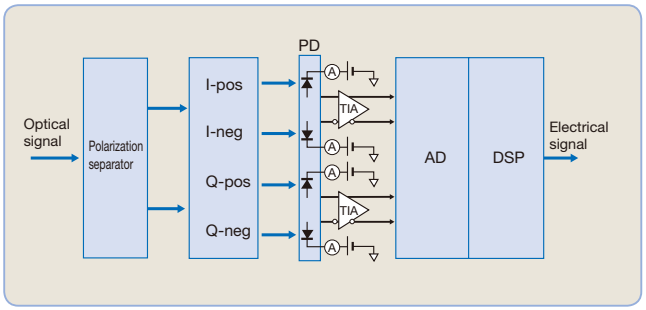
- Voltage application: -10 V to +10 V
- Voltage measurement resolution: 100 µV (10 V range)
- Current measurement resolution: 10 pA (3 µA range)



Bias Source for Communication LDs and PDs

The 6540/6541 works as bias source for photo detectors (PDs) used in receivers for digital coherent communication.

- Voltage output noise 4 mVp-p (3 V range, DC to 20 MHz)
  5 mVp-p (10 V range, DC to 20 MHz)
- Current measurement resolution
  100 nA (30 mA range)
  1 µA (500 mA range)



Specifications

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

Source/Measurement (6540/6541)

● Voltage source/measurement range:

Range	Source range	Setting resolution	Measurement range	Measurement resolution
3 V	0 to ±3.2000 V	100 µV	0 to ±3.20999 V	10 µV
10 V	0 to ±10.000 V	1 mV	0 to ±10.0999 V	100 µV

● Current source/measurement range:

Range	Source range	Setting resolution	Measurement range	Measurement resolution
3 µA	0 to ±3.2000 µA	100 pA	0 to ±3.20999 µA	10 pA
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
500 mA	0 to ±500.00 mA	20 µA	0 to ±500.999 mA	1 µA

The total output current of 4 channels should be up to 1 A.

● Resistance measurement range:

Range	Measurement range	Measurement resolution
Determined by voltage range/current range calculations	0 Ω to 5 GΩ	Minimum 20 µΩ

● Voltage limit (compliance) range:

Maximum setting range	Setting resolution*1
0 V to 3.200 V	1 mV
3.201 V to 10.00 V	10 mV

● Current limit (compliance) range:

Setting range	Setting resolution*1
0.010 µA to 3.200 µA	1 nA
3.201 µA to 32.00 µA	10 nA
32.01 µA to 320.0 µA	100 nA
320.1 µA to 3.200 mA	1 µA
3.201 mA to 32.00 mA	10 µA
32.01 mA to 320.0 mA	100 µA
320.1 mA to 500.0 mA	100 µA

*1 : Where, (Hi limit value - Lo limit value) ≥ 60 digits (200 digits for 3 µA range)

● Accuracy: Includes calibration accuracy, 1-day stability, temperature coefficient, and linearity.

Voltage source:

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of setting + V)		±(ppm of setting + V)/℃
3 V	0.02+350 µV	0.0075 + 100 µV	15 + 30 µV
10 V	0.023+3 mV	0.0075 + 1 mV	15 + 300 µV

Voltage limit:

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of setting+V)		±(ppm of setting+V)/℃
3 V	0.025 + 1.5 mV	0.008 + 150 µV	15 + 70 µV
10 V	0.04 + 15 mV	0.01 + 1.5 mV	25 + 700 µV

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

Current source:

Range	Accuracy	1-day stability	Temperature coefficient
	±(% of setting+A+A×Vo/1V)		±(ppm of setting +A+A×Vo/1V)/℃
3 µA	0.03 + 6 nA + 20 pA	0.009 + 3 nA + 4 pA	20 + 600 pA + 0.6 pA
30 µA	0.03 + 9 nA + 200 pA	0.009 + 5 nA + 40 pA	20 + 1 nA + 6 pA
300 µA	0.03 + 60 nA + 2 nA	0.009 + 20 nA + 400 pA	20 + 5 nA + 60 pA
3 mA	0.03 + 600 nA + 20 nA	0.009 + 200 nA + 4 nA	20 + 50 nA + 600 pA
30 mA	0.03 + 6 µA + 200 nA	0.009 + 2 µA + 40 nA	20 + 500 nA + 6 nA
300 mA	0.045 + 60 µA + 2 µA	0.01 + 20 µA + 400 nA	20 + 5 µA + 70 nA
500 mA	0.05 + 100 µA + 4 µA	0.017 + 40 µA + 700 nA	20 + 10 µA + 150 nA

