M160 Precision DC Calibrator

remote control manual

Content

1. Connection Setup

The calibrator can be integrated into automated calibration systems (ATS) and generally controlled from remote computer via RS232 or with GPIB (IEEE488), LAN and USB option 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 preferred interface in MENU (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/TCP/UDP protocols to communicate with remote controller (PC). By default, calibrator is set to establish Telnet server with DHCP hostname "M160_SNxxxxxx" ("xxxxxx" stands for serial number), listening to port 23. All IPv4 parameters can be changed in calibrator Menu > Interface > LAN Settings:

DHCP	ON	
IP Address	192.168.001.100	only valid if DHCP is OFF
Subnet mask	255.255.255.000	only valid if DHCP is OFF
Default gateway	255.255.255.255	only valid if DHCP is OFF
Telnet port number	23	
TCP port number	22	
UDP port number	22	
Host name	M160_SN620031	only valid if DHCP is 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 M160_SNxxxxxx yy", where "xxxxxx" is serial number and "yy" is communication port.

Connection to simulator box using Microsoft Telnet terminal with DHCP option enabled:
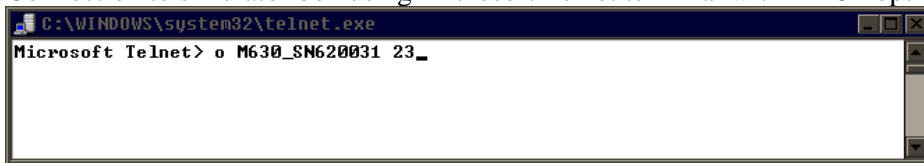
If connection is successful following screen will appear:

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) need to use following commands:

- SYSTem:REMote   Puts device into Remote mode
- SYSTem:LOCal   Returns device from Remote mode and unlocks keyboard
- SYSTem:RWLock   Put device into Remote mode and locks all keys (including Local key).

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. { GPIB}.
<SPD>	String Program Data (quoted string). This type of parameter is similar to CPD, but allows transmission of more ISO characters.
?	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 behaviour 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.
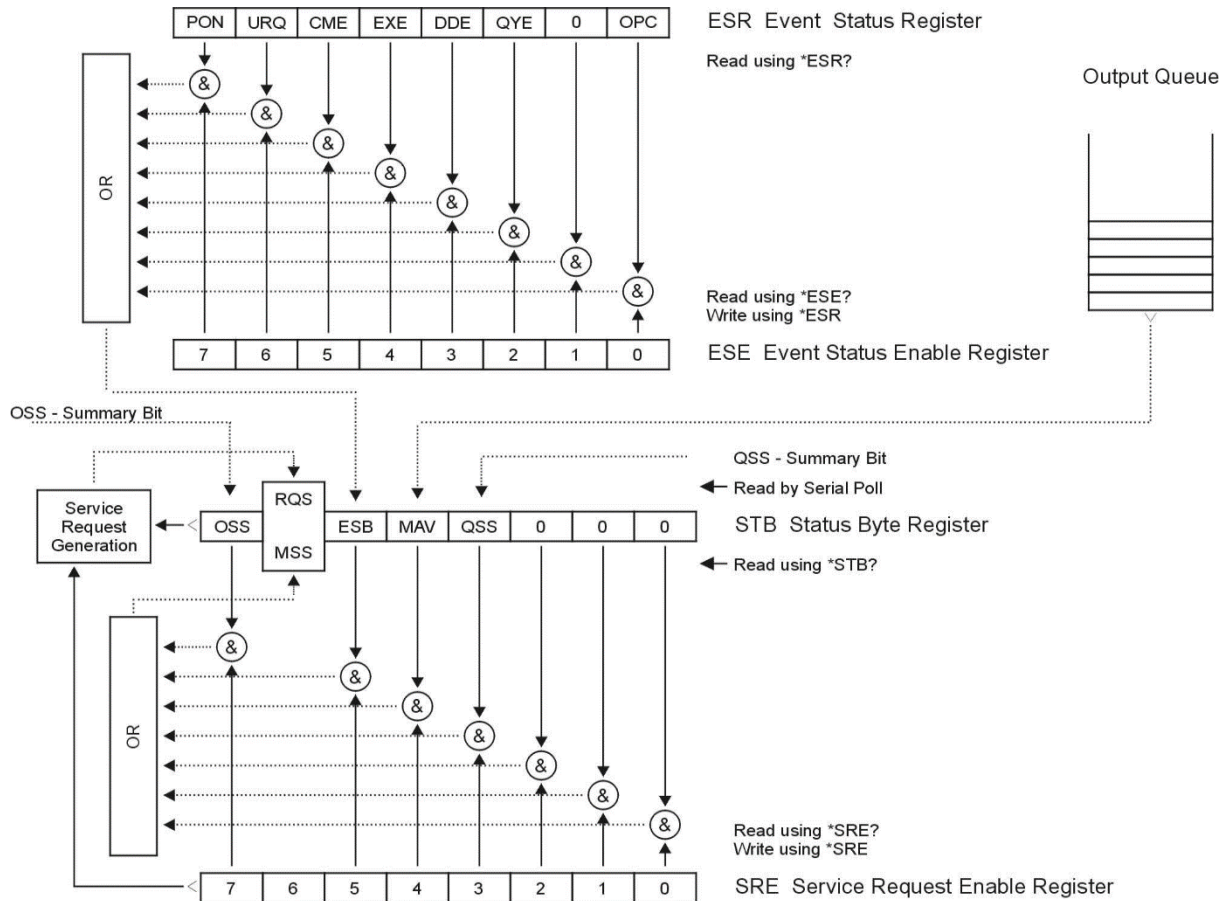

Figure 1 Status register overview

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. His 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 M160 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.

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.

3.3. SCPI Error codes

SCPI Remote control errors

Error	Message
-100	"Command error"
-101	"Invalid character"
-102	"Syntax error"
-103	"Invalid separator"
-104	"Data type error"
-105	"GET not allowed"
-108	"Parameter not allowed"
-109	"Missing parameter"
-112	"Program mnemonic too long"
-113	"Undefined header"
-114	"Header suffix out of range"
-120	"Numeric data error"
-121	"Invalid character in number"
-130	"Suffix error"
-141	"Invalid character data"
-144	"Character data too long"
-151	"Invalid string data"
-161	"Invalid block data"
-203	"Command protected"
-220	"Parameter error"
-222	"Data out of range"
-283	"Illegal variable name"
-350	"Queue overflow"
-400	"Query error"
-410	"Query INTERRUPTED"
-420	"Query UNTERMINATED"
-430	"Query DEADLOCKED"
-440	"Query UNTERMINATED after indefinite response"
514	"Command not allowed with GPIB"

4. M160 Series SCPI Command Reference

This chapter describes standard SCPI commands.

