

Programmable DC Electronic Load

PEL-2000 Series

PROGRAMMING MANUAL

GW INSTEK PART NO. 82EL-20040IA1



ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

September 2012 edition

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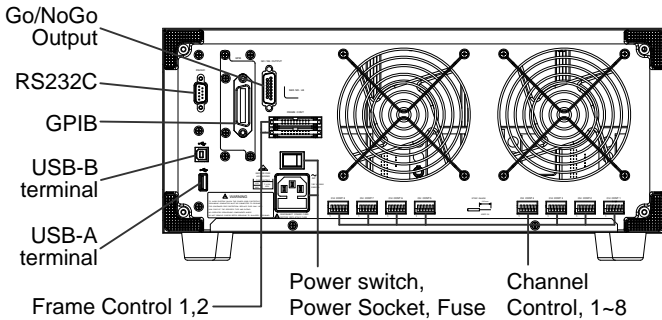
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INTERFACE OVERVIEW

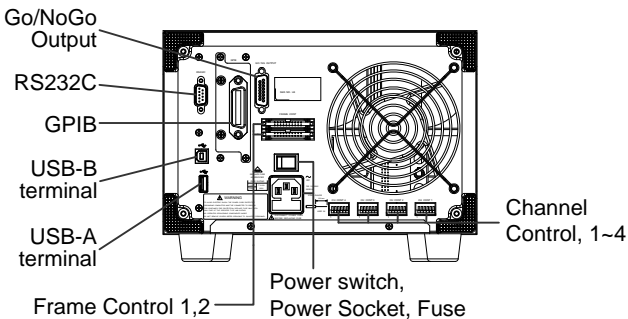
This manual describes how to use the PEL-2000's remote command functionality and lists the command details. The Overview chapter describes how to configure the PEL-2000 USB/RS232/GPIB remote control interface.

Rear Panel Overview

PEL-2004



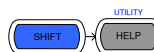
PEL-2002



Configuring the USB Interface

| | | |
|----------------|-------------------------|----------------------|
| USB connection | PC side connector | Type A, host |
| | PEL-2000 side connector | Type B, device |
| | Speed | 1.1/2.0 (full speed) |

Panel operation 1. Press the Shift Key then the Help key to access the Utility menu.

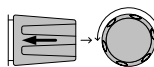


2. Press F3(Interface Menu).



3.

4. If the interface is not USB, use the selector knob to choose USB.



5. Connect the USB cable to the USB-B slave port on the rear.



6. When the PC asks for the USB driver, select pel_cdc_2000.inf (downloadable from the GW website, www.gwinstek.com, PEL-2000 product corner).

7. On the PC, activate a terminal application such as MTTY (Multi-Threaded TTY). To check the COM port No., see the Device Manager in the PC. For WindowsXP, select Control panel → System → Hardware tab.

8. Run this query command via the terminal application.
*idn?
This command should return the manufacturer, model number, serial number, and firmware version in the following format.
GW, PEL-2002/2004, 00000001, V1.00

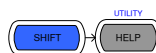
9. Configuring the command interface is completed. Refer to the other chapters for more details.

RS-232C Interface Configuration

| | | |
|-----------------------|-----------|--------------------------------|
| RS-232C configuration | Connector | DB-9, Male |
| | Baud rate | 2400, 4800, 9600, 19200, 38400 |
| | Parity | None, Odd, Even |
| | Data bit | 8 (fixed) |
| | Stop bit | 1, 2 |

Panel operation

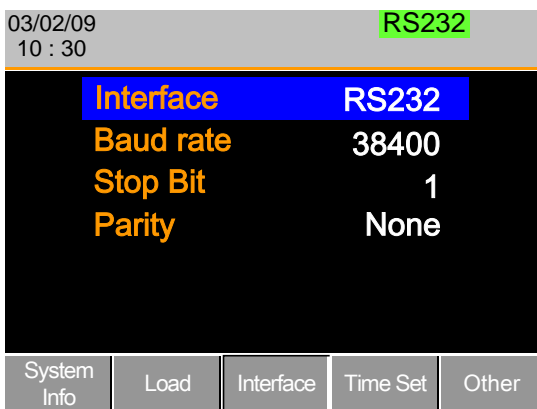
1. Press the Shift Key then the Help key to access the Utility menu.



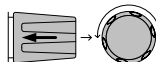
2. Press the Shift Key then the Help key to access the Utility menu.



3. 03/02/09
10 : 30



4. If the interface is not set to RS232, use the selector knob to change the interface to RS232.



5. Edit the Baud rate, Stop bit and parity.

Baud rate 2400, 4800, 9600, 19200, 38400

Stop Bit Range 1,2

Parity Range None, Odd, Even

6. Connect the RS-232C cable to the rear panel port: DB-9 male connector.



Terminal application

Invoke a terminal application such as MTTY (Multi-Threaded TTY).

- For RS-232C, set the COM port, baud rate, stop bit, data bit, and parity accordingly.

To check the COM port No. for RS-232C, see the Device Manager in the PC. For WinXP, Control panel → System → Hardware tab.

7. Ensure the terminal application has the following settings;
8. Baud rate - as per PEL-2000 settings
9. Com Port - as per PC settings (Device Manager)
10. Parity - None
11. Data bits - 8
12. Stop bits - None

Functionality check

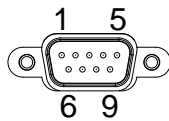
Run this query command via the terminal.

`*idn?`

This should return the Manufacturer, Model number, Serial number, and Firmware version in the following format.

GW, PEL-2002/2004, 00000001, V1.00

Pin assignment



2: RxD (Receive data)

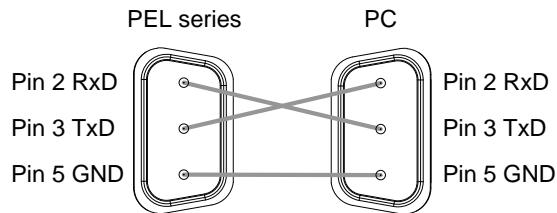
3: TxD (Transmit data)

5: GND

1, 4, 6, 7, 8, 9: No connection

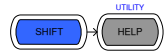
PC connection

Use the Null Modem connection as shown in the diagram below.



GPIB Interface Configuration

- Panel operation
1. Press the Shift Key then the Help key to access the Utility menu.



2. Press F3(Interface Menu).



3.

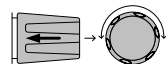
03/02/09
10 : 30

GPIB

| | |
|-----------|------|
| Interface | GPIB |
| Address | 01 |

| | | | | |
|-------------|------|-----------|----------|-------|
| System Info | Load | Interface | Time Set | Other |
|-------------|------|-----------|----------|-------|

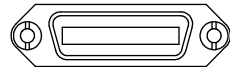
4. If the interface is not set to GPIB, use the selector knob to change the interface to GPIB.



5. Edit the GPIB address.

Range 1 ~ 30

6. Connect the GPIB cable to the rear panel port: 24-pin female connector



- GPIB constraints
- Maximum 15 devices altogether, 20m cable length, 2m between each device
 - Unique address assigned to each device
 - At least 2/3 of the devices turned On
 - No loop or parallel connection

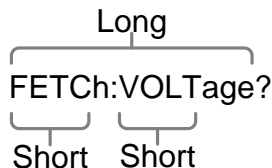
C COMMAND OVERVIEW

The Command overview chapter lists all the PEL-2000 commands and command queries. The command syntax section shows you the basic rules you have to apply when using commands.

Command Syntax

| | |
|----------------------|--|
| Compatible standard | <ul style="list-style-type: none"> • IEEE488.2, 1992 (fully compatible) • SCPI, 1994 (partially compatible) |
| Command types | There are a number of different instrument commands and queries. A command sends instructions or data to the electronic load and a query receives data or status information from the electronic load. |
| Command Types | |
| Simple | A single command with/without a parameter |
| Example | *OPC |
| Compound | Two or more commands separated by a colon (:) with/without a parameter |
| Example | UTILITY:SOUND 1 |
| Query | A query is a simple or compound command followed by a question mark (?). A parameter (data) is returned. |
| Example | UTILITY:SOUND? |

Command forms Commands and queries have two different forms, long and short. The command syntax is written with the short form of the command in capitals and the remainder (long form) in lower case.



The commands can be written in capitals or lower-case, just so long as the short or long forms are complete. An incomplete command will not be recognized.

Below are examples of correctly written commands.

LONG FETCh:VOLTage? FETCH:VOTAGE?
 fetch:voltage?

SHORT FETC:VOLT? fetc:volt?

Square Brackets Commands that contain squares brackets indicate that the contents are optional. The function of the command is the same with or without the square bracketed items, as shown below.

Example:

```
:LOAD[:STATe]
=                :LOAD:STATe
=                :LOAD
```

Command format :PROG**am**:CHA**in** <NR1>LF

┌───┐ ┌──┐ ┌──┐ ┌──┐

1 2 3 4

1: command header

2: single space

3: parameter

4: message terminator

| Parameter | Type | Description | Example |
|--------------------|--------------|---|----------------------------|
| | <Boolean> | Boolean logic | 0, 1 |
| | <NR1> | integers | 0, 1, 2, 3 |
| | <NR2> | decimal numbers | 0.1, 3.14, 8.5 |
| | <NR3> | floating point | 4.5e-1, 8.25e+1 |
| | <NRf> | any of NR1, 2, 3 | 1, 1.5, 4.5e-1 |
| | <NRf+> | NRf type including MIN (minimum) and MAX (maximum) limits of the parameter. | 1, 1.5, 4.5e-1 MAX, MIN |
| | <aard> | Arbitrary ascii characters. | |
| | <block data> | IEEE-488.2 binary block data. The block data is comprised of five parts: | |
| | | <pre> #216<16_bytes_data><NL> a b c d e </pre> | |
| | | <ul style="list-style-type: none"> a. Initialization character (#) b. Digit length (in ASCII) of the number of bytes c. Number of bytes d. Binary data e. New line character | |
| Message terminator | LF^END | line feed code (hexadecimal 0A) with END message | |
| | LF | line feed code | |
| | <dab>^END | last data byte with END message | |

List of Commands in Functional Order

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C COMMAND DETAILS

The Command details chapter shows the detailed syntax, equivalent panel operation, and example for each command. For the list of all commands, see page16. Before programming the PEL-2000 electronic load, please become familiar with the Status registers, detailed on page162.

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Common commands

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| *IDN? | 28 |
| *OPC | 28 |
| *RCL | 29 |
| *RDT? | 29 |
| *RST | 29 |
| *SAV | 30 |
| *SRE | 30 |
| *STB? | 31 |
| *TST? | 31 |

*CLS

Status Command

| | |
|-------------|--|
| Description | <p>Clears:</p> <ul style="list-style-type: none"> Channel Status Register Channel Summary Register Questionable Status Register Standard Events Register Operation Status Register Error Queue <p>When the *CLS command follows a program message terminator <nl>, the following is cleared:</p> <ul style="list-style-type: none"> Output Queue MAV bit <p>See page162.</p> |
| Syntax | *CLS |
| Example | *CLS |

***ESE** Status Command

Description The Standard Event Status Enable command determines which events in the Standard Event Status Event register can set the Event Summary Bit (ESB) of the Status Byte register. Any bit positions set to 1 enable the corresponding event. Any enabled events set bit 5 (ESB) of the Status Byte register. See page169.

Syntax *ESE <NRf>

| Parameter | <NRf> | Bit(s) Set | <NRf> | Bit(s) Set |
|-----------|-------|------------|-------|------------|
| | 4 | QYE | 32 | CME |
| | 8 | DDE | 64 | ~ |
| | 16 | EXE | 128 | ~ |

Example *ESE 40 Sets CME and DDE events in the Standard Event Status Event Register.

Query Syntax *ESE?

| Return Parameter | <NR1> | Bit(s) Set | <NR1> | Bit(s) Set |
|------------------|-------|------------|-------|------------|
| | 4 | QYE | 32 | CME |
| QYE | 8 | DDE | 64 | ~ |
| | 16 | EXE | 128 | ~ |

Example *ESE? Returns the settings in the Standard Event Status Enable Register. Here CME and QYE are enabled.
40

***ESR?** Status Command

Description Reads the Standard Event Status Register. This command also clears the Standard Event Status Register. Page168.

Query Syntax *ESR?

| Return Parameter | <NR1> | Bit(s) Set | <NR1> | Bit(s) Set |
|------------------|-------|------------|-------|------------|
| | 4 | QYE | 32 | CME |
| | 8 | DDE | 64 | ~ |
| | 16 | EXE | 128 | ~ |

Example *ESR?
48

The return value is the status reading of the standard Event Status Register.

***IDN?** System Command

| | | | | |
|-------------------------|--|--|----------|------------------|
| Description | Returns the load generator identification. | | | |
| Query Syntax | *IDN? | | | |
| Return Parameter | <aard> | Data | <aard> | Data |
| | GW | Manufacturer | XXXXXXXX | Serial No. |
| | PEL-2000 | Model | V1.00 | Firmware Version |
| Example | *IDN? | Returns the mainframe identification string. | | |
| | GW, PEL-2002/2004, 00000001, V1.00 | | | |

***OPC** Status Command

| | | | | |
|-------------------------|--|-------------------|-------|-----------|
| Description | This command sets the OPC (Operation Command Bit) bit (bit 0) of the Standard Event Status Register after the mainframe has completed all pending operations. Page168. | | | |
| Syntax | *OPC | | | |
| Example | *OPC | Sets the OPC bit. | | |
| Query Syntax | *OPC? | | | |
| Return Parameter | <NR1> | Operation | <NR1> | Operation |
| | 0 | Pending | 1 | Complete |

| | | |
|---------------|------------|---------------------------------------|
| Query Example | *OPC? 1 | All pending operations are completed. |
|---------------|------------|---------------------------------------|

***RCL** Status Command

| | |
|-------------|--|
| Description | The Recall Instrument State command restores the instrument settings from a previously saved memory setting. |
|-------------|--|

| | |
|--------|------------|
| Syntax | *RCL <Nrf> |
|--------|------------|

| | | |
|-----------|----------------|--------------------------------|
| Parameter | <Nrf> 1~120 | Recall Memory Setting 1~120 |
|-----------|----------------|--------------------------------|

| | | |
|---------|--------|--------------------------|
| Example | *RCL 1 | Recalls Setting memory 1 |
|---------|--------|--------------------------|

***RDT?** System Command

| | |
|-------------|---|
| Description | Returns the load module type in each channel in order from 1~8. If no frame is present a 0 is returned. |
|-------------|---|

| | |
|--------------|-------|
| Query Syntax | *RDT? |
|--------------|-------|

| | | |
|------------------|----------------------|--|
| Return Parameter | <aard> 2020L 0 | Occupied Channel PEL-2020 left channel Empty channel |
|------------------|----------------------|--|

| | | |
|---------------|----------------------------------|--|
| Query Example | *RDT? 0,0,2020L,2020R,0,0,0,0 | Channels 1-2 and 5-8 are empty; 3-4 is occupied by the PEL-2020 load module. |
|---------------|----------------------------------|--|

***RST** Status Command

| | |
|-------------|---|
| Description | Resets the mainframe by forcing the ABORT, *CLS, and LOAD:PROT:CLE command. |
|-------------|---|

| | |
|--------|------|
| Syntax | *RST |
|--------|------|

| | |
|---------|------|
| Example | *RST |
|---------|------|

***SAV**

All Channels

| | | | |
|-------------|---|----------------------------------|--|
| Description | Saves the data memory into the specified save slot. | | |
| Syntax | *SAV <NR1> | | |
| Parameter | <NR1> | Save slot | |
| | 1~120 | 1~120 | |
| Example | *SAV 2 | Saves data memory to save slot 2 | |

***SRE**

Status Command

| | | | | |
|------------------|--|---|-------|------------|
| Description | The Service Request Enable Command determines which events in the Status Byte Register are allowed to set the MSS (Master summary bit) Any bit that is set to "1" will cause the MSS bit to be set. See page170 for details. | | | |
| Syntax | *SRE <NRf> | | | |
| Parameter | <NRf> | Bit(s) Set | <NRf> | Bit(s) Set |
| | 4 | CSUM | 32 | ESB |
| | 8 | QUES | | |
| | 16 | MAV | | |
| Example | *SRE 12 | Sets bits CSUM and QUES in the Service Request Enable register. | | |
| Query Syntax | *SRE? | | | |
| Return Parameter | <NR1> | Bit(s) Set | <NRf> | Bit(s) Set |
| | 4 | CSUM | 32 | ESB |
| | 8 | QUES | | |
| | 16 | MAV | | |

| | | |
|---------|-------------|---|
| Example | *SRE? 48 | Returns settings of the Service Request Enable Register. Here ESB and MAV are returned. |
|---------|-------------|---|

***STB?** Status Command

| | |
|-------------|--|
| Description | <p>Reads the Status Query Byte Register. The *STB? command does not clear the register.</p> <p>If the Master Summary Status bit (MSS) is set, it indicates that there is a reason for a service request.</p> |
|-------------|--|

| | | | | |
|------------------|--------------------|------------|--------------------|------------|
| Query Syntax | *STB | | | |
| Return Parameter | <NRf> | Bit(s) Set | <NRf> | Bit(s) Set |
| | 4 | CSUM | 32 | ESB |
| | 8 | QUES | 64 | MSS |
| | 16 | MAV | | |

| | | |
|---------------|-------------|---|
| Query Example | *STB? 36 | Returns status of a byte query in the Status Byte Register. Here CSUM and ESB are returned. |
|---------------|-------------|---|

***TST?** Status Command

| | |
|-------------|--|
| Description | Performs a system self-test and returns 0 if all tests passed. 1 is returned if a test failed. |
|-------------|--|

| | | | | |
|------------------|--------------------|-------------|--------------------|-------------|
| Query Syntax | *TST? | | | |
| Return Parameter | <NR1> | Test result | <NR1> | Test result |
| | 0 | Pass | 1 | Fail |

| | |
|---------|-------------|
| Example | *TST? >0 |
|---------|-------------|

Abort Subsystem

:ABORt 32

:ABORt All
Channel Command

| | |
|-------------|------------------------------------|
| Description | Turns all electronic loads to OFF. |
| Syntax | :ABORt |
| Example | :ABORt |

Channel Subsystem

| | |
|--------------------------|----|
| :CHANnel[:LOAD] | 33 |
| :CHANnel:ACTive | 34 |
| :CHANnel:SYNCon | 34 |
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| :CHANnel:ID? | 35 |
| :CHANnel:DISPlay..... | 35 |
| :CHANnel:MEMo | 36 |
| :MEMo? | 37 |

| :CHANnel[:LOAD] | | Channel Specific Command |
|------------------|---|---|
| Description | Selects the channel that the channel specific commands use. This command will not change the channel in the display screen. | |
| Syntax | :CHANnel[:LOAD] <NRf+> | |
| Parameter | <NRf+> 1~8 MAX MIN | Channel selected CH1 ~ CH8 CH8 CH1 |
| Example | :CHAN 1 | Sets channel 1 as the specific channel. |
| | :CHAN:LOAD 1 | Sets channel 1 as the specific channel. |
| Query Syntax | :CHANnel? [LIST] | |
| Return Parameter | <NR1> 1~8 LIST | Current specific channel CH1 ~ CH8 Lists available channels |
| Query Example | :CHAN? LIST 1, 2 | Channel 1 and 2 is available. |

:CHANnel:ACTive Channel Specific Command

| | | |
|-------------|--|-------------------------------|
| Description | This command is for compatibility with other instruments only and has no action. | |
| Syntax | :CHANnel ACTive {ON 1 OFF 1} | |
| Parameter | ON/1 | Enabled |
| | OFF/0 | Disabled |
| Example | :CHAN:ACT ON | Enables the specific channel. |

:CHANnel:SYNCon Channel Specific Command

| | | |
|------------------|---|--|
| Description | Turns independent mode on or off for the channel. | |
| Syntax | :CHANnel:SYNCon {ON 1 OFF 0} | |
| Parameter | ON/1 | ON |
| | OFF/0 | OFF |
| Example | :CHAN:SYNC ON | Enables the current channel to receive synchronized commands |
| Query Syntax | :CHANnel:SYNCon? | |
| Return Parameter | <NR1> | Sync Status |
| | 0 | Independent mode is OFF |
| | 1 | Independent mode is ON |
| Query Example | :CHAN:SYNC? 0 | Independent mode is set to OFF for the channel. |

:CHANnel:SYNCon:ALL All Channels

Description Turns independent mode on or off for all the channels.

Syntax :CHANnel:SYNCon:ALL {ON|1|OFF|0}

| | | |
|------------------|-------|----------------------|
| Parameter | ON/1 | ON for all channels |
| | OFF/0 | OFF for all channels |

Example :CHAN:SYNCon:ALL ON Enables all channels to receive synchronized commands

:CHANnel:ID? Channel Specific Command

Description Queries the load module identity.

Query Syntax :CHANnel:ID?

| | | | | |
|-------------------------|----------|-----------------|----------|-------------------|
| Return Parameter | <aard> | Data | <aard> | Data |
| | GW | Manufacturer | 00000001 | Serial No. |
| | PEL2020R | Channel load id | 1.00 | Firmware Version. |

Query Example :CHAN:ID? Returns the load module identification string.
 GW, PEL2020R, 00000001, V1.00

:CHANnel:DISPlay Channel Specific Command

Description Sets or queries which channel is active on the mainframe display.

