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Programming Manual

UDP4303S Programmable Linear DC Power Suppliers

REV 1.0

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1. SCPI

SCPI (Standard Commands for Programmable Instruments) is a standard command set based on the existing standards IEEE 488.1 and IEEE 488.2. And follow the IEEE754 standard floating-point arithmetic rules, ISO646 information exchange 7 bits code symbol (equivalent to ASCII programming) and other standard standardized instrument programming language.

This section describes the format, symbols, parameters, and abbreviation rules of the SCPI command.

Command Format

The SCPI command is a tree-like hierarchy consisting of multiple subsystems, each consisting of a root keyword and one or more hierarchical key words.

The command line usually begins with a colon ":"; Keywords are separated by the colon ":", followed by optional parameter settings. The command keyword is separated by spaces from the first parameter. The command string must end with a newline <NL> character. Add the question mark "?" after the command line. It is usually indicated that this feature is being queried.

Symbol Description

The following four symbols are not part of SCPI command, it cannot send with the command. It is usually used as supplementary description of command parameter.

- Braces { }
  The braces usually contain multiple optional parameters, it should select one parameter when send command.
  For example, :INSTrument[:SELEct] {CH1|CH2|CH3|SER|PAR}.

- Vertical bar |
  The vertical bar is used to separate multiple parameters; it should select one parameter when send command.
  For example, :INSTrument[:SELEct] {CH1|CH2|CH3|SER|PAR}.

- Square Brackets [ ]
  The contents in square brackets (command keywords) can be omissible. If the parameter is omitted, the instrument will set the parameter as the default value.
  For example, for the command :INSTrument[:SELEct]{CH1|CH2|CH3|SER|PAR}, [:SELEct] can be omitted.

- Triangular Brackets < >
  The parameter in the triangular brackets must be replaced with a valid value.
  For example, send the command ":LISTout:TEMPlet:POINTs <point>" in the format of ":LISTout:TEMPlet:POINTs 20."

Parameter Description

The parameters in this manual can be divided into five types: Boolean, Integer, Real, Discrete, and ASCII string.

- Boolean

  The parameter can set to "ON" (1) or "OFF" (0).

  For example, :LISTout[:STATe] {0|1|OFF|ON}

- Integer

  Unless otherwise specified, the parameter can take any valid integer value.

  Note: Do not set decimal as parameter; otherwise, errors may occur.

- Discrete

  Unless otherwise specified, the parameter can take any valid integer value.

- Discrete

  The parameter can only take specified numbers or characters.

  For example, the parameter in the command :SOURce:Mode {NORMal|SER|PAR} can only be NORMal, SER, or PARA.

- ASCII String

  A string parameter can contain any ASCII character. Strings must begin and end with paired quotation marks, which can be either single or double quotes. To include a quotation mark or delimiter within the string, type it twice without adding any other characters.

  For example, set IP: SYST:COMM:LAN:IPAD "192.168.1.10"

Abbrevation

All commands are case-sensitive. If a command is written in an abbreviated format, all capital letters in the command must be input completely.

Data Return

Data return is divided into single data and batch data. The single data return is the corresponding parameter type, in which the real return type is expressed in scientific notation. The part before e retains three figures behind the decimal point, and the e part retains three figures; the batch return must be obeying IEEE 488.2# string data format, '#'+ the length of character bits [fixed to one character] + ASCII valid value+ valid data+ end mark ['\n']

For example, #3123xxxxxxxxxxxxxxxxxxx\n represents 123 strings batch data return format, '3' presents "123" occupies three-character bits.

Note: If return data is invalid data, use * to represent it.

2. Communication

The instrument can communicate with the computer via USB, LAN, and RS232 interface. The end mark is "\n", that is hexadecimal system "0x0A".

USB Interface

The instrument is used as a USB-TMC device. The VISA programming resource descriptor is similar to:

"USB0::0x0483::0x5740::UDP51183557335E::INSTR"

LAN Interface

The instrument supports the programming mode of VXI and SOCKET. The port number of SOCKET mode is 5025. The VISA programming resource descriptor is similar to:

"TCPIP0::192.168.10.142::INSTR";

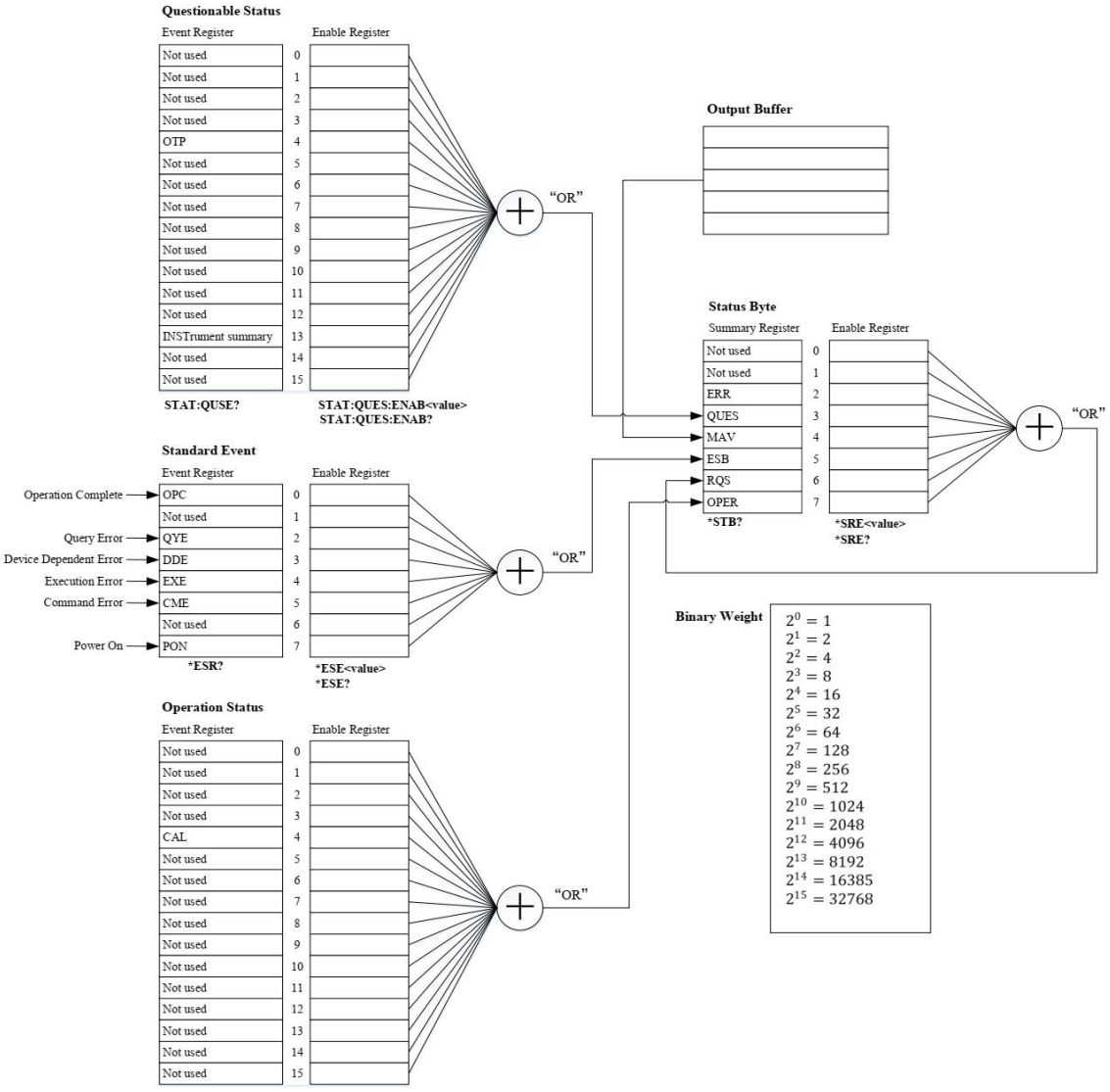
"TCPIP0::192.168.10.142::5025::SOCKET"。

RS232 Interface

Please use a crossover RS232 cable and select the baud rate based on the actual situation. The instrument supports 4800, 7200, 9600, 14400, 19200, 38400, 57600, 115200, and 128000 baud rates. The baud rate can be set in the instrument's system.

3. SCPI Status Register

Standard Register



Suspicious Status Register

The definition of the suspicious status register is shown in the following table.

Bit	Definition	Decimal	Meaning
4	OTP	16	Over temperature protection
13	INSTrument summary	8192	The summary of the channel's suspicious status register and the channel's SUMMARY register

Others	Not used	-	Not used, always be 0

When this register is queried using the command :STATus:QUEStionable:CONDition?, the OTP bit responds to the temperature status of the instrument. An OTP bit that is true indicates that the instrument is overheating, while an OTP bit that is false indicates that the instrument temperature is within the normal range.

Standard Event Register

The definition of the standard event register is shown in the following table.

Bit	Definition	Decimal	Meaning
0	OPC	1	The operation is completed. *OPC instruction is executed.
1	Not used	2	Not used, always be 0
2	QYE	4	Query error
3	DDE	8	Device error
4	EXE	16	Execution error
5	CME	32	Command error
6	Not used	64	Not used, always be 0
7	PON	128	Power-on inspection

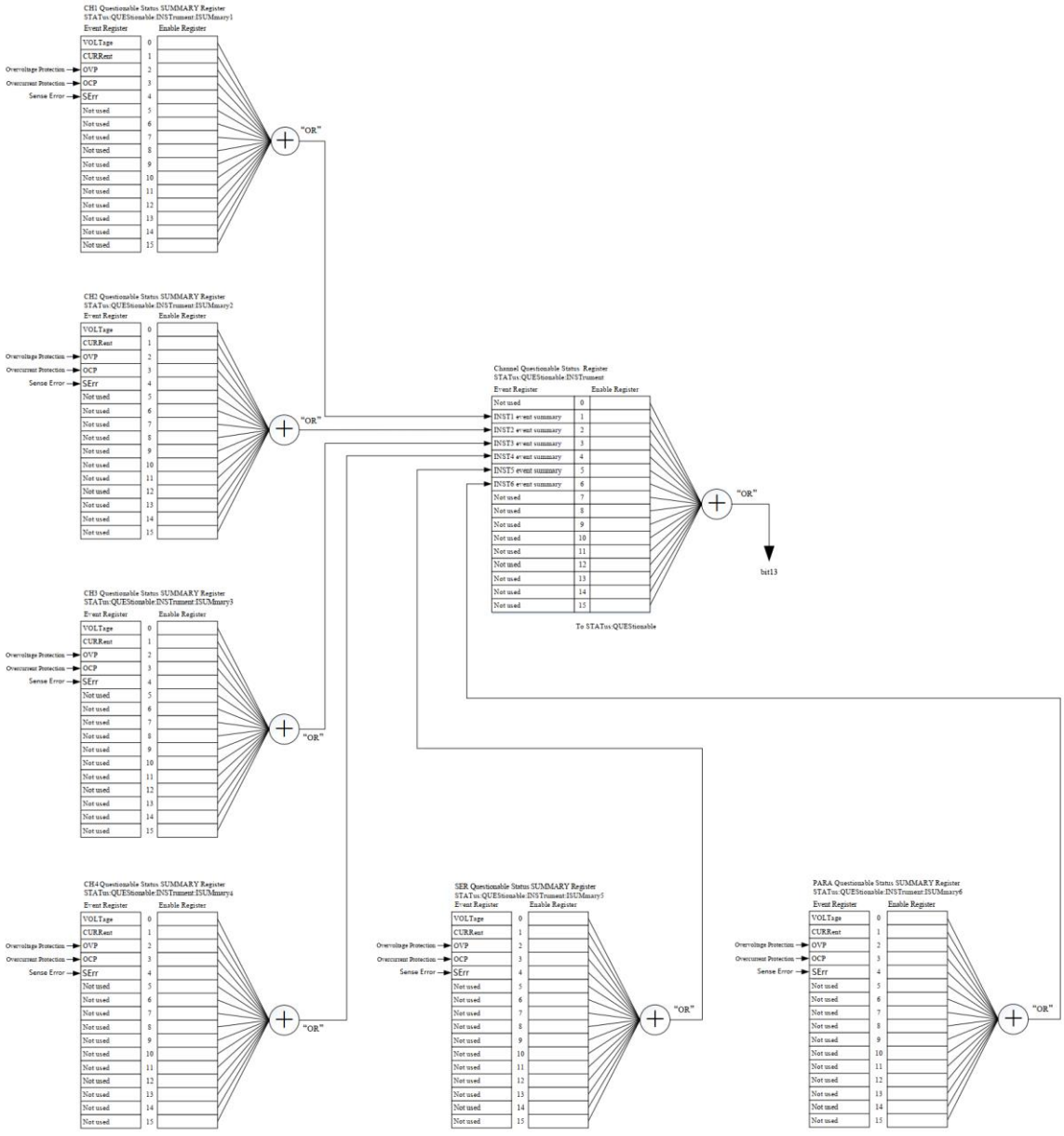
Status Byte

The definition of the status byte is shown in the following table.

Bit	Definition	Decimal	Meaning
0	Not used	1	Not used, always be 0
1	Not used	2	Not used, always be 0
2	ERR	4	Message contains in error output queue
3	QUES	8	Suspicious status register reports the event
4	MAV	16	The data in output buffer can be used
5	ESB	32	Standard event register reports the event

6	RSQ	64	Request service
7	OPER	128	Operation register reports the event

4. Channel's Suspicious Status Register



Channel's Suspicious Status SUMMARY Register

The definition of the channel's suspicious status SUMMARY register is shown in the following table.

Bit	Definition	Decimal	Meaning

0	VOLTage	1	The voltage is not controllable. The power is in the constant current mode.
1	CURRent	2	The current is not controllable. The power is in constant voltage mode.
2	OVP	4	Overvoltage protection has been activated.
3	OCP	8	Over current protection has been activated.
4	SErr	16	Remote sense error (reverse connection, no connection, or over limit)
Others	Not used	-	Not used, always be 0

When querying this register using the command :STATus:QUEStionable:INSTrument:ISUMmary#:CONDition?, the VOLT bit being true indicates that the corresponding channel operates in constant-current mode, while the CURR bit being true indicates that the corresponding channel operates in constant-voltage mode. If both the VOLT and CURR bits are false, this indicates that the channel is in the output off state. The instrument will not retain the abnormal state after over-voltage, over-current, or sense errors occur, so this command cannot be used to obtain the desired information. Instead, you should use the command :STATus:QUEStionable:INSTrument:ISUMmary#[:EVENt]? to query whether the corresponding event has occurred.