Current limit:

Range	Accuracy	1-day stability	Temperature coefficient
	±(% of setting + A + A × Vo/1 V)		±(ppm of setting + A + A × Vo/1 V)/℃
3 µA	0.04 + 7 nA + 20 pA	0.009 + 4 nA + 4 pA	20 + 800 pA + 0.6 pA
30 µA	0.04 + 20 nA + 200 pA	0.009 + 5 nA + 40 pA	20 + 1.5 nA + 6 pA
300 µA	0.04 + 200 nA + 2 nA	0.009 + 30 nA + 400 pA	20 + 10 nA + 60 pA
3 mA	0.04 + 2 µA + 20 nA	0.009 + 300 nA + 4 nA	20 + 100 nA + 600 pA
30 mA	0.04 + 20 µA + 200 nA	0.009 + 3 µA + 40 nA	20 + 1 µA + 6 nA
300 mA	0.055 + 200 µA + 2 µA	0.01 + 35 µA + 400 nA	20 + 10 µA + 70 nA
500 mA	0.055 + 350 µA + 4 µA	0.017 + 60 µA + 700 nA	30 + 20 µA + 150 nA

Vo: Compliance voltage (-10 V to + 10 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)/℃
3 V	0.02+120 µV	0.0055 + 50 µV	10 + 15 µV
10 V	0.02+1.2 mV	0.006 + 400 µV	10 + 150 µV

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

Range	Accuracy	1-day stability	Temperature coefficient
	±(%of reading+A+A×Vo/1V)		±(ppm of reading+A+ A×Vo/1V)/℃
3 µA	0.03 + 5.5 nA + 20 pA	0.007 + 2.8 nA + 4 pA	15 + 550 pA + 0.6 pA
30 µA	0.03 + 8 nA + 200 pA	0.007 + 4 nA + 40 pA	15 + 1 nA + 6 pA
300 µA	0.03 + 40 nA + 2 nA	0.007 + 15 nA + 400 pA	15 + 4 nA + 60 pA
3 mA	0.03 + 400 nA + 20 nA	0.008 + 150 nA + 4 nA	15 + 40 nA + 600 pA
30 mA	0.03 + 4 µA + 200 nA	0.008 + 1.5 µA + 40 nA	15 + 400 nA + 6 nA
300 mA	0.045 + 40 µA + 2 µA	0.009 + 20 µA + 400 nA	15 + 4 µA + 70 nA
500 mA	0.05 + 75 µA + 4 µA	0.016 + 35 µA + 700 nA	20 + 8 µA + 150 nA

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

Condition	Accuracy
	±(% of reading) ±(digits+digits+digits)
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)*2
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)*2

Vo: Compliance voltage (-10 V to + 10 V)

*2: CMV item = (A × Vo/1 V); "source or measurement current" × "source or measurement voltage"/1 V digit value

The full-scale item tolerances listed below are added to the integration time 100 µs to 10 ms, P/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	P/H
Voltage measurement	3 V	5	15	20	30	35	500
	10 V	5	15	20	30	35	500
Current measurement	3 µA	600	1000	1500	2000	2000	2000
	30 µA	200	300	300	300	500	800
	300 µA	40	50	60	80	200	500
	3 mA	40	50	60	80	200	500
	30 mA	40	50	60	80	200	500
	300 mA	40	50	60	60	200	500
	500 mA	40	50	60	60	200	500

P/H: Measurement in the peak hold mode (integration time: 1 ms)

● Source linearity: ±3 digits or less
● Maximum output current/channel: 0 V to ±10 V: ±500 mA
● Maximum compliance voltage: ±500 mA: 0 V to ±10 V
● Maximum output current/4 channels: ±1 A

● 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
3 V	—	80 µV	300 µV	4 mV
10 V	—	500 µV	2 mV	5 mV

Current source:

