



IN COOPERATION WITH NGI®

**N35200 SCPI
V20240115**

N35200 Series Programming Guide SCPI Protocol

SCPI

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1 Preface

Dear Customers,

First of all, we greatly appreciate your choice of N35200 series bidirectional programmable DC power supply (N35200 for short). We are also honored to introduce our company, Hunan Next Generation Instrumental T&C Tech. Co., Ltd. (NGI for short).

About Company

NGI is a professional manufacturer of intelligent equipment and test & control instruments, committed to developing, manufacturing battery simulators, power supplies, electronic loads, and many more instruments. The products can be widely used in the industries of battery, power supply, fuel cell, consumer electronics, new energy vehicle, semiconductor, etc.

NGI maintains close cooperation with many universities and scientific research institutions, and maintains close ties with many industry leaders. We strive to develop high-quality, technology-leading products, provide high-end technologies, and continue to explore new industry measurement and control solutions.

About Manual

This manual is applied to N35200 series bidirectional programmable DC power supply, including programming guide based on standard SCPI protocol. The copyright of the manual is owned by NGI. Due to the upgrade of instrument, this manual may be revised without notice in future versions.

This manual has been reviewed carefully by NGI for the technical accuracy. The manufacturer declines all responsibility for possible errors in this operation manual, if due to misprints or errors in copying. The manufacturer is not liable for malfunctioning if the product has not correctly been operated.

To ensure the safety and correct use of N35200, please read this manual carefully, especially the safety instructions.

Please keep this manual for future use.

Thanks for your trust and support.

2 Safety Instructions

In the operation and maintenance of the instrument, please strictly comply with the following safety instructions. Any performance regardless of attentions or specific warnings in other chapters of the manual may impair the protective functions provided by the instrument.

NGI shall not be liable for the results caused by the neglect of those instructions.
















2.1 Safety Notes

- **Confirm the AC input voltage before supplying power.**
- **Reliable grounding:** Before operation, the instrument must be reliably grounded to avoid the electric shock.
- **Confirm the fuse:** Ensure to have installed the fuse correctly.
- **Do not open the chassis:** The operator cannot open the instrument chassis. Non-professional operators are not allowed to maintain or adjust it.
- **Do not operate under hazardous conditions:** Do not operate the instrument under flammable or explosive conditions.
- **Confirm the working range:** Make sure the DUT is within N35200's rated range.

2.2 Safety Symbols

Please refer to the following table for definitions of international symbols used on the instrument or in the user manual.

Table 1

Symbol	Definition	Symbol	Definition
	DC (direct current)	N	Null line or neutral line
	AC (alternating current)	L	Live line
	AC and DC	I	Power-on
	Three-phase current		Power-off
	Ground		Back-up power
	Protective ground		Power-on state
	Chassis ground		Power-off state
	Signal ground		Risk of electric shock
WARNING	Hazardous sign		High temperature warning
Caution	Be careful		Warning

3 Communication Configuration

Communication mode: LAN/RS232/RS485
IP Address: 192.168.0.123
UDP port number: 7000 (Default)
TCP port number:7000 (Default)

4 Programming Command Overview

4.1 Brief Introduction

N35200 commands include two types: IEEE488.2 public commands and SCPI commands.

IEEE 488.2 public commands define some common control and query commands for instruments. Basic operation on N35200 can be achieved through public commands, such as reset, status query, etc. All IEEE 488.2 public commands consist of an asterisk (*) and three-letter mnemonic: *IDN ?.

SCPI commands can implement most of N35200 functions of testing, setting, and measurement. SCPI commands are organized in the form of a command tree. Each command can contain multiple mnemonics, and each node of the command tree is separated by a colon (:), as shown in the below figure. Top of the command tree is called ROOT. The full path from ROOT to the leaf node is a complete programming command.

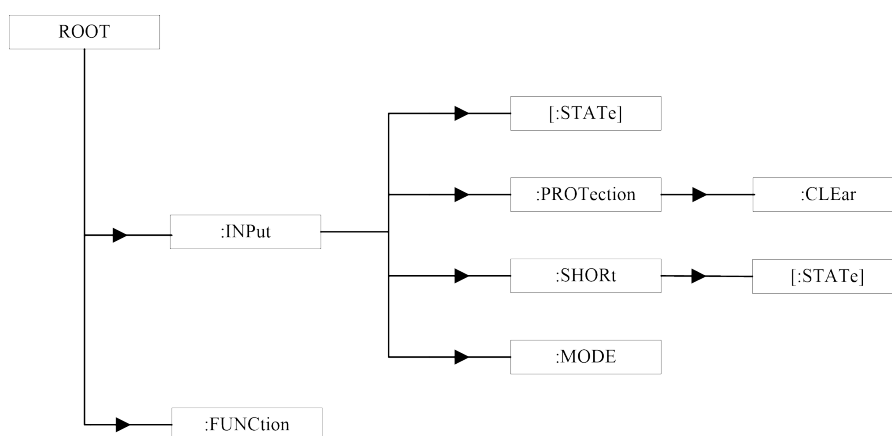


Figure 4.1 Command Tree Example

4.2 Syntax

N35200 SCPI commands are the inheritance and expansion of IEEE 488.2 commands. SCPI commands consist of command keywords, separators, parameter fields and terminators. Take the following command as an example:

SOURce:VOLTage 252.5

In this command, SOURce and VOLTage are command keywords. The colon (:) and space are separators. 252.5 is the parameter field. The carriage return is terminator. Some commands have multiple parameters. The parameters are separated by a comma (,).

For the convenience of description, the symbols in the subsequent chapters will be applicable to the following conventions.

- ◆ Square brackets ([]) indicate optional keywords or parameters, which can be omitted.
- ◆ Curly brackets ({}) indicate the parameter options in the command string.
- ◆ Angle brackets (<>) indicate that a numeric parameter must be provided.
- ◆ The vertical line (|) is used to separate the options of multiple optional parameters.

4.2.1 Command Keyword

Each command keyword has two formats: long mnemonic and short mnemonic. Short mnemonic is short for long mnemonic. Each mnemonic should not exceed 12 characters, including any possible numeric suffixes. The power supply only accepts precisely long or short mnemonics.

The rules for generating mnemonics are as follows:

1. Long mnemonics consist of one word or phrase. If it is a word, the entire word constitutes a mnemonic.

Examples:

CURRENT — **CURRent**

2. Short mnemonics generally consist of the first 4 characters of long mnemonics.

Example:

CURRent — **CURR**

3. If the character length of long mnemonic is less than or equal to 4, long and short mnemonics are the same. If the character length of long mnemonic is greater than 4 and the fourth character is a vowel, short mnemonic will be composed of 3 characters, discarding the vowel.

Examples:

MODE —— **MODE**
POWer —— **POW**

4.2.2 Command Separator

1. Colon (:)

Colon is used to separate two adjacent keywords in the command, such as separating **SOUR,LEV and VOLT** in command **SOUR:VOLT:LEV 32.54**.

Colon can also be the first character of a command.

2. Space

Space is used to separate command field and parameter field.

3. Semicolon (;)

Semicolon is used to separate multiple command units when multiple command units are included in one command. The level of the present path does not change by using a semicolon.

