



ACP2000&3000 Series Power Source Programming Manual

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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.
- <mode>: Represents the mode parameter. Refer to the description of each command for specific values.
- ?: 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.
- The transmission interval between each command shall be greater than 100 ms.

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	Resets the device software and restores default

Description	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: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.

2.1.5 :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

2.1.6 :SYSTem:TIME

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

2.1.7 :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
--	---------------	----

2.1.8 :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 device work mode.	
Parameters	<mode> (NORM LIST TRAN) ● NORM: Normal output mode ● LIST: List output mode ● TRAN: Surge/Dropout mode	
Note	Switch the main operating mode of the device.	
Return Format	String (NORM, LIST, TRAN).	

Example	Set	:CONF:MODE NORM
	Query	:CONF:MODE?
	Return	NORM

2.3 AC/DC Mode Configure Commands

2.3.1 :CONFigure:COUPling

Syntax	:CONFigure:COUPling <mode> :CONFigure:COUPling?	
Function Description	Set / query device AC/DC operating mode.	
Parameters	<mode> (AC DC). AC: Normal AC output mode. DC: Normal DC output mode.	
Note	Switch the main operating mode of the device.	
Return Format	String (AC,DC).	
Example	Set	:CONFigure:COUPling AC
	Query	:CONFigure:COUPling?
	Return	AC

3 Normal Mode-AC Mode Configure

Configure normal AC voltage and frequency output under :CONF:MODE NORM and :CONFigure:COUPling AC mode.

3.1 [:SOURce]:VOLTage[:LEVel]

Syntax	[:SOURce]:VOLTage[:LEVel] <val> [:SOURce]:VOLTage[:LEVel]?	
Function Description	Set / query output voltage.	
Parameters	<val>: numeric value; range: 0~300.00; unit is: V.	
Note	Set RMS value of AC output voltage.	
Return Format	numeric value (unit is: V).	
Example	Set	VOLT 220.5
	Query	VOLT?
	Return	220.50

3.2 [:SOURce]:FREQuency[:CW]

Syntax	[:SOURce]:FREQuency[:CW] <val> [:SOURce]:FREQuency[:CW]?	
Function Description	Set / query output frequency.	
Parameters	<val>: numeric value; range: 15~400; unit is: Hz.	
Note	Set frequency of AC output voltage.	
Return Format	numeric value (unit is: Hz).	
Example	Set	FREQ 50.0
	Query	FREQ?

	Return	50.00
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3.3 [:SOURce]:PHASe:STARt

Syntax	[:SOURce]:PHASe:STARt <val> [:SOURce]:PHASe:STARt?	
Function Description	Set / query start angle of output waveform.	
Parameters	<val>: numeric value; range: 0~359.0; unit is: ° .	
Note	Define the initial phase angle of the output sine wave at startup.	
Return Format	numeric value (°).	
Example	Set	PHAS:STAR 90.0
	Query	PHAS:STAR?
	Return	90.0

3.4 [:SOURce]:PHASe:STOP

Syntax	[:SOURce]:PHASe:STOP <val> [:SOURce]:PHASe:STOP?	
Function Description	Set / query stop angle of output waveform.	
Parameters	<val>: numeric value; range: 0~359.0; unit is: ° .	
Note	Define the phase angle of the output sine wave at power-off (used for soft start / soft stop).	
Return Format	numeric value (°)	
Example	Set	PHAS:STOP 180.0
	Query	PHAS:STOP?
	Return	180.0

4 Normal Mode-DC Mode Configure

Configure normal DC voltage and DC current output under :CONF:MODE NORM, :CONFigure:COUPling DC mode.

