
Triple Output Programmable DC Power Supply

EDU36311A

The logo for dataTec, featuring the word "dataTec" in a white, italicized, sans-serif font on a red rectangular background.

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The Keysight logo, consisting of a red stylized waveform icon followed by the word "KEYSIGHT" in a bold, black, sans-serif font. Below it, the text "Authorized Premium Distributor" is written in a smaller, black, sans-serif font.

KEYSIGHT
Authorized Premium
Distributor

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Notices

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Waste Electrical and Electronic Equipment (WEEE)

This product complies with the WEEE Directive) marketing requirement. The affixed product label (see below) indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category: With reference to the equipment types in the WEEE directive Annex 1, this product is classified as “Monitoring and Control instrumentation” product. Do not dispose in domestic household waste.

To return unwanted products, contact your local Keysight office, or see

about.keysight.com/en/companyinfo/environment/takeback.shtml for more information.



Declarations of Conformity

Declarations of Conformity for this product and for other Keysight products may be downloaded from the Web. Go to <https://regulations.about.keysight.com/DoC/default.htm>. You can then search by product number to find the latest Declaration of Conformity.

Safety Information

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Safety and Regulatory Information

Safety Considerations

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements.

WARNING BEFORE APPLYING POWER

- Verify that the product is set to match the available line voltage and that the correct fuse is installed. Use the label on the rear of the instrument to configure the power. See **Options and Fuse Information** for additional details.
- Ensure the mains supply voltage fluctuation do not exceed $\pm 10\%$ of the nominal supply voltage.

GROUND THE INSTRUMENT

This product is a Safety Class I instrument (provided with a protective earth terminal). To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument must be connected to the AC power supply mains through a three-conductor power cable, with the third wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. If the instrument is to be energized via an external autotransformer for voltage reduction, be certain that the autotransformer common terminal is connected to the neutral (earthed pole) of the AC power lines (supply mains).

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE OR WET ENVIRONMENTS

Do not operate the device around flammable gases or fumes, vapor, or wet environments.

DO NOT OPERATE DAMAGED OR DEFECTIVE INSTRUMENTS

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the instrument. Return the instrument to a Keysight Technologies Sales and Service Office for service and repair to ensure that safety features are maintained. To contact Keysight for sales and technical support, refer to the support links on the following Keysight website: www.keysight.com/find/assist (worldwide contact information for repair and service).

USE THE POWER CORD PROVIDED

Use the device with the power cord provided with the shipment.

USE THE DEVICE AS SPECIFIED

If the device is used in a manner not specified by manufacturer, the device protection may be impaired.

DO NOT BLOCK VENTILATION HOLES

Do not block any of the ventilation holes of the device.

OBSERVE ALL DEVICE MARKINGS BEFORE CONNECTING TO DEVICE

Observe all markings on the device before connecting any wiring to the device.

WARNING TURN DEVICE OFF BEFORE CONNECTING TO OUTPUT TERMINALS
Turn off the device power before connecting to the output terminals.

ENSURE COVER IS SECURED IN PLACE
Do not operate the device with the cover removed or loosened.

TURN DEVICE OFF AND REMOVE ALL CONNECTIONS BEFORE INSTALLING THE GPIB INTERFACE
Turn off the power and remove all connections, including the power cord, from the instrument prior installation of the GPIB interface.

CAUTION CLEAN WITH SLIGHTLY DAMPENED CLOTH
Clean the outside of the instrument with a soft, lint-free, slightly dampened cloth. Do not use detergent, volatile liquids, or chemical solvents.

NOTE Connect USB cable with ferrite core to the rear panel USB port of the instrument.

Safety Symbols

Symbol	Description
	Caution, risk of danger (refer to the manual for specific Warning or Caution information)
	Protective earth (ground) terminal.
	Frame or chassis (ground) terminal.
	Alternating current (AC).
	Plus, positive polarity.
	Minus, negative polarity.

WARNING The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION The CAUTION sign denotes a hazard. It calls attention to an operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond CAUTION sign until the indicated conditions are fully understood and met.

NOTE The NOTE sign denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

Regulatory Markings

Symbol	Description
	The RCM mark is a registered trademark of the Australian Communications and Media Authority.
	The CE mark is a registered trademark of the European Community. This CE mark shows that the product complies with all the relevant European Legal Directives. ICES/NMB-001 indicates that this ISM device complies with the Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada. ISM GRP.1 Class A indicates that this is an Industrial Scientific and Medical Group 1 Class A product.
	The UKCA (UK Conformity Assessed) marking is a UK product marking that is used for goods being placed on the market in Great Britain (England, Wales, and Scotland)
	This symbol indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.
	This symbol is a South Korean Class A EMC Declaration. This is a Class A instrument suitable for professional use and in electromagnetic environment outside of the home.
	The CSA mark is a registered trademark of the Canadian Standards Association.

South Korean Class A EMC declaration:

Information to the user:

This equipment has been conformity assessed for use in business environments. In a residential environment this equipment may cause radio interference.

- This EMC statement applies to the equipment only for use in business environment.

사용자 안내문
이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

- 사용자 안내문은 “업무용 방송통신기자재”에만 적용한다.

Safety and EMC Requirements

This power supply is designed to comply with the following safety and EMC (Electromagnetic Compatibility) requirements:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU

Environmental Conditions

The EDU36311A is designed for indoor use and in an area with low condensation. The table below shows the general environmental requirements for this instrument.

Environmental condition	Requirement
Temperature	Operating condition: 0 °C to 40 °C
	Storage condition: -20 °C to 70 °C
Humidity	Operating condition: Up to 80% RH at 40 °C (non-condensing)
	Storage condition: Up to 90% RH at 65 °C (non-condensing)
Altitude	Up to 2000 m
Pollution degree	2
Overvoltage category	II
Power supply and line frequency	100 V/115 V/230 V, 50/60Hz
Power consumption	300 VA maximum

1 Getting Started

[Product Introduction](#)

[Prepare Instrument for Use](#)

[Options and Fuse Information](#)

[Programming Ranges](#)

[Installation](#)

[Remote Interface Configuration](#)

[Remote Control](#)

[Using the Built-in Help System](#)

[Firmware Update](#)

[Front Panel Menu Reference](#)

This chapter gets you started with the EDU36311A programmable DC power supply.

Product Introduction

The Keysight EDU36311A is a triple output DC bench power supply.

Key features:

- Three outputs: 6 V/5 A, 30 V/1 A, 30 V/1 A
- High performance functionality: accuracy, transient response, and rise/fall time
- Colorful, information-packed 7" WVGA display.
- Excellent usability
- USB and LAN IO interface
- Web Interface
- SCPI programmability
- Pathwave BenchVue software included
- 3-year warranty standard

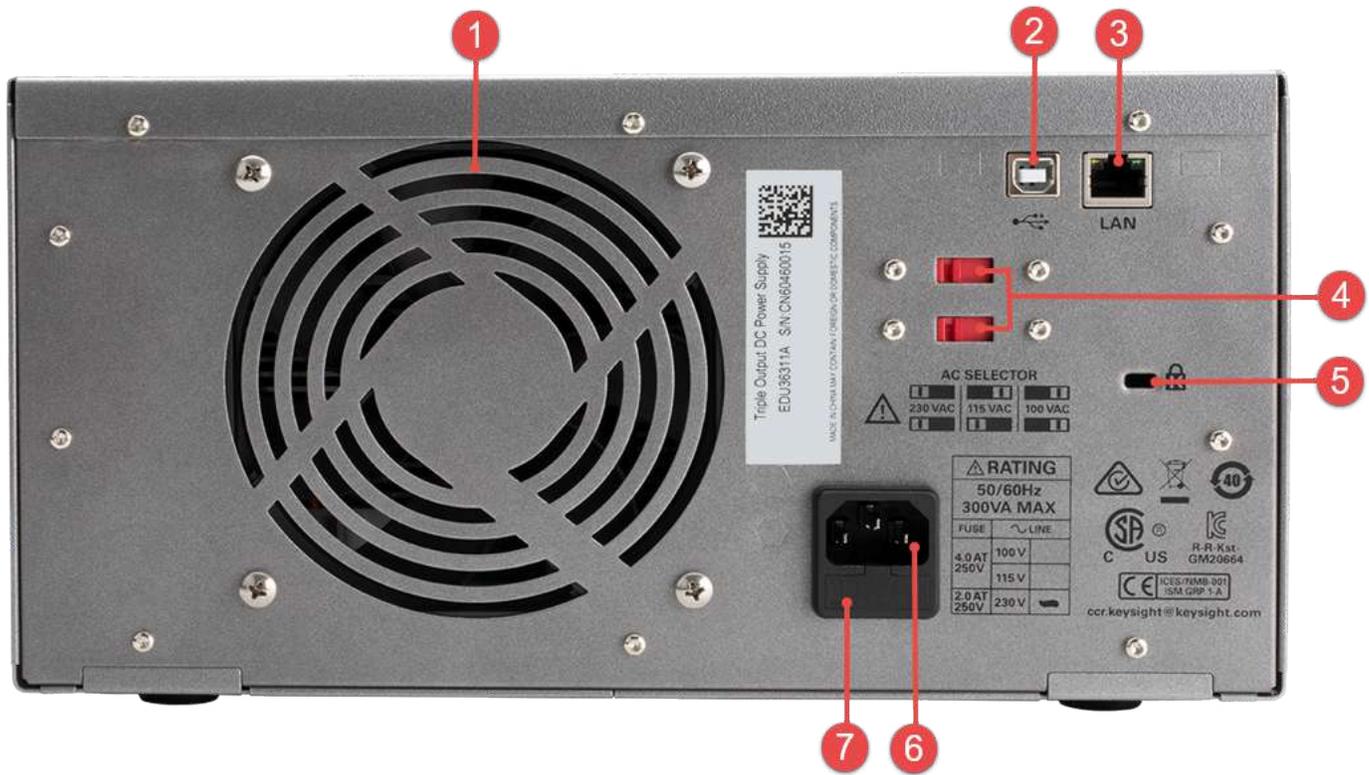
Front panel at a glance



Item	Description
1	Information-packed, WVGA display

Item	Description
2	Output selection keys Selects an output to control. The lit key indicates the selected output. Tip: When this key is selected, pressing this key again will toggle between multiple and single output view.
3	Voltage/Current knobs Set the voltage and current of the selected output.
4	Meter View and Tracking keys – [Meter View] turns on the meter view for the selected output. – [Tracking] turns on or off the track mode for output 2 and 3.
5	Navigation keys. – Navigate through the control dialog windows; press [Select] key to select a control.
6	Numeric keypad – Enters numeric values. Press [Enter] key to complete the entry. – Deletes the values entered into the dialog using the back key.
7	All Output On/Off key Turns all outputs On and Off according to the specified turn-on and turn-off delays.
8	Output On key Turns individual outputs On or Off; outputs are on when the key is lit.
9	Output terminals
10	Softkeys Accesses the soft front panel menu. The Back key moves back in the softkey menu hierarchy.
11	Earth ground reference
12	USB port Allows an external USB flash drive to be connected to the instrument.
<div style="background-color: #e0e0e0; padding: 5px; display: inline-block;">NOTE</div> The EDU36311A supports USB flash drives with the following specification: USB 2.0, FAT32 format, up to 32 GB. We recommend using SanDisk Cruzer Blade flash drive for the front panel USB port.	
13	Power switch Turns on the instrument.

