meatest

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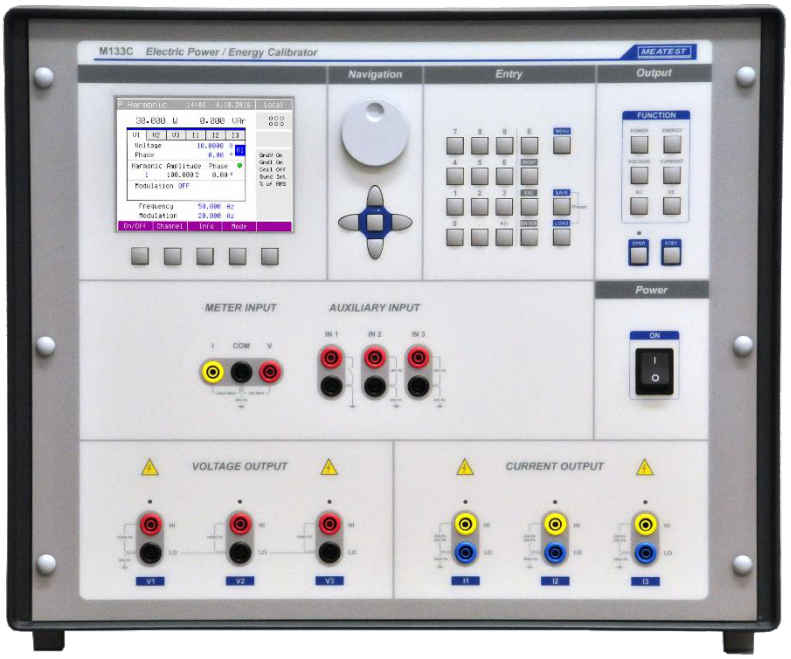
M133C / M133Ci Power & Energy Calibrator

remote control manual



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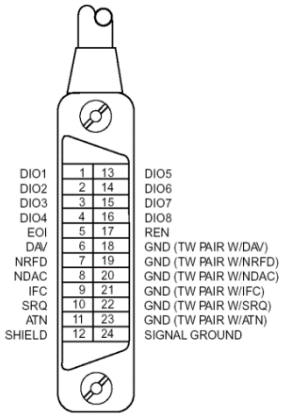
1. Connection Setup

The calibrator is equipped with RS232 serial line, IEEE488 bus and the TCP/IP Ethernet connection. System connectors are located at the rear panel. For the remote control to work properly, interface parameters must be set in the system menu. For RS232 line communication speed can be set (1200 to 115200 Bd). For IEEE488 bus, an address from range 0 to 30 is allowed. For Ethernet connection can be set IP address. The calibrator can be only controlled by one of interfaces at a time. It is therefore necessary to select one of the interfaces (RS232/Ethernet/IEEE488) using the system menu.

1.1. IEEE488 bus properties

The instrument performs the following functions based on IEEE488 bus commands:

SH1, AH1, T5, L3, RL1, DC1, SR1



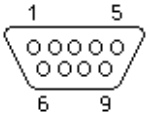
The instrument also recognizes the following general commands:

DCL	Device Clear	reset the calibrator
SDC	Selected Device Clear	reset the calibrator
EOI	End or Identify Message Terminator	close the message
GTL	Go To Local	close remote control mode
LLO	Local Lock Out	local control locked
SPD	Serial Poll Disable	close serial message status
SPE	Serial Poll Enable	release serial message status

1.2. RS232 serial line setting

To transfer the data using RS232 bus, 8N1 data format is used, i.e. each data word includes 8 bits, no parity and one stop bit. The communication speed can be set using the system menu. Available values: 1200, 2400, 4800, 9600, 19200, 38400, 76800 and 115200 Bd.

RS-232 connector layout



Pin	Name	Direction	Description
2	TXD	Output	Transmitter
3	RXD	Input	Receiver
5	GND	-	Ground

9-pin connector D-SUB FEMALE

Cable between the calibrator and PC (configuration 1:1)

PC	D-Sub 1	D-Sub 2	Calibrator
Receiver	2	2	Transmitter
Transmitter	3	3	Receiver
Ground	5	5	Ground

Note:

It is not possible to send or receive data over RS232 or Ethernet when the calibrator is not in remote mode.

You should use the command SYST:REM or SYST:RWL

2. Command syntax

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 and Ethernet) need to use following commands:

- SYST:REM Puts device into Remote mode and locks keyboard except Local button
- SYST:RWL Puts device into Remote mode and locks entire keyboard
- SYST:LOC 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. { GPIB|LAN}.
<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. Standard Status Data Structures

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

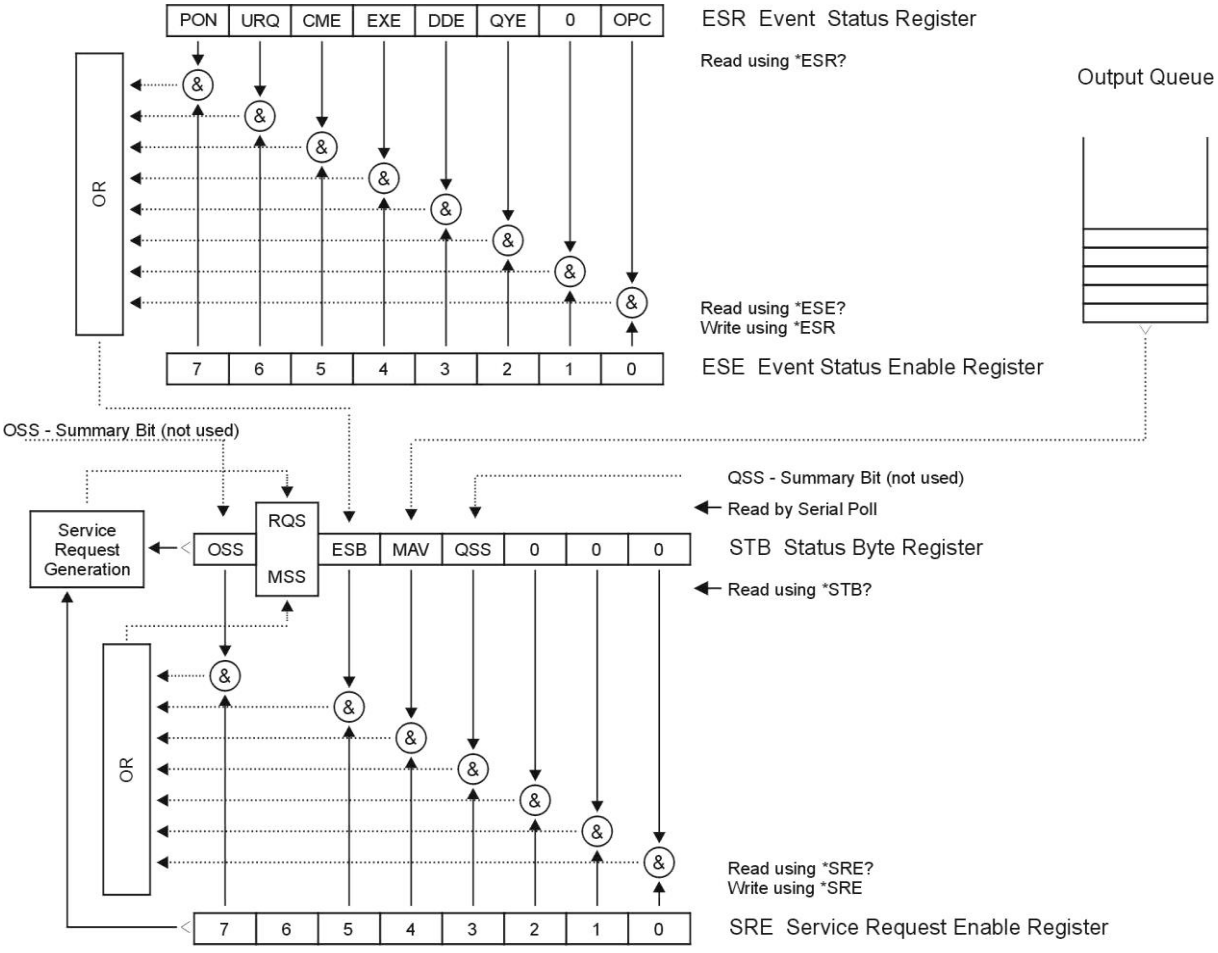


Figure 1 Status register overview

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

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 calibrator 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:

- 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 unmask 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 calibrator on. The register is not reset by the command *CLS.

ESR Event Status Register

Every bit of the Evet Status Register 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:

- 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

Not used in the calibrator.

Questionable Status Register

Not used in the calibrator.

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.

3.2. Error Messages

Remote control errors

Code	Error message	Description
-430	Deadlocked.	Remote interface error. A command was received which generates too much data to fit in the output buffer and the output buffer is full. Command execution continues but all data are lost.
-420	Unterminated.	Remote interface error. The calibrator was addressed to talk but a command has not been received which sends data to the output buffer.
-410	Interrupted.	Remote interface error. A command was received which sends data to the output buffer, but the output buffer contained data from a previous command. The output buffer is cleared when power has been off, or after reset command has been executed.
-363	Input buffer overrun	Remote interface error.
-220	Invalid parameter	Remote interface error. An invalid character string was received. Check to see if you have enclosed the character string in single or double quotes and that the string contains valid ASCII character.
-140	Character data	Remote interface error. Received command doesn’t contain valid character parameter.
-120	Numeric data	Remote interface error. Received command doesn’t contain valid numeric parameter.
-110	Command header	Remote interface error. Received command isn’t valid.