Syntax :CHANnel:DISPlay <NRf+>

| | | |
|------------------|--------|-------------------|
| Parameter | <NRf+> | Channel displayed |
| | 1~8 | CH1 ~ CH8 |

| | | |
|------------------|-----------------------------|---|
| | MAX | Last channel |
| | MIN | First channel |
| Example | :CHAN:DISP 1 | Sets to the active channel on the display to ch1. |
| Query Syntax | :CHANnel:DISPlay? [MAX MIN] | |
| Return Parameter | <NR1> | Channel displayed |
| | 1~8 | CH1 ~ CH8 |
| | MAX/MIN | Returns the allowable maximum or minimum. |
| Query Example | :CHAN:DISP? 1 | Channel 1 is currently active on the display. |

:CHANnel:MEMo Channel Specific Command

| | | |
|--------------------------------|--|---------------------------------------|
| Description | Creates or returns the “memo” that is displayed in the “System Information” screen in the Utility Menu. This memo only applies to this specific channel. The memo will replace the serial number information in the “System Information” screen. | |
| Syntax | :CHANnel:MEMo <string> | |
| Parameter/ Return parameter | <string> | String containing memo. |
| Example | :CHAN:MEM “this is a memo” | Sets to the memo to “this is a memo”. |
| Query Syntax | :CHANnel:MEMo? | |
| Query Example | :CHAN:MEM? this is a memo | Returns the memo message. |

| | | Channel Specific Query |
|--------------------------------|---|----------------------------------|
| :MEMo? | | |
| Description | Creates or returns the “memo” that is displayed in the “System Information” screen in the Utility Menu. This memo applies to the mainframe. The memo will replace the serial number information in the “System Information” screen. | |
| Syntax | :MEMo <string> | |
| Parameter/ Return parameter | <string> | String containing memo. |
| Example | :MEM “this is a memo” | Set the memo to “this is a memo” |
| Query Syntax | :MEMo? | |
| Query Example | :MEM? this is a memo | Returns the memo message. |

CONFIGURE Subsystem

| | |
|---|----|
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| | |
|-----------------------|--------------------------|
| :CONFigure:VOLTage:ON | Channel Specific Command |
|-----------------------|--------------------------|

| | | |
|-------------|---|---------------|
| Description | Sets Von (voltage on value). The allowable Von values are channel and load module specific. | |
| Syntax | :CONFigure:VOLTage:ON <NRf>[MV V KV] | |
| Parameter | <NRf>[MV V KV] | Von |
| | 3 | 3 volts |
| | 30MV | 30 millivolts |
| | 30V | 30 volts |

| | | |
|------------------|----------------------------|---|
| Example | :CONF:VOLT:ON 30MV | Set Von to 30 millivolts. |
| Query Syntax | :CONF:VOLTage:ON? | |
| Return Parameter | <NR2> unit = 1 volt 1 | Von value (volts) 1 volts |
| Query Example | :CONF:VOLT:ON? 0.03 | Von is set as 30 millivolts (0.03 volts). |

:CONF:VOLTage:RANGe Channel Specific Command

| | | |
|------------------|---|---|
| Description | Sets Voltage range for CC mode. | |
| Syntax | :CONF:VOLTage:RANGe <NRf>[V] L H | |
| Parameter | <NRf>[V] , L, H 16 80V L H | Range Low range* High range* Low range High range |
| | *Load module dependent, PEL-2020 shown. | |
| Example | :CONF:VOLT:RANG L | Sets the range to Low for the channel. |
| Query Syntax | :CONF:VOLTage:RANGe? | |
| Return Parameter | <NR2> 16 125 80 500 | Range Low PEL-2020,2030,2040 Low PEL-2041 High PEL-2020,2030,2040 High PEL-2041 |
| Query Example | :CONF:VOLT:RANG? 500 | Returns the voltage range. In this case high for the PEL-2041. |

:CONFigure:VOLTage:LATch Channel Specific Command

| | | |
|------------------|--|-------------------------|
| Description | Turn Von Latch on or off for the specific channel. | |
| Syntax | :CONFigure:VOLTage:LATch {OFF 0 ON 1} | |
| Parameter | {OFF 0 ON 1} | Von Latch |
| | OFF/0 | Off |
| | ON/1 | On |
| Example | :CONF:VOLT:LAT 1 | Sets Von latch to ON. |
| Query Syntax | :CONFigure:VOLTage:LATch? | |
| Return Parameter | <NR1> | Von latch status |
| | 0 | Latched Off |
| | 1 | Latched On |
| Query Example | :CONF:VOLT:LAT? 1 | Von latch is set to ON. |

:CONFigure:AUTO:LOAD All channels

| | | |
|------------------|--|----------------------------|
| Description | Configures the load generator for Auto Load On or Off at start up. | |
| Syntax | :CONFigure:AUTO:LOAD {OFF 0 ON 1} | |
| Parameter | {OFF 0 ON 1} | Auto Load |
| | OFF/0 | Off |
| | ON/1 | On |
| Example | :CONF:AUTO:LOAD ON | Configures Auto Load to On |
| Query Syntax | :CONFigure:AUTO:LOAD? | |
| Return Parameter | <NR1> | Auto Load Status |
| | 0 | Off |
| | 1 | On |

Query Example :CONF:AUTO:LOAD? Auto load is On.
1

:CONFigure:AUTO:MODE All channels

Description Configures the Auto Load mode as (run) Program or Load.

Syntax :CONFigure:AUTO:MODE PROGRAM/0, LOAD/1

| | | |
|-----------|-------------------|----------------|
| Parameter | PROGRAM/0, LOAD/1 | Auto Load Mode |
| | PROGRAM/0 | PROGRAM |
| | LOAD/1 | LOAD |

Example :CONF:AUTO:MODE 1 Configures Auto Load to LOAD

Query Syntax :CONFigure:AUTO:MODE?

| | | |
|------------------|-------|-----------------------|
| Return Parameter | <NR1> | Auto Load Type Status |
| | 0 | PROGRAM MODE |
| | 1 | LOAD MODE |

Query Example :CONF:AUTO:MODE? Auto load mode is to LOAD mode.
1

:CONFigure:SOUND Channel Specific Command

Description Sets the sound of each load module on or off.

Syntax :CONFigure:SOUND {OFF|0|ON|1}

| | | |
|-----------|-------|-----|
| Parameter | OFF/0 | Off |
| | ON/1 | On |

Example :CONF:SOUND ON Configures the sound for the specific channel to On.

Query Syntax :CONFigure:SOUND?

| | | |
|------------------|--------------|--|
| Return Parameter | <NR1> | SOUND Status |
| | 0 | Off |
| | 1 | On |
| Query Example | :CONF:SOUND? | Sound is off for the specific channel. |
| | 0 | |

:CONFigure:REMOte All Channels

| | | |
|-------------|--|--------------------------|
| Description | Turns remote control on or off for all interfaces. | |
| Syntax | :CONFigure:REMOTE {OFF 0 ON 1} | |
| Parameter | OFF/0 | Off |
| | ON/1 | On |
| Example | :CONF:REM 1 | Turns Remote control on. |

:CONFigure:SAVE All Channels

| | | |
|-------------|--|---|
| Description | This command is for compatibility with other instruments only and has no action. | |
| Syntax | :CONFigure:SAVE | |
| Example | :CONF:SAVE | Saves the configuration data for all channels into internal memory. |

:CONFigure:LOAD System Command

| | | |
|-------------|---|--|
| Description | Configures the load module selector knob as OLD or Updated. | |
| Syntax | :CONFigure:LOAD {OLD 0 UPDATED 1} | |
| Example | :CONF:LOAD UPDATED | Sets the load module selector knob as Updated. |

| | | |
|------------------|--------------------|--|
| Parameter | OLD/0 UPDATED/1 | Old Updated |
| Example | :CONF:LOAD OLD | Configuration type set as OLD. |
| Query Syntax | :CONFigure:LOAD? | |
| Return Parameter | <NR1> 0 1 | Configuration type Old Updated |
| Query Example | :CONF:LOAD? 0 | Sets the load module selector configuration type as OLD. |

:CONFigure:PROTection:CURRent:STATE Channel Specific Command

| | | |
|------------------|---|--|
| Description | Sets the current protection for the specific channel on or off. The current protection can also be cleared. | |
| Syntax | :CONFigure:PROTection:CURRent:STATE {OFF 0 ON 1 CLEAR 2} | |
| Parameter | CLEAR/2 OFF/0 ON/1 | Cleared Off On |
| Example | :CONF:PROT:CURR:STAT 1 | Turns on current protection. |
| Query Syntax | : CONFigure:PROTection:CURRent:STATE? | |
| Return Parameter | <NR1> 0 1 2 | Current Protection Off On Clear |
| Query Example | :CONF:PROT:CURR:STAT? 1 | Current protection is turned on. |

:CONFigure:PROTection:CURRent:LEVel Channel Specific Command

| | | |
|------------------|---|---|
| Description | Sets the current protection level for the current/ specific channel. The level can be set to any applicable level or to the channel maximum/ minimum. | |
| Syntax | :CONFigure:PROTection:CURRent:LEVel <NRf>[A] MIN MAX | |
| Parameter | <NRf> | Current Protection Level |
| | .3 | 300mA |
| | 0.3A | 300mA |
| | 300MA | 300mA |
| | MIN | Sets to the minimum level |
| | MAX | Sets the current limit to the maximum level |
| Example | :CONF:PROT:CURR:LEV MAX | Sets the current limit to 20.40A (PEL2020) |
| Query Syntax | : CONFigure:PROTection:CURRent:LEVel? [MIN MAX] | |
| Return Parameter | <NRf> 1 unit = 1 amp | Current protection level |
| | 1 | 1 amp. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :CONF:PROT:CURR:LEV? 0.30 | Current protection level is at 300mA. |

:CONFigure:PROTection:VOLTage:STATe Channel Specific Command

Description Sets the voltage protection for the current/specific channel on or off. The voltage protection can also be cleared.

Syntax :CONFigure:PROTection:VOLTage:STATe
{OFF|0|ON|1|CLEAR|2}

| | | |
|------------------|---------|-------|
| Parameter | CLEAR/2 | Clear |
| | OFF/0 | Off |
| | ON/1 | On |

Example :CONF:PROT:VOLT:STAT 1 Turns on voltage protection.

Query Syntax : CONFigure:PROTection:VOLTage:STATe?

| | | |
|-------------------------|-------|--------------------------|
| Return Parameter | <NR1> | Voltage Protection state |
| | 0 | Off |
| | 1 | On |
| | 2 | Clear |

Query Example :CONF:PROT:VOLT:STAT? Voltage protection is currently off.
0

:CONFigure:PROTection:VOLTage:LEVel Channel Specific Command

Description Sets the voltage protection level for the current/specific channel. The level can be set to any applicable level or to the channel maximum/ minimum.

Syntax :CONFigure:PROTection:VOLTage:LEVel
<NRf>[V]|MIN|MAX

| | | |
|------------------|-------|--------------------------|
| Parameter | <NRf> | Voltage Protection Level |
| | 30 | 30 volts |
| | 30V | 30 volts |

| | | |
|------------------|---|---|
| | MIN | Sets to the minimum level |
| | MAX | Sets the voltage limit to the maximum level |
| Example | :CONF:PROT:VOLT:LEV MAX | Sets the voltage limit to 81.6V (PEL2020) |
| Query Syntax | : CONFigure:PROTection:VOLTage:LEVel? [MIN MAX] | |
| Return Parameter | <NRf> 1 unit = 1 volt | Voltage protection level |
| | 1.00 | 1.00 volts. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :CONF:PROT:VOLT:LEV? 81.6000 | Voltage protection level is at 81.6V. |

:CONFigure:PROTection:POWer:STATe Channel Specific Command

| | | |
|------------------|---|-----------------------------------|
| Description | Sets the power protection for the current/specific channel on or off. The power protection can also be cleared. | |
| Syntax | :CONFigure:PROTection:POWer:STATe {OFF 0 ON 1 CLEAR 2} | |
| Parameter | CLEAR/2 | Cleared |
| | OFF/0 | Off |
| | ON/1 | On |
| Example | :CONF:PROT:POW:STAT 1 | Turns on power protection. |
| Query Syntax | : CONFigure:PROTection:POWer:STATe? | |
| Return Parameter | <NR1> | Power Protection |
| | 0 | Off |
| | 1 | On |
| | 2 | Clear |
| Query Example | :CONF:PROT:POW:STAT? 1 | Power protection is currently on. |

:CONFigure:PROTection:POWer:LEVel Channel Specific Command

Description Sets the power protection level for the current/specific channel. The level can be set to any applicable level or to the channel maximum/minimum.

Syntax :CONFigure:PROTection:POWer:LEVel <NRf>[W]|MIN|MAX

| | | |
|------------------|-------|---|
| Parameter | <NRf> | Power Protection Level |
| | 200 | 200Watts |
| | 200W | 200Watts |
| | MIN | Sets to the minimum level |
| | MAX | Sets the power limit to the maximum level |

Example :CONF:PROT:POW:LEV MAX Sets the power limit to 102W (PEL2020)

Query Syntax : CONFigure:PROTection:POWEr:LEVel? [MIN|MAX]

| | | |
|-------------------------|-----------------|--|
| Return Parameter | <NRf> | Power protection level |
| | 1 unit = 1 watt | Returns the power protection level in Watts. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :CONF:PROT:POW:LEV? 75 Power protection level is at 75 watts.

:CONFigure:PROTection:UVP:CLEAr All Channel Command

Description Clears the under voltage power protection status.

Syntax :CONFigure:PROTection:UVP:CLEAr

Example :CONF:PROT:UVP:CLE Clears the under voltage protection.

:CONFigure:PROTection:UVP:LEVel Channel Specific Command

Description Sets the under voltage protection level for the current/ specific channel. The level can be set to any applicable level or to the channel maximum/ minimum.

Syntax :CONFigure:PROTection:UVP:LEVel
<NRf>[W]|MIN|MAX

| | | |
|------------------|-------|---|
| Parameter | <NRf> | UVP Level |
| | 20 | 20 Volts |
| | 20V | 20 Volts |
| | MIN | Sets to the minimum level (OFF) |
| | MAX | Sets the voltage limit to the maximum level |

Example :CONF:PROT:UVP:LEV MIN Sets the UVP limit to OFF

Query Syntax :CONFigure:PROTection:UVP:LEVel? [MIN|MAX]

| | | |
|-------------------------|-----------------|--|
| Return Parameter | <NRf> | Power protection level |
| | 1 unit = 1 volt | Returns the UVP level as volts. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :CONF:PROT:UVP:LEV? UVP level is at 75 volts.
75

:CONFigure:RESPonse Channel Specific Command

Description Sets or queries the response rate for the specific channel.

Syntax :CONFigure:RESPonse {NORMAL|0|FAST|1}

| | | |
|------------------|----------|--------|
| Parameter | NORMAL/0 | Normal |
| | FAST/1 | Fast |

Example :CONF:RESP 0 Response set to normal.

Query Syntax : CONFigure:RESPonse?

| | | |
|------------------|-------|----------|
| Return Parameter | <NR1> | Response |
| | 0 | Normal |
| | 1 | Fast |

Query Example :CONF:RESP?
1 Response is Fast.

:CONFigure:RESEt Channel Specific Command

Description Recalls the original factory default settings.

Syntax :CONFigure:RESEt

Example :CONF:RESE

:CONFigure:GROup:UNITs Channel Specific Command

Description Sets or queries the number of single channel load modules (PEL-2040 or PEL-2041) that can be used in the parallel mode.

Syntax CONFigure:GROup:UNITs <NRf>[MIN|MAX]

| | | |
|-----------|-------|----------------------------|
| Parameter | <NRf> | Number of units |
| | MIN | Sets to the minimum number |
| | MAX | Sets to the maximum number |

Example CONF:GRO:UNIT 2 Sets the parallel mode to 2 units.

Query Syntax CONFigure:GROup:UNITs? [MIN|MAX]

| | | |
|------------------|---------|--|
| Return Parameter | <NR1> | Returns the number of units |
| | MAX/MIN | Returns the allowable maximum and minimum. |

| | | |
|---|---|---|
| Query Example | :CONF:GRO:UNIT? 2 | 2 units are set for the parallel mode. |
| | :CONFigure:GROUp:MODE | Channel Specific Command |
| <hr style="border: 1px solid orange;"/> | | |
| Description | Sets or queries the parallel mode. | |
| Syntax | :CONFigure:GROUp:MODE {SYNC 0 PARALLEL 1} | |
| Parameter | SYNC, 0 | Sync mode |
| | PARALLEL, 1 | Parallel mode |
| Example | :CONF:GRO:MODE 0 | Sets the parallel mode to SYNC. |
| Query Syntax | :CONFigure:GROUp:MODE? | |
| Return Parameter | 0 | Sync mode |
| | 1 | Parallel mode |
| Query Example | :CONF:GRO:MODE? 0 | the parallel mode is currently set to SYNC. |

Utility Subsystem

| | |
|----------------------------|----|
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:UTILity:AUTO:LOAD System Command

| | | |
|------------------|---|--|
| Description | Sets the mainframe to auto mode. Upon startup the mainframe will turn loads/ programs on. | |
| Syntax | :UTILity:AUTO:LOAD {OFF 0 ON 1} | |
| Parameter | OFF/0 | Turns auto loading off |
| | ON/1 | Turns auto loading on |
| Example | :UTIL:AUTO:LOAD 1 | Turns auto loading on |
| Query Syntax | :UTILity:AUTO:LOAD? | |
| Return Parameter | <NR1> | Auto load status |
| | 0 | Auto loading is off |
| | 1 | Auto loading is on |
| Query Example | :UTIL:AUTO:LOAD? 1 | The main frame is currently configured to auto load. |

:UTILity:AUTO:MODE System Command

| | | |
|------------------|--|------------------------------------|
| Description | Sets the mainframe auto mode as load or program. Upon startup the mainframe can automatically turn on loads or automatically run the last program. | |
| Syntax | :UTILity:AUTO:MODE {PROGRAM 0 LOAD 1} | |
| Parameter | PROGRAM/0 | Sets the auto load mode to program |
| | LOAD/1 | Sets the auto load mode to load. |
| Example | :UTIL:AUTO:MODE 1 | Auto load mode is set to load. |
| Query Syntax | :UTILity:AUTO:MODE? | |
| Return Parameter | <NR1> | Auto load mode |
| | 0 | Program |
| | 1 | Load |
| Query Example | :UTIL:AUTO:MODE? 0 | Auto load mode is set to Program. |

:UTILity:SOUND System Command

| | | |
|------------------|--|-----------------|
| Description | Turns the sound on/off for the mainframe/load modules. | |
| Syntax | :UTILity:SOUND {OFF 0 ON 1} | |
| Parameter | OFF/0 | Turns sound off |
| | ON/1 | Turns sound on |
| Example | :UTIL:SOUN 1 | Turns sound on. |
| Query Syntax | :UTILity:SOUND? | |
| Return Parameter | <NR1> | Sound |
| | 0 | Off |

| | | |
|---------------|-------------|--------------------------------|
| | 1 | On |
| Query Example | :UTIL:SOUN? | Sound is currently set to off. |
| | 0 | |

:UTILity:REMOte System Command

| | | |
|-------------|-------------------------------------|--------------------------|
| Description | Turns the remote control on or off. | |
| Syntax | :UTILity:REMOte {OFF 0 ON 1} | |
| Parameter | OFF/0 | Turns Remote control off |
| | ON/1 | Turns remote control on |
| Example | :UTIL:REM 1 | Turns remote control on. |

:UTILity:REMOte:MODE System Command

| | | |
|-------------|---|----------------------------|
| Description | Sets the remote mode to fast or normal. When in fast mode, the panel interface is deactivated with an interface time of no more than 10ms. Normal mode has an interface time of 30~130ms. In normal mode the display interface continues to update the screen in real-time. | |
| Syntax | :UTILity:REMOte:MODE {NORMAL 0 FAST 1} | |
| Parameter | NORMAL/0 | NORMAL |
| | FAST/1 | FAST |
| Example | :UTIL:REM:MODE 1 | Turns remote mode to fast. |

:UTILity:TIME System Command

| | | | |
|------------------|--|--|-----------------|
| Description | Sets the date and time on the mainframe. | | |
| Syntax | :UTILity:TIME [aard] | | |
| Parameter | [aard] | | |
| | <pre> "200811131300" └─┬─┬─┬─┘ 1 2 3 </pre> | 1 | Year |
| | | 2 | Month/Day |
| | | 3 | Time (24 hours) |
| Example | :UTIL:TIME "200901031343" | | |
| | Sets the time to 1:00 pm, January 3 rd , 2009. | | |
| Query Syntax | :UTIL:TIME? | | |
| Return Parameter | [aard] | | |
| | <pre> 2008/11/13 13:00 └─┬─┬─┬─┘ 1 2 3 </pre> | 1 | Year |
| | | 2 | Month/Day |
| | | 3 | Time (24 hours) |
| Query Example | :UTIL:TIME? 2009/11/13/13:00 | The date is November 13 th , 2009. The time is 1:00 pm. | |

:UTILity:LOAD System Command

| | | |
|------------------|--|------------------------------------|
| Description | Sets the knob control style. The load module control knobs can be set to operate independently (OLD style) to the mainframe or with the mainframe (UPDATED). | |
| Syntax | :UTILity:LOAD {OLD 0 Updated 1} | |
| Parameter | OLD/0 | Old |
| | UPDATED/1 | Updated |
| Example | :UTIL:LOAD 1 | Set the knob style to independent. |
| Query Syntax | :UTILity:LOAD? | |
| Return Parameter | <NR1> | Knob style |

| | | |
|---------------|---------------|-----------------------------------|
| | 0 | Old |
| | 1 | Updated |
| Query Example | :UTIL:LOAD? 1 | The knob style is set to Updated. |

:UTILity:IDENTify System Command

| | | |
|-------------|--|-----------------------|
| Description | Flashes a message "I am Here!" on the mainframe display. This command is useful to identify a PEL-2000 mainframe in a group. Pressing any key on the mainframe will also turn the message off. | |
| Syntax | :UTILity:IDENTify {OFF 0 ON 1} | |
| Parameter | OFF/0 | Turns message off |
| | ON/1 | Turns message on |
| Example | :UTIL:IDEN 1 | Turns the message on. |

:UTILity:FRAME System Command

| | | |
|------------------|-----------------------------|----------------------|
| Description | Turns Frame Link on or off. | |
| Syntax | :UTILity:FRAME {OFF 0 ON 1} | |
| Parameter | {OFF 0 ON 1} | Frame Link |
| | OFF/0 | off |
| | ON/1 | on |
| Example | :UTIL:FRAM 1 | Turns Frame Link on. |
| Query Syntax | :UTILity:FRAME? | |
| Return Parameter | <NR1> | Frame Link |
| | 0 | Off |
| | 1 | On |
| Query Example | :UTIL:FRAM? 0 | Frame Link is on. |

Current Subsystem

| | |
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| | | |
|------------------------|---|---------------------------------|
| :CURRent:STATic:RECall | | Channel Specific Command |
| Description | Sets or queries whether A Value or B Value is the currently active value in CC static mode. | |
| Syntax | :CURRent:STATic:RECall {A 0 B 1} | |
| Parameter | A/0 | A |
| | B/1 | B |
| Example | :CURR:STAT:REC 1 | Makes B Value the active value. |
| Query Syntax | :CURRent:STATic:RECall? | |
| Return Parameter | <NR1> | Value |
| | 0 | A |
| | 1 | B |

Query Example :CURR:STAT:REC?
0

A Value is active.