4.1. SCPI Command Tree

This chapter summarizes all public SCPI commands supported by device in alphabetic order.

```
:CALibration
        :DATE(?) <DNPD>,<DNPD>,<DNPD>
        :INTerval(?) <DNPD>
        :POINt
                :AMPLitude(?) <DNPD>
                :CONVerter? <DNPD>
                :DATE(?) <DNPD>,<DNPD>,<DNPD>
                :MEASure? <DNPD>
                :MODE(?) <DNPD>
                :SELect(?) <DNPD>
                :SAVE
        :SECure
                :EXIT
                :PASSword(?) <DNPD>
        :ACAL
                :ENAB(?) {OFF|ON|MANual}
                :CLR
                :TRIG
                :AMPLitude<IND_RANGE>? <DNPD>
        :STATus<IND_STATUS>? <DNPD>

:DISPlay
        :ANNotation
                :CLOCk
                        :DATE
                                :FORMat(?) {MDYS|MDYA|DMYS|DMYO|DMYA|YMDS|YMDO}
                        [:STATe](?) {ON|OFF|1|0}
                :TOOLtip
                        [:STATe](?) {ON|OFF|1|0}
        :METer
                [:STATe](?) {ON|OFF|1|0}
        :BRIGhtness(?) <DNPD>
        :LANGuage(?) {ENGLish}
:MEMory
        :COUNt? <DNPD>
        :PART<IND_MEMORY>
                :NAME? <CPD>
                :SIZE? <DNPD>
                :TRANsfer<IND_COUNTER>(?) <CPD>
:OUTPut
        [:STATe](?) {ON|OFF|1|0}
        :LOW(?) {FLOat|GROund}
        :COMPensation(?) {ON|OFF|1|0}
        :RESistance
                :SHORt(?) {ON|OFF|1|0}
                :COMPensation(?) {ON|OFF|1|0}
        :FREQuency
                :PULL(?) {ON|OFF|1|0}
```

```
        :OVERload? {1|0}
        :CURRent
                :LIMit
                        [:LEVel](?) <DNPD>[A]
                        :STATe(?) {ON|OFF|1|0}
        :VOLTage
                :LIMit
                        [:LEVel](?) <DNPD>[V]
                        :STATe(?) {ON|OFF|1|0}


[:SOURce]
        :VDC
                [:AMPLitude](?) <DNPD>[V]
                :RANGe(?) {AUTO|100V|30V|3V|300MV}
                :LIMiting
                        [:AMPLitude](?) <DNPD>[A]
                        :RESet(?) {ADJustable|MAXimum}
        :CDC
                [:AMPLitude](?) <DNPD>[A]
                :RANGe(?) {AUTO|50MA|25MA}
                :LIMiting
                        [:AMPLitude](?) <DNPD>[V]
                        :RESet(?) {ADJustable|MAXimum}
        :RTD
                [:AMPLitude](?) <DNPD>[{CEL|FAR|K}]
                :TYPE(?) {PLATinum|NICKel}
                :ZRESistance(?) <DNPD>[OHM]
                :STANdard(?) {PT385A|PT385B|PT3916|PT3926|USER}
                :COEFficient(?) <DNPD>,<DNPD>,<DNPD>
        :TCPL
                [:AMPLitude](?) <DNPD>[{CEL|FAR|K}]
                :TYPE(?) {R|S|B|J|T|E|K|N|M|C|D|G2}
                :RJMode(?) {MANual|EXTern}
                :RJAMplitude(?) <DNPD>
                :RJEXtern
                        :TYPE (?) {PLATinum|NICKel}
                        :RJMode (?) <DNPD>[OHM]
                        :PTSTandard(?) { PT385A|PT385B |PT3916|PT3926|PTUSER}
                        :COEFficient(?) <DNPD>,<DNPD>,<DNPD>
        :FREQuency
                [:AMPLitude](?) <DNPD>[HZ]
                :DUTY(?) <DNPD>
                :PULSes
                        [:STATe](?) {ON|OFF|1|0}
                        :COUNt(?) <DNPD>
                        :ACTual? <DNPD>
        :RESistance
                [:AMPLitude](?) <DNPD>[OHM]
        :STEP
                [:STATe](?) {ON|OFF|1|0}
                :SELect<IND_STEP>(?) <DNPD>
              :COUNt<IND_STEP>(?) <DNPD>
                :PRESet
                        :COUNt? <DNPD>
                        :NAME(?) <SPD>
                        :PCLear
```

```
                          :RAPPend <SPD>
                          :RCOunt? <DNPD>
                          :ROW<IND_COUNTER>
                                  :AMPLitude(?) <SPD>
                                  :RDELete
                          :SAVE
:MEASure
      :VOLTage
              [:AMPLitude]? <DNPD>[V]
      :CURRent
              [:AMPLitude]? <DNPD>[A]
      :CONFigure(?) {FREQ|COUN}
      :FREQuency
              [:AMPLitude]? <DNPD>[HZ]
      :COUNter
              [:AMPLitude]? <DNPD>
              :CLEar
:TCPL
              :RJAMplitude(?) <DNPD>
:STATus
      :OPERation
              :CONDition(?) <DNPD>
              :ENABle(?) <DNPD>
              [:EVENt]? <DNPD>
              :NTRansition(?) <DNPD>
              :PTRansition(?) <DNPD>
      :QUEStionable
              :CONDition(?) <DNPD>
              :ENABle(?) <DNPD>
              [:EVENt]? <DNPD>
              :NTRansition(?) <DNPD>
              :PTRansition(?) <DNPD>
:SYSTem
      :BEEPer
              :STATe(?) {ON|OFF|1|0}
              :VOLume(?) <DNPD>
              :KEYBoard(?) {ON|OFF|1|0}
      :COMMunicate
              :BUS(?) {SERial|GPIB|USB|LAN}
              :GPIB
                      :ADDRess(?) <DNPD>
              :LAN
                      :ADDRess(?) <CPD>
                      :MASK(?) <CPD>
                      :GATE(?) <CPD>
                      :PORT(?) <DNPD>
                      :HOST(?) <CPD>
                      :DHCP(?) {ON|OFF|1|0}
              :RESTart
              :SERial
                      :BAUD(?) {1200|2400|4800|9600|19200|38400|57600|115200}
              :TBUS(?) {SERial|GPIB|USB|LAN}
      :DATE(?) <DNPD>,<DNPD>,<DNPD>
      :ERRor
              [:NEXT]? <CPD>
      :KEY(?) <DNPD>
```

:LOCal
        :MODel? <DNPD>
        :PRESet
        :REMote
        :RWLock
        :SERVice
                :CFLash
                :CRAM
        :TIME(?) <DNPD>,<DNPD>,<DNPD>
        :VERSion? <CPD>
:UNIT
        :TEMPerature(?) {CEL|FAR|K}
*CLS
*ESE(?)
*ESR?
*IDN?
*OPC(?)
*OPT?
*RST
*SRE(?)
*STB?
*TST?
*WAI

4.2. SCPI Standard Commands

*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>   frimware version
 Remarks:
  Overlapped command
 Example:
   *IDN? Response: MEATEST,M160,712341,1.000

*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 device are complete.

Parameters:

<DNPD>   always returns 1

Remarks:

Sequential command

Example:

*OPC? Response: 1

*OPT?

Syntax:

*OPT?

Description:

This command return the instrument's hardware fitment. The only parameter returns presence of GPIB/LAN/USB interface.

Parameters:

<DNPD>   0 – extended interface not present, 1 – extended interface present

Remarks:

Overlapped command

Example:

*OPT? Response: 1

*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

*RST

Syntax:

*RST

Description:

This command resets the device to its initial status.

Parameters:

None

Remarks:

Sequential command

Example:

*RST

*TST?

Syntax:

*TST?

Description:

This command launches internal self-test and returns result.
Parameters:
<DNPD> 0 – test passed, 1 – test failed
Remarks:
Sequential command
Example:
*TST? Response: 0

*STB?

Syntax:
*STB?
Description:
This query returns content of register STB, which carries the MSS bit status.
Parameters
<DNPD> Status byte register, Range 0 … 255
Remarks:
Overlapped command
Example:
*STB? Response: 0

*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

*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

*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

*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

4.3.   SCPI Commands

This chapters describes all public SCPI commands in detailed form. The commands here are in alphabetic order.

:CALibration:DATE

Syntax:
>   :CALibration:DATE <DNPD>,<DNPD>,<DNPD>
>   :CALibration:DATE?
Description:
>   This command sets 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
>   Overlapped command
Example:
>   CAL:DATE 2017,01,13
>   CAL:DATE? Response: 2017,01,13

:CALibration:INTerval

Syntax:
>   :CALibration:INTerval <DNPD>
>   :CALibration:INTerval?
Description:
>   This command sets recommended calibration interval for this unit.
Parameters:
>   <DNPD>   Month, Range 1 ... 240
Remarks:
>   This command requires "Calibration" access
>   Overlapped command
Example:
>   CAL:INT 12

CAL:INT? Response: 12

:CALibration:POINt:AMPLitude

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

Description:
 This command sets calibration value of particular point. Data will be saved to nonvolatile memory on CAL:POIN:SAVE command.

Parameters:
 <DNPD> Calibration point value. Ranges and default values varies in accordance to selected point (see "Calibration points").

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

Example:
 CAL:POIN:AMPL 1.944
 CAL:POIN:AMPL? Response: 1.944000E+00

:CALibration:POINt:CONVerter?

Syntax:
 :CALibration:POINt:CONVerter?

Description:
 This command reads converter value of particular calibration point.

Parameters:
 <DNPD> Calibration converter value. Ranges and default values varies in accordance to selected point (see "Calibration points").

