Keysight Models 6811B – 6814B, 6834B, and 6843A AC Power Solutions

Quick Start Guide

KEYSIGHT TECHNOLOGIES

Safety Notices

The following general safety precautions must be observed during all phases of operation 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 if the customer fails to comply with these requirements.

WARNING: *LETHAL VOLTAGES*

Ac sources can supply 425 V peak at their output. DEATH on contact may result if the output terminals or circuits connected to the output are touched when power is applied. Hazardous voltages can remain active inside the unit even after it has been turned off. If the internal LED's are on, hazardous voltages are present.

General

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions. Any LEDs in this product are Class 1 LEDs as per IEC 825-1. This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada.

Environmental Conditions

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specification tables for the ac mains voltage requirements and ambient operating temperature range. Do not operate the instrument in the presence of flammable gases or fumes.

Before Applying Power

Verify that all safety precautions are taken. Make all connections to the unit before applying power. Note the instrument's external markings described under "Safety Symbols"

Ground the Instrument

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground 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.

Fuses

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuseholders.

Do Not Remove the Cover

Operating personnel must not remove instrument covers. Parts replacement and internal adjustments must be made only by qualified service personnel.

In Case of Damage

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

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 Symbols


Direct current


Alternating current


Both direct and alternating current


Three phase alternating current


Earth (ground) terminal


Protective earth ground terminal.


Frame or chassis terminal


Terminal is at earth potential.


Neutral conductor on permanently installed equipment


Line conductor on permanently installed equipment.

On supply


Off supply


Standby supply. Unit is not completely disconnected from ac mains when switch is off

In position of a bi-stable push switch


Out position of a bi-stable push switch


Caution, risk of electric shock


Caution, hot surface


Caution, refer to accompanying description

Contents

NOTE: You can contact Keysight Technologies at one of the following telephone numbers for warranty, service, or technical support information.

In the United States: (800) 829-4444
In Europe: 31 20 547 2111
In Japan: 0120-421-345

Or use our Web link for information on contacting Keysight in your country or specific location: www.keysight.com/find/assist

Or contact your Keysight Technologies Representative.

Part number: 5962-0883
Print date: December, 2014

The front panel - at a glance

14-character display shows menu commands and measured values.

- Annunciators indicate operating modes and status conditions.

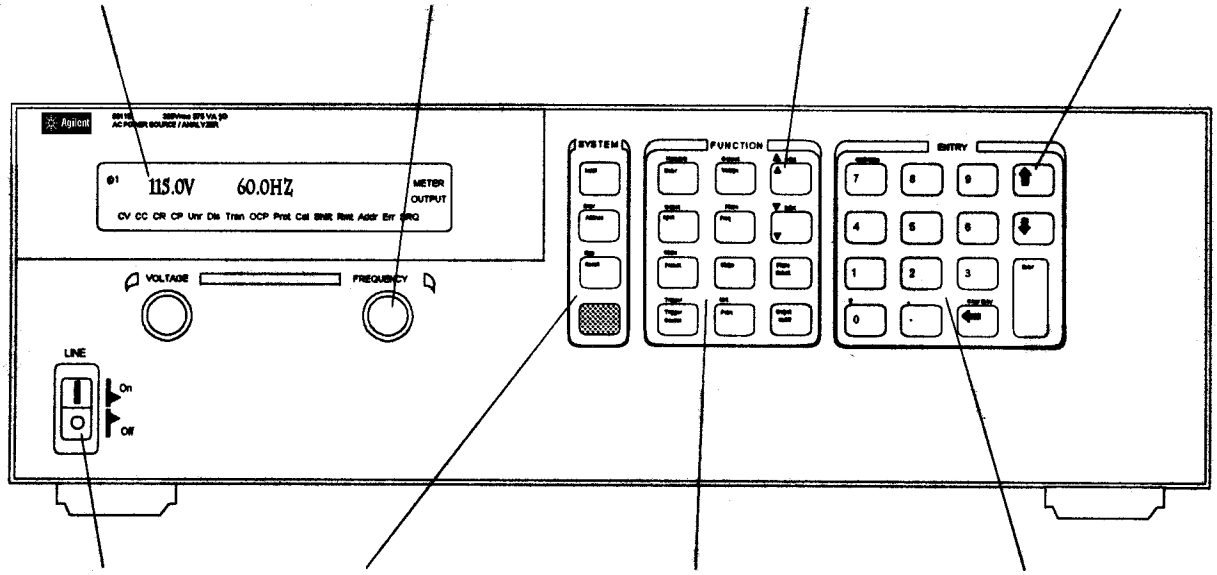
Rotary controls set voltage and frequency when ac source is in local mode.

- Turn rapidly for coarse control
- Turn slowly for fine control.

▼ and ▲ scroll through menu commands.

▼ index and ▲ index scroll through lists and harmonic arrays.

▼ and ▲ scroll through command parameters.



Turns the ac source on or off

System keys:

- Return to Local mode
- Set the GPIB address and other system parameters
- Set the RS-232 interface
- Display SCPI error codes
- Save and recall instrument states

Function keys:

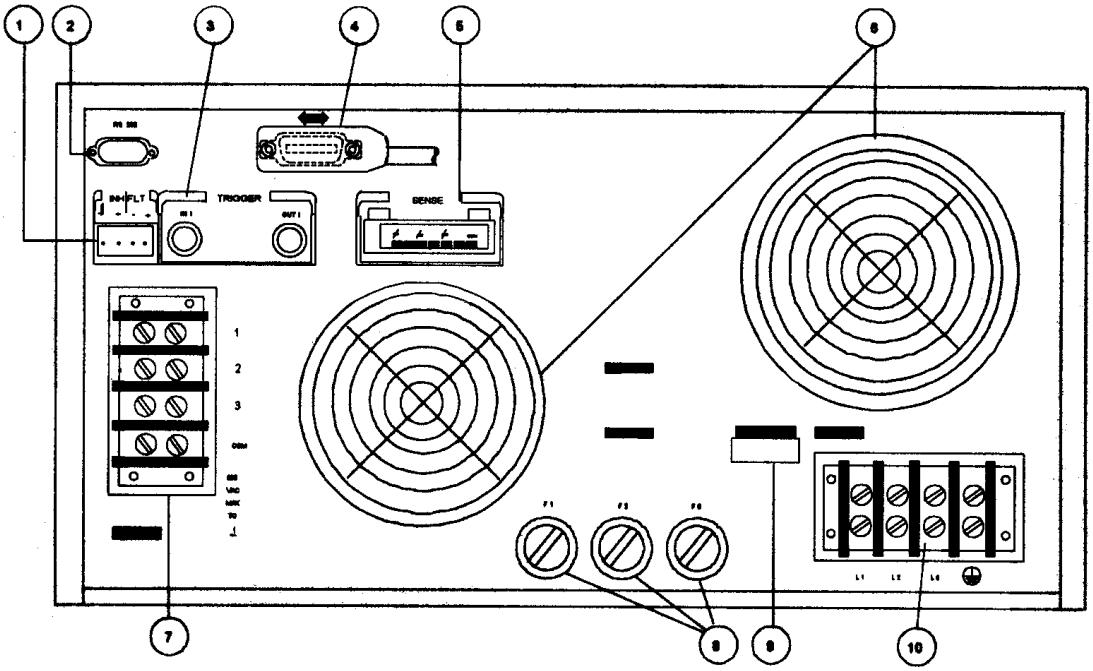
- Enable/disable the output
- Select output phases
- Select front panel metering and harmonic analysis functions
- Program voltage frequency, phase, current limit, pulse parameters, and waveform shapes
- Set and clear protection functions
- Select output and input coupling
- Monitor status
- Scroll through front panel menu commands.

