RIGOL

# DP2000 Series

## Programmable
## Linear DC Power Supply

## Data Sheet

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# DP2000 Series
## Programmable Linear DC Power Supply

### DP2000 Features

- 4.3-inch LCD color touch screen
- 3 independent channels: 32V/3A || 32V/3A || 6V/5A (10A)
- High resolution for measurement of 1 μA low current
- Capability to measure and display wide dynamic ranges of current
- Front and rear output terminals
- Minimum dwell time in Arb editor: 1 ms
- Low output ripple and noise <350 μVrms/2 mVpp
- Auto series/parallel connections
- LAN, USB, RS232, and Digital I/O
- Over voltage, over current, and over temperature protection

### Applications




### Low-power IoT Device Testing



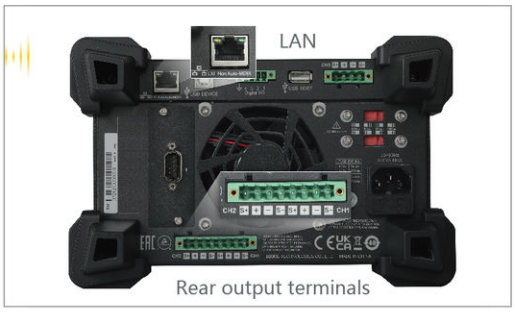
### Minimum Dwell Time: 1 ms




### 4.3-inch Touch Screen



### ATE Testing



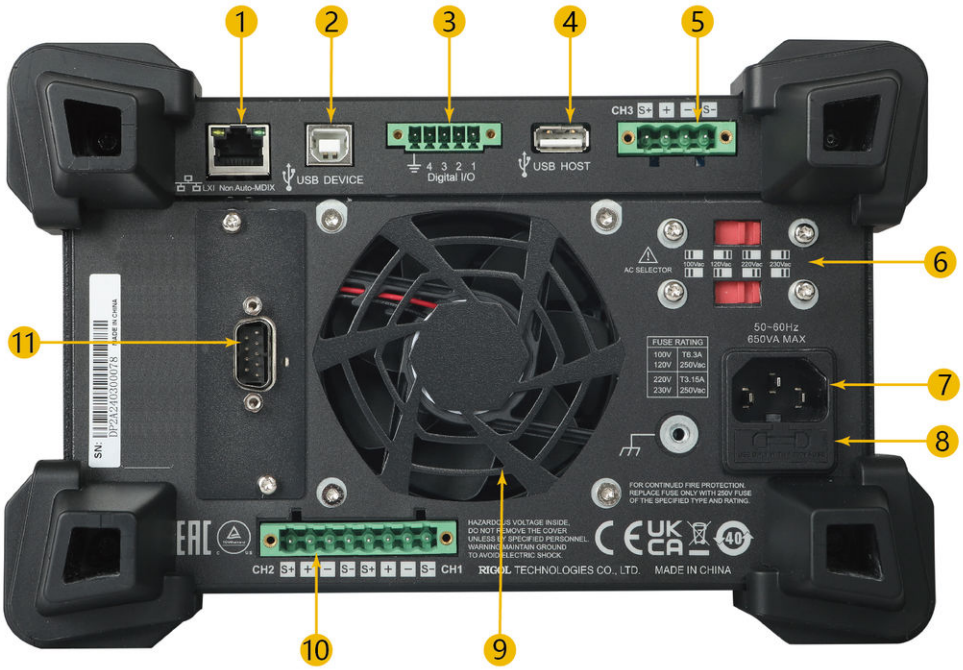
# DP2000 Series
## Programmable Linear DC Power Supply




| Item | Description |
|---|---|
| 1 | 4.3-inch LCD color touch screen |
| 2 | Channel selection keys and output On/Off keys |
| 3 | Parameter input area |
| 4 | Enter key (used to confirm the entry; long press the key to lock the touch screen) |
| 5 | Back key (used to cancel the entry; press the key to return to local operation from remote control) |
| 6 | Earth ground reference |
| 7 | Function menu |
| 8 | Output terminal |
| 9 | USB port |
| 10 | Power switch key |

