Programming Manual

DML Series
Modular Programmable DC Electronic Load

BK PRECISION

Contents

About this Manual

This manual describes how to use the Standard Commands for Programming Instruments (SCPI) to communicate with the DML Series.

1.1 Intended Audience

This document is designed for instrument programmers tasked with creating SCPI-based programs for the DML Series.

1.2 Related Documents

Refer to the following documents for more information:

- DML Series User's Manual. This manual describes the operation of the DML Series.
- Standard Commands for Programming Instruments (SCPI), Volume1-4, Version 1990.0 May 1999, SCPI Consortium, 2515 Camino del Rio South, Suite 340, San Diego, Ca 92108.
- IEEE Std 488.2-1992, The Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017-2394, USA (ISBN 1-55937-238-9)

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 DML series aligns with the SCPI language and incorporates the IEEE 488.2 STD status structure.

The commands can be issued over VISA or socket using TCP port 5025.

2.1.1 Types of SCPI Messages

In order to program an DML 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 DML 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 DML instrument responds by sending a response message back to the controller. This response message contains data formatted in a specific SCPI format.

The following documents provide more information about SCPI programming:

- Standard Commands for Programming Instruments (SCPI), Volume1-4, Version 1990.0 May 1999, SCPI Consortium, 2515 Camino del Rio South, Suite 340, San Diego, Ca 92108.
- IEEE Std 488.2-1992, The Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017-2394, USA (ISBN 1-55937-238-9)

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 these common SCPI commands applicable to programming the DML series. For a detailed description of these commands, consult **Chapter 5**.

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 consist of one or more properly formatted SCPI commands, a parameter (if necessary, and a terminator sent from the controller to the DML instrument to request some action or to query the instrument for a response.

Figure 2.3 shows the syntax of a program message:

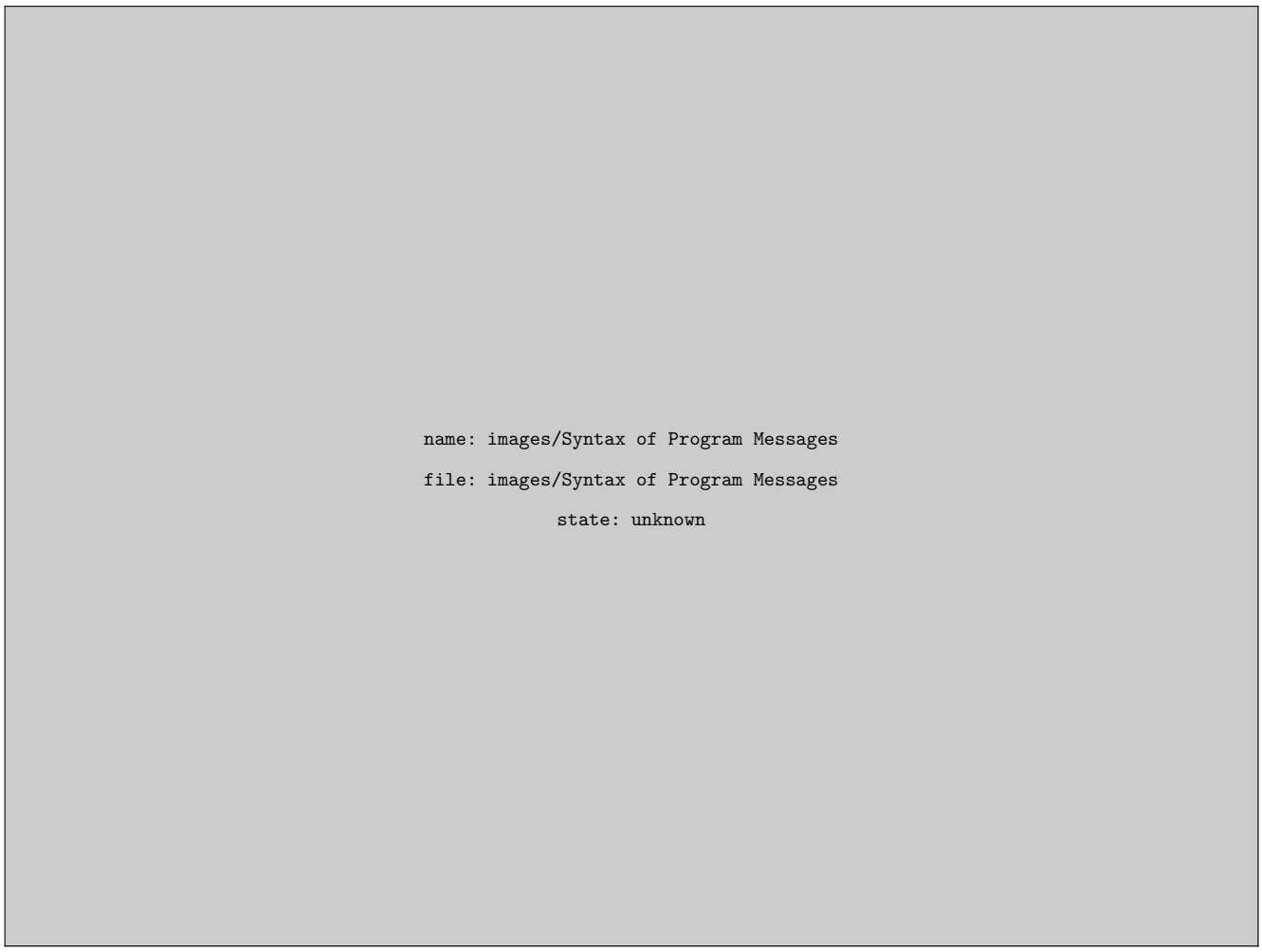

Figure 2.1 Syntax of Program Messages

A semicolon (;) is used to link commands from different groups.

SCPI Data Types

SCPI defines various data types for use in program messages and response messages.

The DML series uses the following subset of SCPI data types:

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

This section summarizes these data types. Refer to the SCPI standards document for more information about these data types.

3.1 <CRD> Character Data Types

If a command parameter takes data type, a specific number of settings are allowed for the parameter.

Example In the command DISPlay:PAGE the user can specify one of the following character data types:

{ MEAS | MANUMEM | MANUCOMM | PROGMEM1 | PROGMEM2 | PROGMEM3 | PROGCOMM | SYSTENV | SYSTCOM | SYSTTOOL | INTF | EXTF}

Character data types have the following characteristics:

- Can be expressed in either the short or long form, while response messages return them exclusively in the short form.
- Are case insensitive in program messages but in response messages are standardized to uppercase.
- Must have a specific length.

3.2 <NR1> Value Data Type

The data type <NR1> is utilized to indicate zero, positive, and negative integer values, including optional signs.

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

0 100 -10

3.3 <NR2> Value Data Type

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

The difference between <NR1> and <NR2> is the explicit decimal point.

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

200.50 100.0 0.0

NOTICE 0 is a special case and redundant decimal points are ignored.

3.4 <NRf> Value Data Type

The <NRf> data type is employed to define floating-point values. These values encompass digits with an implied decimal point, an explicit decimal point, or an explicit decimal point along with an exponent.

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

200 15.000e-3 0.015

3.5 Boolean 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.

NOTICE The characters OFF and ON are not case sensitive.

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.

4.1 How They are Listed

The commands are listed by subsystem and 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 HVL seires.

4.4 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.

Common SCPI Commands

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.

5.1 *IDN?

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

Syntax **Query** *IDN?

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

<device id>:="BK" is used to identify instrument.

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

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

<firmware version>:= Firmware revision number.

<hardware version>:= Hardware revision number.

Example *IDN?

Returns: B&K Precision,DML1102,XXXXXXXXX,0.90-1.00

5.2 *RST

Description The Reset command performs a device reset. The Reset command is the third level of reset in a three-level reset strategy.

Syntax **Query** *RST?

Example **Query** *RST?

ABORt

6.1 ABORt

Description Disables all modules placing them in the IDLE state.

Syntax **Command** ABORt

Parameters None

Example **Command** ABORt

ADVance Subsystem

This chapter describes commands for advanced test modes, including CR-LED simulation, Battery testing, Timing tests, OCP/OVP/OPP tests, Sine wave generation, List sequencing, and automated Programs.

CR-LED Settings

Commands for configuring the Constant Resistance LED (CR-LED) simulation mode.

7.1 ADVance:LED:V <NRf>

Description Sets the threshold voltage for CR-LED mode.

Syntax
Command :ADVance:LED:V **<NRf>**
Query :ADVance:LED:V?

Parameters <**NRf**> := { Numeric threshold voltage value in Volts. }

Example
Command :ADV:LED:V 1
Query :ADV:LED:V?

7.2 ADVance:LED:R <NRf>

Description Sets the equivalent series resistance for CR-LED mode.

Syntax
Command :ADVance:LED:R **<NRf>**
Query :ADVance:LED:R?

Parameters <**NRf**> := { Numeric resistance value in Ohms. }

Example
Command :ADV:LED:R 1
Query :ADV:LED:R?

7.3 ADVance:LED:CURRent:RANGe <CRD> <NR1>

Description Sets the current measurement range to be used during CR-LED mode.

Syntax
Command :ADVance:LED:CURRent:RANGe **<CRD>** **<NR1>**
Query :ADVance:LED:CURRent:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the CR-LED mode current range. }

Example
Command :ADV:LED:CURR:RANG 1
Query :ADV:LED:CURR:RANG?

BAT (Battery Test) Settings

Commands for configuring the Battery Discharge Test (BAT) mode.

7.4 ADVance:BAT:MODE <CRD> <NR1>

Description Sets the discharge mode for the battery test (Constant Current, Resistance, or Power).

Syntax
Command :ADVance:BAT:MODE <CRD> <NR1>
Query :ADVance:BAT:MODE?

Parameters <NR1> := { **CC** | **0** | **CR** | **1** | **CP** | **2**. Sets the battery discharge mode. }

Example
Command :ADV:BAT:MODE 0
Query :ADV:BAT:MODE?

