English

中文

RIGOL

Quick Guide

DL3000 Programmable DC Electronic Load

Feb. 2025
RIGOL TECHNOLOGIES CO., LTD.

English

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RIGOL guarantees that this product conforms to the national and industrial standards in China as well as the ISO9001:2008 standard and the ISO14001:2004 standard. Other international standard conformance certifications are in progress.

Contact Us

If you have any problem or requirement when using our products or this manual, please contact **RIGOL**.

E-mail: service@rigol.com
Website: www.rigol.com

English

General Safety Summary

1. Only the exclusive power cord designed for the instrument and authorized for use within the local country could be used.
2. Ensure that the instrument is safely grounded.
3. Observe all terminal ratings.
4. Use proper overvoltage protection.
5. Do not operate without covers.
6. Do not insert objects into the air outlet.
7. Use the proper fuse.
8. Avoid circuit or wire exposure.
9. Do not operate the instrument with suspected failures.
10. Provide adequate ventilation.
11. Do not operate in wet conditions.
12. Do not operate in an explosive atmosphere.
13. Keep instrument surfaces clean and dry.
14. Prevent electrostatic impact.
15. Handle with caution.

Safety Notices and Symbols

Safety Notices in this Manual:

WARNING
Indicates a potentially hazardous situation or practice which, if not avoided, will result in serious injury or death.

CAUTION
Indicates a potentially hazardous situation or practice which, if not avoided, could result in damage to the product or loss of important data.

Safety Terms on the Product:

DANGER	It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.
WARNING	It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.
CAUTION	It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

English

Safety Symbols on the Product:

Hazardous Voltage

Safety Warning

Protective Earth Terminal

Chassis Ground

Test Ground

English

Care and Cleaning

Care

Do not store or leave the instrument where it may be exposed to direct sunlight for long periods of time.

Cleaning

Clean the instrument regularly according to its operating conditions.

1. Disconnect the instrument from all power sources.
2. Clean the external surfaces of the instrument with a soft cloth dampened with mild detergent or water. When cleaning the LCD, take care to avoid scarifying it.

CAUTION

To avoid damage to the instrument, do not expose it to caustic liquids.

WARNING

To avoid short-circuit resulting from moisture or personal injuries, ensure that the instrument is completely dry before connecting it to the power supply.

Document Overview

English

This manual introduces some basic information that you should know when you use DL3000 for the first time. It contains the following contents: out-of-box inspection method, product overview, turn-on checkout, and remote control overview.

Tip
For the latest version of this manual, download it from **RIGOL** official website (www.rigol.com).

Format Conventions in this Manual

(1) The key on the front panel is denoted by the format of "Key Name (Bold) + Text Box" in the manual. For example, **ON/OFF** denotes the "ON/OFF" key.
(2) Use the screen shot to indicate the key. For example,  denotes the Power key.

Content Conventions in this Manual

The number of channels and the rated values of input parameters for DL3000 are listed in the following table. Unless otherwise specified, this manual takes DL3031A as an example to illustrate the functions and operation methods of the DL3000 series.

Model	No. of Channels	Voltage	Current	Power
DL3021/ DL3021A	1	150 V	40 A	200 W
DL3031/ DL3031A	1	150 V	60 A	350 W
DL3041	1	200 V	70 A	450 W

English

General Inspection

1. Inspect the packaging

If the packaging has been damaged, do not dispose the damaged packaging or cushioning materials until the shipment has been checked for completeness and has passed both electrical and mechanical tests.

The consigner or carrier shall be liable for the damage to the instrument resulting from shipment. **RIGOL** would not be responsible for free maintenance/rework or replacement of the instrument.

2. Inspect the instrument

In case of any mechanical damage, missing parts, or failure in passing the electrical and mechanical tests, contact your **RIGOL** sales representative.

3. Check the accessories

Please check the accessories according to the packing lists. If the accessories are damaged or incomplete, please contact your **RIGOL** sales representative.

English

Product Overview

DL3000 is a cost-effective programmable DC electronic load with high performance. With a user-friendly interface and superb performance specifications, DL3000 provides various interfaces for remote communication to meet your diversified test requirements. It can be widely used in various industries, such as automotive electronics, aerospace, and fuel cells.

For descriptions of the front panel, refer to Figure 1; for descriptions of the rear panel, refer to Figure 2; and for descriptions of the main interface (display screen), refer to Figure 3.

