

Programming Manual

9810 Series

Programmable AC Power Sources



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About this Manual

This manual describes how to use the Standard Commands for Programming Instruments (SCPI) to communicate with the 9810 Series Benchtop Data Acquisition System. It provides a comprehensive reference for the command syntax, parameters, and functioning of the instrument's remote control capabilities.

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1.1 Intended Audience

This document is designed for instrument programmers and engineers tasked with creating SCPI-based software applications for the 9810 Series. Users should have a basic understanding of remote communication interfaces (such as USB, LAN, or GPIB) and the SCPI programming language.

1.2 Related Documents

For additional information regarding the operation and standards of the instrument, refer to the following documents:

- **9810 Series User's Manual:** Describes the front-panel operation, installation, and general features of the 9810 Series.
- **Standard Commands for Programming Instruments (SCPI):** Volume 1-4, Version 1990.0 (May 1999), SCPI Consortium.
- **IEEE Std 488.2-1992:** IEEE Standard Codes, Formats, Protocols, and Common Commands. The Institute of Electrical and Electronics Engineers, Inc..

Syntax Convention

2.1 Introduction

SCPI (Standard Commands for Programmable Instruments) serves as a universal programming language designed for electronic test and measurement instruments. It is grounded in the IEEE 488.1 and IEEE 488.2 standards. The 9810 series aligns with the SCPI language and incorporates the IEEE 488.2 STD status structure.

The commands can be issued over USB, LAN, or GPIB interfaces.

2.1.1 Types of SCPI Messages

In order to program a 9810 instrument, it is necessary to create a program message. This message comprises one or more appropriately formatted SCPI commands transmitted from the controller to the 9810 instrument.

The program message, which can be sent at any time, requests the instrument to execute a specific action or provide data or status information. These requests are also referred to as *queries*.

Upon receiving a query, the 9810 instrument responds by sending a response message back to the controller. This response message contains data formatted in a specific SCPI format.

2.2 Types of SCPI Commands

Two types of SCPI commands are available: common commands, described below, and device-specific subsystem commands.

2.2.1 Common Commands

Common SCPI commands, as defined by IEEE 488.2, are responsible for controlling and managing generic system functions like reset, self-test, configuration storage, and device identification. Typically, common commands start with an asterisk (*), have a length of four to five characters, and may involve one or more parameters.

The command keyword is separated from the initial parameter by a space. Multiple commands can be separated using a semicolon (;), as demonstrated below:

```
*RST; *CLS; *ESE 32; *OPC?
```

Refer to Table 2.1 for a summary of the common SCPI commands applicable to the 9810 series.

Command	Description
*CLS	Clears all Event Registers summarized in the status byte.
*ESE?	Returns an <NR1>, representing the value of the Standard Event Status Enable Register. Reading the value of the register will result in its clearance.
*ESR?	Returns an <NR1>, representing the value of the Standard Event Status Register. Reading the value of the register will result in its clearance.
*IDN?	Returns the unique identification string of the instrument.
*OPC?	Returns a "+1", when all pending selected device operations have been finished.
*RST	The Reset command performs a device reset. The Reset command is the third level of reset in a three-level reset strategy.
*SRE?	The Service Request Enable query allows the programmer to determine the current contents of the Service Request Enable Register.
*STB?	Returns the current binary value of the Status Byte Register.

Table 2.1 Common SCPI Commands

2.3 Syntax of Program Messages

A program message consists of one or more properly formatted SCPI commands, a parameter (if necessary), and a terminator sent from the controller to the 9810 instrument.

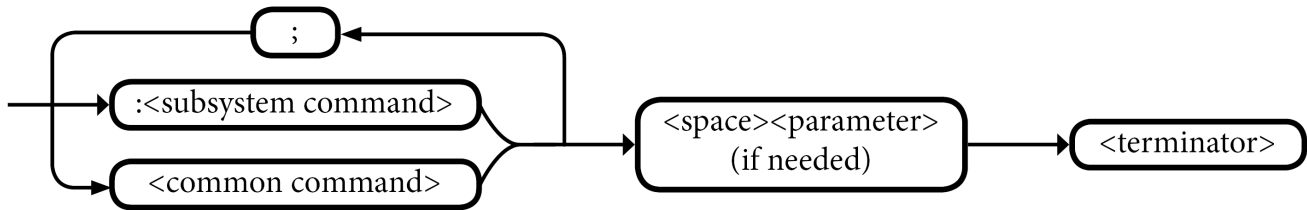


Figure 2.1 Syntax of Program Messages

2.3.1 Command Structure

SCPI commands follow a tree-like structure, organized into nodes. Each level of the command tree is a node. Each keyword (node) of a SCPI command is separated by a colon (:).

CONFigure:VOLTage:DC

2.3.2 Command Forms

Commands and queries have two different forms: long and short.

- **Long Form:** The full word (e.g., CONFigure).
- **Short Form:** An abbreviated version, typically the first three or four letters (e.g., CONF).