7.5 ADVance:BAT:VALue <NRf>

Description Sets the discharge value (current, resistance, or power, depending on the selected BAT:MODE).

Syntax
Command :ADVance:BAT:VALue <NRf>
Query :ADVance:BAT:VALue?

Parameters <NRf> := { Numeric discharge value (Unit depends on `:ADV:BAT:MODE`: Amps for CC, Ohms for CR, Watts for CP). }

Example
Command :ADV:BAT:VAL 1
Query :ADV:BAT:VAL?

7.6 ADVance:BAT:CONDition <CRD> <NR1>

Description Sets the condition that terminates the battery discharge test.

Syntax
Command :ADVance:BAT:CONDition <CRD> <NR1>
Query :ADVance:BAT:CONDition?

Parameters <NR1> := { **VOLT**age | **0** | **TIME** | **1** | **CAP**acity | **2** | **ENER**gy | **3**. Sets the test termination condition. }

Example
Command :ADV:BAT:COND 1

Query :ADV:BAT:COND?

7.7 ADVance:BAT:LEVEL <NRf>

Description Sets the threshold value for the selected termination condition (`:ADV:BAT:COND`).

Syntax **Command** :ADVance:BAT:LEVEL **<NRf>**

Query :ADVance:BAT:LEVEL?

Parameters <**NRf**> := { Numeric termination threshold value (Unit depends on `:ADV:BAT:COND`: Volts, Seconds, Ampere-hours, or Watt-hours). }

Example **Command** :ADV:BAT:LEVEL 1
Query :ADV:BAT:LEVEL?

7.8 ADVance:BAT:RISE <NRf>

Description Sets the rising current slope used in battery test mode (if applicable).

Syntax **Command** :ADVance:BAT:RISE **<NRf>**

Query :ADVance:BAT:RISE?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example **Command** :ADV:BAT:RISE 1
Query :ADV:BAT:RISE?

7.9 ADVance:BAT:FALL <NRf>

Description Sets the falling current slope used in battery test mode (if applicable).

Syntax **Command** :ADVance:BAT:FALL **<NRf>**

Query :ADVance:BAT:FALL?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example **Command** :ADV:BAT:FALL 1
Query :ADV:BAT:FALL?

7.10 ADVance:BAT:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during Battery Test mode.

Syntax

Command :ADVance:BAT:VOLTage:RANGe **<CRD>** **<NR1>**

Query :ADVance:BAT:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the Battery Test mode voltage range. }

Example

Command :ADV:BAT:VOLT:RANG 1

Query :ADV:BAT:VOLT:RANG?

TIMING (Time Test) Settings

Commands for configuring the Timing Test (TIML/M/H) mode, often used for measuring rise/fall/holdup times.

7.11 ADVance:TIMing:MODE <CRD> <NR1>

Description Sets the load mode (CC, CR, or CP) to be used during the timing test.

Syntax
Command :ADVance:TIMing:MODE **<CRD>** **<NR1>**
Query :ADVance:TIMing:MODE?

Parameters <**NR1**> := { **CC** | **0** | **CR** | **1** | **CP** | **2**. Sets the test mode. }

Example
Command :ADV:TIM:MODE 0
Query :ADV:TIM:MODE?

7.12 ADVance:TIMing:VALue <NRf>

Description Sets the load value (current, resistance, or power) corresponding to the selected `:ADV:TIM:MODE`.

Syntax
Command :ADVance:TIMing:VALue **<NRf>**
Query :ADVance:TIMing:VALue?

Parameters <**NRf**> := { Numeric load value (Unit depends on `:ADV:TIM:MODE`: Amps, Ohms, or Watts). }

Example
Command :ADV:TIM:VAL 1
Query :ADV:TIM:VAL?

7.13 ADVance:TIMing:TRIGger:MODE <CRD> <NR1>

Description Sets the trigger condition for starting and stopping the time measurement.

Syntax
Command :ADVance:TIMing:TRIGger:MODE **<CRD>** **<NR1>**
Query :ADVance:TIMing:TRIGger:MODE?

Parameters <**NR1**> := { **FALL** | **0** | **RISE** | **1** | **HOLDUP** | **2**. Sets the timing trigger mode. }

Example
Command :ADV:TIM:TRIG:MODE 0

Query :ADV:TIM:TRIG:MODE?

7.14 ADVance:TIMing:TRIGger:VSTArt <NRf>

Description Sets the starting voltage threshold for the timing measurement trigger.

Syntax **Command** :ADVance:TIMing:TRIGger:VSTArt **<NRf>**

Query :ADVance:TIMing:TRIGger:VSTArt?

Parameters <**NRf**> := { Numeric starting voltage threshold in Volts. }

Example **Command** :ADV:TIM:TRIG:VSTA 1
Query :ADV:TIM:TRIG:VSTA?

7.15 ADVance:TIMing:TRIGger:VEND <NRf>

Description Sets the ending (termination) voltage threshold for the timing measurement trigger.

Syntax **Command** :ADVance:TIMing:TRIGger:VEND **<NRf>**

Query :ADVance:TIMing:TRIGger:VEND?

Parameters <**NRf**> := { Numeric ending voltage threshold in Volts. }

Example **Command** :ADV:TIM:TRIG:VEND 2
Query :ADV:TIM:TRIG:VEND?

7.16 ADVance:TIMing:ENDVoltage <NRf>

Description Sets the termination voltage specifically for the HOLDUP trigger mode.

Syntax **Command** :ADVance:TIMing:ENDVoltage **<NRf>**

Query :ADVance:TIMing:ENDVoltage?

Parameters <**NRf**> := { Numeric hold mode termination voltage in Volts. }

Example **Command** :ADV:TIM:ENDV 2
Query :ADV:TIM:ENDV?

7.17 ADVance:TIMing:TOUT <NRf>

Description Sets a timeout duration for the timing test.

Syntax **Command** :ADVance:TIMing:TOUT **<NRf>**

Query :ADVance:TIMing:TOUT?

Parameters <**NRf**> := { Numeric timeout duration in seconds. }

Example **Command** :ADV:TIM:TOUT 1
Query :ADV:TIM:TOUT?

7.18 ADVance:TIMing:RISE <NRf>

Description Sets the rising current slope used in timing test mode (if applicable).

Syntax **Command** :ADVance:TIMing:RISE **<NRf>**

Query :ADVance:TIMing:RISE?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example **Command** :ADV:TIM:RISE 1
Query :ADV:TIM:RISE?

7.19 ADVance:TIMing:FALL <NRf>

Description Sets the falling current slope used in timing test mode (if applicable).

Syntax **Command** :ADVance:TIMing:FALL **<NRf>**

Query :ADVance:TIMing:FALL?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example **Command** :ADV:TIM:FALL 1
Query :ADV:TIM:FALL?

7.20 ADVance:TIMing:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during Timing Test mode.

Syntax **Command** :ADVance:TIMing:VOLTage:RANGe **<CRD>** **<NR1>**

Query :ADVance:TIMing:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the Timing Test mode voltage range. }

Example **Command** :ADV:TIM:VOLT:RANG 1
Query :ADV:TIM:VOLT:RANG?

OCP (Over Current Protection Test) Settings

Commands for configuring the Over Current Protection (OCP) test mode.

7.21 ADVance:OCP:ISTArt <NRf>

Description Sets the starting current level for the OCP test ramp.

Syntax
Command :ADVance:OCP:ISTArt **<NRf>**
Query :ADVance:OCP:ISTArt?

Parameters <**NRf**> := { Numeric starting current value in Amperes. }

Example
Command :ADV:OCP:ISTA 1
Query :ADV:OCP:ISTA?

7.22 ADVance:OCP:IEND <NRf>

Description Sets the ending (termination) current level for the OCP test ramp.

Syntax
Command :ADVance:OCP:IEND **<NRf>**
Query :ADVance:OCP:IEND?

Parameters <**NRf**> := { Numeric ending current value in Amperes. }

Example
Command :ADV:OCP:IEND 2
Query :ADV:OCP:IEND?

7.23 ADVance:OCP:STEP <NRf>

Description Sets the number of steps in the OCP test ramp.

Syntax
Command :ADVance:OCP:STEP **<NRf>**
Query :ADVance:OCP:STEP?

Parameters <**NRf**> := { Number of steps (integer). }

Example
Command :ADV:OCP:STEP 100
Query :ADV:OCP:STEP?

7.24 ADVance:OCP:DWELI <NRf>

Description Sets the dwell time (duration spent at each current step) during the OCP test.

Syntax
Command :ADVance:OCP:DWELI <NRf>
Query :ADVance:OCP:DWELI?

Parameters <NRf> := { Numeric dwell time per step in seconds. }

Example
Command :ADV:OCP:DWEL 1
Query :ADV:OCP:DWEL?

7.25 ADVance:OCP:SPECification:H <NRf>

Description Sets the upper specification limit for the OCP test result (Pass/Fail determination).

Syntax
Command :ADVance:OCP:SPECification:H <NRf>
Query :ADVance:OCP:SPECification:H?

Parameters <NRf> := { Numeric upper current limit specification in Amperes. }

Example
Command :ADV:OCP:SPEC:H 2
Query :ADV:OCP:SPEC:H?

7.26 ADVance:OCP:SPECification:L <NRf>

Description Sets the lower specification limit for the OCP test result (Pass/Fail determination).

Syntax
Command :ADVance:OCP:SPECification:L <NRf>
Query :ADVance:OCP:SPECification:L?

Parameters <NRf> := { Numeric lower current limit specification in Amperes. }

Example
Command :ADV:OCP:SPEC:L 1
Query :ADV:OCP:SPEC:L?

7.27 ADVance:OCP:TRIGger:VOLTage <NRf>

Description Sets the voltage threshold that triggers the OCP test to start or evaluate.

Syntax
Command :ADVance:OCP:TRIGger:VOLTage <NRf>

Query :ADVance:OCP:TRIGger:VOLTage?

