Programming Manual

MR Series
High Voltage Multi-Range
DC Power Supplies

BK PRECISION

Contents

Common Commands

1.1 *CLS

Description Clear (1)All event registers(2)Status byte (3)Error queue (4)Output queue (5)MAV bit **Command Syntax** *CLS

1.2 *ESE

Description Event status enable

Command Syntax *ESE

Query Syntax *ESE?

Query Example **>*ese?**
>0

1.3 *ESR?

Description Event status enable register

Query Syntax *ESR?

Event Status Register Bit

Bit	Bit Name	Decimal Value	Definition
0	OPC	1	A 1 in this bit position indicates that all pending signal generator operations were completed following execution of the *OPC command.
1	not used	not used	
2	QYE	4	A 1 in this bit position indicates that a query error has occurred. Query errors have instrument error numbers from -499 to -400.
3	DDE	8	A 1 in this bit position indicates that a device dependent error has occurred. Device dependent errors have instrument error numbers from -399 to -300 and 1 to 32767. (1)Self-test error (2)Calibration password is incorrect (3)Calibration error (4)Device-specific error
4	EXE	16	A 1 in this bit position indicates that an execution error has occurred. Execution errors have instrument error numbers from -299 to -200. (1)Data out of range (2)Too much data (3)Hardware missing(option)
5	CME	32	A 1 in this bit position indicates that a command error has occurred. Command errors have instrument error numbers from -199 to -100.
6	not used	64	
7	PON	128	A 1 in this bit position indicates that the signal generator has been turned off and then on.

1.4 *IDN?

Description Query Instrment information

Query Syntax *IDN?

Query Example **>*idn?**
>B&K PRECISION,MR40003,123456,0.55-7.k7-5.00d-1.H0

1.5 *OPC

Description Set operation complete command and query

Command Syntax *OPC

Query Syntax *OPC?

Query Example **>*opc?**
>1

1.6 *OPT?

Description Query for installed options. A ``0'' indicates there are no installed options, ``1'' indicates a GPIB/LAN card is installed.

Query Syntax *OPT?

Query Example **>*opt?**
>1

1.7 *RCL

Description Recalls a saved instrument state

Command Syntax *RCL <NR1>

Command example **>*rcl 0**

1.8 *RST

Description Reset the power supply to default settings.

Command Syntax *RST

Notes Default settings:

Setting Category	Setting	Value
Output	Voltage	10 V
	Current	1 A
Protection	OVP	OVPMax
	OCP	OCPMax
	OPP	OPPMax
	CV>CV	OFF
	CC>CV	OFF
Limit	Vmax	VMax
	Vmin	0
	IMax	IMax
	IMin	0
Slope	Voltage Slope	VSRMax
	Current Slope	ISRMax
Timer	Mode	Off
	HHH:MM:SS	000:00:00
Program	Mode	OFF
	Program Number	0
Parallel	Mode	OFF
	Address 0 (Master)	
PV Simulation	Mode	OFF
	Curve	1
	Control	Mode CC
Power-On State	Mode	Disable
	Memory	1
	Output State	OFF

1.9 *SAV

Description Saves an instrument state

Command Syntax *SAV <1-10>

Command Example **>*SAV 1**

1.10 *SRE

Description Service request enable register

Command Syntax *SRE

Query Syntax *SRE?

1.11 *STB?

Description Query status byte

Query Syntax *STB?

Status ByteRegister Bit

Bit	Bit Name	Decimal Value	Definition
0-1	not used	not used	
2	ERR	4	Error/Event Queue Summary Bit. A 1 in this bit position indicates that one or more errors in the Error Queue. Use “SYSTem:ERRor?” to read and delete errors.
3	QUES	8	Data Questionable Status Summary Bit.
4	MAV	16	Message available.
5	ESB	32	Standard Event Status Summary Bit.
6	MSS	64	Request Service (RQS) Summary Bit. A 1 in this bit position indicates that the signal generator has at least one reason to require service. This bit is also called the Master Summary Status bit (MSS). The individual bits in the Status Byte are individually ANDed with their corresponding service request enable register, then each individual bit value is ORed and input to this bit.
7	OPER	128	Operation Status Summary Bit.

1.12 *LRN?

Description This command returns the device setup query. It is defined as "Learn Device Setup Query" in IEEE 488.2. The command returns instrument settings , same as that from Save/Recall state.

Query Syntax *LRN?

Command example **>*LRN?**

>VOLT 15.0;CURR 8.000;VOLT:PROT 10.0;CURR:PROT 20.000;POW:PROT 5200.5;CVCC:PROT 1;CCCV:PROT 1;VOLT:MAX 200.0;VOLT:MIN 0.0;CURR:MAX 10.000;CURR:MIN 0.000;VOLT:SLEW 16.665;CURR:SLEW 500.0;TIM 1;TIM:COUN 0:0:0;PROG 1;PROG:NUMB 2;SYST:COMM:PAR:MODE 1;SYST:COMM:PAR:ADDR 0;SAS 1;SAS:CUR 1;SAS:CONT:MOD 1

1.13 *WAI

Description This command prohibits the instrument from executing any new commands until all pending overlapped commands have been processed.

