meatest

9010 Multifunction Calibrator

remote control manual

Content

Meatest 9010 Remote Control Manual

1. Connection Setup

The calibrator can be integrated into automated calibration systems (ATS) and generally controlled from remote computer via RS232, USB, GPIB (IEEE488) or Ethernet interface. When controlled remotely, maximum ratings of calibrator's output signals as well as all other specifications are the same as in manual mode.

Only one interface can be used for communication at any given time. To establish connection between the calibrator and computer, select prefered interface in MENU->Interface->Active bus (RS232 is active by default) and follow instructions from relevant subchapter below.

1.1. RS232 and USB Connection

Connect the calibrator to your remote controller (PC) using either:

- 9-pin D-SUB, 1:1 male/female RS232 cable, or
- USB 2.0 A-B cable

And set the remote controller as follows:

- COM port   see available COM ports in Windows Device Manager
  USB appears as serial converter "USB Serial Port (COMxx)"
- Baudrate   9600 (can be changed to 1200 – 115200 in calibrator Menu->Interface)
- Data bits   8
- Stop bits   1
- Parity   None
- Handshake (Xon/Xoff) Off

1.2. GPIB Connection

Set GPIB address of controlled device in your remote controller (PC) to match value in calibrator's MENU->Interface->GPIB Address (2 by default).

Connect the calibrator to your remote controller (PC) using IEEE488 cable. When using converters, make sure you use National Instruments converters as other types (e.g. Agilent) might not work properly. Once connected, the calibrator automatically executes IEEE488 bus commands SH1, AH1, T5, L3, RL1, and DC1 (in that order). Calibrator also recognizes following general commands:

- DCL   Device Clear – resets device to its basic state
- SDC   Selected Device Clear – resets device to its basic state
- LLO   Local Lock Out – puts device into Remote mode and locks keyboard
- GTL   Go To Local – returns device from Remote mode and unlocks keyboard

1.3. Ethernet Connection

Ethernet connection uses IPv4 and Telnet protocols to communicate with remote controller (PC). By default, calibrator is set to establish Telnet server with DHCP hostname "9010_SNxxxxxx" ("xxxxxx" stands for serial number), listening to port 23. All IPv4 parameters can be changed in calibrator Menu > Interface > LAN Settings:

- DHCP discovery ON/OFF
- Port number
- Host name (with DHCP ON)
- IP address, subnet mask and default gateway (with DHCP OFF; in this case use IP address instead of hostname from now on)

Connect remote controller (PC) using at least category 4 UTP cable. It is recommended to check LAN connection with ping utility afterwards (type "ping " and hostname into Windows command line and see if the calibrator responds).

Once connected, you'll be able to log into the calibrator as Telnet client using Microsoft Telnet Client, Putty or similar. To start MS Telnet Client, open your command line and type in „Telnet". Then proceed with „o 9010_SNxxxxxx yy", where "xxxxxx" is serial number and "yy" is communication port:

```
C:\Windows\System32\telnet.exe                          —    □    ×

Welcome to Microsoft Telnet Client

Escape Character is 'Ctrl+]'

Microsoft Telnet> o 9010_SN750021 23_
```

```
C:\Windows\System32\telnet.exe                          —    □    ×

Welcome to 9010 device

9010>
```
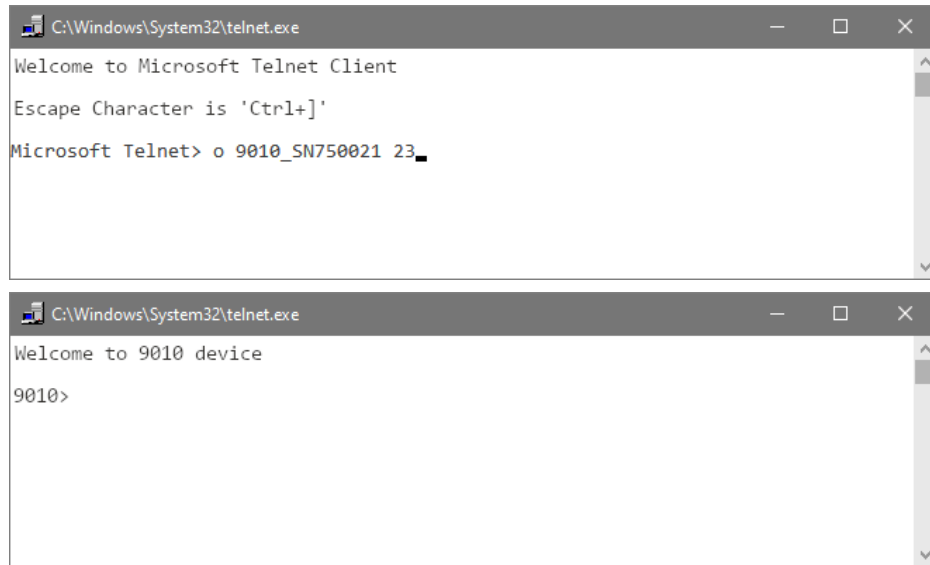
2. Executing Commands

Most commands can be executed in Remote mode only. In Remote mode, device blocks manual entry interfaces (keyboard, touchscreen) to prevent unintended manipulation during remote control session. GPIB interface switches device into and out of Remote mode automatically. Other interfaces (RS232, USB and Ethernet) need to use following commands:

- SYSTem:REMote   Puts device into Remote mode and locks keyboard except Local button
- SYSTem:RWLock   Puts device into Remote mode and locks entire keyboard
- SYSTem:LOCal   Returns device from Remote mode and unlocks keyboard

2.1.   Command Syntax

All commands listed in this chapter are made of KEYWORDS and PARAMETERS.

One or more KEYWORDS divided by colons (:) make up name of a command. When typing a command, keywords in square brackets ([ ]) can be omitted as well as lowercase letters and leading colons. For example ":OUTPut:STATe ON", ":OUTPut ON" and "OUTP 1" are considered the same.

Different PARAMETER types describe what kind of data is expected. For more details on parameter types, see table below. In command reference parameters are indicated by sharp brackets (< >) and separated by commas (,). Square brackets ([ ]) indicate non-mandatory parameters, vertical lines (|) indicate parameter alternatives.

Multiple commands can be executed at once if separated by semicolon (;). In any case, command (or set of commands) has to end with line feed (LF) terminator in order to be executed. With exception of GPIB interface, the device will also accept carriage return (CR) and combination of both (CRLF) as terminators. Inversely, device will always terminate its reply with CRLF or just LF in case of GPIB. The communication may look like this:

1. Controller> „RES 100;OUTP ON"+LF (ASCII code 10)
2. Device> „1.000000E+02 OHM"+LF
3. Device> „1"+LF

Used parameter types

Type	Description
<DNPD>	Decimal Numeric Program Data, this format is used to express decimal number with or without the exponent.
<CPD>	Character Program Data. Usually, it represents a group of alternative character parameters. E.g. {SERial|GPIB|USB|LAN}.
<SPD>	String Program Data (quoted string). This type of parameter is similar to CPD, but allows transmission of more ISO characters.
<BOOL>	Boolean Program Data. This type of parameter has only two states 0 and 1. Parameter can take form of integer value (0 or 1), or character alias (ON or OFF). Device always returns integer value (0 or 1).
<UNIT>	Unit parameter works in conjunction with DNPD parameter and specifies unit of DNPD (numeric) value. Unit must be selected from predefined ones. If UNIT part is omitted, default one is used. Query always returns actual unit.
<N>	Numeric suffix – unique identifier with NR1 format (an integer without a decimal point).
?	A flag indicating a request for the value of the parameter specified by the command. No other parameter than the question mark can be used.
(?)	A flag indicating a request for the parameter specified by the command. This command permits a value to be set as well as requested.

3. Status Reporting

3.1. Status Data Structure-Register Model

Device meets standard protocol according to the standard IEEE488.2. The protocol can be used for checking of error and status behavior of the device. It enables single-wire transmitting of SRQ command. The conditions on which SRQ signal (local control request) is sent can be set with commands *STB?, *SRE?, *SRE, *ESR?, *ESE?, *ESE a *CLS.
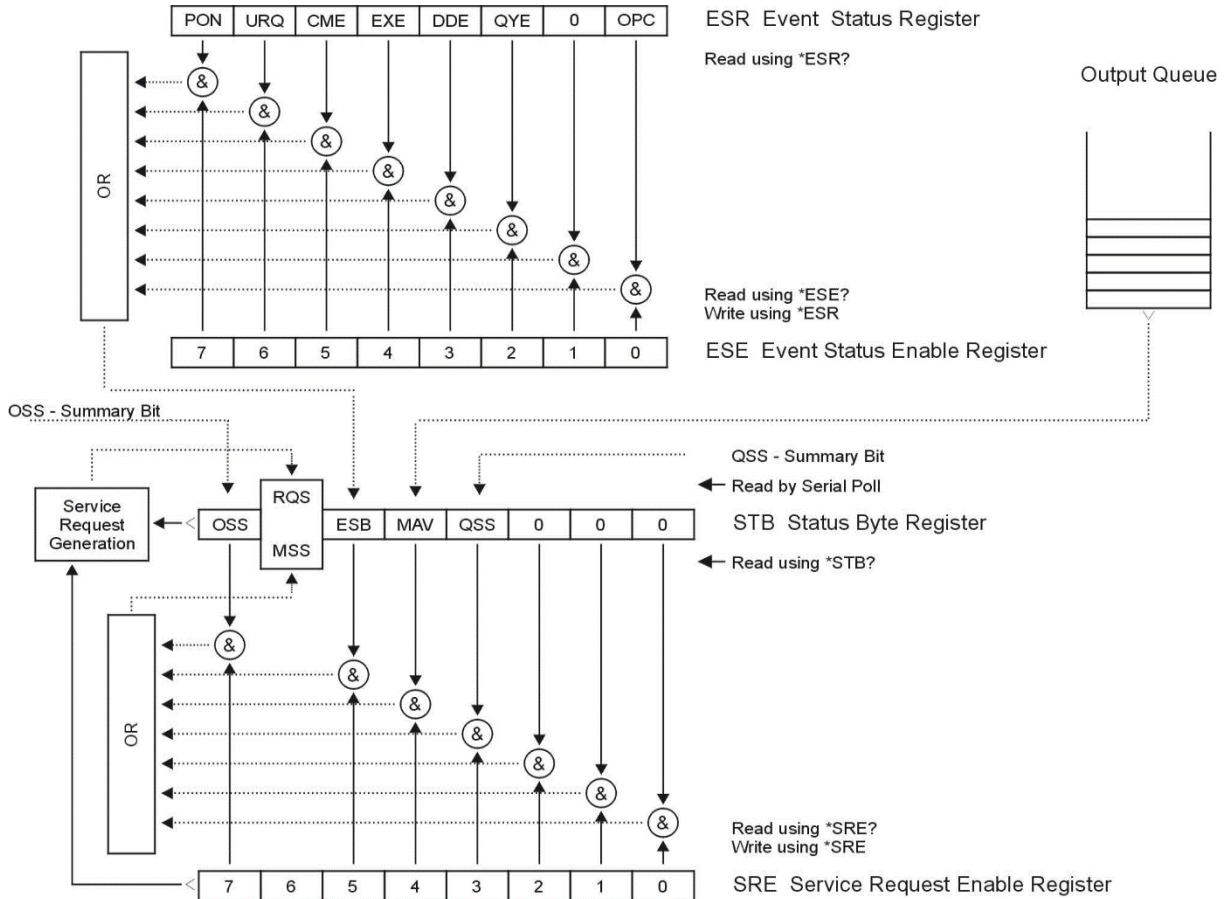
Figure 1 Status register overview

Status data structure contains following registers:

- STB – Status Byte Register
- SRE – Service Request Enable Register
- ESR – Event Status Register
- ESE – Event Status Enable Register
- Output Queue

3.2. Status Data Structure Registers

STB Status Byte Register

STB is main register where information from other status registers and from output queue is collected. Value of STB register is reset after switching on the device or after sending command *CLS. This command reset the STB register except bit MAV, which remains set if the output queue is not empty. STB register value can be read via serial message or through general query *STB?. Bit configuration of Status Byte Register is as follows:

- OSS Operation Summary Status, bit 7. SCPI-defined. The OSS bit is set to 1 when the data in the OSR (Operation Status Register) contains one or more enabled bits which are true.
- RQS Request Service, bit 6. The bit is read as a part of status byte only when serial message is sent.
- MSS Master Summary Status, bit 6. The MSS bit is set to 1 whenever bits ESB or MAV are 1 and enabled (1) in the SRE. This bit can be read using the *STB? command. Its value is derived from STB and SRE status.
- ESB Event Summary Bit, bit 5. His value is derived from STB and SRE status. The ESB bit is set to 1 when one or more enabled ESR bits are set to 1.
- MAV Message Available, bit 4. The MAV bit is set to 1 whenever data is available in the IEEE488 Output Queue (the response on query is ready).
- QSS Questionable Summary Status, bit 3. SCPI-defined. The QSS bit is set to 1 when the data in the QSR (Questionable Status Register) contains one or more enabled bits which are true.

SRE Service Request Enable Register

The Service Request Enable Register suppresses or allows the STB bits. "0" value of a SRE bit means, that the bit does not influence value of MSS bit. Value of any unmasked STB bit results in setting of the MSS bit to the level "1". SRE bit 6 is not influenced and its value is "0". The SRE register value can be set via the command *SRE followed by mask register value (0 – 191). The register can be read with the command *SRE?. The register is automatically resets after switching the device on. The register is not reset by the command *CLS.

ESR Event Status Register

Every bit of the EventStatusRegister corresponds to one event. Bit is set when the event is changed and it remains set also when the event passed. The ESR is cleared when the power is turned on (except bit PON which is set), and every time it is read via command *ESR? Or cleared with *CLS. Bit configuration of Event Status Register is as follows:

- PON Power On, bit 7. This event bit indicates that an off-to-on transition has occurred in the device's power supply.
- URQ User Request, bit 6. Bit is not used and it is always "0".
- CME Command Error, bit 5. This event bit indicates that an incorrectly formed command or query has been detected by the instrument.
- EXE Execution Error, bit 4. This event bit indicates that the received command cannot be executed, owing to the device state or the command parameter being out of limits.
- DDE Device Dependent Error, bit 3. This event bit indicates that an error has occurred which is neither a Command Error, a Query Error, nor an Execution Error. A Device-specific Error is any executed device operation that did not properly complete due to some condition, such as overload.
- QYE Query Error, bit 2. The bit is set if the device is addressed as talker and output queue is empty or if control unit did not pick up response before sending next query.
- OPC Operation Complete, bit 0. This event bit is generated in response to the *OPC command. It indicates that the device has completed all selected pending operations.

ESE Event Status Enable Register

The Event Status Enable Register allows one or more events in the Event Status Register to be reflected in the ESB summary-message bit. This register is defined for 8 bits, each corresponding to the bits in the Event Status Register. The Event Status Enable Register is read with the common query *ESE?. Data is returned as a binary-weighted value. The Event Status Enable Register is written to by the common command, *ESE. Sending the *ESE common command followed by a zero clears the ESE. The Event Status Enable Register is cleared upon power-on.

It suppresses or allows bits in ESR register. Value „0"of a bit of ESE register suppresses influence of appropriate bit of ESR register on value of sum bit of ESB status register. Setting of any unmask bit of ESR register results in setting of ESB status register. ESE register value can be modified by command *ESE followed by value of mask register (integer in range 0 –255). Reading of the register can be performed with command *ESE?. The register is automatically reset after switching on. The register is not reset with *CLS command.

Operation Status Register

The device uses bit 12 to indicate the active energy mode.

Questionable Status Register

The device uses bit 11 to query reaching the lower limit for the Test Limiting function.

The device uses bit 12 to query reaching the upper limit for the Test Limiting function.

Output Queue

The Output Queue stores response messages until they are read from control unit. If there is at minimum one sign in the output queue, MAV register (message available) is set. The Output Queue is cleared upon power-on and after reading all signs from output queue.

Error Queue

The Error Queue stores error messages. They are placed in a "first in, first out" queue.

The queue is read destructively using the query command "SYSTem:ERRor?" to obtain a code number and error message. The query "SYSTem:ERRor?" can be used to read errors in the queue until it is empty, when the message "0, No Error" will be returned.

3.3. Error Messages

SCPI Remote control errors

Code	Name	Description
-440	Query UNTERMINATED after indefinite response	Indicates that a query was received in the same program message after an query requesting an indefinite response was executed
-430	Query DEADLOCKED	Indicates that a condition causing a DEADLOCKED Query error occurred; for example, both input buffer and output buffer are full and the device cannot continue.
-420	Query UNTERMINATED	Indicates that a condition causing an UNTERMINATED Query error occurred; for example, the device was addressed to talk and an incomplete program message was received.
-410	Query INTERRUPTED	Indicates that a condition causing an INTERRUPTED Query error occurred; for example, a query followed by DAB or GET before a response was completely sent.
-400	Query error	This is the generic query error.
-350	Queue overflow	A specific code entered into the queue in lieu of the code that caused the error. This code indicates that there is no room in the queue and an error occurred but was not recorded.
-283	Illegal variable name	An attempt was made to reference a nonexistent variable in a program.

-241	Option is not present	Indicates that a legal program command or query could not be executed because of missing device hardware; for example, an option was not installed.
-230	Data corrupt or stale	Possibly invalid data; new reading started but not completed since last access.
-224	Illegal parameter value	Used where exact value, from a list of possible, was expected.
-222	Data out of range	Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range as defined by the device.
-221	Setting conflict	Indicates that a legal program data element was parsed but could not be executed due to the current device state.
-220	Parameter error	Indicates that a program data element related error occurred.
-213	Init ignored	Indicates that a request for a measurement initiation was ignored as another measurement was already in progress.
-211	Trigger ignored	Indicates that a GET, *TRG, or triggering signal was received and recognized by the device but was ignored because of device timing considerations; for example, the device was not ready to respond.
-203	Command protected	Indicates that a legal password-protected program command or query could not be executed because the command was disabled.
-161	Invalid block data	A block data element was expected, but was invalid for some reason; for example, an END message was received before the length was satisfied.
-151	Invalid string data	A string data element was expected, but was invalid for some reason; for example, an END message was received before the terminal quote character.
-144	Character data too long	The character data element contains more than twelve characters.
-141	Invalid character data	Either the character data element contains an invalid character or the particular element received is not valid for the header.
-131	Invalid suffix	The suffix does not follow the syntax, or the suffix is inappropriate for this device.
-130	Suffix error	This error is generated when parsing a suffix.
-121	Invalid character in number	An invalid character for the data type being parsed was encountered; for example, an alpha in a decimal numeric.
-120	Numeric data error	This error is generated when parsing a data element which appears to be numeric, including the nondecimal numeric types.
-114	Header suffix out of range	The value of a numeric suffix attached to a program mnemonic makes the header invalid.
-113	Undefined header	The header is syntactically correct, but it is undefined for this specific device; for example, *XYZ is not defined for any device.
-112	Program mnemonic too long	The header contains more that twelve characters.
-109	Missing parameter	Fewer parameters were received than required for the header; for example, the *EMC common command requires one parameter, so receiving *EMC is not allowed.
-108	Parameter not allowed	More parameters were received than expected for the header; for example, the *EMC common command only accepts one parameter, so receiving *EMC 0,1 is not allowed.
-105	GET not allowed	A Group Execute Trigger was received within a program message.
-104	Data type error	The parser recognized a data element different than one allowed; for example, numeric or string data was expected but block data was encountered.
-103	Invalid separator	The parser was expecting a separator and encountered an illegal character.
-102	Syntax error	An unrecognized command or data type was encountered; for example, a string was received when the device does not accept strings.
-101	Invalid character	A syntactic element contains a character which is invalid for that type; for example, a header containing an ampersand, OUTPUT&.
-100	Command error	This is the generic syntax error.
263	Not able to execute while instrument is measuring	The command cannot be executed because the measurement is in progress.

311	Not able to specify resolution with autorange	The resolution parameter was ignored because automatic range selection is used.
514	Command not allowed with GPIB	The command is not supported for GPIB.
515	The command is only supported for the RS232 bus	This command can only be used with the RS232 bus.
532	Not able to achieve requested resolution	The desired resolution cannot be set.
535	Value exceeded user global limit	The user-defined Master Limit has been exceeded.

Slave processor errors

1001	Internal communication with <module_name> failed.	The Slave processor received the command when it did not complete the previous commands. Pleas restart the device.
1002	Internal communication with <module_name> failed.	The Slave processor received a command with a wrong checksum. The command was not executed.
1003	Internal communication with <module_name> failed.	The Slave processor received an unknown command. Please update the device's FW.
1004	Internal communication with <module_name> failed.	The slave processor received the data, but its length is incorrect. Please update the device's FW.
1005	Internal communication with <module_name> failed.	The received parameter value is out of range. Please update the device's FW.
1006	Internal communication with <module_name> failed.	The command cannot be executed because the FW loading mode is active. Please restart the device.
1007	Internal communication with <module_name> failed.	The requested internal function does not exist. Please update the device's FW.
1008	Internal meter in <module_name> module does not measure	Internal meter returns invalid result.
1009	Internal meter in <module_name> module is overloaded	Internal meter is overloaded.
1010	Flash memory error in <module_name> module	Internal Flash operation error on slave processor.
1011	Flash memory error in <module_name> module	Writing or reading from the cell was not performed because the cell is out of range.
1012	Flash memory error in <module_name> module	Cannot write cell because it does not fit in Flash memory.
1013	Flash memory error in <module_name> module	Internal flash memory not found.

Master processor errors

2001 ... 2009	Internal communication with <module_name> failed.	General communication error between Master and Slave processor.
2010	<module_name> module disconnected!	The internal module has stopped communicating. Restart the device.
2011	<module_name> module is missing!	One of the basic modules of the device does not communicate.
2012	The <module_name> module has not completed the required function.	The device was not able to set the function even after a given timeout.

Execution errors

3001 ... 3011	Internal communication with <module_name> failed.	Obsolete function data. Please upload the latest FW.

Flash memory errors

4001 ... 4015	Flash memory error

Data transmitting errors

5001 ... 5005	Data transmitting module error

User interface errors

6001	Unknown command
6002	Invalid parameter
6003	Not setable
6004	Not questionable
6005	Unknown variable
6006	Value too low
6007	Value too high
6008	Not number
6009	Access denied
6011	Unknown format for displaying a variable
6012	Not initialized
6019	Empty string not allowed
6022	This name already exists
6032	Device is in remote mode. Activate the "Go to Local" key to go to Local mode.
6033	The code is invalid.
6034	Serial number is invalid.
6035	Invalid calibration index.
6036	The code is invalid.
6037	Unlock data failed to write.
6038 ... 6042	Invalid parameter
6043	Value exceeded user global limit

MODBUS errors

6050	MODBUS: Wrong control sum
6051	MODBUS: Not ASCII
6052	MODBUS: Outland message
6053	MODBUS: Invalid function
6054	MODBUS: Invalid location
6055	MODBUS: Invalid register count

Device errors

7001 ... 7005	A device error has occurred in the <module_name> module.
7006	Internal fan stopped!
7018	A device error has occurred in the <module_name> module.
7019	External synchronization lost
7020	External synchronization is not accomplished
7021	This function is unavailable!
7022	Meter function is unavailable!
7023	Current supply is too hot. Wait for it to cool down.

Hard overload checking

7100	2V Range overload!
7101	20V Range overload!
7102	Meter overload!
7103	Hi-Current amplifier overload!
7104	Lo-Current amplifier overload!
7105	280V Range overload!
7106	RF Output overload!
7107	Simulator current overload!
7108	Simulator voltage overload!
7109	PWM Amplifier overload!
7110	HF Amplifier overload!
7111	The current terminals are open!
7112	The voltage terminals are shorted!

Calibration data errors

8001	Invalid calibration index
8002	Invalid calibration mode
8003	Value too low
8004	Value too high
8005	Output is switched off
8006	Invalid measure
8007	Measurement is overloaded
8008	Measurement out of limit
8009	The device is in the warm state. <time> minutes left.
8010	Could not clear the preset!
8011	Required preset does not exist!
8012	Preset size exceeded!
8013	Could not write the preset!
8014	Could not read the preset!
8015	Preset is damaged!
8016	The preset is empty!
8017	The memory is full. You cannot create a new record. First remove older one.
8018	Access denied
8019	Input is switched off
8022	Current shunt temperature is high for calibration

Device presets errors

9003	Required preset does not exist!
9004	Could not clear the preset!
9005	Could not write the preset!
9006	Could not read the preset!
9007	Preset is damaged!
9002	The preset is empty!
9008	Preset size exceeded!

Harmonic presets errors

10001	Required preset does not exist!
10002	Invalid channel index

10003	Invalid harmonic index
10004	Could not write the preset!
10005	Could not read the preset!
10006	The preset is not editable!
10007	The preset cannot be deleted!
10008	It can be deleted only the last preset!
10009	Preset cannot be deleted because it is active on the voltage channel!
10010	Preset cannot be deleted because it is active on the current channel!
10011	Maximal preset count reached!
10012	Invalid parameter

Meter overload errors

11007	The voltage terminals are shorted!
11008	HVR Voltage overload!
11019	The voltage amplifier temperature is too high.
11022	Power supply "C" temperature is too high.
11023	Power supply "A" temperature is too high.
11024	Temperature of reference chamber is out of range!
11025	2V Amplifier temperature is too high.
11026	20V Amplifier temperature is too high.
11027	HF Amplifier temperature is too high.
11028	The current terminals are open!
11030	The Hi-Current amplifier temperature is too high.
11031	The Hi-Current amplifier temperature is too high.
11032	The Hi-Current amplifier temperature is too high.
11037	Power supply "B" temperature is too high.

External options errors

12001 ... 12009	Communication with external option failed.
12010	GBR resistance overload!
12011	Line impedance overload!
12012	Loop impedance overload!
12013	RCD trip current overload!
12014 ... 12024	Communication with external option failed.
12025	External option error. <device name> <error code>
12026	The external <device name> unit is HW obsolete.
12027	The external <device name> unit is SW obsolete. Please upload the new FW to the external unit.
12028	The external <device name> unit does not have the required features.
12029	The external unit <device name> is not available.
12030	The external unit <device_name> has not completed the required function.
12031	The external <device_name> unit is SW obsolete. Please upload the new FW to the external unit.
12032	The 9010 device has outdated FW. Please upload the new FW to the 9010 device.

Cable compensation related errors

13001-13999	13001: The preset is empty!
	13007: Maximum number of records reached
	13010: The item can not be deleted!

4. 9010 SCPI Command Reference

:CALCulate:AVERage:AVERage?

Syntax:

    :CALCulate:AVERage:AVERage?

Description:

    Returns the average value for all meter measurements since the averaging was enabled.

Parameters:

    <DNPD> - average value, (default 0.0).

Remarks:

    Averaging is started after enabling by the CALC:AVER ON command.

    The value is cleared after receiving the CALC:AVER:CLE command.

    The value is cleared after power on.

    The value is cleared on *RST command.

    Overlapped command.

Example:

    CALC:AVER:AVER? Response: 4.524123E+000

:CALCulate:AVERage:CLEar[:IMMediate]

Syntax:

    :CALCulate:AVERage:CLEar[:IMMediate]

Description:

    Clears all averaging values for the meter.

Parameters:

    None

Remarks:

    Overlapped command.

Example:

    CALC:AVER:CLE

:CALCulate:AVERage:COUNt?

Syntax:

    :CALCulate:AVERage:COUNt?

Description:

    Returns the number of readings taken since averaging was enabled.

Parameters:

    <DNPD> - number of readings, (default 0.0).

Remarks:

    Averaging is started after enabling by the CALC:AVER ON command.