4.1 [:SOURce]:VOLTage:DC

Syntax	[:SOURce]:VOLTage:DC <val> [:SOURce]:VOLTage:DC?	
Function Description	Set / query output voltage.	
Parameters	<val>: numeric value; range: -450~450.00; unit is: V.	
Note	Set DC output voltage.	
Return Format	numeric value (unit is: V).	
Example	Set	VOLT:DC 220.5
	Query	VOLT:DC?
	Return	220.50

4.2 [:SOURce]:CURRent:DC

Syntax	[:SOURce]:CURRent:DC <val> [:SOURce]:CURRent:DC?	
Function Description	Set / query output current.	
Parameters	<val>: numeric value; range: 0~10.00; unit is: A.	
Note	Set DC output current.	
Return Format	numeric value (unit is: A).	
Example	Set	CURR:DC 5
	Query	CURR:DC?

	Return	5
--	---------------	---

5 Normal Mode Output Configure

5.1 [SOURce:]VOLTage:RANGe

Syntax	[SOURce:]VOLTage:RANGe <type> [SOURce:]VOLTage:RANGe?	
Function Description	Set / query output voltage range under AC mode.	
Parameters	300V	
Note	Set output voltage range to limit output voltage.	
Return Format	300V	
Example	Set	VOLT:RANG 300V
	Query	VOLT:RANG?
	Return	300V

5.2 [SOURce:]VOLTage:LIMit[:LEVel]

Syntax	[SOURce:]VOLTage:LIMit[:LEVel] <val> [SOURce:]VOLTage:LIMit[:LEVel]?	
Function Description	Set / query output voltage limit under AC mode.	
Parameters	<val>: numeric value; range: 0~300; unit is: V.	
Note	Set the upper limit of output voltage for protection and restriction.	
Return Format	numeric value (unit is: V).	
Example	Set	VOLT:LIM 280.0
	Query	VOLT:LIM?
	Return	280.0

5.3 [SOURce:]FREQUency:LIMit[:LEVel]

Syntax	[SOURce:]FREQUency:LIMit[:LEVel] <val> [SOURce:]FREQUency:LIMit[:LEVel]?	
Function Description	Set / query output frequency limit under AC mode.	
Parameters	<val>: numeric value; range: 40~500; unit is: Hz.	
Note	Set upper limit of output frequency.	
Return Format	numeric value (unit is: Hz).	
Example	Set	FREQ:LIM 450.0
	Query	FREQ:LIM?
	Return	450.0

5.4 [:SOURce]:DAMPing[:STATe]

Syntax	[:SOURce]:DAMPing[:STATe] <mode> [:SOURce]:DAMPing[:STATe]?	
Function Description	Set / query device damping switch.	
Parameters	<mode> (OFF ON). ● OFF: Damping disabled ● ON: Damping enabled	
Note	None.	
Return Format	String (OFF,ON)	
Example	Set	DAMP ON
	Query	DAMP?
	Return	OFF

5.5 [:SOURce]:DAMPing:LEVel

Syntax	[:SOURce]:DAMPing:LEVel <mode> [:SOURce]:DAMPing:LEVel?	
Function Description	Set / query damping strength of the device.	
Parameters	<mode> (LOW MED HIGH)。 ● LOW: Low strength ● MED: Medium strength ● HIGH: High strength	
Note	None.	
Return Format	String (LOW,MED,HIGH).	
Example	Set	DAMPing:LEVel LOW
	Query	DAMPing:LEVel?
	Return	LOW

5.6 [:SOURce]:VOLTage:DC:LIMit

Syntax	[:SOURce]:VOLTage:DC:LIMit <val> [:SOURce]:VOLTage:DC:LIMit?	
Function Description	Set / query output voltage limit under DC mode.	
Parameters	<val>: numeric value; range: -450~450; unit is: V.	
Note	Set upper limit of DC output voltage for output protection.	
Return Format	numeric value (unit is: V).	
Example	Set	VOLT:DC:LIM 280.0
	Query	VOLT:DC:LIM?
	Return	280.0

5.7 [:SOURce]:CURRent:DC:LIMit

Syntax	[:SOURce]:CURRent:DC:LIMit <val> [:SOURce]:CURRent:DC:LIMit?	
Function Description	Set / query output current limit under DC mode.	
Parameters	<val>: numeric value; range: 0~10; unit is: A.	
Note	Set upper limit of output current for output protection.	
Return Format	numeric value (unit is: A).	
Example	Set	CURR:DC:LIM 5
	Query	CURR:DC:LIM?
	Return	5

6 LIST Mode Configure

Configure sequence output under :CONF:MODE LIST mode.

