PROGRAMMING MANUAL

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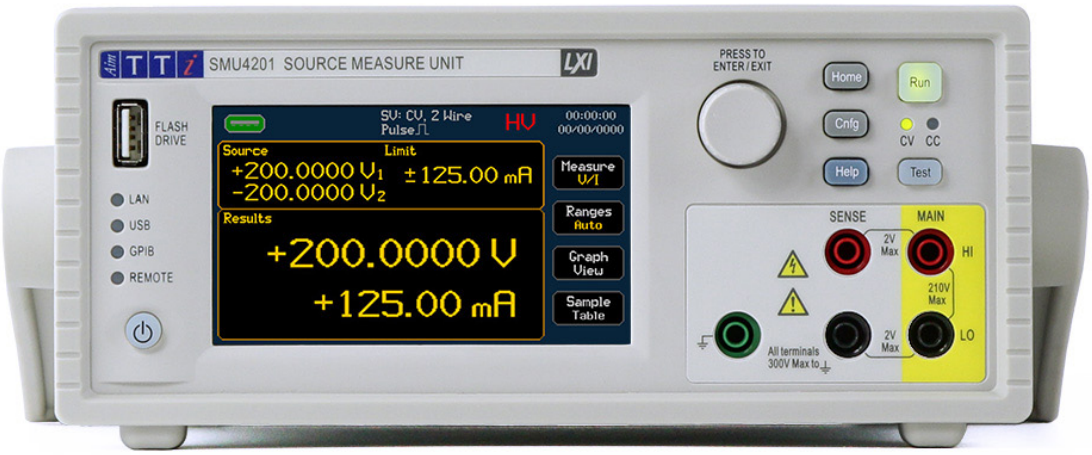

SMU4000 SERIES

SOURCE MEASURE UNITS

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1. INTRODUCTION

Using this Manual

This manual contains information required to control the SMU via remote interfaces, a separate instruction manual and safety guide are available to download from the Aim-TTi website and are intended to be read before using the instrument for the first time.

In this manual:

- Front panel keys and sockets are shown in capitals, e.g., HOME, CNFG;
- Text, entry fields and messages displayed on the LCD are shown in a different font, e.g., Source, Limit, Results.
- Hyperlinks are shown in italics, e.g., '*Using this Manual*'

The descriptions in this manual relate to using the instrument via the touch screen, alternatively; the hard keys and rotary knob can be used.

Throughout this manual, the navigation through menus will be shown at the top of a section using the following format: MENU>Sub Menu>Option

Other resources available

Manuals

Other Manuals are available for this product series including:

- Safety Documentation and Quick Start Guide [English, French, German, Italian & Spanish]
- Instruction Manual [English]
- Service Guide [English]

Additional resources can be found at www.aimtti.com/support. Service Guide is available upon request.

Software

All of the SCPI commands in this manual can also be found in The SMU Test Bridge software Instrument Menu (when connected to an SMU), alongside descriptions and examples. Commands can be executed directly from the software, via a USB or LAN connection. Test Bridge SMU is available to download free from www.aimtti.com.

2. REMOTE OPERATION

Overview

The instrument can be remotely controlled via its USB, LAN or (optional) GPIB interfaces.

USB remote control operates in a similar way to an RS232 interface but via the USB connector.

The LAN interface is designed to meet 1.5 LXI Device Specification 2016.

Remote control using the LAN interface is possible using the TCP/IP Sockets protocol. The instrument also contains a basic Web server which provides information on the instrument and allows it to be configured from a web browser. Simple command line control from the browser is also possible. If sending Lists or Sequences via LAN, please see 'Sending Lists and Sequences via LAN' Application Note, available from www.aimtti.co.uk/support

The instrument is supplied with USB and LAN as standard.

GPIB is available as a factory fitted option upon purchase, or can be purchased at a later date from the manufacturer or their overseas agents, to be fitted by the customer.

Remote/ local operation

At power-on the instrument will be in the local state and the remote LED indicators on the front panel will show any detected remote connections. In this state, all front panel operations are possible.

When the instrument receives a command from an interface, the remote state will be entered and the REMOTE LED indicator will become illuminated alongside any detected remote connections on the front panel. In this state the front panel user interface can still be navigated but no changes to parameters are possible.

The instrument may be returned to the local state by pressing the CNFG key; however, the effect of this action will only remain until the instrument receives another character from the interface, when the remote state will once again be entered. Returning to Local by this action will keep the settings at their last remotely set values.

USB interface

Using the USB interface for remote control requires a Communications Device Class driver on the PC to provide a virtual COM port instance.

Windows 10 will automatically install a suitable driver. In earlier versions of Windows a suitable driver is provided by Microsoft, but it is not installed by default. The data (.INF) file to control the installation is provided on the website: www.aimtti.com

If required, unzip the contents of the downloaded USB driver.

NOTE

The same driver is also used by many other instruments from this manufacturer and may already be known to the PC.

Installing the USB driver for the first time

To install the driver for the first time:

- First switch the unit on
- Then connect the USB port to the PC.

NOTE

In Windows 10, the driver is automatically installed by the operating system.

The Windows plug and play functions should automatically recognise the attachment of new hardware to the USB interface and (possibly after searching the internet for some time) prompt for the location of a suitable driver. Follow the Windows prompts and point to the downloaded driver file named USB_ARM_VCP_xxx.INF, where xxx is a version number.

In some cases, Windows will not complete this procedure (especially recent versions which search the internet first, looking for the unique Vendor ID and Product ID), in which case the instrument will show in Device Manager as “not working properly”. If this happens, select this device, right click and choose “update driver software...” and then “browse this computer for driver software...” and then locate the downloaded .INF file.

Once Windows has installed the device driver it will assign a COM port number to this particular unit. This number will depend on previous COM port assignments on this PC, and it may be necessary to use Device Manager to discover it. Each instrument has a unique USB identifier which is remembered by the system, so it will receive the same COM port number whenever it is attached to the same PC (regardless of the physical interface socket used), even though the COM port will disappear while the instrument is disconnected or switched off. Other instruments will receive different COM port numbers.

NOTE

A different PC will not necessarily assign the same COM port number to a particular instrument (it depends on the history of installations) Device Manager can be used to change the assignments given.

This virtual COM port can be driven by Windows applications (including a terminal emulator) in exactly the same way as any standard COM port, except that the Baud rate and other settings are unnecessary and are ignored. Some old applications might not function with COM port numbers 3 or 4, or above 9. In this case, use Device Manager to change the allocation given. Once it is installed, the driver will be maintained by Windows Update in the usual way.

LAN interface

The LAN interface is designed to comply with the LXI standard version 1.5 LXI Device Specification 2016 and contains the interfaces and protocols described below.

Since it is possible to misconfigure the LAN interface, making it impossible to communicate with the instrument over LAN, a LAN Configuration Initialise (LCI) mechanism is provided via the menus from the front panel to reset the instrument's interfaces to the factory default.

The default setting is for the instrument to attempt to obtain settings via DHCP if available or, if DHCP times out (30 seconds), via Auto-IP.

In the very unlikely event that an Auto-IP address cannot be found a static IP address of 192.168.1.100 is assigned. Resetting the LAN removes any password protection which has been set on the web page.

To reset the LAN interface touch the **Lan Reset** button on the [CNFG] > **Interfaces> LAN Configure** menu.

The LAN configure menu also contains the option to set a host and service name. The hostname can be set to a custom name which will allow the SMU to be discoverable in pc applications through its set hostname. Hostname can be between 2 and 26 characters. The service name is a unique name allocated to the SMU that can be viewed form the Lan Configure menu. Service name can be set between 2 and 53 characters.

NOTE

Lan Reset will change all variables to default included Hostname and service name.

For more information on LXI standards refer to www.lxistandard.org

LAN connection

To use the LAN interface, the IP address or the host name of the instrument must be known, this can be found in the LAN menu: [CNFG] > **Interfaces> LAN Configure**

Alternatively, Windows PC software tools such as the LXI Discovery Tool may be used find all LXI compliant devices on the network. The latest version of the LXI Discovery Tool can be downloaded from www.lxistandard.org.

Note that older versions of the LXI Discovery Tool may not find this instrument as they only support the legacy VXI-11 protocol which is not implemented in this instrument.

Connecting via a router is recommended as this is significantly quicker to assign an IP address; connecting directly to the PC will begin to assign an IP address only after a 30 second DHCP time-out. Double clicking on any entry in the list of devices discovered will open the PC's web browser and display the Home page of that device.

There are also tools for LAN discovery included as part of the National Instruments Measurement and Automation Explorer package and the Keysight (formerly Agilent) Vee application.

The unit will, when first powered up, attempt to obtain settings via DHCP if available or, if DHCP times out (30 seconds), via Auto-IP. In the very unlikely event that an Auto-IP address cannot be found a static IP address of 192.168.1.100 is assigned. During this time the LAN LED indicator will be lit. If a LAN connection is successfully made, **LAN** will appear on the status bar. However, if a connection is still not made by the end of the above process, or if the LAN connector is physically removed at any time, the LAN LED will turn off and LAN will not be shown on the status bar; see 'LAN error' section for details.

Web server; configuration password protection

The unit contains a basic web server. This provides information on the instrument and allows it to be configured. The Settings page can be password protected to deter unauthorised changes to the remote operation configuration.

NOTE

The default configuration page password is blank (no password).

The Settings page itself explains how to set the password. The password can be up to 15 characters long; the User Name should be left blank. The password will, however, be reset to the default (no password) if the front panel is used to reset all the LAN parameters to their factory default.

The web pages also have an 'Identify' function which allows the user to send an identifying command to the instrument which causes its display to flash until the command is cancelled.

ICMP ping server

The unit contains an ICMP server allowing the instrument to be 'pinged' via either its host name or IP address.

mDNS and DNS-SD support

Multicast DNS provides DNS services even on networks without a central DNS server (or DHCP server). This simplifies the setting up of a simple LAN using meaningful hostnames instead of a raw IP address. With service discovery it becomes straightforward for the device to be discovered and the services it provides.

The services provided by the instrument are http (_http._tcp) , lxi (_lxi._tcp) and scpi-raw (_scpi-raw._tcp).

VISA resource name

The instrument must be referred to by its raw socket information when used in software packages which communicate via a VISA resource name. For example, an instrument at IP address 192.168.1.100 would normally have a VISA resource name of "TCPIP0::192.168.1.100::inst0::INSTR" but for this instrument the name must be modified to read "TCPIP0::192.168.1.100::5025::SOCKET" where 5025 is the scpi-raw TCP port used by this instrument for control and monitoring.

XML identification document URL

As required by the LXI Standard, the instrument provides an XML identification document that can be queried via a GET at "http:<hostname>:80/lxi/identification" that conforms to the LXI XSD Schema (available at http:www.lxistandard.org/InstrumentIdentification/1.0) and the W3C XML Schema Standards (http:www.w3.org/XML/Schema). This document describes the instrument.

TCP sockets

The instrument uses 1 socket on TCP port 5025 for instrument control and monitoring. Text commands are sent to this port as defined in the 'Remote Control Commands' section and any replies are returned via the same port. Commands may be separated with either semicolons ";" or line feeds.

LAN error

If a LAN connection is made but an error is detected (e.g. the IP address is the same as another device on the network) then the LAN field in the status bar will show LAN IP ERROR until the error is corrected.

If a LAN error occurs; check and correct the configuration of the instrument; To reset the LAN interface touch the Lan Reset button on the [CNFG] > Interface> LAN Configure menu.

The default setting is for the instrument to attempt to obtain settings via DHCP if available or, if DHCP times out (30 seconds), via Auto-IP. In the very unlikely event that an Auto-IP address cannot be found a static IP address of 192.168.1.100 is assigned. If no physical LAN connection is found at any time the LAN LED on the front panel will not be lit.

GPIB interface

The GPIB interface 24-way connector is located on the instrument rear panel. The pin connections are as specified in IEEE Std. 488.1-1987 and the instruments in the range complies with IEEE Std. 488.1-1987 and IEEE Std. 488.2-1987 and contain the following IEEE 488.1 subsets.

GPIB subsets

This instrument contains the following IEEE 488.1 subsets:

Source Handshake	SH1
Acceptor Handshake	AH1
Talker	T6
Listener	L4
Service Request	SR1
Remote Local	RL2
Parallel Poll	PP1
Device Clear	DC1
Device Trigger	DT0
Controller	C0
Electrical Interface	E2

GPIB IEEE Std. 488.2 error handling – Query error register

The IEEE 488.2 UNTERMINATED error (addressed to talk with nothing to say) is handled as follows. If the instrument is addressed to talk and the response formatter is inactive and the input queue is empty then the UNTERMINATED error is generated. This will cause the Query Error bit to be set in the Standard Event Status Register, a value of 3 to be placed in the Query Error Register and the parser to be reset.

The IEEE 488.2 INTERRUPTED error is handled as follows. If the response formatter is waiting to send a response message and a <PROGRAM MESSAGE TERMINATOR> has been read by the parser or the input queue contains more than one END message then the instrument has been INTERRUPTED and an error is generated. This will cause the Query Error bit to be set in the Standard Event Status Register, a value of 1 to be placed in the Query Error Register and the response formatter to be reset thus clearing the output queue. The parser will then start parsing the next <PROGRAM MESSAGE UNIT> from the input queue.

The IEEE 488.2 DEADLOCK error is handled as follows. If the response formatter is waiting to send a response message and the input queue becomes full then the instrument enters the DEADLOCK state and an error is generated. This will cause the Query Error bit to be set in the Standard Event Status Register, a value of 2 to be placed in the Query Error Register and the response formatter to be reset thus clearing the output queue. The parser will then start parsing the next <PROGRAM MESSAGE UNIT> from the input queue.

GPIB parallel poll

Complete parallel poll capabilities are offered on this instrument. The Parallel Poll Enable Register is set to specify which bits in the Status Byte Register are to be used to form the ist local message The Parallel Poll Enable Register is set by the *PRE <nr1> command and read by the *PRE? command. The value in the Parallel Poll Enable Register is ANDed with the Status Byte Register; if the result is zero then the value of ist is 0 otherwise the value of ist is 1.

The instrument must also be configured so that the value of ist can be returned to the controller during a parallel poll operation. The instrument is configured by the controller sending a Parallel Poll Configure command (PPC) followed by a Parallel Poll Enable command (PPE). The bits in the PPE command are shown in the following table:

Bit 7 =	X	don't care
Bit 6 =	1	
Bit 5 =	1	Parallel poll enable
Bit 4 =	0	
Bit 3 =	Sense	sense of the response bit; 0 = low, 1 = high
Bit 2 =	?	
Bit 1 =	?	bit position of the response
Bit 0 =	?	

EXAMPLE

To return the RQS bit (bit 6 of the Status Byte Register) as a 1 when true and a 0 when false in bit position 1 in response to a parallel poll operation send the following commands

*PRE 64<pmt>, then PPC followed by 69H (PPE)

The parallel poll response from the instrument will then be 00H if RQS is 0 and 01H if RQS is 1.

