B+K PRECISION®

Model: 9833

PROGRAMMING MANUAL

Version 1

Notations

TEXT – Denotes a softkey.
$\boxed{\text{TEXT}}$ – Denotes a front panel button.

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1. Remote Interfaces

A. RS488.2 - GPIB
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2. SCPI Commands

General syntax for SCPI commands or query is a ":" (colon) separated string with either a "?" or an argument following the command string separated by a SPACE character. Commands are terminated by the linefeed character (0x10, "\n"). Arguments are listed using "< ARG | ARG | … >" in the following descriptions. The "ARG" will be from the following:

Symbol	Format
<NR1>	Number with an implicit decimal point at the end. Ex. 100
<NRf>	Number with an explicit decimal point. Ex. 100.5
<Boolean>	Boolean value. Ex. 0 | OFF | 1 | ON
<STR>	Named value. Ex. "phase"

Most commands have a long and short format, the capitalized portion of the name is the short form, and the complete name is the long form. For example, the FETch can be sent as either "fet" or fetch. Short and long forms may be mixed in a command string. An optional portion of a command is shown within "[ ]".

E. Example query command – Read the serial number

"

XX.XX SYStem

XX.XX.YY SERial?

"

This command is in the SYStem section of the SCPI command set. The command is a "query" command and will return a string containing the serial number. As a "query" it must end with a "?" character. The value returned will be terminated by 2 characters "\r" "\n" (0x0D 0x0A).

Command string: "sys:ser?\n" OR "system:serial?\n" OR "sys:serial?\n" etc…

F. Example value set command

"

XX.XX SYStem

XX.XX.YY SERial?

"

G. Example value set command

"

XX.XX SYStem

XX.XX.YY SERial?

"

H. FETCh | MEASure

1. Command Summary

The following commands use either FETCH or MEASURE as the root. For example, "FETCH:FREQ?", and "MEASURE:FREQ?" are equivalent. Fetch and Measure function identically, they trigger measurement and return the value measured.

MEASure:VOLTage:AC?
MEASure:VOLTage:DC?
MEASure:CURRent:AC?
MEASure:CURRent:DC?
MEASure:CURRent:CREStfactor?
MEASure:CURRent:INRush?
MEASure:CURRent:PEAK:POSitive?
MEASure:CURRent:PEAK:NEGative?
MEASure:POWer:AC:REAL?
MEASure:POWer:ACAPParent?
MEASure:POWer:AC:REACtive?
MEASure:POWer:AC:PFACtor?

2. FETCh:VOLTage:AC? - MEASure:VOLTage:AC?

Description	Query the RMS AC voltage.
Query Syntax	FETCh:VOLTage:AC? - MEASure:VOLTage:AC?
Returned Parameters	<NRf>
	Value: 0-300V or 0-150V depending on the range setting.
Related Commands	[SOURce]:VOLTage:AC

3. FETCh:VOLTage:DC? – MEASure:VOLTage:DC?

Description	Query the DC voltage.

Query Syntax FETCh:VOLTage:DC? – MEASure:VOLTage:DC?

Returned Parameters <NR1>

Value: -424 to 424 or -212 to 212 depending on the range setting.

Related Commands [SOURce]:VOLTage:DC

4. *FETCh:CURRent:AC? – MEASure:CURRent:AC?*

Description Query the AC current (Amps).

Query Syntax FETCh:CURRent:AC? – MEASure:CURRent:AC?

Returned Parameters <NRf>

Value: Returns a floating point number.

Related Commands OUTPut:LIMit:CURRent

5. *FETCh:CURRent:DC? – MEASure:CURRent:DC?*

Description Query the DC current being delivered.

Query Syntax FETCh:CURRent:DC? – MEASure:CURRent:DC?

Returned Parameters <NRf>

Value: A floating point

Related Commands [SOURce]:VOLTage:DC,
OUTPut:LIMit:VOLTage:DC:POSitive,
OUTPut:LIMit:VOLTage:DC:NEGative

6. *FETCh:CURRent:CREStfactor? – MEASure:CURRent:CREStfactor?*

Description Query the Crest Factor measured by the unit.

Query Syntax FETCh:CURRent:CREStfactor?
MEASure:CURRent:CREStfactor?

Returned Parameters <NRf>

7. FETCh:CURRent:INRush? – MEASure:CURRent:INRush?

Description Query the measured inrush current delivered to the load.

Note Value valid only when the supply output is on. Disabling output clears the value and returns 0.000000.

Query Syntax FETCh:CURRent:INRush?

MEASure:CURRent:INRush?

Returned Parameters <NRf>

Related Commands source:current:inrush:start

source:current:inrush:interval

8. FETCh:CURRent:PEAK:POSitive? – MEASure:CURRent:PEAK:POSitive?

Description Query the positive peak current delivered to the load.

Note This is the present value at the time the command is issued.

Query Syntax FETCh:CURRent:PEAK:POSitive?

MEASure:CURRent:PEAK:POSitive?

Returned Parameters <NRf>

9. FETCh:CURRent:PEAK:NEGative? – MEASure:CURRent:PEAK:NEGative?

Description Query the negative peak current delivered to the load.

Note This is the present value at the time the command is issued.

Query Syntax FETCh:CURRent:PEAK:NEGative?

MEASure:CURRent:PEAK:NEGative?

Returned Parameters <NRf>

10. FETCh:FREQuency? – MEASure:FREQuency?

Description Query the frequency at the output.

Query Syntax FETCh:FREQuency?

MEASure:FREQuency?

Returned Parameters <NRf>

Related Commands [SOURce]:FREQuency

11. FETCh:POWer:AC:REAL? – MEASure:POWer:AC:REAL?

Description Query the real component of the power consumed by the load.

Query Syntax FETCh:POWer:AC:REAL?

MEASure:POWer:AC:REAL?

Returned Parameters <NRf>

12. FETCh:POWer:AC:APParent? – MEASure:POWer:AC:APParent?

Description Query the apparent power consumed by the load.

Query Syntax FETCh:POWer:AC:APParent?

MEASure:POWer:AC:APParent?

Returned Parameters <NRf>

13. FETCh:POWer:AC:REACtive? – MEASure:POWer:AC:REACtive?

Description Query the reactive power consumed by the load.