Command Syntax *WAI

Measurement Commands

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

Description Retrieve the output current value.

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

Response Format Decimal number.

Query Example **>meas:curr?**
>0.996

2.2 MEASure[:SCALar]:POWer[:DC]?

Description Retrieve the output power value.

Query Syntax MEASure[:SCALar]:POWer[:DC]?

Response Format Decimal number.

Query Example
>measure:power:dc?
>0.1

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

Description Retrieve the output voltage value.

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

Response Format Decimal number.

Query Example **>measure:scalar:voltage?**
>10.2

Voltage Commands

3.1 [SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude]

Description Output voltage setting.

Command Syntax [SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude] <voltage>

Command Example **>volt 900**

Query Syntax [SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude]?

Query Example **>volt?**
>900.0

3.2 [SOURce:]VOLTage:SLEW

Description Voltage rising slew rate. Falling slew rate is not controlled via command.

Command Syntax [SOURce:]VOLTage:SLEW <slew rate V/ms>

Command Example **>volt 9**

Query Syntax [SOURce:]VOLTage:SLEW?

Query Example **>volt:slew?**
>9.0

3.3 [SOURce:]VOLTage:PROTection[:LEVel]

Description Over-voltage protection level.

Command Syntax [SOURce:]VOLTage:PROTection[:LEVel] <voltage>

Command Example **>volt:prot 1100**

Query Format [SOURce:]VOLTage:PROTection[:LEVel]?

Response Format <voltage>

Query Example **>voltage:protection?**
>1100.0

3.4 [SOURce:]VOLTage:MAX[:LEVel]

Description Configures the maximum voltage limit.

Command Syntax [SOURce:]VOLTage:MAX[:LEVel] <voltage>

Command Example **>volt:max 1100**

Query Format [SOURce:]VOLTage:MAX[:LEVel]?

Response Format <voltage>

Query Example **>voltage:MAX?**
>1100.0

3.5 [SOURce:]VOLTage:MIN[:LEVel]

Description Configures the minimum voltage limit.

Command Syntax [SOURce:]VOLTage:MIN[:LEVel] <voltage>

Command Example **>volt:min 1100**

Query Format [SOURce:]VOLTage:MIN[:LEVel]?

Response Format <voltage>

Query Example **>voltage:MIN?**
>1100.0

3.6 [SOURce:]CVCC:PROTection[:LEVel]

Description Enables the CV to CC crossover protection.

Command Syntax [SOURce:]CVCC:PROT[:LEVel] <0|1>

Command Example **>cvcc:prot 1**

Query Format [SOURce:]CVCC:PROT[:LEVel]?

Response Format <0|1>

Query Example **>CVCC:PROT?**
>1

Current

4.1 [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude]

Description Current limit.

Command Syntax [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude] <current>

Command Example **>current 15**

Query Format [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude]?

Response Format <current>

Query Example **>curr?**
>15.000

4.2 [SOURce:]CURRent:SLEW

Description Current rise slew rate. Current fall slew not defined by command.

Command Syntax [SOURce:]CURRent:SLEW <slew rate mA/ms>

Command Example **>curr:slew 9**

Query Syntax [SOURce:]CURRent:SLEW?

Query Example **>curr:slew?**
>9.0

4.3 [SOURce:]CURRent:PROTection[:LEVel]

Description Over-current protection limit.

Command Syntax [SOURce:]CURRent:PROTection[:LEVel] <current>

Command Example **>curr:prot 1.123**

Query Format [SOURce:]CURRent:PROTection[:LEVel]?

Response Format <current>

Query Example **>current:protection:level?**
>1.123

4.4 [SOURce:]CURRent:MAX[:LEVel]

Description Configures the maximum current limit.

Command Syntax [SOURce:]CURRent:MAX[:LEVel] <current>

Command Example **>curr:max 10**

Query Format [SOURce:]CURRent:MAX[:LEVel]?

Response Format <current>

Query Example **>current:MAX?**
>10.0

4.5 [SOURce:]CURRent:MIN[:LEVel]

Description Configures the minimum current limit.

Command Syntax [SOURce:]CURRent:MIN[:LEVel] <current>

Command Example **>curr:min 1**

Query Format [SOURce:]CURRent:MIN[:LEVel]?

Response Format <current>

Query Example **>current:MIN?**
>1.0

4.6 [SOURce:]CCCV:PROTection[:LEVel]

Description Enables the CC to CV crossover protection.

Command Syntax [SOURce:]CCCV:PROT[:LEVel] <0|1>

Command Example **>cccv:prot 1**

Query Format [SOURce:]CCCV:PROT[:LEVel]?

Response Format <0|1>

Query Example **>CCCV:PROT?**
>1

Power Commands

5.1 [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude]

Description Output power setting.