Parameters <NRf> := { Numeric trigger voltage threshold in Volts. }

Example **Command** :ADV:OCP:TRIG:VOLT 1
Query :ADV:OCP:TRIG:VOLT?

7.28 ADVance:OCP:LATCh <CRD> <NR1>

Description Sets whether the load latches off (locks) when the OCP condition is detected.

Syntax **Command** :ADVance:OCP:LATCh <CRD> <NR1>

Query :ADVance:OCP:LATCh?

Parameters <NR1> := { **OFF** | **0** | **ON** | **1**. Sets the OCP latch state. }

Example **Command** :ADV:OCP:LATC 1
Query :ADV:OCP:LATC?

7.29 ADVance:OCP:RESult?

Description Returns the result of the last executed OCP test (e.g., trip current value, Pass/Fail status).

Syntax **Command**

Query :ADVance:OCP:RESult?

Parameters None.

Example **Command**
Query :ADV:OCP:RES?

7.30 ADVance:OCP:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during OCP Test mode.

Syntax **Command** :ADVance:OCP:VOLTage:RANGe <CRD> <NR1>

Query :ADVance:OCP:VOLTage:RANGe?

Parameters <NR1> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the OCP Test mode voltage range. }

Example **Command** :ADV:OCP:VOLT:RANG 1
Query :ADV:OCP:VOLT:RANG?

OVP (Over Voltage Protection Test) Settings

Commands for configuring the Over Voltage Protection (OVP) test mode.

7.31 ADVance:OVP:VOLTage <NRf>

Description Sets the trigger voltage threshold for the OVP test.

Syntax

Command	:ADVance:OVP:VOLTage **<NRf>**
Query	:ADVance:OVP:VOLTage?

Parameters <**NRf**> := { Numeric OVP trigger voltage in Volts. }

Example

Command	:ADV:OVP:VOLT 1
Query	:ADV:OVP:VOLT?

7.32 ADVance:OVP:RESult?

Description Returns the result of the last executed OVP test (e.g., trip voltage value).

Syntax

Command	
Query	:ADVance:OVP:RESult?

Parameters None.

Example

Command	
Query	:ADV:OVP:RES?

OPP (Over Power Protection Test) Settings

Commands for configuring the Over Power Protection (OPP) test mode.

7.33 ADVance:OPP:PSTArt <NRf>

Description Sets the starting power level for the OPP test ramp.

Syntax
Command :ADVance:OPP:PSTArt **<NRf>**
Query :ADVance:OPP:PSTArt?

Parameters <**NRf**> := { Numeric starting power value in Watts. }

Example
Command :ADV:OPP:PSTA 1
Query :ADV:OPP:PSTA?

7.34 ADVance:OPP:PEND <NRf>

Description Sets the ending (termination) power level for the OPP test ramp.

Syntax
Command :ADVance:OPP:PEND **<NRf>**
Query :ADVance:OPP:PEND?

Parameters <**NRf**> := { Numeric ending power value in Watts. }

Example
Command :ADV:OPP:PEND 2
Query :ADV:OPP:PEND?

7.35 ADVance:OPP:STEP <NRf>

Description Sets the number of steps in the OPP test ramp.

Syntax
Command :ADVance:OPP:STEP **<NRf>**
Query :ADVance:OPP:STEP?

Parameters <**NRf**> := { Number of steps (integer). }

Example
Command :ADV:OPP:STEP 100
Query :ADV:OPP:STEP?

7.36 ADVance:OPP:DWELl <NRf>

Description Sets the dwell time (duration spent at each power step) during the OPP test.

Syntax
Command :ADVance:OPP:DWELl <NRf>
Query :ADVance:OPP:DWELl?

Parameters <NRf> := { Numeric dwell time per step in seconds. }

Example
Command :ADV:OPP:DWEL 1
Query :ADV:OPP:DWEL?

7.37 ADVance:OPP:SPECification:H <NRf>

Description Sets the upper specification limit for the OPP test result (Pass/Fail determination).

Syntax
Command :ADVance:OPP:SPECification:H <NRf>
Query :ADVance:OPP:SPECification:H?

Parameters <NRf> := { Numeric upper power limit specification in Watts. }

Example
Command :ADV:OPP:SPEC:H 2
Query :ADV:OPP:SPEC:H?

7.38 ADVance:OPP:SPECification:L <NRf>

Description Sets the lower specification limit for the OPP test result (Pass/Fail determination).

Syntax
Command :ADVance:OPP:SPECification:L <NRf>
Query :ADVance:OPP:SPECification:L?

Parameters <NRf> := { Numeric lower power limit specification in Watts. }

Example
Command :ADV:OPP:SPEC:L 1
Query :ADV:OPP:SPEC:L?

7.39 ADVance:OPP:TRIGger:VOLTage <NRf>

Description Sets the voltage threshold that triggers the OPP test to start or evaluate.

Syntax
Command :ADVance:OPP:TRIGger:VOLTage <NRf>

Query :ADVance:OPP:TRIGger:VOLTage?

Parameters <NRf> := { Numeric trigger voltage threshold in Volts. }

Example **Command** :ADV:OPP:TRIG:VOLT 1
Query :ADV:OPP:TRIG:VOLT?

7.40 ADVance:OPP:LATCh <CRD> <NR1>

Description Sets whether the load latches off (locks) when the OPP condition is detected.

Syntax **Command** :ADVance:OPP:LATCh <CRD> <NR1>

Query :ADVance:OPP:LATCh?

Parameters <NR1> := { **OFF** | **0** | **ON** | **1**. Sets the OPP latch state. }

Example **Command** :ADV:OPP:LATC 1
Query :ADV:OPP:LATC?

7.41 ADVance:OPP:RESult?

Description Returns the result of the last executed OPP test (e.g., trip power value, Pass/Fail status).

Syntax **Command**

Query :ADVance:OPP:RESult?

Parameters None.

Example **Command**
Query :ADV:OPP:RES?

7.42 ADVance:OPP:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during OPP Test mode.

Syntax **Command** :ADVance:OPP:VOLTage:RANGe <CRD> <NR1>

Query :ADVance:OPP:VOLTage:RANGe?

Parameters <NR1> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the OPP Test mode voltage range. }

Example **Command** :ADV:OPP:VOLT:RANG 1
Query :ADV:OPP:VOLT:RANG?

SINE (Sine Wave Test) Settings

Commands for configuring the Sine Wave generation mode (SWDL/M/H).

7.43 ADVance:SINE:FREQuency <NRf>

Description Sets the frequency of the sine wave current modulation.

Syntax
Command :ADVance:SINE:FREQuency **<NRf>**
Query :ADVance:SINE:FREQuency?

Parameters <**NRf**> := { Numeric frequency value in Hertz. }

Example
Command :ADV:SINE:FREQ 1
Query :ADV:SINE:FREQ?

7.44 ADVance:SINE:IDC <NRf>

Description Sets the DC offset current level for the sine wave.

Syntax
Command :ADVance:SINE:IDC **<NRf>**
Query :ADVance:SINE:IDC?

Parameters <**NRf**> := { Numeric DC current value in Amperes. }

Example
Command :ADV:SINE:IDC 1
Query :ADV:SINE:IDC?

7.45 ADVance:SINE:IAC <NRf>

Description Sets the AC amplitude (peak) of the sine wave current modulation.

Syntax
Command :ADVance:SINE:IAC **<NRf>**
Query :ADVance:SINE:IAC?

Parameters <**NRf**> := { Numeric AC current amplitude (peak) in Amperes. }

Example
Command :ADV:SINE:IAC 2
Query :ADV:SINE:IAC?

7.46 ADVance:SINE:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during Sine Wave mode.

Syntax

Command :ADVance:SINE:VOLTage:RANGe **<CRD>** **<NR1>**

Query :ADVance:SINE:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the Sine Wave mode voltage range. }

Example

Command :ADV:SINE:VOLT:RANG 1

Query :ADV:SINE:VOLT:RANG?

LIST (List Test) Settings

Commands for configuring the List sequence mode (LISTL/M/H).

7.47 ADVance:LIST:REPeat <NRf>

Description Sets the number of times the entire list sequence should repeat. A value of 0 often implies continuous repetition.

Syntax
Command :ADVance:LIST:REPeat <NRf>
Query :ADVance:LIST:REPeat?

Parameters <NRf> := { Number of repetitions (e.g., 0 for continuous). }

Example
Command :ADV:LIST:REP 1
Query :ADV:LIST:REP?

7.48 ADVance:LIST:SEQuence:ALL <NRf>

Description Sets the total number of sequences (steps) defined in the list.

Syntax
Command :ADVance:LIST:SEQuence:ALL <NRf>
Query :ADVance:LIST:SEQuence:ALL?

Parameters <NRf> := { Total number of sequences (integer). }

Example
Command :ADV:LIST:SEQ:ALL 10
Query :ADV:LIST:SEQ:ALL?

7.49 ADVance:LIST:DATA {Arg}

Description Sets the parameters for a specific sequence number within the list.

Syntax
Command :ADVance:LIST:DATA {ArgSeqNo,ArgLevel,ArgDwell,ArgSlope}
Query :ADVance:LIST:DATA? {ArgSeqNo}

Parameters **Arg1:** Sequence number (<NRf> := { integer }). **Arg2:** Load setting value/level for this sequence (<NRf> := { unit depends on List mode, e.g., Amps }). **Arg3:** Duration/Dwell time for this sequence (<NRf> := { seconds }). **Arg4:** Slope for transitioning into this sequence (<NRf> := { e.g., A/us }).

Example **Command** :ADV:LIST:DATA 1,1,1,1
Query :ADV:LIST:DATA? 1

7.50 ADVance:LIST:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during List mode operation.

Syntax **Command** :ADVance:LIST:VOLTage:RANGe **<CRD> <NR1>**

Query :ADVance:LIST:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the List mode voltage range. }

Example **Command** :ADV:LIST:VOLT:RANG 1
Query :ADV:LIST:VOLT:RANG?