Example:

SOUR:VOLT:SLEW:POS 312.54;NEG 280.25

The above command is to set voltage rise slew to 312.54V/s and voltage fall slew to 280.25V/s . The above command is equivalent to the following two commands:

SOUR:VOLT:SLEW:POS 312.54

SOUR:VOLT:SLEW:NEG 280.25

4. Semicolon and Colon (;:)

It is used to separate multiple commands.

MEASure:VOLTage?;;SOUR:VOLT 35.68;;SOUR:SCUR 25.08

4.2.3 Query

Question mark (?) is used to mark the query function. It follows the last keyword of the command field. For example, for querying the setting voltage of power supply, the query command is **MEASure:VOLTage?**. If the setting voltage is 5V, the power supply will return a character string **5V**.

After the power supply receives the query command and completes the analysis, it will execute the command and generate a response string. The response string is first written into the output buffer. If the present remote interface is a GPIB interface, it waits for the controller to read the response. Otherwise, it immediately sends the response string to the interface.

Most commands have corresponding query syntax. If a command cannot be queried,

the power supply will report an error message “-115 Command can not query” and nothing will be returned.

4.2.4 Command Terminator

The command terminators are line feed character (ASCII character LF, value 10) and EOI (only for GPIB interface). The terminator function is to terminate the present command string and reset the command path to the root path.

4.3 Parameter Format

Parameter programmed are represented by ASCII code in the types of numeric, character, bool, etc.

Table 2

Symbol	Description	Example
<NR1>	Integer value	123
<NR2>	Floating point value	123., 12.3, 0.12, 1.23E4
<NRf>	The value may be NR1 or NR2.	
<NRf+>	Expanded value format that includes <NRf>, MIN and MAX.	
<Bool>	Boolean data	0 OFF 1 ON
<CRD>	Character data, for example, CURR	VOLT 192.168.1.123
<SRD>	Character string data	5000V/s, 3000V/s
<AARD>	Return ASCII code data, allowing the return of undefined 7-bit ASCII. This data type has an implied command terminator.	

5 Commands

5.1 IEEE 488.2 Common Commands

Common commands are general commands required by IEEE 488.2 standard that instruments must support. They are used to control the general functions of instruments, such as reset and status query. Its syntax and semantics follow IEEE 488.2 standard. IEEE 488.2 common commands have no hierarchy.

*IDN?

This command reads information of the power supply. It returns the data in four

character strings separated by three commas. The data include manufacturer, model, reserved field and software version.

Query Syntax	*IDN?		
Parameters	None		
Returns	<AARD>	String	Description
		NGITECH	Manufacturer
		N35200	Model
		0	Reserved field
		XX.XX	Software version
Returns Example	NGITECH,N35200,0,V1.00		

Note: Common commands only supports ***IDN?** at present.

***OPC**

Make the standard event register OPC location "1", which indicates that all operations and commands initiated before this command have been completed.

Command Syntax	*OPC
Parameters	None
Query Syntax	*OPC?
Returns	<NR1>

***RST**

Factory data reset.

Command Syntax	*RST
Parameters	None
Returns	None

5.2 Measure Commands

MEASure[:SCALar]:VOLTage[:DC]?

This command is used to query the readback voltage of power supply.

Command Syntax MEASure[:SCALar]:VOLTage[:DC]?

Parameters None

Example MEAS:VOLT:DC?

Returns <NRf>

Unit V

MEASure[:SCALar]:CURRent[:DC]?

This command is used to query the readback current of power supply.

Command Syntax MEASure[:SCALar]:CURRent[:DC]?

Parameters None

Example MEAS:CURR:DC?

Returns <NRf>

Unit A

MEASure[:SCALar]:POWER[:DC]?

This command is used to query the readback power of power supply.

Command Syntax MEASure[:SCALar]:POWER[:DC]?

Parameters None

Example MEAS:POW:DC?

Returns <NRf>

Unit W

MEASure[:SCALar]:RESistance[:DC]?

This command is used to query the readback resistance of power supply.

Command Syntax MEASure[:SCALar]:RESistance[:DC]?

Parameters None

Example MEAS:RES:DC?

Returns <NRf>

Unit Ω

MEASure[:SCALar]:QUANtity?

This command is used to query the readback electric quantity of power supply.

Command Syntax MEASure[:SCALar]:QUANtity?

Parameters None

Example MEASure:QUAN?

Returns <NRf>

Unit Ah

MEASure[:SCALar]:ENERgy?

This command is used to query the readback energy of power supply.

Command Syntax MEASure[:SCALar]:ENERgy?

Parameters None

Example MEASure:ENER?

Returns <NRf>

Unit kWh

MEASure:TIME?

After the load is started, the load time will be accumulated. This command is used to query the load time. The return data format is HH:MM:SS, which means hour, minute and second.

Command Syntax MEASure:TIME?

Parameters None

Example MEASure:TIME?

Returns <SRD>

Note 1:26:52 means 1 hour 26 minutes and 52 seconds.

MEASure[:SCALar]:TEMPerature?

This command is used to query the temperature of power supply.

Command Syntax MEASure[:SCALar]:TEMPerature?

Parameters None

Example MEASure:TEMPerature?

Returns <NR1>

Unit °C

FETCh[:SCALar]:VOLTage[:DC]?

This command is used to query the readback voltage of power supply.

Command Syntax FETCh[:SCALar]:VOLTage[:DC]?

Parameters None

Example FETC:VOLT:DC?

Returns <NRf>

Unit V

FETCh[:SCALar]:CURRent[:DC]?

This command is used to query the readback current of power supply.

Command Syntax FETCh[:SCALar]:CURRent[:DC]?

Parameters None

Example FETC:CURR:DC?

Returns <NRf>

Unit A

FETCh[:SCALar]:POWer[:DC]?

This command is used to query the readback power of power supply.

Command Syntax FETCh[:SCALar]:POWer[:DC]?

Parameters None

Example FETC:POW:DC?

Returns <NRf>

Unit W

FETCh:STATus?

This command is used to query the status of power supply.

Command Syntax FETCh:STATus?

Parameters None

Example FETC:STATus?

Returns <NR1> decimal number Please kindly see the below table.

Table 3

31	30	29	28	27	26	25	24	23	22
Start completed	Under calibration	Remote lock	Emergency stop	Cascade	Analog programming				
21	20	19	18	17	16	15	14	13	12
Protection						Under test	Test completed	Remote control	Voltage sense
11	10	9	8	7	6	5	4	3	2
Function				Mode			Source&load mode	Current sense exceeds the	

						range.
1	0					
Voltage sense exceeds the range.	Output display					
Bit 0	Output indication, 0 for off, 1 for on					
Bit 1	0 for voltage sense normal operation, 1 for voltage sense over the range					
Bit 2	0 for current sense normal operation, 1 for current sense over the range					
Bit 3	0 for source mode, 1 for load mode					
Bit 4-6	0 for CV, 1 for CC, 2 for CP, 3 for CR					
Bit 7-11	0 for STATIC, 1 for CR, 2 for SEQ, 3 for CHARGE, 4 for DISCHARGE, 5 for RAMP, 6 for WAVE					
Bit 12	0 for local sense, 1 for remote sense					
Bit 13	0 for local control, 1 for remote control					
Bit 14	0 for test uncompleted, 1 for test completed					
Bit 15	0 for not under test, 1 for under test					
Bit 16-21	0 for no protection, 1 for PMF, 2 for OTP, 3 for RV, 4 for OC, 5 for OV, 6 for OP, 7 for OCP, 8 for OVP, 9 for OPP, 10 for LVP, others for undefined					
Bit 22-26	0 for off, 1 for on, BIT22 for voltage, BIT23 for source current, BIT24 for load current, BIT25 for source power, BIT26 for load power					
Bit 27	0 for cascade off, 1 for cascade on					
Bit 28	0 for emergency stop resetting, 1 for emergency stop activated					
Bit 29	0 for remote unlocked, 1 for remote locked					
Bit 30	0 for not under calibration, 1 for under calibration					
Bit 31	0 for start uncompleted, 1 for start completed					

5.3 System Commands

SYSTem:COMMunicate:LAN:IP[:CONFiguration]

This command is used to set the IP address of power supply.

