

Programming Manual

5490C Series

5½ and 6½ Digit Multimeters



CONFigure Subsystem

The CONFigure command is the easiest way to configure measurements. Like the MEASure? query, these commands use the default measurement configuration values. However, these commands do not automatically start measuring, so you can modify the measurement properties before starting the measurement.

1.1 Default measurement configuration for the CONFigure command

Measurement parameters	Default Setting
AC input filter (bandwidth)	20 Hz (medium speed filter)
Auto Zero	If the resolution setting causes NPLC to be less than 1, it will be turn OFF; if the resolution setting causes NPLC to be greater than or equal to 1, it will be turn ON.
Range	AUTO (including voltage range for frequency and period measurement)
Number of samples per trigger	1 sample
Trigger number	1 trigger
Trigger delay	Auto delay
Trigger source	Immediately
Trigger slope	NEGative
Mathematical function	Forbidden. Other parameters have not changed.
Empty state of each function	Forbidden

1.2 CONFigure?

Description Returns a string indicating the current function, range, and resolution.

Query Syntax CONFigure?

Query Example conf?
DCI, 1.00000000E-04, 1.00000000E-09

1.3 CONFigure:VOLTage:DC

Description Configure the instrument for DC voltage measurement, setting all measurement parameters and trigger parameters to their default values.

Command Syntax CONFigure[:VOLTage]:DC <range>

Parameters <range>: 100m, 1, 10, 100, 1000, AUTO, MIN, MAX
Default:AUTO

Example CONF:VOLT:DC 100

1.4 CONFigure:VOLTage:AC

Description Configure the instrument for AC voltage measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure[:VOLTage]:AC <range>

Parameters <range>: 100m, 1, 10, 100, 750, AUTO Default:AUTO

Example CONF:VOLT:AC 100

1.5 CONFigure:CURRent:DC

Description Configure the instrument for DC current measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:CURRent:DC <range>

Parameters <range>: 100 uA, 1 mA, 10 mA, 100 mA, 1 A, 3 A, 10 A. Default:AUTO

Example CONF:CURR:DC 100m

1.6 CONFigure:CURRent:AC

Description Configure the instrument for AC current measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:CURRent:AC <range>

Parameters <range>: 100 uA, 1 mA, 10 mA, 100 mA, 1 A, 3 A, 10 A. Default:AUTO

Example CONF:CURR:AC 100m

1.7 CONFigure:CONTInuity

Description Configure the instrument for continuity measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:CONTInuity

Example CONF:CONT

1.8 CONFigure:DIODE

Description Configure the instrument for diode measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:DIODE

Example CONF:DIOD

1.9 CONFigure:RESistance

Description Configure the instrument for two-wire resistance measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:RESistance <range>

Parameters <range>: 10, 100, 1k, 10k, 100k, 1M, 10M, 100M Default:AUTO

Example CONF:RES 10M

1.10 CONFigure:FRESistance

Description Configure the instrument for four-wire resistance measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:FRESistance <range>

Parameters <range>: 10, 100, 1k, 10k, 100k, 1M, 10M, 100M Default:AUTO

Example CONF:FRES 10M

1.11 CONFigure:FREQuency

Description Configure the instrument for frequency measurement, set all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:FREQuency [<range>-MIN-MAX-DEF]

Parameters <range>: 100m, 1, 10, 100, 750 Default:AUTO

Example CONF:FREQ 10

1.12 CONFigure:PERiod

Description Configure the instrument for periodic measurements, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:PERiod [<range>-MIN-MAX-DEF]

Parameters <range>: 100m, 1, 10, 100, 750 Default:AUTO

Example CONF:PER 10MA

1.13 CONFigure:TEMPerature

Description Configure the instrument for temperature measurement and set all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:TEMPerature [FRTD-RTD-FTHermistor-THERmistor]

Parameters <probe_type>:FRTD, RTD, FTHermistor, THERmistor

Example CONF:TEMP RTD

1.14 CONFigure:CAPacitance

Description Configure the instrument for capacitance measurement, setting all measurement parameters and trigger parameters to default values

Command Syntax CONFigure:CAPacitance <range>

Parameters <range>:1n, 10n, 100n, 1u, 10u, 100u, 1m, 10m Default:AUTO

Example CONF:CAP 10u

MEASure subsystem

With MEASure? queries, you can use a single command to select functions and ranges. All other parameters are set to default values (see Table 7.3.1).

The example below configures the DC voltage measurement, internally triggering the instrument to take measurements, and reading the measurement results. The default range (automatic adjustment range) and resolution (10 PLC) are used for measurement.

Query Syntax MEAS:VOLT:DC?

Typical Response +4.23450000E-03

The example below configures the instrument for 2-wire resistance measurements, triggers the instrument to take measurements and reads the measurements. Select the 1 k Ω range.

MEAS:RES? 1000

Typical Response +3.27150000E+02

2.1 MEASure:VOLTage:AC-DC?

Description Configure the instrument for AC or DC voltage measurement and immediately trigger the measurement to send the measurement to the user. All other measurement parameters and trigger parameters are set to default values.

Command Syntax MEASure:VOLTage:AC? or MEASure:VOLTage:DC? <range>

Parameters AC: <range>:100m, 1, 10, 100, 750. Default:AUTO

DC: <range>:100m, 1, 10, 100, 1000. Default:AUTO

Example MEAS:VOLT:DC? 100

Typical Response +8.53210000E+1

2.2 MEASure:CURRent:AC-DC?

Description Configure the instrument for AC or DC current measurement and immediately trigger the measurement to send the measurement to the user. All other measurement parameters and trigger parameters are set to default values.

Syntax MEASure:CURRent:AC? or MEASure:CURRent:DC? <range>

Parameters <range>: 100u, 1m, 10m, 100m, 1, 3, 10. Default:AUTO

Example MEAS:CURR:DC? 10

Typical Response +8.53210000E+01

2.3 MEASure:CONTInuity?

Description Configure the instrument to perform a continuity measurement and immediately trigger the measurement to send the measurement to the user. All other measurement parameters and trigger parameters are set to default values.

Syntax MEASure:CONTInuity?

Example MEAS:CONT?

Typical Response +8.53210000E+00

2.4 MEASure:DIODE?

Description Configure the instrument to perform a diode measurement and immediately trigger the measurement and send the measurement to the user. All other measurement parameters and trigger parameters are set to default values.

Syntax MEASure:DIODE?

Example MEAS:DIODE?

Typical Response +8.53210000E+00

2.5 MEASure:RESistance-FRESistance?

Description Configure the instrument to perform a 2-wire resistance (RESistance) or 4-wire resistance (FRESistance) measurement and immediately trigger the measurement to send the measurement results to the user. All other measurement parameters and trigger parameters are set to default values.

