



OWH67B Series Programmable Power Supply Programming Manual

For product support, visit: www.owon.com.hk/download

※:The illustrations, interface, icons and characters in the user manual may be slightly different from the actual product. Please refer to the actual product.

Aug. 2026 edition V1.0.0

Copyright © LILLIPUT Company. All rights reserved.

The LILLIPUT's products are under the protection of the patent rights, including ones which have already obtained the patent rights and those which are applying for. The information in this manual will replace all that in the materials published originally.

The information in this manual was correct at the time of printing. However, LILLIPUT will continue to improve products and reserves the rights to change specification at any time without notice.

owon[®] is the registered trademark of the LILLIPUT Company.

Fujian LILLIPUT Optoelectronics Technology Co., Ltd.

No. 19, Heming Road

Lantian Industrial Zone, Zhangzhou 363005 P.R. China

Tel: +86-596-2130430

Fax: +86-596-2109272

Web: www.owon.com.cn

E-mail: info@owon.com.cn

Table of Content

1. IEEE 488.2 Common Commands	1
1.1 Symbol and Format Description	1
1.2 *IDN	1
1.3 *RST	1
2. System Configure and Output	3
2.1 System Configure Commands	3
2.1.1 :SYSTem:VERSion?	3
2.1.2 :SYSTem:LOCal	3
2.1.3 :SYSTem:REMote	3
2.1.4 :SYSTem:SN	4
2.1.5 :SYSTem:ChECksum	4
2.1.6 :SYSTem:RST	5
2.1.7 :SYSTem:DATE	5
2.1.8 :SYSTem:TIME	5
2.1.9 :SYSTem:BACKlight	6
2.1.10 OUTPut[:STATe]	6
2.2 Mode Configure Commands	7
2.2.1 :CONFigure:MODE	7
3. Source Mode Configure	8
3.1 Source Mode Global Settings	8
3.1.1 [SOURce:]SRC:MODE	8
3.2 NORM Mode Set (CV/CC)	8
3.2.1 [SOURce:]VOLTage	8
3.2.2 [SOURce:]CURRent	9
3.2.3 [SOURce:]CURRent:LIMit:POSitive	9
3.2.4 [SOURce:]CURRent:LIMit:NEGative	10
3.2.5 [SOURce:]VOLTage:LIMit:POSitive	10
3.2.6 [SOURce:]VOLTage:LIMit:NEGative	11
3.2.7 [SOURce:]POWer:LIMit:POSitive	11

3.2.8 [SOURce:]POWer:LIMit:NEGative	11
3.2.9 [SOURce:]FUNCTion:PRlarity	12
3.2.10 [SOURce:]VOLTage:SLOPe[:LEVel][:IMMediate][:AMPLitude]	12
3.2.11 [SOURce:]CURRent:SLOPe[:LEVel][:IMMediate][:AMPLitude]	13
3.3 LIST Mode Set (Sequence Output Mode)	13
3.3.1 [SOURce:]LIST:MODE	13
3.3.2 [SOURce:]LIST:STEP	14
3.3.3 [SOURce:]LIST:INDex	14
3.3.4 [SOURce:]LIST:VOLTage	15
3.3.5 [SOURce:]LIST:CURRent	15
3.3.6 [SOURce:]LIST:TIMER	16
3.3.7 [SOURce:]LIST:CYCle	16
3.3.8 [SOURce:]LIST:LOAD	17
3.3.9 [SOURce:]LIST:TRIG	17
3.3.10 [SOURce:]LIST:Run:CYCle?	17
3.3.11 [SOURce:]LIST:Run:STEP?	18
4. LOAD Mode Configure	19
4.1 [SOURce:]LOAD:MODE	19
4.2 [SOURce:]LOAD:CURRent	19
4.3 [SOURce:]LOAD:VOLTage	20
4.4 [SOURce:]LOAD:POWer	20
4.5 [SOURce:]LOAD:RESistance	20
4.6 Slew Set (Load Mode)	21
4.6.1 [SOURce:]LOAD:VOLTage:SLEW:RISE	21
4.6.2 [SOURce:]LOAD:VOLTage:SLEW:FALL	21
4.6.3 [SOURce:]LOAD:RESistance:SLEW:RISE	22
4.6.4 [SOURce:]LOAD:RESistance:SLEW:FALL	22
4.6.5 [SOURce:]LOAD:POWer:SLEW:RISE	23
4.6.6 [SOURce:]LOAD:POWer:SLEW:FALL	23
4.6.7 [SOURce:]LOAD:CURRent:SLEW:RISE	24
4.6.8 [SOURce:]LOAD:CURRent:SLEW:FALL	24

4.7 [SOURce:]VOLTage[:LEVel]:ON	25
5. BAT Mode Configure (Battery Stimulate)	26
5.1 [SOURce:]BATTery:TYPE	26
5.2 [SOURce:]BATTery:CAPacity	26
5.3 [SOURce:]BATTery:RESistance	27
5.4 [SOURce:]BATTery:SOC:INITial	27
5.5 [SOURce:]BATTery:SERies	28
5.6 [SOURce:]BATTery:PARallel	28
5.7 [SOURce:]BATTery:VOLTage:HIGH	29
5.8 [SOURce:]BATTery:VOLTage:LOW	29
5.9 [SOURce:]BATTery:STATE?	30
6. PV Mode Configure	31
6.1 [SOURce:]CONFG:SAS:CURve:TYPE	31
6.2 [SOURce:]CONFG:SAS:VMPp	31
6.3 [SOURce:]CONFG:SAS:TMP	32
6.4 [SOURce:]CONFG:SAS:PMPp	32
6.5 [SOURce:]CONFG:SAS:TECH	32
6.6 [SOURce:]CONFG:SAS:IRR	33
6.7 [SOURce:]CONFG:SAS:SANDIA:TECH	33
6.8 [SOURce:]CONFG:SAS:SANDIA:IRR	34
6.9 [SOURce:]CONFG:SAS:SANDIA:TMP	34
6.10 [SOURce:]CONFG:SAS:SANDIA:PMPp	35
6.11 [SOURce:]CONFG:SAS:SANDIA:VMPp	35
6.12 [SOURce:]CONFG:SAS:TRIG	36
6.13 [SOURce:]CONFG:SAS:AVErage:VMPp?	36
6.14 [SOURce:]CONFG:SAS:AVErage:IMPp?	37
6.15 [SOURce:]CONFG:SAS:AVErage:PMPp?	37
6.16 [SOURce:]CONFG:SAS:CUSTOM:VMPp	37
6.17 [SOURce:]CONFG:SAS:CUSTOM:IMPp	38
6.18 [SOURce:]CONFG:SAS:CUSTOM:ISC	38
6.19 [SOURce:]CONFG:SAS:CUSTOM:VOC	39

7. Measurement System	40
7.1 MEASure:VOLTage[:DC]?	40
7.2 MEASure:CURREnt[:DC]?	40
7.3 MEASure:POWEr[:DC]?	40
7.4 MEASure:BATTery:SOC?	41
7.5 MEASure[:SCALar]:ALL[:DC]:INFO?	41
7.6 MEASure:GRID:VOLTage?	42
7.7 MEASure:GRID:CURREnt?	42
7.8 MEASure:GRID:FREQUency?	42
7.9 MEASure:GRID:POWEr:APParent?	43
7.10 MEASure:GRID:POWEr:REACTive?	43
7.11 MEASure:GRID:POWEr?	44
7.12 MEASure:GRID:POWEr:FACTor?	44
7.13 MEASure:GRID:ENERgy:POSitive?	44
7.14 MEASure:GRID:ENERgy:NEGative?	45
7.15 MEASure:GRID:ALL?	45
8. Protect System	46
8.1 [SOURce:]VOLTage:PROTection	46
8.2 [SOURce:]CURREnt:PROTection	46
8.3 [SOURce:]POWEr:PROTection	47
9. Example	48
9.1 Typical Programming Flow Example for CCCV Mode	48
9.2 Typical Programming Flow Example for LIST Mode	48
9.3 Typical Programming Flow Example for LOAD Mode	49
9.4 Typical Programming Flow Example for BAT Mode	49
9.5 Typical Programming Flow Example for PV Mode	50

1. IEEE 488.2 Common Commands

1.1 Symbol and Format Description

- []: Keywords inside square brackets are optional. For example, for [SOURce:]VOLTage, sending VOLT is sufficient.
- <val>: Represents a numeric parameter (e.g., 12.5, 60, 1.2E-3).
- <bool>: Represents a boolean value, accepting 0|OFF or 1|ON.
- ? : Indicates that the command supports Query.
- All commands are case-insensitive. Uppercase letters in examples are for readability only.