    The value is cleared after receiving the CALC:AVER:CLE command.

    The value is cleared after power on.

    The value is cleared on *RST command.

    Overlapped command.

Example:

    CALC:AVER:COUN? Response: 3.82E+002

:CALCulate:AVERage:MINimum?

Syntax:

    :CALCulate:AVERage:MINimum?

Description:

    Returns the minimum value found during the averaging.

Parameters:

    <DNPD> - minimum value, (default 0.0).

Remarks:

    Averaging is started after enabling by the CALC:AVER ON command.

The value is cleared after receiving the CALC:AVER:CLE command.
The value is cleared after power on.
The value is cleared on *RST command.
Overlapped command.

Example:
CALC:AVER:MIN? Response: 4.513743E+000

:CALCulate:AVERage:MAXimum?

Syntax:
:CALCulate:AVERage:MAXimum?
Description:
Returns the maximum value found during the averaging.
Parameters:
<DNPD> - maximum value, (default 0.0).
Remarks:
Averaging is started after enabling by the CALC:AVER ON command.
The value is cleared after receiving the CALC:AVER:CLE command.
The value is cleared after power on.
The value is cleared on *RST command.
Overlapped command.
Example:
CALC:AVER:MAX? Response: 4.533872E+000

:CALCulate:AVERage:PTPeak?

Syntax:
:CALCulate:AVERage:PTPeak?
Description:
Returns the spanning value (peak to peak) found during the averaging.
Parameters:
<DNPD> - spanning value, (default 0.0).
Remarks:
Averaging is started after enabling by the CALC:AVER ON command.
The value is cleared after receiving the CALC:AVER:CLE command.
The value is cleared after power on.
The value is cleared on *RST command.
Overlapped command.
Example:
CALC:AVER:PTP? Response: 2.0129E-002

:CALCulate:AVERage:SDEViation?

Syntax:
:CALCulate:AVERage:SDEViation?
Description:
Returns the standard deviation value calculated during the averaging.
Parameters:
<DNPD> - standard deviation, (default 0.0).
Remarks:
Averaging is started after enabling by the CALC:AVER ON command.
The value is cleared after receiving the CALC:AVER:CLE command.
The value is cleared after power on.
The value is cleared on *RST command.
Overlapped command.
Example:
CALC:AVER:SDEV? Response: 1.329125E-007

:CALCulate:AVERage[:STATe]

>*Syntax:*
>>:CALCulate:AVERage[:STATe] <BOOL>
>>:CALCulate:AVERage[:STATe]?
>
>*Description:*
>>Disables or enables the averaging math function for meter.
>
>*Parameters:*
>><BOOL> - averaging state {ON|OFF|1|0} (default 0).
>>>·ON   enables the averaging math function.
>>>·OFF   disables the averaging math function.
>>>·1   enables the averaging math function.
>>>·0   disables the averaging math function.
>
>*Remarks:*
>>The value is stored in each preset.
>>The value is set according to "Start-up" preset after power on.
>>The value is set to default on *RST command.
>>Overlapped command.
>
>*Example:*
>>CALC:AVER ON
>>CALC:AVER? Response: 1

:CALCulate:CLEar[:IMMediate]

>*Syntax:*
>>:CALCulate:CLEar[:IMMediate]
>
>*Description:*
>>Clears all math functions (Averaging, Smoothing, Limit testing).
>
>*Parameters:*
>>None
>
>*Remarks:*
>>Overlapped command.
>
>*Example:*
>>CALC:CLE

:CALCulate:LIMit:CLEar[:IMMediate]

>*Syntax:*
>>:CALCulate:LIMit:CLEar[:IMMediate]
>
>*Description:*
>>Clears the limit testing function.
>
>*Parameters:*
>>None
>
>*Remarks:*
>>Overlapped command.
>
>*Example:*
>>CALC:LIM:CLE

:CALCulate:LIMit:LOWer[:DATA]

>*Syntax:*
>>:CALCulate:LIMit:LOWer[:DATA] <DNPD>
>>:CALCulate:LIMit:LOWer[:DATA]?
>
>*Description:*
>>Sets the lower limit for limit testing.
>
>*Parameters:*
>><DNPD> - lower limit, (default 0.0).
>
>*Remarks:*
>>The value is stored in each preset.

The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CALC:LIM:LOW 9.0
CALC:LIM:LOW? Response: 9.000000E+00

:CALCulate:LIMit:UPPer[:DATA]

Syntax:
:CALCulate:LIMit:UPPer[:DATA] <DNPD>
:CALCulate:LIMit:UPPer[:DATA]?

Description:
Sets the upper limit for limit testing.

Parameters:
<DNPD> - upper limit, (default 0.0).

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CALC:LIM:UPP 11.0
CALC:LIM:UPP? Response: 1.100000E+01

:CALCulate:LIMit[:STATe]

Syntax:
:CALCulate:LIMit[:STATe] <BOOL>
:CALCulate:LIMit[:STATe]?

Description:
Disables or enables the limit testing function for meter.

Parameters:
<BOOL> - limit state {ON|OFF|1|0} (default 0)
·ON   enables the limit testing function for meter.
·OFF   disables the limit testing function for meter.
·1   enables the limit testing function for meter.
·0   disables the limit testing function for meter.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CALC:LIM ON
CALC:LIM? Response: 1

:CALCulate:SCALe:FUNCtion

Syntax:
:CALCulate:SCALe:FUNCtion <CPD>
:CALCulate:SCALe:FUNCtion?

Description:
Selects desired scaling function if the scaling is enabled.

Parameters:
<CPD> - scale function {PCT|SCALe} (default PCT).
·PCT   meter value is recalculated relative to the reference $Y=((X-R)/R)*100$.
·SCALe   meter value is recalculated according to the formula $Y=A*X-B$.

Remarks:
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> CALC:SCAL:FUNC PCT
> CALC:SCAL:FUNC? Response: PCT

:CALCulate:SCALe:GAIN

Syntax:
> :CALCulate:SCALe:GAIN <DNPD>
> :CALCulate:SCALe:GAIN?

Description:
> Sets the gain (A component) for scaling function Y=A*X-B.

Parameters:
> <DNPD> - gain, (default 1.0).

Remarks:
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> CALC:SCAL:GAIN 1.0
> CALC:SCAL:GAIN? Response: 1.000000E+00

:CALCulate:SCALe:OFFSet

Syntax:
> :CALCulate:SCALe:OFFSet <DNPD>
> :CALCulate:SCALe:OFFSet?

Description:
> Sets the offset (B component) for scaling function Y=A*X-B.

Parameters:
> <DNPD> - offset, (default 0.0).

Remarks:
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> CALC:SCAL:OFFS 0.0
> CALC:SCAL:OFFS? Response: 0.000000E+00

:CALCulate:SCALe:REFerence

Syntax:
> :CALCulate:SCALe:REFerence <DNPD>
> :CALCulate:SCALe:REFerence?

Description:
> Sets the reference value (R component) for percentage scaling function Y=((X-R)/R)*100.

Parameters:
> <DNPD> - scale reference, (default 0.0).

Remarks:
> The value must not be zero to operate.
> The value is stored in each preset.

The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
    CALC:SCAL:REF 1.0
    CALC:SCAL:REF? Response: 1.000000E+00

:CALCulate:SCALe:REFerence:AUTO

Syntax:
    :CALCulate:SCALe:REFerence:AUTO <BOOL>
    :CALCulate:SCALe:REFerence:AUTO?

Description:
    Sets the reference value for the percentage function according to the measured value.

Parameters:
    <BOOL> - auto reference {ON|OFF|1|0} (default 0).
        ·ON   new reference value will be automatically set.
        ·OFF   reference value will not change.
        ·1   new reference value will be automatically set.
        ·0   reference value will not change.

Remarks:
    The value is automatically cleared after setting a new reference value.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:
    CALC:SCAL:REF:AUTO ON
    CALC:SCAL:REF:AUTO? Response: 1

:CALCulate:SCALe[:STATe]

Syntax:
    :CALCulate:SCALe[:STATe] <BOOL>
    :CALCulate:SCALe[:STATe]?

Description:
    Disables or enables the scaling function for meter.

Parameters:
    <BOOL> - scale state {ON|OFF|1|0} (default 0).
        ·ON   enables the scaling function for meter.
        ·OFF   disables the scaling function for meter.
        ·1   enables the scaling function for meter.
        ·0   disables the scaling function for meter.

Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:
    CALC:SCAL ON
    CALC:SCAL? Response: 1

:CALCulate:SCALe:UNIT

Syntax:
    :CALCulate:SCALe:UNIT <SPD>
    :CALCulate:SCALe:UNIT?

Description:
    Sets the unit for scale function. Unit is shown on display.

Parameters:

                <SPD> - unit. Upper alpha, lower alpha, digits and underscores are allowable. Maximal length is 4 characters (default "").

Remarks:

                It must be enabled by the CALC:SCAL:UNIT:STAT command for the unit to be displayed.
                The unit is not valid for the percentage function.
                The value is stored in each preset.
                The value is set according to "Start-up" preset after power on.
                The value is set to default on *RST command.
                Overlapped command.

Example:

                CALC:SCAL:UNIT "W"
                CALC:SCAL:UNIT? Response: "W"

:CALCulate:SCALe:UNIT:STATe

Syntax:

                :CALCulate:SCALe:UNIT:STATe <BOOL>
                :CALCulate:SCALe:UNIT:STATe?

Description:

                Disables or enables the unit for scaling function.

Parameters:

                <BOOL> - unit state {ON|OFF|1|0} (default 0).

                      ·ON   enables the unit.
                      ·OFF   disables the unit.
                      ·1   enables the unit.
                      ·0   disables the unit.

Remarks:

                The value is stored in each preset.
                The value is set according to "Start-up" preset after power on.
                The value is set to default on *RST command.
                Overlapped command.

Example:

                CALC:SCAL:UNIT:STAT ON
                CALC:SCAL:UNIT:STAT? Response: 1

:CALCulate:SMOothing:RESPonse

Syntax:

                :CALCulate:SMOothing:RESPonse <CPD>
                :CALCulate:SMOothing:RESPonse?

Description:

                Sets the measurement filtering using a moving average.

Parameters:

                <CPD> - smoothing response {SLOW|MEDium|FAST} (default FAST).

                      ·SLOW   strong filtering using 100 measurements.
                      ·MEDium   medium filtering using 50 measurements.
                      ·FAST   slight filtering using 10 measurements.

Remarks:

                Filtering must be enabled by the CALC:SMO ON command.
                The value is stored in each preset.
                The value is set according to "Start-up" preset after power on.
                The value is set to default on *RST command.
                Overlapped command.

Example:

                CALC:SMO:RESP SLOW
                CALC:SMO:RESP? Response: SLOW

:CALCulate:SMOothing[:STATe]

Syntax:

:CALCulate:SMOothing[:STATe] <BOOL>
:CALCulate:SMOothing[:STATe]?

Description:

Disables or enables the smoothing meter readings.

Parameters:

<BOOL> - smoothing state {ON|OFF|1|0} (default 0).

·ON   enables smoothing.
·OFF   disables smoothing.
·1   enables smoothing.
·0   disables smoothing.

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CALC:SMO ON
CALC:SMO? Response: 1

:CALibration:DATE

Syntax:

:CALibration:DATE <DNPD>,<DNPD>,<DNPD>
:CALibration:DATE?

Description:

Sets the date of last calibration.

Parameters:

<DNPD> - year, range 2000...2063.
<DNPD> - month, range 1...12.
<DNPD> - day, range 1...31.

Remarks:

This command requires "Calibration" access to write date.
Overlapped command.

Example:

CAL:DATE 2020,3,28
CAL:DATE? Response: 2020,3,28

:CALibration:INTerval

Syntax:

:CALibration:INTerval <DNPD>
:CALibration:INTerval?

Description:

Sets the calibration interval. If the current instrument date is greater than the calibration date extended by the calibration interval, the instrument will announce the outdated calibration.

Parameters:

<DNPD>- calibration interval [months], range 0 ... 240 (default 12).

Remarks:

This command requires "Calibration" access to write interval.
Overlapped command.

Example:

CAL:INT 12
CAL:INT? Response: 12

:CALibration:POINt:ACCuracy?

Syntax:
> :CALibration:POINt:ACCuracy?

Description:
> The command is used to read the required absolute accuracy at the selected calibration point. The calibration point must first be selected using the CAL:POIN:MODE and CAL:POIN:SEL commands.

Parameters:
> <DNPD> - requested accuracy

Remarks:
> The accuracy is fixed for each calibration point.
> Overlapped command.

Example:
> CAL:POIN:ACC? Response: 8.000000E-07

:CALibration:POINt:AMPLitude

Syntax:
> :CALibration:POINt:AMPLitude <DNPD>
> :CALibration:POINt:AMPLitude?

Description:
> Sets the actual calibration amplitude during calibration. The calibration mode and point must be selected beforehand.

Parameters:
> <DNPD> - calibration point amplitude.

Remarks:
> This command requires "Calibration" access.
> Overlapped command.

Example:
> CAL:POIN:AMPL 65.3257
> CAL:POIN:AMPL? Response: 6.532570E+01

:CALibration:POINt:CONVerter?

Syntax:
> :CALibration:POINt:CONVerter?

Description:
> Returns actual converter value during calibration meter.

Parameters:
> <DNPD> - converter value.

Remarks:
> Overlapped command.

Example:
> CAL:POIN:CONV? Response: 1.000000E+00

:CALibration:POINt:DATE

Syntax:
> :CALibration:POINt:DATE?

Description:
> Returns calibration date for selected calibration point. The calibration date is updated automatically after saving calibration point by CAL:POIN:SAVE command.

Parameters:
> <DNPD> - year, range 2020...2063
> <DNPD> - month, range 1...12
> <DNPD> - day, range 1...31

Remarks:
> Overlapped command.

Example:
> CAL:POIN:DATE? Response: 2020,1,14

:CALibration:POINt:MEASure?

Syntax:
> :CALibration:POINt:MEASure?

Description:
> Returns the actual measured value during meter calibration.

Parameters:
> <DNPD> - measured value.

Remarks:
> Overlapped command.

Example:
> CAL:POIN:MEAS? Response: 1.000000E+00

:CALibration:POINt:MODE

Syntax:
> :CALibration:POINt:MODE <DNPD>
> :CALibration:POINt:MODE?

Description:
> Selects the calibration mode.

Parameters:
> <DNPD> - calibration mode, see table below for more details

Remarks:
> This command requires "Calibration" access.
> Overlapped command.

Example:
> CAL:POIN:MODE 10
> CAL:POIN:MODE? Response: 10

Cal. mode	Calibration function	Cal. mode	Calibration function
44	Voltage DC > Range 20 mV PASSIVE	22	Current AC > Range 200 mA
45	Voltage DC > Range 200 mV PASSIVE	23	Current AC > Range 2 A
1	Voltage DC > Range 20 mV	24	Current AC > Range 30 A
2	Voltage DC > Range 200 mV	36	Current Harmonic > Range 200 uA
3	Voltage DC > Range 2 V	37	Current Harmonic > Range 2 mA
4	Voltage DC > Range 20 V	38	Current Harmonic > Range 20 mA
5	Voltage DC > Range 100 V	39	Current Harmonic > Range 200 mA
72	Voltage DC > Range 280 V	40	Current Harmonic > Range 2 A
6	Voltage DC > Range 1000 V	41	Current Harmonic > Range 30 A
7	Voltage AC > Range 20 mV	78	Scope Sine > Amplitude linearity
8	Voltage AC > Range 200 mV	79	Scope Sine > Attenuator attenuation
9	Voltage AC > Range 2 V	80	Scope Sine > Frequency response
10	Voltage AC > Range 20 V	124	Scope Voltage > Range 0.5 V
11	Voltage AC > Range 100 V	125	Scope Voltage > Range 10 V
73	Voltage AC > Range 280 V	81	Resistance LVR > Fixed
12	Voltage AC > Range 1000 V	82	Resistance LVR > Variable > Nominal
29	Voltage Harmonic > Range 20 mV	83	Resistance LVR > Variable > Extended
30	Voltage Harmonic > Range 200 mV	91	Resistance HVR > Fixed
31	Voltage Harmonic > Range 2 V	90	Resistance HVR > Variable
32	Voltage Harmonic > Range 20 V	84	Capacitance > Fixed
33	Voltage Harmonic > Range 100 V	85	Capacitance > Variable > Nominal
34	Voltage Harmonic > Range 280 V	86	Capacitance > Variable > Extended

Cal. mode	Calibration function	Cal. mode	Calibration function
35	Voltage Harmonic > Range 1000 V	51	Meter > Voltage DC > Range 12 mV
126	Voltage from current > Range 50 mV	52	Meter > Voltage DC > Range 120 mV
127	Voltage from current > Range 500 mV	53	Meter > Voltage DC > Range 1.2 V
128	Voltage from current > Range 5 V	54	Meter > Voltage DC > Range 12 V
13	Current DC > Range 200 uA	121	Meter > Lo DC Current > Range 100 uA
14	Current DC > Range 2 mA	122	Meter > Lo DC Current > Range 1 mA
15	Current DC > Range 20 mA	57	Meter > Current DC > Range 2.4 mA
16	Current DC > Range 200 mA	58	Meter > Current DC > Range 24 mA
17	Current DC > Range 2 A	59	Meter > Resistance > 2 kOhm
18	Current DC > Range 30 A	60	Meter > Resistance > 20 kOhm
19	Current AC > Range 200 uA	61	Meter > Frequency
20	Current AC > Range 2 mA	95	Meter > Voltage HVR > Range 1100 V (<1 MOhm)
21	Current AC > Range 20 mA	96	Meter > Voltage HVR > Range 1500 V (>1 MOhm)

:CALibration:POINt:NOMinal?

Syntax:
> :CALibration:POINt:NOMinal?

Description:
> The command is used to read the nominal value at the selected calibration point. The calibration point must first be selected using the CAL:POIN:MODE and CAL:POIN:SEL commands.

Parameters:
> <DNPD> - nominal value of the calibration point.

Remarks:
> The nominal value is fixed for each calibration point.
> Overlapped command.

Example:
> CAL:POIN:NOM? Response: 1.900000E+01

:CALibration:POINt:SELect

Syntax:
> :CALibration:POINt:SELect <DNPD>
> :CALibration:POINt:SELect?

Description:
> Selects a calibration point within one calibration mode.

Parameters:
> <DNPD> - calibration point, range 1 ... calibration point count for actual calibration mode.

Remarks:
> This command requires "Calibration" access.
> Overlapped command.

Example:
> CAL:POIN:SEL 1
> CAL:POIN:SEL? Response: 1

:CALibration:POINt:SAVE

Syntax:
> :CALibration:POINt:SAVE

Description:
> Saves the actual calibration point.

Parameters:

None

Remarks:

This command requires "Calibration" access.

Overlapped command.

Example:

CAL:POIN:SAVE

:CALibration:SECure:EXIT

Syntax:

:CALibration:SECure:EXIT

Description:

Exits calibration mode and makes calibration backup.

Parameters:

None

Remarks:

Overlapped command.

Example:

CAL:SEC:EXIT

:CALibration:SECure:PASSword

Syntax:

:CALibration:SECure:PASSword <DNPD>

Description:

Enters calibration mode. Valid calibration password is required.

Parameters:

<DNPD> - calibration password, range 0 ... 4294967295 (default 9010).

Remarks:

Overlapped command.

Example:

CAL:SEC:PASS 9010

:CALibration:STATus<N>?

Syntax:

:CALibration:STATus<N>?

Description:

Returns required calibration status.

Parameters:

<N> - index, 1-warm up, 2-try mode, 3-outdated calibration.

<DNPD> - calibration status, 0-false, 1-true.

Remarks:

Overlapped command.

Example:

CAL:STAT1? Response: 0

:CONFigure?

Syntax:

:CONFigure?

Description:

Returns actual meter configuration.

Parameters:

<SPD> - meter configuration "function range,resolution".

Remarks:

Overlapped command.

Example:

CONF? Response: "VOLT 1.200000E+01,1.000000E-5"

:CONFigure:CURRent[:DC]

Syntax:
:CONFigure:CURRent[:DC][<DNPD>[,<DNPD>]]
:CONFigure:CURRent[:DC]?

Description:
Configures meter in Current DC mode.

Parameters:
<DNPD> - range [A], range 0 ... 0.024.
<DNPD> - resolution [A] - this parameter is ignored and device sets fixed resolution by selected range.

Remarks:
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CONF:CURR 0.024
CONF:CURR? Response: 2.400000E-2,1.000000E-08

:CONFigure:CURRent:LO

Syntax:
:CONFigure:CURRent:LO[<DNPD>[,<DNPD>]]
:CONFigure:CURRent:LO?

Description:
Configures meter in Current Lo mode.

Parameters:
<DNPD> - range [A], range 0 ... 0.0011.
<DNPD> - resolution [A] - this parameter is ignored and device sets fixed resolution by selected range.

Remarks:
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CONF:CURR:LO 0.001
CONF:CURR:LO? Response: 1.100000E-3,1.000000E-09

:CONFigure:FREQuency

Syntax:
:CONFigure:FREQuency[<DNPD>[,<DNPD>]]
:CONFigure:FREQuency?

Description:
Configures meter in Frequency mode.

Parameters:
<DNPD> - range [Hz], 0 ... 100000.0.
<DNPD> - resolution [Hz] - this parameter is ignored and device sets fixed resolution by selected range.

Remarks:
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CONF:FREQ 100000.0
CONF:FREQ? Response: 1.000000E+05,1.000000E+00

:CONFigure:RESistance

Syntax:
:CONFigure:RESistance[<DNPD>[,<DNPD>]]
:CONFigure:RESistance?

Description:
Configures meter in Resistance mode.

Parameters:
<DNPD> - range [Ohm], range 0.0 ... 20000.0.
<DNPD> - resolution [Ohm] - this parameter is ignored and device sets fixed resolution by selected range.

Remarks:
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CONF:RES 20000.0
CONF:RES? Response: 2.000000E+04,1.000000E-02

:CONFigure:TEMPerature:RTD

Syntax:
:CONFigure:TEMPerature:RTD[<DNPD>[,<DNPD>]]
:CONFigure:TEMPerature:RTD?

Description:
Configures meter in Temperature RTD mode.

Parameters:
<DNPD> - resistance range [Ohm], range 0.0 ... 20000.0.
<DNPD> - resolution [Ohm] - this parameter is ignored and device sets fixed resolution by selected range.

Remarks:
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CONF:TEMP:RTD 20000.0
CONF:TEMP:RTD? Response: 2.000000E+04,1.000000E-02

:CONFigure:TEMPerature:TCOuple

Syntax:
:CONFigure:TEMPerature:TCOuple[<DNPD>[,<DNPD>]]
:CONFigure:TEMPerature:TCOuple?

Description:
Configures meter in Temperature TC mode.

Parameters:
<DNPD> - voltage range [V], range 0.0 ... 0.12.
<DNPD> - resolution [V] - this parameter is ignored and device sets fixed resolution by selected range.

Remarks:
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
CONF:TEMP:TCO 0.12
CONF:TEMP:TCO? Response: 1.200000-E01,1.000000E-08

:CONFigure:VOLTage[:DC]

Syntax:
> :CONFigure:VOLTage[:DC][<DNPD>[,<DNPD>]]
> :CONFigure:VOLTage[:DC]?

Description:
> Configures meter in Voltage DC mode.

Parameters:
> <DNPD> - voltage range [V], range 0.0 ... 12.0.
> <DNPD> - resolution [V] - this parameter is ignored and device sets fixed resolution by selected range.

Remarks:
> The value is set to default after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> CONF:VOLT 12.0
> CONF:VOLT? Response: 1.200000E+01,1.000000E-05

:DISPlay:ACCuracy:ACTive?

Syntax:
> :DISPlay:ACCuracy:ACTive?

Description:
> Returns the current absolute specification value for the selected control on the instrument display. The control is selected using the DISP:ACT command.

Parameters:
> <DNPD> - accuracy

Remarks:
> The value is calculated according to the currently set function parameters.
> Overlapped command.

Example:
> DISP:ACC:ACT? Response: 3.500000E-06

:DISPlay:ACCuracy[:SOURce]?

Syntax:
> :DISPlay:ACCuracy[:SOURce]?

Description:
> Returns absolute accuracy for actual selected source function, range and amplitude.

Parameters:
> <DNPD> - accuracy.

Remarks:
> Overlapped command.

Example:
> DISP:ACC? Response: 3.900000E-04

:DISPlay:ACCuracy:METer?

Syntax:
> :DISPlay:ACCuracy:METer?

Description:
> Returns absolute accuracy for actual selected meter function, range and measured value.

Parameters:
> <DNPD> - accuracy.

Remarks:
> Returns -1.000000E+20 if actual measurement is invalid.
> Overlapped command.

Example:

DISP:ACC:MET? Response: 1.681000E-05

:DISPlay:ACTivate

Syntax:

:DISPlay:ACTivate <DNPD>

:DISPlay:ACTivate?

Description:

Activates control on the display.

Parameters:

<DNPD> - control to activate. Order is from top-left, 0-deselects control.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

DISP:ACT 1

DISP:ACT? Response: 1

:DISPlay:ANNotation:CLOCk:DATE:FORMat

Syntax:

:DISPlay:ANNotation:CLOCk:DATE:FORMat <CPD>

:DISPlay:ANNotation:CLOCk:DATE:FORMat?

Description:

Sets the date format used on the device's display.

Parameters:

<CPD> - date format {MDYS|MDYA|DMYS|DMYO|DMYA|YMDS|YMDO} (default MDYS).

·MDYS	MM/DD/YYYY
·MDYA	MM-DD-YYYY
·DMYS	DD/MM/YYYY
·DMYO	DD.MM.YYYY
·DMYA	DD-MM-YYYY
·YMDS	YYYY/MM/DD
·YMDO	YYYY.MM.DD

Remarks:

Overlapped command.

Example:

DISP:ANN:CLOC:DATE:FORM MDYS

DISP:ANN:CLOC:DATE:FORM? Response: MDYS

:DISPlay:ANNotation:CLOCk[:STATe]

Syntax:

:DISPlay:ANNotation:CLOCk[:STATe] <BOOL>

:DISPlay:ANNotation:CLOCk[:STATe]?

Description:

Enables or disables clock in the title bar.

Parameters:

<BOOL> - clock state {ON|OFF|1|0} (default 0).

·ON	enables clock.
·OFF	disables clock.
·1	enables clock.
·0	disables clock.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:
DISP:ANN:CLOC ON
DISP:ANN:CLOC? Response: 1

:DISPlay:BRIGhtness

Syntax:
:DISPlay:BRIGhtness <DNPD>
:DISPlay:BRIGhtness?

Description:
Sets display backlight intensity.

Parameters:
<DNPD> - brightness, range 0.0 ... 1.0 (default 1.0).

Remarks:
Overlapped command.

Example:
DISP:BRIG 1.0
DISP:BRIG? Response: 1.000000E+00

:DISPlay:KEYBoard:BRIGhtness

Syntax:
:DISPlay:KEYBoard:BRIGhtness <DNPD>
:DISPlay:KEYBoard:BRIGhtness?

Description:
Sets keyboard LED lights intensity.

Parameters:
<DNPD> - brightness, range 0.0 ... 1.0 (default 1.0).

Remarks:
Overlapped command.

Example:
DISP:KEYB:BRIG 1.0
DISP:KEYB:BRIG? Response: 1.000000E+00

:DISPlay:LANGuage

Syntax:
:DISPlay:LANGuage <CPD>
:DISPlay:LANGuage?

Description:
Language selection for display.

Parameters:
<CPD> - language {ENGLish} (default ENGL).
·ENGLish   English language.

Remarks:
Overlapped command.