Command Syntax SYSTem:COMMunicate:LAN:IP[:CONFiguration] <CRD>

Parameters <CRD>

Example SYSTem:COMMunicate:LAN:IP "192.168.0.126"

Query Syntax SYSTem:COMMunicate:LAN:IP?

Returns	<CRD>
---------	-------

SYSTem:COMMunicate:LAN:DGATeway

This command is used to set the gateway address of power supply.

Command Syntax	SYSTem:COMMunicate:LAN:DGATeway<CRD>
----------------	--------------------------------------

Parameters	<CRD>
------------	-------

Example	SYST:COMM:LAN:DGAT "192.168.0.1"
---------	----------------------------------

Query Syntax	SYST:COMM:LAN:DGAT?
--------------	---------------------

Returns	<CRD>
---------	-------

SYSTem:COMMunicate:LAN:SMASK

This command is used to set the subnet mask of power supply.

Command Syntax	SYSTem:COMMunicate:LAN:SMASK<CRD>
----------------	-----------------------------------

Parameters	<CRD>
------------	-------

Example	SYST:COMM:LAN:SMAS"255.255.255.0"
---------	-----------------------------------

Query Syntax	SYST:COMM:LAN:SMAS?
--------------	---------------------

Returns	<CRD>
---------	-------

SYSTem:COMMunicate:SERial:BAUDrate

This command is used to set the baud rate of serial port.

Command Syntax SYSTem:COMMunicate:SERial:BAUDrate<CRD>

Parameters <4800|9600|19200|38400|115200>

Example SYST:COMM:SER:BAUD 38400

Query Syntax SYST:COMM:SER:BAUD?

Returns <CRD>

SYSTem:COMMunicate:SERial:PARity

This command is used to set the parity of serial port.

Command Syntax SYSTem:COMMunicate:SERial:PARity <CRD>

Parameters <NONE | ODD | EVEN>

Example SYSTem:COMMunicate:SERial:PARity NONE

Query Syntax SYSTem:COMMunicate:SERial:PARity?

Returns <NONE | ODD | EVEN>

SYSTem:COMMunicate:CAN:BAUDrate

This command is used to set the CAN baud rate.

Command Syntax SYSTem:COMMunicate:CAN:BAUDrate <CRD>

Parameters <CRD>

Example SYST:COMM:CAN:BAUD 250

Query Syntax SYST:COMM:CAN:BAUD?

Returns <CRD>

SYSTem:POWDown:SAVe

This command is used to turn on/off power-off memory.

Command Syntax SYSTem:POWDown:SAVe<bool>

Parameters <0|1|OFF|ON>

Example SYSTem:POWDown:SAVe ON

Query Syntax SYSTem:POWDown:SAVe?

Returns ON|OFF

SYSTem:LANGuage

This command is used to set language.

Command Syntax	SYSTem:LANGuage <CRD>
Parameters	<CHINese ENGLish>
Example	SYSTem:LANGuage ENGLish
Query Syntax	SYSTem:LANGuage?
Returns	<CHINese ENGLish>

SYSTem:DEVice:ADDRes

This command is used to set device address.

Command Syntax	SYSTem:DEVice:ADDRes <NR1>
Parameters	<NR1>,range:1~248
Example	SYSTem:DEVice:ADDRes 160
Query Syntax	SYSTem:DEVice:ADDRes?
Returns	<NR1>

SYSTem:SOUNd

This command is used to turn on/off beeper.

Command Syntax SYSTem:SOUNd <bool>

Parameters <OFF|ON>

Example SYSTem:SOUNd ON

Query Syntax SYSTem:SOUNd?

Returns <ON|OFF>

5.4 Output Commands

OUTPut:PRlority

This command is used to set CV priority or CC priority.

Command Syntax OUTPut:PRlority<CRD>

Parameters <CV | CC>

Example OUTPut:PRlority CV

Query Syntax OUTPut:PRlority?

Returns <CV | CC>

OUTPut:ONOFF

This command is used to turn on/off output.

Command Syntax OUTPut:ONOFF <bool>

Parameters <0|1|OFF|ON>

Example OUTPut:ONOFF ON

Query Syntax OUTPut:ONOFF?

Returns ON|OFF

OUTPut:SYSRzero

This command is used to control quick zero of the power supply.

Command Syntax OUTPut:SYSRzero<bool>

Parameters <0|1|OFF|ON>

Example OUTPut:SYSRzero ON

Query Syntax OUTPut:SYSRzero?

Returns ON|OFF

OUTPut:MODE

This command is used to set the operating mode of power supply.

Command Syntax OUTPut:MODE<CRD>

Parameters NORMAl | CR | SEQuence | CHArge | DISCharge | RAMP | RESI
NORMAl for voltage/current/power, CR for constant resistance mode, SEQuence for SEQ sequence mode, CHArge for charge mode, DISCharge for discharge mode, RAMP for ramp mode, RESI for internal resistance simulation

Example OUTPut:MODE NORMAl

Query Syntax OUTPut:MODE?

Returns NORMAl

OUTPut:STATe?

This command is used to query the status of power supply.

Command Syntax OUTPut:STATe?

Returns ON|OFF

OUTPut:EVENT?

This command is used to read the alarm status of the power supply and clear the alarm.

Command Syntax OUTPut:EVENT?

Returns <NR1> decimal number Please kindly see Table 3.

OUTPut:CLEArevent

This command is used to clear the protection.

Command Syntax OUTPut:CLEArevent <bool>

Parameters <1|CLEAr>

Example OUTPut:CLEArevent CLEAr

Query Syntax None

OUTPut:AUTOrun

This command is used to control the auto run function of power supply.

Command Syntax OUTPut:AUTOrun<bool>

Parameters <0 | 1 | OFF | ON>

Example OUTPut:AUTOrun ON

Query Syntax OUTPut:AUTOrun?

Return ON|OFF

OUTPut:RUNDelay

This command is used to set the delay time for auto-run function.

Command Syntax OUTPut:RUNDelay <NRf>

Parameters <NRf> Range MIN~MAX

Example OUTPut:RUNDelay 10.0

Query Syntax OUTPut:RUNDelay?

Return <NRf>

OUTPut:PROTection:CLEar

This command is used to clear the protection.

Command Syntax OUTPut:PROTection:CLEar

Parameters <1|CLEar>

Example OUTP:PROT:CLE CLEar

Query Syntax None

5.5 Source Commands

SOURce:VOLTage

This command is used to set output voltage. The unit is V.

Command Syntax SOURce:VOLTage<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:VOLTage 10

Query Syntax SOURce:VOLTage?