Channel's Suspicious Status Register

The definition of the channel's suspicious status register is shown in the following table.

Bit	Definition	Decimal	Meaning
0	Not used	1	Not used, always be 0
1	INST1 event summary	2	The event summary of CH1 independent channel
2	INST2 event summary	4	The event summary of CH2 independent channel
3	INST3 event summary	8	The event summary of CH3 independent channel
4	INST4 event summary	16	The event summary of CH4 independent channel
5	INST5 event summary	32	The event summary of SER channel
6	INST6 event summary	64	The event summary of PARA channel
	Not used	-	Not used, always be 0

5. SCPI Command Explanation

1. IEEE488 Common Command

*CLS

Command Format: *CLS

Command Function: Set the value of the enable register in standard event register.

*ESE

Command Format: *ESE <enable value>

Command Function: Set the value of the enable register in standard event register.

*ESE?

Command Format: *ESE?

Command Function: Query the value of the enable register in standard event register.

*ESR?

Command Format: *ESR?

Command Function: Query the value of the enable register in standard event register.

*IDN?

Command Format: *IDN?

Command Function: Query the basic information of the instrument, such as the manufacture's name, model, product serial number, and software version.

*OPC

Command Format: *OPC

Command Function: "OPC"bit is set in standard event register after this command is executed.

*OPC?

Command Format: *OPC?

Command Function: The query returns "1" when all commands are executed.

*RST

Command Format: *RST

Command Function: Restore the instrument to the factory settings.

*SRE

Command Format: *SRE <enable value>

Command Function: Set the value of the enable register in status register.

*SRE?

Command Format: *SRE?

Command Function: Query the value of the enable register in status register.

*STB?

Command Format: *STB?

Command Function: Query the status byte register.

*TST?

Command Format: *TST?

Command Function: Query the result of the instrument's self-inspection. The query returns 0 if the instrument is normal. The query returns1 if the instrument is abnormal.

*WAI

Command Format: *WAI

Command Function: Set the instrument to wait to complete the unfinish operation and then to execute other commands.

*SAV

Command Format: *SAV {1|2|3|4|5|6|7|8|9|10}

Command Function: Save the status data to the specified position of the internal memory.

Description: It is equivalent to the command :MEMory[:STATe]:STORe STAT, {1|2|3|4|5|6|7|8|9|10}.

For Example: *SAV, 1

*RCL

Command Format: *RCL {1|2|3|4|5|6|7|8|9|10}

Command Function: Load the status data from the specified position in the internal memory.

Description: It is equivalent to the command :MEMory[:STATe]:LOAD STAT, {1|2|3|4|5|6|7|8|9|10}.

For Example: *RCL, 1

2. APPLy

:APPLy

Command Format: :APPLy [CH1|CH2|CH3|CH4|SER|PARa],[<volt>|MINimum|MAXimum],[<curr>|MINimum|MAXimum]

Command Function: Set the specified channel as the current channel and set the voltage and current value for this channel.

Description: "CH1, CH2" can only be selected in normal mode;"SER"can only be selected in serial mode; and"PARA"can only be selected in parallel mode. When"volt"and "curr"parameter is omitted at the same time, it only sets the specified channel as the current channel, not change the voltage and current value of the channel.

For Example: :APPLy CH1,15.00V, 2.000A

:APPLy?

Command Format: :APPLy? [CH1|CH2|CH3|CH4|SER|PARa],[CURRent|VOLTage]

Command Function: Query the voltage and current value of a certain channel.

Description: If the channel parameter is omitted, the current channel is the one to be queried by default. If it is assigned "CURRent," the current value is returned; if it is assigned "VOLTage," the voltage value is returned. If no specific assignment is made, both the voltage and current values are returned.

For Example: :APPLy? CH1, VOLT

Query Return: CH1, 15.00

3. INSTrument

:INSTrument[:SELEct]

:INSTrument[:SELect]

Command Format: :INSTrument[:SELect] {CH1|CH2|CH3|CH4|SER|PARa}

:INSTrument[:SELEct] {CH1|CH2|CH3|CH4|SER|PARa}

Command Function: Set the specified channel as the current channel.

Description:"CH1, CH2" can only be selected in normal mode;"SER"can only be selected in serial mode; and "PARA"can only be selected in parallel mode.

Set the power mode according to the command :SOURce:Mode {NORMal|SER|PARa}.

For Example: :INSTrument:SELE Ch3

:INSTrument[:SELEct]?

:INSTrument[:SELect]?

Command Format: :INSTrument[:SELEct]?

:INSTrument[:SELect]?

Command Function: Query the current channel.

Description: The query returns "CH1|CH2|CH3|CH4|SER|PAR."

For Example: :INSTrument:SELE?

Query Return: CH1

:INSTrument:NSELect

Command Format: :INSTrument:NSELect {1|2|3|4|5|6}

Command Function: Set the specified channel as the current channel.

Description: 1 corresponds to CH1; 2 corresponds to CH2; 3 corresponds to CH3; 5 corresponds to SER; 6 corresponds to PARA. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

For Example: :INSTrument:NSELect 3

:INSTrument:NSELect?

Command Format: :INSTrument:NSELect?

Command Function: Query the current channel.

Description: The query returns"1|2|3|4|5|6."

For Example: :INSTrument:NSELect?

Query Return: 3

4. SOURce

:SOURce:Mode

Command Format: :SOURce:Mode { NORMal|SERies|PARAllel|PARA}

Command Function: Set the operating mode of the power supply.

Description: NORMal is the normal independent mode. SERies is the serial mode. PARAllel, PARA is the parallel mode. It takes some time for the power supply to switch modes. During this time, if commands related to the power supply's operating mode are executed, it may cause command execution to fail. Therefore, after switching the operating mode of the power supply, a new command should be executed after an interval of at least 500 milliseconds.

Relevant Command: :OUTPut:PAIR {OFF|SERies|PARAllel}

For Example: :SOURce:Mode SER

:SOURce:Mode?

Command Format: :SOURce:Mode?

Command Function: Query the current operating mode of the power supply.

Description: The query returns "NORMAL | SER | PARA."

Relevant Command: :OUTPut:PAIR?

For Example: :SOURce:Mode?

Query Return: SER

[:SOURce:]BLEeder[:STATe]

Command Format: [:SOURce:]BLEeder[:STATe] {0|1|OFF|ON}

Command Function: Set the operation mode of the leakage circuit to "On" or "Off."

Relevant Command: :OUTPut:OFFMode [BLEON | BLEOFF]

For Example: [:SOURce:]BLEeder[:STATe] ON

[:SOURce:]BLEeder[:STATe]?

Command Format: [:SOURce:]BLEeder[:STATe]?

Command Function: Query the operation mode of the leakage circuit.

Relevant Command: :OUTPut:OFFMode?

For Example: [:SOURce:]BLEeder[:STATe]?

Query Return: ON

[:SOURce#]:VOLTage[:LEVel][:IMMediate][:AMPLitude]

Command Format: [:SOURce#]:VOLTage[:LEVel][:IMMediate][:AMPLitude]{<vol>|MINimum|MAXimum}

Command Function: Set the current value for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, then the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

For Example: :SOURce1:VOLTage 25.00

[:SOURce#]:VOLTage[:LEVel][:IMMediate][:AMPLitude]?

Command Format: [:SOURce#]:VOLTage[:LEVel][:IMMediate][:AMPLitude]?

Command Function: Query the current value for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1.

For Example: :SOURce1:VOLTage?

Query Return: 25.00

[:SOURce#]:VOLTage:PROTection[:LEVel]

Command Format: [:SOURce#]:VOLTage:PROTection[:LEVel]{<vol>|MINimum|MAXimum}

Command Function: Set the overcurrent protection value for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

For Example: :SOURce1:VOLTage:PROTection 30.00

[:SOURce#]:VOLTage:PROTection[:LEVel]?

Command Format: [:SOURce#]:VOLTage:PROTection[:LEVel]?

Command Function: Query the overvoltage protection value for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1.

For Example: :SOURce1:VOLTage:PROTection?

Query Return: 30.00

[:SOURce#]:VOLTage:PROTection:STATe

Command Format: [:SOURce#]:VOLTage:PROTection:STATe {0|1|OFF|ON}

Command Function: Set the switch state of the overvoltage protection for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

For Example: :SOURce1:VOLTage:PROTection:STATe 1

[:SOURce#]:VOLTage:PROTection:STATe?

Command Format: [:SOURce#]:VOLTage:PROTection:STATe?

Command Function: Query the switch state of the overvoltage protection for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. The query returns"ON | OFF."

For Example: :SOURce1:VOLTage:PROTection:STATe?

Query Return: ON

[:SOURce#]:VOLTage:SENSe[:STATe]

Command Format: [:SOURce#]:VOLTage:SENSe[:STATe] {0|1|OFF|ON}

Command Function: Set the switch state of the remote sense for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

Relevant Command: :OUTPut:SENSe[:STATe] [CH1|CH2|CH3|CH4|SER|PARa,] {0|1|OFF|ON}

For Example: :SOURce1:VOLTage:SENSe 1

[:SOURce#]:VOLTage:SENSe[:STATe]?

Command Format: [:SOURce#]:VOLTage:SENSe[:STATe]?

Command Function: Query the switch state of the remote sense for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. The query returns"ON | OFF."

Relevant Command: :OUTPut:SENSe[:STATe]? [CH1|CH2|CH3|CH4|SER|PARa]

For Example: :SOURce1:VOLTage:SENSe?

Query Return: ON

[:SOURce#]:CURRent[:LEVel][:IMMediate][:AMPLitude]

Command Format: [:SOURce#]:CURRent[:LEVel][:IMMediate][:AMPLitude]{<curr>|MINimum|MAXimum}

Command Function: Set the current value for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

For Example: :SOURce1:CURRent 3.000

[:SOURce#]:CURRent[:LEVel][:IMMediate][:AMPLitude]?

Command Format: [:SOURce#]:CURRent[:LEVel][:IMMediate][:AMPLitude]?

Command Function: Query the current value for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1.

For Example: :SOURce1:CURRent?

Query Return: 3.000

[:SOURce#]:CURRent:PROTection[:LEVel]

Command Format: [:SOURce#]:CURRent:PROTection[:LEVel]{<curr>|MINimum|MAXimum}

Command Function: Set the overcurrent protection value for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

For Example: :SOURce1:CURRent:PROTection 3.000

[:SOURce#]:CURRent:PROTection[:LEVel]?

Command Format: [:SOURce#]:CURRent:PROTection[:LEVel]?

Command Function: Query the overcurrent protection value for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1.

For Example: :SOURce1:CURRent:PROTection?

Query Return: 3.000

[:SOURce#]:CURRent:PROTection:STATe

Command Format: [:SOURce#]:CURRent:PROTection:STATe {0|1|OFF|ON}

Command Function: Set the switch state of the overcurrent protection for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

For Example: :SOURce1:CURRent:PROTection:STATe 1

[:SOURce#]:CURRent:PROTection:STATe?

Command Format: [:SOURce#]:CURRent:PROTection:STATe?

Command Function: Query the switch state of the overcurrent protection for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. The query returns "ON | OFF."

For Example: :SOURce1:CURRent:PROTection:STATe?

Query Return: ON

[:SOURce#]:CURRent:PROTection:DELay

Command Format: [:SOURce#]:CURRent:PROTection:DELay {<time>|MINimum|MAXimum}

Command Function: Set the delay time of the overcurrent protection for the specified channel and designate it as the current channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. 1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode. time range is from 0 to 1.000 seconds.

Relevant Command: OUTPut:OCP:DELay {<time>|MINimum|MAXimum}

For Example: :SOURce1:CURRent:PROTection:DELay 25ms Set the CH1 as the current channel, and delay time of the overcurrent protection to 25 ms.

[:SOURce#]:CURRent:PROTection:DELay?

Command Format: [:SOURce#]:CURRent:PROTection:DELay?

Command Function: Query the delay time of the overcurrent protection for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. The query returns "ON | OFF."T he query returns as a real number, with the unit in seconds (s).

Relevant Command: OUTPut:OCP:DELay?

For Example: :SOURce1:CURRent:PROTection:DELay?

Query Return: 0.025

[:SOURce#]:CURRent:PROTection:DELay:MODE

Command Format: [:SOURce#]:CURRent:PROTection:DELay:MODE { ANYway | SCHange }

Command Function: Query the overcurrent protection value for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. "1" and "2" can only be selected in normal mode; "5" can only be selected in serial mode; "6" can only be selected in parallel mode.

ANYway: It will be delayed each time an overcurrent occurs.

SCHange: It will be delayed when the voltage, current, or output state is changed. It will not be delayed at any other time.

Relevant Command: :OUTPut:OCP:DELay:MODE [CH1|CH2|CH3|CH4|SER|PARa,] { ANYway | SCHange }

For Example: :SOURce1:CURRent:PROTection:DELay:MODE ANY Set the CH1 as the current channel, and delay mode to ANY.

[:SOURce#]:CURRent:PROTection:DELay:MODE?

Command Format: [:SOURce#]:CURRent:PROTection:DELay:MODE?

Command Function: Query the delay mode of the overcurrent protection for the specified channel.

Description: The optional values for # are "1|2|3|5|6." Here, 1-4 corresponds to CH1-CH4, 2 corresponds to CH2, 3 corresponds to CH3, 5 corresponds to SER, and 6 corresponds to PARA. If [:SOURce#] or # is omitted, the default is CH1. The query returns ANY | SCH.

Relevant Command: OUTPut:OCP:DELay:MODE?

For Example: :SOURce1:CURRent:PROTection:DELay:MODE?

Query Return: ANY

5. OUTPut

:OUTPut[:STATe]

Command Format: :OUTPut[:STATe] [CH1|CH2|CH3|CH4|SER|PARa|ALL,] {0|1|OFF|ON}

Command Function: Turn on/off output switch of the specified channel and designate it as the current channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER" can only be selected in serial mode; and "PARA" can only be selected in parallel mode.