Eeprom errors

501	Eeprom write.	Eeprom write failed.
502	Eeprom read.	Eeprom read failed.
503	Eeprom error.	Eeprom data lost. Check calibration data.

Overload errors

701,704, 706, 707	Output overload	Output signal over specified limits. Decrease signal level or decrease the load.
703	High temperature	Calibrator power stage overheated. Disconnect external load. Ambient temperature is too high or forced ventilation holes are blocked.
705	Input overload	Input signal over specified limits. Decrease signal level.
706	Current output overload	Current terminals are open and/or external voltage has been detected. Current output has been disconnected. Decrease load impedance to specified limits and/or disconnect external source of current from output terminals.
707	Voltage output overload	Voltage terminals are shorted and/or external voltage has been detected. Voltage output has been disconnected. Increase load impedance to specified limits and/or disconnect external source of current from output terminals.

Communication error

722	Unexpected crossing.	Error in internal communication.
721	Unknown function.	Error in internal communication.
730, 731	Calibrator not ready	Error in internal communication.
732	Internal cpu RESET	Calibrator will be restarted.
743	Interface receive	Error in internal communication.
745	Internal CPU timeout	Error in internal communication.
746, 747, 748	Slave error	Error in internal communication.

Incorrect harmonic range

750	Harmonic U#1 over range	Amplitude of harmonic signal on voltage channel #1 is too high. Reduce amplitudes of individual harmonic components.
751	Harmonic U#2 over range	Amplitude of harmonic signal on voltage channel #2 is too high. Reduce amplitudes of individual harmonic components.
752	Harmonic U#3 over range	Amplitude of harmonic signal on voltage channel #3 is too high. Reduce amplitudes of individual harmonic components.
753	Harmonic I#1 over range	Amplitude of harmonic signal on current channel #1 is too high. Reduce amplitudes of individual harmonic components.
754	Harmonic I#2 over range	Amplitude of harmonic signal on current channel #2 is too high. Reduce amplitudes of individual harmonic components.
755	Harmonic I#3 over range	Amplitude of harmonic signal on current channel #3 is too high. Reduce amplitudes of individual harmonic components.

Function not available

770	Function not available.	Selected function is not available for this device (higher harmonic components are not available for M133Ci).

4. M133C SCPI Command Reference

INPut subsystem

This subsystem enables to change parameters of calibrator inputs.

Keyword	**Parameters**
INPut	
:FILTer (?)	<CPD> { OFF | ON | 0 | 1 }
:PULLup (?)	<CPD> { OFF | 150 | 1K }

INP:FILT (?) <CPD> { OFF | ON | 0 | 1 }

This command connects the internal filter to the IN1.

- OFF or 0 – disconnects filter (frequency range 0 to 1 MHz)
- ON or 1 – connects filter (frequency range 0 to 400 Hz)

State of the function remains valid even after the calibrator is switched off and back on.

If query is sent, calibrator returns state of the fucntion { 0 | 1 }.

INP:PULL (?) <CPD> { OFF | 150 | 1K }

This command connects the internal pull-up resistor (150 Ω or 1 kΩ) to the IN1.

- OFF – disconnects pull-up resistor
- 150 – connects pull-up resistor (150 Ω)
- 1K – connects pull-up resistor (1k Ω)

State of the function remains valid even after the calibrator is switched off and back on.

If query is sent, calibrator returns connects resistor { OFF | 150 | 1K }.

OUTPut subsystem

This subsystem enables to activate or deactivate the calibrator output.

Keyword	**Parameters**
OUTPut	
[:STATe](?)	<CPD> { ON | OFF }
:LOWVoltage(?)	<CPD> { FLOat | GROund }
:LOWCurrent (?)	<CPD> { FLOat | GROund }
[:PHASe]:UNIT(?)	<CPD> { DEG | COS }
:CURCoil(?)	<CPD> { OFF | X25 | X50 | USER}
:USER(?)	<DNPD>
:SYNChronization(?)	<CPD> { INT | LINE | IN1 | IN2 | IN3 }
:LOCKed?	<CPD> { 0 | 1 }
:ENERgy	
:UNIT(?)	<CPD> { WS | WH }
:MVOLtage(?)	<CPD> { OFF | ON | 0 | 1 }
:REFerence	
:UNIT(?)	<CPD> { W | VA | VAR }
:PULLup(?)	<CPD> { 0 | 1 }

:CONStant(?) <DNPD>

:MHARmonics

:UNIT(?) <CPD> { PRMS | PFUN }

:VFC(?) <CPD> { OFF | ON | 0 | 1 }

:CONFiguration(?) <CPD> { 1 | 12 | 123 }

:L280(?) <CPD> { OFF | ON | 0 | 1 }

OUTP[:STAT](?) <CPD> { ON | OFF }

This command activates or deactivates output terminals.

- ON - activates the output
- OFF - deactivates the output

If query is sent, calibrator returns ON if the output is active or OFF if it is inactive

Example: OUTP ON - activates the output

OUTP? - the calibrator returns ON or OFF

OUTP:LOWV(?) <CPD> { FLO | GRO }

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

- FLOat ungrounds voltage outputs
- GROund grounds voltage outputs

If query is sent, calibrator returns GRO when the output is grounded or FLO when floating.

Example:

OUTP:LOWV GRO

OUTP:LOWV? Calibrator returns FLO or GRO

OUTP:LOWC(?) <CPD> { FLO | GRO }

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

- FLOat ungrounds current outputs
- GROund grounds current outputs

If query is sent, calibrator returns GRO when the output is grounded or FLO when floating.

Example:

OUTP:LOWC GRO

OUTP:LOWC? Calibrator returns FLO or GRO

OUTP[:PHAS]:UNIT(?) <CPD> { DEG | COS }

This command sets the method used to specify the phase shift between the output voltage and current.

- DEG activates a mode where all entries are done using the angle, „°“ in the range of 0.0 – 360.0°
- COS activates a mode where all entries are done using the power factor in the range of 1.000 to –1.000, LAG or LEAD (LAG = 0-180°, LEAD = 180-360°)

The unit of measurement remains valid even after the calibrator is switched off and back on.

If query is sent, calibrator returns the set unit of measurement { DEG | COS }.

Example: OUTP:UNIT DEG <cr> - sets the angle as the unit of phase shift

OUTP:UNIT? <cr> - the calibrator returns DEG

OUTP:CURC(?) <CPD> { OFF | X25 | X50 | USER}

This command activates or deactivates the use of 25, 50-turns or user defined current coil.

- OFF - deactivates the current coil

- X25 - activates the 25 turns current coil
- X50 - activates the 50 turns current coil
- USER - activates user defined current coil

If query is sent, calibrator returns X50, X25, USER or OFF.

Example: OUTP:CURC X50 activates 50-tuen current coil
OUTP:CURC? Calibrator returns OFF, X50 or X25

OUTP:CURC:USER(?) <DNPD>

This command sets the number of turns of the user-defined current coil.

<DNPD> Parameter represents the number of turns.

Example: OUTP:CURC:USER 10 sets the 10-turn current coil.

OUTP:SYNC(?) <CPD> { INT | LINE | IN1 | IN2 | IN3 }

This command sets mode of output frequency synchronization.

- INT – internal synchronization
- LINE – synchronization to power supply frequency
- IN1 – synchronization to external signal (input IN1)
- IN2 – synchronization to external signal (input IN2)
- IN3 – synchronization to external signal (input IN3)

If query is sent, calibrator returns INT, LINE, IN1, IN2 or IN3 according to selected synchronization mode.

Example: OUTP:SYNC INT selects frequency synchronization to internal reference
OUTP:SYNC? Calibrator returns INT, LINE, IN1, IN2 or IN3

OUTP:SYNC:LOCK? <CPD> { 0 | 1 }

This query returns the actual state of frequency synchronization.

- 0 – output frequnecy is not locked (it is not possible to activate the output terminals)
- 1 – output frequency is locked to reference signal

Example: OUTP:SYNC:LOCK? calibrator returns 1 or 0

OUTP:ENER:UNIT(?) <CPD> { WS | WH }

This command sets unit used for energy.

- WS - energy is displayed in Ws, VAs, VArs
- WH - energy is displayed in Wh, VAh, VArh

Energy unit remains valid even after the calibrator is switched off and back on.

If query is sent, calibrator returns set energy unit { WS | WH }.

Example: OUTP:ENER:UNIT WH <cr> - sets energy unit Wh
OUTP: ENER:UNIT? <cr> - the calibrator returns WH

OUTP:ENER:MVOL(?) <CPD> { OFF | ON | 0 | 1 }

This command activates or deactivates Maintain Voltage Signal function.

- OFF or 0 – function is not active
- ON or 1 – function is active

State of the function remains valid even after the calibrator is switched off and back on.

If query is sent, calibrator returns state of the function { 0 | 1 }.

Example: OUTP:ENER:MVOL ON <cr> - activates Maintain Voltage Signal function
OUTP: ENER:MVOL? <cr> - the calibrator returns 1

OUTP:REF:PULL (?) <CPD> { 0 | 1 }

This command connects the internal pull-up resistor (150 Ω) to the Energy pulse output.

- 0 disconnects pull-up resistor
- 1 connects pull-up resistor

If query is sent, calibrator returns 0 or 1.

Example: OUTP:REF:PULL 1 - connects pull-up resistor
OUTP:REF:PULL? - calibrator returns 0 or 1

OUTP:REF:CONS(?) <DNPD>

This command sets number of pulses per selected unit (pulses generated on Energy pulse output on the rear panel BNC).

<DNPD>

Parameter represents the value number of pulses per selected unit.

If query is sent, calibrator returns set value using standard exponential format. Example: 400.0 i/kWh is returned as 4.000000e+002.