Returns <NRf>

SOURce:VOLTage:LEVel:LIMit[:HIGH]

This command is used to set the Max. output voltage. The unit is V.

Command Syntax SOURce:VOLTage:LEVel:LIMit:HIGH<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOUR:VOLT:LEV:LIM 45

Query Syntax SOUR:VOLT:LEV:LIM?

Returns <NRf>

SOURce:VOLTage:LEVel:LIMit:LOW

This command is used to set the Min. output voltage. The unit is V.

Command Syntax SOURce:VOLTage:LEVel:LIMit:LOW <NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOUR:VOLT:LEV:LIM:LOW 0

Query Syntax SOUR:VOLT:LEV:LIM:LOW?

Returns <NRf>

SOURce:VOLTage:SLEW[:BOTH]?

This command is used to read the rise&fall slew rate of voltage.

Command Syntax SOURce:VOLTage:SLEW:BOTH?

Parameters None

Example SOUR:VOLT:SLEW?

Returns <NRf>,<NRf> Represent respectively: rise slew, fall slew

SOURce:VOLTage:SLEW:POSitive

This command is used to set the rise slew rate of voltage. The unit is V/ms.

Command Syntax SOURce:VOLTage:SLEW:POSitive <NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOUR:VOLT:SLEW:POS 2800

Query SOUR:VOLT:SLEW:POS?

Returns <NRf>V/ms

SOURce:VOLTage:SLEW:NEGative

This command is used to set the fall slew rate of voltage. The unit is V/ms.

Command Syntax SOURce:VOLTage:SLEW:NEGative<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOUR:VOLT:SLEW:NEG 2800

Query SOUR:VOLT:SLEW:NEG?

Returns <NRf>V/ms

SOURce:SCURrent

This command is used to set source current. The unit is A.

Command Syntax SOURce:SCURrent<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SCURrent 5.28.

Query Syntax SOURce:SCURrent?

Returns <NRf>

SOURce:SCURRent:LEVel:LIMit[:HIGH]

This command is used to set the Max.output source current. The unit is A.

Command Syntax SOURce:SCURRent:LEVel:LIMit[:HIGH]<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SCURRent:LEVel:LIMit 40.4

Query Syntax SOURce:SCURRent:LEVel:LIMit?

Returns <NRf>

SOURce:SCURRent:LEVel:LIMit:LOW

This command is used to set the Min.output source current. The unit is A.

Command Syntax SOURce:SCURRent:LEVel:LIMit:LOW<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SCURRent:LEVel:LIMit:LOW 0

Query Syntax SOURce:SCURRent:LEVel:LIMit:LOW?

Returns <NRf>

SOURce:SCURRent:SLEW[:BOTH]?

This command is used to query rise&fall slew rate of source current.

Command Syntax SOURce:SCURRent:SLEW?

Parameters None

Example SOURce:SCURRent:SLEW?

Returns <NRf>,<NRf>

SOURce:SCURRent:SLEW:POSitive

This command is used to set rise slew rate of source current. The unit is A/ms.

Command Syntax SOURce:SCURRent:SLEW:POSitive<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SCURRent:SLEW:POSitive 280

Query SOURce:SCURRent:SLEW:POSitive?

Returns <NRf>

SOURce:SCURRent:SLEW:NEGative

This command is used to set fall slew rate of source current. The unit is A/ms.

Command Syntax SOURce:SCURRent:SLEW:NEGative<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SCURRent:SLEW:NEGative 280

Query SOURce:SCURRent:SLEW:NEGative?

Returns <NRf>

SOURce:LCURrent

This command is used to set load current. The unit is A.

Command Syntax SOURce:LCURrent<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:LCURrent 5.28

Query SOURce:LCURrent?

Returns <NRf>

SOURce:LCURRent:LEVel:LIMit[:HIGH]

This command is used to set the Max.input of load current. The unit is A.

Command Syntax SOURce:LCURRent:LEVel:LIMit[:HIGH]<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:LCURRent:LEVel:LIMit 40

Query SOURce:LCURRent:LEVel:LIMit?

Returns <NRf>

SOURce:LCURRent:LEVel:LIMit:LOW

This command is used to set Min.input of load current. The unit is A.

Command Syntax SOURce:LCURRent:LEVel:LIMit:LOW<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:LCURRent:LEVel:LIMit:LOW 0

Query SOURce:LCURRent:LEVel:LIMit:LOW?

Returns <NRf>

SOURce:LCURRent:SLEW[:BOTH]?

This command is used to query the rise&fall slew rate of load current.

Command Syntax SOURce:LCURRent:SLEW?

Parameters None

Example SOURce:LCURRent:SLEW?

Returns <NRf>,<NRf>

SOURce:LCURRent:SLEW:POSitive

This command is used to set the rise slew rate of load current. The unit is A/ms.

Command Syntax SOURce:LCURRent:SLEW:POSitive<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:LCURRent:SLEW:POSitive 280

Query SOURce:LCURRent:SLEW:POSitive?

Returns <NRf>

SOURce:LCURRent:SLEW:NEGative

This command is used to set the fall slew rate of load current. The unit is A/ms.

Command Syntax SOURce:LCURRent:SLEW:NEGative<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:LCURRent:SLEW:NEGative 280

Query SOURce:LCURRent:SLEW:NEGative?

Returns <NRf>A/ms

SOURce:SPOWer

This command is used to set the source power. The unit is W.

Command Syntax SOURce:SPOWer <NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SPOWer 1528

Query SOURce:SPOWer?

Returns <NRf>

SOURce:SPOWer:LEVel:LIMit[:HIGH]

This command is used to set the Max. source power. The unit is W.

Command Syntax SOURce:SPOWer:LEVel:LIMit[:HIGH]<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SPOWer:LEVel:LIMit 2000

Query SOURce:SPOWer:LEVel:LIMit?

Returns <NRf>

SOURce:SPOWer:LEVel:LIMit:LOW

This command is used to set the Min. source power. The unit is W.

Command Syntax SOURce:SPOWer:LEVel:LIMit:LOW<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:SPOWer:LEVel:LIMit:LOW 0

Query SOURce:SPOWer:LEVel:LIMit:LOW?

Returns <NRf>

SOURce: LPOWer

This command is used to set the load power. The unit is W.

Command Syntax	SOURce:LPOWer <NRf+>
Parameters	<NRf+> Range MIN~MAX
Example	SOURce:LPOWer 1000
Query	SOURce:LPOWer?
Returns	<NRf>

SOURce:LPOWer:LEVel:LIMit[:HIGH]

This command is used to set the Max. load power. The unit is W.

Command Syntax	SOURce:LPOWer:LEVel:LIMit[:HIGH]<NRf+>
Parameters	<NRf+>
Example	SOURce:LPOWer:LEVel:LIMit 2000
Query	SOURce:LPOWer:LEVel:LIMit?
Returns	<NRf>

SOURce:LPOWer:LEVel:LIMit:LOW

This command is used to set the Min. load power. The unit is W.

Command Syntax SOURce:LPOWer:LEVel:LIMit:LOW<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:LPOWer:LEVel:LIMit:LOW 0

Query SOURce:LPOWer:LEVel:LIMit:LOW?

Returns <NRf>

SOURce:CRREsistance

This command is used to set the resistance value of load mode under constant resistance mode. The unit is Ω .

Command Syntax SOURce:CRREsistance<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:CRREsistance100

Query SOURce:CRREsistance?