SYSTem:REMOte is the command to enable remote control.

1.2 *IDN

Syntax	*IDN?	
Function Description	Query device identification information (manufacturer, model, serial number, firmware version).	
Parameters	None	
Note	Compliant with the IEEE 488.2 standard, used for device identification.	
Return Format	String, format: manufacturer,model,serial number,firmware version	
Example	Query	*IDN?
	Return	Factory,Device,1234567,FV:V1.0.0

1.3 *RST

Syntax	*RST
Function Description	Resets the device software and restores default configurations.
Parameters	None
Note	After execution, the device returns to the initial state, and

	mode and parameters must be reconfigured.	
Return Format	None	
Example	Set	*RST //The device resets and restarts, and the screen displays the initial interface.

2. System Configure and Output

2.1 System Configure Commands

2.1.1 :SYSTem:VERSion?

Syntax	:SYSTem:VERSion?	
Function Description	Query the SCPI protocol version supported by the device.	
Parameters	None	
Note	Return SCPI version	
Return Format	String, example: 1999.0.	
Example	Query	:SYSTem:VERSion?
	Return	V1.0.0

2.1.2 :SYSTem:LOCal

Syntax	:SYSTem:LOCal	
Function Description	Release remote control and switch to local operation mode (front panel key control).	
Parameters	None	
Note	After execution, remote commands are disabled, and operation must be performed via the front panel.	
Return Format	None (no return value on successful execution).	
Example	Set	:SYSTem:LOCal //The device switches to local mode, controlled via front panel keys.

2.1.3 :SYSTem:REMOte

Syntax	:SYSTem:REMOte	
Function	Enables remote control mode (accepts SCPI commands).	

Description		
Parameters	None	
Note	After execution, the device only responds to SCPI commands, and front panel keys are locked.	
Return Format	None (no return value on successful execution).	
Example	Set	:SYSTem:REMOte //The device switches to remote mode.

2.1.4 :SYSTem:SN

Syntax	:SYSTem:SN <val>	
Function Description	Set the device serial number (unique identifier).	
Parameters	<val> (String, length $\leq$ 20, e.g.: 2023001).	
Note	The serial number is used to distinguish devices and supports letters, digits and partial symbols.	
Return Format	None	
Example	Set	:SYSTem:SN 2023001

2.1.5 :SYSTem:ChECksum

Syntax	:SYSTem:ChECksum <val>	
Function Description	Set the device checksum (for configuration data verification).	
Parameters	<val> (Hexadecimal string, e.g.: A1B12C31).	
Note	The checksum must match the internally stored value of the device to prevent configuration errors.	
Return Format	None	
Example	Set	:SYSTem:ChECksum A1B2C3

2.1.6 :SYSTem:RST

Syntax	:SYSTem:RST	
Function Description	Software reset (identical function to *RST, SCPI standard extension).	
Parameters	None	
Note	Default configurations are restored after execution; reinitialization is required.	
Return Format	None (no return value on successful execution).	
Example	Set	:SYSTem:RST //The device resets, and all parameters return to default values.

2.1.7 :SYSTem:DATE

Syntax	:SYSTem:DATE <val> :SYSTem:DATE?	
Function Description	Set / query the device system date.	
Parameters	<val> (string, format: YYYY/MM/DD)	
Note	The date is used for logging.	
Return Format	Query: string.	
Example	Set	:SYSTem:DATE 2023/10/01
	Query	:SYSTem:DATE?
	Return	2023/10/01

2.1.8 :SYSTem:TIME

Syntax	:SYSTem:TIME <val> :SYSTem:TIME?	
Function	Set / query the device system time.	

Description		
Parameters	<val> (string, format: HH:MM:SS).	
Note	The time is used for logging.	
Return Format	Query: string.	
Example	Set	:SYSTem:TIME 14:30:00
	Query	:SYSTem:TIME?
	Return	14:30:00

2.1.9 :SYSTem:BACKlight

Syntax	:SYSTem:BACKlight <val> :SYSTem:BACKlight?	
Function Description	Set / query the device system backlight.	
Parameters	<val> (Integer, range: 0 - 100; 0 = Off, 100 = Maximum brightness).	
Note	A larger brightness value corresponds to brighter backlight.	
Return Format	Query: Integer (e.g., 80).	
Example	Set	:SYSTem:BACKlight 80
	Query	:SYSTem:BACKlight?
	Return	80

2.1.10 OUTPut[:STATe]

Syntax	OUTPut[:STATe] <bool> OUTPut[:STATe]?	
Function Description	Set / query module output state (On/Off).	
Parameters	<bool>(0 1 ON OFF)	

Note	When the output is enabled, the device operates according to the configured mode (Source / Load / Battery Simulation / PV Simulation).	
Return Format	Query: (ON OFF)	
Example	Set	OUTP ON
	Query	OUTP?
	Return	1

2.2 Mode Configure Commands

2.2.1 :CONFigure:MODE

Syntax	:CONFigure:MODE <mode> :CONFigure:MODE?	
Function Description	Set / query the device work mode.	
Parameters	<mode>(SOURCE LOAD BATT PV) SOUR : Power Supply mode; LOAD : Electronic Load Mode; BATT : Battery Simulation Mode; PV : PV Simulation Mode	
Note	Switch mode.	
Return Format	Query: string.	
Example	Set	:CONF:MODE SOURCE
	Query	:CONF:MODE?
	Return	SOURCE

3. Source Mode Configure

3.1 Source Mode Global Settings

3.1.1 [SOURce:]SRC:MODE

Syntax	[SOURce:]SRC:MODE <mode> [SOURce:]SRC:MODE?	
Function Description	Set / query the subtype of source mode (NORM mode / List mode).	
Parameters	<mode>(NORM LIST)	
Note	Enter source mode via :CONF:MODE SOURCE first before setting the subtype.	
Return Format	Query: string.	
Example	Set	SRC:MODE NORM
	Query	SRC:MODE?
	Return	NORM

3.2 NORM Mode Set (CV/CC)

3.2.1 [SOURce:]VOLTage

Syntax	[SOURce:]VOLTage <val> [SOURce:]VOLTage?	
Function Description	Set / query the output voltage in source mode (NORM mode, constant voltage source mode).	
Parameters	<val> (numeric value, unit: V).	
Note	Abbreviation: VOLT may be sent in place of VOLTage.	
Return Format	Query: numeric value.	
Example	Set	VOLT 48

	Query	VOLT?
	Return	48.00

3.2.2 [SOURce:]CURRent

Syntax	[SOURce:]CURRent <val> [SOURce:]CURRent?	
Function Description	Set / query the output current in source mode (NORM mode, constant current source mode).	
Parameters	<val> (numeric value, unit: A).	
Note	Abbreviation: CURR may be sent in place of CURRent.	
Return Format	Query: numeric value.	
Example	Set	CURR 20
	Query	CURR?
	Return	20.00

