R6161

Specifications

DC Voltage/Current Output

Generation range:

Range	Generating range	Minimum step
10 mV (Divider on)	0 to ±11.99999 mV	10 nV
100 mV (Divider on)	0 to ±119.9999 mV	100 nV
1000 mV (Divider on)	0 to ±1199.999 mV	1 µV
1 V	0 to ±1.199999 V	1 µV
10 V	0 to ±11.99999 V	10 µV
100 V	0 to ±119.9999 V	100 µV
1000 V	0 to ±1199.999 V	1 mV
1 mA	0 to ±1.199999 V	1 nA
10 mA	0 to ±11.99999 V	10 nA
100 mA	0 to ±119.9999 V	100 nA

Overall accuracy: Includes the external standard, traceability, calibration error, stability, temperature coefficient, change over time, linearity, noise and ripple (excluding line regulation and load regulation).
The temperature is 23˚C ± 5˚C and the relative humidity is less than 70%. The preheating time must be one hour or more.
*The current range is guaranteed at the follow-up voltage ± 10 V or less.

24-hour total accuracy

Range \ Error	Setting error		Range error
10 mV (Divider on)	±0.0055%	+	±0.7 µV
100 mV (Divider on)	±0.0040%	+	±0.8 µV
1000 mV (Divider on)	±0.0030%	+	±6 µV
1 V	±0.0020%	+	±10 µV
10 V	±0.0020%	+	±60 µV
100 V	±0.0020%	+	±600 µV
1000 V	±0.0025%	+	±6 mV
1 mA	±0.0055%	+	±9 nA
10 mA	±0.0040%	+	±90 nA
100 mA	±0.0040%	+	±900 nA

90-day total accuracy

Range \ Error	Setting error		Range error
10 mV (Divider on)	±0.0060%	+	±2.3 µV
100 mV (Divider on)	±0.0045%	+	±2.5 µV
1000 mV (Divider on)	±0.0035%	+	±8 µV
1 V	±0.0025%	+	±11 µV
10 V	±0.0025%	+	±70 µV
100 V	±0.0025%	+	±700 µV
1000 V	±0.0030%	+	±7 mV
1 mA	±0.0060%	+	±9 nA
10 mA	±0.0045%	+	±90 nA
100 mA	±0.0045%	+	±900 nA

Relative accuracy: A value indicating overall accuracy except for external standard traceability. Includes the calibration error, stability, temperature coefficient, change over time, linearity, noise and ripple, (DC to 1 Hz). (Excludes line regulation and load regulation)
The temperature is 23˚C ± 1˚C and the relative humidity is less than 70%. The preheating time must be one hour or more.

24-hour relative accuracy:

Range \ Error	Setting error		Range error
10 mV (Divider on)	±0.0010%	+	±0.5 µV
100 mV (Divider on)	±0.0010%	+	±0.5 µV
1000 mV (Divider on)	±0.0010%	+	±4 µV
1 V	±0.0005%	+	±6 µV
10 V	±0.0005%	+	±40 µV
100 V	±0.0005%	+	±400 µV
1000 V	±0.0008%	+	±4 mV
1 mA	±0.0015%	+	±5 nA
10 mA	±0.0010%	+	±50 nA
100 mA	±0.0010%	+	±500 nA

90-day relative accuracy:

Range \ Error	Setting error		Range error
10 mV (Divider on)	±0.0020%	+	±2 µV
100 mV (Divider on)	±0.0020%	+	±2 µV
1000 mV (Divider on)	±0.0020%	+	±6 µV
1 V	±0.0015%	+	±8 µV
10 V	±0.0015%	+	±50 µV
100 V	±0.0015%	+	±500 µV
1000 V	±0.0015%	+	±5 mV
1 mA	±0.0025%	+	±6 nA
10 mA	±0.0020%	+	±60 nA
100 mA	±0.0020%	+	±600 nA

One day stability: The temperature is 23˚C ± 1˚C and the relative humidity is 70% or less. The preheating time must be one hour or more. The power and load conditions following that must be constant.
*The current range is guaranteed at the follow-up voltage ± 10 V or less.