Command Syntax [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude] <power>

Command Example **>pow 900**

Query Syntax [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude]?

Query Example **>pow?**
>900.0

5.2 [SOURce:]POWer:PROTection[:LEVel]

Description Over-power protection level.

Command Syntax [SOURce:]POWer:PROTection[:LEVel] <power>

Command Example **>pow:prot 5100**

Query Format [SOURce:]POWer:PROTection[:LEVel]?

Response Format <power>

Query Example **>power:protection?**
>5100.0

Timer Commands

6.1 [SOURce:]TIMer[:STATe]

Description Output Timer state setting.

Command Syntax [SOURce:]TIMer[:STATe] <0|OFF|1|ON>

Command Example **>timer on**

Query Syntax [SOURce:]Timer[:LEVel][:IMMediate][:AMPLitude]?

Query Example **>timer?**
>1

6.2 [SOURce:]TIMer:COUNt

Description Timer timing.

Command Syntax [SOURce:]TIMer:COUNt <hours, minutes,seconds>

Command Example Timer of 10 mins 30 seconds
>timer:count 0,10,00

Query Format [SOURce:]TIMer:COUNt?

Response Format <Timer>

Query Example **>timer:count?**
>0:10:00

Solar Array Simulator Commands

7.1 [SOURce:]SASimulator[:STATe]

Description State of the Solar Array Simulator function

Command Syntax [SOURce:]SASimulator[:STATe] <0|OFF|1|ON>

Command Example **>sas on**

Query Syntax [SOURce:]SASimulator[:STATe]?

Query Example **>sas?**
>1

7.2 [SOURce:]SASimulator:CURve

Description Simulated curve number

Command Syntax [SOURce:]SASimulator:CURve <curve number>

Parameter Values Range: 1-101

Command Example **>sas:curve 3**

Query Syntax [SOURce:]SASimulator:CURve?

Query Example **>sas:curve?**
>3

7.3 [SOURce:]SASimulator:CURve:REGUlation

Description IV regulation curve.

Command Syntax [SOURce:]SASimulator:CURve:REGUlation <Regulation Type Number>

Parameter Values

Parameter Value	Identifier
1	EN50530
2	SANDIA
3	NT B32004

Command Example **>sas:curve:regulation 1**

Query Syntax [SOURce:]SASimulator:CURve:REGUlation?

Query Example **>[SOURce:]SASimulator:CURve:REGUlation?**
>1

7.4 [SOURce:]SASimulator:CURve:VMP

Description Output voltage simulated

Command Syntax [SOURce:]SASimulator:CURve:VMP <voltage>

Command Example **>sas:curve:vmp 240**

Query Syntax [SOURce:]SASimulator:CURve:VMP?

Query Example **>sas:curve:vmp?**
>240.0

7.5 [SOURce:]SASimulator:CURve:PMP

Description Max power point value

Command Syntax [SOURce:]SASimulator:CURve:PMP <power>

Command Example **>sas:curve:pmp 1200**

Query Syntax [SOURce:]SASimulator:CURve:PMP?

Query Example **>sas:curve:pmp?**
>1200.0

7.6 [SOURce:]SASimulator:CURve:MATErial

Description Type of material simulated

Command Syntax [SOURce:]SASimulator:CURve:MATErial <material number>

Command Example **>sasimulator:curve:material 1**

Parameter Values

Parameter Value	Material Type
1	cSi
2	TF
3	SCMC
4	HEC

If the regulation setting is set to 2 (SANDIA), only materials 2, 3, or 4 (TF, SCMC, or HEC) may be used.

If the regulation setting is set to 1 or 3 (EN50530 or NT B32004), only materials 1 or 2 (cSi or TF) may be used.

Query Syntax [SOURce:]SASimulator:CURve:MATErial?

Query Example **>sasimulator:curve:material?**
>1

7.7 [SOURce:]SASimulator:CURve:PARAMeter

Description Configures the curve parameters for building the IV curve profile.

Command Syntax [SOURce:]SASimulator:CURve:PARAMeter <regulation, vmp value, pmp value, material>

Command Example **>sasimulator:curve:parameter 1,100,100,1**

Query Syntax [SOURce:]SASimulator:CURve:PARAMeter?

Query Example **>sasimulator:curve:parameter?**
>1,100.0,100.0,1

7.8 [SOURce:]SASimulator:CONTrol:MODe

Description Selects the control mode (CC or CV) for the SAS simulator function.

Command Syntax [SOURce:]SASimulator:CONTrol:MODe <0|1l>

Command Example **>sas:cont:mod 1**

Query Syntax [SOURce:]SASimulator:CONTrol:MODe?

Query Example **>sas:cont:mod?**
>1

Output

8.1 OUTPut[:STATe]

Description Set Ouput state (on/off)

Command Syntax OUTPut[:STATe] <ON|1|OFF|0>

Command Example **>outp on**

Query Format OUTPut[:STATe]?