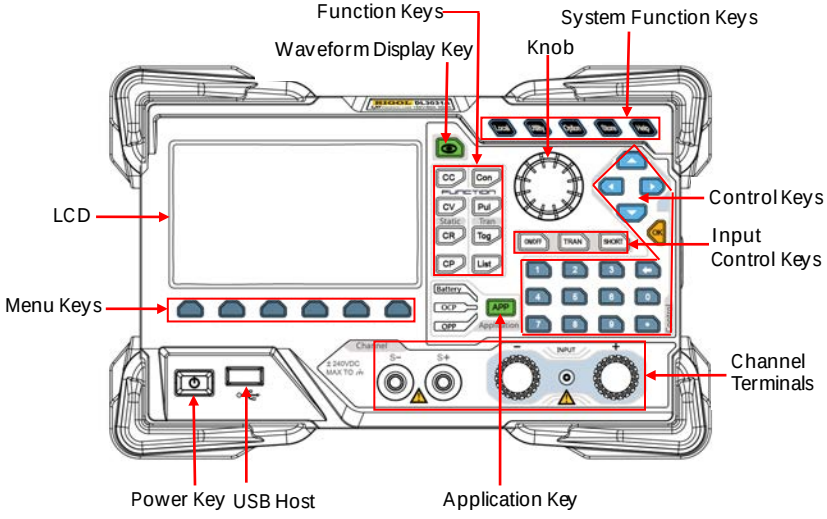

Figure 1 Front Panel

English

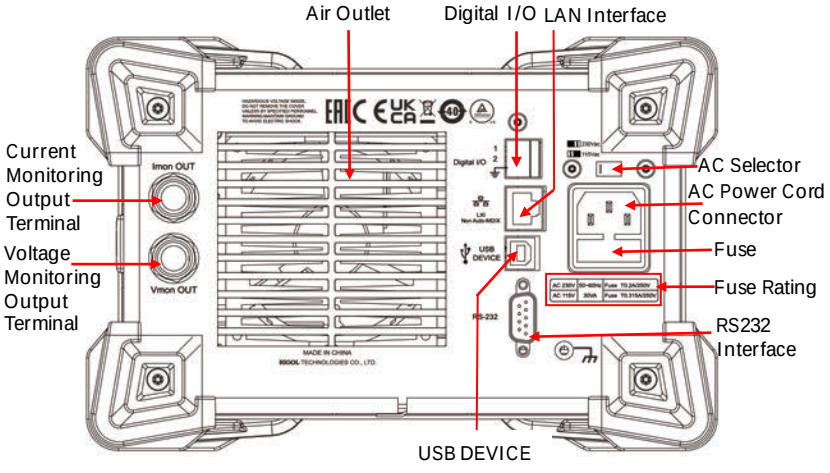

Figure 2 Rear Panel

Figure 3 Main Interface

English

Turn-on Checkout

To Connect to Power Supply

Two kinds of AC power inputs are supported by DL3000 series electronic load. When the DL3000 series is connected to different power sources, the AC selector setting on its rear panel is different, as shown in Table 1.

Table 1 AC Input Power Specification and AC Selector Setting

AC Input Power	AC Selector
±(10% of AC input + 115 Vac), 50 Hz to 60 Hz	115
±(10% of AC input + 230 Vac) (max: 250 Vac), 50 Hz to 60 Hz	230

Please strictly follow the steps below to connect the DL3000 electronic load to the power supply.

1. **Check the input power**
   Ensure that the AC power to be connected to the load conforms to the AC input power requirement specified in Table 1.

2. **Check the AC selector**
   Ensure that the AC selector setting (115 or 230) on the rear panel of the load matches the actual AC input power (For the match relationship, refer to Table 1).

3. **Check the fuse**
   When leaving the factory, the load has installed a fuse that conforms to the destination country standard. Please refer to the "fuse rating" on the rear panel of the load to ensure that the fuse matches the actual AC input power.

4. **Connect the AC power**
   Plug the specified power cord available in the accessories into the AC power supply connector of the instrument, and then connect the instrument to the properly grounded AC power.

English

WARNING
To avoid electric shock, ensure that the instrument is correctly grounded.

To Power on the instrument

After the instrument is connected to the power source, press the **Power** key at the left bottom of the front panel to power on the instrument. When the instrument is turned on, it will undergo a self-test. If the instrument passes the self-test, the welcome interface is displayed; otherwise, self-test failure information will be displayed. At this time, please contact **RIGOL** distributors.

