Programming Manual

8550 Series

Programmable DC Electronic Loads

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Contents

About Commands & Queries

This section lists and describes the remote control commands and queries recognized by the instrument. All commands and queries can be executed in either local or remote state.

The description, command syntax, query syntax, example and respond can be found in a section. The commands are given in both long and short form. All examples are shown in short form. Queries perform actions such as obtaining information, and are recognized by the question mark (?) following the header.

1.1 How They are Listed

The commands are listed by subsystem and alphabetical order according to their short form.

1.2 How They are Described

In the descriptions themselves, a brief explanation of the function performed is given. This is followed by a presentation of the formal syntax, with the header given in Upper-and-Lower-Case characters and the short form derived from it in ALL UPPER-CASE characters. Where applicable, the syntax of the query is given with the format of its response.

1.3 When can they be used?

The commands and queries listed here can be used for the 855X DC Load Series.

1.4 Command Notation

The following notation is used in the commands:

< > Angular brackets enclose words that are used as placeholders, of which there are two types: the header path and the data parameter of a command.

:= A colon followed by an equals sign separates a placeholder from the description of the type and range of values that may be used in a command instead of the placeholder.

{ } Braces enclose a list of choices, one of which one must be made.

[ ] Square brackets enclose optional items

… An ellipsis indicates that the items both to its left and right may be repeated a number of times.

1.5 Data Types

SCPI defines several different data types for use in program messages to the instrument and for use in response messages from the instrument.

The instrument uses the following subset of SCPI data types:

- Character
- <NR1>
- <NR2>
- <NRf>
- <Boolean>

1.5.1 Character Data Types

If a command parameter takes a character data type, a specific number of settings are allowed for the parameter. For example, in the following command, you can specify one of the following character data types to select the opeartion mode: CURR | VOLT | RES | POW

:FUNCtion CURR | VOLT | RES | POW | DYN | LIST | LED | BAT | TIM | OCP |

Character data types have the following characteristics:

- Can have either the short or long form in program messages and are returned in short-form only in response messages
- Are case insensitive in program messages and are in uppercase only in response messages
- Must have a specific leng

1.5.2 <NR1> Value Data Type

The <NR1> value data type is used to specify zero, and positive and negative integer decimal values, including optional signs. If you need to indicate decimal points, use the <NR2> value data type, instead.

The following values are examples of the <NR1> data type:

0 255 –2

1.5.3 <NR2> Value Data Type

The <NR2> value data type is used to specify zero, and positive and negative decimal values, including optional signs and decimal points.

The difference between <NR1> and <NR2> is the explicit decimal point. Note that 0 is a special case and redundant decimal points are ignored.

The following values are examples of the <NR2> data type:

–1.234 1.0 0.0

1.5.4 <NRf> Value Data Type

The <NRf> data type is used to specify a floating-point value. These values include digits with an implied decimal point, an explicit decimal point, or an explicit decimal point and an exponent.

The following values are examples of the <NRf> data type:

6553 1.525e-4 0.100000

1.5.5 <Boolean> Value Data Type

A Boolean data type for a parameter and response represents a single binary condition that is either True or False. Boolean values are defined as follows:

- 0 or OFF – indicates that the condition is False
- 1 or ON – indicates that the condition is True

Note that the characters OFF and ON are not case sensitive. The instrument accepts characters OFF and ON instead of 0 and 1, however if queried, the instrument returns Boolean responses as either 0 or 1.

Common Command Introduction

IEEE standard defines the common commands used for querying the basic inSyntaxion of the instrument or executing basic operations. These commands usually start with "*" and the length of the keywords of the command is usually 3 characters.

Short	Long Form	Subsystem	Description
*IDN	*IDN	SYSTEM	Returns a string that uniquely identifies the instrument.
*RST	*RST	SYSTEM	Initiates a device reset.
*TRG	*TRG	SYSTEM	Generates an immediate trigger.

Table 2.1 Common Commands

2.1 *IDN?

Description The *IDN? query causes the instrument to identify itself. The response comprises manufacturer, model, serial number, software version and firmware version.

Query *IDN?

Response *IDN, <device id>,<model>,<serial number>, <software version>, <hardware version>.

<device id>:="B&K" is used to identify instrument.

<model>:= A model identifier less than 14 characters will contain the model number.

<serial number>:= Number that uniquley identifies the instrument.

<firmware version>:= Firmware revision number.

<hardware version>:= Hardware revision number.

Example *IDN?

Returns: <string> BK,BK8551,<serial numer>,Ver 1.0.8,Hardware 2.006

2.2 *RST

Description Reset the instrument to its factory default state. *RST does not affect stored instrument states, or the I/O settings, which are stored in non-volatile memory.

Syntax *RST

Example *RST

2.3 *TRG

Description The *TRG command generates an immediate trigger when the trigger source is set to **BUS**.

Syntax *TRG

Example *TRG

Related TRIGger:SOURce

Input Subsystem

The input subsystem configures the input state. There are 3 input states; **On, Off**, and **Short.**

3.1 :INPut[:STATe]

Description Enable/Disable the input of the DC load.

Syntax :INPut[:STATe] <boolean>

<boolean> := { On | Off or 1 | 0 }

Query :INPut[:STATe]?

Example INP ON

Response Returns: <boolean>

3.2 :INPut:SHORt

Description Sets the input short mode and enables/disables the input.

Syntax :INPut:SHORt <boolean>

<boolean> := { On | Off or 1 | 0 }

Query :INPut:SHORt?

Example :INP:SHOR 1

Response Returns: <boolean>

MEASure Subsytem

The MEASure subsystem contains the commands used to query the input's current, voltage, resistance, and power input.

