



# SOURCE

Matrix TSL Laboratory PSU and  
Signal Generator

LK6999 (115VAC)  
LK2975 (230VAC)

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## General Information

This Laboratory Power Supply and Signal Generator product is designed primarily for educational use and hence has the inbuilt safety feature of selectable current limit for all power output rails. It is capable of supplying several current limited DC voltage outputs, to be used as a power supply for bench based equipment.

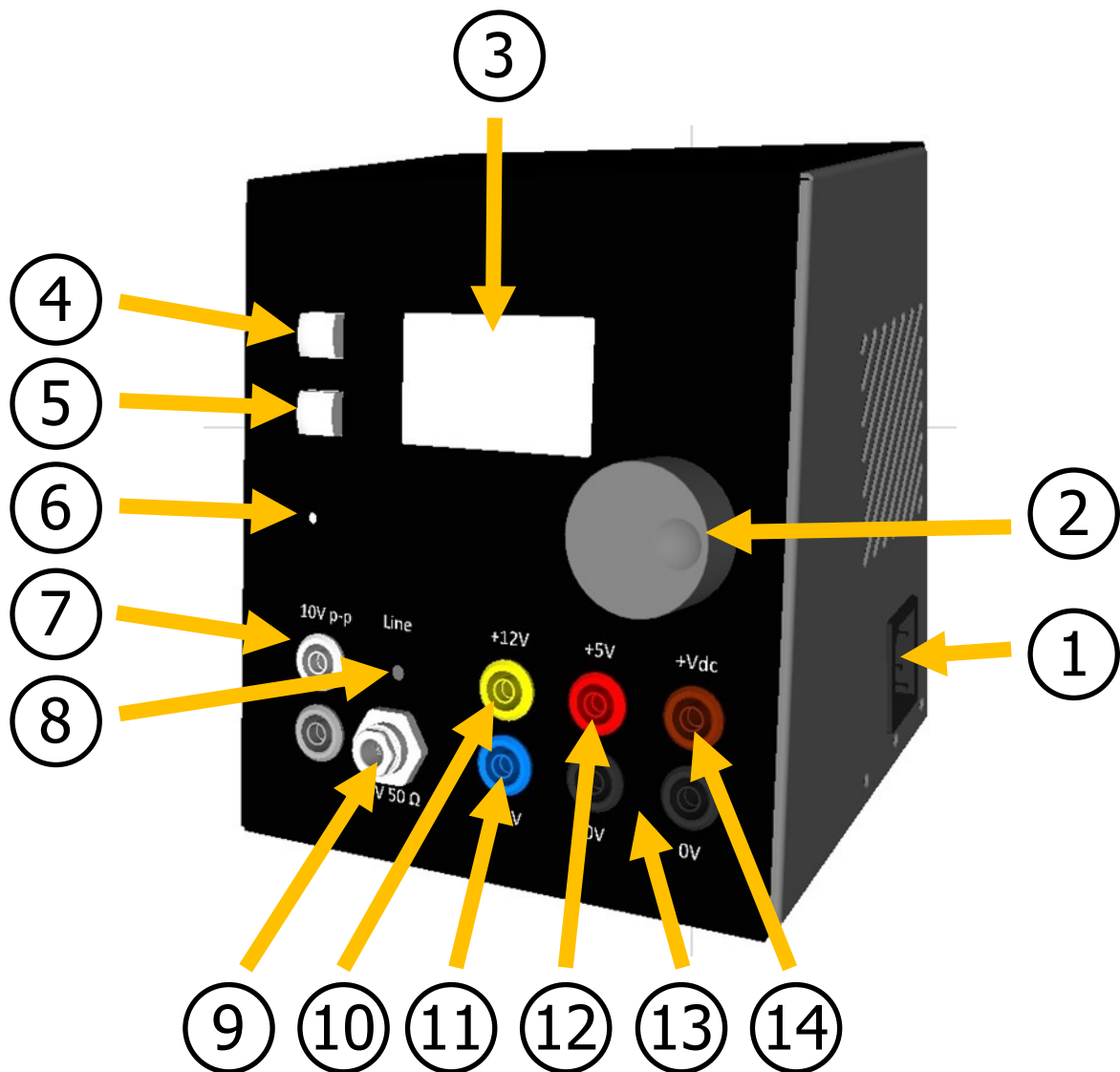
It also generates AC signals for test use at various output levels.