CAUTION
Ensure that the AC selector setting on the rear panel of the instrument matches the actual AC input voltage, otherwise, the electronic load will be burned out.

CAUTION
Please pay attention to the positive and negative polarities of the electronic load to avoid wrong connection. Otherwise, the load will be burned out.

Tip
After powering off the electronic load, please wait for at least 1 s before you power it on again.

To Use the Built-in Help System

English

The built-in help system provides help information for any key on the front panel (except parameter input area) and menu keys, which are convenient for you to get the descriptions of the function keys or menus, as shown in Figure 4.

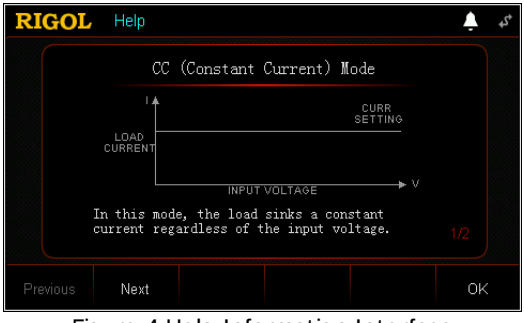

Figure 4 Help Information Interface

1. Get the built-in help information
   Press **Help**, and then "Help" will be displayed at the top of the interface, being highlighted. At this time, press the corresponding function key or menu key to enter the corresponding help information interface.

2. Page up/down operation
   If the help information is displayed in several pages, press **Previous** to go to the previous page or press **Next** to go to the next page. You can also use the arrow keys or the knob to page up/down the help information.

3. Exit the current help information interface
   When the help information is displayed, press **OK** to exit the current help information interface and return to the previous interface.

English

Parameter Setting Method

Most parameters can be set by operating the keys on the front panel. The common setting methods are listed below. The setting method for certain parameters is different from the methods below, refer to the relevant chapters of this manual for the further explanation.

Method 1: Use the numeric keys

1. In the main interface, press the specified menu key to switch the parameter focus; in the guide interface, use the arrow keys to switch the parameter focus.
2. Enter a value by using the numeric key. While entering a name, press  to delete the unwanted character if necessary.
3. When setting resistance, press the specified menu key and select "Ω" or "kΩ" to be the unit.
   When setting period/width, press the specified menu key and select "ms" or "s" to be the unit.
   When setting frequency, press the specified menu key and select "Hz" or "kHz" to be the unit.
   When setting other parameters, press **OK** to confirm the input.

Method 2: Use the knob or the arrow keys

1. In the main interface, press the specified menu key to switch the parameter focus.
2. Press the Left/Right arrow key to move the cursor to a desired position.
3. Press the Up/Down arrow key or rotate the knob to modify the value.

English

Remote Control

DL3000 electronic load can be connected to the PC via the USB, LAN, GPIB, or RS232 interface to build communication and realize remote control. The remote control can be realized by using SCPI (Standard Commands for Programmable Instruments) commands. DL3000 electronic load supports two ways of remote control: user-defined programming and PC software (e.g. **RIGOL** Ultra Sigma).

When the instrument is in remote control, the  icon is displayed on the interface. The keypads on the front panel are locked. At this time, you can press **Local** to exit the remote mode.

More Product Information

1. **Obtain the device information**
   Press **Utility** to enter the system utility function interface, and then press **System Info**. Select the "system information" tab to obtain the device information, including the manufacturer, device model, software and hardware version number, FPGA version number, Boot version number, and the number of boot times, calibration date, and product serial number.

2. **Check the option installation status**
   Press **Utility** to enter the system utility function interface. Then, press **Option** to view the installation status of all the options.

For more information about this instrument, refer to the relevant manuals by logging in to the official website of **RIGOL** (www.rigol.com) to download them.
DL3000 User's Guide: introduces the functions of the instrument and the operation methods, remote control methods, possible failures and solutions in using the instrument, the technical specifications, and order information;
DL3000 Programming Guide: provides detailed descriptions of SCPI commands and programming instances of the instrument.
DL3000 Datasheet: provides the main features and technical specifications of the instrument.

RIGOL

快速指南

中文

DL3000 系列可编程直流电子负载

2025 年 2 月
RIGOL TECHNOLOGIES CO., LTD.