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

Example:
 CAL:POIN:CONV? Response: 1.944000E+00

:CALibration:POINt:DATE?

Syntax:
 :CALibration:POINt:DATE?

Description:
 This command reads date of last calibration of calibration point.

Parameters:
 <DNPD> Year, Range 2000 ... 2063
 <DNPD> Month, Range 1 ... 12
 <DNPD> Day, Range 1 ... 31

Remarks:
 Overlapped command

Example:
 CAL:POIN:DATE? Response: 2017,01,13

:CALibration:POINt:MEASure?

Syntax:
 :CALibration:POINt:MEASure?

Description:
 This command reads measured value of particular calibration point.

Parameters:

<DNPD>   Calibration measured value. Ranges and default values varies in accordance to selected point (see "Calibration points").

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

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

:CALibration:POINt:MODE

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

Description:
 This command enters calibration mode. Mode refers to a particular range.

Parameters:
 <DNPD>   Ranges and default values varies in accordance to selected point (see "Calibration points").

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:
 CAL:POIN:MODE 5
 CAL:POIN:MODE? Response: 5

:CALibration:POINt:SELect

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

Description:
 This command selects calibration points of particular mode.

Parameters:
 <DNPD>   Ranges and default values varies in accordance to selected point (see "Calibration points").

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:
 CAL:POIN:SEL 1
 CAL:POIN:SEL? Response: 1

:CALibration:POINt:SAVE

Syntax:
 :CALibration:POINt:SAVE

Description:
 This command saves current calibration point to non-volatile memory. Unsaved changes will disappear on restart, selection of another calibration point or close the calibration.

Parameters:
 None

Remarks:
 The value is set to default after power on

The value is set to default on *RST command
Overlapped command
Example:
CAL:POIN:SAVE

:CALibration:SECure:EXIT

Syntax:
:CALibration:SECure:EXIT
Description:
This command exits calibration mode and access.
Parameters:
None
Remarks:
The value is set to default after power on
The value is set to default on *RST command
Overlapped command
Example:
CAL:SEC:EXIT

:CALibration:SECure:PASSword

Syntax:
:CALibration:SECure:PASSword <DNPD>
:CALibration:SECure:PASSword?
Description:
This command validates entered password and enables calibration access if verification is successful. Access is invalidated after reset or if CAL:SEC:EXIT command is issued. Calibration password can be changed from decade system menu *MENU->Calibration->Password.*
Parameters:
Range 0 ... 4294967295 (default 0)
Remarks:
The value is set to default after power on
The value is set to default on *RST command
Overlapped command
Example:
CAL:SEC:PASS 0

:CALibration:ACAL:ENAB

Syntax:
:CALibration:ACAL:ENAB < CPD >
:CALibration:ACAL:ENAB?
Description:
This command enables/disables autocalibration (see Autocalibration chapter).
Parameters:
< CPD >   {ON|OFF|MANual} (default ON)
          ·ON   autocalibration is enabled
          ·OFF   autocalibration is disabled
          ·MAN   autocalibration on user request
Remarks:
Overlapped command
Example:
CAL:ACAL:ENAB ON
CAL:ACAL:ENAB? Response: ON

:CALibration:ACAL:CLR

Syntax:
:CALibration:ACAL:CLR
Description:
This command clears all autocalibration offsets.
Parameters:
None
Remarks:
Overlapped command
Example:
:CALibration:ACAL:CLR

:CALibration:ACAL:TRIG

Syntax:
:CALibration:ACAL:TRIG
Description:
This command triggers autocalibration procedure.
Parameters:
None
Remarks:
Overlapped command
Example:
CAL:ACAL:TRIG

:CALibration:ACAL:AMPLitude<IND_RANGE>? <DNPD>

Syntax:
:CALibration:ACAL:AMPLitude<IND_RANGE>?
Description:
This command reads autocalibration offset of selected calibration point.
Parameters:
<IND_RANGE>   Range 1 ... 12 (1 - if omitted):
1 – voltage +300 mV range
2 – voltage -300 mV range
3 – voltage +3 V range
4 – voltage -3 V range
5 – voltage +30 V range
6 – voltage -30 V range
7 – voltage +100 V range
8 – voltage -100 V range
9 – current +25 mA range
10 – current -25 mA range
11 – current +50 mA range
12 – current -50 mA range
Remarks:
Overlapped command
Example:
CAL:ACAL:AMPL1? Response: 1.944000E-07

:CALibration:STATus<N>?

Syntax:
:CALibration:STATus<N>?
Description:
Returns required calibration status.

Parameters:

                <N> - index, 1-warm up, 2-NA (not aplicable), 3-outdated calibration.

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

Remarks:

                Overlapped command.

Example:

                CAL:STAT1? Response: 0

:DISPlay:ANNotation:CLOCk:DATE:FORMat

Syntax:

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

        :DISPlay:ANNotation:CLOCk:DATE:FORMat?

Description:

        This command selects format of date displayed on device screen.

Parameters:

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

                ·MDYS M/D/Y format (M-month, D-day, Y-year)

                ·MDYA M-D-Y format

                ·DMYS D/M/Y format

                ·DMYO D.M.Y format

                ·DMYA D-M-Y format

                ·YMDS Y/M/D format

                ·YMDO Y.M.D format

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:

        This command enables/disables showing actual time in title on device screen.

Parameters:

        <BOOL>   {ON|OFF|1|0} (default 1)

                ·ON   actual time is shown

                ·OFF   actual time is hidden

                ·1   same as ON

                ·0   same as OFF

Remarks:

        Overlapped command

Example:

        DISP:ANN:CLOC ON

        DISP:ANN:CLOC? Response: 1

:DISPlay:ANNotation:TOOLtip[:STATe]

Syntax:

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

        :DISPlay:ANNotation:TOOLtip[:STATe]?

Description:

This command enables/disables showing tooltip in top on device screen.

Parameters:

                    \<BOOL\>   {ON|OFF|1|0} (default 1)

                              ·ON   tooltip is shown

                              ·OFF   tooltip is hidden

                              ·1   same as ON

                              ·0   same as OFF

Remarks:

        Overlapped command

Example:

        DISP:ANN:TOOL ON

        DISP:ANN:TOOL? Response: 1

:DISPlay:METer[:STATe]

Syntax:

        :DISPlay:METer[:STATe] \<BOOL\>

        :DISPlay:METer[:STATe]?

Description:

        This command enables/disables showing meter in bottom on device screen.

Parameters:

                    \<BOOL\>   {ON|OFF|1|0} (default 0)

                            ·ON   meter is shown

                            ·OFF   meter is hidden

                            ·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:

        DISP:MET ON

        DISP:MET? Response: 1

:DISPlay:BRIGhtness

Syntax:

        :DISPlay:BRIGhtness \<DNPD\>

        :DISPlay:BRIGhtness?

Description:

        This command sets brightness of device display.

Parameters:

                    \<DNPD\>   Range 0.0 ... 1.0 (default 1.0), 0.0 – Min, 1.0 – Max brightness

Remarks:

        Overlapped command

Example:

        DISP:BRIG 1.0

        DISP:BRIG? Response: 1.000000E+00

:DISPlay:LANGuage

Syntax:

        :DISPlay:LANGuage \<CPD\>

        :DISPlay:LANGuage?

Description:

        This command selects language that is used on device display.

Parameters:

                    \<CPD\>   {ENGLish} (default ENGL)

                            ·ENGLish   english version

Remarks:

       Overlapped command

Example:

       DISP:LANG ENGL

       DISP:LANG? Response: ENGL

:OUTPut[:STATe]

Syntax:

       :OUTPut[:STATe] <BOOL>

       :OUTPut[:STATe]?

Description:

       This command switches ON/OFF output terminals.

Parameters:

       <BOOL>   {ON|OFF|1|0} (default 0)

          ·ON   output terminals are switched on

          ·OFF   output terminals are switched off

          ·1   same as ON

          ·0   same as OFF

Remarks:

       The value is set to default after power on

       The value is set to default on *RST command

       Overlapped command

Example:

       OUTP ON

       OUTP? Response: 1

:OUTPut:LOW

Syntax:

       :OUTPut:LOW <CPD>

       :OUTPut:LOW?

Description:

       This command connects or disconnects the Lo terminals of voltage and current outputs to/from GND terminal.