During parallel poll response the DIO interface lines are resistively terminated (passive termination). This allows multiple devices to share the same response bit position in either wired-AND or wired-OR configuration.

Status reporting

The standard status and error reporting model described in IEEE Std. 488.2 was designed for the GPIB interface and contains some features intended for use with the Service Request and Parallel Poll hardware capabilities of that interface, and to accommodate its semi-duplex operation. Although those facilities are of little use with other interfaces, this instrument makes the full set of capabilities available to all of the interfaces. All the remote interfaces share the same set of status and error registers.

The full set of error and status registers and the individual bits they contain is shown in the Status Model Diagram and described in detail below, but in brief the status is maintained using three primary registers, the Standard Event Status Register, the Operation Status Register and the Event/Error Queue Register.

Standard event status and standard event status enable registers

These two registers are implemented as required by the IEEE Std. 488.2.
Any bits set in the Standard Event Status Register which correspond to bits set in the Standard Event Status Enable Register will cause the ESB bit to be set in the Status Byte Register.

The Standard Event Status Register is read and cleared by the *ESR? command. The Standard Event Status Enable register is set by the *ESE <nrf> command and read by the *ESE? command.

It is a bit field where each bit has the following significance.

Bit 7:	Power On. Set when power is first applied to the instrument.
Bit 6:	User Request (Not used).
Bit 5:	Command Error. Set when a syntax type error is detected in a command from the bus. The parser is reset and parsing continues at the next byte in the input stream.
Bit 4:	Execution Error. Set when an error is encountered while attempting to execute a completely parsed command. The appropriate error number will be reported in the Execution Error Register.
Bit 3:	Not used.
Bit 2:	Query Error. Set when a query occurs. The appropriate error number will be reported in the Query Error Register.
Bit 1:	Not used.
Bit 0:	Operation Complete: Set in response to the '*OPC' command.

Operation status register

This register contains a number representing the actions currently being performed by the instrument.

Each bit has the following meaning:

0	CALibrating	The instrument is currently performing a calibration.
1	SETTling	The instrument is waiting for signals it controls to stabilize enough to begin measurements.
2	RANGing	The instrument is currently changing its range.
3	SWEeping	A sweep is in progress.
4	MEASuring	The instrument is actively measuring.
5	Waiting for TRIG	The instrument is in a "wait for trigger" state of the trigger model.
6	Waiting for ARM	The instrument is in a "wait for arm" state of the trigger model.
7	CORRecting	The instrument is currently performing a correction.
8	CAL_TEST_FAIL	The current calibration or test failed.
9	Trigger in global pin detected.	
10	Sequence mode currently active.	
11	Sequence mode running.	
12	Dataset ready (there are measurements available in the buffer).	
13	INSTrument Summary Bit One of n multiple logical instruments is reporting OPERational status.	
14	PROGram running	A user-defined programming is currently in the run state.
15	Always zero.	

Error / Event Queue

The error-/event-queue contains all errors and events that have occurred since the instrument was powered on. The queue can be read with the SYSTem:ERRor? command and begins with the first occurred error. When there are no further errors in the queue the response will be 0,"No Error"

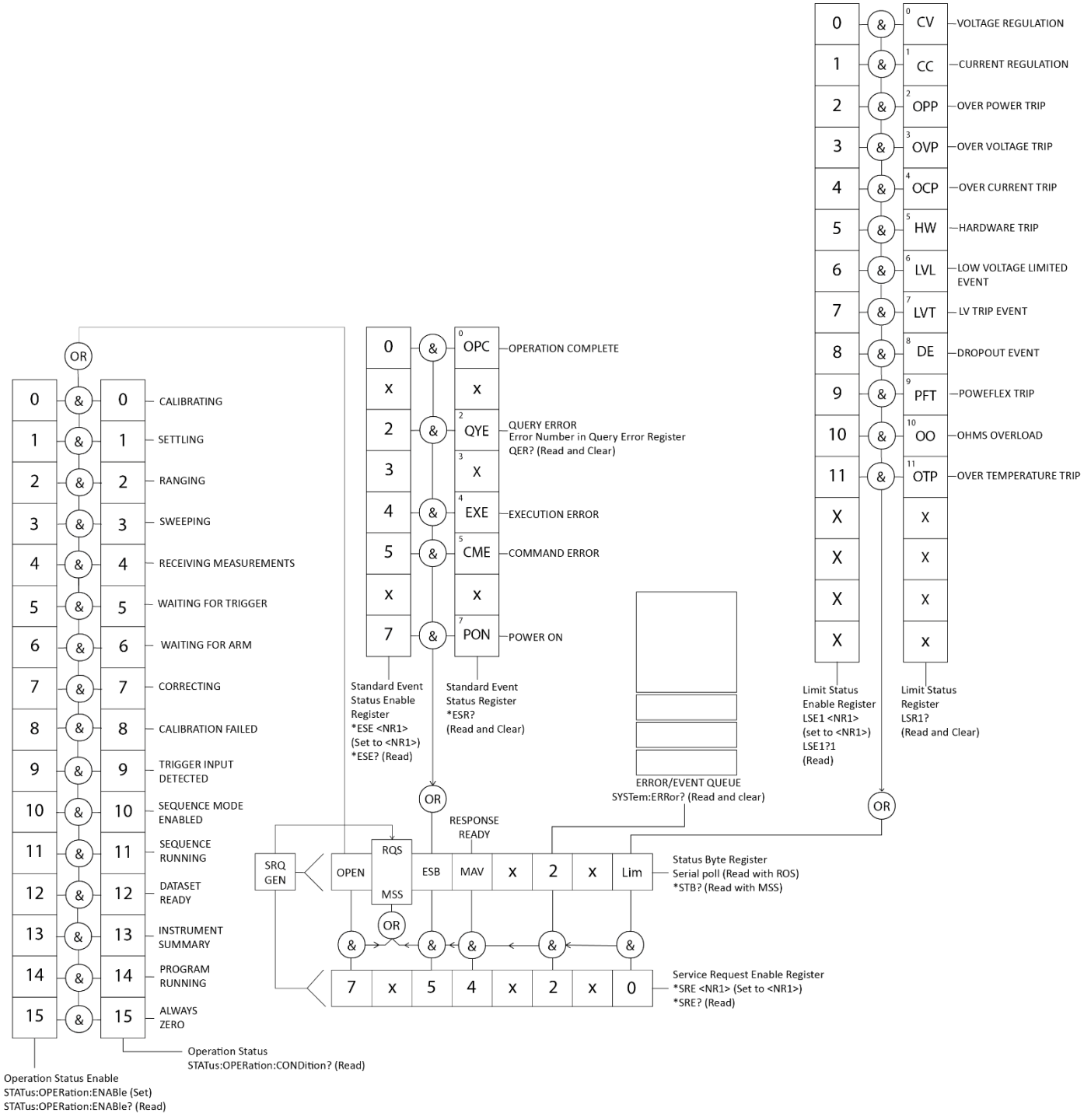
Status byte register and service request enable register

These two registers are implemented as required by the IEEE STD. 488.2.
Any bits set in the Status Byte Register which correspond to bits set in the Service Request Enable Register will cause the RQS/MSS bit to be set in the Status Byte Register, thus generating a Service Request on the bus.

The Status Byte Register is read either by the *STB? command, which will return MSS in bit 6, or by a Serial Poll which will return RQS in bit 6. The Service Request Enable register is set by the *SRE <nrf> command and read by the *SRE? command.

Bit 7:	STATus:OPERation summary bit. This bit is set if any bits in the STATus:OPERation register correspond to bits set in the STATus:OPERation:ENABle register.
Bit 6:	RQS/MSS. This bit, as defined by IEEE Std. 488.2, contains both the Requesting Service message and the Master Status Summary message. RQS is returned in response to a Serial Poll and MSS is returned in response to the *STB? command.
Bit 5:	ESB. The Event Status Bit. This bit is set if any bits set in the Standard Event Status Register correspond to bits set in the Standard Event Status Enable Register.
Bit 4:	MAV. The Message Available Bit. This will be set when the instrument has a response message formatted and ready to send to the controller. The bit will be cleared after the Response Message Terminator has been sent.
Bit 3:	Not used.
Bit 2:	Error Queue is not empty. This will be set when there is one or more entries in the error queue.
Bit 1:	Not used.
Bit 0:	Limit status. Set if any bits set in the LSR1 Register correspond to bits set in the LSR1 Enable Register.

Status model



Power-on and remote operation default settings

The following instrument status values are set at power on:

Status Byte Register	= 0
Service Request Enable Register †	= 0
Standard Event Status Register	= 128 (pon bit set)
Standard Event Status Enable Register †	= 0
Operation Status Enable	= 0
Query Error Register	= 0
Parallel Poll Enable Register †	= 0

† Registers marked thus are specific to the GPIB section of the instrument and are of limited use via other interfaces.

The instrument will be in local state with the front panel controls active.

The instrument parameters at power-on are always the same as at last switch off with the exception of the output status. By default, the output is always off at power on but the user may change this from the front panel to be the same at power on as it was at switch off, see the Power On State paragraph in the instruction manual.

The *RST (reset) interface command resets the instrument to the Remote Operation Default settings.

3. REMOTE COMMAND FORMAT

USB and LAN

USB and LAN input to the instrument is buffered into an input queue which is filled, under interrupt, in a manner transparent to all other instrument operations. The queue contains raw (un-parsed) data which is taken, by the parser, as required. Commands are executed in order and the parser will not start a new command until any previous command is complete.

Commands must be sent as specified in the commands list and must be terminated with the command terminator code 0AH (Line Feed, LF). Commands may be sent in groups with individual commands separated from each other by the code 3BH (;). The group must be terminated with command terminator 0AH (Line Feed, LF).

Responses from the instrument to the controller are sent as specified in the commands list. Each response is terminated by a <RESPONSE MESSAGE TERMINATOR> which is 0DH (Carriage Return, CR) followed by 0AH (Line Feed, LF).

<WHITE SPACE> is defined as character codes 00H to 20H inclusive.

<WHITE SPACE> is ignored except in command identifiers. e.g. '*C LS' is not equivalent to '*CLS'. The high bit of all characters is ignored. The commands are case insensitive.

GPIB

GPIB input to the instrument is buffered into an input queue which is filled, under interrupt, in a manner transparent to all other instrument operations. The queue contains raw (un-parsed) data which is taken, by the parser, as required. Commands are executed in order and the parser will not start a new command until any previous command is complete. Responses are placed in the output queue until the instrument is addressed to talk when the response message will be sent.

Commands are sent as <PROGRAM MESSAGES> by the controller, each message consisting of zero or more <PROGRAM MESSAGE UNIT> elements separated by <PROGRAM MESSAGE UNIT SEPARATOR> elements.

A <PROGRAM MESSAGE UNIT> is any of the commands in the remote commands list.

A <PROGRAM MESSAGE UNIT SEPARATOR> is the semi-colon character ';' (3BH).

<PROGRAM MESSAGES> are separated by <PROGRAM MESSAGE TERMINATOR> elements which may be any of the following:

NL	The new line character (0AH)
NL^END	The new line character with the END message
^END	The END message with the last character of the message

Responses from the instrument to the controller are sent as <RESPONSE MESSAGES>. A <RESPONSE MESSAGE> consists of one <RESPONSE MESSAGE UNIT> followed by a <RESPONSE MESSAGE TERMINATOR>.

A <RESPONSE MESSAGE TERMINATOR> is the new line character with the END message NL^END.

Each query produces a specific <RESPONSE MESSAGE> which is listed along with the command in the remote commands list.

<WHITE SPACE> is ignored except in command identifiers. e.g. '*C LS' is not equivalent to '*CLS'. <WHITE SPACE> is defined as character codes 00H to 20H inclusive with the exception of the NL character (0AH). The high bit of all characters is ignored. The commands are case insensitive.

4. REMOTE CONTROL COMMANDS

SCPI Overview

This instrument uses SCPI (Standard Commands for Programmable Instruments) commands for remote control. The commands are based on SCPI Version 1999 and follow the syntax and rules including commands that are not taken from the SCPI standard. These commands are separated into two groups; common and subsystem.

Common commands are defined by the IEEE 488.2 standard to perform common instrument functions such as querying the status or resetting to default parameters.

Subsystem commands perform instrument specific functions and allow all operating parameters to be configured and queried. They are arranged in groups which correspond to particular functionality of the instrument. A tree structure is used extending to one or more levels below the root

Square brackets [ ] are used to represent a keyword that is optional for the command. Uppercase letters are used to differentiate between the short and long form version of keywords.

EXAMPLE

The command " SOURce:VOLTage:FIXed[:LEVel]"is used to set the source level in SV mode,when the source shape is set to steady. Each of the following representations are equivalent and will set the source level to 5V.

SOURce:VOLTage:FIXed:LEVel 5

SOUR:VOLT:FIX:LEVel 5

SOUR:VOLT:FIX 5

Multiple SCPI commands can be combined into a single message using a semicolon as separator.

EXAMPLE

The combined message below will set the mode to SV, shape to steady and the source level to 5V in SV mode.

SYSTem:FUNCtion:MODE SOURCEVOLTage;:SOURce:VOLTage:SHAPe FIXed;
:SOURce:VOLTage:FIXed:LEVel 5

The colon (:) character in the above example is used to reset the SCPI parser tree to the root level. If separated keywords are at the same branch of the SCPI tree then the colon may be omitted.

The message below is the equivalent of the one above.

SYST:FUNC:MODE SOURCEVOLT;:SOUR:VOLT:SHAP FIX;FIX 5

A message terminator (typically a 'new line' character) completes the message and resets the current path to the root.

SCPI subsystems

OUTPut	The OUTPut subsystem configures the output state.
SYSTem	The SYSTem subsystem is used for a number of functions not associated with the output such as configuring the LAN.
STATus	The STATus subsytem is used to query the Operation Condition Register.
MEMory	The MEMory subsystem is used to manage instrument setups.
SOURce	The SOURce subsystem contains the commands for configuring source modes.
SINK	The SINK subsystem contains the commands for configuring load modes.
SENSe	The SENSe subsystem contains the commands for configuring measurement modes.
CALibration	The CALibration subsystem contains the commands for configuring the calibration routine.

Parameter data formats

Parameter Formats

<NR1>	Digits with no fractional part, i.e. an integer Example: 451
<NR2>	Digits with an explicit decimal point. Example: 0.451
<NR3>	Digits with an explicit decimal point and an exponent. Example: 45.1e+01
<NRF>	A number in any format. Example: 12, 12·00, 1·2 e1 and 120 e-1 are all accepted as the number 12
<CPD>	<CHARACTER PROGRAM DATA>, i.e. a short mnemonic or string such as ON or OFF. Multiple CPDs in a command are shown as <CPD1>, <CPD2>, <CPD3>, etc.
<CRD>	<CHARACTER RESPONSE DATA>. Returns a short mnemonic or string. Only the short form of the parameter is returned.
<Bool>	Boolean data. Example: 0 | 1 or ON | OFF
<Quad>	A number in dotted quad notation.
<String>	String data without any quotation.
<Block>	A sequence of comma separated <NRF> values.