:CURRent:STAtic:L1/L2

Channel Specific
Command

Description Sets the A/B Value for constant current static mode, where L1 is A Value and L2 is B Value. The command is range dependant. If the current range is Low, then the command will only apply to the low range settings.

Syntax :CURRent:STAtic:L1|L2 <NRf+>[A]

| | | |
|-----------|-----------|---|
| Parameter | <NRf+>[A] | |
| | L1 1 | Sets A Value to 1 Amp. |
| | L2 2 | Sets B Value to 2 Amps. |
| | L1 1A | Sets A Value to 1 Amp. (single channel only) |
| | L1 MIN | Sets A Value to the minimum level for the specific channel. |
| | L1 MAX | Sets A Value to the maximum Level for the specific channel. |

Example :CURR:STAT:L1 1

Sets A Value to 1 amp for the current range

Query Syntax :CURRent:STAtic:L1?/L2? [MAX|MIN]

| | | |
|------------------|-----------------|--|
| Return Parameter | <NR2> [MAX MIN] | Current |
| | 1 unit = 1 amp | Returns the current of the A Value (L1) or B Value (L2). |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :CURR:STAT:L2? MAX
10.2

Returns the maximum current allowed for the channel. (PEL-2020)

Query Example :CURR:STAT:L2? 2 Returns the current setting (2 A) for B Value.

:CURRent:STATic:RISE/FALL Channel Specific Command

Description Sets the slew rate for constant current static mode. The command is range dependant. If the current range is Low, then the command will only apply to the low range settings.

Syntax :CURRent:STATic:RISE/FALL <NRf+>[A/uS]

| | | |
|-----------|---------------------|--|
| Parameter | <NRf+>[A/uS] | Slew Rate |
| | RISE/FALL 0.078A/uS | Sets the rising/falling slew rate to 0.078A/uS |
| | RISE/FALL 1 | Sets the rising/falling slew rate to 1A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |

Example :CURR:STAT:RISE .01 Sets the rising slew rate to 0.01A/uS.

Query Syntax : CURRent:STATic:RISE/FALL? [MIN|MAX]

| | | |
|------------------|-----------------|--|
| Return Parameter | <NR2> [MAX MIN] | Slew rate |
| | 1 Unit=1 amp/uS | Returns the slew rate. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :CURR:STAT:RISE? MIN 0.078 the Minimum value for the rising slew rate is 0.078 A/uS for the specific channel.

Query Example :CURR:STAT:RISE? 0.16800 The rising slew rate is 0.168 A/uS for the specific channel.

:CURRent:STATic:LOW:AVALue/BVALue Channel Specific Command

Description Sets the low range A/B Value for constant current static mode.

Syntax :CURRent:STATic:LOW:AVALue/BVALue <NRf+>[A]

| | | |
|------------------|------------|---|
| Parameter | NRf+[A] | |
| | AVALue 1 | Sets A Value to 1 Amp. (Low range only) |
| | BVALue 2 | Sets B Value to 2 Amps. (Low Range only) |
| | AVALue 1A | Sets A Value to 1 Amp. (Low range only) |
| | AVALue MIN | Sets A Value to the minimum level for the specific channel. |
| | AVALue MAX | Sets A Value to the maximum Level for the specific channel. |

Example :CURR:STAT:LOW:AVAL 1 Sets low range CC static mode A Value to 1 amp.

Query Syntax :CURRent:STATic:LOW:AVALue/BVALue? [MAX|MIN]

| | | |
|-------------------------|-----------------|--|
| Return Parameter | <NR2> [MAX MIN] | Current |
| | 1 unit = 1 amp | Returns the current of the A or B Value. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :CURR:STAT:LOW:BVAL? MAX
2 Returns the maximum current allowed for the channel. (PEL-2020)

:CURRent:STATic:LOW:RISE/FALL Channel Specific Command

| | | |
|-------------|---|--|
| Description | Sets the low range rising/falling slew rates. | |
| Syntax | :CURRent:STATic:LOW:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] | Slew Rate |
| | RISE/FALL 0.078A/uS | Sets the rising/falling slew rate to 0.078A/uS |
| | RISE/FALL 1 | Sets the rising/falling slew rate to 1A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |
| Example | :CURR:STAT:LOW:RISE .001 | Sets the rising slew rate to 0.001A/uS. |

| | | |
|------------------|---|--|
| Query Syntax | : CURRent:STATic:LOW:RISE/FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] | Slew rate |
| | 1 Unit=1 amp/uS | Returns the slew rate. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :CURR:STAT:LOW:RISE? MIN
0.078

For low range CC mode, the Minimum value for the rising slew rate is 0.078 A/ uS for the specific channel.

:CURRent:STATic:HIGH:AVALue/BVALue Channel Specific Command

| | | |
|-------------|---|--|
| Description | Sets the high range A/B Value for constant current static mode. | |
| Syntax | :CURRent:STATic:HIGH:AVALue/BVALue <NRf+>[A] | |
| Parameter | NRf+[A] | |

| | | |
|---------------------------------------|--|--|
| | AVALue 10 | Sets A Value to 10 Amps. (high range only) |
| | BVALue 20 | Sets B Value to 20 Amps. (high Range only) |
| | AVALue MIN | Sets A Value to the minimum level for the specific channel. |
| | A Value MAX | Sets A Value to the maximum Level for the specific channel. |
| Example | :CURRent:STATic:HIGH:AV ALue 10 | Sets high range CC static mode A Value to 10 amps. |
| Query Syntax | :CURRent:STATic:HIGH:AV ALue/BVALue? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] MAX/MIN 1 unit= 1 amp | Auto load mode Returns the allowable maximum and minimum. Returns the current of the A or B Value. |
| Query Example | :CURR:STAT:HIGH:BVALue? MAX 20.4000 | Returns the maximum current allowed for the channel in high range mode. (PEL-2020) |
| :CURRent:STATic:HIGH:RISE/FALL | | Channel Specific Command |
| Description | Sets the high range rising/falling slew rate. | |
| Syntax | :CURRent:STATic:HIGH:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] RISE/FALL 0.8A/uS RISE/FALL 1 | Slew Rate Sets the rising/falling slew rate to 0.8A/uS Sets the rising/falling slew rate to 1A/uS |

| | | |
|------------------|---|---|
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |
| Example | :CURR:STAT:HIGH:RISE 1.1 | Sets the rising slew rate to 1.1A/uS. |
| Query Syntax | :CURRent:STATic:HIGH:RISE/FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] 1 Unit=1 amp/uS MAX/MIN | Slew rate Returns the slew rate. Returns the allowable maximum and minimum. |
| Query Example | :CURR:STAT:HIGH:RISE? MAX 0.8000 | For high range CC mode, the maximum value for the rising slew rate is 0.8000 A/uS for the specific channel. |

:CURRent:DYNamic:L1/L2 Channel Specific Command

| | | |
|-------------|---|--|
| Description | Sets the current levels (Level 1 & 2) for CC dynamic mode. The command is range dependant. If the current range is Low, then the settings will only apply to low range. | |
| Syntax | :CURRent:DYNamic:L1/L2 <NRf+>[A] | |
| Parameter | NRf+[A] | Current |
| | L1 1 | Sets L1 to 1 Amp. |
| | L2 2 | Sets L2 to 2 Amps. |
| | L2 2A | Sets L2 to 2 Amps. |
| | L1/L2 MIN | Sets L1 or L2 to the minimum level for the specific channel. |

| | | |
|------------------|---|---|
| | L1/L2 MAX | Sets L1 or L2 to the maximum Level for the specific channel. |
| Example | :CURR:DYN:L1 10 | In CC dynamic mode, Set L1 (level 1) to 10 amps. |
| Query Syntax | :CURRent:DYNamic:L1/L2? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] MAX/MIN 1 unit= 1 amp | Current Returns the allowable maximum and minimum. Returns the current of L1/L2, or the maximum or minimum current allowed. |
| Query Example | :CURR:DYN:L2? 2.0400 | Returns current for the specific channel. |

:CURRent:DYNamic:RISE/FALL Channel Specific Command

| | | |
|--------------|---|---|
| Description | Sets the rising/falling slew rate for CC dynamic mode for the specific channel and range. | |
| Syntax | :CURRent:DYNamic:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] RISE/FALL 0.8A/uS RISE/FALL 1 RISE/FALL MIN RISE/FALL MAX | Slew Rate Sets the rising/falling slew rate to 0.8A/uS Sets the rising/falling slew rate to 1A/uS Sets to the slowest rising/falling slew rate. Sets to the fastest rising/falling slew rate. |
| Example | :CURR:DYNA:RISE 1.1 | Sets the rising slew rate to 1.1A/uS. |
| Query Syntax | : CURRent:DYNamic:RISE/FALL? [MIN MAX] | |

| | | |
|------------------|---|--|
| Return Parameter | <NR2> [MAX MIN] 1 Unit=1 amp/uS MAX/MIN | Slew rate Returns the slew rate. Returns the allowable maximum or minimum. |
|------------------|---|--|

| | | |
|---------------|-------------------------------|--|
| Query Example | :CURR:DYN:FALL? MIN 0.0003 | Shows the minimum allowable value for the falling slew rate as 0.0003 A/uS for the specific channel and range. |
|---------------|-------------------------------|--|

:CURRent:DYNamic:T1/T2 Channel Specific Command

| | | |
|-------------|--|--|
| Description | Sets the timers T1 or T2 for CC dynamic mode for the specific channel and range. | |
|-------------|--|--|

| | | |
|--------|-------------------------------------|--|
| Syntax | :CURRent:DYNamic:T1/T2 <NRf+>[S ms] | |
|--------|-------------------------------------|--|

| | | |
|-----------|--|---|
| Parameter | <NRf+>[S] T1/T2 0.1S T1/T2 1 T1/T2 MIN T1/T2 MAX | Time Sets the T1/T2 time to 0.1 seconds. Sets T1/T2 to 1 second. Sets the T1/T2 to the minimum value. Sets the T1/T2 time to the maximum time |
|-----------|--|---|

| | | |
|---------|-------------------|--|
| Example | :CURR:DYNA:T1 .1S | Sets the T1 time to 100 milliseconds for the specific channel. |
|---------|-------------------|--|

| | | |
|--------------|------------------------------------|--|
| Query Syntax | : CURRent:DYNamic:T1/T2? [MIN MAX] | |
|--------------|------------------------------------|--|

| | | |
|------------------|---|---|
| Return Parameter | <NR2> [MAX MIN] 1 Unit=1 second MAX/MIN | Time Returns T1/T2 time. Returns the allowable maximum and minimum. |
|------------------|---|---|

| | | |
|-----------------------------------|--------------------------------------|---|
| Query Example | :CURR:DYN:LOW:T1? 2.5 | Returns the T1 time of 2.5 seconds. |
| | :CURR:DYN:LOW:T1? MIN 0.000025 | Returns the minimum T1 time allowable for the specific channel and range. |
| :CURRent:DYNAmic:LOW:L1/L2 | | Channel Specific Command |

Description Sets the low range current levels (Level 1 & 2) for CC dynamic mode.

Syntax :CURRent:DYNAmic:LOW:L1/L2 <NRf+>[A]

| | | |
|------------------|-----------|--|
| Parameter | NRf+[A] | Current |
| | L1 1 | Sets L1 to 1 Amp. (low range only) |
| | L2 2 | Sets L2 to 2 Amps. (low Range only) |
| | L2 2A | Sets L2 to 2 Amps. (low Range only) |
| | L1/L2 MIN | Sets L1 or L2 to the minimum level for the specific channel. |
| | L1/L2 MAX | Sets L1 or L2 to the maximum Level for the specific channel. |

Example :CURR:DYN:LOW:L1 10 In low range CC dynamic, Set L1 (level 1) to 10 amps.

Query Syntax :CURRent:DYNAmic:LOW:L1/L2? [MIN|MAX]

| | | |
|-------------------------|-----------------|--|
| Return Parameter | <NR2> [MAX MIN] | Current |
| | 1 unit= 1 amp | Returns the current of L1/L2, or the maximum or minimum current allowed. |

| | | |
|------------------|---|---|
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :CURR:DYN:LOW:L2? 2.0400 | Returns current for the specific channel. |
| | :CURRent:DYNamic:LOW:RISE/FALL | Channel Specific Command |
| Description | Sets the low range rising/falling slew rate for CC dynamic mode for the specific channel. | |
| Syntax | :CURRent:DYNamic:LOW:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] | Slew Rate |
| | RISE/FALL 0.8A/uS | Sets the rising/falling slew rate to 0.8A/uS |
| | RISE/FALL 1 | Sets the rising/falling slew rate to 1A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |
| Example | :CURR:DYNA:LOW:RISE 1.1 | Sets the rising slew rate to 1.1A/uS. |
| Query Syntax | : CURRent:DYNamic:LOW:RISE/FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] | Slew rate |
| | 1 Unit=1 amp/uS | Returns the slew rate. |
| | MAX/MIN | Returns the allowable maximum or minimum. |
| Query Example | :CURR:DYN:LOW:FALL? MIN 0.0003 | For low range dynamic CC mode, the minimum allowable value for the falling slew rate is 0.0003 A/uS for the specific channel. |

:CURRent:DYNamic:LOW:T1/T2 Channel Specific Command

Description Sets the low range timers T1 or T2 for CC dynamic mode for the specific channel.

Syntax :CURRent:DYNamic:LOW:T1/T2 <NRf+>[S/ms]

| | | |
|------------------|--------------|---|
| Parameter | <NRf+>[S/ms] | Time |
| | T1/T2 0.1S | Sets the T1/T2 time to 0.1 seconds. |
| | T1/T2 1 | Sets T1/T2 to 1 second. |
| | T1/T2 MIN | Sets the T1/T2 to the minimum value. |
| | T1/T2 MAX | Sets the T1/T2 time to the maximum time |

Example :CURR:DYNA:LOW:T1 .1S Sets the T1 time to 100 milliseconds for the specific channel.

Query Syntax : CURRent:DYNamic:LOW:T1/T2? [MIN|MAX]

| | | |
|-------------------------|-----------------|--|
| Return Parameter | <NR2> [MAX MIN] | Time |
| | 1 Unit=1 second | Returns T1/T2 time. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :CURR:DYN:LOW:T1? 2.5 Returns the T1 time of 2.5 seconds.
 :CURR:DYN:LOW:T1? MIN Returns the minimum T1 time allowable for the specific channel.
 0.000025

:CURRent:DYNamic:HIGH:L1/L2 Channel Specific Command

Description Sets the high range current levels (Level 1 & 2) for CC dynamic mode.

| | | |
|------------------|--|---|
| Syntax | :CURRent:DYNamic:HIGH:L1/L2 <NRf+>[A] | |
| Parameter | NRf+[A] | |
| | L1 10 | Sets L1 to 10 Amps. (High range only) |
| | L2 20 | Sets L2 to 20 Amps. (High Range only) |
| | L1/L2 MIN | Sets L1 or L2 to the minimum level for the specific channel. |
| | L1/L2 MAX | Sets L1 or L2 to the maximum Level for the specific channel. |
| Example | :CURR:DYN:HIGH:L1 10 | In high range CC dynamic mode, Set L1 (level 1) to 10 amps. |
| Query Syntax | :CURRent:DYNamic:HIGH:L1/L2? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] | Return value |
| | 1 unit= 1 amp | Returns the current of Level 1 / 2 (L1/L2). |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :CURR:DYN:HIGH:L2? MAX | Returns the maximum current allowed for the channel. (PEL-2000) |
| | 20.4000 | |

:CURRent:DYNamic:HIGH:RISE/FALL Channel Specific Command

| | | |
|-------------|--|--|
| Description | Sets the high range rising/falling slew rate for CC dynamic mode for the specific channel. | |
| Syntax | :CURRent:DYNamic:HIGH:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] | Slew Rate |
| | RISE/FALL 0.8A/uS | Sets the rising/falling slew rate to 0.8A/uS |

| | | |
|------------------|---|---|
| | RISE/FALL 1 | Sets the rising/falling slew rate to 1A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |
| Example | :CURR:DYNA:HIG:RISE 1.1 | Sets the rising slew rate to 1.1A/uS. |
| Query Syntax | : CURRent:DYNamic:HIG:RISE/FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] 1 Unit = 1 amp/uS MAX/MIN | Slew rate Returns the slew rate. Returns the allowable maximum and minimum. |
| Query Example | :CURR:DYN:HIG:FALL? MAX 0.8 | For high range dynamic CC mode, the maximum value for the falling slew rate is 0.8 A/uS for the specific channel. |

:CURRent:DYNamic:HIG:T1/T2 Channel Specific Command

| | | |
|-------------|--|---|
| Description | Sets the timers T1 or T2 for CC dynamic mode for the specific channel in high range. | |
| Syntax | :CURRent:DYNamic:HIG:T1/T2 <NRf+>[S ms] | |
| Parameter | <NRf+>[S] | Time |
| | T1/T2 0.1S | Sets the T1/T2 time to 0.1 seconds. |
| | T1/T2 1 | Sets T1/T2 to 1 second. |
| | T1/T2 MIN | Sets the T1/T2 to the minimum value. |
| | T1/T2 MAX | Sets the T1/T2 time to the maximum time |

| | | |
|------------------|--|--|
| Example | :CURR:DYNA:HIGH:T1 10S | Sets the high range T1 time to 10 seconds for the specific channel. |
| Query Syntax | :CURRent:DYNamic:HIGH:T1/T2? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] 1 Unit=1 second MAX/MIN | Time Returns T1/T2 time. Returns the allowable maximum and minimum. |
| Query Example | :CURR:DYN:HIGH:T1? 2.5 :CURR:DYN:HIGH:T1? MIN 0.000025 | Returns the T1 time of 2.5 seconds. Returns the minimum T1 time allowable for the specific channel. |

FETCH Subsystem

| | |
|--------------------|----|
| :FETCh:VOLTage? | 71 |
| :FETCh:CURRent? | 71 |
| :FETCh:POWer? | 72 |
| :FETCh:STATus? | 72 |
| :FETCh:ALLVoltage? | 72 |
| :FETCh:ALLCurrent? | 73 |
| :FETCh:ALLPower? | 73 |

:FETCh:VOLTage? Channel Specific Status Command

Description This query returns the real-time voltage of the load module input for the specific channel.

Syntax :FETCh:VOLTage? <NR2>

| | | |
|------------------|-----------------------|---------|
| Parameter | <NR2> 1 unit = 1 volt | Voltage |
| | 8 | 8 volts |

| | | |
|----------------------|---------------------|--|
| Query Example | :FETC:VOLT? 11.2 | The specific channel has a voltage of 11.2 volts at the input. |
|----------------------|---------------------|--|

:FETCh:CURRent? Channel Specific Status Command

Description This query returns the real-time current of the load module input for the specific channel.