Returns <NRf>

SOURce:CRLCurrent

This command is used to set the current value of load mode under constant resistance mode.

Command Syntax SOURce:CRLCurrent <NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:CRLCurrent 10

Query SOURce:CRLCurrent?

Returns <NRf>

SOURce:CRLPower

This command is used to set the power value of load mode under constant resistance mode.

Command Syntax SOURce:CRLPower <NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:CRLPower 1000

Query SOURce:CRLPower?

Returns <NRf>

SOURce:INTERNALres

This command is used to set the resistance value under simulated internal resistance mode. The unit is Ω .

Command Syntax SOURce:INTERNALres<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:INTERNALres10

Query SOURce:INTERNALres?

Returns <NRf>

SOURce:INTERNALres:VOLTage

This command is used to set the voltage value under simulated internal resistance mode. The unit is V.

Command Syntax SOURce:INTERNALres:VOLTage<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:INTERNALres:VOLTage 40

Query SOURce:INTERNALres:VOLTage?

Returns <NRf>

SOURce:INTERNALres:CURRENT

This command is used to set the current value under simulated internal resistance mode. The unit is A.

Command Syntax SOURce:INTERNALres:CURRENT<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:INTERNALres:CURRENT 10

Query SOURce:INTERNALres:CURRENT?

Returns <NRf>

SOURce:INTERNALres:POWER

This command is used to set the power value under simulated internal resistance mode. The unit is W.

Command Syntax SOURce:INTERNALres:POWER<NRf+>

Parameters <NRf+> Range MIN~MAX

Example SOURce:INTERNALres:POWER 1000

Query SOURce:INTERNALres:POWER?

Returns <NRf>

This command is used to save test parameters.

Command Syntax SOURce:FUNcTion:SAVe <NR1>

Parameters <NR1> Range 1~20

Example SOURce:FUNcTion:SAVe 2

Query SOURce:FUNcTion:SAVe?

Returns <NR1>

SOURce:FUNcTion:RECALL

This command is used to recall test parameters.

Command Syntax SOURce:FUNcTion:RECALL <NR1>

Parameters <NR1> Range 1~20

Example SOURce:FUNcTion:RECALL 2

Query SOURce:FUNcTion:RECALL?

Returns <NR1>

SOURce:FUNCtion:FASTcall

This command is used to start fast-call.

Command Syntax SOURce:FUNCtion:FASTcall

Parameters <0|1|OFF|ON>

Example SOUR:FUNC:FAST ON

Query SOUR:FUNC:FAST?

Returns <OFF|ON>

SOURce:FUNCtion:TIMEDWell

This command is used to set time dwell.

Command Syntax SOURce:FUNCtion:TIMDwell <NRf>

Parameters <NR1> Range 0~999999.0,Unit s

Example SOUR:FUNC:TIMD 52.0

Query SOUR:FUNC:TIMD?

Returns <NRf>

5.6 Sequence Commands

SEquence:STATUs

This command is used to query the operating status of SEQ mode.(0-7) for the number of operating step,(8-15) for the number of operating file,(16-31) for the number of cycle times.

Query Syntax SEquence:STATUs?

Parameters None

Example SEquence:STATUs?

Returns <NR1>

SEquence:RUN:FILE

This command is used to set the running file under SEQ mode.

Command Syntax SEquence:RUN:FILE <NR1>

Parameters <NR1> Range: 1-10

Example SEquence:RUN:FILE 2

Query Syntax SEquence:RUN:FILE?

Returns <NR1>

SEQence:RUN:STEP?

This command is used to read present running step number.

Query Syntax	SEQence:RUN:STEP?
Parameters	None
Example	SEQence:RUN:STEP?
Returns	<NR1>

SEQence:RUN:LENGth

This command is used to query the total step number of present SEQ file.

Query Syntax	SEQence:RUN:LENGth?
Parameters	None
Example	SEQence:RUN:LENGth?
Returns	<NR1>

SEQence:RUN:LINK

This command is used to query the link file of present SEQ file.

Query Syntax	SEQence:RUN:LINK?
Parameters	None
Example	SEQence:RUN:LINK?
Returns	<NR1>

SEQuence:RUN:CYCLe

This command is used to query the cycle number of present file.

Query Syntax	SEQuence:RUN:CYCLe?
Parameters	None
Example	SEQuence:RUN:CYCLe?
Returns	<NR1>

SEQuence:RUN:VOLTage

This command is used to query setting voltage value of present step.

Query Syntax	SEQuence:RUN:VOLTage?
Parameters	None
Example	SEQuence:RUN:VOLTage?
Returns	<NRf>

SEquence:RUN:SCURRent

This command is used to query the setting source current value of present file.

Query Syntax	SEquence:RUN:SCURRent?
Parameters	None
Example	SEquence:RUN:SCURRent?
Returns	<NRf>

SEquence:RUN:LCURRent

This command is used to query the setting load current value of present file.

Query Syntax	SEquence:RUN:LCURRent?
Parameters	None
Example	SEquence:RUN:LCURRent?
Returns	<NRf>

SEQuence:RUN:SPOWer

This command is used to query the setting source power value of present file.

Query Syntax SEQuence:RUN:SPOWer?

Parameters None

Example SEQuence:RUN:SPOWer?

Returns <NRf>

SEQuence:RUN:LPOWer

This command is used to query the setting load power value of present file.

Query Syntax SEQuence:RUN:LPOWer?

Parameters None

Example SEQuence:RUN:LPOWer?

Returns <NRf>

SEQuence:RUN:DWELI

This command is used to query the setting operating time of present step.

Query Syntax SEQuence:RUN:DWELI?

Parameters None

Example SEQuence:RUN:DWELI?

Returns <NR1>

SEquence:RUN:TIME

This command is used to query the real operating time of present step.

Query Syntax SEquence:RUN:TIME?

Parameters None

Example SEquence:RUN:TIME?

Returns <NR1>

SEquence:EDIT:FILE

This command is used to set the SEQ editing file.

Command Syntax SEquence:EDIT:FILE <NR1>

Parameters <NR1>,range 1-10

Example SEquence:EDIT:FILE 1

Query SEquence:EDIT:FILE?

Returns <NR1>

SEQUence:EDIT:LENGTh

This command is used to set the total steps of SEQ editing file.

Command Syntax SEQUence:EDIT:LENGTh<NR1>

Parameters <NR1>,range 1-100

Example SEQUence:EDIT:LENGTh 5

Query SEQUence:EDIT:LENGTh?

Returns <NR1>

SEQUence:EDIT:CYCLE

This command is used to set the cycle number of SEQ editing file.

Command Syntax SEQUence:EDIT:CYCLE<NR1>

Parameters <NR1>,range 0-60000

Example SEQUence:EDIT:CYCLE 10

Query SEQUence:EDIT:CYCLE?

Returns <NR1>

SEQence:EDIT:LFILE

This command is used to set the link file of SEQ editing file.

Command Syntax SEQence:EDIT:LFILE<NR1>

Parameters <NR1>,range 1-10 Zero means no link.

Example SEQence:EDIT:LFILE 0

Query SEQence:EDIT:LFILE?

Returns <NR1>

SEQence:EDIT:STEP

This command is used to set the present step No. of SEQ editing file.