# DP2000 Series

## Programmable Linear DC Power Supply




| Item | Description |
|---|---|
| 1 | LAN port |
| 2 | USB DEVICE (connect the instrument as "slave" device to external USB device) |
| 3 | Digital I/O port |
| 4 | USB HOST (connect the instrument as "host" device to external USB device) |
| 5 | CH3 output terminal ports and Sense terminals |
| 6 | AC selector |
| 7 | AC power inlet socket |
| 8 | Fuse |
| 9 | Fan ventilation hole |
| 10 | CH1&CH2 output terminal ports and Sense terminals |
| 11 | RS232 port |

# Product Introduction

## Product Features

- DP2031: 32 V/3 A || 32 V/3 A || 6 V/5 A (10 A)[1]
- 3 electrically isolated independent channels with a maximum total power of 222 W
- 4.3-inch LCD color touch screen
- Internal series/parallel connections for CH1 and CH2
- High resolution for measurement of 1 μA low range current
- Capability to measure and display wide dynamic ranges of current
- Excellent programming/readback accuracy
- Transient response time <50 μs
- Front and rear output terminals
- 2-wire or 4-wire remote sense
- A maximum of 512 arbitrary points with dwell time down to 1 ms; various built-in basic waveforms
- Low output ripple and noise <350 $\mu V_{rms}$/2 $mV_{pp}$
- Command processing time <10 ms
- Automatic switchover between low and high range measurement
- Timing output, energy consumption analysis (IoT), data logging and analysis
- Capability to measure the minimum of 1 ms pulse current
- Three rack-units (3U), 1/2-rack form factor
- PC control
- Over voltage, over current, and over temperature protection
- Various interfaces available: USB HOST, LAN, Digital I/O, and RS232 standard

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**Note[1]:** The CH3 of DP2031 has two ranges: 6 V/5 A and 6 V/10 A (optional). When it switches to 6 V/10 A, both CH1 and CH2 switch to 32 V/2 A from 32 V/3 A.

# RIGOL DP Family Overview

| | DP800 | DP900 | DP2000 |
|---|---|---|---|
| |  |  |  |
| **Number of Channels** | 1/2/3 | 3 | 3 |
| **Channel-to-channel Isolation** | Partially isolated | Fully isolated | Fully isolated |
| **Auto Series/ Parallel Connection** | Not available | Available (CH1, CH2) | Available (CH1, CH2) |
| **Screen** | 3.5-inch screen | 4.3-inch touch screen | 4.3-inch touch screen |
| **Total Power** | 140 W to 200 W | 210 W | 222 W |
| **Output Ripple and Noise** | <350 $\mu V_{rms}$/2 $mV_{pp}$<br><2 $mA_{rms}$ | <350 $\mu V_{rms}$/2 $mV_{pp}$<br><2 $mA_{rms}$ | <350 $\mu V_{rms}$/2 $mV_{pp}$<br><2 $mA_{rms}$ |
| **Programming Accuracy 12 Months (25°C±5°C)** | CH1, CH2:<br>0.05%+20 mV<br>0.2%+5 mA<br>CH3:<br>0.1%+5 mV<br>0.2%+5 mA[2] | CH1, CH2:<br>0.05%+10 mV[1]<br>0.2%+5 mA<br>CH3:<br>0.1%+5 mV<br>0.2%+5 mA | CH1, CH2:<br>0.03%+8 mV<br>0.15%+5 mA<br>CH3:<br>0.04%+4 mV<br>0.15%+10 mA |
| **Readback Accuracy 12 Months (25°C±5°C)** | CH1, CH2:<br>0.05%+10 mV<br>0.15%+5 mA<br>CH3:<br>0.1%+5 mV<br>0.15%+5 mA[2] | CH1, CH2:<br>0.05%+10 mV[1]<br>0.15%+5 mA<br>CH3:<br>0.1%+5 mV<br>0.15%+5 mA | CH1, CH2:<br>0.05%+8 mV<br>0.15%+5 mA<br>0.25%+28 μA (low range current)<br>CH3:<br>0.08%+3 mV<br>0.15%+10 mA |