3.2.3 [SOURce:]CURRent:LIMit:POSitive

Syntax	[SOURce:]CURRent:LIMit:POSitive <val> [SOURce:]CURRent:LIMit:POSitive?	
Function Description	Set / query the positive current limit in source mode (NORM mode, constant voltage source mode).	
Parameters	<val> (numeric value, unit: A).	
Note	Abbreviation: CURR:LIM:POS may be sent in place of the full command.	
Return Format	Query: numeric value.	
Example	Set	CURR:LIM:POS 5
	Query	CURR:LIM:POS?
	Return	5.00

3.2.4 [SOURce:]CURRent:LIMit:NEGative

Syntax	[SOURce:]CURRent:LIMit:NEGative <val> [SOURce:]CURRent:LIMit:NEGative?	
Function Description	Set / query the negative current limit in source mode (NORM mode, constant voltage source mode).	
Parameters	<val> (numeric value, unit: A).	
Note	Abbreviation: CURR:LIM:NEG may be sent in place of the full command.	
Return Format	Query: numeric value.	
Example	Set	CURR:LIM:NEG -5
	Query	CURR:LIM:NEG?
	Return	-5.0

3.2.5 [SOURce:]VOLTage:LIMit:POSitive

Syntax	[SOURce:]VOLTage:LIMit:POSitive <val> [SOURce:]VOLTage:LIMit:POSitive?	
Function Description	Set / query the positive voltage limit in source mode (NORM mode, constant current source mode).	
Parameters	<val> (numeric value, unit: V).	
Note	Abbreviation: VOLT:LIM:POS may be sent in place of the full command.	
Return Format	Query: numeric value.	
Example	Set	VOLT:LIM:POS 5
	Query	VOLT:LIM:POS?
	Return	5.00

3.2.6 [SOURce:]VOLTage:LIMit:NEGative

Syntax	[SOURce:]VOLTage:LIMit:NEGative <val> [SOURce:]VOLTage:LIMit:NEGative?	
Function Description	Set / query the negative voltage limit in source mode (NORM mode, constant current source mode).	
Parameters	<val> (numeric value, unit: A).	
Note	Abbreviation: VOLT:LIM:NEG may be sent in place of the full command.	
Return Format	Query: numeric value.	
Example	Set	VOLT:LIM:NEG 4
	Query	VOLT:LIM:NEG?
	Return	4.0

3.2.7 [SOURce:]POWer:LIMit:POSitive

Syntax	[SOURce:]POWer:LIMit:POSitive <val> [SOURce:]POWer:LIMit:POSitive?	
Function Description	Set / query the positive power limit in source mode (NORM mode).	
Parameters	<val> (numeric value, unit: W).	
Note	Abbreviation: POW:LIM:POS.	
Return Format	Query: numeric value.	
Example	Set	POW:LIM:POS 5
	Query	POW:LIM:POS?
	Return	5.0

3.2.8 [SOURce:]POWer:LIMit:NEGative

Syntax	[SOURce:]POWer:LIMit:NEGative <val>
---------------	-------------------------------------

	[SOURce:]POWer:LIMit:NEGative?	
Function Description	Set / query the negative power limit in source mode (NORM mode).	
Parameters	<val> (numeric value, unit: W).	
Note	The CP function must be enabled first. Abbreviation: POW:LIM:NEG.	
Return Format	Query: numeric value (e.g. -5.0).	
Example	Set	POW:LIM:NEG -5
	Query	POW:LIM:NEG?
	Return	-5.0

3.2.9 [SOURce:]FUNCTION:PRiority

Syntax	[SOURce:]FUNCTION:PRiority <mode> [SOURce:]FUNCTION:PRiority?	
Function Description	Set / query constant voltage / constant current source mode under CCCV mode.	
Parameters	<mode>(CV CC).	
Note	Abbreviation: FUNC:PRI.	
Return Format	Query: (CV CC)	
Example	Set	FUNC:PRI CC
	Query	FUNC:PRI?
	Return	CC

3.2.10 [SOURce:]VOLTage:SLOPe[:LEVel][:IMMediate][:AMP Litude]

Syntax	[SOURce:]VOLTage:SLOPe[:LEVel][:IMMediate][:AMPLitude] > <val> [SOURce:]VOLTage:SLOPe?
---------------	--

Function Description	Set / query voltage slew rate (rate of voltage change in NORM mode).	
Parameters	<val> (numeric value, unit: V/ms).	
Note	Abbreviation: VOLT:SLOP.	
Return Format	Query: numeric value.	
Example	Set	VOLT:SLOP 0.2
	Query	VOLT:SLOP?
	Return	0.2

3.2.11 [SOURce:]CURRent:SLOPe[:LEVel][:IMMediate][:AMP Litude]

Syntax	[SOURce:]CURRent:SLOPe[:LEVel][:IMMediate][:AMPLitude] <val> [SOURce:]CURRent:SLOPe?	
Function Description	Set / query current slew rate (rate of current change in NORM mode).	
Parameters	<val> (numeric value, unit is: A/ms).	
Note	Abbreviation: CURR:SLOP.	
Return Format	Query: numeric value.	
Example	Set	CURR:SLOP 0.5
	Query	CURR:SLOP?
	Return	0.5

3.3 LIST Mode Set (Sequence Output Mode)

3.3.1 [SOURce:]LIST:MODE

Syntax	[SOURce:]LIST:MODE <mode> [SOURce:]LIST:MODE?
---------------	--

Function Description	Set / query the running mode of LIST mode (Auto / Manual).	
Parameters	<mode>(AUTO MANUAL).	
Note	Abbreviation: LIST:MODE.	
Return Format	Query: AUTO	
Example	Set	LIST:MODE AUTO
	Query	LIST:MODE?
	Return	AUTO

3.3.2 [SOURce:]LIST:STEP

Syntax	[SOURce:]LIST:STEP <val> [SOURce:]LIST:STEP?	
Function Description	Set / query the total steps of LIST mode (Number of List Entries).	
Parameters	<val> (numeric value, ≥1).	
Note	Abbreviation: LIST:STEP.	
Return Format	Query: Integer.	
Example	Set	LIST:STEP 2
	Query	LIST:STEP?
	Return	2

3.3.3 [SOURce:]LIST:INDEX

Syntax	[SOURce:]LIST:INDEX <val> [SOURce:]LIST:INDEX?	
Function Description	Set / query the current edit index of LIST Mode (step number for designated operation).	
Parameters	<val> (Integer).	

Note	Abbreviation: LIST:IND.	
Return Format	Query: Integer.	
Example	Set	LIST:IND 1
	Query	LIST:IND?
	Return	1

3.3.4 [SOURce:]LIST:VOLTage

Syntax	[SOURce:]LIST:VOLTage <val> [SOURce:]LIST:VOLTage?	
Function Description	Set / query the voltage value of the current index step in LIST Mode.	
Parameters	<val> (numeric value, unit: V).	
Note	Abbreviation: LIST:VOLT.	
Return Format	Query: numeric value.	
Example	Set	LIST:VOLT 24
	Query	LIST:VOLT?
	Return	24.00

3.3.5 [SOURce:]LIST:CURREnt

Syntax	[SOURce:]LIST:CURREnt <val> [SOURce:]LIST:CURREnt?	
Function Description	Set / query the current value of the current index step in LIST Mode.	
Parameters	<val> (numeric value, unit: A).	
Note	Abbreviation: LIST:CURREnt.	
Return Format	Query: numeric value.	