Entry keys:

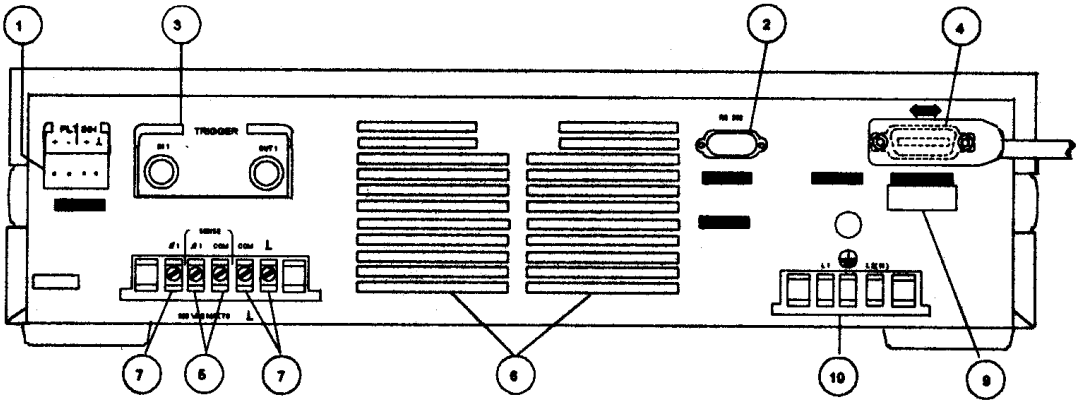
- Enter values
- Increment or decrement values
- Scroll through command parameters.
- Calibrate the ac source.

The rear panel – at a glance

Agilent Models 6814B 6834B 6843A



Agilent Models 6811B 6812B 6813B



Rear Panel Connections (see Chapter 3 in the User's Guide for details)

1 INH (Remote Inhibit) TTL input signal for externally disabling the power source.
FLT (Discrete Fault Indicator) TTL output signal when there is a device fault.

2 RS-232 connector for remote controller.

3 TRIGGER BNC connectors for external trigger inputs and &source; trigger outputs.

4 GPIB connector and GPIB cable for remote controller.

5 SENSE connections for remote voltage sensing at the load.

6 Airflow Vents (do not block).

7 OUTPUT power connections to the load. (ϕ2, ϕ3 connections available on Keysight 6834B only.)

8 AC Input Line Fuses (Keysight 6814B/6834B/6843A only. Other models have internal fuses).

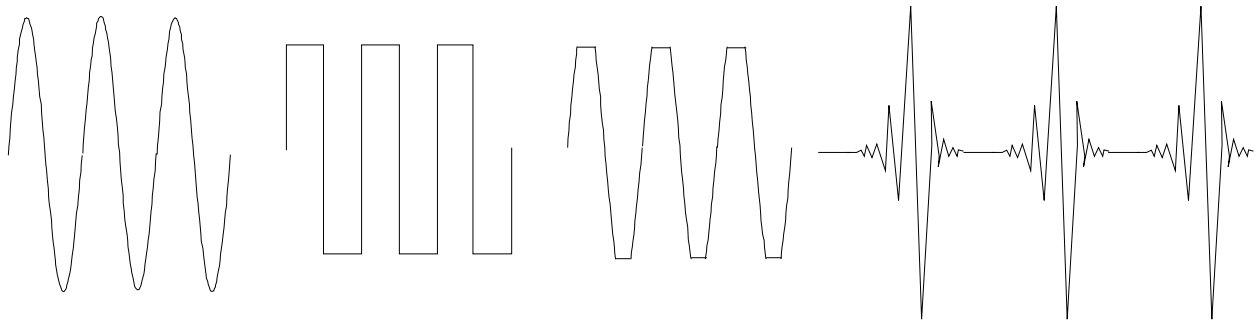
9 LINE RATING label specifies power source required by the power source.

10 AC Line Input connections from the power source.

What the ac source can do

Generate waveform shapes

- Sinewave
- Squarewave
- Clipped sinewave
- User-definable waveforms



Program the output

- Phase
- Ac rms voltage
- Distortion
- Frequency
- Voltage and frequency slew rates
- Rms current limit

Keysight Models 6811B, 6812B, 6813B program the following additional output functions:

- Dc voltage
- Peak Current limit
- AC coupling
- Impedance

Make the following measurements

- Ac rms, ac + dc rms voltage
- Ac rms, ac + dc rms current; plus repetitive and non-repetitive peak current
- Real, reactive, and apparent power
- Harmonic analysis of voltage and current waveforms giving amplitude, phase, and total harmonic distortion results of up to the 50th harmonic.
- Triggered acquisition of digitized voltage and current with extensive post-acquisition calculations

Keysight Models 6811B, 6812B, 6813B make the following additional measurements:

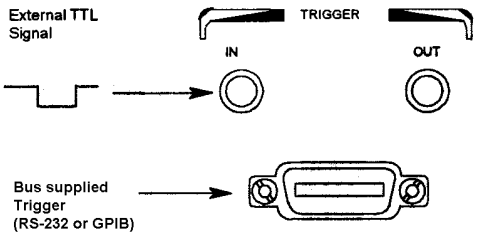
- Dc voltage
- Dc current

Keysight Model 6834B makes the following additional measurement:

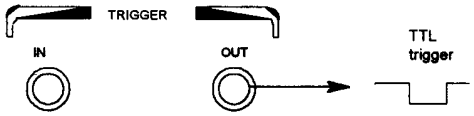
- Total power and neutral current

Synchronize transient events or measurements with external signals

- Triggers applied to the unit

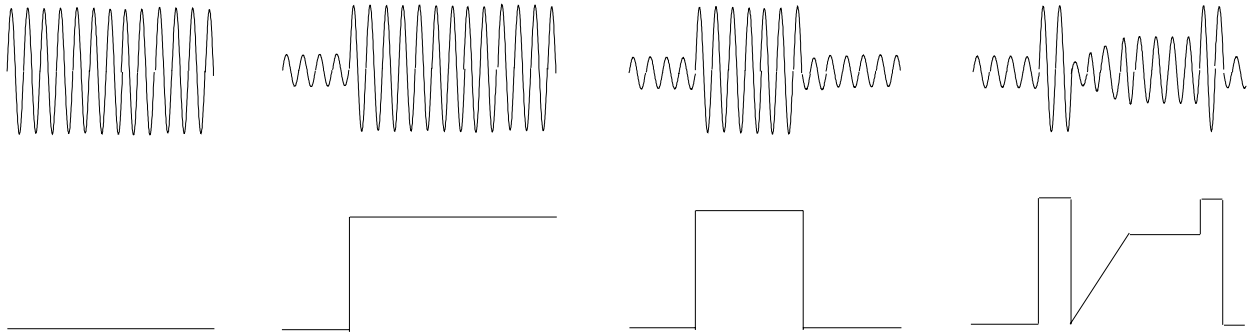


- Triggers generated by the unit



Operate in four transient modes

- Fixed
- Step
- Pulse
- List



Operate under local or remote control

- From the front panel keys
- Through the built-in GPIB or RS-232 interfaces

Implement protection features

- Over-voltage
- Over-current
- Over-power
- Over-temperature
- User-defined external events (via a FLT shutdown signal)

How to use the front panel

Make sure the unit is turned on.

From the System key group

Local

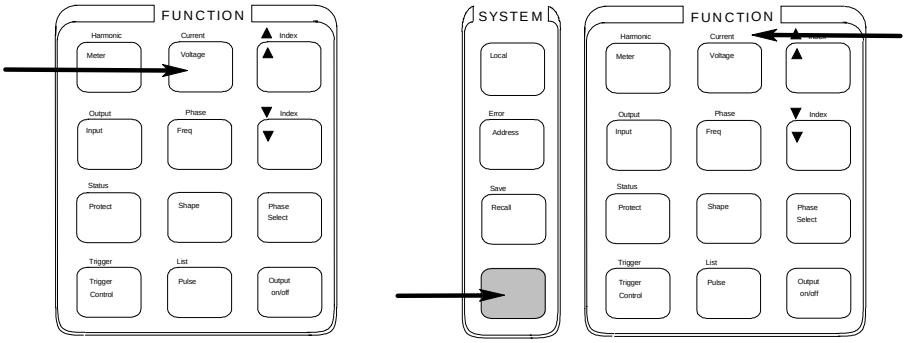
Press **Local** to activate the front panel keypad if the unit is not already in local mode. (If the Local Lockout command is in effect, cycle power to return the unit to local mode.)

From the Function key group

Voltage

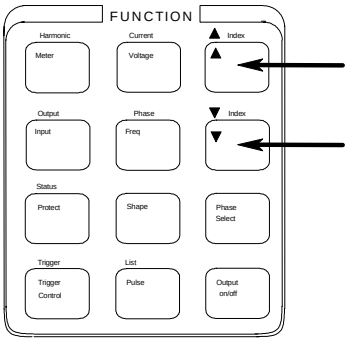
Press **Voltage** to select the voltage function. To select a different function, simply press the appropriate key.

To select a function appearing above a key (such as **Current**), first press the blue shift key, then press the key below the function.



NOTE: **Pressing Output on/off, Phase Select, or (Shift) + Trigger immediately implements the function**. Display annunciators indicate that an immediate action has occurred. All other function keys have command menus underneath them that are accessed via the ▲ and ▼ keys after the function key is pressed. Refer to "The front panel menus- at a glance".

▲ ▼ Use these keys to move through the command menus of the selected function.

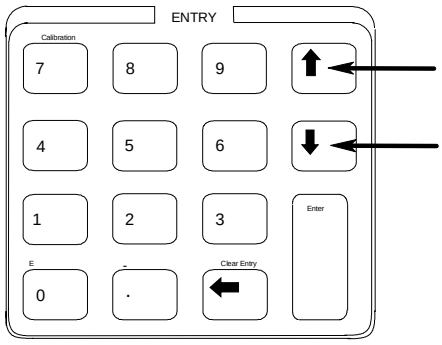


The following chart shows the commands in the Voltage function menu. Some commands may not appear on all models. Menus are circular, you can return to the starting position by continuously pressing ▲ or ▼.

Key	Display	Command Function
Voltage	VOLT <value>	Set immediate rms output voltage
▼	VOLT:T <value>	Set triggered rms output voltage
▼	VOLT:M FIXED	Select the voltage mode
▼	OFFSET <value>	Set immediate dc offset voltage
▼	OFFSET:T<value>	Set triggered dc offset voltage
▼	OFFSET:M FIXED	Select the dc offset voltage mode
▼	RANGE 150	Selects the voltage range
▼	SLEW <value>	Set immediate voltage slew rate in volts/second
▼	SLEW:T<value>	Set triggered voltage slew rate in volts/second
▼	SLEW:M FIXED	Select the voltage slew mode
▼	ALC INT	Select the voltage sense source
▼	ALC:DET RMS	Select the voltage sense detector

From the Entry key group

⬇ ⬆ Use these keys to increment/decrement or select the command parameters to be executed. If the parameter is a number, use these keys to make minor changes to the value. **Enter** enters the selection and returns to the Meter function.



Key	Display	Description
Voltage , ▼ , ▼	VOLT:M FIXED	Sets fixed mode
⬇	VOLT:M STEP	Sets step mode
⬇	VOLT:M PULSE	Sets pulse mode
⬇	VOLT:M LIST	Sets list mode

1 9 Use the numeric Entry keys to directly enter a value for the command parameter. For example, to enter a value for the voltage parameter:

Key	Display	Description
Voltage	VOLT 0	0 volts
6 , 0	VOLT 60	60 volts
Enter	60 V 60 Hz	enters the value and returns to the Meter function

Some basic operations

Make sure the unit is turned on. Use either the front panel keys or the corresponding SCPI commands.