The user has control over most parameters through the use of a backlit display based menu system, push buttons and rotary control knob.

There are two versions of this product available, identified by the product label on the underside of the unit.



## Product features



- 1) Mains inlet socket
- 2) Rotary control and push On/Off switch
- 3) Backlit display
- 4) Up selection push switch
- 5) Down selection push switch
- 6) LED status indicator
- 7) Sockets for loudspeaker / Vac output
- 8) Jack socket for AC wave signal output
- 9) BNC socket for AC wave signal output
- 10) Socket for +12 volt power supply rail
- 11) Socket for -12 volt power supply rail
- 12) Socket for +5 volt power supply rail
- 13) Common 0 volt (ground) sockets for power supply rails
- 14) Socket for variable voltage power supply rail

## Outputs specification table

Feature	Output	Details		Terminal
Signal Generator: Sine, Square, Triangle, Sawtooth, Custom	Instrumentation 0.1Hz to 100KHz	50 Ohm DC coupled 10V p-p		BNC
	Audio Output 20Hz-20KHz	Loudspeaker/Transducer AC coupled 10V p-p 1.3 Amp peak		4mm shrouded(+) 4mm shrouded(-)
		Line Out AC coupled 2V p-p 200 Ohm source impedance		Mono Jack
Power Supply	3-10V variable	up to 3A maximum	variable current limited, monitored	4mm shrouded (brown)
	+12V	up to 5A maximum	variable current limited, monitored	4mm shrouded (blue)
	+5V	up to 5A maximum	variable current limited, monitored	4mm shrouded (red)
	-12V	up to 300 mA	current limited to 300mA	4mm shrouded (yellow)

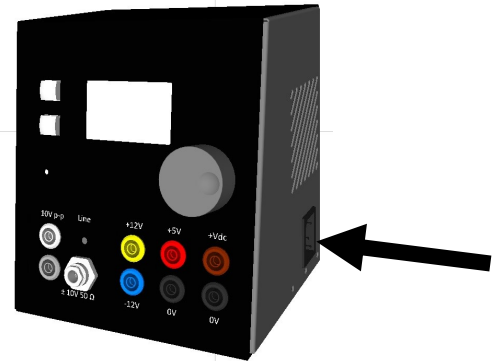
# Operating instructions

## Connecting to a mains electricity supply

Connect to a mains power source using the supplied lead. Whenever connected to a mains supply the unit will be in standby mode and the LED status indicator will be amber.

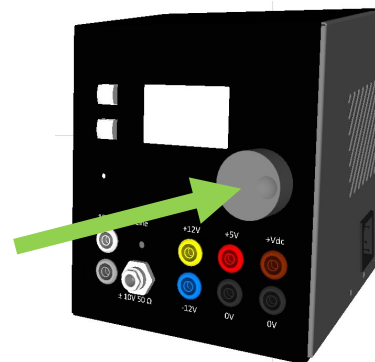
## Turning the unit on (from standby)

To fully turn on the unit from standby push the main rotary control button. The status LED will change from amber to green and the display backlight will illuminate.



## Turning the unit off (to standby)

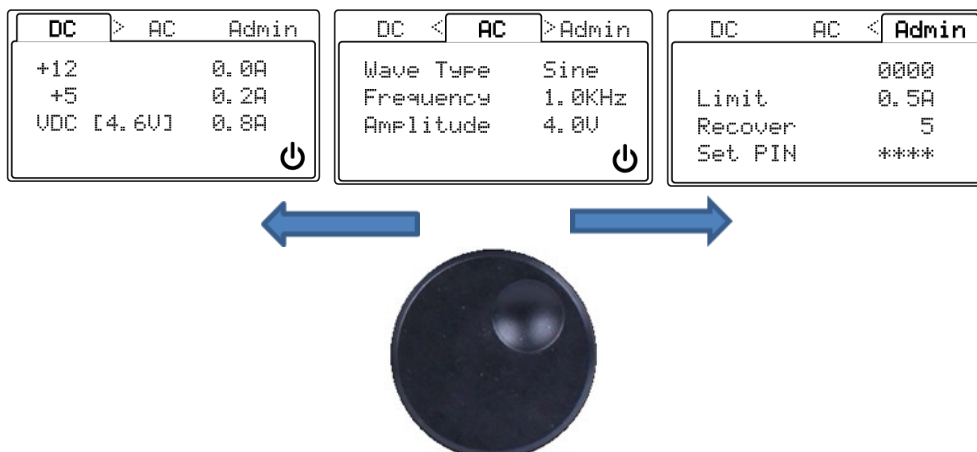
To turn off all outputs and put the unit into standby mode, press the main rotary control button. A confirmation dialog will appear on screen, press the main rotary control button again and the unit will go to standby mode. The display backlight will turn off and the LED status indicator will go to amber.