Syntax :FETCh:CURRent? <NR2>

| | | |
|------------------|---------------------|-------|
| Parameter | <NR2> 1 unit= 1 amp | |
| | 1 | 1 amp |

| | | |
|----------------------|--------------------|--|
| Query Example | :FETC:CURR? 1.2 | The specific channel has a current of 1.2 amps at the load module input. |
|----------------------|--------------------|--|

:FETCh:POWer? Channel Specific
Status Command

| | | | |
|---------------|---|--|--|
| Description | This query returns the real-time power of the load module input for the specific channel. | | |
| Syntax | :FETCh:CURRent? <NR2> | | |
| Parameter | <NR2> 1 unit= 1 amp | | |
| | 1 | | 1 amp |
| Query Example | :FETC:POW? 1.2 | | The specific channel is at 1.2 watts. |

:FETCh:STATus? Status Command

| | | | | |
|---------------|--|-----------|--------|--|
| Description | This query returns the status of the load module. The returned value is the bit weight of the Channel Status Register. See page 162. | | | |
| Syntax | :FETCh:STATus? <NR1> | | | |
| Parameter | <NR1> | Condition | <NR1> | Condition |
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 16-128 | Not Used |
| Query Example | :FETC:STAT? 2 | | | Over voltage (OV) protection has been triggered for the specific channel. |

:FETCh:ALLVoltage? All Channel Status
Command

| | | | |
|-------------|--|--|--|
| Description | This query returns the voltage values of all the load modules/channels in order from 1-8(PEL-2004)/1-4(PEL2002). | | |
| Syntax | :FETCh:ALLVoltage? | | |

| | | |
|-----------|---|--|
| Parameter | <aard> CH1,CH2,CH3,CH4,CH5, CH6,CH7,CH8 | Returns all the voltage values from all the channels, 1-8(PEL-2004)/1-4(PEL-2002). |
|-----------|---|--|

| | | |
|---------------|--|--|
| Query Example | :FETC:ALLV? 2.5000, 3.0000, 0.0000, 0.0000, 0.0000, 0.0000, 5.500, 0.0000 | Channel 1 and 2 have voltages of 2.5 and 3 volts respectively. Channels 3-6 and 8 have no voltage and channel 7 is 5.5 volts |
|---------------|--|--|

All Channel Status Command

:FETCh:ALLCurrent?

| | |
|-------------|--|
| Description | This query returns the current values of all the load modules/channels in order from 1-8(PEL-2004)/1-4(PEL2002). |
|-------------|--|

| | |
|--------|---------------------------|
| Syntax | :FETCh:ALLCurrent? <aard> |
|--------|---------------------------|

| | | |
|-----------|---|--|
| Parameter | <aard> CH1,CH2,CH3,CH4,CH5, CH6,CH7,CH8 | Returns all the current values from all the channels, 1-8(PEL-2004)/1-4(PEL-2002). |
|-----------|---|--|

| | | |
|---------------|---|---|
| Query Example | :FETC:ALLC? 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 0.0000, 1.2000, 3.5600 | Channels 1 to 6 have no current. Channels 7 & 8 have 1.2 and 3.56 amps, respectively. |
|---------------|---|---|

All Channel Status Command

:FETCh:ALLPower?

| | |
|-------------|--|
| Description | This query returns the power values of all the load modules/channels in order from 1-8(PEL-2004)/1-4(PEL2002). |
|-------------|--|

| | |
|--------|-------------------------|
| Syntax | :FETCh:ALLPower? <aard> |
|--------|-------------------------|

| | | |
|---------------|--|---|
| Parameter | <p><aard> CH1,CH2,CH3,CH4,CH5, CH6,CH7,CH8</p> | <p>Returns all the power values from all the channels, 1-8(PEL-2004)/1-4(PEL-2002).</p> |
| Query Example | <p>:FETC:ALLP? 0.0000, 0.0000, 10.200, 5.5000</p> | <p>Channels 1 to 2 have no power. Channels 3 & 4 have 10.2 and 5.5 watts, respectively.</p> |

LOAD Subsystem

| | |
|------------------------------|----|
| :LOAD[:STATe]..... | 75 |
| :LOAD:SHORt[:STATe] | 75 |
| :LOAD:SHORt:KEY..... | 76 |
| :LOAD:PROTection? | 76 |
| :LOAD:PROTection:CLEar | 77 |
| :LOAD:TIME?..... | 77 |
| :LOAD:DELAy | 78 |
| :LOAD:TYPE..... | 78 |

Channel

:LOAD[:STATe] Specific Command

| | | |
|------------------|---|-------------------------------------|
| Description | This command turns the electronic load on/off for the specific channel. | |
| Syntax | :LOAD[:STATe] {ON 1 OFF 0} | |
| Parameter | ON/1 | Load On |
| | OFF/0 | Load Off |
| Example | :LOAD ON | Turns the specific channel load on. |
| Query Syntax | :LOAD[:STATe]? | |
| Return Parameter | <NR1> | Load module |
| | 1 | Load is On |
| | 0 | Load is Off |
| Query Example | :LOAD? | Turns the specific channel load on. |

Channel Specific Command

:LOAD:SHORt[:STATe] Command

| | | |
|-------------|--|--|
| Description | This command shorts the electronic load on/off for the specific channel. | |
| Syntax | :LOAD:SHORt[:STATe] {ON 1 OFF 0} | |

| | | |
|------------------|----------------------|--|
| Parameter | ON/1 | Shorting is On |
| | OFF/0 | Shorting is Off |
| Example | :LOAD:SHOR ON | Short circuits the load module channel. |
| Query Syntax | :LOAD:SHORT[:STATe]? | |
| Return Parameter | <NR1> | Short Load module |
| | 1 | Shorting is activated |
| | 0 | Shorting is deactivated |
| Query Example | :LOAD:SHOR? | Shorting is deactivated on the specific channel. |
| | 0 | |

Channel Specific Command

:LOAD:SHORT:KEY

| | | |
|------------------|--|---|
| Description | The SHORT key can be set to Toggle or Hold mode. | |
| Syntax | :LOAD:SHORT:KEY {TOGGLE 1 HOLD 0} | |
| Parameter | TOGGLE/1 | Sets the SHORT key to toggle mode |
| | HOLD/0 | Sets the SHORT key to hold mode |
| Example | :LOAD:SHOR:KEY 1 | Set the SHORT key to toggle. |
| Query Syntax | :LOAD:SHORT:KEY? | |
| Return Parameter | <NR1> | Mode |
| | 1 | Toggle mode is active |
| | 0 | Hold mode is active |
| Query Example | :LOAD:SHOR:KEY? | Hold mode is active for the specific channel. |
| | 0 | |

Channel Specific Command

:LOAD:PROTection?

Description Returns the protection levels for electronic load

Query Syntax :LOAD:PROTection?

Query Example :LOAD:PROT? Clears the Channel Status Register.

| Return Parameter | <NR1> | Condition | <NR1> | Condition |
|------------------|-------|-----------|--------|-----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 16-128 | Not Used |

Query Example :LOAD:PROT? Returns the status of the Channel Status Register. Here 0 is returned indicating no protection settings have been tripped.

:LOAD:PROTection:CLEar Channel Specific Command

Description This command clears the Channel Status Register for the specific channel. See page162.

Syntax :LOAD:PROTection:CLEar

Example :LOAD:PROT:CLE Clears the Channel Status Register.

:LOAD:TIME? Channel Specific Command

Description This command displays the total load on time. If the load is on, the load time when the command was issued is displayed.

Query Syntax :LOAD:TIME?

| | | |
|------------------|-----------------------|--------------|
| Return Parameter | <NR1>1unit = 1 second | Load on time |
| | 2.2 | 2.2 seconds |

Query Example :LOAD:TIME?
5.1 Returns the load on time as 5.1 seconds.

:LOAD:DElay Channel Specific Command

Description Sets or queries the load delay time for the specific channel.

Syntax :LOAD:DElay <NRf>[S]

| | | |
|-----------|----------|-------------------------------------|
| Parameter | <NRf>[S] | Time |
| | 0.1S | Sets the delay time to 0.1 seconds. |

Example :LOAD:DEL 0.1s Sets the delay time to 0.1s.

Query Syntax :LOAD:DEL?

| | | |
|------------------|-------|------------------------|
| Return Parameter | <NR2> | Delay time in seconds. |
|------------------|-------|------------------------|

Query Example :LOAD:DEL?
0.10000 Returns the delay time for the current channel.

:LOAD:TYPE All Channels

Description Sets or queries which load type is the active type.

Syntax :LOAD:TYPE {LOAD|0|PROGRAM|1|SEQUENCE|2}

| | | |
|-----------|------------|-------------|
| Parameter | LOAD/0 | Normal load |
| | PROGRAM/1 | Program |
| | SEQUENCE/2 | Sequence |

Example :LOAD:TYPE: 1 Program is active.

Query Syntax :LOAD:TYPE?

| | | |
|------------------|-------|-------------|
| Return Parameter | <NR1> | Type |
| | 0 | Normal load |
| | 1 | Program |
| | 2 | Sequence |

| | | |
|---------------|------------------|--------------------------------|
| Query Example | :LOAD:TYPE? 0 | The normal load type is active |
|---------------|------------------|--------------------------------|

Measure Subsystem

| | |
|----------------------|----|
| :MEASure:VOLTage? | 80 |
| :MEASure:CURREnt? | 80 |
| :MEASure:POWer? | 81 |
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| :MEASure:ALLCurrent? | 83 |
| :MEASure:ALLPower? | 83 |

| | | |
|--------------------------|--|---|
| :MEASure:VOLTage? | | Channel Specific Command |
| <hr/> | | |
| Description | This query returns the measured voltage of the specific channel. | |
| Query Syntax | :MEASure:VOLTage? <NR2> | |
| Return Parameter | <NR2> 1 unit = 1 volt | Voltage at the load input |
| | 0.5000 | 0.5000 volts |
| Query Example | :MEAS:VOLT? 8.5600 | A voltage of 8.56 volts is measured at the specific channel load input. |

| | | |
|--------------------------|--|---|
| :MEASure:CURREnt? | | Channel Specific Command |
| <hr/> | | |
| Description | This query returns the measured current of the specific channel. | |
| Query Syntax | :MEASure:CURREnt? <NR2> | |
| Return Parameter | <NR2> 1 unit = 1 amp | Current at the load input |
| | 1.0000 | 1.0000 amps |
| Query Example | :MEAS:CURRE? 1.5 | A current of 1.5 amps is measured at the specific channel load input. |

:MEASure:POWer? Channel Specific Command

| | | |
|------------------|--|---|
| Description | This query returns the measured power of the specific channel. | |
| Query Syntax | :MEASure:POWer? <NR2> | |
| Return Parameter | <NR2> 1 unit = 1 watt 1.0000 | Power at the load input 1.0000 watts |
| Query Example | :MEAS:POW? 1.5 | 1.5 watts is measured at the specific channel load input. |

:MEASure:INPut Channel Specific Command

| | | |
|------------------|--|---|
| Description | This command is for compatibility with other instruments only and has no action. | |
| Syntax | :MEASure:INPut {LOAD 0 UUT 1} | |
| Parameter | LOAD/0 UUT/1 | Disabled Enabled |
| Example | :MEAS:INP 0 | Disable voltage sense. |
| Query Syntax | :MEASure:INPut? <NR1> | |
| Return Parameter | <NR1> 0 1 | Voltage Sense Disabled Enabled |
| Query Example | :MEAS:INP? 1 | Returns the voltage input status. Voltage sense is enabled. |

:MEASure:SCAN Channel Specific Command

| | | |
|------------------|---|--|
| Description | This command allows the mainframe to scan all the load modules. | |
| Syntax | :MEASure:SCAN {OFF 0 ON 1} | |
| Parameter | OFF/0 | Disabled |
| | ON/1 | Enabled |
| Example | :MEAS:SCAN 0 | Disable scanning. |
| Query Syntax | :MEASure:SCAN? <NR1> | |
| Return Parameter | <NR1> | Scan |
| | 0 | Disabled |
| | 1 | Enabled |
| Query Example | :MEAS:SCAN? 1 | Returns the scanning status. Here scanning is enabled. |

:MEASure:ALLVoltage? All Channel Command

| | | |
|-----------------|--|--|
| Description | This query measures the voltage values of all the load modules/channels in order from 1-8 (PEL-2004)/1-4(PEL2002). | |
| Query Syntax | :MEASure:ALLVoltage? <aard> | |
| Query Parameter | <aard> 1 unit = 1 volt | |
| | CH1,CH2,CH3,CH4,CH5, CH6,CH7,CH8 | Returns all the voltage values from all the channels, 1-8(PEL-2004)/1-4(PEL-2002). |

Query Example :MEAS:ALLV?
 2.5000, 3.0000, 0.0000,
 0.0000, 0.0000, 0.0000,
 5.500, 0.0000

Channel 1 and 2 have voltages of 2.5 and 3 volts respectively. Channels 3-6 and 8 have no voltage and channel 7 is 5.5 volts

:MEASure:ALLCurrent? All Channel Command

Description This query returns the current measured of all the load modules/channels in order from 1-8 (PEL-2004)/1-4(PEL2002).

Query Syntax :MEASure:ALLCurrent? <aard>

| | | |
|-----------------|--|--|
| Query Parameter | <aard> 1 unit = 1 amp CH1,CH2,CH3,CH4,CH5, CH6,CH7,CH8 | Returns all the current values from all the channels, 1-8(PEL-2004)/1-4(PEL-2002). |
|-----------------|--|--|

Query Example :MEAS:ALLC?
 0.0000, 0.0000, 0.0000,
 0.0000, 0.0000, 0.0000,
 1.2000, 3.5600

Channels 1 to 6 have no current. Channels 7 & 8 have 1.2 and 3.56 amps, respectively.

:MEASure:ALLPower? All Channel Command

Description This query returns the power measured of all the load modules/channels in order from 1-8 (PEL-2004)/1-4(PEL2002).

Query Syntax :MEASure:ALLPower? <aard>

| | | |
|-----------------|---|--|
| Query Parameter | <aard> 1 unit = 1 watt CH1,CH2,CH3,CH4,CH5, CH6,CH7,CH8 | Returns all the power values from all the channels, 1-8(PEL-2004)/1-4(PEL-2002). |
|-----------------|---|--|

| | | |
|---------------|---|--|
| Query Example | :MEAS:ALLP? 0.0000, 0.0000, 0.0000 ,0.0000, 0.0000, 0.0000, 1.5000, 3.2000 | Channels 1 to 6 have no power. Channels 7 & 8 have 1.5 and 3.2 watts, respectively. |
|---------------|---|--|

MODE Subsystem

:MODE.....85

:MODE Channel Specific
Command

Description This command sets the operating mode of the specific channel. Some modes are load module dependant.

Syntax :MODE {CCL|CCH|CCDL|CCDH|CRL|CRH|CRDL|CRDH|CV|CPL|CPH|CVL|CVH}

| | | |
|------------------|------|-----------------------------|
| Parameter | CCL | CC static mode, low range |
| | CCH | CC static mode, high range |
| | CCDL | CC dynamic mode, low range |
| | CCDH | CC dynamic mode, high range |
| | CRL | CR static mode, low range |
| | CRH | CR static mode, high range |
| | CRDL | CR dynamic mode, low range |
| | CRDH | CR dynamic mode, high range |
| | CV | CV mode |
| | CPL | CP static mode, low range |
| | CPH | CP static mode, high range |
| | CVL | CV static mode, low range |
| | CVH | CV static mode, low range |

Example :MODE CCL Set the specific channel to low range constant current static mode.

Query Syntax :MODE?

| | | |
|-------------------------|-----|----------------------------|
| Return Parameter | CCL | CC static mode, low range |
| | CCH | CC static mode, high range |

| | |
|------|-----------------------------|
| CCDL | CC dynamic mode, low range |
| CCDH | CC dynamic mode, high range |
| CRL | CR static mode, low range |
| CRH | CR static mode, high range |
| CRDL | CR dynamic mode, low range |
| CRDH | CR dynamic mode, high range |
| CV | CV mode |
| CPL | CP static mode, low range |
| CPH | CP static mode, high range |
| CVL | CV static mode, low range |
| CVH | CV static mode, low range |

Query Example :MODE?
CCH

The specific channel is currently set to CC static mode, high range.

OCP Test Automation Commands

| | |
|---------------------------|----|
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| | |
|--------------------|-----------------------------|
| :OCP:EDIT:CHANnel? | Channel Specific Command |
|--------------------|-----------------------------|

| | |
|-------------|---|
| Description | Sets or queries which channel is used to apply the OCP Test Automation parameters. Also see page 92 for setting the active channel. |
|-------------|---|

| | |
|--------|-------------------------|
| Syntax | :OCP:EDIT:CHANnel <NR1> |
|--------|-------------------------|

| | |
|-----------|-----------|
| Parameter | <NR1> 1-8 |
|-----------|-----------|

| | | |
|---------|------------------|---------------------------------------|
| Example | :OCP:EDIT:CHAN 1 | Sets channel 1 as the chosen channel. |
|---------|------------------|---------------------------------------|

| | |
|--------------|--------------------|
| Query Syntax | :OCP:EDIT:CHANnel? |
|--------------|--------------------|

| | |
|------------------|-----------|
| Return Parameter | <NR1> 1-8 |
|------------------|-----------|

| | | |
|---------------|---------------------|----------------------------------|
| Query Example | :OCP:EDIT:CHAN 1 | Channel 1 is the chosen channel. |
|---------------|---------------------|----------------------------------|

:OCP:CHANnel:RANGe Channel Specific Command

Description Sets or queries the channel range. High(CC Mode High) or Low(CC Mode Low)

Syntax :OCP:CHANnel:RANGe {LOW|0|HIGH|1}

| | | |
|------------------|--------|--------------------|
| Parameter | LOW/0 | CC Mode Low range |
| | HIGH/1 | CC Mode High range |

Example :OCP:CHAN:RANG 0 Sets the range to LOW.

Query Syntax :OCP:CHANnel:RANGe?

| | | |
|-------------------------|---|--------------------|
| Return Parameter | 0 | CC Mode Low range |
| | 1 | CC Mode High range |

Query Example :OCP:CHAN:RANG? 0 The range is CC Mode Low.

:OCP:CHANnel:STARt Channel Specific Command

Description Sets or queries the starting current value.

Syntax :OCP:CHANnel:STARt {<NRF>[A] | MIN | MAX}

| | | |
|------------------|----------|----------------------------|
| Parameter | <NRF>[A] | The current value in Amps. |
| | MAX | The maximum current value. |
| | MIN | The minimum current value. |

Example :OCP:CHAN:STAR MIN Set the start current to the minimum.

Query Syntax :OCP:CHANnel:STARt? [MIN | MAX]

Return Parameter <NR2> Returns the starting current in Amps.

Query Example :OCP:CHAN:STAR? MIN 1.5 Returns the minimum starting current.

:OCP:CHANnel:END Channel Specific Command

| | | |
|------------------|--|--|
| Description | Sets the ending current value for the test. The value must be higher than the DUT OCP value. | |
| Syntax | :OCP:CHANnel:END {<NRF>[A] MIN MAX} | |
| Parameter | <NRF>[A] | The current value in Amps. |
| | MAX | The maximum current value. |
| | MIN | The minimum current value. |
| Example | :OCP:CHAN:END MIN | Set the ending current to the minimum. |
| Query Syntax | :OCP:CHANnel:END? | |
| Return Parameter | <NR2> | Returns the ending current in Amps. |
| Query Example | :OCP:CHAN:END? 10.0 | Returns the ending current. |

:OCP:CHANnel:STEP:CURRent Channel Specific Command

| | | |
|------------------|---|---|
| Description | Sets the current step resolution for the OCP Test Automation. | |
| Syntax | :OCP:CHANnel:STEP:CURRent {<NRF>[A] MIN MAX} | |
| Parameter | <NRF>[A] | The current value in Amps. |
| | MAX | The maximum current value. |
| | MIN | The minimum current value. |
| Example | :OCP:CHAN:STEP:CURRent MIN | Set the step resolution to the minimum value. |
| Query Syntax | :OCP:CHANnel:STEP:CURRent? | |
| Return Parameter | <NR2> | Returns the current step resolution in Amps. |
| Query Example | :OCP:CHAN:STEP:CURR? 0.5 | Returns the step resolution. |

:OCP:CHANnel:LAST Channel Specific Command

| | | |
|------------------|--|---|
| Description | Queries or sets the current value for after the DUT OCP protection has been activated. | |
| Syntax | :OCP:CHANnel:LAST {<NRF>[A] MIN MAX} | |
| Parameter | <NRF>[A] | The current value in Amps. |
| | MAX | The maximum current value. |
| | MIN | The minimum current value. |
| Example | :OCP:CHAN:LAST MAX | Set the current value to the maximum value. |
| Query Syntax | :OCP:CHANnel:LAST? | |
| Return Parameter | <NR> | Returns the current value in Amps. |
| Query Example | :OCP:CHAN:LAST? 3.0 | Returns the current value. |

:OCP:CHANnel:STEP:TIME Channel Specific Command

| | | |
|------------------|--|---|
| Description | Queries or sets how long the step time is for the OCP Test Automation. | |
| Syntax | :OCP:CHANnel:STEP:TIME {<NRF>[S] MIN MAX} | |
| Parameter | <NRF>[S] | The step time in seconds (50mS~1600S). |
| | MAX | The maximum step time. |
| | MIN | The minimum step time. |
| Example | :OCP:CHAN:STEP:TIME MIN | Set the step time to the maximum value. |
| Query Syntax | :OCP:CHANnel:STEP:TIME? | |
| Return Parameter | <NR2> | Returns the step time in seconds. |
| Query Example | :OCP:CHAN:STEP:TIME? 10.0 | Returns the step time. |

| | | Channel Specific Command |
|---------------------------|---|--|
| :OCP:CHANnel:DElay | | |
| Description | Queries or sets the test delay time for the OCP Test Automation function. | |
| Syntax | :OCP:CHANnel:DElay {<NRF>[S] MIN MAX} | |
| Parameter | <NRF>[S] | The delay time in seconds (5mS~160S). |
| | MAX | The maximum delay time. |
| | MIN | The minimum delay time. |
| Example | :OCP:CHAN:DEL MAX | Set the delay time to the maximum value. |
| Query Syntax | :OCP:CHANnel:DElay? | |
| Return Parameter | <NR2> | Returns the delay time in seconds. |
| Query Example | :OCP:CHAN:DEL? 5.0 | Returns the delay time. |

| | | Channel Specific Command |
|-----------------------------|---|---|
| :OCP:CHANnel:TRIGger | | |
| Description | Queries or sets the voltage trigger for when the power supply OCP has been triggered. | |
| Syntax | :OCP:CHANnel:TRIGger {<NRF>[V] MIN MAX} | |
| Parameter | <NRF>[V] | The trigger voltage level. |
| | MAX | The maximum trigger voltage. |
| | MIN | The minimum trigger voltage. |
| Example | :OCP:CHAN:TRIG MAX | Set the trigger voltage level to the maximum value. |
| Query Syntax | :OCP:CHANnel:TRIGger? | |
| Return Parameter | <NR2> | Returns the trigger voltage level in volts. |
| Query Example | :OCP:CHAN:TRIG? 5.0 | Returns the trigger level. |

:OCP:CHANnel:ACTive Channel Specific Command

Description Queries or sets which bit(s) are the active channel for the OCP Test Automation function. More than one channel can be activated based on the bit weight of the parameter.

Syntax :OCP:CHANnel:ACTive {<NR1>0~255}

| Parameter | <NR1> (BIT WEIGHT) | Channel number | <NR1> (BIT WEIGHT) | Channel number |
|-----------|-----------------------|----------------|-----------------------|----------------|
| | 1 | 1 | 16 | 5 |
| | 2 | 2 | 32 | 6 |
| | 4 | 3 | 64 | 7 |
| | 8 | 4 | 128 | 8 |

Example :OCP:CHAN:ACT 3 Activates channel 1 and 2.

Query Syntax :OCP:CHANnel:ACTive?

| Return Parameter | <NR1> (BIT WEIGHT) | Channel number | <NR1> (BIT WEIGHT) | Channel number |
|------------------|-----------------------|----------------|-----------------------|----------------|
| | 1 | 1 | 16 | 5 |
| | 2 | 2 | 32 | 6 |
| | 4 | 3 | 64 | 7 |
| | 8 | 4 | 128 | 8 |

Query Example :OCP:CHAN:ACT? 4 Returns channel 4 as the active channel.