Example:

Number of pulses 1000 i/kVArh:

OUTP:REF:CONS 1000.0
OUTP:REF:UNIT VAR

OUTP:REF:UNIT(?) <CPD> { W | VA | VAR }

This command defines unit of constant for pulses generated on Energy pulse output.

<CPD>

If query is sent, calibrator returns selected unit.

Example: OUTP:REF:UNIT VAR <cr> - sets energy pulse output unit VAR
OUTP: REF:UNIT? <cr> - the calibrator returns VAR

OUTP:MHAR:UNIT(?) <CPD> { PRMS | PFUN }

This command defines how are evaluated higher harmonic components.

<CPD>

- PRMS – % of RMS value
- PFUN – % of Fundamental harmonic value

If query is sent, calibrator returns selected unit.

Example: OUTP:MHAR:UNIT PRMS <cr> - harmonics are expressed as “% of RMS”
OUTP:MHAR:UNIT? <cr> - the calibrator returns PRMS

OUTP:VFC(?) <CPD> { OFF | ON | 0 | 1 }

This command activates or deactivates the Voltage from Current function.

- OFF or 0 - function is not active
- ON or 1 - function is active

State of the function remains valid even after calibrator is switched off and

back on.

If a query is sent, calibrator returns state of the function { 0 | 1 }.

Example: OUTP:VFC ON - activates Voltage from Current function
OUTP:VFC? - calibrator returns 1

OUTP:EQU:FACT(?) <DNPD>

This command sets the ratio between the simulated current value and the voltage output.

<DNPD>

Parameter represents the ratio expressed in V/A.

If a query is sent, the Product returns set value with standard exponential format. Example: 1 V/A is returned as 1.000000e+000.

Example: OUTP:EQU:FACT 1 - sets ratio to 1 V/A
OUTP:EQU:FACT? - returns 1.000000e+000

OUTP:CONF (?) <CPD> { 1 | 12 | 123 }

This command defines how many outputs is used in basic power and energy AC modes (Pac and Eac).

- 1 – active are channels U1, I1 only
- 12 – active are channels U1, U2, I1, I2
- 123 – active are all channels

If query is sent, calibrator returns active channels.

Example: OUTP:CONF 123 <cr> - activates all channels
OUTP:CONF? <cr> - the calibrator returns 123

OUTP:L280(?) <CPD> { OFF | ON | 0 | 1 }

This command activates or deactivates „280V range lock" function.

- OFF or 0 – 280V range is not locked
- ON or 1 – 280V range is locked

State of the function is switched off after power on.

If query is sent, calibrator returns state of the function { 0 | 1 }.

Example: OUTP:L280 ON <cr> - locks 280V range
OUTP:L280? <cr> - the calibrator returns 1

MEASure a CONFigure subsystem

This subsystem allows controlling the internal multimeter.

Keyword	**Parameters**
MEASure?	
CONFigure(?)	<CPD> { VOLTage | CURRent | FREQuency }

MEAS?

This query returns value measured by the multimeter.

calibrator returns the set value of power using standard exponential format. Example: 5.456 V is returned as 5.456000e+000.

Example: MEAS? Calibrator returns measured value

CONF(?) <CPD> { VOLT | CURR | FREQ }

This command sets the function of internal multimeter.

If query is sent, calibrator returns VOLT, CURR or FREQ according to selected multimeter function.

Example: CONF VOLT sets the multimeter to function voltage DC

SOURce subsystem

This subsystem allows controlling the individual functions of the calibrator.

Keyword	**Parameters**
[SOURce]	
:MODE? { PAC | PDC | PACI | PDCI | PACE | PHAR | PIH | PDIP | PDCE | EAC | EDC | EACI | EDCI | VAC | VDC | CAC | CDC | CACI | CDCI }	
:PAC	
:POWer(?)	<DNPD>
[:POWer]	
:UNIT(?)	<CPD> { W | VA | VAR}
:VOLTage(?)	<DNPD>
:CURRent(?)	<DNPD>
[:CURRent]	
:PHASe(?)	<DNPD>
:POLarity(?)	<CPD> { LEAD | LAG }
:FREQuency(?)	<DNPD >
:PDC	
:POWer(?)	<DNPD>
:VOLTage(?)	<DNPD>
:CURRent(?)	<DNPD>
:PACI	
:POWer(?)	<DNPD>
[:POWer]	
:UNIT(?)	<CPD> { W | VA | VAR }
:VOLTage(?)	<DNPD>
:CURRent(?)	<DNPD>
[:CURRent]	
:PHASe(?)	<DNPD>
:POLarity(?)	<CPD> { LEAD | LAG }
:FREQuency(?)	<DNPD >
:PDCI	
:POWer(?)	<DNPD>
:VOLTage(?)	<DNPD>
:CURRent(?)	<DNPD>
:PACE	
:POWer?	
[:POWer]	
:UNIT(?)	<CPD> { W | VA | VAR }
:VOLTage<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle (?)	<CPD> { ON | OFF }
:CURRent<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle (?)	<CPD> { ON | OFF }
:FREQuency(?)	<DNPD >

:PDCE	
:POWer?	
:VOLTage<n>(?)	<DNPD>
:ENABle (?)	<CPD> { ON | OFF }
:CURRent<n>(?)	<DNPD>
:ENABle (?)	<CPD> { ON | OFF }
:PHAR	
:POWer?	<DNPD>, <DNPD>
:VOLTage<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle (?)	<CPD> { ON | OFF }
:HARMonic<y>(?)	<DNPD>
:PHASe(?)	<DNPD>
:MODulation(?)	<DNPD>
:SHAPe(?)	<CPD> { SIN | RECT | OFF }
:DUTY(?)	<DNPD>
:CURRent<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle(?)	<CPD> { ON | OFF }
:HARMonic<y>(?)	<DNPD>
:PHASe(?)	<DNPD>
:MODulation(?)	<DNPD>
:SHAPe(?)	<CPD> { SIN | RECT | OFF }
:DUTY(?)	<DNPD>
:FREQuency(?)	<DNPD>
:MODulation(?)	<DNPD>
:PIH	
:VOLTage<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle(?)	<CPD> { ON | OFF }
:IHARmonic(?)	<DNPD>
:CURRent<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle(?)	<CPD> { ON | OFF }
:IHARmonic(?)	<DNPD>
:FREQuency(?)	<DNPD>
:IHARmonic(?)	<DNPD>
:PDIP	
:VOLTage<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle(?)	<CPD> { ON | OFF }
:CHANge (?)	<DNPD>
:CURRent<n>(?)	<DNPD>
:PHASe(?)	<DNPD>
:ENABle(?)	<CPD> { ON | OFF}
:CHANge (?)	<DNPD>
:FREQuency(?)	<DNPD>
:TIME(?)	<DNPD>,<DNPD>,<DNPD>,<DNPD>,<DNPD>
:TRIGger	
:INPut(?)	<CPD> { OFF | IN3 }

:SYNChronization(?)	<CPD> { OFF | ON }
:REPetition (?)	<CPD> { ONE | REPeat }
:STARt	
:EAC	
:ENERgy?	
:DEViation?	
:POWer?	
[:POWer]	
:UNIT(?)	<CPD> { W | VA | VAR }
:VOLTage(?)	<DNPD>
:CURRent(?)	<DNPD>
[:CURRent]	
:PHASe(?)	<DNPD>
:POLarity(?)	<CPD> { LEAD | LAG }
:FREQuency(?)	<DNPD>
:CONStant(?)	<DNPD>
:TIME(?)	<DNPD>
:CONTrol(?)	<CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 | FR1 | FR2 | FR3 }
:TEST	
:TIME(?)	<DNPD>
:COUNt(?)	<DNPD>
:FREQ?	<DNPD>
:WUP	
:TIME(?)	<DNPD>
:COUNt(?)	<DNPD>
:EDC	
:ENERgy?	
:DEViation?	
:POWer?	
:VOLTage(?)	<DNPD>
:CURRent(?)	<DNPD>
:CONStant(?)	<DNPD>
:TIME(?)	<DNPD>
:CONTrol(?)	<CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 | FR1 | FR2 | FR3 }
:TEST	
:TIME(?)	<DNPD>
:COUNt(?)	<DNPD>
:FREQ?	<DNPD>
:WUP	
:TIME(?)	<DNPD>
:COUNt(?)	<DNPD>
:EACI	
:ENERgy?	
:DEViation?	
:POWer?	
:VOLTage(?)	<DNPD>
:CURRent(?)	<DNPD>
[:CURRent]	

```
        :PHASe(?)                   <DNPD>
    :FREQuency(?)                   <DNPD                                   >
    :CONStant(?)                    <DNPD>
    :TIME(?)                        <DNPD>
    :CONTrol(?)                     <CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 |
                                    FR1 | FR2 | FR3 }
    :TEST
        :TIME(?)                    <DNPD>
        :COUNt(?)                   <DNPD>
        :FREQ?                      <DNPD>
    :WUP
        :TIME(?)                    <DNPD>
        :COUNt(?)                   <DNPD>
:EDCI
    :ENERgy?
    :DEViation?
    :POWer?
    :VOLTage(?)                     <DNPD>
    :CURRent(?)                     <DNPD>
    :CONStant(?)                    <DNPD>
    :TIME(?)                        <DNPD>
    :CONTrol(?)                     <CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 |
                                    FR1 | FR2 | FR3 }
    :TEST
        :TIME(?)                    <DNPD>
        :COUNt(?)                   <DNPD>
        :FREQ?                      <DNPD>
    :WUP
        :TIME(?)                    <DNPD>
        :COUNt(?)                   <DNPD>
:VAC
    :VOLTage(?)                     <DNPD>
    :FREQuency(?)                   <DNPD >
:VDC
    :VOLTage(?)                     <DNPD>
:CAC
    :CURRent(?)                     <DNPD>
    :FREQuency(?)                   <DNPD >
:CDC
    :CURRent(?)                     <DNPD>
:CACI
    :CURRent(?)                     <DNPD>
    :FREQuency(?)                   <DNPD >
    :CDCI
        :CURRent(?)    <DNPD>
```

[SOUR]:MODE?