For Example: :OUTPut:STATe CH1, ON

:OUTPut[:STATe]?

Command Format: :OUTPut[:STATe]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the status of the output switch for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default. The query returns "ON | OFF."

For Example: :OUTPut:STATe? CH1

Query Return: ON

:OUTPut:CVCC?

Command Format: :OUTPut:CVCC? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the status of the constant voltage and constant current for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default. The query returns "CV | CC."

For Example: :OUTPut:CVCC? CH1

Query Return: CV

:OUTPut:OVP:VALue

Command Format: :OUTPut:OVP:VALue [CH1|CH2|CH3|CH4|SER|PARa,] {<vol>|MINimum|MAXimum}

Command Function: Set the overcurrent protection value for the specified channel and designate it as the current channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER" can only be selected in serial mode; and "PARA" can only be selected in parallel mode.

For Example: :OUTPut:OVP:VALue CH1, 5

:OUTPut:OVP:VALue?

Command Format: :OUTPut:OVP:VALue? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the overvoltage protection value for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default.

For Example: :OUTPut:OVP:VALue? CH1

Query Return: 5.00

:OUTPut:OVP[:STATe]

Command Format: :OUTPut:OVP[:STATe] [CH1|CH2|CH3|CH4|SER|PARa,] {0|1|OFF|ON}

Command Function: Set the switch state of the overvoltage protection for the specified channel and designate it as the current channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER" can only be selected in serial mode; and "PARA" can only be selected in parallel mode.

For Example: :OUTPut:OVP:STATe CH1, ON

:OUTPut:OVP[:STATe]?

Command Format: :OUTPut:OVP[:STATe]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the switch state of the overvoltage protection for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default. The query returns "ON | OFF."

For Example: :OUTPut:OVP:STATe? CH1

Query Return: ON

:OUTPut:OCP:VALue

Command Format: :OUTPut:OCP:VALue [CH1|CH2|CH3|CH4|SER|PARa,] {<curr>|MINimum|MAXimum}

Command Function: Set the overcurrent protection value for the specified channel and designate it as the current channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER" can only be selected in serial mode; and "PARA" can only be selected in parallel mode.

For Example: :OUTPut:OCP:VALue CH1, 3

:OUTPut:OCP:VALue?

Command Format: :OUTPut:OCP:VALue? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the overcurrent protection value for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default.

For Example: :OUTPut:OCP:VALue? CH1

Query Return: 3.000

:OUTPut:OCP[:STATe]

Command Format: :OUTPut:OCP[:STATe] [CH1|CH2|CH3|CH4|SER|PARa,] {0|1|OFF|ON}

Command Function: Set the switch state of the overcurrent protection for the specified channel and designate it as the current channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER" can only be selected in serial mode; and "PARA" can only be selected in parallel mode.

For Example: :OUTPut:OCP:STATe CH1, ON

:OUTPut:OCP[:STATe]?

Command Format: :OUTPut:OCP[:STATe]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the switch state of the overcurrent protection for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default. The query returns "ON | OFF."

For Example: :OUTPut:OCP:STATe? CH1

Query Return: ON

:OUTPut:OCP:DELay

Command Format: :OUTPut:OCP:DELay [CH1|CH2|CH3|CH4|SER|PARa,] {<time>|MINimum|MAXimum}

Command Function: Set the delay time of the overcurrent protection for the specified channel and designate it as the current channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER" can only be selected in serial mode; and "PARA"can only be selected in parallel mode. time range is from 0 to 1.000 seconds.

Relevant Command: [:SOURce#]:CURRent:PROTection:DELay {<time>|MINimum|MAXimum}

For Example: :OUTPut:OCP:DELay CH1, 30ms Set the CH1 as the current channel, and delay time of the overcurrent protection to 30 ms.

:OUTPut:OCP:DELay?

Command Format: :OUTPut:OCP:DELay? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the delay time of the overcurrent protection for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default. The query returns a real number, with the unit in seconds(s).

Relevant Command: [:SOURce#]:CURRent:PROTection:DELay?

For Example: :OUTPut:OCP:DELay? CH1

Query Return: 0.030

:OUTPut:OCP:DELay:MODE

Command Format: :OUTPut:OCP:DELay:MODE [CH1|CH2|CH3|CH4|SER|PARa,] { ANYway | SCHange }

Command Function: Query the overcurrent protection value for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER" can only be selected in serial mode; and"PARA"can only be selected in parallel mode.

ANYway: It will be delayed each time an overcurrent occurs.

SCHange: It will be delayed when the voltage, current, or output state is changed. It will not be delayed at any other time.

Relevant Command: [:SOURce#]:CURRent:PROTection:DELay:MODE { ANYway | SCHange }

For Example: :OUTPut:OCP:DELay:MODE CH1, ANY Set the CH1 as the current channel, and delay mode to ANY.

:OUTPut:OCP:DELay:MODE?

Command Format: :OUTPut:OCP:DELay:MODE? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the delay mode of the overcurrent protection for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default. The query returns ANY | SCH.

Relevant Command: [:SOURce#]:CURRent:PROTection:DELay:MODE?

For Example: :OUTPut:OCP:DELay:MODE? CH1

Query Return: ANY

:OUTPut:PONSetup[:STATe]

Command Format: :OUTPut:PONSetup[:STATe][RST | LAST | LOFF]

Command Function: Set the output parameter and output state when the instrument powers on.

Description:

RST: The output parameter is restored to the default value, and the output state is turned off.

LAST: The output parameter is restored to the last setting, and the output state is reactivated.

LOFF: The output parameter is restored to the last setting, and the output state is turned off.

For Example: :OUTPut:PONSetup:STATe LAST

:OUTPut:PONSetup[:STATe]?

Command Format: :OUTPut:PONSetup[:STATe]?

Command Function: Query the output parameter and output state when the instrument powers on.

Description: The query returns RST | LAST | LOFF.

RST: The output parameter is restored to the default value, and the output state is turned off.

LAST: The output parameter is restored to the last setting, and the output state is reactivated.

LOFF: The output parameter is restored to the last setting, and the output state is turned off.

For Example: :OUTPut:PONSetup:STATe?

Query Return: LAST

:OUTPut:PAIR

Command Format: :OUTPut:PAIR[OFF | SERies |PARallel]

Command Function: Set the operating mode of the power supply.

Description: OFF indicates that both serial and parallel modes are turned off, resulting in independent mode.

SERies is the serial mode. PARallel is the parallel mode. It takes some time for the power supply to switch modes. During this time, if commands related to the power supply's operating mode are executed, it may cause command execution to fail. Therefore, after switching the operating mode of the power supply, a new command should be executed after an interval of at least 1 second.

Relevant Command: :SOURce:Mode {NORMal|SERies|PARallel|PARA}

For Example: :OUTPut:PAIR OFF Set the operating mode to independent mode.

:OUTPut:PAIR?

Command Format: :OUTPut:PAIR?

Command Function: Query the operating mode of the power supply.

Description: The query returns OFF | SER | PAR.

OFF: Independent mode

SER: Serial mode

PAR: Parallel mode

Relevant Command: :SOURce:Mode?

For Example: :OUTPut:PAIR?

Query Return: OFF

:OUTPut:SENSe[:STATe]

Command Format: :OUTPut:SENSe[:STATe] [CH1|CH2|CH3|CH4|SER|PARa,] {0|1|OFF|ON}

Command Function: Set the switch state of the remote sense for the specified channel and designate it as the current channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default."CH1, CH2" can only be selected in normal mode; "SER can only be selected in serial mode; and"PARA"can only be selected in parallel mode.

Relevant Command: [:SOURce#]:VOLTage:SENSe[:STATe] {0|1|OFF|ON}

For Example: :OUTPut:SENSe:STATe CH1, ON

:OUTPut:SENSe[:STATe]?

Command Format: :OUTPut:SENSe[:STATe]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the switch state of the remote sense for the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default. The query returns "ON | OFF."

Relevant Command: [:SOURce#]:VOLTage:SENSe[:STATe]?

For Example: :OUTPut:SENSe:STATe? CH1

Query Return: ON

:OUTPut:TRACk[:STATe]

Command Format: :OUTPut:TRACk[:STATe] {0|1|OFF|ON}

Command Function: Turn on/off the tracking mode.

Description: After turning on the tracking mode, when setting the voltage, current, overvoltage, and overcurrent parameters for CH1, the same parameters will be applied to CH2. Conversely, when setting CH2, the same parameters will be applied to CH1.

For Example: :OUTPut:TRACk:STATe ON

:OUTPut:TRACk[:STATe]?

Command Format: :OUTPut:TRACk[:STATe]?

Command Function: Query the switch state of the tracking mode

For Example: :OUTPut:TRACk:STATe?.

Query Return: ON

:OUTPut:OFFMode

Command Format: :OUTPut:OFFMode [BLEON | BLEOFF]

Command Function: Set the off mode for the power output.

Description:

BLEON: When the output is disabled, the leakage circuit will be activated.

BLEOFF: When the output is disabled, the leakage circuit will also be disabled.

Relevant Command: [:SOURce:]BLEeder[:STATe] {0|1|OFF|ON}

For Example: :OUTPut:OFFMode BLEON

:OUTPut:OFFMode?

Command Format: :OUTPut:OFFMode?

Command Function: Query the off mode for the power output.

Description: The query returns BLEON | BLEOFF.

BLEON: When the output is disabled, the leakage circuit will be activated.

BLEOFF: When the output is disabled, the leakage circuit will also be disabled.

Relevant Command: [:SOURce:]BLEeder[:STATe]?

For Example: :OUTPut:OFFMode?

Query Return: BLEON

6. MEASure

:MEASure:ALL[:DC]?

Command Format: :MEASure:ALL[:DC]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the actual voltage, current and power value at the output terminal of the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default.

For Example: :MEASure:ALL? CH1

Query Return: 05.10,0.089,00.45

:MEASure[:VOLTage][:DC]?

Command Format: :MEASure[:VOLTage][:DC]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the actual voltage value at the output terminal of the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default.

For Example: :MEASure:VOLTage? CH1

Query Return: 05.10

:MEASure:CURRent[:DC]?

Command Format: :MEASure:CURRent[:DC]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the actual current value at the output terminal of the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default.

For Example: :MEASure:CURRent? CH1

Query Return: 0.089

:MEASure:CURRent:RANGe

Command Format: :MEASure:CURRent:RANGe [AUTO|LOW|HIGH]

Command Function: Set the range mode for current sampling.

Description:

AUTO: Automatically switch the range

LOW: Fixed at the minimum current range

HIGH: Fixed at the maximum current range

For Example: :MEASure:CURRent:RANGe AUTO Set the range mode to AUTO

:MEASure:CURRent:RANGe?

Command Format: :MEASure:CURRent:RANGe?

Command Function: Query the range mode for current sampling.

Description: The query returns AUTO|LOW|HIGH.

For Example: :MEASure:CURRent:RANGe?

Query Return: AUTO

:MEASure:CURRent:RATE

Command Format: :MEASure:CURRent:RATE [62|4000|8000|4K|8K]

Command Function: Set the sampling rate for current sampling.

Description:

62: 62 times per second

4000|4K: 4000 per second

8000|8K: 8000 per second

For Example: :MEASure:CURRent:RATE 8k 8000 次 Set the sampling rate to 8k

:MEASure:CURRent:RATE?

Command Format: :MEASure:CURRent:RATE?

Command Function: Query the sampling rate for current sampling.

Description: The query returns 62|4000|8000.

For Example: :MEASure:CURRent:RATE?

Query Return: 8000

:MEASure:POWEr[:DC]?

Command Format: :MEASure:POWEr[:DC]? [CH1|CH2|CH3|CH4|SER|PARa]

Command Function: Query the actual power value at the output terminal of the specified channel.

Description: If the channel parameter is omitted, the current channel, which is the channel to be queried, will be used by default.

For Example: :MEASure:POWEr? CH1

Query Return: 00.45

7. LISTout

:LISTout[:STATe]

Command Format: :LISTout[:STATe] {0|1|OFF|ON}

Command Function: Start or stop the list output mode of the current channel.

Description: It can set and query the current channel by the command in"INSTrument"chapter.

For Example: :LISTout:STATe ON

:LISTout[:STATe]?

Command Format: :LISTout[:STATe]?

Command Function: Query the list output status mode of the current channel.

Description: The query returns"ON|OFF."

For Example: :LISTout[:STATe]?

Query Return: ON

:LISTout:STATUS?

Command Format: :LISTout:STATUS?

Command Function: Query the list output status mode of the current channel.

Description: The query returns four data"STOPPED|READY|RUNNING|PAUSED, Time, Index, Cycles."

STOPPED: The list output is off.

READY: The list output is activated, but the channel output is not turned on.

RUNNING: The list output is active and operational.

PAUSED: The list output is activated and has been operated; however, the channel output is in the off state.

Time: A real number indicating the remaining operation time for the current group of data, with the unit in seconds(s).

Index: An integer indicating the position serial number of the current group of data.

Cycles: An integer indicating the remaining number of cycles. "0" indicates an infinite cycle.

For Example: :LISTout:STATUS?

Query Return: RUNNING, 0.612, 2, 0

:LISTout:CYCLEs

Command Format: :LISTout:CYCLEs <CycN>

Command Function: Set the cycle time while the list output is operating.

Description: CycN: Cycle time, ranging from 0 to 99999. "0" indicates an infinite cycle.

Note: When the list output is operating, the parameter cannot be set.

For Example: :LISTout:CYCLEs 5

:LISTout:CYCLEs?

Command Format: :LISTout:CYCLEs?

Command Function: Query the cycle time while the list output is operating.

Description: The query returns cycle time, ranging from 0 to 99999. "0" indicates an infinite cycle.

For Example: :LISTout:CYCLEs?

Query Return: 5

:LISTout:ENDState

Command Format: :LISTout:ENDState {OFF|LAST}

Command Function: Set the output state after the list output has finished.

Description:

OFF: Turn off the channel output after the list output has finished.

LAST: Retain the last output state after the list output has finished.

Note: When the list output is operating, the parameter cannot be set.

For Example: :LISTout:ENDState OFF

:LISTout:ENDState?

Command Format: :LISTout:ENDState?

Command Function: Query the output state after the list output has finished.

Description: The query returns {OFF|LAST}.

OFF: Turn off the channel output after the list output has finished.