保证和声明

版权

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文档编号

QGJ01001-1110

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联系我们

如您在使用此产品或本手册的过程中有任何问题或需求，可与 **RIGOL** 联系：

电子邮箱：service@rigol.com

网址：www.rigol.com

一般安全概要

1. 请使用所在国家认可的本产品专用电源线。
2. 请确保产品可靠接地。
3. 查看所有终端额定值。
4. 请使用合适的过压保护。
5. 请勿开盖操作。
6. 请勿将异物插入排风口。
7. 请使用合适的保险丝。
8. 避免电路外露。
9. 怀疑产品出故障时，请勿进行操作。
10. 请保持适当的通风。
11. 请勿在潮湿环境下操作。
12. 请勿在易燃易爆的环境下操作。
13. 请保持产品表面的清洁和干燥。
14. 请注意防静电保护。
15. 请注意搬运安全。

安全术语和符号

本手册中的安全术语：

警告

警告性声明指出可能会造成人身伤害或危及生命安全的情况或操作。

注意

注意性声明指出可能导致本产品损坏或数据丢失的情况或操作。

产品上的安全术语：

DANGER	表示您如果不进行此操作，可能会立即对您造成危害。
WARNING	表示您如果不进行此操作，可能会对您造成潜在的危害。
CAUTION	表示您如果不进行此操作，可能会对本产品或连接到本产品的其他设备造成损坏。

产品上的安全符号：

高电压

安全警告

保护性接地端

壳体接地端

测量接地端

保养与清洁

保养

请勿将仪器放置在长时间受到日照的地方。

清洁

请根据使用情况定期对仪器进行清洁。方法如下：

1. 断开电源。
2. 用柔和的清洁剂或清水浸湿软布擦拭仪器外部。清洁带有液晶显示屏的仪器时，请注意不要划伤液晶显示屏。

注意

请勿使任何腐蚀性的液体沾到仪器上，以免损坏仪器。

警告

重新通电之前，请确认仪器已经干透，避免因水分造成电气短路甚至人身伤害。

文档概述

本文档介绍首次使用DL3000系列时需要了解的信息，包括开箱检查方法、产品简介、开机检查的具体步骤以及远程控制概述等。

中文

提示
本手册的最新版本可登陆 **RIGOL** 网址（www.rigol.com）进行下载。

文档格式的约定

(1) 使用“按键字符（加粗）+文本框”格式表示前面板按键，如 **ON/OFF** 表示“ON/OFF”按键。
(2) 使用按键的实际截图表示按键，如  （电源开/关键）。

文档内容的约定

DL3000系列可编程直流电子负载的通道数和额定输入参数见下表。如无特殊说明，本手册以DL3031A为例说明DL3000系列的功能和操作方法。

型号	通道数	电压	电流	功率
DL3021/DL3021A	1	150 V	40 A	200 W
DL3031/DL3031A	1	150 V	60 A	350 W
DL3041	1	200 V	70 A	450 W

一般性检查

1. 检查运输包装

如运输包装已损坏，请保留被损坏的包装或防震材料，直到货物经过完全检查且仪器通过电性和机械测试。

因运输造成仪器损坏，由发货方和承运方联系赔偿事宜。**RIGOL**公司恕不进行免费维修或更换。

2. 检查整机

若存在机械损坏或缺失，或者仪器未通过电性和机械测试，请联系您的**RIGOL** 经销商。

3. 检查随机附件

请根据装箱单检查随机附件，如有损坏或缺失，请联系您的**RIGOL**经销商。

产品简介

中文

DL3000 系列是一款高性价比、经济型的可编程直流电子负载，它拥有友好的人机交互界面和优异的性能指标，提供多种远程通信接口，能满足多样化的测试需求，为设计和测试提供多种解决方案，广泛应用于汽车电子、航空航天和燃料电池等行业。