Rear panel at a glance

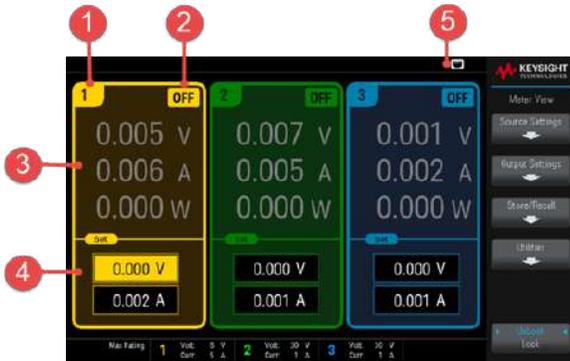


Item	Description
1	Fan ventilation hole
2	Universal Serial Bus (USB-B) interface connector
3	Local Area Network (LAN) interface connector
4	AC selector
5	Kensington security slot
6	AC inlet
7	AC selector fuse-holder assembly

Meter view

Press [**Meter View**]. This key toggles between multiple and single output view.

Multiple Output View



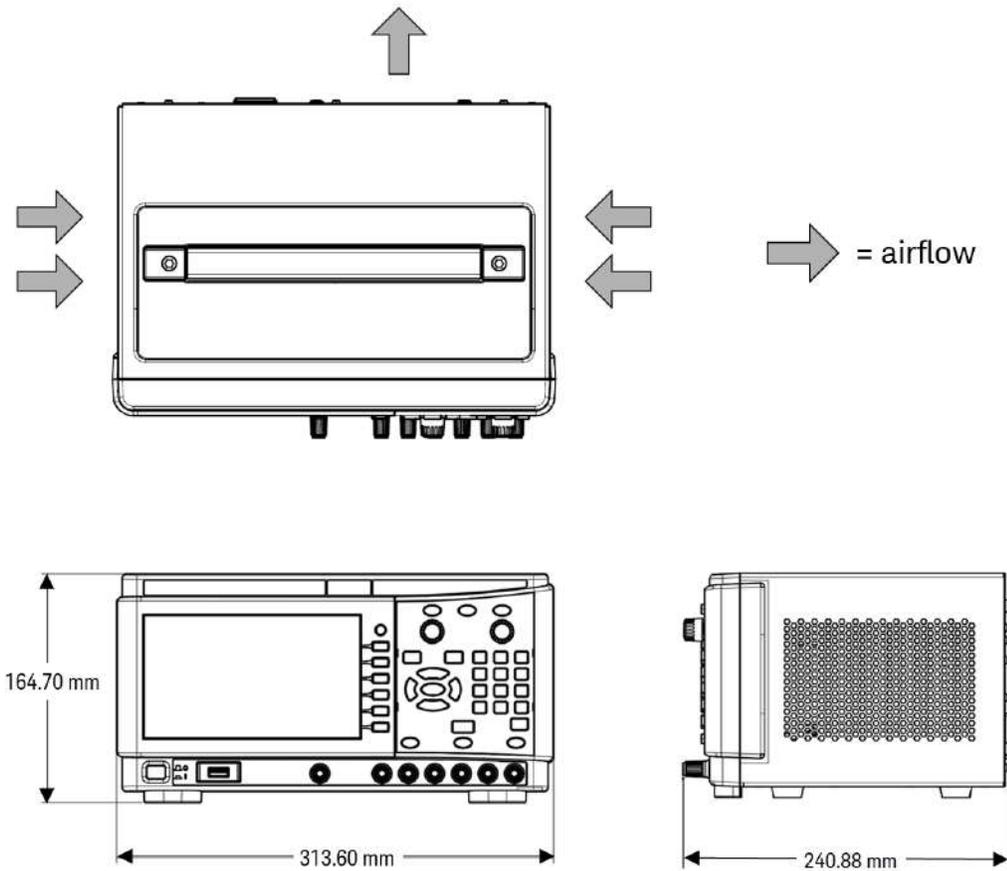
Single Output View



Item	Description
1	Output identifier When an output is selected, the background becomes highlighted. The selected output is displayed in an enlarged format in single output view.
2	Output status OFF: The output is off CV: The output is in constant voltage mode CC: The output is in constant current mode UR: The output is unregulated OV: Over-voltage protection is tripped OC: Over-current protection is tripped OT: Over-temperature protection is tripped
3	Output meters Displays the actual output voltage and current. Displays power in single output view.
4	Output settings Displays the present output voltage and current settings. Use the numeric keypad or turn the front panel voltage or current knob to adjust these settings.
5	Interface status  : USB flash drive is connected  : LAN is connected  : Instrument front panel is locked  : Instrument error has occurred  : Instrument in remote mode  : Over-voltage protection is tripped  : Over-current protection is tripped  : Over-temperature protection is tripped
6	Ratings and protection Displays the present over-voltage protection (OVP) setting and whether over-current protection (OCP) is on or off.
7	Output delay Displays the OCP, Output On and Output Off delay values.

Item	Description
8	Soft front panel menu

Dimension diagram



Setup the instrument

Place the instrument's feet on a flat, smooth horizontal surface. Connect output to the front panel, being careful not to short the leads together. Attach the power cable to the rear panel, then plug it into main power. Connect LAN or USB cables as desired, and you may also secure the instrument with a security lock cable.

Before disconnecting cables and cords from the instrument, turn the instrument off using the front-panel power switch and disconnect from the supply source by unplugging the detachable power cord.

Prepare Instrument for Use

Initial inspection

When you receive your power supply, inspect it for any obvious damage that may have occurred during shipment. If there is damage, notify the shipping carrier and nearest Keysight Sales and Support Office immediately. Refer to www.keysight.com/find/assist.

Until you have checked out the power supply, save the shipping carton and packing materials in case the unit has to be returned. Check the list under **Standard Shipped Items** and verify that you have received these items with your instrument. If anything is missing, please contact your nearest Keysight Sales and Support Office.

Standard shipped items

- Keysight EDU36311A DC power supply
- AC power cord
- Quick Start Guide
- Certificate of calibration
- China RoHS Addendum
- Keysight safety leaflet

Documentation and firmware revisions

The Keysight EDU36311A documentation listed below can be downloaded for free through our website at www.keysight.com/find/EDU36311A-manuals.

- Keysight EDU36311A Triple Output Programmable DC Power Supply User's Guide. This manual.
- Keysight EDU36311A Triple Output Programmable DC Power Supply Programming Guide.
- Keysight EDU36311A Triple Output Programmable DC Power Supply Quick Start Guide
- Keysight EDU36311A Triple Output Programmable DC Power Supply Service Guide.

For the latest firmware revision and firmware update instruction, go to www.keysight.com/find/EDU36311A-sw.

Recommended calibration interval

Keysight Technologies recommends a one year calibration cycle for the EDU36311A programmable DC power supply.

Options and Fuse Information

WARNING

Ensure you order the proper instrument option for the mains power that will be used for the instrument.

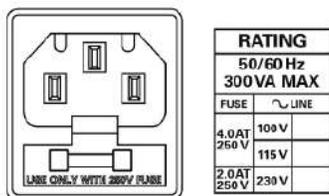
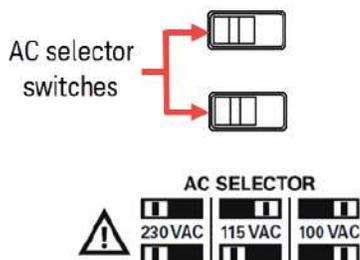
Options 0EM, 0E3, and 0E9 determine which power-line voltage is selected at the factory.

Option	Description
0EM	115 VAC \pm 10%, 50/60 Hz input voltage
0E3	230 VAC \pm 10%, 50/60 Hz input voltage
0E9	100 VAC \pm 10%, 50/60 Hz input voltage

Ensure the correct AC input voltage and fuse settings

Use the proper switch settings

To change the input AC voltage selector on the power supply, use the two AC selector switches on the upperside of the power supply as shown.



For example, to select 230 V, slide both switches to the left, as illustrated in the diagram below the switches.

To select 115 V, slide the upper switch to the right and the lower switch to the left.

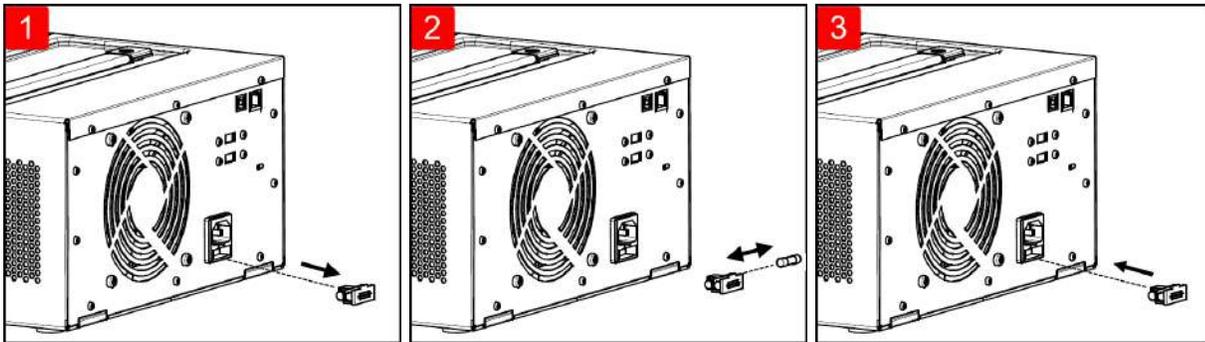
To select 100 V, slide both switches to the right.