Query Example **>output:state?**
>1
Return values: 0|1

8.2 OUTPut:INHibit:MODE

Description Set Remote Inhinit mode

Command Syntax OUTPut:INHibit:MODE <0|OFF|1|LIVE|2|LATCh>

Command Example **>outp:inhibit:mode live**

Query Format OUTPut:INHibit:MODE?

Query Example **>outp:inh:mode?**
LIVE

Return Values OFF|LIVE|LATCH

8.3 OUTPut:PON:STATe

Description Set power-on state: reset/*RST, Last state, user state (requires selecting memory location and output state), disable

Command Syntax OUTPut:PON:STATe <0|1|2|3,<mem location>,<output state>|>

Notes: 0 - DISABLE, 1 - *RST (reset state), 2 - LAST (last state), 3 - USER (user specified state)
For 3 - USER: <mem location> is memory location <1-10> and <output state> is output state <0|1>

Command Example **>outp:pon:stat 0 (disable)**
>outp:pon:stat 3,10,1 (USER, memory location 10, output ON)

Query Format OUTPut:PON:STATe?

Query Example **>output:pon:stat?**
>LAST

Return values DISABLE, LAST, USER, OFF

8.4 OUTPut:PROTection:CLEar

Description Clear all protect error (OV/OC/OT/PF/MSP)

Command Syntax OUTPut:PROTection:CLEar

Command Example **>outp:prot:clear**

8.5 [SOURce:]:EXTernal:MODe

Description Selects the mode for external analog control.

Command Syntax EXT:MOD <0|1>

Notes 0 - EXT-V (voltage control), 1 - EXT-R (resistance control)

Command Example **>ext:mod 1**

Query Format [SOURce:]:EXTernal:MODe?

Query Example **>ext:mod?**
Return values: 0|1

8.6 [SOURce:]:EXTernal:RANGe

Description Selects the range for external analog control.

Command Syntax EXT:RANG <0|1>

Notes 0 - 5V/5K, 1 - 10V/10K

Command Example **>ext:rang 1**

Query Format [SOURce:]:EXTernal:RANGe?

Query Example **>ext:rang?**
Return values: 0|1

Status

Description

The Operation and Questionable status groups use four different type of registers to track qualify, flag, and enable instrument events.
a. Condition register :
The state of the instrument.
The bits in the condition register are updated in real time and the bits are not latched or buffered.
b. PTR/NTR:
Controls the data transfer between Condition and Event registers. [0,0] : data is not transmitted.
[0,1] : Transfer data when the bit changes from 1 to 0.
[1,0] : Transfer data when the bit changes from 0 to 1.
[1,1] : data is transmitted.
c. Event register:
When an event bit is set, subsequent events corresponding to that bit are ignored. This is a read-only reg- ister.
d. Enable register:
An Enable register defines which bits in the event register will be reported to the Status Byte register Group.

You can write to or read from an enable register.

9.1 STATus:OPERation[:EVENt]?

Description Query operation status event register

Query Syntax STATus:OPERation[:EVENt]?

Query Example stat:oper?

9.2 STATus:OPERation:CONDition?

Description Query operation status condition register

Query Syntax STATus:OPERation:CONDition?

Query Example stat:oper:cond?

9.3 STATus:OPERation:ENABle

Description Set operation status enable register

Command Syntax STATus:OPERation:ENABle

Command Example

Query Format STATus:OPERation:ENABle?

Query Example stat:oper:enab?

9.4 STATus:OPERation:NTRansition

Description Set operation status negative transition filter **Command Syntax** STATus:OPERation:NTRansition

Command Example

Query Format STATus:OPERation:NTRansition?

Query Example stat:oper:ntr?

9.5 STATus:OPERation:PTRansition

Description Set operation status positive transition filter

Command Syntax STATus:OPERation:PTRansition

Command Example

Query Format STATus:OPERation:PTRansition?

Query Example stat:oper:ptr?

Questionable Status Register Bit

Bit	Bit Name	Decimal Value	Definition
0	OV	1	Bit is 1 when OVP occurs.
1	OC	2	Bit is 1 when OCP occurs.
2	PF	4	Bit is 1 when PFC failed.
3	CP	8	Bit is 1 when the instrument is in CP mode.
4	OT	16	Bit is 1 when OTP occurs.
5	MSP	32	Bit is 1 when parallel mode has an error.
6-8	not used	not used	
9	INH	512	Bit is 1 when remote inhibit occurs.
10	UNR	1024	Bit is 1 when output is unregulated.
0	not used	not used	

9.6 STATus:QUEStionable[:EVENt]?

Description Query questionable status event register

Query Syntax STATus:QUEStionable[:EVENt]?

Query Example stat:ques?

9.7 STATus:QUEStionable:CONDition?

Description Query questionable status condition register

Query Syntax STATus:QUEStionable:CONDition?

Query Example stat:ques:cond?