Parameters:

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

          ·FLOat

          ·GROund

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:LOW FLO

       OUTP:LOW? Response: FLO

:OUTPut:COMPensation

Syntax:

       :OUTPut:COMPensation <BOOL>

       :OUTPut:COMPensation?

Description:

       This command select 4-wire voltage outputs connection (remote sense).

Parameters:

       <BOOL>   {ON|OFF|1|0} (default 0)

·ON   selsects 4-wire connection

·OFF   selsects 2-wire connection

·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:

OUTP:COMP ON

OUTP:COMP? Response: 1

:OUTPut:CURRent:LIMit[:LEVel]

Syntax:

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

:OUTPut:CURRent:LIMit[:LEVel]?

Description:

Sets the global 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.

Parameters:

<DNPD> - current limit level [A], range 0.001 ... 0.05 (default 0.05)

<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: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:LIM 0.04

OUTP:CURR:LIM? Response: 4.000000E-02 A

:OUTPut:CURRent:LIMit:STATe

Syntax:

:OUTPut:CURRent:LIMit:STATe <BOOL>

:OUTPut:CURRent:LIMit:STATe?

Description:

Turns the global 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 function. If the status is on, then the maximum value is limited by the current limit level setting.

Parameters:

<BOOL> - 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: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:LIM:STAT ON

OUTP:CURR:LIM:STAT? Response: 1

:OUTPut:OVERload?

Syntax:

:OUTPut:OVERload?

Description:

Returns overload of output terminals.

Parameters:

<BOOL> - overload state, {1|0}.

·1 output terminals are overloaded.

·0 output terminals are OK.

Remarks:

If the output terminals in Voltage, Current or TC function are overloaded (a value higher than the set Limit), it returns 1. Otherwise, it returns 0.

Example:

:OUTP:OVER? Response: 1

:OUTPut:RESistance:SHORt

Syntax:

:OUTPut:RESistance:SHORt <BOOL>

:OUTPut:RESistance:SHORt?

Description:

This command turns on short function. "Short" is activated only if output terminals are switched on (see OUTP:STAT command).

Parameters:

<BOOL>   {ON|OFF|1|0} (default 0)

·ON   short is set if output is on

·OFF   resistance is set if output is on

·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:

OUTP:RES:SHOR ON

OUTP:RES:SHOR? Response: 1

:OUTPut:RESistance:COMPensation

Syntax:

:OUTPut:RESistance:COMPensation <BOOL>
:OUTPut:RESistance:COMPensation?

Description:

This command select 4-wire resistance outputs connection (remote sense).

Parameters:

<BOOL>   {ON|OFF|1|0} (default 1)
    ·ON   selsects 4-wire connection

   ·OFF   selsects 2-wire connection

   ·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:

OUTP:RES:COMP ON
OUTP:RES:COMP? Response: 1

:OUTPut:FREQuency:PULL

Syntax:

:OUTPut:FREQuency:PULL <BOOL>
:OUTPut:FREQuency:PULL?

Description:

This command connects the internal pull-up resistor (50 Ω) to the Frequency output.

Parameters:

<BOOL>   {ON|OFF|1|0} (default 0)
    ·ON   connects pull-up resistor

   ·OFF   disconnects pull-up resistor

   ·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:

OUTP:FREQ:PULL ON
OUTP:FREQ:PULL? Response: 1

:OUTPut:VOLTage:LIMit[:LEVel]

Syntax:

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

:OUTPut:VOLTage:LIMit[:LEVel]?

Description:

Sets the global 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> - current limit level [V], range 1.0 ... 100.0 (default 100.0)

<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: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:LIM 50.0

OUTP:VOLT:LIM? Response: 5.000000E+01 V

:OUTPut:VOLTage:LIMit:STATe

Syntax:

:OUTPut:VOLTage:LIMit:STATe <BOOL>

:OUTPut:VOLTage:LIMit:STATe?

Description:

Turns the global 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 function. If the status is on, then the maximum value is limited by the voltage limit level setting.

Parameters:

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

·ON Voltage limit is active.

·OFF The voltate limit is not active.

·1 Voltage limit is active.

·0 The voltate limit is not active.

Remarks:

The limit level is set with the OUTP:VOLT: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:LIM:STAT ON

OUTP:VOLT:LIM:STAT? Response: 1

[:SOURce]:VDC[:AMPLitude]

Syntax:

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

[:SOURce]:VDC[:AMPLitude]?

Description:

This command sets voltage amplitude in Voltage function. Node SOUR:VDC also selects Voltage function if not already selected.

Parameters:

<DNPD>   Range -100.0 ... 100.0 (default 10.0)

<UNIT>   {V}

·V   Volt

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:

      VDC 10.0
      VDC? Response: 1.000000E+01 V

[:SOURce]:VDC:RANGe

Syntax:

      [:SOURce]:VDC:RANGe <CPD>
      [:SOURce]:VDC:RANGe?

Description:

      This command selects range in Voltage function. Node SOUR:VDC also selects Voltage function if not already selected.

Parameters:

      <CPD>   {AUTO|100V|30V|3V|300MV} (default AUTO)
          ·AUTO auto-range mode
          ·100V fixed 100 V range
          ·30V   fixed 30 V range
          ·3V   fixed 3 V range
          ·300MV   fixed 300 mV range

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:

      VDC:RANG AUTO
      VDC:RANG? Response: AUTO

[:SOURce]:VDC:LIMiting[:AMPLitude]

Syntax:

      [:SOURce]:VDC:LIMiting[:AMPLitude] <DNPD>[<UNIT>]
      [:SOURce]:VDC:LIMiting[:AMPLitude]?

Description:

      This command sets output current limiting in Voltage function. This command operates in conjunction with VDC:LIM:RES command. Node SOUR:VDC also selects Voltage function if not already selected.

Parameters:

      <DNPD>   Voltage amplitude 0-30 V: Range 0.0 ... 0.05 (default 0.05)
      <DNPD>   Voltage amplitude 30.0001-100 V: Range 0.0 ... 0.05 (default 0.05)
      <UNIT>   {A}
          ·A   Amper

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:

      VDC:LIM 0.05
      VDC:LIM? Response: 5.000000E-02 A

[:SOURce]:VDC:LIMiting:RESet

Syntax:

[:SOURce]:VDC:LIMiting:RESet <CPD>
[:SOURce]:VDC:LIMiting:RESet?

Description:

This command selects output current limitigne behavior, if was voltage amplitude changed.
Node SOUR:VDC also selects Voltage function if not already selected.

Parameters:

<CPD>   {ADJustable|MAXimum} (default ADJ)

·ADJustable   output   current   limiting   is   adjustable   (see
VDC:LIM:AMPL)

·MAXimum   output current limiting is always maximum

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:

VDC:LIM:RES ADJ
VDC:LIM:RES? Response: ADJ

[:SOURce]:CDC[:AMPLitude]

Syntax:

[:SOURce]:CDC[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:CDC[:AMPLitude]?

Description:

This command sets current amplitude in Current function. Node SOUR:CDC also selects
Current function if not already selected.

Parameters:

<DNPD>   Range -0.05 ... 0.05 (default 0.01)
<UNIT>   {A}

·A   Amper

Remarks:

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

Example:

CDC 0.01
CDC? Response: 1.000000E-02 A

[:SOURce]:CDC:RANGe

Syntax:

[:SOURce]:CDC:RANGe <CPD>
[:SOURce]:CDC:RANGe?

Description:

This command selects range in Current function. Node SOUR:CDC also selects Current
function if not already selected.

Parameters:

<CPD>   {AUTO|50MA|25MA} (default AUTO)

·AUTO auto-range mode
·50MA fixed 50 mA range
·25MA fixed 25 mA range

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:

CDC:RANG AUTO

CDC:RANG? Response: AUTO

[:SOURce]:CDC:LIMiting[:AMPLitude]

Syntax:

[:SOURce]:CDC:LIMiting[:AMPLitude] <DNPD>[<UNIT>]

[:SOURce]:CDC:LIMiting[:AMPLitude]?

Description:

This command sets output voltage limiting in Current function. This command operates in conjunction with CDC:LIM:RES command. Node SOUR:CDC also selects Current function if not already selected.