Use the correct fuse

The following table describes the fuse that you should use with each of the power supply's option.

Option	Fuse part number	Description	Application
EDU36311A-0E3	EDU36311-30001	Fuse 2 A, 250 V	230 V line voltage
EDU36311A-0E9 EDU36311A-0EM	EDU36311-30002	Fuse 4 A, 250 V	100 V and 115 V line voltage

To configure the correct fuse, follow the three steps shown below:



1 Pull the fuse holder out of the power supply.

2 Remove and insert the proper fuse into the fuse holder.

3 Re-insert the fuse holder into the power supply.

Programming Ranges

The following table shows the maximum voltage and current that can be programmed for each model.

Parameter		6V output	30V output	30V output
Output Identifier		P6V	P30V	N30V
Output Number		1	2	3
Voltage	MAXimum	6.18 V	30.9 V	30.9 V
	MINimum	0 V	0 V	0 V
	DEFault (*RST)	0 V	0 V	0 V
Current	MAXimum	5.15 A	1.03 A	1.03 A
	MINimum	0.002 A	0.001 A	0.001 A
	DEFault (*RST)	5 A	1 A	1 A

Installation

Connecting the power cord

Connecting the outputs

Parallel and series connections

Interface connections

Connecting the power cord

WARNING

FIRE HAZARD

Use only the power cord that was supplied with your instrument. Using other types of power cords may cause overheating of the power cord, resulting in fire.

SHOCK HAZARD

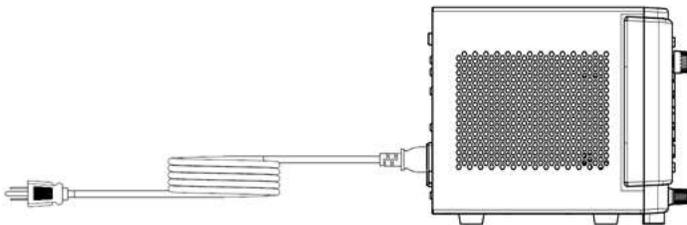
The power cord provides a chassis ground through a third conductor. Be certain that your power outlet is of the three-conductor type with the correct pin connected to earth ground.

NOTE

Ensure the AC voltage setting on the rear panel is correctly set prior connecting the power cord.

Connect the power cord to the AC inlet connector on the rear of the unit. If the wrong power cord was shipped with your unit, contact your nearest Keysight Sales and Support Office.

Removing the power cord will disconnect AC input power to the unit.



Connecting the outputs

Binding posts

WARNING

SHOCK HAZARD

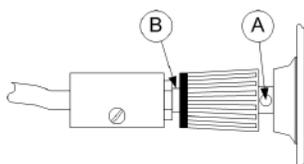
Turn off AC power before connecting wires to the front panel. All wires and straps must be properly connected with the binding posts securely tightened.

The binding posts accept wires sizes up to AWG 14 in location (A). Securely fasten all wires by hand-tightening the binding posts. You can also insert standard banana plugs into the front of the connectors as shown in (B). A chassis ground binding post is located on the front panel for convenience.

Maximum current rating:

(A) = 20 A

(B) = 15 A



Wire sizing

WARNING

FIRE HAZARD

Select a wire size large enough to carry short-circuit current without overheating (refer to the following table). To satisfy safety requirements, load wires must be heavy enough not to overheat while carrying the short-circuit output current of the unit.

AWG	Suggested maximum current (A) ¹	mΩ/ft	mΩ/m
12	25	1.59	5.2
14	20	2.53	8.3
16	13	4.02	13.2
18	10	6.39	21.0
20	7	10.2	33.5
22	5	16.1	52.8
24	3.5	25.7	84.3

Notes:

1. Single conductor in free air at 30 °C with insulation

Output isolation

The outputs of the power supply are isolated from earth ground. Any output terminal may be grounded, or an external voltage source may be connected between any terminal output and ground. However, output terminals must be kept within ±60 Vdc of ground. Any one of the three terminals can be tied to ground as needed. An earth ground terminal is provided on the front panel for convenience.

Multiple loads

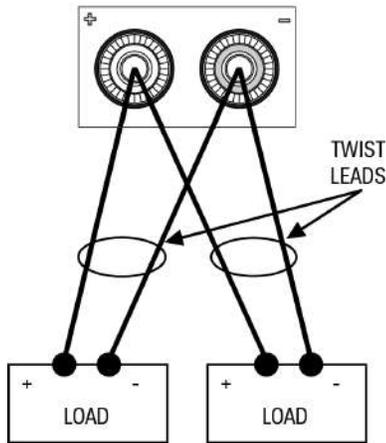
When connecting multiple loads to the power supply, each load should be connected to the output terminals using separate connecting wires. This minimizes mutual coupling effects between loads and takes full advantage of the low output impedance of the power supply. Each pair of wires should be as short as possible and twisted or shielded to reduce lead inductance and noise pick-up. If a shield is used, connect one end to the power supply ground terminal and leave the other end disconnected.

If cabling considerations require the use of distribution terminals that are located remotely from the power supply, connect output terminals to the distribution terminals by a pair of twisted or shielded wires. Connect each load to the distribution terminals separately.

CAUTION

Turn on AC power before connecting loads to prevent currents from damaging the loads.

Front panel



Parallel and series connections

Parallel connections

Series connections

Parallel connections

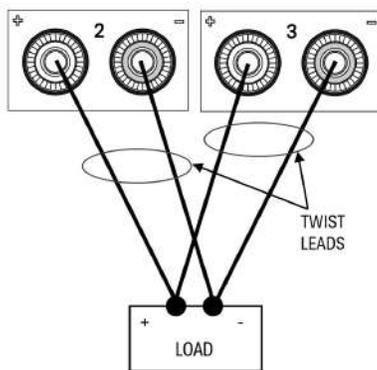
CAUTION

Only connect outputs that have identical voltage and current ratings in parallel.

Connecting outputs in parallel provides a greater current capability than can be obtained from a single output.

The following figures show how to connect two outputs in parallel.

Front panel



Series connections

WARNING

SHOCK HAZARD

Floating voltages must not exceed 60 VDC. No output terminal may be more than 60 VDC from chassis ground.

CAUTION

Only connect outputs that have identical voltage and current ratings in series.

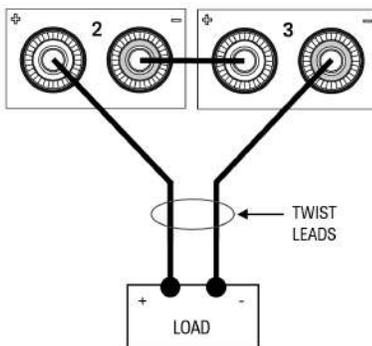
Two outputs of the same voltage and current rating can be connected in series to provide up to two times the output voltage capability. Because the current is the same through each element in a series circuit, outputs connected in series must have equivalent current ratings. Otherwise, the higher rated output could potentially damage the lower rated output by forcing excessive current through it under certain load conditions.

To prevent currents from damaging the power system when the load is connected, always turn series-connected outputs on and off together. Do not leave one output on while the other is off.

Connecting outputs in series provides a greater voltage capability than can be obtained from a single output.

The following figures show how to connect two outputs to a single load.

Front panel



Interface Connections

USB connections

LAN connections - site and private

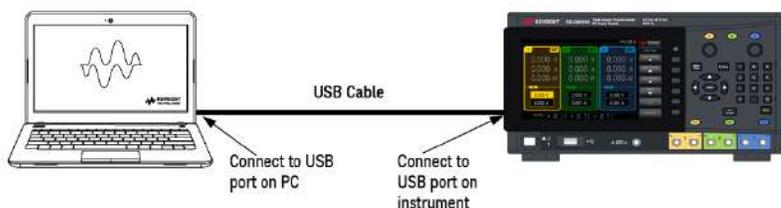
This section describes how to connect to the various communication interfaces on your power supply. For further information about configuring the remote interfaces, refer to [Remote Interface Configuration](#).

NOTE

If you have not already done so, install the Keysight IO Libraries Suite, which can be found at www.keysight.com/find/iolib. For detailed information about interface connections, refer to the Keysight Technologies USB/LAN/GPIB Interfaces Connectivity Guide included with the Keysight IO Libraries Suite.

USB connections

The following figure illustrates a typical USB interface system.



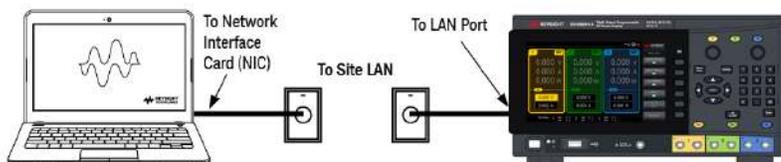
1. Connect your instrument to the USB port on your computer using a USB cable.
2. With the Connection Expert utility of the Keysight IO Libraries Suite running, the computer will automatically recognize the instrument. This may take several seconds. When the instrument is recognized, your computer will display the VISA alias, IDN string, and VISA address. This information is located in the USB folder. You can also view the instrument's VISA address from the front panel menu.
3. You can now use Interactive IO within the Connection Expert to communicate with your instrument, or you can program your instrument using the various programming environments.

NOTE

The USB cable is not recommended to be longer than 3 meters.

LAN connections - site and private

A **site LAN** is a local area network in which LAN-enabled instruments and computers are connected to the network through routers, hubs, and/or switches. They are typically large, centrally-managed networks with services such as DHCP and DNS servers. The following figure illustrates a typical site LAN system.



1. Connect the instrument to the site LAN or to your computer using a LAN cable. The as-shipped instrument LAN settings are configured to automatically obtain an IP address from the network using a DHCP server (DHCP is set On). The DHCP server will register the instrument's hostname with the dynamic DNS server. The hostname as well

as the IP address can then be used to communicate with the instrument. The front panel LAN indicator will come on when the LAN port has been configured.

NOTE

If you need to manually configure any instrument LAN settings, refer to [Remote Interface Configuration](#) for information about configuring the LAN settings from the front panel of the instrument.