Range \ Error	Setting error		Range error
10 mV (Divider on)	±0.0007%	+	±0.3 µV
100 mV (Divider on)	±0.0007%	+	±0.3 µV
1000 mV (Divider on)	±0.0007%	+	±2 µV
1 V	±0.0005%	+	±3 µV
10 V	±0.0005%	+	±20 µV
100 V	±0.0005%	+	±200 µV
1000 V	±0.0005%	+	±2 mV
1 mA	±0.0012%	+	±2 nA
10 mA	±0.0007%	+	±20 nA
100 mA	±0.0007%	+	±200 nA

Temperature coefficient: The temperature is 23˚C ± 10˚C and the relative humidity is 70% or less. The preheating time must be one hour or more. The power and load conditions following that must be constant.

Range \ Error	Setting error		Range error
10 mV (Divider on)	±0.0004%/˚C	+	±0.01 µV/˚C
100 mV (Divider on)	±0.0004%/˚C	+	±0.07 µV/˚C
1000 mV (Divider on)	±0.0004%/˚C	+	±0.6 µV/˚C
1 V	±0.0002%/˚C	+	±1 µV/˚C
10 V	±0.0002%/˚C	+	±6 µV/˚C
100 V	±0.0002%/˚C	+	±60 µV/˚C
1000 V	±0.0003%/˚C	+	±600 µV/˚C
1 mA	±0.0006%/˚C	+	±0.7 nA/˚C
10 mA	±0.0004%/˚C	+	±7 nA/˚C
100 mA	±0.0004%/˚C	+	±70 nA/˚C

DC Voltage/Current Generators/Calibrators

Low-Output, High-Precision Working Standard VIG

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Linearity: The temperature is 23˚C ± 1˚C and the relative humidity is 70% or less. The preheating time must be one hour or more. The power and load conditions following that must be constant. The current range is at follow-up voltage ± 10 V or less.

Range	Linearity Error
10 mV (Divider on)	±0.03 µV
100 mV (Divider on)	±0.3 µV
1000 mV (Divider on)	±4 µV
1 V	±3 µV
10 V	±30 µV
100 V	±400 µV
1000 V	±5 mV
1 mA	±3 nA
10 mA	±30 nA
100 mA	±500 nA

Noise and ripple: Current range for a 1 kΩ load resistance

Range	0.1 Hz to 10 Hz (rms)	10 Hz to 10 kHz (rms)	DC to 20 MHz (p-p)
10 mV (Divider on)	±0.2 µV	20 µV	1 mV
100 mV (Divider on)	±0.5 µV	20 µV	1 mV
1000 mV (Divider on)	±1 µV	20 µV	1 mV
1 V	±2 µV	100 µV	3 mV
10 V	±10 µV	100 µV	3 mV
100 V	±100 µV	100 µV	3 mV
1000 V	±1 mV	1 mV	10 mV
1 mA	±5 nA	50 nA	2 µA (10 µA)*
10 mA	±20 nA	200 nA	2 µA (10 µA)*
100 mA	±200 nA	500 nA	10 µA

* The values in parentheses are for the 1 mA and 10 mA ranges of option 01.

Load regulation and output resistance:

Range	Load regulation (load condition)	Output resistance*
10 mV (Divider on)		200 Ω ± 0.5%
100 mV (Divider on)		200 Ω ± 0.5%
1000 mV (Divider on)		200 Ω ± 0.5%
1 V	± 0.0008% (10 Ω or more)	100 mΩ or less
10 V	± 0.0002%(100 Ω or more)	100 mΩ or less
100 V	± 0.0002% (1 kΩ or more)	100 mΩ or less
1000 V	± 0.0002% (100 kΩ or more)	100 mΩ or less
1 mA	± 0.0002% (10 kΩ or more)	5 GΩ or more
10 mA	± 0.0002% (1 kΩ or more)	5 GΩ or more
100 mA	± 0.0002% (100 Ω or more)	1 GΩ or more

* Output resistance at EXT.SENSE "OFF" (during two-wire connection) output pin

Settling time: Arrival time to ±0.001 % of last value (The 100 mA range is the arrival time to ±0.0015% of last value.)