LAST: Retain the last output state after the list output has finished.

For Example: :LISTout:ENDState?

Query Return: OFF

:LISTout:GROUP:NUM?

Command Format: :LISTout:GROUP:NUM?

Command Function: Query the number of output data groups for the list output.

Description: The query returns the number of output data groups for the list output, ranging from 0 to 512. "0" indicates that the list is empty.

For Example: :LISTout:GROUP:NUM?

Query Return: 5

:LISTout:GROUP:INSert

Command Format: :LISTout:GROUP:INSert [Index]

Command Function: Insert a group of data at the specified position.

Description: Index: Range 0 ≤ Index < 512. Specify the insertion position. If the position does not exist or this parameter is omitted, the data will be inserted at the end of the table.

For Example: LISTout:GROUP:INSert 5 Insert a group of data at position 5

:LISTout:GROUP:DELete

Command Format: :LISTout:GROUP:DELete <Index >

Command Function: Delete a group of data at the specified position.

Description: Index: Range 0 ≤ Index < 512. Specify the deletion position. If the location does not exist, an error will occur.

For Example: LISTout:GROUP:DELete 3 Delete a group of data at position 3

:LISTout:GROUP:CLEar

Command Format: :LISTout:GROUP:CLEar

Command Function: Clear all groups of data.

:LISTout:GROUP:PARAmeter

Command Format: :LISTout:GROUP:PARAmeter <index>, <volt>, <curr>, <time>

Command Function: Set the specified parameter for the group of data at the specified position.

Description: index: Range 0 ≤ Index < 512. The serial number of the group for which the parameter is to be set; an execution error will occur if the location does not exist.

Volt: Output voltage of the group, with the unit in volts.

curr: Output current of the group, with the unit in ampere.

time: Output time of the group, with the default unit in seconds, ranging from 0.001 ≤ time ≤ 3600.000.

Note: When the list output is operating, the parameter cannot be set.

For Example: :LISTout:GROUP:PARAmeter 0, 10.00, 3.00, 1.5

:LISTout:GROUP:PARAmeter?

Command Format: :LISTout:GROUP:PARAmeter? <index>

Command Function: Query the specified parameter for the group of data at the specified position.

Description: index: Range 0 ≤ Index < 512. The serial number of the group for which the parameter is to be queried; an execution error will occur if the location does not exist.

The query returns three real data values "Vol, Curr, Time", with units in volts, ampere, and seconds, respectively.

For Example: :LISTout:GROUP:PARAmeter? 0

Query Return: 10.000,3.0000,1.500

:LISTout:TEMPlet:SELect

Command Format: :LISTout:TEMPlet:SELect {SINE | PULSE | RAMP | UP | DN | UPDN | RISE | FALL }

Command Function: Select the template type for list output.

Description:

SINE: Template for a sine wave

PULSE: Template for pulse mode

RAMP: Template for ramp mode

UP: Template for stair-rising

DN: Template for stair-down

UPDN: Template for up/down

RISE: Template for exponential rise

FALL: Template for exponential fall

For Example: :LISTout:TEMPlet:SELect SINE

:LISTout:TEMPlet:SELect?

Command Format: :LISTout:TEMPlet:SELect?

Command Function: Query the template type of list output.

Description: The query returns { SINE | PULS E| RAMP | UP | DN | UPDN | RISE | FALL }.

For Example: :LISTout:TEMPlet:SELect?

Query Return: SINE

:LISTout:TEMPlet:OBJect

Command Format: :LISTout:TEMPlet:OBJect {V | C}, <Vaule>

Command Function: Set the template to build the object for the list output mode, along with the corresponding constant output value.

Description:

V: Build the voltage, the Vaule indicates the constant current value.

C: Build the current, the Vaule indicates the constant voltage value.

For Example: :LISTout:TEMPlet:OBJect V, 3.00

:LISTout:TEMPlet:OBJect?

Command Format: :LISTout:TEMPlet:OBJect? {V | C}

Command Function: Query the build object of the template for the list output mode, along with the corresponding constant output value.

Description: The query returns {V | C}, Value.

V: Build the voltage, the Vaule indicates the constant current value.

C: Build the current, the Vaule indicates the constant voltage value.

For Example: :LISTout:TEMPlet:OBJect?

Query Return: V, 3.0000

:LISTout:TEMPlet:MAXValue

Command Format: :LISTout:TEMPlet:MAXValue {<value>|MINimum|MAXimum}

Command Function: Set the maximum for the template.

Description: <value>: Specify a real number.

MINimum: 0

MAXimum: Maximum output value for the corresponding channel and its associated build object.

For Example: :LISTout:TEMPlet:MAXValue 5.55

:LISTout:TEMPlet:MAXValue?

Command Format: :LISTout:TEMPlet:MAXValue?

Command Function: Query the maximum for the template.

Description: The query returns <value> as a real number.

For Example: :LISTout:TEMPlet:MAXValue?

Query Return: 5.55

:LISTout:TEMPlet:MINValue

Command Format: :LISTout:TEMPlet:MINValue {<value>|MINimum|MAXimum}

Command Function: Set the minimum for the template.

Description: <value>: Specify a real number.

MINimum: 0

MAXimum: Maximum output value for the corresponding channel and its associated build object.

For Example: :LISTout:TEMPlet:MINValue 1.11

:LISTout:TEMPlet:MINValue?

Command Format: :LISTout:TEMPlet:MINValue?

Command Function: Query the minimum for the template.

Description: The query returns <value> as a real number.

For Example: :LISTout:TEMPlet:MINValue?

Query Return: 1.11

:LISTout:TEMPlet:PERIod

Command Format: :LISTout:TEMPlet:PERIod <value>

Command Function: Set the cycle for the template. This parameter will not affect the template for exponential rise and exponential fall.

Description: <value>: A real number, with the unit in seconds (s). Specify the time for the cycle, ranging from 0.001 to 3600.

For Example: :LISTout:TEMPlet:PERIod 10

:LISTout:TEMPlet:PERIod?

Command Format: :LISTout:TEMPlet:PERIod?

Command Function: Query the cycle for the template.

Description: The query returns <value> as a real number, with the unit in seconds (s).

For Example: :LISTout:TEMPlet:PERIod?

Query Return: 10.000

:LISTout:TEMPlet:INTErval

Command Format: :LISTout:TEMPlet:INTErval <value>

Command Function: Set the time interval for the template.

Description: <value>: A real number, with the unit in seconds (s). Specify the time for the cycle, ranging from 0.001 to 3600.

For Example: :LISTout:TEMPlet:INTErval 1.008

:LISTout:TEMPlet:INTErval?

Command Format: :LISTout:TEMPlet:INTErval?

Command Function: Query the time interval for the template.

Description: The query returns<value> as a real number, with the unit in seconds (s).

For Example: :LISTout:TEMPlet:INTErval?

Query Return: 1.008

:LISTout:TEMPlet:CYCLEs

Command Format: :LISTout:TEMPlet:CYCLEs < count>

Command Function: Set the cycle for the template. This parameter only takes effect for the sine template.

Description: <count>: An integer value, ranging from 1 to 512. <count> indicates the number of cycles for the waveform to be built.

For Example: :LISTout:TEMPlet:CYCLEs 2

:LISTout:TEMPlet:CYCLEs?

Command Format: :LISTout:TEMPlet:CYCLEs?

Command Function: Query the cycle for the template.

Description: The query returns <count>, an integer value, ranging from 1 to 512. <count> indicates the number of cycles for the waveform to be built.

For Example: :LISTout:TEMPlet:CYCLEs?

Query Return: 2

:LISTout:TEMPlet:INVErt

Command Format: :LISTout:TEMPlet:INVErt {0|1|OFF|ON}

Command Function: Set the reverse phase for the template.

Description: Only the Sine, Pulse, and Ramp templates have reverse functions; therefore, this command is valid only for these templates.

For Example: :LISTout:TEMPlet:INVErt ON

:LISTout:TEMPlet:INVErt?

Command Format: :LISTout:TEMPlet:INVErt?

Command Function: Query the reverse phase for the template.

Description: The query returns {OFF|ON }.

For Example: :LISTout:TEMPlet:INVErt?

Query Return: ON

:LISTout:TEMPlet:WIDTh

Command Format: :LISTout:TEMPlet:WIDTh <value>

Command Function: Set the pulse width for the pulse template. This parameter only takes effect for the pulse template.

Description: <value>: A real number, with the unit in seconds (s). Specify the pulse width, ranging from 0.001 to 3600.

For Example: :LISTout:TEMPlet:WIDTh 5.008

:LISTout:TEMPlet:WIDTh?

Command Format: :LISTout:TEMPlet:WIDTh?

Command Function: Query the pulse width for the pulse template.

Description: The query returns<value> as a real number, with the unit in seconds (s).

For Example: :LISTout:TEMPlet:WIDTh?

Query Return: 5.008

:LISTout:TEMPlet:PULSECount

Command Format: :LISTout:TEMPlet:PULSECount <count>

Command Function: Set the pulse count for the pulse template. This parameter only takes effect for the pulse template.

Description: <count>: An integer value, ranging from 1 to 256. <count> indicates the number of pulses to be built.

For Example: :LISTout:TEMPlet:PULSECount 18

:LISTout:TEMPlet:PULSECount?

Command Format: :LISTout:TEMPlet:PULSECount?

Command Function: Query the pulse count for the template.

Description: The query returns <count>, the number of pulses plan to be built.

For Example: :LISTout:TEMPlet:PULSECount?

Query Return: 18

:LISTout:TEMPlet:SYMMetry

Command Format: :LISTout:TEMPlet:SYMMetry <value>

Command Function: Set the symmetry for the ramp template. This parameter only takes effect for the ramp template.

Description: <value>: An integer value. Specify the symmetry for the ramp template, ranging from 0 to 100.

For Example: :LISTout:TEMPlet:SYMMetry 58

:LISTout:TEMPlet:SYMMetry?

Command Format: :LISTout:TEMPlet:SYMMetry?

Command Function: Query the symmetry for the ramp template.

Description: The query returns <value> as an integer.

For Example: :LISTout:TEMPlet:SYMMetry?

Query Return: 58

:LISTout:TEMPlet:STAIr

Command Format: :LISTout:TEMPlet:STAIr <count>

Command Function: Set the stair number for the stair template. This parameter only takes effect for stair up, stair down, and stair up and down.

Description: The query returns <count> as an integer value, ranging from 1 to 512. Specify the stair number for the stair wave to be built.

For Example: :LISTout:TEMPlet:STAIr 5

:LISTout:TEMPlet:STAIr?

Command Format: :LISTout:TEMPlet:STAIr?

Command Function: Query the stair number for the stair template.

Description: The query returns <count> as an integer value. Specify the stair number for the stair wave plan to be built.

For Example: :LISTout:TEMPlet:STAIr?

Query Return: 5

:LISTout:TEMPlet:EXPPoints

Command Format: :LISTout:TEMPlet:EXPPoints <point>

Command Function: Set the inserted group for the exponential template. This parameter only takes effect for the exponential rise and exponential fall templates.

Description: <point> as an integer value, ranging from 1 to 512. Specify the inserted group for the exponential template.

For Example: :LISTout:TEMPlet:EXPPoints 88

:LISTout:TEMPlet:EXPPoints?

Command Format: :LISTout:TEMPlet:EXPPoints?

Command Function: Query the inserted group for the exponential template.

Description: The query returns <point> as an integer value. Specify the inserted group plan to be built.

For Example: :LISTout:TEMPlet:EXPPoints?

Query Return: 88

:LISTout:TEMPlet:EXPRate

Command Format: :LISTout:TEMPlet:EXPRate <value>

Command Function: Set the exponent for the exponential template.

Description: <value>: An integer value, ranging from 0 to 10. This command sets the ascending index when the template type is exponential rise, and it sets the descending index when the template type is exponential fall. This command is not available for other templates.

For Example: :LISTout:TEMPlet:EXPRate 5

:LISTout:TEMPlet:EXPRate?

Command Format: :LISTout:TEMPlet:EXPRate?

Command Function: Query the exponent for the exponential template.

Description: The query returns < value > as an integer value. Use this command to return the descending index when the template type is exponential fall; otherwise, it returns the ascending index.

For Example: :LISTout:TEMPlet:EXPRate?

Query Return: 5

:LISTout:TEMPlet:POINTs?

Command Format: :LISTout:TEMPlet:POINTs?

Command Function: Query the number of data groups that will be generated if the data is built with the currently set parameters. If the number of generated groups exceeds the remaining available space, the build will fail.

Description: The query returns <point>. The data is built with the currently set parameters.

For Example: :LISTout:TEMPlet:POINTs?

Query Return: 50

:LISTout:TEMPlet:CONSTruct

Command Format: :LISTout:TEMPlet:CONSTruct [index]

Command Function: Construct the data and place the newly constructed data starting from the specified position.

Description: <index>: Specify the position number where the first set of constructed data will be placed, with the remaining data placed in descending order. If the specified position does not exist (i.e., the number is greater than the total number of existing data sets) or if this parameter is omitted, the new data will be placed at the end of the existing data.

For Example: :LISTout:TEMPlet:CONSTruct

8. DELAY

:DELAY[:STATe]

Command Format: :DELAY[:STATe] {0|1|OFF|ON}

Command Function: Start or stop the delayer of the current channel.

Description: It can set and query the current channel by the command in"INSTrument"chapter.

For Example: :DELAY:STATe ON

:DELAY[:STATe]?

Command Format: :DELAY[:STATe]?

Command Function: Query the delayer status of the current channel.

Description: The query returns ON|OFF.

For Example: :DELAY[:STATe]?

Query Return: ON

:DELAY:STATUS?

Command Format: :DELAY:STATUS?

Command Function: Query the delayer operating mode of the current channel.

Description: The query returns four data"STOPPED|RUNNING, Time, Index, Cycles."

STOPPED: The delayer is off.

RUNNING: The delayer is active and optional.

Time: A real number indicating the remaining operation time of the current group of data, with the unit in seconds(s).

Index: An integer indicating the position serial number of the current group of data.

Cycles: An integer, the remaining number of cycles. "0" indicates an infinite cycle.

For Example: :DELAY:STATUS?

Query Return: RUNNING, 0.872, 2, 0

:DELAY:CYCLEs

Command Format: :DELAY:CYCLEs <CycN>

Command Function: Set the cycle time while the delayer is operating.