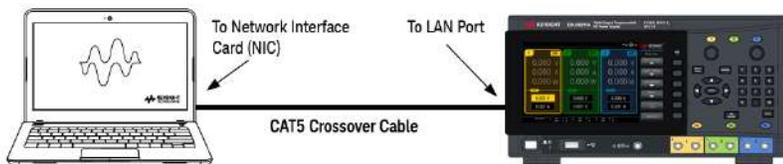
2. Use the Connection Expert utility of the Keysight IO Libraries Suite to add the power supply and verify a connection. To add the instrument, you can request the Connection Expert to discover the instrument. If the instrument cannot be found, add the instrument using its hostname or IP address.

NOTE

If this does not work, refer to “Troubleshooting Guidelines” in the Keysight Technologies USB/LAN/GPIB Interfaces Connectivity Guide included with the Keysight IO Libraries Suite.

3. You can now use Interactive IO within the Connection Expert to communicate with your instrument, or you can program your instrument using the various programming environments.

A **private LAN** is a network in which LAN-enabled instruments and computers are directly connected, and not connected to a site LAN. They are typically small, with no centrally-managed resources. The following figure illustrates a typical private LAN system.



1. Connect the instrument to the computer using a LAN crossover cable. Alternatively, connect the computer and the instrument to a standalone hub or switch using regular LAN cables.

NOTE

Make sure your computer is configured to obtain its address from DHCP and that NetBIOS over TCP/IP is enabled. Note that if the computer had been connected to a site LAN, it may still retain previous network settings from the site LAN. Wait one minute after disconnecting it from the site LAN before connecting it to the private LAN. This allows Windows to sense that it is on a different network and restart the network configuration.

2. The factory-shipped instrument LAN settings are configured to automatically obtain an IP address from a site network using a DHCP server. You can leave these settings as they are. Most Keysight products and most computers will automatically choose an IP address using auto-IP if a DHCP server is not present. Each assigns itself an IP address from the block 169.254.nnn. Note that this may take up to one minute. The front panel LAN indicator will come on when the LAN port has been configured.

NOTE

Turning off DHCP reduces the time required to fully configure a network connection when the power supply is turned on. To manually configure the instrument LAN settings, refer to [Remote Interface Configuration](#) for information about configuring the LAN settings from the front panel of the instrument.

3. Use the Connection Expert utility of the Keysight IO Libraries Suite to add the power supply and verify a connection. To add the instrument, you can request the Connection Expert to discover the instrument. If the instrument cannot be found, add the instrument using its hostname or IP address.

NOTE

If this does not work, refer to “Troubleshooting Guidelines” in the Keysight Technologies USB/LAN/GPIB Interfaces Connectivity Guide included with the Keysight IO Libraries Suite.

4. You can now use Interactive IO within the Connection Expert to communicate with your instrument, or you can program your instrument using the various programming environments.

Remote Interface Configuration

The instrument supports remote interface communication over two interfaces: USB and LAN.

- USB Interface: Use the rear-panel USB port to communicate with your PC.
- LAN Interface: When shipped, DHCP is on, which may enable communication over LAN. The acronym DHCP stands for Dynamic Host Configuration Protocol, a protocol for assigning dynamic IP addresses to networked devices. With dynamic addressing, a device can have a different IP address every time it connects to the network.

It is recommended to remove any unused remote interface connection.

Keysight IO Libraries Suite

NOTE

Ensure that the Keysight IO Libraries Suite is installed before you proceed for the remote interface configuration.

Keysight IO Libraries Suite is a collection of free instrument control software that automatically discovers instruments and allows you to control instruments over LAN, USB, GPIB, RS-232, and other interfaces. For more information, or to download IO Libraries, go to www.keysight.com/find/iosuite.

LAN configuration

The following sections describe the primary front panel LAN configuration functions on the front-panel menu.

NOTE

LAN configuration can be done from the front panel or through SCPI commands.

After changing the LAN settings, you must save the changes. Press **Apply** to save the setting. If you do not save the setting, exiting the I/O Config menu will also prompt you to press **Yes** to save the LAN setting or **No** to exit without saving. Press **Yes** cycles power to the instrument and activates the settings. LAN settings are non-volatile, they will not be changed by power cycling or *RST. If you do not want to save your changes, press **No** to cancel all changes.

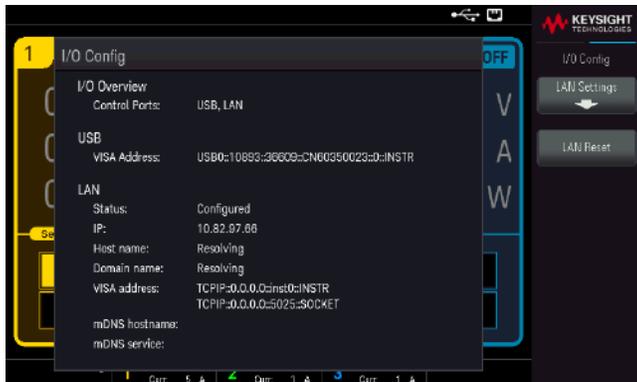
When shipped, DHCP is on, which may enable communication over LAN. The acronym DHCP stands for Dynamic Host Configuration Protocol, a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network.

Some LAN settings require you to cycle instrument power to activate them. The instrument briefly displays a message when this is the case, so watch the screen closely as you change LAN settings.

Viewing the LAN settings

Press **Utilities** > **I/O Config** to view the LAN settings.

The LAN status may be different from the front panel configuration menu settings - depending on the configuration of the network. If the settings are different, it is because the network has automatically assigned its own settings.



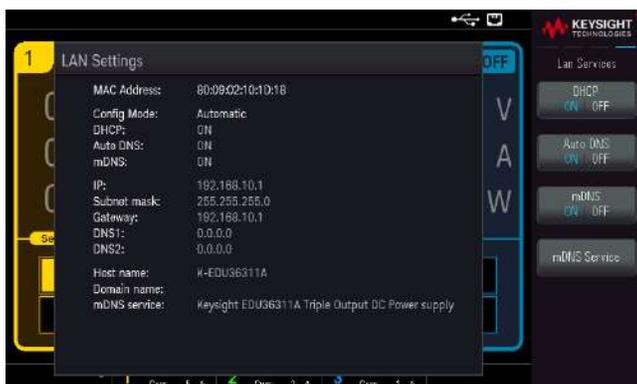
Modifying the LAN settings

As shipped from the factory, the instrument pre-configured settings should work in most LAN environments. Refer to Non-Volatile Settings in the Programming Guide for information on the factory-shipped LAN settings.

Press **Utilities** > **I/O Config** > **LAN Settings** to access the LAN Settings menu.



Press **Services** to access the LAN Services menu.



DHCP

DHCP (Dynamic Host Configuration Protocol) can automatically assign a dynamic IP address to a LAN device. This is typically the easiest way to configure the instrument for LAN.

– This setting is non-volatile; it will not be changed by power cycling or *RST.

1. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **DHCP ON | OFF** to use DHCP to automatically assign an IP address.

To manually set an IP address, Subnet Mask, or Default Gateway, press **DHCP ON | OFF**. Then, change the IP setup as described below.

IP Address

You can enter a static IP address for the instrument as a four-byte integer expressed in dot notation. Each byte is a decimal value, with no leading zeros (for example, 192.168.2.20).

– If DHCP is on, it attempts to assign an IP address to the instrument. If it fails, Auto-IP attempts to assign an IP address to the instrument.

– Contact your LAN administrator for details.

– This setting is non-volatile; it will not be changed by power cycling or *RST.

1. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **DHCP ON | OFF**.
2. Press **Back**. Then press **Addresses** > **Modify IP Address**. Select IP Address field using the **Previous** and **Next** key. Set the desired IP address.
3. Press **Apply** to save the setting.

Subnet Mask

Subnetting allows the LAN administrator to subdivide a network to simplify administration and minimize network traffic. The subnet mask indicates the portion of the host address used to indicate the subnet.

– Contact your LAN administrator for details.

– This setting is non-volatile; it will not be changed by power cycling or *RST.

1. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **DHCP ON | OFF**.
2. Press **Back**. Then press **Addresses** > **Modify Subnet Mask**.
3. Select Subnet Mask field using **Previous** and **Next** key. Set the desired subnet mask address. (Example: 255.255.0.0)
4. Press **Apply** to save the setting.

Gateway

A gateway is a network device that connects networks. The default gateway setting is the IP address of such a device.

- You need not set a gateway address if using DHCP.
- Contact your LAN administrator for details.
- This setting is non-volatile; it will not be changed by power cycling or *RST.
 1. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **DHCP ON | OFF**.
 2. Press **Back**. Then press **Addresses** > **Modify Gateway**.
 3. Select Gateway field using **Previous** and **Next** key. Set the appropriate gateway address.
 4. Press **Apply** to save the setting.

DNS

DNS (Domain Name Service) is an Internet service that translates domain names into IP addresses. The DNS server address is the IP address of a server that performs this service.

- Normally, DHCP discovers DNS address information; you only need to change this if DHCP is unused or not functional. Contact your LAN administrator for details.
- This setting is non-volatile; it will not be changed by power cycling or *RST.
 1. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **Auto DNS ON | OFF** to configure the addressing of the instrument in DNS server automatically.
 2. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **Auto DNS ON | OFF** to configure the addressing of the instrument manually.
 3. Press **Back**. Then press **Addresses** > **Modify DNS1** or **DNS2**.
 4. Select DNS1 address or DNS2 address using **Previous** and **Next** key. These fields only appear when Auto DNS is set to Off.
 5. Set the desired primary and secondary address.
 6. Press **Apply** to save the setting.

Hostname

A hostname is the host portion of the domain name, which is translated into an IP address.

Each power supply is shipped with a default hostname with the format: Keysight-model number-serial number, where model number is the power supply's 9-character model number (e.g. EDU36311A), and serial number is the last five characters of the 10-character power supply serial number located on the label on the top of the unit (e.g. 45678 if the serial number is MY12345678).

- The instrument receives a unique hostname at the factory, but you may change it. The hostname must be unique on the LAN.
 - The name must start with letter; other characters can be an upper or lower case letters, numeric digits, or dashes ("-").
 - This setting is non-volatile; it will not be changed by power cycling or *RST.
1. Press **Utilities** > **I/O Config** > **LAN Settings** > **Host Name**.
 2. Enter the host name with the keyboard provided. See **Using the virtual keyboard**.
 3. Press **Apply** to save the setting.
 4. Press **Clears All** to cancel all the changes. Press **Back** to exit without saving.

mDNS Service

The mDNS service name is registered with the selected naming service.