Command Syntax SEQence:EDIT:STEP<NR1>

Parameters <NR1>,range 1-total steps of SEQ editing file

Example SEQence:EDIT:STEP 1

Query SEQence:EDIT:STEP?

Returns <NR1>

SEQuence:EDIT:VOLTage

This command is used to set the present step voltage of SEQ editing file. The unit is V.

Command Syntax SEQuence:EDIT:VOLTage<NRf>

Parameters <NRf>

Example SEQuence:EDIT:VOLTage 10

Query SEQuence:EDIT:VOLTage?

Returns <NRf>

SEQuence:EDIT:SCURrent

This command is used to set the present step source current of SEQ editing file. The unit is A.

Command Syntax SEQuence:EDIT:SCURrent<NRf>

Parameters <NRf>

Example SEQuence:EDIT:SCURrent 10.3

Query SEQuence:EDIT:SCURrent?

Returns <NRf>

SEQuence:EDIT:LCURrent

This command is used to set the present step load current of SEQ editing file. The unit is A.

Command Syntax SEQuence:EDIT:LCURrent<NRf>

Parameters <NRf>

Example SEQuence:EDIT:LCURrent 10.3

Query SEQuence:EDIT:LCURrent?

Returns <NRf>

SEQuence:EDIT:SPOWer

This command is used to set the present step source power of SEQ editing file. The unit is W.

Command Syntax SEQuence:EDIT:SPOWer <NRf>

Parameters <NRf>

Example SEQuence:EDIT:SPOWer 1000

Query SEQuence:EDIT:SPOWer?

Returns <NRf>

SEQuence:EDIT:LPOWer

This command is used to set the present step load power of SEQ editing file. The unit is W.

Command Syntax SEQuence:EDIT:LPOWer <NRf>

Parameters <NRf>

Example SEQuence:EDIT:LPOWer 1000

Query SEQuence:EDIT:LPOWer?

Returns <NRf>

SEQuence:EDIT:DWELI

This command is used to set the present step dwell time of SEQ editing file. The unit is s.

Command Syntax SEQuence:EDIT:DWELI<NRf>

Parameters <NRf>

Example SEQuence:EDIT:DWELI 15000

Query SEQuence:EDIT:DWELI?

Returns <NRf>

SEQuence:EDIT:SAVe

This command is used to save the SEQ file.

Command Syntax SEQuence:EDIT:SAVe SAVe

Parameters None

Example SEQuence:EDIT:SAV SAV

Query None

5.7 Ramp Commands

RAMP:VOLTage:BEGiN

This command is used to set the RAMP voltage value of begin point(A point).The unit is V.

Command Syntax RAMP:VOLTage:BEGiN <NRf+>

Parameters <NRf+>,range Min.-Max.

Example RAMP:VOLT:BEG 10

Query RAMP:VOLT:BEG?

Returns <NRf>

RAMP:VOLTage:MIDDLE

This command is used to set the RAMP voltage value of middle point(B point).The unit is V.

Command Syntax RAMP:VOLTage:MIDDLE <NRf+>

Parameters <NRf+>,range Min.-Max.

Example RAMP:VOLT:MIDDLE 20

Query RAMP:VOLT:MIDD?

Returns <NRf>

RAMP:VOLTage:END

This command is used to set the RAMP voltage value of end point(C point).The unit is V.

Command Syntax RAMP:VOLTage:END <NRf+>

Parameters <NRf+>,range Min.-Max.

Example RAMP:VOLT:END 30

Query RAMP:VOLT:END?

Returns <NRf>

RAMP:CURRent

This command is used to set the RAMP current value. The unit is A.

Command Syntax RAMP:CURRent <NRf+>

Parameters <NRf+>, range Min.-Max.

Example RAMP:CURR 2.3

Query RAMP:CURR?

Returns <NRf>

RAMP:POWer

This command is used to set the RAMP power value. The unit is W.

Command Syntax RAMP:POWer <NRf+>

Parameters <NRf+>, range Min.-Max.

Example RAMP:POW 2000

Query RAMP:POW?

Returns <NRf>

RAMP:SLEW:BTOM

This command is used to set the RAMP voltage slew rate between begin A point and middle B point. The unit is V/ms.

Command Syntax RAMP:SLEW:BTOM <NRf+>

Parameters <NRf+>,range Min.-Max.

Example RAMP:SLEW:BTOM 127.3

Query RAMP:SLEW:BTOM?

Returns <NRf>

RAMP:SLEW:MTOE

This command is used to set the RAMP voltage slew rate between middle B point and end C point. The unit is V/ms.

Command Syntax RAMP:SLEW:MTOE <NRf+>

Parameters <NRf+>,range Min.-Max.

Example RAMP:SLEW:MTOE 127.3

Query RAMP:SLEW:MTOE?

Returns <NRf>

RAMP:HOLDtime:APON

This command is used to set the RAMP holding time of A point. The unit is s.

Command Syntax RAMP:HOLDtime:APON <NRf+>

Parameters <NRf+>,range 0.000~9999.999

Example RAMP:HOLD:APON 123.4

Query RAMP:HOLD:APON?

Returns <NRf>

RAMP:HOLDtime:BPON

This command is used to set the RAMP holding time of B point. The unit is s.

Command Syntax RAMP:HOLDtime:BPON <NRf+>

Parameters <NRf+>,range 0.000~9999.999

Example RAMP:HOLD:BPON 123.4

Query RAMP:HOLD:BPON?

Returns <NRf>

RAMP:HOLDtime:CPON

This command is used to set the RAMP holding time of C point. The unit is s.

Command Syntax RAMP:HOLDtime:CPON <NRf+>

Parameters <NRf+>,range 0.000~9999.999

Example RAMP:HOLD:CPON 123.4

Query RAMP:HOLD:CPON?

Returns <NRf>

5.8 Charge Commands

CHARge:VOLTage

This command is used to set the charge voltage value. The unit is V.

Command Syntax CHARge:VOLTage<NRf+>

Parameters <NRf+>, range Min.-Max.

Example CHARge:VOLTage 10

Query CHARge:VOLTage?

Returns <NRf>

CHARge:CURREnt

This command is used to set the charge current value. The unit is A.

Command Syntax CHARge:CURREnt<NRf+>

Parameters <NRf+>, range Min.-Max.

Example CHARge:CURREnt 10

Query CHARge:CURREnt?

Returns <NRf>

CHARge:POWer

This command is used to set the charge power value. The unit is W.

Command Syntax CHARge:POWer<NRf+>

Parameters <NRf+>, range Min.-Max.

Example CHARge:POWer 10

Query CHARge:POWer?

Returns <NRf>

CHARge:ABORt:VOLTagE

This command is used to set the end voltage value. The unit is V.

Command Syntax CHARge:ABORt:VOLTagE<NRf+>

Parameters <NRf+>, range Min.-Max.

Example CHARge:ABORt:VOLTagE 10

Query CHARge:ABORt:VOLTagE?

Returns <NRf>

CHARge:ABORt:CURRent

This command is used to set the end current value. The unit is A.

Command Syntax CHARge:ABORt:CURRent<NRf+>

Parameters <NRf+>,range Min.-Max.

Example CHARge:ABORt:CURRent 10

Query CHARge:ABORt:CURRent?

Returns <NRf>

CHARge:ABORt:QUANtity

This command is used to set the end electric quantity value. The unit is Ah.

Command Syntax CHARge:ABORt:QUANtity<NRf+>

Parameters <NRf+>,range Min.-Max.