Description: CycN: Cycle time, ranging from 0 to 99999. "0" indicates an infinite cycle.

Note: When the delayer is operating, the parameter cannot be set.

For Example: :DELAY:CYCLEs 5

:DELAY:CYCLEs?

Command Format: :DELAY:CYCLEs?

Command Function: Query the cycle time while the delayer is operating.

Description: CycN: Cycle time, ranging from 0 to 99999. "0" indicates an infinite cycle.

For Example: :DELAY:CYCLEs?

Query Return: 5

:DELAY:ENDState

Command Format: :DELAY:ENDState {OFF|ON|LAST}

Command Function: Set the output state after the delayer has finished.

Description:

OFF: Turn off the delayer after the list output has finished.

ON: Turn on the delayer after the list output has finished.

LAST: Retain the last output state after the delayer has finished.

Note: When the delayer is operating, the parameter cannot be set.

For Example: :DELAY:ENDState OFF

:DELAY:ENDState?

Command Format: :DELAY:ENDState?

Command Function: Query the output state after the delayer has finished.

Description: The query returns {OFF | ON | LAST}.

OFF: Turn off the delayer after the list output has finished.

ON: Turn on the delayer after the list output has finished.

LAST: Retain the last output state after the delayer has finished.

For Example: :DELAY:ENDState?

Query Return: OFF

:DELAY:GROUP:NUM?

Command Format: :DELAY:GROUP:NUM?

Command Function: Query the number of output data groups for delayer.

Description: The query returns the number of output data groups for the delayer, ranging from 0 to 512. "0" indicates that the list is empty.

For Example: :DELAY:GROUP:NUM?

Query Return: 5

:DELAY:GROUP:INSert

Command Format: :DELAY:GROUP:INSert [Index]

Command Function: Insert a group of data at the specified position.

Description: Index: Range 0 ≤ Index < 512. Specify the insertion position. If the position does not exist or this parameter is omitted, the data will be inserted at the end of the table.

For Example: DELAY:GROUP:INSert 5 Insert a group of data at position 5

:DELAY:GROUP:DELete

Command Format: :DELAY:GROUP:DELete <Index >

Command Function: Delete a group of data at the specified position.

Description: Index: Range 0 ≤ Index < 512. Specify the deletion position. If the location does not exist, an error will occur.

For Example: DELAY:GROUP:DELete 3 Delete a group of data at position 3

:DELAY:GROUP:CLEar

Command Format: :DELAY:GROUP:CLEar

Command Function: Clear all groups of data.

Description:

For Example:

:DELAY:GROUP:PARAmeter

Command Format: :DELAY:GROUP:PARAmeter <index>, {0|1|ON|OFF}, <time>

Command Function: Set the specified parameter for the group of data at the specified position.

Description: index: Range 0 ≤ Index < 512. The serial number of the group for which the parameter is to be set; an execution error will occur if the location does not exist.

0|1|ON|OFF: The output state of this group: on or off.

time: Output time of the group, with the default unit in seconds, ranging from 0.001 ≤ time ≤ 3600.000.

Note: When the delayer is operating, the parameter cannot be set.

For Example: :DELAY:GROUP:PARAmeter 0, on, 1.588

:DELAY:GROUP:PARAmeter?

Command Format: :DELAY:GROUP:PARAmeter? <index>

Command Function: Query the specified parameter for the group of data at the specified position.

Description: index: Range 0 ≤ Index < 512. The serial number of the group for which the parameter is to be queried; an execution error will occur if the location does not exist.

The query returns {ON | OFF}, Time. ON | OFF indicates the output state. Time indicates a real number, with the unit in seconds (s).

For Example: :DELAY:GROUP:PARAmeter? 0

Query Return: ON,1.588

:DELAY:GENerate:SELect

Command Format: :DELAY:GENerate:SELect { FIX | INC | DEC }

Command Function: Select the automatic generation type for the delayer.

Description:

FIX: Fixed time means that the on and off times for each group are constant.

INC: A monotonically rising type, where the time increases sequentially in each group.

DEC: A monotonically falling type, where the time decreases sequentially in each group.

For Example: :DELAY:GENerate:SELect FIX

:DELAY:GENerate:SELect?

Command Format: :DELAY:GENerate:SELect?

Command Function: Query the automatic generation type for the delayer.

Description: The query returns { FIX | INC | DEC }.

FIX: Fixed time means that the on and off times for each group are constant.

INC: A monotonically rising type, where the time increases sequentially in each group.

DEC: A monotonically falling type, where the time decreases sequentially in each group.

For Example: :DELAY:GENerate:SELect?

Query Return: FIX

:DELAY:GENerate:PATT

Command Format: :DELAY:GENerate:PATT { 01P | 10P }

Command Function: Set the automatic generation code pattern.

Description:

01P: The first group of generated data is off, the second group is on, and this pattern continues for subsequent groups.

10P: The first group of generated data is on, the second group is off, and this pattern continues for subsequent groups.

For Example: :DELAY:GENerate:PATT 01P

:DELAY:GENerate:PATT?

Command Format: :DELAY:GENerate:PATT?

Command Function: Query the automatic generation code pattern.

Description: The query returns { 01P | 10P } .

01P: The first group of generated data is off, the second group is on, and this pattern continues for subsequent groups.

10P: The first group of generated data is on, the second group is off, and this pattern continues for subsequent groups.

For Example: :DELAY:GENerate:PATT?

Query Return: 01P

:DELAY:GENerate:POINTs

Command Format: :DELAY:GENerate:POINTs < point >

Command Function: Set the automatic generation of group data.

Description: <point>: Generated group as an integer, ranging from 1 to 512. If the generated group is greater than the space remain group; otherwise, the generation will fail.

For Example: :DELAY:GENerate:POINTs 8

:DELAY:GENerate:POINTs?

Command Format: :DELAY:GENerate:POINTs?

Command Function: Query the automatic generation of group data.

Description: The query returns"point"as an integer. If the generated group is greater than the space remain group; otherwise, the generation will fail.

For Example: :DELAY:GENerate:POINTs?

Query Return: 8

:DELAY:GENerate:TIMe:ON

Command Format: :DELAY:GENerate:TIMe:ON <time>

Command Function: Set the runtime for the group whose status is "On" when the generation type is FIX.

Description: time: A real number, with the unit in seconds (s), ranging from 0.001 to 3600. This parameter is only effective when the generation type is set to FIX.

For Example: :DELAY:GENerate:TIMe:ON 1.888

:DELAY:GENerate:TIMe:ON?

Command Format: :DELAY:GENerate:TIMe:ON?

Command Function: Query the runtime for the group whose status is "On" when the generation type is FIX.

Description: The query returns <time> as a real number, with the unit in seconds (s).

For Example: :DELAY:GENerate:TIMe:ON?

Query Return: 1.888

:DELAY:GENerate:TIMe:OFF

Command Format: :DELAY:GENerate:TIMe:OFF <time>

Command Function: Set the runtime for the group whose status is "Off" when the generation type is FIX.

Description: time: A real number, with the unit in seconds (s), ranging from 0.001 to 3600. This parameter is only effective when the generation type is set to FIX.

For Example: :DELAY:GENerate:TIMe:OFF 2.558

:DELAY:GENerate:TIMe:OFF?

Command Format: :DELAY:GENerate:TIMe:OFF?

Command Function: Query the runtime for the group whose status is "Off" when the generation type is FIX.

Description: The query returns <time> as a real number, with the unit in seconds (s).

For Example: :DELAY:GENerate:TIMe:OFF?

Query Return: 2.558

:DELAY:GENerate:TIMe:BASE

Command Format: :DELAY:GENerate:TIMe:BASE <time>

Command Function: Set the runtime (base time) for the first generated data when the generation type is set to INC or DEC.

Description: time: A real number, with the unit in seconds (s), ranging from 0.001 to 3600. This parameter is only effective when the generation type is set to INC and DEC.

For Example: :DELAY:GENerate:TIMe:BASE 8.888

:DELAY:GENerate:TIMe:BASE?

Command Format: :DELAY:GENerate:TIMe:BASE?

Command Function: Query the runtime (base time) for the first generated data when the generation type is set to INC or DEC.

Description: The query returns <time> as a real number, with the unit in seconds (s).

For Example: :DELAY:GENerate:TIMe:BASE?

Query Return: 8.888

:DELAY:GENerate:TIMe:STEP

Command Format: :DELAY:GENerate:TIMe:STEP <time>

Command Function: Set the step value (step time) of the runtime (base time) for each group when the generation type is set to INC or DEC.

Description: time: A real number, with the unit in seconds (s), ranging from 0.001 to 3600. This parameter is only effective when the generation type is set to INC and DEC.

For Example: :DELAY:GENerate:TIMe:STEP 0.999

:DELAY:GENerate:TIMe:STEP?

Command Format: :DELAY:GENerate:TIMe:STEP?

Command Function: Query the step value (step time) of runtime (base time) for each group when the generation type is set to INC or DEC.

Description: The query returns <time> as a real number, with the unit in seconds (s).

For Example: :DELAY:GENerate:TIMe:STEP?

Query Return: 0.999

:DELAY:GENerate:CONSTruct

Command Format: :DELAY:GENerate:CONSTruct [index]

Command Function: Construct the data and place the newly constructed data starting from the specified position.

Description: <index>: Specify the position number where the first set of constructed data will be placed, with the remaining data placed in descending order. If the specified position does not exist (i.e., the number is greater than the total number of existing data sets) or if this parameter is omitted, the new data will be placed at the end of the existing data. If the relevant parameters are not set properly (e.g., a calculation result for INC with a runtime greater than 3600 seconds or for DEC with a runtime less than 0.001 seconds), and there is insufficient remaining space, the generation will fail.

For Example: :DELAY:GENerate:CONSTruct

9. MONItor

:MONItor[:STATe]

Command Format: :MONItor[:STATe] {0|1|OFF|ON}

Command Function: : Start or stop the monitor of the current channel.

Description: It can set and query the current channel by the command in"INSTrument"chapter.

For Example: :MONItor:STATe ON

:MONItor[:STATe]?

Command Format: :MONItor[:STATe]?

Command Function: Query the monitor status of the current channel.

Description: The query returns {ON|OFF}.

For Example: :MONItor:STATe?

Query Return: ON

:MONItor:CONDition#

Command Format: :MONItor:CONDition# { U< | U> | I< | I> | P< | P> | NONE [,value] }

Command Function: Set the monitoring condition for the instrument.

Description: The optional values of "#" are "1, 2, 3". "1" corresponds to the first judgment condition, "2" corresponds to the second judgment condition, "3" corresponds to the third judgment condition; if this parameter is omitted, the default is the first judgment condition. "3" corresponds to the third judgment condition; if this parameter is omitted, the default is the first judgment condition.

U<: Activate this condition, which triggers when the voltage is less than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

U>: Activate this condition, which triggers when the voltage is greater than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

I<: Activate this condition, which triggers when the current is less than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

I>: Activate this condition, which triggers when the current is greater than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

P<: Activate this condition, which triggers when the power is less than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

P>: Activate this condition, which triggers when the power is greater than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

NONE: Disactivate this condition, the "value" parameter must be omitted.

For Example: Activate the first condition and set the voltage to be greater than 12.58 volts using the following command:

:MONItor:CONDition1 U>, 12.58

:MONItor:CONDition#?

Command Format: :MONItor:CONDition#?

Command Function: Query the monitoring condition for the instrument.

Description: The query returns: "U< | U> | I< | I> | P< | P> | NONE [,value]."

The optional values of "#" are "1, 2, 3". "1" corresponds to the first judgment condition, "2" corresponds to the second judgment condition, "3" corresponds to the third judgment condition; if this parameter is omitted, the default is the first judgment condition. "3" corresponds to the third judgment condition; if this parameter is omitted, the default is the first judgment condition.

U<: Activate this condition, which triggers when the voltage is less than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

U>: Activate this condition, which triggers when the voltage is greater than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

I<: Activate this condition, which triggers when the current is less than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

I>: Activate this condition, which triggers when the current is greater than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

P<: Activate this condition, which triggers when the power is less than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

P>: Activate this condition, which triggers when the power is greater than the specified comparison value. Use the "value" parameter to set this comparison value simultaneously.

NONE: Disactivate this condition, the "value" parameter must be omitted.

For Example: Query the first condition using the following command:

:MONItor:CONDition1?

Query Return: U>,12.580. The condition is activated, and the voltage is greater than 12.580 volts.

:MONItor:LOGic

Command Format: :MONItor:LOGic {1|2} , {AND|OR}

Command Function: Set the logical symbol in the monitoring condition for the current channel.

Description: {1|2}: 1 specifies to set the first logical symbol； 2 specifies to set the second logical symbol.

AND: Set the specified logical symbol to "AND".

OR: Set the specified logical symbol to "OR".

For Example: :MONItor:LOGic 1, AND

:MONItor:LOGic 2, OR

:MONItor:LOGic?

Command Format: :MONItor:LOGic? {1|2}

Command Function: Query the logical symbol in the monitoring condition of the current channel.

Description: {1|2}: 1 specifies to set the first logical symbol； 2 specifies to set the second logical symbol.

The query returns {AND|OR}.

For Example: :MONItor:LOGic? 1

Query Return: AND

:MONItor:LOGic? 2

Query Return: OR

:MONItor:STOPway

Command Format: :MONItor:STOPway {OUTOFF|MSG|BEEPER}, {ON|OFF}

Command Function: Set the stop method of the monitor for the current channel.

Description:

OUTOFF: Set whether the output is turned on or off. ON: Turn off output. OFF: Turn on output.

MSG: Set whether to display a pop-up hint message or not. ON: Display the pop-up hint message. OFF: Do not display the pop-up hint message.

BEEPER: Set the beeper sound to on or off. ON: Turn on the beeper sound. OFF: Turn off the beeper sound.

For Example: :MONItor:STOPway OUTOFF, ON Turn off output when the monitoring condition is met.

:MONItor:STOPway MSG, OFF The hint message will not pop up when the monitoring condition is met.

:MONItor:STOPway BEEPER, ON The beeper will sound when the monitoring condition is met.

:MONItor:STOPway?

Command Format: :MONItor:STOPway?

Command Function: Query the stop method of the monitor for the current channel.