Example:
DISP:LANG ENGL
DISP:LANG? Response: ENGL

:HARMonic:CURRent:CALCulate

Syntax:
:HARMonic:CURRent:CALCulate

Description:
Calculates the harmonic signal for the current channel. Must be called after all harmonic amplitude and phase changes and before switching output on.

Parameters:

None
Remarks:
    Overlapped command.
Example:
    HARM:CURR:CALC

:HARMonic:CURRent:CLEar

Syntax:
    :HARMonic:CURRent:CLEar
Description:
    Resets all harmonic amplitudes and phases for the current channel.
Parameters:
    None
Remarks:
    Overlapped command.
Example:
    HARM:CURR:CLE

:HARMonic:CURRent:ORDer<N>:AMPLitude

Syntax:
    :HARMonic:CURRent:ORDer<N>:AMPLitude <DNPD>
    :HARMonic:CURRent:ORDer<N>:AMPLitude?
Description:
    Sets the harmonic amplitude for the current channel.
Parameters:
    <N> - harmonic, range 2 ... 50.
    <DNPD> - amplitude [%], range 0.0 ... 30.0 (default 0.0).
Remarks:
    The value can be stored in harmonic preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.
Example:
    HARM:CURR:ORD2:AMPL 10.0
    HARM:CURR:ORD2:AMPL? Response: 1.000000E+01

:HARMonic:CURRent:ORDer<N>:PHASe

Syntax:
    :HARMonic:CURRent:ORDer<N>:PHASe <DNPD>
    :HARMonic:CURRent:ORDer<N>:PHASe?
Description:
    Sets the harmonic phase for the current channel.
Parameters:
    <N> - harmonic, range 2 ... 50.
    <DNPD> - phase [°], range 0.0 ... 360.0 (default 0.0).
Remarks:
    The value can be stored in harmonic preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.
Example:
    HARM:CURR:ORD2:PHAS 60.0
    HARM:CURR:ORD2:PHAS? Response: 6.000000E+01

:HARMonic:CURRent[:PRESet]:NAME

Syntax:

:HARMonic:CURRent[:PRESet]:NAME <SPD>

:HARMonic:CURRent[:PRESet]:NAME?

Description:

Sets the name for the selected preset. Presets are common for voltage and current channel. The preset must first be selected with the HARM:CURR:SEL command.

Parameters:

<SPD> preset name. The characters A ... Z, a ... z, 0 ... 9, space, underscore, dot, plus, minus can be used. The name can contain up to 8 characters.

Remarks:

Overlapped command.

Example:

HARM:CURR:NAME "Harm 5"

HARM:CURR:NAME? Response: "Harm 5"

:HARMonic:CURRent[:PRESet]:SAVE

Syntax:

:HARMonic:CURRent[:PRESet]:SAVE

Description:

Stores the currently adjusted harmonic preset on the current channel in non-volatile memory. The voltage and current channels share the same presets. The preset name remains unchanged.

Parameters:

None

Remarks:

Overlapped command.

Example:

HARM:CURR:SAVE

:HARMonic:CURRent[:PRESet]:SELect

Syntax:

:HARMonic:CURRent[:PRESet]:SELect <DNPD>
:HARMonic:CURRent[:PRESet]:SELect?

Description:

Selects harmonic preset for the current channel.

Parameters:

<DNPD> - preset index, range 1 ... 23 (default 1).

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

HARM:CURR:SEL 1
HARM:CURR:SEL? Response: 1

:HARMonic:VOLTage:CALCulate

Syntax:
> :HARMonic:VOLTage:CALCulate

Description:
> Calculates the harmonic signal for the voltage channel. Must be called after all harmonic amplitude and phase changes and before switching output on.

Parameters:
> None

Remarks:
> Overlapped command.

Example:
> HARM:VOLT:CALC

:HARMonic:VOLTage:CLEar

Syntax:
> :HARMonic:VOLTage:CLEar

Description:
> Resets all harmonic amplitudes and phases for the voltage channel.

Parameters:
> None

Remarks:
> Overlapped command.

Example:
> HARM:VOLT:CLE

:HARMonic:VOLTage:ORDer<N>:AMPLitude

Syntax:
> :HARMonic:VOLTage:ORDer<N>:AMPLitude <DNPD>
> :HARMonic:VOLTage:ORDer<N>:AMPLitude?

Description:
> Sets the harmonic amplitude for the voltage channel.

Parameters:
> <N> - harmonic, range 2 ... 50.
> <DNPD> - amplitude [%], range 0.0 ... 30.0 (default 0.0).

Remarks:
> The value can be stored in harmonic preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> HARM:VOLT:ORD2:AMPL 10.0
> HARM:VOLT:ORD2:AMPL? Response: 1.000000E+01

:HARMonic:VOLTage:ORDer<N>:PHASe

Syntax:
> :HARMonic:VOLTage:ORDer<N>:PHASe <DNPD>
> :HARMonic:VOLTage:ORDer<N>:PHASe?

Description:
> Sets the harmonic phase for the voltage channel.

Parameters:
> <N> - harmonic, range 2 ... 50.
> <DNPD> - phase [°], range 0.0 ... 360.0 (default 0.0).

Remarks:
> The value can be stored in harmonic preset.
> The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

HARM:VOLT:ORD2:PHAS 60.0

HARM:VOLT:ORD2:PHAS? Response: 6.000000E+01

:HARMonic:VOLTage[:PRESet]:NAME

Syntax:

:HARMonic:VOLTage[:PRESet]:NAME <SPD>

:HARMonic:VOLTage[:PRESet]:NAME?

Description:

Sets the name for the selected preset. Presets are common for voltage and current channel. The preset must first be selected with the HARM:VOLT:SEL command.

Parameters:

<SPD> preset name. The characters A ... Z, a ... z, 0 ... 9, space, underscore, dot, plus, minus can be used. The name can contain up to 8 characters.

Remarks:

Overlapped command.

Example:

HARM:VOLT:NAME "Harm 5"

HARM:VOLT:NAME? Response: "Harm 5"

:HARMonic:VOLTage[:PRESet]:SAVE

Syntax:

:HARMonic:VOLTage[:PRESet]:SAVE

Description:

Stores the currently adjusted harmonic preset on the voltage channel in non-volatile memory. The voltage and current channels share the same presets. The preset name remains unchanged.

Parameters:

None

Remarks:

Overlapped command.

Example:

HARM:VOLT:SAVE

:HARMonic:VOLTage[:PRESet]:SELect

Syntax:

:HARMonic:VOLTage[:PRESet]:SELect <DNPD>

:HARMonic:VOLTage[:PRESet]:SELect?

Description:

Selects harmonic preset for the voltage channel.

Parameters:

<DNPD> - preset index, range 1 ... 23 (default 1).

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

HARM:VOLT:SEL 1

HARM:VOLT:SEL? Response: 1

:INPut:LOW

Syntax:

:INPut:LOW <CPD>

:INPut:LOW?

Description:

Sets the ground for the meter COM input terminal.

Parameters:

<CPD> - grounding {FLOat|GROund} (default GRO).

·FLOat   COM terminal is floating.

·GROund   COM terminal is grounded.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

INP:LOW FLO

INP:LOW? Response: FLO

:MEASure:CURRent[:DC]?

Syntax:

:MEASure:CURRent[:DC]?

Description:

Configures meter for Current DC function in default mode and takes measurement.

Parameters:

<DNPD> - measurement.

Remarks:

Overlapped command.

Example:

MEAS:CURR? Response: 1.6821000E-04

:MEASure:CURRent:LO?

Syntax:

:MEASure:CURRent:LO?

Description:

Configures meter for Current LO function in default mode and takes measurement.

Parameters:

<DNPD> - measurement.

Remarks:

Overlapped command.

Example:

MEAS:CURR:LO? Response: -2.625000E-08

:MEASure:FREQuency?

Syntax:

:MEASure:FREQuency?

Description:

Configures meter for Frequency function in default mode and takes measurement.

Parameters:

              \<DNPD\> - measurement.

Remarks:

              Overlapped command.

Example:

              MEAS:FREQ? Response: 6.238164E+03

:MEASure:RESistance?

Syntax:

              :MEASure:RESistance?

Description:

              Configures meter for Resistance function in default mode and takes measurement.

Parameters:

              \<DNPD\> - measurement.

Remarks:

              Overlapped command.

Example:

              MEAS:RES? Response: 4.000140E+03

:MEASure:TEMPerature:RTD?

Syntax:

              :MEASure:TEMPerature:RTD?

Description:

              Configures meter for Temperature RTD function in default mode and takes measurement.

Parameters:

              \<DNPD\> - measurement.

Remarks:

              The value is set to default after power on

              The value is set to default on *RST command

              Overlapped command

Example:

              MEAS:TEMP:RTD? Response: 2.210000E+02

:MEASure:TEMPerature:TCOuple?

Syntax:

              :MEASure:TEMPerature:TCOuple?

Description:

              Configures meter for Temperature TC function in default mode and takes measurement.

Parameters:

              \<DNPD\> - measurement.

Remarks:

              The value is set to default after power on

              The value is set to default on *RST command

              Overlapped command

Example:

              MEAS:TEMP:TCO? Response: -9.985000E+01

:MEASure:VOLTage[:DC]?

Syntax:

              :MEASure:VOLTage[:DC]?

Description:

              Configures meter for Voltage DC function in default mode and takes measurement.

Parameters:

              \<DNPD\> - measurement.

Remarks:

Overlapped command.

Example:

MEAS:VOLT? Response: 9.997400E+00

:OUTPut:CURRent:AC:LIMit[:LEVel]

Syntax:

:OUTPut:CURRent:AC:LIMit[:LEVel] <DNPD>[<UNIT>]

:OUTPut:CURRent:AC:LIMit[:LEVel]?

Description:

Sets the global AC current limit on all functions. This value limits both the amplitude setting and the range setting. This protects the connected devices from setting the calibrator to a value greater than the allowed one. There is no current limitation when using VFC current mode. When using Coil current mode, the limit applies to the current going to the coil.

Parameters:

<DNPD> - AC current limit level [A], range 0.01 ... 20.5 (default 20.5)

<UNIT> - limit unit {A}

·A   limit will be set in Amperes.

Remarks:

Setting the limit turns on the limit state.

The limit can be turned off with the command OUTP:CURR:AC:LIM:STAT.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:CURR:AC:LIM 20.5

OUTP:CURR:AC:LIM? Response: 2.050000E+01 A

:OUTPut:CURRent:AC:LIMit:STATe

Syntax:

:OUTPut:CURRent:AC:LIMit:STATe <BOOL>

:OUTPut:CURRent:AC:LIMit:STATe?

Description:

Turns the global AC current limit state on or off. If the state is off, then the maximum current value generated by the device is given by the capability of the device. If the status is on, then the maximum value is limited by the AC current limit level setting.

Parameters:

<BOOL> - AC current limit state {ON|OFF|1|0} (default OFF)

·ON   Current limit is active.

·OFF   The current limit is not active.

·1   Current limit is active.

·0   The current limit is not active.

Remarks:

The limit level is set with the OUTP:CURR:AC:LIM:LEV command.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:CURR:AC:LIM:STAT ON

OUTP:CURR:AC:LIM:STAT? Response: 1

:OUTPut:CURRent:COIL:TURNs

Syntax:
> :OUTPut:CURRent:COIL:TURNs <DNPD>
> :OUTPut:CURRent:COIL:TURNs?

Description:
> Number of coil turns connected to the current output.

Parameters:
> <DNPD> - number of coil turns, range 2 ... 200 (default 50).

Remarks:
> The current output must be set to Coil mode.
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> OUTP:CURR:COIL:TURN 50
> OUTP:CURR:COIL:TURN? Response: 50

:OUTPut:CURRent:COIL:UNCertainty

Syntax:
> :OUTPut:CURRent:COIL:UNCertainty <DNPD>
> :OUTPut:CURRent:COIL:UNCertainty?

Description:
> Sets the desired uncertainty of the current coil. This uncertainty is included in the resulting current uncertainty.

Parameters:
> <DNPD> - current coil uncertainty. Range 0.0 ... 50.0 (default 0.25).

Remarks:
> The value is stored in each preset.
> The value is set according to "Startup" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> OUTP:CURR:COIL:UNC 0.25
> OUTP:CURR:COIL:UNC? Response: 2.500000E-01

:OUTPut:CURRent:DC:LIMit[:LEVel]

Syntax:
> :OUTPut:CURRent:DC:LIMit[:LEVel] <DNPD>[<UNIT>]
> :OUTPut:CURRent:DC:LIMit[:LEVel]?

Description:
> Sets the global DC current limit on all functions. This value limits both the amplitude setting and the range setting. This protects the connected devices from setting the calibrator to a value greater than the allowed one. There is no current limitation when using VFC current mode. When using Coil current mode, the limit applies to the current going to the coil.

Parameters:
> <DNPD> - DC current limit level [A], range 0.01 ... 20.5 (default 20.5)
> <UNIT> - limit unit {A}
> > ·A   limit will be set in Amperes.

Remarks:
> Setting the limit turns on the limit state.
> The limit can be turned off with the command OUTP:CURR:DC:LIM:STAT.
> The value is not affected by the * RST command or the stored preset.
> This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:CURR:DC:LIM 20.5
OUTP:CURR:DC:LIM? Response: 2.050000E+01 A

:OUTPut:CURRent:DC:LIMit:STATe

Syntax:

:OUTPut:CURRent:DC:LIMit:STATe <BOOL>

:OUTPut:CURRent:DC:LIMit:STATe?

Description:

Turns the global DC current limit state on or off. If the state is off, then the maximum current value generated by the device is given by the capability of the device. If the status is on, then the maximum value is limited by the DC current limit level setting.

Parameters:

<BOOL> - DC current limit state {ON|OFF|1|0} (default OFF)

·ON   Current limit is active.

·OFF   The current limit is not active.

·1   Current limit is active.

·0   The current limit is not active.

Remarks:

The limit level is set with the OUTP:CURR:DC:LIM:LEV command.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:CURR:DC:LIM:STAT ON

OUTP:CURR:DC:LIM:STAT? Response: 1

:OUTPut:CURRent:MODE

Syntax:

:OUTPut:CURRent:MODE <CPD>
:OUTPut:CURRent:MODE?

Description:

Sets the mode in which the current output operates. The value of current amplitude on the display is recalculated accordingly.

Parameters:

<CPD> - current mode {NORMal|VFC|COIL|M151} (default NORM).

·NORMal direct setting of current. No recalculation is performed.

·VFC   Voltage from Current. There will be voltage at the output of the current terminals (Voutput=Idisplay*Factor).

·COIL   the current value will be multiplied by the number of turns of the coil.

·M151   the current will be generated by an external device.

Remarks:

Current mode is valid for both current and power function.

For VFC mode, the equivalent factor can be set by OUTP:CURR:VFC:FACT command.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

OUTP:CURR:MODE NORM

OUTP:CURR:MODE? Response: NORM

:OUTPut:CURRent:PHASe

Syntax:

:OUTPut:CURRent:PHASe \<DNPD>[\<UNIT>]

:OUTPut:CURRent:PHASe?

Description:

Sets the phase shift between the reference signal and the current output. The setting is valid for the IAC function.

Parameters:

\<DNPD> - phase shift, range 0.0 ... 360.0 ° (default 0.0).

\<UNIT> - phase unit {DEG}

·DEG   the phase shift will be set in degrees.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

OUTP:CURR:PHAS 0.0

OUTP:CURR:PHAS? Response: 0.000000E+00 DEG

:OUTPut:CURRent:VFC:FACTor

Syntax:

:OUTPut:CURRent:VFC:FACTor \<DNPD>

:OUTPut:CURRent:VFC:FACTor?

Description:

Voltage from current equivalent factor. The current is recalculated according to this factor if the current output is set to VFC.

Parameters:

\<DNPD> - equivalent factor [V/A], range 2.0e-6 ... 10.0 (default 1.0).

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

OUTP:CURR:VFC:FACT 1.0

OUTP:CURR:VFC:FACT? Response: 1.000000E+00

:OUTPut:DELay:OFF

Syntax:

:OUTPut:DELay:OFF \<DNPD>[\<UNIT>]

:OUTPut:DELay:OFF?

Description:

Sets the voltage-to-current delay when the terminals are switched off.

Parameters:

\<DNPD> - voltage-to-current delay [s], range 0 ... 60 (default 0).

\<UNIT> - delay unit {S}

·S   the delay will be set in seconds.

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
OUTP:DEL:OFF 1
OUTP:DEL:OFF? Response: 1 S

:OUTPut:DELay:ON

Syntax:
:OUTPut:DELay:ON <DNPD>[<UNIT>]
:OUTPut:DELay:ON?

Description:
Sets the current-to-voltage delay when the terminals are switched on.

Parameters:
<DNPD> - current-to-voltage [s], range 0 ... 60 (default 0).
<UNIT> - delay unit {S}
·S   the delay will be set in seconds.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
OUTP:DEL:ON 1
OUTP:DEL:ON? Response: 1 S

:OUTPut:LOW<N>

Syntax:
:OUTPut:LOW<N> <CPD>
:OUTPut:LOW<N>?

Description:
Sets the ground for the source Lo or I- output terminal.

Parameters:
<N> - function to which the grounding will be applied:
1 - Voltage
2 - Current
3 - LVR
4 - Capacitance
5 - Temperature TC
6 - Power voltage
7 - Power current
8 - HVR
9 - Temperature RTD
<CPD> - grounding {FLOat|GROund} (default GRO).
·FLOat   terminal is floating.
·GROund   terminal is grounded.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
OUTP:LOW1 FLO

OUTP:LOW1? Response: FLO

:OUTPut[:STATe]

Syntax:

:OUTPut[:STATe] <BOOL>
:OUTPut[:STATe]?

Description:

Turns the output terminals on or off.

Parameters:

<BOOL> - output state, {ON|OFF|1|0} (default 0).

·ON   turns on the output terminals.
·OFF   turns off the output terminals.
·1   turns on the output terminals.
·0   turns off the output terminals.

Remarks:

It may take a few seconds for the terminals to turn on. The * OPC? command can be used to determine the completion of the operation.
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

OUTP ON
*OPC? Response: 1
OUTP? Response: 1

:OUTPut:ROSCilator:MODE

Syntax:

:OUTPut:ROSCilator:MODE <CPD>
:OUTPut:ROSCilator:MODE?

Description:

Selects function of rear panel Ext Sync Output BNC – either SYNC or SAMPle output. Both outputs generate squarewave signal with rising edge phase-locked to internal AC voltage reference.
"Sync output" is phase and frequency reference of main output signal, used to synchronize with other devices. Sync output frequency is limited to 1200 Hz (2400 Hz if main signal frequency is 19200 Hz or more). Higher frequencies are divided by powers of two so that Sync output frequency is always kept below 1200 Hz (2400 Hz for main frequency of 19200 Hz or more).
"Sample output" is meant to trigger an external voltmeter to synchronize sampling measurements with main voltage output, useful for calibration of 9010. Sample output must be enabled using OUTP:ROSC:STAT command. Frequency multiplier can be selected using OUTP:ROSC:MULT command.

Parameters:

<CPD> {OFF|SYNC|SAMPle} (default OFF)
OFF   Ext Sync Output BNC is switched to Hi-Z state.
SYNC Sync signal is active at Ext Sync Output BNC.
SAMPle   Sample signal is active at Ext Sync Output BNC (if switched ON).

Remarks:

The value is stored in each preset.
The value is set according to "Startup" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

OUTP:ROSC:MODE OFF
OUTP:ROSC:MODE? Response: OFF

:OUTPut:ROSCilator:MULTiplier

Syntax:

    :OUTPut:ROSCilator:MULTiplier <CPD>
    :OUTPut:ROSCilator:MULTiplier?

Description:

Sets ratio between frequency of the internal Sync signal and output frequency at Ext Sync Output BNC connector when OUTP:ROSC:MODE is set to SAMP.

"Sample multiplier" set to "Auto" multiplies main signal frequency up to 850 Hz by factors 2048 – 64, keeping the sample output at around 30 – 65 kHz. Main signal frequency above 850 Hz gets multiplied by factors 32 – 8, rising sample output frequency up to its limit of 5 MHz.

Parameters:

    <CPD> {AUTO|16|32|64|128|256|512|1024|2048} (default AUTO)

AUTO	Multiplies main signal frequency (instead of Sync signal) up to 850 Hz by ratios 2048 – 64, keeping the sample output at around 30 – 65 kHz. Main signal frequency above 850 Hz gets multiplied by ratios 32 – 8, rising sample output frequency up to its limit of 5 MHz:

2048:1	main signal frequency < 33 Hz
1024:1	33 – 66 Hz
512:1	66 – 128 Hz
256:1	128 – 266 Hz
128:1	266 – 512 Hz
64:1	512 – 850 Hz
32:1	850 – 153600 Hz
16:1	153600 – 307200 Hz
8:1	≥ 307200 Hz

16	A frequency 16 times higher than the Sync signal will be generated
32	A frequency 32 times higher than the Sync signal will be generated
64	A frequency 64 times higher than the Sync signal will be generated
128	A frequency 128 times higher than the Sync signal will be generated
256	A frequency 256 times higher than the Sync signal will be generated
512	A frequency 512 times higher than the Sync signal will be generated
1024	A frequency 1024 times higher than the Sync signal will be generated
2048	A frequency 2048 times higher than the Sync signal will be generated

Remarks:

The value is stored in each preset.

The value is set according to "Startup" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

    OUTP:ROSC:MULT AUTO
    OUTP:ROSC:MULT? Response: AUTO

:OUTPut:ROSCilator[:STATe]

Syntax:

    :OUTPut:ROSCilator[:STATe] <BOOL>
    :OUTPut:ROSCilator[:STATe]?

Description:

Activates or deactivates the sampling signal, which is synchronous with the voltage or current output signal.

Parameters:

    <BOOL> - sampling state {ON|OFF|1|0} (default 0).

·ON	The sampling signal is run when the reference signal passes zero.
·OFF	The sampling signal is stopped immediately.
·1	The sampling signal is run when the reference signal passes zero.
·0	The sampling signal is stopped immediately.

Remarks:

> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:

> OUTP:ROSC ON
> OUTP:ROSC? Response: 1

:OUTPut:SCOPe:CABLe:ACTual?

Syntax:

> :OUTPut:SCOPe:CABLe:ACTual?

Description:

> Returns the current value of the cable attenuation in decibels, according to the set parameters of the Scope function.

Parameters:

> <DNPD> - cable attenuation value [dB]

Remarks:

> The value is calculated at query time.

Example:

> OUTP:SCOP:CABL:ACT? Response: 6.000000E-02

:OUTPut:SCOPe:CABLe:LIMit?

Syntax:

> :OUTPut:SCOPe:CABLe:LIMit?

Description:

> Returns a status whether the current cable attenuation value is within the allowed range.
> The cable attenuation value is calculated according to the entered cable data.

Parameters:

> <DNPD> - the status of the calculated cable attenuation value
> > ·0   The cable attenuation is within the specified range.
> > ·1   The lower attenuation limit has been exceeded.
> > ·2   The upper attenuation limit has been exceeded.

Remarks:

> The value is determined at query time.

Example:

> OUTP:SCOP:CABL:LIM? Response: 0

:OUTPut:SCOPe:CABLe:POINt:ADD

Syntax:

> :OUTPut:SCOPe:CABLe:POINt:ADD <DNPD>,<DNPD>

Description:

> Adds a calibration point to the currently selected cable preset. The maximum number of points is 64. The points are automatically sorted by frequency. Linear interpolation is performed between individual points. Separate commands must be used to read the frequency or attenuation calibration point. The set calibration values are applied immediately even without saving the preset.

Parameters:

> <DNPD> - frequency of the calibration point [Hz], range 1.0 ... 1e12
> <DNPD> - attenuation of the calibration point [dB], range 0.0 ... 1.5

Remarks:

The calibration points (all preset) can be saved to non-volatile memory with the OUTP:SCOP:CABL:SAVE command. Otherwise, they will be overwritten after changing the cable preset or turning off the device.

Overlapped command.

Example:

OUTP:SCOP:CABL:POIN:ADD 1.0E9,0.51

:OUTPut:SCOPe:CABLe:POINt:COUNt?

Syntax:

:OUTPut:SCOPe:CABLe:POINt:COUNt?

Description:

Returns the number of calibration points of the current cable preset.

Parameters:

<DNPD> - number of calibration points

Remarks:

Overlapped command

Example:

OUTP:SCOP:CABL:POIN:COUN? Response: 8

:OUTPut:SCOPe:CABLe:POINt:DELete[:ALL]

Syntax:

:OUTPut:SCOPe:CABLe:POINt:DELete[:ALL]

Description:

Deletes all current calibration points of the selected cable preset. Values are deleted only in volatile memory, until the cable preset is saved to non-volatile memory by the command OUTP:CABL:SCOP:SAVE.

Parameters:

None

Remarks:

The calibration values (all preset) can be saved with the OUTP:SCOP:CABL:SAVE command. Otherwise, they will be reloaded after changing the cable preset or turning off the device.

Overlapped command.

Example:

OUTP:SCOP:CABL:POIN:DEL

:OUTPut:SCOPe:CABLe:POINt:INDex<N>:ATTenuation

Syntax:

:OUTPut:SCOPe:CABLe:POINt:INDex<N>:ATTenuation <DNPD>

:OUTPut:SCOPe:CABLe:POINt:INDex<N>:ATTenuation?

Description:

Sets or reads the current attenuation value for the specified calibration point. The calibration point index <N> must not exceed the number of calibration points for the given cable preset. Only existing calibration points can be read or written with the command. Additional points can be added with the command OUTP:SCOP:CABL:POIN:ADD. The set calibration values are applied immediately even without saving the preset.

Parameters:

<N> - one based calibration point, range 1 ... point count (1 - if omitted)

<DNPD> - attenuation [dB], range 0.0 ... 1.5

Remarks:

The calibration values (all preset) can be saved with the OUTP:SCOP:CABL:SAVE command. Otherwise, they will be reloaded after changing the cable preset or turning off the device.
Overlapped command.

Example:

OUTP:SCOP:CABL:POIN:IND1:ATT 0.24
OUTP:SCOP:CABL:POIN:IND1:ATT? Response: 2.400000E-01

:OUTPut:SCOPe:CABLe:POINt:INDex<N>:DELete

Syntax:

:OUTPut:SCOPe:CABLe:POINt:INDex<N>:DELete

Description:

Deletes the currently selected calibration point. The other points are automatically sorted by frequency.

Parameters:

<N> - one based calibration point index, range 1 ... point count (1 - if omitted)

Remarks:

Overlapped command.

Example:

OUTP:SCOP:CABL:POIN:IND1:DEL

:OUTPut:SCOPe:CABLe:POINt:INDex<N>:FREQuency

Syntax:

:OUTPut:SCOPe:CABLe:POINt:INDex<N>:FREQuency <DNPD>
:OUTPut:SCOPe:CABLe:POINt:INDex<N>:FREQuency?

Description:

Sets or reads the current frequency value for the specified calibration point. The calibration point index <N> must not exceed the number of calibration points for the given cable preset. Only existing calibration points can be read or written with the command. Additional points can be added with the command OUTP:SCOP:CABL:POIN:ADD. The set calibration values are applied immediately even without saving the preset.

Parameters:

<N> - one based calibration point index, range 1 ... point count (1 - if omitted)
<DNPD> - frequency [Hz], range 1.0 ... 1e12

Remarks:

The calibration values (all preset) can be saved with the OUTP:SCOP:CABL:SAVE command. Otherwise, they will be reloaded after changing the cable preset or turning off the device.
Overlapped command.

Example:

OUTP:SCOP:CABL:POIN:IND1:FREQ 4.7E8
OUTP:SCOP:CABL:POIN:IND1:FREQ? Response: 4.700000E+08

:OUTPut:SCOPe:CABLe[:PRESet]:COUNt?