Parameters:

<DNPD>	Current amplitude 0-25 mA: Range 0.0 ... 100.0 (default 30.0)
<DNPD>	Current amplitude 25.0001-50 mA: Range 0.0 ... 30.0 (default 30.0)
<UNIT>	{V}
·V	Voltage

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:

CDC:LIM 30.0

CDC:LIM? Response: 3.000000E+01 V

[:SOURce]:CDC:LIMiting:RESet

Syntax:

[:SOURce]:CDC:LIMiting:RESet <CPD>

[:SOURce]:CDC:LIMiting:RESet?

Description:

This command selects output voltage limitigne behavior, if was current amplitude changed. Node SOUR:CDC also selects Current function if not already selected.

Parameters:

<CPD>	{ADJustable	MAXimum} (default ADJ)
·ADJustable	output current limiting is adjustable (see CDC:LIM:AMPL)
·MAXimum	output voltage limiting is always maximum

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:

CDC:LIM:RES ADJ

CDC:LIM:RES? Response: ADJ

[:SOURce]:RTD[:AMPLitude]

Syntax:

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

[:SOURce]:RTD[:AMPLitude]?

Description:

This command sets temperature in RTD function. Node SOUR:RTD also selects RTD function if not already selected. If unit parameter is part of temperature, new unit is set.

Parameters:

        <DNPD>   Temperature at Nickel function. Default value is 100.0 °C.

        <UNIT>   {CEL|FAR|K}

            ·CEL   degrees of Celsius

            ·FAR   degrees of Fahrenheit

            ·K   Kelvin

Remarks:

        The value is set to default after power on

        The value is set to default on *RST command

        Overlapped command

Example:

        RTD 100.0

        RTD? Response: 1.000000E+02 CEL

[:SOURce]:RTD:TYPE

Syntax:

        [:SOURce]:RTD:TYPE <CPD>

        [:SOURce]:RTD:TYPE?

Description:

        This command selects RTD type in RTD function. Node SOUR:RTD also selects RTD function if not already selected.

Parameters:

        <CPD>   {PLATinum|NICKel} (default PLAT)

            ·PLATinum

            ·NICKel

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:

        RTD:TYPE PLAT

        RTD:TYPE? Response: PLAT

[:SOURce]:RTD:ZRESistance

Syntax:

        [:SOURce]:RTD:ZRESistance <DNPD>[<UNIT>]

        [:SOURce]:RTD:ZRESistance?

Description:

        This command sets resistance at 0 °C for Platinum function. Node SOUR:RTD also selects RTD function if not already selected.

Parameters:

        <DNPD>   Range 100.0 ... 1000.0 (default 100.0)

        <UNIT>   {OHM}

            ·OHM

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:

        RTD:ZRES 100.0

        RTD:ZRES? Response: 1.000000E+02 OHM

[:SOURce]:RTD:STANdard

Syntax:

[:SOURce]:RTD:STANdard <CPD>
[:SOURce]:RTD:STANdard?

Description:

This command selects Platinum temperature standard. Node SOUR:RTD also selects RTD function if not already selected.

Parameters:

<CPD>   {PT385A|PT385B|PT3916|PT3926|USER} (default PT385A)
·PT385A   Pt385 (68) standard
·PT385B   Pt385 (90) standard
·PT3916   Pt3916 standard
·PT3926   Pt3926 standard
·USER User (see RTD:COEF command)

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:

RTD:STAN PT385A
RTD:STAN? Response: PT385A

[:SOURce]:RTD:COEFficient

Syntax:

[:SOURce]:RTD:COEFficient <DNPD>,<DNPD>,<DNPD>
[:SOURce]:RTD:COEFficient?

Description:

This command allows to define Coefficients (A, B, C) used for "User" Platinum standard
scale. Node SOUR:RTD also selects RTD function if not already selected.

Parameters:

<DNPD>   Range 3e-3 ... 5e-3 (default 3.9083E-3)
<DNPD>   Range -7e-7 ... -5e-7 (default -5.775E-7)
<DNPD>   Range -5e-12 ... -3e-12 (default -4.18301E-12)

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:

RTD:COEF 3.9083E-3,-5.775E-7,-4.18301E-12
RTD:COEF? Response: 3.908300E-03,-5.775000E-07,-4.183010E-12

[:SOURce]:TCPL[:AMPLitude]

Syntax:

[:SOURce]:TCPL[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:TCPL[:AMPLitude]?

Description:

This command sets temperature in TC function. Node SOUR:TCPL also selects TC function if not already selected. If unit parameter is part of temperature, new unit is set.

Parameters:

<DNPD>   TC function. Default value is 100.0 °C.
<UNIT>   {CEL|FAR|K}
·CEL   degrees of Celsius

·FAR	degrees of Fahrenheit
·K	Kelvin

Remarks:

The value is set to default after power on

The value is set to default on *RST command

Overlapped command

Example:

TCPL 100.0

TCPL? Response: 1.000000E+02 CEL

[:SOURce]:TCPL:TYPE

Syntax:

[:SOURce]:TCPL:TYPE <CPD>

[:SOURce]:TCPL:TYPE?

Description:

This command selects thermocouple type. Node SOUR:TCPL also selects TC function if not already selected.

Parameters:

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

·R
·S
·B
·J
·T
·E
·K
·N
·M
·C
·D
·G2

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:

TCPL:TYPE R

TCPL:TYPE? Response: R

[:SOURce]:TCPL:RJMode

Syntax:

[:SOURce]:TCPL:RJMode <CPD>

[:SOURce]:TCPL:RJMode?

Description:

This command selects manual or external reference junction compensation. Node SOUR:TCPL also selects TC function if not already selected.

Parameters:

<CPD>   {MANual|EXTern} (default MAN)

·MANual   manual reference junction is set (see TCPL:RJAM)

·EXTern   external reference junction is set

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:
        TCPL:RJM MAN
        TCPL:RJM? Response: MAN

[:SOURce]:TCPL:RJAMplitude

Syntax:
        [:SOURce]:TCPL:RJAMplitude <DNPD>
        [:SOURce]:TCPL:RJAMplitude?
Description:
        This command sets/reads reference junction temperature. Node SOUR:TCPL also selects
        TC function if not already selected.
Parameters:
        <DNPD>   Range -50.0 ... 150.0 (default 23.0)
Remarks:
        The value is set to default after power on
        The value is set to default on *RST command
        Overlapped command
Example:
        TCPL:RJAM 23.0
        TCPL:RJAM? Response: 2.300000E+01

[:SOURce]:TCPL:RJEXtern:TYPE

Syntax:
        [:SOURce]:TCPL:RJEXtern:TYPE <CPD>
        [:SOURce]:TCPL:RJEXtern:TYPE?
Description:
        This command selects reference junction type. Node SOUR:TCPL also selects TC function
        if not already selected.
Parameters:
        <CPD>   {PLATinum|NICKel} (default PLAT)
                ·PLATinum
                ·NICKel
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:
        TCPL:RJEX:TYPE PLAT
        TCPL:RJEX:TYPE? Response: PLAT

[:SOURce]:TCPL:RJEXtern:ZRESistance

Syntax:
        [:SOURce]:TCPL:RJEXtern:ZRESistance <DNPD>[<UNIT>]
        [:SOURce]:TCPL:RJEXtern:ZRESistance?
Description:
        This command sets resistance at 0 °C for Platinum reference junction. Node SOUR:TCPL
        also selects TC function if not already selected.
Parameters:
        <DNPD>   Range 100.0 ... 200.0 (default 100.0)
        <UNIT>   {OHM}
                ·OHM
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:

TCPL:RJEX:ZRES 100.0

TCPL:RJEX:ZRES? Response: 1.000000E+02 OHM

[:SOURce]:TCPL:RJEXtern:PTSTandard

Syntax:

[:SOURce]:TCPL:RJEXtern:PTSTandard <CPD>

[:SOURce]:TCPL:RJEXtern:PTSTandard?

Description:

This command selects Platinum temperature standard for reference junction. Node SOUR:TCPL also selects TC function if not already selected.