Description: The query returns OutputOff:{ON|OFF}, Msg:{ON|OFF}, Beep:{ON|OFF}.

For Example: :MONItor:STOPway?

Query Return: OutputOff:ON,Msg:OFF,Beep:ON

10. TRIGger

:TRIGger:IN[:ENABle]

Command Format: :TRIGger:IN[:ENABle] {D1|D2|D3|D4},{ 0|1|OFF|ON }

Command Function: Start or stop the trigger for the input mode. If the trigger is currently in output mode, it will automatically switch to input mode.

Description: D1|D2|D3|D4: Select the trigger IO.

For Example: :TRIGger:IN:ENABle D1, OFF Stop the trigger of IO1; IO1 will switch to input mode.

:TRIGger:IN:ENABle D1, ON Start the trigger of IO1; IO1 will switch to input mode.

:TRIGger:IN[:ENABle]?

Command Format: :TRIGger:IN[:ENABle]? {D1|D2|D3|D4}

Command Function: Query the trigger status of input mode.

Description: D1|D2|D3|D4: Select the trigger IO.

When IO is in output mode, it will return "OFF."

When IO is in input mode, it will return "OFF" or "ON" depending on the trigger status.

For Example: :TRIGger:IN:ENABle? D1

Query Return: ON

:TRIGger:IN:SOURce

Command Format: :TRIGger:IN:SOURce {D1|D2|D3|D4}[,CH_NAME][,CH_NAME][,CH_NAME][,CH_NAME]

Here, CH_NAME is defined as { CH1 | CH2 | CH3 | CH4 | SER | PARa }.

Command Function: Set the controlled source for the input mode trigger. When the input IO generates a trigger signal, the controlled source will execute the action according to the specified response settings.

Description: D1|D2|D3|D4: Select the trigger IO.

CH1: Channel 1 CH2: Channel 2 CH3: Channel 3 CH4: Channel 4 SER: Serial channel PARA: Parallel channel

When setting the channel, CH1 and CH2 cannot be displayed simultaneously with SER and PARA; SER and PARA cannot appear at the same time.

For Example: :TRIGger:IN:SOURce D1, CH1, CH2, CH3 Set the cotrolled source of IO1 to CH1, CH2, and CH3.

:TRIGger:IN:SOURce D1, CH1, CH3 Set the cotrolled source of IO1 to CH1 and CH3.

:TRIGger:IN:SOURce D1, CH3, SER Set the cotrolled source of IO1 to CH3 and SER (serial channel).

:TRIGger:IN:SOURce D1, PAR Set the cotrolled source of IO1 to PARA (parallel channel).

:TRIGger:IN:SOURce?

Command Format: :TRIGger:IN:SOURce? {D1|D2|D3|D4}

Command Function: Query the controlled source of the input mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns all combinations of controlled channels. Such as:"CH2,CH3", the query returns two controlled channels, channel 2 and channel 3.

CH1: Channel 1 CH2: Channel 2 CH3: Channel 3 CH4: Channel 4 SER: Serial channel PARA: Parallel channel

For Example: :TRIGger:IN:SOURce? D1

Query Return: CH2,CH3

:TRIGger:IN:TYPE

Command Format: :TRIGger:IN:TYPE {D1|D2|D3|D4},{RISE|FALL|HIGH|LOW}

Command Function: Set the trigger signal type for input mode trigger.

Description:

D1|D2|D3|D4: Select the trigger IO.

RISE: Rising edge signal

FALL: Falling edge signal

HIGH: High-level signal

LOW: Low-level signal

For Example: :TRIGger:IN:TYPE D1, FALL Set the trigger input signal type of IO1 to a falling edge.

:TRIGger:IN:TYPE?

Command Format: :TRIGger:IN:TYPE? {D1|D2|D3|D4}

Command Function: Query the trigger signal type of input mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns {RISE|FALL|HIGH|LOW}.

RISE: Rising edge signal

FALL: Falling edge signal

HIGH: High-level signal

LOW: Low-level signal

For Example: :TRIGger:IN:TYPE? D1 Query the trigger signal type of IO1.

Query Return: FALL Return result: Falling edge

:TRIGger:IN:SENSitivity

Command Format: :TRIGger:IN:SENSitivity {D1|D2|D3|D4},{LOW|MID|HIGH}

Command Function: Set the sensitivity of trigger signal for the input mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

LOW: Low sensitivity

MID: Middle sensitivity

HIGH: High sensitivity

For Example: :TRIGger:IN:SENSitivity D1, MID Set the input trigger signal sensitivity of IO1 to middle sensitivity.

:TRIGger:IN:SENSitivity?

Command Format: :TRIGger:IN:SENSitivity? {D1|D2|D3|D4}

Command Function: Query the sensitivity of trigger signal of the input mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns {LOW|MID|HIGH }.

LOW: Low sensitivity

MID: Middle sensitivity

HIGH: High sensitivity

For Example: :TRIGger:IN:SENSitivity? D1 Query the input trigger signal sensitivity of IO1.

Query Return: MID Return result: Middle sensitivity

:TRIGger:IN:RESPonse

Command Format: :TRIGger:IN:RESPonse {D1|D2|D3|D4},{ON|OFF|ALTER}

Command Function: Set the trigger response for the input mode trigger. When an input trigger event is generated, the trigger will execute the specified response.

Description: D1|D2|D3|D4: Select the trigger IO.

ON: When an input trigger event is generated, the trigger will activate the output of the controlled channel.

OFF: When an input trigger event is generated, the trigger will deactivate the output of the controlled channel.

ALTER: When input trigger event is generated, the trigger will invert the output of the controlled channel.

For Example: :TRIGger:IN:RESPonse D1, OFF Set the input trigger response of IO1 to OFF.

:TRIGger:IN:RESPonse?

Command Format: :TRIGger:IN:RESPonse? {D1|D2|D3|D4}

Command Function: Query the trigger response of input mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns {ON|OFF|ALTER }, it represents when input trigger event is generated, the trigger will execute the trigger response.

ON: When an input trigger event is generated, the trigger will activate the output of the controlled channel.

OFF: When an input trigger event is generated, the trigger will deactivate the output of the controlled channel.

ALTER: When input trigger event is generated, the trigger will invert the output of the controlled channel

For Example: :TRIGger:IN:RESPonse? D1 Query the input trigger response of IO1.

Query Return: OFF Return result: When input trigger event is generated, the trigger will deactivate the output of the controlled channel.

:TRIGger:OUT[:ENABle]

Command Format: :TRIGger:OUT[:ENABle] {D1|D2|D3|D4},{0|1|OFF|ON}

Command Function: Start or stop output mode trigger. If the trigger is in input mode, the trigger will switch to output mode.

Description: D1|D2|D3|D4: Select the trigger IO.

For Example: :TRIGger:OUT:ENABle D1, OFF Stop the trigger of IO1; IO1 will switch to output mode.

:TRIGger:OUT:ENABle D1, ON Start the trigger of IO1; IO1 will switch to output mode.

:TRIGger:OUT[:ENABle]?

Command Format: :TRIGger:OUT[:ENABle]? {D1|D2|D3|D4}

Command Function: Query the status of output mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

When IO is in input mode, it will return "OFF."

When IO is in output mode, it will return "OFF"or "ON" depending on the trigger status.

For Example: :TRIGger:OUT:ENABle? D1

Query Return: ON

:TRIGger:OUT:SOURce

Command Format: :TRIGger:OUT:SOURce {D1|D2|D3|D4},{CH1|CH2|CH3|CH4|SER|PARa}

Command Function: Set the trigger condition for the output mode trigger. When the controlled source meets the trigger condition, IO will output the response signal according to the specified output signal settings.

Description: D1|D2|D3|D4: Select the trigger IO.

Only one channel can be selected as the controlled source.

CH1: Channel 1 CH2: Channel 2 CH3: Channel 3 CH4: Channel 4 SER: Serial channel PARA: Parallel channel

For Example: :TRIGger:OUT:SOURce D1, CH1 Set CH1 to the controlled channel for IO1.

:TRIGger:OUT:SOURce?

Command Format: :TRIGger:OUT:SOURce? {D1|D2|D3|D4},

Command Function: Query the controlled source of output mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns {CH1|CH2|CH3|SER|PAR}.

CH1: Channel 1 CH2: Channel 2 CH3: Channel 3 CH4: Channel 4 SER: Serial channel PAR：并联通道。

For Example: :TRIGger:OUT:SOURce? D1 Query the controlled source of IO1.

Query Return: CH1 Return result: CH1 is the controlled source of IO1.

:TRIGger:OUT:CONDition

Command Format: :TRIGger:OUT:CONDition {D1|D2|D3|D4},{AUTO|OUTOFF|OUTON|>V|<V|=V|>C|<C|=C|>P|<P|=P}[,<value>]

Command Function: Set the trigger condition for the output mode trigger. When the controlled source meets the trigger condition, IO will output the response signal according to the specified output signal settings.

Description: D1|D2|D3|D4: Select the trigger IO.

AUTO: Automatic trigger; the instrument continuously generates the trigger condition. This mode does not accept a parameter with<value>.

OUTOFF: The trigger condition is generated when the controlled source turns off the output. This mode does not accept a parameter with<value>.

OUTON: The trigger condition is generated when the controlled source turns on the output. This mode does not accept a parameter with<value>.

>V: The trigger condition is generated when the voltage of the controlled source is greater than the judgment value. The parameter <value> can be omitted.

<V: The trigger condition is generated when the voltage of the controlled source is less than the judgment value. The parameter <value> can be omitted.

=V: The trigger condition is generated when the voltage of the controlled source is equal to the judgment value. The parameter <value> can be omitted.

>C: The trigger condition is generated when the current of the controlled source is greater than the judgment value. The parameter <value> can be omitted.

<C: The trigger condition is generated when the current of the controlled source is greater than the judgment value. The parameter <value> can be omitted.

=C: The trigger condition is generated when the current of the controlled source is equal to the judgment value. The parameter <value> can be omitted.

>P: The trigger condition is generated when the power of the controlled source is greater than the judgment value. The parameter <value> can be omitted.

<P: The trigger condition is generated when the power of the controlled source is less than the judgment value. The parameter <value> can be omitted.

=P: The trigger condition is generated when the power of the controlled source is equal to the judgment value. The parameter <value> can be omitted.

For Example: :TRIGger:OUT:CONDition D1,>V, 30.00 Set the trigger condition of IO1 to the voltage is greater than 30.00 volts.

:TRIGger:OUT:CONDition

Command Format: :TRIGger:OUT:CONDition {D1|D2|D3|D4}

Command Function: Query the trigger condition of output mode trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns {AUTO|OUTOFF|OUTON|>V|<V|=V|>C|<C|=C|>P|<P|=P} [,<value>].

The query returns AUTO|OUTOFF|OUTON" ; it cannot have a parameter with <value>.

The query returns ">V|<V|=V|>C|<C|=C|>P|<P|=P" ; it has the parameter <value>.

For Example: :TRIGger:OUT:CONDition? D1 Query the output trigger condition of IO1.

Query Return: >V,30.000 Return result: Trigger condition is voltage is greater than 30.00 volts.

:TRIGger:OUT:POLArity

Command Format: :TRIGger:OUT:POLArity {D1|D2|D3|D4},{POSItive|NEGAtive}

Command Function: Set the output signal polarity for output trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

POSItive: Output the positive signal

NEGAtive: Output the negative signal

For Example: :TRIGger:OUT:POLArity D1, POSItive Set the output signal of IO1 to positive.

:TRIGger:OUT:POLArity?

Command Format: :TRIGger:OUT:POLArity? {D1|D2|D3|D4}

Command Function: Query the output signal polarity of output trigger.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns {POSITIVE|NEGATIVE}.

POSItive: Output the positive signal

NEGAtive: Output the negative signal

For Example: :TRIGger:OUT:POLArity? D1 Query the output signal polarity of IO1.

Query Return: POSITIVE Return result: The output signal polarity of IO1 is positive.

:TRIGger:OUT:DATA

Command Format: :TRIGger:OUT:DATA {D1|D2|D3|D4}, {0 | 1}

Command Function: Set the output level for an IO port when in output mode.

Description: D1|D2|D3|D4: Select the trigger IO.

0: Output the low level

1: Output the high level

For Example: :TRIGger:OUT:DATA D1, 1 Set the output level for IO1 to 1.

:TRIGger:OUT:DATA?

Command Format: :TRIGger:OUT:DATA? {D1|D2|D3|D4}

Command Function: Query the output level for an IO port when in output mode.

Description: D1|D2|D3|D4: Select the trigger IO.

The query returns {0 | 1}.

0: Output the low level

1: Output the high level

Note: This command queries the actual level state of the port; its value may not necessarily match the value set by the :TRIGger:OUT:DATA.

For Example: :TRIGger:OUT:DATA? D1 Query the level of IO1.

Query Return: 1 Return result: The level of IO1 is 1.

11. RECorder

:RECorder[:STATe]

Command Format: :RECorder[:STATe] {0|1|OFF|ON}

Command Function: Start or stop the recorder.

Description: Before starting the recorder, ensure that the recorder parameters are correctly set and the following conditions are met: All folders in the specified path must exist; the file name specified in the path must not already exist; at least one channel must be open for data recording; at least one type of readback data (V,A,W) must be enabled for recording.

For Example: :RECorder On Start the recorder.

:RECorder[:STATe]?

Command Format: :RECorder[:STATe]?

Command Function: Query whether the recorder is turned on.

Description: The query returns OFF|ON.

For Example: :RECorder?

Query Return: ON

:RECorder:PATH

Command Format: :RECorder:PATH "<D:/dirname/.../filename.csv>"

Command Function: Set the save path for the recorded file.

Description: The path must be a complete file path, including the disk letter, folder path, file name, and the file extension must be ".csv." All folders at each level included in the path must already exist, and the specified file name must not exist in this path; otherwise, starting the recorder will fail.

For Example: :RECorder:PATH "D:/MyDir/MyRec.csv"

:RECorder:PATH?

Command Format: :RECorder:PATH?

Command Function: Query the save path for the recorded file.

Description: The query returns <D:/dirname/.../filename.csv>. The return path only supports ASCII characters. If a non-ASCII character is present, it will be replaced by "?" in the return path.

For Example: :RECorder:PATH?

Query Return: D:/MyDir/MyRec.csv

:RECorder:CHANnel

Command Format: :RECorder:CHANnel [CH_NAME [,CH_NAME][,CH_NAME][,CH_NAME][,CH_NAME] [,CH_NAME]]

Here, CH_NAME is defined as { CH1 | CH2 | CH3 | CH4 | SER | PARa }

Command Function: Set the channels that the recorder is required to record.

Description: CH1: Channel 1 CH2: Channel 2 CH3: Channel 3 CH4: Channel 4 SER: Serial channel PARA: Parallel channel

For Example: :RECorder:CHANnel CH1, CH2, CH3 Record CH1, CH2, and CH3

:RECorder:CHANnel CH1, CH3 Record CH1 and CH3

:RECorder:CHANnel CH3, SER Record CH3 and SER (serial channel)

:RECorder:CHANnel PAR Record PAR (parallel channel)

:RECorder:CHANnel?

Command Format: :RECorder:CHANnel?

Command Function: Query the channels that the recorder is required to record.

Description: The query returns a combination of the names of all channels designated for recording, or "NULL"if no channels are currently open.

CH1: Channel 1 CH2: Channel 2 CH3: Channel 3 CH4: Channel 4 SER: Serial channel PARA: Parallel channel

For Example: :RECorder:CHANnel?

Query Return: CH2,CH3 Record CH2 and CH3

:RECorder:DATA

Command Format: :RECorder:DATA [V|A|W [,V|A|W][,V|A|W]]

Command Function: Set the reading that the recorder is required to record.

Description: V: Voltage reading A: Current reading W: Power reading

For Example: :RECorder:DATA V, A, W Record voltage, current, and power

:RECorder:DATA V, W Record voltage and power

:RECorder:DATA V, A Record voltage and current

:RECorder:DATA V Record voltage

:RECorder:DATA?

Command Format: :RECorder:DATA?

Command Function: Query the reading that the recorder is required to record.

Description: The query returns a combination of the names of all channels designated for recording, or "NULL"if no channels are currently open.

V: Voltage reading A: Current reading W: Power reading

For Example: :RECorder:DATA?

Query Return: V,A,W Record voltage, current, and power

Query Return: V,A Record voltage and current

:RECorder:TINTerval

Command Format: :RECorder:TINTerval < time|MINimum|MAXimum >

Command Function: Set the interval time of recording reading for the recorder.

Description: time: A real number, with the unit in seconds (s), ranging from 0.2 to 9999.9. The input time parameter is rounded to the nearest integer multiple of 100 ms.

MINimum: 0.2 seoncds

MAXimum: 9999.9 seoncds

For Example: :RECorder:TINTerval 1.2 Set the recording interval time to 1.2 seconds.

:RECorder:TINTerval 1.26 Set the recording interval time to 1.2 seconds; in fact, it is approximately 1.3 seconds.

:RECorder:TINTerval?

Command Format: :RECorder:TINTerval?

Command Function: Query the interval time of recording reading for the recorder.

Description: The query returns a real number indicating the interval time, with the unit in seconds (s).

For Example: :RECorder:TINTerval?

Query Return: 1.3

:RECorder:DURation?

Command Format: :RECorder:DURation?

Command Function: Set the recorded time (operating duration) for the recorder.

Description: The query returns a real number indicating the recorded time, with the unit in seconds (s).

For Example: :RECorder:DURation?

Query Return: 1.3

:RECorder:POINTs?

Command Format: :RECorder:POINTs?

Command Function: Query the number of recorded data for the recorder.

Description: The query returns an integer indicating the number of recorded data.

For Example: :RECorder:POINTs?

Query Return: 58 The recorder has recorded 58 data points.

12. PRESet

:PRESet#[:APPLy]

Command Format: :PRESet#[:APPLy]

Command Function: Apply the preset parameter of the specified group to the output setting parameter.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted.

For Example: :PRESet1:APPLy

:PRESet#:COVer

Command Format: :PRESet#:COVer

Command Function: Overrides the preset value parameter of the specified group with the current output settings.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted.

For Example: :PRESet1:COVer

:PRESet#:SET:VOLTage

Command Format: :PRESet#:SET:VOLTage {CH1|CH2|CH3|CH4|SER|PARa}, {<volt>|MINimum|MAXimum}

Command Function: Set the voltage value for the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted.

For Example: :PRESet1:SET:VOLTage CH1, 5.00

:PRESet#:SET:VOLTage?

Command Format: :PRESet#:SET:VOLTage? {CH1|CH2|CH3|CH4|SER|PARa}

Command Function: Query the voltage value for the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted. The query returns the voltage as a real number.

For Example: :PRESet1:SET:VOLTage? CH1

Query Return: 05.00

:PRESet#:SET:CURRent

Command Format: :PRESet#:SET:CURRent {CH1|CH2|CH3|CH4|SER|PARa}, {<curr>|MINimum|MAXimum}

Command Function: Set the current value for the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted.

For Example: :PRESet1:SET:CURRent CH1, 1.258

:PRESet#:SET:CURRent?

Command Format: :PRESet#:SET:CURRent? {CH1|CH2|CH3|CH4|SER|PARa}

Command Function: Query the current value for the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted. The query returns the current as a real number.

For Example: :PRESet1:SET:CURRent? CH1

Query Return: 1.258

:PRESet#:SET:OVP

Command Format: :PRESet#:SET:OVP {CH1|CH2|CH3|CH4|SER|PARa}, {0|1|OFF|ON} [,{<volt>|MINimum|MAXimum}]

Command Function: Set the switch state of the overvoltage protection and value for the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted. When parameter {<volt>|MINimum|MAXimum} is omitted, it can only set the overvoltage switch, not change the protective value.

For Example: :PRESet1:SET:OVP CH1, OFF

:PRESet1:SET:OVP CH1, ON

:PRESet1:SET:OVP CH1, OFF, 20.00

:PRESet1:SET:OVP CH1, ON, 15.00

:PRESet#:SET:OVP?

Command Format: :PRESet#:SET:OVP? {CH1|CH2|CH3|CH4|SER|PARa}

Command Function: Query the switch state of the overvoltage protection and value of the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted. The query returns {OFF|ON}, <value>.

OFF|ON: The switch status of overvoltage protection

<value>: A real number representing the overvoltage protection value.

For Example: :PRESet1:SET:OVP? CH1

Query Return: ON,15.000

:PRESet#:SET:OCP

Command Format: :PRESet#:SET:OCP {CH1|CH2|CH3|CH4|SER|PARa}, {0|1|OFF|ON} [,{<curr>|MINimum|MAXimum}]

Command Function: Set the switch state of the overcurrent protection and value for the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted. When parameter {<volt>|MINimum|MAXimum} is omitted, it can only set the overcurrent switch, not change the protective value.

For Example: :PRESet1:SET:OCP CH1, OFF

:PRESet1:SET:OCP CH1, ON

:PRESet1:SET:OCP CH1, OFF, 2.000

:PRESet1:SET:OCP CH1, ON, 1.500

:PRESet#:SET:OCP?

Command Format: :PRESet#:SET:OCP? {CH1|CH2|CH3|CH4|SER|PARa}

Command Function: Query the switch state of the overcurrent protection and value of the preset group.

Description: The optional values for # are "1|2|3|4|5", corresponding to the respective preset value groups; this parameter cannot be omitted. The query returns {OFF|ON}, <value>.

OFF|ON: The switch status of overcurrent protection.

<value>: A real number representing the overcurrent protection value.

For Example: :PRESet1:SET:OCP? CH1

Query Return: ON,1.500

13. Memory

:MEMory[:STATe]:STORe

Command Format: :MEMory[:STATe]:STORe [STAT|LIST|DELAY,] {1|2|3|4|5|6|7|8|9|10}, ["FileName.csv"]

Command Function: Save the setup data to the specified position in internal memory.

Description: "STAT" is the setup data of normal mode."LIST" is the setup data of list output."DELAY" is the setup data of the delayer. If the type parameter is omitted, the default value is"STAT." If the file name is not specified, the default names will be "STATxx.csv,""LISTxx.csv," and "DELAYxx.csv," where "xx" is replaced by the file's location number. When specifying a file name, it must include an extension, which should be ".csv."

For Example: :MEM:STOR STAT, 1

:MEMory[:STATe]:LOAD

Command Format: :MEMory[:STATe]:LOAD [STAT|LIST|DELAY,] {1|2|3|4|5|6|7|8|9|10}

Command Function: Load the setup data from the specified position in internal memory.

Description: "STAT" is the setup data of normal mode. "LIST" is the setup data of list output."DELAY" is the setup data of the delayer. If the type of parameter is omitted, the default value is"STAT."

For Example: :MEM:LOAD STAT, 1

:MEMory[:STATe]:DELete

Command Format: :MEMory[:STATe]:DELete [STAT|LIST|DELAY,] {1|2|3|4|5|6|7|8|9|10}

Command Function: Delete the saved data from the specified position in internal memory.

Description: "STAT" is the setup data of normal mode."LIST" is the setup data of list output."DELAY" is the setup data of the delayer. If the type of parameter is omitted, the default value is"STAT."

For Example: :MEM:DEL STAT, 1

:MEMory[:STATe]:VALid?

Command Format: :MEMory[:STATe]:VALid? [STAT|LIST|DELAY,] {1|2|3|4|5|6|7|8|9|10}. RETURN:(YES|NO)

Command Function: Check whether data is saved at the specified position in internal memory.

Description: "STAT" is the setup data of normal mode."LIST" is the setup data of list output."DELAY" is the setup data of the delayer. If the type of parameter is omitted, the default value is"STAT." The query returns YES | NO.

For Example: :MEM:VAL? STAT, 1

Query Return: NO

14. MMemory

:MMEMory:DISK?

Command Format: :MMEMory:DISK? RETURN:(NULL | D:\)

Command Function: Query the drive of external memory.

Description: When the external memory is available, the query returns "D:\". When the external memory is not available, the query returns "NULL."

For Example: :MMEMory:DISK?

Query Return: D:\

:MMEMory:CDIRectory

Command Format: :MMEMory:CDIRectory "<D:\Dir_Name>"

Command Function: Set the operation path for the current file.

Description: The path length cannot be over 200 bytes.

For Example: :MMEMory:CDIRectory "D:\Dir1"

:MMEMory:CDIRectory?

Command Format: :MMEMory:CDIRectory?

Command Function: Query the operation path of the current file.

Description: The query returns D:\Dir_Name

For Example: :MMEMory:CDIRectory?

Query Return: D:\ Dir_Name

:MMEMory:CATalog?

Command Format: :MMEMory:CATalog?

Command Function: Query the available file folder and file in the current operation path.

Description: Return the names of the folders and files available under the current operation path, separated by commas. Only names consisting of plain English characters and "CSV" format files will be returned. If there is no content, return "NULL."

For Example: :MMEMory:CATalog?

Query Return: dir1,file.csv

:MMEMory:STORe

Command Format: :MMEMory:STORe [STAT|LIST|DELAY,] "FileName.csv"

Command Function: Save the setup data to the specified file in the current operation path.

Description: "STAT" is the setup data of normal mode."LIST" is the setup data of list output."DELAY" is the setup data of the delayer. If the type of parameter is omitted, the default value is"STAT."The filename must include an extension, specifically a ".csv" extension.

For Example: :MMEMory:STORe list, "MyList.csv"

:MMEMory:TYPE?

Command Format: :MMEMory:TYPE? "FileName.csv"

Command Function: Query the setup data to the specified file in the current operation path.

Description: The instrument will only process files in the ".csv"format. Inputting a filename with an extension other than ".csv" will result in an execution error.

The query returns STAT|LIST|DELAY|RECORD|UNKNOWN.

STAT: Status data file

LIST: List data file

DELAY: Delayer data file

RECORD: Record data file

UNKNOWN: Unknown file

For Example: :MMEMory:TYPE? "MyList.csv"

Query Return: LIST

:MMEMory:LOAD

Command Format: :MMEMory:LOAD "FileName.csv"

Command Function: Load the setup data from the specified file in the current operation path.

Description: The instrument will only process files in the".csv"format. Inputting a filename with an extension other than".csv"will result in an execution error.

For Example: :MMEMory:LOAD "MyList.csv"

:MMEMory:DELete

Command Format: :MMEMory:DELete " FileName.csv "

Command Function: Delete the specified file in the current operation path.

Description: The instrument will only process files in the".csv"format. Inputting a filename with an extension other than".csv"will result in an execution error.

For Example: :MMEMory:DEL "MyList.csv"

15. STATus

:STATus:PRESet

Command Format: :STATus:PRESet

Command Function: Restore all enabled registers and operation registers of the suspicious status register to their default status.

Description: After executing this command, the value of the enable register for the "Channel Suspicious Status Register" is 126, while the values of the enable registers for the"Channel Suspicious Status SUMMARY Register," "Standard Suspicious Status Register," and "Operation Register" are all 0. Additionally, the values for the"Channel Suspicious Status SUMMARY Register," "Standard Suspicious Status Register,"and "Operation Register Enable Register" are also all 0.

:STATus:OPERation[:EVENt]?

Command Format: :STATus:OPERation[:EVENt]?

Command Function: Query the event register of the operation status.

Description: After executing this command, the value of the event register is returned, and the event register is subsequently cleared.

:STATus:OPERation:CONDition?

Command Format: :STATus:OPERation:CONDition?

Command Function: Query the condition register of the operation status register.

:STATus:OPERation:ENABle

Command Format: :STATus:OPERation:ENABle

Command Function: Set the enable register for the operation status register.

:STATus:OPERation:ENABle?

Command Format: :STATus:OPERation:ENABle**?**

Command Function: Query the enable register of the operation status register.

:STATus:QUEStionable[:EVENt]?

Command Format: :STATus:QUEStionable[:EVENt]?

Command Function: Query the event register of the suspicious status register.

Description: After executing this command, the value of the event register is returned, and the event register is subsequently cleared.

:STATus:QUEStionable:CONDition?

Command Format: :STATus:QUEStionable:CONDition?

Command Function: Query the condition register of the suspicious status register.

:STATus:QUEStionable:ENABle

Command Format: :STATus:QUEStionable:ENABle

Command Function: Set the enable register of the suspicious status register.

:STATus:QUEStionable:ENABle?

Command Format: :STATus:QUEStionable:ENABle?