:OCP:STATus? Query

Description Queries the status of the OCP Test Automation function.

Query Syntax :OCP:STATus? {0 | 1}

Return Parameter 0 Test ended

1 OCP test active

Query Example :OCP:STAT? The test has ended.
0

:OCP:SAVE Channel Specific Command

Description Saves the current COP Test Automation parameters.

Syntax :OCP:SAVE

:OCP:RESult? Query

Description Returns the OCP Test Automation results.

Query Syntax :OCP:RESult?

Query Example :OCP:RES? This is an example of the results that are returned for the PEL-2004.
Ch1 OCP Voltage, Ch1 OCP Current, Ch2 OCP Voltage, Ch2 OCP Current, Ch3 OCP Voltage, Ch3 OCP Current, Ch4 OCP Voltage, Ch4 OCP Current, Ch5 OCP Voltage, Ch5 OCP Current, Ch6 OCP Voltage, Ch6 OCP Current, Ch7 OCP Voltage, Ch7 OCP Current, Ch8 OCP Voltage, Ch8 OCP Current

:OCP:RUN Command

Description Turns the OCP Test Automation function on or off.

Syntax :OCP:RUN { 0 | OFF | 1 | ON }

Parameter 0/OFF Turn off.
1/ON Turn on.

Example :OCP:RUN OFF Turn the test off.

Program Subsystem

| | |
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| :PROG:FILE | 94 |
| :PROG:SEQuence | 95 |
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| :PROG:FILE | | Program Number Specific |
|------------------|--------------------------|--|
| Description | Sets the program number. | |
| Syntax | :PROG:FILE <NR1> | |
| Parameter | <NR1> 1~12 | Program number Number 1~12 |
| Example | :PROG:FILE 5 | Sets the program number to 5. |
| Query Syntax | :PROG:FILE? | |
| Return Parameter | <NR1> 1-12 | Mainframe Scanning Returns the current program number |
| Query Example | :PROG:FILE? 5 | The set program number is 5. |

| | | Program Number Specific |
|-----------------------|--|---|
| :PROG:SEQuence | | |
| Description | Sets the Sequence number for the current program number. | |
| Syntax | :PROG:SEQuence <NR1> | |
| Parameter | <NR1> 1~10 | Sequence number Number 1~10 |
| Example | :PROG:SEQ 1 | Sets the sequence number to 1 for the current program number. |
| Query Syntax | :PROG:SEQuence? | |
| Return Parameter | <NR1> 1-10 | Mainframe Scanning Returns the current sequence number |
| Query Example | :PROG:SEQ? 1 | The set sequence number is 1. |

| | | Program Number Specific |
|---------------------|---|--|
| :PROG:MEMory | | |
| Description | Sets the memory number used for the current program/sequence. | |
| Syntax | :PROG:MEMory <NR1> | |
| Parameter | <NR1> 1~120 | Memory number Number 1~120 |
| Example | :PROG:MEM 1 | Sets the memory number to 001. |
| Query Syntax | :PROG:MEMory? | |
| Return Parameter | <NR1> 1-120 | Mainframe Scanning Returns the current program number |

Query Example :PROG:MEM? 1 The memory number for the current program/sequence is 001.

:PROG:SEQ:SHORT:CHANnel Program Number Specific

Description Simulates short circuits for load channels for the current sequence number.

Syntax :PROG:SEQ:SHORT:CHANnel <NR1>

| Parameter | <NR1> (BIT WEIGHT) | Channel number | <NR1> (BIT WEIGHT) | Channel number |
|-----------|-----------------------|----------------|-----------------------|----------------|
| | 1 | 1 | 16 | 5 |
| | 2 | 2 | 32 | 6 |
| | 4 | 3 | 64 | 7 |
| | 8 | 4 | 128 | 8 |

Example :PROG:SEQ:SHOR:CHAN 12 Simulates a short circuit for channels 3 and 4.

Query Syntax :PROG:SEQ:SHORT:CHANnel? <NR1>

| Return Parameter | <NR1> (BIT WEIGHT) | Short Channel number | <NR1> (BIT WEIGHT) | Short Channel number |
|------------------|-----------------------|----------------------|-----------------------|----------------------|
| | 1 | 1 | 16 | 5 |
| | 2 | 2 | 32 | 6 |
| | 4 | 3 | 64 | 7 |
| | 8 | 4 | 128 | 8 |

Query Example :PROG:SEQ:SHOR:CHAN? 12 Returns channels 3 and 4 are set as shorted for the program sequence.

:PROG:SEQ:SHORT:TIME Program Number Specific

| | | |
|------------------|---|--|
| Description | Sets the short time (seconds) for the current program sequence. | |
| Syntax | :PROG:SEQ:SHORT:TIME <NRf>[S] | |
| Parameter | <NRf>[S] | Short Time |
| | 0.0 | 0 seconds = OFF |
| | 0.1~60 | 0.1~60 seconds |
| | 0.1~60S | 0.1~60 seconds |
| Example | :PROG:SEQ:SHOR:TIME 0.5 | The short time for the program sequence is set to .5 seconds |
| Query Syntax | :PROG:SEQ:SHORT:TIME? <NR2> | |
| Return Parameter | <NR2> 1 unit = 1 second | Short Time |
| | 0.0~60 | Returns the short time for the program sequence. |
| Query Example | :PROG:SEQ:SHOR:TIME? 5 | The short time for the program sequence is 5 seconds. |

:PROG:SEQ:MODE Program Number Specific

| | | |
|-------------|---|--|
| Description | Sets the program sequence to Auto, Manual or Skip mode. | |
| Syntax | :PROG:SEQ:MODE {MANUAL AUTO SKIP} | |
| Parameter | MANUAL | Manual mode: program sequence is run manually |
| | AUTO | Auto mode: program sequence is run automatically |

| | | |
|------------------|-------------------------|--|
| | SKIP | Skip mode: current program sequence is skipped. |
| Example | :PROG:SEQ:MODE: AUTO | The current program sequence is set to Automatic mode. |
| Query Syntax | :PROG:SEQ:MODE? | |
| Return Parameter | MANUAL AUTO SKIP | Manual mode Auto mode Skip mode |
| Query Example | :PROG:SEQ:MODE? AUTO | The current program sequence is set to AUTO. |

:PROG:ACTive Program Number Specific

| | | | | |
|------------------|---|--------------------------|-----------------------|----------------|
| Description | Activates or selects the active load modules. | | | |
| Syntax | :PROG:ACTive <NR1> | | | |
| Parameter | <NR1> (BIT WEIGHT) | Active Channel | <NR1> (BIT WEIGHT) | Active Channel |
| | 1 | 1 | 16 | 5 |
| | 2 | 2 | 32 | 6 |
| | 4 | 3 | 64 | 7 |
| | 8 | 4 | 128 | 8 |
| Example | :PROG:ACT 4 | Activates channel three. | | |
| Query Syntax | :PROG:ACTive? <NR1> | | | |
| Return Parameter | <NR1> (BIT WEIGHT) | Active Channel | <NR1> (BIT WEIGHT) | Active Channel |
| | 1 | 1 | 16 | 5 |
| | 2 | 2 | 32 | 6 |
| | 4 | 3 | 64 | 7 |
| | 8 | 4 | 128 | 8 |

Query Example :PROG:ACT?
12 Channels 3 and 4 are active.

:PROG:CHAI Program Number Specific

Description Chains the current program number to a specified program number.

Syntax :PROG:CHAI <NR1>

| | | |
|-----------|-------|--------------------|
| Parameter | <NR1> | Program |
| | 1-12 | 1-12 |
| | 0 | No chain/End chain |

Example :PROG:CHA 6 Chains the current program number to program number 6

Query Syntax :PROG:CHAI? <NR1>

| | | |
|------------------|-------|--------------------|
| Return Parameter | <NR1> | Program |
| | 1-12 | 1-12 |
| | 0 | No chain/End chain |

Query Example :PROG:CHA?
6 Returns the program number the current program is chained to.

:PROG:ONTIME Program Number Specific

Description Sets the on-time for the program number. 0.1~60 seconds.

Syntax :PROG:ONTIME <NRf>[S]

| | | |
|-----------|----------|-----------------|
| Parameter | <NRf>[S] | Program On Time |
| | 0.1-60 | 0.1~60 seconds |
| | 0.1-60s | 0.1~60 seconds |

| | | |
|------------------|---------------------|--|
| Example | :PROG:ONT 10S | Set the on-time for the current program number to 10 seconds. |
| Query Syntax | :PROG:ONTime? <NR2> | |
| Return Parameter | <NR2> 0.1~60 | Program On Time 0.1~60 seconds |
| Query Example | :PROG:ONT? 10 | Returns the on-time for the current program number in seconds. |

:PROG:OFFTime Program Number Specific

| | | |
|------------------|---|---|
| Description | Sets the off-time for the program number. 0.1~60 seconds. | |
| Syntax | :PROG:OFFTime <NRf>[S] | |
| Parameter | <NRf>[S] 0.0 0.1~60 0.1~60s | Program Off Time 0 seconds = OFF 0.1~60 seconds 0.1~60 seconds |
| Example | :PROG:OFFT 10S | Set the off-time for the current program number to 10 seconds. |
| Query Syntax | :PROG:OFFTime? <NR2> | |
| Return Parameter | <NR2> unit = 1 second 0.0~60 | Program Off Time 0.0~60 seconds |
| Query Example | :PROG:OFFT? 10 | Returns the off-time for the current program number in seconds. |

:PROG:RUN All Channel
Command

Description Runs the current program number when set to on, and when set to off will allow all the program/sequence data to be programmed.

Syntax :PROG:RUN {OFF|0|ON|1}

| | | |
|------------------|-------|-----|
| Parameter | OFF/0 | OFF |
| | ON/1 | ON |

Example :PROG:RUN 1 Runs the program.

:PROG:SAVE All Channel
Command

Description Saves the current program to memory.

Syntax :PROG:SAVE

Example :PROG:SAVE Saves the program to memory.

:PROG:PFTime Program Number
Specific

Description Sets the P/F-Time (pass/fail time) for the current program sequence in seconds.

Syntax :PROG:PFTime <NRf>[S]

| | | |
|------------------|------------|-------------------|
| Parameter | <NRf>[S] | P/F Time |
| | 0.0 | 0 seconds = OFF |
| | 0.1~119.9 | 0.1~119.9 seconds |
| | 0.1~119.9S | 0.1~119.9 seconds |

Example :PROG:PFT 0.5 Sets the P/F-Time to .5 seconds

Query Syntax :PROG:PFTime? <NR2>

Return Parameter <NR2> 1 unit = 1 second Short Time

| | | |
|-------------------------|---|--|
| | 0.0~119.9 | Returns the P/F-Time for the program sequence. |
| Query Example | :PROG:PFTime? 5 | The P/F-Tme is 5 seconds. |
| :PROG:CHAI:STARt | | Program Number Specific |
| Description | Sets or queries which program number is used as the "start" program in a program chain. | |
| Syntax | :PROG:CHAI:STARt <NR1> | |
| Parameter | <NR1> 1-12 | Program number 1~12 |
| Example | :PROG:CHA:STAR 1 | Set program #1 to start the chain. |
| Query Syntax | :PROG:CHAI:STARt? <NR1> | |
| Return Parameter | <NR1> 1-12 | Program number 1~12 |
| Query Example | :PROG:CHA:STAR? 5 | Program #5 starts the chain. |

Resistance Subsystem

| | |
|--|-----|
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| :RESistance[:STATic]:RISE/FALL..... | 104 |
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| :RESistance:DYNamic:LOW:RISE/FALL | 110 |
| :RESistance:DYNamic:LOW:T1/T2 | 110 |
| :RESistance:DYNamic:HIGH:L1/L2 | 111 |
| :RESistance:DYNamic:HIGH:RISE/FALL | 112 |
| :RESistance:DYNamic:HIGH:T1/T2..... | 113 |

| | |
|----------------------------|--------------------------|
| :RESistance[:STATic]:L1/L2 | Channel Specific Command |
|----------------------------|--------------------------|

| | |
|-------------|---|
| Description | Sets A/B Value for constant resistance mode, where L1 is A Value and L2 is B Value. This command only applies to current mode (static). |
|-------------|---|

| | |
|--------|--|
| Syntax | :RESistance[:STATic]:L1/L2 <NRf+>[OHM] |
|--------|--|

| | | |
|-----------|-----------|---|
| Parameter | NRf+[OHM] | Resistance |
| | L1 10 | Sets A Value to 10 ohms |
| | L2 20 | Sets B Value* to 20 ohms |
| | | *Single Channel |
| | L1 MIN | Sets A Value to the minimum level for the specific channel. |
| | L1 MAX | Sets A Value to the maximum level for the specific channel. |

| | | |
|------------------|--|---|
| Example | :RES:L1 10 | Sets CR static mode A Value to 10 ohms, depending on the specific range |
| Query Syntax | :RESistance[:STATic]:L1/L2? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] 1 unit = 1 ohm/1 k ohm MAX/MIN | Resistance Returns the resistance of the A or B Value. Returns the allowable maximum and minimum. |
| Query Example | :RES:L1? MAX 300 | Returns the maximum resistance allowed for the channel. (PEL-2020) |

:RESistance[:STATic]:RISE/FALL Channel Specific Command

| | | |
|--------------|--|---|
| Description | Sets the rising/falling slew rate for CR mode. The command applies to the current mode (static/dynamic) and the current range (High/Low) | |
| Syntax | :RESistance[:STATic]:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] RISE/FALL 0.8A/uS RISE/FALL .8 RISE/FALL MIN RISE/FALL MAX | Slew rate Sets the rising/falling slew rate to 0.8A/uS Sets the rising/falling slew rate to 0.8A/uS Sets to the slowest rising/falling slew rate. Sets to the fastest rising/falling slew rate. |
| Example | :RES:RISE 0.1 | Sets the rising slew rate to 0.1A/uS. |
| Query Syntax | :RESistance:RISE/FALL? [MIN MAX] | |

| | | |
|------------------|--|---|
| Return Parameter | <NR2> [MAX MIN] 1 Unit =1 amp/uS MAX/MIN | Slew rate Returns the slew rate. Returns the allowable maximum and minimum. |
|------------------|--|---|

| | | |
|---------------|--------------------------|--|
| Query Example | :RES:RISE? MAX 0.8000 | Returns the maximum value for the rising slew rate (0.8 A/uS). |
|---------------|--------------------------|--|

:RESistance:STATic:RECall Channel Specific Command

| | | |
|-------------|---|--|
| Description | Sets or queries whether A Value or B Value is the currently active value in CR static mode. | |
|-------------|---|--|

| | | |
|--------|-------------------------------------|--|
| Syntax | :RESistance:STATic:RECall {A 0 B 1} | |
|--------|-------------------------------------|--|

| | | |
|-----------|------------|--------|
| Parameter | A/0 B/1 | A B |
|-----------|------------|--------|

| | | |
|---------|-----------------|---------------------------------|
| Example | :RES:STAT:REC 1 | Makes B Value the active value. |
|---------|-----------------|---------------------------------|

| | | |
|--------------|---------------------|--|
| Query Syntax | :RES:STATic:RECall? | |
|--------------|---------------------|--|

| | | |
|------------------|-----------------|-----------------|
| Return Parameter | <NR1> 0 1 | Value A B |
|------------------|-----------------|-----------------|

:RESistance:STATic:LOW:AVALue/BVALue Channel Specific Command

| | | |
|-------------|---|--|
| Description | Sets the low range A/B Value for constant resistance static mode. | |
|-------------|---|--|

| | | |
|--------|--|--|
| Syntax | :RESistance:STATic:LOW:AVALue/BVALue <NRf+>[OHM] | |
|--------|--|--|

| | | |
|-----------|------------------------|---|
| Parameter | NRf+[OHM] AVALue 10 | Resistance Sets A Value to 10 ohms. (Low range only) |
|-----------|------------------------|---|

| | | |
|--|------------|---|
| | BVALue 20 | Sets B Value to 20 ohms. (Low Range only) |
| | AVALue MIN | Sets A Value to the minimum level for the specific channel. |
| | AVALue MAX | Sets A Value to the maximum level for the specific channel. |

Example :RES:STAT:LOW:BVAL 10 Sets low range CR static mode B Value to 10 ohms.

Query Syntax :RESistance:STATic:LOW:AVALue/BVALue?

Return Parameter <NR2> [MAX|MIN] Resistance
 1 unit = 1 ohm Returns the resistance of the A or B Value.

Query Example :RES:STAT:LOW:AVAL? Returns the maximum
 MAX resistance allowed for
 300 the channel. (PEL-2020)

:RESistance:STATic:LOW:RISE/FALL Channel Specific Command

Description Sets the low range rising/falling slew rate.

Syntax :RESistance:STATic:LOW:RISE/FALL <NRf+>[A/uS]

| | | |
|-----------|-------------------|---|
| Parameter | <NRf+>[A/uS] | Slew rate |
| | RISE/FALL 0.8A/uS | Sets the rising/falling slew rate to 0.8A/uS |
| | RISE/FALL .8 | Sets the rising/falling slew rate to 0.8 A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |

| | | |
|------------------|---|---|
| Example | :RES:STAT:LOW:RISE 0.1 | Sets the rising slew rate to 0.1A/uS. |
| Query Syntax | :RESistance:STATic:LOW:RISE/FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] 1 Unit =1 amp/uS MAX, MIN | Slew rate Returns the slew rate. Returns the allowable maximum and minimum. |
| Query Example | :RES:STAT:LOW:RISE? MAX 0.8000 | For low range CR mode, the maximum value for the rising slew rate is 0.8 A/uS for the specific channel. |

Channel Specific
Command

:RESistance:STATic:HIGH:AVALue/BVALue

| | | |
|-------------|--|--|
| Description | Sets the high range A/B Value for constant resistance static mode. | |
| Syntax | :RESistance:STATic:HIGH:AVALue/BVALue <NRf+>[OHM] | |
| Parameter | NRf+[OHM] AVALue 10 BVALue 20OHM AVALue MIN AVALue MAX | Sets A Value to 10 ohms. (high range only) Sets B Value to 20 ohms. (high Range only) Sets A Value to the minimum level for the specific channel. Sets A Value to the maximum level for the specific channel. |
| Example | :RES:STAT:HIGH:BVAL 10 | Sets high range CR static mode B Value to 10 ohms. |

| | | |
|------------------|---|--|
| Query Syntax | :RESistance:STATic:HIGH:AVALue/BVALue? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] 1 unit= 1 ohm | Resistance Returns the resistance of the A or B Value. |
| Query Example | :RES:STAT:HIGH:BVAL? MAX 15000.0 | Returns the maximum resistance allowed for the channel for B Value. (PEL-2020) |

:RESistance:STATic:HIGH:RISE/FALL Channel Specific Command

| | | |
|------------------|--|---|
| Description | Sets the high range rising/falling slew rate. | |
| Syntax | :RESistance:STATic:HIGH:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] | Slew rate |
| | RISE/FALL 0.8A/uS | Sets the rising/falling slew rate to 0.8A/uS |
| | RISE/FALL 0..5 | Sets the rising/falling slew rate to 0.5A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |
| Example | :RES:STAT:HIGH:RISE 1.1 | Sets the rising slew rate to 1.1A/uS. |
| Query Syntax | :RESistance:STATic:HIGH:RISE/FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] 1 Unit=1 amp/uS MAX/MIN | Slew rate Returns the slew rate. Returns the allowable maximum and minimum. |

Query Example :RES:STAT:HIGH:RISE? MIN 0.8000 For high range CR mode, the minimum value for the rising slew rate is 0.8 A/uS for the specific channel.

:RESistance:DYNamic:LOW:L1/L2 Channel Specific Command

Description Sets the low range resistance levels (Level 1 & 2) for CR dynamic mode.

Syntax :RESistance:DYNamic:LOW:L1/L2 <NRf+>[OHM]

| | | |
|-----------|-----------|--|
| Parameter | NRf+[OHM] | Ohms |
| | L1 10 | Sets L1 to 10 ohms. (low range only) |
| | L2 20OHM | Sets L2 to 20 ohms. (low range only) |
| | L1/L2 MIN | Sets L1 or L2 to the minimum level for the specific channel. |
| | L1/L2 MAX | Sets L1 or L2 to the maximum Level for the specific channel. |

Example :RES:DYN:LOW:L1 10 In low range CR dynamic mode, Set L1 (level 1) to 10 ohms.