AUTO (Automatic Test) / Program (PROG) Settings

Commands for creating, selecting, and querying automated test programs composed of multiple sequences or steps. Note: These commands start with `:PROGram`, not `:ADVance`.

7.51 PROGram:NSELect <NRf>

Description Selects the program number to be executed or configured.

Syntax
Command :PROGram:NSELect **<NRf>**
Query :PROGram:NSELect?

Parameters <**NRf**> := { Program number (integer). }

Example
Command :PROG:NSEL 1
Query :PROG:NSEL?

7.52 PROGram:DATA Arguments

Description Sets the main parameters for a specified program number.

Syntax
Command :PROGram:DATA ArgProgNo,ArgType,ArgLink,ArgRepeat,ArgSeqCount
Query :PROGram:DATA? ArgProgNo

Parameters
Arg1: Program number (<**NRf**> := { integer }).
Arg2: Program type (<**NR1**> := { **0** | LIST, **1** | STEP }).
Arg3: Link knot - next program number to execute (<**NRf**> := { integer }).
Arg4: Number of repetitions for this program (<**NRf**> := { integer, 0 may mean infinite }).
Arg5: Total number of sequences/steps in this program (<**NRf**> := { integer }).

Example
Command :PROG:DATA 1,1,2,1,1
Query :PROG:DATA? 1

7.53 PROGram:DATA:LIST Arguments

Description Sets the detailed parameters for a specific sequence within a program defined as LIST type (`:PROG:DATA` Arg2=0).

Syntax

Command :PROGram:DATA:LIST ArgProgNo,ArgSeqNo,ArgTrig,...

Query :PROGram:DATA:LIST? ArgProgNo,ArgSeqNo

Parameters

Arg1: Program number (<**NRf**> := { integer }).
Arg2: Sequence number (<**NRf**> := { integer }).
Arg3: Trigger mode (<**NR1**> := { 0 | Skip, 1 | Auto, 2 | Manual, 3 | External }).
Arg4: Test mode (<**NR1**> := { 0 | CC, 1 | CR, 2 | CV, 4 | CP }).
Arg5: Range (<**NR1**> := { 0 | Low, 1 | Medium, 2 | High }).
Arg6: Duration (<**NRf**> := { seconds }).
Arg7: Pull-load value (<**NRf**> := { unit depends on Arg4 }).
Arg8: Upper voltage limit (<**NRf**> := { Volts }).
Arg9: Lower voltage limit (<**NRf**> := { Volts }).
Arg10: Upper current limit (<**NRf**> := { Amps }).
Arg11: Lower current limit (<**NRf**> := { Amps }).
Arg12: Upper power limit (<**NRf**> := { Watts }).
Arg13: Lower power limit (<**NRf**> := { Watts }).
Arg14: Delay time (<**NRf**> := { seconds }).
Arg15: Rising slope (<**NRf**> := { e.g., A/us }).
Arg16: Falling slope (<**NRf**> := { e.g., A/us }).

Example

Command :PROG:DATA:LIST 1,1,1,0,0,1,1,2,0,2,0,2,0,1,1,1
Query :PROG:DATA:LIST? 1,1

7.54 PROGram:DATA:STEP Arguments

Description Sets the detailed parameters for a program defined as STEP type (`:PROG:DATA` Arg2=1).

Syntax

Command :PROGram:DATA:STEP ArgProgNo,ArgTrig,ArgMode,...

Query :PROGram:DATA:STEP? ArgProgNo

Parameters

Arg1: Program number (<**NRf**> := { integer }).
Arg2: Trigger mode (<**NR1**> := { 0 | Skip, 1 | Auto, 2 | Manual, 3 | External }).
Arg3: Test mode (<**NR1**> := { 0 | CC, 1 | CR, 2 | CV, 4 | CP }).
Arg4: Range (<**NR1**> := { 0 | Low, 1 | Medium, 2 | High }).
Arg5: Duration (<**NRf**> := { seconds }).
Arg6: Starting pull-load value (<**NRf**> := { unit depends on Arg3 }).
Arg7: Termination pull-load value (<**NRf**> := { unit depends on Arg3 }).
Arg8: Upper voltage limit (<**NRf**> := { Volts }).
Arg9: Lower voltage limit (<**NRf**> := { Volts }).
Arg10: Upper current limit (<**NRf**> := { Amps }).
Arg11: Lower current limit (<**NRf**> := { Amps }).
Arg12: Upper power limit (<**NRf**> := { Watts }).
Arg13: Lower power limit (<**NRf**> := { Watts }).
Arg14: Delay time (<**NRf**> := { seconds }).
Arg15: Rising slope (<**NRf**> := { e.g., A/us }).
Arg16: Falling slope (<**NRf**> := { e.g., A/us }).

Example

Command :PROG:DATA:STEP 1,1,0,0,1,1,2,2,0,2,0,2,0,1,1,1
Query :PROG:DATA:STEP? 1

7.55 PROGram:SPECification:LIST? Arguments

Description Queries the test results (specifications met/failed) for a specific sequence within an executed LIST type program.

Syntax **Command**

Query :PROGram:SPECification:LIST? ArgProgNo,ArgSeqNo

Parameters **Arg1:** Program number (<**NRf**> := { integer }). **Arg2:** Sequence number (<**NRf**> := { integer }).

Example **Command**
Query :PROG:SPEC:LIST? 1,1

7.56 PROGram:SPECification:STEP? Arguments

Description Queries the test results (specifications met/failed) for an executed STEP type program.

Syntax **Command**

Query :PROGram:SPECification:STEP? ArgProgNo

Parameters **Arg1:** Program number (<**NRf**> := { integer }).

Example **Command**
Query :PROG:SPEC:STEP? 1

CHANnel Subsystem

This chapter describes commands for selecting and controlling instrument channels or modules.

8.1 CHANnel[:LOAD] <NR1>

Description Selects the target channel(s) for subsequent commands. Can select a specific channel number or all channels simultaneously. The [:LOAD] node is optional.

Syntax

Command CHANnel[:LOAD] **<NR1>**

Query CHANnel[:LOAD]?

Parameters <**NR1**> := { 1, 2 | **ALL**. Specifies the channel number (integer) or selects all channels. }

Example

Command :CHAN 1
Query :CHAN?

8.2 CHANnel:ACTive <CRD> <NR1>

Description Activates (turns ON) or deactivates (turns OFF) the currently selected channel/module load input.

Syntax

Command CHANnel:ACTive **<CRD>** **<NR1>**

Query CHANnel:ACTive?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the active state of the selected channel. }

Example

Command :CHAN:ACT 1
Query :CHAN:ACT?

8.3 CHANnel:ID?

Description Queries the currently selected channel/module for its identification information (e.g., model number, serial number, firmware version).

Syntax

Command

Query CHANnel:ID?

Parameters None.

Example

Command
Query :CHAN:ID?

CONFigure Subsystem

This chapter describes commands for configuring various instrument settings, including voltage thresholds, soft start, timers, protection features, parallel operation, DIO, and CAN interface settings.

9.1 CONFigure:VOLTage:LATCh <CRD> <NR1>

Description Enables or disables the Von latch feature. When enabled, the load remains on after the input voltage drops below Von, until it drops below Voff.

Syntax
Command :CONFigure:VOLTage:LATCh **<CRD>** **<NR1>**
Query :CONFigure:VOLTage:LATCh?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the Von latch state. }

Example
Command :CONF:VOLT:LATC 1
Query :CONF:VOLT:LATC?

9.2 CONFigure:VOLTage:ON <NRf>

Description Sets the start voltage (Von) threshold. The load turns on when the input voltage exceeds this level (if enabled).

Syntax
Command :CONFigure:VOLTage:ON **<NRf>**
Query :CONFigure:VOLTage:ON?

Parameters <**NRf**> := { Numeric start voltage (Von) threshold in Volts. }

Example
Command :CONF:VOLT:ON 0.2
Query :CONF:VOLT:ON?

9.3 CONFigure:VOLTage:OFF <NRf>

Description Sets the shutdown voltage (Voff) threshold. The load turns off when the input voltage drops below this level.

Syntax
Command :CONFigure:VOLTage:OFF **<NRf>**
Query :CONFigure:VOLTage:OFF?

Parameters <**NRf**> := { Numeric shutdown voltage (Voff) threshold in Volts. }

Example
Command :CONF:VOLT:OFF 0.2
Query :CONF:VOLT:OFF?

9.4 CONFigure:VOLTage:SENse <CRD> <NR1>

Description Enables or disables the remote voltage sense function.

Syntax
Command :CONFigure:VOLTage:SENse **<CRD>** **<NR1>**
Query :CONFigure:VOLTage:SENse?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the remote voltage sense state. }

Example
Command :CONF:VOLT:SEN 1
Query :CONF:VOLT:SEN?

9.5 CONFigure:SOFTstart <CRD> <NR1>

Description Enables or disables the soft start function, which ramps the load current gradually when turned on.

Syntax
Command :CONFigure:SOFTstart **<CRD>** **<NR1>**
Query :CONFigure:SOFTstart?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the soft start state. }

Example
Command :CONF:SOFT 1
Query :CONF:SOFT?

9.6 CONFigure:SOFTstart:VALue <NRf>

Description Sets the duration of the soft start ramp.

Syntax
Command :CONFigure:SOFTstart:VALue **<NRf>**
Query :CONFigure:SOFTstart:VALue?

Parameters <**NRf**> := { Numeric soft start duration in seconds. }

Example
Command :CONF:SOFT:VAL 0.001
Query :CONF:SOFT:VAL?

9.7 CONFigure:COUNttime <CRD> <NR1>

Description Enables or disables the positive timing function (elapsed time measurement).

Syntax
Command :CONFigure:COUNttime **<CRD>** **<NR1>**
Query :CONFigure:COUNttime?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the positive timing state. }

Example
Command :CONF:COUN 1
Query :CONF:COUN?