Example CHARge:ABORt:QUANtity 10

Query CHARge:ABORt:QUANtity?

Returns <NRf>

CHARge:ABORt:TIME

This command is used to set the end time. The unit is s.

Command Syntax CHARge:ABORt:TIME<NRf+>

Parameters <NRf+>,range Min.-Max.

Example CHARge:ABORt:TIME 10

Query CHARge:ABORt:TIME?

Returns <NRf>

5.9 Discharge Commands

DISCharge:CURRent

This command is used to set the discharge current. The unit is A.

Command Syntax DISCharge:CURRent<NRf+>

Parameters <NRf+>,range Min.-Max.

Example DISCharge:CURRent 10

Query DISCharge:CURRent?

Returns <NRf>

DISCharge:POWer

This command is used to set the discharge power. The unit is W.

Command Syntax DISCharge:POWer<NRf+>

Parameters <NRf+>,range Min.-Max.

Example DISCharge:POWer 10

Query DISCharge:POWer?

Returns <NRf>

DISCharge:ABORt:VOLTage

This command is used to set the discharge end voltage. The unit is V.

Command Syntax DISCharge:ABORt:VOLTage<NRf+>

Parameters <NRf+>,range Min.-Max.

Example DISCharge:ABORt:VOLTage 10

Query DISCharge:ABORt:VOLTage?

Returns <NRf>

DISCharge:ABORt:QUANtity

This command is used to set the discharge end electric quantity. The unit is Ah.

Command Syntax DISCharge:ABORt:QUANtity<NRf+>

Parameters <NRf+>, range Min.-Max.

Example DISCharge:ABORt:QUANtity 10

Query DISCharge:ABORt:QUANtity?

Returns <NRf>

DISCharge:ABORt:TIME

This command is used to set the discharge end time. The unit is s.

Command Syntax DISCharge:ABORt:TIME<NRf+>

Parameters <NRf+>, range Min.-Max.

Example DISCharge:ABORt:TIME 10

Query DISCharge:ABORt:TIME?

Returns <NRf>

5.10 Parallel Commands

PARallel:SELEct

This command is used to set the parallel control.

Command Syntax PARallel:SELEct<Bool>

Parameters <0|OFF|1|ON>

Example PARallel:SELEct ON

Query PARallel:SELEct?

Returns <OFF|ON>

PARallel:ROLe

This command is used to set the role of master or slave.

Command Syntax PARallel:ROLe <CRD>

Parameters <0|MASTER|1|SLAVE1|2|SLAVE2|3|SLAVE3|4|SLAVE4>

Example PAR:ROL SLAVE1

Query PAR:ROL?

Returns <MASTER|SLAVE1|SLAVE2|SLAVE3|SLAVE4>

PARallel:SLAVe:NUMBer

This command is used to set the number of slave units.

Command Syntax PARallel:SLAVe:NUMBer <NR1>

Parameters <NR1>,range 1-4

Example PARallel:SLAVe:NUMBer 3

Query PARallel:SLAVe:NUMBer?

Returns <NR1>

5.11 Aprogram Commands

APRogram:VOLMode

This command is used to set the voltage program mode of external programming.

Command Syntax APRogram:VOLMode <CRD>

Parameters <OFF | VOLTage>

Example APRogram:VOLModeVOLTage

Query Syntax APRogram:VOLMode?

Returns <OFF | VOLTage>

APRogram:CURMode

This command is used to set the current program mode of external programming.

Command Syntax	APRogram:CURMode <CRD>
Parameters	<OFF CURRent SOURcecurrent LOADcurrent>
Explanation	OFF-turn off current program CURRent-turn on source current/load current program SOURcecurrent-turn on source current program LOADcurrent-turn on load current program
Example	APRogram:CURModeCURRent
Query Syntax	APRogram:CURMode?
Returns	<OFF CURRent SOURcecurrent LOADcurrent>

APRogram:POWMode

This command is used to set the power program mode of external programming.

Command Syntax	APRogram:POWMode <CRD>
Parameters	<OFF POWER SOURcepower LOADpower>
Explanation	OFF-turn off power program POWER-turn on source power/load power program SOURcepower -turn on source power program LOADpower-turn on load power program
Example	APRogram:POWModePOWER
Query Syntax	APRogram:POWMode?
Returns	<OFF POWER SOURcepower LOADpower>

APRogram:CTRL

This command is used to enable the external programming function.

Command Syntax APRogram:CTRL <CRD>

Parameters <OFF | TOGGle | HOLD>

Example APRogram:CTRL HOLD

Query Syntax APRogram:CTRL?

Returns <OFF | TOGGle | HOLD>

APRogram:APGLevel

This command is used to select external programming voltage level .

Command Syntax APRogram:APGLevel

Parameters <5 | 10>

Example APRogram:APGLevel 5

Query Syntax APRogram:APGLevel?

Returns <5 | 10>

MONilevel

This command is used to select monitor output voltage level .

Command Syntax APProgram:MONilevel

Parameters <5 | 10>

Example APProgram:MONilevel 5

Query Syntax APProgram:MONilevel?

Returns <5 | 10>

5.12 Protect Commands

PROTECT:OVER:VOLTage

This command is used to set the over voltage protection value. The unit is V.

Command Syntax PROTECT:OVER:VOLTage<NRf+>

Parameter <NRf+>, range MIN~MAX

Example PROTECT:OVER:VOLTage 28.23

Query Syntax PROTECT:OVER:VOLTage?

Returns <NRf>

PROTECT:OVER:CURRENT

This command is used to set the over current protection value. The unit is A.

Command Syntax PROTECT:OVER:CURRENT <NRf+>

Parameters <NRf+>, range MIN~MAX

Example PROTECT:OVER:CURRENT 30

Query Syntax PROTECT:OVER:CURRENT?

Returns <NRf>

PROTECT:OVER:POWER

This command is used to set the over power protection value. The unit is W.

Command Syntax PROTECT:OVER:POWER <NRf+>

Parameters <NRf+>, range MIN~MAX

Example PROTECT:OVER:POWER 2000

Query Syntax PROTECT:OVER:POWER?

Returns <NRf>

PROTECT:UNDER:VOLTAGE

This command is used to set the under voltage protection value. The unit is V.

Command Syntax PROTECT:UNDER:VOLTAGE<NRf+>

Parameters <NRf+>, range MIN~MAX

Example PROTECT:UNDER:VOLTAGE 0

Query Syntax PROTECT:UNDER:VOLTAGE?

Returns <NRf>

6 Programming Examples

This chapter will describe how to control the power supply by programming commands.

Note: In this chapter, there are comments starting with //, following some commands. These comments cannot be recognized by the power supply, only for the convenience of understanding the corresponding commands. Therefore, it is not allowed to input comments including // in practice.

6.1 Normal Mode

Example: set the power supply to normal mode, output voltage to 50.5V, source current to 20.6A, load current to 20.6A, source power to 2000W, load power to 2000W, the commands are listed as follows.

```
OUTPut OFF //turn off the output of power supply
OUTPut:MODE NORMAL //set operation mode to Normal mode
SOURce:VOLTage 50.5 //set voltage to 50.5V
SOURce:SCURrent 20.6 //set source current to 20.6A
SOURce:LCURrent 20.6 //set load current to 20.6A
SOURce:SPOWer 2000 //set source power to 2000W

SOURce:LPOWer 2000 //set load power to 2000W

OUTPut:ONOFF 1 //turn on the output of power supply
```

6.2 SEQ Mode

The SEQ test mainly judges the number of running steps based on the selected SEQ file. It will run all the steps in sequence, according to the preset output parameters for each step. Links can also be made between files. The cycle times can be also set. Example: set the power supply to SEQ mode, SEQ file No. to 5, total steps to 3 and file cycle times to 1. The steps parameters are as below table.

Step No.	Voltage(V)	Source Current(A)	Load Current(A)	Source Power(W)	Load Power(W)	Dwell Time(s)
1	10	15	15	1000	1000	10
2	20	25	25	1001	1001	15
3	30	35	35	1002	1002	25

```

OUTPut:ONOFF //turn off the output of power supply
OUTPut:MODE SEQuence //set operation mode to SEQ mode
SEQuence:EDIT:FILE 5 //set SEQ file No. to 5
SEQuence:EDIT:LENGth 3 //set total steps of SEQ file No. to 3
SEQuence:EDIT:CYCLe 1 //set cycle times of SEQ file No. to 1
SEQuence:EDIT:LFILE 0 //set the link file to 0

SEQuence:EDIT:STEP 1 //set step No. to 1
SEQuence:EDIT:VOLTage 10 //set voltage for step No. 1 to 10V
SEQuence:EDIT:SCURrent 15 //set source current for step No. 1 to 15A
SEQuence:EDIT:LCURrent 15 //set load current for step No. 1 to 15A
SEQuence:EDIT:SPOWer 1000 //set source power for step No. 1 to 1000W
SEQuence:EDIT:LPOWer 1000 //set load power for step No. 1 to 1000W
SEQuence:EDIT:DWELl 10 //set dwell time for step No. 1 to 10s
SEQuence:EDIT:SAV SAV //save

SEQuence:EDIT:STEP 2 //set step No. to 2
SEQuence:EDIT:VOLTage 20 //set voltage for step No. 2 to 20V
SEQuence:EDIT:SCURrent 25 //set source current for step No. 2 to 25A
SEQuence:EDIT:LCURrent 25 //set load current for step No. 2 to 25A
SEQuence:EDIT:SPOWer 1001 //set source power for step No. 2 to 1001W
SEQuence:EDIT:LPOWer 1001 //set load power for step No. 2 to 1001W
SEQuence:EDIT:DWELl 15 //set dwell time for step No. 2 to 15s
SEQuence:EDIT:SAV SAV //save

SEQuence:EDIT:STEP 3 //set step No. to 3
SEQuence:EDIT:VOLTage 30 //set voltage for step No. 3 to 30V
SEQuence:EDIT:SCURrent 35 //set source current for step No. 3 to 35A
SEQuence:EDIT:LCURrent 35 //set load current for step No. 3 to 35A
SEQuence:EDIT:SPOWer 1002 //set source power for step No. 3 to 1002W
SEQuence:EDIT:LPOWer 1002 //set load power for step No. 3 to 1002W
SEQuence:EDIT:DWELl 25 //set dwell time for step No. 3 to 25s
SEQuence:EDIT:SAV SAV //save

SEQuence:RUN:FILE 5 //set the running SEQ file No. to 5
OUTPut:ON //turn on the output of power supply
SEQuence:STATus? //query the SEQ operating status

```

6.3 Measurement

```

MEASure:VOLTage? //Read the readback voltage of power supply
MEASure:CURrent? //Read the readback current of power supply

```

MEASure:POWer?

//Read the readback power of power supply

6.4 Factory Reset

*RST //////command factory reset

7 Error Message

7.1 Syntax Error

-100	Command error	Undefined syntax error
-101	Invalid character	Invalid characters appeared in the program information string
-102	Syntax error	An unrecognized command or data type exists
-103	Invalid separator	A separator was required, but a character other than a separator was sent
-104	Data type error	The current data type does not match the required type
-105	GET not allowed	Receiving a group execution trigger (GET) in a program message
-106	Semicolon unwanted	One or more redundant semicolons exist
-107	Comma unwanted	One or more extra commas exist in the parameter list
-108	Parameter not allowed	The number of parameters exceeds the number required by the command
-109	Missing parameter	The number of parameters is less than the number required by the command, or no parameters are entered
-110	Command header error	Undefined command header error
-111	Header separator error	A non-separator character is used in place of the command header separator
-112	Program mnemonic too long	Command mnemonics are longer than 12 characters
-113	Undefined header	The received commands, although syntactically structured, are not defined in this instrument
-114	Header suffix out of rang	The suffix of the command header is out of range
-115	Command can not query	The command does not have the query mode

-116	Command must query	The command must be in query format
-120	Numeric data error	Undefined numeric data error
-121	Invalid character in number	A data character appeared in the numeric data that was not accepted by the previous command
-123	Exponent too large	The absolute value of the index is over 32,000
-124	Too many digits	Decimal data The value contains more than 255 characters except the prefix 0
-128	Numeric data not allowed	Receive a numeric data element in the correct format where it is not accepted
-130	Suffix error	Undefined suffix error
-131	Invalid suffix	Suffixes do not follow the syntax defined in IEEE 488.2, or suffixes are not suitable for E5071C
-134	Suffix too long	The suffix is longer than 12 characters
-138	Suffix not allowed	Append suffixes to numeric elements that do not allow suffixes
-140	Character data error	Undefined keyword data error
-141	Invalid character data	Found an invalid character in the keyword data element, or received an invalid keyword
-144	Character data too long	The length of the keyword data exceeds 12 characters
-148	Character data not allowed	Receive the correctly formatted keyword data element at the location where the instrument does not accept the keyword data element
-150	String data error	Undefined string data error
-151	Invalid string data	The string data should be present, but for some reason, the present string data is invalid
-158	String data not allowed	The string data element is received at a location where the instrument does not accept the string data element
-160	Block data error	Undefined block data error
-161	Invalid block data	A data block was expected, but for some reason, the data block that appeared was invalid
-168	Block data not allowed	Receive a data block element at a location where the instrument does not accept a data block element
-170	Expression error	Undefined expression error
-178	Expression data not allowed	The expression data element is received at a location where the instrument does not accept the expression data element
-180	Macro error	Undefined macro error
-181	Invalid outside	Macro parameter placeholder "\$" encountered

	macro definition	outside of macro definition
-183	Invalid inside macro definition	When the macro was defined (*DDT,*DMC), the content syntax of the macro was incorrect
-184	Macro parameter error	The command in the macro definition has the wrong number or type of arguments

7.2 Execution Error

-200	Execution error	An execution-related error was generated and the instrument could not specify an error message
-220	Parameter error	Undefined parameter error
-221	Setting conflict	The command parameters have been parsed, but cannot be executed due to the current device status
-222	Data out of range	Data out of range
-224	Illegal parameter value	The parameter is not in the list of optional parameters for the current command
-225	Out of memory	The available memory in this instrument is not sufficient to perform the selected operation
-232	Invalid format	Illegal data format
-240	Hardware error	Undefined hardware error
-242	Calibration data lost	Calibration data loss
-243	NO reference	No reference voltage
-256	File name not found	File name not found
-259	Not selected file	No files available
-295	Input buffer overflow	Input cache overflow
-296	Output buffer overflow	Output cache overflow