The column on the left indicates the front panel keys that program the indicated action. If the SCPI programming syntax is substantially different from the front panel menu command, it is shown inside parentheses ( ).

The text to the right describes the result. If appropriate, the resultant output waveshape is shown underneath the description.

Enable the output

Output On/Off

When the output is enabled, the programmed voltage appears at the output and the Dis annunciator turns off.

Select the output phase (Keysight 6834B only)

Phase Select

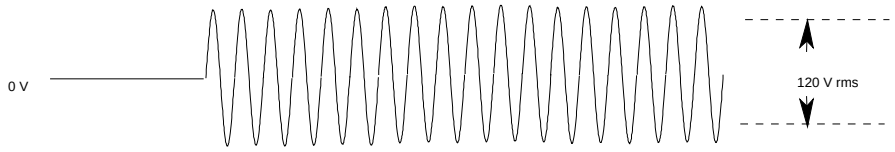
(INST:NSEL)

You can specify phases individually, or you can couple the phases. When phases are coupled, all three phase annunciators (ϕ1, ϕ2, ϕ3) on the front panel are on, indicating that commands will be sent to all three phases. Note that front panel metering is only done one phase at a time (except for the total power and neutral current measurements).

Set the voltage

Voltage
1
2
0
VOLT 120
Enter

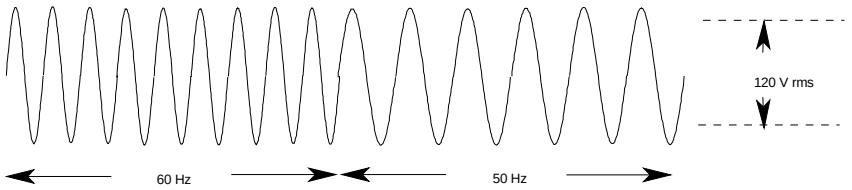
When this command is sent, the output voltage is set to 120 V rms.



Set the frequency

Freq
5
0
FREQ 50
Enter

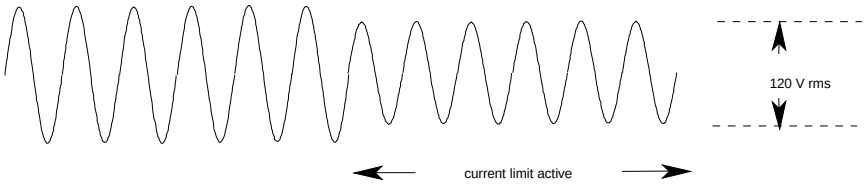
When this command is sent, the output frequency is set to 50 Hz.



Set the rms current limit (and peak current on Keysight 6811B/6812B/6813B units)

Shift
Current
1
0
CURR:LEV 10
Enter

When this command is sent, the rms current limit is set to 10 A. If more current than the programmed limit is drawn, the output voltage amplitude is reduced to keep the rms current within the specified limit. Press **Shift Current** and ▼ to access CURR:PEAK, which lets you set the peak current limit on Keysight 6811B/6812B/6813B units. Note that the peak current limit circuit on these units acts instantly and clips the output voltage to maintain the programmed peak limit.

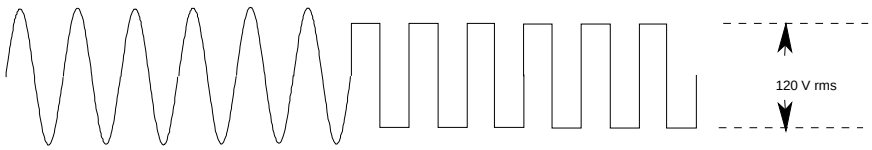


NOTE: The rms current limit circuit is slower than the peak current limit circuit and, depending on the setting of the peak current limit and the load on the output, your unit may generate momentary peak currents that can well exceed the rms current limit.

Select a waveshape

Shape
⬇
SHAPE SQUARE
Enter

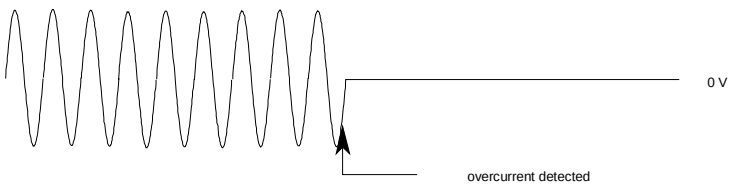
When this command is sent, the output generates a squarewave. Note that the peak-to-peak amplitude of the squarewave is less that that of a sinewave when it is programmed to the same rms voltage amplitude.



Program a protection function

Protect
CURR:LEV 10
Enter
Protect
▼
⬇
CURR:PROT ON
Enter

These commands clear all previously set protection functions and then set the current protection, which disables the output when an overcurrent condition is detected. The OCP annunciator will light when this command is programmed.



Measuring the output

All measurements are based on acquiring and subsequently processing output waveform information. When the ac source is on, it takes measurements and updates the front panel meter continuously. The **Meter** key accesses the measurement functions from the front panel.

The SCPI MEASure command acquires **new** waveform information each time it is executed. The SCPI FETCh command does not acquire new waveform information but extracts the desired information from previously acquired waveform data. SCPI commands let you measure phases individually or simultaneously measure all phases using the FETCh command.

Measurement functions

The following example illustrates the measurements that can be returned by the front panel of the ac source when sourcing power to a typical non-resistive load such as a power supply. The ac source output voltage and current waveforms are shown on the next page.

NOTE: On Keysight 6811B, 6812B, and 6813B units, the **Input** key selects the meter coupling and hence, what the meter will measure. The choices are: AC only, DC only, or AC + DC.

Meter (FETC/MEAS)	120V 60HZ	rms voltage and frequency
▼	120V 1.925A	rms voltage and current
▼	1.93A 60HZ	rms current and frequency
▼	120V 150.5W	rms voltage and power
▼	2.82 CREST F	current crest factor
▼	5.379A PK REP	peak current, repetitive
▼	36.83A PK NR	peak current, non repetitive
▼	230.6VA	apparent power
▼	175.2 VAR	reactive power
▼	0.65 PFACTOR	power factor

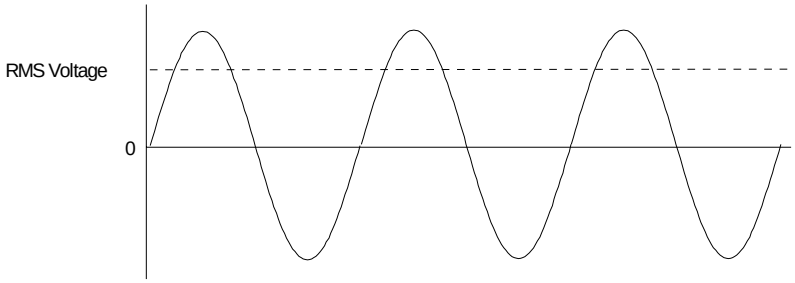
Note that in addition to the measurement functions listed above, the Keysight 6834B unit can also measure total power of all phases and neutral rms current.