Command Function: Query the enable register of the suspicious status register.

:STATus:QUEStionable:INSTrument[:EVENt]?

Command Format: :STATus:QUEStionable:INSTrument[:EVENt]?

Command Function: Query the event register of the channel's suspicious status register.

Description: After executing this command, the value of the event register is returned, and the event register is subsequently cleared.

:STATus:QUEStionable:INSTrument:CONDition?

Command Format: :STATus:QUEStionable:INSTrument:CONDition?

Command Function: Query the condition register of the channel's suspicious status register.

:STATus:QUEStionable:INSTrument:ENABle

Command Format: :STATus:QUEStionable:INSTrument:ENABle

Command Function: Set the condition register of the channel's suspicious status register.

:STATus:QUEStionable:INSTrument:ENABle?

Command Format: :STATus:QUEStionable:INSTrument:ENABle?

Command Function: Query the enable register of the channel's suspicious status register.

:STATus:QUEStionable:INSTrument:ISUMmary#[:EVENt]?

Command Format: :STATus:QUEStionable:INSTrument:ISUMmary#[:EVENt]? (1≤ # ≤ 6, can be omissible.)

Command Function: Query the event register of suspicious Summary status register of a channel.

Description: To select the channel, use the following values: "1" for CH1, "2" for CH2, "3" for CH3, "5" for SER, and "6" for PARA. If the parameter is omitted, the command will default to the currently selected channel. After executing this command, the value of the event register is returned, and the event register is subsequently cleared.

For Example: :STATus:QUEStionable:INSTrument:ISUMmary1? Query the event of CH1.

:STATus:QUEStionable:INSTrument:ISUMmary? Query the event of the current channel.

:STATus:QUEStionable:INSTrument:ISUMmary#:CONDition?

Command Format: :STATus:QUEStionable:INSTrument:ISUMmary#:CONDition? (1≤ # ≤ 6, can be omissible.)

Command Function: Query the condition register of suspicious Summary status register of a channel.

Description: To select the channel, use the following values: "1" for CH1, "2" for CH2, "3" for CH3, "5" for SER, and "6" for PARA. If the parameter is omitted, the command will default to the currently selected channel.

For Example: :STATus:QUEStionable:INSTrument:ISUMmary1:COND? Query the event of CH1.

:STATus:QUEStionable:INSTrument:ISUMmary#:ENABle

Command Format: :STATus:QUEStionable:INSTrument:ISUMmary#:ENABle (1≤ # ≤ 6, can be omissible.)

Command Function: Set the enable register of suspicious Summary status register of a channel.

Description: To select the channel, use the following values: "1" for CH1, "2" for CH2, "3" for CH3, "5" for SER, and "6" for PARA. If the parameter is omitted, the command will default to the currently selected channel.

:STATus:QUEStionable:INSTrument:ISUMmary#:ENABle?

Command Format: :STATus:QUEStionable:INSTrument:ISUMmary#:ENABle? (1≤ # ≤ 6, can be omissible.)

Command Function: Query the enable register of suspicious Summary status register of a channel.

Description: To select the channel, use the following values: "1" for CH1, "2" for CH2, "3" for CH3, "5" for SER, and "6" for PARA. If the parameter is omitted, the command will default to the currently selected channel.

16. SYSTem

:SYSTem:VERSion?

Command Format: :SYSTem:VERSion?

Command Function: Query the version number of SCPI that is used by the current system.

:SYSTem:ERRor[:NEXT]?

Command Format: :SYSTem:ERRor[:NEXT]?

Command Function: Read a error message.

:SYSTem:ERRor:COUNt?

Command Format: :SYSTem:ERRor:COUNt?

Command Function: Query the count of unread error messages.

:SYSTem:BEEPer[:STATe]

Command Format: :SYSTem:BEEPer[:STATe] {0|1|OFF|ON}

Command Function: Turn on/off the beeper sound.

For Example: :SYSTem:BEEPer:STATe OFF Turn off the beeper sound.

:SYSTem:BEEPer[:STATe]?

Command Format: :SYSTem:BEEPer[:STATe]?

Command Function: Query the switch status of the beeper sound.

Description: The query returns {ON|OFF}.

For Example: :SYSTem:BEEPer:STATe? Query the switch status of the beeper sound.

Query Return: OFF Return result: The beeper sound is disabled.

:SYSTem:BRIGhtness

Command Format: :SYSTem:BRIGhtness <value>

Command Function: Set the backlight brightness of LCD.

Description: The query returns <value> as an integer value, ranging from 1 to 100.

For Example: :SYSTem:BRIGhtness 80 Set the backlight brightness of LCD to 80%.

:SYSTem:BRIGhtness?

Command Format: :SYSTem:BRIGhtness?

Command Function: Query the backlight brightness of LCD.

Description: The query returns <value> as an integer value, ranging from 1 to 100.

For Example: :SYSTem:BRIGhtness? Query the backlight brightness of LCD.

Query Return: 80 Return result: The backlight brightness of LCD is 80%.

:SYSTem:COMMunicate:LAN:APPLy

Command Format: :SYSTem:COMMunicate:LAN:APPLy

Command Function: Apply the network parameters that have been set.

Description: When using the command":SYSTem:COMMunicate:LAN:xxxx"(where 'xxxx' represents other network setting commands in LAN) to set the network parameters, the setup will not take effect immediately and will not be saved to the non-volatile memory of the instrument. You must execute the command":SYSTem:COMMunicate:LAN:APPLy"to make the parameters valid and save them permanently. You can execute multiple commands to modify several parameters and then execute a single command":SYSTem:COMMunicate:LAN:APPLy."

For Example: :SYSTem:COMMunicate:LAN:DHCP:STATe ON Turn on DHCP function.

:SYSTem:COMMunicate:LAN:APPLy Apply the network parameters that have been set.

:SYSTem:COMMunicate:LAN:DHCP[:STATe]

Command Format: :SYSTem:COMMunicate:LAN:DHCP[:STATe] {0|1|OFF|ON}

Command Function: Turn on/off DHCPFunction of the network.

Description: When using the command to set the network parameters, the setup will not take effect immediately and will not be saved to the non-volatile memory of the instrument. You must execute the command":SYSTem:COMMunicate:LAN:APPLy"to make the parameters valid and save them permanently. You can execute multiple commands to modify several parameters and then execute a single command":SYSTem:COMMunicate:LAN:APPLy."

For Example: :SYSTem:COMMunicate:LAN:DHCP:STATe ON Turn on DHCP function.

:SYSTem:COMMunicate:LAN:APPLy Apply the network parameters that have been set.

:SYSTem:COMMunicate:LAN:DHCP[:STATe]?

Command Format: :SYSTem:COMMunicate:LAN:DHCP[:STATe]?

Command Function: Query the switch status of DHCPFunction of the network.

Description: After the network parameters are set, and before executing the command ":SYSTem:COMMunicate:LAN", the result queried by this command reflects the temporary parameters and the parameter data used when executing":SYSTem:COMMunicate:LAN."Otherwise, the result queried by this command reflects the currently operating parameters of the instrument.

The query returns {ON|OFF}.

For Example: :SYSTem:COMMunicate:LAN:DHCP:STATe?

Query Return: ON

:SYSTem:COMMunicate:LAN:IPADdress

Command Format: :SYSTem:COMMunicate:LAN:IPADdress "x.x.x.x"

Command Function: Set IP address of the instrument.

Description: When using the command to set the network parameters, the setup will not take effect immediately and will not be saved to the non-volatile memory of the instrument. You must execute the command ":SYSTem:COMMunicate:LAN:APPLy"to make the parameters valid and save them permanently. You can execute multiple commands to modify several parameters and then execute a single command":SYSTem:COMMunicate:LAN:APPLy."

For Example: :SYSTem:COMMunicate:LAN:IPADdress "192.168.10.142" Set IP address to 192.168.10.142.

:SYSTem:COMMunicate:LAN:APPLy Apply the network parameters that have been set.

:SYSTem:COMMunicate:LAN:IPADdress?

Command Format: :SYSTem:COMMunicate:LAN:IPADdress?

Command Function: Query IP address of the instrument.

Description: After the network parameters are set, and before executing the command ":SYSTem:COMMunicate:LAN", the result queried by this command reflects the temporary parameters and the parameter data used when executing":SYSTem:COMMunicate:LAN."Otherwise, the result queried by this command reflects the currently operating parameters of the instrument.

The query returns "192.168.10.142."

For Example: :SYSTem:COMMunicate:LAN:IPADdress?

Query Return: "192.168.10.142"

:SYSTem:COMMunicate:LAN:SMASK

Command Format: :SYSTem:COMMunicate:LAN:SMASK "x.x.x.x"

Command Function: Set the network subnet mask of the instrument.

Description: When using the command to set the network parameters, the setup will not take effect immediately and will not be saved to the non-volatile memory of the instrument. You must execute the command ":SYSTem:COMMunicate:LAN:APPLy"to make the parameters valid and save them permanently. You can

execute multiple commands to modify several parameters and then execute a single command":SYSTem:COMMunicate:LAN:APPLy."

For Example: :SYSTem:COMMunicate:LAN:SMASK "255.255.255.0" Set the subnet mask to 255.255.255.0

:SYSTem:COMMunicate:LAN:APPLy Apply the network parameters that have been set.

:SYSTem:COMMunicate:LAN:SMASK?

Command Format: **:SYSTem:COMMunicate:LAN:SMASK?**

Command Function: Query the network subnet mask of the instrument.

Description: After the network parameters are set, and before executing the command ":SYSTem:COMMunicate:LAN", the result queried by this command reflects the temporary parameters and the parameter data used when executing":SYSTem:COMMunicate:LAN."Otherwise, the result queried by this command reflects the currently operating parameters of the instrument.

The query returns "255.255.255.0."

For Example: :SYSTem:COMMunicate:LAN:SMASK?

Query Return: "255.255.255.0"

:SYSTem:COMMunicate:LAN:GATEway

Command Format: **:SYSTem:COMMunicate:LAN:GATEway** "x.x.x.x"

Command Function: Set the network gateway of the instrument.

Description: When using the command to set the network parameters, the setup will not take effect immediately and will not be saved to the non-volatile memory of the instrument. You must execute the command ":SYSTem:COMMunicate:LAN:APPLy"to make the parameters valid and save them permanently. You can execute multiple commands to modify several parameters and then execute a single command":SYSTem:COMMunicate:LAN:APPLy."

For Example: :SYSTem:COMMunicate:LAN:GATEway "192.168.10.1"

Set the network gateway to 192.168.10.1

:SYSTem:COMMunicate:LAN:APPLy Apply the network parameters that have been set.

:SYSTem:COMMunicate:LAN:GATEway?

Command Format: **:SYSTem:COMMunicate:LAN:GATEway?**

Command Function: Query the network gateway of the instrument.

Description: After the network parameters are set, and before executing the command ":SYSTem:COMMunicate:LAN", the result queried by this command reflects the temporary parameters and the parameter data used when executing":SYSTem:COMMunicate:LAN."Otherwise, the result queried by this command reflects the currently operating parameters of the instrument.

The query returns "192.168.10.1."

For Example: :SYSTem:COMMunicate:LAN:GATEway?

Query Return: "192.168.10.1"

:SYSTem:COMMunicate:RS232:BAUD

Command Format: :SYSTem:COMMunicate:RS232:BAUD {4800|7200|9600|14400|19200|38400|57600|115200|128000}

Command Function: Set the baud rate for RS232 interface.

For Example: :SYSTem:COMMunicate:RS232:BAUD 9600 Set the baud rate of RS232 to 9600.

:SYSTem:COMMunicate:RS232:BAUD?

Command Format: :SYSTem:COMMunicate:RS232:BAUD?

Command Function: Query the baud rate of RS232 interface.

Description: The query returns {4800|7200|9600|14400|19200|38400|57600|115200|128000}.

For Example: :SYSTem:COMMunicate:RS232:BAUD? Query the baud rate of RS232 interface.

Query Return: 9600 Return result: Baud rate of RS232 is 9600.

:SYSTem:LOCK

Command Format: :SYSTem:LOCK {0|1|OFF|ON}

Command Function: Turn on/off the key lock. Long press "LOCK" key to unlock the keyboard.

Description: "ON/OFF" key is valid when the key lock is enabled.

For Example: :SYSTem:LOCK Lock the keyboard.

:SYSTem:LOCK?

Command Format: :SYSTem:LOCK?

Command Function: Query the status of the key lock.

Description: The query returns {ON|OFF}.

For Example: :SYSTem:LOCK? Query the status of the key lock.

Query Return: OFF Return result: The keyboard is unlocked.

:SYSTem:KLOCk:STATe

:SYSTem:RWLock[:STATe]

Command Format: :SYSTem:KLOCk:STATe [0|1|OFF|ON]

:SYSTem:RWLock[:STATe] [0|1|OFF|ON]

Command Function: Turn on/off the remote key lock. The lock can only be unlocked by a remote command or by restarting the device if the remote lock key is enabled.

Description: If the parameter is omitted, the remote key is enabled by default. "ON/OFF" key is valid when the remote key lock is enabled.

For Example: :SYSTem:KLOCk:STAT ON Remote lock

:SYSTem:RWLock Remote lock

:SYSTem:KLOCk:STATe?

:SYSTem:RWLock[:STATe]?

Command Format: :SYSTem:KLOCk:STATe?

:SYSTem:RWLock[:STATe]?

Command Function: Query the status of the remote key lock.

Description: The query returns {ON|OFF}.

For Example: :SYSTem:KLOCk:STAT? Query the status of the remote key lock.

Query Return: OFF Return result: Remote key lock is disabled.

:SYSTem:LANGuage:TYPE

Command Format: :SYSTem:LANGuage:TYPE {EN|CH}

Command Function: Set the UI language for the instrument.

Description: EN: English CH: Simplified Chinses

For Example: :SYSTem:LANGuage:TYPE EN Set the UI language to EN.

:SYSTem:LANGuage:TYPE?

Command Format: :SYSTem:LANGuage:TYPE?

Command Function: Query the UI language for the instrument.

Description: The query returns {EN|CH }.

EN: English CH: Simplified Chinses

For Example: :SYSTem:LANGuage:TYPE? Query the UI language

Query Return: EN Return result: EN

6. Programming Example

Documentation No.

Software Version

1.10