4.1 MEASure:VOLTage

Description Reads the voltage amplitude measured at the input.

Query MEASure:VOLTage?

Example MEAS:VOLT?

Query Respond Returns: <NR2>

4.2 MEASure:CURRent

Description Reads the current amplitude measured at the input.

Query MEASure:CURRent?

Example MEAS:CURR?

Query Respond Returns: <NR2>

4.3 MEASure:RES

Description Reads the input's set resistance.

Query MEASure:RES?

Example MEAS:RES?

Query Respond Returns: <NR2>

4.4 MEASure:POWer

Description Reads the power measured at the input.

Query MEASure:POWer?

Example MEAS:POW?

Query Respond Returns: <NR2>

Function Subsystem

The function substem switches the operation mode. Setting a mode will automatically change the menu in the instrument.

5.1 :FUNCtion

Description Sets the function mode of the instrument. The menu in the instrument will change to the corresponding function menu.

Syntax :FUNCtion <character>

<character> := {CURR | VOLT | RES | POW | DYN | LIST | LED | BAT | TIM | OCP | OVP | OPP | LEFF | SWEEP | AUTO}

Query :FUNCtion?

Example FUNC CURR

Response Returns: <character>

Current Subsystem

The current subsystem contains all commands that configure the current parameters. These parameters include: Range, value, and slew rate.

6.1 :CURRent

Description Sets the I-set value in constant current mode. The I-set value is the current value the load will sink when the input is enabled.

Syntax :CURRent <NR2>

8550 : <NR2> := {0.0000 to 30.000}

8551 : <NR2> := {0.0000 to 60.000}

NOTICE The value has a resolution of .1 mA when the current range is set to low, and a resolution of 1 mA when the current range is set to high.

Query :CURRent?

Example CURR 10.000

Response Returns: <NR2>

6.2 :CURRent:RANGe

Description Sets the current range of the selected operation mode. The command will not affect the current range of the modes that are not selected.

Syntax :CURRent:RANGe <NR1>

8550<NR1> := {3 | 30}

8551<NR1> := {6 | 60}

Query :CURRent:RANGe?

Example CURR:RANG 6

Response Returns: <NR1>

6.3 :CURRent:SLEW[:BOTH]

Description Sets the same slew rate for both the rise and fall slope in constant current mode (CC).

NOTICE The instrument must be in CC operation mode for the command to work. If the instrument is not in CC mode upon entering CC the slew values will be set to the default values (0.300 A/μs)

Syntax :CURRent:SLEW[:BOTH] <NR2>

<NR2> := {0.012 to 3.00 s}

Query :CURRent:SLEW[:BOTH]?

Example CURR:SLEW 0.200

Response Returns: <NR2>,<NR2>

6.4 :CURRent:SLEW:RISE

Description Sets the current rise time for constant current mode (CC).

NOTICE The instrument must be in CC operation mode for the command to work. If the instrument is not in CC mode upon entering CC the rise time will be set to the default value (0.300 A/μs)

Syntax :CURRent:SLEW:RISE <NR2>

<NR2> := {0.012 to 3.00 A/μs}

Query :CURRent:SLEW:RISE?

Example CURR:SLEW:RISE 0.200

Response Returns: <NR2>

6.5 :CURRent:SLEW:FALL

Description Sets the current fall time for constant current mode (CC).

NOTICE The instrument must be in CC operation mode for the command to work. If the instrument is not in CC mode upon entering CC the fall time will be set to the default value (0.300 A/μs)

Syntax :CURRent:SLEW:FALL <NR2>

<NR2> := {0.012 to 3.00 A/μs}

Query :CURRent:SLEW:FALL?

Example CURR:SLEW:FALL 0.200

Response Returns: <NR2>

Voltage Subsystem

The VOLTage subsystem contains all commands that configure the voltage parameters. These parameters include: Range, value, slew rate, Von and Voff.

7.1 :VOLTage

Description Sets the V-set value in constant voltage mode. The V-set value is the voltage value the load will maintain when the input is enabled.

Syntax :VOLTage <NR2>

<NR2> := {0.000 to 150.00}

NOTICE The value has a resolution of 1 mV when the voltage range is set to low, and a resolution of 10 mV when the voltage range is set to high.

Query :VOLTage?

Example VOLT 10.000

Response Returns: <NR2>

7.2 :VOLTage:RANGe

Description Sets the voltage range of the selected operation mode. The command will not affect the voltage range of the modes that are not selected.

Syntax :VOLTage:RANGe <NR1>

<NR1> := {15 | 150}

Query :VOLTage:RANGe?

Example VOLT:RANG 15

Response Returns: <NR1>

7.3 :VOLTage:SLEW

Description Sets the voltage rise time for constant voltage mode (CV).

NOTICE The instrument must be in CV operation mode for the command to work. If the instrument is not in CV mode upon entering CV the rise time will be set to the default value (0.300 V/ms)

Syntax :VOLTage:SLEW <NR2>

<NR2> := {0.001 to 3.00 V/ms}

Query :VOLTage:SLEW?

Example VOLT:SLEW 0.200

Response Returns: <NR2>

7.4 :Voltage:ON

Description Sets the load voltage (Von) value.

Upon enabling the input if the input voltage is lower than this value, the ON/OFF button light flashes and no current is sunk until the input voltage exceeds this value. When the input voltage is greater than this value, the ON/OFF button light is always on and the load begins to sink current.

Syntax :VOLTage:ON <NR2>

<NR2> := {0.20 to 150.10 V}

Query :VOLTage:ON?

Example VOLT:ON 30.00

Response Returns: <NR2>

7.5 :Voltage:OFF

Description Sets the load unloading voltage (Voff) value.