# The menu system

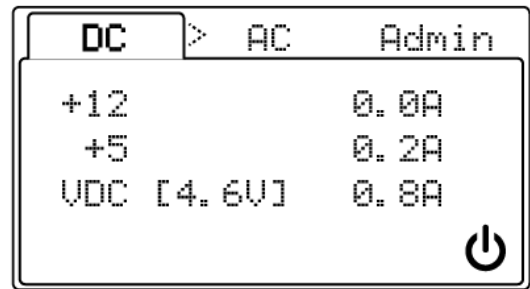
The unit is controlled via a tabbed menu system.

When one of the top row tab names is highlighted the tabbed page can be changed by turning the rotary control knob. If a tab name is not highlighted, press the “up” push button (4) until it is.

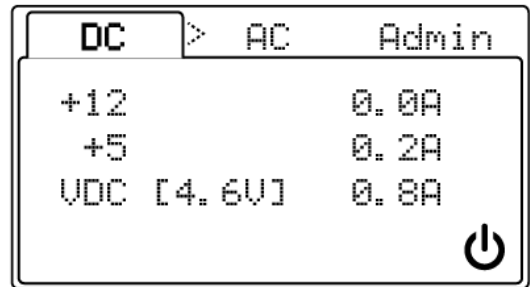


## DC power supply output menu

At the “DC” tabbed menu page, the variable output voltage and supplied currents for each supply rail are displayed.



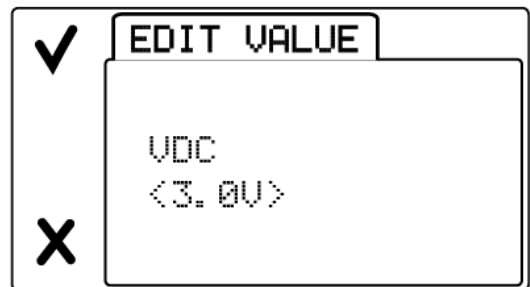
Press the “Down” push button (5) and the variable output voltage will be marked by the cursors.



Push the rotary control and edit screen will appear. The variable output voltage can then be adjusted with the rotary control.

To set the new value push the “Up” push button (4), as indicated by the tick symbol.

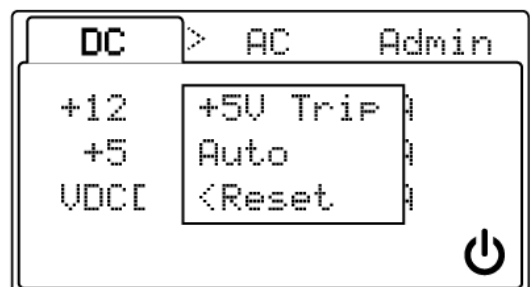
To cancel the change push the “Down” push button (5), as indicated by the cross symbol.



## DC power rail over current trip

If any rail output exceeds the pre-set current limit then the rail is turned off.

In this case the popup message will appear as shown.



The rail supply can be re-established by activating a reset via the “Down” push button (5).

If the automatic reset feature is enabled then the countdown time to power rail on will be displayed. In this example the rail will be turned back on in 5 seconds.

## AC waveform output menu

At the “AC” tabbed menu page, the wave type, frequency and amplitude (approximate peak to peak voltage of the BNC output) are displayed.

Press the “Down” push button (4) and the Wave Type option is highlighted.

The Wave Type can be changed by pushing the rotary control and then at the edit page use the rotary control to change the setting.

To set the new value push the “Up” push button (4), as indicated by the tick symbol.

To cancel the change push the “Down” push button (5), as indicated by the cross symbol.

Press the “Down” push button (5) again and the Frequency option is highlighted.

The Frequency can be changed by pushing the rotary control and then at the edit page use the rotary control to change the setting.

To set the new value push the “Up” push button (4), as indicated by the tick symbol.

To cancel the change push the “Down” push button (5), as indicated by the cross symbol.

Press the “Down” push button (5) again and the Amplitude option is highlighted.

The Amplitude can be changed by pushing the rotary control and then at the edit page use the rotary control to change the setting.

To set the new value push the “Up” push button (4), as indicated by the tick symbol.

To cancel the change push the “Down” push button (5), as indicated by the cross symbol.

DC	<	<b>AC</b>	>	Admin
Wave Type	Sine			
Frequency	1.0KHz			
Amplitude	4.0V			
				⏻

DC	<	<b>AC</b>	>	Admin
Wave Type	[Sine ]			
Frequency	1.0KHz			
Amplitude	4.0V			
				⏻

✓	<table border="1"> <tr> <td colspan="2" style="text-align: center;"><b>EDIT VALUE</b></td> </tr> <tr> <td style="text-align: center;">Wave Type</td> <td style="text-align: center;">&lt;Sine &gt;</td> </tr> </table>	<b>EDIT VALUE</b>		Wave Type	<Sine >
<b>EDIT VALUE</b>					
Wave Type	<Sine >				
✗					

DC	<	<b>AC</b>	>	Admin
Wave Type	Sine			
Frequency	[1.0]KHz			
Amplitude	4.0V			
				⏻

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<b>EDIT VALUE</b>					
Frequency	< 1.0KHz >				
✗					

DC	<	<b>AC</b>	>	Admin
Wave Type	Sine			
Frequency	1.0KHz			
Amplitude	[ 4.0]V			
				⏻

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Amplitude	< 4.0V >				
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## Custom wave editor

At the “AC” tabbed menu page, ensure that the Wave Type is set to “Custom”

Press the “Down” push button (4) repeatedly until the Wave Edit option is highlighted.

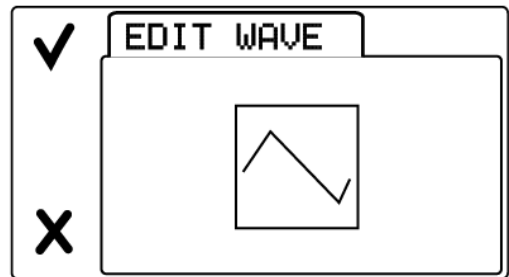
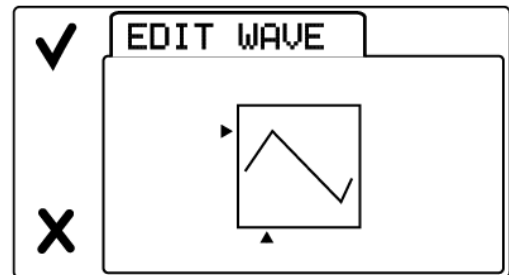
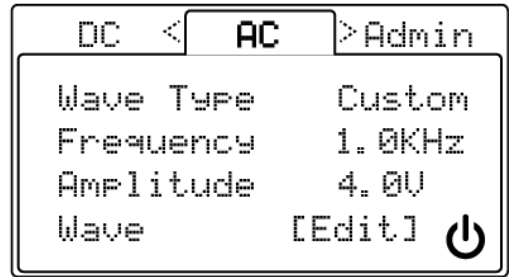
Push the rotary control and the edit wave page will appear.

Turn the rotary control to the desired point in the waveform and then use the Up and Down push switches to increase or decrease the level at that point.

When editing is complete, turn the rotary control until the confirm (tick) and cancel (cross) options appear.

To set the new custom waveform push the “Up” push button (4), as indicated by the tick symbol.

To cancel the change push the “Down” push button (5), as indicated by the cross symbol.





## Administration menu

At the “Admin” tabbed menu page, the settings for the rail current limit and auto recovery time are displayed.

To change these values requires the entry of the correct four digit PIN code.

Press the “Down” push button (4) and the PIN code is highlighted. Then push the rotary control and the PIN entry page will be displayed.

Enter the PIN (access code) using the rotary control. The factory default code is 1234, but this can be changed by the user.

Confirm the entry by using the “Up” push button (4), as indicated by the tick symbol.

To cancel push the “Down” push button (5), as indicated by the cross symbol.

If the correct PIN code was entered then the “Down” push button (5) will move the highlight down to the first configuration option, which is the power rails current Limit.