Example	Set	LIST:CURRE 5
	Query	LIST:CURRE?
	Return	5.00

3.3.6 [SOURce:]LIST:TIMEr

Syntax	[SOURce:]LIST:TIMEr <val> [SOURce:]LIST:TIMEr?	
Function Description	Set / query the duration time (unit is:s) of the current index step in LIST Mode.	
Parameters	<val> (numeric value, ≥0.5, e.g: 5.0).	
Note	Abbreviation: LIST:TIME.	
Return Format	Query: numeric value.	
Example	Set	LIST:TIME 5
	Query	LIST:TIME?
	Return	5.0

3.3.7 [SOURce:]LIST:CYCLE

Syntax	[SOURce:]LIST:CYCLE <val> [SOURce:]LIST:CYCLE?	
Function Description	Set / query the cycle count of LIST Mode (0 = infinite cycles).	
Parameters	<val> (Integer, ≥0).	
Note	Abbreviation: LIST:CYCLE.	
Return Format	Query: Integer.	
Example	Set	LIST:CYCLE 3
	Query	LIST:CYCLE?
	Return	3

3.3.8 [SOURce:]LIST:LOAD

Syntax	[SOURce:]LIST:LOAD	
Function Description	Load LIST table data (activate configured step count, voltage, current and duration).	
Parameters	None	
Note	Execute this command after all LIST parameters are configured.	
Return Format	None (no return value on successful execution).	
Example	Set	LIST:LOAD //Once the list data is loaded, the sequence is ready to run.

3.3.9 [SOURce:]LIST:TRIG

Syntax	[SOURce:]LIST:TRIG	
Function Description	Trigger the LIST to execute the current indexed step under Manual Mode (Valid when LIST:MODE is set to MANUAL).	
Parameters	None	
Note	One step is executed upon each transmission.	
Return Format	None (no return value on successful execution).	
Example	Set	LIST:TRIG //Execute the current indexed step (e.g., index 1).

3.3.10 [SOURce:]LIST:Run:CYCLe?

Syntax	[SOURce:]LIST:Run:CYCLe?	
Function Description	Query the current cycle count of LIST Mode (during operation).	
Parameters	None	
Note	Return the number of completed cycles (starting from 1).	

Return Format	Integer.	
Example	Query	LIST:Run:CYCLE?
	Return	2

3.3.11 [SOURce:]LIST:Run:STEP?

Syntax	[SOURce:]LIST:Run:STEP?	
Function Description	Query the currently executing step number of LIST Mode (during operation).	
Parameters	None	
Note	Return the currently executing step number.	
Return Format	Integer.	
Example	Query	LIST:Run:STEP?
	Return	1

4. LOAD Mode Configure

4.1 [SOURce:]LOAD:MODE

Syntax	[SOURce:]LOAD:MODE <mode> [SOURce:]LOAD:MODE?	
Function Description	Set / query the electronic load mode type (Constant Current / Constant Voltage / Constant Resistance / Constant Power).	
Parameters	<mode> (CC CV CR CP) .	
Note	Abbreviation: LOAD:MODE.	
Return Format	Query:CC	
Example	Set	LOAD:MODE CC
	Query	LOAD:MODE?
	Return	CC

4.2 [SOURce:]LOAD:CURREnt

Syntax	[SOURce:]LOAD:CURREnt <val> [SOURce:]LOAD:CURREnt?	
Function Description	Set / query the sink current value under CC mode (Constant Current Load).	
Parameters	<val> (numeric value, unit: A).	
Note	Abbreviation: LOAD:CURREnt.	
Return Format	Query: numeric value.	
Example	Set	LOAD:CURREnt 5
	Query	LOAD:CURREnt?
	Return	5.00

4.3 [SOURce:]LOAD:VOLTage

Syntax	[SOURce:]LOAD:VOLTage <val> [SOURce:]LOAD:VOLTage?	
Function Description	Set / query the sink voltage value under CV mode (Constant Voltage Load).	
Parameters	<val> (numeric value, unit: V).	
Note	Abbreviation: LOAD:VOLT.	
Return Format	Query: numeric value.	
Example	Set	LOAD:VOLT 24
	Query	LOAD:VOLT?
	Return	24.00

4.4 [SOURce:]LOAD:POWer

Syntax	[SOURce:]LOAD:POWer <val> [SOURce:]LOAD:POWer?	
Function Description	Set / query the sink power value under CP mode (Constant Power Load).	
Parameters	<val> (numeric value, unit: W).	
Note	Abbreviation: LOAD:POW.	
Return Format	Query: numeric value.	
Example	Set	LOAD:POW 100
	Query	LOAD:POW?
	Return	100.00

4.5 [SOURce:]LOAD:RESistance

Syntax	[SOURce:]LOAD:RESistance <val> [SOURce:]LOAD:RESistance?
---------------	---

Function Description	Set / query the sink resistance value under CR mode (Constant Resistance Load).	
Parameters	<val> (numeric value, unit is: Ω).	
Note	Abbreviation: LOAD:RES.	
Return Format	Query: numeric value.	
Example	Set	LOAD:RES 10
	Query	LOAD:RES?
	Return	10.0

4.6 Slew Set (Load Mode)

4.6.1 [SOURce:]LOAD:VOLTage:SLEW:RISE

Syntax	[SOURce:]LOAD:VOLTage:SLEW:RISE <type> [SOURce:]LOAD:VOLTage:SLEW:RISE?	
Function Description	Set / query voltage rising slew rate under CV Mode (Fast / Medium / Slow).	
Parameters	<type>(FAST NORM SLOW).	
Note	Abbreviation: LOAD:VOLT:SLEW:RISE.	
Return Format	Query: FAST, NORM, SLOW	
Example	Set	LOAD:VOLT:SLEW:RISE NORM
	Query	LOAD:VOLT:SLEW:RISE?
	Return	NORM

4.6.2 [SOURce:]LOAD:VOLTage:SLEW:FALL

Syntax	[SOURce:]LOAD:VOLTage:SLEW:FALL <type> [SOURce:]LOAD:VOLTage:SLEW:FALL?	
Function Description	Set / query voltage falling slew rate under CV Mode (Fast / Medium / Slow).	

Parameters	<type>(FAST NORM SLOW).	
Note	Abbreviation: LOAD:VOLT:SLEW:FALL.	
Return Format	Query: FAST, NORM, SLOW	
Example	Set	LOAD:VOLT:SLEW:FALL SLOW
	Query	LOAD:VOLT:SLEW:FALL?
	Return	SLOW

4.6.3 [SOURce:]LOAD:RESistance:SLEW:RISE

Syntax	[SOURce:]LOAD:RESistance:SLEW:RISE <type> [SOURce:]LOAD:RESistance:SLEW:RISE?	
Function Description	Set / query resistance rising slew rate under CR Mode (Fast / Medium / Slow).	
Parameters	<type>(FAST NORM SLOW).	
Note	Abbreviation: LOAD:RES:SLEW:RISE.	
Return Format	Query: FAST, NORM, SLOW	
Example	Set	LOAD:RES:SLEW:RISE FAST
	Query	LOAD:RES:SLEW:RISE?
	Return	FAST

4.6.4 [SOURce:]LOAD:RESistance:SLEW:FALL

Syntax	[SOURce:]LOAD:RESistance:SLEW:FALL <type> [SOURce:]LOAD:RESistance:SLEW:FALL?	
Function Description	Set / query falling resistance slew rate under CR Mode (Fast / Medium / Slow).	
Parameters	<type>(FAST NORM SLOW).	
Note	Abbreviation: LOAD:RES:SLEW:FALL.	
Return	Query: FAST, NORM, SLOW	

Format		
Example	Set	LOAD:RES:SLEW:FALL NORM
	Query	LOAD:RES:SLEW:FALL?
	Return	NORM

4.6.5 [SOURce:]LOAD:POWer:SLEW:RISE

Syntax	[SOURce:]LOAD:POWer:SLEW:RISE <type> [SOURce:]LOAD:POWer:SLEW:RISE?	
Function Description	Set / query power rising slew rate under CP Mode (Fast / Medium / Slow).	
Parameters	<type>(FAST NORM SLOW).	
Note	Abbreviation: LOAD:POW:SLEW:RISE.	
Return Format	Query: FAST, NORM, SLOW	
Example	Set	LOAD:POW:SLEW:RISE SLOW
	Query	LOAD:POW:SLEW:RISE?
	Return	SLOW

4.6.6 [SOURce:]LOAD:POWer:SLEW:FALL

Syntax	[SOURce:]LOAD:POWer:SLEW:FALL <type> [SOURce:]LOAD:POWer:SLEW:FALL?	
Function Description	Set / query power falling slew rate under CP Mode (Fast / Medium / Slow).	
Parameters	<type>(FAST NORM SLOW).	
Note	Abbreviation: LOAD:POW:SLEW:FALL.	
Return Format	Query: FAST, NORM, SLOW	
Example	Set	LOAD:POW:SLEW:FALL FAST
	Query	LOAD:POW:SLEW:FALL?

	Return	FAST
--	---------------	------

4.6.7 [SOURce:]LOAD:CURRent:SLEW:RISE

Syntax	[SOURce:]LOAD:CURRent:SLEW:RISE <val> [SOURce:]LOAD:CURRent:SLEW:RISE?	
Function Description	Set / query current rising slew rate under CC Mode.	
Parameters	<val>(Numeric value, unit is: A/ms).	
Note	Abbreviation: LOAD:CURR:SLEW:RISE.	
Return Format	Query: numeric value.	
Example	Set	LOAD:CURR:SLEW:RISE 0.5
	Query	LOAD:CURR:SLEW:RISE?
	Return	0.5

4.6.8 [SOURce:]LOAD:CURRent:SLEW:FALL

Syntax	[SOURce:]LOAD:CURRent:SLEW:FALL <val> [SOURce:]LOAD:CURRent:SLEW:FALL?	
Function Description	Set / query current falling slew rate under CC Mode.	
Parameters	<val>(Numeric value, unit is: A/ms).	
Note	Abbreviation: LOAD:CURR:SLEW:FALL.	
Return Format	Query: numeric value.	
Example	Set	LOAD:CURR:SLEW:FALL 0.3
	Query	LOAD:CURR:SLEW:FALL?
	Return	0.3

4.7 [SOURce:]VOLTage[:LEVel]:ON

Syntax	[SOURce:]VOLTage[:LEVel]:ON <val> [SOURce:]VOLTage[:LEVel]:ON?	
Function Description	Set / query the load-on voltage (the starting voltage to trigger the load in load mode).	
Parameters	<val> (numeric value, unit: V).	
Note	Abbreviation: VOLT:ON.	
Return Format	Query: numeric value.	
Example	Set	VOLT:ON 12
	Query	VOLT:ON?
	Return	12.0

5. BAT Mode Configure (Battery Stimulate)

5.1 [SOURce:]BATTery:TYPE

Syntax	[SOURce:]BATTery:TYPE <type> [SOURce:]BATTery:TYPE?	
Function Description	Set / query battery stimulate type.	
Parameters	<type>(LFP NMC LCO LTG NIMH LA NCA) LFP : Lithium Iron Phosphate NMC : Lithium Nickel Manganese Cobalt Oxide LCO : Lithium Cobalt Oxide LTG : Lithium Titanate Oxide NIMH : Nickel Metal Hydride LA : Lead-Acid NCA : Lithium Nickel Cobalt Aluminum Oxide	
Note	Abbreviation: BATT:TYPE.	
Return Format	Query: string.	
Example	Set	BATT:TYPE LFP
	Query	BATT:TYPE?
	Return	LFP

5.2 [SOURce:]BATTery:CAPacity

Syntax	[SOURce:]BATTery:CAPacity <val> [SOURce:]BATTery:CAPacity?	
Function Description	Set / query battery capacity (Simulated Total Charge).	
Parameters	<val> (numeric value, unit is: Ah).	
Note	Abbreviation: BATT:CAP.	

Return Format	Query: numeric value.	
Example	Set	BATT:CAP 100
	Query	BATT:CAP?
	Return	100.00

5.3 [SOURce:]BATTery:RESistance

Syntax	[SOURce:]BATTery:RESistance <val> [SOURce:]BATTery:RESistance?	
Function Description	Set / query battery internal resistance (internal resistance of simulated battery)	
Parameters	<val> (numeric value, unit is: mΩ).	
Note	Abbreviation: BATT:RES.	
Return Format	Query: numeric value.	
Example	Set	BATT:RES 0.1
	Query	BATT:RES?
	Return	0.1

5.4 [SOURce:]BATTery:SOC:INITial

Syntax	[SOURce:]BATTery:SOC:INITial <val> [SOURce:]BATTery:SOC:INITial?	
Function Description	Set / query battery initial SOC (State of Charge).	
Parameters	<val>(numeric value: 0-100, unit is: %).	
Note	Abbreviation: BATT:SOC:INIT.	
Return Format	Query: numeric value (e.g.: 50.0).	
Example	Set	BATT:SOC:INIT 50

	Query	BATT:SOC:INIT?
	Return	50.0

5.5 [SOURce:]BATTery:SERies

Syntax	[SOURce:]BATTery:SERies <val> [SOURce:]BATTery:SERies?	
Function Description	Set / query number of battery cells in series (simulate series connection of multiple cells).	
Parameters	<val> (integer, ≥1).	
Note	Abbreviation: BATT:SER.	
Return Format	Query: Integer.	
Example	Set	BATT:SER 1
	Query	BATT:SER?
	Return	1

5.6 [SOURce:]BATTery:PARallel

Syntax	[SOURce:]BATTery:PARallel <val> [SOURce:]BATTery:PARallel?	
Function Description	Set / query number of battery cells in parallel (simulate parallel connection of multiple cells).	
Parameters	<val> (integer, ≥1).	
Note	Abbreviation: BATT:PAR.	
Return Format	Query: Integer.	
Example	Set	BATT:PAR 1
	Query	BATT:PAR?
	Return	1

5.7 [SOURce:]BATTery:VOLTage:HIGH

Syntax	[SOURce:]BATTery:VOLTage:HIGH <val> [SOURce:]BATTery:VOLTage:HIGH?	
Function Description	Set / query charge cutoff voltage in battery simulation mode (maximum allowable voltage during charging).	
Parameters	<val>: numeric value, unit is: V	
Note	Valid only in battery simulation (BATT) mode. The set command writes parameters, and the query command reads the current setting values.	
Return Format	<val> (numeric value, unit is: V)	
Example	Set	[SOURce:]BATTery:VOLTage:HIGH 58.4
	Query	[SOURce:]BATTery:VOLTage:HIGH?
	Return	58.4

5.8 [SOURce:]BATTery:VOLTage:LOW

Syntax	[SOURce:]BATTery:VOLTage:LOW <val>; [SOURce:]BATTery:VOLTage:LOW?	
Function Description	Set / query charge cutoff voltage in battery simulation mode (minimum allowable voltage during charging).	
Parameters	<val>: numeric value (e.g.: 40.0), unit is: V	
Note	Valid only in battery simulation (BATT) mode.	
Return Format	<val> (numeric value, unit is: V)	
Example	Set	[SOURce:]BATTery:VOLTage:LOW 40.0
	Query	[SOURce:]BATTery:VOLTage:LOW?
	Return	40.0

5.9 [SOURce:]BATTery:STATE?

Syntax	[SOURce:]BATTery:STATE?	
Function Description	Query charge/discharge status in battery simulation mode.	
Parameters	None	
Note	IDLE: Idle; CHARGE: Charging; RECHARGE: Discharging.	
Return Format	IDLE, CHARGE, RECHARGE	
Example	Query	[SOURce:]BATTery:STATE?
	Return	1

6. PV Mode Configure

6.1 [SOURCE:]CONFIG:SAS:CURve:TYPE

Syntax	[SOURCE:]CONFIG:SAS:CURve:TYPE <type> [SOURCE:]CONFIG:SAS:CURve:TYPE?	
Function Description	Set / query photovoltaic simulation model type under PV Mode.	
Parameters	<type>:(EN50530 SANDIA CUSTOM)	
Note	Select the core simulation algorithm for PV Mode.	
Return Format	Return EN50530 or SANDIA	
Example	Set	[SOURCE:]CONFIG:SAS:CURve:TYPE EN50530
	Query	[SOURCE:]CONFIG:SAS:CURve:TYPE?
	Return	EN50530

6.2 [SOURCE:]CONFIG:SAS:VMPp

Syntax	[SOURCE:]CONFIG:SAS:VMPp <val> [SOURCE:]CONFIG:SAS:VMPp?	
Function Description	Set / query MPP voltage under EN50530 model.	
Parameters	<val>: numeric value, unit is: V	
Note	Valid only when CURve:TYPE=EN50530	
Return Format	<val> (numeric value, unit is: V)	
Example	Set	[SOURCE:]CONFIG:SAS:VMPp 35.0
	Query	[SOURCE:]CONFIG:SAS:VMPp?
	Return	35.0

6.3 [SOURce:]CONFIG:SAS:TMP

Syntax	[SOURce:]CONFIG:SAS:TMP <val> [SOURce:]CONFIG:SAS:TMP?	
Function Description	Set / query ambient temperature under EN50530 model.	
Parameters	<val>: numeric value, unit is: °C	
Note	Valid only when CURve:TYPE=EN50530	
Return Format	<val> (numeric value, unit is: °C)	
Example	Set	[SOURce:]CONFIG:SAS:TMP 25.0
	Query	[SOURce:]CONFIG:SAS:TMP?
	Return	25.0

6.4 [SOURce:]CONFIG:SAS:PMPp

Syntax	[SOURce:]CONFIG:SAS:PMPp <val> [SOURce:]CONFIG:SAS:PMPp?	
Function Description	Set / query MPP power under EN50530 model.	
Parameters	<val>: numeric value, unit is: W	
Note	Valid only when CURve:TYPE=EN50530	
Return Format	<val> (numeric value, unit is: W)	
Example	Set	[SOURce:]CONFIG:SAS:PMPp 1000.0
	Query	[SOURce:]CONFIG:SAS:PMPp?
	Return	1000.0

6.5 [SOURce:]CONFIG:SAS:TECH

Syntax	[SOURce:]CONFIG:SAS:TECH <type> [SOURce:]CONFIG:SAS:TECH?
---------------	--

Function Description	Set / query photovoltaic material type under EN50530 model.	
Parameters	<type>: CSI TF CSI: Crystalline Silicon TF: Thin Film	
Note	Valid only when CURve:TYPE=EN50530	
Return Format	Return CSI or TF	
Example	Set	[SOURce:]CONFIG:SAS:TECH CSI
	Query	[SOURce:]CONFIG:SAS:TECH?
	Return	CSI

6.6 [SOURce:]CONFIG:SAS:IRR

Syntax	[SOURce:]CONFIG:SAS:IRR <val> [SOURce:]CONFIG:SAS:IRR?	
Function Description	Set / query irradiance under EN50530 model.	
Parameters	<val>: numeric value, unit is: W/m ²	
Note	Valid only when CURve:TYPE=EN50530	
Return Format	<val> (numeric value, unit is: W/m ²)	
Example	Set	[SOURce:]CONFIG:SAS:IRR 1000
	Query	[SOURce:]CONFIG:SAS:IRR?
	Return	1000

6.7 [SOURce:]CONFIG:SAS:SANDIA:TECH

Syntax	[SOURce:]CONFIG:SAS:SANDIA:TECH <type> [SOURce:]CONFIG:SAS:SANDIA:TECH?	
Function	Set / query photovoltaic material type under SANDIA model.	

Description		
Parameters	<type>:(TF SMC HC) TF: Thin Film SMC: Standard HC: High-efficiency Crystalline	
Note	Valid only when CURve:TYPE=SANDIA	
Return Format	Return TF SMC HC	
Example	Set	[SOURce:]CONFIG:SAS:SANDIA:TECH SMC
	Query	[SOURce:]CONFIG:SAS:SANDIA:TECH?
	Return	SMC

6.8 [SOURce:]CONFIG:SAS:SANDIA:IRR

Syntax	[SOURce:]CONFIG:SAS:SANDIA:IRR <val> [SOURce:]CONFIG:SAS:SANDIA:IRR?	
Function Description	Set / query irradiance under SANDIA model.	
Parameters	<val>: numeric value, unit is: W/m ²	
Note	Valid only when CURve:TYPE=SANDIA	
Return Format	<val> (numeric value, unit is: W/m ²)	
Example	Set	[SOURce:]CONFIG:SAS:SANDIA:IRR 1200
	Query	[SOURce:]CONFIG:SAS:SANDIA:IRR?
	Return	1200

6.9 [SOURce:]CONFIG:SAS:SANDIA:TMP

Syntax	[SOURce:]CONFIG:SAS:SANDIA:TMP <val> [SOURce:]CONFIG:SAS:SANDIA:TMP?	
Function	Set / query ambient temperature under SANDIA model.	

Description		
Parameters	<val>: numeric value, unit is: °C	
Note	Valid only when CURve:TYPE=SANDIA	
Return Format	<val> (numeric value, unit is: °C)	
Example	Set	[SOURce:]CONFIG:SAS:SANDIA:TMP 30.0
	Query	[SOURce:]CONFIG:SAS:SANDIA:TMP?
	Return	30.0

6.10 [SOURce:]CONFIG:SAS:SANDIA:PMPp

Syntax	[SOURce:]CONFIG:SAS:SANDIA:PMPp <val> [SOURce:]CONFIG:SAS:SANDIA:PMPp?	
Function Description	Set / query MPP power under SANDIA model.	
Parameters	<val>: numeric value, unit is: W	
Note	Valid only when CURve:TYPE=SANDIA	
Return Format	<val> (numeric value, unit is: W)	
Example	Set	[SOURce:]CONFIG:SAS:SANDIA:PMPp 1500.0
	Query	[SOURce:]CONFIG:SAS:SANDIA:PMPp?
	Return	1500.0

6.11 [SOURce:]CONFIG:SAS:SANDIA:VMPp

Syntax	[SOURce:]CONFIG:SAS:SANDIA:VMPp <val> [SOURce:]CONFIG:SAS:SANDIA:VMPp?	
Function Description	Set / query MPP voltage under SANDIA model.	
Parameters	<val>: numeric value, unit is: V	
Note	Valid only when CURve:TYPE=SANDIA	

Return Format	<val> (numeric value, unit is: V)	
Example	Set	[SOURce:]CONFIG:SAS:SANDIA:VMPp 40.0
	Query	[SOURce:]CONFIG:SAS:SANDIA:VMPp?
	Return	40.00

6.12 [SOURce:]CONFIG:SAS:TRIG

Syntax	[SOURce:]CONFIG:SAS:TRIG	
Function Description	Apply the above PV mode settings (submit parameters to output).	
Parameters	None	
Note	Set CURve:TYPE, VMPp, PMPp and other parameters first, then send this command to take effect.	
Return Format	None (No acknowledgment returned by the device)	
Example	Set	[SOURce:]CONFIG:SAS:TRIG //(Activate PV settings.)

6.13 [SOURce:]CONFIG:SAS:AVERage:VMPp?

Syntax	[SOURce:]CONFIG:SAS:AVERage:VMPp?	
Function Description	Query average MPP voltage under PV Mode.	
Parameters	None	
Note	VMPpValid only in PV Mode. Returns average VMPp over long-term operation.	
Return Format	<val> (numeric value, unit is: V)	
Example	Query	[SOURce:]CONFIG:SAS:AVERage:VMPp?
	Return	35.20

6.14 [SOURce:]CONFIG:SAS:AVERage:IMPp?