6.1 [SOURce:]LIST:MODE

Syntax	[SOURce:]LIST:MODE <mode> [SOURce:]LIST:MODE?	
Function Description	Set / query operation mode of LIST function.	
Parameters	<mode> (AUTO MANUAL). ● AUTO: Execute each step automatically in sequence. ● MANUAL: Execute each step by manual trigger.	
Return Format	AUTO or MANUAL.	
Example	Set	LIST:MODE AUTO
	Query	LIST:MODE?
	Return	AUTO

6.2 [SOURce:]LIST:STEP

Syntax	[SOURce:]LIST:STEP <val> [SOURce:]LIST:STEP?	
Function Description	Set / query total step count of LIST mode (number of list entries).	
Parameters	<val> (Integer, 1-100).	
Return Format	Integer.	
Example	Set	LIST:STEP 5
	Query	LIST:STEP?
	Return	5

6.3 [SOURce:]LIST:CYCLe

Syntax	[SOURce:]LIST:CYCLe <val> [SOURce:]LIST:CYCLe?	
Function Description	Set / query total loop count for LIST mode.	
Parameters	<val> (integer, 0-9999; 0 means infinite loop).	
Return Format	Integer.	
Example	Set	LIST:CYC 3
	Query	LIST:CYC?
	Return	3

6.4 [SOURce:]LIST:INDex

Syntax	[SOURce:]LIST:INDex <val> [SOURce:]LIST:INDex?	
Function Description	Set / query active edit index under LIST mode, which selects the target step for operation.	
Parameters	<val> (integer, 1~100, within total step count).	
Note	After setting the index, subsequent commands such as LIST:VOLT, LIST:FREQ apply to this indexed step.	
Return Format	Integer.	
Example	Set	LIST:IND 1
	Query	LIST:IND?
	Return	1

6.5 [SOURce:]LIST:VOLTage

Syntax	[SOURce:]LIST:VOLTage <val> [SOURce:]LIST:VOLTage?	
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Function Description	Set / query voltage value of current indexed LIST step.	
Parameters	<val>: numeric value; range: 0~300.00; unit is: V.	
Return Format	numeric value (unit is: V).	
Example	Set	LIST:VOLT 220.0 (Assume the current index is 1)
	Query	LIST:VOLT?
	Return	220.00

6.6 [SOURce:]LIST:FREQuency

Syntax	[SOURce:]LIST:FREQuency <val> [SOURce:]LIST:FREQuency?	
Function Description	Set / query frequency value of current indexed LIST step.	
Parameters	<val>: numeric value; range: 40~400; unit is: Hz.	
Return Format	numeric value (unit is: Hz).	
Example	Set	LIST:FREQ 60.0 (Assume the current index is 1)
	Query	LIST:FREQ?
	Return	60.00

6.7 [SOURce:]LIST:COUnT

Syntax	[SOURce:]LIST:COUnT <val> [SOURce:]LIST:COUnT?	
Function Description	Set / query cycle count for current indexed LIST step.	
Parameters	<val> (Integer, 1-9999).	
Note	Defines the number of cycles that the output waveform lasts for this step.	