Parameters:

<CPD>   {PT385A|PT385B|PT3916|PT3926|USER} (default PT385A)

·PT385A   Pt385 (68) standard

·PT385B   Pt385 (90) standard

·PT3916   Pt3916 standard

·PT3926   Pt3926 standard

·USER User (see RTD:COEF command)

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:

TCPL:RJEX:PTST PT385A

TCPL:RJEX:PTST? Response: PT385A

[:SOURce]:TCPL:RJEXtern:COEFficient

Syntax:

[:SOURce]:TCPL:RJEXtern:COEFficient <DNPD>,<DNPD>,<DNPD>

[:SOURce]:TCPL:RJEXtern:COEFficient?

Description:

This command allows to define Coefficients (A, B, C) used for "User" Platinum standard reference junction scale. Node SOUR:TCPL also selects TC function if not already selected.

Parameters:

<DNPD>   Range 3e-3 ... 5e-3 (default 3.9083E-3)

<DNPD>   Range -7e-7 ... -5e-7 (default -5.775E-7)

<DNPD>   Range -5e-12 ... -3e-12 (default -4.18301E-12)

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:

TCPL:RJEX:COEF 3.9083E-3,-5.775E-7,-4.18301E-12

TCPL:RJEX:COEF? Response: 3.908300E-03,-5.775000E-07,-4.183010E-12

[:SOURce]:FREQuency[:AMPLitude]

Syntax:

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

[:SOURce]:FREQuency[:AMPLitude]?

Description:
This command sets frequency (period) amplitude in Frequency function. Node SOUR:FREQ also selects Frequency function if not already selected.

Parameters:

      <DNPD>   Range 1E-2 ... 15E3 (default 1000.0)

      <UNIT>   {HZ}

          ·HZ   Hertz

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:
FREQ 1000.0
FREQ? Response: 1.000000E+03 HZ

[:SOURce]:FREQuency:DUTY

Syntax:
[:SOURce]:FREQuency:DUTY <DNPD>
[:SOURce]:FREQuency:DUTY?

Description:
This command sets duty cycle of generated signal in Frequency function. Node SOUR:FREQ also selects Frequency function if not already selected.

Parameters:

      <DNPD>   Range 0.005 ... 0.995 (default 0.5)

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:
FREQ:DUTY 0.5
FREQ:DUTY? Response: 5.000000E-01

[:SOURce]:FREQuency:PULSes[:STATe]

Syntax:
[:SOURce]:FREQuency:PULSes[:STATe] <BOOL>
[:SOURce]:FREQuency:PULSes[:STATe]?

Description:
This commnad switch on pulses generator. Node SOUR:FREQ also selects Frequency function if not already selected.

Parameters:

      <BOOL>   {ON|OFF|1|0} (default 0)

          ·ON   pulses generator activate (see FREQ:PULS:COUN)

          ·OFF   pulses generator deactivate

          ·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:
FREQ:PULS ON
FREQ:PULS? Response: 1

[:SOURce]:FREQuency:PULSes:COUNt

Syntax:

[:SOURce]:FREQuency:PULSes:COUNt <DNPD>
[:SOURce]:FREQuency:PULSes:COUNt?

Description:

This command sets number of generated pulses. Pulses generator must be set to On (see FREQ:PULS). Node SOUR:FREQ also selects Frequency function if not already selected.

Parameters:

<DNPD>   Range 1 ... 9999999 (default 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:

FREQ:PULS:COUN 100
FREQ:PULS:COUN? Response: 100

[:SOURce]:FREQuency:PULSes:ACTual?

Syntax:

[:SOURce]:FREQuency:PULSes:ACTual?

Description:

This command reads actual number of generated pulses.

Parameters:

<DNPD>   Actual number of generated pulses (range 1 ... 9999999)

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:

FREQ:PULS:ACT? Response: 0

[:SOURce]:RESistance[:AMPLitude]

Syntax:

[:SOURce]:RESistance[:AMPLitude] <DNPD>[<UNIT>]
[:SOURce]:RESistance[:AMPLitude]?

Description:

This command sets resistance amplitude in Resistance function. Node SOUR:RES also selects Resistance function if not already selected.

Parameters:

<DNPD>   Range 10 ... 3e5 (default 1000.0)
<UNIT>   {OHM}
        ·OHM

Remarks:

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

Example:

RES 1000.0
RES? Response: 1.000000E+03 OHM

[:SOURce]:STEP[:STATe]

Syntax:

[:SOURce]:STEP[:STATe] <BOOL>

[:SOURce]:STEP[:STATe]?

Description:

This command turns on Step mode for the appropriate function. Step mode defines of 32 user programmable step sequencies for each function. Each sequence contains up to 100 steps (amplitude/duration).

Parameters:

<BOOL>	{ON|OFF|1|0} (default 0)
·ON	step mode activate
·OFF	step mode deactivate
·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:

STEP ON

STEP? Response: 1

[:SOURce]:STEP:SELect<IND_STEP>

Syntax:

[:SOURce]:STEP:SELect<IND_STEP> <DNPD>

[:SOURce]:STEP:SELect<IND_STEP>?

Description:

This command selects step sequence. Selected sequence is shown on device display, can be executed using OUTP ON command and can be edited using SOUR:STEP:PRES group of commands. Sequence is defined by function and by number of step sequence for this function.

Parameters:

<IND_STEP>	Range 1 ... 6 (1 - if omitted):
	1 – Voltage function
	2 – Current function
	3 – TC function
	4 – Frequency function
	5 – RTD function
	6 - Resistance function
<DNPD>	Range 1 ... maximum sequence count (32), one based index of sequence

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:

STEP:SEL1 0

STEP:SEL1? Response: 0

[:SOURce]:STEP:COUNt<IND_STEP>

Syntax:

[:SOURce]:STEP:COUNt<IND_STEP> <DNPD>
[:SOURce]:STEP:COUNt<IND_STEP>?

Description:

This command selects step sequence. Selected sequence is shown on device display, can be executed using OUTP ON command and can be edited using SOUR:STEP:PRES group of commands. Sequence is defined by function and repetition count.

Parameters:

<IND_STEP>	Range 1 ... 4 (1 - if omitted):
	1 – Voltage function
	2 – Current function
	3 – TC function
	4 – Frequency function
<DNPD>	Range 0 ... 999999 (0 – infinite loop)

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:

STEP:COUN1 0
STEP:COUN1? Response: 0

[:SOURce]:STEP:PRESet:COUNt?

Syntax:

[:SOURce]:STEP:PRESet:COUNt?

Description:

This command retrieves maximum number of step sequences. This number represents maximum index used in sequence commands.

Parameters:

<DNPD>	Integer value representing maximum sequence count.

Remarks:

Overlapped command

Example:

STEP:PRES:COUN? Response: 64

[:SOURce]:STEP:PRESet:NAME

Syntax:

[:SOURce]:STEP:PRESet:NAME <SPD>
[:SOURce]:STEP:PRESet:NAME?

Description:

This command allows reading and changing sequence name. Data will be saved to non-volatile memory on STEP:PRES:SAVE command.

Parameters:

<SPD>	Quoted sequence name. Upper alpha, lower alpha, digits and spaces are allowed. Maximum string size is 8 characters.

Remarks:

Overlapped command

Example:

STEP:PRES:NAME "STEP 1s"
STEP:PRES:NAME? Response: "STEP 1s"

[:SOURce]:STEP:PRESet:PCLear

Syntax:

[:SOURce]:STEP:PRESet:PCLear

Description:

This command clears existing sequence data including its step table. Data will be saved to non-volatile memory on STEP:PRES:SAVE command.

Parameters:

None

Remarks:

Overlapped command

Example:

STEP:PRES:PCL

[:SOURce]:STEP:PRESet:RAPPend

Syntax:

[:SOURce]:STEP:PRESet:RAPPend <SPD>

Description:

This command appends new record at the end of step table. Data will be saved to non-volatile memory on STEP:PRES:SAVE command.

Parameters:

<SPD>   Quoted string representing amplitude. The amplitude consists of two float numeric fields separated by comma. The first one represents timing interval in seconds and the second one amplitude.

Remarks:

Overlapped command

Example:

STEP:PRES:RAPP "0.5,220.0"

[:SOURce]:STEP:PRESet:RCOunt?

Syntax:

[:SOURce]:STEP:PRESet:RCOunt?

Description:

This command returns actual number of records in step table.

Parameters:

<DNPD>   Integer value representing number of records.