| | DP800 | DP900 | DP2000 |
|---|---|---|---|
| **Programming Resolution** | 1 mV/1 mA[2] | 1 mV/1 mA | CH1, CH2: 1 mV/0.1 mA<br>CH3: 1 mV/1 mA |
| **Readback Resolution** | 0.1 mV/0.1 mA[2] | 0.1 mV/0.1 mA | 0.1 mV/0.1 mA<br>(Low range current: 1 μA) |
| **Command Processing Time** | 118 ms | 10 ms[3] | 10 ms[3] |
| **Minimum Dwell Time** | 1000 ms | 100 ms (the highest level) | 1 ms (the highest level) |
| **Interface** | USB/LAN/RS232/Digital IO | USB/LAN/Digital IO | USB/LAN/RS232/Digital IO |
| **Rear Output Terminals** | Available on DP811 and DP813 only (for 1 channel) | Not available | Available (for 3 channels) |
| **Weight** | 9.75 kg to 10.5 kg | 9.15 kg | 9.95 kg |
| **Dimension (W x H x D)** | 239 mm×157 mm×418 mm | 239 mm×157 mm×419 mm | 239 mm×157 mm×419 mm |

**Note[1]:** Voltage readback/programming accuracy 12 months for DP932U: 0.05%+20 mV.

**Note[2]**: for DP832A.

**Note[3]:** the time required for the output to change accordingly after receiving the APPLy and SOURce commands.

# Specifications

All the specifications[1] can only be guaranteed when the instrument is operated continuously for more than 30 minutes under the specified operation temperature.

## Number of Channels

| Model | Number of Channels |
|---|---|
| DP2031 | 3 |

## DC Output (0℃~40℃)

| DC output (0℃~40℃) | | | |
|---|---|---|---|
| | | Voltage/Current | OVP/OCP |
| Range1 | CH1 | 0 to 32 V/0 to 3 A | 1 mV to 35.2 V/1 mA to 3.3 A |
| | CH2 | 0 to 32 V/0 to 3 A | 1 mV to 35.2 V/1 mA to 3.3 A |
| | CH3 | 0 to 6 V/0 to 5 A | 1 mV to 6.6 V/1 mA to 5.5 A |
| Range2 (Optional) | CH1 | 0 to 32 V/0 to 2 A | 1 mV to 35.2 V/1 mA to 2.2 A |
| | CH2 | 0 to 32 V/0 to 2 A | 1 mV to 35.2 V/1 mA to 2.2 A |
| | CH3 | 0 to 6 V/0 to 10 A | 1 mV to 6.6 V/1 mA to 11 A |

## Internal Series/Parallel Mode

| Internal series/parallel mode | |
|---|---|
| Series mode voltage | 64 V |
| Parallel mode current | 6 A |

## Load Regulation Rate

| Load regulation rate, ± (% of output + offset) | |
|---|---|
| Voltage | <0.01%+2 mV |
| Current | <0.01%+250 μA |

## Line Regulation Rate

| Line regulation rate, ± (% of output + offset) | |
|---|---|
| Voltage | <0.01%+2 mV |
| Current | <0.01%+250 µA |

## Output Ripple and Noise

| Output ripple and noise (20 Hz to 20 MHz) | |
|---|---|
| Normal mode voltage | <350 $\mu V_{rms}$/2 $mV_{pp}$ |
| Normal mode current | <2 $mA_{rms}$ |

## Accuracy 12 months (25°C±5°C)

| Accuracy 12 months (25°C±5°C)[2], ± (% of output + offset) | | | | | |
|---|---|---|---|---|---|
| | Programming | | Readback | | |
| | Voltage | Current | Voltage | Current | Low range current[3] |
| CH1 | 0.03%+8 mV | 0.15%+5 mA | 0.05%+8 mV | 0.15%+5 mA | 0.25%+28 µA |
| CH2 | 0.03%+8 mV | 0.15%+5 mA | 0.05%+8 mV | 0.15%+5 mA | 0.25%+28 µA |
| CH3 | 0.04%+4 mV | 0.15%+10 mA | 0.08%+3 mV | 0.15%+10 mA | Not available |