Range	Settling time	Load condition
10 mV (Divider on)	1 s	
100 mV (Divider on)	1 s	
1000 mV (Divider on)	1 s	
1 V	1 s	
10 V	1 s	
100 V	1 s	
1000 V	10 s*	
1 mA	1 s	100 kΩ or less
10 mA	1 s	10 kΩ or less
100 mA	1 s	1 kΩ or less

* In the 1000 V range, the arrival time to ±0.05% of last value is within 3 sec. In the 1 mA and 10 mA ranges of option 01, the arrival time to ±0.005% of the last value is within 5 sec. (The load conditions are 1 MΩ or less and 100 kΩ or less, respectively.)

DC Voltage Output

Maximum output current: 1 V, 10 V, and 100 V ranges; 120 mA and 1000 V ranges; 12 mA

Range	Maximum output current
1 V	± 120 mA
10 V	± 120 mA
100 V	± 120 mA
1000 V	± 12 mA

Preheating time (Time required until reaching the specified accuracy): One hour or more

Common mode noise elimination ratio: 140 dB or more (DC) and 80 dB or more (50/60 Hz ±1%) with 1 kΩ unbalanced impedance between the -OUTPUT/-SENSE pin and guard pin

DC Current Output

Range	Maximum follow-up voltage
1 mA	± 120 V
10 mA	± 120 V
100 mA	± 120 V

Maximum follow-up voltage: 120 V, 1200 V is possible in the 1 mA and 10 mA ranges of option 01.

Input/Output Functions

Remote control (BCD) function: Can control the voltage generation, current generation output value, range, polarity, voltage limit, current limit and other parameters in parallel.

GPIB interface: Conforms to IEED STD 488-1978. (SH1, AH1, T6, L3, SR1, RL1, PRO, DC1, DT1, CO, and E2)

General Specifications

Voltage limiter setting: 10 V to 1250 V (resolution of 10 V)

Current limiter setting: 1 mA to 125 mA (resolution of 1 mA)

Maximum applied voltage between terminals:
Between guard terminal and chassis terminal ±500 V peak
Between -OUTPUT/-SENSE terminal and guard terminal ±50 V peak
Between +OUTPUT/+SENSE terminal and guard terminal ±1250V peak
Between OUTPUT terminal and SENSE terminal ±1 V peak

Output format: Floating, unipolar output

Continuous variable unit: The high-order digits can be continuously changed from any digit.

Internal program memory: 100 steps (The step time is 1 to 99 sec. The accuracy is within 7% of the set time.)
Program recall mode Can be set to random step, single scan, repeat scan, first channel and last channel

Single-wire signal: Trigger input; Starts program operation

Operating conditions: 0˚C to +40˚C, relative humidity 70% or less (0˚C to +35˚C, relative humidity 85% or less)

Storage temperature range: -25˚C to +70˚C

Display: Seven-segment green LED digit display. Only a negative (-) polarity is displayed.

Power requirements: Specify at time of ordering

Option No.	Standard	32	42	44
Supply voltage (V)	90 to 110	103 to 132	198 to 242	207 to 250

Frequency: 48 to 66 Hz

Power consumption: 110 VA or less

Dimensions/Mass: Approx. 424 (W) × 132 (H) × 450 (D) mm/17.5kg or less

Standard Accessories

A01402 Power cables (one of each)

Options

Option 01 (Can change the maximum follow-up voltage in the 1 mA and 10 mA ranges to 1200 V.)

Accessories (Sold separately)

A02708 Rack mount set A (EIA standard, including a front handle)

A02709 Rack mount set A (JIS standard, including a front handle)

A02718 Rack mount set B (EIA standard, excluding a front handle)

A02719 Rack mount set B (JIS standard, excluding a front handle)