The commands can be written in either uppercase or lowercase. The instrument is case-insensitive. For example, CONFIGURE, configure, and Conf are all valid.

2.3.3 Square Brackets

Commands that contain square brackets [] indicate that the enclosed keywords or parameters are optional. The function of the command is the same with or without the bracketed items.

[SENSe:] VOLTage:DC:RANGe

Both SENSe:VOLTage:DC:RANGe and VOLTage:DC:RANGe are valid.

2.3.4 Separators and Terminators

- **Command Separator:** A semicolon (;) is used to link multiple commands within a single program message string.
- **Parameter Separator:** A space is used to separate the command header from the first parameter. A comma (,) is used to separate multiple parameters.
- **Message Terminator:** The termination character marks the end of a command line. The 9810 series accepts the Line Feed (LF) character (<\n>) as the terminator. The IEEE 488.2 standard also defines CR, CR+LF, and LF+CR as valid terminators.

2.3.5 Automatic Parameter Range Selection

The instrument may automatically set a command parameter to the next available value if the entered value is not exact. For example, if a specific range is requested that does not exist, the instrument selects the next highest available range.

SCPI Data Types

SCPI defines various data types for use in program messages and response messages. The 9810 Series uses a subset of these standard data types. This section summarizes the data types accepted by the instrument.

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3.1 Data Types

The following data types are used in SCPI commands and queries.

3.1.1 Character Data Types

Character data types are short, mnemonic keywords used to represent specific settings.

- They can be entered in either long or short form (e.g., IMMEDIATE or IMM).
- They are case-insensitive.
- Response messages always return the short form in uppercase.

Example: DISPlay:PAGE {MEAS | MANUMEM | INTF}

3.1.2 Numeric Data Types (<NRf>)

SCPI defines three formats for numeric values, collectively referred to as <NRf>. The instrument accepts any of these formats for numeric parameters.

Data	Description
<NR1>	Integer values (e.g., 0, 100, -10).
<NR2>	Decimal values (e.g., 1.5, 10.0, 0.01).
<NR3>	Floating point values with exponents (e.g., 1.5E+3, 4.5E-6).
<NRf>	Any of the above formats (Flexible Numeric Representation).

Table 3.1 Numeric Data Formats

3.1.3 Boolean Data Type (<Boolean>)

Boolean parameters represent a single binary condition (True or False).

- **ON** or **1**: Represents True (Enabled).
- **OFF** or **0**: Represents False (Disabled).

Example: OUTPut:STATe ON

3.1.4 String Data Type (<String>)

String parameters are enclosed in double quotes (e.g., "Label Name").

- Used for labels, messages, or filenames.
- The quotes are part of the parameter syntax.

Example: `DISPlay:TEXT "Testing"`

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 response are provided for each command. The commands are given in both long and short forms. All examples are shown in the short form. Queries perform actions such as obtaining information and are recognized by the question mark (?) following the header.

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4.1 How They are Listed

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

4.2 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.

4.3 When can they be used?

The commands and queries listed here can be used for the 9810 Series.

4.4 Command Notation

The following notation is used in the command descriptions:

Notation	Description
< >	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 must be made.
	A vertical bar separates multiple parameter choices (e.g., {ON OFF}).
[]	Square brackets enclose optional items.
...	An ellipsis indicates that the items both to its left and right may be repeated a number of times.

Table 4.1 Command Notation Symbols

Common Commands

This section describes the IEEE 488.2 common commands supported by the instrument.

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5.1 *CLS

Description: Clears the following registers: Standard Event Register, Query Event Register, Status Bit Group Register.

Syntax:

Command *CLS

Parameters: None

Example:

Command *CLS

5.2 *ESE?

Description: Queries the value of the Standard Event Enable Register.

Syntax:

Query *ESE?

Parameters: <NR1> : 0 to 255

Example:

Query *ESE?

5.3 *ESR?

Description: Reads the value of the Standard Event Register. After the command is executed, the value of the Standard Event Register is cleared. The bit definition is the same as the Standard Event Enable Register.

Syntax:

Query *ESR?

Parameters: None

Example:

Query *ESR?

5.4 *IDN?

Description: Queries the model number, SN number, and version number of the instrument.

Syntax:

Query *IDN?

Parameters: None

Example:

Query *IDN?

NOTICE

Example return: Tonghui, TH7110, SHF-888-8888, V1.0.0 Copyright(c) 2017-09-01.

5.5 *OPC

Description: Sets the OPC (Operation Complete) bit of the Standard Event Register to 1 when all commands preceding this command have been executed. Sending the query command returns "1" to the output buffer.

Syntax:

Command *OPC

Query *OPC?

Parameters: None

Example:

Command *OPC

Query *OPC?

5.6 *RST

Description: Resets the power supply to the factory setting state.

Syntax:

Command *RST

Parameters: None

Example:

Command *RST

5.7 *SRE?

Description: Queries the value of the Status Enable Register. Returns a decimal number representing the binary weighted sum of all the bits in the enable register.

Syntax:

Query *SRE?