Range	Load resistance	Low frequency noise		High frequency noise
		DC to 100 Hz	DC to 10 kHz	DC to 20 MHz
3 µA	10 kΩ	10 nA	60 nA	500 nA
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
500 mA	1 kΩ	20 µA	100 µA	150 µA

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 : 150 digits + 50 mV*3 SLOW : 450 digits + 50 mV*3	—
	Voltage measurement/limit	50 mV*4	—
	Current measurement/limit	50 mV*4	—
Response switching noise	—	80 mV	—
Power OFF noise	—	600 mV	At 100kΩ

*3 "digits" indicates current source 4 ½ digit values. Double these values in the 500 mA range.
*4 The limit operation is inactive. While the limit operation 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	Limit range	Settling time	
			Output response	
			FAST	SLOW
Voltage source (Output current: 500 mA)	3 V	500 mA	80 µs or less	400 µs or less
	10 V		200 µs or less	1 ms or less
Current source (Output voltage: 10 V)	3 µA	10 V	20 ms or less	20 ms or less
	30 µA		2 ms or less	3 ms or less
	300 µA		400 µs or less	1.5 ms or less
	3 mA			
	30 mA			
	300 mA			
	500 mA		500 µs or less	2 ms or less

(Typical value)	Source range	Limit range	Settling time	
			Output response	
			FAST	SLOW
Voltage source (Output current: 20 % or less of full sale)	3 V	3 mA to 300 mA	45 µs or less	300 µs or less
	10 V		100 µs or less	600 µs or less
Current source (Output voltage: 1 V)	3 mA	3 V	50 µs or less	200 µs or less
	30 mA			
	300 mA			
	500 mA		80 µs or less	300 µs or less

- Over shoot: ±0.1% or less under pure resistance load
  (3 µA, 30 µA and 300 µA ranges excluded)
- Line regulation: ±0.003 % of range or less
- Load regulation: Voltage source: ±0.003 % of range or less
  (Under the maximum load)
  Current source: Depending on the accuracy CMV (A × Vo/1V)
- Output resistance: Not including the output cable
- Maximum load capacitance: Maximum load capacitance that does not generate oscillation in voltage source or voltage limit status

Current range	Output resistance (Ω)		Maximum load capacitance
	Voltage source	Current source	
3 µA	3Ω or less	10 GΩ or higher	1 µF
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
500 mA	10 mΩ or less	1 MΩ or higher	2000 µF

- Maximum inductive load: Maximum inductive load that does not generate oscillation in current source or current limit status

Current source range/current limit range		3 µA, 30 µA	300 µA	3 mA to 500 mA
	Response			
Maximum inductive load	FAST	100 µH	200 µH	1 mH
	SLOW	500 µH	1 mH	

- Effective CMRR: At unbalanced impedance 1 kΩ
  In DC and AC 50/60 Hz ± 0.08 %

	Integration time	
	Other than right	Integral multiple of 1 PLC
Voltage source/current measurement	50 dB	110 dB
Current source/voltage measurement	50 dB	110 dB

- NMRR: At AC 50/60 Hz ± 0.08%

	Integration time	
	Other than right	Integral multiple of 1 PLC
Voltage measurement/ current measurement	0 dB	60 dB

Source and measurement function (6540/6541)