Query Syntax :RESistance:DYNamic:LOW:L1/L2? [MIN|MAX]

| | | |
|------------------|-----------------|----------------------------------|
| Return Parameter | <NR2> [MAX MIN] | Resistance |
| | 1 unit= 1 ohm | Returns the resistance of L1/L2. |

Query Example :RES:DYN:LOW:L2? MAX 300 Returns the maximum resistance allowed for the channel. (PEL-2020)

:RESistance:DYNamic:LOW:RISE/FALL Channel Specific Command

| | | |
|------------------|---|--|
| Description | Sets the low range rising/falling slew rate for CR dynamic mode for the specific channel. | |
| Syntax | :RESistance:DYNamic:LOW:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] | Slew Rate |
| | RISE/FALL 0.8A/uS | Sets the rising/falling slew rate to 0.8A/uS |
| | RISE/FALL .1 | Sets the rising/falling slew rate to 0.1A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |
| Example | :RES:DYNA:LOW:RISE 0.1 | Sets the rising slew rate to ~ 0.1A/uS. |
| Query Syntax | :RESistance:DYNamic:LOW:RISE/FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] | Slew rate |
| | 1 Unit=1 amp/uS | Returns the slew rate. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :RES:DYN:LOW:FALL? MIN 0.8000 | For low range dynamic CR mode, the minimum value for the falling slew rate is 0.8 A/uS for the specific channel. |

:RESistance:DYNamic:LOW:T1/T2 Channel Specific Command

| | | |
|-------------|---|--|
| Description | Sets the timers T1 or T2 for CR dynamic mode for the specific channel in low range. | |
| Syntax | :RESistance:DYNamic:LOW:T1/T2 <NRf+>[S ms] | |

| | | |
|------------------|--|---|
| Parameter | <NRf+>[S] T1/T2 0.1S T1/T2 1 T1/T2 MIN T1/T2 MAX | Time T1/T2 Sets the T1/T2 time to 0.1 seconds. Sets T1/T2 to 1 second. Sets the T1/T2 to the minimum value. Sets the T1/T2 time to the maximum time |
| Example | :RES:DYNA:LOW:T1 10S | Sets the T1 time to 10 seconds for the specific channel. |
| Query Syntax | :RESistance:DYNamic:T1/T2? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] 1 Unit=1 second MAX/MIN | Time T1/T2 Returns T1/T2 time. Returns the allowable maximum and minimum. |
| Query Example | :RES:DYN:LOW:T1? 2.5 :CURR:DYN:LOW:T1? MIN 0.00025 | Returns the T1 time of 2.5 seconds. Returns the minimum T1 time allowable for the specific channel. |

:RESistance:DYNamic:HIGH:L1/L2 Channel Specific Command

| | | |
|-------------|--|--|
| Description | Sets the high range resistance levels (Level 1 & 2) for CR dynamic mode. | |
| Syntax | :RESistance:DYNamic:HIGH:L1/L2 <NRf+>[OHM] | |
| Parameter | NRf+[OHM] L1 10 L2 20OHM | Resistance Sets L1 to 10 ohms. (high range only) Sets L2 to 20 ohms. (high range only) |

| | | |
|------------------|---|--|
| | L1/L2 MIN | Sets L1 or L2 to the minimum level for the specific channel. |
| | L1/L2 MAX | Sets L1 or L2 to the maximum level for the specific channel. |
| Example | :RES:DYN:HIG:HL1 10 | In high range CR dynamic mode, Set L1 (level 1) to 10 ohms. |
| Query Syntax | :RESistance:DYNamic:HIG:HL1/L2? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] 1 unit= 1 ohm | Resistance Returns the resistance of Level 1 / 2 (L1/L2). |
| Query Example | :RES:DYN:HIG:L2? MAX 15000.0 | Returns the maximum resistance allowed for the channel. (PEL-2020) |

:RESistance:DYNamic:HIG:RISE/FALL Channel Specific Command

| | | |
|-------------|--|---|
| Description | Sets the high range rising/falling slew rate for CR dynamic mode for the specific channel. | |
| Syntax | :RESistance:DYNamic:HIG:RISE/FALL <NRf+>[A/uS] | |
| Parameter | <NRf+>[A/uS] | Slew Rate |
| | RISE/FALL 0.8A/uS | Sets the rising/falling slew rate to 0.8A/uS |
| | RISE/FALL 1 | Sets the rising/falling slew rate to 1A/uS |
| | RISE/FALL MIN | Sets to the slowest rising/falling slew rate. |
| | RISE/FALL MAX | Sets to the fastest rising/falling slew rate. |
| Example | :RES:DYN:HIG:RISE 1.1 | Sets the rising slew rate to 1.1A/uS. |

| | | |
|------------------|--|---|
| Query Syntax | :RESistance:DYNamic:HIGH:FALL? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] | Slew rate |
| | 1 Unit=1 amp/uS | Returns the slew rate. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :RES:DYN:HIGH:FALL? MAX 0.8000 | For high range dynamic CR mode, the minimum value for the falling slew rate is 0.8 A/uS for the specific channel. |

Channel Specific Command

:RESistance:DYNamic:HIGH:T1/T2

| | | |
|------------------|---|---|
| Description | Sets the timers T1 and T2 for high range dynamic CR mode. | |
| Syntax | :RESistance:DYNamic:HIGH:T1/T2 <NRf+>[S]ms] | |
| Parameter | <NRf+>[S] | Timer T1/T2 |
| | T1/T2 0.1S | Sets the T1/T2 time to 0.1 seconds. |
| | T1/T2 1 | Sets T1/T2 to 1 second. |
| | T1/T2 MIN | Sets the T1/T2 to the minimum value. |
| | T1/T2 MAX | Sets the T1/T2 time to the maximum time |
| Example | :RES:DYNA:HIGH:T1 10S | Sets the high range T1 time to 10 seconds for the specific channel. |
| Query Syntax | :RESistance:DYNamic:HIGH:T1/T2? [MIN MAX] | |
| Return Parameter | <NR2> [MAX MIN] | T1/T2 time. |
| | 1 Unit=1 second | Returns T1/T2 time. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

| | | |
|---------------|-----------------------|------------------------|
| Query Example | :RES:DYN:HIG:HT1? | Returns the T1 time of |
| | 2.5 | 2.5 seconds. |
| | :RES:DYN:LOW:HT1? MIN | Returns the minimum T1 |
| | 0.000025 | time allowable for the |
| | | specific channel. |

RUN Subsystem

:RUN115

:RUN All Channel
Command

| | | |
|-------------|------------------------------------|--------------------------------|
| Description | Turns on all the electronic loads. | |
| Syntax | :RUN | |
| Example | :RUN | Turns on all electronic loads. |

SHOW Subsystem

:SHOW[:DISPlay] dual channel 116
 :SHOW[:DISPlay] single channel 117

:SHOW[:DISPlay] dual channel Channel Specific Command
 (Dual channel module)

| | | |
|-------------|---|---|
| Description | Sets the display mode of the load module of the specific channel. | |
| Syntax | :SHOW:DISPlay {LVI LVW LIW RVI RVW RIW LRV LRI LRW LRS LIRV LVRI LVRI} | |
| Parameter | LVI | Left channel, voltage/current |
| | LVW | Left channel, voltage/power |
| | LIW | Left channel, current/power |
| | RVI | Right channel, voltage/current |
| | RVW | Right channel, voltage/power |
| | RIW | Right channel, current/power |
| | LRV | Left and right channel voltage |
| | LRI | Left and right channel current |
| | LRW | Left and right channel power |
| | LRS | Left and right channel load on time |
| | LIRV | Left channel current, right channel voltage |
| | LVRI | Left channel voltage, right channel current |
| Example | :SHOW:DISP LVI | Show the left channel voltage and current on the load module display. |

:SHOW[:DISPlay] single channel Channel Specific Command
 (Single channel module)

| | | |
|-------------|---|---|
| Description | Sets the display mode of the load module of the specific channel. | |
| Syntax | :SHOW:DISPlay {VI, VW, IW, S} | |
| Parameter | VI | Voltage/current |
| | VW | Voltage/power |
| | IW | Current/power |
| | S | Load on time |
| Example | :SHOW:DISP VI | Shows voltage and current on the load module display. |

SPECIFICATION Subsystem

| | |
|---|-----|
| :SPECification:UNIT | 118 |
| :SPECification[:PASS]? | 119 |
| :SPECification[:PASS]:CHANnel/ ALLChannel/VOLTage/CURRent? | 119 |
| :SPECification:VOLTage:H/L/C | 120 |
| :SPECification:CURRent:H/L/C..... | 120 |
| :SPECification:TEST:..... | 121 |

| :SPECification:UNIT | | Channel Specific Command |
|---------------------|--|--|
| Description | Sets the Go/NoGo (specification) units as percentages or values. | |
| Syntax | :SPECification:UNIT {PERCENT 0 VALUE 1} | |
| Parameter | PERCENT/0 VALUE/1 | Percentages Values |
| Example | :SPEC:UNIT PERCENT | Sets the Go/NoGo limits as percentages |
| Query Syntax | :SPECification:UNIT? <NR1> | |
| Return Parameter | <NR1> 0 1 | Go/NoGo Unit Percent Value |
| Query Example | :SPEC:UNIT? 0 | The Go/ NoGo (specification) units are set as percent. |

:SPECification[:PASS]? Channel Specific Command

Description Displays if the Go/NoGo (specification) limit has passed/failed for the current channel used.

Query Syntax :SPECification[:PASS]?

| | | |
|-------------------------|--------------------|-----------------------|
| Return Parameter | <NR1> | Go/NoGo Specification |
| | 0 | Fail |
| | 1 | Pass |

Query Example :SPEC:PASS? Go/NoGo has failed
0

Query Example :SPEC? Go/NoGo has failed
0

**:SPECification[:PASS]:CHANnel/
ALLChannel/VOLTage/CURRent?** Channel Specific Command

Description Queries if the voltage, current, current channel or all channels have passed/failed the Go/NoGo (specification) limits.
VOLTage→CC, CR mode,
CURRent→CV, CP mode

Query Syntax :SPECification[:PASS]:CHANnel/ALLChannel/VOLTage/CURRent?

| | | |
|-------------------------|--------------------|-----------------------|
| Return Parameter | <NR1> | Go/NoGo Specification |
| | 0 | Fail |
| | 1 | Pass |

Query Example :SPEC:PASS:VOLT? The test has exceeded the Go/NoGo voltage limits.
0

Query Example :SPEC:VOLT? The test has exceeded the Go/NoGo voltage limits.
0

| :SPECification:VOLTage:H/L/C | | Channel Specific Command |
|-------------------------------------|---|---|
| Description | Sets the high(H), low(L) and center(C) Go/NoGo voltage limit specifications. Applicable to CC and CR mode only. | |
| Syntax | :SPECification:VOLTage:H/L/C <NRf+>[V] | |
| Parameter | <NRf+>[V] 1 unit = 1 volt | Go/NoGo voltage limit |
| | 1 | 1 volt |
| | 1V | 1 volt |
| Example | :SPEC:VOLT:H 2V | Sets the Go/NoGo high voltage limit to 2 volts. |
| Query Syntax | :SPECification:VOLTage:H/L/C? <NR2> | |
| Return Parameter | <NR2> | Go/NoGo voltage |
| | 1 unit = 1 volt | Returns the limit voltage |
| Query Example | :SPEC:VOLT:H? 2.000 | The voltage limit is 2 volts. |

| :SPECification:CURRent:H/L/C | | Channel Specific Command |
|-------------------------------------|--|---|
| Description | Sets the high(H), low(L) and center(C) Go/NoGo current limit specifications. Applicable to CV mode only. | |
| Syntax | :SPECification:CURRent::H/L/C <NRf+>[A] | |
| Parameter | <NRf+>[A] 1 unit = 1 amp | Go/NoGo current limit |
| | 1 | 1 amp |
| | 1A | 1 amp |
| Example | :SPEC:CURR:H 1A | Sets the Go/NoGo high current limit to 1 amp. |
| Query Syntax | :SPECification:CURRent:H/L/C? <NR2> | |

| | | |
|------------------|-------------------------|--|
| Return Parameter | <NR2> 1 unit = 1 amp | Go/NoGo voltage Returns the limit current |
|------------------|-------------------------|--|

| | | |
|---------------|------------------------|---------------------------------|
| Query Example | :SPEC:CURR:H? 5.120 | The current limit is 5.12 amps. |
|---------------|------------------------|---------------------------------|

:SPECification:TEST: Channel Specific Command

| | | |
|-------------|---|--|
| Description | Turns the Go/NoGo specification (SPEC) limits on/off. | |
|-------------|---|--|

| | | |
|--------|----------------------------------|--|
| Syntax | :SPECification:TEST {OFF 0 ON 1} | |
|--------|----------------------------------|--|

| | | |
|-----------|---------------|-----------|
| Parameter | OFF/0 ON/1 | OFF ON |
|-----------|---------------|-----------|

| | | |
|---------|----------------|---|
| Example | :SPEC:TEST OFF | Turn Go/NoGo SPEC off for the specific channel. |
|---------|----------------|---|

| | | |
|--------------|----------------------|--|
| Query Syntax | :SPECification:TEST? | |
|--------------|----------------------|--|

| | | |
|------------------|-----------------|----------------------------------|
| Return Parameter | <NR1> 0 1 | Go/NoGo SPEC status Off On |
|------------------|-----------------|----------------------------------|

| | | |
|---------------|------------------|----------------------------|
| Query Example | :SPEC:TEST? 1 | Go/NoGo SPEC limits is on. |
|---------------|------------------|----------------------------|

STATUS Subsystem

| | |
|--|-----|
| :STATus:CHANnel:CONDition? | 122 |
| :STATus:CHANnel:ENABle..... | 123 |
| :STATus:CHANnel:EVENT? | 123 |
| :STATus:CHANnel:NTRansition/PTRansition | 124 |
| :STATus:CSUMmary:ENABle | 125 |
| :STATus:CSUMmary:EVENT? | 126 |
| :STATus:QUEStionable:CONDition?..... | 126 |
| :STATus:QUEStionable:ENABle..... | 127 |
| :STATus:QUEStionable[:EVENT]? | 127 |
| :STATus:QUEStionable:NTRansition/PTRansition . | 128 |
| :STATus:PREset | 129 |

| | |
|----------------------------|--------------------------|
| :STATus:CHANnel:CONDition? | Channel Specific Command |
|----------------------------|--------------------------|

| | |
|-------------|---|
| Description | Returns the status of the Channel Status Condition Register. The returned value is the bit weight of the Channel Status Condition Register. See page 164 for details. |
|-------------|---|

| | |
|--------------|---------------------------------|
| Query Syntax | :STATus:CHANnel:CONDition?<NR1> |
|--------------|---------------------------------|

| Return Parameter | <NR1> | Condition | <NR1> | Condition |
|------------------|-------|-----------|-----------|-----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not Used |

| | | |
|---------------|-----------------------|--|
| Query Example | :STAT:CHAN:COND? 3 | Indicates OC and OV conditions are true. |
|---------------|-----------------------|--|

:STATus:CHANnel:ENABle Channel Specific Command

Description Sets which events are enabled in the Channel Status Enable register. The mask values are the bit weights of the Channel Status Enable Register. See page 164 for details.

Syntax :STATus:CHANnel:ENABle <NR1>

| Parameter | <NR1> | Event | <NR1> | Event |
|-----------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not Used |

Example :STAT:CHAN:ENAB 12 Events OP (Bit 3) and RV (Bit 4) are enabled in the Channel Status Enable register.

Query Syntax :STATus:CHANnel:ENABle? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not Used |

Query Example :STAT:CHAN:ENAB? 4 The OP event is enabled.

:STATus:CHANnel:EVENT? Channel Specific Command

Description Returns the status of the Channel Status Event register for the specific channel. The Channel Status Event register is cleared upon reading.

Query Syntax :STATus:CHANnel:EVENT? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not Used |

Query Example :STAT:CHAN:EVEN?
1
An over current (OC) event occurred since the last time the Channel Status Event register was read.

**:STATus:CHANnel:NTRansition/
PTRansition** Channel Specific
Command

Description Determines whether a negative transition (NTR 1→0) or positive (PTR 0→1) transition in the Channel Status Condition register will set the corresponding event in the Channel Status Event register.

The mask values are the bit weights of the Channel Status PTR/NTR filters. See page 164 for details.

Syntax :STATus:CHANnel:NTRansition/PTRansition <NR1>

| Parameter | <NR1> | Condition | <NR1> | Condition |
|-----------|-------|-----------|-----------|-----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not Used |

Example :STAT:CHAN:NTR 12
OP (Bit 3) and RV (Bit 4) are set as negative transitions.

:STAT:CHAN:PTR 1
OC (Bit 1) is set as a positive transition.

Query Syntax :STATus:CHANnel:NTRansition/PTRansition? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not Used |

Query Example :STAT:CHAN:NTR? 4
OP is set as a negative transition.

:STATus:CSUMmary:ENABle Channel Specific Command

Description Determines which channels in the Channel Summary Register group can set the CSUM bit of the Status Byte Register. The mask values are the bit weights of each corresponding channel in the Channel Summary Enable Register. See page 165 for details.

Syntax :STATus:CSUMmary:ENABle <NR1>

| Parameter | <NR1> | Event | <NR1> | Event |
|-----------|-------|-------|-------|-------|
| | 1 | CH1 | 16 | CH5 |
| | 2 | CH2 | 32 | CH6 |
| | 4 | CH3 | 64 | CH7 |
| | 8 | CH4 | 128 | CH8 |

Example :STAT:CSUM: 3
Events from channel 1 and 2 are enabled

Query Syntax :STATus:CSUMmary:ENABle? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-------|-------|
| | 1 | CH1 | 16 | CH5 |
| | 2 | CH2 | 32 | CH6 |
| | 4 | CH3 | 64 | CH7 |
| | 8 | CH4 | 128 | CH8 |

Query Example :STAT:CSUM:ENAB?
4

Only the events from channel 3 can set the CSUM bit in the Status Byte Register.

:STATus:CSUMmary:EVENT? Channel Specific Command

Description Returns the status of the Channel Summary Event register. The Channel Summary Event register is cleared upon reading.

Query Syntax :STATus:CSUMmary:EVENT? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-------|-------|
| | 1 | CH1 | 16 | CH5 |
| | 2 | CH2 | 32 | CH6 |
| | 4 | CH3 | 64 | CH7 |
| | 8 | CH4 | 128 | CH8 |

Query Example :STAT:CSUM:EVEN?
4

An event from channel 3 occurred since the last time the Channel Summary Event register was read.

:STATus:QUEStionable:CONDition? Channel Specific Command

Description Returns the status of the Questionable Status Condition register for the specific channel. See page 166 for details.

Query Syntax :STATus:QUEStionable:CONDition? <NR1>

| Return Parameter | <NR1> | Condition | <NR1> | Condition |
|------------------|-------|-----------|-----------|-----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128-65535 | Not used |

Query Example :STAT:QUES:COND? 2 OV (overvoltage) error.

:STATus:QUEStionable:ENABLE Channel Specific Command

Description Sets which events are enabled in the Questionable Status Enable register. The mask values are the bit weights of the events. See page 166 for details.

Syntax :STATus:QUEStionable:ENABLE <NR1>

| Parameter | <NR1> | Event | <NR1> | Event |
|-----------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not used |

Example :STAT:QUES:ENAB 12 Events OP (Bit 3) and RV (Bit 4) are enabled in the Questionable Status Enable register.

Query Syntax :STATus:QUEStionable:ENABLE? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not used |

Query Example :STAT:QUES:ENAB? 4 The OP event is enabled.

:STATus:QUEStionable[:EVENTt]? Channel Specific Command

Description Returns the status of the Questionable Status Event register. The Questionable Status Event register is cleared upon reading.

Query Syntax :STATus:QUEStionable[:EVENTt]? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not used |

Query Example :STAT:QUES:EVEN?
1
An over current (OC) event occurred since the last time the Questionable Status Event register was read.

:STATus:QUEStionable:NTRansition/
PTRansition Channel Specific
Command

Description Determines whether a negative transition (NTR 1→0) or positive (PTR 0→1) transition in the Questionable Status Condition register will set the corresponding event in the Questionable Status Event register.

The mask values are the bit weights of the Questionable Status PTR/NTR filters. See page 166 for details.

Syntax :STATus:QUEStionable:NTRansition/PTRansition
<NR1>

| Parameter | <NR1> | Condition | <NR1> | Condition |
|-----------|-------|-----------|-----------|-----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not used |

| | | |
|---------|------------------|--|
| Example | :STAT:QUES:NTR 5 | OC (Bit 1) and OP (Bit 3) are set as negative transitions. |
| | :STAT:CHAN:PTR 2 | OV (Bit 2) is set as a positive transition. |

Query Syntax :STATus:QUESTionable:NTRansition/PTRansition? <NR1>

| Return Parameter | <NR1> | Event | <NR1> | Event |
|------------------|-------|-------|-----------|----------|
| | 1 | OC | 16 | OT |
| | 2 | OV | 32 | G/N |
| | 4 | OP | 64 | UVP |
| | 8 | RV | 128~65535 | Not used |

Query Example :STAT:QUES:NTR? 4
Returns which conditions (OP) have negative transitions.

:STATus:PREset Channel Specific Command

Description The status preset command resets the Enable registers and NTR/PTR registers from the Channel Status and Questionable Status Register groups.

| Preset | Register | Preset |
|--------|----------------------------|-------------------|
| | Channel Status Enable | All bits set to 1 |
| | Channel Status PTR | All bits set to 1 |
| | Channel Status NTR | All bits set to 0 |
| | Questionable Status Enable | All bits set to 0 |
| | Questionable Status PTR | All bits set to 1 |
| | Questionable Status NTR | All bits set to 0 |

Syntax :STATus:PREset

Example :STAT:PRE

Voltage Subsystem

| | |
|------------------------------|-----|
| :VOLTage:L1/L2 | 130 |
| :VOLTage:RECall..... | 131 |
| :VOLTage:AVALue/BVALue | 131 |
| :VOLTage:CURRent | 132 |
| :VOLTage:MODE..... | 133 |

| :VOLTage:L1/L2 | | Channel Specific Command |
|------------------|---|---|
| Description | Sets the voltage of A Value or B Value in CV mode, where L1 is A Value and L2 is B Value. | |
| Syntax | :VOLTage:L1/L2 <NRf+>[V] | |
| Parameter | <NRf+>[V] | Voltage |
| | 10 | 10 volts |
| | 10V | 10 volts |
| | MIN | Sets the voltage to the minimum value for the channel |
| | MAX | Sets the voltage to the maximum value for the channel |
| Example | :VOLT:L1 10V | Sets A Value to 10 volts for the specific channel |
| | :VOLT:L2 MAX | Sets B Value to the maximum allowed voltage for the specific channel. |
| Query Syntax | :VOLTage:L1/L2? [MAX MIN] | |
| Return Parameter | <NR2> 1 unit = 1 volt | Voltage |
| | 10 | Returns the voltage of the specific channel. |

| | | |
|--|---------|--|
| | MAX/MIN | Returns the allowable maximum and minimum. |
|--|---------|--|

Query Example :VOLT:L1?
5

A Value is set to 5 volts.

:VOLT:L1? MAX
81.6000

Returns the maximum settable voltage.

:VOLTage:RECall Channel Specific Command

Description Sets or queries whether A Value or B Value is the currently active value in CV mode.

Syntax :VOLTage:RECall {A|0|B|1}

| | | |
|-----------|-----|---|
| Parameter | A/0 | A |
| | B/1 | B |

Example :VOLT:REC 1

Makes B Value the active value.