Parameters: None

Example:

Query *SRE?

5.8 *STB?

Description: Reads the value of the Status Byte Register.

Syntax:

Query *STB?

Parameters: None

Example:

Query *STB?

POWer Subsystem

This chapter describes commands for controlling the instrument's Constant Power (CP) related operation modes.

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6.1 Power Commands

6.1.1 [SOURce:]POWer

Description: Sets the output power value.

Syntax:

Command [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude] <NRf+> |MIN |MAX

Query [SOURce:]POWer?

Parameters: <NRf+> : 0 to Rated Power

Example:

Command POW 10000

Query POW?

6.1.2 [SOURce:]POWer:TRIGgered

Description: Sets the output power value after a trigger event occurs.

Syntax:

Command [SOURce:]POWer[:LEVel]:TRIGger <NRf+> |MIN |MAX

Query [SOURce:]POWer:TRIGgered?

Parameters: <NRf+> : 0 to Rated Power

Example:

Command POW:TRIG 12000

Query POW:TRIG?

6.1.3 [SOURce:]POWer:PROTection:LEVel

Description: Sets the over power protection (OPP) value.

Syntax:

Command [SOURce:]POWer:PROTection:LEVel <NRf+> |MIN |MAX

Query [SOURce:]POWer:PROTection:LEVel?

Parameters: <NRf+> : 10% to 110% of Rated Power

Example:

Command POW:PROT:LEV 10000

Query POW:PROT:LEV?

6.1.4 [SOURce:]POWer:SLEW:RATE

Description: Sets the slew rate for all programmed changes in the output power level.

Syntax:

Command [SOURce:]POWer:SLEW:RATE <NR1> [MIN |MAX

Query [SOURce:]POWer:SLEW:RATE?

Parameters: <NR1> : Value in W/ms (Model dependent)

Example:

Command POW:SLEW:RATE 80

Query POW:SLEW:RATE?

Function Subsystem

The function subsystem controls the shape and attributes of the output signal. This includes setting test parameters such as output voltage, frequency, limits, and specific function modes like Surge/Drop and protections.

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7.1 Output & Mode Commands

7.1.1 FUNCTION:OUTPut

Description: Enables or disables the AC output. This command is only valid in the measurement display page.

Syntax:

Command `FUNCTION:OUTPut <Boolean>`

Query `FUNCTION:OUTPut?`

Parameters: <Boolean> : 0 | 1 | OFF | ON

Example:

Command `FUNC:OUTP 1`

Query `FUNC:OUTP?`

NOTICE

The command is only valid in the measurement display page.

7.1.2 FUNCTION:RunMode

Description: Configures the test mode operation to either Manual or Programmable.

Syntax:

Command `FUNCTION:RunMode <character>`

Query `FUNCTION:RunMode?`

Parameters: <character> : MANUal | PROGram

Example:

Command `FUNC:RM:MANU`

Query `FUNC:RM?`

NOTICE

The command is not valid when the output is enabled.

7.2 Memory & Step Commands

7.2.1 FUNCTION:MEMory:MANUal|PROGram

Description: Configures the memory sequence number for the specified mode.

Syntax:

Command FUNCTION:MEMory:MANUal|PROGram <NR1>

Query FUNCTION:MEMory:MANUal|PROGram?

Parameters: <NR1> : 1 to 50

Example:

Command FUNC:MEM:MANU 2

Query FUNC:MEM:PROG?

NOTICE

The command is not valid when the output is enabled.

7.2.2 FUNCTION:MEMory:CYCLE

Description: Sets the number of cycles for the current memory sequence in programmable mode. Set to 0 for infinite loop.

Syntax:

Command FUNCTION:MEMory:CYCLE <NR1>

Query FUNCTION:MEMory:CYCLE?

Parameters: <NR1> : 0 to 999

Example:

Command FUNC:MEM:CYCLE 0

Query FUNC:MEM:CYCLE?

NOTICE

The command is not valid when the output is enabled.

7.2.3 FUNCTION:STEP

Description: Sets the number of steps in the programmable mode.

Syntax:

Command FUNCTION:STEP <NR1>

Query FUNCTION:STEP?

Parameters: <NR1> : 1 to 9

Example:

Command FUNC:STEP 2

Query FUNC:STEP?

NOTICE

The command is not valid when the output is enabled.

7.2.4 FUNCTION:STEP:CYCLE

Description: Sets the number of cycles for the currently selected step in programmable mode.

Syntax:

Command FUNCTION:STEP:CYCLE <NR1>

Query FUNCTION:STEP:CYCLE?

Parameters: <NR1> : 0 to 999

Example:

Command FUNC:STEP:CYCLE 2

Query FUNC:STEP:CYCLE?

NOTICE

The command is not valid when the output is enabled.

7.2.5 FUNCtion:LoopCycle

Description: Sets the total number of cycles for the memory sequence in programmable mode.

Syntax:

Command FUNCtion:LoopCycle <NR1>

Query FUNCtion:LoopCycle?