When the load is officially loaded, if the input voltage value is lower than this value, the instrument is turned off and the load stops sinking current.

Syntax :VOLTage:OFF <NR2>

<NR2> := {0.00 to 150.09 V}

NOTICE The :VOLTage:OFF value cannot exceed the :VOLTage:ON value.

Query :VOLTage:OFF?

Example VOLT:OFF 20.00

Response Returns: <NR2>

Resistance Subsystem

The resistance subsytem consist of a single command which sets the R-set value.

8.1 :RESistance

Description Sets the R-set value in constant resistance mode. The R-set value is the resistance value the load will maintain when the input is enabled.

Syntax :RESistance <NR2>

8551: <NR2> := {0.0500Ω to 50 kΩ}

Query :RESistance?

Example RES 50000

Response Returns: <NR2>

Power Subsystem

The power subsytem consist of a single command which sets the P-set value.

9.1 :POWer

Description Sets the P-set value in constant power mode. The P-set value is the power value the load will maintain when the input is enabled.

Syntax :POWer <NR2>

8550 : <NR2> := {0.00 to 350.00 W}

8551 : <NR2> := {0.00 to 175.00 W}

Query :POWer?

Example POW 350

Response Returns: <NR2>

Dynamic Subsystem

The dynamic subsystem contains the commands used to configure the parameters of transient mode.

10.1 :DYNamic:ALEVel

Description Sets the A level of the transient mode.

Syntax :DYNamic:ALEVel <NR2>

8550: <NR2> := {0.0000 to 30.000 A}

8550: <NR2> := {0.0000 to 60.000 A}

NOTICE The value ahs a resolution of .1 mA when the current range is set to low, and a resolution of 1 mA when the current range is set to high.

Query :DYNamic:ALEVel?

Example DYN:ALEV 10.000

Response Returns: <NR2>

10.2 :DYNamic:BLEVel

Description Sets the B level of the transient mode.

Syntax :DYNamic:BLEVel <NR2>

8550: <NR2> := {0.0000 to 30.000 A}

8550: <NR2> := {0.0000 to 60.000 A}

NOTICE The value ahs a resolution of .1 mA when the current range is set to low, and a resolution of 1 mA when the current range is set to high.

Query :DYNamic:BLEVel?

Example DYN:BLEV 10.000

Response Returns: <NR2>

10.3 :DYNamic:AWIDth

Description Sets the duration of the A level in transient mode.

Syntax :DYNamic:AWIDth <NR2>

<NR2> := {20 μs to 60.00s}

Query :DYNamic:AWIDth?

Example DYN:AWIDT 0.00002

Response Returns: <NR2>

NOTICE When the units are in ms the instrument will respond with a resolution of 10 ms. For example, a response of 000.02 indicates A width is set to 20 μs. When the units are in seconds the instrument will respond with a resolution of 1ms. For example, a response of 00.020 indicates A width is set to 20 ms.

10.4 :DYNamic:BWIDth

Description Sets the duration of the B level in transient mode.

Syntax :DYNamic:BWIDth <NR2>

<NR2> := {20 μs to 60.00s}

Query :DYNamic:BWIDth?

Example DYN:BWIDT 0.00002

Response Returns: <NR2>

NOTICE

When the units are in ms the instrument will respond with a resolution of 10 ms. For example, a response of 000.02 indicates B width is set to 20 μs. When the units are in seconds the instrument will respond with a resolution of 1ms. For example, a response of 00.020 indicates B width is set to 20 ms.

10.5 :DYNamic:SLEW[:BOTH]

Description Sets the same slew rate for both the rise and fall slope in transient mode.

NOTICE

The instrument must be in transient operation mode for the command to work. If the instrument is not in transient mode upon entering transient mode the slew values will be set to the default values (0.300 A/μs)

Syntax :DYNamic:SLEW[:BOTH] <NR2>

<NR2> := {0.012 to 3.00 s}

Query :DYNamic:SLEW[:BOTH]?

Example DYN:SLEW 0.200

Response Returns: <NR2>

10.6 :DYNamic:SLEW:RISE

Description Sets the current rise time for transient mode.

NOTICE

The instrument must be in transient operation mode for the command to work. If the instrument is not in transient mode upon entering transient mode the rise time will be set to the default value (0.300 A/μs)

Syntax :DYNamic:SLEW:RISE <NR2>

<NR2> := {0.012 to 0.300 A/μs}

Query :DYNamic:SLEW:RISE?

Example DYN:SLEW:RISE 0.200

Response Returns: <NR2>

10.7 :DYNamic:SLEW:FALL

Description Sets the current fall time for transient mode.

NOTICE

The instrument must be in transient mode for the command to work. If the instrument is not in transient mode upon entering transient mode the fall time will be set to the default value (0.300 A/μs)

Syntax :DYNamic:SLEW:FALL <NR2>

<NR2> := {0.012 to 0.300 A/μs}

Query :DYNamic:SLEW:FALL?

Example DYN:SLEW:FALL 0.200

Response Returns: <NR2>

10.8 :DYNamic:REPeat

Description Sets the number of repetitions in transient continuous mode. This value indicates the number of times the transient operation will run.

Syntax :DYNamic:REPeat <NR1>

<NR1> := {0 to 65535}

Query :DYNamic:REPeat?

Example DYN:REP 10

Response Returns: <NR1>

10.9 :DYNamic:MODE

Description Sets the dynamic operation mode.

Syntax :DYNamic:MODE <character>

<character> := {CONTinuous | PULSe | TOGGle}

Query :DYNamic:MODE?

Example DYN:MODE PULS

Response Returns: <character>

List Subsystem

The LIST subsystem contains all the commands that configure the list mode parameters. These parameters include file: number, mode, count. The commands to edit a list are also included in this subsystem. The commands to edit a list include: add, clear, done and level.

11.1 :LIST:FILE

Description Selects the list file to be executed or edited.

Syntax :LIST:FILE <NR1>

<NR1> := {1 to 10}

Query :LIST:FILE?

Example LIST:FILE 1

Response Returns: <NR1>

11.2 :LIST:MODE

Description Sets the opereation mode of the list function. List has three operation modes: countinuous, count, and step. The modes determine how the list will be executed.

Syntax :LIST:MODE <character>

<character> := {CONT | COUNT | STEP}

Query :LIST:MODE?

Example LIST:MODE CONT

Response Returns: <character>

11.3 :LIST:COUNT

Description Sets the number of times a list will be executed when list mode is set to to count.

Syntax :LIST:COUNT <NR1>

<NR1> := {1 to 100}

Query :LIST:COUNT?

Example LIST:COUNT 2

Response Returns: <NR1>

11.4 :LIST ADD

Description Inserst a new step into the selected list.

Syntax :LIST ADD

Example LIST ADD

11.5 :LIST CLEAR

Description Clears all steps of the selected list

Syntax :LIST CLEAR

Example LIST CLEAR

11.6 :LIST DONE

Description Completes edits to the selected file.

Syntax :LIST DONE

Example LIST DONE

11.7 :LIST:LEVel:

Description Configures the parameters of the selected step. Only the step of the selected file will be affected.

Syntax :LIST:LEVel:<NR1> <NR2>,<NR2>,<NR2>

Step : <NR1> := {1 to 100}

Current Level : <NR2> := {0.000 to 60.00}

Step duration : <NR2> := {0.00001 to 50 s}

Slope : <NR2> := {0.0012 to 0.300 A/μs}

Query :LIST:LEVel:<NR1>?

Example LIST:LEV:1 2.000,5.00,0.300

Response Returns: <NR2>,<NR2>,<NR2>

LED Subsystem

The LED subsystem contains all the commands used to configure the parameters of LED mode. These parameters include: Vo, Io, and Rd coeff.

12.1 :LED:VOLTage

Description Sets the LED turn-on voltage.

Syntax :LED:VOLTage <NR2>

<NR2> := {0 to 150.1 V}

Query :LED:VOLTage?

Example LED:VOLT 4.00

Response Returns: <NR2>

12.2 :LED:CURRent

Description Sets the LED condutction current.

Syntax :LED:CURRent <NR2>

8550 : <NR2> := {0.000 to 60.0 V} 8551 : <NR2> := {0.000 to 30.0 V}

Query :LED:CURRent?

Example LED:CURR 0.100

Response Returns: <NR2>

12.3 :LED:RCOeff

Description Sets the LED condutction coefficient.

Syntax :LED:RCOeff <NR2>

<NR2> := {0.01 to 1.00}

Query :LED:RCOeff?

Example LED:RCOeff 0.80

Response Returns: <NR2>

Battery Subssytem

The BATtery subsystem contains all the commands used to configure battery mode.

13.1 :BATtery:MODE

Description Sets the discharge mode of the battery test.

Syntax :BATtery:MODE <character>

<character> := {CURR | RES | POW}

Query :BATtery:MODE?

Example BAT:MODE CURR

Response Returns: <character>

13.2 :BATtery:VALue

Description Sets the operation value of the battery test. The range of the value will vary depending on the mode selected.

Syntax :BATtery:VALue <NR2>

CC Mode: 8550 : <NR2> := {0.000 to 60.100}
8551 : <NR2> := {0.000 to 30.000}

CR Mode: <NR2> := {0.050 to 50000 Ω}

CW Mode: 8550 : <NR2> := {0.000 to 350.00}
8551 : <NR2> := {0.000 to 175.000}

Query :BATtery:VALue?

Example BAT:VAL 3.000

Response Returns: <NR2>

13.3 :BATtery:CONDition

Description Sets the stop condition type for the battery test.

Syntax :BATtery:CONDition <character>

<character> := {VOLT | TIM | AH | WH}

Query :BATtery:CONDition?

Example BAT:COND VOLT

Response Returns: <character>

13.4 :BATtery:LEVel

Description Sets the threshold level for the battery test stop condition.

Syntax :BATtery:LEVel <NR2>

Voltage Condition: 8550 : <NR2> := {0.000 to 175.100 V}
8551 : <NR2> := {0.000 to 350.000 V}

Time Condition: <NR2> := {1 to 360000 s}

Ah Condition: <NR2> := {0.01 to 999999 Ah}

Wh Condition: <NR2> := {0.01 to 999999 Wh}

Query :BATtery:LEVel?

Example BAT:LEV 2.00

Response Returns: <NR2>

Time Subsystem

The TIMe subsystem contains the commands used to configure the time mode parameters. These parameters include: load mode, mode value, trigger source, stsarting edge, starting level, ending edge, and ending edge level. The results of the test can also be queried.

14.1 :TIMing:LOAD:MODE

Description Sets the load to be used for the time test.

Syntax :TIMing:LOAD:MODE <character>

<character> := {CURR | VOLT | POW | RES | OFF}

Query :TIMing:LOAD:MODE?

Example TIM:LOAD:MODE CURR

Response Returns: <character>

14.2 :TIMing:LOAD:VALue

Description Sets the load value to be used for the time test.