前面板、后面板和主界面（显示屏）的简要介绍请分别参考图 1、图 2 和图 3。

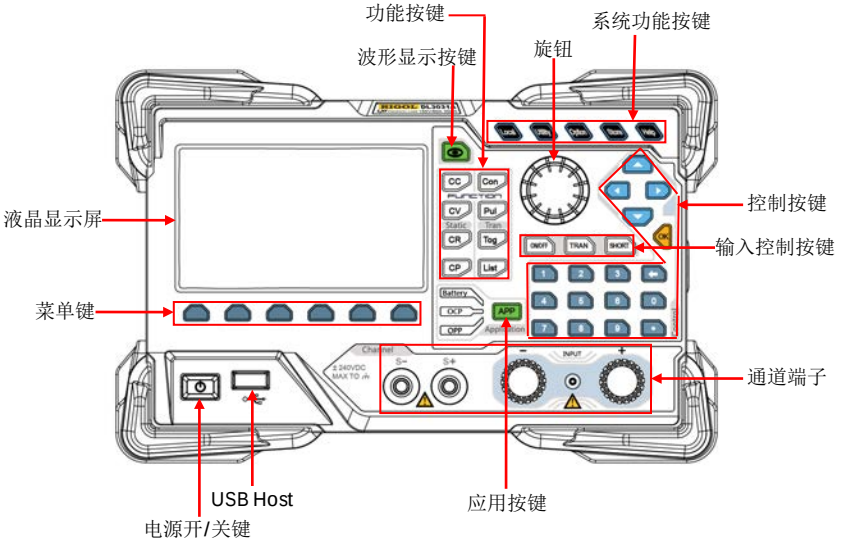

图 1 前面板

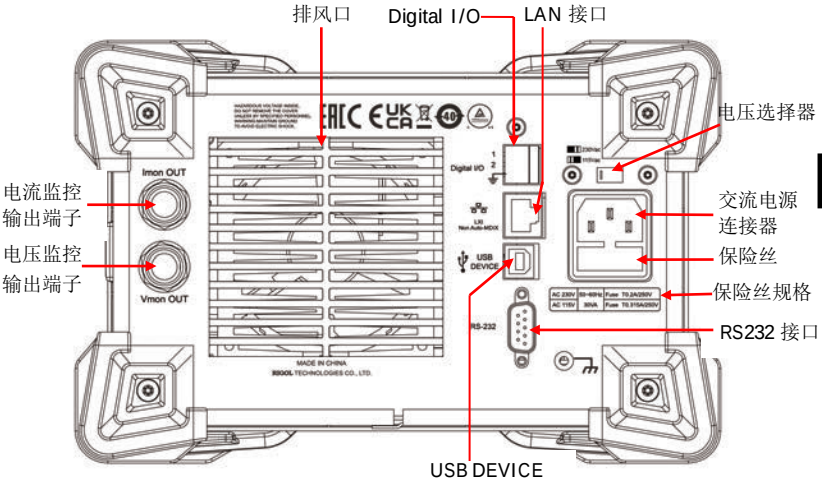
排风口
Digital I/O
LAN 接口
电压选择器
电流监控
输出端子
电压监控
输出端子
交流电源
连接器
保险丝
保险丝规格
RS232 接口
USB DEVICE
Imon OUT
Vmon OUT
Digital I/O
LXI
USB DEVICE
RS-232

图 2 后面板

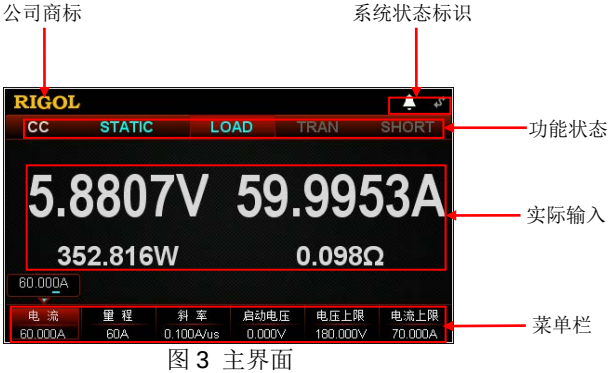
公司商标
系统状态标识
RIGOL
CC
STATIC
LOAD
TRAN
SHORT
功能状态
5.8807V 59.9953A
352.816W 0.098Ω
实际输入
60.000A
电 流
里 程
斜 率
启动电压
电压上限
电流上限
60.000A
60A
0.100A/us
0.000V
180.000V
70.000A
菜单栏

图 3 主界面

开机检查

连接电源

中文

DL3000 系列电子负载支持两种规格的交流电源输入，连接不同规格的输入电源时，后面板电压选择器的设置也不同，见表 1。

表 1 交流输入电源和电压选择器设置

交流输入电源	电压选择器
115 Vac±10%，50 Hz~60 Hz	115
230 Vac±10%（最大 250 Vac），50 Hz~60 Hz	230

请严格按照如下步骤连接电源。

1. 检查输入电源

请确保连接到仪器的交流电源符合表 1 中的要求。

2. 检查后面板电压选择器

请确保仪器后面板电压选择器的设置（115 或 230）与实际交流输入电源相匹配（匹配关系请参考表 1）。

3. 检查保险丝

仪器出厂时，已安装指定规格的保险丝。请参考仪器后面板“保险丝规格”的说明，确保保险丝与实际交流输入电源相匹配。

4. 连接交流电源

请使用附件提供的电源线将仪器连接至正确接地的交流电源。

警告

为避免电击，请确认仪器接地良好。

开机

正确连接电源后，按前面板左下方的**电源开/关键** 启动仪器。开机过程中，仪器会执行一系列的自检。若自检通过，仪器正常启动，屏幕会显示开机界面；否则，系统会提示相应的自检失败信息，此时请联系您的 **RIGOL** 经销商。