Parameters: <NR1> : 0 to 999

Example:

Command FUNC:LC 10

Query FUNC:LC?

7.2.6 FUNCtion:SingleStep

Description: Enables or disables the single-step test function in programmable mode.

Syntax:

Command FUNCtion:SingleStep <boolean>

Query FUNCtion:SingleStep?

Parameters: <boolean> : 0 | 1 | OFF | ON

Example:

Command FUNC:SS 1

Query FUNC:SS?

NOTICE

The command is invalid when the output is turned on.

7.2.7 FUNCTION:CONNECT

Description: Enables or disables the step connection parameter of the currently selected step.

Syntax:

Command FUNCTION:CONNECT <boolean>

Query FUNCTION:CONNECT?

Parameters: <boolean> : 0 | 1 | OFF | ON

Example:

Command FUNC:CONNECT 1

Query FUNC:CONNECT?

NOTICE

The command is invalid when the output is turned on.

7.3 Voltage Commands

7.3.1 FUNCTION:VOLTage:MANUal|PROGram

Description: Configures the voltage value for the specified mode.

Syntax:

Command FUNCTION:VOLTage:MANUal|PROGram <NR1>

Query FUNCTION:VOLTage:MANUal|PROGram?

Parameters: <NR1> : 0.0 to 300.0 V

Example:

Command FUNC:VOLT:MANU 110

Query FUNC:VOLT:PROG?

7.3.2 FUNCTION:VOLTage:HighLIMIT:MANUal|PROGram

Description: Configures the high voltage limit value for the specified mode.

Syntax:

Command FUNCTION:VOLTage:HighLIMIT:MANUal|PROGram <NR1>

Query FUNCTION:VOLTage:HighLIMIT:MANUal|PROGram?

Parameters: <NR1> : 0.0 to 300.0 V

Example:

Command FUNC:VOLT:HILMT:MANU 300

Query FUNC:VOLT:HILMT:PROG?

7.3.3 FUNCTION:VOLTage:LOWLIMIT:MANUal|PROGram

Description: Configures the low voltage limit value for the specified mode.

Syntax:

Command FUNCTION:VOLTage:LOWLIMIT:MANUal|PROGram <NR1>

Query FUNCTION:VOLTage:LOWLIMIT:MANUal|PROGram?

Parameters: <NR1> : 0.0 to 300.0 V

Example:

Command FUNC:VOLT:LOLMT:MANU 90

Query FUNC:VOLT:LOLMT:PROG?

7.3.4 FUNCTION:VOLTage:MODE:MANUal|PROGram

Description: Configures the voltage output mode to AUTO or HIGH.

Syntax:

Command FUNCTION:VOLTage:MODE:MANUal|PROGram <character>

Query FUNCTION:VOLTage:MODE:MANUal|PROGram?

Parameters: <character> : AUTO | HIGH

Example:

Command FUNC:VOLT:MODE:MANU AUTO

Query FUNC:VOLT:MODE:PROG?

7.3.5 FUNCTION:VOLTage:LiMiT

Description: Sets the output voltage limit protection in manual mode. This value represents the allowable difference between the set voltage and the output voltage.

Syntax:

Command FUNCTION:VOLTage:LiMiT <NR2>

Query FUNCTION:VOLTage:LiMiT?

Parameters: <NR2> : 5.0 to 50.0 V

Example:

Command FUNC:VOLT:LMT 10

Query FUNC:VOLT:LMT?

7.4 Current Commands

7.4.1 FUNCTION:CURRENT:HighLIMIT:MANUal|PROGram

Description: Configures the high current limit value for the specified mode.

Syntax:

Command FUNCTION:CURRENT:HighLIMIT:MANUal|PROGram <NR1>

Query FUNCTION:CURRENT:HighLIMIT:MANUal|PROGram?

Parameters:

Condition	Range
Voltage $\leq$ 150V	0.000 to 8.400 A
Voltage > 150V	0.000 to 4.200 A

Table 7.1 Current Limit Ranges

Example:

Command FUNC:CURR:HILMT:MANU 8.4

Query FUNC:CURR:HILMT:PROG?

7.4.2 FUNCTION:CURRENT:LoWLIMIT:MANUal|PROGram

Description: Configures the low current limit value for the specified mode.

Syntax:

Command FUNCTION:CURRENT:LoWLIMIT:MANUal|PROGram <NR1>

Query FUNCTION:CURRENT:LoWLIMIT:MANUal|PROGram?

Parameters:

Condition	Range
Voltage $\leq$ 150V	0.000 to 8.400 A
Voltage > 150V	0.000 to 4.200 A

Table 7.2 Current Limit Ranges

Example:

Command FUNC:CURR:LOLMT:MANU 0.1

Query FUNC:CURR:LOLMT:PROG?

7.4.3 FUNCTION:AmperePeak:HighLiMiT

Description: Configures the peak current high limit value of the selected step in programmable mode.

Syntax:

Command FUNCTION:AmperePeak:HighLiMiT <NR1>

Query FUNCTION:AmperePeak:HighLiMiT?

Parameters:

Condition	Range
AUTO ($\leq$ 150V)	0.0 to 33.6 A
AUTO ($>$ 150V) or HIGH	0.0 to 16.8 A

Table 7.3 High Apk Limit Range

Example:

Command FUNC:AP:HILMT 33.6

Query FUNC:AP:HILMT?

NOTICE

When the parameter is set to 0.0, this function is turned off.

7.4.4 FUNCtion:AmperePeak:LOWLIMIT

Description: Configures the peak current low limit value of the selected step in programmable mode.

Syntax:

Command FUNCtion:AmperePeak:LOWLIMIT <NR1>

Query FUNCtion:AmperePeak:LOWLIMIT?

Parameters:

Condition	Range
AUTO ($\leq$ 150V)	0.0 to 33.6 A
AUTO ($>$ 150V) or HIGH	0.0 to 16.8 A

Table 7.4 Low Apk Limit Range

Example:

Command FUNC:AP:LOLMT 0

Query FUNC:AP:LOLMT?

NOTICE

When the parameter is set to 0.0, this function is turned off.

7.4.5 FUNCtion:OverCurrentFold:MANUal|PROGram

Description: Enables or disables the over-current fold function.

Syntax:

Command FUNCtion:OverCurrentFold:MANUal|PROGram <boolean>

Query FUNCtion:OverCurrentFold:MANUal|PROGram?

Parameters: <boolean> : 0 | 1 | OFF | ON

Example:

Command FUNC:OCF:MANU 1

Query FUNC:OCF:PROG?

7.5 Power Commands

7.5.1 FUNCTION:POWer:HighLiMiT

Description: Configures the power high limit value of the selected step in programmable mode.

Syntax:

Command FUNCTION:POWer:HighLiMiT <NR1>

Query FUNCTION:POWer:HighLiMiT?

Parameters: <NR1> : 0 to 1000 W

Example:

Command FUNC:POW:HILMT 33.6

Query FUNC:POW:HILMT?

7.5.2 FUNCTION:POWer:LOWLIMIT

Description: Configures the power low limit value of the selected step in programmable mode.

Syntax:

Command FUNCTION:POWer:LOWLIMIT <NR1>

Query FUNCTION:POWer:LOWLIMIT?

Parameters: <NR1> : 0 to 1000 W

Example:

Command FUNC:POW:LOLMT 0

Query FUNC:POW:LOLMT?

7.5.3 FUNCTION:PowerFactor:HighLiMiT

Description: Configures the PowerFactor high limit value of the selected step in programmable mode.

Syntax:

Command FUNCTION:PowerFactor:HighLiMiT <NR1>

Query FUNCTION:PowerFactor:HighLiMiT?

Parameters: <NR1> : 0.000 to 1.000

Example:

Command FUNC:PF:HILMT 0.95

Query FUNC:PF:HILMT?

7.5.4 FUNCTION:PowerFactor:LOWLIMIT

Description: Configures the PowerFactor low limit value of the selected step in programmable mode.

Syntax:

Command `FUNCTION:PowerFactor:LOWLIMIT <NR1>`

Query `FUNCTION:PowerFactor:LOWLIMIT?`

Parameters: <NR1> : 0.000 to 1.000

Example:

Command `FUNC:PF:LOLMT 0`

Query `FUNC:PF:LOLMT?`

7.6 Frequency & Phase Commands

7.6.1 FUNCTION:FREQuency:MANUal|PROGram

Description: Configures the output frequency value.

Syntax:

Command FUNCTION:FREQuency:MANUal|PROGram <NR1>

Query FUNCTION:FREQuency:MANUal|PROGram?

Parameters: <NR1> : 45.0 to 500 Hz

Example:

Command FUNC:FREQ:MANU 60

Query FUNC:FREQ:PROG?

NOTICE

Resolution: 0.1 Hz (< 100 Hz), 1 Hz ($\geq$ 100 Hz).

7.6.2 FUNCTION:FREQuency:HighLIMIT:MANUal|PROGram

Description: Configures the high frequency limit value.

Syntax:

Command FUNCTION:FREQuency:HighLIMIT:MANUal|PROGram <NR1>

Query FUNCTION:FREQuency:HighLIMIT:MANUal|PROGram?

Parameters: <NR1> : 45.0 to 500 Hz

Example:

Command FUNC:FREQ:HILMT:MANU 500

Query FUNC:FREQ:HILMT:PROG?

7.6.3 FUNCTION:FREQuency:LOWLIMIT:MANUal|PROGram

Description: Configures the low frequency limit value.

Syntax:

Command FUNCTION:FREQuency:LOWLIMIT:MANUal|PROGram <NR1>

Query FUNCTION:FREQuency:LOWLIMIT:MANUal|PROGram?

Parameters: <NR1> : 45.0 to 500 Hz

Example:

Command FUNC:FREQ:LOLMT:MANU 45

Query FUNC:FREQ:LOLMT:PROG?