Syntax :TIMing:LOAD:VALue <NR2>

CC Mode: 8550 : <NR2> := {0.000 to 60.100}
8551 : <NR2> := {0.000 to 30.000}

CV Mode: <NR2> := {0.000 to 150.00}

CR Mode: <NR2> := {0.050 to 50000 Ω}

CW Mode: 8550 : <NR2> := {0.000 to 350.00}
8551 : <NR2> := {0.000 to 175.000}

Query :TIMing:LOAD:VALue?

Example TIM:LOAD:VAL 6.000

Response Returns: <character>

14.3 :TIMing:TSTart:SOURce

Description Sets the source that will trigger the start of the counter.

Syntax :TIMing:TSTart:SOURce <character>

<character> := {VOLT | CURR | TRIG}

Query :TIMing:TSTart:SOURce?

Example TIM:TST:SOUR CURR

Response Returns: <character>

14.4 :TIMing:TSTart:LEVel

Description Set the level that triggers the start of the counter.

Syntax :TIMing:TSTart:LEVel <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.100}
8551 : <NR2> := {0.000 to 30.000}

Volt range: <NR2> := {0.000 to 150.00}

Query :TIMing:TSTart:LEVel?

Example TIM:TST:LEV 10.000

Response Returns: <NR2>

14.5 :TIMing:TSTart:EDGe

Description Sets the trigger edge that starts the time test.

Syntax :TIMing:TSTart:EDGe <character>

<character> := {RISE | FALL}

Query :TIMing:TSTart:EDGe?

Example TIM:TST:EDG FALL

Response Returns: <character>

14.6 :TIMing:TEND:SOURce

Description Sets the source that will trigger the end of the time test.

Syntax :TIMing:TEND:SOURce <character>

<character> := {VOLT | CURR | TRIG}

Query :TIMing:TEND:SOURce?

Example TIM:TEND:SOUR CURR

Response Returns: <character>

14.7 :TIMing:TEND:LEVel

Description Set the level that triggers the end of the time test.

Syntax :TIMing:TEND:LEVel <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.100}
8551 : <NR2> := {0.000 to 30.000}

Volt range: <NR2> := {0.000 to 150.00}

Query :TIMing:TEND:LEVel?

Example TIM:TEND:LEV 10.000

Response Returns: <NR2>

14.8 :TIMing:TEND:EDGe

Description Sets the trigger edge that ends the time test.

Syntax :TIMing:TEND:EDGe <character>

<character> := {RISE | FALL}

Query :TIMing:TEND:EDGe?

Example TIM:TEND:EDG FALL

Response Returns: <character>

14.9 :TIMing:RESult

Description Query the results of the time test.

Query :TIMing:RESult?

Example TIM:RES?

Response Returns: <NR2>

OCP Subsystem

The OCP subsytem contains the commands used to configure the OCP Test mode parameters. These parameters include the: start current, end current, step increment, step dwell time, and the end voltage trigger. The commands also provide a query to read the results of the test as well as the maximum power point.

15.1 :OCP:ISTart

Description Sets the starting load current of the OCP test.

Syntax :OCP:ISTart <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :OCP:ISTart?

Example OCP:IST 2.000

Response Returns: <NR2>

15.2 :OCP:IEND

Description Sets the value of the last load current step for the OCP test.

Syntax :OCP:IEND <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :OCP:IEND?

Example OCP:IEND 2.000

Response Returns: <NR2>

15.3 :OCP:STEP

Description Sets the incremental steps of the OCP test.

Syntax :OCP:STEP <NR1>

<NR1> := {1 to 100}

Query :OCP:STEP?

Example :OCP:STEP 5

Response Returns: <NR1>

15.4 :OCP:DWELL

Description Sets the time width for each step in the OCP test.

Syntax :OCP:DWELL <NR2>

<NR2> := {0.00001 to 0.99999}

Query :OCP:DWELL?

Example OCP:DWELL 0.200

Response Returns: <NR2>

15.5 :OCP:VTRig

Description Sets the voltage level that triggers over-current protection. The test will end once the input signal meets the voltage value.

Syntax :OCP:VTRig <NR2>

<NR2> := {0.000 to 150.00}

Query :OCP:VTRig?

Example OCP:VTR 12.000

Response Returns: <NR2>

15.6 :OCP:RESult[:OCP]

Description Query the value of the overcurrent protection point.

Query :OCP:RESult[:OCP]?

Example OCP:RES?

Response Returns: <NR2>

15.7 :OCP:RESult:PMAX

Description Query the maximum power point recorded in the OCP test.

Query :OCP:RESult:PMAX?

Example OCP:RES:PMAX?

Response Returns: <NR2>

OVP Subsystem

The OVP subsytem contains the commands used to configure the OVP Test mode as well as query the test results.

16.1 :OVP:VTRig

Description Sets the voltage level that triggers over-voltage protection. The test will end once the input signal meets the voltage value.

Syntax :OVP:VTRig <NR2>

<NR2> := {0.000 to 150.00}

Query :OVP:VTRig?

Example OVP:VTR 12.000

Response Returns: <NR2>

16.2 :OVP:RESult[:OVP]

Description Query the value of the overcurrent protection point.

Query :OVP:RESult[:OVP]?

Example OVP:RES?

Response Returns: <NR2>

16.3 :OVP:RESult:TIME

Description Query the calculated time for the output to settle from the peak voltage to desired voltage value.

Query :OVP:RESult:TIME?

Example OVP:RES:TIME?

Response Returns: <NR2>

OPP Subsystem

The OPP subsytem contains the commands used to configure the OPP Test mode parameters. These parameters include the: start power, end power, step increment, step dwell time, and the end voltage trigger. The commands also provide a query to read the results of the test as well as the maximum recorded power point.

17.1 :OPP:PSTart

Description Sets the starting load power of the OPP test.

Syntax :OPP:PSTart <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :OPP:PSTart?

Example OPP:PST 2.000

Response Returns: <NR2>

17.2 :OPP:PEND

Description Sets the value of the last load power step for the OPP test.

Syntax :OPP:PEND <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :OPP:PEND?

Example OPP:PEND 2.000

Response Returns: <NR2>

17.3 :OPP:STEP

Description Sets the incremental steps of the OPP test.

Syntax :OPP:STEP <NR1>

<NR1> := {1 to 100}

Query :OPP:STEP?

Example :OPP:STEP 5

Response Returns: <NR1>

17.4 :OPP:DWELL

Description Sets the time width for each step in the OPP test.

Syntax :OPP:DWELL <NR2>

<NR2> := {.00001 to 0.99999}

Query :OPP:DWELL?

Example OPP:DWELL 0.200

Response Returns: <NR2>

17.5 :OPP:VTRig

Description Sets the voltage level that triggers over-power protection. The test will end once the input signal meets the voltage value.

Syntax :OPP:VTRig <NR2>

<NR2> := {0.000 to 150.00}

Query :OPP:VTRig?

Example OPP:VTR 12.000

Response Returns: <NR2>

17.6 :OPP:RESult[:OPP]

Description Query the value of the over-power protection point.

Query :OPP:RESult[:OPP]?

Example OPP:RES?

Response Returns: <NR2>

17.7 :OPP:RESult:PMAX

Description Query the maximum power point recorded in the OPP test.

Query :OPP:RESult:PMAX?

Example OPP:RES:PMAX?

Response Returns: <NR2>

Load Effect Subsystem

The LEFF subsystem contains the commands used to configure the parameters of the load effect test. These parameters include: minimum current, maximum current, normal load operation, and step delay. The subsystem also includes query commands to read the results of the test.

18.1 :LEFFect:IMIN

Description Sets the low level load current of the load regulation test.

Syntax :LEFFect:IMIN <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :LEFFect:IMIN?

Example LEFF:IMIN 1.000

Response Returns: <NR2>

18.2 :LEFFect:IMAX

Description Sets the high level load current of the load regulation test.

Syntax :LEFFect:IMAX <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :LEFFect:IMAX?

Example LEFF:IMAX 60.000

Response Returns: <NR2>

18.3 :LEFFect:INORMal

Description Sets the normal load current level of the load regulation test.

Syntax :LEFFect:INORMal <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :LEFFect:INORMal?

Example LEFF:INORM 30.000

Response Returns: <NR2>

18.4 :LEFFect:DELay

Description Sets the load current time for each step in the load regulation test.

Syntax :LEFFect:DELay <NR2>

<NR2> := {0.1 to 60 s}

Query :LEFFect:DELay?

Example LEFF:DEL 5.00

Response Returns: <NR2>

18.5 :LEFFect:RESult:VOLTage?

Description Query the differnce between the maximum voltage and the minimum voltage.

Query :LEFFect:RESult:VOLTage?

Example LEFF:RES:VOLT?

Response Returns: <NR2>

18.6 :LEFFect:RESult:RESistance?

Description Query the calculated internal resistance of the DUT.

Query :LEFFect:RESult:RESistance?

Example LEFF:RES:RES?

Response Returns: <NR2>

18.7 :LEFFect:RESult:REGulation?

Description Query the calculated load adjustment rate.

Query :LEFFect:RESult:REGulation?

Example :LEFF:RES:REG?

Response Returns: <NR2>

Sweep Subsystem

The SWEEP subsystem contains the commands used to configure the parameters of the sweep test. The commands supported are:

19.1 :SWEEP:MODE

Description Sets the sweep working mode.

Syntax :SWEEP:MODE <character>

<character> := {AUTO | MANul}

Query :SWEEP:MODE?

Example SWEEP:MODE AUTO

Response Returns: <character>

19.2 :SWEEP:IMIN

Description The sets minimum load current level of the sweep test.

Syntax :SWEEP:IMIN <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :SWEEP:IMIN?

Example SWEEP:IMIN 1.000

Response Returns: <NR2>

19.3 :SWEEP:IMAX

Description The sets maximum load current level of the sweep test.

Syntax :SWEEP:IMAX <NR2>

Current range: 8550 : <NR2> := {0.000 to 60.000}
8551 : <NR2> := {0.000 to 30.000}

Query :SWEEP:IMAX?

Example SWEEP:IMAX 5.000

Response Returns: <NR2>

19.4 :SWEEP:SLEW[:BOTH]

Description Sets the same slew rate for both the rise and fall slope in sweep mode.

NOTICE

The instrument must be in sweep operation mode for the command to work. If the instrument is not in sweep mode upon entering the sweep menu the slew values will be set to the default values (0.300 A/μs)

Syntax :SWEEP:SLEW[:BOTH] <NR2>

<NR2> := {0.012 to 3.00 Aμs}

Query :SWEEP:SLEW[:BOTH]?

Example SWEEP:SLEW 0.200

Response Returns: <NR2>,<NR2>

19.5 :SWEEP:SLEW:RISE

Description Sets the current rise time for sweep mode.

NOTICE

The instrument must be in sweep operation mode for the command to work. If the instrument is not in sweep mode upon entering the sweep menu the rise time will be set to the default value (0.300 A/μs)

Syntax :SWEEP:SLEW:RISE <NR2>

<NR2> := {0.012 to 3.00 A/μs}

Query :SWEEP:SLEW:RISE?

Example SWEEP:SLEW:RISE 0.200

Response Returns: <NR2>

19.6 :SWEEP:SLEW:FALL

Description Sets the current fall time for sweep mode.