9.8 CONFigure:CUTOFFtime <CRD> <NR1>

Description Enables or disables the countdown cutoff timer. When enabled, the load turns off after the specified duration.

Syntax
Command :CONFigure:CUTOFFtime **<CRD>** **<NR1>**
Query :CONFigure:CUTOFFtime?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the countdown timer state. }

Example
Command :CONF:CUTOFF 1
Query :CONF:CUTOFF?

9.9 CONFigure:CUTOFFtime:VALue <NRf>

Description Sets the duration for the countdown cutoff timer.

Syntax
Command :CONFigure:CUTOFFtime:VALue **<NRf>**
Query :CONFigure:CUTOFFtime:VALue?

Parameters <**NRf**> := { Numeric countdown time duration in seconds. }

Example
Command :CONF:CUTOFF:VAL 2
Query :CONF:CUTOFF:VAL?

9.10 CONFigure:LVP <CRD> <NR1>

Description Enables or disables Low Voltage Protection (LVP).

Syntax **Command** :CONFigure:LVP **<CRD>** **<NR1>**

Query :CONFigure:LVP?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the LVP state. }

Example **Command** :CONF:LVP 1
Query :CONF:LVP?

9.11 CONFigure:ALLRun <CRD> <NR1>

Description Enables or disables the ALLRUN function, which likely synchronizes the load ON/OFF state across multiple parallel units.

Syntax **Command** :CONFigure:ALLRun **<CRD>** **<NR1>**

Query :CONFigure:ALLRun?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the ALLRUN function state. }

Example **Command** :CONF:ALLR 1
Query :CONF:ALLR?

9.12 CONFigure:EXTernal:WAVeform <CRD> <NR1>

Description Enables or disables the external analog waveform control function.

Syntax **Command** :CONFigure:EXTernal:WAVeform **<CRD>** **<NR1>**

Query :CONFigure:EXTernal:WAVeform?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the external waveform function state. }

Example **Command** :CONF:EXT:WAV 1
Query :CONF:EXT:WAV?

9.13 CONFigure:SOUNd <CRD> <NR1>

Description Enables or disables the audible key press sound (beeper).

Syntax
Command :CONFigure:SOUNd <CRD> <NR1>
Query :CONFigure:SOUNd?

Parameters <NR1> := { **OFF** | **0** | **ON** | **1**. Sets the key sound state. }

Example
Command :CONF:SOUN 1
Query :CONF:SOUN?

9.14 CONFigure:PARALLel:INITial <CRD> <NR1>

Description Sets the parallel online initialization state.

Syntax
Command :CONFigure:PARALLel:INITial <CRD> <NR1>
Query :CONFigure:PARALLel:INITial?

Parameters <NR1> := { **OFF** | **0** | **ON** | **1**. Sets the parallel initialization state. }

Example
Command :CONF:PARALL:INIT 1
Query :CONF:PARALL:INIT?

9.15 CONFigure:PARALLel:MODE <CRD> <NR1>

Description Sets the role of the instrument in a parallel configuration.

Syntax
Command :CONFigure:PARALLel:MODE <CRD> <NR1>
Query :CONFigure:PARALLel:MODE?

Parameters <NR1> := { **NONE** | **0** | **SLAVE** | **1** | **MASTER** | **2**. Sets the parallel operation mode. }

Example
Command :CONF:PARALL:MODE 1
Query :CONF:PARALL:MODE?

9.16 CONFigure:PARALLel:TYPE <CRD> <NR1>

Description Sets the type of parallel connection (e.g., how load is shared or copied).

Syntax

Command :CONFigure:PARALLel:TYPE <**CRD**> <**NR1**>

Query :CONFigure:PARALLel:TYPE?

Parameters <**NR1**> := { **POW**er | **0** | **_COPY** | **1**. Sets the parallel connection type. }

Example

Command :CONF:PARALL:TYPE 0

Query :CONF:PARALL:TYPE?

9.17 CONFigure:DIO:IN1 <NR1>

Description Configures the function assigned to the DIO IN1 digital input pin.

Syntax

Command :CONFigure:DIO:IN1 <**NR1**>

Query :CONFigure:DIO:IN1?

Parameters <**NR1**> := { **0** | NONE | **1**| EXTERNAL LOAD ON/OFF | **2**| REMOTE INHIBIT. Selects the function for DIO IN1. }

Example

Command :CONF:DIO:IN1 0

Query :CONF:DIO:IN1?

9.18 CONFigure:DIO:IN2 <NR1>

Description Configures the function assigned to the DIO IN2 digital input pin.

Syntax

Command :CONFigure:DIO:IN2 <**NR1**>

Query :CONFigure:DIO:IN2?

Parameters <**NR1**> := { **0** | NONE | **1**| OCP TEST PASS-H | **2**| REMOTE INHIBIT. Selects the function for DIO IN2. }

Example

Command :CONF:DIO:IN2 0

Query :CONF:DIO:IN2?

9.19 CONFigure:DIO:OUT1 <NR1>

Description Configures the function assigned to the DIO OUT1 digital output pin.

Syntax
Command :CONFigure:DIO:OUT1 <NR1>
Query :CONFigure:DIO:OUT1?

Parameters <NR1> := { **0** | NONE | **1**| EXT LOAD ON/OFF | **2**| OCP FAIL-L | **3**| TOTAL PASS-H | **4**| TOTAL FAIL-L | **5**| FAULT-H (OTP/OVP/OCP/OPP/REV) | **6**| BUS ACT-H | **7**| BUS ACT-L. Selects the function for DIO OUT1. }

Example
Command :CONF:DIO:OUT1 0
Query :CONF:DIO:OUT1?

9.20 CONFigure:DIO:OUT2 <NR1>

Description Configures the function assigned to the DIO OUT2 digital output pin.

Syntax
Command :CONFigure:DIO:OUT2 <NR1>
Query :CONFigure:DIO:OUT2?

Parameters <NR1> := { **0** | NONE | **1**| EXT LOAD ON/OFF | **2**| OCP FAIL-L | **3**| TOTAL PASS-H | **4**| TOTAL FAIL-L | **5**| FAULT-H (OTP/OVP/OCP/OPP/REV) | **6**| BUS ACT-H | **7**| BUS ACT-L. Selects the function for DIO OUT2. }

Example
Command :CONF:DIO:OUT2 0
Query :CONF:DIO:OUT2?

9.21 CONFigure:DIO:VOLTage <NR1>

Description Sets the output voltage level for the DIO digital output pins.

Syntax
Command :CONFigure:DIO:VOLTage <NR1>
Query :CONFigure:DIO:VOLTage?

Parameters <NR1> := { **0** | NONE | **1**| 1.8V | **2**| 3.3V | **3**| 5V. Selects the DIO output voltage level. }

Example
Command :CONF:DIO:VOLT 1
Query :CONF:DIO:VOLT?

9.22 CONFigure:CAN:ADDRess <NRf>

Description Sets the CAN bus address for the instrument.

Syntax
Command :CONFigure:CAN:ADDRess **<NRf>**
Query :CONFigure:CAN:ADDRess?

Parameters <**NRf**> := { Numeric CAN bus address (integer value). }

Example
Command :CONF:CAN:ADDR 1
Query :CONF:CAN:ADDR?

9.23 CONFigure:CAN:MODE <CRD> <NR1>

Description Sets the CAN bus operation mode (role) for the instrument frame.

Syntax
Command :CONFigure:CAN:MODE **<CRD>** **<NR1>**
Query :CONFigure:CAN:MODE?

Parameters <**NR1**> := { Sets the CAN bus operation mode (e.g., **0** | Standalone, **1**| Slave, **2**| Master). }

Example
Command CONF:CAN:MODE 1
Query :CONF:CAN:MODE?

9.24 CONFigure:CAN:STATe <CRD> <NR1>

Description Enables or disables the CAN bus interface.

Syntax
Command :CONFigure:CAN:STATe **<CRD>** **<NR1>**
Query :CONFigure:CAN:STATe?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the CAN interface state. }

Example
Command CONF:CAN:STAT 1
Query :CONF:CAN:STAT?

CURRent Subsystem

This chapter describes commands for controlling the instrument's Constant Current (CC) related operation modes, including static CC, dynamic CC, and frequency sweep CC modes.

STATic (General Mode CC) Settings

Commands for configuring the standard Constant Current (CC) mode.

10.1 CURRent:STATic:L1 <NRf>

Description Sets the static current level 1.

Syntax
Command CURRent:STATic:L1 **<NRf>**
Query CURRent:STATic:L1?

Parameters <**NRf**> := { Numeric current value in Amperes. }

Example
Command :CURR:STAT:L1 1
Query :CURR:STAT:L1?

10.2 CURRent:STATic:L2 <NRf>

Description Sets the static current level 2.

Syntax
Command CURRent:STATic:L2 **<NRf>**
Query CURRent:STATic:L2?

Parameters <**NRf**> := { Numeric current value in Amperes. }

Example
Command :CURR:STAT:L2 2
Query :CURR:STAT:L2?

10.3 CURRent:STATic:RISE <NRf>

Description Sets the rising current slope for CC mode.

Syntax
Command CURRent:STATic:RISE **<NRf>**
Query CURRent:STATic:RISE?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example
Command :CURR:STAT:RISE 1
Query :CURR:STAT:RISE?

10.4 CURRent:STATic:FALL <NRf>

Description Sets the falling current slope for CC mode.

Syntax

Command	CURRent:STATic:FALL **<NRf>**
Query	CURRent:STATic:FALL?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example

Command	:CURR:STAT:FALL 1
Query	:CURR:STAT:FALL?

10.5 CURRent:STATic:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during Static CC mode operation.

Syntax

Command	CURRent:STATic:VOLTage:RANGe **<CRD>** **<NR1>**
Query	CURRent:STATic:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the Static CC mode voltage range. }

Example

Command	:CURR:STAT:VOLT:RANG 1
Query	:CURR:STAT:VOLT:RANG?