Return Format	Integer.	
Example	Set	LIST:COUN 100 (Assume the current index is 1)
	Query	LIST:COUN?
	Return	100

6.8 [SOURce:]LIST:LOAD

Syntax	[SOURce:]LIST:LOAD	
Function Description	Load LIST table data to activate configured step count, voltage, frequency and cycle settings.	
Parameters	None.	
Note	Execute this command after all LIST parameters are set to submit the sequence configuration.	
Return Format	None (No return data upon successful execution).	
Example	Set	LIST:LOAD

6.9 [SOURce:]LIST:TRIG

Syntax	[SOURce:]LIST:TRIG	
Function Description	Trigger LIST to execute current index step in manual mode (valid only when LIST:MODE is MANUAL).	
Parameters	None.	
Note	In MANUAL mode, each command triggers execution of current index step, then index increments automatically.	
Return Format	None (No return data upon successful execution).	
Example	Set	LIST:TRIG

7 Surge/Dropout Mode Configuration (TRAN)

Configure voltage surge or dropout test under :CONF:MODE TRAN mode.

7.1 [:SOURce]:TRANsient:Base:VOLTage

Syntax	[:SOURce]:TRANsient:Base:VOLTage <val> [:SOURce]:TRANsient:Base:VOLTage?	
Function Description	Set / query voltage value.	
Parameters	<val> (unit: V).	
Note	None.	
Return Format	numeric value (unit is: V).	
Example	Set	TRAN:B:VOLT 300.0
	Query	TRAN:B:VOLT?
	Return	300.0

7.2 [:SOURce]:TRANsient:Base:FREQuency

Syntax	[:SOURce]:TRANsient:Base:FREQuency <val> [:SOURce]:TRANsient:Base:FREQuency?	
Function Description	Set / query frequency value.	
Parameters	<val> (unit: Hz).	
Note	None.	
Return Format	numeric value (unit is: Hz).	
Example	Set	TRAN:B:FREQ 50.0
	Query	TRAN:B:FREQ?
	Return	50.0

7.3 [:SOURce]:TRANSient:MODE

Syntax	[:SOURce]:TRANSient:MODE <mode> [:SOURce]:TRANSient:MODE?	
Function Description	Set / query surge/dropout execution mode.	
Parameters	<mode> (CYCLE TRIGGER) CYCLE: cycle mode. TRIGGER: trigger mode, execution controlled by trigger source.	
Return Format	CYCLE TRIGGER	
Example	Set	TRAN:MODE TRIGGER
	Query	TRAN:MODE?
	Return	TRIGGER

7.4 [:SOURce]:TRANSient:SITE

Syntax	[:SOURce]:TRANSient:SITE <val> [:SOURce]:TRANSient:SITE?	
Function Description	Set / query start phase.	
Parameters	<val>: numeric value; range: 0~360.0; unit is: °.	
Note	Define the phase angle at which the surge or dropout starts within one sine wave cycle.	
Return Format	<val> (unit: °).	
Example	Set	TRAN:SITE 90.0
	Query	TRAN:SITE?
	Return	90.0

7.5 [:SOURce]:TRANSient:DEGRee

Syntax	[:SOURce]:TRANSient:DEGRee <val> [:SOURce]:TRANSient:DEGRee?	
Function Description	Set / query angle width.	
Parameters	<val>: numeric value; range: 0~360.0; unit is: °.	
Note	Define the phase angle duration of the surge or dropout.	
Return Format	<val> (unit: °).	
Example	Set	TRAN:DEG 45.0
	Query	TRAN:DEG?
	Return	45.0

7.6 [:SOURce]:TRANSient:TYPE

Syntax	[:SOURce]:TRANSient:TYPE <mode> [:SOURce]:TRANSient:TYPE?	
Function Description	Set / query dropdown value option (set by percentage or voltage value).	
Parameters	<mode> (PERCENT VOLTAGE).	
Note	When PERCENT is selected, configure via TRAN:PERC; when VOLTAGE is selected, configure via TRAN:VOLT.	
Return Format	PERCENT or VOLTAGE.	
Example	Set	TRAN:TYPE PERCENT
	Query	TRAN:TYPE?
	Return	PERCENT

7.7 [:SOURce]:TRANSient:PERCent

Syntax	[:SOURce]:TRANSient:PERCent <val>
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	[:SOURce]:TRANsient:PERCent?	
Function Description	Set / query dropout value (percentage).	
Parameters	<val>: numeric value; range: 0~200.0; unit is: %. For example, 150% means the voltage rises to 150% of the base value, and 50% means the voltage drops to 50% of the base value.	
Note	Valid only when TRAN:TYPE PERCENT.	
Return Format	<val> (unit: %).	
Example	Set	TRAN:PERC 120.5
	Query	TRAN:PERC?
	Return	120.5

7.8 [:SOURce]:TRANsient:VOLTage

Syntax	[:SOURce]:TRANsient:VOLTage <val> [:SOURce]:TRANsient:VOLTage?	
Function Description	Set / query dropout value (voltage).	
Parameters	<val>: numeric value; range: 0~425.0; unit is: V.	
Note	Valid only when TRAN:TYPE VOLTAGE. Set the absolute target voltage for surge or dropout.	
Return Format	numeric value (unit is: V).	
Example	Set	TRAN:VOLT 300.0
	Query	TRAN:VOLT?
	Return	300.0

7.9 [:SOURce]:TRANsient:COUNt

Syntax	[:SOURce]:TRANsient:COUNt <val>
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	[:SOURce]:TRANsient:COUNT?	
Function Description	Set / query number of continuous dropouts.	
Parameters	<val> (integer, 0-9999). ● 0: No continuous dropout generated. ● N: Generate N continuous dropouts spaced by TRAN:DEG.	
Return Format	Integer.	
Example	Set	TRAN:COUN 5
	Query	TRAN:COUN?
	Return	5

7.10 [:SOURce]:TRANsient:CYCLe:COUNT

Syntax	[:SOURce]:TRANsient:CYCLe:COUNT <val> [:SOURce]:TRANsient:CYCLe:COUNT?	
Function Description	Set / query cycle count, minimum value $\geq$ number of continuous dropouts.	
Parameters	<val> (integer, range: number of continuous dropouts ~ 9999).	
Return Format	Integer.	
Example	Set	TRAN:CYC:COUN 5
	Query	TRAN:CYC:COUN?
	Return	5

7.11 [:SOURce]:TRANsient:TRIGGER

Syntax	[:SOURce]:TRANsient:TRIGGER	
Function Description	Control instrument trigger when execution mode is trigger mode.	

Parameters	None.	
Return Format	None.	
Example	Set	TRANsient:TRIGGER

8 Measurement System

All measurement commands are Query commands, used to read the current output or grid parameters of the device.

8.1 :MEASure:VOLTage[:AC]?

Syntax	:MEASure:VOLTage[:AC]?	
Function Description	Read RMS output voltage.	
Return Format	numeric value (unit is: V).	
Example	Query	MEAS:VOLT?
	Return	220.50

8.2 :MEASure:CURREnt[:AC]?

Syntax	:MEASure:CURREnt[:AC]?	
Function Description	Read RMS output current.	
Return Format	numeric value (unit is: A).	
Example	Query	MEAS:CURREnt?
	Return	5.12

8.3 :MEASure:POWer[:AC][:REAL]?

Syntax	:MEASure:POWer[:AC][:REAL]?	
Function Description	Read output active power.	
Return Format	numeric value (unit is: W).	
Example	Query	MEAS:POW?

	Return	1126.40
--	---------------	---------

8.4 :MEASure:FREQuency[:AC]?

Syntax	:MEASure:FREQuency[:AC]?	
Function Description	Read output frequency.	
Return Format	numeric value (unit is: Hz).	
Example	Query	MEAS:FREQ?
	Return	50.00

8.5 :MEASure:ALL?

Syntax	:MEASure:ALL?	
Function Description	Read all main display information: Voltage(V), Current(A), Power(W), Frequency(Hz).	
Return Format	Return string, format: <Voltage>,<Current>,<Power>,<Frequency>.	
Example	Query	MEAS:ALL?
	Return	220.50,5.12,1126.40,50.00

8.6 :MEASure:POWer:APParent?

Syntax	:MEASure:POWer:APParent?	
Function Description	Read AC apparent power (S).	
Return Format	numeric value (unit is: VA).	
Example	Query	MEAS:POW:APP?
	Return	1150.25

8.7 :MEASure:POWer:REACtive?

Syntax	:MEASure:POWer:REACtive?	
Function Description	Read AC reactive power (Q).	
Return Format	numeric value (unit is: var).	
Example	Query	MEAS:POW:REAC?
	Return	450.30

8.8 :MEASure:POWer:PF?

Syntax	:MEASure:POWer:PF?	
Function Description	Read AC power factor (PF).	
Return Format	Value (dimensionless, range -1 ~ 1).	
Example	Query	MEAS:POW:PF?
	Return	0.98

8.9 :MEASure:CURRent:PEAK:POS?

Syntax	:MEASure:CURRent:PEAK:POS?	
Function Description	Read positive peak current (Ip+).	
Return Format	numeric value (unit is: A).	
Example	Query	MEAS:CURR:PEAK:POS?
	Return	7.25

8.10 :MEASure:CURRent:PEAK:NEG?

Syntax	:MEASure:CURRent:PEAK:NEG?	
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Function Description	Read negative peak current (Ip-).	
Return Format	numeric value (unit is: A).	
Example	Query	MEAS:CURREN:PEAK:NEG?
	Return	-7.18

8.11 :MEASure:CURRent:CREStfactor?

Syntax	:MEASure:CURRent:CREStfactor?	
Function Description	Read current crest factor (Cfl).	
Return Format	Numeric value.	
Example	Query	MEAS:CURREN:CRES?
	Return	1.45

8.12 :MEASure:AUXiliary:ALL?

Syntax	:MEASure:AUXiliary:ALL?	
Function Description	Read all secondary display information: Apparent power(S), Reactive power(Q), Power factor(PF), Positive peak current(Ip+), Negative peak current(Ip-), Current crest factor(Cfl).	
Return Format	Return string, format: <S>,<Q>,<PF>,<Ip+>,<Ip->,<Cfl>.	
Example	Query	MEAS:AUX:ALL?
	Return	1150.25,450.30,0.98,7.25,-7.18,1.45

9 Protect System

9.1 [:SOURce]:VOLTage:PROTection

Syntax	[:SOURce]:VOLTage:PROTection <val> [:SOURce]:VOLTage:PROTection?	
Function Description	Set / query overvoltage protection (OVP) setting value.	
Parameters	<val>: numeric value; range: 1~450; unit is: V.	
Note	Applicable to all output modes. Output turns off upon trigger.	
Return Format	numeric value (unit is: V).	
Example	Set	VOLT:PROT 250.0
	Query	VOLT:PROT?
	Return	250.0

9.2 [:SOURce]:CURRent:PROTection

Syntax	[:SOURce]:CURRent:PROTection <val> [:SOURce]:CURRent:PROTection?	
Function Description	Set / query overcurrent protection (OCP) setting value.	
Parameters	<val>: numeric value; range: 0.1~46; unit is: A.	
Note	Protection will be triggered and output disabled when the output current (peak) exceeds this value.	
Return Format	numeric value (unit is: A).	
Example	Set	CURR:PROT 15.0
	Query	CURR:PROT?
	Return	15.00

9.3 [:SOURce]:POWer:PROTection

Syntax	[:SOURce]:POWer:PROTection <val> [:SOURce]:POWer:PROTection?	
Function Description	Set / query overpower protection (OPP) setting value.	
Parameters	<val>: numeric value; range: 10~3100; unit is: W.	
Note	Protection will be triggered and output disabled when the active output power exceeds this value.	
Return Format	numeric value (unit is: W).	
Example	Set	POW:PROT 2000.0
	Query	POW:PROT?
	Return	2000.0

9.4 [:SOURce]:CURRent:PROTection:RMS

Syntax	[:SOURce]:CURRent:PROTection:RMS <val> [:SOURce]:CURRent:PROTection:RMS?	
Function Description	Set/Query RMS OCP value	
Parameters	<val>: numeric value; range: 0.1~17; unit is: A.	
Note	If the RMS output current exceeds this value, protection will activate after the delay time.	
Return Format	numeric value (unit is: A).	
Example	Set	CURR:PROT:RMS 10.0
	Query	CURR:PROT:RMS?
	Return	10.00

9.5 [:SOURce]:CURRent:PROTection:RMS:DELaY

Syntax	[:SOURce]:CURRent:PROTection:RMS:DELaY <val> [:SOURce]:CURRent:PROTection:RMS:DELaY?	
Function Description	Set/Query RMS OCP delay.	
Parameters	<val>: numeric value; range: 0~10; unit is: s.	
Note	Protection triggers only when the current remains above the OCP_RMS setting for this delay duration.	
Return Format	numeric value (unit is: s).	
Example	Set	CURR:PROT:RMS:DEL 2.0
	Query	CURR:PROT:RMS:DEL?
	Return	2.0

9.6 [:SOURce]:POWeR:PROTection:DELaY

Syntax	[:SOURce]:POWeR:PROTection:DELaY <val> [:SOURce]:POWeR:PROTection:DELaY?	
Function Description	Set/Query OPP delay.	
Parameters	<val>: numeric value; range: 0~10; unit is: s.	
Note	Protection triggers only when the power remains above the OPP setting for this delay duration.	
Return Format	numeric value (unit is: s).	
Example	Set	POW:PROT:DEL 1.5
	Query	POW:PROT:DEL?
	Return	1.5

10 Example

Note: The transmission interval between each command shall be greater than 100 ms.

10.1 Typical Programming Flow Example for NORM Mode

Application: Set output to 220V/50Hz and power on.

```
SYSTem:REMOte      // Enable SCPI remote control
CONF:MODE NORM     // Set to normal output mode
CONF:COUP AC       // Configure to AC mode
VOLT 220.0          // Set output voltage to 220.0V
FREQ 50.0           // Set output frequency to 50.0Hz
OUTP ON            // Enable output
```

10.2 Typical Programming Flow Example for LIST Mode

Application: Execute the table below. Operation Mode: AUTO; Total Steps: 2; Total Cycles: 3.

STEP	VOLT(V)	FREQ(Hz)	Count
1	100	60	200
2	200	50	100

```
SYSTem:REMOte      // Enable SCPI remote control
CONF: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 3         // Set total cycles to 3
LIST:IND 1         // Navigate to Index (Step) 1
```

```

LIST:VOLT 100.0    // Set voltage of Index (Step) 1 to 100V
LIST:FREQ 60.0     // Set frequency of Index (Step) 1 to 60Hz
LIST:COUN 200      // Set Step 1 lasts for 200 cycles.
LIST:IND 2         // Navigate to Index (Step) 2
LIST:VOLT 200.0    // Set voltage of Index (Step) 2 to 200V
LIST:FREQ 50.0     // Set frequency of Index (Step) 2 to 50Hz
LIST:COUN 100      // Set Step 2 lasts for 200 cycles.
LIST:LOAD          // Load table

OUTP ON           // Enable output, and the sequence starts
                  running.

```

10.3 Typical Programming Flow Example for Surge/Dropout Mode

Application: Generate a dropout with 45° width and voltage drop to 50% at 90° phase, manual trigger.

```

SYSTem:REMOte      //Enable SCPI remote control
CONF:MODE TRAN     // Set to Surge/Dropout mode
TRAN:MODE TRIGGER  // Set to trigger mode
TRAN:SITE 90.0     // Set start phase to 90°
TRAN:DEG 45.0      // Set angle width to 45°
TRAN:TYPE PERCENT  // Set drop value by percentage
TRAN:PERC 50.0     // Set voltage drop to 50%
OUTP ON           // Enable main output (normal waveform)
                  // ... When dropout trigger is required,
                  manually trigger via panel button VOLT

```