Syntax:

:OUTPut:SCOPe:CABLe[:PRESet]:COUNt?

Description:

Returns the number of available cable presets. All presets are available even if they are empty.

Parameters:

<DNPD> - number of all cable presets, the value is always 16

Remarks:
        Overlapped command
Example:
        OUTP:SCOP:CABL:COUN? Response: 16

:OUTPut:SCOPe:CABLe[:PRESet]:ERASe

Syntax:
        :OUTPut:SCOPe:CABLe[:PRESet]:ERASe
Description:
        Deletes the selected cable preset from non-volatile memory. The number of calibration
        points for the given preset will be zero. The preset name will default to "Cable N", where
        N is the preset index. It is not necessary to delete the preset. When saving a preset, the
        current preset is always overwritten.
Parameters:
        None
Remarks:
        The preset is selected by the OUTP:SCOP:CABL:SEL command.
        Overlapped command.
Example:
        OUTP:SCOP:CABL:ERAS

:OUTPut:SCOPe:CABLe[:PRESet]:NAME

Syntax:
        :OUTPut:SCOPe:CABLe[:PRESet]:NAME <SPD>
        :OUTPut:SCOPe:CABLe[:PRESet]:NAME?
Description:
        Sets or reads the name of the selected cable preset.
Parameters:
        <SPD> - cable preset name, max. 15 characters, allowed characters are: A to Z, a to z,
        0 to 9, comma, period, slash, asterisk, underscore, plus and minus.
Remarks:
        The preset is selected by the OUTP:SCOP:CABL:SEL command.
        The name (all preset) can be saved with the OUTP:SCOP:CABL:SAVE command.
        Otherwise, it will be reloaded after changing the cable preset or turning off the device.
        Overlapped command.
Example:
        OUTP:SCOP:CABL:NAME "RF Cable"
        OUTP:SCOP:CABL:NAME? Response: "RF Cable"

:OUTPut:SCOPe:CABLe[:PRESet]:SAVE

Syntax:
        :OUTPut:SCOPe:CABLe[:PRESet]:SAVE
Description:
        This command saves the currently modified cable preset to non-volatile memory,
        including all calibration points and the preset name. The preset will thus be available
        even after selecting another preset or after turning off the device.
Parameters:
        None
Remarks:
        Overlapped command.
Example:
        OUTP:SCOP:CABL:SAVE

:OUTPut:SCOPe:CABLe[:PRESet]:SELect

Syntax:

    :OUTPut:SCOPe:CABLe[:PRESet]:SELect <DNPD>

    :OUTPut:SCOPe:CABLe[:PRESet]:SELect?

Description:

    The command selects and loads a cable preset from non-volatile memory. According to the saved calibration data of the cable, the correction of the voltage output to the Scope Sine function is then performed. The selected preset can then be modified using other commands. Index 0 selects a preset named "None", which contains no calibration data and therefore no output correction will be performed. Preset "None" cannot be edited by any command.

Parameters:

    <DNPD> - cable preset index, range 0 ... 16 (default 0)

Remarks:

    The value is stored in each device preset.

    The value is set according to "Startup" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    OUTP:SCOP:CABL:SEL 16

    OUTP:SCOP:CABL:SEL? Response: 16

:OUTPut:SCOPe:TRIGger:RATio

Syntax:

    :OUTPut:SCOPe:TRIGger:RATio <CPD>

    :OUTPut:SCOPe:TRIGger:RATio?

Description:

    Sets the division ratio between the output frequency on the HF connector and the TRG trigger output.

Parameters:

    <CPD> {OFF|1|10|100} (default OFF)

        ·OFF   Trigger output is disabled.

        ·1   Sets the division ratio to 1.

        ·10   Sets the division ratio to 10.

        ·100   Sets the division ratio to 100.

Remarks:

    The value is stored in each preset.

    The value is set according to "Startup" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    OUTP:SCOP:TRIG:RAT OFF

    OUTP:SCOP:TRIG:RAT? Response: OFF

:OUTPut:SYNChro:FREQuency

Syntax:

    :OUTPut:SYNChro:FREQuency?

Description:

    Returns the actual frequency of the generated signal if external synchronization is selected.

Parameters:

    <DNPD> - actual frequency

<UNIT> - frequency unit {HZ}

        ·HZ   frequency is returned in hertz.

Remarks:

Overlapped command.

Example:

OUTP:SYNC:FREQ? Response: 1.200000E+02 HZ

:OUTPut:SYNChro:SOURce

Syntax:

:OUTPut:SYNChro:SOURce <CPD>

:OUTPut:SYNChro:SOURce?

Description:

Selects the source for synchronizing the voltage and current output.

Parameters:

<CPD> - source {INT|LINE|BNC|EXT} (default INT)

      ·INT   internal signal is used.

      ·LINE signal is synchronized to the mains voltage (50/60 Hz).

      ·BNC signal is synchronized to the external BNC input (15 to 1000 Hz).

      ·EXT   signal is synchronized to the external MSI unit (15 to 1000 Hz).

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

OUTP:SYNC:SOUR INT

OUTP:SYNC:SOUR? Response: INT

:OUTPut:VOLTage:AC:LIMit[:LEVel]

Syntax:

:OUTPut:VOLTage:AC:LIMit[:LEVel] <DNPD>[<UNIT>]

:OUTPut:VOLTage:AC:LIMit[:LEVel]?

Description:

Sets the global AC voltage limit on all functions. This value limits both the amplitude setting and the range setting. This protects the connected devices from setting the calibrator to a value greater than the allowed one.

Parameters:

<DNPD> - AC voltage limit level [V], range 1.0 ... 1050.0 (default 1050.0)

<UNIT> - limit unit {V}

      ·V   limit will be set in Volts.

Remarks:

Setting the limit turns on the limit state.

The limit can be turned off with the command OUTP:VOLT:AC:LIM:STAT.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:VOLT:AC:LIM 1050.0

OUTP:VOLT:AC:LIM? Response: 1.050000E+03 V

:OUTPut:VOLTage:AC:LIMit:STATe

Syntax:

:OUTPut:VOLTage:AC:LIMit:STATe <BOOL>

:OUTPut:VOLTage:AC:LIMit:STATe?

Description:

Turns the global AC voltage limit state on or off. If the state is off, then the maximum voltage value generated by the device is given by the capability of the device. If the status is on, then the maximum value is limited by the AC voltage limit level setting.

Parameters:

<BOOL> - AC voltage limit state {ON|OFF|1|0} (default OFF)

·ON   Voltage limit is active.

·OFF   The voltage limit is not active.

·1   Voltage limit is active.

·0   The voltage limit is not active.

Remarks:

The limit level is set with the OUTP:VOLT:AC:LIM:LEV command.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:VOLT:AC:LIM:STAT ON

OUTP:VOLT:AC:LIM:STAT? Response: 1

:OUTPut:VOLTage:AC:PROTection[:LEVel]

Syntax:

:OUTPut:VOLTage:AC:PROTection[:LEVel] <DNPD>[<UNIT>]

:OUTPut:VOLTage:AC:PROTection[:LEVel]?

Description:

This is a warning of dangerous contact voltage. If the user sets the voltage value on the calibrator higher than this limit, the ⚡ symbol will light up on the screen. The warning is further highlighted by an intermittent beep. It is possible to select the setting for switching off the terminals when this voltage is exceeded.

Parameters:

<DNPD> - AC voltage threshold, range 20 ... 100 (default 50)

<UNIT> - threshold unit {V}

·V   threshold will be set in Volts.

Remarks:

Terminal switching can be set with the command OUTP:VOLT:PROT:STAT.

The volume of the beep can be set with the command SYST:BEEP:PROT:VOL.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:VOLT:AC:PROT 50

OUTP:VOLT:AC:PROT? Response: 50 V

:OUTPut:VOLTage:DC:LIMit[:LEVel]

Syntax:

:OUTPut:VOLTage:DC:LIMit[:LEVel] <DNPD>[<UNIT>]

:OUTPut:VOLTage:DC:LIMit[:LEVel]?

Description:

Sets the global DC voltage limit on all functions. This value limits both the amplitude setting and the range setting. This protects the connected devices from setting the calibrator to a value greater than the allowed one.

Parameters:

<DNPD> - AC voltage limit limit [V], range 1.0 ... 1050.0 (default 1050.0)

<UNIT> - limit unit {V}

·V   limit will be set in Volts.

Remarks:

Setting the limit turns on the limit state.

The limit can be turned off with the command OUTP:VOLT:DC:LIM:STAT.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:VOLT:DC:LIM 1050.0

OUTP:VOLT:DC:LIM? Response: 1.050000E+03 V

:OUTPut:VOLTage:DC:LIMit:STATe

Syntax:

:OUTPut:VOLTage:DC:LIMit:STATe <BOOL>

:OUTPut:VOLTage:DC:LIMit:STATe?

Description:

Turns the global DC voltage limit state on or off. If the state is off, then the maximum voltage value generated by the device is given by the capability of the device. If the status is on, then the maximum value is limited by the DC voltage limit level setting.

Parameters:

<BOOL> - DC voltage limit state {ON|OFF|1|0} (default OFF)

·ON   Voltage limit is active.

·OFF   The voltage limit is not active.

·1   Voltage limit is active.

·0   The voltage limit is not active.

Remarks:

The limit level is set with the OUTP:VOLT:DC:LIM:LEV command.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:VOLT:DC:LIM:STAT ON

OUTP:VOLT:DC:LIM:STAT? Response: 1

:OUTPut:VOLTage:DC:PROTection[:LEVel]

Syntax:

:OUTPut:VOLTage:DC:PROTection[:LEVel] <DNPD>[<UNIT>]

:OUTPut:VOLTage:DC:PROTection[:LEVel]?

Description:

This is a warning of dangerous contact voltage. If the user sets the voltage value on the calibrator higher than this limit, the ⚡ symbol will light up on the screen. The warning is further highlighted by an intermittent beep. It is possible to select the setting for switching off the terminals when this voltage is exceeded.

Parameters:

<DNPD> - DC voltage threshold, range 20 ... 100 (default 50)

<UNIT> - threshold unit {V}

·V   threshold will be set in Volts.

Remarks:

Terminal switching can be set with the command OUTP:VOLT:PROT:STAT.

The volume of the beep can be set with the command SYST:BEEP:PROT:VOL.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:VOLT:DC:PROT 50

OUTP:VOLT:DC:PROT? Response: 50 V

:OUTPut:VOLTagePHASe

Syntax:

:OUTPut:VOLTage:PHASe <DNPD>[<UNIT>]
:OUTPut:VOLTage:PHASe?

Description:

Sets the phase shift between the reference signal and the voltage output. The setting is valid for the VAC and PAC function.

Parameters:

<DNPD> - phase shift, range 0.0 ... 360.0 ° (default 0.0).
<UNIT> - phase unit {DEG}
·DEG   the phase shift will be set in degrees.

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

OUTP:VOLT:PHAS 0.0
OUTP:VOLT:PHAS? Response: 0.000000E+00 DEG

:OUTPut:VOLTage:PROTection[:STATe]

Syntax:

:OUTPut:VOLTage:PROTection[:STATe] <BOOL>

:OUTPut:VOLTage:PROTection[:STATe]?

Description:

Protection terminal switch off settings. If the protection is enabled, the terminals switch off when the terminals are switched on and the voltage amplitude changes from safe to dangerous. The terminals can then be switched on again with a dangerous voltage value.

Parameters:

<BOOL> - automatic switch off {ON|OFF|1|0} (default 1)

·ON   the terminals will be switched off when the voltage is exceeded.

·OFF	the state of the terminals remains unchanged.	

·OFF the state of the terminals remains unchanged.

·1   the terminals will be switched off when the voltage is exceeded.

·0   the state of the terminals remains unchanged.

Remarks:

The terminal switch-off voltage threshold can be set with command OUTP:VOLT:DC:PROT or OUTP:VOLT:AC:PROT.

The value is not affected by the * RST command or the stored preset.

This command requires "Calibration" access.

Overlapped command.

Example:

OUTP:VOLT:PROT ON

OUTP:VOLT:PROT? Response: 1

:READ?

Syntax:

:READ?

Description:

Triggers the measurement and returns the measurement result.

Parameters:

<DNPD> - measured value.

Remarks:

Before using READ? command, the meter must be configured.

Overlapped command.

Example:

READ? Response: 2.050751E+00

:SENSe:CURRent[:DC]:APERture

Syntax:

:SENSe:CURRent[:DC]:APERture <DNPD>

:SENSe:CURRent[:DC]:APERture?

Description:

Sets the integration time for the measurement.

Parameters:

<DNPD> - aperture time [s], range 0.05 ... 0.8 (supported times 0.05, 0.06, 0.1, 0.2, 0.4, 0.8).

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:CURR:APER 0.1

SENS:CURR:APER? Response: 1.000000E-01

:SENSe:CURRent[:DC]:NULL[:STATe]

Syntax:

:SENSe:CURRent[:DC]:NULL[:STATe] <BOOL>

:SENSe:CURRent[:DC]:NULL[:STATe]?

Description:

Turns the null state on or off for the Current DC meter function. When null state is turned on, it takes measurement and uses it as an offset (NULL value).

Parameters:

<BOOL> - null state {ON|OFF|1|0} (default 0).

 ·ON turns the null state ON.
 ·OFF turns the null state OFF.
 ·1   turns the null state ON.
 ·0   turns the null state OFF.

Remarks:

The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

SENS:CURR:NULL ON
SENS:CURR:NULL? Response: 1

:SENSe:CURRent[:DC]:NULL:VALue

Syntax:

:SENSe:CURRent[:DC]:NULL:VALue <DNPD>
:SENSe:CURRent[:DC]:NULL:VALue?

Description:

Sets the offset value for the Current DC meter function directly, or allows you to read the offset value.

Parameters:

<DNPD> - null value [A], the null value range is directly dependent on the range of the meter function.

Remarks:

The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

SENS:CURR:NULL:VAL 1e-6
SENS:CURR:NULL:VAL? Response: 1.000000E-06

:SENSe:CURRent[:DC]:RANGe

Syntax:

:SENSe:CURRent[:DC]:RANGe <DNPD>
:SENSe:CURRent[:DC]:RANGe?

Description:

Sets the current range for Current DC meter function manually.

Parameters:

<DNPD> - current range [A], range 0.0 ... 0.024 (2.4 mA, 24 mA ranges are available, default 24 mA).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

SENS:CURR:RANG 0.024
SENS:CURR:RANG? Response: 2.400000E-02

:SENSe:CURRent[:DC]:RANGe:AUTO

Syntax:

:SENSe:CURRent[:DC]:RANGe:AUTO <BOOL>
:SENSe:CURRent[:DC]:RANGe:AUTO?

Description:

Sets the automatic current range selection for Current DC meter function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.

·OFF   turns off automatic range selection.

·1   turns on automatic range selection.

·0   turns off automatic range selection.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:CURR:RANG:AUTO ON

SENS:CURR:RANG:AUTO? Response: 1

:SENSe:CURRent:LO:NULL[:STATe]

Syntax:

:SENSe:CURRent:LO:NULL[:STATe] <BOOL>

:SENSe:CURRent:LO:NULL[:STATe]?

Description:

Turns the null state on or off for the Lo DC Current meter function. When null state is turned on, it takes measurement and uses it as an offset (NULL value).

Parameters:

<BOOL> - null state {ON|OFF|1|0} (default 0).

·ON   turns the null state ON.

·OFF   turns the null state OFF.

·1   turns the null state ON.

·0   turns the null state OFF.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:CURR:LO:NULL ON

SENS:CURR:LO:NULL? Response: 1

:SENSe:CURRent:LO:NULL:VALue

Syntax:

:SENSe:CURRent:LO:NULL:VALue <DNPD>

:SENSe:CURRent:LO:NULL:VALue?

Description:

Sets the offset value for the Lo DC Current meter function directly, or allows you to read the offset value.

Parameters:

<DNPD> - null value [A], the null value range is directly dependent on the range of the meter function.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:CURR:LO:NULL:VAL 2.2e-5

SENS:CURR:LO:NULL:VAL? Response: 2.200000E-05

:SENSe:CURRent:LO:RANGe

Syntax:

:SENSe:CURRent:LO:RANGe <DNPD>

:SENSe:CURRent:LO:RANGe?

Description:

Sets the current range for Lo Current DC meter function manually.

Parameters:

<DNPD> - current range [A], range 0.0 ... 0.001 (100 uA, 1 mA ranges are available, default 1 mA).

Remarks:

The closest upper range to the entered value will be selected.

Setting the range turns off the automatic range selection.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:CURR:LO:RANG 0.001

SENS:CURR:LO:RANG? Response: 1.000000E-03

:SENSe:CURRent:LO:RANGe:AUTO

Syntax:

:SENSe:CURRent:LO:RANGe:AUTO <BOOL>

:SENSe:CURRent:LO:RANGe:AUTO?

Description:

Sets the automatic current range selection for Lo Current DC meter function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.

·OFF   turns off automatic range selection.

·1   turns on automatic range selection.

·0   turns off automatic range selection.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:CURR:LO:RANG:AUTO ON

SENS:CURR:LO:RANG:AUTO? Response: 1

:SENSe:FREQuency:COUPling

Syntax:

:SENSe:FREQuency:COUPling <CPD>

:SENSe:FREQuency:COUPling?

Description:

Sets the frequency coupling for Frequency meter function.

Parameters:

<CPD> - frequency coupling {PASSive|ACTive} (default PASS).

·PASSive   sets the passive coupling for meter function.

·ACTive   sets the active (pull up) coupling for frequency function.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:FREQ:COUP PASS

SENS:FREQ:COUP? Response: PASS

:SENSe:FREQuency:NULL[:STATe]

Syntax:

:SENSe:CURRent:LO:NULL[:STATe] <BOOL>

:SENSe:CURRent:LO:NULL[:STATe]?

Description:

Turns the null state on or off for the Frequency meter function. When null state is turned on, it takes measurement and uses it as an offset (NULL value).

Parameters:

<BOOL> - null state {ON|OFF|1|0} (default 0).

·ON   Turns the null state ON.

·OFF   Turns the null state OFF.

·1   Turns the null state ON.

·0   Turns the null state OFF.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:CURR:LO:NULL ON

SENS:CURR:LO:NULL? Response: 1

:SENSe:FREQuency:NULL:VALue

Syntax:

:SENSe:CURRent:LO:NULL:VALue <DNPD>

:SENSe:CURRent:LO:NULL:VALue?

Description:

Sets the offset value for the Frequency meter function directly, or allows you to read the offset value.

Parameters:

<DNPD> - null value [Hz], the null value range is directly dependent on the range of the meter function.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:FREQ:NULL:VAL 4.5

SENS:FREQ:NULL:VAL? Response: 4.500000E+00

:SENSe:FREQuency:RANGe

Syntax:

:SENSe:FREQuency:RANGe <DNPD>

:SENSe:FREQuency:RANGe?

Description:

Sets the frequency range for Frequency meter function manually.

Parameters:

<DNPD> - frequency range [Hz], range 0.0 ... 100000.0 (10 kHz, 100 kHz ranges are available, default 100 kHz).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:FREQ:RANG 100000
SENS:FREQ:RANG? Response: 1.000000E+05

:SENSe:FREQuency:RANGe:AUTO

Syntax:
:SENSe:FREQuency:RANGe:AUTO <BOOL>
:SENSe:FREQuency:RANGe:AUTO?

Description:
Sets the automatic frequency range selection for Frequency meter function.

Parameters:
<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON	turns on automatic range selection.
·OFF	turns off automatic range selection.
·1	turns on automatic range selection.
·0	turns off automatic range selection.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:FREQ:RANG:AUTO ON
SENS:FREQ:RANG:AUTO? Response: 1

:SENSe:FUNCtion[:ON]

Syntax:
:SENSe:FUNCtion[:ON] <SPD>
:SENSe:FUNCtion[:ON]?

Description:
Sets the desired meter function or returns the set function.

Parameters:
<SPD> - meter function

"OFF"	turns off meter function.
"VOLT"	Voltage DC
"CURR"	Current DC
"CURR:LO"	Lo DC Current
"RES"	Resistance
"FREQ"	Frequency
"TEMP:RTD"	Temperature RTD
"TEMP:TC"	Temperature TC

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:FUNC "VOLT"
SENS:FUNC? Response: "VOLT"

:SENSe:RESistance:APERture

Syntax:

:SENSe:RESistance:APERture <DNPD>

:SENSe:RESistance:APERture?

Description:

Sets the integration time for the measurement.

Parameters:

<DNPD> - aperture time [s], range 0.05 ... 0.8 (supported times are 0.05, 0.06, 0.1, 0.2, 0.4, 0.8).

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:RES:APER 0.8

SENS:RES:APER? Response: 8.00000E-01

:SENSe:RESistance:NULL[:STATe]

Syntax:

:SENSe:RESistance:NULL[:STATe] <BOOL>

:SENSe:RESistance:NULL[:STATe]?

Description:

Turns the null state on or off for the Resistance meter function. When null state is turned on, it takes measurement and uses it as an offset (NULL value).

Parameters:

<BOOL> - null state {ON|OFF|1|0} (default 0).

    ·ON   Turns the null state ON.

    ·OFF   Turns the null state OFF.

    ·1   Turns the null state ON.

    ·0   Turns the null state OFF.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:RES:NULL ON

SENS:RES:NULL? Response: 1

:SENSe:RESistance:NULL:VALue

Syntax:

:SENSe:RESistance:NULL:VALue <DNPD>

:SENSe:RESistance:NULL:VALue?

Description:

Sets the offset value for the Resistance meter function directly, or allows you to read the offset value.

Parameters:

<DNPD> - null value, the null value range is directly dependent on the range of the meter function.

Remarks:

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SENS:RES:NULL:VAL 0.035

SENS:RES:NULL:VAL? Response: 3.500000E-02

:SENSe:RESistance:RANGe

Syntax:
> :SENSe:RESistance:RANGe <DNPD>
> :SENSe:RESistance:RANGe?

Description:
> Sets the resistance range for the Resistance meter function manually.

Parameters:
> <DNPD> - resistance range [Ohm], range 0.0 ... 20000.0 (2 kOhm, 20 kOhm ranges are available, default 20 kOhm).

Remarks:
> The closest upper range to the entered value will be selected.
> Setting the range turns off the automatic range selection.
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command

Example:
> SENS:RES:RANG 2000
> SENS:RES:RANG? Response: 2.000000E+03

:SENSe:RESistance:RANGe:AUTO

Syntax:
> :SENSe:RESistance:RANGe:AUTO <BOOL>
> :SENSe:RESistance:RANGe:AUTO?

Description:
> Sets the automatic resistance range selection for Resistance meter function.

Parameters:
> <BOOL> - automatic range selection {ON|OFF|1|0} (default 1).
>> ·ON   turns on automatic range selection.
>> ·OFF   turns off automatic range selection.
>> ·1   turns on automatic range selection.
>> ·0   turns off automatic range selection.

Remarks:
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> SENS:RES:RANG:AUTO ON
> SENS:RES:RANG:AUTO? Response: 1

:SENSe:VOLTage[:DC]:APERture

Syntax:
> :SENSe:VOLTage[:DC]:APERture <DNPD>
> :SENSe:VOLTage[:DC]:APERture?

Description:
> Sets the integration time for the measurement.

Parameters:
> <DNPD> - aperture time [s], range 0.05 ... 0.8 (supported times 0.05, 0.06, 0.1, 0.2, 0.4, 0.8).

Remarks:
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.
Overlapped command.

Example:
SENS:VOLT:APER 0.1
SENS:VOLT:APER? Response: 1.000000E-01

:SENSe:VOLTage[:DC]:IMPedance:AUTO

Syntax:
:SENSe:VOLTage[:DC]:IMPedance:AUTO <BOOL>
:SENSe:VOLTage[:DC]:IMPedance:AUTO?

Description:
Sets the input impedance for the meter Voltage DC function.

Parameters:
<BOOL> - auto impedance {ON|OFF|1|0} (default 0)
- ·ON   Sets Hi-Z impedance for ranges less than or equal to 12V, otherwise sets an impedance of 10 MOhm.
- ·OFF   Sets impedance of 10 MOhm for all ranges.
- ·1   Sets Hi-Z impedance for ranges less than or equal to 12V, otherwise sets an impedance of 10 MOhm.
- ·0   Sets impedance of 10 MOhm for all ranges.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:VOLT:IMP:AUTO ON
SENS:VOLT:IMP:AUTO? Response: 1

:SENSe:VOLTage[:DC]:NULL[:STATe]

Syntax:
:SENSe:VOLTage[:DC]:NULL[:STATe] <BOOL>
:SENSe:VOLTage[:DC]:NULL[:STATe]?

Description:
Turns the null state on or off for the Voltage DC meter function. When null state is turned on, it takes measurement and uses it as an offset (NULL value).

Parameters:
<BOOL> - null state {ON|OFF|1|0} (default 0).
- ·ON   turns the null state ON.
- ·OFF   turns the null state OFF.
- ·1   turns the null state ON.
- ·0   turns the null state OFF.

Remarks:
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:VOLT:NULL ON
SENS:VOLT:NULL? Response: 1

:SENSe:VOLTage[:DC]:NULL:VALue

Syntax:
:SENSe:VOLTage[:DC]:NULL:VALue <DNPD>
:SENSe:VOLTage[:DC]:NULL:VALue?

Description:

Sets the offset value for the Voltage DC meter function directly, or allows you to read the offset value.

Parameters:
    <DNPD> - null value [V], the null value range is directly dependent on the range of the meter function.

Remarks:
    The value is set to default after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:
    SENS:VOLT:NULL:VAL 0.001
    SENS:VOLT:NULL:VAL? Response: 1.000000E-03

:SENSe:VOLTage[:DC]:RANGe

Syntax:
    :SENSe:VOLTage[:DC]:RANGe <DNPD>
    :SENSe:VOLTage[:DC]:RANGe?

Description:
    Sets the voltage range for the Voltage DC meter function manually.

Parameters:
    <DNPD> - voltage range [V], range 0.0 ... 12.0 (12 mV, 120 mV, 1.2 V, 12 V ranges are available, default 12 V).

Remarks:
    The closest upper range to the entered value will be selected.
    Setting the range turns off the automatic range selection.
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:
    SENS:VOLT:RANG 1.2
    SENS:VOLT:RANG? Response: 1.200000E+00

:SENSe:VOLTage[:DC]:RANGe:AUTO

Syntax:
    :SENSe:VOLTage[:DC]:RANGe:AUTO <BOOL>
    :SENSe:VOLTage[:DC]:RANGe:AUTO?

Description:
    Sets the automatic voltage range selection for Voltage DC meter function.

Parameters:
    <BOOL> - automatic range selection {ON|OFF|1|0} (default 1).
        ·ON   turns on automatic range selection.
        ·OFF   turns off automatic range selection.
        ·1   turns on automatic range selection.
        ·0   turns off automatic range selection.

Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:
    SENS:VOLT:RANG:AUTO ON
    SENS:VOLT:RANG:AUTO? Response: 1

:SENSe:TEMPerature:RTD:COEFficient\<N>

Syntax:

    :SENSe:TEMPerature:RTD:COEFficient\<N> \<DNPD>

    :SENSe:TEMPerature:RTD:COEFficient\<N>?

Description:

    Sets user coefficients for resistance calculation to the RTD Temperatures function.
    Calculation is done using this formula $R=R0*(1+t*(A+t*(B+t*C*(t-100))))$.

Parameters:

    \<N> - coefficient index:

        1   coefficient A, coefficient value range from 3.0e-3 to 5.0e-3.

        2   coefficient B, coefficient value range from -7.0e-7 to -5.0e-7.