Remarks:

Overlapped command

Example:

STEP:PRES:RCO? Response: 6

[:SOURce]:STEP:PRESet:ROW<IND_ROW>:AMPLitude

Syntax:

[:SOURce]:STEP:PRESet:ROW<IND_ROW>:AMPLitude <SPD>
[:SOURce]:STEP:PRESet:ROW<IND_ROW>:AMPLitude?

Description:

This command sets / retrieves selected row in step table. Data will be saved to nonvolatile memory on STEP:PRES:SAVE command.

Parameters:

<IND_ROW>   Range 1 ... Row count (1 - if omitted)
<SPD>   Quoted string representing amplitude. The amplitude consists of two float numeric fields separated by comma. The first one represents timing interval in seconds and the second one amplitude.

Remarks:

Overlapped command

Example:

STEP:PRES:ROW1:AMPL "0.5,220.0"
STEP:PRES:ROW1:AMPL? Response: "5.000000E-01,2.200000E+02"

[:SOURce]:STEP:PRESet:ROW<IND_ROW>:RDELete

Syntax:
   [:SOURce]:STEP:PRESet:ROW<IND_ROW>:RDELete
Description:
   This command deletes row from step table. Data will be saved to non-volatile memory on STEP:PRES:SAVE command.
Parameters:
   <IND_ROW>   Range 1 ... Row count (1 - if omitted)
Remarks:
   Overlapped command
Example:
   STEP:PRES:ROW1:RDEL

[:SOURce]:STEP:PRESet:SAVE

Syntax:
   [:SOURce]:STEP:PRESet:SAVE
Description:
   This command saves current sequence to non-volatile memory. Unsaved changes will disappear on restart, function change or selection of another sequence.
Parameters:
   None
Remarks:
   Overlapped command
Example:
   STEP:PRES:SAVE

:MEASure:VOLTage[:AMPLitude]?

Syntax:
   :MEASure:VOLTage[:AMPLitude]?
Description:
   This query returns value of output voltage in Current function.
Parameters:
   <DNPD>   Range -100.0 ... 100.0
   <UNIT>   {V}
        ·V   Voltage
Remarks:
   The value is set to default after power on
   The value is set to default on *RST command
   Overlapped command
Example:
   MEAS:VOLT? Response: 1.000000E+02 V

:MEASure:CURRent[:AMPLitude]?

Syntax:
   :MEASure:CURRent[:AMPLitude]?
Description:
   This query returns value of output current in Voltage function.
Parameters:
   <DNPD>   Range -5e-2 ... 5e-2
   <UNIT>   {A}
        ·A   Amper

Remarks:

The value is set to default after power on

The value is set to default on *RST command

Overlapped command

Example:

MEAS:CURR? Response: 5.000000E-02 A

:MEASure:CONFigure

Syntax:

:MEASure:CONFigure <CPD>

:MEASure:CONFigure?

Description:

This command sets the function of internal multimeter.

Parameters:

                                                        <CPD>   {FREQ|COUN} (default FREQ)

             ·FREQ Frequency

             ·COUNCounter

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:

MEAS:CONF FREQ

MEAS:CONF? Response: FREQ

:MEASure:FREQuency[:AMPLitude]?

Syntax:

:MEASure:FREQuency[:AMPLitude]?

Description:

This query returns value of frequency meter.

Parameters:

    <DNPD>   Measured value

    <UNIT>   {HZ}

        ·HZ   Hertz

Remarks:

The value is set to default after power on

The value is set to default on *RST command

Overlapped command

Example:

MEAS:FREQ? Response: 5.000000E+01 HZ

:MEASure:COUNter[:AMPLitude]?

Syntax:

:MEASure:COUNter[:AMPLitude]?

Description:

This query returns value of counter.

Parameters:

    <DNPD>   Measured value

Remarks:

The value is set to default after power on

The value is set to default on *RST command

Overlapped command

Example:

MEAS:COUN? Response: 1.0E+006

:MEASure:TCPL:RJAMplitude

> Syntax:
>> :MEASure:TCPL:RJAMplitude?
>
> Description:
>> This query returns external reference junction temperature.
>
> Parameters:
>> <DNPD>   Measured value
>
> Remarks:
>> The value is set to default after power on
>> The value is set to default on *RST command
>> Overlapped command
>
> Example:
>> MEAS:TCPL:RJAM? Response: 2.300000E+01

:STATus:OPERation:CONDition

> Syntax:
>> :STATus:OPERation:CONDition?
>
> Description:
>> This query 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. Register is not cleared after this query. 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
>
> Remarks:
>> Overlapped command
>
> Example:
>> STAT:OPER:COND? Response: 2

:STATus:OPERation:ENABle

> Syntax:
>> :STATus:OPERation:ENABle <DNPD>
>> :STATus:OPERation:ENABle?
>
> Description:
>> This command 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 2
>> STAT:OPER:ENAB? Response: 2

:STATus:OPERation[:EVENt]?

> Syntax:
>> :STATus:OPERation[:EVENt]?
>
> Description:
>> This query 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. Register is cleared after this query.
>
> Parameters:
>> <DNPD>   Operational Data Event register
>
> Remarks:
>> Overlapped command

Example:
>STAT:OPER? Response: 0

:STATus:OPERation:NTRansition

Syntax:
>:STATus:OPERation:NTRansition <DNPD>
>:STATus:OPERation:NTRansition?

Description:
>This command allows set 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 2
>STAT:OPER:NTR? Response: 2

:STATus:OPERation:PTRansition

Syntax:
>:STATus:OPERation:PTRansition <DNPD>
>:STATus:OPERation:PTRansition?

Description:
>This command allows set 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 1.0
>STAT:OPER:PTR? Response: 1.000000E+00

:STATus:QUEStionable:CONDition

Syntax:
>:STATus:QUEStionable:CONDition?

Description:
>This query 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. Register is not cleared after this query. 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

Remarks:
>Overlapped command

Example:
>STAT:QUES:COND? Response: 2

:STATus:QUEStionable:ENABle

Syntax:

:STATus:QUEStionable:ENABle <DNPD>
:STATus:QUEStionable:ENABle?

Description:

This command 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 2
STAT:QUES:ENAB? Response: 2

:STATus:QUEStionable[:EVENt]?

Syntax:

:STATus:QUEStionable[:EVENt]?

Description:

This query 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. Register is cleared after this query.

Parameters:

<DNPD>   Questionable Data Event register

Remarks:

Overlapped command

Example:

STAT:QUES? Response: 0

:STATus:QUEStionable:NTRansition

Syntax:

:STATus:QUEStionable:NTRansition <DNPD>
:STATus:QUEStionable:NTRansition?

Description:

This command allows set 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 2
STAT:QUES:NTR? Response: 2

:STATus:QUEStionable:PTRansition

Syntax:

:STATus:QUEStionable:PTRansition <DNPD>
:STATus:QUEStionable:PTRansition?

Description:

This command allows set 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 2

        STAT:QUES:PTR? Response: 2

:SYSTem:BEEPer:STATe

Syntax:

        :SYSTem:BEEPer:STATe <BOOL>

        :SYSTem:BEEPer:STATe?

Description:

        This command sets state of device beeper.

Parameters:

        <BOOL>   {ON|OFF|1|0} (default 1)

                ·ON   device system beeper is enabled

                ·OFF   device system beeper is disabled

                ·1   same as ON

                ·0   same as OFF

Remarks:

        Overlapped command

        Value is not affected by reset

Example:

        SYST:BEEP:STAT ON

        SYST:BEEP:STAT? Response: 1

:SYSTem:BEEPer:VOLume

Syntax:

        :SYSTem:BEEPer:VOLume <DNPD>

        :SYSTem:BEEPer:VOLume?

Description:

        This command sets the system device beeper volume.

Parameters:

        <DNPD>   Range 0.0 ... 1.0 (Max. volume) (default 0.2)

Remarks:

        Overlapped command

        Value is not affected by reset

Example:

        SYST:BEEP:VOL 0.2

        SYST:BEEP:VOL? Response: 2.000000E-01

:SYSTem:BEEPer:KEYBoard

Syntax:

        :SYSTem:BEEPer:KEYBoard <BOOL>

        :SYSTem:BEEPer:KEYBoard?

Description:

        This command sets state of keyboard beeper.