注意

启动仪器前，请确保仪器后面板电压选择器的设置与实际交流输入电压相匹配，否则会烧坏电子负载。

注意

在接线前请注意电子负载正负极标识，否则会烧坏电子负载。

提示

关机后，请至少等待1 s后再开机。

使用内置帮助系统

内置帮助系统提供前面板任意按键（除参数输入区）及菜单键的帮助信息，方便用户快速获取功能按键或菜单的功能提示，如图 4 所示。

中文

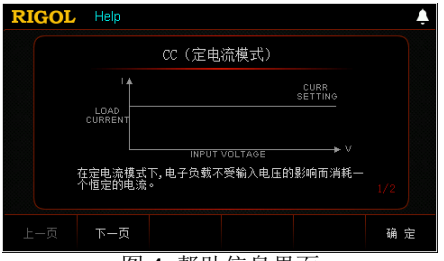

图 4 帮助信息界面

1. 获取内置帮助的方法
   按 **Help** 键，界面上方会高亮显示“Help”字样，然后再按下需要查看其帮助信息的按键或菜单键，即可进入相应的帮助信息界面。

2. 帮助的翻页操作
   若帮助信息有多页显示，按 **上一页** 或 **下一页** 键切换页面，也可通过方向键或旋钮进行切换。

3. 退出当前的帮助信息
   当界面显示帮助信息时，按 **确定** 键退出当前的帮助信息界面，返回到进入帮助信息前的界面。

参数设置方法

您可以通过前面板操作设置大多数参数，常用设置方法如下。某些参数的设置方法与下述方法不同，将在相关章节中分别进行说明。

方法 1：使用数字键

1. 在主界面中，按相应的菜单键切换参数焦点至需要设置的参数；在向导界面中，使用方向键切换参数焦点至需要设置的参数。
2. 使用数字键直接输入所需的数值。输入过程中，按返回键 可删除已输入的字符。
3. 设置电阻值时，按相应的菜单键选择单位 Ω 或 kΩ；
   设置周期和宽度时，按相应的菜单键选择单位 ms 或 s；
   设置频率时，按相应的菜单键选择单位 Hz 或 kHz；
   设置其他参数时，按 OK 键确认输入即可。

方法 2：使用旋钮或方向键

1. 在主界面中，按相应的菜单键切换参数焦点至需要设置的参数。
2. 使用左/右键移动光标位置至所需修改的位。
3. 使用上/下键或旋转旋钮修改该位的数字为所需的值。

远程控制

DL3000 系列电子负载支持通过 USB 接口、LAN 接口、GPIB 接口和 RS232 接口与计算机进行通信从而实现远程控制。远程控制基于 SCPI（Standard Commands for Programmable Instruments）命令集实现。DL3000 系列电子负载支持两种远程控制方式：用户自定义编程和使用 PC 软件（如 **RIGOL** Ultra Sigma）。

当仪器处于远程控制状态时，用户界面显示  图标，前面板按键被锁定。此时，您可以按 **Local** 键退出远程模式。

更多产品信息

1. **获取设备信息**
   按 **Utility** 键进入系统辅助功能界面，然后按 **系统信息** 键，进入“系统信息”选项卡即可获取设备信息，包括厂商、产品型号、软硬件版本号、FPGA 版本号、Boot 版本号、开机次数、校准时间和产品序列号。

2. **查看选件安装状态**
   按 **Utility** 键进入系统辅助功能界面，然后按 **选件** 键，即可查看所有选件的安装状态。

欲了解本产品更多信息，请查阅相关手册（您可登录**RIGOL**网站（www.rigol.com）下载）。
《DL3000用户手册》：提供本产品的功能介绍及操作方法、远程控制方法、在使用过程中可能出现的故障及处理方法、性能指标以及订货信息；
《DL3000编程手册》：提供本产品的SCPI命令集以及编程实例；
《DL3000数据手册》：提供本产品的主要特色和技术指标。