        3   coefficient C, coefficient value range from -5.0e-12 to -3.0e-12.

    \<DNPD> - coefficient value.

Remarks:

    These coefficients are common to both the meter and the source see
    SOUR:TEMP:RTD:COEF command.

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    SENS:TEMP:RTD:COEF1 3.9083e-3

    SENS:TEMP:RTD:COEF1? Response: 3.908300E-03

:SENSe:TEMPerature:RTD:NULL[:STATe]

Syntax:

    :SENSe:TEMPerature:RTD:NULL[:STATe] \<BOOL>

    :SENSe:TEMPerature:RTD:NULL[:STATe]?

Description:

    Turns the null state on or off for the Temperature RTD meter function. When null state
    is turned on, it takes measurement and uses it as an offset (NULL value).

Parameters:

    \<BOOL> - null state {ON|OFF|1|0} (default 0).

        ·ON   turns the null state ON.

        ·OFF   turns the null state OFF.

        ·1   turns the null state ON.

        ·0   turns the null state OFF.

Remarks:

    The value is set to default after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    SENS:TEMP:RTD:NULL ON

    SENS:TEMP:RTD:NULL? Response: 1

:SENSe:TEMPerature:RTD:NULL:VALue

Syntax:

    :SENSe:TEMPerature:RTD:NULL:VALue \<DNPD>

    :SENSe:TEMPerature:RTD:NULL:VALue?

Description:

    Sets the offset value for the Temperature RTD meter function directly, or allows you to
    read the offset value.

Parameters:

    \<DNPD> - null value [Ohm], the null value range is directly dependent on the range of
    the meter function.

Remarks:

      The value is set to default after power on.

      The value is set to default on *RST command.

      Overlapped command.

Example:

      SENS:TEMP:RTD:NULL:VAL 0.3

      SENS:TEMP:RTD:NULL:VAL? Response: 3.000000E-01

:SENSe:TEMPerature:RTD:RANGe

Syntax:

      :SENSe:TEMPerature:RTD:RANGe <DNPD>

      :SENSe:TEMPerature:RTD:RANGe?

Description:

      Sets the resistance range for Temperature RTD meter function manually.

Parameters:

      <DNPD> - resistance range [Ohm], range 0.0 ... 20000.0 (2 kOhm, 20 kOhm ranges are available, default 20 kOhm).

Remarks:

      The closest upper range to the entered value will be selected.

      Setting the range turns off the automatic range selection.

      The value is stored in each preset.

      The value is set according to "Start-up" preset after power on.

      The value is set to default on *RST command.

      Overlapped command.

Example:

      SENS:TEMP:RTD:RANG 2000

      SENS:TEMP:RTD:RANG? Response: 2.000000E+03

:SENSe:TEMPerature:RTD:RANGe:AUTO

Syntax:

      :SENSe:TEMPerature:RTD:RANGe:AUTO <BOOL>

      :SENSe:TEMPerature:RTD:RANGe:AUTO?

Description:

      Sets the automatic resistance range selection for Temperature RTD meter function.

Parameters:

      <BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

            ·ON   turns on automatic range selection.

            ·OFF   turns off automatic range selection.

            ·1   turns on automatic range selection.

            ·0   turns off automatic range selection.

Remarks:

      The value is stored in each preset.

      The value is set according to "Start-up" preset after power on.

      The value is set to default on *RST command.

      Overlapped command.

Example:

      SENS:TEMP:RTD:RANG:AUTO ON

      SENS:TEMP:RTD:RANG:AUTO? Response: 1

:SENSe:TEMPerature:RTD:RESistance[:REFerence]

Syntax:

      :SENSe:TEMPerature:RTD:RESistance[:REFerence] <DNPD>[<UNIT>]

      :SENSe:TEMPerature:RTD:RESistance[:REFerence]?

Description:

      Sets resistance R0 at 0 °C for Temperature RTD meter function.

Parameters:

        <DNPD> - resistance R0, range 20.0 ... 2000.0 Ohm (default 1000.0 Ohm).

        <UNIT> - resistance unit {OHM}.

            ·OHM Ohm unit is used.

Remarks:

        The value is stored in each preset.

        The value is set according to "Start-up" preset after power on.

        The value is set to default on *RST command.

        Overlapped command.

Example:

        SENS:TEMP:RTD:RES 1000.0

        SENS:TEMP:RTD:RES? Response: 1.000000E+03 OHM

:SENSe:TEMPerature:RTD:STANdard

Syntax:

        :SENSe:TEMPerature:RTD:STANdard <CPD>

        :SENSe:TEMPerature:RTD:STANdard?

Description:

        Sets the standard for resistance calculation to the RTD Temperature meter function.

Parameters:

        <CPD> - RTD standard {PT385A|PT385B|PT3916|PT3926|USER} (default PT385B).

            ·PT385A   resistance is calculated using PT3850 standard.

            ·PT385B   resistance is calculated using PT3851 standard.

            ·PT3916   resistance is calculated using PT3916 standard.

            ·PT3926   resistance is calculated using PT3826 standard.

            ·USER   resistance is calculated using user coefficients A, B, C.

Remarks:

        The value is stored in each preset.

        The value is set according to "Start-up" preset after power on.

        The value is set to default on *RST command.

        Overlapped command.

Example:

        SENS:TEMP:RTD:STAN PT385A

        SENS:TEMP:RTD:STAN? Response: PT385A

:SENSe:TEMPerature:RTD:TYPE

Syntax:

        :SENSe:TEMPerature:RTD:TYPE <CPD>

        :SENSe:TEMPerature:RTD:TYPE?

Description:

        Sets the RTD simulator type to the RTD Temperature meter function.

Parameters:

        <CPD> - RTD type {PLATinum|NICKel} (default PLAT).

            ·PLATinum   simulation for platinum RTD.

            ·NICKel   simulation for nickel RTD.

Remarks:

        The value is stored in each preset.

        The value is set according to "Start-up" preset after power on.

        The value is set to default on *RST command.

        Overlapped command.

Example:

        SENS:TEMP:RTD:TYPE PLAT

        SENS:TEMP:RTD:TYPE? Response: PLAT

:SENSe:TEMPerature:TCOuple:NULL[:STATe]

Syntax:

:SENSe:TEMPerature:TCOuple:NULL[:STATe] <BOOL>
:SENSe:TEMPerature:TCOuple:NULL[:STATe]?

Description:

Turns the null state on or off for the Temperature TC meter function. When null state is turned on, it takes measurement and uses it as an offset (NULL value).

Parameters:

<BOOL> - null state {ON|OFF|1|0} (default 0).

·ON   turns the null state ON.
·OFF   turns the null state OFF.
·1   turns the null state ON.
·0   turns the null state OFF.

Remarks:

The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

SENS:TEMP:TCO:NULL ON
SENS:TEMP:TCO:NULL? Response: 1

:SENSe:TEMPerature:TCOuple:NULL:VALue

Syntax:

:SENSe:TEMPerature:TCOuple:NULL:VALue <DNPD>
:SENSe:TEMPerature:TCOuple:NULL:VALue?

Description:

Sets the offset value for the Temperature TC meter function directly, or allows you to read the offset value.

Parameters:

<DNPD> - null value [V], the null value range is directly dependent on the range of the meter function.

Remarks:

The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

SENS:TEMP:TCO:NULL:VAL -0.000005
SENS:TEMP:TCO:NULL:VAL? Response: -5.00000E-06

:SENSe:TEMPerature:TCOuple:RANGe

Syntax:

:SENSe:TEMPerature:TCOuple:RANGe <DNPD>
:SENSe:TEMPerature:TCOuple:RANGe?

Description:

Sets the voltage range for Temperature TC meter function manually.

Parameters:

<DNPD> - voltage range [V], range 0.0 ... 0.12 (12 mV, 120 mV ranges are available, default 120 mV).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
    SENS:TEMP:TCO:RANG 0.12
    SENS:TEMP:TCO:RANG? Response: 1.200000E-01

:SENSe:TEMPerature:TCOuple:RANGe:AUTO

Syntax:
    :SENSe:TEMPerature:TCOuple:RANGe:AUTO <BOOL>
    :SENSe:TEMPerature:TCOuple:RANGe:AUTO?
Description:
    Sets the automatic voltage range selection for Temperature TC meter function.
Parameters:
    <BOOL> - automatic range selection {ON|OFF|1|0} (default 0).
        ·ON   turns on automatic range selection.
        ·OFF   turns off automatic range selection.
        ·1   turns on automatic range selection.
        ·0   turns off automatic range selection.
Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.
Example:
    SENS:TEMP:TCO:RANG:AUTO ON
    SENS:TEMP:TCO:RANG:AUTO? Response: 1

:SENSe:TEMPerature:TCOuple:RJUNction:EXTernal

Syntax:
    :SENSe:TEMPerature:TCOuple:RJUNction:EXTernal?
Description:
    Returns the cold junction temperature if the cold end temperature type is set to external.
    The command is used for the TC meter function.
Parameters:
    <DNPD> - measured external cold junction temperature.
    <UNIT> - temperature unit {CEL|FAR|K}.
        ·CEL   degrees Celsius unit is used.
        ·FAR   degrees Fahrenheit unit is used.
        ·K   Kelvin unit is used.
Remarks:
    Temperature is measured using external sensor.
    The cold end temperature determination type is set with the
    SENS:TEMP:TCO:RJUN:TYPE command.
    The sensor is configured using the SENS:TEMP:RTD… commands.
    Default unit can be selected using UNIT:TEMP command.
    Overlapped command.
Example:
    SENS:TEMP:TCO:RJUN:EXT? Response: 2.289000E+01 CEL

:SENSe:TEMPerature:TCOuple:RJUNction:TYPE

Syntax:
    :SENSe:TEMPerature:TCOuple:RJUNction:TYPE <CPD>
    :SENSe:TEMPerature:TCOuple:RJUNction:TYPE?
Description:
    Sets the method of obtaining cold junction temperature for Temperature TC meter function.
Parameters:

<CPD> - cold junction temperature type {FIX|EXT} (default FIX).
·FIX   temperature is fixed and can be set using SENS:TEMP:TCO:RJUN command.
·EXT   temperature is measured using external sensor.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:TEMP:TCO:RJUN:TYPE FIX
SENS:TEMP:TCO:RJUN:TYPE? Response: FIX

:SENSe:TEMPerature:TCOuple:RJUNction[:VALue]

Syntax:
:SENSe:TEMPerature:TCOuple:RJUNction[:VALue] <DNPD>[<UNIT>]
:SENSe:TEMPerature:TCOuple:RJUNction[:VALue]?

Description:
Sets the cold junction temperature in fixed mode.

Parameters:
<DNPD> - fixed cold junction temperature.
<UNIT> - temperature unit {CEL|FAR|K}.
·CEL   degrees Celsius unit is used.
·FAR   degrees Fahrenheit unit is used.
·K   Kelvin unit is used.

Remarks:
Default unit can be selected using UNIT:TEMP command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:TEMP:TCO:RJUN 23
SENS:TEMP:TCO:RJUN? Response: 2.300000E+01 CEL

:SENSe:TEMPerature:TCOuple:STANdard

Syntax:
:SENSe:TEMPerature:TCOuple:STANdard <CPD>
:SENSe:TEMPerature:TCOuple:STANdard?

Description:
Sets standard for calculation voltage for Temperature TC meter function.

Parameters:
<CPD> - standard {PTS68|ITS90} (default ITS90).
·PTS68 voltage is calculated using older PTS68 standard.
·ITS90 voltage is calculated using newer ITS90 standard.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SENS:TEMP:TCO:STAN PTS68
SENS:TEMP:TCO:STAN? Response: PTS68

:SENSe:TEMPerature:TCOuple:TYPE

Syntax:

    :SENSe:TEMPerature:TCOuple:TYPE <CPD>

    :SENSe:TEMPerature:TCOuple:TYPE?

Description:

    Sets the thermocouple type for Temperature TC meter function.

Parameters:

    <CPD> - TC type {R|S|B|J|T|E|K|N|M|C|D|G2} (default R).

·R	thermocouple type R
·S	thermocouple type S
·B	thermocouple type B
·J	thermocouple type J
·T	thermocouple type T
·E	thermocouple type E
·K	thermocouple type K
·N	thermocouple type N
·M	thermocouple type M
·C	thermocouple type C
·D	thermocouple type D
·G2	thermocouple type G2

Remarks:

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    SENS:TEMP:TCO:TYPE R

    SENS:TEMP:TCO:TYPE? Response: R

[:SOURce]:CAPacitance[:AMPLitude]

Syntax:

    [:SOURce]:CAPacitance[:AMPLitude] <DNPD>[<UNIT>]

    [:SOURce]:CAPacitance[:AMPLitude]?

Description:

    Sets the capacitance amplitude in Variable or Fixed capacitance mode.

Parameters:

    <DNPD> - capacitance amplitude, range 0.8 nF ... 120 mF in variable mode (default 100 nF), 1 nF ... 100 uF in fixed mode.

    <UNIT> - capacitance unit {F}

        ·F   Farad unit is used.

Remarks:

    Calibration value can be obtained in fixed mode.

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    CAP 1e-7

    CAP? Response: 1.000000E-07 F

[:SOURce]:CAPacitance:FIXed

Syntax:

    [:SOURce]:CAPacitance:FIXed <CPD>

    [:SOURce]:CAPacitance:FIXed?

Description:

Sets the capacitance amplitude in Fixed Capacitance mode.

Parameters:

<CPD> - capacitance standard {1N|10N|100N|1U|10U|100U} (default 1N).

·1N 1 nF capacitance standard.
·10N 10 nF capacitance standard.
·100N 100 nF capacitance standard.
·1U 1 uF capacitance standard.
·10U 10 uF capacitance standard.
·100U 100 uF capacitance standard.

Remarks:

Calibration value can be obtained using CAP? command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CAP:FIX 1N
CAP:FIX? Response: 1N
CAP? Response: 1.002415E-09

[:SOURce]:CAPacitance:MODE

Syntax:

[:SOURce]:CAPacitance:MODE <CPD>
[:SOURce]:CAPacitance:MODE?

Description:

Sets the capacitance mode for Capacitance source function.

Parameters:

<CPD> - capacitance mode {FIXed|VARiable} (default VAR)

·FIXed capacitance is set using discrete internal standards.
·VARiable capacitance is set continuously using the simulator.

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CAP:MODE FIX
CAP:MODE? Response: FIX

[:SOURce]:CURRent:AC[:AMPLitude]

Syntax:

[:SOURce]:CURRent:AC[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:CURRent:AC[:AMPLitude]?

Description:

Sets the current amplitude for Current AC source function.

Parameters:

<DNPD> - current amplitude, range 0.00001 ... 20.5 A RMS in normal mode (default 1.0 A).
<UNIT> - unit used for current amplitude {ARMS|APK|APP|AAVG} (default ARMS).

·ARMS Ampere RMS
·APK Ampere Peak
·APP Ampere Peak to Peak
·AAVG Ampere Average

Remarks:

The amplitude setting is affected by the current mode setting, see OUTP:CURR:MODE command.

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.
Example:
    CURR:AC 1.0
    CURR:AC? Response: 1.000000E+00 ARMS

[:SOURce]:CURRent:AC:FREQuency
Syntax:
    [:SOURce]:CURRent:AC:FREQuency <DNPD>[<UNIT>]
    [:SOURce]:CURRent:AC:FREQuency?
Description:
    Sets the frequency for Current AC source function.
Parameters:
    <DNPD> - frequency [Hz], range 15.0 ... 10000.0 depending on the current amplitude
    (default 1000.0).
    <UNIT> - frequency unit {HZ}.
        ·HZ   Hertz unit is used.
Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.
Example:
    CURR:AC:FREQ 1000.0
    CURR:AC:FREQ? Response: 1.000000E+03 HZ

[:SOURce]:CURRent:AC:RANGe
Syntax:
    [:SOURce]:CURRent:AC:RANGe <DNPD>
    [:SOURce]:CURRent:AC:RANGe?
Description:
    Sets the current range for Current AC source function manually.
Parameters:
    <DNPD> - current range [A], range 0.0 ... 20.5 in normal mode (200 uA, 2 mA, 20 mA,
    200 mA, 2 A, 20,5 A ranges are available, default 2 A).
Remarks:
    The range setting is affected by the current mode setting, see OUTP:CURR:MODE
    command.
    The closest upper range to the entered value will be selected.
        Setting the range turns off the automatic range selection.
        The value is stored in each preset.
        The value is set according to "Start-up" preset after power on.
        The value is set to default on *RST command.
        Overlapped command.
Example:
    CURR:AC:RANG 0.02
    CURR:AC:RANG? Response: 2.000000E-02

[:SOURce]:CURRent:AC:RANGe:AUTO
Syntax:
    [:SOURce]:CURRent:AC:RANGe:AUTO <BOOL>
    [:SOURce]:CURRent:AC:RANGe:AUTO?
Description:

Sets the automatic range selection for Current AC source function.

Parameters:

        <BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

                ·ON   turns on automatic range selection.

                ·OFF   turns off automatic range selection.

                ·1   turns on automatic range selection.

                ·0   turns off automatic range selection.

Remarks:

        The value is stored in each preset.

        The value is set according to "Start-up" preset after power on.

        The value is set to default on *RST command.

        Overlapped command.

Example:

        CURR:AC:RANG:AUTO ON

        CURR:AC:RANG:AUTO? Response: 1

[:SOURce]:CURRent:AC:SHAPe

Syntax:

        [:SOURce]:CURRent:AC:SHAPe <CPD>

        [:SOURce]:CURRent:AC:SHAPe?

Description:

        Selects the signal waveform for Current AC source function.

Parameters:

        <CPD> - shape {SINE|LSINe|SQUare|TRIangle|URAMp|DRAMp|HARMonic}
(default SINE).

                ·SINE   sine waveform.

                ·LSINe   limited sine waveform.

                ·SQUare   square waveform.

                ·TRIangle   triangle waveform.

                ·URAMp   rising ramp waveform.

                ·DRAMp   falling ramp waveform.

                ·HARMonic   harmonic waveform, see HARM:CURR commands.

Remarks:

        The value is stored in each preset.

        The value is set according to "Start-up" preset after power on.

        The value is set to default on *RST command.

        Overlapped command.

Example:

        CURR:AC:SHAP SINE

        CURR:AC:SHAP? Response: SINE

[:SOURce]:CURRent:AC:VFC[:AMPLitude]

Syntax:

        [:SOURce]:CURRent:AC:VFC[:AMPLitude] <DNPD>[<UNIT>]

        [:SOURce]:CURRent:AC:VFC[:AMPLitude]?

Description:

        Sets the VFC amplitude for Current AC source function.

Parameters:

        <DNPD> - voltage amplitude, range 0.005 ... 5.0 V RMS (default 1.0).

        <UNIT> - unit for voltage amplitude {V}.

                ·V   Volt RMS unit is used.

Remarks:

        Current mode must be set to VFC using OUTP:CURR:MODE command.

        The value is stored in each preset.

        The value is set according to "Start-up" preset after power on.

        The value is set to default on *RST command.

Overlapped command.

Example:

CURR:AC:VFC 1.0
CURR:AC:VFC? Response: 1.000000E+00 V

[:SOURce]:CURRent:AC:VFC:RANGe

Syntax:

[:SOURce]:CURRent:AC:VFC:RANGe <DNPD>
[:SOURce]:CURRent:AC:VFC:RANGe?

Description:

Sets the VFC range for Current AC source function manually.

Parameters:

<DNPD> - VFC range [V], range 0.0 ... 5.0 (50 mV, 500 mV, 5 V ranges are available, default 5 V).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CURR:AC:VFC:RANG 0.05
CURR:AC:VFC:RANG? Response: 5.00000E-02

[:SOURce]:CURRent:AC:VFC:RANGe:AUTO

Syntax:

[:SOURce]:CURRent:AC:VFC:RANGe:AUTO <BOOL>
[:SOURce]:CURRent:AC:VFC:RANGe:AUTO?

Description:

Sets the automatic VFC range selection for Current AC source function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.
·OFF   turns off automatic range selection.
·1   turns on automatic range selection.
·0   turns off automatic range selection.

Remarks:

Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CURR:AC:VFC:RANG:AUTO ON
CURR:AC:VFC:RANG:AUTO? Response: 1

[:SOURce]:CURRent[:DC][:AMPLitude]

Syntax:

[:SOURce]:CURRent[:DC][:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:CURRent[:DC][:AMPLitude]?

Description:

Sets amplitude for Current DC source function.

Parameters:

<DNPD> - current amplitude, range 0.0 ... ±20.5 A in normal mode (default 1.0).

<UNIT> - unit used for current amplitude {A} (default A).

·A   Ampere unit is used.

Remarks:

The amplitude setting is affected by the current mode setting, see OUTP:CURR:MODE command.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

CURR 1.0

CURR? Response: 1.000000E+00 A

[:SOURce]:CURRent[:DC]:RANGe

Syntax:

[:SOURce]:CURRent[:DC]:RANGe <DNPD>

[:SOURce]:CURRent[:DC]:RANGe?

Description:

Sets the current range for Current DC source function.

Parameters:

<DNPD> - current range [A], range 0.0 ... 20.5 in normal mode (200 uA, 2 mA, 20 mA, 200 mA, 2 A, 20.5 A ranges are available, default 2 A).

Remarks:

The range setting is affected by the current mode setting, see OUTP:CURR:MODE command.

The closest upper range to the entered value will be selected.

Setting the range turns off the automatic range selection.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

CURR:RANG 0.002

CURR:RANG? Response: 2.000000E-03

[:SOURce]:CURRent[:DC]:RANGe:AUTO

Syntax:

[:SOURce]:CURRent[:DC]:RANGe:AUTO <BOOL>

[:SOURce]:CURRent[:DC]:RANGe:AUTO?

Description:

Sets the automatic current range selection for Current DC source function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.

·OFF   turns off automatic range selection.

·1   turns on automatic range selection.

·0   turns off automatic range selection.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

CURR:RANG:AUTO ON

CURR:RANG:AUTO? Response: 1

[:SOURce]:CURRent[:DC]:VFC[:AMPLitude]

Syntax:

[:SOURce]:CURRent[:DC]:VFC[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:CURRent[:DC]:VFC[:AMPLitude]?

Description:

Sets the VFC amplitude for Current DC source function.

Parameters:

<DNPD> - voltage amplitude, range 0.0 ... 5.0 V (default 1.0).
<UNIT> - unit for voltage amplitude {V}.
    ·V   Volt unit is used.

Remarks:

Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CURR:VFC 1.0
CURR:VFC? Response: 1.000000E+00 V

[:SOURce]:CURRent[:DC]:VFC:RANGe

Syntax:

[:SOURce]:CURRent[:DC]:VFC:RANGe <DNPD>
[:SOURce]:CURRent[:DC]:VFC:RANGe?

Description:

Sets the VFC range for Current DC source function manually.

Parameters:

<DNPD> - VFC range [V], range 0.0 ... 5.0 (50 mV, 500 mV, 5 V ranges are available, default 5 V).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CURR:VFC:RANG 0.5
CURR:VFC:RANG? Response: 5.00000E-01

[:SOURce]:CURRent[:DC]:VFC:RANGe:AUTO

Syntax:

[:SOURce]:CURRent[:DC]:VFC:RANGe:AUTO <BOOL>
[:SOURce]:CURRent[:DC]:VFC:RANGe:AUTO?

Description:

Sets the automatic VFC range selection for Current DC source function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).
    ·ON   turns on automatic range selection.
    ·OFF   turns off automatic range selection.
    ·1   turns on automatic range selection.
    ·0   turns off automatic range selection.

Remarks:

Current mode must be set to VFC using OUTP:CURR:MODE command.

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

CURR:VFC:RANG:AUTO ON
CURR:VFC:RANG:AUTO? Response: 1

[:SOURce]:FUNCtion[:ON]

Syntax:

[:SOURce]:FUNCtion[:ON] <SPD>
[:SOURce]:FUNCtion[:ON]?

Description:

Sets the desired source function or returns the set function.

Parameters:

<SPD> - source function

"VOLT"	Voltage DC
"VOLT:AC"	Voltage AC
"CURR"	Current DC
"CURR:AC"	Current AC
"POW"	Power DC
"POW:AC"	Power AC
"RES"	Resistance LVR
"RES:HVOL"	Resistance HVR
"CAP"	Capacitance
"TEMP:RTD"	Temperature RTD
"TEMP:TCO"	Temperature TC
"SCOP:VOLT"	Scope Voltage
"SCOP:SINE"	Scope Sine
"SCOP:PWM"	Scope PWM
"SCOP:MARK"	Scope Mark

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

FUNC "CURR:AC"
FUNC? Response: "CURR:AC"

[:SOURce]:POWer:AC[:AMPLitude]

Syntax:

[:SOURce]:POWer:AC[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:POWer:AC[:AMPLitude]?

Description:

Sets the power AC amplitude.

Parameters:

<DNPD> - power AC amplitude, the range depends on voltage, current, power factor and current mode (default 10.0).
<UNIT> - power AC unit {W|VA|VAr}.

·W   real power.
·VA   apparent power.
·VAr   reactive power.

Remarks:

Changing the power amplitude has the effect of changing the current amplitude.
The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC 10.0

POW:AC? Response: 1.000000E+01 W

[:SOURce]:POWer:AC:CURRent[:AMPLitude]

Syntax:

[:SOURce]:POWer:AC:CURRent[:AMPLitude] <DNPD>[<UNIT>]

[:SOURce]:POWer:AC:CURRent[:AMPLitude]?

Description:

Sets the current amplitude in Power AC mode

Parameters:

<DNPD> - current amplitude, range 0.0002 ... 20.5 A RMS in normal mode (default 1.0).

<UNIT> - current unit {A}.

·A   Ampere RMS unit is used.

Remarks:

The amplitude setting is affected by the current mode setting, see OUTP:CURR:MODE command.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC:CURR 1.0

POW:AC:CURR? Response: 1.000000E+00 A

[:SOURce]:POWer:AC:CURRent:PHASe

Syntax:

[:SOURce]:POWer:AC:CURRent:PHASe <DNPD>[<UNIT>]

[:SOURce]:POWer:AC:CURRent:PHASe?

Description:

Sets the phase shift between current and voltage channel for Power AC source function.

Parameters:

<DNPD> - phase shift, range 0.0 ... 360.0 ° (default 0.0).

<UNIT> - phase unit {DEG|LEAD|LAG}.

·DEG   degree.

·LEAD leading power factor.

·LAG   lagging power factor.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC:CURR:PHAS 0.0

POW:AC:CURR:PHAS? Response: 0.000000E+00 DEG

[:SOURce]:POWer:AC:CURRent:RANGe

Syntax:

[:SOURce]:POWer:AC:CURRent:RANGe <DNPD>

[:SOURce]:POWer:AC:CURRent:RANGe?

Description:

Sets the current range for Power AC source function manually.

Parameters:

    <DNPD> - current range [A], range 0.0 ... 20.5 in normal mode (2 mA, 20 mA, 200 mA, 2 A, 20.5 A ranges are available, default 2.0 A).

Remarks:

    The range setting is affected by the current mode setting, see OUTP:CURR:MODE command.

    The closest upper range to the entered value will be selected.

        Setting the range turns off the automatic range selection.

        The value is stored in each preset.

        The value is set according to "Start-up" preset after power on.

        The value is set to default on *RST command.

        Overlapped command.

Example:

    POW:AC:CURR:RANG 2

    POW:AC:CURR:RANG? Response: 2.000000E+00

[:SOURce]:POWer:AC:CURRent:RANGe:AUTO

Syntax:

    [:SOURce]:POWer:AC:CURRent:RANGe:AUTO <BOOL>

    [:SOURce]:POWer:AC:CURRent:RANGe:AUTO?