NOTICE The instrument must be in sweep operation mode for the command to work. If the instrument is not in sweep mode upon entering the sweep menu the fall time will be set to the default value (0.300 A/μs)

Syntax :SWEEP:SLEW:FALL <NR2>

<NR2> := {0.012 to 3.00 A/μs}

Query :SWEEP:SLEW:FALL?

Example SWEEP:SLEW:FALL 0.200

Response Returns: <NR2>

19.7 :SWEEP:FSTart

Description Sets the starting frequency of the SWEEP test.

Syntax :SWEEP:FSTart <NR2>

<NR2> := {0.01 to 25000.00 Hz}

Query :SWEEP:FSTart?

Example SWEEP:FST 50.000

Response Returns: <NR2>

19.8 :SWEEP:FEND

Description Sets the value of the last frequency step for the SWEEP test.

Syntax :SWEEP:FEND <NR2>

<NR2> := {0.01 to 25000.00 Hz}

Query :SWEEP:FEND?

Example SWEEP:FEND 60.000

Response Returns: <NR2>

19.9 :SWEEP:STEP

Description Sets the incremental steps of the SWEEP test.

Syntax :SWEEP:STEP <NR1>

<NR2> := {0.01 to 25000.00 Hz}

Query :SWEEP:STEP?

Example :SWEEP:STEP 5

Response Returns: <NR1>

19.10 :SWEEP:DWELL

Description Sets the time width for each step in the SWEEP test.

Syntax :SWEEP:DWELL <NR2>

<NR2> := {0.0001 to 99.999 s}

Query :SWEEP:DWELL?

Example SWEEP:DWELL 10.000

Response Returns: <NR2>

19.11 :SWEEP:DUTY

Description Sets the sweep duty cycle.

Syntax :SWEEP:DUTY <NR1>

<NR1> := {1 to 99 %}

Query :SWEEP:DUTY?

Example SWEEP:DUTY 50

Response Returns: <NR1>

Auto Subsystem

The AUTO subsystem contains the commands used to configure the parameters of the auto test. The commands supported are:

20.1 :AUTO:FILE

Description Selects the file to be executed or edited aswell as the step to be edited.

Syntax :AUTO:FILE <NR1>,<NR1>

File Number: <NR1> := {1 to 10}

Step Number: <NR1> := {1 to 50}

NOTICE The first <NR1> value specifies the file number while the second <NR1> value specifies the step number.

Query :AUTO:FILE?

Example AUTO:FILE 1,2

Response Returns: <NR1>

20.2 :AUTO:COUNT

Description Sets the number of loop counts the selected file will run.

Syntax :AUTO:COUNT <NR1>

<NR1> := {1 to 100}

Query :AUTO:COUNT?

Example AUTO:COUNT 2

Response Returns: <NR1>

20.3 :AUTO ADD

Description Inserst a new step into the selected file.

Syntax :AUTO ADD

Example AUTO ADD

20.4 :AUTO CLEAR

Description Clears all steps of the selected file

Syntax :AUTO CLEAR

Example AUTO CLEAR

20.5 :AUTO DONE

Description Completes edits to the selected file.

Syntax :AUTO DONE

Example AUTO DONE

20.6 :AUTO:MODE

Description Sets the opereation mode of the selected step in the selected file.

Syntax :AUTO:MODE <character>

<character> := {CURR | VOLT | RES | POW}

Query :AUTO:MODE?

Example AUTO:MODE CURR

Response Returns: <character>

20.7 :AUTO:LEVel

Description Sets the load value of the selected step in the selected file.

Syntax :AUTO:LEVel <NR2>

CC Mode: 8550 : <NR2> := {0.000 to 60.100}
8551 : <NR2> := {0.000 to 30.000}

CV Mode: <NR2> := {0.000 to 150.00}

CR Mode: <NR2> := {0.050 to 50000 Ω}

CW Mode: 8550 : <NR2> := {0.000 to 350.00}
8551 : <NR2> := {0.000 to 175.000}

Query :AUTO:LEVel?

Example AUTO:LEV 10.000

Response Returns: <NR2>

20.8 :AUTO:SLEW[:BOTH]

Description Sets the same slew rate for both the rise and fall slope in auto mode.

NOTICE The instrument must be in auto operation mode for the command to work. If the instrument is not in auto mode upon entering the auto menu the slew values will be set to the default values (0.300 A/μs for CC and 3.00 V/ms for CV)

Syntax :AUTO:SLEW[:BOTH] <NR2>

CV Mode : <NR2> := {0.00 to 3.00 V/ms}

CC Mode : <NR2> := {0.012 to 3.00 Aμs}

Query :AUTO:SLEW[:BOTH]?

Example AUTO:SLEW 0.200

Response Returns: <NR2>,<NR2>

20.9 :AUTO:SLEW:RISE

Description Sets the current rise time for auto mode.

NOTICE The instrument must be in auto operation mode for the command to work. If the instrument is not in auto mode upon entering the auto menu the slew values will be set to the default values (0.300 A/μs for CC and 3.00 V/ms for CV)

Syntax :AUTO:SLEW:RISE <NR2>

CV Mode : <NR2> := {0.00 to 3.00 V/ms}

CC Mode : <NR2> := {0.012 to 3.00 Aμs}

Query :AUTO:SLEW:RISE?

Example AUTO:SLEW:RISE 0.200

Response Returns: <NR2>

20.10 :AUTO:SLEW:FALL

Description Sets the current fall time for auto mode.

NOTICE The instrument must be in auto operation mode for the command to work. If the instrument is not in auto mode upon entering the auto menu the slew values will be set to the default values (0.300 A/μs for CC and 3.00 V/ms for CV)

Syntax :AUTO:SLEW:FALL <NR2>

CV Mode : <NR2> := {0.00 to 3.00 V/ms}

CC Mode : <NR2> := {0.012 to 3.00 Aμs}

Query :AUTO:SLEW:FALL?