This command returns selected mode of the calibrator { PAC | PDC | PACI | PDCI | PACE | PDCE | PHAR | PIH | PDIP | EAC | EDC | EACI | EDCI | VAC | VDC | CAC | CDC | CACI | CDCI }.

- PAC – Power AC mode
- PDC – Power DC mode
- PACI – Power AC high current mode
- PDCI – Power DC high current mode
- PACE – Power AC extended mode
- PDCE – Power DC extended mode
- PHAR – Power harmonic mode
- PIH – Power interharmonic mode
- PDIP – Power Dip/Swell mode
- EAC – Energy AC mode
- EDC – Energy DC mode
- EACI – Energy AC high current mode
- EDCI – Energy DC high current mode
- VAC – Voltage AC mode
- VDC – Voltage DC mode
- CAC – Current AC mode
- CDC – Current DC mode
- CACI – Current AC high current mode
- CDCI – Current DC high current mode

Example:

MODE?

[SOUR]:PAC:POW(?) <DNPD>

This command sets the power value in Power AC mode.

<DNPD>

Parameter represents the value of the power expressed in actual units (W, VA, VAr).

If query is sent, calibrator returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Example:

AC power 1000W:

PAC:POW 1000

Note:

Command switches the calibrator in Power AC mode.

[SOUR]:PAC[:POW]:UNIT(?) <CPD> { W | VA | VAR }

This command selects units for power in the Power AC mode.

If query is sent, calibrator returns actual units in Power AC mode.

Example:

Select unit W for Power AC mode:

PAC:UNIT W

Note:

Command switches the calibrator in Power AC mode.

[SOUR]:PAC:VOLT(?) <DNPD>

This command sets the output voltage value.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

PAC:VOLT 230.5

Note:

Command switches the calibrator in Power AC mode.

[SOUR]:PAC:CURR(?) <DNPD>

This command sets the output current value in Power AC mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

PAC:CURR 23.05

Note:

Command switches the calibrator in Power AC mode.

[SOUR]:PAC[:CURR]:PHAS(?) <DNPD>

This command sets the phase angle between voltage and current.

<DNPD>

Represents the phase angle between the output voltage and current in degrees (PHAS:UNIT=DEG), or specified as a value of the power factor (PHAS:UNIT=COS).

If query is sent, calibrator returns the set value of the phase shift between the output voltage and current using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example: PAC:PHAS 250.2 - sets 250.2° phase shift between the output voltage and current

(PHAS:UNIT=DEG) PAC:PHAS? - the calibrator returns 2.502000e+002

Example: PAC:PHAS 0.554 – sets power factor 0.554

(PHAS:UNIT=COS) PAC:PHAS? - the calibrator returns 5.540000e-001,LAG

Note:

Command switches the calibrator in Power AC mode.

[SOUR]:PAC[:CURR]:POLarity(?) <CPD> { LEAD | LAG }

This command sets the polarity of phase angle between voltage and current. Command is valid only for PHAS:UNIT=DEG.

<CPD>

Represents the polarity of phase angle between the output voltage and current.

If query is sent, calibrator returns the polarity of the phase angle between the output voltage and current.

Example:

PAC:POL LEAD sets the phase angle polarity to Lead

Note:

Command switches the calibrator in Power AC mode.

[SOUR]:PAC:FREQ(?) <DNPD>

This command sets the frequency in Power AC mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

PAC:FREQ 60

Notes:

Command switches the calibrator in Power AC mode.

[SOUR]:PDC:POW(?) <DNPD>

This command sets the power value in Power DC mode.

<DNPD>

Parameter represents the value of the power expressed in W.

If query is sent, calibrator returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Example:

DC power 1000W:

PDC:POW 1000

Note:

Command switches the calibrator in Power DC mode.

[SOUR]:PDC:VOLT(?) <DNPD>

This command sets the output voltage value in Power DC mode.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

PDC:VOLT 230.5

Note:

Command switches the calibrator in Power DC mode.

[SOUR]:PDC:CURR(?) <DNPD>

This command sets the output current value in Power DC mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

PDC:CURR 23.05

Note:

Command switches the calibrator in Power DC mode.

[SOUR]:PACI:POW(?) <DNPD>

This command sets the power value in Power AC high current mode.

<DNPD>

Parameter represents the value of the power expressed in actual units (W, VA, VAr).

If query is sent, calibrator returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Example:

AC power 1000W:

PACI:POW 1000

Note:

Command switches the calibrator in Power AC high current mode.

[SOUR]:PACI[:POW]:UNIT(?) <CPD> { W | VA | VAR }

This command selects units for power in the Power AC high current mode.

If query is sent, calibrator returns actual units in Power AC high current mode.

Example:

Select unit W for Power AC high current mode:

PACI:UNIT W

Note:

Command switches the calibrator in Power AC high current mode.

[SOUR]:PACI:VOLT(?) <DNPD>

This command sets the output voltage value.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

PAC:VOLT 230.5

Note:

Command switches the calibrator in Power AC high current mode.

[SOUR]:PACI:CURR(?) <DNPD>

This command sets the output current value in Power AC high current mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

PACI:CURR 23.05

Note:

Command switches the calibrator in Power AC high current mode.

[SOUR]:PACI[:CURR]:PHAS(?) <DNPD>

This command sets the phase angle between voltage and current.

<DNPD>

Represents the phase angle between the output voltage and current in degrees (PHAS:UNIT=DEG), or specified as a value of the power factor (PHAS:UNIT=COS).

If query is sent, calibrator returns the set value of the phase shift between the output voltage and current using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example: PACI:PHAS 250.2 - sets 250.2° phase shift between the output voltage and current

(PHAS:UNIT=DEG) PACI:PHAS? - the calibrator returns 2.502000e+002

Example: PACI:PHAS 0.554 – sets power factor 0.554

(PHAS:UNIT=COS) PACI:PHAS? - the calibrator returns 5.540000e-001,LAG

Note:

Command switches the calibrator in Power AC high current mode.

[SOUR]:PACI[:CURR]:POLarity(?) <CPD> { LEAD | LAG }

This command sets the polarity of phase angle between voltage and current. Command is valid only for PHAS:UNIT=DEG.

<CPD>

Represents the polarity of phase angle between the output voltage and current.

If query is sent, calibrator returns the polarity of the phase angle between the output voltage and current.

Example:

PACI:POL LEAD sets the phase angle polarity to Lead

Note:

Command switches the calibrator in Power AC high current mode.

[SOUR]:PACI:FREQ(?) <DNPD>

This command sets the frequency in Power AC high current mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

PACI:FREQ 60

Notes:

Command switches the calibrator in Power AC high current mode.

[SOUR]:PDCI:POW(?) <DNPD>

This command sets the power value in Power DC high current mode.

<DNPD>

Parameter represents the value of the power expressed in W.

If query is sent, calibrator returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Example:

DC power 1000W:

PDCI:POW 1000

Note:

Command switches the calibrator in Power DC high current mode.

[SOUR]:PDCI:VOLT(?) <DNPD>

This command sets the output voltage value in Power DC high current mode.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

PDCI:VOLT 230.5

Note:

Command switches the calibrator in Power DC high current mode.

[SOUR]:PDCI:CURR(?) <DNPD>

This command sets the output current value in Power DC high current mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

PDCI:CURR 23.05

Note:

Command switches the calibrator in Power DC high current mode.

[SOUR]:PACE:POW?

This query returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Note:

Query switches the calibrator in Power AC extended mode.

[SOUR]:PACE[:POW]:UNIT(?) <CPD> { W | VA | VAR }

This command selects units for power in the Power AC extended mode.

If query is sent, calibrator returns actual units in Power AC extended mode.

Example:

Select unit W for Power AC extended mode:

PACE:UNIT W

Note:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PACE:VOLT<n>(?) <DNPD>

This command sets the output voltage value in channel <n>

<DNPD>

Parameter represents the value of the output voltage expressed in V.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V in channel 1:

PACE:VOLT1 230.5

Note:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PACE:VOLT<n>:PHAS(?) <DNPD>

This command sets the phase angle between voltage output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PACE:VOLT1:PHAS 0

PACE:VOLT2:PHAS 120

PACE:VOLT3:PHAS 240

Note:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PACE:VOLT<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the voltage output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PACE:VOLT1:ENAB ON

Note:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PACE:CURR<n>(?) <DNPD>

This command sets the output current value in channel <n>

<DNPD>

Parameter represents the value of the output current expressed in A.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 V is returned as 1.101200e+001.

Example:

Current 23.05A in channel 1:

PACE:CURR1 23.05

Note:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PACE:CURR<n>:PHAS(?) <DNPD>

This command sets the phase angle between current output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PACE:CURR1:PHAS 0

PACE: CURR 2:PHAS 120

PACE: CURR 3:PHAS 240

Note:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PACE:CURR<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the current output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PACE:CURR1:ENAB ON

Note:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PACE:FREQ(?) <DNPD>

This command sets the frequency in Power AC extended mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

PACE:FREQ 60

Notes:

Command switches the calibrator in Power AC extended mode.

[SOUR]:PDCE:POW?

This command sets the power value in Power DC extended mode.

This query returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Note:

Query switches the calibrator in Power DC extended mode.

[SOUR]:PDCE:VOLT<n>(?) <DNPD>

This command sets the output voltage value in channel <n>

<DNPD>

Parameter represents the value of the output voltage expressed in V.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V in channel 1:

PDCE:VOLT1 230.5

Note:

Command switches the calibrator in Power DC extended mode.

[SOUR]:PDCE:VOLT<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the voltage output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PDCE:VOLT1:ENAB ON

Note:

Command switches the calibrator in Power DC extended mode.

[SOUR]:PDCE:CURR<n>(?) <DNPD>

This command sets the output current value in channel <n>

<DNPD>

Parameter represents the value of the output current expressed in A.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 V is returned as 1.101200e+001.

Example:

Current 23.05A in channel 1:

PDCE:CURR1 23.05

Note:

Command switches the calibrator in Power DC extended mode.

[SOUR]:PDCE:CURR<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the current output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PDCE:CURR1:ENAB ON

Note:

Command switches the calibrator in Power DC extended mode.

[SOUR]:PHAR:POW?

This query returns active and reactive power values using standard exponential format.

Example: 100.60 W, 1.1 VAr is returned as 1.006000e+002, 1.100000e+000.

Note:

Query switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>(?) <DNPD>

This command sets the output voltage value in channel <n>

<DNPD>

Parameter represents the value of the output voltage expressed in V.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V in channel 1:

PHAR:VOLT1 230.5

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>:PHAS(?) <DNPD>

This command sets the phase angle between voltage output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PHAR:VOLT1:PHAS 0

PHAR:VOLT2:PHAS 120

PHAR:VOLT3:PHAS 240

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the voltage output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PHAR:VOLT1:ENAB ON

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>:HARM<y>(?) <DNPD>

This command sets the level of <y> harmonic in output voltage in channel <n>

<DNPD>

Parameter represents the level of <y> harmonic expressed in %.

<n>

Parameter represents the output channel (1, 2 or 3).

<y>

Parameter represents the harmonic order (1 to 50). Number 1 is for query only.

If query is sent, calibrator returns the level of the harmonic order using standard exponential format. Example: 10% is returned as 1.000000e+001.

Example:

Set harmonic order 2 to 5.3% in voltage channel 1:

PHAR:VOLT1:HARM2 5.3

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>:HARM<y>:PHAS(?) <DNPD>

This command sets the phase shift of <y> harmonic component in channel <n>

<DNPD>

Parameter represents the phase shift of <y> harmonic component expressed in °.

<n>

Parameter represents the output channel (1, 2 or 3).

<y>

Parameter represents the harmonic order (2 to 50). Order 1 has zero phase shift and can’t be changed.

If query is sent, calibrator returns the phase shift of harmonic component using standard exponential format. Example: 10° is returned as 1.000000e+001.

Example:

Set phase shift of harmonic component 2 to 5.3° in voltage channel 1:

PHAR:VOLT1:HARM2:PHAS 5.3

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>:MOD(?) <DNPD>

This command sets the modulation level for voltage output in channel <n>.

<DNPD>

Represents the modulation level in %.

If query is sent, calibrator returns the modulation level using standard exponential format. Example: 12.45 is returned as 1.145000e+001.

Example:

PHAR:VOLT1:MOD 12.45

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>:MOD:SHAP(?) <CPD> { SIN | RECT | OFF }

This command sets type of modulation for voltage output in channel <n>.

<CPD>

- SIN – modulation using sinusoidal wave shape
- RECT – modulation using rectangular wave shape
- OFF - disables modulation

If query is sent, calibrator returns SIN, RECT or OFF.

Example:

PHAR:VOLT1:MOD:SHAP SIN

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:VOLT<n>:MOD:DUTY(?) <DNPD>

This command sets the duty cycle of rectangular modulation for voltage output in channel <n>.

<DNPD>

Represents the duty cycle in %.

If query is sent, calibrator returns the duty cycle using standard exponential format. Example: 50% is returned as 5.000000e+001.

Example:

PHAR:VOLT1:MOD:DUTY 50

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>(?) <DNPD>

This command sets the output current value in channel <n>

<DNPD>

Parameter represents the value of the output current expressed in A.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Voltage 23.05A in channel 1:

PHAR:CURR1 23.05

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>:PHAS(?) <DNPD>

This command sets the phase angle between current output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PHAR:CURR1:PHAS 0

PHAR:CURR2:PHAS 120

PHAR:CURR3:PHAS 240

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the current output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PHAR:CURR1:ENAB ON

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>:HARM<y>(?) <DNPD>

This command sets the level of <y> harmonic in output current in channel <n>

<DNPD>

Parameter represents the level of <y> harmonic expressed in %.

<n>

Parameter represents the output channel (1, 2 or 3).

<y>

Parameter represents the harmonic order (1 to 50). Number 1 is for query only.

If query is sent, calibrator returns the level of the harmonic order using standard exponential format. Example: 10% is returned as 1.000000e+001.

Example:

Set harmonic order 2 to 5.3% in voltage channel 1:

PHAR:CURR1:HARM2 5.3

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>:HARM<y>:PHAS(?) <DNPD>

This command sets the phase shift of <y> harmonic component in channel <n>

<DNPD>

Parameter represents the phase shift of <y> harmonic component expressed in °.

<n>

Parameter represents the output channel (1, 2 or 3).

<y>

Parameter represents the harmonic order (2 to 50). Order 1 has zero phase shift and can't be changed.

If query is sent, calibrator returns the phase shift of harmonic component using standard exponential format. Example: 10° is returned as 1.000000e+001.

Example:

Set phase shift of harmonic component 2 to 5.3° in current channel 1:

PHAR:CURR1:HARM2:PHAS 5.3

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>:MOD(?) <DNPD>

This command sets the modulation level for current output in channel <n>.

<DNPD>

Parameter represents the modulation level in %.

If query is sent, calibrator returns the modulation level using standard exponential format. Example: 12.45 is returned as 1.145000e+001.

Example:

PHAR:CURR1:MOD 12.45

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>:MOD:SHAP(?) <CPD> { SIN | RECT | OFF }

This command sets type of modulation for current output in channel <n>.

<CPD>

- SIN – modulation using sinusoidal wave shape
- RECT – modulation using rectangular wave shape
- OFF - disables modulation

If query is sent, calibrator returns SIN, RECT or OFF.

Example:

PHAR:CURR1:MOD:SHAP SIN

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:CURR<n>:MOD:DUTY(?) <DNPD>

This command sets the duty cycle of rectangular modulation for current output in channel <n>.

<DNPD>

Represents the duty cycle in %.

If query is sent, calibrator returns the duty cycle using standard exponential format. Example: 50% is returned as 5.000000e+001.

Example:

PHAR:CURR1:MOD:DUTY 50

Note:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:FREQ(?) <DNPD>

This command sets the frequency in Power Harmonic mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

PHAR:FREQ 60

Notes:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PHAR:FREQ:MOD(?) <DNPD>

This command sets the modulation frequency in Power Harmonic mode.

<DNPD>

Parameter represents the value of modulation frequency expressed in Hz.

If query is sent, calibrator returns the value of modulation frequency using standard exponential format. Example: 5Hz is returned as 5.000000e+000.

Example:

Modulation frequency 5.3Hz:

PHAR:FREQ:MOD 5.3

Notes:

Command switches the calibrator in Power Harmonic mode.

[SOUR]:PIH

This command switches the calibrator in Power Interharmonic mode.

Example:

PIH

[SOUR]:PIH:VOLT<n>(?) <DNPD>

This command sets the output voltage value in channel <n>

<DNPD>

Parameter represents the value of the output voltage expressed in V.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V in channel 1:

PIH:VOLT1 230.5

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:VOLT<n>:PHAS(?) <DNPD>

This command sets the phase angle between voltage output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PIH:VOLT1:PHAS 0

PIH:VOLT2:PHAS 120

PIH:VOLT3:PHAS 240

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:VOLT<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the voltage output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PIH:VOLT1:ENAB ON

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:VOLT<n>:IHAR(?) <DNPD>

This command sets the level of interharmonic component for voltage output in channel <n>.

<DNPD>

Represents the voltage in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Interharmonic component 23.05V in channel 1:

PIH:VOLT1:IHAR 23.05

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:CURR<n>(?) <DNPD>

This command sets the output current value in channel <n>

<DNPD>

Parameter represents the value of the output current expressed in A.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 11.012 V is returned as 1.101200e+001.

Example:

Voltage 23.05V in channel 1:

PIH:CURR1 23.05

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:CURR<n>:PHAS(?) <DNPD>

This command sets the phase angle between current output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PIH:CURR1:PHAS 0

PIH:CURR1:PHAS 120

PIH:CURR1:PHAS 240

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:CURR<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the current output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PIH:CURR1:ENAB ON

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:CURR<n>:IHAR(?) <DNPD>

This command sets the level of interharmonic component for current output in channel <n>.

<DNPD>

Represents the current in A.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 11.012 V is returned as 1.101200e+001.

Example:

Interharmonic component 2.305A in channel 1:

PIH:CURR1:IHAR 2.305

Note:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:FREQ(?) <DNPD>

This command sets the frequency in Power Interharmonic mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

PIH:FREQ 60

Notes:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PIH:FREQ:IHAR(?) <DNPD>

This command sets the modulation frequency in Power Interharmonic mode.

<DNPD>

Parameter represents the value of modulation frequency expressed in Hz.

If query is sent, calibrator returns the value of modulation frequency using standard exponential format. Example: 5Hz is returned as 5.000000e+000.

Example:

Interharmonic frequency 72.5Hz:

PIH:FREQ:IHAR 72.5

Notes:

Command switches the calibrator in Power Interharmonic mode.

[SOUR]:PDIP

This command switches the calibrator in Power Dip/Swell mode.

Example:

PDIP

[SOUR]:PDIP:VOLT<n>(?) <DNPD>

This command sets the output voltage value in channel <n>

<DNPD>

Parameter represents the value of the output voltage expressed in V.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V in channel 1:

PDIP:VOLT1 230.5

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:VOLT<n>:PHAS(?) <DNPD>

This command sets the phase angle between voltage output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PDIP:VOLT1:PHAS 0

PDIP:VOLT2:PHAS 120

PDIP:VOLT3:PHAS 240

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:VOLT<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the voltage output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PDIP:VOLT1:ENAB ON

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:VOLT<n>:CHAN(?) <DNPD>

This command sets the level of change (Dip/Swell - t3 period) for voltage output in channel <n>.

<DNPD>

Represents the voltage in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Dip/Swell change 23.05V in channel 1:

PDIP:VOLT1:CHAN 23.05

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:CURR<n>(?) <DNPD>

This command sets the output current value in channel <n>

<DNPD>

Parameter represents the value of the output current expressed in A.

<n>

Parameter represents the output channel (1, 2 or 3).

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A in channel 1:

PDIP:CURR1 23.05

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:CURR<n>:PHAS(?) <DNPD>

This command sets the phase angle between current output in channel <n> and internal reference phase.

<DNPD>

Represents the phase angle in degrees.

If query is sent, calibrator returns the set value of the phase angle using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example:

PDIP:CURR1:PHAS 0

PDIP:CURR2:PHAS 120

PDIP:CURR3:PHAS 240

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:CURR<n>:ENAB(?) <CPD> { ON | OFF }

This command enables (disables) the current output in channel <n>. Disabled outputs are OFF also during OUTP ON.

- ON - enables the output
- OFF - disables the output

If query is sent, calibrator returns ON if the output is enabled or OFF if it is disabled.

Example:

PDIP:CURR1:ENAB ON

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:CURR<n>:CHAN(?) <DNPD>

This command sets the level of change (Dip/Swell - t3 period) for current output in channel <n>.

<DNPD>

Represents the current in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Dip/Swell change 2.305A in channel 1:

PDIP:CURR1:CHAN 2.305

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:FREQ(?) <DNPD>

This command sets the frequency in Power Dip/Swell mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

PDIP:FREQ 60

Notes:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:TIME(?) <DNPD>,<DNPD>,<DNPD>,<DNPD>,<DNPD>

This command sets the time periods t1, t2, t3, t4 and t5 in Power Dip/Swell mode.

<DNPD>,<DNPD>,<DNPD>,<DNPD>,<DNPD>

Parameters represent the value of times (t1, t2, t3, t4 and t5) expressed in s.

If query is sent, calibrator returns time values using standard exponential format. Example: 50s is returned as 5.000000e+001.

Example:

period t1 100ms

period t2 20ms

period t3 30s

period t4 200ms

period t5 0s

PDIP:TIME 0.1, 0.02, 30, 0.2, 0

Notes:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:TRIG:INP(?) <CPD> { OFF | IN3 }

This command enables (disables) external trigger for Dip/Swell mode.

- OFF – disables external trigger for Dip/Swell function
- IN3 – enables external trigger for Dip/Swell function (TTL falling edge applied to input IN3)

If query is sent, calibrator returns IN3 if external trigger is enabled or OFF if it is disabled.

Example:

PDIP:TRIG:INP IN3

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:TRIG:SYNC(?) <CPD> { OFF | ON }

This command enables (disables) synchronization of Dip/Swell shape.

- OFF – Dip/Swell shape starts immediately after trigger
- ON – start of Dip/Swell shape is synchronized with the phase 0°

If query is sent, calibrator returns ON if synchronization is enabled or OFF if it is disabled.

Example:

PDIP:TRIG:SYNC ON

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:TRIG:REP(?) <CPD> { ONE | REP }

This sets automatic repetition of generated Dip/Swell shape.

- ONE – trigger starts generation of one Dip/Swell shape
- REP – trigger starts repeated generation of Dip/Swell shapes

If query is sent, calibrator returns ONE if repetition is disabled or REP if it is enabled.

Example:

PDIP:TRIG:REP ONE

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:PDIP:TRIG:STAR

This command starts generation of Dip/Swell shape.

Example:

PDIP:TRIG:STAR

Note:

Command switches the calibrator in Power Dip/Swell mode.

[SOUR]:EAC:ENER?

This query returns the set value of energy using standard exponential format. Example: 100.60 Ws is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy AC mode.

[SOUR]:EAC:DEV?

This query returns deviation between tested energy meter end the calibrator. Calculation of deviation is based on pulses generated by energy meter. Example: 0.612 % is returned as 6.120000e-001.

Note:

Query switches the calibrator in Energy AC mode.

[SOUR]:EAC:POW?

This query returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy AC mode.

[SOUR]:EAC[:POW]:UNIT(?) <CPD> { W | VA | VAR }

This command selects units for power in the Energy AC mode.

If query is sent, calibrator returns actual units in Energy AC mode.

Example:

Select unit W for Energy AC mode:

EAC:UNIT W

Note:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:VOLT(?) <DNPD>

This command sets the output voltage value.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

EAC:VOLT 230.5

Note:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:CURR(?) <DNPD>

This command sets the output current value in Energy AC mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

EAC:CURR 23.05

Note:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC[:CURR]:PHAS(?) <DNPD>

This command sets the phase angle between voltage and current.

<DNPD>

Represents the phase angle between the output voltage and current in degrees (PHAS:UNIT=DEG), or specified as a value of the power factor (PHAS:UNIT=COS).

If query is sent, calibrator returns the set value of the phase shift between the output voltage and current using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example: EAC:PHAS 250.2 - sets 250.2° phase shift between the output voltage and current

(PHAS:UNIT=DEG) EAC:PHAS? - the calibrator returns 2.502000e+002

Example: EAC:PHAS 0.554 – sets power factor 0.554

(PHAS:UNIT=COS) EAC:PHAS? - the calibrator returns 5.540000e-001,LAG

Note:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC[:CURR]:POLarity(?) <CPD> { LEAD | LAG }

This command sets the polarity of phase angle between voltage and current. Command is valid only for PHAS:UNIT=DEG.

<CPD>

Represents the polarity of phase angle between the output voltage and current.

If query is sent, calibrator returns the polarity of the phase angle between the output voltage and current.

Example:

EAC:POL LEAD sets the phase angle polarity to Lead

Note:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:FREQ(?) <DNPD>

This command sets the frequency in Energy AC mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

EAC:FREQ 60

Notes:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:CONT(?) <CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 | FR1 | FR2 | FR3}

This command selects energy counting control mode.

<CPD>

represents the control mode of energy counting.

- PACK – Packet mode energy counting is controlled by time to deliver specific "Packet" of energy
- CNT1 – energy counting mode is controlled by pulses on input 1
- CNT2 – energy counting mode is controlled by pulses on input 2
- TIM1 – energy timer mode is controlled by pulses on input 1
- TIM2 – energy timer mode is controlled by pulses on input 2
- FR1 – frequency measuring on input 1
- FR2 – frequency measuring on input 2
- FR3 – frequency measuring on multimeter input V/COM

If query is sent, calibrator returns the selected control mode.

Example:

EAC:CONT PACK selects the Packet control mode which is controlled by time

Note:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:TIME(?) <DNPD>

This command sets the time in Energy AC "Packet" control mode.

<DNPD>

Parameter represents the value of time expressed in s.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 120s is returned as 1.200000e+002.

Example:

Time 60s:

EAC:TIME 60

Notes:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:CONS(?) <DNPD>

This command sets number of pulses per selected unit (pulses generated by energy meter).

<DNPD>

Parameter represents the value number of pulses per selected unit.

If query is sent, calibrator returns set value using standard exponential format. Example: 400.0 i/kWh is returned as 4.000000e+002.

Example:

Number of pulses 1000 i/kVArh:

EAC:CONS 1000.0

EAC:UNIT VAR

Note:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:TEST:TIME (?) <DNPD>

This command sets test timer in Energy AC mode.

<DNPD>

Parameter represents test time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EAC:TEST:TIME 10

Notes:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:TEST:COUN(?) <DNPD>

This command sets test pulse counter in Energy AC mode.

<DNPD>

Parameter represents number of test pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EAC:TEST:COUN 10

Notes:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:TEST:FREQ? <DNPD>

This query returns actual frequency generated by tested energy meter.

<DNPD>

Parameter represents measured frequency.

Calibrator returns frequency using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EAC:TEST:FREQ?

Notes:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:WUP:TIME (?) <DNPD>

This command sets warm-up timer in Energy AC mode.

<DNPD>

Parameter represents warm-up time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EAC:WUP:TIME 10

Notes:

Command switches the calibrator in Energy AC mode.

[SOUR]:EAC:WUP:COUN(?) <DNPD>

This command sets warm-up pulse counter in Energy AC mode.

<DNPD>

Parameter represents number of warm-up pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EAC:WUP:COUN 10

Notes:

Command switches the calibrator in Energy AC mode.

[SOUR]:EDC:ENER?

This query returns the set value of energy using standard exponential format. Example: 100.60 Ws is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy DC mode.

[SOUR]:EDC:DEV?

This query returns deviation between tested energy meter end the calibrator. Calculation of deviation is based on pulses generated by energy meter. Example: 0.612 % is returned as 6.120000e-001.

Note:

Query switches the calibrator in Energy DC mode.

[SOUR]:EDC:POW?

This query returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy DC mode.

[SOUR]:EDC:VOLT(?) <DNPD>

This command sets the output voltage value.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

EDC:VOLT 230.5

Note:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:CURR(?) <DNPD>

This command sets the output current value in Energy DC mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

EDC:CURR 23.05

Note:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:CONT(?) <CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 | FR1 | FR2 | FR3}

This command selects energy counting control mode.

<CPD>

represents the control mode of energy counting.

- PACK – Packet mode energy counting is controlled by time to deliver specific "Packet" of energy
- CNT1 – energy counting mode is controlled by pulses on input 1
- CNT2 – energy counting mode is controlled by pulses on input 2
- TIM1 – energy timer mode is controlled by pulses on input 1
- TIM2 – energy timer mode is controlled by pulses on input 2
- FR1 – frequency measuring on input 1
- FR2 – frequency measuring on input 2
- FR3 – frequency measuring on multimeter input V/COM

If query is sent, calibrator returns the selected control mode.

Example:

EDC:CONT PACK selects the Packet control mode which is controlled by time

Note:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:TIME(?) <DNPD>

This command sets the time in Energy DC "Packet" control mode.

<DNPD>

Parameter represents the value of time expressed in s.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 120s is returned as 1.200000e+002.

Example:

Time 60s:

EDC:TIME 60

Notes:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:CONS(?) <DNPD>

This command sets number of pulses per one kWh (pulses generated by energy meter).

<DNPD>

Parameter represents the value number of pulses per one kWh.

If query is sent, calibrator returns set value using standard exponential format. Example: 400.0 i/kWh is returned as 4.000000e+002.

Example:

Number of pulses 1000 i/kWh:

EDC:CONS 1000.0

Note:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:TEST:TIME (?) <DNPD>

This command sets test timer in Energy DC mode.

<DNPD>

Parameter represents test time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDC:TEST:TIME 10

Notes:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:TEST:COUN(?) <DNPD>

This command sets test pulse counter in Energy DC mode.

<DNPD>

Parameter represents number of test pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDC:TEST:COUN 10

Notes:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:TEST:FREQ? <DNPD>

This query returns actual frequency generated by tested energy meter.

<DNPD>

Parameter represents measured frequency.

Calibrator returns frequency using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDC:TEST:FREQ?

Notes:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:WUP:TIME (?) <DNPD>

This command sets warm-up timer in Energy DC mode.

<DNPD>

Parameter represents wrm-up time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDC:WUP:TIME 10

Notes:

Command switches the calibrator in Energy DC mode.

[SOUR]:EDC:WUP:COUN(?) <DNPD>

This command sets warm-up pulse counter in Energy DC mode.

<DNPD>

Parameter represents number of warm-up pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDC:WUP:COUN 10

Notes:

Command switches the calibrator in Energy DC mode.

[SOUR]:EACI:ENER?

This query returns the set value of energy using standard exponential format. Example: 100.60 Ws is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:DEV?

This query returns deviation between tested energy meter end the calibrator. Calculation of deviation is based on pulses generated by energy meter. Example: 0.612 % is returned as 6.120000e-001.

Note:

Query switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:POW?

This query returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy AC high current mode.

[SOUR]:EACI[:POW]:UNIT(?) <CPD> { W | VA | VAR }

This command selects units for power in the Energy AC high current mode.

If query is sent, calibrator returns actual units in Energy AC high current mode.

Example:

Select unit W for Energy AC high current mode:

EACI:UNIT W

Note:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:VOLT(?) <DNPD>

This command sets the output voltage value.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

EACI:VOLT 230.5

Note:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:CURR(?) <DNPD>

This command sets the output current value in Energy AC high current mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

EACI:CURR 23.05

Note:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI[:CURR]:PHAS(?) <DNPD>

This command sets the phase angle between voltage and current.

<DNPD>

Represents the phase angle between the output voltage and current in degrees (PHAS:UNIT=DEG), or specified as a value of the power factor (PHAS:UNIT=COS).

If query is sent, calibrator returns the set value of the phase shift between the output voltage and current using standard exponential format. Example: 156.3 ° is returned as 1.563000e+002.

Example: EACI:PHAS 250.2 - sets 250.2° phase shift between the output voltage and current

(PHAS:UNIT=DEG) EACI:PHAS? - the calibrator returns 2.502000e+002

Example: EACI:PHAS 0.554 – sets power factor 0.554

(PHAS:UNIT=COS) EACI:PHAS? - the calibrator returns 5.540000e-001,LAG

Note:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI[:CURR]:POLarity(?) <CPD> { LEAD | LAG }

This command sets the polarity of phase angle between voltage and current. Command is valid only for PHAS:UNIT=DEG.

<CPD>

Represents the polarity of phase angle between the output voltage and current.

If query is sent, calibrator returns the polarity of the phase angle between the output voltage and current.

Example:

EACI:POL LEAD sets the phase angle polarity to Lead

Note:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:FREQ(?) <DNPD>

This command sets the frequency in Energy AC high current mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

EACI:FREQ 60

Notes:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:CONT(?) <CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 | FR1 | FR2 | FR3}

This command selects energy counting control mode.

<CPD>

represents the control mode of energy counting.

- PACK – Packet mode energy counting is controlled by time to deliver specific “Packet” of energy
- CNT1 – energy counting mode is controlled by pulses on input 1
- CNT2 – energy counting mode is controlled by pulses on input 2
- TIM1 – energy timer mode is controlled by pulses on input 1
- TIM2 – energy timer mode is controlled by pulses on input 2
- FR1 – frequency measuring on input 1
- FR2 – frequency measuring on input 2
- FR3 – frequency measuring on multimeter input V/COM

If query is sent, calibrator returns the selected control mode.

Example:

EACI:CONT PACK selects the Packet control mode which is controlled by time

Note:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:TIME(?) <DNPD>

This command sets the time in Energy AC high current “Packet” control mode.

<DNPD>

Parameter represents the value of time expressed in s.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 120s is returned as 1.200000e+002.

Example:

Time 60s:

EACI:TIME 60

Notes:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:CONS(?) <DNPD>

This command sets number of pulses per selected unit (pulses generated by energy meter).

<DNPD>

Parameter represents the value number of pulses per selected unit.

If query is sent, calibrator returns set value using standard exponential format. Example: 400.0 i/kWh is returned as 4.000000e+002.

Example:

Number of pulses 1000 i/kVArh:

EACI:CONS 1000.0

EACI:UNIT VAR

Note:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:TEST:TIME (?) <DNPD>

This command sets test timer in Energy AC high current mode.

<DNPD>

Parameter represents test time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EACI:TEST:TIME 10

Notes:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:TEST:COUN(?) <DNPD>

This command sets test pulse counter in Energy AC high current mode.

<DNPD>

Parameter represents number of test pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EACI:TEST:COUN 10

Notes:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:TEST:FREQ? <DNPD>

This query returns actual frequency generated by tested energy meter.

<DNPD>

Parameter represents measured frequency.

Calibrator returns frequency using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EACI:TEST:FREQ?

Notes:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:WUP:TIME (?) <DNPD>

This command sets warm-up timer in Energy AC high current mode.

<DNPD>

Parameter represents wrm-up time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EACI:WUP:TIME 10

Notes:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EACI:WUP:COUN(?) <DNPD>

This command sets warm-up pulse counter in Energy AC high current mode.

<DNPD>

Parameter represents number of warm-up pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EACI:WUP:COUN 10

Notes:

Command switches the calibrator in Energy AC high current mode.

[SOUR]:EDCI:ENER?

This query returns the set value of energy using standard exponential format. Example: 100.60 Ws is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:DEV?

This query returns deviation between tested energy meter end the calibrator. Calculation of deviation is based on pulses generated by energy meter. Example: 0.612 % is returned as 6.120000e-001.

Note:

Query switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:POW?

This query returns the set value of power using standard exponential format. Example: 100.60 W is returned as 1.006000e+002.

Note:

Query switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:VOLT(?) <DNPD>

This command sets the output voltage value.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

EDCI:VOLT 230.5

Note:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:CURR(?) <DNPD>

This command sets the output current value in Energy DC high current mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

EDCI:CURR 23.05

Note:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:CONT(?) <CPD> { PACK | CNT1 | CNT2 | TIM1 | TIM2 | FR1 | FR2 | FR3}

This command selects energy counting control mode.

<CPD>

represents the control mode of energy counting.

- PACK – Packet mode energy counting is controlled by time to deliver specific “Packet” of energy
- CNT1 – energy counting mode is controlled by pulses on input 1
- CNT2 – energy counting mode is controlled by pulses on input 2
- TIM1 – energy timer mode is controlled by pulses on input 1
- TIM2 – energy timer mode is controlled by pulses on input 2
- FR1 – frequency measuring on input 1
- FR2 – frequency measuring on input 2
- FR3 – frequency measuring on multimeter input V/COM

If query is sent, calibrator returns the selected control mode.

Example:

EDCI:CONT PACK selects the Packet control mode which is controlled by time

Note:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:TIME(?) <DNPD>

This command sets the time in Energy DC high current “Packet” control mode.

<DNPD>

Parameter represents the value of time expressed in s.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 120s is returned as 1.200000e+002.

Example:

Time 60s:

EDCI:TIME 60

Notes:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:CONS(?) <DNPD>

This command sets number of pulses per one kWh (pulses generated by energy meter).

<DNPD>

Parameter represents the value number of pulses per one kWh.

If query is sent, calibrator returns set value using standard exponential format. Example: 400.0 i/kWh is returned as 4.000000e+002.

Example:

Number of pulses 1000 i/kWh:

EDCI:CONS 1000.0

Note:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:TEST:TIME (?) <DNPD>

This command sets test timer in Energy DC high current mode.

<DNPD>

Parameter represents test time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDCI:TEST:TIME 10

Notes:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:TEST:COUN(?) <DNPD>

This command sets test pulse counter in Energy DC high current mode.

<DNPD>

Parameter represents number of test pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDCI:TEST:COUN 10

Notes:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:TEST:FREQ? <DNPD>

This query returns actual frequency generated by tested energy meter.

<DNPD>

Parameter represents measured frequency.

Calibrator returns frequency using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDCI:TEST:FREQ?

Notes:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:WUP:TIME (?) <DNPD>

This command sets warm-up timer in Energy DC high current mode.

<DNPD>

Parameter represents wrm-up time when pulses are counted.

If query is sent, calibrator returns the value of time using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDCI:WUP:TIME 10

Notes:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:EDCI:WUP:COUN(?) <DNPD>

This command sets warm-up pulse counter in Energy DC high current mode.

<DNPD>

Parameter represents number of warm-up pulses to be counted.

If query is sent, calibrator returns number of pulse counts using standard exponential format. Example: 20 is returned as 2.000000e+001.

Example:

EDCI:WUP:COUN 10

Notes:

Command switches the calibrator in Energy DC high current mode.

[SOUR]:VAC:VOLT(?) <DNPD>

This command sets the output voltage value in Voltage AC mode.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

VAC:VOLT 230.5

Note:

Command switches the calibrator in Voltage AC mode.

[SOUR]:VAC:FREQ(?) <DNPD>

This command sets the frequency in Voltage AC mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

VAC:FREQ 60

Notes:

Command switches the calibrator in Voltage AC mode.

[SOUR]:VDC:VOLT(?) <DNPD>

This command sets the output voltage value in Voltage DC mode.

<DNPD>

Parameter represents the value of the output voltage expressed in V.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 110.12 V is returned as 1.101200e+002.

Example:

Voltage 230.5V:

VDC:VOLT 230.5

Note:

Command switches the calibrator in Voltage DC mode.

[SOUR]:CAC:CURR(?) <DNPD>

This command sets the output current value in Current AC mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

CAC:CURR 23.05

Note:

Command switches the calibrator in Current AC mode.

[SOUR]:CAC:FREQ(?) <DNPD>

This command sets the frequency in Current AC mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

CAC:FREQ 60

Notes:

Command switches the calibrator in Current AC mode.

[SOUR]:CDC:CURR(?) <DNPD>

This command sets the output voltage value in Current DC mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

CDC:CURR 23.05

Note:

Command switches the calibrator in Current DC mode.

[SOUR]:CACI:CURR(?) <DNPD>

This command sets the output current value in Current AC high current mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output current using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

CACI:CURR 23.05

Note:

Command switches the calibrator in Current AC high current mode.

[SOUR]:CACI:FREQ(?) <DNPD>

This command sets the frequency in Current AC high current mode.

<DNPD>

Parameter represents the value of frequency expressed in Hz.

If query is sent, calibrator returns the value of frequency using standard exponential format. Example: 50Hz is returned as 5.000000e+001.

Example:

Frequency 60Hz:

CACI:FREQ 60

Notes:

Command switches the calibrator in Current AC high current mode.

[SOUR]:CDCI:CURR(?) <DNPD>

This command sets the output voltage value in Current DC high current mode.

<DNPD>

Parameter represents the value of the output current expressed in A.

If query is sent, calibrator returns the value of output voltage using standard exponential format. Example: 11.012 A is returned as 1.101200e+001.

Example:

Current 23.05A:

CDCI:CURR 23.05

Note:

Command switches the calibrator in Current DC high current mode.

SYSTem subsystem

The subsystem enables to control various functions from the MENU.

SYSTem

:DATE(?)	<DNPD>,<DNPD>,<DNPD>
:TIME(?)	<DNPD>,<DNPD>,<DNPD>
:ERRor?	
:REMote	
:RWLock	
:LOCal	

SYST:DATE(?) <DNPD>,<DNPD>,<DNPD>

This command sets system date of the calibrator.

<DNPD>,<DNPD>,<DNPD>

Represents date in format YYYY, MM, DD.

If query is sent, calibrator returns current value of system date in format YYYY,MM,DD.

where YYYY = year (2000..2099)

MM = month (01..12)

DD = day (01..31)

SYST:TIME(?) <DNPD>,<DNPD>,<DNPD>

This command sets time of the calibrator.

<DNPD>,<DNPD>,<DNPD>

Represents time in format HH,MM,SS.

If query is sent, calibrator returns current value of system time in format HH,MM,SS.

where HH = hour (00..23)

MM = minute (00..59)

SS = second (00..59)

SYST:ERR?

Query the multimeter's error queue. Detected errors are placed in the queue. This query returns the first error from the queue. The queue is type "first in, first out". The error is deleted after reading.

The response is in the form of 'String Program Data', and consists of two elements: a code number and error message.

If all errors are read calibrator returns message 0,"No Error".

In case of overflow the error queue the last error in the queue is –350,"Queue overflow". Also the earliest errors remain in the queue, and the most recent error is discarded.

Example:

SYST:ERR?

SYST:REM

This command places the calibrator in the remote mode for RS232 or Ethernet operation. All keys on the front panel, except the LOCAL key, are disabled.

Note:

It is not possible to send or receive data over RS232 or Ethernet when the calibrator is not in remote mode.

SYST:RWL

This command places the calibrator in the remote mode for RS232 or Ethernet operation. All keys on the front panel, including the LOCAL key, are disabled.

SYST:LOC

This command returns the calibrator in the local mode. This command is for RS232 and Ethernet interfaces.

STATus subsystem

This subsystem is used to enable bits in the Operation and Questionable Event registers. The Operation and Questionable: Event, Enable and Condition registers can be interrogated to determine their state.

STATus

:OPERational

:EVENt?

:ENABle(?) <DNPD>

:CONDition?

:QUEStionable

:EVENt?

:ENABle(?) <DNPD>

:CONDition?

:PRESet

STAT:OPER:EVEN?

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.

Example:

STAT:OPER:EVEN?

STAT:OPER:ENAB? <DNPD>

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.

<DNPD>

Parameter represents required value of Operational Data Enable register.

If query is sent, calibrator returns the value of the registr as a decimal number. Example: 64 is returned as 64.

Example:

Set bit 1 in the Operational Data Enable register (other bits are 0):

STAT:OPER:ENAB 2

STAT:OPER:COND?

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.

Example:

STAT:OPER:COND?

STAT:QUES:EVEN?

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.

Example:

STAT:QUES:EVEN?

STAT:QUES:ENAB? <DNPD>

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.

<DNPD>

Parameter represents required value of Questionable Data Enable register.

If query is sent, calibrator returns the value of the register as a decimal number. Example: 64 is returned as 64.

Example:

Set bit 1 in the Questionable Data Enable register (other bits are 0):

STAT:QUES:ENAB 2

STAT:QUES:COND?

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.

Example:

STAT:QUES:COND?

STAT:PRES

This command clears all bits in the Operation Data Enable register and in the Questionable Data Enable register.

Example:

STAT:PRES

IEEE488.2 Common Commands

I/D (instrument identification)

***IDN?**

This command returns the identification of the manufacturer, model, serial number and firmware revision.

The reply is formatted as follows:

MEATEST,M133C,100002,1.22

Operation complete

***OPC**

This command sets the OPC bit in the ESR (Event Status Register) when all pending operations are complete.

Operation complete?

***OPC?**

This command returns "1" to the output queue after all pending operations are complete.

Option identification?

***OPT?**

This command return the instrument's hardware fitment.

The reply is formatted as follows:

1,a2,a3,0,0,0,0

Where:

1 .. indicates that the main unit (channel #1) is fitted –must be

a1 … indicates that additional unit (channel #2) is fitted

a2 … indicates that additional unit (channel #3) is fitted

0 … position reserved for future use.

a1 = 0 … unit channel #2 is not fitted

a1 = 1 … unit channel #2 is fitted

a2 = 0 … unit channel #3 is not fitted

a2 = 1 … unit channel #3 is fitted

Wait-to-Continue command

***WAI**

Prevents the instrument from executing any further commands or queries until all previous remote commands have been executed.

Reset

***RST**

This command resets the calibrator to its initial status.

Test operation

***TST?**

This command launches an internal self-test. Return the self-test result ("0" for pass or "1" for fail).

Status byte reading

***STB?**

This query returns number in range 0 to 255 with information about content of register STB, which carries the MSS bit status.

Service Request Enable

***SRE <value>**

This command sets condition of the Service Request Enable register. Since bit 6 is not used, the maximum value is 191.

Service Request Enable reading

***SRE?**

This query returns the Service Request Enable Register number.

Event Status Register reading

***ESR?**

This query returns the contents of the Event Status Register and clears the register.

Event Status Enable setting

***ESE <value>**

This command programs the Event Status Enable register bits. Parameter "value" is number in range 0 – 255.

Event Status Enable reading

***ESE?**

This query returns the Event Status Enable register.

Clear status

***CLS**

This command clears the Event Status Register and the Status Byte Register except the MAV bit and output queue. Output line is not reset.

5. Revisions

5.1. Change 1:

Parameter	Original	Updated	
OUTPut subsystem	---	OUTPut subsystem	Chapter 4.
OUTP:VFC	---	OUTP:VFC(?) <CPD> { OFF | ON | 0 | 1 }	Chapter 4.

5.2. Change 2:

Parameter	Original	Updated	
OUTPut subsystem	---	OUTP:CURC:USER(?) <DNPD>	Chapter 4.