Description:

    Sets the automatic current range selection for Power AC source function.

Parameters:

    <BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

        ·ON   turns on automatic range selection.

        ·OFF   turns off automatic range selection.

        ·1   turns on automatic range selection.

        ·0   turns off automatic range selection.

Remarks:

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    POW:AC:CURR:RANG:AUTO ON

    POW:AC:CURR:RANG:AUTO? Response: 1

[:SOURce]:POWer:AC:CURRent:VFC[:AMPLitude]

Syntax:

    [:SOURce]:POWer:AC:CURRent:VFC[:AMPLitude] <DNPD>[<UNIT>]

    [:SOURce]:POWer:AC:CURRent:VFC[:AMPLitude]?

Description:

    Sets the VFC amplitude for Power AC source function.

Parameters:

    <DNPD> - VFC amplitude, range 0.005 ... 5.0 V RMS (default 1.0).

    <UNIT> - VFC unit {V}.

        ·V   Volt RMS unit is used.

Remarks:

    Current mode must be set to VFC using OUTP:CURR:MODE command.

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    POW:AC:CURR:VFC 1.0

    POW:AC:CURR:VFC? Response: 1.000000E+00 V

[:SOURce]:POWer:AC:CURRent:VFC:RANGe

Syntax:

[:SOURce]:POWer:AC:CURRent:VFC:RANGe <DNPD>
[:SOURce]:POWer:AC:CURRent:VFC:RANGe?

Description:

Sets the VFC range for Power AC source function manually.

Parameters:

<DNPD> - VFC range [V], range 0.0 ... 5.0 (50 mV, 500 mV, 5 V ranges are available, default 5 V).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

POW:AC:CURR:VFC:RANG 0.5
POW:AC:CURR:VFC:RANG? Response: 5.00000E-01

[:SOURce]:POWer:AC:CURRent:VFC:RANGe:AUTO

Syntax:

[:SOURce]:POWer:AC:CURRent:VFC:RANGe:AUTO <BOOL>
[:SOURce]:POWer:AC:CURRent:VFC:RANGe:AUTO?

Description:

Sets the automatic VFC range selection for Power AC source function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.
·OFF   turns off automatic range selection.
·1   turns on automatic range selection.
·0   turns off automatic range selection.

Remarks:

Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

POW:AC:CURR:VFC:RANG:AUTO ON
POW:AC:CURR:VFC:RANG:AUTO? Response: 1

[:SOURce]:POWer:AC:ENERgy:ACTual

Syntax:

[:SOURce]:POWer:AC:ENERgy:ACTual?

Description:

Returns actual loaded energy in Energy mode of Power AC function.

Parameters:

<DNPD> - actual loaded energy.
<UNIT> - energy unit {WS|WH}.

·WS   Watt * Second.
·WH   Watt * Hour.

Remarks:

The energy value is cleared after switching output on.

The energy mode must be enabled by POW:AC:ENER:STAT command.
The energy unit can be changed using UNIT:ENER command.
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
POW:AC:ENER:ACT? Response: 3.355210E+06 WS

[:SOURce]:POWer:AC:ENERgy[:AMPLitude]

Syntax:
[:SOURce]:POWer:AC:ENERgy[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:POWer:AC:ENERgy[:AMPLitude]?

Description:
Sets the total amount of energy to be supplied in Energy mode of Power AC function.

Parameters:
<DNPD> - energy, range depends on the voltage, current and power factor settings (default 600 Ws).
<UNIT> - energy unit {WS|WH}.
    ·WS   Watt * Second.
    ·WH   Watt * Hour.

Remarks:
Changing the energy value has the effect of changing the energy time.
The energy mode must be enabled by POW:AC:ENER:STAT command.
After loading all the energy, the terminals switch off themselves.
The energy unit can be changed using UNIT:ENER command.
The value is set to default after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
POW:AC:ENER 1200
POW:AC:ENER? Response: 1.200000E+03 WS

[:SOURce]:POWer:AC:ENERgy:CLEar

Syntax:
[:SOURce]:POWer:AC:ENERgy:CLEar

Description:
Clears the amount of energy in Energy mode of Power AC function.

Parameters:
None

Remarks:
Overlapped command.

Example:
POW:AC:ENER:CLE

[:SOURce]:POWer:AC:ENERgy:MODE

Syntax:
[:SOURce]:POWer:AC:ENERgy:MODE <CPD>
[:SOURce]:POWer:AC:ENERgy:MODE?

Description:
Sets the energy counting mode. In both modes, the current loaded energy can be read with the POW:AC:ENER:ACT? command.

Parameters:
<CPD> - energy mode {TIMer|FREE} (default TIM)
    ·TIMer   energy is generated according to the set time.
    ·FREE   energy is generated continuously until the terminals are switched off.

Remarks:
> The value is stored in each preset.
> The value is set according to "Startup" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> POW:AC:ENER:MODE TIM
> POW:AC:ENER:MODE? Response: TIM

[:SOURce]:POWer:AC:ENERgy:STATe

Syntax:
> [:SOURce]:POWer:AC:ENERgy:STATe <BOOL>
> [:SOURce]:POWer:AC:ENERgy:STATe?

Description:
> Enables or disables Energy mode of Power AC function.

Parameters:
> <BOOL> - energy state {ON|OFF|1|0} (default 0).
>> ·ON   energy is enabled.
>> ·OFF   energy is disabled.
>> ·1   energy is enabled.
>> ·0   energy is disabled.

Remarks:
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> POW:AC:ENER:STAT ON
> POW:AC:ENER:STAT? Response: 1

[:SOURce]:POWer:AC:ENERgy:TIME

Syntax:
> [:SOURce]:POWer:AC:ENERgy:TIME <DNPD>
> [:SOURce]:POWer:AC:ENERgy:TIME?

Description:
> Sets the amount of time in Energy mode of Power AC function.

Parameters:
> <DNPD> - energy time [s], range 2 ... 3600 (default 60). The resolution is 1ms.

Remarks:
> The energy mode must be enabled by POW:AC:ENER:STAT command.
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> POW:AC:ENER:TIME 60
> POW:AC:ENER:TIME? Response: 6.000000E+01

[:SOURce]:POWer:AC:FREQuency

Syntax:
> [:SOURce]:POWer:AC:FREQuency <DNPD>[<UNIT>]
> [:SOURce]:POWer:AC:FREQuency?

Description:
> Sets the frequency for Power AC source function.

Parameters:

<DNPD> - frequency, range 15.0 ... 1000.0 Hz depending on the current mode (default 50.0).

<UNIT> - frequency unit {HZ}.

·HZ   Hertz unit is used.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC:FREQ 50.0

POW:AC:FREQ? Response: 5.000000E+01 HZ

[:SOURce]:POWer:AC:HARMonic:STATe

Syntax:

[:SOURce]:POWer:AC:HARMonic:STATe <BOOL>

[:SOURce]:POWer:AC:HARMonic:STATe?

Description:

Enables or disables Harmonic mode for Power AC function.

Parameters:

<BOOL> - harmonic state {ON|OFF|1|0} (default 0).

·ON   turns harmonic mode on.

·OFF   turns harmonic mode off.

·1   turns harmonic mode on.

·0   turns harmonic mode off.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC:HARM:STAT ON

POW:AC:HARM:STAT? Response: 1

[:SOURce]:POWer:AC:VOLTage[:AMPLitude]

Syntax:

[:SOURce]:POWer:AC:VOLTage[:AMPLitude] <DNPD>[<UNIT>]

[:SOURce]:POWer:AC:VOLTage[:AMPLitude]?

Description:

Sets the voltage amplitude for Power AC function.

Parameters:

<DNPD> - voltage amplitude, range 0.2 ... 280.0 V RMS (default 10.0).

<UNIT> - voltage unit {V}.

·V   Volt RMS unit is used.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC:VOLT 10.0

POW:AC:VOLT? Response: 1.000000E+01 V

[:SOURce]:POWer:AC:VOLTage:RANGe

Syntax:

[:SOURce]:POWer:AC:VOLTage:RANGe <DNPD>
[:SOURce]:POWer:AC:VOLTage:RANGe?

Description:

Sets the voltage range for Power AC source function manually.

Parameters:

<DNPD> - voltage range [V], range 0.0 ... 280.0 (2 V, 20 V, 100 V, 280 V ranges are available, default 20 V).

Remarks:

The closest upper range to the entered value will be selected.

Setting the range turns off the automatic range selection.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC:VOLT:RANG 20

POW:AC:VOLT:RANG? Response: 2.000000E+01

[:SOURce]:POWer:AC:VOLTage:RANGe:AUTO

Syntax:

[:SOURce]:POWer:AC:VOLTage:RANGe:AUTO <BOOL>
[:SOURce]:POWer:AC:VOLTage:RANGe:AUTO?

Description:

Sets the automatic voltage range selection for Power AC source function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.
·OFF   turns off automatic range selection.
·1   turns on automatic range selection.
·0   turns off automatic range selection.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

POW:AC:VOLT:RANG:AUTO ON

POW:AC:VOLT:RANG:AUTO? Response: 1

[:SOURce]:POWer[:DC][:AMPLitude]

Syntax:

[:SOURce]:POWer[:DC][:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:POWer[:DC][:AMPLitude]?

Description:

Sets the power amplitude in Power DC mode.

Parameters:

<DNPD> - power amplitude, range 0.0 ... 5740.0 W in normal mode (default 10.0).

<UNIT> - power unit {W}.

·W   Watt unit is used.

Remarks:

The amplitude setting is affected by the current mode setting, see OUTP:CURR:MODE command.

Changing the power amplitude has the effect of changing the current amplitude.

The value is set to default after power on.

The value is set to default on *RST command.

Overlapped command.

Example:
>POW 10.0
>POW? Response: 1.000000E+01 W

[:SOURce]:POWer[:DC]:CURRent[:AMPLitude]

Syntax:
>[:SOURce]:POWer[:DC]:CURRent[:AMPLitude] <DNPD>[<UNIT>]
>[:SOURce]:POWer[:DC]:CURRent[:AMPLitude]?

Description:
>Sets the current amplitude for Power DC function.

Parameters:
><DNPD> - current amplitude, range 0.0 ... 20.5 A in normal mode (default 1.0).
><UNIT> - current unit {A}.
>>·A   Ampere unit is used.

Remarks:
>The amplitude setting is affected by the current mode setting, see OUTP:CURR:MODE command.
>The value is stored in each preset.
>The value is set according to "Start-up" preset after power on.
>The value is set to default on *RST command.
>Overlapped command.

Example:
>POW:CURR 1.0
>POW:CURR? Response: 1.000000E+00 A

[:SOURce]:POWer[:DC]:CURRent:RANGe

Syntax:
>[:SOURce]:POWer[:DC]:CURRent:RANGe <DNPD>
>[:SOURce]:POWer[:DC]:CURRent:RANGe?

Description:
>Sets the current range for Power DC source function manually.

Parameters:
><DNPD> - current range [A], range 0.0 ... 20.5 in normal mode (2 mA, 20 mA, 200 mA, 2 A, 20.5 A ranges are available, default 2 A).

Remarks:
>The range setting is affected by the current mode setting, see OUTP:CURR:MODE command.
>The closest upper range to the entered value will be selected.
>>Setting the range turns off the automatic range selection.
>>The value is stored in each preset.
>>The value is set according to "Start-up" preset after power on.
>>The value is set to default on *RST command.
>>Overlapped command.

Example:
>POW:CURR:RANG 0.2
>POW:CURR:RANG? Response: 2.000000E-01

[:SOURce]:POWer[:DC]:CURRent:RANGe:AUTO

Syntax:
>[:SOURce]:POWer[:DC]:CURRent:RANGe:AUTO <BOOL>
>[:SOURce]:POWer[:DC]:CURRent:RANGe:AUTO?

Description:
>Sets the automatic current range selection for Power DC source function.

Parameters:
><BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.
·OFF   turns off automatic range selection.
·1   turns on automatic range selection.
·0   turns off automatic range selection.

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

POW:CURR:RANG:AUTO ON
POW:CURR:RANG:AUTO? Response: 1

[:SOURce]:POWer[:DC]:CURRent:VFC[:AMPLitude]

Syntax:

[:SOURce]:POWer[:DC]:CURRent:VFC[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:POWer[:DC]:CURRent:VFC[:AMPLitude]?

Description:

Sets the VFC amplitude for Power DC source function.

Parameters:

<DNPD> - VFC amplitude, range 0.0 ... ±5.0 V (default 1.0).
<UNIT> - VFC unit {V}.
    ·V   Volt unit is used.

Remarks:

Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

POW:CURR:VFC 1.0
POW:CURR:VFC? Response: 1.000000E+00 V

[:SOURce]:POWer[:DC]:CURRent:VFC:RANGe

Syntax:

[:SOURce]:POWer[:DC]:CURRent:VFC:RANGe <DNPD>
[:SOURce]:POWer[:DC]:CURRent:VFC:RANGe?

Description:

Sets the VFC range for Power DC source function manually.

Parameters:

<DNPD> - VFC range [V], range 0.0 ... 5.0 (50 mV, 500 mV, 5 V ranges are available, default 5 V).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
Current mode must be set to VFC using OUTP:CURR:MODE command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

POW:CURR:VFC:RANG 5
POW:CURR:VFC:RANG? Response: 5.00000E+00

[:SOURce]:POWer[:DC]:CURRent:VFC:RANGe:AUTO

Syntax:
> [:SOURce]:POWer[:DC]:CURRent:VFC:RANGe:AUTO <BOOL>
> [:SOURce]:POWer[:DC]:CURRent:VFC:RANGe:AUTO?

Description:
> Sets the automatic VFC range selection for Power DC source function.

Parameters:
> <BOOL> - automatic range selection {ON|OFF|1|0} (default 1).
>> ·ON   turns on automatic range selection.
>> ·OFF   turns off automatic range selection.
>> ·1   turns on automatic range selection.
>> ·0   turns off automatic range selection.

Remarks:
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> POW:CURR:VFC:RANG:AUTO ON
> POW:CURR:VFC:RANG:AUTO? Response: 1

[:SOURce]:POWer[:DC]:ENERgy:ACTual

Syntax:
> [:SOURce]:POWer[:DC]:ENERgy:ACTual?

Description:
> Returns actual loaded energy in Energy mode of Power DC function.

Parameters:
> <DNPD> - actual loaded energy.
> <UNIT> - energy unit {WS|WH}.
>> ·WS   Watt * Second.
>> ·WH   Watt * Hour.

Remarks:
> The energy mode must be enabled by POW:DC:ENER:STAT command.
> Overlapped command.

Example:
> POW:ENER:ACT? Response: 9.99742E+07 WS

[:SOURce]:POWer[:DC]:ENERgy[:AMPLitude]

Syntax:
> [:SOURce]:POWer[:DC]:ENERgy[:AMPLitude] <DNPD>[<UNIT>]
> [:SOURce]:POWer[:DC]:ENERgy[:AMPLitude]?

Description:
> Sets the total amount of energy to be supplied in Energy mode of Power DC function.

Parameters:
> <DNPD> - energy, range depends on the voltage and current (default 600 Ws).
> <UNIT> - energy unit {WS|WH}.
>> ·WS   Watt * Second.
>> ·WH   Watt * Hour.

Remarks:
> Changing the energy value has the effect of changing the energy time.
> The energy mode must be enabled by POW:DC:ENER:STAT command.
> After loading all the energy, the terminals switch off themselves.
> The energy unit can be changed using UNIT:ENER command.
> The value is set to default after power on.
> The value is set to default on *RST command.

Overlapped command.
Example:
POW:ENER 1200.0
POW:ENER? Response: 1.200000E+03 WS

[:SOURce]:POWer[:DC]:ENERgy:CLEar
Syntax:
[:SOURce]:POWer[:DC]:ENERgy:CLEar
Description:
Clears the amount of energy in Energy mode of Power DC function.
Parameters:
None
Remarks:
Overlapped command.
Example:
POW:ENER:CLE

[:SOURce]:POWer[:DC]:ENERgy:MODE
Syntax:
[:SOURce]:POWer:AC:ENERgy:MODE <CPD>
[:SOURce]:POWer:AC:ENERgy:MODE?
Description:
Sets the energy counting mode. In both modes, the current loaded energy can be read with
the POW:DC:ENER:ACT? command.
Parameters:
<CPD> - energy mode {TIMer|FREE} (default TIM)
·TIMer   energy is generated according to the set time.
·FREE   energy is generated continuously until the terminals are switched off.
Remarks:
The value is stored in each preset.
The value is set according to "Startup" preset after power on.
The value is set to default on *RST command.
Overlapped command.
Example:
POW:ENER:MODE TIM
POW:ENER:MODE? Response: TIM

[:SOURce]:POWer[:DC]:ENERgy:STATe
Syntax:
[:SOURce]:POWer[:DC]:ENERgy:STATe <BOOL>
[:SOURce]:POWer[:DC]:ENERgy:STATe?
Description:
Enables or disables energy mode in Power DC function.
Parameters:
<BOOL> - energy state {ON|OFF|1|0} (default 0).
·ON   energy mode is enabled.
·OFF   energy mode is disabled.
·1   energy mode is enabled.
·0   energy mode is disabled.
Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.
Example:

POW:ENER:STAT ON
POW:ENER:STAT? Response: 1

[:SOURce]:POWer[:DC]:ENERgy:TIME

Syntax:
[:SOURce]:POWer[:DC]:ENERgy:TIME <DNPD>
[:SOURce]:POWer[:DC]:ENERgy:TIME?
Description:
Sets the amount of time in Energy mode of Power DC function.
Parameters:
<DNPD> - energy time [s], range 2 ... 3600 (default 60). The resolution is 1ms.
Remarks:
The energy mode must be enabled by POW:DC:ENER:STAT command.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.
Example:
POW:ENER:TIME 60
POW:ENER:TIME? Response: 6.000000E+01

[:SOURce]:POWer[:DC]:VOLTage[:AMPLitude]

Syntax:
[:SOURce]:POWer[:DC]:VOLTage[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:POWer[:DC]:VOLTage[:AMPLitude]?
Description:
Sets the voltage amplitude in Power DC function.
Parameters:
<DNPD> - voltage amplitude, range 0.2 ... ±280.0 V (default 10.0).
<UNIT> - voltage unit {V}.
·V   Volt unit is used.
Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.
Example:
POW:VOLT 10.0
POW:VOLT? Response: 1.000000E+01 V

[:SOURce]:POWer[:DC]:VOLTage:RANGe

Syntax:
[:SOURce]:POWer[:DC]:VOLTage:RANGe <DNPD>
[:SOURce]:POWer[:DC]:VOLTage:RANGe?
Description:
Sets the voltage range in Power DC source function manually.
Parameters:
<DNPD> - voltage range [V], range 0.0 ... 280.0 (2 V, 20 V, 100 V, 280 V ranges are
available, default 20 V).
Remarks:
The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.

Overlapped command.
Example:
POW:VOLT:RANG 100
POW:VOLT:RANG? Response: 1.000000E+02

[:SOURce]:POWer[:DC]:VOLTage:RANGe:AUTO
Syntax:
[:SOURce]:POWer[:DC]:VOLTage:RANGe:AUTO <BOOL>
[:SOURce]:POWer[:DC]:VOLTage:RANGe:AUTO?
Description:
Sets the automatic voltage range selection in Power DC source function.
Parameters:
<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).
·ON   turns on automatic range selection.
·OFF   turns off automatic range selection.
·1   turns on automatic range selection.
·0   turns off automatic range selection.
Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.
Example:
POW:VOLT:RANG:AUTO ON
POW:VOLT:RANG:AUTO? Response: 1

[:SOURce]:RESistance[:LVOLtage][:AMPLitude]
Syntax:
[:SOURce]:RESistance[:LVOLtage][:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:RESistance[:LVOLtage][:AMPLitude]?
Description:
Sets the resistance amplitude for Low Voltage Resistance source function.
Parameters:
<DNPD> - resistance amplitude, range 0.0 ... 1.0e9 Ohm (default 100.0).
<UNIT> - resistance unit {OHM}.
·OHM Ohm unit is used.
Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.
Example:
RES 100.0
RES? Response: 1.000000E+02 OHM

[:SOURce]:RESistance[:LVOLtage]:COMPensation
Syntax:
[:SOURce]:RESistance[:LVOLtage]:COMPensation <DNPD>[<UNIT>]
[:SOURce]:RESistance[:LVOLtage]:COMPensation?
Description:
Sets the compensation for Low Voltage Resistance source function.
Parameters:
<DNPD> - compensation, range 0.0 ... 1.0 Ohm (default 0.0).
<UNIT> - compensation unit {OHM}.
·OHM Ohm unit is used.

Remarks:

> The compensation is valid only for Variable 2-wire mode.
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:

> RES:COMP 0.012
> RES:COMP? Response: 1.200000E-02 OHM

[:SOURce]:RESistance[:LVOLtage]:FIXed

Syntax:

> [:SOURce]:RESistance[:LVOLtage]:FIXed <CPD>
> [:SOURce]:RESistance[:LVOLtage]:FIXed?

Description:

> Selects the fixed resistance standard for Low Voltage Resistance source function.

Parameters:

> <CPD>   -   fixed   resistance   standard
> {0R|1R|10R|100R|1K|10K|100K|1M|10M|100M|1G} (default 0R).
>> ·0R   0 Ohm resistance standard.
>> ·1R   1 Ohm resistance standard.
>> ·10R   10 Ohm resistance standard
>> ·100R 100 Ohm resistance standard.
>> ·1K   1 kOhm resistance standard.
>> ·10K   10 kOhm resistance standard.
>> ·100K 100 kOhm resistance standard.
>> ·1M   1 MOhm resistance standard.
>> ·10M   10 MOhm resistance standard.
>> ·100M 100 MOhm resistance standard.
>> ·1G   1 GOhm resistance standard.

Remarks:

> The display shows the real calibrated resistance value in this mode.
> The real calibrated resistance value can be read using the RES? command.
> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:

> RES:FIX 0R
> RES:FIX? Response: 0R

[:SOURce]:RESistance[:LVOLtage]:MODE

Syntax:

> [:SOURce]:RESistance[:LVOLtage]:MODE <CPD>
> [:SOURce]:RESistance[:LVOLtage]:MODE?

Description:

> Sets the resistance mode for Low Voltage Resistance source function.

Parameters:

> <CPD> - resistance mode {FIXed|VARiable} (default FIX)
>> ·FIXed   resistance is set using discrete internal standards.
>> ·VARiable   resistance is set continuously using the simulator.

Remarks:

> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:

RES:MODE FIX

RES:MODE? Response: FIX

[:SOURce]:RESistance[:LVOLtage]:WIRE

Syntax:

[:SOURce]:RESistance[:LVOLtage]:WIRE <CPD>

[:SOURce]:RESistance[:LVOLtage]:WIRE?

Description:

Sets the 2-wire or 4-wire terminal mode for Low Voltage Resistance source function.

Parameters:

<CPD> - terminal mode {2W|4W} (default 2W).

·2W   2-wire resistance connection.

·4W   4-wire resistance connection.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

RES:WIRE 2W

RES:WIRE? Response: 2W

[:SOURce]:RESistance:HVOLtage[:AMPLitude]

Syntax:

[:SOURce]:RESistance:HVOLtage[:AMPLitude] <DNPD>[<UNIT>]

[:SOURce]:RESistance:HVOLtage[:AMPLitude]?

Description:

Sets the resistance amplitude for High Voltage Resistance source function.

Parameters:

<DNPD> - resistance amplitude, range 100.0e3 ... 10.0e9 Ohm in Variable mode, 100.0e9 in Fixed mode (default 100.0).

<UNIT> - resistance unit {OHM}.

·OHM Ohm unit is used.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

RES:HVOL 1e6

RES:HVOL? Response: 1.000000E+06 OHM

[:SOURce]:RESistance:HVOLtage:COMPensation

Syntax:

[:SOURce]:RESistance:HVOLtage:COMPensation <DNPD>[<UNIT>]

[:SOURce]:RESistance:HVOLtage:COMPensation?

Description:

Sets the compensation for High Voltage Resistance source function.

Parameters:

<DNPD> - compensation, range 0.0 ... 100.0 Ohm (default 0.0).

<UNIT> - compensation unit {OHM}.

·OHM Ohm unit is used.

Remarks:

The compensation is valid only for Variable mode.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

    RES:HVOL:COMP 0.55

    RES:HVOL:COMP? Response: 5.50000E-01 OHM

[:SOURce]:RESistance:HVOLtage:FIXed

Syntax:

    [:SOURce]:RESistance:HVOLtage:FIXed <CPD>

    [:SOURce]:RESistance:HVOLtage:FIXed?

Description:

    Selects the fixed resistance standard for High Voltage Resistance source function.

Parameters:

    <CPD> - fixed resistance standard {100G} (default 100G).

        ·100G   100 GOhm resistance standard.

Remarks:

    The display shows the real calibrated resistance value in this mode.

    The real calibrated resistance value can be read using the RES:HVOL? command.

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    RES:HVOL:FIX 100G

    RES:HVOL:FIX? Response: 100G

[:SOURce]:RESistance:HVOLtage:MODE

Syntax:

    [:SOURce]:RESistance:HVOLtage:MODE <CPD>

    [:SOURce]:RESistance:HVOLtage:MODE?

Description:

    Sets the resistance mode for High Voltage Resistance source function.

Parameters:

    <CPD> - resistance mode {FIXed|VARiable} (default FIX).

        ·FIXed   resistance is set using discrete internal standard.

        ·VARiable   resistance is set continuously using all available standards.

Remarks:

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    RES:HVOL:MODE FIX

    RES:HVOL:MODE? Response: FIX

[:SOURce]:SCOPe:MARK:AMPLitude

Syntax:

    [:SOURce]:SCOPe:MARK:AMPLitude <DNPD>[<UNIT>]

    [:SOURce]:SCOPe:MARK:AMPLitude?

Description:

    Sets the voltage amplitude for Scope Time Marker source function. The amplitude is set in four fixed steps and is equivalent to the attenuator setting.

Parameters:

<DNPD> - voltage amplitude, range 0.0 ... 1.0 Vpk (default 0.05).
<UNIT> - voltage unit {VPK}.
·VPK   Volt peak unit is used.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SCOP:MARK:AMPL 1.0
SCOP:MARK:AMPL? Response: 1.000000E+00 VPK

[:SOURce]:SCOPe:MARK:ATTenuator

Syntax:
[:SOURce]:SCOPe:MARK:ATTenuator <CPD>
[:SOURce]:SCOPe:MARK:ATTenuator?

Description:
Sets the voltage attenuator for Scope Time Marker source function.

Parameters:
<CPD> - voltage attenuator {50MV|100MV|500MV|1V} (default 50MV).
·50MV   50 mVpk output amplitude.
·100MV   100 mVpk output amplitude.
·500MV   500 mVpk output amplitude.
·1V   1 Vpk output amplitude.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SCOP:MARK:ATT 50MV
SCOP:MARK:ATT? Response: 50MV

[:SOURce]:SCOPe:MARK:DUTY

Syntax:
[:SOURce]:SCOPe:MARK:DUTY <CPD>
[:SOURce]:SCOPe:MARK:DUTY?

Description:
Sets the duty cycle for Scope Time Marker source function.

Parameters:
<CPD> - duty cycle {1PCT|10PCT|20PCT|30PCT|40PCT|50PCT} (default 50PCT).
·1PCT   1 % pulse width.
·10PCT   10 % pulse width.
·20PCT   20 % pulse width.
·30PCT   30 % pulse width.
·40PCT   40 % pulse width.
·50PCT   50 % pulse width.

Remarks:
Available values are dependent on the output period.
For period below 0.4 us Spike mode is used instead.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
SCOP:MARK:DUTY 1PCT

SCOP:MARK:DUTY? Response: 1PCT

[:SOURce]:SCOPe:MARK[:PERiod]

Syntax:

[:SOURce]:SCOPe:MARK[:PERiod] <DNPD>[<UNIT>]

[:SOURce]:SCOPe:MARK[:PERiod]?

Description:

Sets the period for Scope Time Marker source function.

Parameters:

<DNPD> - period, range 2.5e-9 ... 10.0 s (default 1.0e-3).

<UNIT> - period unit {S}.

·S   second unit is used.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:MARK 1e-3

SCOP:MARK? Response: 1.000000E-03 S

[:SOURce]:SCOPe:METer:RANGe

Syntax:

[:SOURce]:SCOPe:METer:RANGe <DNPD>

[:SOURce]:SCOPe:METer:RANGe?

Description:

Sets the range of the input impedance meter. The impedance is measured at the HF connector. The meter has two ranges of 100 Ohm and 2 MOhm

Parameters:

<DNPD>   Range 0.0 ... 2.0e6 (default 100). Any value up to 100 sets the range to 100 Ohm, any value greater than 100 sets the range to 2 MOhm.

Remarks:

The value is stored in each preset.

The value is set according to "Startup" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:MET:RANG 2e6

SCOP:MET:RANG? Response: 2.000000E+06

[:SOURce]:SCOPe:METer:READ?

Syntax:

[:SOURce]:SCOPe:METer:READ?

Description:

The command returns the current measurement from the meter. The command waits for the measurement to be completed, so that a new reading is obtained by reading it again.

Parameters:

<DNPD>   Range 0.0 ... 2.0e6. The value 1.0e20 is returned in case of overload of the meter.

Remarks:

Overlapped command.

Example:

SCOP:MET:READ? Response: 1.000000E+00

[:SOURce]:SCOPe:METer:STATe

Syntax:

    [:SOURce]:SCOPe:METer:STATe <BOOL>

    [:SOURce]:SCOPe:METer:STATe?

Description:

    Turns the input impedance meter on or off for the oscilloscope function. Activating the meter turns off the current signal generation function. The Scope option must be present in the calibrator to use this meter.

Parameters:

    <BOOL>   {ON|OFF|1|0} (default OFF)

           ·ON   Turns on the meter.

           ·OFF   Turns off the meter.

           ·1   Turns on the meter.

           ·0   Turns off the meter.

Remarks:

    The value is set to default after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    SCOP:MET:STAT ON

    SCOP:MET:STAT? Response: 1

[:SOURce]:SCOPe:PWM[:FREQuency]

Syntax:

    [:SOURce]:SCOPe:PWM[:FREQuency] <DNPD>[<UNIT>]

    [:SOURce]:SCOPe:PWM[:FREQuency]?

Description:

    Sets the frequency for Scope PWM source function.

Parameters:

    <DNPD> - frequency, range 0.1 ... 400000.0 Hz (default 1000.0).

    <UNIT> - frequency unit {HZ}.

          ·HZ   Hertz unit is used.

Remarks:

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

    The value is set to default on *RST command.

    Overlapped command.

Example:

    SCOP:PWM 1000.0

    SCOP:PWM? Response: 1.000000E+03 HZ

[:SOURce]:SCOPe:PWM:AMPLitude

Syntax:

    [:SOURce]:SCOPe:PWM:AMPLitude <DNPD>[<UNIT>]

    [:SOURce]:SCOPe:PWM:AMPLitude?

Description:

    Sets the voltage amplitude for Scope PWM source function. The amplitude is set in four fixed steps and is equivalent to the attenuator setting.

Parameters:

    <DNPD> - voltage amplitude, range 0.0 ... 1.0 Vpk (default 0.05).

    <UNIT> - voltage unit {VPK}.

          ·VPK   Volt peak unit is used.

Remarks:

    The value is stored in each preset.

    The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:PWM:AMPL 1.0

SCOP:PWM:AMPL? Response: 1.000000E+00 VPK

[:SOURce]:SCOPe:PWM:ATTenuator

Syntax:

[:SOURce]:SCOPe:PWM:ATTenuator <CPD>

[:SOURce]:SCOPe:PWM:ATTenuator?

Description:

Sets the voltage attenuator for Scope PWM source function.

Parameters:

<CPD> - voltage attenuator {50MV|100MV|500MV|1V} (default 50MV).

 ·50MV   50 mVpk output amplitude.

 ·100MV   100 mVpk output amplitude.

 ·500MV   500 mVpk output amplitude.

 ·1V   1 Vpk output amplitude.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:PWM:ATT 50MV

SCOP:PWM:ATT? Response: 50MV

[:SOURce]:SCOPe:PWM:DUTY

Syntax:

[:SOURce]:SCOPe:PWM:DUTY <CPD>

[:SOURce]:SCOPe:PWM:DUTY?

Description:

Sets the duty cycle for Scope PWM source function.

Parameters:

<CPD> - duty cycle {1PCT|10PCT|20PCT|30PCT|40PCT|50PCT} (default 50PCT).

 ·1PCT   1 % pulse width.

 ·10PCT   10 % pulse width.

 ·20PCT   20 % pulse width.

 ·30PCT   30 % pulse width.

 ·40PCT   40 % pulse width.

 ·50PCT   50 % pulse width.

Remarks:

Available values are dependent on the output period.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:PWM:DUTY 1PCT

SCOP:PWM:DUTY? Response: 1PCT

[:SOURce]:SCOPe:SINE[:FREQuency]

Syntax:

[:SOURce]:SCOPe:SINE[:FREQuency] <DNPD>[<UNIT>]

[:SOURce]:SCOPe:SINE[:FREQuency]?

Description:

Sets the frequency for Scope Sine source function.

Parameters:

<DNPD> - frequency, range 15.0 ... 400000.0 Hz (default 1000.0).

<UNIT> - frequency unit {HZ}.

·HZ   Hertz unit is used.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:SINE 1e6

SCOP:SINE? Response: 1.000000E+06 HZ

[:SOURce]:SCOPe:SINE:AMPLitude

Syntax:

[:SOURce]:SCOPe:SINE:AMPLitude <DNPD>[<UNIT>]

[:SOURce]:SCOPe:SINE:AMPLitude?

Description:

Sets the output amplitude for Scope Sine source function.

Parameters:

<DNPD> - output amplitude, range 0.0014 ... 1.5 Vpk (default 1.0 Vpk).

<UNIT> - output amplitude unit {VRMS|VPK|VPP|VAVE|DBU|DBV|DBM}.

·VRMS Volt RMS.

·VPK   Volt Peak.

·VPP   Volt Peak to Peak.

·VAVE Volt average.

·DBU dBu (relative to 0.775 V).

·DBV dBV (relative to 1 V).

·DBM dBm (relative to 1 mW/50 Ohm).

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:SINE:AMPL 1.0

SCOP:SINE:AMPL? Response: 1.000000E+00 VRMS

[:SOURce]:SCOPe:VOLTage[:AMPLitude]

Syntax:

[:SOURce]:SCOPe:VOLTage[:AMPLitude] <DNPD>[<UNIT>]

[:SOURce]:SCOPe:VOLTage[:AMPLitude]?

Description:

Sets the voltage amplitude for Scope Voltage source function.

Parameters:

<DNPD> - voltage amplitude, range 0.0 ... 10.5 Vpk in Low mode, 0.0 ... 200 Vpk in High mode (default 1.0 Vpk).

<UNIT> - voltage amplitude unit {VPK}.

·VPK   Volt peak unit is used.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

    SCOP:VOLT 1.0
    SCOP:VOLT? Response: 1.000000E+00 VPK

[:SOURce]:SCOPe:VOLTage:FREQuency

Syntax:

    [:SOURce]:SCOPe:VOLTage:FREQuency <DNPD>[<UNIT>]
    [:SOURce]:SCOPe:VOLTage:FREQuency?

Description:

    Sets the frequency for Scope Voltage source function.

Parameters:

    <DNPD> - frequency, range 0.1 ... 100000.0 Hz in Low mode, 15.0 ... 1000.0 Hz in High mode (default 1000.0 Hz).
    <UNIT> - frequency unit {HZ}.
        ·HZ   Hertz unit is used.

Remarks:

    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:

    SCOP:VOLT:FREQ 1e3
    SCOP:VOLT:FREQ? Response: 1.000000E+03 HZ

[:SOURce]:SCOPe:VOLTage:IMPedance

Syntax:

    [:SOURce]:SCOPe:VOLTage:IMPedance <CPD>
    [:SOURce]:SCOPe:VOLTage:IMPedance?

Description:

    Sets or reads the oscilloscope input impedance option to the Scope Voltage function.

Parameters:

    <CPD> - oscilloscope impedance {1MOHM|50OHM} (default 1MOHM)
        ·1MOHM   1 Mohm impedance
        ·50OHM   50 Ohm impedance

Remarks:

    The value is stored in each preset.
    The value is set according to "Startup" preset after power on.
    The value is set to default on *RST command.
    Overlapped command

Example:

    SCOP:VOLT:IMP 1MOHM
    SCOP:VOLT:IMP? Response: 1MOHM

[:SOURce]:SCOPe:VOLTage:RANGe

Syntax:

    [:SOURce]:SCOPe:VOLTage:RANGe <DNPD>
    [:SOURce]:SCOPe:VOLTage:RANGe?

Description:

    Sets or reads the voltage range for Scope Voltage function manually. When setting the range, automatic range setting is canceled.

Parameters:

    <DNPD> - Scope voltage range [V], range 0.0 ... 200.0 (20 mV, 200 mV, 2 V, 20 V, 100 V, 200 V, default 2 V / auto).

Remarks:

    The value is stored in each preset.

The value is set according to "Startup" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:VOLT:RANG 10

SCOP:VOLT:RANG? Response: 2.000000E+01

[:SOURce]:SCOPe:VOLTage:RANGe:AUTO

Syntax:

[:SOURce]:SCOPe:VOLTage:RANGe:AUTO <BOOL>

[:SOURce]:SCOPe:VOLTage:RANGe:AUTO?

Description:

Sets or reads the automatic voltage range selection for Scope Voltage function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.

·OFF   turns off automatic range selection.

·1   same as ON

·0   same as OFF

Remarks:

The value is stored in each preset.

The value is set according to "Startup" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:VOLT:RANG:AUTO ON

SCOP:VOLT:RANG:AUTO? Response: 1

[:SOURce]:SCOPe:VOLTage:SHAPe

Syntax:

[:SOURce]:SCOPe:VOLTage:SHAPe <CPD>

[:SOURce]:SCOPe:VOLTage:SHAPe?

Description:

Sets or reads the shape for Scope Voltage output function.

Parameters:

<CPD> - shape {POSitive|NEGative|SQUare|SINE} (default POS).

·POSitive   Positive DC voltage.

·NEGative   Negative DC voltage.

·SQUare   Symmetric square voltage.

·SINE   Sine waveform.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

SCOP:VOLT:SHAP POS

SCOP:VOLT:SHAP? Response: POS

[:SOURce]:TEMPerature:RTD[:AMPLitude]

Syntax:

[:SOURce]:TEMPerature:RTD[:AMPLitude] <DNPD>[<UNIT>]

[:SOURce]:TEMPerature:RTD[:AMPLitude]?

Description:

Sets the temperature for Temperature RTD source function.

Parameters:

                                       <DNPD> - temperature, range -200.0 ... 850.0 °C (default 100.0 °C).

                                         <UNIT> - temperature unit {CEL|FAR|K}.

          ·CEL   degrees Celsius unit is used.

          ·FAR   degrees Fahrenheit unit is used.

          ·K   Kelvin unit is used.

Remarks:

     Default unit can be selected using UNIT:TEMP command

     The value is stored in each preset

     The value is set according to "Start-up" preset after power on

     The value is set to default on *RST command

     Overlapped command

Example:

     TEMP:RTD 100.0

     TEMP:RTD? Response: 1.000000E+02 CEL

[:SOURce]:TEMPerature:RTD:COEFficient<N>

Syntax:

     [:SOURce]:TEMPerature:RTD:COEFficient<N> <DNPD>

     [:SOURce]:TEMPerature:RTD:COEFficient<N>?

Description:

     Sets user coefficients for resistance calculation to the RTD Temperatures function. Calculation is done using this formula $R=R0*(1+t*(A+t*(B+t*C*(t-100))))$.

Parameters:

     <N> - coefficient index:

          1   coefficient A, coefficient value range from 3.0e-3 to 5.0e-3.

          2   coefficient B, coefficient value range from -7.0e-7 to -5.0e-7.

          3   coefficient C, coefficient value range from -5.0e-12 to -3.0e-12.

     <DNPD> - coefficient value.

Remarks:

     These coefficients are common to both the meter and the source see SENS:TEMP:RTD:COEF command.

     The value is stored in each preset.

     The value is set according to "Start-up" preset after power on.

     The value is set to default on *RST command.

     Overlapped command.

Example:

     TEMP:RTD:COEF1 1.0

     TEMP:RTD:COEF1? Response: 1.000000E+00

[:SOURce]:TEMPerature:RTD:RESistance[:REFerence]

Syntax:

     [:SOURce]:TEMPerature:RTD:RESistance[:REFerence] <DNPD>[<UNIT>]

     [:SOURce]:TEMPerature:RTD:RESistance[:REFerence]?

Description:

     Sets resistance R0 at 0 °C for Temperature RTD source function.

Parameters:

     <DNPD> - resistance R0, range 20.0 ... 2000.0 Ohm (default 1000.0 Ohm).

     <UNIT> - resistance unit {OHM}.

          ·OHM unit for R0 resistance.

Remarks:

     The value is stored in each preset.

     The value is set according to "Start-up" preset after power on.

     The value is set to default on *RST command.

     Overlapped command.

Example:

TEMP:RTD:RES 1000.0
TEMP:RTD:RES? Response: 1.000000E+03 OHM

[:SOURce]:TEMPerature:RTD:STANdard

Syntax:
    [:SOURce]:TEMPerature:RTD:STANdard <CPD>
    [:SOURce]:TEMPerature:RTD:STANdard?

Description:
    Sets the standard for resistance calculation to the RTD Temperature source function.

Parameters:
    <CPD> - RTD standard {PT385A|PT385B|PT3916|PT3926|USER} (default PT385B).

·PT385A	resistance is calculated using PT3850 standard.
·PT385B	resistance is calculated using PT3851 standard.
·PT3916	resistance is calculated using PT3916 standard.
·PT3926	resistance is calculated using PT3826 standard.
·USER	resistance is calculated using user coefficients A, B, C.

Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:
    TEMP:RTD:STAN PT385A
    TEMP:RTD:STAN? Response: PT385A

[:SOURce]:TEMPerature:RTD:TYPE

Syntax:
    [:SOURce]:TEMPerature:RTD:TYPE <CPD>
    [:SOURce]:TEMPerature:RTD:TYPE?

Description:
    Sets the RTD simulator type to the RTD Temperature source function.

Parameters:
    <CPD> - RTD type {PLATinum|NICKel} (default PLAT).

·PLATinum	simulation for platinum RTD.
·NICKel	simulation for nickel RTD.

Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:
    TEMP:RTD:TYPE PLAT
    TEMP:RTD:TYPE? Response: PLAT

[:SOURce]:TEMPerature:TCOuple[:AMPLitude]

Syntax:
    [:SOURce]:TEMPerature:TCOuple[:AMPLitude] <DNPD>[<UNIT>]
    [:SOURce]:TEMPerature:TCOuple[:AMPLitude]?

Description:
    Sets the temperature for Temperature TC source function.

Parameters:
    <DNPD> - temperature, range is dependent on the TC type (default 100.0).
    <UNIT> temperature unit {CEL|FAR|K}.

·CEL	degrees Celsius unit is used.
·FAR	degrees Fahrenheit unit is used.

·K   Kelvin unit is used.

Remarks:

Default unit can be selected using UNIT:TEMP command.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

TEMP:TCO 100.0

TEMP:TCO? Response: 1.000000E+02 CEL

[:SOURce]:TEMPerature:TCOuple:MODE

Syntax:

[:SOURce]:TEMPerature:TCOuple:MODE <CPD>

[:SOURce]:TEMPerature:TCOuple:MODE?

Description:

Sets the voltage output mode for Temperature TC source function.

Parameters:

<CPD> - output mode {PASSive|ACTive} (default ACT).

·PASSive   voltage output consists of a passive divider.

·ACTive   voltage output has an output buffer with a low output resistance.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

TEMP:TCO:MODE PASS

TEMP:TCO:MODE? Response: PASS

[:SOURce]:TEMPerature:TCOuple:RJUNction:EXTernal

Syntax:

[:SOURce]:TEMPerature:TCOuple:RJUNction:EXTernal?

Description:

Returns the cold junction temperature if the cold end temperature type is set to external.

The command is used for the TC source function.

Parameters:

<DNPD> - measured external cold junction temperature.

<UNIT> - temperature unit {CEL|FAR|K}.

·CEL   degrees Celsius unit is used.

·FAR   degrees Fahrenheit unit is used.

·K   Kelvin unit is used.

Remarks:

Temperature is measured using external sensor.

The cold end temperature determination type is set with the TEMP:TCO:RJUN:TYPE command.

The sensor is configured using the SENS:TEMP:RTD… commands.

Default unit can be selected using UNIT:TEMP command.

Overlapped command.

Example:

TEMP:TCO:RJUN:EXT? Response: 2.130000E+01 CEL

[:SOURce]:TEMPerature:TCOuple:RJUNction:TYPE

Syntax:

[:SOURce]:TEMPerature:TCOuple:RJUNction:TYPE <CPD>

[:SOURce]:TEMPerature:TCOuple:RJUNction:TYPE?

Description:

Sets the method of obtaining cold junction temperature for Temperature TC source function.

Parameters:

<CPD> - cold junction temperature type {FIX|EXT} (default FIX).

·FIX   temperature is fixed and can be set using TEMP:TCO:RJUN command.

·EXT   temperature is measured using external sensor.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

TEMP:TCO:RJUN:TYPE FIX

TEMP:TCO:RJUN:TYPE? Response: FIX

[:SOURce]:TEMPerature:TCOuple:RJUNction[:VALue]

Syntax:

[:SOURce]:TEMPerature:TCOuple:RJUNction[:VALue] <DNPD>[<UNIT>]

[:SOURce]:TEMPerature:TCOuple:RJUNction[:VALue]?

Description:

Sets the remote junction temperature for Temperature TC source function.

Parameters:

<DNPD> - remote junction temperature, range is dependent on the TC type (default 23.0).

<UNIT> - remote junction temperature unit {CEL|FAR|K}.

·CEL   degrees Celsius unit is used.

·FAR   degrees Fahrenheit unit is used.

·K   Kelvin unit is used.

Remarks:

Default unit can be selected using UNIT:TEMP command.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

TEMP:TCO:RJUN 23.0

TEMP:TCO:RJUN? Response: 2.300000E+01 CEL

[:SOURce]:TEMPerature:TCOuple:STANdard

Syntax:

[:SOURce]:TEMPerature:TCOuple:STANdard <CPD>

[:SOURce]:TEMPerature:TCOuple:STANdard?

Description:

Sets the standard for calculation voltage for Temperature TC source function.

Parameters:

<CPD> - standard {PTS68|ITS90} (default ITS90).

·PTS68 voltage is calculated using older PTS68 standard.

·ITS90 voltage is calculated using newer ITS90 standard.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

TEMP:TCO:STAN PTS68
TEMP:TCO:STAN? Response: PTS68

[:SOURce]:TEMPerature:TCOuple:TYPE

Syntax:
    [:SOURce]:TEMPerature:TCOuple:TYPE <CPD>
    [:SOURce]:TEMPerature:TCOuple:TYPE?
Description:
    Sets the thermocouple type for Temperature TC source function.
Parameters:
    <CPD> - TC type {R|S|B|J|T|E|K|N|M|C|D|G2} (default R).

·R	thermocouple type R
·S	thermocouple type S
·B	thermocouple type B
·J	thermocouple type J
·T	thermocouple type T
·E	thermocouple type E
·K	thermocouple type K
·N	thermocouple type N
·M	thermocouple type M
·C	thermocouple type C
·D	thermocouple type D
·G2	thermocouple type G2

Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.
Example:
    TEMP:TCO:TYPE R
    TEMP:TCO:TYPE? Response: R

[:SOURce]:VOLTage:AC[:AMPLitude]

Syntax:
    [:SOURce]:VOLTage:AC[:AMPLitude] <DNPD>[<UNIT>]
    [:SOURce]:VOLTage:AC[:AMPLitude]?
Description:
    Sets voltage amplitude for Voltage AC source function.
Parameters:
    <DNPD> - voltage amplitude, range 0.001 ... 1050.0 V RMS (default 10.0).
    <UNIT> - voltage unit {VRMS|VPK|VPP|VAVG}.

·VRMS	Volt RMS.
·VPK	Volt Peak.
·VPP	Volt Peak to Peak.
·VAVG	Volt Average.

Remarks:
    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.
Example:
    VOLT:AC 10.0
    VOLT:AC? Response: 1.000000E+01 VRMS

[:SOURce]:VOLTage:AC:FREQuency

Syntax:

[:SOURce]:VOLTage:AC:FREQuency <DNPD>[<UNIT>]
[:SOURce]:VOLTage:AC:FREQuency?

Description:

Sets the frequency for Voltage AC source function.

Parameters:

<DNPD> - frequency, range 15.0 ... 300000.0 Hz depending on the voltage amplitude
(default 1000.0 Hz).
<UNIT> - frequency unit {HZ}.

·HZ   Hertz unit is used.

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

VOLT:AC:FREQ 1000.0
VOLT:AC:FREQ? Response: 1.000000E+03 HZ

[:SOURce]:VOLTage:AC:RANGe

Syntax:

[:SOURce]:VOLTage:AC:RANGe <DNPD>
[:SOURce]:VOLTage:AC:RANGe?

Description:

Sets the voltage range for Voltage AC source function manually.

Parameters:

<DNPD> - voltage range [V], range 0.0 ... 1050.0 (20 mV, 200 mV, 2 V, 20 V, 100 V,
280 V, 1000 V ranges are available, default 20 V).

Remarks:

The closest upper range to the entered value will be selected.
Setting the range turns off the automatic range selection.
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

VOLT:AC:RANG 0.02
VOLT:AC:RANG? Response: 2.000000E-02

[:SOURce]:VOLTage:AC:RANGe:AUTO

Syntax:

[:SOURce]:VOLTage:AC:RANGe:AUTO <BOOL>
[:SOURce]:VOLTage:AC:RANGe:AUTO?

Description:

Sets the automatic voltage range selection for Voltage AC source function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.
·OFF   turns off automatic range selection.
·1   turns on automatic range selection.
·0   turns off automatic range selection.

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.
Overlapped command.

Example:
VOLT:AC:RANG:AUTO ON
VOLT:AC:RANG:AUTO? Response: 1

[:SOURce]:VOLTage:AC:SHAPe

Syntax:
[:SOURce]:VOLTage:AC:SHAPe <CPD>
[:SOURce]:VOLTage:AC:SHAPe?

Description:
Selects the signal waveform for Voltage AC source function.

Parameters:
<CPD> - shape {SINE|LSINe|SQUare|TRIangle|URAMp|DRAMp|HARMonic}
(default SINE).

·SINE	sine waveform.
·LSINe	limited sine waveform.
·SQUare	square waveform.
·TRIangle	triangle waveform.
·URAMp	rising ramp waveform.
·DRAMp	falling ramp waveform.
·HARMonic	harmonic waveform, see HARM:VOLT commands.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
VOLT:AC:SHAP SINE
VOLT:AC:SHAP? Response: SINE

[:SOURce]:VOLTage[:DC][:AMPLitude]

Syntax:
[:SOURce]:VOLTage[:DC][:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:VOLTage[:DC][:AMPLitude]?

Description:
Sets the voltage amplitude for Voltage DC source function.

Parameters:
<DNPD> - voltage amplitude, range 0.0 ... ±1050.0 V (default 10.0 V).
<UNIT> - voltage unit {V}.
　　　·V　　volt used as unit.

Remarks:
The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:
VOLT 10.0
VOLT? Response: 1.000000E+01 V

[:SOURce]:VOLTage[:DC]:MODE

Syntax:
[:SOURce]:VOLTage[:DC]:MODE <CPD>
[:SOURce]:VOLTage[:DC]:MODE?

Description:

Sets the output mode for Voltage DC source function.

Parameters:

<CPD> - output mode {PASSive|ACTive} (default ACT).

·PASSive   voltage output for the ranges 20 mV and 200 mV consists of a passive divider.

·ACTive   voltage output has an output buffer with a low output resistance.

Remarks:

Passive mode only applies to the 20 mV and 200 mV ranges.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

VOLT:MODE PASS

VOLT:MODE? Response: PASS

[:SOURce]:VOLTage[:DC]:RANGe

Syntax:

[:SOURce]:VOLTage[:DC]:RANGe <DNPD>

[:SOURce]:VOLTage[:DC]:RANGe?

Description:

Sets the voltage range for Voltage DC source function manually.

Parameters:

<DNPD> - voltage range [V], range 0.0 ... 1050.0 (20 mV, 200 mV, 2 V, 20 V, 100 V, 280 V, 1000 V ranges are available, default 20 V).

Remarks:

The closest upper range to the entered value will be selected.

Setting the range turns off the automatic range selection.

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

VOLT:RANG 1000

VOLT:RANG? Response: 1.000000E+03

[:SOURce]:VOLTage[:DC]:RANGe:AUTO

Syntax:

[:SOURce]:VOLTage[:DC]:RANGe:AUTO <BOOL>

[:SOURce]:VOLTage[:DC]:RANGe:AUTO?

Description:

Sets the automatic voltage range selection for Voltage DC source function.

Parameters:

<BOOL> - automatic range selection {ON|OFF|1|0} (default 1).

·ON   turns on automatic range selection.

·OFF   turns off automatic range selection.

·1   turns on automatic range selection.

·0   turns off automatic range selection.

Remarks:

The value is stored in each preset.

The value is set according to "Start-up" preset after power on.

The value is set to default on *RST command.

Overlapped command.

Example:

VOLT:RANG:AUTO ON

VOLT:RANG:AUTO? Response: 1

:STATus:OPERation:CONDition

Syntax:
> :STATus:OPERation:CONDition?

Description:
> Returns the content of Operational Condition register. It is a decimal value which corresponds to the binary-weighted sum of all bits in the register. The response to the query therefore represents an instantaneous 'Snapshot' of the register state, at the time that the query was accepted.

Parameters:
> <DNPD> Operational Condition register.
>> Bit 12 contains ENERGY active status.

Remarks:
> Register is not cleared after this query.
> Overlapped command.

Example:
> STAT:OPER:COND? Response: 4096

:STATus:OPERation:ENABle

Syntax:
> :STATus:OPERation:ENABle <DNPD>
> :STATus:OPERation:ENABle?

Description:
> Enables bits in the Operational Data Enable register. Selected bits are summarized at bit 7 (OSS) of the IEEE488.2 Status Byte register.

Parameters:
> <DNPD> Operational Data Enable register.

Remarks:
> Overlapped command.

Example:
> STAT:OPER:ENAB 4096
> STAT:OPER:ENAB? Response: 4096

:STATus:OPERation[:EVENt]?

Syntax:
> :STATus:OPERation[:EVENt]?

Description:
> Returns the content of Operational Data Event register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register.

Parameters:
> <DNPD> Operational Data Event register.

Remarks:
> Register is cleared after this query.
> Overlapped command

Example:
> STAT:OPER? Response: 0

:STATus:OPERation:NTRansition

Syntax:
> :STATus:OPERation:NTRansition <DNPD>
> :STATus:OPERation:NTRansition?