DYNamic (Dynamic Pull-load Mode) Settings

Commands for configuring the Dynamic Constant Current (CCDL/M/H) mode, which toggles between two current levels.

10.6 CURRent:DYNamic:L1 <NRf>

Description Sets the dynamic current level 1.

Syntax
Command CURRent:DYNamic:L1 **<NRf>**
Query CURRent:DYNamic:L1?

Parameters <**NRf**> := { Numeric current value in Amperes. }

Example
Command :CURR:DYN:L1 1
Query :CURR:DYN:L1?

10.7 CURRent:DYNamic:L2 <NRf>

Description Sets the dynamic current level 2.

Syntax
Command CURRent:DYNamic:L2 **<NRf>**
Query CURRent:DYNamic:L2?

Parameters <**NRf**> := { Numeric current value in Amperes. }

Example
Command :CURR:DYN:L2 2
Query :CURR:DYN:L2?

10.8 CURRent:DYNamic:RISE <NRf>

Description Sets the rising current slope for dynamic CC mode transitions.

Syntax
Command CURRent:DYNamic:RISE **<NRf>**
Query CURRent:DYNamic:RISE?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example
Command :CURR:DYN:RISE 1
Query :CURR:DYN:RISE?

10.9 CURRent:DYNamic:FALL <NRf>

Description Sets the falling current slope for dynamic CC mode transitions.

Syntax
Command CURRent:DYNamic:FALL <NRf>
Query CURRent:DYNamic:FALL?

Parameters <NRf> := { Numeric slope value in Amperes per microsecond (A/us). }

Example
Command :CURR:DYN:FALL 1
Query :CURR:DYN:FALL?

10.10 CURRent:DYNamic:T1 <NRf>

Description Sets the time duration for dynamic current level 1.

Syntax
Command CURRent:DYNamic:T1 <NRf>
Query CURRent:DYNamic:T1?

Parameters <NRf> := { Numeric time duration value in seconds. }

Example
Command :CURR:DYN:T1 1
Query :CURR:DYN:T1?

10.11 CURRent:DYNamic:T2 <NRf>

Description Sets the time duration for dynamic current level 2.

Syntax
Command CURRent:DYNamic:T2 <NRf>
Query CURRent:DYNamic:T2?

Parameters <NRf> := { Numeric time duration value in seconds. }

Example
Command :CURR:DYN:T2 1
Query :CURR:DYN:T2?

10.12 CURRent:DYNamic:REPeat <NRf>

Description Sets the number of times the dynamic sequence (L1/T1 to L2/T2) should repeat. A value of 0 often implies continuous repetition.

Syntax **Command** CURRent:DYNamic:REPeat **<NRf>**

Query CURRent:DYNamic:REPeat?

Parameters <**NRf**> := { Number of repetitions (e.g., 0 for continuous). }

Example **Command** :CURR:DYN:REP 1
Query :CURR:DYN:REP?

10.13 CURRent:DYNamic:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during Dynamic CC mode operation.

Syntax **Command** CURRent:DYNamic:VOLTage:RANGe **<CRD>** **<NR1>**

Query CURRent:DYNamic:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the Dynamic CC mode voltage range. }

Example **Command** :CURR:DYN:VOLT:RANG 1
Query :CURR:DYN:VOLT:RANG?

SWEep (Dynamic Frequency Sweep Mode) Settings

Commands for configuring the Dynamic Frequency Sweep Constant Current (CCFSL/M/H) mode.

10.14 CURRent:SWEep:L1 <NRf>

Description Sets the sweep current level 1.

Syntax
Command CURRent:SWEep:L1 **<NRf>**
Query CURRent:SWEep:L1?

Parameters <**NRf**> := { Numeric current value in Amperes. }

Example
Command :CURR:SWE:L1 1
Query :CURR:SWE:L1?

10.15 CURRent:SWEep:L2 <NRf>

Description Sets the sweep current level 2.

Syntax
Command CURRent:SWEep:L2 **<NRf>**
Query CURRent:SWEep:L2?

Parameters <**NRf**> := { Numeric current value in Amperes. }

Example
Command :CURR:SWE:L2 2
Query :CURR:SWE:L2?

10.16 CURRent:SWEep:RISE <NRf>

Description Sets the rising current slope for frequency sweep mode.

Syntax
Command CURRent:SWEep:RISE **<NRf>**
Query CURRent:SWEep:RISE?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example
Command :CURR:SWE:RISE 1
Query :CURR:SWE:RISE?

10.17 CURRent:SWEep:FALL <NRf>

Description Sets the falling current slope for frequency sweep mode.

Syntax
Command CURRent:SWEep:FALL <NRf>
Query CURRent:SWEep:FALL?

Parameters <NRf> := { Numeric slope value in Amperes per microsecond (A/us). }

Example
Command :CURR:SWE:FALL 1
Query :CURR:SWE:FALL?

10.18 CURRent:SWEep:FSTArt <NRf>

Description Sets the starting frequency for the sweep.

Syntax
Command CURRent:SWEep:FSTArt <NRf>
Query CURRent:SWEep:FSTArt?

Parameters <NRf> := { Numeric starting frequency value in Hertz. }

Example
Command :CURR:SWE:FSTA 100
Query :CURR:SWE:FSTA?

10.19 CURRent:SWEep:FEND <NRf>

Description Sets the ending (termination) frequency for the sweep.

Syntax
Command CURRent:SWEep:FEND <NRf>
Query CURRent:SWEep:FEND?

Parameters <NRf> := { Numeric ending frequency value in Hertz. }

Example
Command :CURR:SWE:FEND 1000
Query :CURR:SWE:FEND?

10.20 CURRent:SWEep:FSTEp <NRf>

Description Sets the frequency step size for the sweep.

Syntax
Command CURRent:SWEep:FSTEp <NRf>

Query CURRent:SWEep:FSTEp?

Parameters <**NRf**> := { Numeric frequency step value in Hertz. }

Example **Command** :CURR:SWE:FSTE 100
Query :CURR:SWE:FSTE?

10.21 CURRent:SWEep:DWELI <NRf>

Description Sets the dwell time (duration spent at each frequency step) during the sweep.

Syntax **Command** CURRent:SWEep:DWELI <**NRf**>

Query CURRent:SWEep:DWELI?

Parameters <**NRf**> := { Numeric dwell time value in seconds. }

Example **Command** :CURR:SWE:DWEL 1
Query :CURR:SWE:DWEL?

10.22 CURRent:SWEep:DUTY <NRf>

Description Sets the duty cycle for the waveform at each frequency step.

Syntax **Command** CURRent:SWEep:DUTY <**NRf**>

Query CURRent:SWEep:DUTY?

Parameters <**NRf**> := { Numeric duty cycle value (e.g., 0.0 to 1.0 for 0% to 100%). }

Example **Command** :CURR:SWE:DUTY 0.5
Query :CURR:SWE:DUTY?

10.23 CURRent:SWEep:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage measurement range to be used during CC Frequency Sweep mode operation.

Syntax **Command** CURRent:SWEep:VOLTage:RANGe <**CRD**> <**NR1**>

Query CURRent:SWEep:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the CC Frequency Sweep mode voltage range. }

Example **Command** :CURR:SWE:VOLT:RANG 1
Query :CURR:SWE:VOLT:RANG?

DIGitizing Subsystem

This section describes commands for configuring and controlling the waveform digitization function.

11.1 DIGitizing:ABORt

Description Disables the digitizing function and stops any acquisition in progress.

Syntax **Command** :DIGitizing:ABORt

Parameters None.

Example **Command** :DIG:ABOR

11.2 DIGitizing:INITiate

Description Initializes the digitizing function, arming it to wait for a trigger according to the configured settings. This typically starts the acquisition process.

Syntax **Command** :DIGitizing:INITiate

Parameters None.

Example **Command** :DIG:INIT

11.3 DIGitizing:STATe <CRD> <NR1>

Description Enables or disables the overall digitizing function.

Syntax **Command** :DIGitizing:STATe **<CRD> <NR1>**

Query :DIGitizing:STATe?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the digitizing state. }

Example **Command** :DIG:STAT 1
Query :DIG:STAT?

11.4 DIGitizing:SAMPling:POINt <NRf>

Description Sets the total number of data points to be sampled in one digitization cycle.

Syntax

Command	:DIGitizing:SAMPling:POINt **<NRf>**
Query	:DIGitizing:SAMPling:POINt?

Parameters <**NRf**> := { Number of sampling points. }

Example

Command	:DIG:SAMP:POIN 100
Query	:DIG:SAMP:POIN?

11.5 DIGitizing:SAMPling:TIME <NRf>

Description Sets the time interval between consecutive sampling points.

Syntax

Command	:DIGitizing:SAMPling:TIME **<NRf>**
Query	:DIGitizing:SAMPling:TIME?

Parameters <**NRf**> := { Sampling time interval in seconds. }

Example

Command	:DIG:SAMP:TIME 0.02
Query	:DIG:SAMP:TIME?

11.6 DIGitizing:TRIGger:POINt <NRf>

Description Sets the position of the trigger event within the acquired waveform data record. This often determines the number of pre-trigger or post-trigger samples.

Syntax

Command :DIGitizing:TRIGger:POINt **<NRf>**

Query :DIGitizing:TRIGger:POINt?

Parameters <**NRf**> := { Trigger point position (sample number). }

Example

Command :DIG:TRIG:POIN 100

Query :DIG:TRIG:POIN?

11.7 DIGitizing:TRIGger:SOURce <CRD> <NR1>

Description Sets the source event that triggers the start of waveform acquisition.

Syntax

Command :DIGitizing:TRIGger:SOURce **<CRD>** **<NR1>**

Query :DIGitizing:TRIGger:SOURce?

Parameters <**NR1**> := { **LOADON** | **0** | **LOADOFF** | **1** | **TTL** | **2** | **BUS** | **3** | **MANUAL** | **4**. Sets the trigger source. }

Example

Command :DIG:TRIG:SOUR 1

Query :DIG:TRIG:SOUR?

