

Programming Manual

BA8100

EIS Battery Analyzer



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About Commands & Queries

This section lists and describes the remote control commands and queries recognized by the instrument. All commands and queries can be executed in either local or remote state.

The description, command syntax, query syntax, example and respond can be found in a section. The commands are given in both long and short form. All examples are shown in short form. Queries perform actions such as obtaining information, and are recognized by the question mark (?) following the header.

1.1 How They are Listed

The commands are listed by subsystem and alphabetical order according to their short form.

1.2 How They are Described

In the descriptions themselves, a brief explanation of the function performed is given. This is followed by a presentation of the formal syntax, with the header given in Upper-and-Lower-Case characters and the short form derived from it in ALL UPPER-CASE characters. Where applicable, the syntax of the query is given with the format of its response.

1.3 When can they be used?

The commands and queries listed here can be used for BA8100 EIS Battery Analyzer.

1.4 Command Notation

The following notation is used in the commands:

< > Angular brackets enclose words that are used as placeholders, of which there are two types: the header path and the data parameter of a command.

:= A colon followed by an equals sign separates a placeholder from the description of the type and range of values that may be used in a command instead of the placeholder.

{ } Braces enclose a list of choices, one of which one must be made.

[] Square brackets enclose optional items.

... An ellipsis indicates that the items both to its left and right may be repeated a number of times.

Common Command Introduction

IEEE standard defines the common commands used for querying the basic inSyntax of the instrument or executing basic operations. These commands usually start with "*" and the length of the keywords of the command is usually 3 characters.

Short	Long Form	Subsystem	What Command/Query does
*CLS	*CLS	SYSTEM	Clears the instrument status byte by emptying the error queue and clearing all event registers. Also cancels any preceding *OPC command or query.
*IDN	*IDN	SYSTEM	Returns a string that uniquely identifies the instrument.
*RCL	*RCL	SYSTEM	Recalls a saved instrument state.
*RST	*RST	SYSTEM	Initiates a device reset.

2.1 *CLS

Description The *CLS command clears the instrument status byte and all event registers. It also cancels any preceding *OPC commands and query.

Example *CLS

2.2 *IDN?

Description The *IDN? query causes the instrument to identify itself. The response comprises manufacturer, model, serial number, software version and firmware version.

Query Syntax *IDN?

Response Syntax *IDN, <device id>, <model>, <serial number>, <software version>, <hardware version>.

<device id>:= "BK" is used to identify instrument.

<model>:= A model identifier less than 14 characters will contain the model number.

<serial number>:= Each product has its own number, the serial number can labeled product uniqueness.

<software version>:= A serial numbers about software version.

<hardware version>:= The hardware level field, should contain inSyntax about all separately revisable subsystems. This inSyntax can be contained in single or multiple revision codes.

Example *IDN?

Returns: BK PRECISION,BA8100,0,CF:92.1CT,FV:1.04

2.3 RCL

Description The *RCL command recalls a saved instrument state.

Command Syntax *RCL

Example *RCL

2.4 *RST

Description The *RST command initiates a device reset. The *RST recalls the default setup.

Command Syntax *RST

Example *RST

Input Commands

Input commands provide remote access to configure all input menu options.

3.1 Current Gain

Description Sets and queries the input current ADC gain.

Command Syntax IM:INPUT:CURRENT:GAIN <NR1>
<NR1>= 0|2x1, 1|2x15, 2|2x30, 3|2x45,4
|10x1, 5|10x15, 6|10x30, 7|10x45,

Default 0

Query Format IM:INPUT:CURRENT:GAIN?

Respond

Example IM:INPUT:CURRENT:GAIN 2x30

3.2 Unit Current Query

Description Queries the current conversion unit value.

Query Format IM:INPUT:CURRENT:UNIT?

Respond <NRf>, Current conversion value (A/Volt)

Example IM:INPUT:CURRENT:UNIT?

3.3 Auto Gain

Description Sets the auto gain control (AGC).

Command Syntax IM:INPUT:GAIN:AUTO <Bool>
<Bool>= 0|OFF or 1|ON

Default 0|OFF

Query Format IM:INPUT:GAIN:AUTO?

Respond <Bool>,AGC Control State

Example IM:INPUT:GAIN:AUTO ON

3.4 Sample Cycle

Description Sets the sample cycle in unit of ms for a statistic cycle.

Command Syntax IM:INPUT:SAMPL:CYCL <NRF+>
<NRF+> = 10~10000 ms

Query Format IM:INPUT:SAMP:CYCL?

Respond <NRF+>,10~10000 ms

Example IM:INPUT:SAMPL:CYCL 1000

3.5 Auto Sample

Description Enable/disable the sample auto rate function.

Command Syntax IM:INPUT:SAMPL:AUTO <boolean>
<boolean> = {0 | 1}

Query Format IM:INPUT:SAMP:AUTO?

Respond <boolean> = {0 | 1}

Example IM:INPUT:SAMPL:AUTO 1

3.6 Voltage Gain

Description Sets the voltage ADC gain.

Command Syntax IM:INPUT:VOLTAGE:GAIN <NR1>
<NR1> = 0|2x1, 1|2x15, 2|2x30, 3|2x45,4
|10x1, 5|10x15, 6|10x30, 7|10x45,

Default 0

Query Format IM:INPUT:VOLTAGE:GAIN?

Respond <NR1>, corresponding to the gain selection above

Example IM:INPUT:VOLTAGE:GAIN 2x1, 1

Output Commands

Output commands provide remote access for configuring all output menu options.

4.1 Voltage Offset

Description Sets output DC voltage offset.

Command Syntax IM:OUTPUT:OFFSET <NRF+>
<NRF+> = 0~10 Volts

Default 0.0

Query Format IM:OUTPUT:OFFSET?

Query Respond <nrf+> = 0~10 Volts

Example IM:OUTPUT:OFFSET 5

4.2 Sine Wave Frequency

Description Sets the output DDS Sine Wave Frequency.

Command Syntax IM:OUTPUT:SINE:FREQ<NRF+> or <CRD>
<NRF+> = 0 ~ 20KHz
<crd> MAX |MIN

Default 0.0

Query Format IM:OUTPUT:SINE:FREQ? MAX |MIN

Query Respond <NRF+>, 0 ~ 20KHz <CRD> MAX |MIN

Example IM:OUTPUT:SINE:FREQ 1000

4.3 Voltage Amplitude

Description Sets the output AC Voltage Amplitude.

Command Syntax IM:OUTPUT:AMPLITUDE<NRF+>,<CRD>
<NRF+> = 0 ~ 1 VOLT
<CRD> = MAX |Maximum value of AC Amplitude
MIN |Minimum value of AC Amplitude

Default 0.0

Query Format IM:OUTPUT:AMPLITUDE? MAX |MIN

Query Respond <NRF+>, 0~ 1 Volt <CRD> MAX |MIN

Example IM:OUTPUT:AMPLITUDE 1

4.4 DC Voltage Level

Description Sets output AC Voltage Amplitude and DC Voltage Level.

Command Syntax IM:OUTPUT:LEV <NRF+><NRF+>
<NRF+>AC Voltage Amplitude = 0 ~ 1 Volt
<NRF+> DC Voltage Level = 0 ~ 10 Volts

Example IM:OUTPUT:LEV 0 5

4.5 DCI Amplitude

Description Sets the DCI output Amplitude.

Command Syntax IM:LOAD:CURRENT:OFFSET<NRF+>
<NRF+> = 0 ~ 3 VOLT

Default 1.0

Query Format IM:LOAD:CURRENT:OFFSET?

Query Respond <NRF+>, 0 to 3 A

Example IM:LOAD:CURRENT:OFFSET 1

4.6 ACI Amplitude

Description Sets the ACI output Amplitude.

Command Syntax IM:LOAD:CURRENT:AMPLITUDE<NRF+>
<NRF+> = 0 ~ 3 VOLT

Default 1.0

Query Format IM:LOAD:CURRENT:AMPLITUDE?

Query Respond <NRF+>, 0 to 3 A

Example IM:LOAD:CURRENT:AMPLITUDE 1

Setting Commands

The setting commands set different parameters for the BATTERY ANALYZER.

5.1 Output

Description Sets the BATTERY ANALYZER control enable or disable.

Command Syntax OUTput<Bool>
<bool> = 0 |OFF or 1 |ON

Default 0

Query Format OUTput?

Query Respond <Bool> 0 |1

Example OUTput 1

5.2 Phase Retrieve

Description Sets the BATTERY ANALYZER phase retrieve format.

Command Syntax IM:PHASE:STATE <Bool>
<Bool> = 0 |±180, 1|+360

Default 0

Query Format IM:PHASE:STATE?

Query Respond <Bool> 0 |1

Example IM:PHASE:STATE 180

5.3 AC Format

Description Sets the BATTERY ANALYZER AC format is Rms or Peak Value.

Command Syntax IM:AC:VALUE:PEAK<Bool>
<Bool> = 0 |RMS , 1 |PEAK

Default 0

Query Format IM:AC VALUE :PEAK <Bool>

Query Respond <Bool> 0 |1

Example IM:AC VALUE:PEAK 1

Query Commands

The Query commands provide remote: voltage, current, and resistance measurement. Measurement status check and BATTERY ANALYZER firmware version check can also be queried.

6.1 Current Value

Description	This command queries the current value, which returns the current value in scientific format and corresponding phase angle in degrees.
Default	0
Query Format	IM:MEAS:CURRE?
Query Respond	1.23456e-3 1.002
Example	IM:MEAS:CURRE?

6.2 DC Current Value

Description	Queries the DC load current value.
Default	0
Query Format	MEAS:CURRE?
Query Respond	Returned <NRf+> DC current Level – 0 3 Amps
Example	MEAS:CURRE? 0.489388

6.3 Voltage Measurement

Description	Queries the V θ value returning it in scientific format and corresponding phase angle in degrees.
Default	0
Query Format	IM:MEAS:VOLT?
Query Respond	1.23456e-3 1.002
Example	IM:MEAS:VOLT?

6.4 DC VOLTAGE

Description	Queries the DC voltage value.
Default	0
Query Format	MEAS:VOLT?
Query Respond	Returned <NRf+> DC VOLT Level – 0 80 Volt.
Example	MEAS:VOLT? 0.027988

6.5 Impedance

Description	Queries the impedance value, returning it in scientific format and corresponding phase angle in degrees (polar form)
Default	0
Query Format	IM:MEAS:RES?
Query Respond	1.23456e-3 1.002
Example	IM:MEAS:RES? 1.23456e-3 1.002

6.6 AC Voltage | Current | Impedance

Description	Queries AC voltage / current / impedance amplitude and phase. Returns the three values in scientific format with corresponding phase angle in degrees.
Default	0
Query Format	IM:MEAS:VAL?
Query Respond	5.54123e-04 -163.52 1.13412e-01 160.83 4.88592e-03 -2.69
Example	IM:MEAS:VAL? 5.54123e-04 -163.52 1.13412e-01 160.83 4.88592e-03 -2.69

6.7 AC Voltage | Current | Impedance | DC Voltage | DC Amp

Description	Queries the AC voltage / current / impedance amplitude and phase, DC voltage, DC Amp.
Query Format	IM:MEAS:SUMM?
Query Respond	5.54123e-04 -163.52 1.13412e-01 160.83 4.88592e-03 -2.69 0.027988 0.489388
Example	IM:MEAS:SUMM? 5.54123e-04 -163.52 1.13412e-01 160.83 4.88592e-03 -2.69 0.027988 0.489388

6.8 Impedance Rectangular Format

Description	Queries the impedance returning a value in rectangular format. Returned value is separated into the real and imaginary parts.
Default	0
Query Format	IM:MEAS:RES:RECT?
Query Respond	1.00880e+00 1.59295e-03
Example	IM:MEAS:RES:RECT? 1.00880e+00 1.59295e-03

6.9 Retrieve Verification

Description	Queries to check if the measured values are ready for retrieve.
Query Format	IM:MEAS:READY?
Query Respond	0 Measured value not ready 1 Measured value is ready
Example	IM:MEAS:READY? 1

6.10 Hardware Version

Description	Queries the BATTERY ANALYZER hardware version.
Query Format	IM:VERSION?
Query Respond	Hardware Version Number
Example	IM:VERSION?

6.11 Q Factor Measurement

Description	Queries Q factor measurement.
Query Format	IM:MEAS:QUAL:VAL?
Query Respond	X.XXXXX
Example	IM:MEAS:QUAL:VAL? X.XXXXX

6.12 D Factor Measurement

Description	Queries D factor Measurement.
Query Format	IM:MEAS:DISS:VAL?
Query Respond	X.XXXXX
Example	IM:MEAS:DISS:VAL? X.XXXXX

6.13 Parallel Impedance

Description	Queries the parallel impedance value returning the value in rectangular format.
Default	0
Query Format	IM:MEAS:IND:PAR?
Query Respond	1.00880e+00 1.59295e-03
Example	IM:MEAS:IND:PAR? 1.00880e+00 1.59295e-03

6.14 Series Capacitance Measurement

Description	Queries series capacitance measurement.
Query Format	IM:MEAS:CAP?
Query Respond	1.00880e+00 1.59295e-03
Example	IM:MEAS:CAP? 1.00880e+00 1.59295e-03

6.15 Parallel Capacitance Measurement

Description	Queries Parallel Capacitance Measurement.
Default	0
Query Format	IM:MEAS:IND:PAR?
Query Respond	1.00880e+00 1.59295e-03
Example	

6.16 Series Inductance Measurement

Description	Queries series inductance measurement.
Query Format	IM:MEAS:IND?
Query Respond	1.00880e+00 1.59295e-03
Example	IM:MEAS:IND? 1.00880e+00 1.59295e-03

6.17 Parallel Inductance Measurement

Description	Queries Parallel INductance Measurement.
Query Format	IM:MEAS:IND:PAR?
Query Respond	1.00880e+00 1.59295e-03
Example	IM:MEAS:IND:PAR? 1.00880e+00 1.59295e-03

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