Syntax MEASure:RESistance? or MEASure:FRESistance? <range>

Parameters <range>:10, 100, 1k, 10k, 100k, 1M, 10M, 100M . Default:AUTO

Example MEAS:FRES? 100

Typical Response +8.53210000E+01

2.6 MEASure:FREQuency-PERiod?

Description Configure the instrument to perform frequency or period measurements and immediately trigger the measurement to send the measurement to the user. All other measurement parameters and trigger parameters are set to default values.

Syntax MEASure:FREQuency or MEASure:PERiod? <range>

Parameters <range>:100m, 1, 10, 100, 750. Default:AUTO

Example MEAS:FREQ? 10

Typical Response +1.4527800E-04

2.7 MEASure:TEMPerature?

Description Configure the instrument to perform temperature measurement and immediately trigger the measurement to send the measurement to the user. All other measurement parameters and trigger parameters are set to default values.

Syntax MEASure:TEMPerature? <probe>

Parameters <probe>: FRTD, RTD, FTHERmistor, THERmistor.

Example MEAS:TEMP? RTD

Typical Response +8.53210000E+1

2.8 MEASure:CAPacitance?

Description Configure the instrument to make a capacitance measurement and immediately trigger the measurement and send the measurement to the user. All other measurement parameters and trigger parameters are set to default values

Syntax MEASure:CAPacitance? <range>

Parameters <range>:1n, 10n, 100n, 1u, 10u, 100u, 1m, 10m. Default:AUTO

Example MEAS:CAP? 10u

Typical Response +8.53210000E-06

TRIGger subsystem

3.1 ABORt

Description Terminates the measurement in progress and returns the instrument to the trigger idle state.

Command Syntax ABORt

Example Terminate the measurement in progress: ABORt

3.2 INITiate

Description Changes the state of the trigger system from idle to wait for trigger and then clears the previous set of measurement result from the reading memory. When the specified trigger condition is met after receiving the INIT command, measurement will begin.

You can store up to 10,000 measurements in the reading memory. If the reading memory overflows, the new measured value will overwrite the oldest measured value and the latest measured value will always be retained.

To retrieve measurements from the reading memory, use FETCh?.

Command Syntax INITiate

Example Return five DC voltage measurements and start the measurement using a software trigger:

```
CONF:VOLT:DC 10
TRIG:SOUR BUS
SAMP:COUN 5
INIT
*TRG
FETCh?
```

3.3 FETCh?

Description Wait for the measurement to complete and send all measurements to the user.

The FETCh? query does not erase the measurement results from the reading memory. You can send the query multiple times to retrieve the same data.

When measuring configuration changes, or when executing any of the following commands, the instrument will clear all measurements from the reading memory: INITiate, MEASure:<function>?, READ?, *RST, SYSTem:PRESet.

Syntax FETCh?

Example Combine CONFigure and INITiate with FETCh?. The INITiate command places the instrument in the waiting for trigger state, triggers the measurement when the rear panel Ext Trig input is a pulse signal (low by default), and sends the measurement to the user. The FETCh? query copies the measurement from the reading memory to the instrument's output buffer.

```
CONF:VOLT:DC 10, 0.003
TRIG:SOUR EXT
SAMP:COUN 4
INIT
FETCh?
```

Typical Response -4.98748741E-01, -4.335163427E-01, -4.33118686E-01, -3.48109378E-01

Note Before Sending FETCh?, it is best to ensure that the trigger operation completes triggering all the measurements, which is defined by the SAMPlE:COUNT command. WTG? command can be used to check the trigger status.

3.4 R?

Description Read and erase all measurements from the internal buffer memory. The command can be used if the triggered operation requires capturing more than 10000 pts of data. In this case, this command can be used to periodically read and clear the internal buffer memory before it fills to capacity of 10000 pts.

Syntax R?

Example R?

Typical Response -4.98748741E-01, -4.335163427E-01, -4.33118686E-01, -3.48109378E-01

3.5 READ?

Description Start a new set of measurements, wait for all measurements to complete and transfer all available measurements. Sending READ? is similar to sending INITiate:FETCh?.

Syntax READ?

Example Take the measurement from the reading memory:

READ?

Typical Response -4.98748741E-01, -4.335163427E-01, -4.33118686E-01, -3.48109378E-01

Note The READ? command may cause an error if the remote connection timeout is not longer than required for the instrument to finish triggering and taking the measurements into the memory. Thus, this command is recommended only for capturing smaller multiple points of data. The timing is also dependent on other factors such as integration(aperture time), the function selected for the measurement, the range, the bandwidth (when applicable), the gate time (when applicable), total number of sample counts (specified by SAMPlE:COUNT command) and total number of trigger counts (specified by TRIGger:COUNT command).

3.6 TRIGger:COUNT

Description Set the number of triggers the instrument accepts. When the number of triggers reaches the set value, the instrument will return to the idle state and no longer trigger.

Command Syntax TRIGger:COUNT <count>-MIN-MAX-DEF

Query Syntax TRIGger:COUNT? [MIN-MAX-DEF]

Parameters <count>: 1 - 999999. Default: 1

Example Return ten sets of five DC voltage measurements and start each measurement group with an external trigger:

```
CONF:VOLT:DC
SAMP:COUN 5
TRIG:COUN 10
TRIG:SOUR EXT
READ?
```

Typical Response +1.00520000E+01, ... (50 measurements)

3.7 TRIGger:SOURce

Description Select the trigger source for the measurement

IMMediate: The trigger signal is always present. A trigger signal is issued as soon as the instrument is placed in the “waiting for trigger” state.

BUS: When the DMM is in the “Wait Bus Trigger”, the instrument is triggered by sending “*TRG” via the remote interface.

EXTernal: When the DMM is in the Wait External Trigger, the instrument is triggered by sending a TTL pulse to the Ext Trig interface on the rear panel.

Command Syntax TRIGger:SOURce IMMEDIATE-EXTernal-BUS

Query Syntax TRIGger:SOURce?

Parameters trigger source type

Example Return ten sets of five DC voltage measurements and start each measurement group with an external trigger:

```
CONF:VOLT:DC
SAMP:COUN 5
TRIG:COUN 10
TRIG:SOUR EXT
READ?
```

Typical Response +1.00520000E+01, ... (50 measurements)

3.8 TRIGger:DELay

Description Sets the waiting time for the instrument to receive the trigger signal to the middle of the start measurement.

If you have configured more than one measurement for each trigger of the instrument (SAMPLE:COUNT >1), after the trigger, a delay is inserted between two adjacent measurements.

Setting a specific trigger delay will disable the automatic trigger delay (TRIGger:DELay:AUTO OFF).