Query Syntax :VOLTage:RECall?

| | | |
|------------------|-------|-------|
| Return Parameter | <NR1> | Value |
| | 0 | A |
| | 1 | B |

:VOLTage:AVALue/BVALue Channel Specific Command

Description Sets the voltage of A Value or B Value in CV mode.

Syntax :VOLTage:AVALue/BVALue <NRf+>[V]

| | | |
|-----------|-----------|---|
| Parameter | <NRf+>[V] | Voltage |
| | 10 | 10 volts |
| | 10V | 10 volts |
| | MIN | Sets the voltage to the minimum value for the channel |

| | | |
|------------------|-----------------------------------|---|
| | MAX | Sets the voltage to the maximum value for the channel |
| Example | :VOLT:AVAL 10V | Sets A Value to 10 volts for the specific channel |
| | :VOLT:BVAL MAX | Sets B Value to the maximum allowed voltage for the specific channel. (single channel only) |
| Query Syntax | :VOLTage:AVALue/BVALue? [MAX MIN] | |
| Return Parameter | <NR2> 1 unit = 1 volt | Voltage |
| | 10 | Returns the voltage of the specific channel. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :VOLT:AVAL? | A Value is set to 5 volts. |
| | 5 | |
| | :VOLT:AVAL? MAX | Returns the maximum |
| | 81.6000 | settable voltage. |

:VOLTage:CURRent Channel Specific Command

| | | |
|-------------|------------------------------------|---|
| Description | Sets the current limit in CV mode. | |
| Syntax | :VOLTage:CURRent <NRf+>[A] | |
| Parameter | <NRf+>[A] | Current limit |
| | 1 | 1 Amp |
| | 1A | 1 Amp |
| | MIN | Sets the current limit to the minimum value for the channel |

| | | |
|------------------|-----------------------------|---|
| | MAX | Sets the current limit to the maximum value for the channel |
| Example | :VOLT:CURREN 1A | Sets the current limit to 1 Amp for the specific channel. |
| | :VOLT:CURREN MAX | Sets the current limit to the maximum limit for the specific channel. |
| Query Syntax | :VOLTage:CURRENt? [MAX MIN] | |
| Return Parameter | <NR2> 1 unit = 1 amp | Current limit |
| | 1 | Returns the current limit of the specific channel. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :VOLT:CURREN? 5 | The current limit is 5 amps for the specific channel. |

:VOLTage:MODE Channel Specific Command

| | | |
|--------------|--|--|
| Description | Set the constant voltage response time for the specific channel. | |
| Syntax | :VOLTage:MODE {SLOW 0 FAST 1} | |
| Parameter | SLOW/0 | Slow response time |
| | FAST/1 | Fast response time |
| Example | :VOLT:MODE SLOW | Sets the response time to SLOW for the specific channel. |
| | :VOLT:MODE 1 | Sets the response time to FAST for the specific channel. |
| Query Syntax | :VOLTage:MODE? <NR1> | |

| | | |
|------------------|-------------|--|
| Return Parameter | <NR1> | Response Time |
| | 0 | Slow |
| | 1 | Fast |
| Query Example | :VOLT:MODE? | The specific channel is set to SLOW response time. |
| | 0 | |

Power Subsystem

| | |
|---------------------------------|-----|
| :POWer:L1/L2 | 135 |
| :POWer:CURRent | 136 |
| :POWer:RECall | 137 |
| :POWer:LOW:AVALue/BVALue | 137 |
| :POWer:LOW:CURRent | 138 |
| :POWer:HIGH:AVALue/BVALue | 139 |
| :POWer:HIGH:CURRent..... | 140 |

| | | Channel Specific Command |
|-------------------------|---|---|
| :POWer:L1/L2 | | |
| Description | Sets the A/B Value for constant power mode, where L1 is A Value and L2 is B Value. The command is range dependant. If the current range is Low, then the command will only apply to the low range settings. | |
| Syntax | :POWer:L1 L2 <NRf+>[W] | |
| Parameter | <NRf+>[W] | |
| | L1 1 | Sets A Value to 1 Watt. |
| | L2 2 | Sets B Value to 2 Watts. |
| | L1 1W | Sets A Value to 1 Watt. (single channel only) |
| | L1 MIN | Sets A Value to the minimum level for the specific channel. |
| | L1 MAX | Sets A Value to the maximum Level for the specific channel. |
| Example | :POW:L1 1 | Sets A Value to 1 watt |
| Query Syntax | :POW:L1?/L2? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] | Current |

| | | |
|-----------------------|--|---|
| | 1 unit = 1 watt | Returns the power of the A Value (L1) or B Value (L2). |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :POW:L2? MAX 357.000 | Returns the maximum power allowed for the channel. (PEL-2040) |
| :POWer:CURRent | | Channel Specific Command |
| Description | Sets the current limit for constant power mode. The command is range dependant. If the current range is Low, then the command will only apply to the low range settings. | |
| Syntax | :POWer:CURRent <NRF+>[A] | |
| Parameter | <NRF+>[A] | |
| | 1 | Sets the current limit to 1A. |
| | 1A | Sets the current limit to 1A. |
| | MIN | Sets the current limit to the minimum level for the specific channel. |
| | MAX | Sets the current limit to the maximum level for the specific channel. |
| Example | :POW:CURR 1 | Sets the current limit to 1A. |
| Query Syntax | :POW:CURRent? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] | Current |
| | 1 unit = 1 amp | Returns the current limit. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :POW:CURR?
7.0 Returns the current limit for the specific channel.

:POWer:RECall Channel Specific Command

Description Sets or queries whether A Value or B Value is the currently active value in CP mode.

Syntax :POWer:RECall A/0, B/1

| | | |
|-----------|----------|-------|
| Parameter | A/0, B/1 | Value |
| | A/0 | A |
| | B/1 | B |

Example :POW:REC 1 Makes B Value the active value.

Query Syntax :POWer:RECall?

| | | |
|------------------|-------|-------|
| Return Parameter | <NR1> | Value |
| | 0 | A |
| | 1 | B |

Query Example :POW:REC?
0 A Value is active.

:POWer:LOW:AVALue/BVALue Channel Specific Command

Description Sets the low range A/B Value for constant power mode.

Syntax :POWer:LOW:AVALue/BVALue <NRf+>[W]

| | | |
|-----------|------------|---|
| Parameter | NRf+[W] | |
| | AVALue 1 | Sets A Value to 1 watt. |
| | BVALue 1W | Sets B Value to 1 watt. |
| | AVALue MIN | Sets A Value to the minimum level for the specific channel. |

| | | |
|------------------|---|---|
| | AVALue MAX | Sets A Value to the maximum Level for the specific channel. |
| Example | :POWer:LOW:AVAL 1 | Sets A Value to 1 watt for the low range. |
| Query Syntax | :POWer:LOW:AVALue/BVALue? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] 1 unit = 1 watt MAX/MIN | Current Returns the power of the A or B Value. Returns the allowable maximum and minimum. |
| Query Example | :POWer:LOW:BVAL? MAX 2 | Returns the maximum power allowed for the channel/range. |

:POWer:LOW:CURRent Channel Specific Command

| | | |
|-------------|--|--|
| Description | Sets the current limit for constant power mode for the low range only. | |
| Syntax | :POWer:LOW:CURRent <NRf+>[A] | |
| Parameter | <NRf+>[A] 1 1A MIN MAX | Sets the current limit to 1A. Sets the current limit to 1A. Sets the current limit to the minimum level for the specific channel. Sets the current limit to the maximum level for the specific channel. |
| Example | :POW:CURR 1 | Sets the current limit to 1A. |

| | | |
|------------------|-----------------------------|---|
| Query Syntax | :POW:LOW:CURRent? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] | Current |
| | 1 unit = 1 amp | Returns the current limit. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :POW:LOW:CURR? 7.0 | Returns the current limit for the specific channel. |

:POWer:HIGH:AVALue/BVALue Channel Specific Command

| | | |
|------------------|--|---|
| Description | Sets the high range A/B Value for constant power mode. | |
| Syntax | :POWer:HIGH:AVALue/BVALue <NRF+>[W] | |
| Parameter | NRF+[W] | |
| | AVALue 1 | Sets A Value to 1 watt. |
| | BVALue 1W | Sets B Value to 1 watt. |
| | AVALue MIN | Sets A Value to the minimum level for the specific channel. |
| | AVALue MAX | Sets A Value to the maximum Level for the specific channel. |
| Example | :POWer:HIGH:AVAL 1 | Sets A Value to 1 watt for the high range. |
| Query Syntax | :POWer:LOW:AVALue/BVALue? [MAX MIN] | |
| Return Parameter | <NR2> [MAX MIN] | Current |
| | 1 unit = 1 watt | Returns the power of the A or B Value. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :POWer:HIGH:BVAL? AX Returns the maximum
2 power allowed for the
channel/range.

:POWer:HIGH:CURRent Channel Specific
Command

Description Sets the current limit for constant power mode for
the high range only.

Syntax :POWer:HIGH:CURRent <NRf+>[A]

| | | |
|-----------|-----------|---|
| Parameter | <NRf+>[A] | |
| | 1 | Sets the current limit to 1A. |
| | 1A | Sets the current limit to 1A. |
| | MIN | Sets the current limit to the minimum level for the specific channel. |
| | MAX | Sets the current limit to the maximum level for the specific channel. |

Example :POW:HIGH:CURR 1 Sets the current limit to
1A.

Query Syntax :POW:HIGH:CURRent? [MAX|MIN]

| | | |
|------------------|-----------------|--|
| Return Parameter | <NR2> [MAX MIN] | Current |
| | 1 unit = 1 amp | Returns the current limit. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :POW:HIGH:CURR? Returns the current limit
7.0 for the specific channel.

SYSTEM Subsystem

| | |
|-----------------------|-----|
| :SYSTem:ERRor?..... | 141 |
| :SYSTem:VERSion?..... | 141 |
| :SYSTem:SETup..... | 142 |

:SYSTem:ERRor? System Command

Description The System Error command returns all the system errors. Please see the Error codes section for a full description. (page142)

Query Syntax :SYSTem:ERRor?

| | | | |
|-------------------------|----------------------|-------|------------------------|
| Return Parameter | <character string> | Error | |
| | -102, "Syntax error" | 1 | Error code number |
| | | 2 | Error code description |

Query Example :SYST:ERR? Returns the next error in the Error Queue.
 -102, "Syntax error"

:SYSTem:VERSion? System Command

Description The system version command returns the SCPI version: year and SCPI version of that year.

Query Syntax :SYSTem:VERSion?

| | | |
|-------------------------|--------|---------------|
| Return Parameter | <NRf> | |
| | 2008.0 | Year/ version |

:SYSTem:SETup System Command

| | | |
|------------------|---|--|
| Description | Sets or returns the system setup for the current settings using block data. See the command syntax on page 13 for more details. | |
| Syntax | :SYSTem:SETup <block data> | |
| Parameter | <block data> | System setup data |
| Example | :SYST:SET <block data> | Loads the system setup using block data. |
| Query Syntax | :SYSTem:SETup? | |
| Return Parameter | <block data> | Returns the system setup as block data. |
| Query Example | :SYST:SET? #<digits><byte count><data><NL> | Returns the system settings as block data. |

Memory Subsystem

| | |
|--------------------------------|-----|
| :MEMory:SAVE:PREset | 143 |
| :MEMory:SAVE:PROGram | 143 |
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| :MEMory:FILE:PRESet | 146 |
| :MEMory:FILE:PROGram | 146 |
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:MEMory:SAVE:PREset Channel Specific Command

| | | |
|-------------|--|------------------------------------|
| Description | Saves preset data for the specific channel to internal memory slots P0~P9. | |
| Syntax | :MEMory:SAVE:PREset: <NR1> | |
| Parameter | <NR1> 0~9 | Preset no. P0~P9 |
| Example | :MEM:SAVE:PRE 0 | Saves the preset settings to (P0). |

:MEMory:SAVE:PROGram Channel Specific Command

| | | |
|-------------|---|----------------------------|
| Description | Saves the specific channel into memory. | |
| Syntax | :MEMory:SAVE:PROGram <NR1> | |
| Parameter | <NR1> 001~120 | Memory number M001~M120 |

Example :MEM:SAVE:PROG 100 Saves the channel to Memory M100.

:MEMory:SAVE:ALLPreset All Channels

Description Saves preset data to internal memory for all channels.

Syntax :MEMory:SAVE:ALLPreset: <NR1>

| | | |
|-----------|--------------|---------------------|
| Parameter | <NR1> 0~9 | Preset no. P0~P9 |
|-----------|--------------|---------------------|

Example :MEM:SAVE:ALLP 0 Saves the preset settings to (P0) for all channels.

:MEMory:SAVE:SETup All Channels

Description Saves setup data for all channels to internal memory slots S1~S4.

Syntax :MEMory:SAVE:SETup: <NR1>

| | | |
|-----------|--------------|---------------------|
| Parameter | <NR1> 1~4 | Setup data S1~S4 |
|-----------|--------------|---------------------|

Example :MEM:SAVE:SET 1 Saves the setup data to S1 (applicable to all channels).

:MEMory:RECall:PREset Channel Specific Command

Description Recalls preset data for the specific channel from internal memory slots P0~P9.

Syntax :MEMory:RECall:PREset: <NR1>

| | | |
|-----------|--------------|---------------------|
| Parameter | <NR1> 0~9 | Preset no. P0~P9 |
|-----------|--------------|---------------------|

| | | |
|--------------------------------|----------------|--|
| Example | :MEM:REC:PRE 0 | Recalls the preset settings from (P0). |
| | | Channel Specific Command |
| :MEMory:RECall:PROG ram | | |

| | | |
|-------------|---|--|
| Description | Recalls memory data to the current channel. | |
| Syntax | :MEMory:RECall:PROG <NR1> | |
| Parameter | <NR1> 001~120 | Memory number M001~M120 |
| Example | :MEM:REC:PROG 100 | Recalls the memory M100 for the current channel. |

:MEMory:RECall:ALLPreset All Channels

| | | |
|-------------|--|---|
| Description | Recalls preset data from internal memory for all channels. | |
| Syntax | :MEMory:RECall:ALLPreset: <NR1> | |
| Parameter | <NR1> 0~9 | Preset no. P0~P9 |
| Example | :MEM:REC:ALLP 0 | Recalls the preset settings from (P0) for all channels. |

:MEMory:RECall:SETup All Channels

| | | |
|-------------|---|---------------------|
| Description | Recalls setup data for all channels from internal memory slots S1~S4. | |
| Syntax | :MEMory:RECall:SETup: <NR1> | |
| Parameter | <NR1> 1~4 | Setup data S1~S4 |

| | | |
|---------|----------------|--|
| Example | :MEM:REC:SET 1 | Recalls the setup data from S1 (applicable to all channels). |
| Example | :MEM:REC:100 | Recalls memory data M100 to the current channel. |

:MEMory:FILE:PRESet System Command

| | | |
|------------------|---|--|
| Description | Sets or returns the preset settings using block data. See the command syntax on page 13 for more details on block data. | |
| Syntax | :MEMory:FILE:PREset <block data> | |
| Parameter | <block data> | Preset data |
| Example | :MEM:FILE:PRE <block data> | Loads the preset settings block data. |
| Query Syntax | :MEMory:FILE:PREset? | |
| Return Parameter | <block data> | Returns the preset settings as block data. |
| Query Example | :MEM:FILE:PRE? #<digits><byte count><data><NL> | Returns the preset settings as block data. |

:MEMory:FILE:PROGram System Command

| | | |
|--------------|--|--|
| Description | Sets or returns the program data using block data. See the command syntax on page 13 for more details on block data. | |
| Syntax | :MEMory:FILE:PROGram <block data> | |
| Parameter | <block data> | Program data |
| Example | :MEM:FILE:PROG <block data> | Loads the program data using block data. |
| Query Syntax | :MEMory:FILE:PROGram? | |

| | | |
|------------------|---|---|
| Return Parameter | <block data> | Returns the program data as block data. |
| Query Example | :MEM:FILE:PROG? #<digits><byte count><data><NL> | Returns the program data as block data. |

:MEMory:FILE:SETup

System Command

| | | |
|------------------|--|--|
| Description | Sets or returns the setup data using block data. See the command syntax on page 13 for more details on block data. | |
| Syntax | :MEMory:FILE:SETup <block data> | |
| Parameter | <block data> | Setup data |
| Example | :MEM:FILE:SET <block data> | Loads the setup data using block data. |
| Query Syntax | :MEMory:FILE:SETup? | |
| Return Parameter | <block data> | Returns the setup data as block data. |
| Query Example | :MEM:FILE:SET? #<digits><byte count> <data><NL> | Returns the setup data as block data. |

:MEMory:FILE:SEQuence

System Command

| | | |
|--------------|---|---|
| Description | Sets or returns the sequence data using block data. See the command syntax on page 13 for more details on block data. | |
| Syntax | :MEMory:FILE:SEQuence <block data> | |
| Parameter | <block data> | Sequence data |
| Example | :MEM:FILE:SEQ <block data> | Loads the sequence data using block data. |
| Query Syntax | :MEMory:FILE:SEQuence? | |

| | | |
|------------------|--|--|
| Return Parameter | <block data> | Returns the sequence data as block data. |
| Query Example | :MEM:FILE:SEquence? #<digits><byte count> <data><NL> | Returns the sequence data as block data. |

SEquence Subsystem

| | |
|------------------------------------|-----|
| :SEquence:EDIT:POINT..... | 149 |
| :SEquence:END | 150 |
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| | |
|----------------------|--------------------------|
| :SEquence:EDIT:POINT | Channel Specific Command |
|----------------------|--------------------------|

| | | |
|------------------|--|--------------------------------------|
| Description | Sets the current point in the sequence. The SEquence:END command should first be used to set the number of points. | |
| Syntax | :SEquence:EDIT:POINT <NR1> | |
| Parameter | <NR1> 1~last point | Points 1~ last point. |
| Example | :SEQ:EDIT:POIN 3 | Sets the point to number 3. |
| Query Syntax | :SEquence:EDIT:POINT? | |
| Return Parameter | <NR1> 1~last point | Points Returns the current point. |

Query Example :SEQ:EDIT:POIN? The current point is 3.
3

:SEquence:END Channel Specific Command

Description Sets the number of points in the sequence.

Syntax :SEquence:END <NR1>

| | | |
|-----------|-------|--------|
| Parameter | <NR1> | Points |
| | 1~120 | 1~120. |

Example :SEQ:END 5 Sets the max number of points to 5.

Query Syntax :SEquence:END?

| | | |
|------------------|-------|--------|
| Return Parameter | <NR1> | Points |
| | 1~120 | 1~120 |

Query Example :SEQ:END? There are 5 points in the sequence.
5

:SEquence:POINt:RESistance Channel Specific Command

Description Sets the resistance value for the current point. CR mode only.

Syntax :SEquence:POINt:RESistance
<NRf>[OHM]|MIN|MAX

| | | |
|-----------|----------------------|---------------------------|
| Parameter | <NRf>[OHM], MIN, MAX | Resistance value |
| | 100 | 100Ω |
| | 100 OHM | 100Ω |
| | MAX/MIN | Maximum or minimum value. |

Example :SEQ:POIN:RES 100 Sets the resistance to 100.

Query Syntax :SEquence:POINt::RESistance? [MAX|MIN]

| | | |
|------------------|-------|------------------|
| Return Parameter | <NR1> | Resistance Value |
|------------------|-------|------------------|

| | | |
|---------------|-----------------------|--|
| | 1 unit = 1 ohm | Returns the resistance value. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :SEQ:POIN:RES? 100 | The resistance value is 100 ohm. |

:SEQ:POIN:CURRent Channel Specific Command

| | | |
|-------------|---|---------------------------|
| Description | Sets the current value for the current point. CC mode only. | |
| Syntax | :SEQ:POIN:CURRent <NRf>[A] MIN MAX | |
| Parameter | <NRf>[A], MIN, MAX | Current value |
| | 10 | 10A |
| | 100 A | 100A |
| | MAX/MIN | Maximum or minimum value. |

Example :SEQ:POIN:CURR 1 Sets the current to 1.

Query Syntax :SEQ:POIN::CURRent? [MAX|MIN]

| | | |
|------------------|--------------|--|
| Return Parameter | <NR1> | Current Value |
| | 1 unit = 1 A | Returns the current value. |
| | MAX/MIN | Returns the allowable maximum and minimum. |

Query Example :SEQ:POIN:CURR?
1 The current value is 1 amp.

:SEQ:POIN:RISE/FALL Channel Specific Command

| | | |
|-------------|---|-----------|
| Description | Sets the rising and falling slew rates for the current point. | |
| Syntax | :SEQ:POIN:RISE/FALL<NRf>[A/us] MIN MAX | |
| Parameter | <NRf>[A/us], MIN, MAX | Slew rate |

| | | |
|------------------|---------------------------------------|--|
| | 1.2 | 1.2A/us |
| | 1.2 A/us | 1.2A/us |
| | MAX/MIN | Maximum or minimum value. |
| Example | :SEQ:POIN:RISE .3 A | Sets the rising slew rate to 0.3 A/us |
| | :SEQ:POIN:FALL .4 A | Sets the falling slew rate to 0.4 A/us |
| Query Syntax | :SEQuence:POINt::RISE/FALL? [MAX MIN] | |
| Return Parameter | <NR1> | Slew Rate |
| | 1 unit = 1 A/us | Returns the slew rate. |
| | MAX/MIN | Returns the allowable maximum and minimum. |
| Query Example | :SEQ:POIN:RISE? | Returns the rising slew rate (0.3 A/us). |
| | 0.30000 | |
| | :SEQ:POIN:FALL? | Returns the falling slew rate (0.4 A/us). |
| | 0.40000 | |

:SEQuence:POINt:TIME Channel Specific Command

| | | |
|--------------|---|---|
| Description | Sets the duration time of the current point in seconds. | |
| Syntax | :SEQuence:POINt:TIME <NRf>[S] MIN MAX | |
| Parameter | <NRf> | Duration Time |
| | 0.0001~60000 | 0.0001~60,000.0 seconds |
| | 0.0001~60000S | 0.0001~60,000.0 seconds |
| | MIN | 0.0001seconds |
| | MAX | 60,000 seconds |
| Example | :SEQ:POIN:TIME 10 | Sets the point duration time to 10 seconds. |
| Query Syntax | :SEQuence:POIN:TIME? [MAX MIN] | |

| | | |
|------------------|----------------------------------|---|
| Return Parameter | <NR2> 0.0001~60000 MAX/MIN | Point Returns the point duration time. Returns the allowable maximum and minimum. |
|------------------|----------------------------------|---|

| | | |
|---------------|----------------------------|---|
| Query Example | :SEQ:POIN:TIME? 0.00100 | The point duration time is 0.001 seconds. |
|---------------|----------------------------|---|

:SEquence:REPeat Channel Specific Command

Description Sets the number of times the sequence can be repeated (looped).