Each power supply is shipped with a default service name with the format: Keysight-model number-serial number, where model number is the power supply's 9-character model number (e.g. EDU36311A), and serial number is the last five characters of the 10-character power supply serial number located on the label on the top of the unit (e.g. 45678 if the serial number is MY12345678).

- The instrument receives a unique mDNS service name at the factory, but you may change it. The mDNS service name must be unique on the LAN.
 - The name must start with letter; other characters can be an upper or lower case letters, numeric digits, or dashes ("-").
1. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **mDNS ON | OFF** to configures the service name registered with the selected naming service automatically.
 2. Press **Utilities** > **I/O Config** > **LAN Settings** > **Services** > **mDNS ON | OFF** to configure the service name of the instrument manually.
 3. Select mDNS Service field using the navigation keys.
 4. Press **mDNS Service** and enter the service name with the keyboard provided. See **Using the virtual keyboard**.
 5. Press **Apply** to save the setting.
 6. Press **Clears All** to cancel all the changes. Press **Back** to exit without saving.

Using sockets

NOTE

Power supplies allow any combination of up to two simultaneous data socket, control socket, and telnet connections to be made.

Keysight instruments have standardized on using port 5025 for SCPI socket services. A data socket on this port can be used to send and receive ASCII/SCPI commands, queries, and query responses. All commands must be terminated with a newline for the message to be parsed. All query responses will also be terminated with a newline.

The socket programming interface also allows a control socket connection. The control socket can be used by a client to send device clear and to receive service requests. Unlike the data socket, which uses a fixed port number, the port number for a control socket varies and must be obtained by sending the following SCPI query to the data socket: `SYSTem:COMMunicate:TCPIP:CONTRol?`

After the port number is obtained, a control socket connection can be opened. As with the data socket, all commands to the control socket must be terminated with a newline, and all query responses returned on the control socket will be terminated with a newline.

To send a device clear, send the string "DCL" to the control socket. When the power system has finished performing the device clear it echoes the string "DCL" back to the control socket.

Service requests are enabled for control sockets using the Service Request Enable register. Once service requests have been enabled, the client program listens on the control connection. When SRQ goes true the instrument will send the string "SRQ +nn" to the client. The "nn" is the status byte value, which the client can use to determine the source of the service request.

More about IP addresses and dot notation

Dot-notation addresses ("nnn.nnn.nnn.nnn" where "nnn" is a byte value from 0 to 255) must be expressed with care, as most PC web software interprets byte values with leading zeros as octal (base 8) numbers. For example, "192.168.020.011" is equivalent to decimal "192.168.16.9" because ".020" is 16 expressed in octal, and ".011" (octal) is "9" (base 10). To avoid confusion, use only decimal values from 0 to 255, with no leading zeros.

Remote Control

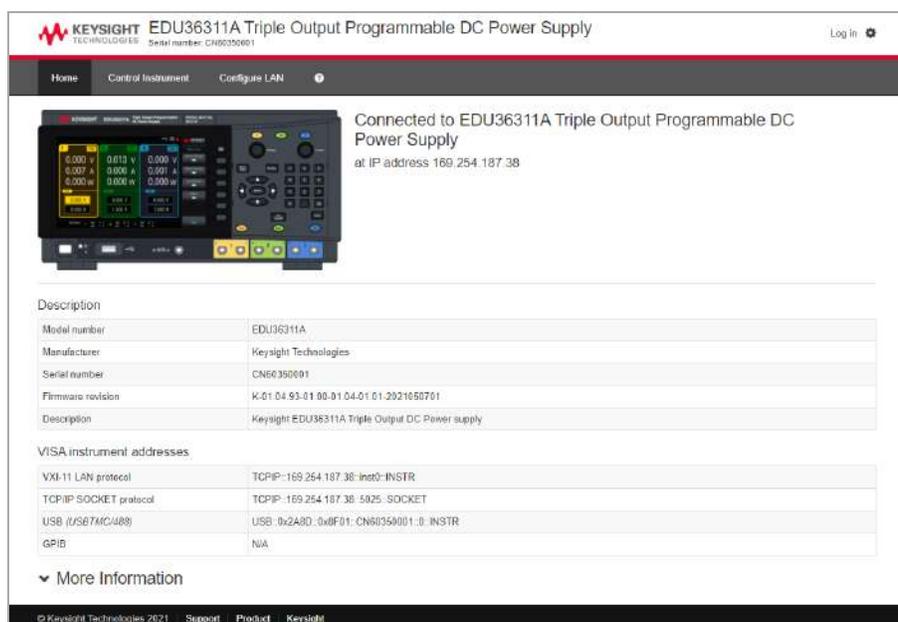
You can control the instrument via SCPI with Keysight IO Libraries or via a simulated front panel with the instrument's Web interface.

Web interface

You can monitor and control the instrument from a Web browser by using the instrument's Web interface. To connect, simply enter the instrument's IP address or hostname in your browser's address bar and press Enter.

NOTE

If you see an error indicating 400: Bad Request, that is related to an issue with "cookies" in your Web browser. To avoid this issue, either start the Web interface by using the IP address (not hostname) in the address bar), or clear cookies from your browser immediately before starting the Web interface.



KEYSIGHT TECHNOLOGIES EDU36311A Triple Output Programmable DC Power Supply
Serial number: CN60350001

Home Control Instrument Configure LAN Log In

Connected to EDU36311A Triple Output Programmable DC Power Supply
at IP address 169.254.187.38

Description

Model number	EDU36311A
Manufacturer	Keysight Technologies
Serial number	CN60350001
Firmware revision	K-01.04.93-01.00-01.04-01.01.2021050701
Description	Keysight EDU36311A Triple Output DC Power supply

VISA instrument addresses

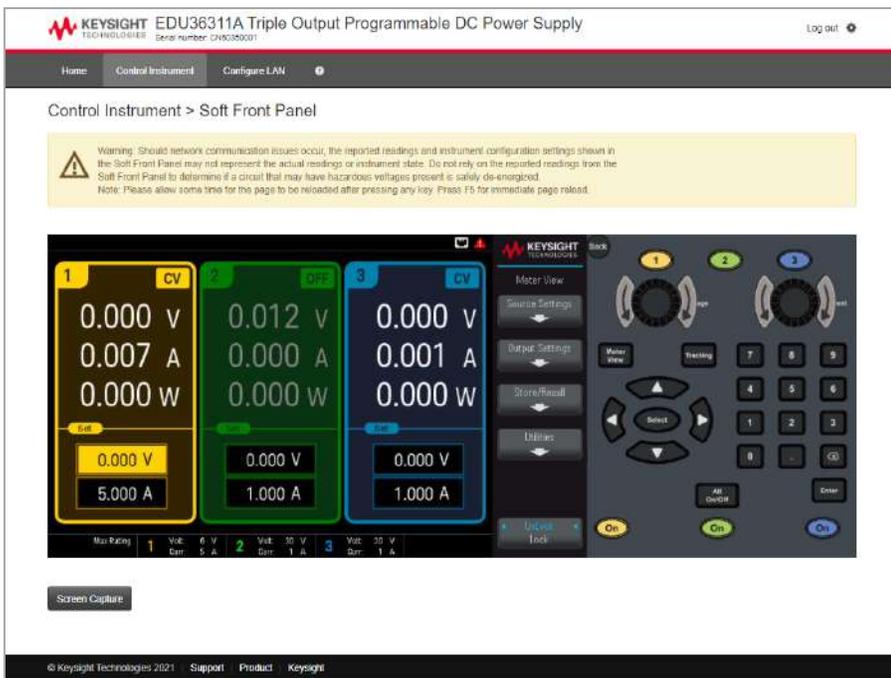
VXI-11 LAN protocol	TCP/IP: 169.254.187.38: instr: INSTR
TCP/IP SOCKET protocol	TCP/IP: 169.254.187.38: 5025: SOCKET
USB (VISA 76C408)	USB: 0x2A8D: 0x8F01: CN60350001: 0: INSTR
GPIB	N/A

More Information

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The Configure LAN tab on the top allows you to change the instrument's LAN parameters; exercise caution when doing so, as you may interrupt your ability to communicate with the instrument.

When you click the Control Instrument tab, the instrument will ask you for a password (default is *keysight*), and then it will open a new page, shown below.



This interface allows you to use the instrument just as you would from the front panel. Note the curved arrow keys that allow you to "rotate" the knob. You can press the arrow keys to rotate the knob clockwise and counter-clockwise, just as you would press any of the other keys on the front panel.

WARNING READ WARNING
Be sure to read and understand the warning at the top of the Control Instrument page.

Technical connection details

In most cases, you can easily connect to the instrument with the IO Libraries Suite or Web interface. In certain circumstances, it may be helpful to know the following information.

Interface	Details
VXI-11 LAN	VISA String: TCPIP0::<IP Address>::inst0::INSTR Example: TCPIP0::192.168.10.2::inst0::INSTR
Web UI	Port number 80, URL http://<IP address>/
USB	USB0::0x2A8D::<Prod ID>::<Serial Number>::0::INSTR Example: USB0::0x2A8D::0x8F01::CN60350010::0::INSTR The vendor ID: 0x2A8D, the product ID is 0x8F01, and the instrument serial number is CN60350010.

Use the Built-in Help System

The built-in help system provides context-sensitive help on any front panel key or menu softkey.

View the help information for the front panel key

Press and hold any softkey or key, such as **[All On/Off]**.



Press **OK** to exit.

NOTE

LOCAL LANGUAGE HELP

All front-panel keys' help, and help topics are available in English, French, German, Spanish, Japanese, Korean, Simplified Chinese, Traditional Chinese, and Russian. To select the local language, press **Utilities > User Settings > Language**. Then select the desired language. The menu softkey labels and status line messages are not translated.

Firmware Update

NOTE

Do not turn off the instrument during the update.

1. Press **Utilities** > **Help** > **About** to determine what instrument firmware version is currently installed.
2. Go to www.keysight.com/find/EDU36311A-sw to find the latest firmware version. If this matches the version installed on your instrument, there is no need to continue with this procedure. Otherwise, download the firmware update utility and a ZIP file of the firmware. Detailed firmware update instructions are located on the download page.