Command Syntax TRIGger:DELay <seconds>-MIN-MAX-DEF

Query Syntax TRIGger:DELay? [MIN-MAX-DEF]

Parameters required delay time

Example Returns the result of five DC voltage measurements. There is a 2 second delay before each measurement.

```
CONF:VOLT:DC 10
SAMP:COUN 5
TRIG:DEL 2
READ?
```

Typical Response +4.27230000E+00, +4.27150000E+00, +4.27190000E+00, +4.27170000E+00, +4.27200000E+00

3.9 TRIGger:DELay:AUTO

Description Disable or enable automatic trigger delay. If enabled, the instrument sets the delay based on function, range, and integration time or bandwidth.

By default, TRIGger:DElay:AUTO is ON.

Command Syntax TRIGger:DElay:AUTO ON, 1, OFF, 0

Query Syntax TRIGger:DElay:AUTO?

Parameters ON, 1, OFF, 0

Example Returns the result of five DC voltage measurements. There is an automatic delay between each measurement

```
CONF:VOLT:DC 10
SAMP:COUN 5
READ?
```

Typical Response +4.27230000E+00, +4.27150000E+00, +4.27190000E+00, +4.27170000E+00, +4.27200000E+00

3.10 SAMPlE:COUNt

Description Specifies the number of measurements (number of samples) taken each time the instrument is triggered.

You can use the specified sample count with a trigger count (TRIGger:COUNt). The total number of measurements returned before returning to the idle trigger state is the product of the sample count and the trigger count.

Command Syntax SAMPlE:COUNt <count>-MIN-MAX-DEF

Query Syntax SAMPlE:COUNt? [MIN-MAX-DEF]

Parameters <count>: 1 - 999999. Default: 1

Example Return ten sets of four-time resistance measurements and start each measurement group with an external trigger:

```
CONF:RES 1E6
SAMP:COUN 4
TRIG:COUN 10
TRIG:SOUR EXT
READ?
```

Typical Response +1.00520000E+06, ... (40 measurements)

3.11 WTG?

Description Queries the trigger status.

This command can be used during long periods of triggered measurement operation (i.e. high sample count). This command is used in conjunction with INITiate and FETCh? command so that rather than specifying a fixed timeout in the remote settings, this command can be used to query periodically the trigger status. FETCh? command can be sent after the trigger is back to idle state.

Command Syntax WTG?

Query Syntax WTG?

Response 0 - Trigger is busy or not ready.

1 - Trigger is ready.

[SENSe:]VOLTage subsystem

This subsystem configures AC voltage measurement, DC voltage measurement.

4.1 [SENSe:]VOLTage:AC:BANDwidth

Description Sets the AC filter cutoff frequency for AC voltage measurements.

The instrument uses three different AC filters that allow you to optimize low frequency accuracy or reduce AC settling time after changing the input signal amplitude. Based on the cutoff frequency specified by this command, the instrument selects a slow (3 Hz), medium (20 Hz) or fast (200 Hz) filter. Specify the lowest frequency you want to encounter. Lower frequencies result in longer settling times.

Command Syntax [SENSe:]VOLTage:AC:BANDwidth <filter>-MIN-MAX

Query Syntax [SENSe:]VOLTage:AC:BANDwidth? [MIN-MAX-DEF]

Parameters <filter>:3, 20, 200. Default: 20

Example VOLT:AC:BAND 200

4.2 [SENSe:]VOLTage:AC:SPEEd

Description Sets the measurement speed for AC voltage measurements.

The measurement speed is limited by the filter cutoff frequency. The 3Hz filter only supports slow (SLOW), the 20Hz filter supports slow (SLOW) and medium speed (MEDIUM), and the 200Hz filter supports slow (SLOW), medium speed (MEDIUM) and fast (FAST).

Command Syntax [SENSe:]VOLTage:AC:SPEEd <speed>-MIN-MAX

Query Syntax [SENSe:]VOLTage:AC:SPEEd? [MIN-MAX-DEF]

Parameters <speed>:SLOW-MEDIUM-FAST. Default:MEDIUM

Example VOLT:AC:SPEE SLOW

4.3 [SENSe:]VOLTage:AC:SECondary

Description Select the auxiliary measurement function for the AC voltage measurement.

Please use DATA2? to read auxiliary measurement results.

Command Syntax [SENSe:]VOLTage:AC:SECondary OFF-BEFOREmath-FREQUENCY

Query Syntax [SENSe:]VOLTage:AC:SECondary?

Parameters OFF-BEFOREmath-FREQUENCY

Example VOLT:AC:SEC FREQ

4.4 [SENSe:]VOLTage:AC-DC:RANGe

Description Select a fixed range for AC and DC voltage measurements

Command Syntax	[SENSe:]VOLTage:AC:RANGe <range>-MIN-MAX or [SENSe:]VOLTage:DC:RANGe <range>-MIN-MAX
Query Syntax	[SENSe:]VOLTage:AC:RANGe? [MIN-MAX-DEF] or [SENSe:]VOLTage:DC:RANGe? [MIN-MAX-DEF]
Parameters	AC:<range>:100m, 1, 10, 100, 750. Default: 10
DC	<range>:100m, 1, 10, 100, 1000. Default: 1000
Example	VOLT:AC:RANG 10

4.5 [SENSe:]VOLTage:AC-DC:RANGe:AUTO

Description	Enable or disable autoranging for AC and DC voltage measurements The autoranging range can be adjusted down to less than 10% of the range and can be adjusted upwards to more than 120% of the range.
Command Syntax	[SENSe:]VOLTage:AC:RANGe:AUTO ON-OFF or [SENSe:]VOLTage:DC:RANGe:AUTO ON-OFF
Query Syntax	[SENSe:]VOLTage:AC:RANGe:AUTO? or [SENSe:]VOLTage:DC:RANGe:AUTO?
Parameters	ON, 1, OFF, 0
Example	VOLT:AC:RANG:AUTO ON

4.6 [SENSe:]VOLTage[:DC]:NPLC

Description	Sets the integration time in terms of the number of power line cycles (PLC) for DC voltage measurement. The integration time is the period during which the instrument's analog-to-digital (A/D) converter measures the input signal samples. A longer integration time gives a higher measurement resolution, but the measurement speed is slower.
Command Syntax	[SENSe:]VOLTage[:DC]:NPLC <plc>-MIN-MAX
Query Syntax	[SENSe:]VOLTage[:DC]:NPLC? [MIN-MAX-DEF]
Parameters	<plc>:0.02, 0.2, 1, 10, 100
Example	VOLT:NPLC 10

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

Description	Enable or disable the automatic input impedance mode for DC voltage measurement
Command Syntax	[SENSe:]VOLTage[:DC]:IMPedance:AUTO ON-OFF
Query Syntax	[SENSe:]VOLTage[:DC]:IMPedance:AUTO?
Parameters	ON, 1, OFF, 0
Example	VOLT:IMP:AUTO ON

4.8 [SENSe:]VOLTage[:DC]:ZERO:AUTO

Description	Enable or disable the auto zero mode for the DC voltage.
--------------------	--

ON: The DMM internally measures the offset after each measurement. This measurement is then subtracted from the previous reading. This prevents the offset voltage on the DMM input circuit from affecting the measurement accuracy.