Description:
> Sets the Operation Negative Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the negative transition filter shall cause a 1 to 0 transition in the corresponding bit of the associated

condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:
> <DNPD> Operation Negative Transition Register, range 0 ... 32767

Remarks:
> Overlapped command

Example:
> STAT:OPER:NTR 4096
> STAT:OPER:NTR? Response: 4096

:STATus:OPERation:PTRansition

Syntax:
> :STATus:OPERation:PTRansition <DNPD>
> :STATus:OPERation:PTRansition?

Description:
> Sets Operation Positive Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the positive transition filter shall cause a 0 to 1 transition in the corresponding bit of the associated condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:
> <DNPD> Operation Positive Transition Register, range 0 ... 32767

Remarks:
> Overlapped command

Example:
> STAT:OPER:PTR 0
> STAT:OPER:PTR? Response: 0

:STATus:QUEStionable:CONDition

Syntax:
> :STATus:QUEStionable:CONDition?

Description:
> Returns the content of Questionable Condition register. It is a decimal value which corresponds to the binary-weighted sum of all bits in the register. The response to the query therefore represents an instantaneous 'Snapshot' of the register state, at the time that the query was accepted.

Parameters:
> <DNPD> Questionable Condition register.
>> Bit 11 contains the lower limit for the LIMIT testing function exceeded.
>> Bit 12 contains the upper limit for the LIMIT testing function exceeded.

Remarks:
> Register is not cleared after this query.
> Overlapped command.

Example:
> STAT:QUES:COND? Response: 2048

:STATus:QUEStionable:ENABle

Syntax:
> :STATus:QUEStionable:ENABle <DNPD>
> :STATus:QUEStionable:ENABle?

Description:
> Enables bits in the Questionable Data Enable register. Selected bits are summarized at bit 3 (QSS) of the IEEE488.2 Status Byte register.

Parameters:
> <DNPD> Questionable Data Enable register.

Remarks:

　　Overlapped command.

Example:

　　STAT:QUES:ENAB 6144

　　STAT:QUES:ENAB? Response: 6144

:STATus:QUEStionable[:EVENt]?

Syntax:

　　:STATus:QUEStionable[:EVENt]?

Description:

　　Returns the content of Questionable Data Event register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register.

Parameters:

　　<DNPD> Questionable Data Event register.

Remarks:

　　Register is cleared after this query.

　　Overlapped command.

Example:

　　STAT:QUES? Response: 0

:STATus:QUEStionable:NTRansition

Syntax:

　　:STATus:QUEStionable:NTRansition <DNPD>

　　:STATus:QUEStionable:NTRansition?

Description:

　　Sets Questionable Negative Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the negative transition filter shall cause a 1 to 0 transition in the corresponding bit of the associated condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:

　　<DNPD> Questionable Negative Transition Register, range 0 ... 32767

Remarks:

　　Overlapped command.

Example:

　　STAT:QUES:NTR 2048

　　STAT:QUES:NTR? Response: 2048

:STATus:QUEStionable:PTRansition

Syntax:

　　:STATus:QUEStionable:PTRansition <DNPD>

　　:STATus:QUEStionable:PTRansition?

Description:

　　Sets Questionable Positive Transition Register. It is a decimal value which corresponds to the binary-weighted sum of all bits set in the register. Setting a bit in the positive transition filter shall cause a 0 to 1 transition in the corresponding bit of the associated condition register to cause a 1 to be written in the associated bit of the corresponding event register.

Parameters:

　　<DNPD> Questionable Positive Transition Register, range 0 ... 32767

Remarks:

　　Overlapped command.

Example:

　　STAT:QUES:PTR 2048

　　STAT:QUES:PTR? Response: 2048

:SYSTem:BEEPer:PROTection:VOLume

Syntax:
:SYSTem:BEEPer:PROTection:VOLume <DNPD>
:SYSTem:BEEPer:PROTection:VOLume?
Description:
Sets the beeper volume when the dangerous voltage at the output terminals is reached.
Parameters:
<DNPD> - beeper volume, range 0.0 ... 1.0 (default 0.3)
Remarks:
The dangerous voltage threshold can be set with command OUTP:VOLT:DC:PROT or OUTP:VOLT:AC:PROT.
The value is not affected by the * RST command or the stored preset.
This command requires "Calibration" access.
Overlapped command.
Example:
SYST:BEEP:PROT:VOL 0.01
SYST:BEEP:PROT:VOL? Response: 1.000000E-02

:SYSTem:BEEPer:STATe

Syntax:
:SYSTem:BEEPer:STATe <BOOL>
:SYSTem:BEEPer:STATe?
Description:
Sets the device beeper state.
Parameters:
<BOOL> beeper state {ON|OFF|1|0} (default 1)
·ON   device system beeper is enabled.
·OFF   device system beeper is disabled.
·1   device system beeper is enabled.
·0   device system beeper is disabled.
Remarks:
Overlapped command.
Example:
SYST:BEEP:STAT ON
SYST:BEEP:STAT? Response: 1

:SYSTem:BEEPer:VOLume

Syntax:
:SYSTem:BEEPer:VOLume <DNPD>
:SYSTem:BEEPer:VOLume?
Description:
Sets the device beeper volume.
Parameters:
<DNPD> - beeper volume, range 0.0 ... 1.0 (default 0.03)
Remarks:
Overlapped command.
Example:
SYST:BEEP:VOL 0.01
SYST:BEEP:VOL? Response: 1.000000E-02

:SYSTem:COMMunicate:BUS

Syntax:
:SYSTem:COMMunicate:BUS <CPD>
:SYSTem:COMMunicate:BUS?
Description:

Selects the device remote interface.
Parameters:
<CPD> - remote interface {SERial|GPIB|USB|LAN} (default SER).
·SERial   RS232 interface.
·GPIB   GPIB interface.
·USB   USB interface.
·LAN   LAN interface.
Remarks:
Sequential command.
Example:
SYST:COMM:BUS SER
SYST:COMM:BUS? Response: SER

:SYSTem:COMMunicate:GPIB:ADDRess

Syntax:
:SYSTem:COMMunicate:GPIB:ADDRess <DNPD>
:SYSTem:COMMunicate:GPIB:ADDRess?
Description:
Sets the GPIB address.
Parameters:
<DNPD> - GPIB address, range 1 ... 31 (default 2).
Remarks:
Overlapped command.
Example:
SYST:COMM:GPIB:ADDR 2
SYST:COMM:GPIB:ADDR? Response: 2

:SYSTem:COMMunicate:LAN:ADDRess

Syntax:
:SYSTem:COMMunicate:LAN:ADDRess <CPD>
:SYSTem:COMMunicate:LAN:ADDRess?
Description:
Sets the IP address.
Parameters:
<CPD> - LAN address, Range 000.000.000.000 ... 255.255.255.255 (default 192.168.001.100).
Remarks:
DHCP must be set to off to take effect.
Interface must be restarted to take effect (see SYST:COMM:REST command).
Overlapped command.
Example:
SYST:COMM:LAN:ADDR 192.168.001.100
SYST:COMM:LAN:ADDR? Response: 192.168.001.100

:SYSTem:COMMunicate:LAN:MASK

Syntax:
:SYSTem:COMMunicate:LAN:MASK <CPD>
:SYSTem:COMMunicate:LAN:MASK?
Description:
Sets the subnet mask.
Parameters:
<CPD> - subnet mask, range 000.000.000.000 ... 255.255.255.255 (default 255.255.255.000).
Remarks:
DHCP must be set to off to take effect.

Interface must be restarted to take effect (see SYST:COMM:REST command).
Overlapped command.
Example:
SYST:COMM:LAN:MASK 255.255.255.000
SYST:COMM:LAN:MASK? Response: 255.255.255.000

:SYSTem:COMMunicate:LAN:GATE

Syntax:
:SYSTem:COMMunicate:LAN:GATE <CPD>
:SYSTem:COMMunicate:LAN:GATE?
Description:
Sets the default gateway.
Parameters:
<CPD> - default gateway, range 000.000.000.000 ... 255.255.255.255 (default 255.255.255.255).
Remarks:
DHCP must be set to off to take effect.
Interface must be restarted to take effect (see SYST:COMM:REST command).
Overlapped command.
Example:
SYST:COMM:LAN:GATE 255.255.255.255
SYST:COMM:LAN:GATE? Response: 255.255.255.255

:SYSTem:COMMunicate:LAN:PORT

Syntax:
:SYSTem:COMMunicate:LAN:PORT <DNPD>
:SYSTem:COMMunicate:LAN:PORT?
Description:
Sets the port number.
Parameters:
<DNPD> - port number, range 0 ... 9999 (default 23)
Remarks:
Interface must be restarted to take effect (see SYST:COMM:REST command).
Overlapped command.
Example:
SYST:COMM:LAN:PORT 23
SYST:COMM:LAN:PORT? Response: 23

:SYSTem:COMMunicate:LAN:HOST

Syntax:
:SYSTem:COMMunicate:LAN:HOST <CPD>
:SYSTem:COMMunicate:LAN:HOST?
Description:
Sets the host name.
Parameters:
<CPD> - host name. Upper alpha, lower alpha, digits, underscores and spaces are allowable. Maximum string size is 14 characters.
Remarks:
DHCP must be set to on to take effect.
Interface must be restarted to take effect (see SYST:COMM:REST command).
Overlapped command.
Example:
SYST:COMM:LAN:HOST 9010_SN750051
SYST:COMM:LAN:HOST? Response: 9010_SN750051

:SYSTem:COMMunicate:LAN:DHCP

Syntax:
> :SYSTem:COMMunicate:LAN:DHCP <BOOL>
> :SYSTem:COMMunicate:LAN:DHCP?

Description:
> Enables or disables the DHCP.

Parameters:
> <BOOL> - DHCP {ON|OFF|1|0} (default 1)
>> ·ON DHCP is enabled.
>> ·OFF DHCP is disabled.
>> ·1   DHCP is enabled.
>> ·0   DHCP is disabled.

Remarks:
> Overlapped command.

Example:
> SYST:COMM:LAN:DHCP ON
> SYST:COMM:LAN:DHCP? Response: 1

:SYSTem:COMMunicate:RESTart

Syntax:
> :SYSTem:COMMunicate:RESTart

Description:
> Restarts communication interface. It will take several seconds. During this period device will not respond to any commands. Restart is needed for all LAN setting changes.

Parameters:
> None

Remarks:
> Overlapped command.

Example:
> SYST:COMM:REST

:SYSTem:COMMunicate:SERial:BAUD

Syntax:
> :SYSTem:COMMunicate:SERial:BAUD <CPD>
> :SYSTem:COMMunicate:SERial:BAUD?

Description:
> Sets the baudrate for RS232 interface.

Parameters:
> <CPD> - baudrate {1200|2400|4800|9600|19200|38400|57600|115200} (default 9600).
>> ·1200   1200 Bd
>> ·2400   2400 Bd
>> ·4800   4800 Bd
>> ·9600   9600 Bd
>> ·19200   19200 Bd
>> ·38400   38400 Bd
>> ·57600   57600 Bd
>> ·115200   115200 Bd

Remarks:
> Overlapped command.

Example:
> SYST:COMM:SER:BAUD 1200
> SYST:COMM:SER:BAUD? Response: 1200

:SYSTem:COMMunicate:USB:BAUD

Syntax:

:SYSTem:COMMunicate:USB:BAUD <CPD>
:SYSTem:COMMunicate:USB:BAUD?

Description:
Sets the baudrate for USB interface.

Parameters:
<CPD> - baudrate {1200|2400|4800|9600|19200|38400|57600|115200} (default 9600).

·1200	1200 Bd
·2400	2400 Bd
·4800	4800 Bd
·9600	9600 Bd
·19200	19200 Bd
·38400	38400 Bd
·57600	57600 Bd
·115200	115200 Bd

Remarks:
Overlapped command.

Example:
SYST:COMM:USB:BAUD 1200
SYST:COMM:USB:BAUD? Response: 1200

:SYSTem:DATE

Syntax:
:SYSTem:DATE <DNPD>,<DNPD>,<DNPD>
:SYSTem:DATE?

Description:
Sets the device system date.

Parameters:
<DNPD> - year, range 2000 ... 2063
<DNPD> - month, range 1 ... 12
<DNPD> - day, range 1 ... 31

Remarks:
This command requires "Calibration" access.
Overlapped command.

Example:
SYST:DATE 2020,7,16
SYST:DATE? Response: 2020,7,16

:SYSTem:ERRor[:NEXT]?

Syntax:
:SYSTem:ERRor[:NEXT]?

Description:
Queries the error queue for the next item and removes it from the queue.

Parameters:
<DNPD> - error code
<SPD> - quoted error message

Remarks:
Error queue is cleared by reading all errors or by issuing *CLS command.
Overlapped command.

Example:
SYST:ERR? Response:

:SYSTem:KEY

Syntax:
:SYSTem:KEY <DNPD>
:SYSTem:KEY?

Description:
Activates key action trough remote interface or returns last activated key.
Parameters:
<DNPD> - key

1	KEY_F1
9	KEY_F2
17	KEY_F3
25	KEY_F4
33	KEY_F5
41	KEY_F6
2	KEY_SELECT_LEFT
10	KEY_SELECT_RIGHT
18	KEY_SETUP_SOURCE
26	KEY_SETUP_METER
34	KEY_SYSTEM_PRESET
42	KEY_SYSTEM_MENU
31	KEY_0
23	KEY_1
22	KEY_2
38	KEY_3
15	KEY_4
14	KEY_5
45	KEY_6
7	KEY_7
6	KEY_8
37	KEY_9
30	KEY_POINT
46	KEY_SIGN
29	KEY_EXP
21	KEY_BKSP
13	KEY_CANCEL
5	KEY_ENTER
8	KEY_UP
16	KEY_DOWN
24	KEY_LEFT
32	KEY_RIGHT
250	KEY_WHEEL_LEFT
249	KEY_WHEEL_RIGHT
48	KEY_WHEEL_PRESS
4	KEY_VOLTAGE
12	KEY_CURRENT
20	KEY_RESISTANCE
28	KEY_CAPACITANCE
36	KEY_POWER
43	KEY_SCOPE
35	KEY_OPTIONS
19	KEY_OUTPUT_ON
27	KEY_OUTPUT_OFF
3	KEY_METER_NULL
11	KEY_METER_FUNC

Remarks:
This command does not require LOCAL mode.
Overlapped command.
Example:
SYST:KEY 1
SYST:KEY? Response: 1

:SYSTem:LOCal

Syntax:
:SYSTem:LOCal

Description:
Places device in the LOCAL mode and unlocks all keys on front panel of the device. The device will not respond to commands in LOCAL mode except for written exceptions.

Parameters:
None

Remarks:
This command is valid only for RS232, LAN and USB interfaces.
Overlapped command.

Example:
SYST:LOC

:SYSTem:PRESet

Syntax:
:SYSTem:PRESet

Description:
Set all device parameters to default. Effect is the same as *RST command do.

Parameters:
None

Remarks:
Overlapped command.

Example:
SYST:PRES

:SYSTem:REMote

Syntax:
:SYSTem:REMote

Description:
Places device in the REMOTE mode and locks all keys except LOCAL key. The device will not respond to any other command until is in REMOTE mode.

Parameters:
<action>   REMOTE

Remarks:
The Command is valid only for RS232, LAN and USB interfaces.
Overlapped command.

Example:
SYST:REM

:SYSTem:RESTart

Syntax:
:SYSTem:RESTart

Description:
Restarts the device. The same initialization procedure is performed as after turning device on with the power ON / OFF button.

Parameters:
None

Remarks:
Overlapped command.

Example:
SYST:REST

:SYSTem:RWLock

Syntax:
:SYSTem:RWLock

Description:
Places device in the REMOTE mode and locks all keys including LOCAL key. The device will not respond to any other command until is in REMOTE mode.

Parameters:
None

Remarks:
The Command is valid only for RS232, LAN, USB interfaces.
Overlapped command.

Example:
SYST:RWL

:SYSTem:SETup:CLEar

Syntax:
:SYSTem:SETup:CLEar

Description:
Clears preset selected by SYST:SET:SEL command.

Parameters:
None

Remarks:
Overlapped command.

Example:
SYST:SET:CLE

:SYSTem:SETup:LOAD

Syntax:
:SYSTem:SETup:LOAD

Description:
Loads preset selected by SYST:SET:SEL command. All volatile device parameters will be set according to this preset.

Parameters:
None

Remarks:
Overlapped command.

Example:
SYST:SET:LOAD

:SYSTem:SETup:NAME

Syntax:
:SYSTem:SETup:NAME <SPD>
:SYSTem:SETup:NAME?

Description:
Sets preset name. The name is not saved until the entire preset is saved with the SYST:SET:SAVE command. Therefore, the preset name must be set first and then the preset must be saved.

Parameters:
<SPD> - preset name. Upper alpha, lower alpha, digits, underscores and spaces are allowable. Maximum string size is 18 characters.

Remarks:
Overlapped command.

Example:
SYST:SET:NAME "Scope voltage"
SYST:SET:NAME? Response: "Scope voltage"

:SYSTem:SETup:SAVE

Syntax:
> :SYSTem:SETup:SAVE

Description:
> Saves actual device parameter's set as preset.

Parameters:
> None

Remarks:
> Overlapped command.

Example:
> SYST:SET:SAVE

:SYSTem:SETup:SELect

Syntax:
> :SYSTem:SETup:SELect <DNPD>
> :SYSTem:SETup:SELect?

Description:
> Selects the system preset index. All other SYST:SET commands will use this preset number.

Parameters:
> <DNPD> - preset index, range 0 ... 99 (default 0). Preset index corresponds to display preset number labelled "Location". Preset number 0 is "Start-up" preset.

Remarks:
> The value is set to default after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> SYST:SET:SEL 0
> SYST:SET:SEL? Response: 0

:SYSTem:TIME

Syntax:
> :SYSTem:TIME <DNPD>,<DNPD>,<DNPD>
> :SYSTem:TIME?

Description:
> Sets the device real time.

Parameters:
> <DNPD> - hours, range 0 ... 23
> <DNPD> - minutes, range 0 ... 59
> <DNPD> - seconds, range 0 ... 59

Remarks:
> This command requires "Calibration" access.
> The value is set to default after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:
> SYST:TIME 10,43,0
> SYST:TIME? Response: 10,43,0

:SYSTem:VERSion?

Syntax:
> :SYSTem:VERSion?

Description:
> Returns version of implemented SCPI language.

Parameters:

<CPD> SCPI language version.

Remarks:

Overlapped command.

Example:

SYST:VERS? Response: 1999.0

:UNIT:CURRent

Syntax:

:UNIT:CURRent <CPD>
:UNIT:CURRent?

Description:

Sets Current AC amplitude unit. The unit is reflected on the display, and also affects the parameter settings via the remote control.

Parameters:

<CPD> - current unit {ARMS|APK|APP|AAVG} (default ARMS)
·ARMS Ampere RMS
·APK   Ampere Peak
·APP   Ampere Peak to Peak
·AAVG   Ampere Average

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

UNIT:CURR ARMS
UNIT:CURR? Response: ARMS

:UNIT:ENERgy

Syntax:

:UNIT:ENERgy <CPD>
:UNIT:ENERgy?

Description:

Sets energy amount unit. The unit is reflected on the display.

Parameters:

<CPD> - energy amount {WS|WH} (default WS)
·WS   Watt * Second
·WH   Watt * Hour

Remarks:

The value is stored in each preset.
The value is set according to "Start-up" preset after power on.
The value is set to default on *RST command.
Overlapped command.

Example:

UNIT:ENER WS
UNIT:ENER? Response: WS

:UNIT:PHASe

Syntax:

:UNIT:PHASe <CPD>
:UNIT:PHASe?

Description:

Sets Power AC phase unit. The unit is reflected on the display, and also affects the parameter settings via the remote control.

Parameters:

<CPD> - power phase unit {DEG|COS} (default DEG)

> ·DEG   degree
> ·COS   power factor

Remarks:

> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:

> UNIT:PHAS DEG
> UNIT:PHAS? Response: DEG

:UNIT:POWer

Syntax:

> :UNIT:POWer <CPD>
> :UNIT:POWer?

Description:

> Sets the Power AC unit. The unit is reflected on the display, and also affects the parameter settings via the remote control.

Parameters:

> <CPD> - Power AC unit {W|VA|VAR} (default W)

> > ·W   real power
> > ·VA   apparent power
> > ·VAr   reactive power

Remarks:

> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:

> UNIT:POW W
> UNIT:POW? Response: W

:UNIT:SCOPe[:SINE][:AMPLitude]

Syntax:

> :UNIT:SCOPe[:SINE][:AMPLitude] <CPD>
> :UNIT:SCOPe[:SINE][:AMPLitude]?

Description:

> Sets or reads the voltage amplitude unit for the Scope Sine function. The unit is reflected on the display, and also affects the parameter settings via the remote control.

Parameters:

> <CPD> - Scope Sine amplitude unit {VRMS|VPK|VPP|VAVE|DBU|DBV|DBM} (default VPK)

> > ·VRMS   Volt RMS
> > ·VPK   Volt Peak
> > ·VPP   Volt Peak to Peak
> > ·VAVE   Volt Average
> > ·DBU   dBu (relative to 0.775 V)
> > ·DBV   dBV (relative to 1 V)
> > ·DBM   dBm (relative to 1 mW / 50 Ohm)

Remarks:

> The value is stored in each preset.
> The value is set according to "Start-up" preset after power on.
> The value is set to default on *RST command.
> Overlapped command.

Example:

UNIT:SCOP:SINE VRMS
UNIT:SCOP:SINE? Response: VRMS

:UNIT:SCOPe:VOLTage[:AMPLitude]

Syntax:

    :UNIT:SCOPe:VOLTage[:AMPLitude] <CPD>
    :UNIT:SCOPe:VOLTage[:AMPLitude]?

Description:

    Sets or reads the voltage amplitude unit for the Scope Voltage function. The unit is reflected on the display, and also affects the parameter settings via the remote control.

Parameters:

    <CPD> - Scope Voltage amplitude unit {VRMS|VPK|VPP } (default VPK)

        ·VRMS   Volt RMS
        ·VPK   Volt Peak
        ·VPP   Volt Peak to Peak

Remarks:

    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:

    UNIT:SCOP:VOLT VRMS
    UNIT:SCOP:VOLT? Response: VRMS

:UNIT:TEMPerature

Syntax:

    :UNIT:TEMPerature <CPD>
    :UNIT:TEMPerature?

Description:

    Sets the temperature unit. The unit is reflected on the display, and also affects the parameter settings via the remote control.

Parameters:

    <CPD> unit for temperature {CEL|FAR|K} (default CEL)

        ·CEL   degrees Celsius
        ·FAR   degrees Fahrenheit
        ·K   Kelvin

Remarks:

    The value is stored in each preset.
    The value is set according to "Start-up" preset after power on.
    The value is set to default on *RST command.
    Overlapped command.

Example:

    UNIT:TEMP CEL
    UNIT:TEMP? Response: CEL

:UNIT:TIME

Syntax:

    :UNIT:TIME <CPD>
    :UNIT:TIME?

Description:

    Sets the energy time unit. The unit is reflected on the display, and also affects the parameter settings via the remote control.

Parameters:

    <CPD> - energy time unit {S|HMS} (default S)

        ·S   second

·HMS   hh:mm:ss
Remarks:
        The value is stored in each preset.
        The value is set according to "Start-up" preset after power on.
        The value is set to default on *RST command.
        Overlapped command.
Example:
        UNIT:TIME S
        UNIT:TIME? Response: S

:UNIT:VOLTage

Syntax:
        :UNIT:VOLTage <CPD>
        :UNIT:VOLTage?
Description:
        Sets the Voltage AC amplitude unit. The unit is reflected on the display, and also affects
        the parameter settings via the remote control.
Parameters:
        <CPD> - voltage unit {VRMS|VPK|VPP|VAVG} (default VRMS)
            ·VRMSVolt RMS
            ·VPK   Volt Peak
            ·VPP   Volt Peak to Peak
            ·VAVG   Volt Average
Remarks:
        The value is stored in each preset.
        The value is set according to "Start-up" preset after power on.
        The value is set to default on *RST command.
        Overlapped command.
Example:
        UNIT:VOLT VRMS
        UNIT:VOLT? Response: VRMS

IEEE 488.2 Mandatory Commands

*CLS

Syntax:
        *CLS
Description:
        This command clears all status data structures in the device i.e. Event Status Register,
        Status Byte Register except the MAV bit, Operation Status Register, Questionable
        Status Register. Also, error queue is cleared. Output queue is unaffected.
Parameters:
        None
Remarks:
        Overlapped command.
Example:
        *CLS

*ESE

Syntax:
        *ESE
        *ESE?
Description:
        This command programs the Event Status Enable register bits.
Parameters:
        <DNPD> - Event Status Enable register, range 0 … 255

Remarks:
>Overlapped command.

Example:
>*ESE 2
>*ESE? Response: 2

*ESR?

Syntax:
>*ESR?

Description:
>This query returns the contents of the Event Status Register and clears the register.

Parameters:
><DNPD> - Event Status Register

Remarks:
>Overlapped command.

Example:
>*ESR? Response: 0

*IDN?

Syntax:

> *IDN?

Description:

> This command returns the identification of the manufacturer, model, serial number and firmware revision.

Parameters:

> <CPD> - manufacturer
> <CPD> - model
> <DNPD> - serial number
> <DNPD> - firmware version

Remarks:

> Overlapped command.

Example:

> *IDN? Response: MEATEST,9010,750151,1.000

*OPC

Syntax:

> *OPC

Description:

> This command sets the OPC bit in the ESR (Event Status Register) when all pending operations are complete.

Parameters:

> None

Remarks:

> Overlapped command.

Example:

> *OPC

*OPC?

Syntax:

> *OPC?

Description:

> This command returns "1" to the output queue after all pending operations inside decade box are complete.

Parameters:

> <DNPD> - always returns 1

Remarks:

> Sequential command

Example:

> *OPC? Response: 1

*OPT?

Syntax:
> *OPT?

Description:
> This command returns the instrument's hardware fitment. The answer consists of individual numbers, where 0 means absence of option and 1 means that the option is installed in the device.

Parameters:
> \<DNPD\> - Extended interface
> \<DNPD\> - Scope option
> \<DNPD\> - Meter option
> \<DNPD\> - Resistance LVR and Capacitance option
> \<DNPD\> - Resistance HVR option
> \<DNPD\> - Temperature TC option
> \<DNPD\> - Temperature RTD option
> \<DNPD\> - Power option

Remarks:
> Overlapped command.

Example:
> *OPT? Response: 1,0,0,1,1,1,1,1

*RST

Syntax:
> *RST

Description:
> This command resets the device to its initial factory-set state. This state may be different from the "Start-up" preset.

Parameters:
> None

Remarks:
> Sequential command.

Example:
> *RST

*SRE

Syntax:
> *SRE
> *SRE?

Description:
> This command allows set condition of the Service Request Enable register. Since bit 6 is not used, the maximum value is 191.

Parameters:
> \<DNPD\> - Service Request Enable register

Remarks:
> Overlapped command.

Example:
> *SRE 2
> *SRE? Response: 2

*STB?

Syntax:
        *STB?
Description:
        This query returns content of STB register, which carries the MSS bit status.
Parameters:
        <DNPD> - Status byte register, range 0 … 255
Remarks:
        Overlapped command.
Example:
        *STB? Response: 0

*TST?

Syntax:
        *TST?
Description:
        This command launches internal self-test and returns result.
Parameters:
        <DNPD> - test result, 0 –passed, 1 – failed
Remarks:
        Sequential command.
Example:
        *TST? Response: 0

*WAI

Syntax:
        *WAI
Description:
        Prevents the instrument from executing any further commands or queries until all previous remote commands have been executed.
Parameters:
        None
Remarks:
        Sequential command.
Example:
        *WAI