5. SCPI COMMAND LIST

The SCPI commands in this manual are formatted in the following styles:

Command:

- SOURce:VOLTage:FIXed[:LEVel] <NRF>

Description:

- **Black** = Can be presented as a query command by adding '?' at the end, this will return the current set value or parameter as <…>
- Blue = Query only. E.g. 'FW? Return the instrument firmware versions.'
- Orange = No query option. E.g. '*RST Reset the instrument parameters to their default values.'

Common Commands

*IDN?	Return the instrument identification. The exact response is determined by the instrument configuration and is of the form of <Manufacturer, Model,Serial No., XX.xx >
*CLS	Clear Status. Clears the Status structure. This indirectly clears the Status Byte Register.
*RST	Reset the instrument parameters to their default values.
*TRG	This command acts as a manual trigger to start a sequence step when the trigger type is set to "Command".
*SRE <NR1>	Set the Service Request Enable Register to <NR1>.
*SRE?	Return the value of the Service Request Enable Register in <NR1> numeric format. The syntax of the response is<NR1><RMT>
*ESE <NR1>	Set the Standard Event Status Enable Register to the value of <NR1>
*ESE?	Return the value in the Standard Event Status Enable Register in <NR1> numeric format. The syntax of the response is <NR1><RMT>
*OPC	Set the Operation Complete bit (bit 0) in the Standard Event Status Register. This will happen immediately the command is executed because of the sequential nature of all operations.
*OPC?	Query Operation Complete status. The response is always 1<RMT> and will be available immediately the command is executed because all commands are sequential.
*ESR?	Return the value in the Standard Event Status Register in <NR1> numeric format. The register is then cleared. The response is <NR1><RMT>.
QER?	Query and clear Query Error Register. The response format is NR1<RMT>
*STB?	Return the value of the Status Byte Register in <NR1> numeric format. The syntax of the response is<NR1><RMT>

SCPI Commands

Global

*IDN?

Return the instrument identification. The exact response is determined by the instrument configuration and is of the form of <Manufacturer, Model,Serial No., XX.xx >

FW?

Return the instrument firmware versions.

MAC_ID?

Query the media access control address (MAC) of the instrument. The response is a 12 digit hexadecimal number of 6 bytes separated with a hyphen.

Status

*RST
Reset the instrument parameters to their default values.

*CLS
Clear Status. Clears the Status structure. This indirectly clears the Status Byte Register.

*TRG
Command to remote start of a sequence step when the trigger type is set to "Command".

*STB?
Return the value of the Status Byte Register in <NR1> numeric format. The syntax of the response is<NR1><RMT> ·

*SRE <NR1>
Set the global status sre to <NR1>

*ESR?
Return the value in the Standard Event Status Register in <NR1> numeric format. The register is then cleared. The response is <NR1><RMT>. See Status reporting section for details.

*ESE <NR1>
Return the value in the Standard Event Status Enable Register in <NR1> numeric format. The syntax of the response is <NR1><RMT> ·

*OPC
Set the Operation Complete bit (bit 0) in the Standard Event Status Register. This will happen immediately the command is executed because of the sequential nature of all operations

QER?
Query and clear Query Error Register. The response format is NR1<RMT>

EER?
Return the most recent error number.

STATus:OPERation:CONDition
Set the global status operation condition

STATus:OPERation:ENABle
Set the global status status register

LSR1 <NR1>
Set the global status lsr1 to <NR1>

LSE1 <NR1>
Set the global status lse1 to <NR1>

*LSE
Set the global status lse

System

SYSTem:ERRor[:NEXT]?
Query the global system get error

SYSTem:DATE <String>
Set system date. Format dd,mm,yyyy

SYSTem:TIME <String>
Set system time. Format hh,mm,ss

SYSTem:TRIGger
Trigger the next measurement remotely when a non-fixed shape trigger is enabled.

SYSTem:OUTTrigger?
Query the DIO trigger out pin.

SYSTem:INTRigger?
Query the DIO trigger in pin.

SYSTem:MODE:HV:STATe <Bool>
Enable the global system hv state to <Bool> OFF|ON|0|1

SYSTem:PROTection:VOLTage:TRIPped?
Query the global system voltage protection tripped

SYSTem:PROTection:VOLTage:CLEAr
Set the global system voltage protection clear

SYSTem:PROTection:CURRent:TRIPped?
Query the global system current protection tripped

SYSTem:PROTection:CURRent:CLEAr
Set the global system current protection clear

SYSTem:PROTection:POWer:TRIPped?
Query the global system power protection tripped

SYSTem:PROTection:VOLTage:CLEAr
Set the global system power protection clear

SYSTem:LOCK:CONFigure
Set the global system interlock behaviour

SYSTem:DIO:ACTion <Bool>
Set the DIO pin action. 1 or ON = Active High, 0 or OFF = Acitve Low.

Memory

Lists†

MEMory:DATA:LIST:CREAte <Name>,<NumberOfPoints>,<CSVData>
Create list of points on the SMU (if it doesn't already exist). This is only available using a USB connection.
Parameters: <Name>,<NumberOfPoints>,<CSVData>
<Name> = Name of list file to be created. Filename must be 8 characters long and have .CSV at the end as <String>.
<NumberOfPoints> = The number of data points contained in <CSVData>, maximum of 100000 as <NR1>.
<CSVData> = CSV string of data points (comma delimited).

MEMory:DATA:LIST:OVERwrite <Name>,<NumberOfPoints>,<CSVData>
Create or overwrite list of points on the SMU. This is only available using a USB connection.
Parameters: <Name>,<NumberOfPoints>,<CSVData>
<Name> = Name of list file to be created. Filename must be 8 characters long and have .CSV at the end as <String>.
<NumberOfPoints> = The number of data points contained in <CSVData>, maximum of 100000 as <NR1>.
<CSVData> = CSV string of data points (comma delimited).

Sequence†

MEMory:DATA:SEQuence:BINary <NumberOfBytes>,<DATA_BLOCK>
Send a sequence (.seq) file to the SMU; the file will be loaded, but not stored in the internal memory. The sequence content will be lost if a power cycle is performed..
Parameters: <NumberOfBytes>,<DATA_BLOCK>
<NumberOfBytes> = Number of bytes in the file as <NR1>.
<DATA_BLOCK> = Binary data.

Setup

MEMory:DATA:SETup:BINary <NumberOfBytes>,<DATA_BLOCK>
Send a setup (.stp) file to the SMU; the file will be loaded, but not stored in the internal memory. The setup content will be retained if a power cycle is performed.
Parameters: <NumberOfBytes>,<DATA_BLOCK>
<NumberOfBytes> = Number of bytes in the file as <NR1>.
<DATA_BLOCK> = Binary data.

Buffer†

MEMory:DATA:BUFFer:INFO?

Query the buffer status. Returns <DATETIME>,<Points>,<Reserved>
<DATETIME> = The system time of the first data point in yyyy-MM-dd HH:mm:SS
<Points> = The number of points in the buffer as <NR1>
<Reserved> = always zero as <NR1>.

MEMory:DATA:BUFFer:BINary? <StartIndex>,<EndIndex>

Read data from the buffer. Only data available will be shown, if any of the Indexes are outside the current measurement data the command will return error. If measurement data is not available the command will return #10.
Parameters: <StartIndex>,<EndIndex>
<StartIndex> = Zero based index of first data point to be returned as <NR1>
<EndIndex> = Zero based index of last data point to be returned as <NR1>
Data returned in the following format: <DATA_BLOCK><CHECKSUM>
<DATA_BLOCK> = <Step Index Byte(0)><Step Repeat Byte(0)><Current Measure Single(0)><Voltage Measure Single(0)><Sample Time Int32 Least Significant(0)><Sample Time Int32 Most Significant(0)><Mode byte(0)><Flags byte(0)>...
<CHECKSUM> = 4 byte Int32, XOR value of <DATA_BLOCK> bytes
To convert sample times to a time: (((UInt64)us_sample_ms << 14) + us_sample_ls) * 10 * 1e-6;
The sample time is the time the unit has been on so to get the measurement time subtract the first sample time from all subsequent sample times.
<Flags byte> = 8 bits encoded as follows (starting with the least significant bit):In CV mode, In CC mode, Primary Tolerance Active, Primary Tolerance Failed, Secondary Tolerance Active, Secondary Tolerance Failed. The last 2 bits a un used.

MEMory:DATA:BUFFer:ASCii?

Query the buffer data. Data is returned in the following format: <NRF Primary Measurement 1>,<NRF Secondary Measurement 1>,<NRF Elapsed Time (s) 1>,<NRF Primary Measurement 2>,<NRF Secondary Measurement 2>,<NRF Elapsed Time (s) 2>,…,<NRF Primary Measurement n>,<NRF Secondary Measurement n>,<NRF Elapsed Time (s) n>

It Is recommended that commands marked with † are sent via the USB connection. If sending via LAN, please see 'Sending Lists and Sequences via LAN' Application Note, available from www.aimtti.co.uk/support Using GPIB may result in much slower data transfer speeds.

Output

OUTPut:STATe <Bool>
Enable the output state to <Bool> OFF|ON|0|1

Results

MEASure:PRIMary:LIVEdata?
Query the results primary measurement

MEASure:SECondary:LIVEdata?
Query the results secondary measurement

MEASure:PRIMary:TOLerance:RESult?
Query the results primary measurement tolerance result

MEASure:SECondary:TOLerance:RESult?
Query the results secondary measurement tolerance result

Mode

SYSTem:FUNCtion:MODE <String>
Set the mode to <String>
SOURCEVOLTage|SOURCECURRent|LOADCURRent|LOADRESistance|LOADPOWer|MEASUREVOLTage|MEASURECURRent|MEASURERESistance|MEASUREHRESistance

Source Voltage Mode

SOURce:VOLTage:TERMinals <String>
Set the source voltage mode terminals to <String> 2WIRe|2WGuard|4WIRe

SOURce:VOLTage:MEASure:COUNt <NR1>
Set the source voltage mode measure count to <NR1>

SOURce:VOLTage:MEASure:COUNt:INFinite <Bool>
Enable the source voltage mode infinite measure count to <Bool> OFF|ON|0|1

SOURce:VOLTage:MEASure:PRIMary <String>
Set the source voltage mode primary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SOURce:VOLTage:MEASure:SECondary <String>
Set the source voltage mode secondary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SOURce:VOLTage:SHAPe <String>
Set the source voltage mode source shape to <String> FIXed|PULSe|SWEep|LIST|PSWEep

SOURce:VOLTage:SHAPe:COUNt <NR1>
Set the source voltage mode shape count to <NR1>

SOURce:VOLTage:SHAPe:COUNt:INFinite <Bool>
Enable the source voltage mode shape infinite to <Bool> OFF|ON|0|1

SOURce:VOLTage:OUTPut:OFF:MODE <String>
Set the source voltage mode off state to <String> OPEN|HIZ|LIMCURRent|ZERO

SOURce:VOLTage:OUTPut:OFF:MEASurement <Bool>
Enable the source voltage mode off measurement to <Bool> OFF|ON|0|1

SOURce:VOLTage:SLEW <NRF>
Set the source voltage mode slew rate to <NRF> V/s|V/ms|V/us

SOURce:VOLTage:SLEW:MAXimum
Set the Source Voltage mode Slew Rate to the maximum allowed rate in V/s

SOURce:VOLTage:SLEW:MINimum
Set the Source Voltage mode Slew Rate to the minimum allowed rate in V/s

SOURce:VOLTage:LOAD:REACtance:HIGH <Bool>
Enable the source voltage mode high reactance to <Bool> OFF|ON|0|1

SOURce:VOLTage:MEASurement:COMPlete:CONFigure <String>
Set the source voltage mode measurement complete to <String> OFF|CONstant

SOURce:VOLTage:CURRent:LIMit <NRF>
Set the source voltage mode current limit to <NRF> A|mA|uA|nA

SOURce:VOLTage:DELay <NRF>
Set the source voltage mode settling time delay to <NRF> S|mS|uS

SOURce:VOLTage:DELay:AUTO <Bool>
Enable the source voltage mode settling time delay auto to <Bool> OFF|ON|0|1

SOURce:VOLTage:SHAPe:TRIGger <String>
Set the source voltage mode trigger to <String> OFF|LEVel|REPeat

Steady

SOURce:VOLTage:FIXed[:LEVel] <NRF>
Set the source voltage mode steady level to <NRF> V|mV|uV

SOURce:VOLTage:FIXed:APERture:TIME <NRF>
Set the source voltage mode steady measurement period time to <NRF> S|mS|uS

SOURce:VOLTage:FIXed:APERture:NPLCycles <NRF>
Set the source voltage mode steady measurement period npl cycles to <NRF> PLC

Pulsed

Low

SOURce:VOLTage:PULSe:FIRSt[:LEVel] <NRF>
Set the source voltage mode pulse low level to <NRF> V|mV|uV

SOURce:VOLTage:PULSe:FIRSt:APERture:TIME <NRF>
Set the source voltage mode pulse low measurement period time to <NRF> S|mS|uS

SOURce:VOLTage:PULSe:FIRSt:APERture:NPLCycles <NRF>
Set the source voltage mode pulse low measurement period npl cycles to <NRF> PLC

High

SOURce:VOLTage:PULSe:SECond[:LEVel] <NRF>
Set the source voltage mode pulse high level to <NRF> V|mV|uV

SOURce:VOLTage:PULSe:SECond:APERture:TIME <NRF>
Set the source voltage mode pulse high measurement period time to <NRF> S|mS|uS

SOURce:VOLTage:PULSe:SECond:APERture:NPLCycles <NRF>
Set the source voltage mode pulse high measurement period npl cycles to <NRF> PLC

Sweep

SOURce:VOLTage:SWEep:SPACing <String>
Set the source voltage mode sweep shape to <String> LINear|LOG|DLINear|DLOG

SOURce:VOLTage:SWEep:POINts <NR1>
Set the source voltage mode sweep points to <NR1>

SOURce:VOLTage:SWEep:STARt <NRF>
Set the source voltage mode sweep start to <NRF> V|mV|uV

SOURce:VOLTage:SWEep:STOP <NRF>
Set the source voltage mode sweep stop to <NRF> V|mV|uV

SOURce:VOLTage:SWEep:STEP?
Query the source voltage mode sweep step

SOURce:VOLTage:SWEep:APERture:TIME <NRF>
Set the source voltage mode steady measurement period time to <NRF> S|mS|uS

SOURce:VOLTage:SWEep:APERture:NPLCycles <NRF>
Set the source voltage mode steady measurement period npl cycles to <NRF> PLC