## Resolution

| Resolution | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Programming | | Readback | | | Display | | |
| | Voltage | Current | Voltage | Current | Low range current[3] | Voltage | Current | Low range current[3] |
| CH1 | 1 mV | 0.1 mA | 0.1 mV | 0.1 mA | 1 µA | 1 mV | 0.1 mA | 1 µA |
| CH2 | 1 mV | 0.1 mA | 0.1 mV | 0.1 mA | 1 µA | 1 mV | 0.1 mA | 1 µA |
| CH3 | 1 mV | 1 mA | 0.1 mV | 0.1 mA | Not available | 1 mV | 0.1 mA | Not available |

## Transient Response Time

| Transient response time |
| --- |
| Less than 50 µs of time to recover to within the ±15 mV settling band following a load change from 50% to 100% or from 100% to 50% of full load. |

## Command Processing Time

| Command processing time[4] |
| --- |
| <10 ms |

## OVP/OCP Accuracy

| OVP/OCP accuracy, ± (% of output + offset) | |
| --- | --- |
| OVP accuracy, ± (% of output + offset) | 0.2%+20 mV |
| OCP accuracy, ± (% of output + offset) | 0.5%+20 mA |

## Voltage Programming Response Time (Within 99% of the Total Variation Range)

| Voltage programming response time (within 99% of the total variation range) | | | | |
| --- | --- | --- | --- | --- |
| Channel | Full Load (Up) | No Load (Up) | Full Load (Down) | No Load (Down) |
| CH1 | <50 ms | <30 ms | <50 ms | <400 ms |
| CH2 | <50 ms | <30 ms | <50 ms | <400 ms |
| CH3 | <15 ms | <14 ms | <20 ms | <100 ms |

## Temperature Coefficient Per °C

| Temperature coefficient per °C, ± (% of output + offset) | | |
| --- | --- | --- |
| Channel | Voltage | Current |
| CH1 | 0.01%+4 mV | 0.01%+2 mA |
| CH2 | 0.01%+4 mV | 0.01%+2 mA |
| CH3 | 0.01%+4 mV | 0.01%+3 mA |

## Mechanical Characteristics

| Mechanical characteristics | |
|---|---|
| Dimension | 239 mm (W) x 157 mm (H) x 419 mm (D) |
| Weight | 9.95 kg |
| Rack mount kit | Three rack-units (3U), 1/2-rack form factor |

## Power Source

| Power source | |
|---|---|
| AC input (50 Hz to 60 Hz) | 100 $V_{ac}$±10%<br>120 $V_{ac}$±10%<br>220 $V_{ac}$±10%<br>230 $V_{ac}$±10% (max. 250 $V_{ac}$) |
| Maximum input power | 650 VA |

## Interface

| Interface | |
|---|---|
| USB DEVICE | 1 |
| USB HOST | 2 (1 for front panel and 1 for rear panel) |
| LAN | 1 |
| RS232 | 1 |
| Digital IO | 1 (optional for DP932U; not available for DP932E) |
| Rear Output Terminals | 3 |

## Environmental Conditions

| Environmental conditions | |
|---|---|
| Cooling Method | Fan cooling |
| Operating Temperature | 0°C to +40°C |
| Storage Temperature | -40°C to +60°C |

| Environmental conditions | |
|---|---|
| Humidity | 5% to 80% relative humidity |
| Altitude | Below 1500 meters |
| IP Rating | IP20 |
| Pollution Degree | PD2 |
| Overvoltage Categories | OVC II |
| Operating Environment | For indoor use only and non-operating in humid environment. |

## Warranty and Calibration Interval

| Warranty and calibration interval | |
|---|---|
| Warranty | 3 years (excluding the accessories) |
| Recommended calibration interval | Every 12 months |

**Note[1]:**

- Unless otherwise stated, the specifications are applicable to all the channels of the specified model.
- All parameters are measured at rear output terminals.
- Not applicable in series/parallel connection mode.