Push the rotary control to select and edit the value. At the Limit option the rotary control can be used to set the power rails current limit to either 0.5A, 1A, 2A or maximum for the rail. See the table on page 4.

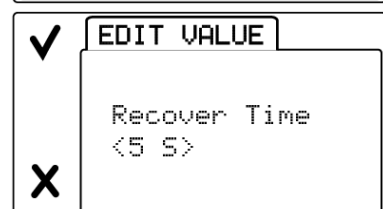
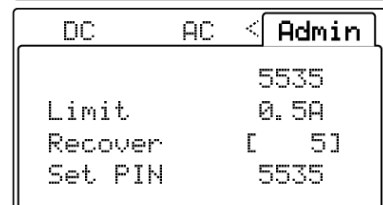
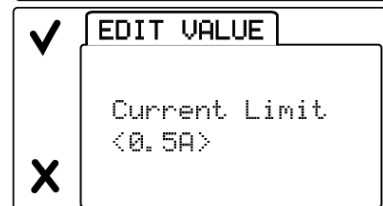
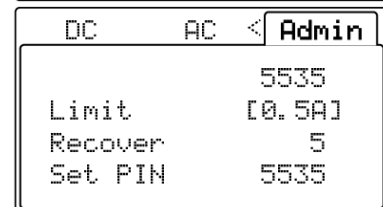
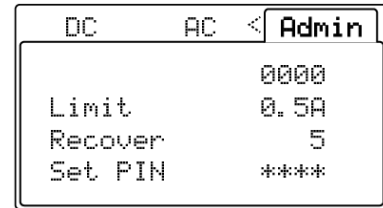
If the current limit is exceeded by any rail then the output power rails are shut down, until either the rotary push on is activated or the auto-recovery time has elapsed.

The auto-recovery of the power rails is configured by the Recover option setting. This sets the time in seconds that the unit waits before automatically attempting to re-establish the power rails to their on condition.

When the Recover time is set to 0 the unit does not attempt recovery but remains in standby mode with the rails turned off. The rails are powered back on by the user pressing the “Down” push button (5)

The last option Set PIN, enables the use to change the PIN access code.

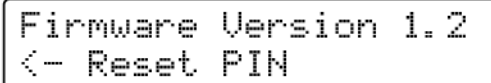
The access PIN code can be set back to 1234 by the use of the factory reset feature.



## Factory reset

To reset the unit to factory pre-set conditions, such as configuration settings, custom waveform and access PIN code of 1234:

- Remove mains power from the unit.
- Press and hold both Up and Down push switches
- Apply mains power
- Release both Up and Down push switches
- Press the Up push switch to action the reset
- Or press the rotary push switch to cancel



```
Firmware Version 1.2  
<- Reset PIN
```

Cancel ->

## Safety

This product must be connected to mains earth, using the supplied mains power cable.

Note that the common (0v) supply rail terminals are connected to the chassis and mains earth.

Not to be used in conjunction with any other power supply sources.

Ensure all external wiring is in a good condition and correctly terminated.

Do not operate the equipment if it has been subjected to liquid spills, in any such case disconnect the unit from the mains supply, if it is safe to do so.

Do not cover or block the air vents, but allow space around the unit for free air flow ventilation.

Do not open or disassemble the unit, there are no user serviceable parts inside.

The product is not intended for use in safety-critical applications.

## Power Rating

Power input rating is 210-240VAC 1A or 105-125VAC 2A depending upon region and model.

If the power lead fuse is replaced it must be replaced by one of the same rating.

## FCC

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this product not expressly approved by Matrix TSL could void the user's authority to operate the equipment.

## CE Conformity

The products covered by this guide are intended to be used in all EU member countries, Norway, and Switzerland. Products have been tested and found to comply with the requirements for a Class B device pursuant to European Council Directive 2014/30/EU (EMC) and 2014/35/EU (LVD) thereby satisfying the requirements for CE Marking and sale within the European Economic Area (EEA).

Applicable standards EN61326-1:2013 (EMC) and EN61010-1:2010 (LVD)

## RoHS

Restriction of Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

This product complies in all material respects with DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive) and Amendment 2005/618/EC filed under C(2005) 3143.

## WEEE

Waste Electrical and Electronic Equipment (WEEE)

For product recycling instructions and more information, please go to [www.matrixtsl.com](http://www.matrixtsl.com)



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