7.6.4 FUNCTION:StartANGLE:MANUal|PROGram

Description: Configures the starting phase angle of the output waveform.

Syntax:

Command FUNCTION:StartANGLE:MANUal|PROGram <NR1>

Query FUNCTION:StartANGLE:MANUal|PROGram?

Parameters: <NR1> : 0 to 359 degrees

Example:

Command FUNC:SANG:MANU 90

Query FUNC:SANG:PROG?

7.6.5 FUNCTION:EndANGLE:MANUal|PROGram

Description: Configures the ending phase angle of the output waveform.

Syntax:

Command FUNCTION:EndANGLE:MANUal|PROGram <NR1>

Query FUNCTION:EndANGLE:MANUal|PROGram?

Parameters: <NR1> : 0 to 359 degrees

Example:

Command FUNC:EANG:MANU 90

Query FUNC:EANG:PROG?

7.7 Time & Ramp Commands

7.7.1 FUNCTION:DELAY

Description: Configures the delay determination time of the current step in programmable mode.

Syntax:

Command FUNCTION:DELAY <NR1>

Query FUNCTION:DELAY?

Parameters: <NR1> : 0.1 to 999.9

Example:

Command FUNC:DELAY 1

Query FUNC:DELAY?

NOTICE

The value entered depends on the Time Unit (Second, Minute, or Hour).

7.7.2 FUNCTION:DWELL

Description: Configures the test time of the current step in programmable mode.

Syntax:

Command FUNCTION:DWELL <NR1>

Query FUNCTION:DWELL?

Parameters: <NR1> : 0.1 to 999.9

Example:

Command FUNC:DWELL 10

Query FUNC:DWELL?

7.7.3 FUNCTION:RAMP:UP

Description: Configures the ramp up time of the current step in programmable mode.

Syntax:

Command FUNCTION:RAMP:UP <NR1>

Query FUNCTION:RAMP:UP?

Parameters: <NR1> : 0.0 to 999.9 s

Example:

Command FUNC:RAMP:UP 100

Query FUNC:RAMP:UP?

7.7.4 FUNCTION:RAMP:DOWN

Description: Configures the ramp down time of the current step in programmable mode.

Syntax:

Command FUNCTION:RAMP:DOWN <NR1>

Query FUNCTION:RAMP:DOWN?

Parameters: <NR1> : 0.0 to 999.9 s

Example:

Command FUNC:RAMP:DOWN 100

Query FUNC:RAMP:DOWN?

7.7.5 FUNCTION:TIME:SECond|MINute|HOUR

Description: Configures the timer value in manual mode.

Syntax:

Command FUNCTION:TIME:SECond|MINute|HOUR <NR1>

Query FUNCTION:TIME:SECond|MINute|HOUR?

Parameters: <NR1> : 0 to 59 (Sec/Min), 0 to 99 (Hour)

Example:

Command FUNC:TIME:SEC 30

Query FUNC:TIME:MIN?

7.7.6 FUNCTION:TIME:UNIT

Description: Configures the unit of delay judgment and test time in programmable mode.

Syntax:

Command FUNCTION:TIME:UNIT:SECond|MINute|HOUR

Query FUNCTION:TIME:UNIT?

Parameters: <character> : SECond | MINute | HOUR

Example:

Command FUNC:TIME:UNIT MIN

Query FUNC:TIME:UNIT?

7.8 Surge & Drop Commands

7.8.1 FUNCTION:SurgeDrop:MANUal|PROGram

Description: Enables or disables the surge drop function in the specified mode.

Syntax:

Command FUNCTION:SurgeDrop:MANUal|PROGram <boolean>

Query FUNCTION:SurgeDrop:MANUal|PROGram?

Parameters: <boolean> : 0 | 1 | OFF | ON

Example:

Command FUNC:SD:MANU 1

Query FUNC:SD:PROG?

7.8.2 FUNCTION:SurgeDrop:ConnecT:MANUal|PROGram

Description: Enables or disables the surge drop connection.

Syntax:

Command FUNCTION:SurgeDrop:ConnecT:MANUal|PROGram <boolean>

Query FUNCTION:SurgeDrop:ConnecT:MANUal|PROGram?

Parameters: <boolean> : 0 | 1 | OFF | ON

Example:

Command FUNC:SD:CT:MANU 1

Query FUNC:SD:CT:PROG?

7.8.3 FUNCTION:SurgeDrop:VOLT:MANUal|PROGram

Description: Configures the voltage value of the surge drop.

Syntax:

Command FUNCTION:SurgeDrop:VOLT:MANUal|PROGram <NR2>

Query FUNCTION:SurgeDrop:VOLT:MANUal|PROGram?

Parameters: <NR2> : 0.0 to 300.0 V

Example:

Command FUNC:SD:VOLT:MANU 110.0

Query FUNC:SD:VOLT:PROG?

7.8.4 FUNCTION:SurgeDrop:SITE:MANUal|PROGram

Description: Configures the position where the surge drop appears.