Pulsed Sweep

SOURce:VOLTage:PSWEep:SWEep:SPACing <String>
Set the source voltage mode pulsed sweep spacing to <String> LINear|LOG|DLINear|DLOG

SOURce:VOLTage:PSWEep:SWEep:POINts <NR1>
Set the source voltage mode pulsed sweep points to <NR1>

SOURce:VOLTage:PSWEep:SWEep:STARt <NRF>
Set the source voltage mode pulsed sweep start to <NRF> V|mV|uV

SOURce:VOLTage:PSWEep:SWEep:STOP <NRF>
Set the source voltage mode pulsed sweep stop to <NRF> V|mV|uV

SOURce:VOLTage:PSWEep:SWEep:STEP?
Query the source voltage mode pulsed sweep step

SOURce:VOLTage:PSWEep:FILTer <Bool>
Enable the source voltage mode pulsed sweep filter to <Bool> OFF|ON|0|1

SOURce:VOLTage:PSWEep:SWEep:APERture:TIME <NRF>
Set the source voltage mode pulsed sweep time to <NRF> S|mS|uS

SOURce:VOLTage:PSWEep:SWEep:APERture:NPLCycles <NRF>
Set the source voltage mode pulsed sweep npl cycles to <NRF> PLC

Steady

SOURce:VOLTage:PSWEep:FIXed[:LEVel] <NRF>
Set the source voltage mode pulsed sweep level to <NRF> V|mV|uV

SOURce:VOLTage:PSWEep:FIXed:APERture:TIME <NRF>
Set the source voltage mode pulsed sweep time to <NRF> S|mS|uS

SOURce:VOLTage:PSWEep:FIXed:APERture:NPLCycles <NRF>
Set the source voltage mode pulsed sweep npl cycles to <NRF> PLC

List

SOURce:VOLTage:LIST:NAMe <String>
Set the source voltage mode list name to <String>

SOURce:VOLTage:LIST:APERture:TIME <NRF>
Set the source voltage mode steady measurement period time to <NRF> S|mS|uS

SOURce:VOLTage:LIST:APERture:NPLCycles <NRF>
Set the source voltage mode steady measurement period npl cycles to <NRF> PLC

Ranges

Current

SOURce:VOLTage:RANGe:CURRent <String>
Set the source voltage mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SOURce:VOLTage:RANGe:CURRent:AUTO <Bool>
Enable the source voltage mode current range auto to <Bool> OFF|ON|0|1

SOURce:VOLTage:RANGe:CURRent:AUTO:MINimum <String>
Set the source voltage mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

Voltage

SOURce:VOLTage:RANGe:VOLTage <String>
Set the source voltage mode range voltage manual range to <String>
20MV|200MV|2V|20V|200V

SOURce:VOLTage:RANGe:VOLTage:AUTO <Bool>
Enable the source voltage mode range voltage auto to <Bool> OFF|ON|0|1

SOURce:VOLTage:RANGe:VOLTage:AUTO:MINimum <String>
Set the source voltage mode range voltage auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SOURce:VOLTage:PROTection:VOLTage <NRF>
Set the source voltage mode protection voltage voltage to <NRF> V|mV|uV

SOURce:VOLTage:PROTection:VOLTage:STATe <Bool>
Enable the source voltage mode protection voltage state to <Bool> OFF|ON|0|1

Current

SOURce:VOLTage:PROTection:CURRent <NRF>
Set the source voltage mode protection current current to <NRF> A|mA

SOURce:VOLTage:PROTection:CURRent:STATe <Bool>
Enable the source voltage mode protection current state to <Bool> OFF|ON|0|1

Power

SOURce:VOLTage:PROTection:POWer <NRF>
Set the source voltage mode protection power power to <NRF> W|mW|uW

SOURce:VOLTage:PROTection:POWer:STATe <Bool>
Enable the source voltage mode protection power state to <Bool> OFF|ON|0|1

Math

SOURce:VOLTage:CALCulate:MATH:TYPE <String>
Set the source voltage mode math type to <String> NONE|DEViation|DEVPct|RATPct|MXPB

SOURce:VOLTage:CALCulate:MATH:REFerence <NRF>
Set the source voltage mode math custom reference to <NRF>

SOURce:VOLTage:CALCulate:MATH:REFerence:LIVE
Set the source voltage mode math live reference

mx+b

SOURce:VOLTage:CALCulate:MATH:MXPB:MTERm <NRF>
Set the source voltage mode math mx+b m to <NRF>

SOURce:VOLTage:CALCulate:MATH:MXPB:BTERm <NRF>
Set the source voltage mode math mx+b b to <NRF>

SOURce:VOLTage:CALCulate:MATH:MXPB:BTERm:LIVE
Set the source voltage mode math mx+b b configure live reference point

Sorting

SOURce:VOLTage:SORTing:TYPE <String>
Set the source voltage mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SOURce:VOLTage:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the source voltage mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SOURce:VOLTage:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the source voltage mode sorting tolerance primary upper limit to <NRF>

SOURce:VOLTage:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the source voltage mode sorting tolerance primary lower limit to <NRF>

Secondary

SOURce:VOLTage:SORTing:TOLerance:SECondary:STATe <Bool>
Enable the source voltage mode sorting tolerance secondary state to <Bool> OFF|ON|0|1

SOURce:VOLTage:SORTing:TOLerance:SECondary:LIMit:UPPer <NRF>
Set the source voltage mode sorting tolerance secondary upper limit to <NRF>

SOURce:VOLTage:SORTing:TOLerance:SECondary:LIMit:LOWer <NRF>
Set the source voltage mode sorting tolerance secondary lower limit to <NRF>

Source Current Mode

SOURce:CURRent:TERMinals <String>
Set the source current mode terminals to <String> 2WIRe|2WGuard|4WIRe

SOURce:CURRent:MEASure:COUNt <NR1>
Set the source current mode measure count to <NR1>

SOURce:CURRent:MEASure:COUNt:INFinite <Bool>
Enable the source current mode infinite measure count to <Bool> OFF|ON|0|1

SOURce:CURRent:MEASure:PRIMary <String>
Set the source current mode primary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SOURce:CURRent:MEASure:SECondary <String>
Set the source current mode secondary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SOURce:CURRent:SHAPe <String>
Set the source current mode source shape to <String> FIXed|PULSe|SWEep|LIST|PSWEep

SOURce:CURRent:SHAPe:COUNt <NR1>
Set the source current mode shape count to <NR1>

SOURce:CURRent:SHAPe:COUNt:INFinite <Bool>
Enable the source current mode shape infinite to <Bool> OFF|ON|0|1

SOURce:CURRent:OUTPut:OFF:MODE <String>
Set the source current mode off state to <String> OPEN|HIZ|LIMCURRent|ZERO

SOURce:CURRent:OUTPut:OFF:MEASurement <Bool>
Enable the source current mode off measurement to <Bool> OFF|ON|0|1

SOURce:CURRent:SLEW <NRF>
Set the source current mode slew rate to <NRF> A/s|A/ms|A/us

SOURce:CURRent:SLEW:MAXimum
Set the Source Current mode Slew Rate to the maximum allowed rate in A/s

SOURce:CURRent:SLEW:MINimum
Set the Source Current mode Slew Rate to the minimum allowed rate in A/s

SOURce:CURRent:LOAD:REACtance:HIGH <Bool>
Enable the source current mode high reactance to <Bool> OFF|ON|0|1

SOURce:CURRent:MEASurement:COMPlete:CONFigure <String>
Set the source current mode measurement complete to <String> OFF|CONstant

SOURce:CURRent:VOLTage:LIMit <NRF>
Set the source current mode voltage limit to <NRF> V|mV

SOURce:CURRent:SHAPe:TRIGger <String>
Set the source current mode trigger to <String> OFF|LEVel|REPeat

Steady

SOURce:CURRent:FIXed[:LEVel] <NRF>
Set the source current mode steady level to <NRF> A|mA|uA|nA

SOURce:CURRent:FIXed:APERture:TIME <NRF>
Set the source current mode steady measurement period time to <NRF> S|mS|uS

SOURce:CURRent:FIXed:APERture:NPLCycles <NRF>
Set the source current mode steady measurement period npl cycles to <NRF> PLC

Pulsed

Low

SOURce:CURRent:PULSe:FIRSt[:LEVel] <NRF>
Set the source current mode pulse low level to <NRF> A|mA|uA|nA

SOURce:CURRent:PULSe:FIRSt:APERture:TIME <NRF>
Set the source current mode pulse low measurement period time to <NRF> S|mS|uS

SOURce:CURRent:PULSe:FIRSt:APERture:NPLCycles <NRF>
Set the source current mode pulse low measurement period npl cycles to <NRF> PLC

High

SOURce:CURRent:PULSe:SECond[:LEVel] <NRF>
Set the source current mode pulse high level to <NRF> A|mA|uA|nA

SOURce:CURRent:PULSe:SECond:APERture:TIME <NRF>
Set the source current mode pulse high measurement period time to <NRF> S|mS|uS

SOURce:CURRent:PULSe:SECond:APERture:NPLCycles <NRF>
Set the source current mode pulse high measurement period npl cycles to <NRF> PLC

Sweep

SOURce:CURRent:SWEep:SPACing <String>
Set the source current mode sweep shape to <String> LINear|LOG|DLINear|DLOG

SOURce:CURRent:SWEep:POINts <NR1>
Set the source current mode sweep points to <NR1>

SOURce:CURRent:SWEep:STARt <NRF>
Set the source current mode sweep start to <NRF> A|mA|uA|nA

SOURce:CURRent:SWEep:STOP <NRF>
Set the source current mode sweep stop to <NRF> A|mA|uA|nA

SOURce:CURRent:SWEep:STEP?
Query the source current mode sweep step

SOURce:CURRent:SWEep:APERture:TIME <NRF>
Set the source current mode steady measurement period time to <NRF> S|mS|uS

SOURce:CURRent:SWEep:APERture:NPLCycles <NRF>
Set the source current mode steady measurement period npl cycles to <NRF> PLC

Pulsed Sweep

SOURce:CURRent:PSWEep:SWEep:SPACing <String>
Set the source current mode pulsed sweep spacing to <String> LINear|LOG|DLINear|DLOG

SOURce:CURRent:PSWEep:SWEep:POINts <NR1>
Set the source current mode pulsed sweep points to <NR1>

SOURce:CURRent:PSWEep:SWEep:STARt <NRF>
Set the source current mode pulsed sweep start to <NRF> A|mA|uA|nA

SOURce:CURRent:PSWEep:SWEep:STOP <NRF>
Set the source current mode pulsed sweep stop to <NRF> A|mA|uA|nA

SOURce:CURRent:PSWEep:SWEep:STEP?
Query the source current mode pulsed sweep step

SOURce:CURRent:PSWEep:FILTer <Bool>
Enable the source current mode pulsed sweep filter to <Bool> OFF|ON|0|1

SOURce:CURRent:PSWEep:SWEep:APERture:TIME <NRF>
Set the source current mode pulsed sweep steady time to <NRF> S|mS|uS

SOURce:CURRent:PSWEep:SWEep:APERture:NPLCycles <NRF>
Set the source current mode pulsed sweep steady npl cycles to <NRF> PLC

Steady

SOURce:CURRent:PSWEep:FIXed[:LEVel] <NRF>
Set the source current mode pulsed sweep steady level to <NRF> A|mA|uA|nA

SOURce:CURRent:PSWEep:FIXed:APERture:TIME <NRF>
Set the source current mode pulsed sweep time to <NRF> S|mS|uS

SOURce:CURRent:PSWEep:FIXed:APERture:NPLCycles <NRF>
Set the source current mode pulsed sweep npl cycles to <NRF> PLC

List

SOURce:CURRent:LIST:NAMe <String>
Set the source current mode list name to <String>

SOURce:CURRent:LIST:APERture:TIME <NRF>
Set the source current mode steady measurement period time to <NRF> S|mS|uS

SOURce:CURRent:LIST:APERture:NPLCycles <NRF>
Set the source current mode steady measurement period npl cycles to <NRF> PLC

Ranges

Current

SOURce:CURRent:RANGe:CURRent <String>
Set the source current mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SOURce:CURRent:RANGe:CURRent:AUTO <Bool>
Enable the source current mode current range auto to <Bool> OFF|ON|0|1

SOURce:CURRent:RANGe:CURRent:AUTO:MINimum <String>
Set the source current mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A

Voltage

SOURce:CURRent:RANGe:VOLTage <String>
Set the source current mode range voltage manual range to <String>
20MV|200MV|2V|20V|200V

SOURce:CURRent:RANGe:VOLTage:AUTO <Bool>
Enable the source current mode range voltage auto to <Bool> OFF|ON|0|1

SOURce:CURRent:RANGe:VOLTage:AUTO:MINimum <String>
Set the source current mode range voltage auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SOURce:CURRent:PROTection:VOLTage <NRF>
Set the source current mode protection voltage voltage to <NRF> V|mV|uV

SOURce:CURRent:PROTection:VOLTage:STATe <Bool>
Enable the source current mode protection voltage state to <Bool> OFF|ON|0|1

Current

SOURce:CURRent:PROTection:CURRent <NRF>
Set the source current mode protection current current to <NRF> A|mA

SOURce:CURRent:PROTection:CURRent:STATe <Bool>
Enable the source current mode protection current state to <Bool> OFF|ON|0|1

Power

SOURce:CURRent:PROTection:POWer <NRF>
Set the source current mode protection power power to <NRF> W|mW|uW

SOURce:CURRent:PROTection:POWer:STATe <Bool>
Enable the source current mode protection power state to <Bool> OFF|ON|0|1

Settling Time

SOURce:CURRent:DELay <NRF>
Set the source current mode settling time delay to <NRF> S|mS|uS

SOURce:CURRent:DELay:AUTO <Bool>
Enable the source current mode settling time delay auto to <Bool> OFF|ON|0|1

Math

SOURce:CURRent:CALCulate:MATH:TYPE <String>
Set the source current mode math type to <String> NONE|DEViation|DEVPct|RATPct|MXPB

SOURce:CURRent:CALCulate:MATH:REFerence <NRF>
Set the source current mode math custom reference to <NRF>

SOURce:CURRent:CALCulate:MATH:REFerence:LIVE
Set the source current mode math live reference

mx+b

SOURce:CURRent:CALCulate:MATH:MXPB:MTERm <NRF>
Set the source current mode math mx+b m to <NRF>

SOURce:CURRent:CALCulate:MATH:MXPB:BTERm <NRF>
Set the source current mode math mx+b b to <NRF>

SOURce:CURRent:CALCulate:MATH:MXPB:BTERm:LIVE
Set the source current mode math mx+b b configure live reference point

Sorting

SOURce:CURRent:SORTing:TYPE <String>
Set the source current mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SOURce:CURRent:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the source current mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SOURce:CURRent:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the source current mode sorting tolerance primary upper limit to <NRF>

SOURce:CURRent:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the source current mode sorting tolerance primary lower limit to <NRF>