Parameters:

        <BOOL>   {ON|OFF|1|0} (default 1)

                ·ON   device system beeper is enabled

                ·OFF   device system beeper is disabled

                ·1   same as ON

·0   same as OFF
        Remarks:
            Overlapped command
        Example:
            SYST:BEEP:KEYB ON
            SYST:BEEP:KEYB? Response: 1

:SYSTem:COMMunicate:BUS

        Syntax:
            :SYSTem:COMMunicate:BUS <CPD>
            :SYSTem:COMMunicate:BUS?
        Description:
            This command selects communication interface.
        Parameters:
            <CPD>   {SERial|GPIB|USB|LAN} (default SER)
                    ·SERialRS232 interface
                    ·GPIB   GPIB interface
                    ·USB   USB interface
                    ·LAN   LAN interface
        Remarks:
            Sequential command
            Value is not affected by reset
        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:
            This commands allows set communication GPIB address
        Parameters:
            <DNPD>   Range 1 ... 31 (default 2)
        Remarks:
            Overlapped command
            Value is not affected by reset
        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:
            This command allows to change IP address if DHCP is switched off. Interface must be
            restarted to take effect (see SYST:COMM:REST command).
        Parameters:
            <CPD>   Range 000.000.000.000 ... 255.255.255.255 (default 192.168.001.100)
        Remarks:
            Overlapped command
            Value is not affected by reset
        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:
This command allows to change subnet mask if DHCP is switched off. Interface must be restarted to take effect (see SYST:COMM:REST command).
Parameters:
<CPD>   Range 000.000.000.000 ... 255.255.255.255 (default 255.255.255.000)
Remarks:
Overlapped command
Value is not affected by reset
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:
This command allows to change default gateway if DHCP is switched off. Interface must be restarted to take effect (see SYST:COMM:REST command).
Parameters:
<CPD>   Range 000.000.000.000 ... 255.255.255.255 (default 255.255.255.255)
Remarks:
Overlapped command
Value is not affected by reset
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:
This command allows to change port number. Interface must be restarted to take effect (see SYST:COMM:REST command).
Parameters:
<DNPD>   Range 0 ... 9999 (default 23)
Remarks:
Overlapped command
Value is not affected by reset
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:

This command allows to change host name if DHCP is switched on. Interface must be restarted to take effect (see SYST:COMM:REST command).

Parameters:

<CPD>   Upper alpha, lower alpha, digits, underscores and spaces are allowable. Maximum string size is 14 characters.

Remarks:

Overlapped command

Value is not affected by reset

Example:

SYST:COMM:LAN:HOST M160_SNXXXXXX

SYST:COMM:LAN:HOST? Response: M160_SNXXXXXX

:SYSTem:COMMunicate:LAN:DHCP

Syntax:

:SYSTem:COMMunicate:LAN:DHCP <BOOL>

:SYSTem:COMMunicate:LAN:DHCP?

Description:

This command allows switch On/Off DHCP.

Parameters:

<BOOL>   {ON|OFF|1|0} (default 1)

·ON   DHCP is On

·OFF   DHCP is Off

·1   same as ON

·0   same as OFF

Remarks:

Overlapped command

Value is not affected by reset

Example:

SYST:COMM:LAN:DHCP ON

SYST:COMM:LAN:DHCP? Response: 1

:SYSTem:COMMunicate:RESTart

Syntax:

:SYSTem:COMMunicate:RESTart

Description:

This command will restart 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:

This command allows changing RS232 transfer rate.

Parameters:

<CPD>   {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
Value is not affected by reset

Example:

SYST:COMM:SER:BAUD 9600
SYST:COMM:SER:BAUD? Response: 9600

:SYSTem:DATE

Syntax:

:SYSTem:DATE <DNPD>,<DNPD>,<DNPD>
:SYSTem:DATE?

Description:

This commands allows to change system device date.

Parameters:

<DNPD>   Year, Range 2000 ... 2063
<DNPD>   Month, Range 1 ... 12
<DNPD>   Day, Range 1 ... 31

Remarks:

Overlapped command

Example:

SYST:DATE 2012,12,31
SYST:DATE? Response: 2012,12,31

:SYSTem:ERRor[:NEXT]?

Syntax:

:SYSTem:ERRor[:NEXT]?

Description:

This command reads SCPI error (maximum 32) that occurred at first. If number of SCPI errors exceed 32, error -350 "Queue overflow" is returned. For all available error codes and messages see "SCPI Error codes" table. Error queue is cleared by reading all errors or by issuing *CLS command.

Parameters:

<DNPD>   Error code
<SPD>   Quoted error message

Remarks:

Overlapped command

Example:

SYST:ERR? Response: -300,"Device error"

:SYSTem:KEY

Syntax:

:SYSTem:KEY <DNPD>

:SYSTem:KEY?

Description:

This command allows send key code to the device the same way the user can press keys on front panel. Query returns last pressed key.

Key	Code
KEY_0	16
KEY_1	15
KEY_2	21
KEY_3	27
KEY_4	14
KEY_5	20
KEY_6	26
KEY_7	13
KEY_8	19
KEY_9	25
KEY_SELECT	2
KEY_ENTER	34
KEY_CANCEL	33
KEY_UP	5
KEY_DOWN	1
KEY_LEFT	3
KEY_RIGHT	4
KEY_EXPONENT	31
KEY_BACKSPACE	32
KEY_POINT	22
KEY_USER_1	7
KEY_USER_2	8
KEY_USER_3	9
KEY_USER_4	10
KEY_SIGN	28
KEY_OPER	11
KEY_STEP	17

Table 1 Keyboard codes

Parameters:

<DNPD>   Key code. For particular key codes see table above.

Remarks:

Overlapped command

Example:

SYST:KEY 12

SYST:KEY? Response: 12

:SYSTem:LOCal

Syntax:
> :SYSTem:LOCal

Description:
> This command places device in the LOCAL mode and unlocks all keys on front panel of the device. The Command is valid only for RS232, LAN and USB interfaces. The device will not respond to commands in LOCAL mode.

Parameters:
> None

Remarks:
> Overlapped command

Example:
> SYST:LOC

:SYSTem:PRESet

Syntax:
> :SYSTem:PRESet

Description:
> This command will preset all device settings. These settings are the same as the RESET ones.

Parameters:
> None

Remarks:
> Overlapped command

Example:
> SYST:PRES

:SYSTem:REMote

Syntax:
> :SYSTem:REMote

Description:
> This command places device in the REMOTE mode and locks all keys but LOCAL key. The Command is valid only for RS232, LAN and USB interfaces. The device will not respond to any other command until is in REMOTE mode.

Parameters:
> None

Remarks:
> Overlapped command

Example:
> SYST:REM

:SYSTem:RWLock

Syntax:
> :SYSTem:RWLock

Description:
> This command places device in the REMOTE mode and locks all keys including LOCAL key. The Command is valid only for RS232, LAN, USB interfaces. The device will not respond to any other command until is in REMOTE mode.

Parameters:
> None

Remarks:
> Overlapped command

Example:
> SYST:RWL

:SYSTem:TIME

Syntax:
:SYSTem:TIME <DNPD>,<DNPD>,<DNPD>
:SYSTem:TIME?

Description:
This commands allows set system device time (RTC).

Parameters:
<DNPD>   Hours, Range 0 ... 23
<DNPD>   Minutes, Range 0 ... 59
<DNPD>   Seconds, Range 0 ... 59

Remarks:
Overlapped command

Example:
SYST:TIME 10,45,15
SYST:TIME? Response: 10,45,15

:SYSTem:VERSion?

Syntax:
:SYSTem:VERSion?

Description:
This query retreives version of implemented SCPI language

Parameters:
<CPD>   SCPI language version

Remarks:
Overlapped command

Example:
SYST:VERS? Response: 1999.0

:UNIT:TEMPerature

Syntax:
:UNIT:TEMPerature <CPD>
:UNIT:TEMPerature?

Description:
This function allows to set unit for all temperature functions (Platinum, Nickel).

Parameters:
<CPD>   {CEL|FAR|K} (default CEL)
·CEL   degrees of Celsius
·FAR   degrees of Fahrenheit
·K   Kelvin

Remarks:
Overlapped command
Value is not affected by reset

Example:
UNIT:TEMP CEL
UNIT:TEMP? Response: CEL