Syntax:

Command FUNCTION:SurgeDrop:SITE:MANUal|PROGram <NR1>

Query FUNCTION:SurgeDrop:SITE:MANUal|PROGram?

Parameters: <NR1> : 0 to 20 ms

Example:

Command FUNC:SD:SITE:MANU 10

Query FUNC:SD:SITE:PROG?

7.8.5 FUNCTION:SurgeDrop:TIME:MANUal|PROGram

Description: Configures the time width of the surge drop.

Syntax:

Command FUNCTION:SurgeDrop:TIME:MANUal|PROGram <NR1>

Query FUNCTION:SurgeDrop:TIME:MANUal|PROGram?

Parameters: <NR1> : 0 to 20 ms

Example:

Command FUNC:SD:TIME:MANU 10

Query FUNC:SD:TIME:PROG?

7.8.6 FUNCTION:TRIG

Description: Manually triggers a surge drop.

Syntax:

Command FUNCTION:TRIG

Parameters: None

Example:

Command FUNC:TRIG

7.9 Result Commands

7.9.1 FUNCTION:RESULT:MANUal|PROGram

Description: Configures the result display mode.

Syntax:

Command FUNCTION:RESULT:MANUal|PROGram <mode>

Query FUNCTION:RESULT:MANUal|PROGram?

Parameters:

Mode	Description
0	NONE (Manual) / LAST (Program)
1	LAST (Manual) / ALL (Program)
2	ALL (Manual) / P/F (Program)
3	P/F (Manual)

Table 7.5 Result Display Mode

Example:

Command FUNC:RESULT:MANU 2

Query FUNC:RESULT:PROG?

7.9.2 FUNCTION:EXIT

Description: Exits the result display state.

Syntax:

Command FUNCTION:EXIT

Parameters: None

Example:

Command FUNC:EXIT

7.9.3 FUNCTION:SaveResult

Description: Saves the test results when the result display is set to ALL.

Syntax:

Command FUNCTION:SaveResult

Parameters: None

Example:

Command FUNC:SR

FETCH Subsystem

The FETCH subsystem commands are mainly used to query the values of output parameters such as voltage, current, power, ampere peak, power factor, and crest factor in manual mode.

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8.1 Fetch Commands

8.1.1 FETCH:VOLTage?

Description: Queries the output voltage value in manual mode.

Syntax:

Command `FETCH:VOLTage?`

Parameters: None

Example:

Command `FETCH:VOLT?`

NOTICE

The command is valid only when the output is turned on.

8.1.2 FETCH:CURREnt?

Description: Queries the output current value in manual mode.

Syntax:

Command `FETCH:CURREnt?`

Parameters: None

Example:

Command `FETCH:CURRE?`

NOTICE

The command is valid only when the output is turned on.

8.1.3 FETCH:POWer?

Description: Queries the output power value in manual mode.

Syntax:

Command `FETCH:POWer?`

Parameters: None

Example:

Command `FETCH:POW?`

NOTICE

The command is valid only when the output is turned on.

8.1.4 FETCH:AmperePeak?

Description: Queries the ampere peak value in manual mode.

Syntax:

Command `FETCH:AmperePeak?`

Parameters: None

Example:

Command `FETCH:AP?`

NOTICE

The command is valid only when the output is turned on.

8.1.5 FETCH:PowerFactor?

Description: Queries the power factor value in manual mode.

Syntax:

Command `FETCH:PowerFactor?`

Parameters: None

Example:

Command `FETCH:PF?`

NOTICE

The command is valid only when the output is turned on.

8.1.6 FETCH:CrestFactor?

Description: Queries the crest factor value in manual mode.

Syntax:

Command `FETCH:CrestFactor?`

Parameters: None

Example:

Command `FETCH:CF?`

NOTICE

The command is valid only when the output is turned on.

8.1.7 FETCH?

Description: Queries all measurement parameters including voltage, current, power, ampere peak, power factor, and crest factor in manual mode.

Syntax:

Command `FETCH?`

Parameters: None

Example:

Command `FETCH?`

NOTICE

Return format example: 100.0, 1.000, 100.0, 1.42, 1.000, 1.413

SYStem Subsystem

The SYStem subsystem commands are used to set the parameters under the system settings, such as beeper, time, date, communication, and reset functions.

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9.1 Beep Commands

9.1.1 SYSTem:BEEP:PASS

Description: Enables or disables the beep sound when a test passes.

Syntax:

Command SYSTem:BEEP:PASS <Boolean>

Query SYSTem:BEEP:PASS?

Parameters: <Boolean> : 0 | 1 | OFF | ON

Example:

Command SYST:BEEP:PASS 1

Query SYST:BEEP:PASS?

9.1.2 SYSTem:BEEP:FAIL

Description: Enables or disables the beep sound when a test fails.

Syntax:

Command SYSTem:BEEP:FAIL <Boolean>

Query SYSTem:BEEP:FAIL?

Parameters: <Boolean> : 0 | 1 | OFF | ON

Example:

Command SYST:BEEP:FAIL 1

Query SYST:BEEP:FAIL?