Secondary

SOURce:CURRent:SORTing:TOLerance:SECondary:STATe <Bool>
Enable the source current mode sorting tolerance secondary state to <Bool> OFF|ON|0|1

SOURce:CURRent:SORTing:TOLerance:SECondary:LIMit:UPPer <NRF>
Set the source current mode sorting tolerance secondary upper limit to <NRF>

SOURce:CURRent:SORTing:TOLerance:SECondary:LIMit:LOWer <NRF>
Set the source current mode sorting tolerance secondary lower limit to <NRF>

Load Current Mode

SINK:CURRent:TERMinals <String>
Set the load current mode terminals to <String> 2WIRe|4WIRe

SINK:CURRent:MEASure:COUNt <NR1>
Set the load current mode measure count to <NR1>

SINK:CURRent:MEASure:COUNt:INFinite <Bool>
Enable the load current mode infinite measure count to <Bool> OFF|ON|0|1

SINK:CURRent:MEASure:PRIMary <String>
Set the load current mode primary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SINK:CURRent:MEASure:SECondary <String>
Set the load current mode secondary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SINK:CURRent:SHAPe <String>
Set the load current mode source shape to <String> FIXed|PULSe|SWEep|LIST|PSWEep

SINK:CURRent:SHAPe:COUNt <NR1>
Set the load current mode shape count to <NR1>

SINK:CURRent:SHAPe:COUNt:INFinite <Bool>
Enable the load current mode shape infinite to <Bool> OFF|ON|0|1

SINK:CURRent:OUTPut:OFF:MODE <String>
Set the load current mode off state to <String> OPEN|HIZ

SINK:CURRent:OUTPut:OFF:MEASurement <Bool>
Enable the load current mode off measurement to <Bool> OFF|ON|0|1

SINK:CURRent:SLEW <NRF>
Set the load current mode slew rate to <NRF> A/s|A/ms|A/us

SINK:CURRent:SLEW:MAXimum
Set the Load Current mode Slew Rate to the maximum allowed rate in A/s

SINK:CURRent:SLEW:MINimum
Set the Load Current mode Slew Rate to the minimum allowed rate in A/s

SINK:CURRent:LOAD:REACtance:HIGH <Bool>
Enable the load current mode high reactance to <Bool> OFF|ON|0|1

SINK:CURRent:MEASurement:COMPlete:CONFigure <String>
Set the load current mode measurement complete to <String> OFF|CONstant

SINK:CURRent:DROPout:VOLTage <NRF>
Set the load current mode v dropout to <NRF> V|mV|uV

SINK:CURRent:DELay <NRF>
Set the load current mode settling time delay to <NRF> S|mS|uS

SINK:CURRent:DELay:AUTO <Bool>
Enable the load current mode settling time delay auto to <Bool> OFF|ON|0|1

SINK:CURRent:SHAPe:TRIGger <String>
Set the load current mode trigger to <String> OFF|LEVel|REPeat

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Steady

SINK:CURRent:FIXed[:LEVel] <NRF>
Set the load current mode steady level to <NRF> A|mA|uA|nA

SINK:CURRent:FIXed:APERture:TIME <NRF>
Set the load current mode steady measurement period time to <NRF> S|mS|uS

SINK:CURRent:FIXed:APERture:NPLCycles <NRF>
Set the load current mode steady measurement period npl cycles to <NRF> PLC

Pulsed

Low

SINK:CURRent:PULSe:FIRSt[:LEVel] <NRF>
Set the load current mode pulse low level to <NRF> A|mA|uA|nA

SINK:CURRent:PULSe:FIRSt:APERture:TIME <NRF>
Set the load current mode pulse low measurement period time to <NRF> S|mS|uS

SINK:CURRent:PULSe:FIRSt:APERture:NPLCycles <NRF>
Set the load current mode pulse low measurement period npl cycles to <NRF> PLC

High

SINK:CURRent:PULSe:SECond[:LEVel] <NRF>
Set the load current mode pulse high level to <NRF> A|mA|uA|nA

SINK:CURRent:PULSe:SECond:APERture:TIME <NRF>
Set the load current mode pulse high measurement period time to <NRF> S|mS|uS

SINK:CURRent:PULSe:SECond:APERture:NPLCycles <NRF>
Set the load current mode pulse high measurement period npl cycles to <NRF> PLC

Sweep

SINK:CURRent:SWEep:SPACing <String>
Set the load current mode sweep shape to <String> LINear|LOG|DLINear|DLOG

SINK:CURRent:SWEep:POINts <NR1>
Set the load current mode sweep points to <NR1>

SINK:CURRent:SWEep:STARt <NRF>
Set the load current mode sweep start to <NRF> A|mA|uA|nA

SINK:CURRent:SWEep:STOP <NRF>
Set the load current mode sweep stop to <NRF> A|mA|uA|nA

SINK:CURRent:SWEep:STEP?
Query the load current mode sweep step

SINK:CURRent:SWEep:APERture:TIME <NRF>
Set the load current mode steady measurement period time to <NRF> S|mS|uS

SINK:CURRent:SWEep:APERture:NPLCycles <NRF>
Set the load current mode steady measurement period npl cycles to <NRF> PLC

Pulsed Sweep

SINK:CURRent:PSWEep:SWEep:SPACing <String>
Set the load current mode pulsed sweep spacing to <String> LINear|LOG|DLINear|DLOG

SINK:CURRent:PSWEep:SWEep:POINts <NR1>
Set the load current mode pulsed sweep points to <NR1>

SINK:CURRent:PSWEep:SWEep:STARt <NRF>
Set the load current mode pulsed sweep start to <NRF> A|mA|uA|nA

SINK:CURRent:PSWEep:SWEep:STOP <NRF>
Set the load current mode pulsed sweep stop to <NRF> A|mA|uA|nA

SINK:CURRent:PSWEep:SWEep:STEP?
Query the load current mode pulsed sweep step

SINK:CURRent:PSWEep:FILTer <Bool>
Enable the load current mode pulsed sweep filter to <Bool> OFF|ON|0|1

SINK:CURRent:PSWEep:SWEep:APERture:TIME <NRF>
Set the load current mode pulsed sweep time to <NRF> S|mS|uS

SINK:CURRent:PSWEep:SWEep:APERture:NPLCycles <NRF>
Set the load current mode pulsed sweep npl cycles to <NRF> PLC

Steady

SINK:CURRent:PSWEep:FIXed[:LEVel] <NRF>
Set the load current mode pulsed sweep level to <NRF> A|mA|uA|nA

SINK:CURRent:PSWEep:FIXed:APERture:TIME <NRF>
Set the load current mode pulsed sweep time to <NRF> S|mS|uS

SINK:CURRent:PSWEep:FIXed:APERture:NPLCycles <NRF>
Set the load current mode pulsed sweep npl cycles to <NRF> PLC

List

SINK:CURRent:LIST:NAMe <String>
Set the load current mode list name to <String>

SINK:CURRent:LIST:APERture:TIME <NRF>
Set the load current mode steady measurement period time to <NRF> S|mS|uS

SINK:CURRent:LIST:APERture:NPLCycles <NRF>
Set the load current mode steady measurement period npl cycles to <NRF> PLC

Ranges

Current

SINK:CURRent:RANGe:CURRent <String>
Set the load current mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SINK:CURRent:RANGe:CURRent:AUTO <Bool>
Enable the load current mode current range auto to <Bool> OFF|ON|0|1

SINK:CURRent:RANGe:CURRent:AUTO:MINimum <String>
Set the load current mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

Voltage

SINK:CURRent:RANGe:VOLTage:AUTO?
Query the load current mode range voltage auto

SINK:CURRent:RANGe:VOLTage:AUTO:MINimum <String>
Set the load current mode range voltage auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SINK:CURRent:PROTection:VOLTage <NRF>
Set the load current mode protection voltage voltage to <NRF> V|mV|uV

SINK:CURRent:PROTection:VOLTage:STATe <Bool>
Enable the load current mode protection voltage state to <Bool> OFF|ON|0|1

Current

SINK:CURRent:PROTection:CURRent <NRF>
Set the load current mode protection current current to <NRF> A|mA

SINK:CURRent:PROTection:CURRent:STATe <Bool>
Enable the load current mode protection current state to <Bool> OFF|ON|0|1

Power

SINK:CURRent:PROTection:POWer <NRF>
Set the load current mode protection power power to <NRF> W|mW|uW

SINK:CURRent:PROTection:POWer:STATe <Bool>
Enable the load current mode protection power state to <Bool> OFF|ON|0|1

Math

SINK:CURRent:CALCulate:MATH:TYPE <String>
Set the load current mode math type to <String> NONE|DEViation|DEVPct|RATPct|MXPB

SINK:CURRent:CALCulate:MATH:REFerence <NRF>
Set the load current mode math custom reference to <NRF>

SINK:CURRent:CALCulate:MATH:REFerence:LIVE
Set the load current mode math live reference

mx+b

SINK:CURRent:CALCulate:MATH:MXPB:MTERm <NRF>
Set the load current mode math mx+b m to <NRF>

SINK:CURRent:CALCulate:MATH:MXPB:BTERm <NRF>
Set the load current mode math mx+b b to <NRF>

SINK:CURRent:CALCulate:MATH:MXPB:BTERm:LIVE
Set the load current mode math mx+b b configure live reference point

Sorting

SINK:CURRent:SORTing:TYPE <String>
Set the load current mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SINK:CURRent:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the load current mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SINK:CURRent:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the load current mode sorting tolerance primary upper limit to <NRF>

SINK:CURRent:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the load current mode sorting tolerance primary lower limit to <NRF>

Secondary

SINK:CURRent:SORTing:TOLerance:SECondary:STATe <Bool>
Enable the load current mode sorting tolerance secondary state to <Bool> OFF|ON|0|1

SINK:CURRent:SORTing:TOLerance:SECondary:LIMit:UPPer <NRF>
Set the load current mode sorting tolerance secondary upper limit to <NRF>

SINK:CURRent:SORTing:TOLerance:SECondary:LIMit:LOWer <NRF>
Set the load current mode sorting tolerance secondary lower limit to <NRF>

Load Resistance Mode

SINK:RESistance:TERMinals <String>
Set the load resistance mode terminals to <String> 2WIRe|4WIRe

SINK:RESistance:MEASure:COUNt <NR1>
Set the load resistance mode measure count to <NR1>

SINK:RESistance:MEASure:COUNt:INFinite <Bool>
Enable the load resistance mode infinite measure count to <Bool> OFF|ON|0|1

SINK:RESistance:MEASure:PRIMary <String>
Set the load resistance mode primary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SINK:RESistance:MEASure:SECondary <String>
Set the load resistance mode secondary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SINK:RESistance:SHAPe <String>
Set the load resistance mode source shape to <String> FIXed|PULSe|SWEep|LIST|PSWEep

SINK:RESistance:SHAPe:COUNt <NR1>
Set the load resistance mode shape count to <NR1>

SINK:RESistance:SHAPe:COUNt:INFinite <Bool>
Enable the load resistance mode shape infinite to <Bool> OFF|ON|0|1

SINK:RESistance:OUTPut:OFF:MODE <String>
Set the load resistance mode off state to <String> OPEN|HIZ

SINK:RESistance:OUTPut:OFF:MEASurement <Bool>
Enable the load resistance mode off measurement to <Bool> OFF|ON|0|1

SINK:RESistance:SLEW <NRF>
Set the load resistance mode slew rate to <NRF> A/s|A/ms|A/us

SINK:RESistance:SLEW:MAXimum
Set the Load Resistance mode Slew Rate to the maximum allowed rate in A/s

SINK:RESistance:SLEW:MINimum
Set the Load Resistance mode Slew Rate to the minimum allowed rate in A/s

SINK:RESistance:LOAD:REACtance:HIGH <Bool>
Enable the load resistance mode high reactance to <Bool> OFF|ON|0|1

SINK:RESistance:MEASurement:COMPlete:CONFigure <String>
Set the load resistance mode measurement complete to <String> OFF|CONstant

SINK:RESistance:CURRent:LIMit <NRF>
Set the load resistance mode current limit to <NRF> A|mA|uA|nA

SINK:RESistance:CURRent:LIMit:STATe <Bool>
Enable the load resistance mode current limit status to <Bool> OFF|ON|0|1

SINK:RESistance:DROPout:VOLTage <NRF>
Set the load resistance mode v dropout to <NRF> V|mV|uV

SINK:RESistance:DELay <NRF>
Set the load resistance mode settling time delay to <NRF> S|mS|uS

SINK:RESistance:DELay:AUTO <Bool>
Enable the load resistance mode settling time delay auto to <Bool> OFF|ON|0|1

SINK:RESistance:SHAPe:TRIGger <String>
Set the load resistance mode trigger to <String> OFF|LEVel|REPeat

Steady

SINK:RESistance:FIXed[:LEVel] <NRF>
Set the load resistance mode steady level to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:FIXed:APERture:TIME <NRF>
Set the load resistance mode steady measurement period time to <NRF> S|mS|uS

SINK:RESistance:FIXed:APERture:NPLCycles <NRF>
Set the load resistance mode steady measurement period npl cycles to <NRF> PLC

Pulsed

Low

SINK:RESistance:PULSe:FIRSt[:LEVel] <NRF>
Set the load resistance mode pulse low level to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:PULSe:FIRSt:APERture:TIME <NRF>
Set the load resistance mode pulse low measurement period time to <NRF> S|mS|uS

SINK:RESistance:PULSe:FIRSt:APERture:NPLCycles <NRF>
Set the load resistance mode pulse low measurement period npl cycles to <NRF> PLC

High

SINK:RESistance:PULSe:SECond[:LEVel] <NRF>
Set the load resistance mode pulse high level to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:PULSe:SECond:APERture:TIME <NRF>
Set the load resistance mode pulse high measurement period time to <NRF> S|mS|uS

SINK:RESistance:PULSe:SECond:APERture:NPLCycles <NRF>
Set the load resistance mode pulse high measurement period npl cycles to <NRF> PLC

Sweep

SINK:RESistance:SWEep:SPACing <String>
Set the load resistance mode sweep shape to <String> LINear|LOG|DLINear|DLOG

SINK:RESistance:SWEep:POINts <NR1>
Set the load resistance mode sweep points to <NR1>

SINK:RESistance:SWEep:STARt <NRF>
Set the load resistance mode sweep start to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:SWEep:STOP <NRF>
Set the load resistance mode sweep stop to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:SWEep:STEP?
Query the load resistance mode sweep step

SINK:RESistance:SWEep:APERture:TIME <NRF>
Set the load resistance mode steady measurement period time to <NRF> S|mS|uS

SINK:RESistance:SWEep:APERture:NPLCycles <NRF>
Set the load resistance mode steady measurement period npl cycles to <NRF> PLC

Pulsed Sweep

SINK:RESistance:PSWEep:SWEep:SPACing <String>
Set the load resistance mode pulsed sweep spacing to <String> LINear|LOG|DLINear|DLOG

SINK:RESistance:PSWEep:SWEep:POINts <NR1>
Set the load resistance mode pulsed sweep points to <NR1>

SINK:RESistance:PSWEep:SWEep:STARt <NRF>
Set the load resistance mode pulsed sweep start to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:PSWEep:SWEep:STOP <NRF>
Set the load resistance mode pulsed sweep stop to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:PSWEep:SWEep:STEP?
Query the load resistance mode pulsed sweep step

SINK:RESistance:PSWEep:FILTer <Bool>
Enable the load resistance mode pulsed sweep filter to <Bool> OFF|ON|0|1

SINK:RESistance:PSWEep:SWEep:APERture:TIME <NRF>
Set the load resistance mode pulsed sweep time to <NRF> S|mS|uS

SINK:RESistance:PSWEep:SWEep:APERture:NPLCycles <NRF>
Set the load resistance mode pulsed sweep npl cycles to <NRF> PLC

Steady

SINK:RESistance:PSWEep:FIXed[:LEVel] <NRF>
Set the load resistance mode pulsed sweep level to <NRF> MAOhm|KOhm|Ohm|mOhm

SINK:RESistance:PSWEep:FIXed:APERture:TIME <NRF>
Set the load resistance mode pulsed sweep time to <NRF> S|mS|uS

SINK:RESistance:PSWEep:FIXed:APERture:NPLCycles <NRF>
Set the load resistance mode pulsed sweep npl cycles to <NRF> PLC

List

SINK:RESistance:LIST:NAMe <String>
Set the load resistance mode list name to <String>

SINK:RESistance:LIST:APERture:TIME <NRF>
Set the load resistance mode steady measurement period time to <NRF> S|mS|uS

SINK:RESistance:LIST:APERture:NPLCycles <NRF>
Set the load resistance mode steady measurement period npl cycles to <NRF> PLC

Ranges

Current

SINK:RESistance:RANGe:CURRent <String>
Set the load resistance mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SINK:RESistance:RANGe:CURRent:AUTO <Bool>
Enable the load resistance mode current range auto to <Bool> OFF|ON|0|1

SINK:RESistance:RANGe:CURRent:AUTO:MINimum <String>
Set the load resistance mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

Voltage

SINK:RESistance:RANGe:VOLTage:AUTO?
Query the load resistance mode range voltage auto

SINK:RESistance:RANGe:VOLTage:AUTO:MINimum <String>
Set the load resistance mode range voltage auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SINK:RESistance:PROTection:VOLTage <NRF>
Set the load resistance mode protection voltage voltage to <NRF> V|mV|uV

SINK:RESistance:PROTection:VOLTage:STATe <Bool>
Enable the load resistance mode protection voltage state to <Bool> OFF|ON|0|1

Current

SINK:RESistance:PROTection:CURRent <NRF>
Set the load resistance mode protection current current to <NRF> A|mA|uA|nA

SINK:RESistance:PROTection:CURRent:STATe <Bool>
Enable the load resistance mode protection current state to <Bool> OFF|ON|0|1

Power

SINK:RESistance:PROTection:POWer <NRF>
Set the load resistance mode protection power power to <NRF> W|mW|uW

SINK:RESistance:PROTection:POWer:STATe <Bool>
Enable the load resistance mode protection power state to <Bool> OFF|ON|0|1

Math

SINK:RESistance:CALCulate:MATH:TYPE <String>
Set the load resistance mode math type to <String> NONE|DEViation|DEVPct|RATPct|MXPB

SINK:RESistance:CALCulate:MATH:REFerence <NRF>
Set the load resistance mode math custom reference to <NRF>

SINK:RESistance:CALCulate:MATH:REFerence:LIVE
Set the load resistance mode math live reference

mx+b

SINK:RESistance:CALCulate:MATH:MXPB:MTERm <NRF>
Set the load resistance mode math mx+b m to <NRF>

SINK:RESistance:CALCulate:MATH:MXPB:BTERm <NRF>
Set the load resistance mode math mx+b b to <NRF>

SINK:RESistance:CALCulate:MATH:MXPB:BTERm:LIVE
Set the load resistance mode math mx+b b configure live reference point

Sorting

SINK:RESistance:SORTing:TYPE <String>
Set the load resistance mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SINK:RESistance:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the load resistance mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SINK:RESistance:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the load resistance mode sorting tolerance primary upper limit to <NRF>

SINK:RESistance:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the load resistance mode sorting tolerance primary lower limit to <NRF>

Secondary

SINK:RESistance:SORTing:TOLerance:SECondary:STATe <Bool>
Enable the load resistance mode sorting tolerance secondary state to <Bool> OFF|ON|0|1

SINK:RESistance:SORTing:TOLerance:SECondary:LIMit:UPPer <NRF>
Set the load resistance mode sorting tolerance secondary upper limit to <NRF>

SINK:RESistance:SORTing:TOLerance:SECondary:LIMit:LOWer <NRF>
Set the load resistance mode sorting tolerance secondary lower limit to <NRF>

Load Power Mode

SINK:POWer:TERMinals <String>
Set the load power mode terminals to <String> 2WIRe|4WIRe

SINK:POWer:MEASure:COUNt <NR1>
Set the load power mode measure count to <NR1>

SINK:POWer:MEASure:COUNt:INFinite <Bool>
Enable the load power mode infinite measure count to <Bool> OFF|ON|0|1

SINK:POWer:MEASure:PRIMary <String>
Set the load power mode primary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SINK:POWer:MEASure:SECondary <String>
Set the load power mode secondary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SINK:POWer:SHAPe <String>
Set the load power mode source shape to <String> FIXed|PULSe|SWEep|LIST|PSWEep

SINK:POWer:SHAPe:COUNt <NR1>
Set the load power mode shape count to <NR1>

SINK:POWer:SHAPe:COUNt:INFinite <Bool>
Enable the load power mode shape infinite to <Bool> OFF|ON|0|1

SINK:POWer:OUTPut:OFF:MODE <String>
Set the load power mode off state to <String> OPEN|HIZ

SINK:POWer:OUTPut:OFF:MEASurement <Bool>
Enable the load power mode off measurement to <Bool> OFF|ON|0|1

SINK:POWer:SLEW <NRF>
Set the load power mode slew rate to <NRF> W/s|W/ms|W/us

SINK:POWer:SLEW:MAXimum
Set the Load Power mode Slew Rate to the maximum allowed rate in W/s

SINK:POWer:SLEW:MINimum
Set the Load Power mode Slew Rate to the minimum allowed rate in W/s

SINK:POWer:LOAD:REACtance:HIGH <Bool>
Enable the load power mode high reactance to <Bool> OFF|ON|0|1

SINK:POWer:MEASurement:COMPlete:CONFigure <String>
Set the load power mode measurement complete to <String> OFF|CONstant

SINK:POWer:CURRent:LIMit <NRF>
Set the load power mode current limit to <NRF> A|mA|uA|nA

SINK:POWer:CURRent:LIMit:STATe <Bool>
Enable the load power mode current limit status to <Bool> OFF|ON|0|1

SINK:POWer:DROPout:VOLTage <NRF>
Set the load power mode v dropout to <NRF> V|mV|uV

SINK:POWer:DELay <NRF>
Set the load power mode settling time delay to <NRF> S|mS|uS

SINK:POWer:DELay:AUTO <Bool>
Enable the load power mode settling time delay auto to <Bool> OFF|ON|0|1

SINK:POWer:SHAPe:TRIGger <String>
Set the load power mode trigger to <String> OFF|LEVel|REPeat

Steady

SINK:POWer:FIXed[:LEVel] <NRF>
Set the load power mode steady level to <NRF> W|mW|uW

SINK:POWer:FIXed:APERture:TIME <NRF>
Set the load power mode steady measurement period time to <NRF> S|mS|uS

SINK:POWer:FIXed:APERture:NPLCycles <NRF>
Set the load power mode steady measurement period npl cycles to <NRF> PLC

Pulsed

Low

SINK:POWer:PULSe:FIRSt[:LEVel] <NRF>
Set the load power mode pulse low level to <NRF> W|mW|uW

SINK:POWer:PULSe:FIRSt:APERture:TIME <NRF>
Set the load power mode pulse low measurement period time to <NRF> S|mS|uS

SINK:POWer:PULSe:FIRSt:APERture:NPLCycles <NRF>
Set the load power mode pulse low measurement period npl cycles to <NRF> PLC

High

SINK:POWer:PULSe:SECond[:LEVel] <NRF>
Set the load power mode pulse high level to <NRF> W|mW|uW

SINK:POWer:PULSe:SECond:APERture:TIME <NRF>
Set the load power mode pulse high measurement period time to <NRF> S|mS|uS

SINK:POWer:PULSe:SECond:APERture:NPLCycles <NRF>
Set the load power mode pulse high measurement period npl cycles to <NRF> PLC

Sweep

SINK:POWer:SWEep:SPACing <String>
Set the load power mode sweep shape to <String> LINear|LOG|DLINear|DLOG

SINK:POWer:SWEep:POINts <NR1>
Set the load power mode sweep points to <NR1>

SINK:POWer:SWEep:STARt <NRF>
Set the load power mode sweep start to <NRF> W|mW|uW

SINK:POWer:SWEep:STOP <NRF>
Set the load power mode sweep stop to <NRF> W|mW|uW

SINK:POWer:SWEep:STEP?
Query the load power mode sweep step

SINK:POWer:SWEep:APERture:TIME <NRF>
Set the load power mode steady measurement period time to <NRF> S|mS|uS

SINK:POWer:SWEep:APERture:NPLCycles <NRF>
Set the load power mode steady measurement period npl cycles to <NRF> PLC

Pulsed Sweep

SINK:POWer:PSWEep:SWEep:SPACing <String>
Set the load power mode pulsed sweep spacing to <String> LINear|LOG|DLINear|DLOG

SINK:POWer:PSWEep:SWEep:POINts <NR1>
Set the load power mode pulsed sweep points to <NR1>

SINK:POWer:PSWEep:SWEep:STARt <NRF>
Set the load power mode pulsed sweep start to <NRF> A|mA|uA|nA

SINK:POWer:PSWEep:SWEep:STOP <NRF>
Set the load power mode pulsed sweep stop to <NRF> A|mA|uA|nA

SINK:POWer:PSWEep:SWEep:STEP?
Query the load power mode pulsed sweep step

SINK:POWer:PSWEep:FILTer <Bool>
Enable the load power mode pulsed sweep filter to <Bool> OFF|ON|0|1

SINK:POWer:PSWEep:SWEep:APERture:TIME <NRF>
Set the load power mode pulsed sweep time to <NRF> S|mS|uS

SINK:POWer:PSWEep:SWEep:APERture:NPLCycles <NRF>
Set the load power mode pulsed sweep npl cycles to <NRF> PLC

Steady

SINK:POWer:PSWEep:FIXed[:LEVel] <NRF>
Set the load power mode pulsed sweep level to <NRF> A|mA|uA|nA

SINK:POWer:PSWEep:FIXed:APERture:TIME <NRF>
Set the load power mode pulsed sweep time to <NRF> S|mS|uS

SINK:POWer:PSWEep:FIXed:APERture:NPLCycles <NRF>
Set the load power mode pulsed sweep npl cycles to <NRF> PLC

List

SINK:POWer:LIST:NAMe <String>
Set the load power mode list name to <String>

SINK:POWer:LIST:APERture:TIME <NRF>
Set the load power mode steady measurement period time to <NRF> S|mS|uS

SINK:POWer:LIST:APERture:NPLCycles <NRF>
Set the load power mode steady measurement period npl cycles to <NRF> PLC

Ranges

Current

SINK:POWer:RANGe:CURRent <String>
Set the load power mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SINK:POWer:RANGe:CURRent:AUTO <Bool>
Enable the load power mode current range auto to <Bool> OFF|ON|0|1

SINK:POWer:RANGe:CURRent:AUTO:MINimum <String>
Set the load power mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

Voltage

SINK:POWer:RANGe:VOLTage:AUTO?
Query the load power mode voltage range auto

SINK:POWer:RANGe:VOLTage:AUTO:MINimum <String>
Set the load power mode voltage range auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SINK:POWer:PROTection:VOLTage <NRF>
Set the load power mode protection voltage voltage to <NRF> V|mV|uV

SINK:POWer:PROTection:VOLTage:STATe <Bool>
Enable the load power mode protection voltage state to <Bool> OFF|ON|0|1

Current

SINK:POWer:PROTection:CURRent <NRF>
Set the load power mode protection current current to <NRF> A|mA|uA|nA

SINK:POWer:PROTection:CURRent:STATe <Bool>
Enable the load power mode protection current state to <Bool> OFF|ON|0|1

Power

SINK:POWer:PROTection:POWer <NRF>
Set the load power mode protection power power to <NRF> W|mW|uW

SINK:POWer:PROTection:POWer:STATe <Bool>
Enable the load power mode protection power state to <Bool> OFF|ON|0|1

Math

SINK:POWer:CALCulate:MATH:TYPE <String>
Set the load power mode math type to <String> NONE|DEViation|DEVPct|RATPct|MXPB

SINK:POWer:CALCulate:MATH:REFerence <NRF>
Set the load power mode math custom reference to <NRF>

SINK:POWer:CALCulate:MATH:REFerence:LIVE
Set the load power mode math live reference

mx+b

SINK:POWer:CALCulate:MATH:MXPB:MTERm <NRF>
Set the load power mode math mx+b m to <NRF>

SINK:POWer:CALCulate:MATH:MXPB:BTERm <NRF>
Set the load power mode math mx+b b to <NRF>

SINK:POWer:CALCulate:MATH:MXPB:BTERm:LIVE
Set the load power mode math mx+b b configure live reference point

Sorting

SINK:POWer:SORTing:TYPE <String>
Set the load power mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SINK:POWer:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the load power mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SINK:POWer:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the load power mode sorting tolerance primary upper limit to <NRF>

SINK:POWer:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the load power mode sorting tolerance primary lower limit to <NRF>

Secondary

SINK:POWer:SORTing:TOLerance:SECondary:STATe <Bool>
Enable the load power mode sorting tolerance secondary state to <Bool> OFF|ON|0|1

SINK:POWer:SORTing:TOLerance:SECondary:LIMit:UPPer <NRF>
Set the load power mode sorting tolerance secondary upper limit to <NRF>

SINK:POWer:SORTing:TOLerance:SECondary:LIMit:LOWer <NRF>
Set the load power mode sorting tolerance secondary lower limit to <NRF>

Measure Voltage Mode

SENSe:VOLTage:TERMinals?
Query the measure voltage mode terminals

SENSe:VOLTage:MEASure:COUNt <NR1>
Set the measure voltage mode measure count to <NR1>

SENSe:VOLTage:MEASure:COUNt:INFinite <Bool>
Enable the measure voltage mode infinite measure count to <Bool> OFF|ON|0|1

SENSe:VOLTage:OUTPut:OFF:MODE <String>
Set the measure voltage mode off state to <String> OPEN|HIZ|LIMCURRent