Query Syntax FETCh:POWer:AC:REACtive?

MEASure:POWer:AC:REACtive?

Returned Parameters <NRf>

14. FETCh:POWer:AC:PFACtor? – MEASure:POWer:AC:PFACtor?

Description Query the power factor of the output.

Query Syntax FETCh:POWer:AC:PFACtor?

MEASure:POWer:AC:PFACtor?

Returned Parameters <NRf>

I. OUTPut

This is some text that describes the section.

1. Command Summary

OUTPut[:STATe]
OUTPut:MODe
OUTPut:PROTection:CLEar
OUTPut:LIMit:VOLTage:AC
OUTPut:LIMit:VOLTage:DC:POSitive
OUTPut:LIMit:VOLTage:DC:NEGative
OUTPut:LIMit:CURRent
OUTPut:LIMit:CURRent:DELay
OUTPut:LIMit:POWer

2. OUTPut:[STATe]

Description Turn the OUTPut on or off, or query the present state.

Command Syntax OUTPut[:STATe] <Bool>

Parameters 0 | OFF | 1 | ON

Examples OUTP on

Query Syntax OUTPut:[STATe]?

Returned Parameters <STR>

Returns the string “ON” or “OFF”

3. OUTPut:MODe

Description Set or query the waveform operation to output.

Use this to switch between normal output mode or to run one of the other programmatic modes.

Command Syntax OUTPut:MODe <STR>

Parameters NORMal | STEP | LIST | PULSE

Examples OUTP:MOD step

Query Syntax OUTPut:MODe?

Returned Parameters <STR>

"NORMal", "STEP", "LIST", "PULSE"

4. OUTPut:PROTection:CLEar

Description Reset the protection state in the event of a protection fault. When a limit is reached, the output will turn off and the alarm will sound. This command clears the alarm.

Command Syntax OUTPut:PROTection:CLEar

Parameters None

Examples output:prot:cle

5. OUTPut:LIMit:VOLTage:AC

Description Set or query the AC voltage limit.

Note This limit applies to AC and AC+DC modes and limits based on the RMS output voltage.

Command Syntax OUTPut:LIMit:VOLTage:AC <NR2>

Parameters Output voltage limit as a floating point number. 310V for example.

Examples outp:lim:volt:ac 310

Query Syntax OUTPut:LIMit:VOLTage:AC?

Returned Parameters <NR2>

Example: 310.000000

6. OUTPut:LIMit:VOLTage:DC:POSitive

Description Set or query the upper DC voltage limit.

Command Syntax OUTPut:LIMit:VOLTage:DC:POSitive <NR2>

Parameters Positive voltage limit

Examples output:limit:voltage:dc:positive 125

Query Syntax OUTPut:LIMit:VOLTage:DC:POSitive?

Returned Parameters <NR2>

Example: 125.000000

7. *OUTPut:LIMit:VOLTage:DC:NEGative*

Description Set or query the lower DC voltage limit.

Command Syntax OUTPut:LIMit:VOLTage:DC:NEGative <NR2>

Parameters Negative voltage limit

Examples OUTP:LIM:VOLT:DC:NEG -100

Query Syntax OUTPut:LIMit:VOLTage:DC:NEGative?

Returned Parameters <NR2>

8. *OUTPut:LIMit:CURRent*

Description Set or query the current limit in amps.

Command Syntax OUTPut:LIMit:CURRent <NR2>

Examples OUTP:LIM:CURR 12.34

Query Syntax OUTPut:LIMit:CURRent?

Returned Parameters <NR2>

9. *OUTPut:LIMit:CURRent:DELay*

Description Set the delay, in milliseconds, for triggering output protection.

Command Syntax OUTPut:LIMit:CURRent:DELay <NR2>

Parameters <NR2>

	0-10000ms
Examples	OUTPut:LIMit:CURRent:DEL 133
Query Syntax	OUTPut:LIMit:CURRent:DELay?
Returned Parameters	<NR1>
Related Commands	OUTPut:LIMit:CURRent

10. OUTPut:LIMit:POWer

Description	Set or query the OUTPut power limit in watts.
Command Syntax	OUTPut:LIMit:POWer <NR2>
Parameters	0 to 3300 depending on unit.
Examples	OUTP:LIM:POW 3300
Query Syntax	OUTPut:LIMit:POWer?
Returned Parameters	<NR2>

J. [SOURce]

1. Command Summary

[SOURce]:VOLTage:RANGe
[SOURce]:VOLTage:AC
[SOURce]:VOLTage:DC
[SOURce]:CURRent:INRush:STARt
[SOURce]:CURRent:INRush:INTerval
[SOURce]:FREQuency
[SOURce]:SYNChronous
[SOURce]:PHASe
[SOURce]:CONFigure:COUPling
[SOURce]:CONFigure:TIMer[:STATe]
[SOURce]:CONFigure:TIMer:COUNt
[SOURce]:CONFigure:EXTernal
[SOURce]:CONFigure:INHibit
[SOURce]:CONFigure:TRANSient
[SOURce]:STEP:VOLTage:AC
[SOURce]:STEP:VOLTage:DC
[SOURce]:STEP:DVOLtage:AC
[SOURce]:STEP:DVOLtage:DC

2. *[SOURce]:VOLTage:RANGe*

Description Set the voltage range to HIGH (300V) or LOW (150V).

Command Syntax [SOURce]:VOLTage:RANGe <STR>

Parameters <HIGH | LOW>

Examples sour:volt:rang high

Query Syntax [SOURce]:VOLTage:RANGe?

Returned Parameters <STR>

"HIGH" or "LOW"

3. *[SOURce]:VOLTage:AC*

Description Set or query the AC voltage OUTPut.

Command Syntax [SOURce]:VOLTage:AC <NR2>

Parameters 0-150, 0-300

Examples SOUR:VOLT:AC 110.0

Query Syntax [SOURce]:VOLTage:AC?

Returned Parameters <NR2>

Related Commands OUTPut:LIMit:VOLTage:AC

4. *[SOURce]:VOLTage:DC*

Description Set or query the DC OUTPut voltage setting in Volts.