Example AUTO:SLEW:FALL 0.200

Response Returns: <NR2>

20.11 :AUTO:IRANGE

Description Sets the current range of the selected step in the selected file.

Syntax :AUTO:IRANGE <NR1>

8550 : <NR1> := {6 A | 60 A} 8551 : <NR2> := {3 A | 30 A}

Query :AUTO:IRANGE?

Example :AUTO:IRANGE 6

Response Returns: <NR1>

20.12 :AUTO:VRANGE

Description Sets the voltage range of the selected step in the selected file.

Syntax :AUTO:VRANGE <NR1>

<NR1> := {15 V | 150 V}

Query :AUTO:VRANGE?

Example AUTO:VRANGE 6

Response Returns: <NR1>

20.13 :AUTO:LIMIT

Description Sets the limit ype of the selected step in the selected file.

Syntax :AUTO:LIMIT <character>

<character> := {CURR | VOLT | POW | OFF}

Query :AUTO:LIMIT?

Example AUTO:LIMIT CURR

Response Returns: <character>

20.14 :AUTO:UPPer

Description Sets the upper limit of the selected step in the selected file.

Syntax :AUTO:UPPer <NR2>

CC Mode: 8550 : <NR2> := {0.000 to 60.100}
8551 : <NR2> := {0.000 to 30.000}

CV Mode: <NR2> := {0.000 to 150.00}

CW Mode: 8550 : <NR2> := {0.000 to 350.00}

Query :AUTO:UPPer?

Example AUTO:UPP 10.000

Response Returns: <NR2>

20.15 :AUTO:LOWer

Description Sets the lower limit of the selected step in the selected file.

Syntax :AUTO:LOWer <NR2>

CC Mode: 8550 : <NR2> := {0.000 to 60.100}
8551 : <NR2> := {0.000 to 30.000}

CV Mode: <NR2> := {0.000 to 150.00}

CW Mode: 8550 : <NR2> := {0.000 to 350.00}

Query :AUTO:LOWer?

Example AUTO:LOW 10.000

Response Returns: <NR2>

20.16 :AUTO:FAIL

Description Sets the fail operation of the selected step in the selected file. The fail operation will determined if the test is abortered when the input fails to meet the limits or if the test continues regardless of the failure.

Syntax :AUTO:FAIL <character>

<character> := {CONTIN | ABORT}

Query :AUTO:FAIL?

Example AUTO:FAIL ABORT

Response Returns: <character>

20.17 :AUTO:TYPe

Description Sets the delay type of the selected step in the selected file. The type determines if the test continuously transitions from one step to the next once the delay time elapses, or if a trigger is required to proceed from one step to the next after the delay time elapses.

Syntax :AUTO:TYPe <character>

<character> := {TIM | TRIG}

Query :AUTO:TYPe?

Example AUTO:TYP TIM

Response Returns: <charcter>

20.18 :AUTO:TIMe

Description Sets the delay time of the selected step in the selected file. The delay time set the run duration of the corresponding step.

Syntax :AUTO:TIMe <NR2>

<NR2> := {0.1 to 99.0 s}

Query :AUTO:TIMe?

Example AUTO:TIM 10.0

Response Returns: <NR2>

System Subsystem

The SYStem subsystem contains the commands used to configure the instruments settings. The commands supported are:

21.1 :SYStem:LANGuage

Description Sets teh interface language of the instrument. The language can be set to chinese (CN) or english (EN)

Syntax :SYStem:LANGuage <character>

<character> := {CN | EN}

Query :SYStem:LANGuage?

Example SYS:LANG EN

Response Returns: <character>

21.2 :SYStem:VOICe

Description Enable/Disable the buzzer.

Syntax :SYStem:VOICe <boolean>

<boolean> := {1 | 0 or ON | OFF}

Query :SYStem:VOICe?

Example SYS:VOIC 0

Response Returns: <boolean>

21.3 :SYStem:REMOTe

Description Enable/Disable the remote sense compensation.

Syntax :SYStem:REMOTe <boolean>

<boolean> := {1 | 0 or ON | OFF}

Query :SYStem:REMOTe?

Example SYS:REMOT 1

Response Returns: <boolean>

21.4 :SYStem:PMem

Description Sets the location of the file to be loaded on boot up.

Syntax :SYStem:PMem <character>

<character> := {DEFAULT | FILER}

Query :SYStem:PMem?

Example SYS:PM FILER

Response Returns: <character>

21.5 :SYStem:DISP

Description Sets the instrument UI display.

Syntax :SYStem:DISP <NR1>

<NR1> := {0 | 1| 2 | 3}

Query :SYStem:DISP?

Example SYS:DISP 0

Response Returns: <NR1>

21.6 :SYStem:SOURce

Description Specifies what the source of the instrument under test is.

Syntax :SYStem:SOURce <character>

<character> := {CURR | VOLT}

Query :SYStem:SOURce?

Example SYS:SOUR VOLT

Response Returns: <character>

21.7 :SYStem:EPRo

Description Enable/Disable the external analog programming. Port 5 in the Handler interface on the rear panel of the instrument is the EXT-PROG port, which is used for external analog input. Connect this port to 0-10V voltage to simulate the input from 0 to full scale, thus adjust the input voltage and current value of the load.

Syntax :SYStem:EPRo <boolean>

<boolean> := {1 | 0 or ON | OFF}

Query :SYStem:EPRo?

Example SYS:EPR

Response Returns: <boolean>