Syntax	[SOURce:]CONFIG:SAS:AVERage:IMPp?	
Function Description	Query average MPP current under PV Mode.	
Parameters	None	
Note	Valid only in PV Mode. Returns average IMPp over long-term operation.	
Return Format	<val> (numeric value, unit is: A)	
Example	Query	[SOURce:]CONFIG:SAS:AVERage:IMPp?
	Return	28.6

6.15 [SOURce:]CONFIG:SAS:AVERage:PMPp?

Syntax	[SOURce:]CONFIG:SAS:AVERage:PMPp?	
Function Description	Query average MPP power under PV Mode.	
Parameters	None	
Note	Valid only in PV Mode. Returns average PMPp over long-term operation.	
Return Format	<val> (numeric value, unit is: W)	
Example	Query	[SOURce:]CONFIG:SAS:AVERage:PMPp?
	Return	1000.0

6.16 [SOURce:]CONFIG:SAS:CUSTOM:VMPp

Syntax	[SOURce:]CONFIG:SAS:CUSTOM:VMPp <val> [SOURce:]CONFIG:SAS:CUSTOM:VMPp?	
Function Description	Set / query MPP voltage under custom curve.	

Parameters	<val>: numeric value, unit is: V	
Note	Valid only when CURve:TYPE=CUSTOM. The set VMPp value must be less than or equal to open-circuit voltage (VOC).	
Return Format	Query return <val> (numeric value, unit is: V)	
Example	Set	[SOURce:]CONFIG:SAS:CUSTOM:VMPp 30.0
	Query	[SOURce:]CONFIG:SAS:CUSTOM:VMPp?
	Return	30.00

6.17 [SOURce:]CONFIG:SAS:CUSTOM:IMPp

Syntax	[SOURce:]CONFIG:SAS:CUSTOM:IMPp <val> [SOURce:]CONFIG:SAS:CUSTOM:IMPp?	
Function Description	Set / query MPP current under custom curve.	
Parameters	<val>: numeric value, unit is: A	
Note	Valid only when CURve:TYPE=CUSTOM. The set IMPp value must be less than or equal to short-circuit voltage (ISC).	
Return Format	Return <val> (numeric value, unit is: A)	
Example	Set	[SOURce:]CONFIG:SAS:CUSTOM:IMPp 8.0
	Query	[SOURce:]CONFIG:SAS:CUSTOM:IMPp?
	Return	8.00

6.18 [SOURce:]CONFIG:SAS:CUSTOM:ISC

Syntax	[SOURce:]CONFIG:SAS:CUSTOM:ISC <val> [SOURce:]CONFIG:SAS:CUSTOM:ISC?	
---------------	---	--

Function Description	Set / query short-circuit current under custom curve.	
Parameters	<val>: numeric value, unit is: A	
Note	Valid only when CURve:TYPE=CUSTOM. The set IMPp value must be greater than or equal to short-circuit voltage.	
Return Format	Return <val> (numeric value, unit is: A)	
Example	Set	[SOURce:]CONFIG:SAS:CUSTOM:ISC 10.0
	Query	[SOURce:]CONFIG:SAS:CUSTOM:ISC?
	Return	10.00

6.19 [SOURce:]CONFIG:SAS:CUSTOM:VOC

Syntax	[SOURce:]CONFIG:SAS:CUSTOM:VOC <val> [SOURce:]CONFIG:SAS:CUSTOM:VOC?	
Function Description	Set / query open-circuit current under custom curve.	
Parameters	<val>: numeric value, unit is: V	
Note	The set open-circuit voltage must be greater than or equal to the maximum power point voltage (VMPp).	
Return Format	Valid only when CURve:TYPE=CUSTOM. Return<val> (numeric value, unit is: V)	
Example	Set	[SOURce:]CONFIG:SAS:CUSTOM:VOC 40.0
	Query	[SOURce:]CONFIG:SAS:CUSTOM:VOC?
	Return	40.00

7. Measurement System

7.1 MEASure:VOLTage[:DC]?

Syntax	MEASure:VOLTage[:DC]?	
Function Description	Read DC voltage at output terminals.	
Parameters	None	
Note	Applicable to all modes (Source / Load / Battery / PV). Returns the present voltage value.	
Return Format	<val> (numeric value, unit is: V)	
Example	Query	MEASure:VOLTage?
	Return	48.0

7.2 MEASure:CURREnt[:DC]?

Syntax	MEASure:CURREnt[:DC]?	
Function Description	Read DC current at output terminals.	
Parameters	None	
Note	Source Mode = Output Current Load Mode = Sinking Current	
Return Format	<val> (numeric value, unit is: A)	
Example	Query	MEASure:CURREnt?
	Return	5.0

7.3 MEASure:POWEr[:DC]?

Syntax	MEASure:POWEr[:DC]?
Function	Read DC power at output terminals.

Description		
Parameters	None	
Note	Power	
Return Format	<val> (numeric value, unit is: W)	
Example	Query	MEASure:POWer?
	Return	240.0

7.4 MEASure:BATTery:SOC?

Syntax	MEASure:BATTery:SOC?	
Function Description	Query real-time SOC (State of Charge) in battery simulation mode.	
Parameters	None	
Note	Valid only in Battery Mode. Return value in percentage (0–100%).	
Return Format	<val> (numeric value, unit is: %)	
Example	Query	MEASure:BATTery:SOC?
	Return	50.0

7.5 MEASure[:SCALar]:ALL[:DC]:INFO?

Syntax	MEASure:SCALar:ALL:DC:INFO?	
Function Description	Read comprehensive DC-side information (Voltage, Current, Power, OVP status, OCP status).	
Parameters	None	
Note	Return string	
Return Format	Return a string composed of multiple parameters.	
Example	Query	MEASure:SCALar:ALL:DC:INFO?

	Return	2.55,2.00,5.0,OFF,OFF,OFF
--	---------------	---------------------------

7.6 MEASure:GRID:VOLTage?

Syntax	MEASure:GRID:VOLTage?	
Function Description	Read RMS AC grid voltage.	
Parameters	None	
Note	Return Vac (unit is:V)	
Return Format	<val> (numeric value, unit is: V)	
Example	Query	MEASure:GRID:VOLTage?
	Return	220.00

7.7 MEASure:GRID:CURRent?

Syntax	MEASure:GRID:CURRent?	
Function Description	Read RMS AC grid current.	
Parameters	None	
Note	Return Iac (unit is: A)	
Return Format	<val> (numeric value, unit is: A)	
Example	Query	MEASure:GRID:CURRent?
	Return	3.00

7.8 MEASure:GRID:FREQuency?

Syntax	MEASure:GRID:FREQuency?	
Function Description	Read AC grid frequency.	
Parameters	None	

Note	Return frequency (unit is: Hz)	
Return Format	<val> (numeric value, unit is: Hz)	
Example	Query	MEASure:GRID:FREQuency?
	Return	50.00

7.9 MEASure:GRID:POWer:APParent?

Syntax	MEASure:GRID:POWer:APParent?	
Function Description	Read AC apparent power.	
Parameters	None	
Note	Return S (unit is: VA)	
Return Format	<val> (numeric value, unit is: VA)	
Example	Query	MEASure:GRID:POWer:APParent?
	Return	660.00

7.10 MEASure:GRID:POWer:REACtive?

Syntax	MEASure:GRID:POWer:REACtive?	
Function Description	Read AC reactive power.	
Parameters	None	
Note	Return Q (unit is: Var)	
Return Format	<val> (numeric value, unit is: Var)	
Example	Query	MEASure:GRID:POWer:REACtive?
	Return	495.00

7.11 MEASure:GRID:POWer?

Syntax	MEASure:GRID:POWer?	
Function Description	Read AC active power.	
Parameters	None	
Note	Return P (unit is: W)	
Return Format	<val> (numeric value, unit is: W)	
Example	Query	MEASure:GRID:POWer?
	Return	330.00