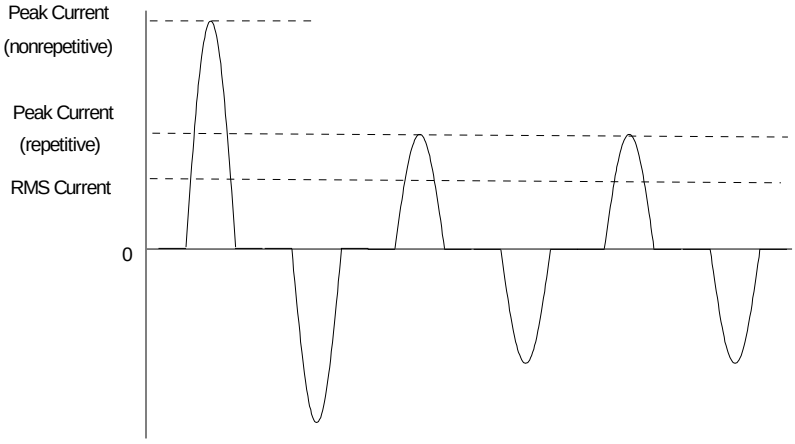
Harmonic measurements

Use the harmonic menu to make harmonic measurements of the output current. The following example illustrates the current magnitude measurements returned at harmonics 0 to 5. Note that harmonic 1 is the fundamental. Harmonic 0 is the dc component.

Shift **Harmonic** (FETC/MEAS)	0.01A I:MAG:0	current amplitude at harmonic 0
Shift **▲Index**	1.43A I:MAG:1	current amplitude at harmonic 1
Shift **▲Index**	0.01A I:MAG:2	current amplitude at harmonic 2
Shift **▲Index**	0.91A I:MAG:3	current amplitude at harmonic 3
Shift **▲Index**	0.01A I:MAG:4	current amplitude at harmonic 4
Shift **▲Index**	0.74A I:MAG:5	current amplitude at harmonic 5

Output voltage and current waveforms





Programming output transients

Up to now the ac source has been programmed with the transient system in Fixed mode. The following examples briefly describe the transient system's Step, Pulse, and List modes, which require the application of a trigger to implement the transient mode.

NOTE: For the examples that follow, press **Shift Output**, scroll to *RST and press **Enter** to reset the unit prior to each example. Also press **Enter** to enter or activate each selection.

Program an output step

Voltage

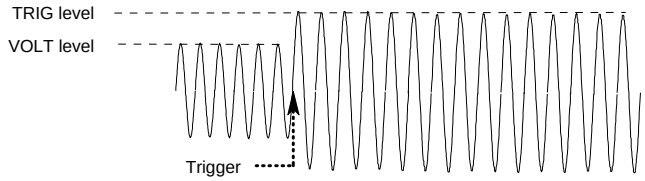
VOLT:M STEP
VOLT 120
VOLT:T 150

Trigger Control

INIT IMMED

Shift **Trigger**

Step transients transition to a new output level upon receipt of a trigger. When these commands are sent, the voltage amplitude is stepped from its previous setting to 150 V rms upon receipt of a trigger.



Program an output pulse

Voltage

VOLT:M PULSE
VOLT 120
VOLT:T 90

Pulse

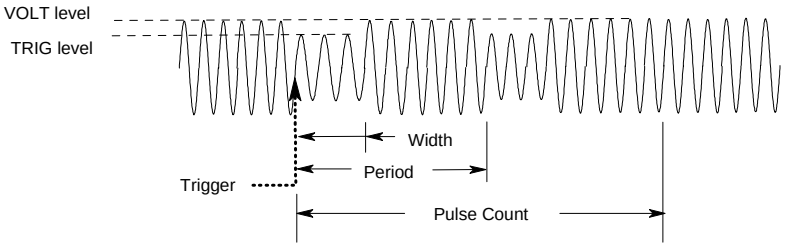
WIDTH .01
PER .03
COUNT 2

Trigger Control

INIT IMMED

Shift **Trigger**

Pulse transients transition to a new output level upon receipt of a trigger and return to the original level after a specified time, repeating this action by the number of times specified by the count. When these commands are sent, two output pulses step the voltage amplitude from its previous setting to 90 V rms upon receipt of a trigger. At the end of the specified period (multiplied by the count), the voltage returns to its original level.



Program an output list

Voltage

VOLT: M LIST
VOLT 120

Shift **List**

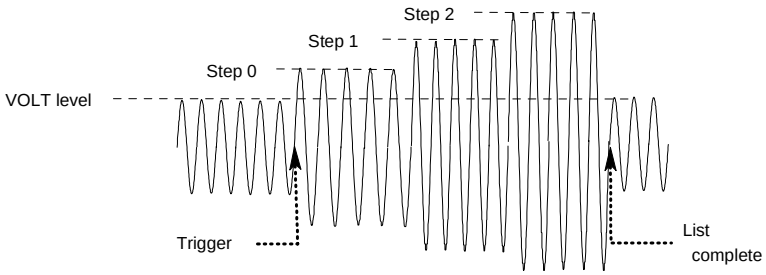
DWELL [0] .5
DWELL [1] .5
DWELL [2] .5
VOLT [0] 130
VOLT [1] 140
VOLT [2] 150
STEP AUTO

Trigger Control

INIT IMMED

Shift **Trigger**

List transients generate complex output sequences. When these commands are sent, the voltage amplitude is sequentially stepped to three levels upon receipt of a trigger, and then returns to the original voltage level. The output remains at each list step for .5 seconds. The values inside the brackets ([ ]) are the list index references. Use **Clear Entry** to clear a list.



More transient examples

The previous examples showed how the transient system can be used to control the output voltage amplitude. The transient system can also control output frequency, phase, waveform shape, voltage and frequency slew rates, offset voltage, and peak current limit. The following examples illustrate how the transient system's Pulse mode can generate frequency, shape, phase, and voltage slew pulses.