**Note[2]:** The accuracy parameters are acquired via calibration under 25℃ after 1-hour warm-up.

**Note[3]:** The low range current mode is applicable to measurement of current lower than 10 mA.

**Note[4]:** the time required for the output to change accordingly after receiving the APPLy and SOURce commands.

# Order Information and Warranty Period

## Order Information

| Order Information | Order No. |
|---|---|
| **Base Unit** | |
| Programmable linear DC power supply, triple-output, high precision | DP2031 |
| **Standard Shipped Accessory** | |
| USB cable | CB-USBA-USBB-FF-150 |
| One fuse | — — |
| Power cord (based on destination country) | — — |
| Three pairs of connecting wires (10 A) | 10A-Testing-Cable |
| **Optional Accessory** | |
| CH3 10 A high range mode | DP2000-10A |
| 7.5 kSa/s high-speed sampling option | DP2000-HADC |
| DP2000 Rack Mount Kit (for a single instrument) | RM-1-DP800 |
| DP2000 Rack Mount Kit (for two instruments side-by-side) | RM-2-DP800 |

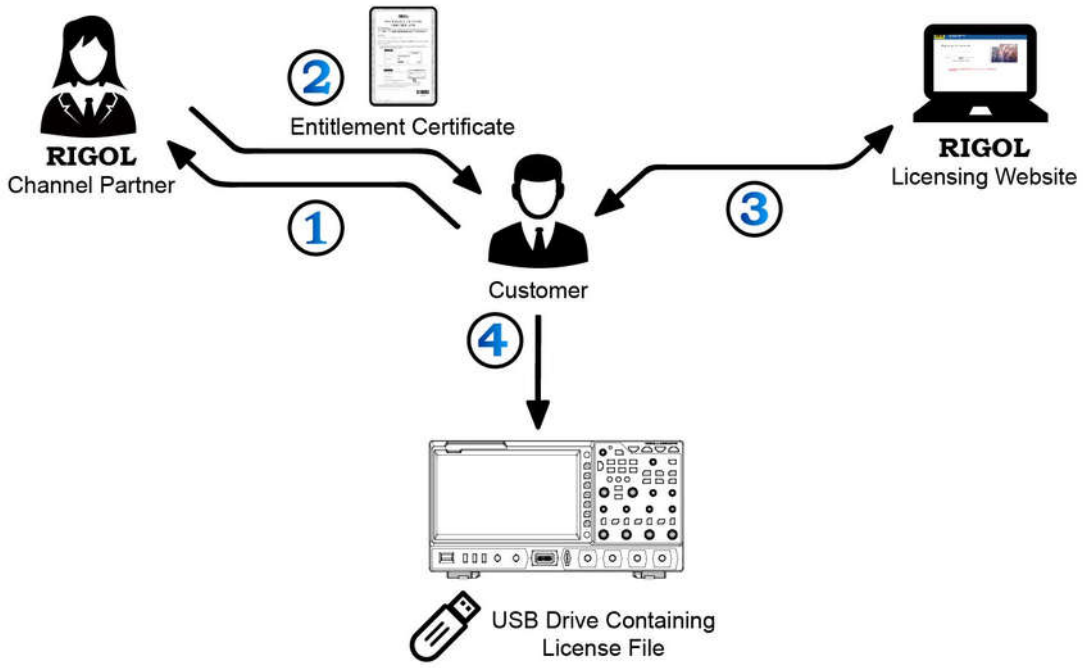
**NOTE:**

For purchasing models, accessories, and options, please contact local RIGOL office.

## Warranty Period

Three years for the mainframe, excluding the accessories.

# Option Ordering and Installation Process




1. According to the usage requirements, please purchase the specified function options from **RIGOL Sales Personnel**, and provide the serial number of the instrument that needs to install the option.
2. After receiving the option order, the **RIGOL** factory will mail the paper software product entitlement certificate to the address provided in the order.
3. Log in to **RIGOL** official website for registration. Use the software key and instruments serial number provided in the entitlement certificate to obtain the option license code and the option license file.
4. Download the option license file to the root directory of the USB storage device, and connect the USB storage device to the instrument properly. After the USB storage device is successfully recognized, the **Option install** menu is activated. Press this menu key to start installing the option.

HEADQUARTER

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