Front Panel Menu Reference

This is an overview of the front-panel menus. Press the softkeys to access the front panel menus.

Menu heading	Description
Source Settings >	Configures the voltage, current, over-voltage protection and over-current protection.
OCP State	Enables or disables the over-current protection state.
OCP Delay	Configures the over-current protection delay start.
Protection Clear	Clears the protection function and returns the outputs to its previous operating state.
Output Settings >	Configures the output turn-on and turn-off sequence.
Tracking	Enables or disables the tracking mode.
Store/Recall >	Saves and recalls instrument states.
Store Settings	Store instrument's state to external USB flash drive, or store instrument's state to internal memory.
Recall Settings	Allows you to browse to the state in the internal memory or browse to the state file (.sta format) in the external USB flash drive.
Power On Setting	Selects the state that will be loaded at power-up.
Set to Defaults	Sets the instrument to the factory default state.
Utilities >	Accesses the IO Config, Instr. Setup, User Settings and Help menu.
I/O Config >	Displays and configures the I/O parameters for remote operations over the USB or LAN interface.
Instr. Setup >	Accesses the self-test and calibration.
User Settings>	Configures the user preferences and set the date and time.
Help >	View the instrument information and error queue.
Unlock	Locks and unlocks the display.
Lock	

2 General Operating Information

Turning the Unit On

Controlling the Outputs

Using the Protection Function

Using the Tracking Operation

Configuring the Output Turn On Turn Off Sequence

Saving and Recalling States from Instrument

Locking/Unlocking the Front Panel

Capturing a Screen

Utilities Menu

This chapter describes the general operating information of the EDU36311A.

NOTE

The EDU36311A uses colors and numbers to let you easily identify information related to specific outputs. For example, all the configuration and display items related to output 1 are shown in the same color as the output selection key.

Turning the Unit On

WARNING

SHOCK HAZARD

Be aware that hazardous voltages can be present on the output terminals. Do not set the output voltage above 60 VDC when turning the unit on.

After you have connected the power cord, press the power switch to turn the unit on. The front panel display lights up after a few seconds. When the front panel meter view appears, use the Voltage and Current knobs to enter voltage and current values. Output 1 is selected by default.



Press one of the three [On] keys to enable an individual output. In meter view, the power supply continuously measures and displays the output voltage and current of each output.

NOTE

A power-on self-test occurs automatically when you turn the unit on. This assures you that the instrument is operational. If self-test fails, or if other operating problems occur with your instrument, the front panel error indicator (⚠) appears at the upper top of the display.



View the error log

Press **Utilities** > **Help** > **Error** to display the error log.



Press **OK** or **[Meter View]** to return to the meter-view display.

- Errors are stored in the order they are received. The error at the end of the list is the most recent error.
- If there are more than 20 errors in the queue, the last error stored is replaced with -350,"Queue overflow". No more errors are stored until you remove errors from the queue.
- Errors will be cleared after you have read them or after an instrument reset.

If you suspect that there is a problem with the power supply, refer to the Troubleshooting section in the Service Guide.

Controlling the Outputs

Step 1 - Select an output

Press one of the output selection keys to select an output to control. The lit key identifies the selected output. All subsequent output-specific front panel commands are sent to the selected output.



Step 2 - Set the output voltage and current

Turn the Voltage and Current knobs. The output voltage or current setting changes when they are turned.



You can also enter the voltage and current values directly in the numeric entry fields (the Set fields) in the meter-view display. There are three methods to enter the value:

- **Numeric keys:** Use the navigation keys to select the field; use the numeric entry keys to enter the value. The value becomes active when you press **[Enter]**.
- **Navigation keys:** Use the navigation keys to select the field, press **[Select]** to edit. Use the left or right arrow to select the area of value edit. Use the up or down arrow to increase or decrease the value. The value becomes active when you press **[Select]** or **[Enter]**.
- **Voltage and Current knobs:** use the Voltage and Current knobs to adjust the values in the Voltage and Current fields.



Lastly, you can press the **Source Settings** key to access the Source Settings window. Use the navigation keys to highlight the Voltage or Current fields. Then enter the voltage and current values with the numeric keys.

Press **[Enter]** to enter the value. Press **Back** to return to the meter-view display.



Table below indicates the output range and default value for voltage and current settings.

Settings	Output range	Default value
Voltage	Output 1: 0 to 6.18V Output 2: 0 to 30.9 V Output 3: 0 to 30.9 V	0 V
Current	Output 1: 0.002 to 5.15 A Output 2: 0.001 to 1.03 A Output 3: 0.001 to 1.03 A	Output 1: 5 A Output 2: 1 A Output 3: 1 A

Step 3 - Enable the output

Press the color-coded **[On]** key to enable an individual output. When an output is on, the **[On]** key for that output is lit. When an output is off, the **[On]** key is not lit. The **[All On/Off]** key turn all outputs on or off simultaneously.

The state of a disabled output (output off) is a condition of zero output voltage and zero source current.

Step 4 - View the output voltage and current

Press **[Meter View]** to view the output voltage and current. When an output is enabled, the front panel meters continuously measure and display the output voltage and current.



Constant voltage and constant current

If the output load resistance exceeds the voltage setting divided by the current setting, the instrument will operate in constant-voltage (CV) mode. The current will equal the voltage divided by the load resistance.

If the output load resistance is less than the voltage setting divided by the current setting, the instrument will operate in constant-current (CC) mode. The voltage will equal the current multiplied by the load resistance.

From the remote interface:

A channel parameter is required with each SCPI command to select an output. For example, (@1) selects output 1, (@2,3) selects output 2 and 3, and (@1:3) selects outputs 1 through 3. The output list must be preceded with an @ symbol and be enclosed in parentheses ().

To set only output 1 to 5 V and 1 A:

```
APPL Ch1, 5, 1
```

To enable only output 1:

```
OUTP ON,(@1)
```

To enable output 1 and output 3:

```
OUTP ON,(@1,3)
```

To measure the output voltage and current of output 1:

```
MEAS:VOLT?(@1)
```

```
MEAS:CURR?(@1)
```

Using the Protection Function

Protection function

Each output has independent protection functions. A front panel status indicator will turn on when a protection function is set. Protection functions are latching, which means that they must be cleared once they are set.

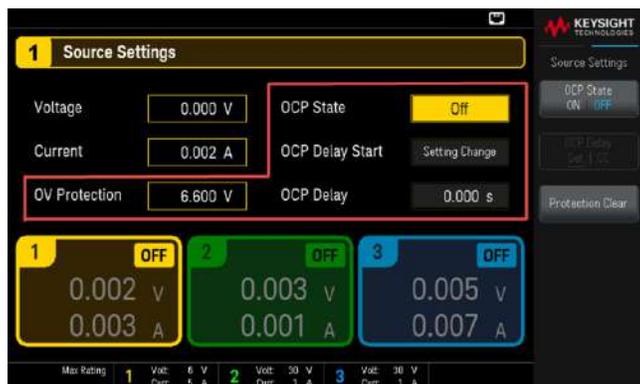
Of the following protection functions, only OV and OC are user-programmable.

- **OV:** Over-voltage protection is a hardware OVP whose trip level is a programmable value. The OVP is always enabled.
- **OC:** Over-current protection is a programmable function that can be enabled or disabled. When enabled, the output will be disabled when the output current reaches the current limit setting.
- **OT:** Over-temperature protection monitors the temperature of each output and shuts down the output if any temperature exceeds the maximum factory-defined limits.

Configuring protection

Protection functions are configured on the Source Settings window.

Press **Source Settings** to access the Source Settings window.



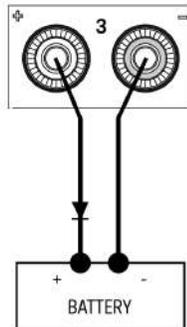
OV Protection

Over-voltage protection disables the output if the output voltage reaches the OVP level.

To set the over-voltage protection, enter an over-voltage value in the OV Protection field.

NOTE

The power supply's OVP circuit will program the output to zero whenever the overvoltage condition occurs. If external voltage source such as battery is connected across the output, and the overvoltage condition inadvertently occurs, the current from the voltage source will sink through the internal circuitry; possibly damaging the power supply. To avoid this, a diode must be connected in series with the output as shown below.

**OCP State**

The over-current protection is disabled by default.

With over-current protection enabled, the power supply disables the output if the output current reaches the current limit setting, which causes a transition from CV to CC mode.

Press **OCP State ON** | **OFF** to enable over-current protection.

Press **OCP State ON** | **OFF** to disable over-current protection.

NOTE

You can also specify a delay to prevent momentary CV-to-CC status changes from tripping the OCP. The delay can be programmed from 0 to 3600 seconds. You can specify if the start of the delay is initiated by any transition into CC mode, or only at the end of a settings change in voltage, current or output state.

OCP Delay

The power supply may momentarily cross into CC mode when it is turned on, when an output value is programmed, or when the output load is connected. In most cases these temporary conditions would not be considered an over-current protection fault, and having an OCP condition disables the output when the CC status bit is set would be a nuisance. Specifying an OCP delay will ignore the CC status bit during the specified delay period.

To set the over-current protection delay, enter the delay value in the OC Protection Delay field. The delay can be programmed from 0 to 3600 seconds.

OCP Delay Start

Specifying an OCP Delay Start lets the OCP circuit ignore the CC status bit during the specified delay period. Once the OCP delay time has expired and if the CC mode persists, the output will shut down.

You can specify the OCP delay start timer through:

- CC Transition: delay timer start at any transition of the output into CC mode. Press **OCP Delay Set** | **CC**.

- Setting Change: delay timer start at the end of a settings change in voltage, current, or output state. Press **OCP Delay Set** | **CC**.

Clears and OVP and OCP Event

To clear the protection function, first remove that condition that caused the protection fault.

Press **Protection Clear** to clear the protection function and returns the output to its previous operating state.

