

Programming Manual

MR Series High Voltage Multi-Range DC Power Supplies



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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	OPPMMax
	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 Byte Register 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:MAX[: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 Query the output power setting.

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

Query Example >pow?
>900.0

5.2 [SOURce:]POWer:PROTectio[n][:LEVel]

Description Over-power protection level.

Command Syntax [SOURce:]POWer:PROTectio[n][:LEVel] <power>

Command Example >pow:prot 5100

Query Format [SOURce:]POWer:PROTectio[n][: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	<table><tr><th>Parameter Value</th><th>Identifier</th></tr><tr><td>1</td><td>EN50530</td></tr><tr><td>2</td><td>SANDIA</td></tr><tr><td>3</td><td>NT B32004</td></tr></table>	Parameter Value	Identifier	1	EN50530	2	SANDIA	3	NT B32004
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|1|>

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)
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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 register.

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:PTRansition

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

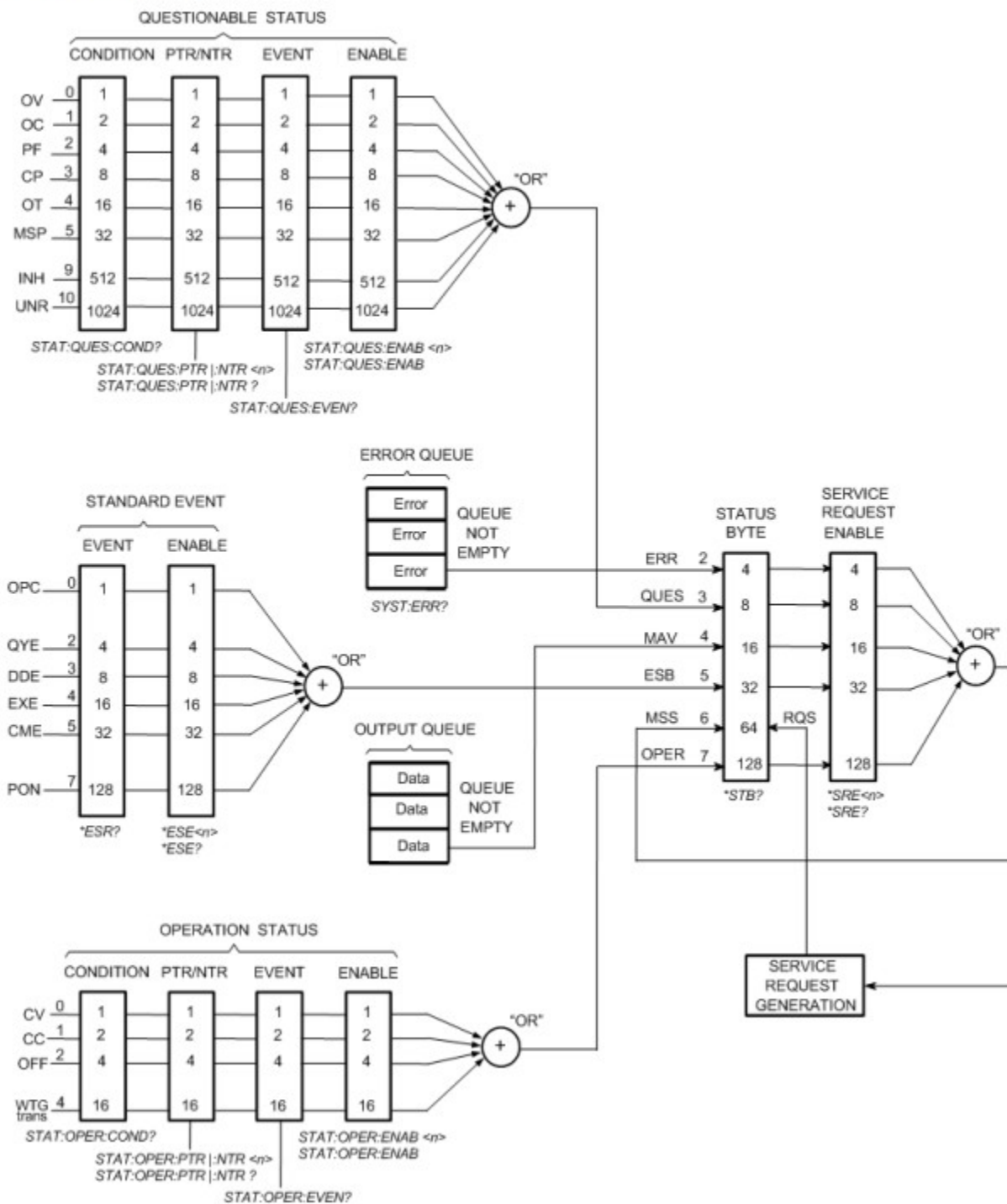


Figure 9.1 Status Registers Diagram

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

Calibration

13.1 CALibrate:PASSword

Description Enter calibration mode.

Note Default password: 13579
Factory default: 24680

Command Syntax CALibrate:PASSword 13579

Command Example cal:pass 13579

13.2 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

13.3 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

13.4 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

13.5 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

13.6 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

13.7 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

13.8 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

13.9 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

13.10 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