Command Syntax [SOURce]:VOLTage:DC <NR2>

Parameters 0 to ±212, 0 to ±424

Examples SOUR:VOLT:DC -100

Query Syntax SOUR:VOLT:DC?

Returned Parameters <NR2>

Related Commands OUTPut:LIMit:VOLTage:DC:NEGative

OUTPut:LIMit:VOLTage:DC:POSitive

5. *[SOURce]:CURRent:INRush:STARt*

Description Set or query the start time for measuring the inrush current being supplied. Parameter is the delay in milliseconds.

Command Syntax [SOURce]:CURRent:INRush:STARt <NR1>

Parameters 0-10000

Examples SOUR:CURR:INR:STARt 300

Query Syntax [SOURce]:CURRent:INRush:STARt?

Returned Parameters <NR1>

6. *[SOURce]:CURRent:INRush:INTerval*

Description This sets the duration of the inrush current measurement.

Command Syntax [SOURce]:CURRent:INRush:INTerval <NR1>

Parameters 0-10000

Examples SOUR:CURR:INR:INT 200

Query Syntax [SOURce]:CURRent:INRush:INTerval?

Returned Parameters <NR1>

7. *[SOURce]:FREQuency*

Description Set or query the AC OUTPut frequency.

Command Syntax [SOURce]:FREQuency <NR2>

Parameters 43-1200.000000

Examples Sour:frequency 60

Query Syntax [SOURce]:FREQuency?

Returned Parameters <NR2>

8. *[SOURce]:SYNChronous*

Description Set or query the synchronization [SOURce] for starting waveform OUTPut. Phase mode starts the waveform starts at a specified point in a cycle with the positive going zero cross being 0 degrees.

Command Syntax [SOURce]:SYNChronous <STR>

Parameters <IMMediate | PHASe>

Examples sync phase

Query Syntax [SOURce]:SYNChronous?

Returned Parameters <STR>

"PHASe" or "IMMediate"

Related Commands [SOURce]:PHASe

9. [SOURce]:PHASe

Description When "[SOURce]:SYNChronous" is set to phase, this command sets or queries the phase angle to use. Value is in degrees.

Command Syntax [SOURce]:PHASe <NR2>

Parameters 0-359.7

Examples sour:phase 45.0

Query Syntax [SOURce]:PHASe?

Returned Parameters <NR2>

Related Commands [SOURce]:SYNChronous

10. [SOURce]:CONFigure:COUPling

Description When using the "Digital IO" and the "Level" function, this sets or queries which mode to use. "AC" will vary the OUTPut AC amplitude according to the "Level" voltage supplied. When in "DC", this varies the DC voltage of the OUTPut via the "Level" voltage supplied. "AC/DC" is not used in "Level" mode.

When not in "Level" mode, this changes the set of values settable by the front panel for user input. AC mode allows setting of the AC amplitude, DC, the DC voltage and AC/DC allows for both.

Command Syntax [SOURce]:CONFigure:COUPling <STR>

Parameters <AC | DC | ACDC>

Examples source:configure:coup AC

Query Syntax [SOURce]:CONFigure:COUPling?

Returned Parameters <STR>

"AC", "DC", "ACDC"

11. [SOURce]:CONFigure:TIMer[:STATe]

Description This enables or disables the OUTPut countdown timer.

Note When this is active, the display of the timer on the unit's display changes from a count up timer to a countdown timer.

Command Syntax [SOURce]:CONFigure:TIMer[:STATe] <BOOL>

Parameters 0, "OFF", 1, "ON"

Parameter may be sent as any of the above forms.

Examples sour:conf:tim on

Query Syntax [SOURce]:CONFigure:TIMer[:STATe]?

Returned Parameters "OFF" or "ON"

Related Commands [SOURce]:CONFigure:TIMer:COUNt

12. [SOURce]:CONFigure:TIMer:COUNt

Description This sets or queries the value of the countdown timer. The format is in Hours,Minutes,Seconds.

Note The return value of this command has a bug currently and drops the 1's digit of the seconds field.

Command Syntax [SOURce]:CONFigure:TIMer:COUNt <NR1,NR1,NR1>

Parameters The countdown timer time in hours, minutes and seconds.

Examples sour:conf:tim:count 0,0,30

This sets the output to turn off 30 seconds after it is turned on.

Query Syntax [SOURce]:CONFigure:TIMer:COUNt?

Returned Parameters "hours,mins,seconds"

example: "00,00,3" for 0 hours, 0 mins and 33 seconds

Related Commands [SOURce]:CONFigure:TIMer[:STATe]

13. [SOURce]:CONFigure:EXTernal

Description Set or query the use of the external signal inputs. Off will disable external input, and Level or AMP modes use the Digital IO and BNC connectors respectively.

Command Syntax [SOURce]:CONFigure:EXTernal <NR1/STR>

Parameters <0 | OFF | 1 | LEVEL | 2 | AMP>

0 or Off to disable external control.

1 or Level to use the level control signal on the Digital IO connector to control the AC or DC level, depending on the output coupling mode.

2 or AMP to use the Amplifier mode via the BNC connector.

Examples sour:conf:ext amp

Query Syntax [SOURce]:CONFigure:EXTernal?

Returned Parameters <Bool>

"OFF" or "ON"

Related Commands [SOURce]:CONFigure:INHibit

[SOURce]:CONFigure:TRANSient

14. [SOURce]:CONFigure:INHibit

Description Set or query the state of the "inhibit" function. When enabled, the state of the "inhibit" pin of the Digital IO is used. See the user manual for more information as this function is rather complex.

Command Syntax [SOURce]:CONFigure:INHibit <Bool>

Parameters <ON | OFF>

Examples sour:conf:inh off

Query Syntax [SOURce]:CONFigure:INHibit?

Returned Parameters <Bool>

"OFF" or "ON"

Related Commands [SOURce]:CONFigure:EXTernal

15. [SOURce]:CONFigure:TRANSient

Description Enable or disable the "Trans" pin OUTPut of the Digital IO, or query whether it is enabled.

Command Syntax [SOURce]:CONFigure:TRANSient <Bool>

Parameters <ON | OFF>

Examples [SOURce]:configure:transient on

Query Syntax [SOURce]:CONFigure:TRANSient?