From the remote interface:

To set the over-voltage protection for output 1 to the maximum limit:

```
VOLT:PROT MAX, (@1)
```

To enable the over-current protection for output 1 and 3:

```
CURR:PROT:STAT ON, (@1,3)
```

To set the over-current protection delay time for output 1 at 3 seconds:

```
CURR:PROT:DEL 3, (@1)
```

To set the over-current protection delay timer start for output 1 to CC transition:

```
CURR:PROT:DEL:STAR CCTR, (@1)
```

To clear protection for output 1:

```
OUTP:PROT:CLE (@1)
```

Using the Tracking Operation

The EDU36311A provides 0 to 30 V tracking outputs. In the track mode, two voltages from Output 2 and Output 3 track each other for convenience in varying the symmetrical voltages needed by operational amplifiers and other circuits using balanced positive and negative inputs.

1. Set Output 2 to your desired voltage.
2. Press **[Tracking]** to enable track mode. You can also enable the track mode by pressing **Output Settings > Tracking ON | OFF**.

When track mode is enabled, Output 3 will be set to the same voltage level as the Output 2 and vice versa. The current limit is independently set for each of the outputs and is not affected by the track mode.

3. Verify that both Output 2 and 3 track each other properly.
You can verify from the front-panel display by comparing the voltage values of Output 2 and Output 3.

NOTE

In the track mode, if the CC annunciator is lit when the display is selected for the 30 V supply, choose a higher current limit for the 30 V supply.



From the remote interface:

To enable track mode:

```
OUTP:TRAC ON
```

Configuring the Output Turn On Turn Off Sequence

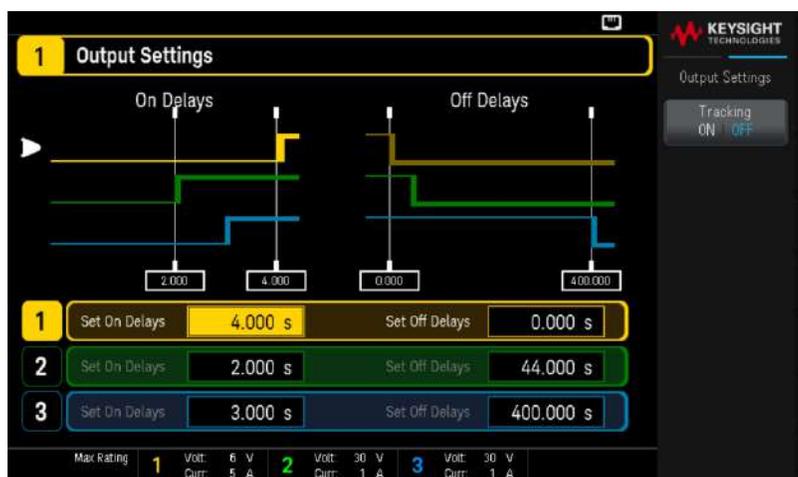
Turn-on and turn-off delays control the turn-on and turn-off timing of the outputs in relation to each other.

Step 1 – Set the output voltage and current of the output channels:

Refer to steps 1 and 2 under **Controlling the Outputs** and set the output voltage and current values of all outputs that will be sequenced.

Step 2 – Configure the turn-on turn-off delays:

Press **Output Settings** to access the On/Off Delays settings. Enter the On Delays and Off Delays for all outputs that will participate in the output on/off delay sequence. Values can range from 0 to 3600 seconds.



Step 3 – Use the All Outputs On and Off keys:

Once output delays have been set, press **[All On/Off]** to start the On delay and Off delay sequence.

NOTE

[All On/Off] will turn ALL outputs on or off, whether they are configured to participate in an output on/off delay sequence or not.

From the remote interface:

To program turn-on and turn-off delays for outputs 1 through 3:

```
OUTP:DEL:RISE 0.01,(@1)
OUTP:DEL:RISE 0.02,(@2)
OUTP:DEL:RISE 0.03,(@3)
OUTP:DEL:FALL 0.04,(@1)
OUTP:DEL:FALL 0.03,(@2)
OUTP:DEL:FALL 0.02,(@3)
```

To turn on all the outputs in sequence:

```
OUTP ON, (@1:3)
```

Saving and Recalling States from Instrument



Store/Recall saves and recall complete instrument states. You can store up to 10 states and set them as power-on state.

The instrument states include volatile settings such as:

- Voltage limit, mode and trigger level
- Over-voltage protection level
- Current limit, mode and trigger level
- Over-current protection state, delay and delay start
- Output selected, state, track mode, rise and fall delay
- Trigger delay, source and initiate continuous state
- Display state, meter view and image capture format

Store Settings

Store Settings allows you to browse to a directory and specify a file name, and to choose whether you want to store a state file internally or to an external USB flash drive.



Store an Instrument State Internally

Destination **Int** | **Ext** to store the instrument state internally within the instrument non-volatile memory.

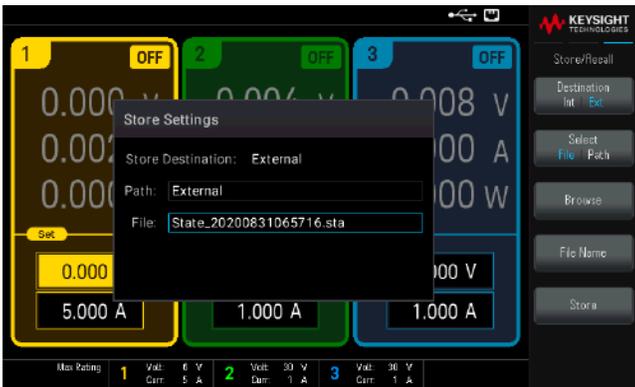
- Press **Store In** to select the state that you want to store the state settings. Choose between the available options: State 0, State 1, State 2, State 3, State 4, State 5, State 6, State 7, State 8, or State 9.
- Press **Store** to save the current instrument state into the selected storage location.

Store an Instrument State Externally

NOTE

Make sure to connect a USB flash drive before proceed. If a USB flash drive is not connected, the menus under **Destination Int** | **Ext** will be grayed out.

Destination **Int** | **Ext** to store the instrument state in a connected external USB flash drive.



Select **File | Path** selects an instrument state file.

- Press **Browse** to browse the directory of the connected external USB flash drive.
 - Press **Select** and use the navigation keys to select a state file. Press **Select** again to confirm your selection.
 - Press **Rename** to rename the selected file.
 - Press **Delete** to delete the selected file.

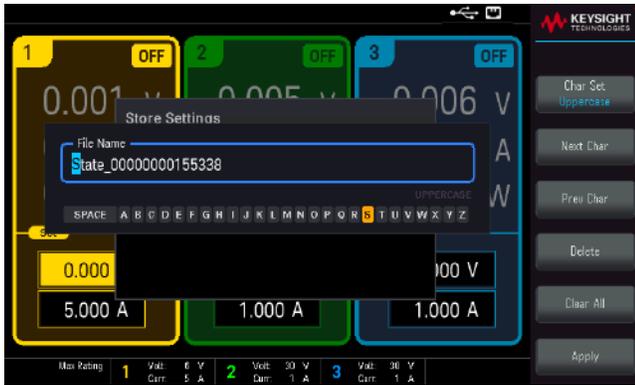
Select **File | Path** selects the location to store an instrument state file.

- Press **Browse** to browse the directory of the connected external USB flash drive.
 - Press **Select Folder** to select a folder in the directory of the connected external USB flash drive.
 - Press **Rename** to rename the selected file.
 - Press **Delete** to delete the selected file.
 - Press **Select** to confirm your selection.

Select **File Name** to specify a file name. Enter the file name with the keyboard provided. See [Using the virtual keyboard](#).

Press **Store** to store the instrument state file to your desired location.

Using the virtual keyboard



A virtual keyboard appears when you press certain softkey, for example **File Name**. This keyboard allows you to edit existing naming. Use the navigation keys, and the softkeys to enter your desired naming. Use the front-panel left and right arrows to point to a letter, and **Previous Char** and **Next Char** to move the cursor in the area where the name is entered.

- Press **Char Set** to change the character display on the virtual keyboard. Toggle between **Uppercase**, **Lowercase**, and **Numeric/Symbol**.
- Press **Delete** to delete the specified character.
- Press **Clear All** to clear the changes made on the file name.
- Press **Apply** to confirm your changes.

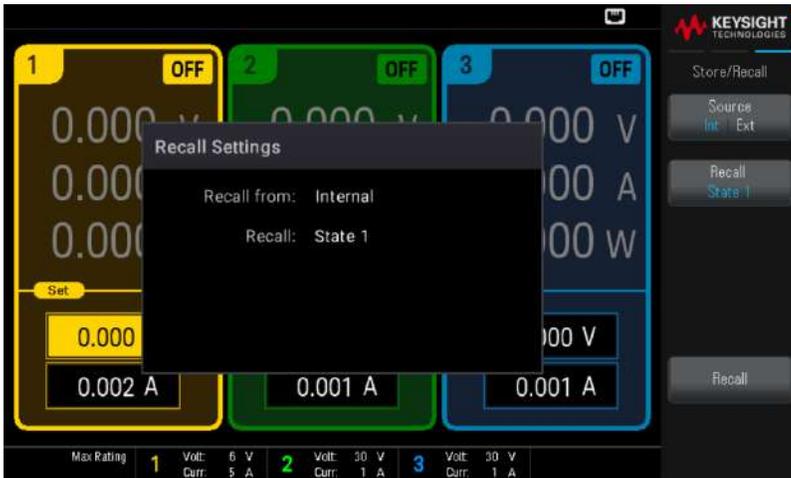
Recall Settings

NOTE

The file you recall must be from same instrument model.

Recall Settings allows you to browse to the state in the internal memory or browse to the state file (.sta format) in the external USB flash drive to be recalled.

Recall an Instrument State Stored Internally



Source **Int** | **Ext** recalls an instrument state that is stored internally within the instrument non-volatile memory.

- Press **Recall** to select the state that you want to recall from. Choose between the available options: State 0, State 1, State 2, State 3, State 4, State 5, State 6, State 7, State 8, or State 9.
- Press **Recall** to recall the instrument state from the selected storage location.

Recall an Instrument State Stored Externally



Source **Int** | **Ext** recalls the instrument state in a connected external USB flash drive.