9.8 STATus:QUEStionable:ENABle

Description Set questionable status enable register

Command Syntax STATus:QUEStionable:ENABle

Command Example

Query Format STATus:QUEStionable:ENABle?

Query Example stat:ques:enab?

9.9 STATus:QUEStionable:NTRansition

Description Set questionable status negative transition

filter **Command Syntax** STATus:QUEStionable:NTRansition

Command Example

Query Format STATus:QUEStionable:NTRansition?

Query Example stat:ques:ntr?

9.10 STATus:QUEStionable:PTRansiton

Description Set questionable status positive transition filter

Command Syntax STATus:QUEStionable:PTRansition

Command Example

Query Format STATus:QUEStionable:PTRansition?

Query Example stat:ques:ptr?

Operation Status Register Bit

Bit	Bit Name	Decimal Value	Definition
0	CC	1	Bit is 1 when in CC mode.
1	CV	2	Bit is 1 when in CV mode.
2	Off	4	Bit is 1 when output is OFF.
3	not used	not used	
4	not used	not used	not used
5-7	not used	not used	

9.11 STATus:PRESet

Description Presets all Enable(disable), PTR(enable), and NTR(disable) registers.

Command Syntax STATus:PRESet

Command Example **>stat:preset**

Status Diagram

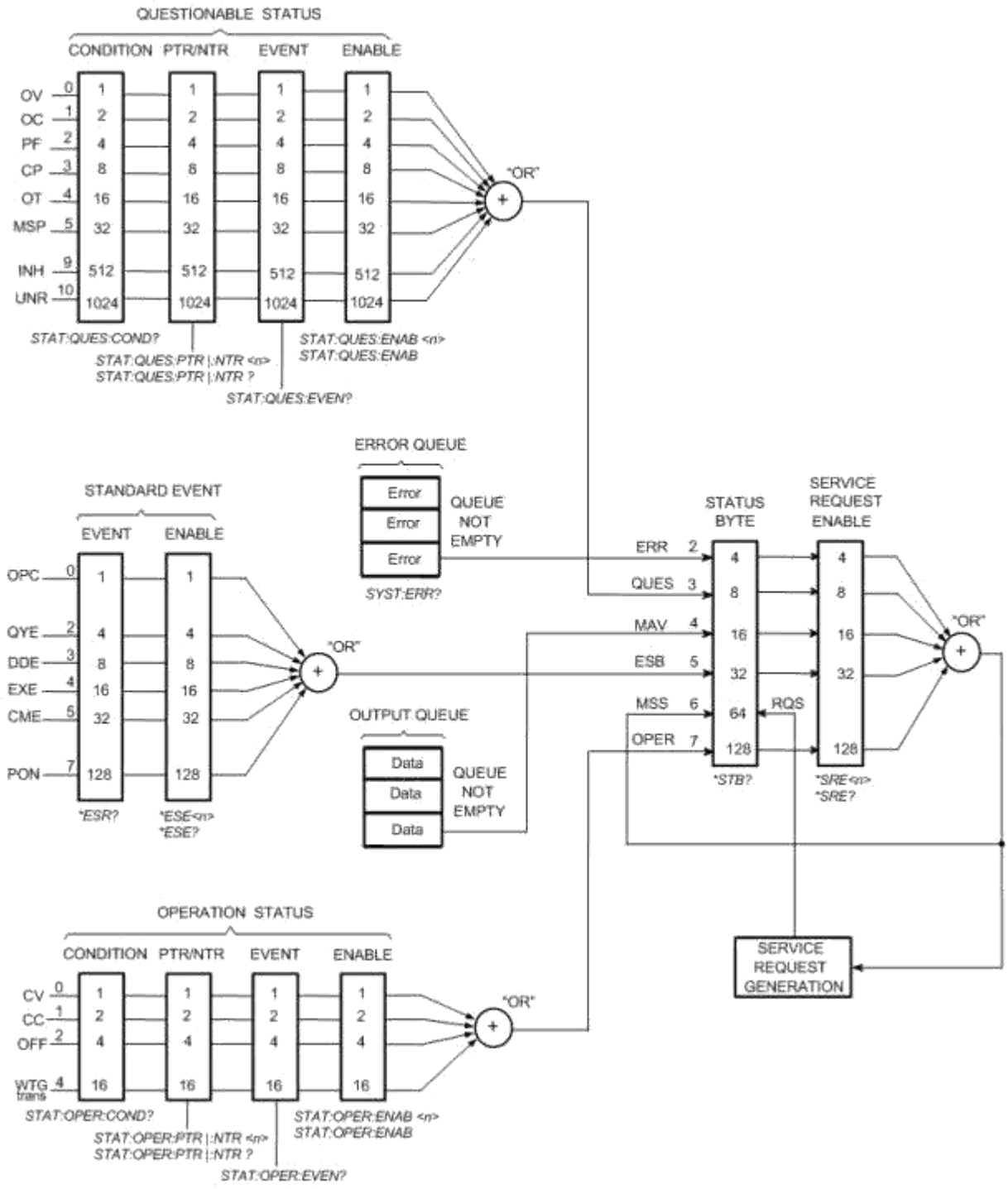

Figure 9.1 Status Registers Diagram

Program

10.1 [SOURce:]PROGram[:STATe]

Description Set program mode ON/OFF

Command Syntax [SOURce:]PROGram[:STATe] <ON|1|OFF|0>

Command Example **>program on**

Query Format PROGram[:STATe]?

Query Example **>prog?**
>1

10.2 [SOURce:]PROGram[:SELected]:NUMBer

Description Selected program from 1-9

Command Syntax [SOURce:]PROGram[:SELected]:NUMBer <program number>

Command Example **>prog:number 1**

Query Format PROGram[:SELected]:NUMBer?

Query Example **>prog:number?**
>1

10.3 [SOURce:]PROGram[:SELected]:DELete

Description Delete the current program

Command Syntax [SOURce:]PROGram[:SELected]:DELete

Command Example **>program:delete**

10.4 [SOURce:]PROGram[:SELected]:NEXT

Description The program to be called after the current program

Command Syntax [SOURce:]PROGram[:SELected]:NEXT <program number>

Command Example **>program:next 2**

Query Syntax PROGram[:SELected]:NEXT?

Query Example **>program:next?**
>2

10.5 [SOURce:]PROGram[:SELected]:REPeat

Description The number of times the program is repeated

Command Syntax [SOURce:]PROGram[:SELected]:REPeat <repeat count>

Parameter Range 0-255

Command Example **>prog:repeat 3**

Query Format PROGram[:SELected]:REPeat?

Query Example
>program:repeat?
>3

10.6 [SOURce:]PROGram[:SELected]:STEP

Description The program's step to be edited.

Command Syntax [SOURce:]PROGram[:SELected]:STEP <step number>

Command Example **>program:step 4**

Query Format PROGram[:SELected]:STEP?

Query Example
>program:step?
4

10.7 [SOURce:]PROGram[:SELected]:STEP:VOLTage

Description Set the current step's voltage

Command Syntax [SOURce:]PROGram[:SELected]:STEP:VOLTage <voltage level>

Command Example **>program:step:voltage 329**

Query Format PROGram[:SELected]:STEP:VOLTage?

Query Example
>program:step:voltage?
329.0

10.8 [SOURce:]PROGram[:SELected]:STEP:CURRent

Description Set the current step's current

Command Syntax [SOURce:]PROGram[:SELected]:STEP:CURRent <current level>

Command Example **>program:step:current 3**

Query Format PROGram[:SELected]:STEP:CURRent?

Query Example
>program:step:current?
3.00

10.9 [SOURce:]PROGram[:SELected]:STEP:TIME

Description Set Step's time interval

Command Syntax [SOURce:]PROGram[:SELected]:STEP:TIME <time in ms>

Command Example **>program:step:time 30**

Query Format PROGram[:SELected]:STEP:TIME?

Query Example
>program:step:time?
>30

Display

11.1 DISPlay[:WINDow][:STATe]

Description Set display on or off. Helps increase the life of the VFD.

Command Syntax DISPlay[:WINDow][:STATe] <ON|1|OFF|0>

Command Example **>disp off**

Query Format DISPlay[:WINDow][:STATe]

Query Example **>disp?**
>1
Return values: 0|1

System

12.1 SYSTem:ERRor?

Description Return whether there was an error.

Query Format SYSTem:ERRor??

Query Example **>SYSTem:ERRor?**
>0,No error

Error Definitions

Error Code	Description
0	No error
-102	Syntax error
-103	Invalid separator
-104	Data type error
-105	GET not allowed
-108	Parameter not allowed
-109	Missing parameter
-110	Command header error
-111	Header separate error
-113	Undefined header
-131	Invalid suffix
-138	Suffix not allowed
-203	Command protected
-221	Settings conflict
-222	Data out of range
-223	Too much data
-240	Hardware error
-350	Error queue overflow

12.2 SYSTem:SECurity:IMMediate

Description Clear all user memory and reboot.

Command Syntax SYSTem:SECurity:IMMediate

Command Example **>SYSTem:SECurity:IMMediate**

12.3 SYSTem:VERSion

Description Return the SCPI version the instrument complies with.

Query Format SYSTem:VERSion?

Query Example **>SYSTem:VERSion**
>1999.0

12.4 SYSTem:COMMunicate:LAN|TCPip:MODE

Description Ethernet setup mode, DHCP or manual (static).

Command Syntax SYSTem:COMMunicate:LAN|TCPip:MODE <DHCP|0|MANUal|1>

Command Example **>sys:comm:lan:mode dhcp**

Query Format SYSTem:COMMunicate:LAN|TCPip:MODE?

Query Example **>sys:comm:lan:mode?**
>DHCP

12.5 SYSTem:COMMunicate:LAN|TCPip:ADDRess

Description Ethernet IP address

Command Syntax SYSTem:COMMunicate:LAN|TCPip:ADDRess <IP Address (format = xxx.xxx.xxx.xxx)>

Command Example **>sys:comm:lan:addr 192.168.0.16**

Query Format SYSTem:COMMunicate:LAN|TCPip:ADDRess?

Query Example **>sys:comm:lan:addr?**
>000.000.000.000

12.6 SYSTem:COMMunicate:LAN|TCPip:GATEway

Description Ethernet Gateway

Command Syntax SYSTem:COMMunicate:LAN|TCPip:GATEway <IP Address (format = xxx.xxx.xxx.xxx)>

Command Example **>sys:comm:lan:gate 192.168.0.1**

Query Format SYSTem:COMMunicate:LAN|TCPip:GATEway?

Query Example **>sys:comm:lan:gate?**
>000.000.000.000

12.7 SYSTem:COMMunicate:LAN|TCPip:MASK

Description Ethernet MASK

Command Syntax SYSTem:COMMunicate:LAN|TCPip:MASK <IP Address (format = xxx.xxx.xxx.xxx)>

Command Example **>sys:comm:lan:mask 255.255.255.0**

Query Format SYSTem:COMMunicate:LAN|TCPip:MASK?

Query Example **>sys:comm:lan:mask?**
>000.000.000.000

12.8 SYSTem:COMMunicate:LAN:RESTart

Description Performs a LAN restart

Command Syntax SYSTem:COMMunicate:LAN:RESTart

Command Example **>SYST:comm:lan:rest**

12.9 SYSTem:COMMunicate:PARallel:MODE

Description Parallel mode enable

Command Syntax SYSTem:COMMunicate:PARallel:MODE <OFF|0|ON|1>

Command Example **>sys:comm:par:mode on**

Query Format SYSTem:COMMunicate:PARallel:MODE?

Query Example **>sys:comm:par:mode?**
>1

12.10 SYSTem:COMMunicate:PARallel:ADDRess

Description Parallel mode communication address. Valid from 0-50.

Command Syntax SYSTem:COMMunicate:PARallel:ADDRess

Command Example **>SYSTem:COMMunicate:PARallel:ADDRess**

Query Format SYSTem:COMMunicate:PARallel:ADDRess?

Query Example **>SYSTem:COMMunicate:PARallel:ADDRess**
>0

12.11 SYSTem:COMMunicate:PARallel:TOTal?

Description Queries the total number of units setup in parallel mode.

Command Syntax SYSTem:COMMunicate:PARallel:TOTal?

Query Example **>SYST:COMM:PAR:TOT?**
>10

12.12 SYSTem:COMMunicate:RLSTate

Description Remote communication state

Command Syntax SYSTem:COMMunicate:RLSTate <LOCal|0|REMote|1|RWLock|2>

Command Example **>SYSTem:COMMunicate:RLSTate rwl**

Query Format SYSTem:COMMunicate:RLSTate?

Query Example **>SYSTem:COMMunicate:RLSTate**
>Remote

12.13 LXI:IDENtify[:STATe]

Description Enables LXI Identification.

Command Syntax LXI:IDENtify[:STATe]

Command Example **>LXI:IDEN 1 (enables lxi identification)**

Query Format LXI:IDENtify[:STATe]?

Query Example **>LXI:IDEN?**
>1

Multi-Unit Control Commands (Chain mode)

13.1 System Control Commands

This set of commands is used to select the instrument (based on their address) to control, obtain, and set its system settings. Note: All system control commands will return an “OK” string to confirm the command was accepted and an action was performed.

Command	Description
CADR	Select the power supply address to control
CCLS	Clear status
CRST	Reset command
CIDN?	Return the power supply model identification
CREV?	Return the firmware version
CSN?	Return the serial number
CST?	Return the device status
CCLR?	Clear protect

13.2 Output control commands

This set of commands controls the outputs of the selected instrument (based on their address). Use the CADR command first to select the address of the unit under control before using any of these commands to control that unit’s output. Note: All output control commands will return an “OK” string to confirm the command was accepted and an action was performed.

Command	Description
CPV	Set the output voltage value in Volts
CPV?	Read the output voltage setting
CMV?	Read the actual output voltage
CPC	Set the output current value in Amperes
CPC?	Read the output current setting
CMC?	Read the actual output current
CDVC?	Display voltage and current data (Return format: <voltage>,<current>)
COUT	Turn the output to ON or OFF (Format: COUT 1/ON or 1/OFF)
COUT?	Return the output On/Off status
COV	Set the OVP level
COV?	Return the OVP setting level

COC	Set the OCP level
COC?	Return the OCP setting level
COP	Set the OPP level
COP?	Return the OPP setting level
CMODE?	Return the power supply operation mode

13.3 Synchronous control commands

This set of commands can be used to control all the power supplies connected in the RS485 chain at once. Note that these commands will not return an “OK” string upon making a configuration.

Command	Description
GRST	Reset command. Brings the power supply to a known state.
GCLS	Group clear status
GCLR	Group clear protect
GPV	Group set the output voltage value in Volts
GPC	Group set the output current value in Amperes
GOUT	Group ON or OFF (Setting Parameter: 1/ON or 0/OFF)
GOV	Group set the OVP level
GOC	Group set the OCP level

Calibration

14.1 CALibrate:PASSword

Description Enter calibration mode.

Note Default password: 13579
Factory default: 24680

Command Syntax CALibrate:PASSword 13579

Command Example **cal:pass 13579**

14.2 CALibrate:CURRent[:LEVel]

Description Sets the current calibration point. There are 5 current points total.
Note: This command requires output to be shorted prior to measurement.

Command Syntax CALibrate:CURRent <point number>, <value>

Note <point number> - 0 to 4 (for 0, <value does not need to be specified> , <value> - Calibration point value as measured using a meter.

Command Example **CAL:CURR 0**
CAL:CURR 1,1.01
CAL:CURR 2,6.80
CAL:CURR 3,13.48
CAL:CURR 4,19.27

14.3 CALibrate:CURRent:PROTection

Description Sets the OCP calibration point.
Note: This command requires output to be shorted prior to measurement. The calibration process may take up to 1 minute.

Command Syntax CALibrate:CURRent:PROTection

Command Example CAL:CURR:PROT

14.4 CALibrate:CURRent:EXTernal

Description Sets the external current control calibration point. There are 3 points total.
Note: This command requires connecting to the DB25 port.

Command Syntax CALibrate:CURRent:EXTernal <point number>,<value>

Note <point number> - 0 to 2 (for 0, <value does not need to be specified> , <value> - Calibration point value as measured using a meter.

Command Example **CAL:CURR:EXT 0**
CAL:CURR:EXT 1,1.016
CAL:CURR:EXT 2,9.08

14.5 CALibrate:CURRent:EXTernal:CC

Description Calibrates the current value for the calculated current for external control. There are 5 points total for this calibration.

Command Syntax CALibrate:CURRent:EXTernal:CC **Command**

Example CAL:CURR:EXT:CC <point number, value>

Note <point number> - 0 - 4 (if 0, <value> does not need to be specified) , <value> - The measured value using a meter connected to the DB25 rear port.

Command Example **CAL:CURR:EXT:CC 0**
CAL:CURR:EXT:CC 1,1.176
CAL:CURR:EXT:CC 2,1.132
CAL:CURR:EXT:CC 3,1.0295
CAL:CURR:EXT:CC 4,1.0022

14.6 CALibrate:VOLTage[:LEVel]

Description Sets the voltage calibration point. There are 5 voltage points total.
Note: This command requires output to be opened prior to measurement.

Command Syntax CALibrate:VOLTage <point number>, <value>

Note <point number> - 0 to 4 (for 0, <value does not need to be specified> , <value> - Calibration point value as measured using a meter.

Command Example **CAL:VOLT 0**
CAL:VOLT 1,1.01
CAL:VOLT 2,6.80
CAL:VOLT 3,13.48
CAL:VOLT 4,19.27

14.7 CALibrate:VOLTage:PROTection

Description Sets the OVP calibration point.
Note: This command requires output to be open. The calibration process may take up to 1 minute.

Command Syntax CALibrate:VOLTage:PROTection

Command Example CAL:VOLT:PROT

14.8 CALibrate:VOLTage:EXTernal

Description Sets the external voltage control calibration point. There are 3 points total.
Note: This command requires connecting to the DB25 port.

Command Syntax CALibrate:VOLTage:EXTernal <point number>,<value>

Note <point number> - 0 to 2 (for 0, <value does not need to be specified> , <value> - Calibration point value as measured using a meter.

Command Example **CAL:VOLT:EXT 0**
CAL:VOLT:EXT 1,1.016
CAL:VOLT:EXT 2,9.08

14.9 CALibrate:VOLTage:EXTernal:CC

Description Calibrates the current value for the calculated voltage for external control. There are 5 points total for this calibration.

Command Syntax CALibrate:VOLTage:EXTernal:CC **Command**

Example CAL:VOLT:EXT:CC <point number, value>

Note <point number> - 0 - 4 (if 0, <value> does not need to be specified) , <value> - The measured value using a meter connected to the DB25 rear port.

Command Example **CAL:VOLT:EXT:CC 0**
CAL:VOLT:EXT:CC 1,1.176
CAL:VOLT:EXT:CC 2,1.132
CAL:VOLT:EXT:CC 3,1.0295
CAL:VOLT:EXT:CC 4,1.0022

14.10 CALibrate:STATe?

Description Queries the state of the calibration.

Note Use this command to query the status of each calibration parameters performed.

Query Format CALibrate:STATe?

Query Return String BUSY|IDLE

Query Example **>CAL:STAT?**
>BUSY