Returned Parameters <Bool>

"ON" or "OFF"

Related Commands [SOURce]:CONFigure:EXTernal

16. [SOURce]:STEP:VOLTage:AC

Description Set or query the starting AC voltage amplitude in STEP mode.

Command Syntax [SOURce]:STEP:VOLTage:AC <NR2>

Parameters 0 to 150, 0 to 300

Examples sour:step:volt:ac 125

Query Syntax [SOURce]:STEP:VOLTage:AC?

Returned Parameters <NR2>

Related Commands [SOURce]:STEP:DVOLtage:AC

17. [SOURce]:STEP:VOLTage:DC

Description Set or query the starting DC voltage value in STEP mode.

Command Syntax [SOURce]:STEP:VOLTage:DC <NR2>

Parameters 0 to ±212, 0 to ±424

Examples [SOURce]:step:volt:dc 35

Query Syntax [SOURce]:STEP:VOLTage:DC?

Returned Parameters <NR2>

Related Commands [SOURce]:STEP:DVOLtage:DC

18. [SOURce]:STEP:DVOLtage:AC

Description Set or query the change in AC voltage magnitude per individual step in a step sequence.

Note This is the change in AC output voltage between steps. The change can be increasing (positive), decreasing (negative) or zero.

Command Syntax [SOURce]:STEP:DVOLtage:AC <NR2>

Parameters 0 to 150, 0 to 300

Examples Step the AC voltage up 20V per step:

step:dvol:ac 20

Step the AC voltage down 11.5V per step:

step:dvol:ac -11.5

Query Syntax [SOURce]:STEP:DVOLtage:AC?

Returned Parameters <NR2>

Related Commands [SOURce]:STEP:VOLTage:AC

19. [SOURce]:STEP:DVOLtage:DC

Description Set or query the change in DC voltage per individual step in a step sequence.

Note This is the change in DC output voltage between steps. The change can be increasing (positive), decreasing (negative) or zero.

Command Syntax [SOURce]:STEP:DVOLtage:DC <NR2>

Parameters 0 to ±212, 0 to ±424

Examples step:dvol:dc 20

Query Syntax [SOURce]:STEP:DVOLtage:DC?

Returned Parameters <NR2>

Related Commands [SOURce]:STEP:VOLTage:DC

20. [SOURce]:STEP:FREQuency

Description Set or query the starting AC voltage frequency for the step sequence.

Command Syntax [SOURce]:STEP:FREQuency <NR2>

Parameters 43-1200

Examples sour:step:freq 50

Query Syntax [SOURce]:STEP:FREQuency?

Returned Parameters <NR2>

Related Commands [SOURce]:STEP:DFREQuency

21. [SOURce]:STEP:DFREQuency

Description Set or query the change in AC frequency per individual step in a step sequence.

Note This is the change in AC output frequency between steps. The change can be increasing (positive), decreasing (negative) or zero.

Command Syntax [SOURce]:STEP:DFREQuency <NR2>

Parameters 43-1200

Examples step:drfeq 10

Query Syntax [SOURce]:STEP:DFREQuency?

Returned Parameters <NR2>

Related Commands [SOURce]:STEP:FREQuency

22. [SOURce]:STEP:TIMe

Description Set or query the total time for the step sequence. The individual step duration is a division of the step time and step number (time/number=(time per individual change)).

Command Syntax [SOURce]:STEP:TIMe <NR2>

Parameters 0-100000

Examples sour:step:tim 2000

Query Syntax [SOURce]:STEP:TIMe?

Returned Parameters <NR1>

23. [SOURce]:STEP:COUNt

Description Set or query the total number or steps to run in a step sequence.

Note Using many steps can help to simulate a sweep.

Command Syntax [SOURce]:STEP:COUNt <NR1>

Parameters 1-99

Examples step:count 45

Query Syntax [SOURce]:STEP:COUNt?

Returned Parameters <NR1>

Related Commands [SOURce]:STEP:TIMe

24. [SOURce]:STEP:SYNChronous

Description	Set or query the phase synchronization mode of the individual steps within the step sequence.
Command Syntax	[SOURce]:STEP:SYNChronous <Bool/Str>
Parameters	<0 | IMMediate | 1 | PHASe>
Examples	sour:step:sync phase
Query Syntax	[SOURce]:STEP:SYNChronous?
Returned Parameters	<STR> "IMMediate" or "PHASe"
Related Commands	[SOURce]:STEP:PHASe

25. [SOURce]:STEP:PHASe

Description	Set or query the phase of the individual steps within the step sequence when using phase synchronization mode.
Note	When a step occurs, the angle of the waveform relative to the positive going zero cross is the start point.
Command Syntax	[SOURce]:STEP:PHASe <NR2>
Parameters	0-359.7
Examples	source:step:phase 60
Query Syntax	[SOURce]:STEP:PHASe?
Returned Parameters	<NR2>
Related Commands	[SOURce]:STEP:SYNChronous

26. List mode programming

Programming and reading list programs entails a sequence of steps to first pick the list, then write or read values to the list.
Writing list programs to the machine:

1. Write - [SOURce]:LIST:NUMber 0

2. Write – [SOURce]:LIST:CONF:WRITE 0,5,0,0,0,0,0
    a. Alternatively, the individual fields may be written
        - i. [SOURce]:LIST:BASE
        - ii. [SOURce]:LIST:SYNChronous
        - iii. [SOURce]:LIST:PHASe
        - iv. [SOURce]:LIST:COUNt
3. Write – [SOURce]:LIST:WRITE 1,111,0,0,43,53,1,2,0
    a. Alternatively, the individual fields may be written
    To write the fields, the command sequence must start with a [SOURce]:LIST:STEPno command, enter every parameter, and end with a [SOURce]:LIST:SAVE command. Only then will the data be entered. This is much like the “ADD STEP” button that must be used when entering list steps manually via the front panel.
        - i. [SOURce]:LIST:STEPno
        - ii. [SOURce]:LIST:VOLTage:LEVel:AC:STARt
        - iii. [SOURce]:LIST:VOLTage:LEVel:AC:END
        - iv. [SOURce]:LIST:VOLTage:LEVel:DC:STARt
        - v. [SOURce]:LIST:VOLTage:LEVel:DC:END
        - vi. [SOURce]:LIST:FREQuency:LEVel:STARt
        - vii. [SOURce]:LIST:FREQuency:LEVel:END
        - viii. [SOURce]:LIST:SAVE
4. Write – [SOURce]:LIST:WRITE 0,0,0,0,43,43,1,2,1

Reading list programs from the machine:

1. Write LIST:NUM
2. Query LIST:CONF:STEP?
3. Query LIST:CONF:READ?
4. Write LIST:START:QUERY
5. Query LIST:READ? for each element in the list. Once the list is completely read, further LIST:READ? commands will start at the beginning and repeat the sequence.

27. [SOURce]:LIST:NUMber

Description	Of the 0-9 lists available, this sets or queries which list is being edited.
Command Syntax	[SOURce]:LIST:NUMber <NR1>
Parameters	0 through 9
Examples	list:number 2
Query Syntax	[SOURce]:LIST:NUMber?

Returned Parameters <NR1>

28. LIST:CONF:WRITE

Description Write the configuration values of a list program. This sets the values shown on the main List screen. The following values are set: "Infinite", "Repeat", "Base", "Sync Source", and "Phase".

Note SOURce is not used for this command!

The list number should be set before issuing this command.

Command Syntax LIST:CONF:WRITE <NR1, NR1, NR1, 0, NR1, NR2, 0>

Parameters Parameter number:

1 – Infinite – "0" for off and "1" for on.

2 – Repeat – 0 through 99 times.

3 – Base – "0" for time and "1" for cycle

4 – Not used, set to 0

5 – Sync Source – 0 for "Immediate" and 1 for "Phase"

6 – Phase(deg) floating point number.

7 – Not used, set to 0.

Examples list:conf:write 0,5,0,0,0,0,0

Related Commands [SOURce]:LIST:NUMber

29. [SOURce]:LIST:BASE

Description Set or query the units to use for timing each list entry, either time or cycles.

Command Syntax [SOURce]:LIST:BASE <STR>

Parameters <TIME | CYCLE>

Examples list:base cycle

Query Syntax [SOURce]:LIST:BASE?

Returned Parameters <STR>

"TIME" or "CYCle"

30. [SOURce]:LIST:SYNChronous

Description Set or query the synchronization to use for the start point of the waveform

Command Syntax [SOURce]:LIST:SYNChronous <STR>

Parameters <IMMediate | PHASe>

Examples sour:list:sync phase

Query Syntax [SOURce]:LIST:SYNChronous?

Returned Parameters <STR>

"IMMediate" or "PHASe"

31. [SOURce]:LIST:PHASe

Description When the "SYNChronous" mode is set to phase, this setting determines where in the cycle the step within the list is started. For example, 90 degrees will be at the positive maximum of the AC waveform.

Command Syntax [SOURce]:LIST:PHASe <NR2>

Parameters 0-359.7

Examples list:phase 90

Query Syntax [SOURce]:LIST:PHASe?

Returned Parameters <NR2>

32. [SOURce]:LIST:COUNt

Description Set or query the number of times to repeat the current list.

Command Syntax [SOURce]:LIST:COUNt <NR1>

Parameters 0-99

Examples list:count 11

Query Syntax [SOURce]:LIST:COUNt?

Returned Parameters <NR1>

33. LIST:WRITE

Description This command writes all fields for an individual step in a list program.

Note SOURce is not used for this command!

Command Syntax LIST:WRITE <NR2,NR2,NR1,NR1,NR1,NR1,NR1,NR1,NR1,>

Parameters

1. Volts(rms) Start – 0 to 300
2. Volts(rms) End – 0 to 300
3. Volts (DC) Start – 0 to ±212 or 0 to ±424
4. Volts (DC) End - 0 to ±212 or 0 to ±424
5. Freq. (Hz) Start – 43 to 1200
6. Freq. (Hz) End – 43 to 1200
7. Time (ms) or Cycle – 0 to 999999
8. Steps – 0 to 200
9. Not Used

Examples LIST:WRITE 1,111,0,0,43,53,1,2,0

Related Commands [SOURce]:LIST:VOLTage:LEVel:AC:STARt

[SOURce]:LIST:VOLTage:LEVel:AC:END

[SOURce]:LIST:VOLTage:LEVel:DC:STARt

[SOURce]:LIST:VOLTage:LEVel:DC:END

[SOURce]:LIST:FREQuency:LEVel:STARt

[SOURce]:LIST:FREQuency:LEVel:END

[SOURce]:LIST:STEPno

34. LIST:CONF:STEP?

Description Read the number of steps in the current list.

Note Issue a [SOURce]:LIST:NUM first, to set the list ID to be read.

Query Syntax LIST:CONF:STEP?

Returned Parameters <NR1> The number of steps in the list.

35. LIST:CONF:READ?

Description Read the list configuration for a given list ID. This is the information on the "LIST" menu page set before entering data for individual list program steps.

Query Syntax LIST:CONF:READ?

Returned Parameters <NR1, NR1, NR1, 1, NR1, NR2>

1 – Infinite – "0" for off and "1" for on.

2 – Repeat – 0 through 99 times.

3 – Base – "0" for time and "1" for cycle

4 – No data, always "1"

5 – Sync Source – 0 for "Immediate" and 1 for "Phase"

6 – Phase(deg) floating point number.

Related Commands

36. LIST:READ?

Description Read the individual program steps in the list. Successive issuance of this command returns then next list program entry. When the end of the list program is reached, the returned list program steps restart at the beginning.

Query Syntax LIST:READ?

Returned Parameters <NR2, NR2, NR2, NR2, NR2, NR2, NR2, NR2, 0>

1 Volts(rms) Start – 0 to 300

2. Volts(rms) End – 0 to 300

3. Volts (DC) Start – 0 to ±212 or 0 to ±424

4. Volts (DC) End - 0 to ±212 or 0 to ±424

5. Freq. (Hz) Start – 43 to 1200

6. Freq. (Hz) End – 43 to 1200

7. Time (ms) or Cycle – 0 to 999999

8. Steps – 0 to 200

9. Not Used

Related Commands [SOURce]:LIST:VOLTage:LEVel:AC:STARt

[SOURce]:LIST:VOLTage:LEVel:AC:END

[SOURce]:LIST:VOLTage:LEVel:DC:STARt

[SOURce]:LIST:VOLTage:LEVel:DC:END

[SOURce]:LIST:FREQuency:LEVel:STARt

[SOURce]:LIST:FREQuency:LEVel:END

[SOURce]:LIST:STEPno

37. LIST:START:QUERY

Description Enable read-back of the list program steps and set pointer to the head of the list program.

Note This command resets the location in the list to read back to the head of the list program. Without this command, the return values are invalid and all zero’s.

	[SOURce] cannot be added to this command.
Command Syntax	LIST:START:QUERY
Parameters	None
Examples	LIST:START:QUERY
Related Commands	LIST:READ?

38. [SOURce]:LIST:STEPno

Description	Set or query the current step within the current list being edited. Remember that the total number of steps defined in all lists is limited.
Command Syntax	[SOURce]:LIST:STEPno <NR1>
Parameters	0-99
Examples	list:stepno 3
Query Syntax	[SOURce]:LIST:STEPno?
Returned Parameters	<NR1>

39. [SOURce]:LIST:VOLTage:LEVel:AC:STARt

Description	Set or query the starting AC voltage of the current step within the current list. Value is limited by the range setting of the machine.
Command Syntax	[SOURce]:LIST:VOLTage:LEVel:AC:STARt <NR2>
Parameters	0-300
Examples	sour:list:volt:lev:ac:start 140
Query Syntax	[SOURce]:LIST:VOLTage:LEVel:AC:STARt?
Returned Parameters	<NR2>

40. [SOURce]:LIST:VOLTage:LEVel:AC:END

Description	Set or query the ending AC voltage of the current step within the current list. Value is limited by the range

setting of the machine.

Command Syntax [SOURce]:LIST:VOLTage:LEVel:AC:END <NR2>

Parameters 0-300

Examples sour:list:volt:lev:ac:end 110

Query Syntax [SOURce]:LIST:VOLTage:LEVel:AC:END?

Returned Parameters <NR2>

41. [SOURce]:LIST:VOLTage:LEVel:DC:STARt

Description Set or query the starting DC voltage of the current step within the current list. Value is limited by the range setting of the machine.

Command Syntax [SOURce]:LIST:VOLTage:LEVel:DC:STARt <NR2>

Parameters 0 to ±212, 0 to ±424

Examples [SOURce]:LIST:VOLTage:LEVel:DC:STARt?

Query Syntax [SOURce]:LIST:VOLTage:LEVel:DC:STARt?

Returned Parameters <NR2>

42. [SOURce]:LIST:VOLTage:LEVel:DC:END

Description Set or query the ending DC voltage of the current step within the current list. Value is limited by the range setting of the machine.

Command Syntax [SOURce]:LIST:VOLTage:LEVel:DC:END <NR2>

Parameters 0 to ±212, 0 to ±424

Examples sour:list:volt:lev:dc:end 60

Query Syntax [SOURce]:LIST:VOLTage:LEVel:DC:END?

Returned Parameters <NR2>

43. [SOURce]:LIST:FREQuency:LEVel:STARt

Description Set or query the starting AC frequency of the current step within the current list. Value is limited by the range setting of the machine.

Command Syntax [SOURce]:LIST:FREQuency:LEVel:STARt <NR2>

Parameters 43-1200

Examples sour:list:freq:lev:start 50

Query Syntax [SOURce]:LIST:FREQuency:LEVel:STARt?

Returned Parameters <NR2>

44. [SOURce]:LIST:FREQuency:LEVel:END

Description Set or query the ending AC frequency of the current step within the current list. Value is limited by the range setting of the machine.

Command Syntax [SOURce]:LIST:FREQuency:LEVel:END <NR2>

Parameters 43-1200

Examples sour:list:freq:lev:end 60

Query Syntax [SOURce]:LIST:FREQuency:LEVel:END?

Returned Parameters <NR2>

45. [SOURce]:LIST:CLEar

Description Clear the current list. This deletes the contents of the current list.

Command Syntax [SOURce]:LIST:CLEar <NR1>

Parameters 0 through 9

Examples list:clear 0

Related Commands [SOURce]:LIST:NUMber

46. [SOURce]:PULSe:VOLTage:AC

Description Set or query the AC voltage magnitude or the pulse.

Command Syntax [SOURce]:PULSe:VOLTage:AC <NR2>

Parameters 0 to 150 or 0 to 300

Examples source:pulse:voltage:ac 140

Query Syntax [SOURce]:PULSe:VOLTage:AC?

Returned Parameters <NR2>

Related Commands

47. [SOURce]:PULSe:VOLTage:DC

Description Set or query the DC voltage level of the pulse.

Command Syntax [SOURce]:PULSe:VOLTage:DC <NR2>

Parameters 0 to ±212, 0 to ±424

Examples sour:puls:volt:dc -50

Query Syntax [SOURce]:PULSe:VOLTage:DC?

Returned Parameters <NR2>

Related Commands

48. [SOURce]:PULSe:FREQuency

Description Set or query the frequency of the AC portion of the pulse.

Command Syntax [SOURce]:PULSe:FREQuency <NR2>

Parameters 43 to 1200

Examples pulse:freq 300

Query Syntax [SOURce]:PULSe:FREQuency?

Returned Parameters <NR2>

49. [SOURce]:PULSe:SYNChronous

Description Set or query the phase of the pulse start as either "immediate" (random phase), or at a specific "phase" angle of the steady state waveform.

Command Syntax [SOURce]:PULSe:SYNChronous <Bool/STR>

Parameters <0 | IMMediate | 1 | PHASe>

Examples sour:pulse:sync phas

Query Syntax [SOURce]:PULSe:SYNChronous?

Returned Parameters “IMMediate” or “PHASe”

50. [SOURce]:PULSe:PHASe

Description Set or query the phase angle to start the pulse from.

Command Syntax [SOURce]:PULSe:PHASe <NR2>

Parameters Phase angle to start pulse at, relative to positive going zero cross of steady state waveform.

Examples pulse:phase 60

Query Syntax [SOURce]:PULSe:PHASe?

Returned Parameters <NR2>

51. [SOURce]:PULSe:DUTY

Description Set or query the duty cycle of the pulse. This is the percentage of the pulse period to OUTPut the pulse. The minimum pulse duration is limited and will not go below 1.5ms typically.

Note

Command Syntax [SOURce]:PULSe:DUTY <NR2>

Parameters 0-100.0

Examples source:pulse:duty 15

Query Syntax [SOURce]:PULSe:DUTY?

Returned Parameters <NR2>

52. [SOURce]:PULSe:PERIOd

Description Set or query the length, or time between pulses, in milliseconds.

Command Syntax [SOURce]:PULSe:PERIOd <NR2>

Parameters 0-100000

Examples source:pulse:period 5000

Query Syntax [SOURce]:PULSe:PERIOd?

Returned Parameters <NR1>

53. [SOURce]:PULSe:COUNt

Description Set or query how many pulse intervals to perform.

Command Syntax [SOURce]:PULSe:COUNt <NR1>

Parameters 0-99

Examples pulse:count 10

Query Syntax [SOURce]:PULSe:COUNt?

Returned Parameters <NR1>

54. [SOURce]:FUNCtion:SHAPe

Description Set or query which waveform configuration to OUTPut.

Command Syntax [SOURce]:FUNCtion:SHAPe <Bool/STR>

Parameters <0 | A | 1 | B>

Examples function:shape A

Query Syntax [SOURce]:FUNCtion:SHAPe?

Returned Parameters “A” or “B”

Related Commands [SOURce]:FUNCtion:SHAPe:A

[SOURce]:FUNCtion:SHAPe:B

55. *[SOURce]:FUNCtion:SHAPe:A*

Description Set or query the waveform defined for setting A.

Command Syntax [SOURce]:FUNCtion:SHAPe:A <STR>

Parameters <SINE | CSIN,NR2 | SQUA | THD,<NR1> | USR,<NR1>>

When setting the shape, the “SINE” and “SQUA” functions

Examples func:shap:a sine

sour:func:shap:a csin,40.5

source:function:shape:a squa

sour:function:shap:a thd,1

func:shap:a user,4

Query Syntax [SOURce]:FUNCtion:SHAPe:A?

Returned Parameters “SINE”, “CSIN,<NR2>”,“SQUA”, “USER,<NR1>”

The return values for CSIN, THD and USER waveforms also return the amount of clipping, the THD waveform number or the user waveform number respectively.

Related Commands [SOURce]:FUNCtion:SHAPe

56. *[SOURce]:FUNCtion:SHAPe:B*

Description Set or query the waveform defined for setting A.

Command Syntax [SOURce]:FUNCtion:SHAPe:B <STR>

Parameters <SINE | CSIN,NR2 | SQUA | THD,<NR1> | USR,<NR1>>

When setting the shape, the “SINE” and “SQUA” functions

Examples func:shap:b sine

sour:func:shap:b csin,40.5

source:function:shape:b squa

sour:function:shap:b thd,1

func:shap:b user,4

Query Syntax [SOURce]:FUNCtion:SHAPe:A?

Returned Parameters “SINE”, “CSIN,<NR2>”,“SQUA”, “USER,<NR1>”

The return values for CSIN, THD and USER waveforms also return the amount of clipping, the THD waveform number or the user waveform number respectively.

Related Commands [SOURce]:FUNCtion:SHAPe

57. [SOURce]:FUNC:SHAP:USER:TABLe:READ

Description The ID number of the USER defined waveform to read.

Note Use this function to set the user defined waveform to retrieve with the

Command Syntax FUNC:SHAP:USER:READ <NR1>

Parameters <NR1>

Examples func:shap:user:read 1

Related Commands [SOURce]:FUNCtion:SHAPe:USER:TABLe:DATA? <NR1>

58. [SOURce]:FUNCtion:SHAPe:USER:TABLe:DATA

Description Write the individual harmonic elements that compose the user defined waveform. The waveform is the sum of the harmonics. For example:

60Hz fundamental and 100% of the 3rd harmonic.

out(t) = sin(2*pi*60*t)+sin(2*pi*180*t)

Note The complete set (0 through 39) should be sent at one time.

Only integer multiples of the fundamental are to be specified. The set of which are the first 39 multiples.

60Hz fundamental:

Field 0 = 60Hz

Field 1 = 120Hz

Field 2 = 180Hz

…

Field 39 = 2400Hz

Magnitude of harmonic: This is the “%” field in the PC software.

Phase – This is the phase shift from the fundamental waveform of the specified harmonic.

Command Syntax

```
[SOURce]:FUNCtion:SHAPe:USER:TABLe:DATA <NR1, NR2, NR1, NR2>
```

Parameters Parameter 1 – element number (0 through 39)

Parameter 2 – Weighting factor (0 to 1)

Parameter 3 – Frequency

Parameter 4 - Phase

Examples

```
func:shap:user:table:data 0,1,50,0

func:shap:user:table:data 1, 0.02, 100, 0

…

func:shap:user:table:data 39,0,2000,0
```

59. [SOURce]:FUNCtion:SHAPe:USER:TABLe:DATA? <NR1>

Description Query the data table for the previously specified waveform table.

This returns a portion of the user defined waveform parameters. The argument of this function defines which set of values to return. This command returns 5 sets at a time.

0 – fields 0 through 4

1 – fields 5 through 9

…

7 – fields 35 through 39

Query Syntax func:shap:user:tabl:data? <NR1>

Returned Parameters ID,magnitude,frequence,phase;(next entry)

Example (50Hz fundamental):

Query command: “source:function:user:table:data? 0”

“0,1.000000,50.000000,0.000000;1,0.020000,100.000000,0.000000;2,0.030000,150.000000,0.000000;3,0.040000,200.000000,0.000000;4,0.050000,250.000000,0.000000\n\r”

K. SYStem

1. Command Summary

SYStem:BEEP
SYStem:BRIGhtness
SYStem:KEY:LOCK
SYStem:TIME
SYStem:DATE
SYStem:RECall:DEFault
SYStem:SERial?
SYStem:MODel?
SYStem:MANUFacture?
SYStem:INTERFACE
SYStem:ERRor?
SYStem:VERSion?
SYStem:GPIB:ADDRess
SYStem:IP:CONFig
SYStem:IP:ADDRess
SYStem:IP:GATEway
SYStem:IP:MASK

2. SYStem:BEEP

Description Set or query the system beep setting.

Command Syntax SYStem:BEEP <Bool>

Parameters <0 | OFF 1 | ON>

Examples sys:beep off

Query Syntax SYStem:BEEP?

Returned Parameters “OFF” or “ON”

3. SYStem:BRIGhtness

Description Set or query the LCD brightness. 0 – min, 9 – max

Command Syntax SYStem:BRIGhtness <NR1>

Parameters 0 through 9

Examples sys:brig 9

Query Syntax SYStem:BRIGhtness?

Returned Parameters <NR1>

4. SYStem:KEY:LOCK

Description Set or query the keyboard lock state.

Command Syntax SYStem:KEY:LOCK <Bool>

Parameters <0 | OFF 1 | ON>

Examples sys:key:lock on

Query Syntax SYStem:KEY:LOCK?

Returned Parameters “OFF” or “ON”

5. SYStem:TIME

Description Set or query the time setting on the machine. The format is in Hours, Minutes and Seconds, in that order.

Command Syntax SYStem:TIME <NR1, NR1, NR1>

Parameters 0-24, 0-59, 0-59

Hours, Minutes, Seconds

Examples sys:time 16,10,00

Query Syntax SYStem:TIME?

Returned Parameters <NR1,NR1,NR1>

6. SYStem:DATE

Description Set or query the date setting on the machine. The format is Year, Month, Day.

Command Syntax SYStem:DATE <NR1, NR1, NR1>

Parameters 0 to 99, 0 to 12, 0 to 31

Year, Month, Day

Examples sys:date 85,11,5

Query Syntax SYStem:DATE?

Returned Parameters <NR1,NR1,NR1>

7. SYStem:RECall:DEFault

Description Recall the default settings for the machine.

Command Syntax SYStem:RECall:DEFault

Examples sys:rec:def

8. SYStem:SERial?

Description Query the machine’s serial number.

Query Syntax SYStem:SERial?

Returned Parameters <STR>

9. SYStem:MODel?

Description Query the machine’s model number.

Query Syntax SYStem:MODel?

Returned Parameters <NR1>

“9833”

10. *SYStem:MANUFacture?*

Description Query the machine manufacturer’s name.

Query Syntax SYStem:MANUFacture?

Returned Parameters “B&K PRECISION”

11. *SYStem:INTERFACE*

Description Set or query the remote interface to use.

Note Currently only returning “TMC” and “VCP” correctly.

Command Syntax SYStem:INTERFACE <NR1/STR>

Parameters <0 | VCP | 1 | TMC | 2 | GPIB | 3 | LAN | 4 | RS232>

Examples sys:interface gpib

Query Syntax sys:interface?

Returned Parameters “VCP”, “TMC”, “GPIB”, “LAN”, “RS232C”

12. *SYStem:ERRor?*

Description Query the current error code, if any. See the user manual for a listing of the error codes returned.

Query Syntax SYStem:ERRor?

Returned Parameters <NR1>, <STR>

13. *SYStem:VERSion?*

Description Query the firmware version of the machine.

Query Syntax SYStem:VERSion?

Returned Parameters <STR>

14. SYStem:GPIB:ADDRess

Description Set or query the GPIB address of the machine.

Command Syntax SYStem:GPIB:ADDRess <NR1>

Parameters GPIB address

Examples sys:gpib:addr 5

Query Syntax SYStem:GPIB:ADDRess?

Returned Parameters <NR1>

15. SYStem:IP:CONFig

Description Set or query the network configuration mode, static or dynamic.

Command Syntax SYStem:IP:CONFig <NR1/STR>

Parameters <0 | DHCP | 1 | STATic>

Examples SYS:IP:CONF DHCP

Query Syntax SYStem:IP:CONFig?

Returned Parameters “DHCP” or “STATic”

16. SYStem:IP:ADDRess

Description Set or query the IP address of the machine.

Command Syntax SYStem:IP:ADDRess <NR1, NR1, NR1, NR1>

Parameters 0 to 255 for each entry.

Examples sys:ip:addr 192,168,2,96

Query Syntax SYStem:IP:ADDRess?

Returned Parameters <STR>

17. SYStem:IP:GATEway

Description Set or query the network gateway.

Command Syntax SYStem:IP:GATEway <NR1, NR1, NR1, NR1>

Parameters 0 through 255 for each entry.

Examples SYStem:IP:GATEway 255,255,255,0

Query Syntax SYStem:IP:GATEway?

Returned Parameters <STR>

18. SYStem:IP:MASK

Description Set or query the network mask.

Command Syntax SYStem:IP:MASK <NR1, NR1, NR1, NR1>

Parameters 0 through 255 for each entry.

Examples SYStem:IP:MASK 1,2,3,4

Query Syntax SYStem:IP:MASK?

Returned Parameters <STR>

L. USBFlash

1. Command Summary

USBFlash:SAVE:CONFiguration
USBFlash:RECall:CONFiguration
USBFlash:SAVE:SCReen
USBFlash:SAVE:COMPlete?

2. USBFlash:SAVE:CONFiguration

Description Store the current settings to internal memory or a USB storage device.

Command Syntax USBFlash:SAVE:CONFiguration <NR1>

Parameters 0 through 9, internal

10 through 99, external

Examples usbf:save:conf 10

3. USBFlash:RECall:CONFiguration

Description Recall a configuration setup from either internal storage or a USB device.

Command Syntax USBFlash:RECall:CONFiguration

Parameters 0 through 9, internal

10 through 99, external

Examples usbf:rec:conf 0

4. USBFlash:SAVE:SCReen

Description Save an image of the LCD screen.

Command Syntax USBFlash:SAVE:SCReen <NR1>

Parameters 0 through 999

Examples usbf:save:scr 0

5. USBFlash:SAVE:COMPlete?

Description Query whether the save action has completed.

Query Syntax USBFlash:SAVE:COMPlete?

Returned Parameters 1 for complete and 0 for all other conditions including busy and no previous save issued.

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