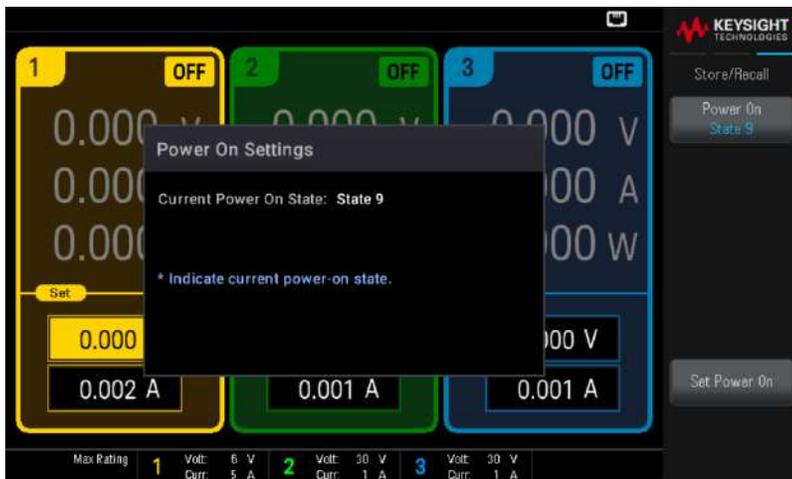
- Press **Browse** to browse the directory of the connected external USB flash drive.
- Press **Select** and use the navigation keys to select a state file. Press **Select** again to confirm your selection.

- Press **Rename** to rename the selected file.
- Press **Delete** to delete the selected file.
- Press **Recall** to recall the instrument state from the selected storage location.

Power On Setting

Power On selects the state that will be loaded at power-up. This can be either the factory default state (Factory Default), or user-defined states (State 0 to State 9).

Press **Set Power On** to save the setting.



Set to Defaults

Set to Defaults loads the instrument's factory default state.



Locking/Unlocking the Front Panel

1. Press **Unlock Lock** to lock the front panel. This produces lock icon(🔒) in the upper corner of the display, as shown below.



2. Select **Unlock** to unlock the front panel.

From the remote interface:

To lock all front panel keys including **Unlock Lock** key:

```
SYST:RWL
```

To lock all front panel keys except **Unlock Lock** key:

```
SYST:REM
```

To unlock the front panel:

```
SYST:LOC
```

Capturing a Screen

Press **Back** for more than three seconds to capture a screen (.bmp format). The screen that was active will be saved to the USB flash drive connected to the front USB port.

Utilities Menu

Utilities provides the following features:



View USB and LAN status as well as configure LAN settings

Perform instrument self-tests and calibration

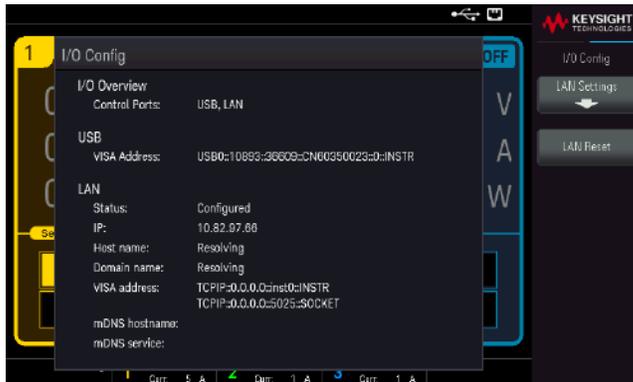
Configures the instrument's various user settings and displays the instrument's error queue

View instrument information and error messages

Utilities Menu - I/O Configuration

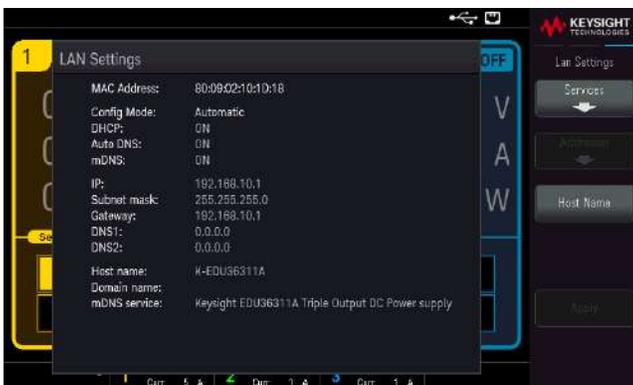


I/O Config displays I/O status and configures the I/O parameters for remote operations over the USB and LAN interface.



LAN Settings

LAN Settings opens the menu shown below.



Press **Host Name** to modify the instrument's host name.

Services enables and disables the following LAN services:



- **DHCP:** Disables or enables instrument's use of DHCP. The acronym DHCP stands for Dynamic Host Configuration Protocol, a protocol for assigning dynamic IP addresses to networked devices. With dynamic addressing, a device can have a different IP address every time it connects to the network.
 - When enabled, the instrument tries to obtain an IP address from a DHCP server. If a DHCP server is found, it assigns a dynamic IP address, Subnet Mask, and Default Gateway to the instrument.
 - When disabled, the instrument uses the static IP address, Subnet Mask, and Default Gateway during power-on. Press **Back** > **Addresses** > **Modify** to provide a static **IP Address**, **Subnet Mask**, and **Gateway**. Press **Apply** to save your changes when you are done.
- **Auto DNS:** Assigns static IP addresses of Domain Name System (DNS) servers. A primary and a secondary server address may be assigned.
 - If DHCP is available and enabled, DHCP will auto-assign these server addresses. These auto-assigned server addresses take precedence over the static addresses assigned with this command.
 - If disabled, press **Back** > **Addresses** > **Modify DNS1** or **DNS2** to provide a static DNS server address.
 - Press **Apply** to save your changes when you are done.
- **mDNS:** The multicast DNS (mDNS) service is for use in networks where no conventional DNS server is installed. Cycling power or resetting the LAN always enables mDNS.
 - Press **mDNS Service** to modify the instrument's mDNS service name.
 - Press **Apply** to save your changes.

After enabling or disabling one or more services, press **Back** > **Apply**. After that, you must cycle instrument power for the new settings to take effect.

LAN Reset

LAN Reset resets the LAN using its current settings and enables DHCP, Auto DNS, and mDNS. The **LAN Reset** softkey also clears any user-defined Web Interface password.

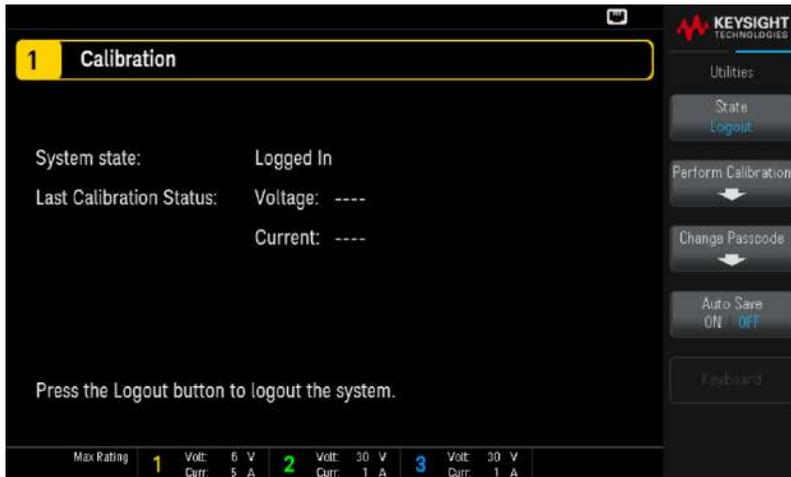
Utilities Menu - Instrument Setup



Instr. Setup provides access to calibration and self-test.

Calibration

Calibration accesses the instrument calibration procedure.



State Login or **State Logout** allows you to login/logout the instrument from the calibration system.

Perform Calibration opens the calibration menu. Make sure you have run the self-test before performing any calibration. Refer to "Calibration Adjustment Procedures" in the Service Guide for details.

The default security passcode is EDU36311A. Press **Change Passcode** to change the passcode. The passcode can be set up to 12 characters, which the first character must be a letter (A-Z), remaining may contains letters, numbers (0-9), or underscore "_". Blank spaces are not allowed.

Auto save ON | Off will automatically save the calibration data upon logout.

When **Auto save** is **OFF**, press **Cal Save** to save the calibration data.

Self Test

Self Test verifies proper instrument operation. Refer to "Self-Test Procedures" in the Service Guide for details.

Utilities Menu - User Settings



User Settings specifies user preferences that control how the user interacts with the instrument. These settings are stored in non-volatile memory.

Language

Language selects the help language for front-panel use: English, French, German, Japanese, Korean, Simplified Chinese, Traditional Chinese, or Russian. All front-panel key help, and help topics appear in the selected language.

The softkey labels are always in English.

Sound

Beeper enables or disables the beeper sound when an error is generated from the front panel or remote interface. This setting will not affect the front panel key click sound.

Key Click enables or disables the click heard when a front-panel key or softkey is pressed.

Display

Display enables or disables the display.

If you turn off the display, the entire front panel display will be blank. Pressing any key will enable the display.

Auto-Dim enables or disables the auto dimming mode, which increases display life by dimming the display during long periods of inactivity. If the auto dimming mode is **On**, the display will be dimmed after 2 minutes of inactivity. This setting is stored in non-volatile memory.

Date / Time



Date / Time sets the instrument's real-time clock, which always uses a 24-hour format (00:00:00 to 23:59:59). There is no automatic setting of the date and time, such as to adjust for daylight savings time.

Select the area of edit from the menu: **Year**, **Month**, **Day**, **Hour**, and **Minute**. Then, use the front panel navigation keys or numeric keypad to set the year, month, day, hour, and minute.

Press **Enter** to confirm the setting or **Cancel** to discard.

Utilities Menu - Help



Help allows you to view instrument information, and error messages.

About

About allows you to view the instrument's model number, description and serial number.

Error

Error displays the instrument's error queue, which includes up to 20 errors.



- Errors are stored in the order they are received. The error at the end of the list is the most recent error.
- If there are more than 20 errors in the queue, the last error stored is replaced with -350, "Queue overflow". No more errors are stored until you remove errors from the queue.
- Errors will be cleared after you have read them or after an instrument reset.

If you suspect that there is a problem with the power supply, refer to "Troubleshooting" in the Service Guide.

3 Characteristics and Specifications

NOTE

For the characteristics and specifications of the EDU36311A programmable DC power supply, refer to the datasheet at <https://www.keysight.com/us/en/assets/3121-1003/data-sheets/EDU36311A-Triple-Output-Bench-Power-Supply.pdf>

The logo for dataTec, featuring the word "dataTec" in a white, italicized, sans-serif font on a red rectangular background.

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