11.8 DIGitizing:WAVeform:CAPture?

Description Initiates the transfer of the captured waveform data from the instrument module's internal memory to the main controller or interface buffer, preparing it for retrieval via `:DATA?` queries.

Syntax **Query** DIGitizing:WAVeform:CAPture?

Parameters None.

Example **Query** :DIG:WAV:CAP?

11.9 DIGitizing:WAVeform:DATA:V?

Description Retrieves the captured voltage waveform data points after a `:CAPture?` command. Data is typically returned in a binary block format.

Syntax **Query** DIGitizing:WAVeform:DATA:V?

Parameters None.

Example **Query** :DIG:WAV:DATA:V?

11.10 DIGitizing:WAVeform:DATA:I?

Description Retrieves the captured current waveform data points after a `:CAPture?` command. Data is typically returned in a binary block format.

Syntax **Query** DIGitizing:WAVeform:DATA:I?

Parameters None.

Example **Query** :DIG:WAV:DATA:I?

FETCh Subsystem

This section describes commands for retrieving previously acquired measurement data without initiating a new measurement cycle. This is typically faster than using the `MEASure?` commands.

12.1 FETCh:ALLCurrent?

Description Returns the last acquired current measurement reading from all connected modules.

Syntax **Query** FETCh:ALLCurrent?

Parameters None.

Example **Query** :FETC:ALLC?

12.2 FETCh:ALLPower?

Description Returns the last acquired power measurement reading from all connected modules.

Syntax **Query** FETCh:ALLPower?

Parameters None.

Example **Query** :FETC:ALLP?

12.3 FETCh:ALLVoltage?

Description Returns the last acquired voltage measurement reading from all connected modules.

Syntax **Query** FETCh:ALLVoltage?

Parameters None.

Example **Query** :FETC:ALLV?

12.4 FETCh:ALLVoltage:MAX?

Description Returns the maximum voltage measurement recorded across all connected modules since the last statistics reset.

Syntax **Query** FETCh:ALLVoltage:MAX?

Parameters None.

Example **Query** :FETC:ALLV:MAX?

12.5 FETCh:ALLVoltage:MIN?

Description Returns the minimum voltage measurement recorded across all connected modules since the last statistics reset.

Syntax **Query** FETCh:ALLVoltage:MIN?

Parameters None.

Example **Query** :FETC:ALLV:MIN?

12.6 FETCh:CURRent?

Description Returns the last acquired current measurement reading from the currently addressed module.

Syntax **Query** FETCh:CURRent?

Parameters None.

Example **Query** :FETC:CURR?

12.7 FETCh:POWer?

Description Returns the last acquired power measurement reading from the currently addressed module.

Syntax **Query** FETCh:POWer?

Parameters None.

Example **Query** :FETC:POW?

12.8 FETCh:VOLTage?

Description Returns the last acquired voltage measurement reading from the currently addressed module.

Syntax **Query** FETCh:VOLTage?

Parameters None.

Example **Query** :FETC:VOLT?

12.9 FETCh:VOLTage:PEAK+?

Description Returns the peak positive voltage (+) recorded on the currently addressed module since the last statistics reset.

Syntax **Query** FETCh:VOLTage:PEAK+?

Parameters None.

Example **Query** :FETC:VOLT:PEAK+?

12.10 FETCh:VOLTage:PEAK-?

Description Returns the peak negative (valley) voltage (-) recorded on the currently addressed module since the last statistics reset.

Syntax **Query** FETCh:VOLTage:PEAK-?

Parameters None.

Example **Query** :FETC:VOLT:PEAK-?

12.11 FETCh:AH?

Description Returns the accumulated Ampere-hour (AH) measurement for the currently addressed module (e.g., used in Battery or Timing modes).

Syntax **Query** FETCh:AH?

Parameters None.

Example **Query** :FETC:AH?

12.12 FETCh:WH?

Description Returns the accumulated Watt-hour (WH) measurement for the currently addressed module (e.g., used in Battery or Timing modes).

Syntax **Query** FETCh:WH?

Parameters None.

Example **Query** :FETC:WH?

12.13 FETCh:TIME?

Description Returns the elapsed time measurement for the currently addressed module (e.g., used in Timing mode).

Syntax **Query** FETCh:TIME?

Parameters None.

Example **Query** :FETC:TIME?

12.14 FETCh:FREQuency?

Description Returns the frequency measurement for the currently addressed module (e.g., used in Frequency Sweep or Sine Wave modes).

Syntax **Query** FETCh:FREQuency?

Parameters None.

Example **Query** :FETC:FREQ?

LOAD Subsystem

This section describes commands for controlling the load state, short circuit simulation, and protection features.

13.1 LOAD[:STATe] <CRD> <NR1>

Description Turns the load input ON (pulling current) or OFF (unloading current). The [:STATe] node is optional.

Syntax

Command LOAD[:STATe] **<CRD>** **<NR1>**

Query LOAD[:STATe]?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the load state. }

Example

Command :LOAD ON

Query :LOAD?

13.2 LOAD:PROTection?

Description Queries the protection status of the load (e.g., indicating if OVP, OCP, OPP, OTP has tripped).

Syntax

Command

Query LOAD:PROTection?

Parameters None.

Example

Command

Query :LOAD:PROT?

13.3 LOAD:PROTection:CLEAr

Description Clears any active (latched) protection state on the load.

Syntax

Command LOAD:PROTection:CLEAr

Parameters None.

Example

Command :LOAD:PROT:CLEA

13.4 LOAD:SHORt[:STATe] <CRD> <NR1>

Description Enables or disables the short circuit simulation feature. The [:STATe] node is optional.

Syntax

Command LOAD:SHORt[:STATe] **<CRD>** **<NR1>**

Query LOAD:SHORt[:STATe]?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Sets the short circuit simulation state. }

Example

Command :LOAD:SHOR ON

Query :LOAD:SHOR?

MEASure Subsystem

This section describes commands for retrieving measurement data from the instrument.

14.1 MEASure:ALLCurrent?

Description Returns the current measurement reading from all connected modules.

Syntax **Query** MEASure:ALLCurrent?

Parameters None.

Example **Query** :MEAS:ALLC?

14.2 MEASure:ALLPower?

Description Returns the power measurement reading from all connected modules.

Syntax **Query** MEASure:ALLPower?

Parameters None.

Example **Query** :MEAS:ALLP?

14.3 MEASure:ALLVoltage?

Description Returns the voltage measurement reading from all connected modules.

Syntax **Query** MEASure:ALLVoltage?

Parameters None.

Example **Query** :MEAS:ALLV?

14.4 MEASure:CURRent?

Description Returns the current measurement reading from the currently addressed module.

Syntax **Query** MEASure:CURRent?

Parameters None.

Example **Query** :MEAS:CURR?

14.5 MEASure:POWer?

Description Returns the power measurement reading from the currently addressed module.

Syntax **Query** MEASure:POWer?

Parameters None.

Example **Query** :MEAS:POW?

14.6 MEASure:VOLTage?

Description Returns the voltage measurement reading from the currently addressed module.

Syntax **Query** MEASure:VOLTage?

Parameters None.

Example **Query** :MEAS:VOLT?

MODE Subsystem

This section describes commands for setting the primary operation mode of the instrument.

15.1 MODE <CRD>

Description Sets the primary operation mode of the electronic load. See the parameter list below for all available modes and their corresponding range settings (Low/Medium/High where applicable).

Syntax

Command :MODE <CRD>

Query :MODE?

Parameters <CRD> := { Sets the operation mode. Select one from the following groups:
CC Modes: CCL | CCM | CCH;
CR Modes: CRL | CRM | CRH;
CV Modes: CVL | CVM | CVH;
CP Modes: CPL | CPM | CPH;
Dynamic (CC) Modes: CCDL | CCDM | CCDH;
Freq Sweep (CC) Modes: CCFSL | CCFSM | CCFSH;
CR-LED Modes: LEDL | LEDM | LEDH;
Battery Modes: BATL | BATM | BATH;
Timing Modes: TIML | TIMM | TIMH;
MPPT Modes: MPPTL | MPPTM | MPPTH;
OCP Test Modes: OCPL | OCPM | OCPH;
OVP Test Modes: OVPL | OVPM | OVPH;
OPP Test Modes: OPPL | OPPM | OPPH;
Sine Wave Modes: SWDL | SWDM | SWDH
List Modes: LISTL | LISTM | LISTH;
Program (Auto) Mode: PROG. }

Example

Command :MODE CCH
Query :MODE?

POWer Subsystem

This section describes commands specifically for configuring the instrument's behavior in Constant Power (CP) mode.

16.1 POWer:STATic:L1 <NRf>

Description Sets the static power level 1.

Syntax
Command POWer:STATic:L1 **<NRf>**
Query POWer:STATic:L1?

Parameters <**NRf**> := { Numeric power value in Watts. }

Example
Command :POW:STAT:L1 1
Query :POW:STAT:L1?

16.2 POWer:STATic:L2 <NRf>

Description Sets the static power level 2.

Syntax
Command POWer:STATic:L2 **<NRf>**
Query POWer:STATic:L2?

Parameters <**NRf**> := { Numeric power value in Watts. }

Example
Command :POW:STAT:L2 2
Query :POW:STAT:L2?

16.3 POWer:STATic:RISE <NRf>

Description Sets the rising slope (current slope) for Constant Power mode operation.

Syntax
Command POWer:STATic:RISE **<NRf>**
Query POWer:STATic:RISE?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example
Command :POW:STAT:RISE 1
Query :POW:STAT:RISE?

16.4 POWer:STATic:FALL <NRf>

Description Sets the falling slope (current slope) for Constant Power mode operation.

Syntax

Command POWer:STATic:FALL **<NRf>**

Query POWer:STATic:FALL?

Parameters <**NRf**> := { Numeric slope value in Amperes per microsecond (A/us). }

Example

Command :POW:STAT:FALL 1

Query :POW:STAT:FALL?