Freq

FREQ:M PULSE
FREQ 60
FREQ:T 50

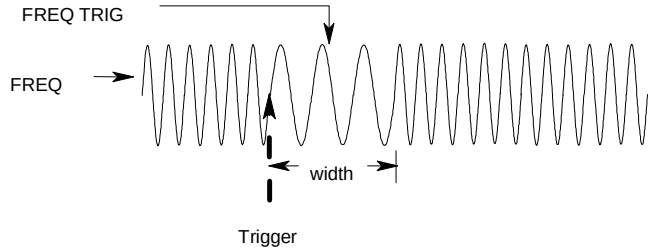
Pulse

WIDTH .1

Trigger Control

INIT IMMED

Shift **Trigger**



Shape

SHAPE:M PULSE
SHAPE SINE
SHAPE:T SQUARE

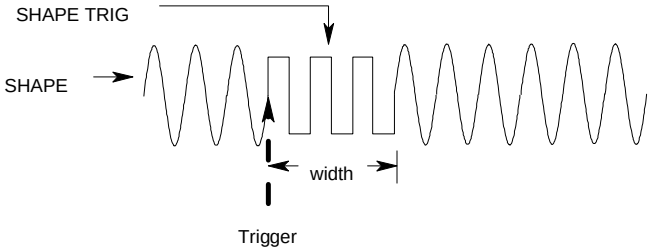
Pulse

WIDTH .05

Trigger Control

INIT IMMED

Shift **Trigger**



Shift **Phase**

PHASE:M PULSE
PHASE 0
PHASE:T 180

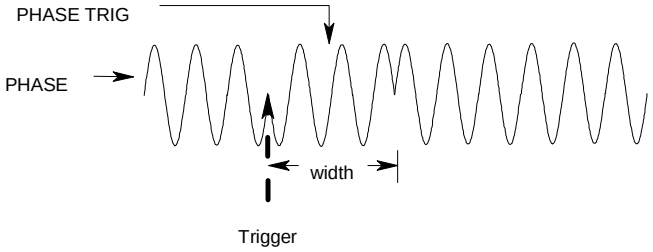
Pulse

WIDTH .05

Trigger Control

INIT IMMED

Shift **Trigger**



Voltage

VOLT:M PULSE
VOLT 120
VOLT:T 150
SLEW:M PULSE
SLEW 10000
SLEW:T 1000

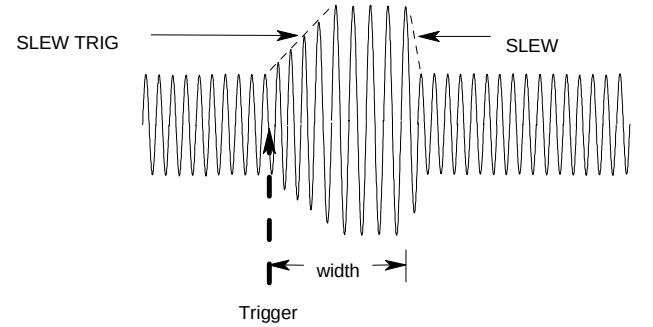
Pulse

WIDTH .1

Trigger Control

INIT IMMED

Shift **Trigger**



Programming trigger synchronization and delays

The previous transient examples were programmed to respond to immediate triggers. However, delayed and phase synchronized triggers can also be programmed as shown in the following examples.

No delay; no phase synchronization

Voltage

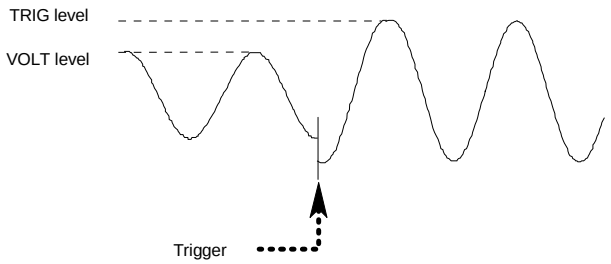
VOLT:M STEP
VOLT 120
VOLT:T 150

Trigger Control

DELAY 0
SYNC:SOUR IMM
INIT:IMMED

Shift **Trigger**

When these commands are sent, the voltage amplitude changes immediately upon the receipt of a trigger.



No delay; 90 degrees phase synchronization

Voltage

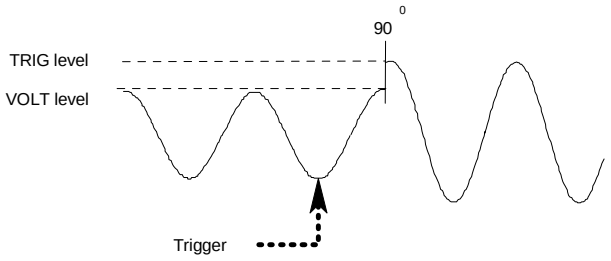
VOLT:M STEP
VOLT 120
VOLT:T 150

Trigger Control

DELAY 0
SYNC:SOUR PHAS
SYNC:PHAS 90
INIT:IMMED

Shift **Trigger**

When these commands are sent, the voltage amplitude changes at the next 90 degree phase angle that occurs following the receipt of a trigger.



Trigger delay; no phase synchronization

Voltage

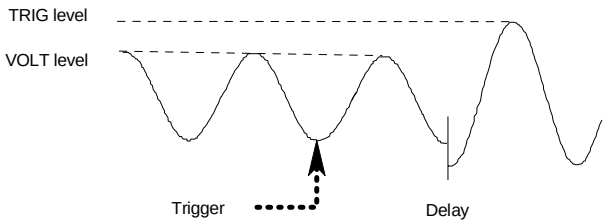
VOLT:M STEP
VOLT 120
VOLT:T 150

Trigger Control

DELAY .0167
SYNC:SOUR IMM
INIT:IMMED

Shift **Trigger**

When these commands are sent, the voltage amplitude changes .0167 seconds after the receipt of a trigger.



Trigger delay; 90 degree phase synchronization

Voltage

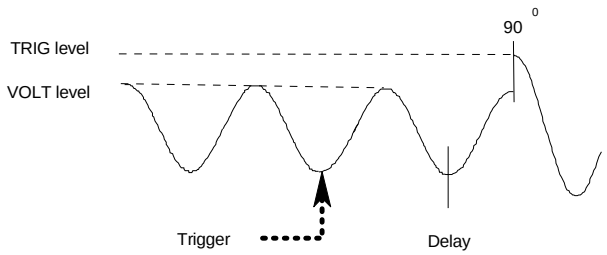
VOLT:M STEP
VOLT 120
VOLT:T 150

Trigger Control

DELAY .0167
SYNC:SOUR PHAS
SYNC:PHAS 90
INIT:IMMED

Shift **Trigger**

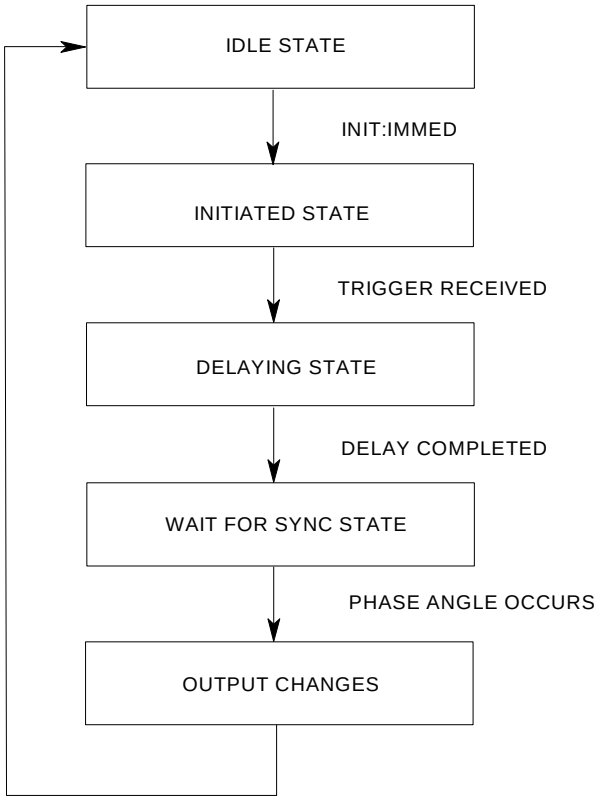
When these commands are sent, the voltage amplitude changes at the next 90 degree phase angle that occurs after the .0167 second delay has expired, following the receipt of a trigger.



More about the trigger system

In the previous examples, a front panel trigger is used to generate the output transients. The trigger is shown occurring at 270 degrees but actual triggers may occur at any phase. Delay and phase synchronization however, will occur as programmed.

Note that trigger system used in the ac source provides great flexibility in generating triggers. The following figure is a simplified model of the trigger system. A complete discussion of the capabilities of the trigger system is found in the ac source Programming Guide.



The front panel menus - at a glance

SYSTEM Keys

Local

Press to change the ac source's selected interface from remote operation to local (front panel) operation. Pressing the key will have no effect if the interface state is already Local, Local-with-Lockout, or Remote-with-Lockout.

Error
Address

Error Functions	
ERROR <value>	Displays system error codes stored in the SCPI error queue. If no errors exist, a 0 is displayed. The Err annunciator is lit when there are errors.

Address Functions	
ADDRESS <value>	sets the GPIB address
INTF GPIB | RS232	selects an interface
BAUDRATE 300 | 600 | 1200 2400 | 4800 | 9600	selects the baud rate
PARITY NONE | EVEN | ODD	selects message parity
LANG SCPI | E9012	selects the language
NOUTPUTS 1 | 3	selects the number of outputs[1]

Save
Recall

Save Functions
Press to save an existing ac source state in nonvolatile memory. Up to 16 states can be saved (0-15).

Recall Functions
Press to place the ac source into a previously saved state. Up to 16 states can be recalled (0-15).

First press and release this blue shift key to select a shifted function. The Shift annunciator lights when this key is pressed.

FUNCTION Keys

Harmonic
Meter

Harmonic Functions	
<reading>A I:MAG: <index>	current harmonic magnitude
<reading>° I:PHASE: <index>	current harmonic phase
<reading>V V:MAG: <index>	voltage harmonic magnitude
<reading>° V:PHASE: <index>	voltage harmonic phase
<reading> N:MAG: <index>	neutral current harmonic magnitude
<reading>° N:PHASE: <index>	neutral current harmonic phase
<reading> CURR:THD	current total % harmonic distortion
<reading> VOLT:THD	voltage total % harmonic distortion

Meter functions continued on next column

FUNCTION Keys

Meter Functions	
<reading>V <reading>Hz	rms voltage and frequency
<reading>V <reading>A	rms voltage and rms current
<reading>A <reading>Hz	rms current and frequency
<reading>V <reading>W	rms voltage and power
<reading> CREST F	current crest factor
<reading>A PK REP	peak current, repetitive
<reading>A PK NR	peak current, nonrepetitive
<reading>VA	apparent power
<reading> VAR	reactive power
<reading>W TOTAL	total power all phases[1]
<reading> PFACTOR	power factor
<reading>A NEUTRAL	neutral rms current[1]

Output
Input

Output Functions	
OUTP:COUP AC | DC	select output coupling[3]
*RST	executes the *RST command
TTLT:SOUR BOT| EOT| LIST	select Trigger Out source coupling
TTLT:STATE ON | OFF	set Trigger Out state
IMP:STATE ON | OFF	set output impedance programming[3]
IMP:REAL <value>	set real part of output impedance[3]
IMP:REAC <value>	set reactive part of output impedance[3]
PON:STATE RST | RCL0	select power-on state command
RI LATCHING | LIVE | OFF	sets remote inhibit mode
DFI ON | OFF	sets discrete fault indicator state
DFI:SOUR QUES | OPER ESB | RQS | OFF	select the DFI source

Input Functions	
INP:COUP AC | DC | ACDC	choose meter coupling
CURR:RANGE HIGH | LOW	current measurement range[3]
WINDOW KBESSEL | RECT	select harmonic measurement window meter

Status
Prot

Status Functions	
*CLS	executes the *CLS command
STATUS:PRESET	executes STATus:PRESet command
*ESR? <value>	return Event Status register value
*STB <value>	return Status Byte register value
OPER:EVEN? <value>	return STAT:OPER:EVENT? value
OPER:COND <value>	return STAT:OPER:COND? value
QUES:EVEN? <value>	return STAT:QUES:EVENT? value
QUES:COND <value>	return STAT:QUES:COND? value

Protect Functions	
PROT:CLEAR	clears latched protection signal
CURR:PROT ON | OFF	set overcurrent protection function
VOLT:PROT ON | OFF	set overvoltage protection function[3]
VOLT:PROT <value>	set overvoltage protection level
DELAY <value>	set a time delay for activating a protection fault

Trigger

Trigger Control

Trigger Function	
Pressing the Shift **Trigger** key generates an immediate trigger	
Trigger Control Functions	
INIT:IMMED	Initiate trigger immediately
INIT:CONT ON | OFF	Initiate trigger continuously
TRIG:SOUR BUS | EXT TTLT | IMM	Select transient trigger source
DELAY <value>	Set trigger delay in seconds
ABORT	Abort all trigger sequences
SYNC:SOUR PHASE | IMM	Select synchronous trigger source
SYNC:PHASE <value>	Set synchronous phase reference

Current

Voltage

Current Functions	
CURR:LEV <value>	set immediate rms current limit[4]
CURR:PEAK <value>	set immediate peak current limit[3]
CURR:PEAK:T <value>	set triggered peak current limit[3]
CURR:PEAK:M FIXED | STEP PULSE | LIST	select the peak current limit mode[3]
Voltage Functions	
VOLT <value>	set immediate ac output voltage[4]
VOLT:T<value>	set triggered output voltage[4]
VOLT:M FIXED | STEP PULSE | LIST	select the voltage mode[4]
RANGE 150 | 300	set the voltage range[2, 4]
OFFSET <value>	set immediate dc offset voltage[3]
OFFSET:T<value>	set triggered dc offset voltage[3]
OFFSET:M FIXED | STEP PULSE | LIST	select the dc offset voltage mode[3]
SLEW <value>	set voltage slew in V/sec[4]
SLEW:T<value>	set triggered voltage slew in V/sec[4]
SLEW:M FIXED | STEP PULSE | LIST	select the voltage slew mode[4]
OFF:SLW <value>	set dc offset slew in V/sec[3]
OFF:SLW:T<value>	set triggered dc offset slew in V/sec[3]
OFF:SLW:M FIXED | STEP PULSE | LIST	select the dc offset voltage slew mode[3]
ALC INT | EXT	select the voltage sense source
ALC:DET RTIME | RMS	select the voltage sense detector[3]

Phase

Freq

Phase Functions	
PHASE <value>	set immediate output phase[4]
PHASE:T <value>	set triggered output phase[4]
PHASE:M FIXED | STEP PULSE | LIST	select the phase mode[4]
Freq Functions	
FREQ <value>	set immediate output frequency
FREQ:T<value>	set triggered output frequency
FREQ:M FIXED | STEP PULSE | LIST	select the frequency mode
SLEW <value>	set frequency slew in Hz/sec
SLEW:T<value>	set triggered frequency slew Hz/sec
SLEW:M FIXED | STEP PULSE | LIST	select the frequency slew mode

Shape

Shape Functions		
SHAPE	SINE |SQUARE CSIN | <user>	set immediate shape
SHAPE:T	SINE |SQUARE CSIN | <user>	set triggered shape
SHAPE:M	FIXED | STEP PULSE | LIST	set shape mode
CLIP <value>		set clipping level

List

Pulse

List Functions	
COUNT <value>	number of times a list repeats
DWEL:<index> <value>	list of output dwell times
FREQ:<index> <value>	list of output frequencies
FSLW:<index> <value>	list of output frequency slew rates
IPK:<index> <value>	list of output peak current limits[3]
OFFS:<index> <value>	list of dc output voltages[3]
OSLW:<index> <value>	dc offset voltage slew rate list[3]
PHASE:<index> <value>	list of output voltage phase angles[4]
SHAP:<index> SINE | SQUARE CSIN | <user>	list of output waveform shapes
STEP ONCE | AUTO	set response of list to triggers
TTLT:<index> ON | OFF	set trigger out pulse list
VOLT:<index> <value>	list of ac output voltages[4]
VSLW:<index> <value>	list of output voltage slew rates[4]
Pulse Functions	
WIDTH <value>	set the pulse width
COUNT <value>	set the number of output pulses
DCYCLE <value>	set the pulse duty cycle
PER <value>	set the pulse period count
HOLD WIDTH | DCYCLE	set parameter that is held constant

▼ Index **▲ Index**

▼ ▲ Index Functions

These are Shift Index keys which are used to scroll through indexed functions. Press these keys to step through integers 0 through 50 for a harmonic list, or 0 through 99 for list points. Hold down these keys to rapidly access any harmonic or list point.

▼ ▲ Functions

These keys let you move through the choices in a command list. Command lists are circular; you can return to the starting position by continuously pressing either key.

Phase Select

This key applies to 3-phase ac sources only. Pressing this key successively selects phase 1 first, followed by phase 2, phase 3, and then all three phases.

Output On/Off

This key toggles the output on and off. When off, the ac source output is disabled and the **Dis** annunciator is on.

ENTRY Keys

These keys let you scroll through choices in a **parameter** list that apply to a specific command. Parameter lists are circular; you can return to the starting position by continuously pressing either key. If the command has a numeric range, these keys increment or decrement the existing value.

0 – **9** The numeric keys 0 through 9 are used for entering numeric values.

– Press shift and this key to enter a minus. Press this key alone to enter a decimal point.

Enter Until you press the Enter key, the values or parameters you enter with the other Entry keys are displayed but not entered into the ac source.

E (**0**) Press Shift and this key to enter an exponent.

Clear Entry Press Shift and this key to abort a keypad entry and clear the value. **When editing a list**, pressing Clear Entry truncates or clears the list at the presently displayed list point. Press this key alone to backspace and delete the last digit entered

Calibration (**7**) Press Shift and this key to access the calibration menu. Refer to appendix B In the user's for more information.

Notes:
1 Valid for Model Keysight 6834B only
2 Valid for Models Keysight 6814B, 6834B, and 6843A only
3 Valid for Models Keysight 6811B, 6812B, and 6813B only
4 Phase selectable on Keysight 6834B

Documentation Map	
Quick Start Guide (this document)	Condensed overview of ac source operation. Read this to quickly get started.
Quick Reference Card	Memory jogger for front panel and remote programming commands. Use this if you are already familiar with programming ac sources.
User's Guide (pdf file included on Customer Care CD-ROM)	Includes description, installation, checkout, operation, specifications, and calibration.
Programming Guide (pdf file included on Customer Care CD-ROM)	Includes introduction to SCPI, command reference dictionary, and application examples.
Service Guide (pdf file included on Customer Care CD-ROM)	Includes assembly level repair procedures and detailed schematics.
Localized Quick Start Guides (pdf files included on Customer Care CD-ROM)	Available in French, German, Spanish, Italian, Japanese, Korean, Simplified and Traditional Chinese.

The web has the most up to date version of the manuals. Go to http://www.keysight.com. Type your model number (e.g. 6811B) into the Search field on the top of the page and click GO. Scroll down to "Manuals and Guides".

To order a printed copy of any of the above manuals, go to http://www.parts.keysight.com. Enter either the product number (e.g. 6811B) or the part number (e.g. 5962-0883) in the Search Value field on the top of the page and click Start Search.

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