9.1.3 SYSTem:BEEP:KEY

Description: Enables or disables the key tone when pressing front panel keys.

Syntax:

Command SYSTem:BEEP:KEY <Boolean>

Query SYSTem:BEEP:KEY?

Parameters: <Boolean> : 0 | 1 | OFF | ON

Example:

Command SYST:BEEP:KEY 1

Query SYST:BEEP:KEY?

9.1.4 SYSTem:BEEP:ALARM

Description: Enables or disables the alarm beep when an abnormality occurs during the test.

Syntax:

Command SYSTem:BEEP:ALARM <Boolean>

Query SYSTem:BEEP:ALARM?

Parameters: <Boolean> : 0 | 1 | OFF | ON

Example:

Command SYST:BEEP:ALARM 1

Query SYST:BEEP:ALARM?

9.2 Date & Time Commands

9.2.1 SYSTem:DATE

Description: Sets or queries the system date. The format is Year-Month-Day (e.g., 2017-8-30).

Syntax:

Command SYSTem:DATE <date>

Query SYSTem:DATE?

Parameters: <date> : YYYY-MM-DD

Example:

Command SYST:DATE 2017-8-30

Query SYST:DATE?

9.2.2 SYSTem:YEAR

Description: Sets or queries the year of the system time.

Syntax:

Command SYSTem:YEAR <value>

Query SYSTem:YEAR?

Parameters: <value> : 0 to 99 | 2000 to 2099

Example:

Command SYST:YEAR 2019

Query SYST:YEAR?

9.2.3 SYSTem:MONTH

Description: Sets or queries the month of the system time.

Syntax:

Command SYSTem:MONTH <value>

Query SYSTem:MONTH?

Parameters: <value> : 1 to 12

Example:

Command SYST:MONTH 8

Query SYST:MONTH?

9.2.4 SYSTem:DATE

Description: Sets or queries the day of the system time. (Note: This command specifically addresses the day value).

Syntax:

Command SYSTem:DATE <value>

Query SYSTem:DATE?

Parameters: <value> : 1 to 31

Example:

Command SYST:DATE 30

Query SYST:DATE?

9.2.5 SYSTem:TIME

Description: Sets or queries the system time. The format is HH:MM:SS (e.g., 08:00:00).

Syntax:

Command SYSTem:TIME <time>

Query SYSTem:TIME?

Parameters: <time> : HH:MM:SS

Example:

Command SYST:TIME 08:00:00

Query SYST:TIME?

9.2.6 SYSTem:TIME:HOURL

Description: Sets or queries the hour of the system time.

Syntax:

Command SYSTem:TIME:HOURL <value>

Query SYSTem:TIME:HOURL?

Parameters: <value> : 0 to 23

Example:

Command SYST:TIME:HOURL 8

Query SYST:TIME:HOURL?

9.2.7 SYSTem:TIME:MINute

Description: Sets or queries the minute of the system time.

Syntax:

Command SYSTem:TIME:MINute <value>

Query SYSTem:TIME:MINute?

Parameters: <value> : 0 to 59

Example:

Command SYST:TIME:MIN 30

Query SYST:TIME:MIN?

9.2.8 SYSTem:TIME:SECond

Description: Sets or queries the second of the system time.

Syntax:

Command SYSTem:TIME:SECond <value>

Query SYSTem:TIME:SECond?

Parameters: <value> : 0 to 59

Example:

Command SYST:TIME:SEC 45

Query SYST:TIME:SEC?

9.3 Control & Reset Commands

9.3.1 SYSTem:PLC

Description: Enables or disables the remote control function (Programmable Logic Control).

Syntax:

Command SYSTem:PLC <Boolean>

Query SYSTem:PLC?

Parameters: <Boolean> : 0 | 1 | OFF | ON

Example:

Command SYST:PLC 1

Query SYST:PLC?

9.3.2 SYSTem:LastState

Description: Configures whether the instrument retains the last power-off state upon the next power-on.

Syntax:

Command SYSTem:LastState <Boolean>

Query SYSTem:LastState?

Parameters: <Boolean> : 0 | 1 | OFF | ON

Example:

Command SYST:LS 1

Query SYST:LS?

9.3.3 SYSTem:RESET:FACTory

Description: Resets the instrument to factory default settings.

Syntax:

Command SYSTem:RESET:FACTory

Parameters: None

Example:

Command SYST:RESET:FACT

9.3.4 SYSTem:RESET:SETUP

Description: Restores all measurement settings to their default values.

Syntax:

Command SYSTem:RESET:SETUP

Parameters: None

Example:

Command SYST:RESET:SETUP

9.4 File Commands

9.4.1 SYSTem:INTerFile:SAVE

Description: Saves the current settings to a file in the internal storage. If the file name already exists, the save operation may fail.

Syntax:

Command SYSTem:INTerFile:SAVE <name>

Parameters: <name> : File Name String

Example:

Command SYST:INTF:SAVE "TEST01"