16.5 POWer:STATic:VOLTage:RANGe <CRD> <NR1>

Description Sets the voltage range for Constant Power mode operation.

Syntax

Command POWer:STATic:VOLTage:RANGe **<CRD>** **<NR1>**

Query POWer:STATic:VOLTage:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the CP mode voltage range. }

Example

Command :POW:STAT:VOLT:RANG 1

Query :POW:STAT:VOLT:RANG?

RESistance Subsystem

This section describes commands specifically for configuring the instrument's behavior in Constant Resistance (CR) mode.

17.1 RESistance:STATic:L1 <NRf>

Description Sets the static resistance level 1.

Syntax
Command RESistance:STATic:L1 **<NRf>**
Query RESistance:STATic:L1?

Parameters <**NRf**> := { Numeric resistance value in Ohms. }

Example
Command :RES:STAT:L1 1
Query :RES:STAT:L1?

17.2 RESistance:STATic:L2 <NRf>

Description Sets the static resistance level 2.

Syntax
Command RESistance:STATic:L2 **<NRf>**
Query RESistance:STATic:L2?

Parameters <**NRf**> := { Numeric resistance value in Ohms. }

Example
Command :RES:STAT:L2 2
Query :RES:STAT:L2?

17.3 RESistance:STATic:CURRent:RANGe <CRD> <NR1>

Description Sets the current range for Constant Resistance mode operation.

Syntax
Command RESistance:STATic:CURRent:RANGe **<CRD>** **<NR1>**
Query RESistance:STATic:CURRent:RANGe?

Parameters <**NR1**> := { **LOW** | **L** | **0** | **MIDDLE** | **M** | **1** | **HIGH** | **H** | **2**. Sets the CR mode current range. }

Example
Command :RES:STAT:CURR:RANG 1
Query :RES:STAT:CURR:RANG?

RUN Subsystem

This section describes commands for initiating run operations.

18.1 RUN

Description Initiates a synchronous start action (e.g., applying pull-load current) across all modules.

Syntax **Command** :RUN

Parameters None.

Example **Command** :RUN

SHOW Subsystem

This section describes commands related to display management.

19.1 SHOW[:DISPlay] <CRD>

Description Switches the channel display focus, for example between Left/Right channels on dual-channel modules or between A/B states on single-channel modules. The [:DISPlay] node is optional.

Syntax **Command** SHOW[:DISPlay] **<CRD>**

Parameters <**CRD**> := { **L** | **R** | **A** | **B**. Selects the display focus: Left/Right (L/R) for dual-channel modules, or A/B state for certain single-channel modules. }

Example **Command** :SHOW:DISP L

SPECification Subsystem

This section describes commands for configuring and querying limit checking specifications.

20.1 SPECification[:PASS]?

Description Returns the overall limit judgment result (Pass/Fail) of all modules. The optional [:PASS] node can often be omitted.

Syntax **Query** SPECification[:PASS]?

Parameters None.

Example **Query** SPEC?

20.2 SPECification:PASS:POWer?

Description Returns the power limit judgment result of all modules. The optional :PASS node can often be omitted.

Syntax **Query** SPECification[:PASS]:POWer?

Parameters None.

Example **Query** SPEC:POW?

20.3 SPECification:PASS:CURRent?

Description Returns the current limit judgment result of all modules. The optional :PASS node can often be omitted.

Syntax **Query** SPECification[:PASS]:CURRent?

Parameters None.

Example **Query** SPEC:CURR?

20.4 SPECification:PASS:VOLTage?

Description Returns the voltage limit judgment result of all modules. The optional :PASS node can often be omitted.

Syntax **Query** SPECification[:PASS]:VOLTage?

Parameters None.

Example **Query** SPEC:VOLT?

20.5 SPECification:TEST <CRD> <NR1>

Description Turns the limit judgment feature on or off.

Syntax

Command SPECification:TEST **<CRD>** **<NR1>**

Query SPECification:TEST?

Parameters <**NR1**> := { **OFF** | **0** | **ON** | **1**. Disables (0) or Enables (1) limit judgment. }

Example

Command SPEC:TEST 1

Query SPEC:TEST?

20.6 SPECification:UNIT <CRD> <NR1>

Description Sets the input mode for limit values (absolute VALUE or PERCENT).

Syntax

Command SPECification:UNIT **<CRD>** **<NR1>**

Query SPECification:UNIT?

Parameters <**NR1**> := { **VALUE** | **0** | **PERCENT** | **1**. Sets mode to absolute values (0) or percentage (1). }

Example

Command SPEC:UNIT 0

Query SPEC:UNIT?

20.7 SPECification:CURRent:C <NRf>

Description Sets the reference current for limit calculations (used when UNIT is PERCENT).

Syntax
Command SPECification:CURRent:C <NRf>
Query SPECification:CURRent:C?

Parameters <NRf> := { Numeric reference current value in Amperes. }

Example
Command SPEC:CURR:C 1
Query SPEC:CURR:C?

20.8 SPECification:CURRent:H <NRf>

Description Sets the upper current limit value.

Syntax
Command SPECification:CURRent:H <NRf>
Query SPECification:CURRent:H?

Parameters <NRf> := { Numeric upper current limit. Interpreted as Amperes if UNIT is VALUE, or percentage if UNIT is PERCENT. }

Example
Command SPEC:CURR:H 2
Query SPEC:CURR:H?

20.9 SPECification:CURRent:L <NRf>

Description Sets the lower current limit value.

Syntax
Command SPECification:CURRent:L <NRf>
Query SPECification:CURRent:L?

Parameters <NRf> := { Numeric lower current limit. Interpreted as Amperes if UNIT is VALUE, or percentage if UNIT is PERCENT. }

Example
Command SPEC:CURR:L 0
Query SPEC:CURR:L?

20.10 SPECification:VOLTage:C <NRf>

Description Sets the reference voltage for limit calculations (used when UNIT is PERCENT).

Syntax
Command SPECification:VOLTage:C <NRf>
Query SPECification:VOLTage:C?

Parameters <NRf> := { Numeric reference voltage value in Volts. }

Example
Command SPEC:VOLT:C 1
Query SPEC:VOLT:C?

20.11 SPECification:VOLTage:H <NRf>

Description Sets the upper voltage limit value.

Syntax
Command SPECification:VOLTage:H <NRf>
Query SPECification:VOLTage:H?

Parameters <NRf> := { Numeric upper voltage limit. Interpreted as Volts if UNIT is VALUE, or percentage if UNIT is PERCENT. }

Example
Command SPEC:VOLT:H 2
Query SPEC:VOLT:H?

20.12 SPECification:VOLTage:L <NRf>

Description Sets the lower voltage limit value.

Syntax
Command SPECification:VOLTage:L <NRf>
Query SPECification:VOLTage:L?

Parameters <NRf> := { Numeric lower voltage limit. Interpreted as Volts if UNIT is VALUE, or percentage if UNIT is PERCENT. }

Example
Command SPEC:VOLT:L 0
Query SPEC:VOLT:L?

20.13 SPECification:POWer:C <NRf>

Description Sets the reference power for limit calculations (used when UNIT is PERCENT).

Syntax
Command SPECification:POWer:C <NRf>
Query SPECification:POWer:C?

Parameters <NRf> := { Numeric reference power value in Watts. }

Example
Command SPEC:POW:C 1
Query SPEC:POW:C?

20.14 SPECification:POWer:H <NRf>

Description Sets the upper power limit value.

Syntax
Command SPECification:POWer:H <NRf>
Query SPECification:POWer:H?

Parameters <NRf> := { Numeric upper power limit. Interpreted as Watts if UNIT is VALUE, or percentage if UNIT is PERCENT. }

Example
Command SPEC:POW:H 2
Query SPEC:POW:H?

20.15 SPECification:POWer:L <NRf>

Description Sets the lower power limit value.

Syntax
Command SPECification:POWer:L <NRf>
Query SPECification:POWer:L?

Parameters <NRf> := { Numeric lower power limit. Interpreted as Watts if UNIT is VALUE, or percentage if UNIT is PERCENT. }

Example
Command SPEC:POW:L 0
Query SPEC:POW:L?

VOLTage Subsystem

This section describes commands specifically for configuring the instrument's behavior in Constant Voltage (CV) mode.

21.1 VOLTage:STATic:L1 <NRf>

Description Sets the static voltage level 1.

Syntax
Command VOLTage:STATic:L1 **<NRf>**
Query VOLTage:STATic:L1?

Parameters <**NRf**> := { Numeric voltage value. }

Example
Command VOLT:STAT:L1 1
Query VOLT:STAT:L1?

21.2 VOLTage:STATic:L2 <NRf>

Description Sets the static voltage level 2.

Syntax
Command VOLTage:STATic:L2 **<NRf>**
Query VOLTage:STATic:L2?

Parameters <**NRf**> := { Numeric voltage value. }

Example
Command VOLT:STAT:L2 2
Query VOLT:STAT:L2?

21.3 VOLTage:STATic:TYPE <CRD> | <NR1>

Description Sets the execution category (related to power supply type) in constant voltage mode.

Syntax
Command VOLTage:STATic:TYPE **<CRD>** | **<NR1>**
Query VOLTage:STATic:TYPE?

Parameters <**NR1**> := { **CURR**ent | **0** | **VOLT**age | **1**. Selects CURRent type PSU (0) or VOLTage type PSU (1). }

Example
Command VOLT:STAT:TYPE 0
Query VOLT:STAT:TYPE?

21.4 VOLTage:STATic:RESponse <CRD> | <NR1>

Description Sets the response speed in constant voltage mode.

Syntax

Command VOLTage:STATic:RESponse <CRD> | <NR1>

Query VOLTage:STATic:RESponse?

Parameters <NR1> := { **FAST** | **0** | **NORMAL** | **1** | **SLOW** | **2**. Sets the CV response speed. }

Example

Command VOLT:STAT:RES 0

Query VOLT:STAT:RES?

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