OFF: The instrument uses the last measured zero return measurement and subtracts it from each measurement. It reads a new zero reading whenever you change the function, range or integration time.

Command Syntax [SENSe:]VOLTage[:DC]:ZERO:AUTO ON-OFF

Query Syntax [SENSe:]VOLTage[:DC]:ZERO:AUTO?

Parameters ON, 1, OFF, 0

Example VOLT:ZERO:AUTO ON

4.9 [SENSe:]VOLTage[:DC]:SECOndary

Description Select the auxiliary measurement function for the DC voltage measurement.

Use DATA2? to read secondary/auxiliary measurement results.

Command Syntax [SENSe:]VOLTage:AC:SECOndary OFF-BEFOreath

Query Syntax [SENSe:]VOLTage:AC:SECOndary?

Parameters OFF-BEFOreath

Example VOLT:DC:SEC BEF

[SENSe:]CURRent Subsystem

5.1 [SENSe:]CURRent:AC:BANDwidth

Description Sets the AC filter cutoff frequency for AC current measurement.

The instrument uses three different AC filters that allow you to optimize low frequency accuracy or reduce AC settling time after changing the input signal amplitude. Based on the cutoff frequency specified by this command, the instrument selects a slow (3 Hz), medium (20 Hz) or fast (200 Hz) filter. Specify the lowest frequency you want to encounter. Lower frequencies result in longer settling times

Command Syntax [SENSe:]CURRent:AC:BANDwidth <filter>-MIN-MAX

Query Syntax [SENSe:]CURRent:AC:BANDwidth? [MIN-MAX-DEF]

Parameters <filter>:3, 20, 200. Default: 20

Example CURR:AC:BAND 200

5.2 [SENSe:]CURRent:AC:SPEEd

Description Sets the measurement speed for AC current measurement.

The measurement speed is limited by the filter cutoff frequency. The 3Hz filter only supports slow (SLOW), the 20Hz filter supports slow (SLOW) and medium speed (MEDium), and the 200Hz filter supports slow (SLOW), medium speed (MEDium) and fast (FAST).

Command Syntax [SENSe:]CURRent:AC:SPEEd <speed>-MIN-MAX

Query Syntax [SENSe:]CURRent:AC:SPEEd? [MIN-MAX-DEF]

Parameters <speed>:SLOW, MEDium, FAST. Default:MEDium

Example CURR:AC:SPEE SLOW

5.3 [SENSe:]CURRent:AC:SECOndary

Description Select the auxiliary measurement function for AC current measurement.

Please use DATA2? to read auxiliary measurement results.

Command Syntax [SENSe:]CURRent:AC:SECOndary OFF-BEFOreath-FREQUency

Query Syntax [SENSe:]CURRent:AC:SECOndary?

Parameters OFF, BEFOreath, FREQUency

Example CURR:AC:SEC BEF

5.4 [SENSe:]CURRent:AC-DC:RANGE

Description Select a fixed range for AC and DC current measurements. Select a fixed measurement range for AC or DC current measurement on the 3 A terminal. For digital multimeter with a 10A range, you cannot use this command to select a 10A range. Please use the directive 7.3.5.5

Command Syntax	[SENSe:]CURRent:AC:RANGe <range>-MIN-MAX or [SENSe:]CURRent:DC:RANGe <range>-MIN-MAX
Query Syntax	[SENSe:]CURRent:AC:RANGe? [MIN-MAX-DEF] or [SENSe:]CURRent:DC:RANGe? [MIN-MAX-DEF]
Parameters	<range>: 100u, 1m, 10m, 100m, 1, 3. Default:AUTO
Example	CURRent:AC:RANG 100m

5.5 [SENSe:]CURRent:AC-DC:RANGe:AUTO

Description	Autoranging for AC and DC current measurements The autoranging range can be adjusted down to less than 10% of the range and can be adjusted upwards to more than 120% of the range.
Command Syntax	[SENSe:]CURRent:AC:RANGe:AUTO ON-OFF or [SENSe:]CURRent:DC:RANGe:AUTO ON-OFF
Query Syntax	[SENSe:]CURRent:AC:RANGe:AUTO? or [SENSe:]CURRent:DC:RANGe:AUTO?
Parameters	ON, 1, OFF, 0
Example	CURR:AC:RANG:AUTO ON

5.6 [SENSe:]CURRent:AC-DC:TERMinals

Description	Enable or disable autoranging for AC and DC current measurements The autoranging range can be adjusted down to less than 10% of the range and can be adjusted upwards to more than 120% of the range.
Command Syntax	[SENSe:]CURRent:AC:TERMinals 3-10 or [SENSe:]CURRent:DC:TERMinals 3-10
Query Syntax	[SENSe:]CURRent:AC:TERMinals? or [SENSe:]CURRent:DC:TERMinals?
Parameters	3, 10
Example	CURR:AC:TERM 10

5.7 [SENSe:]CURRent[:DC]:NPLC

Description	Sets the integration time in terms of the number of power line cycles (PLC) for DC current measurement. The integration time is the period during which the instrument's analog-to-digital (A/D) converter measures the input signal samples. A longer integration time gives a higher measurement resolution, but the measurement speed is slower.
Command Syntax	[SENSe:]CURRent[:DC]:NPLC <plc>-MIN-MAX
Query Syntax	[SENSe:]CURRent[:DC]:NPLC? [MIN-MAX-DEF]
Parameters	<plc>:0.02, 0.2, 1, 10, 100
Example	CURR:NPLC 1

5.8 [SENSe:]CURRent:DC:SECOndary

Description	Select the auxiliary measurement function for the DC current measurement.
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Please use DATA2? to read auxiliary measurement results.

Command Syntax [SENSe:]CURRent:DC:SECondary OFF-BEForemath

Query Syntax [SENSe:]CURRent:DC:SECondary?

Parameters OFF, BEForemath

Example CURR:DC:SEC BEF

5.9 [SENSe:]CURRent[:DC]:ZERO:AUTO

Description Enable or disable the auto zero mode for DC current.

ON: The DMM internally measures the offset after each measurement. This measurement is then subtracted from the previous reading. This prevents the offset voltage on the DMM input circuit from affecting the measurement accuracy.

OFF: The instrument uses the last measured zero return measurement and subtracts it from each measurement. It reads a new zero reading whenever you change the function, range or integration time.

Command Syntax [SENSe:]CURRent [:DC]:ZERO:AUTO ON-OFF

Query Syntax [SENSe:]CURRent [:DC]:ZERO:AUTO?

Parameters ON, 1, OFF, 0

Example CURR:ZERO:AUTO ON

[SENSe:]RESistance-FRESistance subsystem

6.1 [SENSe:]RESistance-FRESistance:RANGe

Description	Set a fixed range for 2-wire or 4-wire resistors
Command Syntax	[SENSe:]RESistance-FRESistance:RANGe <range>-MIN-MAX
Query Syntax	[SENSe:]RESistance-FRESistance:RANGe? [MIN-MAX-DEF]
Parameters	<range>:10, 100, 1k, 10k, 100k, 1MA, 10MA, 100MA
Example	RES:RANG 10MA

6.2 [SENSe:]RESistance-FRESistance:RANGe:AUTO

Description	Enable or disable the autoranging for 2-wire or 4-wire resistance measurements The autoranging range can be adjusted down to less than 10% of the range and can be adjusted upwards to more than 120% of the range.
Command Syntax	[SENSe:]RESistance:RANGe:AUTO ON-OFF or [SENSe:]FRESistance:RANGe:AUTO ONOFF
Query Syntax	[SENSe:]RESistance:RANGe:AUTO? or [SENSe:]FRESistance:RANGe:AUTO?
Parameters	ON, 1, OFF, 0
Example	RES:RANG:AUTO ON

6.3 [SENSe:]RESistance-FRESistance:NPLC

Description	Sets the integration time in terms of the number of power line cycles (PLC) for 2-wire or 4-wire resistance measurements. The integration time is the period during which the instrument's analog-to-digital (A/D) converter measures the input signal samples. A longer integration time gives a higher measurement resolution, but the measurement speed is slower.
Command Syntax	[SENSe:]RESistance:NPLC <plc>-MIN-MAX or [SENSe:]FRESistance:NPLC <plc>-MIN-MAX
Query Syntax	[SENSe:]RESistance:NPLC? [MIN-MAX-DEF] or [SENSe:]FRESistance:NPLC? [MIN-MAX-DEF]
Parameters	<plc>:0.02, 0.2, 1, 10, 100
Example	RES:NPLC 1

6.4 [SENSe:]RESistance-FRESistance:SECOndary

Description	Select the auxiliary measurement function for the resistance measurement. This parameter is shared between two-wire and four-wire resistors. Please use DATA2? to read auxiliary measurement results.
Command Syntax	[SENSe:]RESistance:SECOndary OFF-BEFOreath or [SENSe:]FRESistance:SECOndary OFF-BEFOreath
Query Syntax	[SENSe:]RESistance:SECOndary? or [SENSe:]FRESistance:SECOndary?
Parameters	OFF-BEFOreath

Example RES:SEC BEF

6.5 [SENSe:]RESistance:ZERO:AUTO

Description Enable or disable the auto zero mode for 2-wire resistors.

ON: The DMM internally measures the offset after each measurement. This measurement is then subtracted from the previous reading. This prevents the offset voltage on the DMM input circuit from affecting the measurement accuracy.

OFF: The instrument uses the last measured zero return measurement and subtracts it from each measurement. It reads a new zero reading whenever you change the function, range or integration time.

Command Syntax [SENSe:]RESistance:ZERO:AUTO ON-OFF

Query Syntax [SENSe:]RESistance ZERO:AUTO?

Parameters ON, 1, OFF, 0

Example RES:ZERO:AUTO ON

[SENSe:]FREQuency-PERiod Subsystem

7.1 [SENSe:]FREQuency-PERiod:VOLTage:RANGe

Description Select a fixed range for frequency and period measurements.

This parameter is shared between frequency and period.

Command Syntax [SENSe:]FREQuency:VOLTage:RANGe <range>-MIN-MAX or [SENSe:]PERiod:VOLTage:RANGe <range>-MIN-MAX

Query Syntax [SENSe:]FREQuency:VOLTage:RANGe? [MIN-MAX-DEF] or [SENSe:]PERiod:VOLTage:RANGe? [MIN-MAX-DEF]

Parameters <range>:100m, 1, 10, 100, 750

Example FREQ:RANG 10

7.2 [SENSe:]FREQuency-PERiod:VOLTage:RANGe:AUTO

Description Enable or disable autoranging for frequency and period measurements.

This parameter is shared between frequency and period.

The autoranging range can be adjusted down to less than 10% of the range and can be adjusted upwards to more than 120% of the range.

Command Syntax [SENSe:]FREQuency:VOLTage:RANGe:AUTO ON-OFF or [SENSe:]PERiod:VOLTage:RANGe:AUTO ON-OFF

Query Syntax [SENSe:]FREQuency:VOLTage:RANGe:AUTO? or [SENSe:]PERiod:VOLTage:RANGe:AUTO?

Parameters ON, 1, OFF, 0

Example FREQ:RANG:AUTO ON

7.3 [SENSe:]FREQuency-PERiod:RANGe:LOWer

Description Sets the AC bandwidth used to detect signals during frequency and period measurements.

This parameter is shared between frequency and period.

The instrument uses three different AC filters that allow you to optimize low frequency accuracy or reduce AC settling time after changing the input signal amplitude. Based on the cutoff frequency specified by this command, the instrument selects a slow (3 Hz), medium (20 Hz) or fast (200 Hz) filter. Specify the lowest frequency you want to encounter. Lower frequencies result in longer settling times.

Command Syntax [SENSe:]FREQuency:RANGe:LOWer <filter>-MIN-MAX or [SENSe:]PERiod:RANGe:LOWer <filter>-MIN-MAX

Query Syntax [SENSe:]FREQuency:RANGe:LOWer? [MIN-MAX-DEF] or [SENSe:]PERiod:RANGe:LOWer? [MIN-MAX-DEF]

Parameters <filter>:3, 20, 200. Default: 20

Example FREQ:RANG:LOW 200

7.4 [SENSe:]FREQuency-PERiod:APERture

Description Set the aperture time (gated time) for frequency and period measurement.

This parameter is shared between frequency and period.

The larger the aperture time, the higher the measurement accuracy and the lower the measurement speed.

Command Syntax [SENSe:]FREQuency:APERture <seconds>-MIN-MAX or [SENSe:]PERiod:APERture <seconds>-MIN-MAX

Query Syntax [SENSe:]FREQuency:APERture? [MIN-MAX-DEF] or [SENSe:]PERiod:APERture? [MIN-MAX-DEF]

Parameters <seconds>:10m, 100m, 1

Example FREQ:APER 100m

7.5 [SENSe:]FREQuency:SECondary

Description Select the auxiliary measurement function for the frequency measurement.

Please use DATA2? to read auxiliary measurement results.

Command Syntax [SENSe:]FREQuency:SECondary OFF-BEForemath-ACV-PERiod

Query Syntax [SENSe:]FREQuency:SECondary?

Parameters OFF, BEForemath, ACV, PERiod

Example FREQ BEF

7.6 [SENSe:]PERiod:SECondary

Description Select the auxiliary measurement function for the period measurement.

Please use DATA2? to read auxiliary measurement results.

Command Syntax [SENSe:]PERiod:SECondary OFF-BEForemath-ACV-FREQuency

Query Syntax [SENSe:]PERiod:SECondary?

Parameters OFF-BEForemath-ACV- FREQuency

Example PER BEF

[SENSe:]TEMPerture Subsystem

8.1 [SENSe:]TEMPerture:NPLC

Description Sets the integration time in terms of the number of power line cycles (PLC) for temperature measurement.

The integration time is the period during which the instrument's analog-to-digital (A/D) converter measures the input signal samples. A longer integration time gives a higher measurement resolution, but the measurement speed is slower.

Command Syntax [SENSe:]TEMPerture:NPLC <plc>-MIN-MAX

Query Syntax [SENSe:]TEMPerture:NPLC? [MIN-MAX-DEF]

Parameters <plc>:0.02, 0.2, 1, 10, 100

Example TEMP:NPLC 10

8.2 [SENSe:]TEMPerture:TRANsducer:FRTD-RTD:RESistance

Description Select the nominal resistance (R0) for 2-wire and 4-wire RTD measurements. R0 is an RTD nominal resistance at 0 °C.

Command Syntax [SENSe:]TEMPerture:TRANsducer:FRTD-RTD:RESistance <reference>-MIN-MAX

Query Syntax [SENSe:]TEMPerture:TRANsducer:FRTD-RTD:RESistance? [MIN-MAX-DEF]

Parameters <reference>: set resistance value

Example TEMP:TRAN:RTD:RES 10

8.3 [SENSe:]TEMPerture:TRANsducer:TYPE

Description Select a probe type sensor for temperature measurement. Supported probes are 2-wire and 4-wire RTD, 2-wire and 4-wire thermistors

Command Syntax [SENSe:]TEMPerture:TRANsducer:TYPE FRTD-RTD-FTHermistor-THERmistor

Query Syntax [SENSe:]TEMPerture:TRANsducer:TYPE?

Parameters FRTD, RTD, FTHermistor, THERmistor

Example TEMP:TRAN:TYPE RTD

8.4 [SENSe:]TEMPerture:SECondary

Description Select an auxiliary measurement function for the temperature measurement.

Please use DATA2? to read auxiliary measurement results.

Command Syntax [SENSe:]TEMPerture:SECondary OFF-BEForemath-RESistor

Query Syntax [SENSe:]TEMPerture:SECondary?

Parameters OFF, BEForemath, RESistor

Example TEMP BEF

8.5 [SENSe:]TEMPerture:ZERO:AUTO

Description Enable or disable the auto zero mode for temperature measurement.

ON:The DMM internally measures the offset after each measurement. This measurement is then subtracted from the previous reading. This prevents the offset voltage on the DMM input circuit from affecting the measurement accuracy.

OFF:The instrument uses the last measured zero return measurement and subtracts it from each measurement. It reads a new zero reading whenever you change the function, range or integration time.

Command Syntax [SENSe:]TEMPerture:ZERO:AUTO ON-OFF

Query Syntax [SENSe:]TEMPerture:ZERO:AUTO?

Parameters ON, 1, OFF, 0

Example TEMP:ZERO:AUTO ON

8.6 UNIT:TEMPerture

Description Sets the unit used for temperature measurement (C, F or Kelvin)

Command Syntax UNIT:TEMPerture C-F-K

UNIT:TEMPerture?

Parameters C, F, K

Example UNIT:TEMP F

[SENSe:]CAPacitance subsystem

9.1 [SENSe:]CAPacitance:RANGe

Description Select a fixed range for capacitance measurement.

Command Syntax [SENSe:]CAPacitance:RANGe <range>-MIN-MAX

Query Syntax [SENSe:]CAPacitance:RANGe? [MIN-MAX-DEF]

Parameters <range>:1n, 10n, 100n, 1u, 10u, 100u, 1m, 10m

Example CAP:RANG 100n

9.2 [SENSe:]CAPacitance:RANGe:AUTO

Description Enable or disable autoranging for capacitance measurements

The autoranging range can be adjusted down to less than 10% of the range and can be adjusted upwards to more than 120% of the range.

Command Syntax [SENSe:]CAPacitance:RANGe:AUTO ON-OFF

Query Syntax [SENSe:]CAPacitance:RANGe:AUTO?

Parameters ON, 1, OFF, 0

Example CAP:RANG:AUTO ON

9.3 [SENSe:]CAPacitance:SECondary

Description Select an auxiliary measurement function for the capacitance measurement.

Please use DATA2? to read auxiliary measurement results.

Command Syntax [SENSe:]CAPacitance:SECondary OFF-BEForemath

Query Syntax [SENSe:]CAPacitance:SECondary?

Parameters OFF, BEForemath

Example CAP BEF

SYSTem Subsystem - I/O Configuration

10.1 SYSTem:COMMunicate:RS232:BAUDrate

Description Set the serial port baud rate

Command Syntax SYSTem:COMMunicate:RS232:BAUDrate 4800, 9600, 19200, 38400, 57600, 115200

Query Syntax SYSTem:COMMunicate:RS232:BAUDrate?:

Parameters Supported baud rate: 4800, 9600, 19200, 38400, 57600, 115200

Example SYST:COMM:RS232:BAUD 9600

10.2 SYSTem:COMMunicate:RS232:DATAbits

Description Set serial data bits.

Command Syntax SYSTem:COMMunicate:RS232:DATAbits 7-8

Query Syntax SYSTem:COMMunicate:RS232:DATAbits?:

Parameters Supported data bits: 7-8

Example SYST:COMM:RS232:DATA 8

10.3 SYSTem:COMMunicate:RS232:PARity

Description Set the serial port parity bit.

Command Syntax SYSTem:COMMunicate:RS232:PARity EVEN-ODD-MARK-SPACE-NULL

Query Syntax SYSTem:COMMunicate:RS232:PARity?:

Parameters Check method: EVEN, ODD, MARK, SPACE, NULL

Example SYST:COMM:RS232:PAR NULL

10.4 SYSTem:COMMunicate:RS232:STOPbits

Description Set the serial port stop bit.

Command Syntax SYSTem:COMMunicate:RS232:STOPbits 1-2

Query Syntax SYSTem:COMMunicate:RS232:STOPbits?

Parameters Serial port stop bit: 1-2

Example SYST:COMM:RS232:STOP 1

10.5 SYSTem:COMMunicate:LAN:DNS1-2

Description Set the DNS server address.

Command Syntax SYSTem:COMMunicate:LAN:DNS1-2 <address>

Query Syntax SYSTem:COMMunicate:LAN:DNS1-2?

Parameters Address

Example SYST:COMM:LAN:DNS1 192.168.1.4

10.6 SYSTem:COMMunicate:LAN:GATeway

Description Set the default route for the instrument.

Command Syntax SYSTem:COMMunicate:LAN:GATeway <address>

Query Syntax SYSTem:COMMunicate:LAN:GATeway?

Parameters Address

Example SYST:COMM:LAN:GAT 192.168.1.5

10.7 SYSTem:COMMunicate:LAN:HOSTname

Description Set the host name of the instrument.

Command Syntax SYSTem:COMMunicate:LAN:HOSTname <name>

Query Syntax SYSTem:COMMunicate:LAN:HOSTname?

Parameters Defined hostname

Example SYST:COMM:LAN:HOST "LAB1-DMM"

10.8 SYSTem:COMMunicate:LAN:IPADdress

Description Set the IP address.

Command Syntax SYSTem:COMMunicate:LAN:IPADdress <address>

Query Syntax SYSTem:COMMunicate:LAN:IPADdress?

Parameters IP address

Example SYST:COMM:LAN:IPAD 192.168.1.242

10.9 SYSTem:COMMunicate:LAN:PORT

Description Set the port number of the network port TCP communication.

Command Syntax SYSTem:COMMunicate:LAN:PORT <port>

Query Syntax SYSTem:COMMunicate:LAN:PORT?

Parameters port number

Example SYST:COMM:LAN:PORT 45454

10.10 SYSTem:COMMunicate:LAN:SMASk

Description Set the subnet mask.

Command Syntax SYSTem:COMMunicate:LAN:SMASk <smask>

Query Syntax SYSTem:COMMunicate:LAN:SMASk?

Parameters Subnet mask

Example SYST:COMM:LAN:SMAS 255.255.255.0

SYSTem Subsystem - General Command

11.1 SYSTem:BEEPer[:IMMEDIATE]

Description	Issue a single beep
Command Syntax	SYSTem:BEEPer[:IMMEDIATE]
Example	SYST:BEEP

11.2 SYSTem:BEEPer:STATe

Description	Disable or enable the buzzer sounding during continuity, diode or probe hold measurements, or when an error occurs on the current panel or remote interface.
Command Syntax	SYSTem:BEEPer:STATe ON, 1, OFF, 0
Query Syntax	SYSTem:BEEPer:STATe?
Parameters	ON, 1, OFF, 0
Example	SYST:BEEP:STAT OFF

11.3 SYSTem:CLICk:STATe

Description	When the front panel button or softkey is pressed, the button beep can be disabled or enabled.
Command Syntax	SYSTem:CLICk:STAT ON, 1, OFF, 0
Query Syntax	SYSTem:CLICk:STAT?
Parameters	ON, 1, OFF, 0
Example	SYST:CLIC:STAT OFF

11.4 SYSTem:DATE

Description	Sets the date of the instrument's real-time clock. Set the time with SYSTem:TIME. The unix 32-bit timestamp is used, and the maximum time cannot exceed 2038.
Command Syntax	SYSTem:DATE <year>,<month>,<day>
Query Syntax	SYSTem:DATE?
Parameters	<year>:1970-2038 <month>: 1-12 <day>:1 - the maximum number of days in the current month
Example	SYST:DATE 2018, 5, 29

11.5 SYSTem:TIME

Description	Sets the time of the instrument's real-time clock. Set the date with SYSTem:DATE.
--------------------	---

Command Syntax SYSTem:TIME <hour>, <minute>, <second>

Query Syntax SYSTem:TIME?

Parameters <hour>: 0-23
<minute>: 0-59
<second>: 0-59

Example SYST:TIME 13, 59, 10

11.6 SYSTem:VERSion?

Description Query the current software version.

Syntax SYSTem:VERSion?

Example SYST:VER?

Typical return: 1.10

DATA2 subsystem

This subsystem is used to read auxiliary measurement results.

Description Retrieve auxiliary measurement results

Syntax DATA2?

Example CONF:VOLT:DC 10
VOLT:DC:SEC BEF
READ?
Typical return: 1.70897747E-03
DATA2?
Typical return: 1.70897747E-03

NULL subsystem

This subsystem is used to set and control the null operation of the instrument.

VOLTage[:DC]	DC voltage
VOLTage:AC	AC Voltage
CURRent:DC	DC Current
CURRent:AC	AC Current
RESistance	2-wire resistance
FRESistance	4-wire resistance
FREQuency	Frequency
Period	Period
TEMPerature	Temperature
CAPacitance	Capacitance

The value of <function>

13.1 <function>:NULL:STATe

Description Enable or disable the null function for the function specified by <function>. The possible values of <function> can be found in 7.3.12.

Command Syntax <function>:NULL:STATe ON, 1, OFF, 0

Query Syntax <function>:NULL:STATe?

Parameters ON, 1, OFF, 0

Example VOLT:DC:NULL:STAT ON

13.2 <function>:NULL:VALue

Description Set a null value for the function specified by <function>. See <7.3.12> for the possible value of <function>.

To use a null value, you must turn on the null state (<function>:NULL:STATe ON). Specifying a null value disables automatic null selection (<function>:NULL:VALue:AUTO OFF).

Command Syntax <function>:NULL:VALue ON, 1, OFF, 0

Query Syntax <function>:NULL:VALue?

Parameters ON, 1, OFF, 0

Example VOLT:DC:NULL:VAL 0.214

13.3 <function>:NULL:VALue:AUTO

Description Enable or disable null values for the function specified by <function>. See <7.3.12> for possible values of <function>.

When the automatic reference selection is turned on, the first measurement made is used as the null value for all subsequent measurements.

<function>:NULL:VALue has been set to this value. Automatic null selection will be disabled.

Command Syntax <function>:NULL:VALue:AUTO ON, 1, OFF, 0

Query Syntax <function>:NULL:VALue:AUTO?

Parameters ON, 1, OFF, 0

Example VOLT:DC:NULL:VALue:AUTO ON

CALCulate:SCALE subsystem

This subsystem is mainly used to set and control the mathematical operations of the instrument.

14.1 CALCulate:SCALE:DB:REFerence

Description Stores the relative value in the multimeter's dB relative register, which is used for the dB function in CALCulate:SCALE:FUNCTION. When the dB function is enabled, this value is subtracted from each voltage measurement after the measurement result is converted to dBm.

Command Syntax CALCulate:SCALE:DB:REFerence <reference>

Query Syntax CALCulate:SCALE:DB:REFerence?

Parameters

Example CALC:SCALE:DB:REF -10.0

14.2 CALCulate:SCALE:DBM:REFerence

Description Select the reference resistor to convert the voltage measurement to dBm. This reference affects the dBm and dB calibration function.

Command Syntax CALCulate:SCALE:DBM:REFerence <reference>

Query Syntax CALCulate:SCALE:DBM:REFerence?

Parameters

Example CALC:SCALE:DBM:REF 300

14.3 CALCulate:SCALE:FUNCTION

Description Select the operation to be performed by the calibration function.