7.12 MEASure:GRID:POWer:FACTOR?

Syntax	MEASure:GRID:POWer:FACTOR?	
Function Description	Read AC power factor.	
Parameters	None	
Note	Return PF(None unit)	
Return Format	<val> (Numeric value)	
Example	Query	MEASure:GRID:POWer:FACTOR?
	Return	0.500

7.13 MEASure:GRID:ENERgy:POSitive?

Syntax	MEASure:GRID:ENERgy:POSitive?	
Function Description	Read AC forward energy (input energy)	
Parameters	None	
Note	Return Wp+ (unit is: Wh)	

Return Format	<val> (numeric value, unit is: Wh)	
Example	Query	MEASure:GRID:ENERgy:POSitive?
	Return	1200.00

7.14 MEASure:GRID:ENERgy:NEGative?

Syntax	MEASure:GRID:ENERgy:NEGative?	
Function Description	Read AC reverse energy (output energy)	
Parameters	None	
Note	Return Wp- (unit is: Wh)	
Return Format	<val> (numeric value, unit is: Wh)	
Example	Query	MEASure:GRID:ENERgy:NEGative?
	Return	800.00

7.15 MEASure:GRID:ALL?

Syntax	MEASure:GRID:ALL?	
Function Description	Read all AC information.	
Parameters	None	
Note	Return string (Uac,Iac,FU,S,Q,P,PF,Wp+,Wp-)	
Return Format	Return a string composed of multiple parameters.	
Example	Query	MEASure:GRID:ALL?
	Return	220.00,0.00,0.00,0.00,0.00,0.00,0.000,0.00,0.00

8. Protect System

8.1 [SOURce:]VOLTage:PROTection

Syntax	[SOURce:]VOLTage:PROTection <val> [SOURce:]VOLTage:PROTection?	
Function Description	Set / query overvoltage protection (OVP) setting value (protection triggers when voltage exceeds this value).	
Parameters	<val>: numeric value, unit is: V	
Note	Applicable to all output modes. Output turns off upon trigger.	
Return Format	<val> (numeric value, unit is: V)	
Example	Set	[SOURce:]VOLTage:PROTection 60.0
	Query	[SOURce:]VOLTage:PROTection?
	Return	60.00

8.2 [SOURce:]CURRent:PROTection

Syntax	[SOURce:]CURRent:PROTection <val> [SOURce:]CURRent:PROTection?	
Function Description	Set / query overcurrent protection (OCP) setting value (protection triggers when current exceeds this value).	
Parameters	<val>: numeric value, unit is: A	
Note	Applicable to all output modes. Output turns off upon trigger.	
Return Format	<val> (numeric value, unit is: A)	
Example	Set	[SOURce:]CURRent:PROTection 10.0
	Query	[SOURce:]CURRent:PROTection?
	Return	10.00

8.3 [SOURce:]POWer:PROTection

Syntax	[SOURce:]POWer:PROTection<val> [SOURce:]POWer:PROTection?	
Function Description	Set / query overpower protection (OPP) setting value (protection triggers when power exceeds this value).	
Parameters	<val>: numeric value, unit is: W	
Note	Applicable to all output modes. Output turns off upon trigger.	
Return Format	<val> (numeric value, unit is: W)	
Example	Set	[SOURce:]POWer:PROTection 500.0
	Query	[SOURce:]POWer:PROTection?
	Return	500.0

9. Example

9.1 Typical Programming Flow Example for CCCV Mode

Application: Power Source Mode, Power on with constant 48V output

```
SYSTem:REMOte      //Enable SCPI remote control
CONF:MODE SOURCE    //Set to source mode
SRC:MODE NORM       //Set source to NORM mode
FUNC:PRI CV         //Set to constant voltage mode
VOLT 48             //Set voltage to 48V
CURR:LIM:POS 5      //Set I+ to 5A
CURR:LIM:NEG -5     //Set I- to -5A
POW:LIM:POS 1000    //Set P+ to 1000W
POW:LIM:NEG -1000   //Set P- to -1000W
OUTP ON            //Enable output
```

9.2 Typical Programming Flow Example for LIST Mode

Application: Execute the table below. Operation Mode: AUTO; Total Steps: 2; Total Cycles: 5

STEP	VOLT(V)	CURR(A)	TIMER(s)
1	24	5	5
2	58	3	5

```
SYSTem:REMOte      //Enable SCPI remote control
CONF:MODE SOURCE    //Set to source mode
SRC:MODE LIST       //Set source to LIST mode
LIST:MODE AUTO      //Set operation mode to AUTO for automatic
                    //output.
LIST:STEP 2         //Set total step to 2
```

LIST:CYC 5	//Set total cycles to 5
LIST:IND 1	//Navigate to Index (Step) 1
LIST:VOLT 24	//Set voltage of Index (Step) 1 to 24V
LIST:CURR 5	//Set current of Index (Step) 1 to 5A
LIST:TIME 5	//Set dwell time of Index (Step) 1 to 5s
LIST:IND 2	//Navigate to Index (Step) 2
LIST:VOLT 48	//Set voltage of Index (Step) 2 to 48V
LIST:CURR 3	//Set current of Index (Step) 2 to 3A
LIST:TIME 5	//Set dwell time of Index (Step) 2 to 5s
LIST:LOAD	//Load table
LIST:LOAD?	//Return ON if loading succeeds; OFF means loading in progress
OUTP ON	//Enable output. Power-on is allowed only when LIST:LOAD? returns ON

9.3 Typical Programming Flow Example for LOAD Mode

Application: Load Mode, power on with 5A output under CC mode

SYSTem:REMOte	//Enable SCPI remote control
CONF:MODE LOAD	//Set to LOAD mode
LOAD:MODE:CC	//Set LOAD mode to CC mode
LOAD:CURR 5	//Set current to 5A for CC mode
OUTP ON	//Enable output

9.4 Typical Programming Flow Example for BAT Mode

Application: Simulate discharge of LFP battery

SYSTem:REMOte	//Enable SCPI remote control
CONF:MODE BATT	//Set to battery simulation mode

BATT:TYPE LFP	//Set battery type to Lithium Iron Phosphate (LFP)
BATT:CAP 1	//Set capacity to 1Ah
BATT:RES 0.1	//Set internal resistance to 0.1m Ω
BATT:SER 1	//Set number of series cells to 1
BATT:PAR 1	//Set number of parallel cells to 1
BATT:SOC:INIT 50	//Set initial SOC to 50%
OUTP ON	/Enable output

9.5 Typical Programming Flow Example for PV Mode

Application: Simulate EN50530 curve operation

SYSTem:REMOte	//Enable SCPI remote control
CONF:MODE PV	//Set to PV simulation mode
CONFG:SAS:CURve:TYPE EN50530	//Set curve type to EN50530
CONFG:SAS:TECH CSI	//Set material type to CSI
CONFG:SAS:VMPP 35.0	//Set maximum power point voltage to 35V
CONFG:SAS:PMP 1000.0	//Set maximum power point to 1000W
CONFG:SAS:IRR 1000	//Set irradiance to 1000W/m ²
CONFG:TRIG	//Activate all above settings
OUTP ON	//Enable output

Application: Simulate operation of CUSTOM curve

SYSTem:REMOte	//Enable SCPI remote control
CONF:MODE PV	//Set to PV simulation mode
CONFG:SAS:CURve:TYPE CUSTOM	//Set curve type to CUSTOM
CONFG:SAS:CUSTOM:VOC 38.0	//Set open-circuit voltage to 38.0V
CONFG:SAS:CUSTOM:ISC 10.0	//Set short-circuit current to 10.0A

CONFIG:SAS:CUSTOM:VMPp 30.0	//Set MPP voltage to 30.0V (shall be $\leq$ VOC)
CONFIG:SAS:CUSTOM:IMPp 8.0	//Set MPP current to 8.0A (shall be $\leq$ ISC)
CONFIG:SAS:TRIG	//Activate the above PV settings
OUTP ON	//Enable output