DC source and measurement: 4 channels
Pulse source and measurement: Source and measurement of pulse voltage and current
(However, measurement auto range at pulse source is impossible)
DC sweep source and measurement: Source and measurement by Linear, 2-slope linear, Random and Fixed levels
Pulse sweep source and measurement: Source and measurement by Linear, 2-slope linear, Random and Fixed levels
(However, measurement auto range at pulse source is impossible)
Integration time: 11 types available: 100 µs, 500 µs, 1ms, 5 ms, 10 ms, 1 PLC, 2 PLC, 100 ms, 200 ms, arbitrary value (variable integration) and P/H
P/H: Peak hold (integration time: 1 ms) measurement
(Enabled only in the pulse source mode)
(PLC: Power Line Cycle 50 Hz: 20 ms, 60Hz: 16.66 ms)
Variable integration range: 100 µs to 740 ms (setting resolution: 100 µs)
Sweep mode: Reverse (round) / Single (one way)
Sweep repeat count: 1 to 1000 times or infinite
Maximum number of sweep steps: 10000 steps/channel
Maximum random sweep memory: 10000 data/channel
(Random data can be stored in each channel for the 6541 only)
Sampling count: 1 to 10000 times
(Plural samplings done by single trigger)
(Enabled only when setting to HOLD in the DC or pulse mode)
Measurement data memory: 10000 data/channel
Measurement auto range: Available only in VSIM or ISVM
Measurement function link mode: Links the measurement function to the source function.
VSIM or ISVM, ON/OFF available
Limit: The HI and LO limits can be set individually.
(However, current limits 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; 5-pin rectangular
HI OUTPUT, HI SENSE, LO OUTPUT, and LO SENSE
Maximum input voltage: 10 V peak (between HI-LO)
2 V peak (between OUTPUT and SENSE)
10 V maximum (between LO and chassis)
Isolation between channels: Non-isolated (shared LO)
Maximum remote sensing voltage: ±1 V Max (at output voltage of less than 8 V)
±0.5 V Max (at output voltage of 8 V or higher)
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: 10 GΩ or higher
Voltage measurement input leak current: ±100 pA or lower
Synchronization between channels: Selectable

Interface Function

6540
USB interface: USB 2.0 Full-speed
Connector; Type B (single per channel, 4 USB ports in total)

6541
USB interface: USB 2.0 Full-speed
Connector; Type B (single port)
GPIB interface: Compliant with IEEE-488.2-1987
(Factory option) Interface function; SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E2
Connector; Amphenol 24 pin
LAN interface: Compliant with IEEE802.3 (10BASE-T, 100BASE-TX)
(Factory option) Connector; RJ-45

6540/6541
External control signal: TRIGGER IN, COMPLETE OUT, SYNC OUT, OPERATE IN/OUT, INTERLOCK IN
Connector; BNC

Setting Time (6540/6541)

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

Measurement	Minimum step time
OFF	100 µs
ON	500 µs

Source delay time:

Setting range	Resolution*5	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*5	Setting accuracy
0.100 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*5	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*5	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	

※5 : The setting resolution is determined by the period time resolution.

Hold time:

Setting range	Resolution	Setting accuracy
0 ms to 6000.0 ms	100 µs	±(2 % + 2 ms)

Auto range delay time:

Setting range	Resolution	Setting accuracy
0 ms to 5000.0 ms	100 µs	±(2 % + 2 ms)

General Specifications

Operating environment: Temperature: 0 °C to +50 °C
(up to 0.5 W/channel at current sink)
Relative humidity: 85 % or less, no condensation
However, temperature: 0°C to +40 °C for power of up to 2.5 W/channel at current sink, and temperature: 0 °C to +35 °C for power of up to 5 W/channel at current sink
(Power at current sink: Absolute value of "output voltage x output current" at current sink)

Storage environment: Temperature: -25 °C to +70 °C
Relative humidity: 85 % or less, no condensation

Warm-up time: 60 minutes or more

Display/key: **6540**; LED indicators (OPR/SUS/LMT/ERR)
(To be set by remote control)
6541; 4.3-inch color LCD display and keys

Power supply: AC power supply 100 V/120 V/220 V/240 V
(User selectable)

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

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: **6540**; 90 VA or less
6541; 95 VA or less

Dimensions: Approx. 212 (W) x 88 (H) x 450 (D) mm (2U half)

Mass: 7 kg or less

Safety: Compliant with IEC61010-1 Ed.3

EMC: EN61326-1 class A

Vibration proof: Compliant with IEC60068-2-6, 2G

Supplied Accessories

Name	Model	Quantity
Power cable	A01402	1
Output connector (plug)	JCS-RB0005JX04	4
Output connector (plug) cover	YEE-1000734	4
Cable tie	ESM-000257	4

Optional Accessories

Name	Model
Test fixture	12701A
BNC-BNC cable (1.5 m)	A01036-1500
Input/output cable 5-pin plug-alligator clip (1 m)	CC060001-100
Input/output cable 5-pin plug (2 m)	CC060002-200
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

Options

	Name
GPIB interface (factory option)	OPT6541+01
LAN interface (factory option)	OPT6541+06

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