The DB performs a relative dB calculation. The result is the difference between the input signal and the stored DB relative reference value (CALCulate:SCALE:DB:REFerence), both values are converted to dBm ($\text{dB} = \text{measurement in dBm} - \text{relative value in dBm}$). dB calibration is only available for ACV and DCV measurements.

The DBM performs a dBm calculation. The result is a logarithmic expression based on the power passed to the reference resistor (CALCulate:SCALE:DBM:REFerence) and relative to 1 mW. ($\text{dBm} = 10 \times \log(\text{measurement result} / \text{reference resistance} / 1 \text{ mW})$). The dBm calibration is only available for ACV and DCV measurements.

The PCT performs a percentage change operation. The result is a percentage change in the measurement results in the reference value:

$\text{Result} = ((\text{measurement result} - \text{reference value}) / \text{reference value}) * 100$

SCALE performs Mx+B operations. The result is the measurement result multiplied by the gain value M (CALCulate:SCALE:GAIN) + offset value B (CALCulate:SCALE:OFFSet). The Mx+B calibration applies to all measurement functions except ratio, continuity and diode.

Command Syntax CALCulate:SCALE:FUNCTION DB-DBM-PCT-SCALE

Query Syntax CALCulate:SCALE:FUNCTION?

Parameters Selected operation:DB, DBM, PCT, SCALE

Example Enable the DB calibration function for the next measurement reference:

```
CALC:SCALE:FUNC DB  
CALC:SCALE:STAT ON
```

14.4 CALCulate:SCALE:GAIN

Description Sets the gain value M of the calibration function in CALCulate:SCALE:FUNCTION.

Command Syntax CALCulate:SCALE:GAIN <gain>

Query Syntax CALCulate:SCALE:GAIN?

Parameters gain

Example CALC:SCALE:GAIN 100

14.5 CALCulate:SCALE:OFFSet

Description Sets the offset value B of the calibration function in CALCulate:SCALE:FUNCTION.

Command Syntax CALCulate:SCALE:OFFSet <offset>

Query Syntax CALCulate:SCALE:OFFSet?

Parameters offset

Example CALC:SCALE:OFFSet 5

14.6 CALCulate:SCALE:REFerence

Description Sets the reference value for the PCT function in CALCulate:SCALE:FUNCTION.

Command Syntax CALCulate:SCALE:REFerence <reference>

Query Syntax CALCulate:SCALE:REFerence?

Parameters reference

Example CALC:SCALE:REF 100

14.7 CALCulate:SCALE:REFerence:AUTO

Description Enable or disable the automatic reference selection for the dB calibration function.

Command Syntax CALCulate:SCALE:REFerence:AUTO ON, 1, OFF, 0

Query Syntax CALCulate:SCALE:REFerence:AUTO?

Parameters ON, 1, OFF, 0

Example CALC:SCALE:REF:AUTO ON

14.8 CALCulate:SCALE[:STATe]

Description Enable or disable the calibration function

Command Syntax CALCulate:SCALE[:STATe] ON, 1, OFF, 0

Query Syntax CALCulate:SCALE[:STATe]?

Parameters ON, 1, OFF, 0

Example CALC:SCALE:STAT ON

CALCulate:LIMit subsystem

This subsystem takes limit tests for the measurement results.

15.1 CALCulate:LIMit:LOWer[:DATA]

Description Set the lower limit of the limit test

Command Syntax CALCulate:LIMit:LOWer[:DATA] <value>

Query Syntax CALCulate:LIMit:LOWer[:DATA]?

Parameters <value> set lower limit

Example CALC:LIM:LOW -50

15.2 CALCulate:LIMit:UPPer[:DATA]

Description Set the upper limit of the limit test

Command Syntax CALCulate:LIMit:UPPer[:DATA] <value>

Query Syntax CALCulate:LIMit:UPPer[:DATA]?

Parameters <value> set upper limit

Example CALC:LIM:UPP 50

15.3 CALCulate:LIMit[:STATe]

Description Enable or disable the limit test

Command Syntax CALCulate:LIMit [:STATe] ON, 1, OFF, 0

Query Syntax CALCulate:LIMit[:STATe]?

Parameters ON, 1, OFF, 0

Example CALC:LIM ON

15.4 CALCulate:LIMit:CLEar[:IMMediate]

Description Clear limit test results

Command Syntax CALCulate:LIMit:CLEar[:IMMediate]

Example CALC:LIM:CLE

CALCulate:AVERage Subsystem

This subsystem calculates measurement statistics. Measurement statistics require triggering measurements with more than one sample (use SAMPLE:COUNT command to configure) to be useful, as the calculation is based on the sets of data captured per each trigger.

16.1 CALCulate:AVERage:ALL?

- Description** Queries the measurement statistics data of the average (mean), standard deviation, minimum, and maximum values (in order).
- Query Syntax** CALCulate:AVERage:ALL?
- Typical response** +1.234235, +1.000000, +1.000000, +1.2348289 (format: <mean>, <standard deviation>, <minimum>, <maximum>)

16.2 CALCulate:AVERage:AVERage?

- Description** Queries the measurement statistics average or mean.
- Query Syntax** CALCulate:AVERage:AVERage?
- Typical response** +1.21892357

16.3 CALCulate:AVERage:COUNT?

- Description** Queries the total number of samples used to calculate measurement statistics.
- Query Syntax** CALCulate:AVERage:COUNT?
- Typical response** 10 (for 10 samples)

16.4 CALCulate:AVERage:MAXimum?

- Description** Queries the measurement statistics maximum value.
- Query Syntax** CALCulate:AVERage:MAXimum?
- Typical response** +1.01238548

16.5 CALCulate:AVERage:MINimum?

- Description** Queries the measurement statistics minimum value.
- Query Syntax** CALCulate:AVERage:MINimum?
- Typical response** +1.01238548

16.6 CALCulate:AVERage:PTPeak?

- Description** Queries the measurement statistics peak-to-peak value.

Query Syntax CALCulate:AVERage:PTPeak?

Typical response +1.01238548

16.7 CALCulate:AVERage:SDEVIation?

Description Queries the measurement statistics standard deviation.

Query Syntax CALCulate:AVERage:SDEVIation?

Typical response +1.01238548

16.8 CALCulate:AVERage[:STATe]

Description Enable or disable statistical calculations

Command Syntax CALCulate:AVERage[:STATe] ON, 1, OFF, 0

Query Syntax CALCulate:AVERage[:STATe]?

Parameters ON, 1, OFF, 0

Example CALC:AVER ON

16.9 CALCulate:AVERage:CLEar[:IMMEDIATE]

Description Clear all calculated statistics data: minimum, maximum, average, peak-to-peak, count, and standard deviation.

Command Syntax CALCulate:AVERage:CLEar[:IMMEDIATE]

Example CALC:AVER:CLE