SENSe:VOLTage:OUTPut:OFF:MEASurement <Bool>
Enable the measure voltage mode off measurement to <Bool> OFF|ON|0|1

Steady

SENSe:VOLTage:APERture:TIME <NRF>
Set the measure voltage mode steady measurement period time to <NRF> S|mS|uS

SENSe:VOLTage:APERture:NPLCycles <NRF>
Set the measure voltage mode steady measurement period npl cycles to <NRF> PLC

Ranges

Voltage

SENSe:VOLTage:RANGe:VOLTage <String>
Set the measure voltage mode range voltage manual range to <String>
20MV|200MV|2V|20V|200V

SENSe:VOLTage:RANGe:VOLTage:AUTO <Bool>
Enable the measure voltage mode range voltage auto to <Bool> OFF|ON|0|1

SENSe:VOLTage:RANGe:VOLTage:AUTO:MINimum <String>
Set the measure voltage mode range voltage auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SENSe:VOLTage:PROTection:VOLTage <NRF>
Set the measure voltage mode voltage to <NRF> V|mV|uV

SENSe:VOLTage:PROTection:VOLTage:STATe <Bool>
Enable the measure voltage mode state to <Bool> OFF|ON|0|1

Current

SENSe:VOLTage:PROTection:CURRent <NRF>
Set the measure voltage mode current to <NRF> A|mA|uA|nA

SENSe:VOLTage:PROTection:CURRent:STATe <Bool>
Enable the measure voltage mode state to <Bool> OFF|ON|0|1

Power

SENSe:VOLTage:PROTection:POWer <NRF>
Set the measure voltage mode power to <NRF> W|mW|uW

SENSe:VOLTage:PROTection:POWer:STATe <Bool>
Enable the measure voltage mode state to <Bool> OFF|ON|0|1

Math

SENSe:VOLTage:CALCulate:MATH:TYPE <String>
Set the measure voltage mode math type to <String> NONE|DEViation|DEVPct|RATPct|MXPB

SENSe:VOLTage:CALCulate:MATH:REFerence <NRF>
Set the measure voltage mode math custom reference to <NRF>

SENSe:VOLTage:CALCulate:MATH:REFerence:LIVE
Set the measure voltage mode math live reference

mx+b

SENSe:VOLTage:CALCulate:MATH:MXPB:MTERm <NRF>
Set the measure voltage mode math mx+b m to <NRF>

SENSe:VOLTage:CALCulate:MATH:MXPB:BTERm <NRF>
Set the measure voltage mode math mx+b b to <NRF>

SENSe:VOLTage:CALCulate:MATH:MXPB:BTERm:LIVE
Set the measure voltage mode math mx+b b configure live reference point

Sorting

SENSe:VOLTage:SORTing:TYPE <String>
Set the measure voltage mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SENSe:VOLTage:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the measure voltage mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SENSe:VOLTage:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the measure voltage mode sorting tolerance primary upper limit to <NRF>

SENSe:VOLTage:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the measure voltage mode sorting tolerance primary lower limit to <NRF>

Measure Current Mode

SENSe:CURRent:TERMinals?
Query the measure current mode terminals

SENSe:CURRent:MEASure:COUNt <NR1>
Set the measure current mode measure count to <NR1>

SENSe:CURRent:MEASure:COUNt:INFinite <Bool>
Enable the measure current mode infinite measure count to <Bool> OFF|ON|0|1

SENSe:CURRent:OUTPut:OFF:MODE <String>
Set the measure current mode off state to <String> OPEN|HIZ|LIMCURRent

SENSe:CURRent:OUTPut:OFF:MEASurement <Bool>
Enable the measure current mode off measurement to <Bool> OFF|ON|0|1

Steady

SENSe:CURRent:APERture:TIME <NRF>
Set the measure current mode steady measurement period time to <NRF> S|mS|uS

SENSe:CURRent:APERture:NPLCycles <NRF>
Set the measure current mode steady measurement period npl cycles to <NRF> PLC

Ranges

Current

SENSe:CURRent:RANGe:CURRent:AUTO <Bool>
Enable the measure current mode current range auto to <Bool> OFF|ON|0|1

SENSe:CURRent:RANGe:CURRent <String>
Set the measure current mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SENSe:CURRent:RANGe:CURRent:AUTO:MINimum <String>
Set the measure current mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

Protection

Voltage

SENSe:CURRent:PROTection:VOLTage <NRF>
Set the measure current mode voltage to <NRF> V|mV|uV

SENSe:CURRent:PROTection:VOLTage:STATe <Bool>
Enable the measure current mode state to <Bool> OFF|ON|0|1

Current

SENSe:CURRent:PROTection:CURRent <NRF>
Set the measure current mode current to <NRF> A|mA|uA|nA

SENSe:CURRent:PROTection:CURRent:STATe <Bool>
Enable the measure current mode state to <Bool> OFF|ON|0|1

Power

SENSe:CURRent:PROTection:POWer <NRF>
Set the measure current mode power to <NRF> W|mW|uW

SENSe:CURRent:PROTection:POWer:STATe <Bool>
Enable the measure current mode state to <Bool> OFF|ON|0|1

Math

SENSe:CURRent:CALCulate:MATH:TYPE <String>
Set the measure current mode math type to <String> NONE|DEViation|DEVPct|RATPct|MXPB

SENSe:CURRent:CALCulate:MATH:REFerence <NRF>
Set the measure current mode math custom reference to <NRF>

SENSe:CURRent:CALCulate:MATH:REFerence:LIVE
Set the measure current mode math live reference

mx+b

SENSe:CURRent:CALCulate:MATH:MXPB:MTERm <NRF>
Set the measure current mode math mx+b m to <NRF>

SENSe:CURRent:CALCulate:MATH:MXPB:BTERm <NRF>
Set the measure current mode math mx+b b to <NRF>

SENSe:CURRent:CALCulate:MATH:MXPB:BTERm:LIVE
Set the measure current mode math mx+b b configure live reference point

Sorting

SENSe:CURRent:SORTing:TYPE <String>
Set the measure current mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SENSe:CURRent:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the measure current mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SENSe:CURRent:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the measure current mode sorting tolerance primary upper limit to <NRF>

SENSe:CURRent:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the measure current mode sorting tolerance primary lower limit to <NRF>

Measure Resistance Mode

SENSe:RESistance:TERMinals <String>
Set the measure resistance mode terminals to <String> 2WIRe|4WIRe

SENSe:RESistance:MEASure:COUNt <NR1>
Set the measure resistance mode measure count to <NR1>

SENSe:RESistance:MEASure:COUNt:INFinite <Bool>
Enable the measure resistance mode infinite measure count to <Bool> OFF|ON|0|1

SENSe:RESistance:MEASure:PRIMary <String>
Set the measure resistance mode primary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SENSe:RESistance:MEASure:SECondary <String>
Set the measure resistance mode secondary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SENSe:RESistance:SHAPe <String>
Set the measure resistance mode source shape to <String> FIXed|PULSe|SWEep|LIST|PSWEep

SENSe:RESistance:SHAPe:COUNt <NR1>
Set the measure resistance mode shape count to <NR1>

SENSe:RESistance:SHAPe:COUNt:INFinite <Bool>
Enable the measure resistance mode shape infinite to <Bool> OFF|ON|0|1

SENSe:RESistance:OUTPut:OFF:MODE <String>
Set the measure resistance mode off state to <String> OPEN|HIZ|LIMCURRent|ZERO

SENSe:RESistance:OUTPut:OFF:MEASurement <Bool>
Enable the measure resistance mode off measurement to <Bool> OFF|ON|0|1

SENSe:RESistance:SLEW <NRF>
Set the measure resistance mode slew rate to <NRF> A/s|A/ms|A/us

SENSe:RESistance:SLEW:MAXimum
Set the Measure Resistance mode Slew Rate to the maximum allowed rate in A/s

SENSe:RESistance:SLEW:MINimum
Set the Measure Resistance mode Slew Rate to the minimum allowed rate in A/s

SENSe:RESistance:LOAD:REACtance:HIGH <Bool>
Enable the measure resistance mode high reactance to <Bool> OFF|ON|0|1

SENSe:RESistance:MEASurement:COMPlete:CONFigure <String>
Set the measure resistance mode measurement complete to <String> OFF|CONstant

SENSe:RESistance:VOLTage:LIMit <NRF>
Set the measure resistance mode voltage limit to <NRF> V|mV|uV

SENSe:RESistance:DELay <NRF>
Set the measure resistance mode settling time delay to <NRF> S|mS|uS

SENSe:RESistance:DELay:AUTO <Bool>
Enable the measure resistance mode settling time delay auto to <Bool> OFF|ON|0|1

SENSe:RESistance:SHAPe:TRIGger <String>
Set the measure resistance mode trigger to <String> OFF|LEVel|REPeat

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Steady

SENSe:RESistance:FIXed:CURRent[:LEVel] <NRF>
Set the measure resistance mode steady level to <NRF> A|mA|uA|nA

SENSe:RESistance:FIXed:APERture:TIME <NRF>
Set the measure resistance mode steady measurement period time to <NRF> S|mS|uS

SENSe:RESistance:FIXed:APERture:NPLCycles <NRF>
Set the measure resistance mode steady measurement period npl cycles to <NRF> PLC

Pulsed

Low

SENSe:RESistance:PULSe:FIRSt:CURRent[:LEVel] <NRF>
Set the measure resistance mode pulse low level to <NRF> A|mA|uA|nA

SENSe:RESistance:PULSe:FIRSt:APERture:TIME <NRF>
Set the measure resistance mode pulse low measurement period time to <NRF> S|mS|uS

SENSe:RESistance:PULSe:FIRSt:APERture:NPLCycles <NRF>
Set the measure resistance mode pulse low measurement period npl cycles to <NRF> PLC

High

SENSe:RESistance:PULSe:SECond:CURRent[:LEVel] <NRF>
Set the measure resistance mode pulse high level to <NRF> A|mA|uA|nA

SENSe:RESistance:PULSe:SECond:APERture:TIME <NRF>
Set the measure resistance mode pulse high measurement period time to <NRF> S|mS|uS

SENSe:RESistance:PULSe:SECond:APERture:NPLCycles <NRF>
Set the measure resistance mode pulse high measurement period npl cycles to <NRF> PLC

Sweep

SENSe:RESistance:SWEep:SPACing <String>
Set the measure resistance mode sweep shape to <String> LINear|LOG|DLINear|DLOG

SENSe:RESistance:SWEep:POINts <NR1>
Set the measure resistance mode sweep points to <NR1>

SENSe:RESistance:SWEep:CURRent:STARt <NRF>
Set the measure resistance mode sweep start to <NRF> A|mA|uA|nA

SENSe:RESistance:SWEep:CURRent:STOP <NRF>
Set the measure resistance mode sweep stop to <NRF> A|mA|uA|nA

SENSe:RESistance:SWEep:CURRent:STEP?
Query the measure resistance mode sweep step

SENSe:RESistance:SWEep:APERture:TIME <NRF>
Set the measure resistance mode steady measurement period time to <NRF> S|mS|uS

SENSe:RESistance:SWEep:APERture:NPLCycles <NRF>
Set the measure resistance mode steady measurement period npl cycles to <NRF> PLC

Pulsed Sweep

SENSe:RESistance:PSWEep:SWEep:SPACing <String>
Set the measure resistance mode pulsed sweep spacing to <String>
LINear|LOG|DLINear|DLOG

SENSe:RESistance:PSWEep:SWEep:POINts <NR1>
Set the measure resistance mode pulsed sweep points to <NR1>

SENSe:RESistance:PSWEep:SWEep:CURRent:STARt <NRF>
Set the measure resistance mode pulsed sweep start to <NRF> A|mA|uA|nA

SENSe:RESistance:PSWEep:SWEep:CURRent:STOP <NRF>
Set the measure resistance mode pulsed sweep stop to <NRF> A|mA|uA|nA

SENSe:RESistance:PSWEep:SWEep:CURRent:STEP?
Query the measure resistance mode pulsed sweep step

SENSe:RESistance:PSWEep:FILTer <Bool>
Enable the measure resistance mode pulsed sweep filter to <Bool> OFF|ON|0|1

SENSe:RESistance:PSWEep:SWEep:APERture:TIME <NRF>
Set the measure resistance mode pulsed sweep time to <NRF> S|mS|uS

SENSe:RESistance:PSWEep:SWEep:APERture:NPLCycles <NRF>
Set the measure resistance mode pulsed sweep npl cycles to <NRF> PLC

Steady

SENSe:RESistance:PSWEep:FIXed:CURRent[:LEVel] <NRF>
Set the measure resistance mode pulsed sweep level to <NRF> A|mA|uA|nA

SENSe:RESistance:PSWEep:FIXed:APERture:TIME <NRF>
Set the measure resistance mode pulsed sweep time to <NRF> S|mS|uS

SENSe:RESistance:PSWEep:FIXed:APERture:NPLCycles <NRF>
Set the measure resistance mode pulsed sweep npl cycles to <NRF> PLC

List

SENSe:RESistance:LIST:NAMe <String>
Set the measure resistance mode list name to <String>

SENSe:RESistance:LIST:APERture:TIME <NRF>
Set the measure resistance mode steady measurement period time to <NRF> S|mS|uS

SENSe:RESistance:LIST:APERture:NPLCycles <NRF>
Set the measure resistance mode steady measurement period npl cycles to <NRF> PLC

Ranges

Current

SENSe:RESistance:RANGe:CURRent <String>
Set the measure resistance mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SENSe:RESistance:RANGe:CURRent:AUTO <Bool>
Enable the measure resistance mode current range auto to <Bool> OFF|ON|0|1

SENSe:RESistance:RANGe:CURRent:AUTO:MINimum <String>
Set the measure resistance mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A

Voltage

SENSe:RESistance:RANGe:VOLTage <String>
Set the measure resistance mode range voltage manual range to <String>
20MV|200MV|2V|20V|200V

SENSe:RESistance:RANGe:VOLTage:AUTO <Bool>
Enable the measure resistance mode range voltage auto to <Bool> OFF|ON|0|1

SENSe:RESistance:RANGe:VOLTage:AUTO:MINimum <String>
Set the measure resistance mode range voltage auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SENSe:RESistance:PROTection:VOLTage <NRF>
Set the measure resistance mode protection voltage voltage to <NRF> V|mV|uV

SENSe:RESistance:PROTection:VOLTage:STATe <Bool>
Enable the measure resistance mode protection voltage state to <Bool> OFF|ON|0|1

Current

SENSe:RESistance:PROTection:CURRent <NRF>
Set the measure resistance mode protection current current to <NRF> A|mA|uA|nA

SENSe:RESistance:PROTection:CURRent:STATe <Bool>
Enable the measure resistance mode protection current state to <Bool> OFF|ON|0|1

Power

SENSe:RESistance:PROTection:POWer <NRF>
Set the measure resistance mode protection power power to <NRF> W|mW|uW

SENSe:RESistance:PROTection:POWer:STATe <Bool>
Enable the measure resistance mode protection power state to <Bool> OFF|ON|0|1

Math

SENSe:RESistance:CALCulate:MATH:TYPE <String>
Set the measure resistance mode math type to <String>
NONE|DEViation|DEVPct|RATPct|MXPB

SENSe:RESistance:CALCulate:MATH:REFerence <NRF>
Set the measure resistance mode math custom reference to <NRF>

SENSe:RESistance:CALCulate:MATH:REFerence:LIVE
Set the measure resistance mode math live reference

mx+b

SENSe:RESistance:CALCulate:MATH:MXPB:MTERm <NRF>
Set the measure resistance mode math mx+b m to <NRF>

SENSe:RESistance:CALCulate:MATH:MXPB:BTERm <NRF>
Set the measure resistance mode math mx+b b to <NRF>

SENSe:RESistance:CALCulate:MATH:MXPB:BTERm:LIVE
Set the measure resistance mode math mx+b b configure live reference point

Sorting

SENSe:RESistance:SORTing:TYPE <String>
Set the measure resistance mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SENSe:RESistance:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the measure resistance mode sorting tolerance primary state to <Bool> OFF|ON|0|1

SENSe:RESistance:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the measure resistance mode sorting tolerance primary upper limit to <NRF>

SENSe:RESistance:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the measure resistance mode sorting tolerance primary lower limit to <NRF>

Secondary

SENSe:RESistance:SORTing:TOLerance:SECondary:STATe <Bool>
Enable the measure resistance mode sorting tolerance secondary state to <Bool> OFF|ON|0|1

SENSe:RESistance:SORTing:TOLerance:SECondary:LIMit:UPPer <NRF>
Set the measure resistance mode sorting tolerance secondary upper limit to <NRF>

SENSe:RESistance:SORTing:TOLerance:SECondary:LIMit:LOWer <NRF>
Set the measure resistance mode sorting tolerance secondary lower limit to <NRF>

Measure High Resistance Mode

SENSe:HRESistance:TERMinals <String>
Set the measure high resistance mode terminals to <String> 2WIRe|2WGuard|4WIRe

SENSe:HRESistance:MEASure:COUNt <NR1>
Set the measure high resistance mode measure count to <NR1>

SENSe:HRESistance:MEASure:COUNt:INFinite <Bool>
Enable the measure high resistance mode infinite measure count to <Bool> OFF|ON|0|1

SENSe:HRESistance:MEASure:PRIMary <String>
Set the measure high resistance mode primary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SENSe:HRESistance:MEASure:SECondary <String>
Set the measure high resistance mode secondary measurement to <String>
VOLTage|CURRent|POWer|RESistance

SENSe:HRESistance:SHAPe <String>
Set the measure high resistance mode source shape to <String>
FIXed|PULSe|SWEep|LIST|PSWEep

SENSe:HRESistance:SHAPe:COUNt <NR1>
Set the measure high resistance mode shape count to <NR1>

SENSe:HRESistance:SHAPe:COUNt:INFinite <Bool>
Enable the measure high resistance mode shape infinite to <Bool> OFF|ON|0|1

SENSe:HRESistance:OUTPut:OFF:MODE <String>
Set the measure high resistance mode off state to <String> OPEN|HIZ|LIMCURRent|ZERO

SENSe:HRESistance:OUTPut:OFF:MEASurement <Bool>
Enable the measure high resistance mode off measurement to <Bool> OFF|ON|0|1

SENSe:HRESistance:SLEW <NRF>
Set the measure high resistance mode slew rate to <NRF> V/s|V/ms|V/us

SENSe:HRESistance:SLEW:MAXimum
Set the Measure High Resistance mode Slew Rate to the maximum allowed rate in V/s

SENSe:HRESistance:SLEW:MINimum
Set the Measure High Resistance mode Slew Rate to the minimum allowed rate in V/s

SENSe:HRESistance:LOAD:REACtance:HIGH <Bool>
Enable the measure high resistance mode high reactance to <Bool> OFF|ON|0|1

SENSe:HRESistance:MEASurement:COMPlete:CONFigure <String>
Set the measure high resistance mode measurement complete to <String> OFF|CONstant

SENSe:HRESistance:CURRent:LIMit <NRF>
Set the measure high resistance mode current limit to <NRF> A|mA|uA|nA

SENSe:HRESistance:DELay <NRF>
Set the measure high resistance mode settling time delay to <NRF> S|mS|uS

SENSe:HRESistance:DELay:AUTO <Bool>
Enable the measure high resistance mode settling time delay auto to <Bool> OFF|ON|0|1

SENSe:HRESistance:SHAPe:TRIGger <String>
Set the measure high resistance mode trigger to <String> OFF|LEVel|REPeat

Steady

SENSe:HRESistance:FIXed:VOLTage[:LEVel] <NRF>
Set the measure high resistance mode steady level to <NRF> V|mV|uV

SENSe:HRESistance:FIXed:APERture:TIME <NRF>
Set the measure high resistance mode steady measurement period time to <NRF> S|mS|uS

SENSe:HRESistance:FIXed:APERture:NPLCycles <NRF>
Set the measure high resistance mode steady measurement period npl cycles to <NRF> PLC

Pulsed

Low

SENSe:HRESistance:PULSe:FIRSt:VOLTage[:LEVel] <NRF>
Set the measure high resistance mode pulse low level to <NRF> V|mV|uV

SENSe:HRESistance:PULSe:FIRSt:APERture:TIME <NRF>
Set the measure high resistance mode pulse low measurement period time to <NRF> S|mS|uS

SENSe:HRESistance:PULSe:FIRSt:APERture:NPLCycles <NRF>
Set the measure high resistance mode pulse low measurement period npl cycles to <NRF> PLC

High

SENSe:HRESistance:PULSe:SECond:VOLTage[:LEVel] <NRF>
Set the measure high resistance mode pulse high level to <NRF> V|mV|uV

SENSe:HRESistance:PULSe:SECond:APERture:TIME <NRF>
Set the measure high resistance mode pulse high measurement period time to <NRF> S|mS|uS

SENSe:HRESistance:PULSe:SECond:APERture:NPLCycles <NRF>
Set the measure high resistance mode pulse high measurement period npl cycles to <NRF> PLC

Sweep

SENSe:HRESistance:SWEep:SPACing <String>
Set the measure high resistance mode sweep shape to <String> LINear|LOG|DLINear|DLOG

SENSe:HRESistance:SWEep:POINts <NR1>
Set the measure high resistance mode sweep points to <NR1>

SENSe:HRESistance:SWEep:VOLTage:STARt <NRF>
Set the measure high resistance mode sweep start to <NRF> V|mV|uV

SENSe:HRESistance:SWEep:VOLTage:STOP <NRF>
Set the measure high resistance mode sweep stop to <NRF> V|mV|uV

SENSe:HRESistance:SWEep:VOLTage:STEP?
Query the measure high resistance mode sweep step

SENSe:HRESistance:SWEep:APERture:TIME <NRF>
Set the measure high resistance mode sweep measurement period time to <NRF> S|mS|uS

SENSe:HRESistance:SWEep:APERture:NPLCycles <NRF>
Set the measure high resistance mode sweep measurement period npl cycles to <NRF> PLC

Pulsed Sweep

SENSe:HRESistance:PSWEep:SWEep:SPACing <String>
Set the measure high resistance mode pulsed sweep spacing to <String>
LINear|LOG|DLINear|DLOG

SENSe:HRESistance:PSWEep:SWEep:POINts <NR1>
Set the measure high resistance mode pulsed sweep points to <NR1>

SENSe:HRESistance:PSWEep:SWEep:VOLTage:STARt <NRF>
Set the measure high resistance mode pulsed sweep start to <NRF> V|mV|uV

SENSe:HRESistance:PSWEep:SWEep:VOLTage:STOP <NRF>
Set the measure high resistance mode pulsed sweep stop to <NRF> V|mV|uV

SENSe:HRESistance:PSWEep:SWEep:VOLTage:STEP?
Query the measure high resistance mode pulsed sweep step

SENSe:HRESistance:PSWEep:FILTer <Bool>
Enable the measure high resistance mode pulsed sweep filter to <Bool> OFF|ON|0|1

SENSe:HRESistance:PSWEep:SWEep:APERture:TIME <NRF>
Set the measure high resistance mode pulsed sweep time to <NRF> S|mS|uS

SENSe:HRESistance:PSWEep:SWEep:APERture:NPLCycles <NRF>
Set the measure high resistance mode pulsed sweep npl cycles to <NRF> PLC

Steady

SENSe:HRESistance:PSWEep:FIXed:VOLTage[:LEVel] <NRF>
Set the measure high resistance mode pulsed sweep level to <NRF> V|mV|uV

SENSe:HRESistance:PSWEep:FIXed:APERture:TIME <NRF>
Set the measure high resistance mode pulsed sweep time to <NRF> S|mS|uS

SENSe:HRESistance:PSWEep:FIXed:APERture:NPLCycles <NRF>
Set the measure high resistance mode pulsed sweep npl cycles to <NRF> PLC

List

SENSe:HRESistance:LIST:NAMe <String>
Set the measure high resistance mode list name to <String>

SENSe:HRESistance:LIST:APERture:TIME <NRF>
Set the measure high resistance mode list measurement period time to <NRF> S|mS|uS

SENSe:HRESistance:LIST:APERture:NPLCycles <NRF>
Set the measure high resistance mode list measurement period npl cycles to <NRF> PLC

Ranges

Current

SENSe:HRESistance:RANGe:CURRent <String>
Set the measure high resistance mode current range manual range to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

SENSe:HRESistance:RANGe:CURRent:AUTO <Bool>
Enable the measure high resistance mode current range auto to <Bool> OFF|ON|0|1

SENSe:HRESistance:RANGe:CURRent:AUTO:MINimum <String>
Set the measure high resistance mode current range auto minimum to <String>
200NA|2UA|20UA|200UA|2MA|20MA|200MA|1A|3A

Voltage

SENSe:HRESistance:RANGe:VOLTage <String>
Set the measure high resistance mode range voltage manual range to <String>
20MV|200MV|2V|20V|200V

SENSe:HRESistance:RANGe:VOLTage:AUTO <Bool>
Enable the measure high resistance mode range voltage auto to <Bool> OFF|ON|0|1

SENSe:HRESistance:RANGe:VOLTage:AUTO:MINimum <String>
Set the measure high resistance mode range voltage auto minimum to <String>
20MV|200MV|2V|20V|200V

Protection

Voltage

SENSe:HRESistance:PROTection:VOLTage <NRF>
Set the measure high resistance mode protection voltage voltage to <NRF> V|mV|uV

SENSe:HRESistance:PROTection:VOLTage:STATe <Bool>
Enable the measure high resistance mode protection voltage state to <Bool> OFF|ON|0|1

Current

SENSe:HRESistance:PROTection:CURRent <NRF>
Set the measure high resistance mode protection current current to <NRF> A|mA

SENSe:HRESistance:PROTection:CURRent:STATe <Bool>
Enable the measure high resistance mode protection current state to <Bool> OFF|ON|0|1

Power

SENSe:HRESistance:PROTection:POWer <NRF>
Set the measure high resistance mode protection power power to <NRF> W|mW|uW

SENSe:HRESistance:PROTection:POWer:STATe <Bool>
Enable the measure high resistance mode protection power state to <Bool> OFF|ON|0|1

Math

SENSe:HRESistance:CALCulate:MATH:TYPE <String>
Set the measure high resistance mode math type to <String>
NONE|DEViation|DEVPct|RATPct|MXPB

SENSe:HRESistance:CALCulate:MATH:REFerence <NRF>
Set the measure high resistance mode math custom reference to <NRF>

SENSe:HRESistance:CALCulate:MATH:REFerence:LIVE
Set the measure high resistance mode math live reference

mx+b

SENSe:HRESistance:CALCulate:MATH:MXPB:MTERm <NRF>
Set the measure high resistance mode math mx+b m to <NRF>

SENSe:HRESistance:CALCulate:MATH:MXPB:BTERm <NRF>
Set the measure high resistance mode math mx+b b to <NRF>

SENSe:HRESistance:CALCulate:MATH:MXPB:BTERm:LIVE
Set the measure high resistance mode math mx+b b configure live reference point

Sorting

SENSe:HRESistance:SORTing:TYPE <String>
Set the measure high resistance mode sorting type type to <String> NONE|TOLerance

Tolerance

Primary

SENSe:HRESistance:SORTing:TOLerance:PRIMary:STATe <Bool>
Enable the measure high resistance mode sorting tolerance primary state to <Bool>
OFF|ON|0|1

SENSe:HRESistance:SORTing:TOLerance:PRIMary:LIMit:UPPer <NRF>
Set the measure high resistance mode sorting tolerance primary upper limit to <NRF>

SENSe:HRESistance:SORTing:TOLerance:PRIMary:LIMit:LOWer <NRF>
Set the measure high resistance mode sorting tolerance primary lower limit to <NRF>

Secondary

SENSe:HRESistance:SORTing:TOLerance:SECondary:STATe <Bool>
Enable the measure high resistance mode sorting tolerance secondary state to <Bool>
OFF|ON|0|1

SENSe:HRESistance:SORTing:TOLerance:SECondary:LIMit:UPPer <NRF>
Set the measure high resistance mode sorting tolerance secondary upper limit to <NRF>

SENSe:HRESistance:SORTing:TOLerance:SECondary:LIMit:LOWer <NRF>
Set the measure high resistance mode sorting tolerance secondary lower limit to <NRF>

Calibration

CALibration:SELFtest
Set the calibration self test

6. FACTORY DEFAULT SETTINGS

Manual Setup	
Mode	SV Mode
Terminals	2 Wire
Shape	Steady
Source Level	1V
Current Limit	1mA
Measurement Count	Infinite
Primary Measurement	Voltage
Secondary Measurement	Current
Delay	Auto
Measurement Period	1PLC
Voltage Range	Auto
Auto-Minimum Voltage Range	20mV
Current Range	Auto
Auto-Minimum Current Range	200nA
Off State	0V/100µA
Off State Measurements	On
Slew Rate	Max
High Reactance	Off
Measurement Control	Off
OCP	Disabled
OVP	Disabled
OPP	Disabled
Math	None
Sorting	None
Graph	
Type	YT Graph
Style	Line
X Axis Minimum Position	0 Seconds
Y Axis Minimum Position	0V
X Axis Scale	200µs/div
Y Axis Scale	20nV/div
Markers	Disabled

System	
High Voltage Interlock *	LV
Brightness	75%
Auto-Dim	Off
Beeper	Off
Power Control	Manual On/Off
Air Vents	Clear

*SMU4201 only

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SINK:POWer:FIXed:APERture:TIME <NRF>	50
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SINK:POWer:LIST:APERture:NPLCycles <NRF>	52
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SINK:POWer:PULSe:SECond[:LEVel] <NRF>	50
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