Syntax :SEquence:REPeat <NR1>

| | | |
|-----------|----------------------|--|
| Parameter | <NR1> 1~9999 0 | Repeat setting 1~9999 Infinite repeats |
|-----------|----------------------|--|

| | | |
|---------|---------------------------|--------------------------------------|
| Example | :SEQ:REP 10 :SEQ:REP 0 | Repeat 10 times Repeat infinitely |
|---------|---------------------------|--------------------------------------|

Query Syntax :SEquence:REPeat?

| | | |
|------------------|----------------------|--------------------------------------|
| Return Parameter | <NR1> 1~9999 0 | Repeat setting 1~9999 Infinite |
|------------------|----------------------|--------------------------------------|

| | | |
|---------------|-----------------|-------------------------------|
| Query Example | :SEQ:REP? 10 | Repeats the sequence 10 times |
|---------------|-----------------|-------------------------------|

:SEquence:END:LOAD Channel Specific Command

Description Sets On End Load to On or Off. On End Load determines if the channel will set the load on or off at the end of its sequence until the end of the last sequence (of ALL other channels).

Syntax :SEquence:END:LOAD {OFF|0|ON|1}

| | | |
|------------------|---------------------|--------------------------|
| Parameter | OFF/0 ON/1 | Off On |
| Example | :SEQ:END:LOAD 0 | On End Load = Off. |
| Query Syntax | :SEQ:END:LOAD? | |
| Return Parameter | <NR1> 0 1 | On End Load Off On |
| Query Example | :SEQ:END:LOAD? 1 | On End Load is On. |

:SEQ:VOLT:RANGe Channel Specific Command

| | | |
|------------------|--|---|
| Description | Sets the sequence CC voltage range. | |
| Syntax | :SEQ:VOLT:RANGe <NRf>[V] L H | |
| Parameter | <NRf>[V] , L, H 16 80V L H | Range Low range* High range* Low range High range |
| | *Load module dependent, PEL-200 shown. | |
| Example | :SEQ:VOLT:RANG L | Sets the range to Low for the channel. |
| Query Syntax | :SEQ:VOLT:RANGe? | |
| Return Parameter | <NR2> 16 125 80 500 | Range Low PEL-2020,2030,2040 Low PEL-2041 High PEL-2020,2030,2040 High PEL-2041 |

Query Example :SEQ:VOLT:RANG?
500 Returns the voltage range. In this case high for the PEL-2041.

:SEQuence:LOOP:STARt Channel Specific Command

Description Determines from which point to start repeating (looping) the sequence from when using the SEQuence:REPeat command.

Syntax :SEQuence:LOOP:STARt <NR1>

| | | |
|-----------|-----------------------|-------------------------------------|
| Parameter | <NR1> 1~last point | Start loop from 1st~ last point. |
|-----------|-----------------------|-------------------------------------|

Example :SEQ:LOOP:STAR 2 Loop from point 2.

Query Syntax :SEQuence:LOOP:STARt?

| | | |
|------------------|-----------------------|---|
| Return Parameter | <NR1> 1~last point | Point Returns the point that the loop will start from. |
|------------------|-----------------------|---|

Query Example :SEQ:LOOP:STAR?
2 The loop starts at point 2.

:SEQuence:CHANnel:TIME Channel Specific Command

Description Sets which channel duration time the specific channel will use.

Syntax :SEQuence:CHANnel:TIME <NR1>

| | | |
|-----------|---------------------|------------------------|
| Parameter | <NR1>1~max channels | Duration Time Settings |
| | 1 | Use channel 1 |
| | 2 etc | Use channel 2 etc |

Example :SEQ:CHAN:TIME 3 Set the specific channel to use the channel duration time of channel 3.

| | | |
|------------------|-------------------------|--|
| Query Syntax | :SEquence:CHANnel:TIME? | |
| Return Parameter | <NR1> 1~max channels | Point Returns the channel duration time that the specific channel is using. |
| Query Example | :SEQ:CHAN:TIME? 2 | The specific channel is using the channel duration setting of channel 2. |

:SEquence:RUN Channel Specific Command

| | | |
|-------------|----------------------------|-------------------|
| Description | Turns the sequence On/Off. | |
| Syntax | :SEquence:RUN {OFF 0 ON 1} | |
| Parameter | OFF/0 | Off |
| | ON/1 | On |
| Example | :SEQ:RUN ON | Run the sequence. |

:SEquence:SAVE Channel Specific Command

| | | |
|-------------|--|---------------------|
| Description | Saves the sequence for the specific channel. | |
| Syntax | :SEquence:SAVE | |
| Example | :SEQ:SAVE | Saves the sequence. |

:SEquence:TRIGger:IN Channel Specific Command

| | | |
|-------------|---|-----|
| Description | Turns the trigger input on/off for sequences. See the :SEquence:TRIGger:IN:CHANnel command to set which channels this command applies to. | |
| Syntax | :SEquence:TRIGger:IN {OFF 0 ON 1} | |
| Parameter | OFF/0 | Off |
| | ON/1 | On |

Example :SEQ:TRIG:IN 0 Trigger IN is on.

Query Syntax :SEquence:TRIGger:IN?

| | | |
|------------------|-------|------------|
| Return Parameter | <NR1> | Trigger IN |
| | 0 | Off |
| | 1 | On |

Query Example :SEQ:TRIG:IN?
1

Channel Specific
Command

:SEquence:TRIGger:OUT

Description Turns the trigger output on for the selected channel for sequences. Note that one channel must be set for trigger out.

Syntax :SEquence:TRIGger:OUT <NR1>|MIN|MAX

| | | |
|-----------|-------|------------------------------------|
| Parameter | <NR1> | Channel number |
| | MAX | Sets TRIG OUT to the last channel |
| | MIN | Sets TRIG OUT to the first channel |

Example :SEQ:TRIG:OUT 1 Sets TRIG OUT to CH1.

Query Syntax :SEquence:TRIGger:OUT?

| | | |
|------------------|---------|------------------------|
| Return Parameter | <NR1> | Channel number |
| | MAX/MIN | Last or first channel. |

Query Example :SEQ:TRIG:OUT?
1

Channel Specific
Command

:SEquence:TRIGger:IN:CHANnel

Description Selects which channels are turned on/off with the :SEquence:TRIGger:IN command. The bit weight of the <NR1> value determines which channels are used.

Syntax :SEQuence:TRIGger:IN:CHANnel <NR1>

| Parameter | <NR1> | Channel | <NR1> | Channel |
|-----------|-------|---------|-----------|----------|
| | 1 | CH1 | 32 | CH 6 |
| | 2 | CH2 | 64 | CH 7 |
| | 4 | CH3 | 128 | CH 8 |
| | 8 | CH 4 | 256~65535 | Not used |
| | 16 | CH 5 | | |

Example :SEQ:TRIG:IN:CHAN 9 Sets TRIG IN to CH1 and CH4.

Query Syntax :SEQuence:TRIGger:IN:CHANnel?

| Return Parameter | <NR1> | Channel | <NR1> | Channel |
|------------------|-------|---------|-----------|----------|
| | 1 | CH1 | 32 | CH 6 |
| | 2 | CH2 | 64 | CH 7 |
| | 4 | CH3 | 128 | CH 8 |
| | 8 | CH 4 | 256~65535 | Not used |
| | 16 | CH 5 | | |

Query Example :SEQ:TRIG:IN:CHAN? 14 Sets TRIG IN to CH4 and CH5.

GLOBAL Subsystem

| | |
|---------------------------------------|-----|
| :GLOBal:CONFigure:VOLTage:RANGe | 159 |
| :GLOBal:LOAD:SHORT | 159 |
| :GLOBal:MODE | 159 |

:GLOBal:CONFigure:VOLTage:RANGe Global Command

| | | |
|-------------|--|------------|
| Description | Sets the CC Voltage range high or low. This command applies to all channels. | |
| Syntax | :GLOBal:CONFigure:VOLTage:RANGe {L H} | |
| Parameter | L | Low range |
| | H | High range |
| Example | :GLOB:CONF:VOLT:RANG L Sets the range to low. | |

:GLOBal:LOAD:SHORT Global Command

| | | |
|--------------|---------------------------------|-------|
| Description | Shorts all the input terminals. | |
| Syntax | :GLOBal:LOAD:SHORT {OFF 0 ON 1} | |
| Parameter | {OFF 0 ON 1} | SHORT |
| | OFF/0 | Off |
| | ON/1 | On |
| Example | :GLOB:LOAD:SHOR 0 Short on. | |
| Query Syntax | :GLOBal:LOAD:SHORT? | |

:GLOBal:MODE Global Command

| | |
|-------------|--|
| Description | Sets the mode for all the load modules in the mainframe. |
|-------------|--|

| | | |
|-----------|--|--|
| Syntax | :GLOBal:MODE {CCL CCH CCDL CCDH CRL CRH CRDL CRDH CV CPL CPH} | |
| Parameter | CCL | CC static mode, low range |
| | CCH | CC static mode, high range |
| | CCDL | CC dynamic mode, low range |
| | CCDH | CC dynamic mode, high range |
| | CRL | CR static mode, low range |
| | CRH | CR static mode, high range |
| | CRDL | CR dynamic mode, low range |
| | CRDH | CR dynamic mode, high range |
| | CV | CV mode |
| | CPL | CP static mode, low range |
| | CPH | CP static mode, high range |
| Example | :SEQ:VOLT:RANG L | Sets the range to Low for the channel. |

Command Error Codes

| | |
|-------------|---|
| Description | The PEL has a number of specific error codes. Use the SYSTem:ERRor command to recall the error codes. |
| -102 | Syntax error. An unrecognized command or data type was encountered. |
| -109 | Missing parameter The command header requires more parameters than was received. |
| -122 | Data out of range The data is outside the allowed range. |
| -128 | Numeric data not allowed The command does not accept numerical data/parameters |
| -200 | Execution error Generic execution error. |
| -144 | Character Data too long The character data contains more than twelve characters |
| -151 | Invalid String The string data received is invalid |
| -148 | Character data not allowed The command does not accept character data |
| -138 | Suffix not allowed A command does not accept suffixes/the suffix type. |

S STATUS REGISTERS

To program the PEL-200 Series effectively, the Status Register structure needs to be understood. This chapter explains in detail the structure of the status registers.

Status Register Overview

Description The status registers are used to determine the status of the electronic load. The status registers maintain the status of the protection conditions, load conditions and channel conditions of the load modules.

The PEL-2000 series have a number of register groups:

Channel Status Registers (one for each channel)

Channel Summary Registers

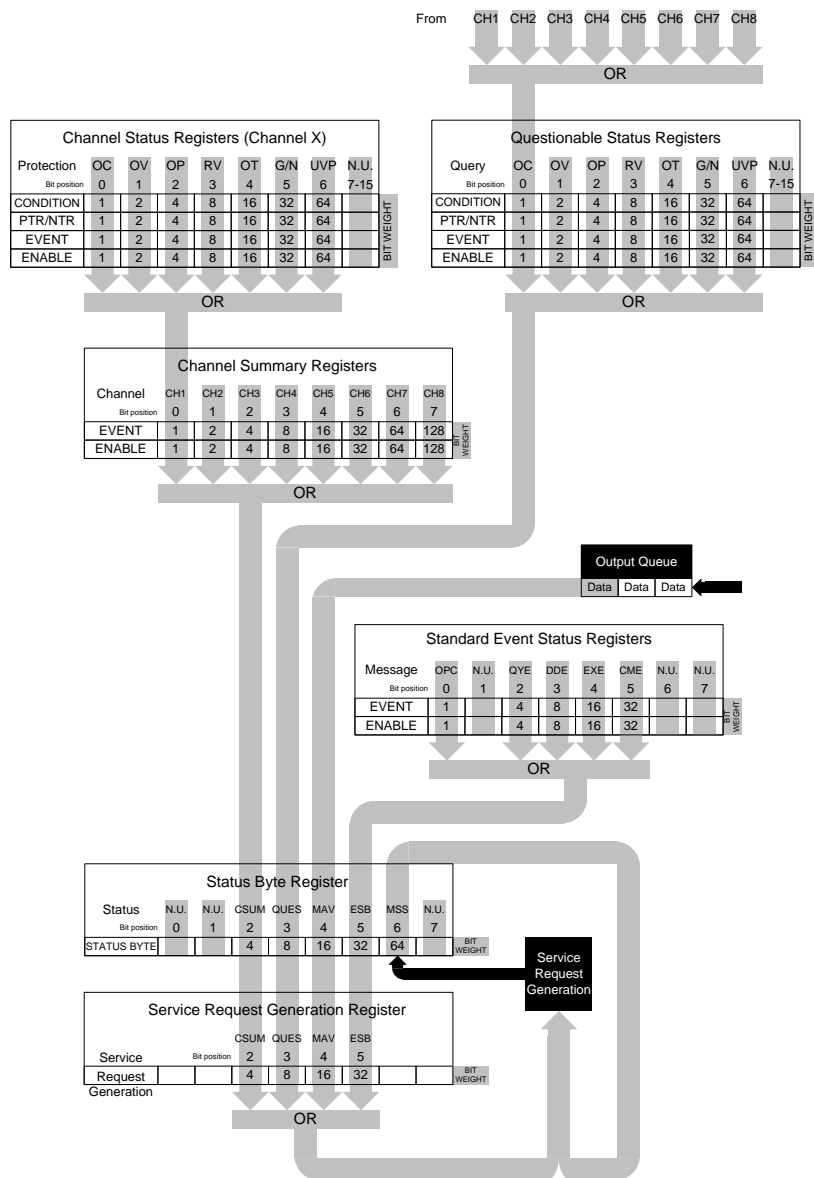
Questionable Status Registers

Standard Event Status Registers

Status Byte Register

Service Request Generation Register

The structure of the status registers is shown on the next page.



Channel Status

Description Each channel has a dedicated Channel Status Register group. These registers show if any errors or faults have occurred to a specific channel.

The Channel Status Register group consists of: the Condition, EVENT and ENABLE registers as well as PTR/NTR (positive and negative transition) filters.

| Channel Status Registers | | | | | | | | |
|--------------------------|------|-----|-----|----|----|----|----|----|
| Bit Position | 7-15 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Condition | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| PTR/NTR | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| EVENT | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| ENABLE | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| Bit weight | | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

- Protection Bits**
- OC** If an over current condition occurs the OC bit (bit 0) is set. The OC bit can only be cleared with the `:LOAD:PROTECTION:CLEAR` command.

 - OV** If an over voltage condition occurs the OV bit (bit 1) is set. The OV bit can only be cleared with the `:LOAD:PROTECTION:CLEAR` command.

 - OP** If an over power condition occurs the OP bit (bit 2) is set. The OP bit can only be cleared with the `:LOAD:PROTECTION:CLEAR` command.

 - RV** If a reverse voltage condition occurs the RV bit (bit 3) is set. The RV bit is automatically cleared after the reverse voltage is removed.

 - OT** When the internal temperature exceeds 85°C the OT bit will be set. The OT bit is automatically cleared after the temperature goes below 85°C.

| | | |
|--------------------|---------------------|---|
| | G/N | The Go/NoGo bit is set when Go/NoGo limits have been exceeded, when Go/NoGo SPEC has been enabled. |
| | UVP | If the under voltage condition occurs the UVP bit is set. |
| Condition Register | | The condition register indicates the status of the electronic load. The condition register can only be changed by a change in the condition of the electronic load. Reading the condition register does not change the state of the condition register. |
| PTR/NTR Register | | The PTR/NTR (Positive/Negative transition) register determines the type of transition conditions that will trigger an event. Only the Channel Status Register and Questionable Status Register can be transition programmed |
| | Positive Transition | 0→1 |
| | Negative Transition | 1→0 |
| Event Register | | The Event Register indicates if an event has been triggered according to the transition settings from the PTR/NTR Register. |
| Enable Register | | The Enable register determines which status event(s) are enabled. Any status events (OC, OV, OP, RV, OT, G/N, UVP) that are enabled will set the corresponding channel bit in the Channel Summary Event Register. |

Channel Summary

| | |
|-------------|---|
| Description | The Channel Summary Registers consolidate the channel status of all 4/8 channels, depending on the electronic load. |
|-------------|---|

| Channel Summary Registers | | | | | | | | |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| EVENT | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| ENABLE | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Bit weight | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

Event Register If an event has been enabled and set in the Channel Status Registers, then the corresponding channel bit will be set in the Channel Summary Event Register. If the Event Register is read, it will be cleared to 0.

Enable Register The Enable Register is used to determine which channel events will be used to set the CSUM bit of the Status Byte Register.

Questionable Status

Description The Questionable Status Registers will show if any faults or errors have occurred. The Questionable Status Registers have the same events as the Channel Status Registers.

| Questionable Status Register | | | | | | | | |
|------------------------------|------|-----|-----|----|----|----|----|----|
| Bit Position | 7-15 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Condition | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| PTR/NTR | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| EVENT | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| ENABLE | 0 | UVP | G/N | OT | RV | OP | OV | OC |
| Bit weight | | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

| | | |
|--------------------|-----|------------------|
| Bit Summary | OC | Over Current |
| | OV | Over voltage |
| | OP | Over Power |
| | RV | Reverse Voltage |
| | OT | Over Temperature |
| | G/N | Go/NoGo |

UVP Under Voltage Protection

Condition Register The Questionable Status Condition Register indicates the status of the electronic load. If a bit is set in the Condition register (OC, OV, OP, RV) indicates that the event is true. Reading the condition register does not change the state of the condition register.

PTR/NTR Register The PTR/NTR (Positive/Negative transition) register determines the type of transition conditions will set the corresponding bit in the Event Registers. Only the Channel Status Register and Questionable Status Register can be transition programmed.

Positive Transition 0→1

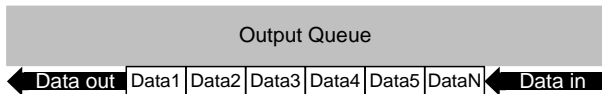
Negative Transition 1→0

Event Register The PTR/NTR Register will dictate the type of transition conditions will set the corresponding bits in the Event Register. If the Event Register is read, it will be cleared to 0.

Enable Register The Enable Register is used to determine which channel events will be used to set the QUES bit of the Status Byte Register.

Output Queue

Description The Output queue stores output messages in a FIFO buffer until read. If the Output Queue has data, the MAV bit in the Status Byte Register is set.



Standard Event Status

Description The Standard Event Status Registers indicate any programming errors that occur. The Standard Event Status Register group comprises of the Event and Enable registers.

| Standard Event Status Registers | | | | | | | | |
|---------------------------------|-----|----|-----|-----|-----|-----|-----|---|
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| EVENT | 0 | 0 | CME | EXE | DDE | QYE | OPC | 0 |
| ENABLE | 0 | 0 | CME | EXE | DDE | QYE | OPC | 0 |
| Bit weight | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

Error Bits **OPC** The operation complete bit is set when all selected pending operations are complete. This bit is set in response to the *OPC command.

QYE The Query Error bit is set in response to an error reading the Output Queue. This can be caused by trying to read the Output Queue when there is no data present.

DDE The Device Dependent Error indicates a memory error/lost memory or failure of the self-test.

EXE The Execution bit indicates an execution error due to one of the following
 Illegal command parameter
 Parameter out of range
 Invalid parameter
 Command didn't execute due to an overriding operation condition.

CME The Command Error bit is set when a syntax error has occurred. The CME bit can also be set when a <GET> command is received within a program message. (Group Execute Trigger) as defined in IEEE 488.1.

Event Register The Event Register will be set to 0 when read.

Enable Register The Enable Register determines which events will set the ESB Bit (bit 5) in the Status Byte Register.

Status Byte Register

Description The Status Byte register consolidates the status events of all the status registers. The Status Byte register can be read with the *STB? query or a serial poll and can be cleared with the *CLS command.

| Status Byte Register | | | | | | | | |
|----------------------|-----|-----|-----|-----|------|------|---|---|
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Condition | 0 | MSS | ESB | MAV | QUES | CSUM | 0 | 0 |
| Bit weight | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

Status Bits **CSUM** The CSUM bit is set when an Enabled event has occurred on a channel. The Channel Condition, Channel Event and Channel Summary Event Registers all determine if the CSUM bit is set.

QUES The Questionable bit is set when a questionable event has occurred.

MAV The Message Available bit is set when there is outstanding data in the Output Queue.

ESB The Event Status bit is set if an enabled event in the Standard Event Status Event Register has occurred.

MSS & RQS The Master Summary Status is used with the *STB? query. When the *STB? query is read the MSS bit is not cleared. The Request Service bit is cleared when it is polled during a serial poll.

Service Request Register

Description The Service Request Generation Register determines which events in the Status Byte Register will generate Service Requests. It is essentially the Status Byte Enable Register. The bit events are the same as the Status Byte Register, minus the MSS/RQS bit.

| Service Request Generation Register (Status Byte Enable) | | | | | | | | |
|--|-----|----|-----|-----|------|------|---|---|
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Condition | 0 | 0 | ESB | MAV | QUES | CSUM | 0 | 0 |
| Bit weight | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |