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Introduction

The PCR-LE series Communication Interface Manual explains the settings and commands for remotely controlling the PCR series using the communication interface.

- RS232C interface (standard equipped)
- GPIB interface (optional)
- USB interface (optional)
- LAN interface (optional)

When the PCR-LE series is operating under remote control, the REMOTE LED on the display on the front panel lights. To switch from remote mode to local mode (panel operation) from the panel, press LOCAL.

Reading environment

This manual is in HTML format and PDF format. The manual can be viewed by the following environment.

- Browser: Microsoft Internet Explorer 11 or later
- PDF Reader: Adobe Reader 10 or later

Related manuals

For the safety precautions, installation, operation, and specifications of the PCR, read the accompanying PCR-LE series User's Manual.

Intended readers

This manual is written for readers with sufficient basic knowledge of how to control instruments using a personal computer.

Familiarize yourself with the [syntax of the SCPI commands](#) that are used with the product before you use them.

Structure of the manual

This manual consists of the following sections.

- Overview
- Setup
- Overview of messages
- Command (list*1)
- Appendix
- Tutorial

*1. The list of command is provided in a PDF file.

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Firmware version of the product to which this manual applies

This manual applies to products with the following firmware version:

Ver.5.0x

Instrument Interface Standards

The PCR conforms to the following standards.

- IEEE Std 488.2-1992 IEEE Standard Codes, Formats, Protocols, and Common Commands For Use With IEEE Std 488.1-1987
- IEEE Std 488.1-1987 IEEE Standard Digital Interface for Programmable Instrumentation

- Standard Commands for Programmable Instruments (SCPI) version 1999.0
- Universal Serial Bus Specification Rev 2.0
- Universal Serial Bus Test and Measurement Class Specification (USBTMC) Rev 1.0
- Universal Serial Bus Test and Measurement Class, Subclass USB488 Specification (USBTMC-USB488) Rev 1.0
- TCP/IP Instrument Protocol Specification VXI-11
- IVI-6.1 IVI High-Speed LAN Instrument Protocol (HiSLIP) Rev 1.0
- LXI Standard 1.3

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Overview of Command

The information that is exchanged between the controller (computer) and the device (PCR-LE series) is called a message.

The PCR uses the SCPI language for the messages.

There are two types of messages, commands that are sent from the computer to the PCR and responses that are sent from the PCR to the computer.

Command Hierarchy

SCPI commands are ASCII-based commands designed for test and measurement devices. The command hierarchy is structured around the common root or node, which is the construction block of the SCPI subsystem. A command consists of a program header, parameters, and punctuation.

The hierarchy is explained using the SOURce subsystem as an example.

Program header	Parameter	Hierarchy of node
SOUR:		Root node
FREQ		Second level
:LIM		Third level
:UPP	<numeric>	Fourth level
:LOW	<bool>	Fourth level
VOLT		Second level
:RANGE		Third level
:UPP	<numeric>	Fourth level
:AUTO	<bool>	Fourth level

A higher node is separated from a lower node using a colon (:).

Command Syntax

This manual denotes SCPI commands using the following format.

```
MEASure[:SCALar]:CURRent:DC? {<numeric>|MINimum|MAXimum}
```

SCPI commands can be issued using the short form. The short form of a SCPI command is the section of the command written in uppercase.

SCPI commands can be sent in the long form or short form. Since SCPI commands are not case-sensitive, CURR, Curr, and curr are all accepted as the short form of CURRent. In the long form, CURRENT, Current, and current are all acceptable.

- A space is required between the program header section and the parameter section.
- Multiple parameters, when available, are concatenated using commas.
- Commands are concatenated using semicolons (compound command).

```
TRIGger:SEquence2:SOURce PHASe;PHASe 270
```

In the second command, TRIGger:SEquence2 is omitted. This is because the path is set to TRIGger:SEquence2 by the first command TRIGger:SEquence2:SOURce PHASe.

This compound command is the same as entering the following commands.

```
TRIGger:SEquence2:SOURce PHASe
TRIGger:SEquence2:PHASe 270
```

An error occurs if a node that is not defined in the current path is designated.

Commands of different subsystems can be concatenated using a colon and a semicolon together.

```
SOURce:CURRent MINimum;MEASure:CURRent:AC?
```

This compound command contains two root nodes, SOURce and MEASure.

When the second or subsequent command starts with a colon, the path specified by the previous command is cleared.

- The maximum number of characters that can be transmitted in a single line is 128.

Special symbols

Special symbols used in this manual to describe SCPI commands are defined below.

- Characters and numbers delimited by "|" in {} braces indicate that one of the items is to be selected.
Do not include the {} braces in the actual program.
- The characters <> indicate program data.
Do not write <> in the actual program.
- Brackets [] indicate option data.
When option data is not sent with the program, the default value is applied.
Do not write [] in the actual program.

Queries

The device settings or status can be queried.
To make a query, add a question mark at the end of the program header section.
If a query has parameters, enter a space after the question mark followed by the parameters.
CURRent? MIN

Response

A response returned as an answer to a query. It is a message that is always sent from the device to the computer. The status of the device or measured values are transmitted to the computer.

NOTE

When transmitting two queries in separate lines, read the response to the first query before transmitting the second line.

Program Terminator

All commands must be terminated using a valid terminator.

	RS232C	GPIOB	USB	LAN VXI-11/ HiSLIP	LAN SCPI-RAW
during reception	LF	LF or EOF	LF or EOF	LF or END	LF
during transmission	LF	LF + EOF	LF + EOF	LF + END	LF

When a command string is terminated, the path is reset to the root level.

NOTE

CR (ASCII 0x0D) is not a terminator.

Common commands

The IEEE-488.2 and SCPI standards contain a set of common commands for reset, self-test, and other functions. These common commands always start with an asterisk. The commands may have one or multiple parameters.

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Installing the VISA Library

VISA (Virtual Instrument Software Architecture) is a specification for standard software that is used to connect instruments. VISA was defined by the IVI Foundation.

A VISA library is required to use the software application. The VISA library (NI-VISA, Agilent VISA, or KI-VISA) must be installed on the controller (Windows).

When the product is controlled by the LAN interface (optional), middleware which applies to the VXI-11 or HiSLIP protocol is required. Middleware is automatically installed by the VISA library.

One of the VISA libraries (driver software implemented in compliance with the VISA specifications) below is necessary.

- NI-VISA by National Instruments (Ver. 5.1.1 or later)
- Agilent VISA by Agilent Technologies (Agilent IO Libraries Suite16.0 or later)
- KI-VISA Ver. 5.0.4 or later

NOTE

If your VISA library is an older version than that specified, you may not be able to use it depending on the interface.

Installing KI-VISA

NOTE

Do not install multiple VISA libraries on the same PC. Doing so may cause errors. KI-VISA is not required if NI-VISA or Agilent VISA is already installed.

KI-VISA is Kikusui's original VISA library that supports the VXIplug&play VISA specifications.

The newest version can be downloaded from the Kikusui website

(<http://www.kikusui.co.jp/en/download/>).

1. Load the accompanying CD-ROM into the CD-ROM drive.
2. Move to the VISA folder using the menu program of the CD-ROM or Explorer.
3. Double-click Kivisa_x_x_x.exe.
The value for x varies depending on the revision of the VISA library stored on the CD-ROM.
4. Proceed with the installation according to the instructions on the screen.

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Interface Setup

The PCR is equipped with RS232C interface as standard. If option interface boards are installed, you can use the GPIB, USB, and LAN interfaces.

Setup

In the factory default settings, the remote control interface is set to the RS232C interface. The GPIB, RS232C, USB, and LAN interfaces cannot be used simultaneously.

- [RS232C](#)
- [GPIB](#)
- [USB](#)
- [LAN](#)
- [Accessing and Operating the PCR from a Web Browser \(LAN interface\)](#)

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Parameters

The parameter format of SCPI is derived from the program parameter format defined in IEEE 488.2.

The representation system of the program data that is used on the PCR is indicated below.

Non-numeric parameters

Character string data (String)

Used when a series of ASCII characters are requested.

Be sure to enclose a string in single or double quotation marks. The start and end quotation marks must match.

```
DISPlay:AMMeter "AVG"
```

If you wish to use a quotation mark as a part of the string, enter two quotation marks consecutively (with no characters in between).

Character data (Character)

Character data is used when only a limited number of values are available for the program setting. Responses are returned in the short form.

```
TRIGger:SOURce {BUS|IMMediate}
```

Boolean data (Boolean)

Boolean data expresses a 1 or 0 condition or an ON or OFF condition. Responses are returned as 1 or 0.

```
OUTPut {ON|OFF|1|0}
```

Numeric parameters

NR1

Represents an integer.

Details are given in the IEEE 488.2 Standard Digital Interface for Programmable Instrumentation.

NR2

Represents a real number (floating point).

Details are given in the IEEE 488.2 Standard Digital Interface for Programmable Instrumentation.

NR3

Represents a real number (exponential).

Details are given in the IEEE 488.2 Standard Digital Interface for Programmable Instrumentation.

The value +3.80000E+02 is returned for the response data 380. The number of digits to the right of the decimal is 5.

NRf

NRf is a generic term that includes NR1, NR2, and NR3.

Numeric

A numeric parameter such as a decimal point, optional prefix, or measurement unit.

The syntax as a numeric representation is the same as NRf.

MINimum and MAXimum are available as substitutes for declaring certain values.

Units such as V, A, and W can also be used in a numeric parameter.

If a value that cannot be assigned is entered, the device rounds the value to the closest possible value.

```
SOURce:FREQuency 1100
```

PCR-M: The range of values for frequency is 40 to 500. Thus, 500 is set even if 1100 is specified.
 PCR-LE/PCR-LE2: The range of values for frequency is 1 to 999.9. Thus, 999.9 is set even if 1100 is specified.

Special form numeric parameters

The special form numeric parameters MINimum, MAXimum and DEFault can be used as substitutes for limit values when the parameter is numeric.

In the example below, the current limit is set to the minimum value.

```
SOURce:CURRent MINimum
```

Queries can be used to inquire the minimum and maximum values for most parameters.

```
SOURce:CURRent? MAX
```

```
SOURce:CURRent? MIN
```

Measurement units

Below are the default measurement units. Commands are accepted even if measurement units are not specified.

·V (voltage) ·A (current) ·W (wattage) ·VA (apparent power)
 ·VAR (reactive power) ·DEG (degrees) ·HZ (frequency)

The following optional prefixes are supported. If you use optional prefixes, specify the measurement unit.

·M (milli) ·K (kilo) ·U (micro)

NOTE

- The unit symbols in the International System of Units (SI) contain lowercase characters. The IEEE standard uses uppercase characters. SCPI commands are not case-sensitive.
- Commands are accepted even if a measurement unit is not specified.
- To enter "μ" in the data, use "U" instead.

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Default Settings

Conditions after sending a *RST, factory shipment, and at power-on

The following table shows how the PCR-LE is set when the *RST command is executed, at the time of factory shipment, and when the power is turned on.

Setup Item	Setting			Unit
	*RST	Factory default	At power-on	
OUTP:COUP	AC		Setting immediately before turning the POWER switch off	--
VOLT:RANG	150			--
VOLT	0			V
VOLT:OFFS	0			V
VOLT:LINE	0			V
VOLT:OFFS:LINE	0			V
FREQ	50.0			HZ
OUTP:PHAS:ON	0/OFF			--
OUTP:PHAS:ON:LEV	0			DEG
OUTP:PHAS:OFF	0/OFF			--
OUTP:PHAS:OFF:LEV	0			DEG
OUTP	0/OFF		Depends on the OUTP:PON settings	--
OUTP:PON	SAFE			--
FREQ:LIM	999.9		Setting immediately before turning the POWER switch off	HZ
FREQ:LIM:LOW	1			HZ
CURR	PCR500LE:5.5 PCR1000LE:11.0 PCR2000LE:22.0 PCR3000LE:33.0 PCR4000LE:44.0 PCR6000LE:66.0 PCR9000LE:99.0			A
CURR:OFFS	PCR500LE:3.85 PCR1000LE:7.70 PCR2000LE:15.40 PCR3000LE:23.10 PCR4000LE:30.80 PCR6000LE:46.20 PCR9000LE:69.30			A
CURR:PROT:STAT	1/ON			--
CURR:PROT:TRIP:TIME	10			S
CURR:PROT:OCP2:TIME	3			S
CURR:PEAK	PCR500LE:22.0 PCR1000LE:44.0 PCR2000LE:88.0 PCR3000LE:132.0 PCR4000LE:176.0 PCR6000LE:264.0 PCR9000LE:396.0			A
CURR:PEAK:LOW	PCR500LE:-22.0 PCR1000LE:-44.0 PCR2000LE:-88.0 PCR3000LE:-132.0 PCR4000LE:-176.0 PCR6000LE:-264.0			A

	PCR9000LE:-396.0		
VOLT:LIM	305.0		V
VOLT:LIM:LOW	0		V
VOLT:OFFS:LIM	431.0		V
VOLT:OFFS:LIM:LOW	-431.0		V
VOLT:OFFS:PROT:LEV	474.1		V
VOLT:OFFS:PROT:LEV:LOW	-474.1		V
VOLT:PROT:LEV	335.5		V
VOLT:PROT:LEV:LOW	0		V
SYST:CONF:RESP	MED		--
FREQ:SYNC	0/OFF		--
FREQ:SYNC:PHASE:DEL	0		DEG
SYST:CONF:SENS:MODE	0/OFF		--
WAVE:BANK	0		--
OUTP:IMP	0/OFF		--
OUTP:IMP:LEV	L range PCR500LE:0.04 PCR1000LE:0.02 PCR2000LE:0.01 PCR3000LE:0.00667 PCR4000LE:0.005 PCR6000LE:0.00333 PCR9000LE:0.00222 H range PCR500LE:0.16 PCR1000LE:0.08 PCR2000LE:0.04 PCR3000LE:0.02667 PCR4000LE:0.02 PCR6000LE:0.01333 PCR9000LE:0.00889		OHM
OUTP:IMP:RAT	1		PCT
OUTP:SST	0/OFF		--
OUTP:SST:TIME	0.1		S
VOLT:VCC:MODE	AUTO		--
VOLT:VCC	431.0		V
DISP:MMOD:CURRE	RMS		--
DISP:MMOD:VOLT	RMS		--
DISP:LVOL	0		--
DISP:PHAS	0		--
VOLT:TRIG	0		V
VOLT:OFFS:TRIG	0		V
VOLT:OFFS:MODE	FIX		--
VOLT:MODE	FIX		--
FREQ:TRIG	50.00	Setting immediately before turning the POWER switch off	HZ
FREQ:MODE	FIX		--
WAVE:BANK:TRIG	0	Setting immediately before turning the POWER switch off	--
WAVE:BANK:MODE	FIX		--
TRIG:SOUR	BUS		--
TRIG:SEQ3:SOUR TRIG:ACQ:SOUR	IMM		--
SENS:APER	0.4	Setting immediately before turning the POWER switch off	S
SENS:CURRE:HOLD	0		S
SIM:T1:PHAS:STAT	0/OFF		--
SIM:T1:TIME	0.1		S

SIM:T1:PHAS	0		DEG
SIM:T2:TIME	0		S
SIM:T3:TIME	0.1		S
SIM:T3:VOLT	0		V
SIM:T4:TIME	0		S
SIM:T5:CYCL:STAT	0/OFF		--
SIM:T5:TIME	0.1		S
SIM:T5:CYCL	0		--
SIM:POL	NORM		--
SIM:REP:COUN	9999		--
TRIG:SEQ4:SOUR TRIG:SIM:SOUR	IMM		--
TRIG:SEQ5:SOUR TRIG:PROG:SOUR	IMM		--
SYST:SLE	0/OFF	Setting immediately before turning the POWER switch off	--
SYST:SLE:TIME	3600		S
SYST:KLOC	0/OFF		--
SYST:CONF:TPH:MODE	0/OFF		--
FUNC:SOUR	INT		--
SYST:CONF:EXT:SINP:POL	NORM		--
VOLT:EXT:SOUR	NONE		HZ

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Command (Function/ Subsystem)

IEEE488.2 Common Commands

<u>*CLS</u>	Clears all the event registers
<u>*ESE</u>	Sets the event status enable register bits
<u>*ESR</u>	Queries the event status register
<u>*IDN</u>	Queries the identification string (manufacturer information)
<u>*OPC</u>	Causes the device to generate the operation complete message in the event status register when all pending selected device operations have been finished
<u>*OPT</u>	Queries the hardware interface board that is installed
<u>*PSC</u>	Initializes *ESE and *SRE
<u>*RST</u>	Performs a device reset; configures the PCR to a known condition independent from the usage history of the device
<u>*SRE</u>	Sets the service request enable register bits
<u>*STB</u>	Reads the status byte and master summary status bits
<u>*TRG</u>	Trigger command
<u>*TST</u>	Executes a self-test
<u>*WAI</u>	Prevents the device from executing subsequent commands or queries until the No Operation Pending flag becomes true

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Command (Function)

Output Settings

Setting the Output	
OUTP:COUP	Sets the output mode
Output on/off	
OUTP	Output on/off
OUTP:PON	Output status at power-on (PCR-LE only)
Setting the output on/off phase angle	
OUTP:PHAS:ON	Sets the output on phase control
OUTP:PHAS:ON:LEV	Sets the output on phase angle
OUTP:PHAS:OFF	Sets the output off phase control
OUTP:PHAS:OFF:LEV	Sets the output off phase angle
Setting the voltage surge suppression	
SYST:CONF:SSUP	Sets the voltage surge suppression
Setting the voltage	
VOLT:RANG	Sets the voltage range
VOLT	Sets the AC voltage
VOLT:OFFS	Sets the DC voltage
Setting the frequency	
FREQ	Sets the frequency

Output Settings (Single-phase, three-wire output/ Three-phase output)

VOLT{1 2 3}	Sets the AC voltage of each phase
VOLT{1 2 3}:OFFS	Sets the DC voltage of each phase
VOLT:LINE	Sets the AC line voltage
SYST:CONF:TPH:MODE	Sets the output mode (2P05-PCR-LE only)
VOLT:OFFS:LINE	Sets the DC line voltage (2P05-PCR-LE only)
SYST:CONF:PHAS:UV	Sets the U-V phase difference
SYST:CONF:PHAS:UW	Sets the U-W phase difference (3P05-PCR-LE only)

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Command (Function)

Protection and Clearing Alarms

Setting frequency limits

[FREQ:LIM](#) Sets the frequency upper limit
[FREQ:LIM:LOW](#) Sets the frequency lower limit

Setting current limits

[CURR](#) Sets the AC current upper limit
[CURR:OFFS](#) Sets the DC current upper limit
[CURR:PROT:STAT](#) Action that is performed when the current limit is exceeded
[CURR:PROT:TRIP:TIME](#) Sets the time until the protection function trips when the current limit is exceeded
[CURR:PROT:OCP2:TIME](#) Sets the time that must elapse after the internal semiconductor protection is activated before an alarm is generated
[CURR:PEAK](#) Sets the peak limit of the positive electric potential
[CURR:PEAK:LOW](#) Sets the peak limit of the negative electric potential

Setting voltage limits

[VOLT:LIM](#) Sets the AC voltage upper limit
[VOLT:LIM:LOW](#) Sets the AC voltage lower limit
[VOLT:OFFS:LIM](#) Sets the DC voltage upper limit
[VOLT:OFFS:LIM:LOW](#) Sets the DC voltage lower limit

Setting OVP and UVP

[VOLT:OFFS:PROT:LEV](#) Sets the OVP value to use to judge averaged voltage measurements
[VOLT:OFFS:PROT:LEV:LOW](#) Sets the UVP value to use to judge averaged voltage measurements
[VOLT:PROT:LEV](#) Sets the OVP value used to judge rms voltage measurements
[VOLT:PROT:LEEV:LOW](#) Sets the UVP value used to judge rms voltage measurements

Clearing alarms

[OUTP:PROT:CLE](#) Clears alarms

Protection and Clearing Alarms (Single-phase, three-wire output/ Three-phase output)

[CURR{1|2|3}](#) Sets the AC current upper limit of each phase
[CURR{1|2|3}:OFFS](#) Sets the DC current upper limit of each phase
[CURR{1|2|3}:PEAK](#) Sets the peak limit of the positive electric potential of each phase
[CURR{1|2|3}:PEAK:LOW](#) Sets the peak limit of the negative electric potential of each phase

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Command (Function)

Advanced Operation

Setting the response

[SYST:CONF:RESP](#) Sets the response

Configuring the synchronization function

[FREQ:SYNC](#) Turns the synchronization function on and off[FREQ:SYNC:PHASE:DEL](#) Sets the synchronization delay phase angle

Setting the compensation function

[SYST:CONF:SENS:MODE](#) Sets the compensation function

Configuring special waveform output

[WAVE:BANK](#) Specifies the number of the waveform bank that you want to execute[WAVE:EDIT:PCL](#) Sets the special waveform to the sine wave or a peak-clipped waveform, and sets the crest factor[WAVE:EDIT:USER:DATA:POIN](#) Sets a user-defined waveform[WAVE:BANK:TYPE](#) Queries the output waveform type[WAVE:EDOT:SIN](#) Sets the special waveform to the sine wave

Configuring the output impedance

[OUTP:IMP](#) Sets the output impedance control[OUTP:IMP:LEVEL](#) Sets the output impedance in terms of resistance[OUTP:IMP:RAT](#) Sets the output impedance in terms of percentage

Configuring soft starts

[OUTP:SST](#) Sets the soft start control[OUTP:SST:TIME](#) Sets the rise time

Configuring the internal Vcc voltage

[VOLT:VCC:MODE](#) Sets the Vcc operating condition[VOLT:VCC](#) Sets the internal Vcc voltage

Setting the ecological function

[SYST:CONF:POW:EXP](#) Sets the anticipated maximum power

Advanced Operation

(Single-phase, three-wire output/ Three-phase output)

[SYST:CONF:POW:{1|2|3}:EXP](#) Sets the anticipated maximum power of each phase[SYST:CONF:TPH:MODE](#) Sets the output mode (2P05-PCR-LE only)[WAVE{1|2|3}:EDIT:USER:DATA:POIN](#) Sets a user-defined waveform of each phase

Advanced Operation (Master-Slave operation)

[SENS:Curr:ADJ:ZERO](#) Starts zero calibration

Advanced Operation (Analog signal operation)

[FUNC:SOUR](#) Sets the signal source (EX05-PCR-LE only)[VOLT:EXT:SOUR](#) Sets the signal source (EX06-PCR-LE only)[SYST:CONF:EXT:SINP{\[0\]|1|2|3}:POL](#) Sets the polarity (EX05-PCR-LE only)[OUTP:EXT:LOG](#) Sets the logic of the output on/off[PROG:EXT:LOG](#) Sets the logic of the sequence start/stop[SYST:CONF:EXT:ACL](#) Sets the logic of the alarm clear[SYST:CONF:EXT:SHUT:CONT](#) Sets the logic of the shut down[SYST:CONF:EXT:OOR:MODE](#) Sets the phase to monitor.[>top](#)

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Command (Function)

Display Function

Configuring the measured value display

- [DISP:MMOD:CURR](#) Sets the measured current and power displays
- [DISP:MMOD:VOLT](#) Sets the measured voltage display

Setting the screen

- [DISP:CONT](#) Adjusts the screen brightness

Display Function (Single-phase, three-wire output/ Three-phase output)

- [DISP:LVOL](#) Switches the voltage display (between phase voltage and line voltage)
- [DISP:PHAS](#) Selects the phase that you want to display

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Command (Function)

Memory Usage

On the PCR-M series, use the *RCL and *SAV commands.

MEM:SAV	Saves settings to memory
MEM:PREV	Views the settings in memory
MEM:RCL	Recalls settings from memory

Configuring the date and time (used in the timestamps of files saved to USB memory devices)

SYST:CONF:DATE	Sets the date
SYST:CONF:TIME	Sets the time

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Command (Function)

Triggered Control of Output

The second level nodes are SEquence[1] and TRANsient. Regardless of which node you use, the PCR operates in the same way when it receives the commands.

[-> Tutorial](#)

[VOLT:TRIG](#)

Sets the AC voltage that will be set when a trigger is received

[VOLT:MODE](#)

Sets the trigger function control of the AC voltage setting

[VOLT:OFFS:TRIG](#)

Sets the DC voltage that will be set when a trigger is received

[VOLT:OFFS:MODE](#)

Sets the trigger function control of the DC voltage setting

[FREQ:TRIG](#)

Sets the frequency that will be set when a trigger is received

[FREQ:MODE](#)

Sets the trigger function control of the frequency setting

[WAVE:BANK:TRIG](#)

Sets the number of the waveform bank that will be set when a trigger is received

[WAVE:BANK:MODE](#)

Sets the trigger function control of the number of the waveform bank

[TRIG:SOUR](#)

Sets the trigger source of the sequence 1 group

[INIT](#)

Starts the trigger function of the sequence 1 group

[INIT:NAME](#)

Starts the trigger function of the specified sequence group

[TRIG](#)

Sequence 1 group software trigger

[ABOR](#)

Aborts the trigger function

Triggered Control of Output (Single-phase, three-wire output/ Three-phase output)

[VOLT{1|2|3}:TRIG](#)

Sets the AC voltage of each phase that will be set when a trigger is received

[VOLT{1|2|3}:OFFS:TRIG](#)

Sets the DC voltage of each phase that will be set when a trigger is received

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Command (Function)

Output On/Off Phase Control

OUTP:PHAS:ON	Sets the output on phase control
OUTP:PHAS:ON:LEV	Sets the output on phase angle
OUTP:PHAS:OFF	Sets the output off phase control
OUTP:PHAS:OFF:LEV	Sets the output off phase angle

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Command (Function)

Measured Value Queries

The second level nodes are SEquence3 and ACQuire. Regardless of which node you use, the PCR operates in the same way when it receives the commands.

If you use the root node MEASure, the measurement is performed, and then the measured value is queried. If you use FETC, the measured value is queried without a measurement being performed.

[-> Tutorial](#)

[TRIG:SEQ3:SOUR](#)

Sets the trigger source of the sequence 3 group

[TRIG:ACQ:SOUR](#)

[INIT:SEQ3](#)

Starts the trigger function of the sequence 3 group

[INIT:NAME](#)

Starts the trigger function of the specified sequence group

[TRIG:SEQ3](#)

Sequence 3 group software trigger

[TRIG:ACQ](#)

[SENS:APER](#)

Sets the aperture time (measurement time)

[ABOR](#)

Aborts the trigger function

[MEAS:CURRE:DC](#)

Queries the DC current

[FETC:CURRE:DC](#)

[MEAS:CURRE:AC](#)

Queries the AC current

[FETC:CURRE:AC](#)

[MEAS:CURRE:AMP:MAX](#)

Queries the peak current

[FETC:CURRE:AMP:MAX](#)

[SENS:CURRE:HOLD](#)

Sets the hold time of the peak current

[MEAS:CURRE:AMP:MAX:HOLD](#) Queries the peak current (the held value)

[FETC:CURRE:AMP:MAX:HOLD](#)

[SENS:CURRE:PEAK:CLE](#)

Clears the held measured peak current

[MEAS:CURRE:CRES](#)

Queries the current crest factor

[FETC:CURRE:CRES](#)

[MEAS:CURRE:HARM](#)

Queries the harmonic current

[FETC:CURRE:HARM](#)

[MEAS:CURRE:HARM:RAT](#)

Queries the harmonic current (as a percentage)

[FETC:CURRE:HARM:RAT](#)

[MEAS:FREQ](#)

Queries the frequency

[FETC:FREQ](#)

[MEAS:POW:AC](#)

Queries the AC power (the actual power)

[FETC:POW:AC](#)

[MEAS:POW:AC:APP](#)

Queries the AC power (the apparent power)

[FETC:POW:AC:APP](#)

[MEAS:POW:AC:REAC](#)

Queries the AC power (the reactive power)

[FETC:POW:AC:REAC](#)

[MEAS:POW:AC:PFAC](#)

Queries the power factor of the AC power

[FETC:POW:AC:PFAC](#)

[MEAS:POW:DC](#)

Queries the DC power

[FETC:POW:DC](#)

[MEAS:VOLT:DC](#)

Queries the DC voltage

[FETC:VOLT:DC](#)

[MEAS:VOLT:AC](#)

Queries the AC voltage

[FETC:VOLT:AC](#)

[MEAS:VOLT:AMPL:MAX](#)

Queries the voltage peak

[FETC:VOLT:AMPL:MAX](#)

Measured Value Queries

(Single-phase, three-wire output/ Three-phase output)

[MEAS{1|2}:CURRE:DC](#)

Queries the DC current of U/V phase (2P05-PCR-LE only)

[FETC{1|2}:CURRE:DC](#)

[MEAS{1|2|3}:CURRE:AC](#)

Queries the AC current of each phase

[FETC{1|2|3}:CURRE:AC](#)

[MEAS{1|2|3}:CURRE:AMPL:MAX](#)

Queries the peak current of each phase

[FETC{1|2|3}:CURRE:AMPL:MAX](#)

[MEAS{1|2|3}:CURRE:AMP:MAX:HOLD](#) Queries the peak current (the held value) of each phase

[FETC{1|2|3}:CURRE:AMP:MAX:HOLD](#)

MEAS{1 2 3}:CURR:CRES	Queries the current crest factor of each phase
FETC{1 2 3}:CURR:CRES	
MEAS{1 2 3}:CURR:HARM	Queries the harmonic current of each phase
FETC{1 2 3}:CURR:HARM	
MEAS{1 2 3}:CURR:HARM:RAT	Queries the harmonic current (as a percentage) of each phase
FETC{1 2 3}:CURR:HARM:RAT	
MEAS{1 2}:LVOL:DC	Queries the DC line voltage of each phase (2P05-PCR-LE only)
FETC{1 2}:LVOL:DC	
MEAS{1 2 3}:LVOL:AC	Queries the AC line voltage of each phase
FETC{1 2 3}:LVOL:AC	
MEAS{1 2 3}:LVOL:AMPL:MAX	Queries the peak AC line voltage of each phase
FETC{1 2 3}:LVOL:AMPL:MAX	
MEAS{1 2 3}:POW:AC	Queries the AC power (the actual power) of each phase
FETC{1 2 3}:POW:AC	
MEAS:POW:AC:TOT	Queries total of the AC power (the actual power)
FETC:POW:AC:TOT	
MEAS{1 2 3}:POW:AC:APP	Queries the AC power (the apparent power) of each phase
FETC{1 2 3}:POW:AC:APP	
MEAS:POW:AC:APP:TOT	Queries total of the AC power (the apparent power)
FETC:POW:AC:APP:TOT	
MEAS{1 2 3}:POW:AC:REAC	Queries the AC power (the reactive power)
FETC{1 2 3}:POW:AC:REAC	
MEAS:POW:AC:REAC:TOT	Queries total of the AC power (the overall reactive power)
FETC:POW:AC:REAC:TOT	
MEAS{1 2 3}:POW:AC:PFAC	Queries the power factor of the AC power of each phase
FETC{1 2 3}:POW:AC:PFAC	
MEAS:POW:AC:PFAC:TOT	Queries total of the power factor of the AC power
FETC:POW:AC:PFAC:TOT	
MEAS{1 2}:POW:DC	Queries the DC power of U/V phase (2P05-PCR-LE only)
FETC{1 2}:POW:DC	
MEAS:POW:DC:TOT	Queries total of the DC power (2P05-PCR-LE only)
FETC:POW:DC:TOT	
MEAS{1 2}:VOLT:DC	Queries the DC voltage of U/V phase (2P05-PCR-LE only)
FETC{1 2}:VOLT:DC	
MEAS{1 2 3}:VOLT:AC	Queries the AC voltage of each phase
FETC{1 2 3}:VOLT:AC	
MEAS{1 2 3}:VOLT:AMPL:MAX	Queries the voltage peak of each phase
FETC{1 2 3}:VOLT:AMPL:MAX	

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Command (Function)

Power Line Abnormality Simulations

The second level nodes are SEQUENCE4 and SIMulation. Regardless of which node you use, the PCR operates in the same way when it receives the commands.

Power line abnormality simulations are enabled in AC mode ([OUTP:COUP AC](#)).

[-> Tutorial](#)

Configuring power line abnormality simulations

SIM:T1:PHAS:STAT	Selects the voltage regulation start (time or phase)
SIM:T1:TIME	Sets the voltage regulation starting time
SIM:T1:PHAS	Sets the voltage regulation starting phase
SIM:T2:TIME	Sets slope time 1
SIM:T3:TIME	Sets the voltage regulation time
SIM:T3:VOLT	Sets the regulated voltage
SIM:T4:TIME	Sets slope time 2
SIM:T5:CYCL:STAT	Selects the duration that the voltage remains at the initial level (time or cycles)
SIM:T5:TIME	Sets the return time
SIM:T5:CYCL	Sets the return cycles
SIM:POL	Sets the voltage regulation polarity
SIM:REP:COUN	Sets the number of repetitions
SYST:CONF:STAT:OUTP:POL	Sets the status signal output polarity

Executing power line abnormality simulations

SIM:STAT	Executes and stops power line abnormality simulations
SIM:EXEC	Queries the execution status of power line abnormality simulations
TRIG:SEQ4:SOUR	Sets the trigger source of the sequence 4 group
TRIG:SIM:SOUR	
INIT:SEQ4	Starts the trigger function of the sequence 4 group
INIT:NAME	Starts the trigger function of the specified sequence group
TRIG:SEQ4	Sequence 4 group software trigger
TRIG:SIM	
ABOR	Aborts the trigger function

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Command (Function)

Sequence Operations

The second level nodes are SEQuence5 and PROGram. Regardless of which node you use, the PCR operates in the same way when it receives the commands.

[-> Tutorial](#)

Configuring sequences

[PROG:EDIT](#)

Edits a sequence step (excluding the jump, impedance, and phase settings)

[PROG:EDIT:JUMP](#)

Edits the jump settings of a sequence step

[PROG:EDIT:OIMP:RAT](#)

Edits the output impedance settings of a sequence step

[PROG:EDIT:PHAS:STAR](#)

Edits the starting phase angle settings and the phase change setting of a sequence step

[PROG:EDIT:PHAS:STOP](#)

Edits the ending phase angle settings of a sequence step

[PROG:LOOP](#)

Sets the number of sequence repetitions

[PROG:CLE](#)

Sets all the steps in the sequence to their default values

[PROG:STEP:STAR](#)

Sets the sequence starting step number

[PROG:STEP:END](#)

Sets the sequence ending step number

[SYST:CONF:STAT:OUTP:POL](#)

Sets the status signal output polarity

[SYST:CONF:TRIG:INP:POL](#)

Sets the trigger signal input polarity

[SYST:CONF:TRIG:OUTP:POL](#)

Sets the trigger signal output polarity

Executing sequences

[TRIG:SEQ5:SOUR](#)

Sets the trigger source of the sequence 5 group

[TRIG:PROG:SOUR](#)

[INIT:SEQ5](#)

Starts the trigger function of the sequence 5 group

[INIT:NAME](#)

Starts the trigger function of the specified sequence group

[PROG:EXEC](#)

Queries the execution state of the sequence

[PROG:STAT](#)

Changes the execution state of the sequence

[TRIG:SEQ5](#)

Sequence 5 group software trigger

[TRIG:PROG](#)

[ABOR](#)

Aborts the trigger function

Sequence Operations (Single-phase, three-wire output/ Three-phase output)

[PROG:EDIT:PHAS:UOFF](#)

Sets the U phase offset of the sequence

[PROG:EDIT:PHAS:UV](#)

Sets the U-V phase difference of a sequence step

[PROG:EDIT:PHAS:UW](#)

Sets the U-W phase difference of a sequence step (3P05-PCR-LE only)

[PROG:EDIT:VOLT{0|1|2|3}](#)

Sets the unbalanced AC voltage of a sequence step

[PROG:EDIT:VOLT{0|1|2|3}:OFFS](#)

Sets the unbalanced DC voltage of a sequence step

[PROG:EDIT:PHAS:RAMP](#)

Sets the phase change

[SYST:CONF:PHAS:UOFF:INIT](#)

Clears the U phase offset setting

Advanced Operation (Analog signal operation)

[PROG:EXT:LOG](#)

Sets the logic of the sequence start/stop

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SYST:ERR	Reads error information
SYST:CONF:TRAC	Sets the communication error display
SYST:CONF:DATE	Sets the date
SYST:CONF:TIME	Sets the time
SYST:KLOC	Locks panel controls
SYST:LOC	Switches the PCR to local mode
SYST:OPT	Queries the optional interface
SYST:REM	Switches the PCR to remote mode; locks panel controls (except the local key)
SYST:RWL	Switches the PCR to remote mode; locks panel controls
SYST:SLE	Turns the sleep function on and off
SYST:SLE:EXEC	Activates sleep mode immediately
SYST:SLE:TIME	Sets the time that must elapse before the product enters sleep mode
SYST:VERS	Queries the SCPI specification version that the PCR complies with

Sequence Operations (Single-phase, three-wire output/ Three-phase output)

[SYST:CONF:PHAS:UOFF:INIT](#) Clears the U phase offset setting

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Command (Function)

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[Status byte register](#)

[Event status register](#)

[OPERations status register](#)

STAT:OPER	Event
STAT:OPER:COND	Register status
STAT:OPER:ENAB	Enable
STAT:OPER:NTR	Negative transition
STAT:OPER:PTR	Positive transition

[QUESTionable status register](#)

STAT:QUES	Event
STAT:QUES:COND	Register status
STAT:QUES:ENAB	Enable
STAT:QUES:NTR	Negative transition
STAT:QUES:PTR	Positive transition

Preset status

STAT:PRES	Resets the enable register

Registers (Single-phase, three-wire output/ Three-phase output)

[OPERation:INSTrument subregister](#)

STAT:OPER:INST	Event
STAT:OPER:INST:COND	Register status
STAT:OPER:INSTR:ENAB	Enable
STAT:OPER:INST:PTR	Negative transition
STAT:OPER:INST:NTR	Positive transition

[OPERation:INSTrument:ISUMmary{1|2|3} subregister](#)

STAT:OPER:INST:ISUM{1 2 3}	Event
STAT:OPER:INST:ISUM{1 2 3}:COND	Register status
STAT:OPER:INSTR:ISUM{1 2 3}:ENAB	Enable
STAT:OPER:INST:ISUM{1 2 3}:PTR	Negative transition
STAT:OPER:INST:ISUM{1 2 3}:NTR	Positive transition

[QUESTionable:INSTrument subregister](#)

STAT:QUES:INST	Event
STAT:QUES:INST:COND	Register status
STAT:QUES:INST:ENAB	Enable
STAT:QUES:INST:PTR	Negative transition
STAT:QUES:INST:NTR	Positive transition

[QUESTionable:INSTrument:ISUMmary{1|2|3} subregister](#)

STAT:QUES:INST:ISUM{1 2 3}	Event
STAT:QUES:INST:ISUM{1 2 3}:COND	Register status
STAT:QUES:INST:ISUM{1 2 3}:ENAB	Enable
STAT:QUES:INST:ISUM{1 2 3}:PTR	Negative transition
STAT:QUES:INST:ISUM{1 2 3}:NTR	Positive transition

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ABOR

Aborts operations such as setting, change, and measurement in all sequence groups.

The trigger status immediately after the power is turned on is the same as the trigger status when the ABOR command is received. If the ABOR command is sent when the measurement is already started, the measured data of the sequence 3 group remains invalid.

If the ABOR command is sent when the sequence 3 group is not initiated and the measured data that is held is valid, the measured data is not discarded.

A specific sequence group cannot be specified with the ABOR command. It is always interpreted as ALL.

Command

ABORt

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Command (Subsystem)

SOURce subsystem

CURR	Sets the AC current upper limit
CURR:OFFS	Sets the DC current upper limit
CURR:PEAK	Sets the peak limit of the positive electric potential
CURR:PEAK:LOW	Sets the peak limit of the negative electric potential
CURR:PROT:OCP2:TIME	Sets the time that must elapse after the internal semiconductor protection is activated before an alarm is generated
CURR:PROT:STAT	Action that is performed when the current limit is exceeded
CURR:PROT:TRIP:TIME	Sets the time until the protection function trips when the current limit is exceeded
FREQ	Sets the frequency
FREQ:LIM	Sets the frequency upper limit
FREQ:LIM:LOW	Sets the frequency lower limit
FREQ:MODE	Sets the trigger function control of the frequency setting
FREQ:SYNC	Turns the synchronization function on and off
FREQ:SYNC:PHASE:DEL	Sets the synchronization delay phase angle of the synchronization function
FREQ:TRIG	Sets the frequency that will be set when a trigger is received
VOLT	Sets the AC voltage
VOLT:LIM	Sets the AC voltage upper limit
VOLT:LIM:LOW	Sets the AC voltage lower limit
VOLT:MODE	Sets the trigger function control of the AC voltage setting
VOLT:OFFS	Sets the DC voltage
VOLT:OFFS:LIM	Sets the DC voltage upper limit
VOLT:OFFS:LIM:LOW	Sets the DC voltage lower limit
VOLT:OFFS:MODE	Sets the trigger function control of the DC voltage setting
VOLT:OFFS:PROT:LEV	Sets the OVP value to use to judge averaged voltage measurements
VOLT:OFFS:PROT:LEV:LOW	Sets the UVP value to use to judge averaged voltage measurements
VOLT:OFFS:TRIG	Sets the DC voltage that will be set when a trigger is received
VOLT:PROT:LEV	Sets the OVP value used to judge rms voltage measurements
VOLT:PROT:LEV:LOW	Sets the UVP value used to judge rms voltage measurements
VOLT:RANG	Sets the voltage range
VOLT:TRIG	Sets the AC voltage that will be set when a trigger is received
VOLT:VCC	Sets the internal Vcc voltage
VOLT:VCC:MODE	Sets the Vcc operating condition
WAVE:BANK	Specifies the number of the waveform bank that you want to execute
WAVE:BANK:TRIG	Sets the number of the waveform bank that will be set when a trigger is received
WAVE:BANK:MODE	Sets the trigger function control of the number of the waveform bank
WAVE:BANK:TYPE	Queries the output waveform type
WAVE:EDIT:PCL	Sets the special waveform to the sine wave or a peak-clipped waveform, and sets the crest factor
WAVE:EDIT:USER:DATA:POIN	Sets a user-defined waveform
WAVE:EDIT:SIN	Sets the special waveform to the sine wave

SOURce subsystem

(Single-phase, three-wire output/ Three-phase output)

CURR{1 2 3}	Sets the AC current upper limit of each phase
CURR{1 2 3}:OFFS	Sets the DC current upper limit of each phase
CURR{1 2 3}:PEAK	Sets the peak limit of the positive electric potential of each phase
CURR{1 2 3}:PEAK:LOW	Sets the peak limit of the negative electric potential of each phase
VOLT{1 2 3}	Sets the AC voltage of each phase
VOLT{1 2 3}:TRIG	Sets the AC voltage of each phase that will be set when a trigger is received

VOLT:LINE	Sets the AC line voltage
VOLT{1 2 3}:OFFS	Sets the DC voltage of each phase
VOLT{1 2 3}:OFFS:TRIG	Sets the DC voltage of each phase that will be set when a trigger is received
VOLT:OFFS:LINE	Sets the DC line voltage (2P05-PCR-LE only)
WAVE{1 2 3}:EDIT:USER:DATA:POIN	Sets a user-defined waveform of each phase

SOURce subsystem (Analog signal operation)

FUNC:SOUR	Sets the signal source (EX05-PCR-LE only)
VOLT:EXT:SOUR	Sets the signal source (EX06-PCR-LE only)

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Command (Subsystem)

OUTPut subsystem

OUTP	Turns output on and off
OUTP:COUP	Sets the output mode
OUTP:IMP	Sets the output impedance control
OUTP:IMP:LEVEL	Sets the output impedance in terms of resistance
OUTP:IMP:RAT	Sets the output impedance in terms of percentage
OUTP:SST	Sets the soft start control
OUTP:SST:TIME	Sets the rise time
OUTP:PHAS:ON	Turns output on phase control on and off
OUTP:PHAS:ON:LEV	Sets the output on phase angle
OUTP:PHAS:OFF	Turns output off phase control on and off
OUTP:PHAS:OFF:LEV	Sets the output off phase angle
OUTP:PON	Output status at power-on
OUTP:PROT:CLE	Clears alarms

OUTPut subsystem (Analog signal operation)

OUTP:EXT:LOG	Sets the logic of the output on/off

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Command (Subsystem)

MEASure and FETCh subsystem

MEAS:CURR:DC	Queries the DC current
FETC:CURR:DC	
MEAS:CURR:AC	Queries the AC current
FETC:CURR:AC	
MEAS:CURR:AMPL:MAX	Queries the peak current
FETC:CURR:AMPL:MAX	
MEAS:CURR:AMP:MAX:HOLD	Queries the peak current (the held value)
FETC:CURR:AMP:MAX:HOLD	
MEAS:CURR:CRES	Queries the current crest factor
FETC:CURR:CRES	
MEAS:CURR:HARM	Queries the harmonic current
FETC:CURR:HARM	
MEAS:CURR:HARM:RAT	Queries the harmonic current (as a percentage)
FETC:CURR:HARM:RAT	
MEAS:FREQ	Queries the frequency
FETC:FREQ	
MEAS:POW:DC	Queries the DC power
FETC:POW:DC	
MEAS:POW:AC	Queries the AC power
FETC:POW:AC	
MEAS:POW:AC:APP	Queries the AC power (the apparent power)
FETC:POW:AC:APP	
MEAS:POW:AC:REAC	Queries the AC power (the reactive power)
FETC:POW:AC:REAC	
MEAS:POW:AC:PFAC	Queries the power factor of the AC power
FETC:POW:AC:PFAC	
MEAS:VOLT:DC	Queries the DC voltage
FETC:VOLT:DC	
MEAS:VOLT:AC	Queries the AC voltage
FETC:VOLT:AC	
MEAS:VOLT:AMPL:MAX	Queries the voltage peak
FETC:VOLT:AMPL:MAX	

MEASure and FETCh subsystem (Single-phase, three-wire output/ Three-phase output)

MEAS{1 2}:CURR:DC	Queries the DC current of U/V phase (2P05-PCR-LE only)
FETC{1 2}:CURR:DC	
MEAS{1 2 3}:CURR:AC	Queries the AC current of each phase
FETC{1 2 3}:CURR:AC	
MEAS{1 2 3}:CURR:AMPL:MAX	Queries the peak current of each phase
FETC{1 2 3}:CURR:AMPL:MAX	
MEAS{1 2 3}:CURR:AMP:MAX:HOLD	Queries the peak current (the held value) of each phase
FETC{1 2 3}:CURR:AMP:MAX:HOLD	
MEAS{1 2 3}:CURR:CRES	Queries the current crest factor of each phase
FETC{1 2 3}:CURR:CRES	
MEAS{1 2 3}:CURR:HARM	Queries the harmonic current of each phase
FETC{1 2 3}:CURR:HARM	
MEAS{1 2 3}:CURR:HARM:RAT	Queries the harmonic current (as a percentage) of each phase
FETC{1 2 3}:CURR:HARM:RAT	
MEAS{1 2}:LVOL:DC	Queries the DC line voltage of each phase (2P05-PCR-LE only)
FETC{1 2}:LVOL:DC	
MEAS{1 2 3}:LVOL:AC	Queries the AC line voltage of each phase
FETC{1 2 3}:LVOL:AC	
MEAS{1 2 3}:LVOL:AMPL:MAX	Queries the peak AC line voltage of each phase
FETC{1 2 3}:LVOL:AMPL:MAX	
MEAS{1 2 3}:POW:AC	Queries the AC power (the actual power) of each phase
FETC{1 2 3}:POW:AC	
MEAS:POW:AC:TOT	Queries total of the AC power (the actual power)
FETC:POW:AC:TOT	
MEAS{1 2 3}:POW:AC:APP	Queries the AC power (the apparent power) of each phase
FETC{1 2 3}:POW:AC:APP	

[MEAS:POW:AC:APP:TOT](#)
[FETC:POW:AC:APP:TOT](#)
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[FETC{1|2|3}:VOLT:AC](#)
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Queries total of the AC power (the apparent power)
 Queries the AC power (the reactive power) of each phase
 Queries total of the AC power (the overall reactive power)
 Queries the power factor of the AC power of each phase
 Queries total of the power factor of the AC power
 Queries the DC power of U/V phase (2P05-PCR-LE only)
 Queries total of the DC power (2P05-PCR-LE only)
 Queries the DC voltage of U/V phase (2P05-PCR-LE only)
 Queries the AC voltage of each phase
 Queries the voltage peak of each phase

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Command (Subsystem)

TRIGger subsystem

[ABOR](#)

Aborts the trigger function

[INIT](#)

Starts the trigger function of the sequence 1 group

[INIT:NAME](#)

Starts the trigger function of the specified sequence group

[INIT:SEQ3](#)

Starts the trigger function of the sequence 3 group

[INIT:SEQ4](#)

Starts the trigger function of the sequence 4 group

[INIT:SEQ5](#)

Starts the trigger function of the sequence 5 group

[TRIG](#)

Sequence 1 group software trigger

[TRIG:ACQ](#)

Sequence 3 group software trigger

[TRIG:ACQ:SOUR](#)

Sets the trigger source of the sequence 3 group

[TRIG:PROG](#)

Sequence 5 group software trigger

[TRIG:PROG:SOUR](#)

Sets the trigger source of the sequence 5 group

[TRIG:SEQ3](#)

Sequence 3 group software trigger

[TRIG:SEQ3:SOUR](#)

Sets the trigger source of the sequence 3 group

[TRIG:SEQ4](#)

Sequence 4 group software trigger

[TRIG:SEQ4:SOUR](#)

Sets the trigger source of the sequence 4 group

[TRIG:SEQ5](#)

Sequence 5 group software trigger

[TRIG:SEQ5:SOUR](#)

Sets the trigger source of the sequence 5 group

[TRIG:SOUR](#)

Sets the trigger source of the sequence 1 group

[TRIG:SIM](#)

Sequence 4 group software trigger

[TRIG:SIM:SOUR](#)

Sets the trigger source of the sequence 4 group

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Command (Subsystem)

PROGram subsystem

PROG:EDIT	Edits a sequence step (excluding the jump, impedance, and phase settings)
PROG:EDIT:JUMP	Edits the jump settings of a sequence step
PROG:EDIT:OIMP:RAT	Edits the output impedance settings of a sequence step
PROG:EDIT:PHAS:STAR	Edits the starting phase angle settings and the phase change setting of a sequence step
PROG:EDIT:PHAS:STOP	Edits the ending phase angle settings of a sequence step
PROG:LOOP	Sets the number of sequence repetitions
PROG:CLE	Sets all the steps in the sequence to their default values
PROG:STEP:STAR	Sets the sequence starting step number
PROG:STEP:END	Sets the sequence ending step number
PROG:EXEC	Queries the execution state of the sequence
PROG:STAT	Changes the execution state of the sequence

PROGram subsystem (Single-phase, three-wire output/ Three-phase output)

PROG:EDIT:PHAS:UOFF	Sets the U phase offset of the sequence
PROG:EDIT:PHAS:UV	Sets the U-V phase difference of a sequence step
PROG:EDIT:PHAS:UW	Sets the U-W phase difference of a sequence step (3P05-PCR-LE only)
PROG:EDIT:PHAS:RAMP	Sets the phase change
PROG:EDIT:VOLT{0 1 2 3}	Sets the unbalanced AC voltage of a sequence step
PROG:EDIT:VOLT{0 1 2 3}:OFFS	Sets the unbalanced DC voltage of a sequence step

PROGram subsystem (Analog signal operation)

PROG:EXT:LOG	Sets the logic of the sequence start/stop

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Command (Subsystem)

SIMulation subsystem

SIM:T1:PHAS:STAT	Selects the voltage regulation start (time or phase)
SIM:T1:TIME	Sets the voltage regulation starting time
SIM:T1:PHAS	Sets the voltage regulation starting phase
SIM:T2:TIME	Sets slope time 1
SIM:T3:TIME	Sets the voltage regulation time
SIM:T3:VOLT	Sets the regulated voltage
SIM:T4:TIME	Sets slope time 2
SIM:T5:CYCL:STAT	Selects the duration that the voltage remains at the initial level (time or cycles)
SIM:T5:TIME	Sets the return time
SIM:T5:CYCL	Sets the return cycles
SIM:POL	Sets the voltage regulation polarity
SIM:REP:COUN	Sets the number of repetitions
SIM:STAT	Executes and stops power line abnormality simulations
SIM:EXEC	Queries the execution status of power line abnormality simulations

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Command (Subsystem)

SYSTem subsystem

SYST:CONF:DATE	Sets the date
SYST:CONF:POW:EXP	Sets the anticipated maximum power
SYST:CONF:RESP	Sets the response
SYST:CONF:SENS:MODE	Sets the compensation function
SYST:CONF:SSUP	Sets the voltage surge suppression
SYST:CONF:STAT:OUTP:POL	Sets the status signal output polarity
SYST:CONF:TIME	Sets the time
SYST:CONF:TRIG:INP:POL	Sets the trigger signal input polarity
SYST:CONF:TRIG:OUTP:POL	Sets the trigger signal output polarity
SYST:CONF:TRAC	Sets the communication error display
SYST:ERR	Reads error information
SYST:KLOC	Locks panel controls
SYST:LOC	Switches the PCR to local mode
SYST:OPT	Queries the optional interface
SYST:REM	Switches the PCR to remote mode; locks panel controls (except the local key)
SYST:RWL	Switches the PCR to remote mode; locks panel controls
SYST:SLE	Turns the sleep function on and off
SYST:SLE:EXEC	Activates sleep mode immediately
SYST:SLE:TIME	Sets the time that must elapse before the product enters sleep mode
SYST:VERS	Queries the SCPI specification version that the PCR complies with

SYSTem subsystem

(Single-phase, three-wire output/ Three-phase output)

SYST:CONF:PHAS:UOFF:INIT	Clears the U phase offset setting
SYST:CONF:PHAS:UV	Sets the U-V phase difference
SYST:CONF:PHAS:UW	Sets the U-W phase difference (3P05-PCR-LE only)
SYST:CONF:POW:{1 2 3}:EXP	Sets the anticipated maximum power of each phase
SYST:CONF:TPH:MODE	Sets the output mode (2P05-PCR-LE only)

SYSTem subsystem (Analog signal operation)

SYST:CONF:EXT:SINP:[0 1 2 3]:POL	Sets the polarity (EX05-PCR-LE only)
SYST:CONF:EXT:ACL	Sets the logic of the alarm clear
SYST:CONF:EXT:SHUT:CONT	Sets the logic of the shut down
SYST:CONF:EXT:OOR:MODE	Sets the phase to monitor.

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STATus subsystem

STATus:OPERation	OPERation status register: Event
STATus:OPERation:CONDition	OPERation status register: Register status
STATus:OPERation:ENABle	OPERation status register: Enable
STATus:OPERation:PTRansition	OPERation status register: Negative transition
STATus:OPERation:NTRansition	OPERation status register: Positive transition
STATus:QUESionable	QUESTionable status register: Event
STATus:QUESionable:CONDition	QUESTionable status register: Register status
STATus:QUESionable:ENABle	QUESTionable status register: Enable
STATus:QUESionable:PTRansition	QUESTionable status register: Negative transition
STATus:QUESionable:NTRansition	QUESTionable status register: Positive transition
STATus:PRESet	Resets the enable register

STATus subsystem

(Single-phase, three-wire output/ Three-phase output)

STAT:OPER:INST	OPER:INST subregister: Event
STAT:OPER:INST:COND	OPER:INST subregister: Register status
STAT:OPER:INST:ENAB	OPER:INST subregister: Enable
STAT:OPER:INST:PTR	OPER:INST subregister: Negative transition
STAT:OPER:INST:NTR	OPER:INST subregister: Positive transition
STAT:OPER:INST:ISUM{1 2 3}	OPER:INST:ISUM subregister: Event
STAT:OPER:INST:ISUM{1 2 3}:COND	OPER:INST:ISUM subregister: Register status
STAT:OPER:INST:ISUM{1 2 3}:ENAB	OPER:INST:ISUM subregister: Enable
STAT:OPER:INST:ISUM{1 2 3}:PTR	OPER:INST:ISUM subregister: Negative transition
STAT:OPER:INST:ISUM{1 2 3}:NTR	OPER:INST:ISUM subregister: Positive transition
STAT:QUES:INST	QUES:INST subregister: Event
STAT:QUES:INST:COND	QUES:INST subregister: Register status
STAT:QUES:INST:ENAB	QUES:INST subregister: Enable
STAT:QUES:INST:PTR	QUES:INST subregister: Negative transition
STAT:QUES:INST:NTR	QUES:INST subregister: Positive transition
STAT:QUES:INST:ISUM{1 2 3}	QUES:INST:ISUM subregister: Event
STAT:QUES:INST:ISUM{1 2 3}:COND	QUES:INST:ISUM subregister: Register status
STAT:QUES:INST:ISUM{1 2 3}:ENAB	QUES:INST:ISUM subregister: Enable
STAT:QUES:INST:ISUM{1 2 3}:PTR	QUES:INST:ISUM subregister: Negative transition
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MEMory subsystem

MEM:SAV	Saves settings to memory
MEM:PREV	Views the settings in memory
MEM:RCL	Recalls settings from memory

SENSe subsystem

SENS:CURR:HOLD	Sets the hold time of the peak current
SENS:CURR:PEAK:CLE	Clears the held measured peak current
SENS:APER	Sets the aperture time (measurement time)

SENSe subsystem(Master-Slave operation)

SENS:CURR:ADJ:ZERO	Starts zero calibration

DISPlay subsystem

DISP:CONT	Adjusts the screen brightness
DISP:MMOD:CURR	Sets the measured current and power displays
DISP:MMOD:VOLT	Sets the measured voltage display

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List of Messages

SCPI command: Command name in the short form.

*RST: "Yes" for commands that are affected by *RST.

R/W: "R" for query commands and "W" for set commands.

M/LE: "M" for PCR-M commands and "LE" for PCR-LE/PCR-LE2 commands.

SOURce subsystem

SCPI command		Response	RST	Description	R/W	M/LE
Program header	Parameter					
[SOUR:]						
CURR[:LEV][:IMM][:AMP]	numeric	NR3	Yes	AC current upper limit	R/W	M/LE
CURR:OFFS[:IMM]	numeric	NR3	Yes	DC current upper limit	R/W	M/LE
CURR:PEAK[:UPP][:IMM]	numeric	NR3	Yes	Sets the peak limit of the positive electric potential	R/W	LE
CURR:PEAK:LOW[:IMM]	numeric	NR3	Yes	Sets the peak limit of the negative electric potential	R/W	LE
CURR:PROT:OCP2:TIME	numeric	NR3	Yes	Sets the time that must elapse after the internal semiconductor protection is activated before an alarm is generated	R/W	LE
CURR:PROT:STATe	bool	NR1	Yes	Action that is performed when the current limit is exceeded	R/W	M/LE
CURR:PROT:TRIP:TIME	numeric	NR3	Yes	Time until the protection function trips when the current limit is exceeded	R/W	LE
FREQ[:CC IMM]	numeric	NR3	Yes	Frequency	R/W	M/LE
FREQ:LIM[:UPP]	numeric	NR3	Yes	Frequency upper limit	R/W	M/LE
FREQ:LIM:LOW	numeric	NR3	Yes	Frequency lower limit	R/W	M/LE
FREQ:MODE	FIX STEP	char	Yes	Trigger function control of the frequency setting	R/W	M/LE
FREQ:SYNC[:STAT]	bool	NR1	Yes	Turns the synchronization function on and off	R/W	LE
FREQ:SYNC:PHASE:DEL	numeric	NR3	Yes	Synchronization delay phase angle	R/W	LE
FREQ:TRIG	numeric	NR3	Yes	Frequency that will be set when a trigger is received	R/W	M/LE
FUNC:SOUR	INT EXT SUM	char	Yes	Sets signal source	R/W	LE
VOLT[:LEV][:IMM][:AMPL]	numeric	NR3	Yes	AC voltage	R/W	M/LE
VOLT:EXT:SOUR	NONE VOLT	char	Yes	Sets the signal source	R/W	LE
VOLT:LIM[:UPP]	numeric	NR3	Yes	AC voltage upper limit	R/W	M/LE
VOLT:LINE	numeric	NR3	Yes	AC Line voltage	R/W	LE ¹
VOLT[:LEV]:LIM:LOW	numeric	NR3	Yes	AC voltage lower limit	R/W	M/LE
VOLT:MODE	FIX STEP	char	Yes	Trigger function control of the AC voltage setting	R/W	M/LE
VOLT:OFFS[:IMM]	numeric	NR3	Yes	DC voltage	R/W	M/LE
VOLT:OFFS:LIM[:UPP]	numeric	NR3	Yes	DC voltage upper limit	R/W	M/LE
VOLT:OFFS:LIM:LOW	numeric	NR3	Yes	DC voltage lower limit	R/W	M/LE
VOLT:OFFS:LINE	numeric	NR3	Yes	DC line voltage	R/W	LE ²
VOLT:OFFS:MODE	FIX STEP	char	Yes	Trigger function control of the DC voltage setting	R/W	M/LE
VOLT:OFFS:PROT:LEV[:UPP]	numeric	NR3	Yes	OVP value in DC mode and AC+DC mode	R/W	LE
VOLT:OFFS:PROT:LEV:LOW	numeric	NR3	Yes	UVP value in DC mode and AC+DC mode	R/W	LE
VOLT:OFFS:TRIG	numeric	NR3	Yes	DC voltage that will be set when a trigger is received	R/W	M/LE
VOLT:PROT:LEV[:UPP]	numeric	NR3	Yes	OVP value in AC mode	R/W	LE
VOLT:PROT:LEV:LOW	numeric	NR3	Yes	UVP value in AC mode	R/W	LE
VOLT:RANG[:UPP]	numeric	NR3	Yes	Voltage range	R/W	M/LE
VOLT:RANG:AUTO	bool	NR1	Yes	Auto voltage range function	R/W	M
VOLT[:LEV]:TRIG[:AMPL]	numeric	NR3	Yes	AC voltage that will be set when a trigger is received	R/W	M/LE
VOLT:VCC[:LEV]	numeric	NR3	Yes	Internal Vcc voltage	R/W	LE
VOLT:VCC:MODE	AUTO MAN	char	Yes	Vcc operating condition	R/W	LE
WAVE:BANK[:SEL]	NR1	NR1	Yes	Number of the waveform bank to execute	R/W	LE
WAVE:BANK:MODE	FIX STEP	char	Yes	Trigger function control of the number of the waveform bank	R/W	LE
WAVE:BANK:TRIG	numeric	NR3	Yes	The number of the waveform bank that will be set when a trigger is received	R/W	LE
WAVE:BANK:TYPE?	NR1	char	Yes	Type of waveform to output	R	LE
WAVE:EDIT:PCL	NR1			Sets the crest factor of the special waveform	R/W	LE
	numeric	NR3				
WAVE:EDIT:SIN	NR1			Sets the special waveform to the sine wave	W	LE
	NR1					
WAVE[0]:EDIT:USER:DATA:POIN	NR1			Sets a user-defined waveform	R/W	LE
	NR1	NR1				

1 Single-phase three-wire output or three-phase output only

2 Single-phase three-wire output only

OUTPut subsystem

SCPI command		Response	*RST	Description	R/W	M/LE
Program header	Parameter					
OUTP						
[[:STAT]	bool	NR1	Yes	Output on/off	R/W	M/LE
:COUP	AC DC ACDC EAC EDC	char	Yes	Output mode	R/W	M/LE
:EXT:LOG	DIS LOW HIGH	char		Sets the logic of the output on/off	R/W	LE
:IMP[:STAT]	bool	NR1	Yes	Output impedance control	R/W	LE
:IMP:LEV	numeric	NR3	Yes	Sets the output impedance in terms of resistance	R/W	LE
:IMP:RAT	numeric	NR3	Yes	Sets the output impedance in terms of percentage	R/W	LE
:SST[:STAT]	bool	NR1	Yes	Soft start control	R/W	LE
:SST:TIME[:RISE]	numeric	NR1	Yes	Rise time	R/W	LE
:PHAS:ON[:STAT]	bool	NR1	Yes	Turns output on phase control on and off	R/W	LE
:PHAS:ON:LEV	numeric	NR3	Yes	Output on phase angle	R/W	LE
:PHAS:OFF[:STAT]	bool	NR1	Yes	Turns output off phase control on and off	R/W	LE
:PHAS:OFF:LEV	numeric	NR3	Yes	Output off phase angle	R/W	LE
:PROT:CLE				Alarm clearing	W	M/LE

MEASure/ FETCh subsystem

SCPI command		Response	*RST	Description	R/W	M/LE
Program header	Parameter					
MEAS[:SCAL]: FETC[:SCAL]:						
CURR:DC				Queries the DC current	R	M/LE
CURR:AC				Queries the AC current	R	M/LE
CURR:AMPL:MAX				Queries the current peak	R	M/LE
CURR:AMPL:MAX:HOLD				Queries the current peak (the held value)	R	M/LE
CURR:CRES				Queries the current crest factor	R	LE
CURR:HARM				Queries the harmonic current	R	LE
CURR:HARM:RAT				Queries the harmonic current (the percentage)	R	LE
FREQ				Queries the frequency	R	M/LE
LVOL				Queries the DC line voltage	R	LE ¹
LVOL:AC				Queries the AC line voltage	R	LE ²
LVOL:AMPL:MAX				Queries the AC voltage peak	R	LE ²
POW:DC				Queries the DC power	R	M/LE
POW:AC				Queries the AC power (the actual power)	R	M/LE
POW:AC:APP				Queries the AC power (the apparent power)	R	M/LE
POW:AC:REAC				Queries the AC power (the reactive power)	R	M/LE
POW:AC:REAC:TOT				Queries the AC power (the overall reactive power)	R	M/LE
POW:AC:PFAC				Queries the power factor of the AC power	R	M/LE
POW:AC:PFAC:TOT				Queries the total power factor of the AC power	R	M/LE
VOLT:DC				Queries the DC voltage	R	M/LE
VOLT:AC				Queries the AC voltage	R	M/LE
VOLT:AMPL:MAX				Queries the voltage peak	R	LE

1 Single-phase three-wire output only

2 Single-phase three-wire output or three-phase output only

TRIGger subsystem

SCPI command		Response	*RST	Description	R/W	M/LE
Program header	Parameter					
ABOR				Aborts the trigger function	W	M/LE
INIT						
[[:IMM]:SEQ[1]]				Starts the trigger function of sequence 1	W	M/LE
:CONT:NAME	TRAN ACQ		Yes	Sets the auto continue mode of the specified sequence	R/W	M
	bool	NR1				
:CONT:SEQ1	bool	NR1	Yes	Auto continue mode of sequence 1	R/W	M
:CONT:SEQ3	bool	NR1	Yes	Auto continue mode of sequence 3	R/W	M
[[:IMM]:NAME	TRAN ACQ SIM PROG	char		Starts the trigger function of the specified sequence	R/W	M/LE
[[:IMM]:SEQ3				Starts the trigger function of sequence 3	R/W	M/LE
[[:IMM]:SEQ4				Starts the trigger function of sequence 4	R/W	LE
[[:IMM]:SEQ5				Starts the trigger function of sequence 5	R/W	LE
TRIG						
[[:SEQ[1]][:IMM]				Sequence 1 software trigger	W	M/LE
[[:TRAN]][:IMM]						
[[:SEQ[1]]:SOUR	IMM BUS	char	Yes	Sequence 1 trigger source	R/W	LE
[[:TRAN]]:SOUR						
:SEQ2:SOUR	IMM PHAS	char	Yes	Output on phase control	R/W	M
:SYNC:SOUR						
:SEQ2:PHAS[:ON]	numeric	NR3	Yes	Phase angle of output on phase control	R/W	M
[[:SEQ3[:IMM]				Sequence 3 software trigger	W	M/LE
:ACQ[:IMM]						
:SEQ3:SOUR	IMM BUS	char	Yes	Sequence 3 trigger source	R/W	M/LE
:ACQ:SOUR						
[[:SEQ4[:IMM]				Sequence 4 software trigger	R/W	LE
:SIM[:IMM]						
:SEQ4:SOUR	IMM BUS	char	Yes	Sequence 4 trigger source	R/W	LE
:SIM:SOUR						
[[:SEQ5[:IMM]				Sequence 5 software trigger	W	LE
:PROG[:IMM]						
:SEQ5:SOUR	IMM BUS	char	Yes	Sequence 5 trigger source	R/W	LE
:PROG:SOUR						
:SIM:SOUR						

PROGram subsystem

SCPI command		Response	*RST	Description	R/W	M/LE
Program header	Parameter					
PROG						
:EDIT	NR1			Edits a sequence step	R/W	LE
	bool	NR1				
	numeric	NR3				
	bool	NR1				
	numeric	NR3				
	bool	NR1				
	numeric	NR3				
	numeric	NR3				
	NR1	NR1				
	bool	NR1				
	bool	NR1				
	bool	NR1				
	bool	NR1				
:EDIT:JUMP	NR1			Edits the jump settings of a sequence step	R/W	LE
	bool	NR1				
	NR1	NR1				
	NR1	NR1				
:EDIT:OIMP:RAT	NR1	NR1		Edits the output impedance settings of a sequence step	R/W	LE
	numeric	NR3				
:EDIT:PHAS:STAR	NR1	NR1		Edits the starting phase angle settings of a sequence step	R/W	LE
	bool	NR1				
	[numeric]	NR3				
:EDIT:PHAS:STOP	NR1	NR1		Edits the ending phase angle settings of a sequence step	R/W	LE
	bool	NR1				
	[numeric]	NR3				
:EDIT:PHASE:UOFFS	NR1	NR1		Edits the U-phase offset settings of a sequence step	R/W	LE ¹
	bool	NR1				
	[numeric]	NR3				
:EDIT:PHASE:UV	NR1	NR1		Edits the U-V phase defference settings of a sequence step	R/W	LE ¹
	bool	NR1				
	[numeric]	NR3				
:EDIT:PHAS:UW	NR1	NR1		Edits the U-W phase defference settings of a sequence step	R/W	LE ²
	bool	NR1				
	[numeric]	NR3				
:EDIT:PHAS:RAMP	NR1	NR1		Sets the phase change	R/W	LE ¹
	char	char				
	[char]	char				
	[char]	char				
:EDIT:VOLT	NR1	NR1		Edits the AC voltage of each phase	R/W	LE ¹
	[numeric]	NR3				
:EDIT:VOLT:OFFS	NR1	NR1		Edits the DC voltage of each phase	R/W	LE ¹
	[numeric]	NR3				
:LOOP	numeric	NR3		Number of sequence repetitions	R/W	LE
CLE	numeric	NR3		Sets all the steps in the sequence to their default values	R/W	LE
:STEP:STAR	numeric	NR3		Sequence starting step number	R/W	LE
:STEP:END	char	NR1		Sequence ending step number	R/W	LE
:EXEC		char,NR3,NR1,NR1		Queries the execution state of the sequence	R	LE
:STAT	STOP RUN PAUS CONT			Changes the execution state of the sequence	W	LE
:EXT:LOG	DIS LOW HIGH	char		Sets the logic of the sequence start/stop	R/W	LE

1 Single-phase three-wire output or three-phase output only

2 Three-phase output only

SIMulation subsystem

SCPI command		Response	*RST	Description	R/W	M/LE
Program header	Parameter					
SIMulation:						
T1:PHAS:STAT	bool	BR1	Yes	Sets the voltage regulation start setting	R/W	LE
T1:TIME[:LEV]	numeric	NR3	Yes	Voltage regulation starting time	R/W	LE
T1:PHAS[:LEV]	numeric	NR3	Yes	Voltage regulation starting phase	R/W	LE
T2:TIME[:LEV]	numeric	NR3	Yes	Slope time 1	R/W	LE
T3:TIME[:LEV]	numeric	NR3	Yes	Voltage regulation time	R/W	LE
T3:VOLT[:LEV]	numeric	NR3	Yes	Regulated voltage	R/W	LE
T4:TIME[:LEV]	numeric	NR3	Yes	Slope time 2	R/W	LE
T5:CYCL:STAT	bool	NR1	Yes	Sets the duration that the voltage remains at the initial level	R/W	LE
T5:TIME[:LEV]	numeric	NR3	Yes	Return time		LE
T5:CYCL[:LEV]	numeric	NR3	Yes	Return cycles	R/W	LE
POL	NORM INV	char	Yes	Voltage regulation polarity	R/W	LE
REP:COUN	numeric	NR3	Yes	Number of repetitions	R/W	LE
STAT	STOP RUN			Executes and stops power line abnormality simulations	W	LE
EXEC		char,NR1		Queries the execution status of power line abnormality simulations	R	LE

Other subsystems

SCPI command		Response	*RST	Description	R/W	M/LE
Program header	Parameter					
MEM:						
SAV	NRf			Saves settings to memory	W	LE
PREV	NRf	NR1,NR3,NR3,NR3,NR1		Views the settings in memory	R	LE
RCL	NRf			Recalls settings from memory	W	LE
SENSe:						
HOLD	SHOR LONG	char		Peak current hold time	R/W	M
CURR:ADJ:ZERO				Starts zero calibration	W	LE
CURR:HOLD	numeric	NR3	Yes	Peak current hold time	R/W	LE
CURR:PEAK:CLE				Clears the peak hold	W	M/LE
APER	numeric	NR3	Yes	Aperture time	R/W	LE
AVER[:STAT]	bool	NR1	Yes	Averaging period of measured values	R/W	M
DISPlay:						
CONT	numeric	NR3	Yes	Adjusts the screen brightness	R/W	LE
AMM	"RMS AVG PEAK WATT"	NR3	Yes	Measured value display	R/W	M
LVOL	bool	NR1	Yes	Selects voltage(phase voltage/ line voltage) display	R/W	LE ¹
PHAS	NRf	NR1	Yes	Selects display of phase	R/W	LE ¹
MMOD:CURR	RMS PEAK WAT T age VA PF AVG	char	Yes	Measured current and power displays	R/W	LE
MMOD:VOLT	RMS PEAK AVG	char	Yes	Measured voltage display	R/W	LE

1 Single-phase three-wire output or three-phase output only

STATus subsystem

SCPI command		Response	Description	R/W	M/LE
Program header	Parameter				
STAT					
:OPER					
[[:EVEN]		NR1	Event ¹	R	1
:COND		NR1	Register status ¹	R	1
:ENAB	NRf	NR1	Enable ¹	R/W	1
:PTR	NRf	NR1	Positive transition ¹	R/W	1
:NTR	NRf	NR1	Negative transition ¹	R/W	1
:INST ²					
[[:EVEN]		NR1	Event ³	R	LE
:COND		NR1	Register status ³	R	LE
:ENAB	NRf	NR1	Enable ³	R/W	LE
:PTR	NRf	NR1	Positive transition ³	R/W	LE
:NTR	NRf	NR1	Negative transition ³	R/W	LE
:ISUM{1 2 3}					
[[:EVEN]		NR1	Event ⁴	R	LE
:COND		NR1	Register status ⁴	R	LE
:ENAB	NRf	NR1	Enable ⁴	R/W	LE
:PTR	NRf	NR1	Positive transition ⁴	R/W	LE
:NTR	NRf	NR1	Negative transition ⁴	R/W	LE
:PRES			Resets the enable register	W	1
:QUES					
[[:EVEN]		NR1	Event ⁵	R	1
:COND		NR1	Register status ⁵	R	1
:ENAB	NRf	NR1	Enable ⁵	R/W	1
:PTR	NRf	NR1	Positive transition ⁵	R/W	1
:NTR	NRf	NR1	Negative transition ⁵	R/W	1
:INST ²					
[[:EVEN]		NR1	Event ⁶	R	LE
:COND		NR1	Register status ⁶	R	LE
:ENAB	NRf	NR1	Enable ⁶	R/W	LE
:PTR	NRf	NR1	Positive transition ⁶	R/W	LE
:NTR	NRf	NR1	Negative transition ⁶	R/W	LE
:ISUM{1 2 3}					
[[:EVEN]		NR1	Event ⁷	R	LE
:COND		NR1	Register status ⁷	R	LE
:ENAB	NRf	NR1	Enable ⁷	R/W	LE
:PTR	NRf	NR1	Positive transition ⁷	R/W	LE
:NTR	NRf	NR1	Negative transition ⁷	R/W	LE

- 1 OPERATION status register
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- 6 OPERATION:INSTrument sub register
- 7 OPERATION:INSTrument:ISUMmary{1|2|3} sub register

SYSTem subsystem

SCPI command		Response	*RST	Description	R/W	M/LE
Program header	Parameter					
SYST						
:CONF						
:BACK	bool	NR1		Auto save function of the panel settings and the configuration settings	R/W	M
:DATE	NR1	NR1		Date	R/W	LE
	NR1	NR1				
	NR1	NR1				
:EXT:ACL	DIS LOW HIGH	char		Sets the logic of the alarm clear	R/W	LE
:EXT:OOR:MODE	TOT:EACH	char		Sets the phase to monitor	R/W	LE
:EXT:SHUT:CONT	DIS LOW HIGH	char		Sets the logic of the shut down	R/W	LE
:EXT:SINP:POL	NORM INV	char	Yes	Sets the polarity	R/W	LE
:PHAS:UV	numeric	NR1		U-V phase difference	R/W	LE ¹
:PHAS:UW	numeric	NR1		U-W phase difference	R/W	LE ²
:PHAS:UOFF:INIT				Clears the U phase offset setting	W	LE ¹
:POW:EXP[:MAX]	numeric	NR3	Yes	Anticipated maximum power	R/W	LE
:RESP[:VOLT]	SLOW MED FAST	char	Yes	Response	R/W	LE
:SENS:MODE	OFF SENS1 SENS2 RADJ	char	Yes	Compensation function	R/W	LE
:SSUP	bool	NR1		Voltage surge suppression	R/W	LE
:STAT:OUTP:POL	POS NEG	char	Yes	Status signal output polarity	R/W	LE
:TIME	NR1	NR1		Time	R/W	LE
	NR1	NR1				
	NR1	NR1				
:TPH:MODE	bool	NR1	Yes	Output mode (Single-phase three-wire, Double-phase)	R/W	LE ³
:TRIG:INP:POL	POS NEG	char	Yes	Trigger signal input polarity	R/W	LE
:TRIG:OUTP:POL	POS NEG	char	Yes	Trigger signal output polarity	R/W	LE
:TRAC	bool	NR1		Communication error display	R/W	M/LE
:WIR	P1 P1W3 P3	char		Output mode (Single-phase, Single-phase three-wire, Three-phase)		LE ⁴
:WIR:CAT		char		Queries the output mode that the PCR-LE2 can change		LE ⁴
:ERR[:NEXT]		string		Reads error information	R	M/LE
:KLOC	bool	NR1		Locks panel controls	R/W	M/LE
:LOC				Switches the PCR to local mode	W	M/LE
:OPT		char		Queries options	R	M/LE
:REM				Sets the PCR to remote mode; locks all panel controls, except the LOCAL key	W	M/LE
:RWL				Sets the PCR to remote mode; locks panel controls	W	M/LE
:SLE:EXEC				Activates sleep mode immediately	R/W	LE
:SLE[:STAT]	bool	NR1	Yes	Turns the sleep function on and off	R/W	LE
:SLE:TIME	numeric	NR3	Yes	The time that must elapse before the PCR-LE series enters sleep mode	R/W	LE
:VERS				Queries SCPI specification version that the PCR series complies with	R	M/LE

- 1 Single-phase three-wire output or three-phase output only
- 2 Three-phase output only
- 3 PCR-LE only
- 4 PCR-LE2 only

IEEE 488.2 common commands

IEEE 488.2 common com- mand	Parameter	Description	R/W	M/LE
*CLS		Clears all the event registers	W	M/LE
*ESE	NR1	Sets the event status enable register bits	R/W	M/LE
*ESR		Queries the event status register	R	M/LE
*IDN		Queries the identification string (manufacturer information)	R	M/LE
*OPC		Causes the PCR series to generate the operation complete message in the event status register when all of its pending operations have finished	R/W	M/LE
*OPT		Queries the optional interface boards that are installed in the PCR series	R	M/LE
*PSC	bool	Sets whether the *ESE and *SRE settings will be cleared	R/W	M/LE
*RCL	NR1	Recalls the settings that have been stored to memory		M
*RST		Resets the PCR series; configures the PCR series to a known condition independent from the usage history of the device	W	M/LE
*SAV	NR1	Saves the current settings to memory		M
*SRE	NR1	Sets the service request enable register bits	R/W	M/LE
*STB		Reads the status byte and master summary status bits	R	M/LE
*TRG		Trigger command	W	M/LE
*TST		Executes a self test	R	M/LE
*WAI		Prevents the PCR series from executing subsequent commands and queries until the flag indicating that there are no operations standing by becomes true	W	M/LE

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IEEE488.2 and SCPI registers are used for the status reports.

In each SCPI status register, there are the following sub registers: CONDition register, EVENT register, ENABLE register, PTRansition filter, and NTRansition filter.

CONDition register

The transition of the CONDition register is automatic and reflects the condition of the PCR in real-time. Reading this register does not affect the contents.

EVENT register

The EVENT register bits are automatically set according to the changes in the CONDition register. The rule varies depending on the positive and negative transition filters (PTRansition and NTRansition). The EVENT register is reset when it is read.

ENABLE register

The ENABLE register enables the reports to the summary bit or status bit of the event bit.

Transition filter

The PTRansition (positive transition) filter is used to report events when the condition changes from false to true.

The NTRansition (negative transition) filter is used to report events when the condition changes from true to false.

If both the positive filter and the negative filter are set to true, events can be reported each time the status changes.

If both filters are cleared, event reporting is disabled.

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[\[-199,-100\]](#) | [\[-299,-200\]](#)
[\[-399,-300\]](#) | [\[-499,-400\]](#)
[\[-899,-800\]](#) | [\[100 and higher\]](#)

A List of Errors

Command errors

An error in the range [-199, -100] indicates that an IEEE 488.2 syntax error has been detected by the instrument's parser. The occurrence of any error in this class shall cause the Command Error (bit 5) in the event status register to be set.

Error code		Error message description
-100	Command error	This is the generic syntax error.
-101	Invalid character	A syntactic element contains a character that is invalid for that type.
-102	Syntax error	An unrecognized command or data type was encountered.
-103	Invalid separator	The parser was expecting a separator and encountered an illegal character.
-104	Data type error	The parser recognized a data element different than one allowed.
-105	GET not allowed	A Group Execute Trigger was received within a program message.
-108	Parameter not allowed	More parameters were received than expected for the header.
-109	Missing parameter	Fewer parameters were received than required for the header.
-110	Command header error	An error was detected in the header.
-113	Undefined header	The header is undefined for this device.
-120	Numeric data error	This error is generated when parsing a data element that appears to be numeric, including the nondecimal numeric types.
-130	Suffix error	This error is generated when parsing a suffix.
-131	Invalid suffix	The suffix does not follow the syntax or the suffix is inappropriate for this device.
-134	Suffix too long	The suffix contained more than 12 characters.
-138	Suffix not allowed	A suffix was encountered after a numeric element which does not allow suffixes.
-140	Character data error	This error is generated when parsing a character data element.
-141	Invalid character data	Either the character data element contains an invalid character or the particular element received is not valid for the header.
-144	Character data too Long	The character data element contains more than twelve characters.
-148	Character data not allowed	A legal character data element was encountered where prohibited by the device.
-150	String data error	This error is generated when parsing a string data element.
-160	Block data error	This error is generated when parsing a block data element.
-170	Expression error	This error is generated when parsing an expression data element.
-180	Macro error	This error is generated when defining a macro or executing a macro.

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Execution errors

An error in the range [-299, -200] indicates that an error has been detected by the instrument's execution control block. The occurrence of any error in this class shall cause the Execution Error (bit 4) in the event status register to be set.

Error code		Error message description
-200	Execution error (generic)	This is the generic syntax error for devices that cannot detect more specific errors.
-203	Command protected	Indicates that a legal password-protected program command or query could not be executed because the command was disabled.
-210	Trigger error	Trigger error.
-211	Trigger ignored	Indicates that a GET, *TRG, or triggering signal was received and recognized by the device but was ignored because of device timing considerations.
-213	Init ignored	Indicates that a request for a measurement initiation was ignored as another measurement was already in progress.
-214	Trigger deadlock	Indicates that the trigger source for the initiation of a measurement is set to GET and a subsequent measurement query was received.
-220	Parameter error	Indicates that a program data element related error occurred.
-221	Settings conflict	Indicates that a legal program data element was parsed but could not be executed due to the current device state.
-222	Data out of range	Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range as defined by the device.
-223	Too much data	Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.
-224	Illegal parameter value	Used where an exact value, from a list of possible values, was expected.
-230	Data corrupt or stale	Possibly invalid data; new reading started but not completed since last access.
-241	Hardware missing	Indicates that a legal program command or query could not be executed because of missing device hardware.

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Device-specific errors

The occurrence of any error in this class shall cause the Device Dependent Error (bit 3) in the event status register to be set.

Error code		Error message description
-360	Communication error	Communication error when the flow control is turned off. This error applies when the RS232C interface is used.
-362	Framing error in program message	Framing error. This error applies when the RS232C interface is used.
-363	Input buffer overrun	Buffer overrun error. This error applies when the RS232C interface is used.
-364	Time out error	Time out error. This error applies when the RS232C interface is used.

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Query errors

An error in the range [-499, -400] indicates that the output queue control of the instrument has detected a problem with the message exchange protocol described in IEEE 488.2, chapter 6. The occurrence of any error in this class shall cause the Query Error (bit 2) in the event status register to be set.

Error code		Error message description
-400	Query error (generic)	This is the generic query error for devices that cannot detect more specific errors.

-410	Query INTERRUPTED	Received a new command before the response was read.
-420	Query UNTERMINATED	The controller attempted to read the response after the device received an unsupported query or has not received a query. The -100 "COMMAND ERROR" error and this error are stored in the error queue. The controller will time out.
-430	Query DEADLOCKED	The error queue, input buffer, and output buffer are full when sending large binary data as a response, and the transmission timing is off.
-440	Query UNTERMINATED after indefinite response	Received a separate query in semicolon-delimited format after a query that returns a response in an indefinite form. (Example: A command such as the following. *IDN?;SYST:ERR?)

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Operation complete event errors

An error in the range [-899, -800] is used when the PCR wishes to report an IEEE488.2 operation complete event. This event occurs when the instrument's synchronization protocol, having been enabled by an *OPC command, completes all selected pending operations.

The occurrence of any event error in this class shall cause the Operation Complete (bit 0) in the event status register to be set.

Error code		Error message description
-800	Operation complete	The instrument has completed all selected pending operations in accordance with the IEEE 488.2, 12.5.2 synchronization protocol.

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Device-dependent errors

The occurrence of any error in this class shall cause the Device Dependent Error (bit 3) in the event status register to be set.

Errors that have a number of +900 or greater are generated as a result of the self test that is run when the *TST? query is received.

Error code		Error message description
100	Advanced features are not available	The option board is not installed.
101	Operation denied while in LOCAL state	Operation is denied because the PCR-M/PCR-LE/PCR-LE2 is in local mode.
102	Operation denied while in OUTPUT ON state	Operation is denied because the OUTPUT is on.
103	Operation denied while in PROTECTION state	Operation is denied because a protection function is activated.
104	Operation denied due to invalid OUTPUT:COUPLING mode	Operation is denied because the output mode is invalid.
105	Operation denied (OUTPUT OFF)	Operation is denied because the OUTPUT is off.
106	Operation denied (TRIP DISABLE)	Operation is denied because the action to perform when the current limit is exceeded is set to "not to turn the output off (DISABLE)."
107	Operation denied (RISE TIME/SIM/SEQ)	Operation is denied because soft start, power line abnormality simulation, or sequence is in progress.
108	Operation denied (WIRING METHOD)	Operation is denied because the wiring method (single-phase, two-wire; single-phase, three-wire; or three-phase) is invalid.
109	Operation denied (EXT.OUTPUT OFF)	Operation is denied because the output has been turned off through external control.
110	Operation denied (EXT.SEQ.STOP)	Operation is denied because a sequence is being executed or stopped through external control.
111	Operation denied (V-PROG)	Operation is denied because the AC voltage output is being controlled with an external signal.
112	Operation denied (SOURCE)	Operation is denied because the command is in conflict with the signal source setting.
199	Operation denied (BUSY)	The operation is denied because the PCR-LE/PCR-LE2 is busy.

201	Operation denied (FREQ)	The sequence cannot be executed because there is a step whose frequency is outside its limits.
202	Operation denied (VOLT)	The power line abnormality simulation, or the sequence cannot be executed because there is a step whose voltage is outside the voltage range or limits.
203	Operation denied (PHASE CHANG)	The sequence cannot be executed because there is a step whose trigger wait setting and sudden phase change setting are both turned on.
301	Settings conflict (COMPENSATION)	Setting conflict: Cannot be set because the command is in conflict with the compensation setting.
302	Settings conflict (CV RESPONSE)	Setting conflict: Cannot be set because the command is in conflict with the response setting.
303	Settings conflict (RISE TIME)	Setting conflict: Cannot be set because the soft start output is in progress or the command is in conflict with the soft start setting.
304	Settings conflict (SYNCRO)	Setting conflict: Cannot be set because the synchronization function is in use.
305	Settings conflict (TRIP)	Setting conflict: Cannot be set because the command is in conflict with the action that is performed when any of the current limits is exceeded.
306	Settings conflict (UNBALANCE PHASE)	Setting conflict: Cannot be set because the phase difference is unbalanced.
308	Settings Conflict (OUTPUT IMPEDANCE)	Setting conflict: Cannot be set because an output impedance is set.
309	Settings conflict (WAVE BANK)	Setting conflict: Cannot be set because a waveform other than waveform bank No. 0 is in use.
909	Selftest error (DSP SIO)	Self-test error: Detected an error in the internal communication.
910	Selftest error (DSP DETect)	Self-test error: Detected an input voltage outside the ratings at power-on.
911	Selftest error (DSP VCC)	Self-test error: Detected a voltage error.
912	Selftest error (DSP Input)	Self-test error: Detected an input voltage outside the ratings.
913	Selftest error (DSP CMD)	Self-test error: Detected an invalid internal communication command.
915	Selftest error (CAL)	Self-test error: Detected an error in the calibration data.

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Processing Time of Commands

The command processing time is the time until the next command is accepted.
The processing times indicated here are typical values.
They are not warranted.
The processing times vary depending on the settings and the measurement conditions.
It does not include the response time of the hardware.

PCR-LE/ PCR-LE2 series

Command	GPIB processing time*1 (ms)	USB processing time (ms)	RS232C processing time*2 (ms)	LAN processing tim*3 (ms)	Description
VOLT	6	5	6	6	Sets the voltage
MEAS:VOLT?	111	110	120	120	Queries the measured voltage output
FREQ	6	6	6	6	Sets the frequency
MEAS:CURRE?	111	110	120	120	Queries the measured voltage output
*RST	50	50	50	52	Performs a device reset

*1 : Using GPIB-USB-B by National Instruments.
*2 : Data rate setting: 19200 bps, Flow control: RTS·CTS
*3 : 100BASE-TX Ethernet

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■ Programming AC Output

AC Voltage and Frequency

Setting the AC voltage and frequency

The AC output voltage and frequency are controlled with the VOLTage and FREQuency commands. Prior to programming the output, it is recommended that the appropriate output mode and voltage range be selected.

The following is an example using the PCR-M.

```
:OUTPut:COUPling AC 'Sets the output mode to AC mode
:VOLTage:RANGe 135 'Sets the voltage range to the 135V range
:VOLTage 110 'Sets the AC voltage to 110 V
:FREQuency 55 'Sets the frequency to 55 Hz
:OUTPut ON 'Turns the output on
```

Setting the AC voltage limit and frequency limit

The maximum allowable value for VOLTage varies depending on the VOLTage:RANGe setting.

The minimum and maximum allowable values for VOLTage and FREQuency commands may vary depending on the VOLTage:LIMit and FREQuency:LIMit settings. The VOLTage and FREQuency settings must be specified within the upper and lower limits.

The voltage limit and frequency limit settings are safety interlock functions that prevent unexpected miss-operation or miss-programming. They are not output limiting functions.

```
:VOLTage:RANGe 135 'Sets the voltage range to the 135V range
:VOLTage:LIMit MAX 'Sets the voltage upper limit to 275 V
:VOLTage:LIMit:LOWer MIN 'Sets the voltage lower limit to 0 V
:VOLTage 110 'Sets the AC voltage to 110 V
:FREQuency:LIMit MAX 'Sets the frequency upper limit to 500 Hz
:FREQuency:LIMit:LOWer MIN 'Sets the frequency lower limit to 40 Hz
:FREQuency 55 'Sets the frequency to 55 Hz
```

Above example expands the upper/lower limits to the widest span allowing the VOLTage and FREQuency to be set to any value within the given range.

When the VOLTage:RANGe is set to 135 V, VOLTage setting cannot exceed 137.5 V.

Query

To query the maximum and minimum allowed values for the VOLTage and FREQuency commands, use the query with the MINimum and/or MAXimum parameters.

```
:VOLTage? MINimum
:VOLTage? MAXimum
:FREQuency? MINimum
:FREQuency? MAXimum
```

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■ Programming DC Output

DC Voltage

Setting the DC voltage

The DC output voltage is controlled with the VOLTage:OFFSet command. Prior to programming the output, it is recommended that the appropriate output mode and voltage range be selected.

The following is an example using the PCR-M.

```
:OUTPut:COUPLing DC 'Sets the output mode to DC mode
:VOLTage:RANGe 135 'Sets the voltage range to the 135V range
:VOLTage:OFFSet 40 'Sets the DC voltage to 40 V
:OUTPut ON 'Turns the output on
```

Once the power supply output is enabled (turned on), output mode and voltage range settings cannot be changed. On the other hand, the VOLTage:OFFSet setting can always be changed while the output is on.

Setting the DC voltage limit

The maximum allowable value for VOLTage:OFFSet also varies depending on the VOLTage:RANGe setting. The minimum and maximum allowable values for VOLTage:OFFSet command may vary depending on the VOLTage:OFFSet:LIMit settings.

```
:VOLTage:RANGe 135 'Sets the voltage range to the 135V range
:VOLTage:OFFSet:LIMit MAX 'Sets the voltage upper limit to 388 V
:VOLTage:OFFSet:LIMit:LOWer MIN 'Sets the voltage lower limit to -388 V
:VOLTage:OFFSet 40 'Sets the DC voltage to 40 V
```

Above example expands the upper/lower limits to the widest span allowing the VOLTage:OFFSet to be set to any value within the given range.

When the VOLTage:RANGe is set to 135 V, VOLTage:OFFSet setting cannot exceed +/-194.0 V. The VOLTage:RANGe specifies the voltage range using the AC voltage expression. The allowable DC voltage range for the 135 V range is +/-194.0 V, and that for the 270 V range is +/-388.0 V. By *RST default, the :VOLTage:OFFSet:LIMit:LOWer setting is not set to its MINimum. It is set to 0 for operational safety.

Query

To query the maximum and minimum allowed values for the VOLTage:OFFSet command, use the query with the MINimum and/or MAXimum parameters.

```
:VOLTage:OFFSet? MINimum
:VOLTage:OFFSet? MAXimum
```

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Triggering Output Change (SEQUence1:TRANsient)

PCR-M/PCR-LE/PCR-LE2 has five different trigger subsystems -TRANsient, SYNChronize, ACQuire, SIMulation, and PROGram. These features are mapped to SEQUENCE1 to SEQUENCE5 respectively, as the SCPI specification generally categorizes each trigger subsystem as a numbered Trigger Sequence.

The TRANsient (SEQUence1) group is a trigger subsystem that changes the output voltage and frequency settings.

State

The three states are available in the sequence operation. -> [See for details](#)

Output Change Control

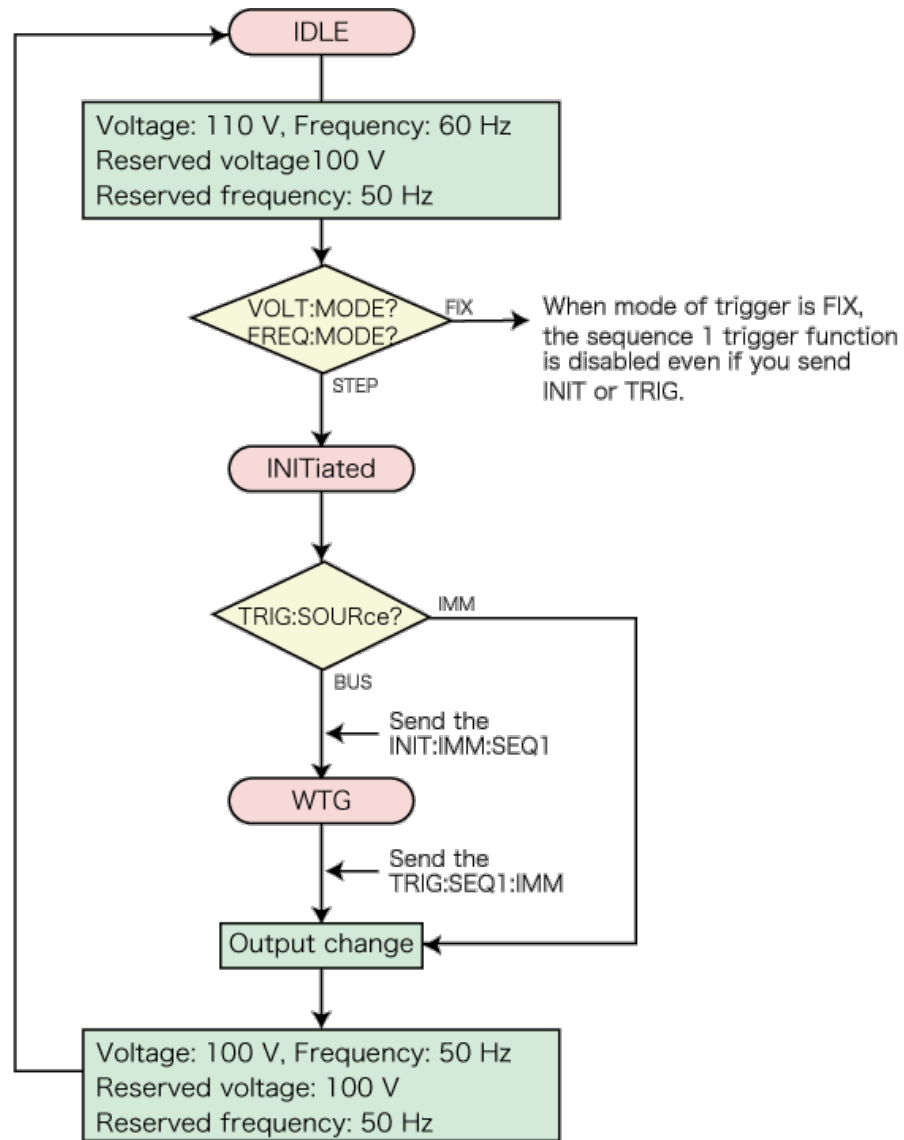
Using TRIGger:SEQUence1 (or TRIGger:TRANsient) subsystem allows you to synchronize the output changes with a given trigger. This is convenient if you want to synchronize output changes with other instrument actions such as external DC power supply or electronic loads.

To reserve triggered settings, use the VOLTage:TRIGgered and FREQUENCY:TRIGgered commands. Keep in mind that the MODE settings for each output item must be set to STEP prior to using triggers.

```
:VOLTage 110 'Sets the voltage to 110 V
:FREQuency 60 'Sets the frequency to 60 Hz
:VOLTage:MODE STEP 'Sets the voltage trigger mode to STEP
:FREQuency:MODE STEP 'Sets the frequency trigger mode to STEP
:VOLTage:TRIGgered 100 'Sets the voltage that will be set when a trigger is
received to 100 V
:FREQuency:TRIGgered 50 'Sets the frequency that will be set when a trigger is
received to 50 Hz
:TRIGger:SEQUence1:SOURce BUS 'Sets the trigger source to BUS
:INITiate 'Initiates sequence 1 (starts the trigger function)
:TRIGger 'Applies a software trigger to sequence 1
```

If you repeatedly change the output, a trigger error (-210) may occur. By using the *OPC command, you can prevent this error. -> [see for detail](#)

```
:TRIGger ; *OPC 'Apply a trigger and wait until the output change is
complete.
```



The **TRIGger:SEquence1:SOURce** command sets the trigger source to **BUS** or **IMMEDIATE**.

When the Trigger Source is set to **IMMEDIATE**, the change is executed immediately causing the voltage and/or frequency to change to a new setting. When the Trigger Source is set to **BUS**, the trigger subsystem goes to the **WTG** (Waiting For Trigger) state. When a software trigger is applied with the **TRIGger:SEquence1:IMMEDIATE** or ***TRG** command, the change is executed.

When the operation is completed, the trigger subsystem returns to the **IDLE** state again. When an **ABORT** or an equivalent command is sent without executing the trigger, the change is cancelled, and then the trigger subsystem returns to the **IDLE** state.

Setting items that are programmable in the sequence 1 group are **VOLTage**, **VOLTage:OFFSet**, and **FREQuency**. **CURRent** limit settings are not associated with the trigger subsystem.

By ***RST** and ***RCL** default, **VOLTage:MODE**, **FREQuency:MODE**, and **VOLTage:OFFSet:MODE** are all reset to **FIXed**. This means that the sequence 1 trigger function is disabled. The **MODE** settings must be explicitly set to **STEP** for each output item.

The **TRIGger:SEquence1:IMMEDIATE** command applies a software trigger to the sequence 1 group

You can also use the ***TRG** command or the **IEEE488.1 get** (Group Execute Trigger) command for the same purpose. This command applies a software trigger to all the sequence groups, so if there are other sequence groups that are in the **INITIATED** state, their sequences will also be executed at the same time.

On the PCR-M, you do not have to send an initiate command for every trigger. You can configure sequences so that they continue automatically.

[INITiate:CONTInuous:SEquence1 ON](#)

Operation using a software trigger

When **ABOR** is sent, **INIT:SEQ1** is cancelled. The **VOLT:TRIG** setting does not change.

Table below shows the responses when the voltage is set to 20 V (**VOLT 20**) and when the target value to which the voltage is to change using a trigger is set to 10 V (**VOLT:TRIG 10**).

	Response	
	VOLT?	VOLT:TRIG?
Immediately after the setting	20 V	10 V
After a trigger is sent	10 V	10 V
After *RST is sent	0 V	0 V
Voltage change VOLT 30 is sent before sending a trigger	30 V	30 V(cancel)

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Measurement (SEquence3: ACQuire)

PCR-M/PCR-LE/PCR-LE2 has five different trigger subsystems -TRANSient, SYNChronize, ACQuire, SIMulation, and PROGram. These features are mapped to SEquence1 to SEquence5 respectively, as the SCPI specification generally categorizes each trigger subsystem as a numbered Trigger Sequence.

The SEquence3 (ACQuire) group is the measurement trigger subsystem. This subsystem is used to measure values such as voltage, current, and power.

There are easy measurements and advanced measurements.

Easy Measurement

The PCR-M/ PCR-LE/PCR-LE2 has the capability to return voltage, current, and power measurement values. The easiest way is use the MEASure commands.

The MEASure commands immediately start a new measurement. This is the easiest way to make measurements, however simultaneity for multi-item measurements are lost, because each MEASure command starts a new measurement. To avoid this, consider the advanced measurement approach that is described later in this manual, allowing separate control for measurement initiation and data query.

Voltage/Current Measurement

In AC mode, use the AC measurement queries.

[:MEASure:VOLTage:AC?](#) 'Queries AC voltage in volts-rms
[:MEASure:CURRent:AC?](#) 'Queries AC current in amps-rms

In DC mode, use the DC measurement queries.

[:MEASure:VOLTage:DC?](#) 'Queries DC voltage in volts
[:MEASure:CURRent:DC?](#) 'Queries DC current in amps

The current measurement function also has the following additional items:

[:MEASure:CURRent:AMPLitude:MAXimum?](#) 'Queries peak current in amps
[:MEASure:CURRent:AMPLitude:MAXimum:HOLD?](#) 'Queries peak current (the held value)
[:MEASure:CURRent:CREStfactor?](#) 'Queries crest factor

The MEASure:CURRent:AMPLitude:MAXimum:HOLD command queries the maximum peak current since the PCR-M/ PCR-LE/PCR-LE2 was turned on or since it was explicitly cleared. To clear the peak current (held value), use the SENSE:CURRent:PEAK:CLEAr command.

[:SENSe:CURRent:PEAK:CLEAr](#)

By [*RST](#) and [*RCL](#) default, the peak current (held value) is not cleared.

Available measurement items vary depending on the selected output mode. For example, DC measurement cannot be performed while AC mode is selected.

Peak current measurement and peak hold measurement can be performed in either AC or DC output mode.

Normally, it takes approximately 330 ms on the PCR-M and approximately 110 ms on the PCR-LE/PCR-LE2 to complete a single measurement. This means that sending MEASure queries multiple times requires long data acquisition time. If you want to acquire multiple items, it is recommended that you use the advanced approach described later.

The PCR-M/ PCR-LE/PCR-LE2 supports READ commands that also initiate a new measurement and data query, however, READ and MEASure operate exactly the same, as they are aliases.

Power Measurement

In AC mode, use the AC measurement queries.

[:MEASure:POWer:AC?](#) 'Queries AC real power in watts
[:MEASure:POWer:AC:APParent?](#) 'Queries AC apparent power in volt-amps
[:MEASure:POWer:AC:REACTive?](#) 'Queries AC reactive power in volt-amps-reactive
[:MEASure:POWer:AC:PFACTOR?](#) 'Queries AC power factor

In DC mode, use the DC measurement queries.

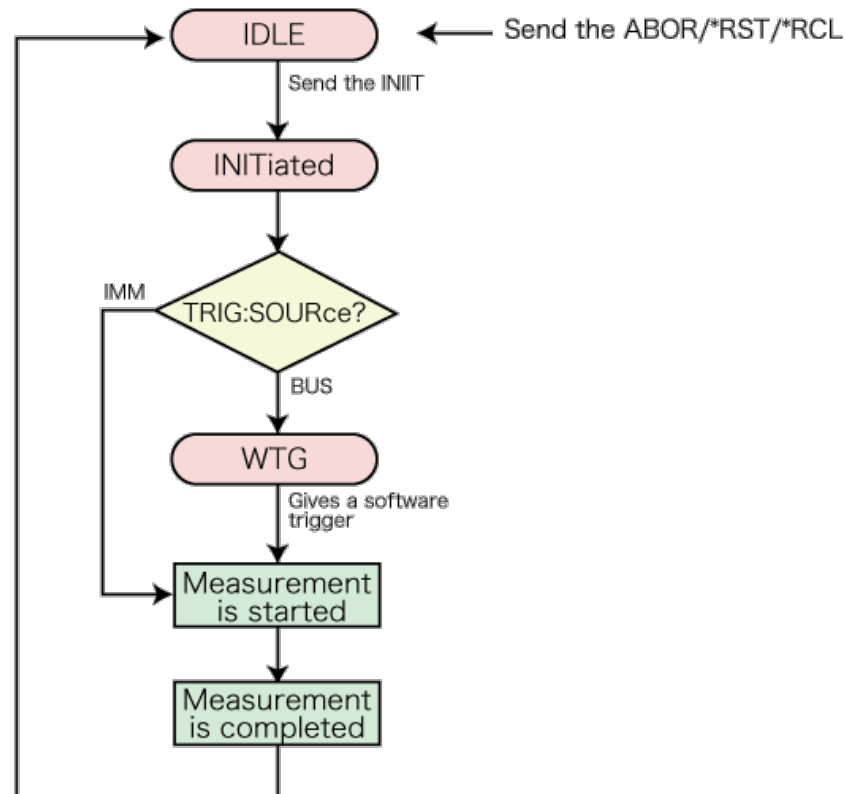
[:MEASure:POWer:DC?](#) 'Queries DC power in watts

Advanced Measurement

In advanced measurement, you can separate and control the starting of measurement and the referencing of data.

State

The three states are available in the sequence operation. -> [See for details](#)



Voltage/Current/Power Measurement

To start a new measurement, set the trigger source to IMMEDIATE and use the INITiate command.

```

:TRIGger:SEquence3:SOURce IMMEDIATE 'Selects trigger source to IMMEDIATE
:INITiate:SEquence3 'Initiates sequence 3
  
```

If you want the sequence 3 group to start the measurement on a software trigger, change the trigger source to BUS.

```

:TRIGger:SEquence3:SOURce BUS 'Selects trigger source to BUS
:INITiate:SEquence3 'Initiates sequence 3
:TRIGger:SEquence3 'Applies a software trigger to sequence 3
  
```

When the measurement is completed, measurement data can be queried with the FETCh query commands.

```

:FETCh:VOLTage:AC? 'Queries AC voltage in volts, without new measure
:FETCh:CURRent:AC? 'Queries AC current in amps, without new measure
:FETCh:POWer:AC? 'Queries AC real power in watts, without new measure
:FETCh:POWer:AC:APParent? 'Queries AC apparent power in volt-amps, without
new measure
  
```

If you send a FETCh command before the measurement is complete, correct measurement data will not be obtained. By using the *OPC command, you can obtain correct measurement data. -> [See for detail](#)

```

:INITiate:SEquence3;*OPC 'Initiate sequence 3 and wait for the measurement
to complete.
  
```

The TRIGger:SEquence3:SOURce command sets the trigger source to BUS or IMMEDIATE. The INITiate:SEquence3 command makes the trigger subsystem leave the IDLE state and go the initiated state.

When the Trigger Source is set to IMMEDIATE, the action is executed immediately causing a new measurement to start. When the Trigger Source is set to BUS, the trigger subsystem goes to the WTG (Waiting For Trigger) state. When a software trigger is applied with the TRIGger:SEquence3:IMMEDIATE or *TRG command, the measurement action is executed. When the operation is completed, the trigger subsystem returns to the IDLE state again. When an ABORT or an equivalent command is sent without executing the trigger, the measurement action is cancelled, and then the trigger subsystem returns to the IDLE state.

The ABORT command and IEEE488.1 sdc/dcl commands simply abort the measurement task that

is in progress. It does not have a feature to invalidate any measurement data that has been acquired. On the other hand, the *RST and *RCL commands not only abort the measurement task, but also invalidate the acquired measurement data. This means that the "*RST;;FETC:VOLT:AC?" command line will generate an error, because no measurement data can be fetched and there is no new measurement is scheduled.

The only difference between MEASure and FETCh commands is that the MEASure command starts a new measurement while the FETCh command does not. Availability for measurement items varies depending on the output mode, but it is exactly the same for MEASure and FETCh.

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Power-line abnormality simulation (SEquence4: SIMulation, PCR-LE/PCR-LE2 only)

PCR-M/PCR-LE/PCR-LE2 has five different trigger subsystems -TRANsient, SYNChronize, ACQuire, SIMulation, and PROGram. These features are mapped to SEquence1 to SEquence5 respectively, as the SCPI specification generally categorizes each trigger subsystem as a numbered Trigger Sequence.

The SEquence4 (SIMulation) group is used to perform power line abnormality simulations.

Configuring parameters

First, configure the parameters.

```
:SIMulation:T1:PHASe:STATe OFF 'Configures T1 so that time will be used to set it
:SIMulation:T5:CYCLE:STATe OFF 'Configures T5 so that time will be used to set it
:SIMulation:T1:TIME 5MS 'Sets the voltage regulation starting time
:SIMulation:T2:TIME 10000MS 'Sets slope time 1
:SIMulation:T3:TIME 100MS 'Sets the voltage regulation time
:SIMulation:T3:VOLTage 50V 'Sets the regulated voltage
:SIMulation:T4:TIME 10000MS 'Sets slope time 2
:SIMulation:T5:TIME 10000MS 'Sets the return time
```

Next, set the number of repetitions.

```
:SIMulation:REPeat:COUNt 5 'Sets the number of repetitions
```

After you have finished configuring the settings, execute the power line abnormality simulation.

Executing power line abnormality simulations.

Send the following command to execute a power line abnormality simulation.

```
:OUTP ON
:SIM:STAT RUN
```

You can query the execution status of power line abnormality simulations.

```
:SIM:EXEC?
```

If the execution has been stopped, "STOP" is returned. If the sequence is being executed, "RUN" and the present repetition number is returned.

To stop a power line abnormality simulation that is being executed, send the following command.

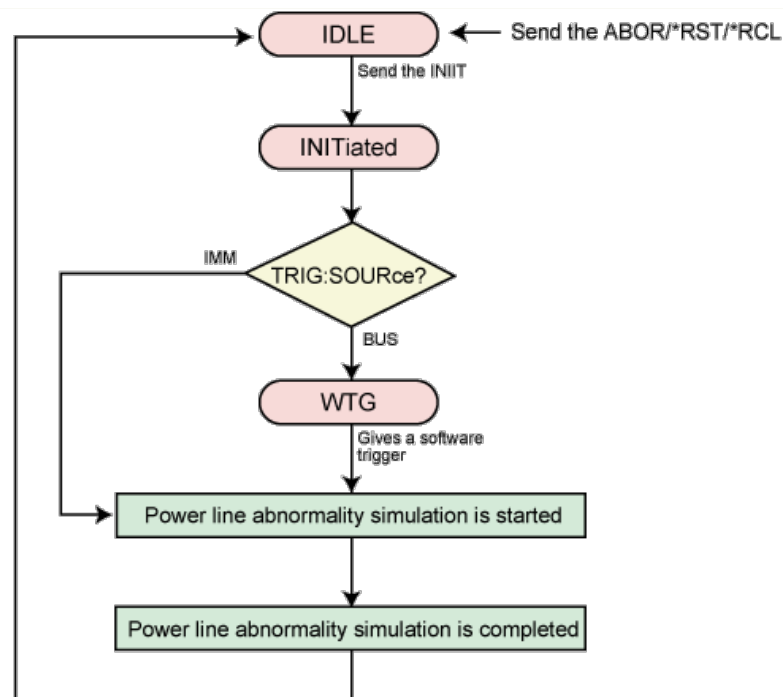
```
:SIM:STAT STOP
```

You can use triggers to execute power line abnormality simulations.

Execution using triggers

You can use triggers to synchronize power line abnormality simulations by using the TRIGger:SEquence4 (or TRIGger:SIMulation) subsystem.

A sequence has three states: IDLE, INITiated, and WtG. [For details, click here.](#)



To start a simulation immediately, set the trigger source to IMMEDIATE, and then use the INITiate command.

```

:TRIGger:SEquence4:SOURce IMMEDIATE 'Sets the trigger source to IMM
:INITiate:SEquence4 'Initiates sequence 4. The power line abnormality
simulation begins.

```

To use software triggers to start the measurement on the sequence 4 group, change the trigger source to BUS.

```

:TRIGger:SEquence4:SOURce BUS 'Sets the trigger source to BUS
:INITiate:SEquence4 'Initiates sequence 4
:TRIGger:SEquence4 'Applies a software trigger to sequence 4. The power line
abnormality simulation begins.

```

Use the TRIGger:SEquence4:SOURce command to set the trigger source to BUS or IMMEDIATE. INITiate:SEquence4 pulls the TRIGger subsystem out of the IDLE state and starts (initiates) the trigger function.

If the trigger source is set to IMMEDIATE, the power line abnormality simulation starts immediately. If the trigger source is set to BUS, the TRIGger subsystem enters the WTG (Waiting For Trigger) state. When a software trigger is received (through the TRIGger:SEquence4 command or *TRG command), the power line abnormality simulation starts. When the simulation finishes, the TRIGger subsystem enters the IDLE state again. If the ABORT command or an equivalent command is received in the WTG state or when a simulation is being executed, the simulation is canceled, and the TRIGger subsystem returns to the IDLE state.

Send the *RST command to reset all the parameters of the power line abnormality simulation.

TRIGger:SEquence4:IMMEDIATE only applies a software trigger to the sequence 4 group.

You can also use the *TRG command or the IEEE488.1 get (Group Execute Trigger) command for the same purpose. This command applies a software trigger to all the sequence groups, so if there are sequence groups that are in the INITiated state, their sequences will also be executed at the same time.

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Sequence (SEquence5: PROGram, PCR-LE/PCR-LE2 only)

PCR-M/PCR-LE/PCR-LE2 has five different trigger subsystems -TRANSient, SYNChronize, ACQuire, SIMulation, and PROGram. These features are mapped to SEquence1 to SEquence5 respectively, as the SCPI specification generally categorizes each trigger subsystem as a numbered Trigger Sequence.

The SEquence5 (PROGram) group is used to execute sequences on the PCR-LE/PCR-LE2.

Configuring step and sequence settings

First, configure the steps.

Use the PROG:EDIT command to set the number of the step that you want to configure, frequency transition, frequency, AC voltage transition, AC voltage, DC voltage signal change, DC voltage, step execution time, waveform bank number, status output, trigger output, trigger input, and whether output is ON or OFF.

[:PROG:Edit 1,OFF,50HZ,OFF,100V,OFF,0V,10S,0,OFF,ON,OFF,ON](#) 'Configures step 1

[:PROG:Edit 2,OFF,60HZ,ON,200V,OFF,0V,1MIN,1,OFF,OFF,OFF,ON](#) 'Configures step 2

[:PROG:Edit 3,ON,400HZ,ON,230V,OFF,50V,1HR,2,ON,OFF,OFF,ON](#) 'Configures step 3

Next, configure the sequence conditions.

[:PROG:STEP:START 1](#) 'Sets the starting step number

[:PROG:STEP:END 3](#) 'Sets the ending step number

[:PROG:LOOP 10](#) 'Sets the number of repetitions

After you have finished configuring the sequence, execute it.

Executing sequences

Send the following command to execute a sequence.

[:PROG:STAT_RUN](#)

You can query the execution state of the sequence.

[:PROG:EXEC?](#)

The execution state—STOP (stopped), RUN (running), or PAUSE (paused), elapsed step time, present repetition number, and step number are returned as a comma-separated list.

To stop a sequence that is being executed, send the following command.

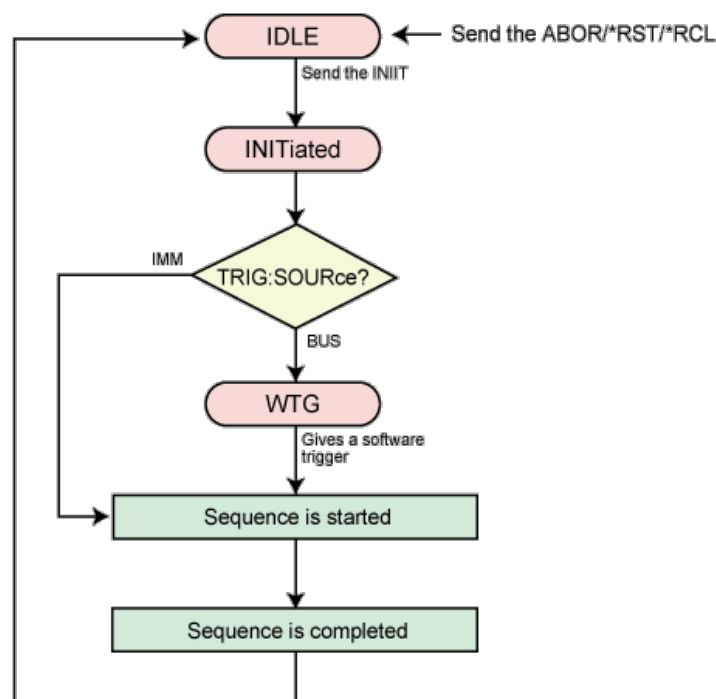
[:PROG:STAT_STOP](#)

You can use triggers to execute sequences.

Execution using triggers

You can use triggers to synchronize sequences by using the TRIGger:SEquence5 (or TRIGger:PROGram) subsystem.

A sequence has three states: IDLE, INITiated, and WTG. [For details, click here.](#)



To start a sequence immediately, set the trigger source to IMMEDIATE, and then use the INITiate command.

```
:TRIGger:SEquence5:SOURce IMMEDIATE 'Sets the trigger source to IMM
:INITiate:SEquence5 'Initiates sequence 5. The sequence begins.
```

If you are using software triggers to start the measurement on the sequence 5 group, change the trigger source to BUS.

```
:TRIGger:SEquence5:SOURce BUS 'Sets the trigger source to BUS
:INITiate:SEquence5 'Initiates sequence 5
:TRIGger:SEquence5 'Applies a software trigger to sequence 5. The sequence
begins.
```

Use the TRIGger:SEquence5:SOURce command to set the trigger source to BUS or IMMEDIATE. INITiate:SEquence5 pulls the TRIGger subsystem out of the IDLE state and starts (initiates) the trigger function.

If the trigger source is set to IMMEDIATE, the sequence starts immediately. If the trigger source is set to BUS, the TRIGger subsystem enters the WTG (Waiting For Trigger) state. When a software trigger is received (through the TRIGger:SEquence5 command or *TRG command), the sequence starts. When the sequence finishes, the TRIGger subsystem enters the IDLE state again. If the ABORt command or an equivalent command is received in the WTG state or when a sequence is being executed, the sequence is canceled, and the TRIGger subsystem returns to the IDLE state.

TRIGger:SEquence5:IMMEDIATE only applies a software trigger to the sequence 5 group.

You can also use the *TRG command or the IEEE488.1 get (Group Execute Trigger) command for the same purpose. This command applies a software trigger to all the sequence groups, so if there are sequence groups that are in the INITiated state, their sequences will also be executed at the same time.

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Waiting for Operation Complete

The *OPC command has a capability to wait for an operation to complete. Operation complete means that there is no pending operation that is still in progress. It takes approximately 330 ms on the PCR-M and approximately 110 ms on the PCR-LE/PCR-LE2 for a measurement to be completed. The PCR is not in the operation complete state while a measurement is ongoing. When the measurement completes, if there are no other operations waiting to be completed, the PCR enters the operation complete state.

When the *OPC command is sent, the PCR-M/ PCR-LE/PCR-LE2 enters the Operation Complete Command Active State (OCAS). When the measurement is completed and there is no other operation pending, the PCR-M/ PCR-LE/PCR-LE2 returns to Operation Complete Command Idle State (OCIS) and sets the OPC bit (bit 0) to TRUE (1) in the Standard Event Status Register. This information can be confirmed with the *ESR? query command by checking the OPC bit (bit 0).

The following example makes a new measurement and sends the *OPC. When the measurement is completed, an SRQ (Service Request) is generated, as the Standard Event Status Enable Register and the Service Request Enable Register are unmasked so that an SRQ can be signaled by the Operation Complete event. When using the RS232 interface, the SRQ feature cannot be used.

```
*ESE 1;*SRE 32;*CLS;:INITiate:IMMediate:SEquence3;*OPC
```

<Wait for the SRQ to be generated.>

Using the *OPC? query command instead of the *OPC command makes the PCR-M/ PCR-LE/PCR-LE2 enter the Operation Complete Query Active State (OQAS). When the measurement is completed and there is no other operation pending, the PCR-M/ PCR-LE/PCR-LE2 returns to the Operation Complete Query Idle State (OQIS) and sets the response data to "1" (in NR1 format) in the output queue.

```
INITiate:IMMediate:SEquence3;*OPC?
```

<Read the response>

At power-on or after the IEEE488 sdc/dcl, *RST command is sent, the PCR-M/ PCR-LE/PCR-LE2 is in the OCIS and OQIS state

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Status Monitoring

The PCR has two mandatory SCPI standard registers, STATus:OPERation and STATus:QUESTionable, in addition to the IEEE488.2 standard registers.

Register basics

All SCPI registers have standard event/filter [architecture](#), employing CONDition, EVENT, ENABLE, and optionally PTRansition and NTRansition. CONDition and EVENT are read-only registers working as status indicators, and ENABLE, PTRansition and NTRansition are read-write registers working as event and summary filters.

STATus:OPERation

[The STATus:OPERation register](#) records events or signals that occur during normal operation.

For example, to check if the PCR is being regulated in CV state, check the CV bit (bit 8) on the STATus:OPERation register.

```
:STATus:OPERation? 'Check whether the CV bit is set
```

STATus:QUESTionable

[The STATus:OPERation register](#) records events or signals that occur during normal operation.

For example, to check if the PCR is being regulated in CV state, check the CV bit (bit 8) on the STATus:OPERation register.

```
:STATus:QUESTionable? 'Check whether the CV bit is set
```

Status Monitoring

STATus:OPERation

The [OPERation Status register](#) is used to record events and notifications that occur during normal operations.

To check whether CV output is being performed, check the CV bit (bit 8) of the OPERation:INSTrument:ISUMmary{1|2|3} subregister.

{1|2|3}の1はU相、2はV相、3はW相です。

```
:STAT:OPER:INST:ISUM2? 'Check whether the CV bit of V phase is set.
```

STATus:QUESTionable

The [QUESTionable Status register](#) is used to record events and notifications that occur during abnormal operations.

To check whether the overvoltage protection function has been activated, check the OV bit (bit 0) of the STATus:QUESTionable register.

```
:STAT:QUES? 'Check whether the OV bit is set.
```

Even if bit 0 is true, you can not tell on which phase the overvoltage protection function has been activated. To check which phase is operating abnormally, check the STATus:QUESTionable:INSTrument subregister.

```
:STAT:QUES:INST? 'Check which phase is operating abnormally.
```

All phases whose corresponding bits are true are operating abnormally. You can determine how the specified phase is operating abnormally by checking the STATus:QUESTionable:INSTrument:ISUMmary{1|2|3} subregister of the phase.

{1|2|3}の1はU相、2はV相、3はW相です。

```
:STAT:OPER:INST:ISUM2? 'Check whether the OV bit of V phase is set.
```

PON (Power ON) bit

The PON bit (bit 7) in the event status register is set whenever the PCR is turned on. The most common use for the PON bit is to generate an SRQ at power-on to keep track of unexpected loss of power or power line failure. To do this, follow the steps shown below.

1. Set *PSC (Power-on Status Clear) to 0 (or OFF).

Enable the backup function of the event status enable register and service request enable register ([*PSC 0](#)).

2. Set the PON bit (bit 7) of the event status enable register.

Permit the transmission of a power-on event to the upper layer ([*ESE 128](#)).

3. Set the ESB bit (bit 5) of the status byte enable register.

Permit the generation of an SRQ caused by a standard event ([*SRE 32](#)).

*PSC 0; *ESE 128; *SRE 32

When using the RS232C interface, the PON bit cannot be assigned to the service request, because SRQs are not generated.

Though the SRQ feature itself is provided by communication protocol on the USB interface or LAN (VXI-11/ HiSLIP) interface, a Connection Lost error in the VISA I/O session occurs immediately before the power-on event. It may be difficult to handle PON events when using the USB interface.

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Error/event queue

The SCPI specifications define a standard error reporting scheme, Error/Event Queue. This is a FIFO (First In First Out) queue, which records errors and events. The maximum number of errors/events that the PCR can record is 255. Each error/event can be read with the SYSTem:ERRor query.

`:SYSTem:ERRor?`

The response to this query contains a numeric part (error/event number) and a textual description, such as:

`-222,"Data out of range"`

The error/event queue is empty when the *CLS common command is sent, when the last item in the queue is read, and when the PCR is turned on. When the error/event queue is empty, the query returns the following:

`0,"No error"`

Displaying communication errors

The PCR has a debug trace function.

The oldest item among the errors and events (if they are present) can be displayed on the PCR. This function is convenient when you debug your remote applications.

While an error/event item is displayed on the panel, the normal voltmeter and ammeter are disabled.

If the error/event queue is empty, the debug trace function does not display any errors. Sending the *CLS command clears the communication error display.

If in local mode, the debug trace function is temporarily disabled.

The communication error display can be enabled or disabled with the SYSTem:ERRor:TRACe command.

`:SYSTem:CONFigure:TRACe {ON|OFF}`

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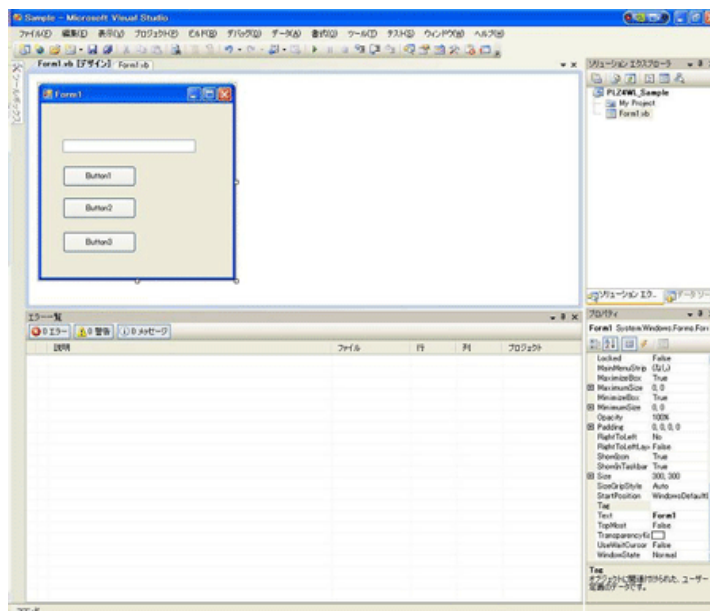
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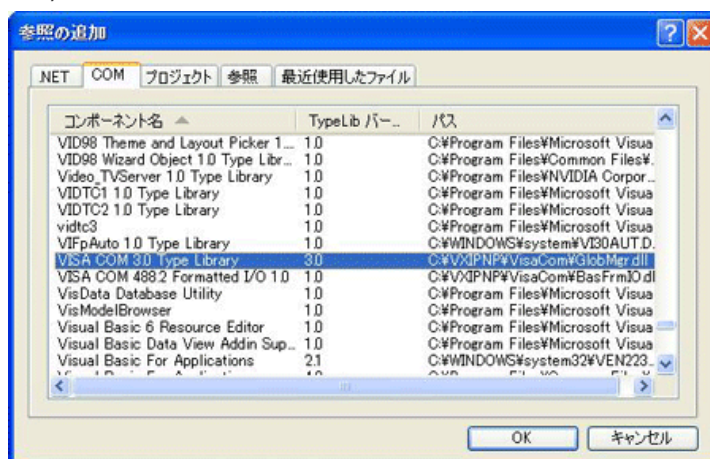
Communicate with the PCR-M/ PCR-LE/PCR-LE2 series using VISA through GPIB, RS232C, USB, or LAN. Visual Basic 2008.



Setting the "Project"

First, set the communication driver (VISA library) for the "Project."

Click "Project" on the menu bar, then select "Add Reference" to refer to "VISA COM 3.0 Type Library."



Communication through GPIB, RS232C, USB, or LAN

After setting the communication driver, you can communicate with the PCR through GPIB, RS232C, USB, or LAN.

The following describes the communication procedure using VISA.

Open the VISA

To communicate with an GPIB, RS232C, USB, or LAN device using VISA, you have to first open VISA. When you open VISA, specify the I/O resource.

```
Set rm = CreateObject("VISA.GlobalRM")
Set msg = rm.Open("USB::0x0B3E::0x1024::00000001::INSTR", NO_LOCK, 0, "")
"USB::0x0B3E::0x1024::00000001::INSTR" is the I/O resource.
```

GPIB	GPIB[<i>board</i>][: <i>PrimaryAddress</i>][: <i>SecondaryAddress</i>][:INSTR] Example: The primary address 3 of the measuring instrument connected to GPIB0 GPIB0::3::INSTR

*1: The hostname must be a valid mDNS hostname (a Bonjour hostname that ends in ".local") or a DNS hostname that is managed by an external DNS server (a full-qualified domain name—FQDN). If you are using an mDNS hostname, Apple Bonjour (alternatively, iTunes or Safari) must be installed on your PC.

When using the alias for the I/O resource, even if the alias name is hard-coded directly in the application, the alias name can be easily converted to the appropriate I/O resource name.

```
Set msg = rm.Open("MYDEV1", NO LOCK, 0, "")
```

1. Select your desired I/O resource

2. Enter the name of alias

Controlling the devices

```
Example:
    msg.WriteString ("VOLT 110" & vbLF)           'Set the AC voltage to 110 V
    msg.WriteString ("FREQ 60" & vbLF)           'Set the frequency to 60.0 Hz
```

```
msg.WriteString ("OUTP 1" & vbCrLf)
```

```
'Turn the output on
```

Closing the VISA

Close the VISA at the end.

You only need to include one "open" VISA command and one "close" VISA command in the program.

```
msg.Close
```

Sample program

```
Imports Ivi.Visa.Interop
```

```
Public Class Form1
```

```
Dim rm As ResourceManager
```

```
Dim msg As IMessage
```

```
Private Sub Form1_Load(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles MyBase.Load
```

```
rm = CreateObject("VISA.GlobalRM")
```

```
msg = rm.Open("GPIB0::1::INSTR", AccessMode.NO_LOCK, 0, "") 'Example: How to write GPIB
```

```
'msg = rm.Open("MYDEV1", AccessMode.NO_LOCK, 0, "") 'Example: Using an alias
```

```
'msg = rm.Open("USB0::0x0B3E::0x1024::00000001::INSTR", AccessMode.NO_LOCK, 0, "") 'Example: USB
```

```
'msg = rm.Open("TCPIP::169.254.178.141::INSTR", AccessMode.NO_LOCK, 0, "") 'Example: LAN
```

```
msg.TerminationCharacterEnabled = True
```

```
End Sub
```

```
'Query the instrument identity
```

```
Private Sub cmdIdn_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles cmdIdn.Click
```

```
msg.WriteString("**IDN?" & vbCrLf)
```

```
TextBox1.Text = msg.ReadString(256)
```

```
End Sub
```

```
'Set the voltage and frequency
```

```
Private Sub cmdCurr_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles cmdCurr.Click
```

```
msg.WriteString("OUTP 0" & vbCrLf)
```

```
msg.WriteString("VOLT 110" & vbCrLf)
```

```
msg.WriteString("FREQ 60" & vbCrLf)
```

```
msg.WriteString("OUTP 1" & vbCrLf)
```

```
End Sub
```

```
'Querys measurement DC voltage
```

```
Private Sub cmdMeas_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles cmdMeas.Click
```

```
msg.WriteString("MEAS:VOLT:DC?" & vbCrLf)
```

```
TextBox1.Text = msg.ReadString(256)
```

```
End Sub
```

```
Private Sub Form1_Disposed(ByVal sender As Object, ByVal e As System.EventArgs) Handles Me.Disposed
```

```
msg.Close()
```

```
End Sub
```

```
END CLASS
```

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Interface Setup for PCR-LE series

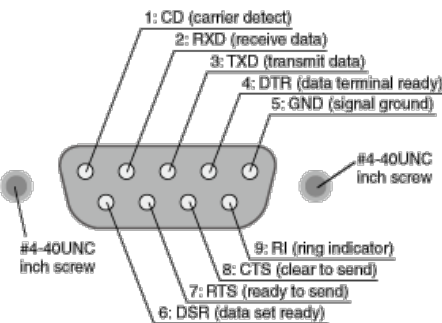
RS232C (standard equipped)

RS232C connection

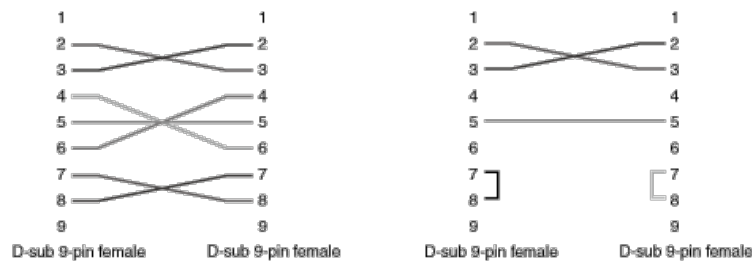
Turn off the POWER switch on the PCR-LE and the computer.

Use a D-sub 9-pin female-to-female AT type crossover cable for the RS232C cable. Figure shows the connector pin assignments.

If you are not using flow control, you do not have to connect all the pins. (See the second crossover cable wiring example below.)



Facing the PCR front panel



Cross cable example1

Cross cable example2

9-pin AT type connector (Flow control cannot be performed using the cable described in the second crossover cable wiring example.)

RS232C configuration

1. Press CONFIG (SHIFT+OPR MODE), COM-I/F, TYPE, and then RS232C.
2. Then, configure the protocol (the baud rate, data length, stop bits, and flow control settings).
For the settings, see the table under Protocol below.
3. Restart the PCR-LE.
The settings are applied.

Protocol

The following table shows the settings that correspond to the RS232C protocol. Underlined values are factory default settings.

Item	Setting
Baudrate	9 600 bps/ <u>19 200 bps</u> / 38 400 bps
Data	<u>8 bit</u> / 7 bit

Stop	<u>1 bit</u> / 2 bit
Parity	Fixed to none
Flow Ctrl	<u>OFF</u> / RTS·CTS

RS232C communication

Use flow control for RS232C communication.

Hard flow	Function
RTS	Request to send
CTS	Clear to send

Break signal

The break signal functions as a substitute for the IEEE488.1 dcl / sdc (Device Clear, Selected Device Clear) message.

NOTE

The RS232C interface should be shifted remotely by the command. Use the "[SYSTem:REMOte](#)" SCPI command to set the RS232C interface to the remote state. Be sure to include this command at the start of the program when you are performing remote programming.

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Interface Setup

Interface Setup for PCR-LE series

GPIOB (optional)

This interface valid only when the optional GPIOB interface board is installed.
[Attachment of the interface board](#)

GPIOB connection

Use a standard IEEE488 cable to connect the PCR-LE to the computer.

GPIOB configuration

1. Press CONFIG (SHIFT+OPR MODE), COM-I/F, TYPE, and then GPIOB.
2. Then, set the address (a value from 1 to 30).
3. Restart the PCR-LE.
The settings are applied.

GPIOB function

Function	Subset	Description
Source handshaking	SH1	Full capability
Acceptor handshaking	AH1	Full capability
Talker	T6	Function available
Listener	L4	Function available
Service request	SR1	Full capability
Remote local	RL1	Full capability
Parallel polling	PP0	No capability
Device clear	DC1	Full capability
Device trigger	DT1	Full capability
Controller	C0	No capability
Electrical interface	E1	Open collector driver

Service request

Service request and serial polling functions are implemented.

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Interface Setup

Interface Setup for PCR-LE series

USB (optional)

This interface is valid only when the optional USB interface board is installed.

[Attachment of the interface board](#)

A device driver supporting USB T&M Class (USBTMC) is required to control the PCR through the USB interface. The USBTMC driver is automatically installed by the VISA library.

USB connection

Use a standard USB cable to connect the PCR to the computer.

USB configuration

1. Press CONFIG (SHIFT+OPR MODE), COM-I/F, TYPE, and then USB.
2. Restart the PCR-LE.
The settings are applied.

Service request

The PCR is equipped with service request and serial polling functions.

USB function

Complies with USB Specification 2.0

Complies with USBTMC Specification 1.0 and USBTMC-USB488 Specification 1.0

Data rate: 12 Mbps maximum (full speed)

VID (Vender ID)

0x0B3E

PID (Product ID)

PCR6000LE2: 0x103A

PCR9000LE2: 0x103B

PCR12000LE2: 0x103C

PCR18000LE2: 0x103E

PCR27000LE2: 0x1041

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Interface Setup

Interface Setup for PCR-LE

LAN (optional)

This interface is valid only when the optional LAN interface board is installed.

[Attachment of the interface board](#)

To use the LAN interface to control the PCR, middleware that supports the VXI-11 or HiSLIP protocol must be installed on the controller. The middleware is installed automatically by the VISA library.

There is a [Web browser](#) interface to the PCR embedded in the LAN interface board. You can configure the LAN interface settings from your PC's Web browser.

For information on topics such as connecting to your corporate LAN, your IP address, your host name, and security, contact your network administrator.

If you are using a host name (a Bonjour host name), you have to install Apple Bonjour.

LAN connection

Use a standard LAN cable (category 5 and straight) to connect the PCR to a network hub or router. Use a crossover cable when making a direct connection.

LAN configuration

Normally, you should set DHCP and AUTO IP to ON to set the IP address automatically.

1. Press CONFIG (SHIFT+OPR MODE) and then COM-I/F (F1). Then, set TYPE to LAN (F5).
2. Then, set the DHCP and AUTO IP settings.

For direct connections, set DHCP (CF30) to "oFF" and AUTO IP (CF31) to "on" and set the IP address automatically.

You cannot set the IP address from the panel. To set a fixed IP address, first set the IP address automatically, and then set a fixed address by accessing the PCR through [a Web browser](#).

You can view the IP address on the COM-I/F screen in the PCR-LE series' CONFIG settings.

Warning

Possible damage to the equipment and electric shock. The LAN interface can be accessed from any place on the network. If necessary, configure the security settings. You can apply password protection for security, and you can restrict the IP addresses to limit the hosts.

-> [Setting procedure](#)

NOTE

The LAN interface should be shifted remotely by the command. Use the "SYSTem:REMOte" SCPI command to set the RS232C interface to the remote state. Be sure to include this command at the start of the program when you are performing remote programming.

Service request

The PCR is equipped with service request and serial polling functions.

LAN function

The PCR may require an Internet connection depending on how the PCR is [accessed through a Web browser](#).

Complies with the LXI Specification Ver.1.3 Class C

Complies with the VXI-11/HiSLIP/SCPI-RAW protocol

Communication speed: Maximum 100 Mbps (Auto negotiation)

NON AUTO MDIX

Web browser access (Internet Explore 9.0 or later, Firefox 8.0 or later, Safari/Mobile Safari 5.1 or later, Chrome 15.0 or later, Opera 11.0 or later)

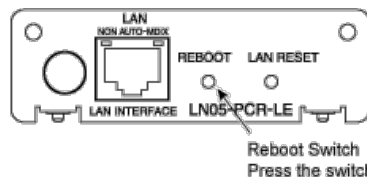
The instrument information, network information, and VISA resource (I/O resource) information

The Lan Configuration and security settings

The simple power supply control application program

Restarting the LAN interface

When you keep pressing the "REBOOT" switch for more than 2 seconds, the LAN will reboot. However, the setting condition of LAN interface will not be changed.

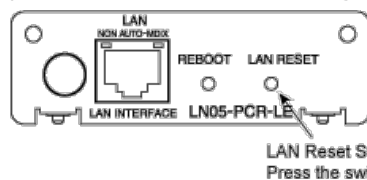


This operation does not affect the PCR's panel settings. If the product is in remote mode, you can use panel operations to switch it to local mode.

Do not use the REBOOT switch carelessly during communication. It may cause to mis-operation.

Resetting the LAN interface

If you hold down the LAN reset switch for 2 seconds, the LAN interface settings (except the host name) are reset to their factory default values. It can be used when neither the security password nor IP address are forgotten.



This operation does not affect the PCR's panel settings. If the product is in remote mode, you can use panel operations to switch it to local mode.

Do not use the LAN RESET switch carelessly during communication. It may cause to mis-operation.

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Interface Setup

Interface Setup for PCR-LE series

Accessing and operating the PCR from a Web browser (LAN interface)

"Accessing and operating the PCR from a Web browser" applies to LN05-PCR-LE with firmware version 2.2x. To view the LN05-PCR-LE's firmware version, access Welcome page on Web browser. You can use the LAN interface to configure detailed settings from a Web browser on your PC.

The Web site's URL is defined by adding "http://" in front of the PCR's IP address.

The URL can be entered directly on the address bar of the browser by confirming the IP address of the config (CONFIG(SHIFT+OPERATION MODE) > COM-I/F > TYPE > LAN) .

When you are using a VISA library, a function is available that enables the application program (such as National Instruments NI-MAX, Agilent Connection Expert, and Kikusui KI-VISA Instrument Explorer) to retrieve the VXI-11 measuring instrument. This function is provided by VISA vendors. You can access the PCR by clicking on the hyperlink that is provided in the retrieval results.

(Example) When the IP address is 169.254.7.8

http://169.254.7.8

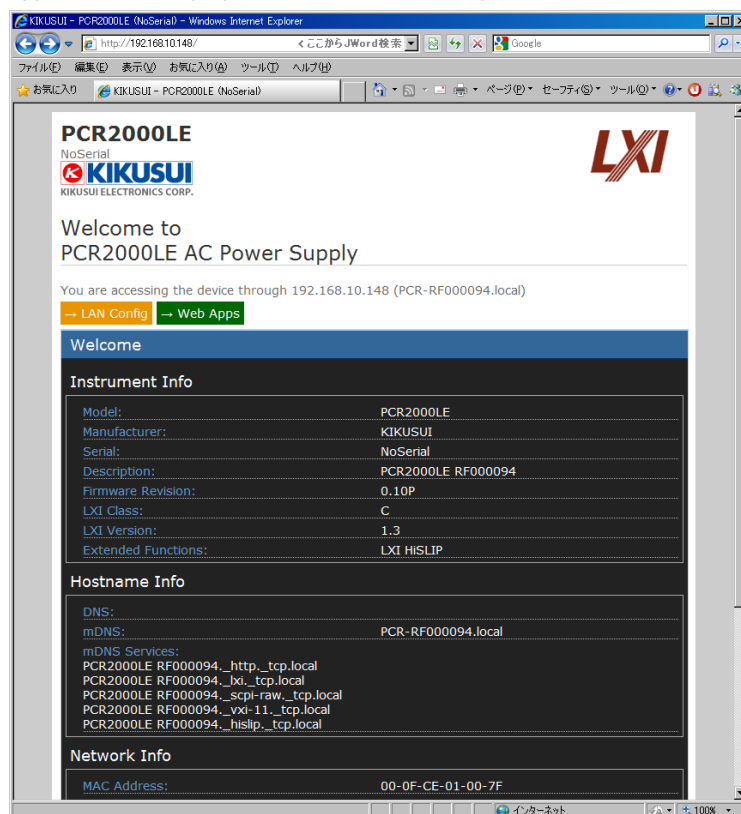
The following browsers are supported.

Internet Explorer 9.0 or later
Firefox 8.0 or later
Safari/Mobile Safari 5.1 or later
Chrome 15.0 or later
Opera 11.0 or later

WELCOME page

When you access the PCR from a Web browser, the WELCOME page is displayed first.

The instrument information, network information, and VISA resource (I/O resource) information appear on the display. Click items in the navigation menu to move to the other pages.



LAN CONFIG page

This page is used to update the network settings/configure security settings, displays the LAN status. It is also used to turn the PCR-LE's "identify" display on and off.

LAN Configuration

You can use this page to configure settings such as the allocation of IP address and the host name. Once you set the host name, you can access the LAN interface by using the host name instead of the IP address. For normal operation, we recommend that you select the "DHCP," "AUTO-IP," "Dynamic DNS," and "mDNS" check boxes.

To apply the settings, click "Apply" after you change the fixed IP address or host name.

If you leave the Hostname and/or Description boxes empty and click "Apply," the host name/Description will be created from the model name and serial number.

SECURITY

This page is used to configure security settings.

You can use this page to set the password protection and to limit hosts by restricting IP addresses.

Password protection is an effective security feature for the Web site. It prevents the settings from being changed inadvertently. The password can contain alphanumeric characters, hyphens, and underscores. The first character should be an alphabetical character. The maximum password length is 15 characters.

IP address restriction to limit hosts is an effective security feature for the VXI-11. If at least one unit is registered, this security feature prevents access from non-registered hosts.

Up to four IP addresses (each for a different unit) can be registered on the host side.

STATUS

Turn the identify display on to identify the PCR-LE that is being controlled through the LAN interface. The PCR-LE that is being controlled will display "Device Identify" on its front panel.

Web Applications page

You can use this page to set up the simple power supply control application program.

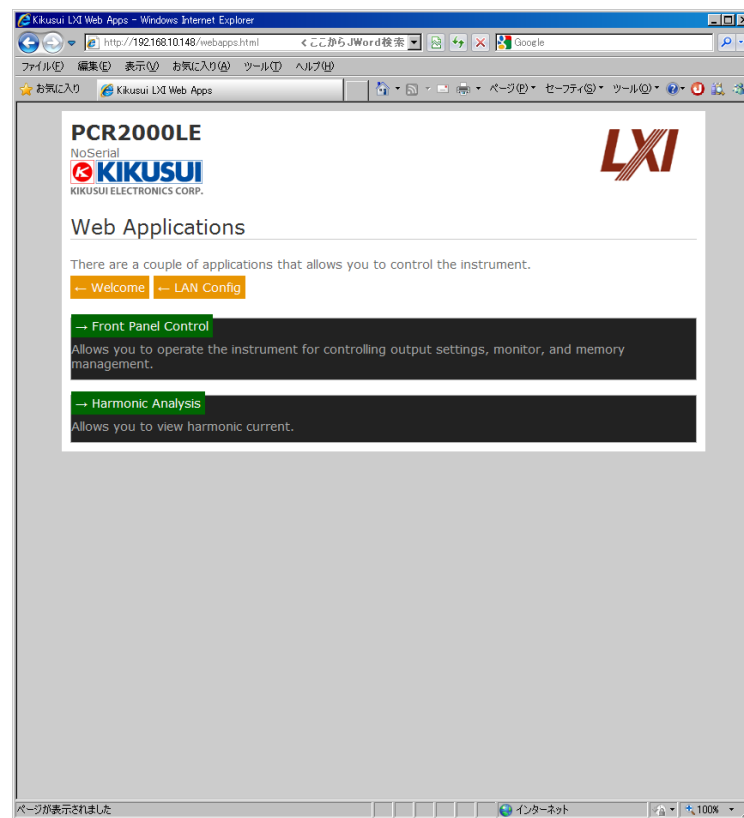
Click "Refresh" to load the current PCR-LE settings. On the Front panel control and Harmonic Analysis pages, the measured values on the PCR-LE at the time that you clicked "Refresh" are displayed.

Front Panel Control

You can use this page to set the voltage and the frequency, control the output, display measured values, save and recall preset memory entries, configure protection settings, and set CONFIG settings.

Harmonic Analysis

You can use this page to view harmonic current.



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OUTP:COUP

Sets the output mode.
This command is not valid when the output is on (OUTP ON).

Command

```
OUTPut:COUPling {AC|DC|ACDC|EAC|EDC}  
OUTPut:COUPling?
```

Parameter

Value	AC	AC mode (default)
	DC	DC mode
	ACDC	AC+DC mode
		This mode is available on the PCR-LE/PCR-LE2 at all times. It is available on the PCR-M when the appropriate optional interface board is installed.
	EAC	EXT-AC
		PCR-M (when the analog interface board is installed) only
	EDC	EXT-DC
		PCR-M (when the analog interface board is installed) only

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the output mode in char format in response to OUTP:COUP?.

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VOLT:RANG

Sets the voltage range.
If the voltage range is switched, the [VOLT:TRIG](#) and [VOLT:OFFS:TRIG](#) settings are cleared, and ABOR is applied to all SEquence groups. Command
This command is not valid when the output is on ([OUTP ON](#)).

Command

```
[SOURce:]VOLTage:RANGe[:UPPer] {<numeric>|MINimum|MAXimum}  
[SOURce:]VOLTage:RANGe[:UPPer]? [{MINimum|MAXimum}]
```

Parameter

Value	150	L range (default)
	300	H range

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the voltage range setting in NR3 format in response to VOLT:RANG?.

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VOLT

Sets the AC voltage.

This command is valid in AC mode and AC+DC mode (when the parameter to [OUTP:COUP](#) is AC or ACDC).

Single-phase three-wire output or Three-phase output (optional): Sets the AC voltage of all phases at once.

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

If the EX06-PCR-LE is in use (optional) and the AC voltage is being controlled with an external signal ([VOLT:EXT:SOUR](#) VOLT), this command is invalid.

Command

```
[SOURce:]VOLTage[0][:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage[0][:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value AC mode, L range: 0 to 152.5
 AC mode, H range: 0 to 305.0
 AC+DC mode, L range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -215.5 V and 215.5 V.
 AC+DC mode, H range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -431 V and 431 V.

A SCPI error (-222, "Data out of range") occurs if outside the range.
 The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the AC voltage setting in NR3 format in response to VOLT?.

In case of the single-phase three-wire output, VOLT? returns a comma-separated list of the AC voltage setting <NR3> for U and V phases.

In case of the three-phase output, VOLT? returns a comma-separated list of the AC voltage setting <NR3> for U, V, and W phases.

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VOLT:OFFS

Sets the DC voltage.

This command is valid in DC mode and AC+DC mode ([OUTP:COUP DC|ACDC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Two-phase output([SYST:CONF:TPH:MODE ON](#)) or three-phase output (optional): Sets the DC voltage of all phases at once.

During single-phase, three-wire output (PCR-LE optional), the value is assigned to the U phase. The V phase is automatically set to the same amplitude as the U phase but with opposite polarity.

Command

```
[SOURce:]VOLTage[0]:OFFSet[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage[0]:OFFSet[:IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value DC mode, L range: -215.5 to 215.5
 DC mode, H range: -431.0 to 431.0
 AC+DC mode, L range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -215.5 V and 215.5 V.
 AC+DC mode, H range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -431 V and 431 V.

A SCPI error (-222, "Data out of range") occurs if outside the range.
 The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the DC voltage setting in NR3 format in response to VOLT:OFFS?.

In case of the two-phase output, VOLT:OFFS? returns a comma-separated list of the DC voltage setting <NR3> for U and V phases.

In case of the three-phase output, VOLT:OFFS? returns a comma-separated list of the DC voltage setting <NR3> for U, V, and W phases.

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VOLT:LINE

Sets the AC line voltage.

This command is valid in AC mode (when the parameter to [OUTP:COUP](#) is AC).

This command is valid during single-phase, three-wire output (PCR-LE optional) when the U-V phase difference is 180 ([SYST:CONF:PHAS:UV](#) 180).

This command is valid during three-phase output (PCR-LE optional) when the U-V phase difference is 120 ([SYST:CONF:PHAS:UV](#) 120) and the U-W phase difference is 240 ([SYST:CONF:PHAS:UW](#) 240).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

If the EX06-PCR-LE is in use (optional) and the AC voltage is being controlled with an external signal ([VOLT:EXT:SOUR](#) VOLT), this command is invalid.

Command

```
[SOURce:]VOLTage:LINE {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:LINE? [{MINimum|MAXimum}]
```

Parameter

Value Single-phase, three-wire output
 L range: 0 to 305.0
 H range: 0 to 610.0
 Three-phase output
 L range: 0 to 264.1
 H range: 0 to 528.2

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the AC line voltage setting in NR3 format in response to VOLT:LINE?.

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VOLT:OFFS:LINE

Sets the DC line voltage.

This command is valid in DC mode ([OUTP:COUP DC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Command

```
[SOURCE:]VOLTage:OFFSet [IMMEdiate] {<numeric>|MINimum|MAXimum}
[SOURCE:]VOLTage:OFFSet [IMMEdiate]? [{MINimum|MAXimum}]
```

Parameter

Value L range : -431.0 to 431.0
H range : -862.0 to 862.0

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the DC line voltage setting in NR3 format in response to VOLT:OFFS:LINE?.

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FREQ

Set the AC output frequency.

This is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Command

```
[SOURce:]FREQuency[:CC|IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]FREQuency[:CC|IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value 1 to 999.9 (50 by default)
Unit HZ

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the AC output frequency in NR3 format in response to FREQ?.

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OUTP:PHAS:ON

Sets whether output on phase control is used.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Use [OUTP:PHAS:ON:LEV](#) to set the output on phase angle.

Command

```
OUTPut:PHASe:ON[:STATe] {ON|OFF|1|0}
OUTPut:PHASe:ON[:STATe] ?
```

Parameter

Value ON(1) The output on phase is controlled.
 OFF(0) The output on phase is not controlled (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns whether the output on phase control is used in NR1 format in response to OUTP:PHAS:ON?.

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OUTP:PHAS:ON:LEV

Sets the output on phase angle.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP](#) AC|ACDC) when the output on phase control is on ([OUTP:PHAS:ON](#) ON).

Command

```
OUTPut:PHASe:ON:LEVel {<numeric>|MINimum|MAXimum}
OUTPut:PHASe:ON:LEVel? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 359 (0 by default)
Unit DEG

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the output on phase angle in NR3 format in response to OUTP:PHAS:ON:LEV?.

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OUTP:PHAS:OFF

Sets whether output off phase control is used.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Use [OUTP:PHAS:OFF:LEV](#) to set the output off phase angle.

Command

```
OUTPut:PHASe:OFF[:STATe] {ON|OFF|1|0}
OUTPut:PHASe:OFF[:STATe] ?
```

Parameter

Value ON(1) The output off phase is controlled.
 OFF(0) The output off phase is not controlled (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns whether the output off phase control is used in NR1 format in response to OUTP:PHAS:OFF?.

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OUTP:PHAS:OFF:LEV

Sets the output off phase angle.
This command is valid in AC mode and AC+DC mode ([OUTP:COUP](#) AC|ACDC) when the output off phase control is on ([OUTP:PHAS:OFF](#) ON).

Command

```
OUTPut:PHASe:OFF:LEVel {<numeric>|MINimum|MAXimum}  
OUTPut:PHASe:OFF:LEVel? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 359 (0 by default)
Unit DEG

For the setting that is applied when *RST is sent, see this [table](#)

Response

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Returns the output off phase angle in NR3 format in response to OUTP:PHAS:OFF:LEV?.

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OUTP

Turns the output on and off.

Command

```
OUTPut[:STATe] {ON|OFF|1|0}  
OUTPut[:STATe]?
```

Parameter

Value ON(1) Output on
OFF(0) Output off (default)

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns whether the output is on in NR1 format in response to OUTP?.

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OUTP:PON

Sets the output state at power-on.

Command

```
OUTPut:PON[:STATe] {SAFE|FORCe}
OUTPut:PON[:STATe]?
```

Parameter

Value SAFE The output is off when the power is turned on (default).
FORCe The output is on when the power is turned on.

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the output state at power-on in CHAR format in response to OUTP:PON?.

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FREQ:LIM

Sets the upper limit value of frequency.
This is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).
If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Command

```
[SOURce:]FREQuency:LIMit[:UPPer] {<numeric>|MINimum|MAXimum}  
[SOURce:]FREQuency:LIMit[:UPPer]? [{MINimum|MAXimum}]
```

Parameter
Value 1 to 999.9 (999.9 by default)
Unit HZ

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the upper limit value of frequency in NR3 format in response to FREQ:LIM?.

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FREQ:LIM:LOW

Sets the lower limit value of frequency.

This is valid in AC mode and AC+DC mode ([OUTP:COUP](#) AC|ACDC).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

Command

```
[SOURce:]FREQuency:LIMit:LOWer {<numeric>|MINimum|MAXimum}
[SOURce:]FREQuency:LIMit:LOWer? [{MINimum|MAXimum}]
```

Parameter

Value	1 to 999.9 (1 by default)
Unit	HZ

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the lower limit value of frequency in NR3 format in response to FREQ:LIM:LOW?.

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CURR

Sets the AC current upper limit.

This command is valid in AC mode ([OUTP:COUP AC](#)).

Single-phase three-wire output or Three-phase output (optional): Sets the AC current upper limit of all phases at once.

Command

```
[SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value PCR500LE: 0.5 to 5.5 (5.5 by default)
PCR1000LE: 1.0 to 11.0 (11.0 by default)
PCR2000LE: 2.0 to 22.0 (22.0 by default)
PCR3000LE: 3.0 to 33.0 (33.0 by default)
PCR4000LE: 4.0 to 44.0 (44.0 by default)
PCR6000LE: 6.0 to 66.0 (66.0 by default)
PCR9000LE: 9.0 to 99.0 (99.0 by default)

PCR6000LE2:
Single-phase output : 6.0 to 66.0 (66.0 by default)
Single-phase three-wire output : 2.0 to 22.0 (22.0 by default)
Three-phase output : 2.0 to 22.0 (22.0 by default)
PCR9000LE2:
Single-phase output : 9.0 to 99.0 (99.0 by default)
Single-phase three-wire output : 3.0 to 33.0 (33.0 by default)
Three-phase output : 3.0 to 33.0 (33.0 by default)
PCR12000LE2:
Single-phase output : 12.0 to 132.0 (132.0 by default)
Single-phase three-wire output : 4.0 to 44.0 (44.0 by default)
Three-phase output : 4.0 to 44.0 (44.0 by default)
PCR18000LE2:
Single-phase output : 18.0 to 198.0 (198.0 by default)
Single-phase three-wire output : 6.0 to 66.0 (66.0 by default)
Three-phase output : 6.0 to 66.0 (66.0 by default)
PCR27000LE2:
Single-phase output : 27.0 to 297.0 (297.0 by default)
Single-phase three-wire output : 9.0 to 99.0 (99.0 by default)
Three-phase output : 9.0 to 99.0 (99.0 by default)

Unit A

For the setting that is applied when *RST is sent, see this [table](#)

Response

Returns the AC current upper limit in NR3 format in response to CURR?.

In case of the single-phase three-wire output, CURR? returns a comma-separated list of the AC current upper limit values <NR3> for U and V phases.

In case of the three-phase output, CURR? returns a comma-separated list of the AC current upper limit values <NR3> for U, V, and W phases.

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CURR:OFFS

Sets the DC current upper limit.

This is valid in DC mode and AC+DC mode ([OUTP:COUP](#) DC|ACDC).

Single-phase three-wire output or Three-phase output (optional): Sets the AC current upper limit of all phases at once.

Command

```
[SOURce:]CURRent:OFFSet[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent:OFFSet[:IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value PCR500LE: 0.35 to 3.85 (3.85 by default)
 PCR1000LE: 0.7 to 7.70 (7.70 by default)
 PCR2000LE: 1.4 to 15.40 (15.40 by default)
 PCR3000LE: 2.1 to 23.10 (23.10 by default)
 PCR4000LE: 2.80 to 30.80 (30.80 by default)
 PCR6000LE: 4.2 to 46.20 (46.20 by default)
 PCR9000LE: 6.3 to 69.30 (69.30 by default)

Unit A

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the DC current upper limit in NR3 format in response to CURR:OFFS?.

In case of the single-phase three-wire output, CURR:OFFS? returns a comma-separated list of the DC current upper limit values <NR3> for U and V phases.

In case of the three-phase output, CURR:OFFS? returns a comma-separated list of the DC current upper limit values <NR3> for U, V, and W phases.

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CURR:PROT:STAT

Sets the PCR acts when the current limit is exceeded.

When you have specified the ON parameter (to select TRIP), use the [CURR:PROT:TRIP:TIME](#) command to set the time that must elapse after a limit has been exceeded before the protection functions are tripped.

Command

```
[SOURce:]CURRent:PROTectioN:STATe {ON|OFF|1|0}
[SOURce:]CURRent:PROTectioN:STATe?
```

Parameter

Value	ON(1)	TRIP (when an overload occurs for longer than the specified time, the output is turned off, and an alarm is generated; default).
	OFF(0)	CC (when an overload occurs, the output is lowered so that the current limit is not exceeded). When you have set the compensation function to the soft sensing function or the regulation adjustment function (SYST:CONF:SENS:MODE SENS2 RADJ), you cannot set this to OFF. If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source or internal signal source plus external signal source (FUNC:SOUR EXT SUM), OFF cannot be selected.

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the PCR acts when the current limit is exceeded in NR1 format in response to CURR:PROT:STAT?.

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CURR:PROT:TRIP:TIME

Sets the time that must elapse before the output is turned off when the current limit is exceeded.

The action that is performed when the limit is exceeded is valid when TRIP ([CURR:PROT:STAT ON](#)) has been selected.

Command

```
[SOURce:]CURRent:PROTectioN:TRIP:TIME {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent:PROTectioN:TRIP:TIME? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 10 (10 by default)
Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the time that must elapse before the output is turned off when the current limit is exceeded in NR3 format in response to CURR:PROT:TRIP:TIME?.

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CURR:PROT:OCP2:TIME

Sets the time that must elapse after the internal semiconductor protection is activated before an alarm is generated.

Command

```
[SOURce:]CURRent:PROTect:OCP2:TIME {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent:PROTect:OCP2:TIME? [{MINimum|MAXimum}]
```

Parameter

Value 1 to 3 (3 by default)
Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the time that must elapse after the internal semiconductor protection is activated before an alarm is generated in NR3 format in response to CURR:PROT:OCP2:TIME?.

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CURR:PEAK

Sets the output peak current limit of the positive electric potential.

Single-phase three-wire output or Three-phase output (optional): Sets the AC current upper limit of all phases at once.

Command

```
[SOURce:]CURRent:PEAK[:UPPer][:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent:PEAK[:UPPer][:IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value PCR500LE: 0.5 to 22.0 (22.0 by default)
PCR1000LE: 1.0 to 44.0 (44.0 by default)
PCR2000LE: 2.0 to 88.0 (88.0 by default)
PCR3000LE: 3.0 to 132.0 (132.0 by default)
PCR4000LE: 4.0 to 176.0 (176.0 by default)
PCR6000LE: 6.0 to 264.0 (264.0 by default)
PCR9000LE: 9.0 to 396.0 (396.0 by default)

Unit A

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the output peak current limit of the positive electric potential in NR3 format in response to CURR:PEAK?.

In case of the single-phase three-wire output, CURR:PEAK? returns a comma-separated list of the output peak current limit of the positive electric potential <NR3> for U and V phases.

In case of the three-phase output, CURR:PEAK? returns a comma-separated list of the output peak current limit of the positive electric potential <NR3> for U, V, and W phases.

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CURR:PEAK:LOW

Sets the output peak current limit of the negative electric potential.

Single-phase three-wire output or Three-phase output (optional): Sets the AC current upper limit of all phases at once.

Command

```
[SOURce:]CURRent:PEAK:LOWer[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent:PEAK:LOWer[:IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value PCR500LE: -0.5 to -22.0 (-22.0 by default)
PCR1000LE: -1.0 to -44.0 (-44.0 by default)
PCR2000LE: -2.0 to -88.0 (-88.0 by default)
PCR3000LE: -3.0 to -132.0 (-132.0 by default)
PCR4000LE: -4.0 to -176.0 (-176.0 by default)
PCR6000LE: -6.0 to -264.0 (-264.0 by default)
PCR9000LE: -9.0 to -396.0 (-396.0 by default)

Unit A

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the output peak current limit of the negative electric potential in NR3 format in response to CURR:PEAK:LOW?.

In case of the single-phase three-wire output, CURR:PEAK:LOW? returns a comma-separated list of the output peak current limit of the negative electric potential <NR3> for U and V phases.

In case of the three-phase output, CURR:PEAK:LOW? returns a comma-separated list of the output peak current limit of the negative electric potential <NR3> for U, V, and W phases.

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VOLT:LIM

Sets the upper limit value of DC voltage.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Command

```
[SOURce:]VOLTage:LIMit[:UPPer] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:LIMit[:UPPer]? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 305.0 (305.0 by default)
A SCPI error (-222, "Data out of range") occurs if outside the range.
Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the upper limit setting of DC voltage in NR3 format in response to VOLT:LIM?.

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VOLT:LIM:LOW

Sets the lower limit value of DC voltage.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Command

```
[SOURce:]VOLTage[:LEVel]:LIMit:LOWer {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage[:LEVel]:LIMit:LOWer? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 305.0 (0 by default)
A SCPI error (-222, "Data out of range") occurs if outside the range.
Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the lower limit setting of DC voltage in NR1 format in response to VOLT:OFFS:LIM:LOW?.

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VOLT:OFFS:LIM

Sets the upper limit value of DC voltage.

This command is valid in DC mode and AC+DC mode ([OUTP:COUP](#) DC|ACDC).

If the EX05-PCR-LE is in use (PCR-LE/PCR-LE2 optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

During single-phase, three-wire output (PCR-LE optional), set the voltage using phase voltage of the U phase.

Command

```
[SOURce:]VOLTage:OFFSet:LIMit[:UPPer] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:OFFSet:LIMit[:UPPer]? [{MINimum|MAXimum}]
```

Parameter

Value PCR-M:
 DC mode, 135V range: -194.0 to 388.0 (388.0 by default)
 DC mode, 270V range: -388.0 to 388.0 (388.0 by default)

 PCR-LE/PCR-LE2: -431.0 to 431.0 (431.0 by default)

 A SCPI error (-222, "Data out of range") occurs if outside the range.
 Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the upper limit setting of DC voltage in NR3 format in response to VOLT:OFFS:LIM?.

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VOLT:OFFS:LIM:LOW

Sets the lower limit value of DC voltage.

This command is valid in DC mode and AC+DC mode ([OUTP:COUP](#) DC|ACDC).

If the EX05-PCR-LE is in use (PCR-LE/PCR-LE2 optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

During single-phase, three-wire output (PCR-LE optional), set the voltage using phase voltage of the U phase.

Command

```
[SOURce:]VOLTage:OFFSet:LIMit:LOWer {<numeric>|MINimum|MAXimum}
```

```
[SOURce:]VOLTage:OFFSet:LIMit:LOWer? [{MINimum|MAXimum}]
```

Parameter

Value PCR-M:

DC mode, 135V range: -388.0 to 194.0 (0 by default)

DC mode, 270V range: -388.0 to 388.0 (0 by default)

PCR-LE/PCR-LE2: -431.0 to 431.0 (-431.0 by default)

A SCPI error (-222, "Data out of range") occurs if outside the range.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the lower limit setting of DC voltage in NR1 format in response to VOLT:OFFS:LIM:LOW?.

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VOLT:OFFS:PROT:LEV

Sets the OVP value used to judge averaged voltage measurements.

This command is valid in DC mode and AC+DC mode ([OUTP:COUP](#) DC|ACDC).

During single-phase, three-wire output (PCR-LE optional), set the voltage using phase voltage of the U phase.

Command

```
[SOURce:]VOLTage:OFFSet:PROTection:LEVel[:UPPer] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:OFFSet:PROTection:LEVel[:UPPer]? [{MINimum|MAXimum}]
```

Parameter

Value -474.1 to 474.1 (474.1 by default)
An SCPI error (-222, "Data out of range") occurs if the specified value is outside the range.
Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the OVP value in NR3 format in response to VOLT:OFFS:PROT:LEV?.

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VOLT:OFFS:PROT:LEV:LOW

Sets the UVP value used to judge averaged voltage measurements.

This command is valid in DC mode and AC+DC mode ([OUTP:COUP](#) DC|ACDC).

During single-phase, three-wire output (PCR-LE optional), set the voltage using phase voltage of the U phase.

Command

```
[SOURce:]VOLTage:OFFSet:PROTectio:n:LEVel:LOWer {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:OFFSet:PROTectio:n:LEVel:LOWer? [{MINimum|MAXimum}]
```

Parameter

Value -474.1 to 474.1 (-474.1 by default)
An SCPI error (-222, "Data out of range") occurs if the specified value is outside the range.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the UVP value in NR3 format in response to VOLT:OFFS:PROT:LEV:LOW?.

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VOLT:PROT:LEV

Sets the OVP value used to judge rms voltage measurements.

This command is valid in AC or AC+DC mode ([OUTP:COUP](#) AC|ACDC).

For single-phase three-wire and three-phase (PCR-LE optional), set this value with the phase voltage.

Command

```
[SOURce:]VOLTage:PROTection:LEVel[:UPPer] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:PROTection:LEVel[:UPPer]? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 474.1 (474.1 by default)
A SCPI error (-222, "Data out of range") occurs if outside the range.
Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the OVP value in NR3 format in response to VOLT:PROT:LEV?.

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VOLT:PROT:LEV:LOW

Sets the UVP value used to judge rms voltage measurements.

This command is valid in AC or AC+DC mode ([OUTP:COUP AC|ACDC](#)).

For single-phase three-wire and three-phase (PCR-LE optional), set this value with the phase voltage.

Command

```
[SOURce:]VOLTage:PROTection:LEVel:LOWer {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:PROTection:LEVel:LOWer? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 474.1 (0 by default)
A SCPI error (-222, "Data out of range") occurs if outside the range.
Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the UVP value in NR3 format in response to VOLT:PROT:LEV:LOW?.

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SYST:CONF:RESP

Sets the response speed.

This command is not valid when the output is on ([OUTP ON](#)).

Command

```
SYSTem:CONFigure:RESPonse[:VOLTage] {SLOW|MEDium|FAST}
SYSTem:CONFigure:RESPonse[:VOLTage]?
```

Parameter

Value	SLOW	High stability
	MEDium	Normal speed (default) This parameter is not valid when the compensation function has been set to hard sensing (SYST:CONF:SENS:MODE SENS1).
	FAST	High speed response (PCR-LE only) This parameter is not valid when the compensation function has been set to hard sensing (SYST:CONF:SENS:MODE SENS1).

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the response speed in CHAR format in response to SYST:CONF:RESP?.

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FREQ:SYNC

Sets the synchronization function.

This is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

Use [FREQ:SYNC:PHASE:DEL](#) to set the synchronization delay phase angle.

Command

```
[SOURce:]FREQuency:SYNChronous[:STATe] {ON|OFF|1|0}
[SOURce:]FREQuency:SYNChronous[:STATe]?
```

Parameter

Value ON(1) The synchronization function is enabled.
OFF(0) The synchronization function is disabled (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the synchronization function in NR1 format in response to FREQ:SYNC?.

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FREQ:SYNC:PHASE:DEL

Sets the synchronization delay phase angle of the synchronization function.
This is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)) when the synchronization function is enabled ([FREQ:SYNC](#)).

Command

```
[SOURce:]FREQuency:SYNChronous:PHASE:DELay {<numeric>|MINimum|MAXimum}  
[SOURce:]FREQuency:SYNChronous:PHASE:DELay? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 359 (0 by default)
Unit DEG

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Returns the synchronization delay phase angle in NR3 format in response to FREQ:SYNC:PHASE:DEL?.

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SYST:CONF:SENS:MODE

Sets the compensation (voltage compensation) function.

This command is not valid when the output is on ([OUTP ON](#)).

This command is not valid when the output impedance is being set ([OUTP:IMP ON](#)).

Command

```
SYSTem:CONFigure:SENSing:MODE {OFF|SENS1|SENS2|RADJust}
SYSTem:CONFigure:SENSing:MODE?
```

Parameter

Value	OFF	The compensation function is not used (default).
	SENS1	The hard sensing function is used. This parameter is not valid when the response is set to normal speed or high speed (SYST:CONF:RESP MED FAST).
	SENS2	The soft sensing function is used. This parameter is not valid in the following situations: When the action that is performed when the current limit is exceeded is CC (CURR:PROT:STAT OFF). When a waveform bank is being used (WAVE:BANK is set to a value other than 0). When soft starts are enabled (OUTP:SST ON). When the output mode is AC+DC (OUTP:COUP ACDC). If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source or internal signal source plus external signal source (FUNC:SOUR EXT SUM), this command is invalid.
	RADJust	The regulation adjustment function is used. This parameter is not valid in the following situations: When the action that is performed when the current limit is exceeded is CC (CURR:PROT:STAT OFF). When a waveform bank is being used (WAVE:BANK is set to a value other than 0). When soft starts are enabled (OUTP:SST ON). When the output mode is DC (OUTP:COUP DC). When the output mode is AC+DC (OUTP:COUP ACDC). If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source or internal signal source plus external signal source (FUNC:SOUR EXT SUM), this command is invalid.

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the compensation function setting in CHAR format in response to SYST:CONF:SENS:MODE?.

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WAVE:BANK

Specifies the number of the waveform bank that you want to execute.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

This command is not valid when the synchronization function is in use ([FREQ:SYNC ON](#)).

This command is not valid if you have set the compensation function to the soft sensing function or the regulation adjustment function ([SYST:CONF:SENS:MODE SENS2|RADJ](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

During single-phase, three-wire output and three-phase output (optional), the same waveform is assigned to all phases.

Command

```
[SOURCE:]WAVE:BANK[:SElect] <NR1>
[SOURCE:]WAVE:BANK[:SElect]?
```

Parameter

Value 0 to 63 (0 by default)

For the setting that is applied when *RST is sent, see this [table](#)

Response

Returns the presently specified waveform bank number in NR1 format in response to WAVE:BANK?.

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OUTP:IMP

Sets whether to set the output impedance.

Use [OUTP:IMP:LEVEL](#) or [OUTP:IMP:RAT](#) to set the output impedance.

This command is valid when the compensation function is not being used ([SYST:CONF:SENS:MODE](#) OFF).

Command

```
OUTPut:IMPedance[:STATe] {ON|OFF|1|0}
OUTPut:IMPedance[:STATe] ?
```

Parameter

Value ON(1) The output impedance will be set.
OFF(0) The output impedance will not be set (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns whether the output impedance will be set in NR1 format in response to OUTP:IMP?.

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OUTP:IMP:LEV

Sets the output impedance in terms of resistance.
This command is valid when the output impedance is on ([OUTP:IMP ON](#)).

Command

```
OUTPut:IMPedance:LEVel {<numeric>|MINimum|MAXimum}  
OUTPut:IMPedance:LEVel? [{MINimum|MAXimum}]
```

Parameter

Value	L range (default)	H range (default)
PCR500LE	0.04 to 4.0 (0.04)	0.16 to 16.0 (0.16)
PCR1000LE	0.02 to 2.0 (0.02)	0.08 to 8.0 (0.08)
PCR2000LE	0.01 to 1.0 (0.01)	0.04 to 4.0 (0.04)
PCR3000LE	0.00667 to 0.667 (0.00667)	0.02667 to 2.667 (0.02667)
PCR4000LE	0.005 to 0.5 (0.005)	0.02 to 2.0 (0.02)
PCR6000LE	0.00333 to 0.333 (0.00333)	0.01333 to 1.333 (0.01333)
PCR9000LE	0.00222 to 0.222 (0.00222)	0.00889 to 0.889 (0.00889)
Unit	OHM	

For the setting that is applied when *RST is sent, see this [table](#)

Response

Returns the output impedance (in terms of resistance) in NR3 format in response to OUTP:IMP:LEV?.

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OUTP:IMP:RAT

Sets the output impedance in terms of percentage.

This command is valid when the output impedance is on ([OUTP:IMP ON](#)).

Command

```
OUTPut:IMPedance:RATio {<numeric>|MINimum|MAXimum}
OUTPut:IMPedance:RATio? [{MINimum|MAXimum}]
```

Parameter

Value 1 to 100 (1 by default)
Unit PCT

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the output impedance (in terms of percentage) in NR3 format in response to OUTP:IMP:RAT?.

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OUTP:SST

Sets whether soft starts are used.

Use [OUTP:SST:TIME](#) to set the rise time.

You cannot turn soft starts on when the action that is performed when the current limit is exceeded is CC ([CURR:PROT:STAT](#) OFF) or when the compensation function is set to the soft sensing function or the regulation adjustment function ([SYST:CONF:SENS:MODE](#) SENS2|RADJ).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), soft start cannot be turned on.

If the EX06-PCR-LE is in use (optional) and the AC voltage is being controlled with an external signal ([VOLT:EXT:SOUR](#) VOLT), soft start cannot be turned on.

Command

```
OUTPut:SSTart[:STATE] {ON|OFF|1|0}
OUTPut:SSTart[:STATE] ?
```

Parameter

Value ON(1) The soft start function is turned on.
OFF(0) The soft start function is turned off (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns whether soft starts are used in NR1 format in response to OUTP:SST?.

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OUTP:SST:TIME

Sets the soft start rise time.

This command is valid when soft starts are on ([OUTP:SST ON](#)).

Command

```
OUTPut:SStart:TIME[:RISE] {<numeric>|MINimum|MAXimum}
OUTPut:SStart:TIME[:RISE]? [{MINimum|MAXimum}]
```

Parameter

Value 0.1 to 3.0 (0.1 by default)
Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the rise time in NR3 format in response to OUTP:SST:TIME?.

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VOLT:VCC:MODE

Sets the internal Vcc operating condition.

Use [VOLT:VCC](#) to set the internal Vcc voltage.

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source or internal signal source plus external signal source ([FUNC:SOUR EXT|SUM](#)), AUTO cannot be specified.

Command

```
[SOURce:]VOLTage:VCC:MODE {AUTO|MANual}
[SOURce:]VOLTage:VCC:MODE?
```

Parameter

Value AUTO The Vcc voltage is set automatically (default).
 MANual The Vcc voltage is fixed.

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the Vcc operating condition in CHAR format in response to VOLT:VCC:MODE?.

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VOLT:VCC

Sets the internal Vcc voltage.

This command is valid when the Vcc operating conditions function is fixed ([VOLT:VCC:MODE MAN](#)).

Command

```
[SOURce:]VOLTage:VCC[:LEVel] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage:VCC[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 431.0 (431.0 by default)

A SCPI error (-222, "Data out of range") occurs if outside the range.

Unit V

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Returns the Vcc voltage in NR3 format in response to VOLT:Vcc?.

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DISP:MMOD:CURR

Sets the measured current or measured power display.

Command

DISPlay:MMODe:CURRent {RMS|PEAK|WATTage|VA|PF|AVG|TWATage|TVA|TPF}

DISPlay:MMODe:CURRent?

Parameter

Value	RMS	The rms measured current is displayed (default).
	PEAK	The peak measured current is displayed.
	WATT	The power is displayed.
	VA	The apparent power is displayed (only in AC mode or AC+DC mode).
	PF	The power factor is displayed (only in AC mode or AC+DC mode).
	AVG	The averaged current is displayed (only in DC mode or AC+DC mode).
	TWAT	The total power is displayed (only single-phase three-wire output or three-phase output).
	TVA	The total apparent power is displayed (only single-phase three-wire output or three-phase output) (only in AC mode).
	TPF	The total power factor is displayed (only single-phase three-wire output or three-phase output) (only in AC mode).

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the measured current or measured power that is being displayed in CHAR format in response to DISP:MMOD:CURR?.

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DISP:MMOD:VOLT

Sets the measured voltage display.

Command

```
DISPlay:MMODe:VOLTage {RMS|PEAK|AVG}  
DISPlay:MMODe:VOLTage?
```

Parameter

Value	RMS	The rms measured voltage is displayed (default).
	PEAK	The peak measured voltage is displayed.
	AVG	The averaged voltage is displayed (only in DC mode and AC+DC mode).

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the measured voltage that is being displayed in CHAR format in response to DISP:MMOD:VOLT?.

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DISP:LVOL

Switches the voltage display (between phase voltage and line voltage).

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

If the EX05-PCR-LE is in use (optional), this command is valid when the signal source is set to internal signal source ([FUNC:SOUR INT](#)).

Command

```
DISPlay:LVOLtage[:STATe] {ON|OFF|1|0}
DISPlay:LVOLtage[:STATe]?
```

Parameter

Value ON(1) Line voltage is displayed.
 OFF(0) Phase voltage is displayed (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the voltage display in NR1 format in response to DISP:LVOL?.

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DISP:PHAS

Selects the phase that you want to display.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
DISPlay:PHASe {0|1|2|3}
DISPlay:PHASe?
```

Parameter

Value 0 All phases are displayed (default).
1 The U phase is displayed.
2 The V phase is displayed.
3 The W phase is displayed (three-phase output only).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the displayed phase in NR1 format in response to DISP:PHAS?.

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VOLT:TRIG

Sets the AC voltage that is applied when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

Single-phase three-wire output or Three-phase output (optional): Sets the AC current upper limit of all phases at once.

Command

```
[SOURce:]VOLTage[:LEVel]:TRIGgered[:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage[:LEVel]:TRIGgered[:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value AC mode, L range: 0 to 152.5
AC mode, H range: 0 to 305.0
AC+DC mode, L range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -215.5 V and 215.5 V.
AC+DC mode, H range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -431 V and 431 V.

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the target value to which the AC voltage is to change using a trigger in NR3 format in response to VOLT:TRIG?.

In case of the single-phase three-wire output, CURR? returns a comma-separated list of the target value <NR3> to which the AC voltage is to change using a trigger for U and V phases.

In case of the three-phase output, CURR? returns a comma-separated list of target value <NR3> to which the AC voltage is to change using a trigger for U, V, and W phases.

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VOLT:OFFS:TRIG

Sets the target DC voltage when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

This command is valid in DC mode and AC+DC mode ([OUTP:COUP](#) DC|ACDC).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

During two-phase output([SYST:CONF:TPH:MODE](#) ON), or single-phase, three-wire output (optional), the value is assigned to the U phase. The V phase is automatically set to the same amplitude as the U phase but with opposite polarity.

Command

```
[SOURce:]VOLTage[0]:OFFSet:TRIGgered {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage[0]:OFFSet:TRIGgered? [{MINimum|MAXimum}]
```

Parameter

Value DC mode, L range: -215.5 to 215.5
DC mode, H range: -431.0 to 431.0
AC+DC mode, L range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -215.5 V and 215.5 V.
AC+DC mode, H range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -431 V and 431 V.

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the target value to which the DC voltage is to change using a trigger in NR3 format in response to VOLT:OFFS:TRIG?.

In case of the two-phase output, VOLT:OFFS:TRIG? returns a comma-separated list of the target value to which the DC voltage <NR3> for U and V phases.

In case of the three-phase output, VOLT:OFFS:TRIG? returns a comma-separated list of the target value to which the DC voltage <NR3> for U, V, and W phases.

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VOLT:OFFS:MODE

Sets the trigger function control of the DC voltage setting when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

Command

```
[SOURce:]VOLTage:OFFSet:MODE {FIXed|STEP}
[SOURce:]VOLTage:OFFSet:MODE?
```

Parameter

Value **FIXed** Disables the trigger function (default)
STEP Enables the trigger function

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the trigger function control of the DC voltage setting in NR1 format in response to VOLT:OFFS:MODE?.

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VOLT:MODE

Sets the trigger function control of the DC voltage setting when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

Command

```
[SOURce:]VOLTage:MODE {FIXed|STEP}
[SOURce:]VOLTage:MODE?
```

Parameter

- Value **FIXed** Disables the trigger function (default)
- STEP** Enables the trigger function

For the setting that is applied when *RST is sent, see this [table](#)

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Response

Returns the trigger function control of the DC voltage setting in NR1 format in response to VOLT:MODE?.

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FREQ:TRIG

Sets the target frequency when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

Command

[SOURCE:]FREQuency:TRIGgered {<numeric>|MINimum|MAXimum}
[SOURCE:]FREQuency:TRIGgered? [{MINimum|MAXimum}]

Parameter

Value 1 to 999.9 (50 by default)
Unit HZ

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the target value to which the frequency is to change using a trigger in NR3 format in response to FREQ:TRIG?.

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FREQ:MODE

Sets the trigger function control of the frequency setting when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

Command

```
[SOURce:]FREQuency:MODE {FIXed|STEP}
[SOURce:]FREQuency:MODE?
```

Parameter

- Value **FIXed** Disables the trigger function (default)
- STEP** Enables the trigger function

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the trigger function control setting of the frequency setting in char format in response to FREQ:MODE?.

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WAVE:BANK:TRIG

WAVE:BANK:TRIG Sets the target number of the waveform bank when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

Command

```
[SOURce:] WAVE:BANK:TRIGgered <NR1>
[SOURce:] WAVE:BANK:TRIGgered?
```

Parameter

Value 0 to 63 (0 by default)

For the setting that is applied when *RST is sent, see this [table](#)

Response

Returns the target value to which the number of the waveform bank is to change using a trigger in NR3 format in response to WAVE:BANK:TRIG?.

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WAVE:BANK:MODE

Sets the trigger function control of the number of the waveform bank when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

Command

```
[SOURce:] WAVE:BANK:MODE {FIXed|STEP}
[SOURce:] WAVE:BANK:MODE?
```

Parameter

- Value **FIXed** Disables the trigger function (default)
- STEP** Enables the trigger function

For the setting that is applied when *RST is sent, see this [table](#)

Response

Returns the trigger function control setting of the number of the waveform bank in char format in response to WAVE:BANK:MODE?.

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TRIG:SOUR

Sets the condition (trigger source) for actually changing the setting after a sequence group 1 receives [INIT/](#) [INIT:NAME](#).

Command

```
TRIGger[:SEquence[1]]:SOURce {IMMediate|BUS}
TRIGger[:SEquence[1]]:SOURce?
TRIGger[:TRANsient]:SOURce {IMMediate|BUS}
TRIGger[:TRANsient]:SOURce?
```

Parameter

Value IMM The setting is changed immediately.
BUS The setting is changed when a software trigger is received (use the *TRG, TRIG, or IEEE488.1 get (Group Execute Trigger) command to change the setting; default).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the trigger source of the sequence 1 group in CHAR format in response to TRIG:SOUR?.

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TRIG:SEQ3:SOUR/ TRIG:ACQ:SOUR

Sets the condition (trigger source) for actually starting the measurement after the sequence 3 group receives [INIT:SEQ3/INIT:NAME](#) ACQ.

Command

```
TRIGger:SEQuence3:SOURce {IMMEDIATE|BUS}
TRIGger:SEQuence3:SOURce?
TRIGger:ACQuire:SOURce {IMMEDIATE|BUS}
TRIGger:ACQuire:SOURce?
```

Parameter

Value	IMM	Start the measurement immediately (default)
	BUS	Wait for a software trigger (*TRG, TRIG:SEQ3, TRIG:ACQ, or IEEE488.1 get (Group Execute Trigger)) to start the measurement

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the trigger source of the sequence 3 group in CHAR format in response to TRIG:SEQ3:SOUR? / TRIG:ACQ:SOUR?.

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SENS:APER

Sets the aperture time (measurement time).

Command

```
SENSe:APERture {<numeric>|MINimum|MAXimum}
SENSe:APERture? [{MINimum|MAXimum}]
```

Parameter

Value 0.100 to 1.000 (0.400 by default)
 Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the aperture time in NR3 format in response to SENS:APER?.

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SENS:CURR:HOLD

Sets the hold time of the peak current.

Command

```
SENSe:CURRent:HOLD {<numeric>|MINimum|MAXimum}
SENSe:CURRent:HOLD? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 10 (0 by default)
Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the hold time in NR3 format in response to SENS:CURR:HOLD?.

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SIM:T1:PHAS:STAT

Sets whether the voltage regulation start of power line abnormality simulations will be set in terms of time or in terms of phase.

When you have selected time, use [SIM:T1:TIME](#) to set the voltage regulation start time.

When you have selected phase, use [SIM:T1:PHAS](#) to set the voltage regulation start phase.

Command

```
SIMulation:T1:PHASe:STATe {ON|OFF|1|0}
SIMulation:T1:PHASe:STATe?
```

Parameter

Value ON(1) The value is set in terms of phase.
 OFF(0) The value is set in terms of time (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the voltage regulation start setting in NR1 format in response to SIM:T1:PHAS:STAT?.

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SIM:T1:TIME

Sets the voltage regulation starting time of power line abnormality simulations.
This command is valid when voltage regulations are configured to be set by time ([SIM:T1:PHAS:STAT](#) OFF).

Command

```
SIMulation:T1:TIME[:LEVel] {<numeric>|MINimum|MAXimum}  
SIMulation:T1:TIME[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value 0.0 to 999.9m (100m by default)
Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the voltage regulation starting time in NR3 format in response to SIM:T1:TIME?.

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SIM:T1:PHAS

Sets the voltage regulation starting phase of power line abnormality simulations.
This command is valid when voltage regulations are configured to be set by phase ([SIM:T1:PHAS:STAT ON](#)).

Command

```
SIMulation:T1:PHAS[:LEVel] {<numeric>|MINimum|MAXimum}  
SIMulation:T1:PHAS[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 359 (0 by default)
Unit DEG

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the voltage regulation starting phase in NR3 format in response to SIM:T1:PHAS?.

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SIM:T2:TIME

Sets slope time 1 of power line abnormality simulations.

Command

```
SIMulation:T2:TIME[:LEVel] {<numeric>|MINimum|MAXimum}  
SIMulation:T2:TIME[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value	0.0 to 99990m (0 by default)
Unit	S

For the setting that is applied when *RST is sent, see this [table](#)

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Returns slope time 1 in NR3 format in response to SIM:T2:TIME?.

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SIM:T3:TIME

Sets the voltage regulation time of power line abnormality simulations.

Command

```
SIMulation:T3:TIME[:LEVel] {<numeric>|MINimum|MAXimum}
SIMulation:T3:TIME[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value	0.0001 to 9.999 (0 by default)
Unit	S

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the voltage regulation time in NR3 format in response to SIM:T3:TIME?.

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SIM:T3:VOLT

Sets the regulated voltage of power line abnormality simulations.

Command

```
SIMulation:T3:VOLTage[:LEVel] {<numeric>|MINimum|MAXimum}
SIMulation:T3:VOLTage[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 305 (0 by default)
 Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the regulated voltage in NR3 format in response to SIM:T3:VOLT?.

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SIM:T4:TIME

Sets slope time 2 of power line abnormality simulations.

Command

```
SIMulation:T4:TIME[:LEVel] {<numeric>|MINimum|MAXimum}
SIMulation:T4:TIME[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value 0.0 to 99990m (0 by default)
Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns slope time 2 in NR3 format in response to SIM:T4:TIME?.

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SIM:T5:CYCL:STAT

Sets whether the duration that the PCR remains in the returned state is configured in terms of time or in terms of cycles for power line abnormality simulations.

When you have selected time, use [SIM:T5:TIME](#) to set the return time.

When you have selected cycles, use [SIM:T5:CYCLE](#) to set the number of return cycles.

Command

```
SIMulation:T5:CYCLe:STATe {ON|OFF|1|0}
SIMulation:T5:CYCLe:STATe?
```

Parameter

Value ON(1) The value is set in terms of cycles.
 OFF(0) The value is set in terms of time (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the returned state setting in NR1 format in response to SIM:T5:CYCL:STAT?.

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SIM:T5:TIME

Sets the return time of power line abnormality simulations.
This command is valid when the duration that the PCR remains in the returned state is configured to be set in terms of time ([SIM:T5:CYCL:STAT](#) OFF).

Command

```
SIMulation:T5:TIME[:LEVel] {<numeric>|MINimum|MAXimum}  
SIMulation:T5:TIME[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value	0.0 to 99.99 (0.1 by default)
Unit	S

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the return time in NR3 format in response to SIM:T5:TIME?.

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SIM:T5:CYCL

Sets the number of return cycles of power line abnormality simulations.

This command is valid when the duration that the PCR remains in the returned state is configured to be set in terms of cycles ([SIM:T5:CYCL:STAT](#) ON).

Command

```
SIMulation:T5:CYCLe[:LEVel] {<numeric>|MINimum|MAXimum}
SIMulation:T5:CYCLe[:LEVel]? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 999900 (0 by default)

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the return cycles in NR3 format in response to SIM:T5:CYCL?.

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SIM:POL

Sets the voltage regulation polarity of power line abnormality simulations.

Command

```
SIMulation:POLarity {NORMal|INVerted}  
SIMulation:POLarity?
```

Parameter

Value NORM Positive polarity is used (default).
INV Negative polarity is used.

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the voltage regulation polarity in char format in response to SIM:POL?.

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SIM:REP:COUN

Sets the number of repetitions of power line abnormality simulations.

Command

```
SIMulation:REPeat:COUNT {<numeric>|MINimum|MAXimum}
SIMulation:REPeat:COUNT? [{MINimum|MAXimum}]
```

Parameter

Value 1 to 9999 (1 by default)
9999 indicates unlimited repetitions.

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the number of repetitions in NR1 format in response to SIM:REP:COUN?.

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TRIG:SEQ4:SOUR/ TRIG:SIM:SOUR

Sets the condition (trigger source) that determines when the sequence 4 group actually executes a sequence operation after the PCR receives the [INIT:SEQ4](#) SIM or [INIT:NAME](#) SIM command.

Command

```
TRIGger:SEQuence4:SOURce {IMMediate|BUS}  
TRIGger:SEQuence4:SOURce?  
TRIGger:SIMulation:SOURce {IMMediate|BUS}  
TRIGger:SIMulation:SOURce?
```

Parameter

- Value IMM The sequence operation starts immediately (default).
- BUS The PCR waits for a software trigger (a *TRG, TRIG:SEQ2, or IEEE 488.1 get (Group Execute Trigger) command), and then the sequence operation starts.

For the setting that is applied when *RST is sent, see this [table](#)

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Returns the sequence 4 group's trigger source in CHAR format in response to TRIG:SEQ4:SOUR? or TRIG:SIM:SOUR?.

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TRIG:SEQ5:SOUR/ TRIG:PROG:SOUR

Sets the condition (trigger source) that determines when the sequence 5 group actually executes a sequence operation after the PCR receives the [INIT:SEQ5](#) PROG or [INIT:NAME](#) PROG command.

Command

```
TRIGger:SEQuence5:SOURce {IMMediate|BUS}
TRIGger:SEQuence5:SOURce?
TRIGger:PROGram:SOURce {IMMediate|BUS}
TRIGger:PROGram:SOURce?
```

Parameter

Value IMM The sequence starts immediately (default).
BUS The PCR waits for a software trigger (a *TRG, TRIG:SEQ3, or IEEE 488.1 get (Group Execute Trigger) command), and then the sequence starts.

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

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SYST:SLE

Turns the sleep function on and off.

Even if the sleep function is turned off, you can activate the sleep function by sending the [SYST:SLE:EXEC](#) command.

Use [SYST:SLE:TIME](#) to set the time that must elapse before the PCR enters sleep mode.

Command

```
SYSTem:SLEep[:STATe] {ON|OFF|1|0}
SYSTem:SLEep[:STATe] ?
```

Parameter

Value ON(1) The sleep function is turned on.
OFF(0) The sleep function is turned off (default).

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns whether the sleep function is on or off in NR1 format in response to SYST:SLE?.

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SYST:SLE:TIME

Sets the time that must elapse before the product enters sleep mode.

Use [SYST:SLE](#) to turn the sleep function on and off.

Command

```
SYSTem:SLEep:TIME {<numeric>|MINimum|MAXimum}
SYSTem:SLEep:TIME? [{MINimum|MAXimum}]
```

Parameter

Value 60 to 3600 (3600 by default)
Unit S

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the time that must elapse before the product enters sleep mode in NR3 format in response to SYST:SLE:TIME?.

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SYST:KLOC

Sets/Releases the panel operation lock.

Command

```
SYSTem:KLOCk {ON|OFF|1|0}  
SYSTem:KLOCk?
```

Parameter

Value	ON(1)	Lock the panel operation
	OFF(0)	Release the panel operation lock

Response

Returns the panel operation lock setting in NR1 format in response to SYST:KLOC?.

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SYST:CONF:TPH:MODE

Sets the output mode for single-phase, three-phase output.

This command is valid in AC mode ([OUTP:COUP AC](#)).

This command is not valid when the output is on ([OUTP ON](#)).

This command is valid in single-phase three-wire output (PCR-LE optional).

Command

```
SYSTem:CONFigure:TPHase:MODE {ON|OFF|1|0}  
SYSTem:CONFigure:TPHase:MODE?
```

Parameter

- Value ON(1) Double-phase output
- OFF(0) Single-phase three-wire output

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the output mode in NR1 format in response to SYST:CONF:TPH:MODE?.

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FUNC:SOUR

Select which signal source to use to control the PCR-LE/ PCR-LE2 Series.
This command is valid in amplifying the input waveform (optional).
This command is valid in single-phase three-wire output or three-phase output (optional).
Single-phase three-wire output or Three-phase output (PCR-LE optional): Sets the signal source of all phases at once.
This command is not valid when the output is on ([OUTP ON](#)).

Command

```
[SOURce:]FUNCtion:SOURce {INTernal|EXTernal|SUM}  
[SOURce:]FUNCtion:SOURce?
```

Parameter

Value	INTernal	Internal signal source
	EXTernal	External signal source
	SUM	Internal and external signal sources

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the signal source in character data format in response to FUNC:SOURFUNC:SOUR?.

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SYST:CONF:EXT:SINP{1|2|3}:POL

Sets whether to output a signal whose polarity is the same as or opposite to that of the input signal.

This command is valid in amplifying the input waveform (optional).

Command

Single-phase

Single-phase three-wire output or Three-phase output (PCR-LE optional): Sets the signal source of all phases at once.

```
SYSTem:CONFigure:EXTernal:SINPut[0]:POLarity {NORMal|INVerted}
SYSTem:CONFigure:EXTernal:SINPut[0]:POLarity?
```

U-phase

```
SYSTem:CONFigure:EXTernal:SINPut1:POLarity {NORMal|INVerted}
SYSTem:CONFigure:EXTernal:SINPut1:POLarity?
```

U-phase

```
SYSTem:CONFigure:EXTernal:SINPut2:POLarity {NORMal|INVerted}
SYSTem:CONFigure:EXTernal:SINPut2:POLarity?
```

V-phase

```
SYSTem:CONFigure:EXTernal:SINPut3:POLarity {NORMal|INVerted}
SYSTem:CONFigure:EXTernal:SINPut3:POLarity?
```

Parameter

Value NORMal Output a signal whose polarity is the same as the input signal.
INVerted Output a signal whose polarity is opposite to that of the input signal.

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Single-phase

Returns the signal polarity in CHAR format in response to SYST:CONF:EXT:SINP:POL?.

Single-phase three-wire

Returns the U phase and V phase signal polarities separated by a comma in CHAR format in response to SYST:CONF:EXT:SINP:POL?.

Returns the U phase signal polarity in CHAR format in response to SYST:CONF:EXT:SINP1:POL?.

Returns the V phase signal polarity in CHAR format in response to SYST:CONF:EXT:SINP2:POL?.

Three-phase

Returns the U phase, V phase, and W phase signal polarities separated by a comma in CHAR format in response to SYST:CONF:EXT:SINP:POL?.

Returns the U phase signal polarity in CHAR format in response to SYST:CONF:EXT:SINP1:POL?.

Returns the V phase signal polarity in CHAR format in response to SYST:CONF:EXT:SINP2:POL?.

Returns the W phase signal polarity in CHAR format in response to SYST:CONF:EXT:SINP3:POL?.

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VOLT:EXT:SOUR

Select whether to control the AC voltage output using an external signal.

This command is valid in Varying the voltage of the output AC waveform using DC signals (optional).

Single-phase three-wire output or Three-phase output (PCR-LE optional): Sets the signal source of all phases at once.

This is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

This is valid in DC mode and AC+DC mode ([OUTP:COUP DC|ACDC](#)).

This command is not valid when the output is on ([OUTP ON](#)).

Command

[SOURce:]VOLTage:EXTernal:SOURce {NONE|VOLTage}

[SOURce:]VOLTage:EXTernal:SOURce?

Parameter

Value	NONE	Do not control the AC voltage using an external signal
	VOLTage	Control the AC voltage using an external signal

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the signal source in character data format in response to VOLT:EXT:SOUR?.

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***CLS**

Clears all event registers including [the status byte](#), [event status](#), and error queue.
Clears the operation complete standby that was created by the *OPC or *OPC? command.

Command

*CLS

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***ESE**

Sets [the event status enable register](#) that is counted by the event summary bit (ESB) of [the status byte](#).

Command

*ESE <NRf>
*ESE?

Parameter

Value : 0 to 255

(Example) When *ESE 16 is transmitted, bit 4 of the event status enable register is set. Each time the execution error bit (bit 4) of the event status register is set, the summary bit (ESB) of the status byte is set.

Response

Returns the value of the event status enable register in NR1 format in response to *ESE?.

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***ESR**

Queries [the event status register](#). Registers that are read are cleared.

Command

*ESR?

Response

Returns the value of the event status register in NR1 format in response to *ESR? and clears the register.

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***IDN**

Queries the model name, serial number, and firmware version of the PCR.

Command

*IDN?

Response

The response to *IDN? is indicated below.
(Example) For a PCR1000LE with serial number AB123456 and firmware version 1.00, this returns:
KIKUSUI,PCR1000LE,AB123456,1.00

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***OPC**

Sets the OPC bit (bit 0) of the event status register when all the commands in standby have been completed.
See section 12.5.3 in IEEE 488.2-1992.

Command

*OPC
*OPC?

Response

Returns 1 in response to *OPC? when all the commands in standby have been completed.

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***OPT/ SYST:OPT**

Queries the optional interface board that is installed in the PCR.

During parallel operation, queries the optional interface boards that are installed in the master unit.

During single-phase three-wire output or three-phase output, queries the optional interface boards that are installed in the U phase unit.

Command

*OPT?
SYST:OPT?

Response

Returns the optional interface board that is installed in the PCR in comma-separated string format in response to OPT?/SYST:OPT?. Returns 0 in response to *OPT?/SYST:OPT? if there is no option installed.

"MP-3P05"	3P05-PCR-LE	Three-phase output driver
"MP-2P05"	2P05-PCR-LE	Single-phase, three-wire output driver
"PD05"	PD05-PCR-LE	Parallel operation driver
"EX05"	EX05-PCR-LE	Analog signal interface
"EX06"	EX06-PCR-LE	Analog signal interface
"USB"	US05-PCR-LE	USB interface board
"GPIB"	IB05-PCR-LE	GPIB interface board
"LAN"	LN05-PCR-LE	LAN interface board

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***PSC**

Sets whether to clear the event status enable register and the service request enable register when the POWER switch is turned on (power-on status).

Command

*PSC <NRf>
*PSC?

Parameter

Value 0 The *ESE and *SRE settings are not cleared when the POWER switch is turned on.
1 The *ESE and *SRE settings are cleared when the POWER switch is turned on.

(Example) To enable the power-on SRQ function

*PSC 0;*SRE 32;*ESE 128

Response

Returns the power-on status setting in response to *PSC?.

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***RST**

Aborts the measurement operation and initializes the PCR to its factory default condition.
For the commands that are affected, see this [table](#)

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*RST

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***SRE**

Sets the service request enable register.

The service request enable register is used to select the summary messages in [the status byte register](#) that will be able to perform service requests.

To clear the service request enable register, send *SRE 0. If the register is cleared, service requests cannot be generated by status information.

Command

*SRE <NRf>
*SRE?

Parameter

Value 0 to 255

(Example) Sending *SRE 8 sets bit 3 of the service request enable register. Each time the summary bit (bit 3) of [the QUESTIONable status register](#) in the status byte is set, a service request message is generated.

Response

Returns the value of the service request enable register in NR1 format in response to *SRE?.

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***STB**

Queries the contents of [the status byte register](#) and the MSS (master summary status) message. The response is the same as serial polling only with the exception that the MSS message appears in place of the RQS message in bit 6.

Command

*STB?

Response

Returns the value of the status byte register and the MSS message (bit 6) in NR1 format in response to *STB?.

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***TRG**

Trigger command.

This is a substitute command for the IEEE488.1 get (Group Execute Trigger) command.

If the PCR is not in a condition to accept triggers, an SCPI error (-211,"Trigger ignored") occurs.

See section 10.37 in IEEE 488.2-1992.

Command

*TRG

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***TST**

Executes a self-test. Use [SYST:ERR?](#) to query the errors that occurred. See section 10.38 in IEEE 488.2-1992.

Command

*TST?

Response

Returns 0 if there are no errors in response to *TST?. Returns the error code, if there are errors.

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***WAI**

Prevents the PCR from executing subsequent commands until all operations in standby are complete.

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*WAI

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SYST:CONF:SSUP

Sets whether voltage surge suppression control is used.

Command

```
SYSTem:CONFigure:SSUPpression[:STATe] {ON|OFF|1|0}  
SYSTem:CONFigure:SSUPpression[:STATe]?
```

Parameter

- Value ON(1) The voltage surge suppression is controlled (default).
- OFF(0) The voltage surge suppression is not controlled.

Response

Returns whether the voltage surge suppression control is used in NR1 format in response to SYST:CONF:SSUP?.

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VOLT{1|2|3}

Sets the AC voltage of each phase.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

This command is valid in AC mode (when the parameter to [OUTP:COUP](#) is AC).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

If the EX06-PCR-LE is in use (optional) and the AC voltage is being controlled with an external signal ([VOLT:EXT:SOUR](#) VOLT), this command is invalid.

Command**U phase**

```
[SOURce:]VOLTage1[:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage1[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]VOLTage2[:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage2[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

W phase (Three-phase output only)

```
[SOURce:]VOLTage3[:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage3[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value L range: 0 to 152.5
H range: 0 to 305.0

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the AC voltage setting of U phase in NR3 format in response to VOLT1?.

Returns the AC voltage setting of V phase in NR3 format in response to VOLT2?.

Returns the AC voltage setting of W phase in NR3 format in response to VOLT3?.

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VOLT{1|2|3}:OFFS

Sets the DC voltage of each phase.

This command is valid in DC mode or AC+DC mode (when the parameter to [OUTP:COUP](#) is DC|ACDC).

This command is valid in two-phase output([SYST:CONF:TPH:MODE](#) ON) or three-phase output (optional).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

Command**U phase**

```
[SOURce:]VOLTage1:OFFSet[:LEVel][:IMMediate][:AMPLitude]
{<numeric>|MINimum|MAXimum}
```

```
[SOURce:]VOLTage1:OFFSet[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]VOLTage2:OFFSet[:LEVel][:IMMediate][:AMPLitude]
{<numeric>|MINimum|MAXimum}
```

```
[SOURce:]VOLTage2:OFFSet[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

W phase (Three-phase output only)

```
[SOURce:]VOLTage3:OFFSet[:LEVel][:IMMediate][:AMPLitude]
{<numeric>|MINimum|MAXimum}
```

```
[SOURce:]VOLTage3:OFFSet[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value DC mode, L range: -215.5 to 215.5
DC mode, H range: -431.0 to 431.0
AC+DC mode, L range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -215.5 V and 215.5 V.
AC+DC mode, H range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -431 V and 431 V.

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the DC voltage setting of U phase in NR3 format in response to VOLT1:OFFS?.

Returns the DC voltage setting of V phase in NR3 format in response to VOLT2:OFFS?.

Returns the DC voltage setting of W phase in NR3 format in response to VOLT3:OFFS?.

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SYST:CONF:PHAS:UV

Sets the U-V phase difference angle.
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).
If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

Command

```
SYSTem:CONFigure:PHASe:UV {<numeric>|MINimum|MAXimum}  
SYSTem:CONFigure:PHASe:UV? [ {MINimum|MAXimum} ]
```

Parameter

Value 0 to 359
Unit DEG

Response

Returns the U-V phase difference angle in NR3 format in response to SYST:CONF:PHAS:UV?.

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SYST:CONF:PHAS:UW

Sets the U-W phase difference angle.
This command is valid in three-phase output (PCR-LE optional).
If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

Command

```
SYSTem:CONFIgure:PHASe:UW {<numeric>|MINimum|MAXimum}  
SYSTem:CONFIgure:PHASe:UW? [{MINimum|MAXimum}]
```

Parameter

Value	0 to 359
Unit	DEG

Response

Returns the U-W phase difference angle in NR3 format in response to SYST:CONF:PHAS:UW?.

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OUTP:PROT:CLE

Clears alarms.

Command

OUTPut:PROTection:CLEar

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CURR{1|2|3}

Sets the AC current upper limit of each phase.

This command is valid in single-phase three-wire output or three-phase output (optional).

This command is valid in AC mode ([OUTP:COUP](#) AC).

Command**U phase**

```
[SOURce:]CURRent1[:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent1[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]CURRent2[:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent2[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

W phase (Three-phase output only)

```
[SOURce:]CURRent3[:LEVel][:IMMediate][:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent3[:LEVel][:IMMediate][:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value PCR500LE: 0.5 to 5.5 (5.5 by default)
 PCR1000LE: 1.0 to 11.0 (11.0 by default)
 PCR2000LE: 2.0 to 22.0 (22.0 by default)
 PCR3000LE: 3.0 to 33.0 (33.0 by default)
 PCR4000LE: 4.0 to 44.0 (44.0 by default)
 PCR6000LE: 6.0 to 66.0 (66.0 by default)
 PCR9000LE: 9.0 to 99.0 (99.0 by default)

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the AC current upper limit of U phase in NR3 format in response to CURR1?.

Returns the AC current upper limit of V phase in NR3 format in response to CURR2?.

Returns the AC current upper limit of W phase in NR3 format in response to CURR3?.

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CURR{1|2|3}:OFFS

Sets the DC current upper limit of each phase.

This command is valid in single-phase three-wire output or three-phase output (optional).

This is valid in DC or AC+DC mode([OUTP:COUP](#) DC|ACDC).

Command

U phase

```
[SOURce:]CURRent1:OFFSet[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent1:OFFSet[:IMMediate]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]CURRent2:OFFSet[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent2:OFFSet[:IMMediate]? [{MINimum|MAXimum}]
```

W phase

```
[SOURce:]CURRent3:OFFSet[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent3:OFFSet[:IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value	PCR500LE: 0.35 to 3.85 (3.85 by default)
	PCR1000LE: 0.7 to 7.70 (7.70 by default)
	PCR2000LE: 1.4 to 15.40 (15.40 by default)
	PCR3000LE: 2.1 to 23.10 (23.10 by default)
	PCR4000LE: 2.80 to 30.80 (30.80 by default)
	PCR6000LE: 4.2 to 46.20 (46.20 by default)
	PCR9000LE: 6.3 to 69.30 (69.30 by default)

Unit A

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the DC current upper limit of U phase in NR3 format in response to CURR1:OFFS?.

Returns the DC current upper limit of V phase in NR3 format in response to CURR2:OFFS?.

Returns the DC current upper limit of W phase in NR3 format in response to CURR3:OFFS?.

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CURR{1|2|3}:PEAK

Sets the output peak current limit of the positive electric potential of each phase.
This command is valid in single-phase three-wire output or three-phase output (optional).

Command**U phase**

```
[SOURce:]CURRent1:PEAK[:UPPer][:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent1:PEAK[:UPPer][:IMMediate]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]CURRent2:PEAK[:UPPer][:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent2:PEAK[:UPPer][:IMMediate]? [{MINimum|MAXimum}]
```

W phase (Three-phase output only)

```
[SOURce:]CURRent3:PEAK[:UPPer][:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent3:PEAK[:UPPer][:IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value PCR500LE: 0.5 to 22.0 (22.0 by default)
PCR1000LE: 1.0 to 44.0 (44.0 by default)
PCR2000LE: 2.0 to 88.0 (88.0 by default)
PCR3000LE: 3.0 to 132.0 (132.0 by default)
PCR4000LE: 4.0 to 176.0 (176.0 by default)
PCR6000LE: 6.0 to 264.0 (264.0 by default)
PCR9000LE: 9.0 to 396.0 (396.0 by default)

Unit A

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the output peak current limit of the positive electric potential of U phase in NR3 format in response to CURR1:PEAK?.

Returns the output peak current limit of the positive electric potential of V phase in NR3 format in response to CURR2:PEAK?.

Returns the output peak current limit of the positive electric potential of W phase in NR3 format in response to CURR3:PEAK?.

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CURR{1|2|3}:PEAK:LOW

Sets the output peak current limit of the negative electric potential of each phase.
This command is valid in single-phase three-wire output or three-phase output (optional).

Command**U phase**

```
[SOURce:]CURRent1:PEAK:LOWer[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent1:PEAK:LOWer[:IMMediate]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]CURRent2:PEAK:LOWer[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent2:PEAK:LOWer[:IMMediate]? [{MINimum|MAXimum}]
```

W phase (Three-phase output only)

```
[SOURce:]CURRent3:PEAK:LOWer[:IMMediate] {<numeric>|MINimum|MAXimum}
[SOURce:]CURRent3:PEAK:LOWer[:IMMediate]? [{MINimum|MAXimum}]
```

Parameter

Value	PCR500LE: -0.5 to -22.0 (-22.0 by default)
	PCR1000LE: -1.0 to -44.0 (-44.0 by default)
	PCR2000LE: -2.0 to -88.0 (-88.0 by default)
	PCR3000LE: -3.0 to -132.0 (-132.0 by default)
	PCR4000LE: -4.0 to -176.0 (-176.0 by default)
	PCR6000LE: -6.0 to -264.0 (-264.0 by default)
	PCR9000LE: -9.0 to -396.0 (-396.0 by default)

Unit A

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the output peak current limit of the negative electric potential of U phase in NR3 format in response to CURR1:PEAK:LOW?.

Returns the output peak current limit of the negative electric potential of V phase in NR3 format in response to CURR2:PEAK:LOW?.

Returns the output peak current limit of the negative electric potential of W phase in NR3 format in response to CURR3:PEAK:LOW?.

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WAVE:EDIT:PCL

Sets the crest factor of the waveform bank whose number you specify. To configure sine waves, use the [WAVE:EDIT:SIN](#) command.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP](#) AC|ACDC).

This command is not valid when the synchronization function is in use ([FREQ:SYNC](#) ON).

If you specify the waveform bank (using [WAVE:BANK](#)) and then turn the output on (using [OUTP](#) ON), you cannot specify the same waveform bank number with this command (the command will not be valid).

Command

```
[SOURce:]WAVE:EDIT:PCLip <BANK_NR1>,{<PCLIP_numeric>|MINimum|MAXimum}
[SOURce:]WAVE:EDIT:PCLip? <BANK_NR1>[,{MINimum|MAXimum}]
```

Parameter (BANK_NR1)

Value 1 to 63 Waveform bank number

Parameter (PCLIP_numeric)

Value 1.1 to 1.40 Crest factor of a peak-clipped waveform
(1.40 by default)

Response

Returns the crest factor in NR3 format in response to WAVE:EDIT:PCL? <BANK>.

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WAVE:EDIT:USER:DATA:POIN

Sets a user-defined waveform by using the waveform bank that you want to edit (specified by its number) and the point that you specify.

Assign waveform data to points that are derived by dividing one cycle (phase angle of 360 degrees) by 1024 (positive peak is 8191 and negative peak is -8191).

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

This command is not valid when the synchronization function is in use ([FREQ:SYNC ON](#)).

If you specify the waveform bank (using [WAVE:BANK](#)) and then turn the output on (using [OUTP ON](#)), you cannot specify the same waveform bank number with this command (the command will not be valid).

Single-phase three-wire output or Three-phase output (PCR-LE optional): Sets a user-defined waveform of all phases at once.

Command

```
[SOURce:]WAVE[0]:EDIT:USER:DATA:POINT <BANK_NR1>,<POINT_NR1>,<data_NR1>
[SOURce:]WAVE[0]:EDIT:USER:DATA:POINT? <BANK_NR1>,<POINT_NR1>
```

Parameter (BANK_NR1, waveform bank number)

Value 1 to 63

Parameter (POINT_NR1, point)

Value 0 to 1023

Parameter (data_NR1)

Value -8191 to 8191

A sine wave by default

When setting a rectangular wave to waveform bank number 1 of phase U

Assign waveform data 8191 to point 0 to point 511.

Example: The command to set point 0 of waveform bank number 1 of phase U:

WAVE1:EDIT:USER:DATA:POIN 1,0,8191

Assign waveform data 0 to point 512.

Example: The command to set point 512 of waveform bank number 1 of phase U:

WAVE1:EDIT:USER:DATA:POIN 1,512,0

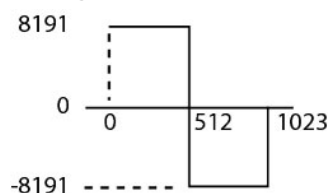
Assign waveform data -8191 to point 513 to point 1022.

Example: The command to set point 513 of waveform bank number 1 of phase U:

WAVE1:EDIT:USER:DATA:POIN 1,513,-8191

Assign waveform data 0 to point 1023.

When you set all the points, waveform bank number 1 of phase U will contain the following rectangular waveform data.



Response

Returns the user-defined waveform data in NR1 format in response to WAVE:EDIT:USER:DATA:POIN? <BANK>,<POINT>.

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WAVE:BANK:TYPE

Queries the output waveform type of the specified waveform bank.
This command is valid in AC mode and AC+DC mode ([OUTP:COUP](#) AC|ACDC).

Command

[SOURce:] WAVE:BANK:TYPE? <NR1>

Parameter

Value 0 to 63 Number of the waveform bank that you want to query

Response

Returns the type of the specified waveform bank (see below) in CHAR format in response to WAVE:BANK:TYPE? <NR1>.

- wavetype SIN Sine wave
- wavetype PCL Peak-clipped waveform
- wavetype USER User-defined waveform

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WAVE:EDIT:SIN

Sets the waveform bank whose number you specify to a sine wave.

This command is valid in AC mode and AC+DC mode ([OUTP:COUP AC|ACDC](#)).

This command is not valid when the synchronization function ([FREQ:SYNC ON](#)) is on.

If you specify the waveform bank (using [WAVE:BANK](#)) and then turn the output on (using [OUTP ON](#)), you cannot specify the same waveform bank number with this command (the command will not be valid).

Command

```
[SOURce:]WAVE:EDIT:SIN <NR1>
```

Parameter

Value 1 to 63 Waveform bank number

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SYST:CONF:POW:EXP

Sets the anticipated maximum power (power-saving function).

This command is not valid on the PCR500LE and PCR1000LE.

This command is valid when all power units are operating normally.

Single-phase three-wire output or Three-phase output (optional): Sets the AC current upper limit of all phases at once. If the connected PCR-LEs are not of the same model, set the limit of each phase using [SYST:CONF:POW{1|2|3}:EXP](#).

Turn the POWER switch off and on to enable the setting.

Master-slave parallel operation (option) is valid only when the connected PCR-LE Series are of the same model.

Command

```
SYSTem:CONFigure:POWer[0]:EXPeCted[:MAXimum] {<numeric>|MINimum|MAXimum}
SYSTem:CONFigure:POWer[0]:EXPeCted[:MAXimum]? [{MINimum|MAXimum}]
```

Parameter

Value PCR2000LE: 1000, 2000 (2000 by default)
PCR3000LE: 1000, 2000, 3000 (3000 by default)
PCR4000LE: 1000, 2000, 3000, 4000 (4000 by default)
PCR6000LE: 1000, 2000, 3000, 4000, 5000, 6000 (6000 by default)
PCR9000LE: 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000 (9000 by default)
The setting range during master-slave parallel operation is "1000VA x the number of parallel units" to "rated output capacity x the number of parallel units." The resolution is 1000VA x the number of parallel units.

Unit VA

Response

Returns the maximum anticipated power in NR3 format in response to SYST:CONF:POW:EXP?.

In case of the single-phase three-wire output, SYST:CONF:POW:EXP? returns a comma-separated list of the maximum anticipated power <NR3> for U and V phases.

In case of the three-phase output, SYST:CONF:POW:EXP? returns a comma-separated list of the maximum anticipated power <NR3> for U, V, and W phases.

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SYST:CONF:POW{1|2|3}:EXP

Sets the anticipated maximum power (power-saving function) of each phase.

This command is valid in single-phase three-wire output or three-phase output (optional).

Turn the POWER switch off and on to enable the setting.

Master-slave parallel operation (option) is valid only when the connected PCR-LE Series are of the same model.

Command**Setting of U phase**

SYSTem:CONFigure:POWer1:EXPeCted[:MAXimum] {<numeric>|MINimum|MAXimum}

SYSTem:CONFigure:POWer1:EXPeCted[:MAXimum]? [{MINimum|MAXimum}]

Setting of V phase

SYSTem:CONFigure:POWer2:EXPeCted[:MAXimum] {<numeric>|MINimum|MAXimum}

SYSTem:CONFigure:POWer2:EXPeCted[:MAXimum]? [{MINimum|MAXimum}]

Setting of W phase (Three-phase output only)

SYSTem:CONFigure:POWer3:EXPeCted[:MAXimum] {<numeric>|MINimum|MAXimum}

SYSTem:CONFigure:POWer3:EXPeCted[:MAXimum]? [{MINimum|MAXimum}]

Parameter

Value PCR2000LE: 1000, 2000 (2000 by default)
PCR3000LE: 1000, 2000, 3000 (3000 by default)
PCR4000LE: 1000, 2000, 3000, 4000 (4000 by default)
PCR6000LE: 1000, 2000, 3000, 4000, 5000, 6000 (6000 by default)
PCR9000LE: 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000 (9000 by default)
The setting range during master-slave parallel operation is "1000VA x the number of parallel units" to "rated output capacity x the number of parallel units." The resolution is 1000VA x the number of parallel units.

Unit VA

Response

Returns the maximum anticipated power of U phase in NR3 format in response to SYST:CONF:POW1:EXP?.

Returns the maximum anticipated power of V phase in NR3 format in response to SYST:CONF:POW2:EXP?.

Returns the maximum anticipated power of W phase in NR3 format in response to SYST:CONF:POW3:EXP?.

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WAVE{1|2|3}:EDIT:USER:DATA:POIN

Sets a user-defined waveform by using the waveform bank that you want to edit (specified by its number and phase) and the point that you specify.

Assign waveform data to points that are derived by dividing one cycle (phase angle of 360 degrees) by 1024 (positive peak is 8191 and negative peak is -8191).

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

This command is valid in AC mode (when the parameter to [OUTP:COUP](#) is AC).

This command is not valid when the synchronization function is in use ([FREQ:SYNC](#) ON).

If you specify the waveform bank (using [WAVE:BANK](#)) and then turn the output on (using [OUTP:ON](#)), you cannot specify the same waveform bank number with this command (the command will not be valid).

Command

U phase

```
[SOURce:]WAVE1:EDIT:USER:DATA:POINT <BANK_NR1>,<POINT_NR1>,<data_NR1>
[SOURce:]WAVE1:EDIT:USER:DATA:POINT? <BANK_NR1>,<POINT_NR1>
```

V phase

```
[SOURce:]WAVE2:EDIT:USER:DATA:POINT <BANK_NR1>,<POINT_NR1>,<data_NR1>
[SOURce:]WAVE2:EDIT:USER:DATA:POINT? <BANK_NR1>,<POINT_NR1>
```

W phase (Three-phase output only)

```
[SOURce:]WAVE3:EDIT:USER:DATA:POINT <BANK_NR1>,<POINT_NR1>,<data_NR1>
[SOURce:]WAVE3:EDIT:USER:DATA:POINT? <BANK_NR1>,<POINT_NR1>
```

Parameter (BANK_NR1, waveform bank number)

Value 1 to 63

Parameter (POINT_NR1, point)

Value 0 to 1023

Parameter (data_NR1)

Value -8191 to 8191

A sine wave by default

When setting a rectangular wave to waveform bank number 1 of phase U

Assign waveform data 8191 to point 0 to point 511.

Example: The command to set point 0 of waveform bank number 1 of phase U:
 WAVE1:EDIT:USER:DATA:POIN 1,0,8191

Assign waveform data 0 to point 512.

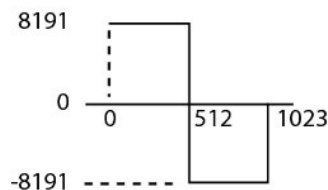
Example: The command to set point 512 of waveform bank number 1 of phase U:
 WAVE1:EDIT:USER:DATA:POIN 1,512,0

Assign waveform data -8191 to point 513 to point 1022.

Example: The command to set point 513 of waveform bank number 1 of phase U:
 WAVE1:EDIT:USER:DATA:POIN 1,513,-8191

Assign waveform data 0 to point 1023.

When you set all the points, waveform bank number 1 of phase U will contain the following rectangular waveform data.



Response

Returns the user-defined waveform data of U phase in NR1 format in response to
 WAVE1:EDIT:USER:DATA:POIN? <BANK>,<POINT>.

Returns the user-defined waveform data of V phase in NR1 format in response to
 WAVE2:EDIT:USER:DATA:POIN? <BANK>,<POINT>.

Returns the user-defined waveform data of W phase in NR1 format in response to
 WAVE3:EDIT:USER:DATA:POIN? <BANK>,<POINT>.

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SENSe:CURRent:ADJ:ZERO

Performs zero adjustment of the current measurement offset.
This command is valid in master-slave parallel control (optional).

Command

SENSe:CURRent:ADJ:ZERO

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OUTP:EXT:LOG

Sets the logic used to control the output on/off using an external contact (SIGNAL I/O connectro).

This command is valid in external signal control (optional).

Command

```
OUTPut:EXTernal:LOGic {DISabled|LOW|HIGH}
OUTPut:EXTernal:LOGic?
```

Parameter

Value	DISabled	Output on/off using an external contact is not performed (default)
	LOW	Turn the output on with low signal
	HIGH	Turn the output on with high signal

Response

Returns the external control logic setting of the output on/off as character data in response to OUTP:EXT:LOG?.

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PROG:EXT:LOG

Sets the logic used to control the sequence run/stop using an external contact (SIGNAL I/O connectro).

This command is valid in external signal control (optional).

Command

PROG:EXTernal:LOGic {DISabled|LOW|HIGH}

PROG:EXTernal:LOGic?

Parameter

Value	DISabled	Sequence run/stop using an external contact is not performed (default)
	LOW	Run the sequence with a low signal
	HIGH	Run the sequence with high signal

Response

Returns the external control logic setting of the sequence run/stop as character data in response to PROG:EXT:LOG?.

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SYST:CONF:EXT:ACL (optional)

Sets the logic used to control the alarm clear using an external contact (SIGNAL I/O connectro). This command is valid in external signal control (optional).

Command

```
SYSTem:CONFigure:EXTernal:ACLogic[:STATe] {DISabled|LOW|HIGH}
SYSTem:CONFigure:EXTernal:ACLogic[:STATe]?
```

Parameter

Value	DISabled	Alarm clear using an external contact is not performed (default)
	LOW	Alarm clear with low signal
	HIGH	Alarm clear with high signal

Response

Returns the external control logic setting of the alarm clear as character data in response to SYST:CONF:EXT:ACL?.

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SYST:CONF:EXT:SHUT:CONT

Sets the external control logic for turning output off.
This command is valid in external signal control (optional).

Command

```
SYSTem:CONFigure:EXTernal:SHUTdown:CONTact {OPEN|SHORT}  
SYSTem:CONFigure:EXTernal:SHUTdown:CONTact?
```

Parameter

value OPEN Turn output off with open circuit.
SHORT Turn output off with open circuit.

Response

Returns the external control logic setting for turning output off in CHAR format in response to SYST:CONF:EXT:SHUT:CONT?.

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SYST:CONF:EXT:OOR:MODE

Sets the phase to monitor.
This command is valid in external signal control (optional).

Command

```
SYSTem:CONFigure:EXTErnal:OOR:MODE {TOTal|EACH}  
SYSTem:CONFigure:EXTErnal:OOR:MODE?
```

Parameter

- Value TOTal Monitor the entire system
- EACH Monitor the phase that has a board installed

Response

Returns the phase to monitor in CHAR format in response to SYST:CONF:EXT:OOR:MODE?.

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DISP:CONT

Adjusts the screen brightness.

Command

```
DISPlay:CONTRast {<numeric>|MINimum|MAXimum}  
DISPlay:CONTRast? [{MINimum|MAXimum}]
```

Parameter

Value 0.0 to 1.0 (1.0 by default)

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the screen brightness in NR3 format in response to DISP:CONT?.

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MEM:SAV

Stores the following settings in memory.

	AC mode	DC mode	AC+DC mode
Frequency	Yes	No	Yes
AC voltage*1	Yes	No	Yes
DC voltage*2	No	Yes	Yes
Wave bank No.	Yes	No	Yes

*1: During single-phase, three-wire output and three-phase output (optional), phase voltages are stored.
*2: During single-phase, three-wire output (optional), phase voltages are stored.
If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

Command

MEMory:SAV <NR1>

Parameter

Value 1 to 99 Memory No.

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MEM:PREV

Views the settings that are stored in memory.

Command

MEMory:PREView? <NRf>

Parameter

Value 0 to 99 Memory No.

Response

Returns the following items that are stored at the specified memory entry number. The items are returned in the following order as a comma-separated list in response to MEM:PREV? <NRf>.

Memory entry number <NR1>,AC voltage <NR3>,DC voltage <NR3>,frequency <NR3>,waveform bank number <NR1>

In case of the single-phase three-wire output, Memory entry number <NR1>,AC voltage of U phase<NR3>,AC voltage of V phase<NR3>,DC voltage of U phase<NR3>,DC voltage of V phase<NR3>,frequency <NR3>,waveform bank number <NR1>

In case of the three-phase output, Memory entry number <NR1>,AC voltage of U phase<NR3>,AC voltage of V phase<NR3>,AC voltage of W phase<NR3>,DC voltage of U phase<NR3>,DC voltage of V phase<NR3>,DC voltage of W phase<NR3>,frequency <NR3>,waveform bank number <NR1>

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MEM:RCL

The following settings are recalled from memory.

	AC mode	DC mode	AC+DC mode
Frequency*1	Yes	No	Yes
AC voltage*2	Yes	No	Yes*3
DC voltage*2	No	Yes*4	Yes*3
Wave bank No.	Yes	No	Yes

- *1: If the frequency that you recall is lower than the frequency lower limit, the frequency is set to the lower limit.
If the frequency that you recall is higher than the frequency upper limit, the frequency is set to the upper limit.
- *2: If the voltage that you recall is lower than the voltage lower limit or is higher than the voltage upper limit, the voltage is set to 0 V.
If the L range is in use and a voltage that is only valid in the H range is recalled, the voltage is set to 0 V.
- *3: If the peak waveform value is outside of -431 V to 431 V for the H range or -215.5 V to 215.5 V for the L range, the voltage is set to 0 V.
- *4: During single-phase, three-wire output (PCR-LE optional), the V phase is automatically set to the same amplitude as the U phase but with opposite polarity.

You can view the settings that are stored in memory by using the [MEM:PREV](#) command.

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

Command

MEMory:RCL <NR1>

Parameter

Value 0 to 99 Memory No.

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SYST:CONF:DATE

Sets the date.

Also set the time (using [SYST:CONF:TIME](#)).

The time and date are used in the timestamps of files saved to USB memory devices.

If the power is left off for two to three weeks, the date is set to April 1, 2011.

If you specify a day that does not exist (for example, February 30), the settings are changed to the first day of the following month.

Command

SYSTem:CONFigure:DATE <year_NR1>,<month_NR1>,<date_NR1>

SYSTem:CONFigure:DATE?

Parameter <year_NR1>

Value 2000 to 2099 Year

Parameter <month_NR1>

Value 1 to 12 Month

Parameter <date_NR1>

Value 1 to 31 Day

Response

Returns the date as a sequence of values in NR1 format (in the order year, month, day) in response to SYST:CONF:DATE?.

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SYST:CONF:TIME

Sets the time.
Also set the date (using [SYST:CONF:DATE](#)).
The time and date are used in the timestamps of files saved to USB memory devices.
If the power is left off for two to three weeks, the time is set to 00:00:00.

Command

```
SYSTem:CONFIgure:TIME <hour_NR1>,<min_NR1>,<sec_NR1>  
SYSTem:CONFIgure:TIME?
```

Parameter <hour_NR1>
Value 0 to 23 Hour

Parameter <min_NR1>
Value 1 to 59 Minute

Parameter <sec_NR1>
Value 1 to 59 Second

Response

Returns the time as a sequence of values in NR1 format (in the order hour, minute, second) in response to SYST:CONF:TIME?.

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INIT

Starts the sequence group 1 trigger function.
If [trigger source](#) is set to IMM, the change starts immediately. If set to BUS, the change starts after waiting for a software trigger.

Command

```
INITiate[:IMMEDIATE][:SEQUENCE[1]]
```

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INIT:NAME

Starts the trigger function of the specified sequence group.
If the trigger source is set to IMM, the settings are changed immediately, or the measurement, power line abnormality simulation, or sequence starts immediately. If the trigger source is set to BUS, the PCR waits for a software trigger, and then the settings are changed, or the measurement, power line abnormality simulation, or sequence starts.

Command

```
INITiate[:IMMEDIATE]:NAME {TRANsient|ACQuire|SIMulation|PROGram}
```

Parameter

Value	TRAN	Starts the output change (sequence 1) trigger function
	ACQ	Starts the measurement (sequence 3) trigger function
	SIM	Starts the power line abnormality simulation trigger function (sequence 4; PCR-LE only) This is not valid when the action that is performed when the current limit is exceeded is set to CC (CURR:PROT:STAT OFF).
	PROG	Starts the sequence operation trigger function (sequence 5; PCR-LE only) This is not valid when the action that is performed when the current limit is exceeded is set to CC (CURR:PROT:STAT OFF).

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TRIG

Executes a software trigger for a sequence group 1.

Command

```
TRIGger[:SEquence[1]][:IMMediate]
TRIGger[:TRANsient][:IMMediate]
```

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VOLT{1|2|3}:TRIG

Sets the AC voltage of each phase that is applied when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

This command is valid in AC mode ([OUTP:COUP](#) AC).

Single-phase three-wire output or Three-phase output (PCR-LE optional): Sets the AC voltage of all phases at once.

Command

U phase

```
[SOURce:]VOLTage1[:LEVel]:TRIGgered[:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage1[:LEVel]:TRIGgered[:AMPLitude]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]VOLTage2[:LEVel]:TRIGgered[:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage2[:LEVel]:TRIGgered[:AMPLitude]? [{MINimum|MAXimum}]
```

W phase (Three-phase output only)

```
[SOURce:]VOLTage3[:LEVel]:TRIGgered[:AMPLitude] {<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage3[:LEVel]:TRIGgered[:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value L range: 0 to 152.5
H range: 0 to 305.0

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the target value of U phase to which the AC voltage is to change using a trigger in NR3 format in response to VOLT1:TRIG?.

Returns the target value of V phase to which the AC voltage is to change using a trigger in NR3 format in response to VOLT2:TRIG?.

Returns the target value of W phase to which the AC voltage is to change using a trigger in NR3 format in response to VOLT3:TRIG?.

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VOLT{1|2|3}:OFFS:TRIG

Sets the DC voltage of each phase that is applied when [INIT/INIT:NAME](#) TRAN and a software trigger are sent.

This command is valid in DC mode or AC+DC mode ([OUTP:COUP](#) DC|ACDC).

This command is valid in two-phase output([SYST:CONF:TPH:MODE](#) ON) or three-phase output (optional).

Command**U phase**

```
[SOURce:]VOLTage1:OFFSet[:LEVel]:TRIGgered[:AMPLitude]
{<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage1:OFFSet[:LEVel]:TRIGgered[:AMPLitude]? [{MINimum|MAXimum}]
```

V phase

```
[SOURce:]VOLTage2:OFFSet[:LEVel]:TRIGgered[:AMPLitude]
{<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage2:OFFSet[:LEVel]:TRIGgered[:AMPLitude]? [{MINimum|MAXimum}]
```

W phase (Three-phase output only)

```
[SOURce:]VOLTage3:OFFSet[:LEVel]:TRIGgered[:AMPLitude]
{<numeric>|MINimum|MAXimum}
[SOURce:]VOLTage3:OFFSet[:LEVel]:TRIGgered[:AMPLitude]? [{MINimum|MAXimum}]
```

Parameter

Value DC mode, L range: -215.5 to 215.5
DC mode, H range: -431.0 to 431.0
AC+DC mode, L range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -215.5 V and 215.5 V.
AC+DC mode, H range: This can only be set when the AC and DC voltages are within the settable ranges defined by the voltage limits and the AC+DC waveform peak is between -431 V and 431 V.

A SCPI error (-222, "Data out of range") occurs if outside the range.
The default value is 0.

Unit V

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the target value of U phase to which the DC voltage is to change using a trigger in NR3 format in response to VOLT1:OFFS:TRIG?.

Returns the target value of V phase to which the DC voltage is to change using a trigger in NR3 format in response to VOLT2:OFFS:TRIG?.

Returns the target value of W phase to which the DC voltage is to change using a trigger in NR3 format in response to VOLT3:OFFS:TRIG?.

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INIT:SEQ3

Clears the present valid measurement data and starts a new measurement.

If [the trigger source](#) parameter is IMM, the measurement starts immediately. If set to BUS, the measurement starts after waiting for a software trigger.

Command

```
INITiate[:IMMediate]:SEquence3
```

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TRIG:SEQ3/ TRIG:ACQ

Executes a software trigger for a sequence group 3.

Command

```
TRIGger:SEQuence3[:IMMediate]
TRIGger:ACQuire[:IMMediate]
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MEAS:CURREN:DC/ FETC:CURREN:DC

MEAS:CURREN:DC? starts a new measurement and then queries the DC current.

FETC:CURREN:DC? queries the DC current without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are DC, ACDC, and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:CURREnt:DC?
FETCh[0][:SCALar]:CURREnt:DC?
```

Response

Returns the DC current in NR3 format in response to MEAS:CURREN:DC? or FETC:CURREN:DC?.

In case of the single-phase three-wire output, MEAS:CURREN:DC? or FETC:CURREN:DC? returns a comma-separated list of the DC current <NR3> for U and V phases.

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MEAS:CURR:AC/ FETC:CURR:AC

MEAS:CURR:AC? starts a new measurement and then queries the AC current.

FETC:CURR:AC? queries the AC current without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are AC, ACDC, EAC (PCR-M only), and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:CURRent:AC?
FETCh[0][:SCALar]:CURRent:AC?
```

Response

Returns the AC current in NR3 format in response to MEAS:CURR:AC? or FETC:CURR:AC?.

In case of the single-phase three-wire output, MEAS:CURR:AC? or FETC:CURR:AC? returns a comma-separated list of the AC current <NR3> for U and V phases.

In case of the three-phase output, MEAS:CURR:AC? or FETC:CURR:AC? returns a comma-separated list of the AC current <NR3> for U, V, and W phases.

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MEAS:CURR:AMPL:MAX/ FETC:CURR:AMPL:MAX

MEAS:CURR:AMPL:MAX? starts a new measurement and then queries the peak current.

FETC:CURR:AMPL:MAX? queries the peak current without starting a new measurement.

All modes (parameters to the [OUTP:COUP](#) command) are valid.

Command

```
MEASure[0][:SCALar]:CURRent:AMPLitude:MAXimum?
FETCh[0][:SCALar]:CURRent:AMPLitude:MAXimum?
```

Response

Returns the peak current in NR3 format in response to MEAS:CURR:AMPL:MAX? or FETC:CURR:AMPL:MAX?.

In case of the single-phase three-wire output, MEAS:CURR:AMPL:MAX? or FETC:CURR:AMPL:MAX? returns a comma-separated list of the peak current <NR3> for U and V phases.

In case of the three-phase output, MEAS:CURR:AMPL:MAX? or FETC:CURR:AMPL:MAX? returns a comma-separated list of the peak current <NR3> for U, V, and W phases.

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**MEAS:CURREN:AMPL:MAX:HOLD/
FETC:CURREN:AMPL:MAX:HOLD**

MEAS:CURREN:AMPL:MAX:HOLD? starts a new measurement and then queries the peak current (the held value).

FETC:CURREN:AMPL:MAX:HOLD? queries the peak current (the held value) without starting a new measurement.

You can use [SENS:CURREN:PEAK:CLE](#) to clear the held peak value.

All modes (parameters to the [OUTP:COUP](#) command) are valid.

Command

```
MEASure[0][:SCALar]:CURREnt:AMPLitude:MAXimum:HOLD?
FETCh[0][:SCALar]:CURREnt:AMPLitude:MAXimumv:HOLD?
```

Response

Returns the peak current (the held value) in NR3 format in response to MEAS:CURREN:AMPL:MAX:HOLD? or FETC:CURREN:AMPL:MAX:HOLD?.

In case of the single-phase three-wire output, MEAS:CURREN:AMPL:MAX:HOLD? or FETC:CURREN:AMPL:MAX:HOLD? returns a comma-separated list of the peak current (the held value) <NR3> for U and V phases.

In case of the three-phase output, MEAS:CURREN:AMPL:MAX:HOLD? or FETC:CURREN:AMPL:MAX:HOLD? returns a comma-separated list of the peak current (the held value) <NR3> for U, V, and W phases.

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SENS:CURR:PEAK:CLE

Clears the peak hold of the current measurement.

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SENSe:CURRent:PEAK:CLEar

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MEAS:CURR:CRES/ FETC:CURR:CRES

MEAS:CURR:CRES? starts a new measurement and then queries the current crest factor.

FETC:CURR:CRES? queries the current crest factor without starting a new measurement.

The valid mode (parameter to the [OUTP:COUP](#) command) is AC.

Command

```
MEASure[0][:SCALar]:CURRent:CREStfactor?
FETCh[0][:SCALar]:CURRent:CREStfactor?
```

Response

Returns the current crest factor in NR3 format in response to MEAS:CURR:CRES? or FETC:CURR:CRES?.

In case of the single-phase three-wire output, MEAS:CURR:CRES? or FETC:CURR:CRES? returns a comma-separated list of the current crest factor <NR3> for U and V phases.

In case of the three-phase output, MEAS:CURR:CRES? or FETC:CURR:CRES? returns a comma-separated list of the current crest factor <NR3> for U, V, and W phases.

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MEAS:CURR:HARM/ FETC:CURR:HARM

MEAS:CURR:HARM? starts a new measurement and then queries the harmonic currents.

FETC:CURR:HARM? queries the harmonic currents without starting a new measurement.

This command is invalid in single-phase three-wire output or three-phase output (PCR-LE optional).

If the EX05-PCR-LE is in use (optional), this command is valid when the signal source is set to internal signal source ([FUNC:SOUR INT](#)).

The valid mode (parameter to the [OUTP:COUP](#) command) is AC.

Command

```
MEASure[0] [:SCALar]:CURRent:HARMonic?
FETCh[0] [:SCALar]:CURRent:HARMonic?
```

Response

Returns the harmonic currents, from the first to the fortieth, in a comma-separated list of values in NR3 format in response to MEAS:CURR:HARM? or FETC:CURR:HARM?.

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MEAS:CURR:HARM:RAT / FETC:CURR:HARM:RAT

MEAS:CURR:HARM:RAT? starts a new measurement and then queries the harmonic currents (as percentages).

FETC:CURR:HARM:RAT? queries the harmonic currents (as percentages) without starting a new measurement.

This command is invalid in single-phase three-wire output or three-phase output (PCR-LE optional).

If the EX05-PCR-LE is in use (optional), this command is valid when the signal source is set to internal signal source ([FUNC:SOUR INT](#)).

The valid mode (parameter to the [OUTP:COUP](#) command) is AC.

Command

```
MEASure[0][:SCALar]:CURRent:HARMonic:RATio?
FETCh[0][:SCALar]:CURRent:HARMonic:RATio?
```

Response

Returns the harmonic currents, from the first to the fortieth, (as percentages) in a comma-separated list of values in NR3 format in response to MEAS:CURR:HARM:RAT? or FETC:CURR:HARM:RAT?.

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MEAS:FREQ/ FETC:FREQ

MEAS:FREQ? starts a new measurement and then queries the frequency.

FETC:FREQ? queries the frequency without starting a new measurement.

All modes (parameters to the [OUTP:COUP](#) command) are valid.

Command

```
MEASure[:SCALar]:FREQuency?
FETCh[:SCALar]:FREQuency?
```

Response

Returns the frequency in NR3 format (returns 0 in DC mode) in response to MEAS:FREQ? or FETC:FREQ?.

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MEAS:POW:AC/ FETC:POW:AC

MEAS:POW:AC? starts a new measurement and then queries the AC power.

FETC:POW:AC? queries the AC power without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are AC, ACDC, EAC (PCR-M only), and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:POWer:AC[:REAL]?
FETCh[0][:SCALar]:POWer:AC[:REAL]?
```

Response

Returns the AC power in NR3 format in response to MEAS:POW:AC? or FETC:POW:AC?.

In case of the single-phase three-wire output, MEAS:POW:AC? or FETC:POW:AC? returns a comma-separated list of the AC power <NR3> for U and V phases.

In case of the three-phase output, MEAS:POW:AC? or FETC:POW:AC? returns a comma-separated list of the AC power <NR3> for U, V, and W phases.

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MEAS:POW:AC:APP/ FETC:POW:AC:APP

MEAS:POW:AC:APP? starts a new measurement and then queries the AC power (the apparent power).

FETC:POW:AC:APP? queries the AC power (the apparent power) without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are AC, ACDC, EAC (PCR-M only), and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:POWer:AC:APParent?
FETCh[0][:SCALar]:POWer:AC:APParent?
```

Response

Returns the AC power (the apparent power) in NR3 format in response to MEAS:POW:AC:APP? or FETC:POW:AC:APP?.

In case of the single-phase three-wire output, MEAS:POW:AC:APP? or FETC:POW:AC:APP? returns a comma-separated list of the AC power (the apparent power) <NR3> for U and V phases.

In case of the three-phase output, MEAS:POW:AC:APP? or FETC:POW:AC:APP? returns a comma-separated list of the AC power (the apparent power) <NR3> for U, V, and W phases.

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MEAS:POW:AC:REAC/ FETC:POW:AC:REAC

MEAS:POW:AC:REAC? starts a new measurement and then queries the AC power (the reactive power).

FETC:POW:AC:REAC? queries the AC power (the reactive power) without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are AC, ACDC, EAC (PCR-M only), and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:POWer:AC:REACtive?
FETCh[0][:SCALar]:POWer:AC:REACtive?
```

Response

Returns the AC power (the reactive power) in NR3 format in response to MEAS:POW:AC:REAC? or FETC:POW:AC:REAC?.

In case of the single-phase three-wire output, MEAS:POW:AC:REAC? or FETC:POW:AC:REAC? returns a comma-separated list of the AC power (the reactive power) <NR3> for U and V phases.

In case of the three-phase output, MEAS:POW:AC:REAC? or FETC:POW:AC:REAC? returns a comma-separated list of the AC power (the reactive power) <NR3> for U, V, and W phases.

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MEAS:POW:AC:PFAC/ FETC:POW:AC:PFAC

MEAS:POW:AC:PFAC? starts a new measurement and then queries the AC power factor.

FETC:POW:AC:PFAC? queries the AC power factor without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are AC, ACDC, EAC (PCR-M only), and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:POWer:PFACtor?
FETCh[0][:SCALar]:POWer:PFACtor?
```

Response

Returns the AC power factor in NR3 format in response to MEAS:POW:AC:PFAC? or FETC:POW:AC:PFAC?.

In case of the single-phase three-wire output, MEAS:POW:AC:PFAC? or FETC:POW:AC:PFAC? returns a comma-separated list of the AC power factor <NR3> for U and V phases.

In case of the three-phase output, MEAS:POW:AC:PFAC? or FETC:POW:AC:PFAC? returns a comma-separated list of the AC power factor <NR3> for U, V, and W phases.

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MEAS:POW:DC/ FETC:POW:DC

MEAS:POW:DC? starts a new measurement and then queries the DC power.

FETC:POW:DC? queries the DC power without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are DC, ACDC, and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:POWer:DC?
FETCh[0][:SCALar]:POWer:DC?
```

Response

Returns the DC power in NR3 format in response to MEAS:POW:DC? or FETC:POW:DC?.

In case of the single-phase three-wire output, MEAS:POW:DC? or FETC:POW:DC? returns a comma-separated list of the DC power <NR3> for U and V phases.

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MEAS:VOLT:DC/ FETC:VOLT:DC

MEAS:VOLT:DC? starts a new measurement and then queries the DC voltage.

FETC:VOLT:DC? queries the DC voltage without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are DC, ACDC (PCR-M only), and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:VOLTage:DC?
FETCh[0][:SCALar]:VOLTage:DC?
```

Response

Returns the DC voltage in NR3 format in response to MEAS:VOLT:DC? or FETC:VOLT:DC?.

In case of the single-phase three-wire output, MEAS:VOLT:DC? or FETC:VOLT:DC? returns a comma-separated list of the DC voltage <NR3> for U and V phases.

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MEAS:VOLT:AC/ FETC:VOLT:AC

MEAS:VOLT:AC? starts a new measurement and then queries the AC voltage.

FETC:VOLT:AC? queries the AC voltage without starting a new measurement.

The valid modes (parameters to the [OUTP:COUP](#) command) are AC, ACDC, EAC (PCR-M only), and EDC (PCR-M only).

Command

```
MEASure[0][:SCALar]:VOLTage:AC?
FETCh[0][:SCALar]:VOLTage:AC?
```

Response

Returns the AC voltage in NR3 format in response to MEAS:VOLT:AC? or FETC:VOLT:AC?.

In case of the single-phase three-wire output, MEAS:VOLT:AC? or FETC:VOLT:AC? returns a comma-separated list of the AC voltage <NR3> for U and V phases.

In case of the three-phase output, MEAS:VOLT:AC? or FETC:VOLT:AC? returns a comma-separated list of the AC voltage <NR3> for U, V, and W phases.

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MEAS:VOLT:AMPL:MAX/ FETC:VOLT:AMPL:MAX

MEAS:VOLT:AMPL:MAX? starts a new measurement and then queries the peak voltage.

FETC:VOLT:AMPL:MAX? queries the peak voltage without starting a new measurement.

All modes (parameters to the [OUTP:COUP](#) command) are valid.

Command

```
MEASure[0][:SCALar]:VOLTage:AMPLitude:MAXimum?
FETCh[0][:SCALar]:VOLTage:AMPLitude:MAXimum?
```

Response

Returns the peak voltage in NR3 format in response to MEAS:VOLT:AMPL:MAX? or FETC:VOLT:AMPL:MAX?.

In case of the single-phase three-wire output, MEAS:VOLT:AMPL:MAX? or FETC:VOLT:AMPL:MAX? returns a comma-separated list of the peak voltage <NR3> for U and V phases.

In case of the three-phase output, MEAS:VOLT:AMPL:MAX? or FETC:VOLT:AMPL:MAX? returns a comma-separated list of the peak voltage <NR3> for U, V, and W phases.

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MEAS{1|2}:CURR:DC/ FETC{1|2}:CURR:DC

MEAS{1|2}:CURR:DC? starts a new measurement and then queries the DC current of the specified phase.

FETC{1|2}:CURR:DC? queries the DC current of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is DC.

Command**U phase**

```
MEASure1[:SCALar]:CURRent:DC?
FETCh1[:SCALar]:CURRent:DC?
```

V phase

```
MEASure2[:SCALar]:CURRent:DC?
FETCh2[:SCALar]:CURRent:DC?
```

Response

Returns the DC current of U phase in NR3 format in response to MEAS1:CURR:DC? or FETC1:CURR:DC?.

Returns the DC current of V phase in NR3 format in response to MEAS2:CURR:DC? or FETC2:CURR:DC?.

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MEAS{1|2|3}:CURR:AC/ FETC{1|2|3}:CURR:AC

MEAS{1|2|3}:CURR:AC? starts a new measurement and then queries the AC current of the specified phase.

FETC{1|2|3}:CURR:AC? queries the AC current of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:CURRent:AC?
FETCh1[:SCALar]:CURRent:AC?
```

V phase

```
MEASure2[:SCALar]:CURRent:AC?
FETCh2[:SCALar]:CURRent:AC?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:CURRent:AC?
FETCh3[:SCALar]:CURRent:AC?
```

Response

Returns the AC current of U phase in NR3 format in response to MEAS1:CURR:AC? or FETC1:CURR:AC?.

Returns the AC current of V phase in NR3 format in response to MEAS2:CURR:AC? or FETC2:CURR:AC?.

Returns the AC current of W phase in NR3 format in response to MEAS3:CURR:AC? or FETC3:CURR:AC?.

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**MEAS{1|2|3}:CURR:AMPL:MAX/
FETC{1|2|3}:CURR:AMPL:MAX**

MEAS{1|2|3}:CURR:AMPL:MAX? starts a new measurement and then queries the peak current of the specified phase.

FETC{1|2|3}:CURR:AMPL:MAX? queries the peak current of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) are AC and DC.

Command**U phase**

```
MEASure1[:SCALar]:CURRent:AMPLitude:MAXimum?
FETCh1[:SCALar]:CURRent:AMPLitude:MAXimum?
```

V phase

```
MEASure2[:SCALar]:CURRent:AMPLitude:MAXimum?
FETCh2[:SCALar]:CURRent:AMPLitude:MAXimum?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:CURRent:AMPLitude:MAXimum?
FETCh3[:SCALar]:CURRent:AMPLitude:MAXimum?
```

Response

Returns the peak current of U phase in NR3 format in response to MEAS1:CURR:AMPL:MAX? or FETC1:CURR:AMPL:MAX?.

Returns the peak current of V phase in NR3 format in response to MEAS2:CURR:AMPL:MAX? or FETC2:CURR:AMPL:MAX?.

Returns the peak current of W phase in NR3 format in response to MEAS3:CURR:AMPL:MAX? or FETC3:CURR:AMPL:MAX?.

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MEAS{1|2|3}:CURR:AMPL:MAX:HOLD/ FETC{1|2|3}:CURR:AMPL:MAX:HOLD

MEAS{1|2|3}:CURR:AMPL:MAX:HOLD? starts a new measurement and then queries the peak current (the held value) of the specified phase.

FETC{1|2|3}:CURR:AMPL:MAX:HOLD? queries the peak current (the held value) of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

You can use [SENS:CURR:PEAK:CLE](#) to clear the held peak value.

The valid modes (parameters to the [OUTP:COUP](#) command) are AC and DC.

Command**U phase**

```
MEASure1[:SCALar]:CURRent:AMPLitude:MAXimum:HOLD?
FETCh1[:SCALar]:CURRent:AMPLitude:MAXimumv:HOLD?
```

V phase

```
MEASure2[:SCALar]:CURRent:AMPLitude:MAXimum:HOLD?
FETCh2[:SCALar]:CURRent:AMPLitude:MAXimumv:HOLD?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:CURRent:AMPLitude:MAXimum:HOLD?
FETCh3[:SCALar]:CURRent:AMPLitude:MAXimumv:HOLD?
```

Response

Returns the peak current (the held value) of U phase in NR3 format in response to MEAS1:CURR:AMPL:MAX:HOLD? or FETC1:CURR:AMPL:MAX:HOLD?.

Returns the peak current (the held value) of V phase in NR3 format in response to MEAS2:CURR:AMPL:MAX:HOLD? or FETC2:CURR:AMPL:MAX:HOLD?.

Returns the peak current (the held value) of W phase in NR3 format in response to MEAS3:CURR:AMPL:MAX:HOLD? or FETC3:CURR:AMPL:MAX:HOLD?.

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MEAS{1|2|3}:CURR:CRES/ FETC{1|2|3}:CURR:CRES

MEAS{1|2|3}:CURR:CRES? starts a new measurement and then queries the current crest factor of the specified phase.

FETC{1|2|3}:CURR:CRES? queries the current crest factor of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:CURRent:CREStfactor?
FETCh1[:SCALar]:CURRent:CREStfactor?
```

V phase

```
MEASure2[:SCALar]:CURRent:CREStfactor?
FETCh2[:SCALar]:CURRent:CREStfactor?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:CURRent:CREStfactor?
FETCh3[:SCALar]:CURRent:CREStfactor?
```

Response

Returns the current crest factor of U phase in NR3 format in response to MEAS1:CURR:CRES? or FETC1:CURR:CRES?.

Returns the current crest factor of V phase in NR3 format in response to MEAS2:CURR:CRES? or FETC2:CURR:CRES?.

Returns the current crest factor of W phase in NR3 format in response to MEAS3:CURR:CRES? or FETC3:CURR:CRES?.

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MEAS{1|2|3}:CURR:HARM/ FETC{1|2|3}:CURR:HARM

MEAS{1|2|3}:CURR:HARM? starts a new measurement and then queries the harmonic currents of the specified phase.

FETC{1|2|3}:CURR:HARM? queries the harmonic currents of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

If the EX05-PCR-LE is in use (optional), this command is valid when the signal source is set to internal signal source ([FUNC:SOUR INT](#)).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:CURRent:HARMonic?
FETCh1[:SCALar]:CURRent:HARMonic?
```

V phase

```
MEASure2[:SCALar]:CURRent:HARMonic?
FETCh2[:SCALar]:CURRent:HARMonic?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:CURRent:HARMonic?
FETCh3[:SCALar]:CURRent:HARMonic?
```

Response

Returns the harmonic currents of U phase, from the first to the fortieth, in a comma-separated list of values in NR3 format in response to MEAS1:CURR:HARM? or FETC1:CURR:HARM?.

Returns the harmonic currents of V phase, from the first to the fortieth, in a comma-separated list of values in NR3 format in response to MEAS2:CURR:HARM? or FETC2:CURR:HARM?.

Returns the harmonic currents of W phase, from the first to the fortieth, in a comma-separated list of values in NR3 format in response to MEAS3:CURR:HARM? or FETC3:CURR:HARM?.

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MEAS{1|2|3}:CURR:HARM:RAT/ FETC{1|2|3}:CURR:HARM:RAT

MEAS{1|2|3}:CURR:HARM:RAT? starts a new measurement and then queries the harmonic currents (as percentages) of the specified phase.

FETC{1|2|3}:CURR:HARM:RAT? queries the harmonic currents (as percentages) of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

If the EX05-PCR-LE is in use (optional), this command is valid when the signal source is set to internal signal source ([FUNC:SOUR INT](#)).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:CURRent:HARMonic:RATio?
FETCh1[:SCALar]:CURRent:HARMonic:RATio?
```

V phase

```
MEASure2[:SCALar]:CURRent:HARMonic:RATio?
FETCh2[:SCALar]:CURRent:HARMonic:RATio?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:CURRent:HARMonic:RATio?
FETCh3[:SCALar]:CURRent:HARMonic:RATio?
```

Response

Returns the harmonic currents of U phase, from the first to the fortieth, (as percentages) in a comma-separated list of values in NR3 format in response to MEAS1:CURR:HARM:RAT? or FETC1:CURR:HARM:RAT?.

Returns the harmonic currents of V phase, from the first to the fortieth, (as percentages) in a comma-separated list of values in NR3 format in response to MEAS2:CURR:HARM:RAT? or FETC2:CURR:HARM:RAT?.

Returns the harmonic currents of W phase, from the first to the fortieth, (as percentages) in a comma-separated list of values in NR3 format in response to MEAS3:CURR:HARM:RAT? or FETC3:CURR:HARM:RAT?.

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MEAS{1|2}:LVOL:DC/ FETC{1|2}:LVOL:DC

MEAS{1|2}:LVOL:DC? starts a new measurement and then queries the DC line voltage of the specified phase.

FETC{1|2}:LVOL:DC? queries the DC line voltage of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is DC

Command**U phase**

```
MEASure1[:SCALar]:LVOLtage:DC?
FETCh1[:SCALar]:LVOLtage:DC?
```

V phase

```
MEASure2[:SCALar]:LVOLtage:DC?
FETCh2[:SCALar]:LVOLtage:DC?
```

Response

Returns the DC line voltage of U phase in NR3 format in response to MEAS1:LVOLT:DC? or FETC1:LVOLT:DC?.

Returns the DC line voltage of V phase in NR3 format in response to MEAS2:LVOLT:DC? or FETC2:LVOLT:DC?.

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MEAS{1|2|3}:LVOL:AC/ FETC{1|2|3}:LVOL:AC

MEAS{1|2|3}:LVOL:AC? starts a new measurement and then queries the AC line voltage of the specified phase.

FETC{1|2|3}:LVOL:AC? queries the AC line voltage of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid mode (parameter to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:LVOLtage:AC?
```

```
FETCh1[:SCALar]:LVOLtage:AC?
```

V phase

```
MEASure2[:SCALar]:LVOLtage:AC?
```

```
FETCh2[:SCALar]:LVOLtage:AC?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:LVOLtage:AC?
```

```
FETCh3[:SCALar]:LVOLtage:AC?
```

Response

Returns the AC line voltage of U phase in NR3 format in response to MEAS1:LVOLT:AC? or FETC1:LVOLT:AC?.

Returns the AC line voltage of V phase in NR3 format in response to MEAS2:LVOLT:AC? or FETC2:LVOLT:AC?.

Returns the AC line voltage of W phase in NR3 format in response to MEAS3:LVOLT:AC? or FETC3:LVOLT:AC?.

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MEAS{1|2|3}:LVOL:AMPL:MAX/ FETC{1|2|3}:LVOL:AMPL:MAX

MEAS{1|2|3}:LVOL:AMPL:MAX? starts a new measurement and then queries the peak AC line voltage of the specified phase.

FETC{1|2|3}:LVOL:AMPL:MAX? queries the peak AC line voltage of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid mode (parameter to the [OUTP:COUP](#) command) are AC and DC.

Command

U phase

```
MEASure1[:SCALar]:LVOLtage:AMPLitude:MAXimum?
```

```
FETCh1[:SCALar]:LVOLtage:AMPLitude:MAXimum?
```

V phase

```
MEASure2[:SCALar]:LVOLtage:AMPLitude:MAXimum?
```

```
FETCh2[:SCALar]:LVOLtage:AMPLitude:MAXimum?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:LVOLtage:AMPLitude:MAXimum?
```

```
FETCh3[:SCALar]:LVOLtage:AMPLitude:MAXimum?
```

Response

Returns the peak AC line voltage of U phase in NR3 format in response to MEAS1:LVOLT:AMPL:MAX? or FETC1:LVOLT:AMPL:MAX?.

Returns the peak AC line voltage of V phase in NR3 format in response to MEAS2:LVOLT:AMPL:MAX? or FETC2:LVOLT:AMPL:MAX?.

Returns the peak AC line voltage of W phase in NR3 format in response to MEAS3:LVOLT:AMPL:MAX? or FETC3:LVOLT:AMPL:MAX?.

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MEAS{1|2|3}:POW:AC/ FETC{1|2|3}:POW:AC

MEAS{1|2|3}:POW:AC? starts a new measurement and then queries the AC power of the specified phase.

FETC{1|2|3}:POW:AC? queries the AC power of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:POWer:AC[:REAL]?
```

```
FETCh1[:SCALar]:POWer:AC[:REAL]?
```

V phase

```
MEASure2[:SCALar]:POWer:AC[:REAL]?
```

```
FETCh2[:SCALar]:POWer:AC[:REAL]?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:POWer:AC[:REAL]?
```

```
FETCh3[:SCALar]:POWer:AC[:REAL]?
```

Response

Returns the AC power of U phase in NR3 format in response to MEAS1:POW:AC? or FETC1:POW:AC?.

Returns the AC power of V phase in NR3 format in response to MEAS2:POW:AC? or FETC2:POW:AC?.

Returns the AC power of W phase in NR3 format in response to MEAS3:POW:AC? or FETC3:POW:AC?.

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MEAS:POW:AC:TOT/ FETC:POW:AC:TOT

MEAS:POW:AC:TOT? starts a new measurement and then queries the total AC power.

FETC:POW:AC:TOT? queries the total AC power without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command

MEASure[:SCALar]:POWer:AC:TOTal?

FETCh[:SCALar]:POWer:AC:TOTal?

Response

In case of the single-phase three-wire output, returns the total AC power of U and V phases in NR3 format in response to MEAS:POW:AC:TOT? or FETC:POW:AC:TOT?.

In case of the three-phase output, returns the total AC power of U, V, and W phases in NR3 format in response to MEAS:POW:AC:TOT? or FETC:POW:AC:TOT?.

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MEAS{1|2|3}:POW:AC:APP/ FETC{1|2|3}:POW:AC:APP

MEAS{1|2|3}:POW:AC:APP? starts a new measurement and then queries the AC power (the apparent power) of the specified phase.

FETC{1|2|3}:POW:AC:APP? queries the AC power (the apparent power) of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:POWer:AC:APParent?
FETCh1[:SCALar]:POWer:AC:APParent?
```

V phase

```
MEASure2[:SCALar]:POWer:AC:APParent?
FETCh2[:SCALar]:POWer:AC:APParent?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:POWer:AC:APParent?
FETCh3[:SCALar]:POWer:AC:APParent?
```

Response

Returns the AC power (the apparent power) of U phase in NR3 format in response to MEAS1:POW:AC:APP? or FETC1:POW:AC:APP?.

Returns the AC power (the apparent power) of V phase in NR3 format in response to MEAS2:POW:AC:APP? or FETC2:POW:AC:APP?.

Returns the AC power (the apparent power) of W phase in NR3 format in response to MEAS3:POW:AC:APP? or FETC3:POW:AC:APP?.

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MEAS:POW:AC:APP:TOT / FETC:POW:AC:APP:TOT

MEAS:POW:AC:APP:TOT? starts a new measurement and then queries the total AC power (the apparent power).

FETC:POW:AC:APP:TOT? queries the total AC power (the apparent power) without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command

```
MEASure[0][:SCALar]:POWer:AC:APParent:TOTal?
FETCh[0][:SCALar]:POWer:AC:APParent:TOTal?
```

Response

In case of the single-phase three-wire output, returns the total AC power (the apparent power) of U and V phases in NR3 format in response to MEAS:POW:AC:APP:TOT? or FETC:POW:AC:APP:TOT?.

In case of the three-phase output, returns the total AC power (the apparent power) of U, V, and W phases in NR3 format in response to MEAS:POW:AC:APP:TOT? or FETC:POW:AC:APP:TOT?.

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MEAS{1|2|3}:POW:AC:REAC/ FETC{1|2|3}:POW:AC:REAC

MEAS{1|2|3}:POW:AC:REAC? starts a new measurement and then queries the AC power (the reactive power) of the specified phase.

FETC{1|2|3}:POW:AC:REAC? queries the AC power (the reactive power) of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command

U phase

```
MEASure1[:SCALar]:POWer:AC:REACtive?
FETCh1[:SCALar]:POWer:AC:REACtive?
```

V phase

```
MEASure2[:SCALar]:POWer:AC:REACtive?
FETCh2[:SCALar]:POWer:AC:REACtive?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:POWer:AC:REACtive?
FETCh3[:SCALar]:POWer:AC:REACtive?
```

Response

Returns the AC power (the reactive power) of U phase in NR3 format in response to MEAS1:POW:AC:REAC? or FETC1:POW:AC:REAC?.

Returns the AC power (the reactive power) of V phase in NR3 format in response to MEAS2:POW:AC:REAC? or FETC2:POW:AC:REAC?.

Returns the AC power (the reactive power) of W phase in NR3 format in response to MEAS3:POW:AC:REAC? or FETC3:POW:AC:REAC?.

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MEAS:POW:AC:REAC:TOT/ FETC:POW:AC:REAC:TOT

MEAS:POW:AC:REAC:TOT? starts a new measurement and then queries the AC power (the overall reactive power).

FETC:POW:AC:REAC:TOT? queries the AC power (the overall reactive power) without starting a new measurement.

The overall reactive power is calculated from the total of the apparent power of each phase (Stotal) and the total of the active power of each phase (Ptotal).

$$\text{Overall reactive power} = \sqrt{S_{\text{total}}^2 - P_{\text{total}}^2}$$

Stotal: Total apparent power of each phases.
Ptotal: Total power of each phases.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) are AC.

Command

```
MEASure[0][:SCALar]:POWer:AC:REACTive:TOTal?
FETCh[0][:SCALar]:POWer:AC:REACTive:TOTal?
```

Response

Returns the AC power (the overall reactive power) in NR3 format in response to MEAS:POW:AC:REAC:TOT? or FETC:POW:AC:REAC:TOT?.

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MEAS{1|2|3}:POW:AC:PFAC/ FETC{1|2|3}:POW:AC:PFAC

MEAS{1|2|3}:POW:AC:PFAC? starts a new measurement and then queries the AC power factor of the specified phase.

FETC{1|2|3}:POW:AC:PFAC? queries the AC power factor of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:POWer:PFACtor?
FETCh1[:SCALar]:POWer:PFACtor?
```

V phase

```
MEASure2[:SCALar]:POWer:PFACtor?
FETCh2[:SCALar]:POWer:PFACtor?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:POWer:PFACtor?
FETCh3[:SCALar]:POWer:PFACtor?
```

Response

Returns the AC power factor of U phase in NR3 format in response to MEAS1:POW:AC:PFAC? or FETC1:POW:AC:PFAC?.

Returns the AC power factor of V phase in NR3 format in response to MEAS2:POW:AC:PFAC? or FETC2:POW:AC:PFAC?.

Returns the AC power factor of W phase in NR3 format in response to MEAS3:POW:AC:PFAC? or FETC3:POW:AC:PFAC?.

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MEAS:POW:AC:PFAC:TOT/ FETC:POW:AC:PFAC:TOT

MEAS:POW:AC:PFAC? starts a new measurement and then queries the total AC power factor.
 FETC:POW:AC:PFAC? queries the total AC power factor without starting a new measurement.
 This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command

```
MEASure[0][:SCALar]:POWer:PFACtor:TOTal?
FETCh[0][:SCALar]:POWer:PFACtor:TOTal?
```

Response

In case of the single-phase three-wire output, returns the total AC power factor of U and V phases in NR3 format in response to MEAS:POW:AC:PFAC:TOT? or FETC:POW:AC:PFAC:TOT?.

In case of the three-phase output, returns the total AC power factor of U, V, and W phases in NR3 format in response to MEAS:POW:AC:PFAC:TOT? or FETC:POW:AC:PFAC:TOT?.

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MEAS{1|2}:POW:DC/ FETC{1|2}:POW:DC (optional)

MEAS{1|2}:POW:DC? starts a new measurement and then queries the DC power of the specified phase.

FETC{1|2}:POW:DC? queries the DC power of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output (optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is DC.

Command**U phase**

```
MEASure1[:SCALar]:POWer:DC?
FETCh1[:SCALar]:POWer:DC?
```

V phase

```
MEASure2[:SCALar]:POWer:DC?
FETCh2[:SCALar]:POWer:DC?
```

Response

Returns the DC power of U phase in NR3 format in response to MEAS1:POW:DC? or FETC1:POW:DC?.

Returns the DC power of V phase in NR3 format in response to MEAS2:POW:DC? or FETC2:POW:DC?.

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MEAS:POW:DC:TOT/ FETC:POW:DC:TOT

MEAS:POW:DC:TOT? starts a new measurement and then queries the total DC power.

FETC:POW:DC:TOT? queries the total DC power without starting a new measurement.

This command is valid in single-phase three-wire output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is DC.

Command

```
MEASure[0][:SCALar]:POWer:DC:TOTal?
FETCh[0][:SCALar]:POWer:DC:TOTal?
```

Response

Returns the total DC power of U and V phases in NR3 format in response to MEAS:POW:DC:TOT? or FETC:POW:DC:TOT?.

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MEAS{1|2}:VOLT:DC/ FETC{1|2}:VOLT:DC

MEAS{1|2}:VOLT:DC? starts a new measurement and then queries the DC voltage of the specified phase.

FETC{1|2}:VOLT:DC? queries the DC voltage of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is DC.

Command**U phase**

```
MEASure1[:SCALar]:VOLTage:DC?
FETCh1[:SCALar]:VOLTage:DC?
```

V phase

```
MEASure2[:SCALar]:VOLTage:DC?
FETCh2[:SCALar]:VOLTage:DC?
```

Response

Returns the DC voltage of U phase in NR3 format in response to MEAS1:VOLT:DC? or FETC1:VOLT:DC?.

Returns the DC voltage of V phase in NR3 format in response to MEAS2:VOLT:DC? or FETC2:VOLT:DC?.

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MEAS{1|2|3}:VOLT:AC/ FETC{1|2|3}:VOLT:AC

MEAS{1|2|3}:VOLT:AC? starts a new measurement and then queries the AC voltage of the specified phase.

FETC{1|2|3}:VOLT:AC? queries the AC voltage of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:VOLTage:AC?
```

```
FETCh1[:SCALar]:VOLTage:AC?
```

V phase

```
MEASure2[:SCALar]:VOLTage:AC?
```

```
FETCh2[:SCALar]:VOLTage:AC?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:VOLTage:AC?
```

```
FETCh3[:SCALar]:VOLTage:AC?
```

Response

Returns the AC voltage of U phase in NR3 format in response to MEAS1:VOLT:AC? or FETC1:VOLT:AC?.

Returns the AC voltage of V phase in NR3 format in response to MEAS2:VOLT:AC? or FETC2:VOLT:AC?.

Returns the AC voltage of W phase in NR3 format in response to MEAS3:VOLT:AC? or FETC3:VOLT:AC?.

Unit: V

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**MEAS{1|2|3}:VOLT:AMPL:MAX/
FETC{1|2|3}:VOLT:AMPL:MAX**

MEAS{1|2|3}:VOLT:AMPL:MAX? starts a new measurement and then queries the peak voltage of the specified phase.

FETC{1|2|3}:VOLT:AMPL:MAX? queries the peak voltage of the specified phase without starting a new measurement.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

The valid modes (parameters to the [OUTP:COUP](#) command) is AC.

Command**U phase**

```
MEASure1[:SCALar]:VOLTage:AMPLitude:MAXimum?
FETCh1[:SCALar]:VOLTage:AMPLitude:MAXimum?
```

V phase

```
MEASure2[:SCALar]:VOLTage:AMPLitude:MAXimum?
FETCh2[:SCALar]:VOLTage:AMPLitude:MAXimum?
```

W phase (Three-phase output only)

```
MEASure3[:SCALar]:VOLTage:AMPLitude:MAXimum?
FETCh3[:SCALar]:VOLTage:AMPLitude:MAXimum?
```

Response

Returns the peak voltage of U phase in NR3 format in response to MEAS1:VOLT:AMPL:MAX? or FETC1:VOLT:AMPL:MAX?.

Returns the peak voltage of V phase in NR3 format in response to MEAS2:VOLT:AMPL:MAX? or FETC2:VOLT:AMPL:MAX?.

Returns the peak voltage of W phase in NR3 format in response to MEAS3:VOLT:AMPL:MAX? or FETC3:VOLT:AMPL:MAX?.

Unit: V

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SYST:CONF:STAT:OUTP:POL

Sets the polarity of the status output.

Command

```
SYSTem:CONFigure:STATus:OUTPut:POLarity {POSitive|NEGative}  
SYSTem:CONFigure:STATus:OUTPut:POLarity?
```

Parameter

Value	POSitive	HIGH (Default)
	NEGative	LOW

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the polarity of the status output in CHAR format in response to SYST:CONF:STAT:OUTP:POL?.

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SIM:STAT

Executes or stops a power line abnormality simulation.

This command is valid in AC mode ([OUTP:COUP AC](#)).

This command is not valid when the output is off ([OUTP OFF](#)).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR EXT](#)), this command is invalid.

If the EX06-PCR-LE is in use (optional) and the AC voltage is being controlled with an external signal ([VOLT:EXT:SOUR VOLT](#)), this command is invalid.

Command

SIMulation:STATe {STOP|RUN}

Parameter

Value	STOP	Stops the power line abnormality simulation
	RUN	Executes the power line abnormality simulation

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SIM:EXEC

Queries the execution status of power line abnormality simulations.

Command

SIMulation:EXECuting?

Response

Returns the execution state (STOP or RUN)<CHAR> and the number of repetitions <NR1> in this order as a comma-separated list in response to SIM:EXEC?.

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INIT:SEQ4

Executes a power line abnormality simulation.

When the [trigger source](#) is set to IMM, the simulation is executed immediately. When the trigger source is set to BUS, the PCR waits for a software trigger, and then executes the simulation.

This is not valid when the action that is performed when the current limit is exceeded is CC ([CURR:PROT:STAT](#) OFF).

Command

```
INITiate[:IMMEDIATE]:SEquence4
```

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TRIG:SEQ4/ TRIG:SIM

Executes a software trigger for a sequence group 4.

Command

```
TRIGger:SEQuence4[:IMMediate]  
TRIGger:SIMulation[:IMMediate]
```

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PROG:EDIT

Configures a sequence step (excluding the jump and impedance settings).

Command

```
PROG:EDIT <step_NR1>,<freq-ramp_bool>,<freq_numeric>,<acv-ramp_bool>,<acv_numeric>,<dcv-ramp_bool>,<dcv_numeric>,<time_numeric>,<bank_NR1>,<status-out_bool>,<trig-out_bool>,<trig-in_bool>,<output_bool>
PROG:EDIT? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <freq-ramp> {ON|OFF|1|0}

Value ON(1) Enables the ramped frequency transition
OFF(0) Disables the ramped frequency transition

Parameter <freq> {<numeric>|MAXimum|MINimum}

Value 1 to 999.9 Frequency
Unit HZ

Parameter <acv-ramp> {ON|OFF|1|0}

Value ON(1) Enables the ramped AC voltage transition
OFF(0) Disables the ramped AC voltage transition

Parameter <acv> {<numeric>|MAXimum|MINimum}

Value 0 to 305.0 AC voltage*1
Unit V

*1 During single-phase, three-wire output and three-phase output (optional), all phases are set at the same time.

Parameter <dcv-ramp> {ON|OFF|1|0}

Value ON(1) Enables the ramped DC voltage signal change
OFF(0) Disables the ramped DC voltage signal change

Parameter <dcv> {<numeric>|MAXimum|MINimum}

Value 0 to ± 431.0 DC voltage ([About the values for single-phase, three-wire output and three-phase output](#))
Unit V

Parameter <time> {<numeric>|MAXimum|MINimum}

Value 0.0001s to 1000h Step time
Unit S

Parameter <bank_NR1>

Value 0 to 63 Number of the waveform bank to use

Parameter <status-out> {ON|OFF|1|0}

Value ON(1) Enables status output
OFF(0) Disables status output

Parameter <trig-out> {ON|OFF|1|0}

Value ON(1) Enables trigger output
OFF(0) Disables trigger output

Parameter <trig-in> {ON|OFF|1|0}

Value ON(1) Enables trigger input
OFF(0) Disables trigger input

Parameter <output> {ON|OFF|1|0}

Value ON(1) Enables output
OFF(0) Disables output

Response

Returns the settings of the specified step in the following order in response to PROG:EDIT? <step_NR1>.

Frequency signal change <NR1>, frequency <NR3>, AC voltage signal change <NR1>, AC voltage*2 <NR3>, DC voltage signal change <NR1>, DC voltage*3 <NC3>, step execution time



<NR3>, waveform bank number <NR1>, status output <NR1>, trigger output <NR1>, trigger input <NR1>, output on/off <NR1>

*2 During single-phase, three-wire output and three-phase output (optional), the U phase AC voltage is returned when the unbalanced voltage is set.

*3 During two-phase output and three-phase output (optional), the U phase DC voltage is returned when the unbalanced voltage is set.

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PROG:EDIT:JUMP

Configures the jump settings of a sequence step.

Command

```
PROG:EDIT:JUMP <step_NR1>,<jump-enable_bool>,<jump-step_NR1>,<jump-count_NR1>
PROG:EDIT:JUMP? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <jump-enable> {ON|OFF|1|0}

Value ON(1) Execution will jump to the specified step.
 OFF(0) Execution will proceed to the subsequent step.

Parameter <jump-step_NR1>

Value 0 to 599 Jump destination step number

Parameter <jump-count_NR1>

Value 1 to 9999 Number of jump repetitions
 9999 indicates unlimited repetitions.

Response

Returns the jump settings of the specified step in the following order in response to PROG:EDIT:JUMP? <step_NR1>.

Whether a jump will be performed <NR1>,jump destination step number <NR1>,number of jump repetitions <NR1>

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PROG:EDIT:OIMP:RAT

Configures the output impedance settings (as a percentage) of a sequence step.

Command

```
PROG:EDIT:OIMPedance:RATio <step_NR1>,<enable_bool>,<ratio_numeric>|MAXimum|MINimum
PROG:EDIT:OIMPedance:RATio? <step_NR1> [{MAXimum|MINimum}]
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <enable_bool> {ON|OFF|1|0}

Value ON(1) The output impedance will be set.
 OFF(0) The output impedance will not be set.

Parameter <ratio_numeric>

Value 1 to 100 Output impedance
 Unit PCT

Response

Returns the output impedance settings of the specified step in the following order in response to PROG:EDIT:OIMP:RAT? <step_NR1>.

Whether the output impedance will be set <NR1>,output impedance <NR3>

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PROG:EDIT:PHAS:STAR

Configures the starting phase angle settings and the phase change setting of a sequence step.

Command

```
PROG:EDIT:PHAS:STAR <step_NR1>,<enable_bool>[,<phase_numeric>[,  
  <phase_change_bool>]]  
PROG:EDIT:PHAS:STAR? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <enable_bool> {ON|OFF|1|0}

Value ON(1) Enables phase control
OFF(0) Disables phase control

Parameter <phase_numeric> {numeric|MAXimum|MINimum}

Value 0 to 359 Starting phase angle
Unit DEG

Parameter <phase_change_bool> {ON|OFF|1|0}

Value ON(1) Enables phase change
OFF(0) Disables phase change

Response

Returns the starting phase angle settings and the phase change setting of the specified step in the following order in response to PROG:EDIT:PHAS:STAR? <step_NR1>.

Whether the phase is controlled <NR1>, starting phase angle <NR3>, phase change setting <NR1>

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PROG:EDIT:PHAS:STOP

Configures the ending phase angle settings of a sequence step.

Command

```
PROG:EDIT:PHAS:STOP <step_NR1>,<enable_bool>,[<phase_numeric>]
PROG:EDIT:PHAS:STOP? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <enable_bool> {ON|OFF|1|0}

Value ON(1) Enables phase control
OFF(0) Disables phase control

Parameter <phase_numeric> {numeric|MAXimum|MINimum}

Value 0 to 359 Ending phase angle
Unit DEG

Response

Returns the ending phase angle settings of the specified step in the following order in response to PROG:EDIT:PHAS:STOP? <step_NR1>.

Whether the phase is controlled <NR1>,ending phase angle <NR3>

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PROG:LOOP

Sets the number of sequence repetitions

Command

PROG:LOOP {<numeric>|MINimum|MAXimum}
PROG:LOOP? [{MINimum|MAXimum}]

Parameter

Value 1 to 99999 (99999 indicates unlimited repetitions)

Response

Returns the number of sequence repetitions in NR1 format in response to PROG:LOOP?.

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PROG:CLE

Sets all the steps in the sequence to their default values.

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PROG:STEP:STAR

Sets the sequence starting step number

Command

```
PROG:STEP:STARt {<numeric>|MINimum|MAXimum}  
PROG:STEP:STARt? [{MINimum|MAXimum}]
```

Parameter

Value 0 to 599

Response

Returns the starting step number in NR1 format in response to PROG:STEP:STAR?.

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PROG:STEP:END

Sets the sequence ending step number

Command

```
PROG:STEP:END {<numeric>|MINimum|MAXimum}  
PROG:STEP:END? [ {MINimum|MAXimum} ]
```

Parameter

Value 0 to 599

Response

Returns the ending step number in NR1 format in response to PROG:STEP:END?.

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SYST:CONF:TRIG:INP:POL

Sets the polarity of the trigger input.

Command

```
SYSTem:CONFigure:TRIG:INPut:POLarity {POSitive|NEGative}
SYSTem:CONFigure:TRIG:INPut:POLarity?
```

Parameter

Value	POSitive	Rising edge (default)
	NEGative	Falling edge

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the polarity of the trigger input in CHAR format in response to SYST:CONF:TRIG:INP:POL?.

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SYST:CONF:TRIG:OUTP:POL

Sets the polarity of the trigger output.

Command

```
SYSTem:CONFigure:TRIG:OUTPut:POLarity {POSitive|NEGative}  
SYSTem:CONFigure:TRIG:OUTPut:POLarity?
```

Parameter

Value	POSitive	Rising edge (default)
	NEGative	Falling edge

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the polarity of the trigger output in CHAR format in response to SYST:CONF:TRIG:OUTP:POL?.

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INIT:SEQ5/ PROG:EXEC

Executes a sequence.

When the [trigger source](#) is set to IMM, the sequence is executed immediately. When the trigger source is set to BUS, the PCR waits for a software trigger, and then executes the sequence.

This is not valid when the action that is performed when the current limit is exceeded is CC ([CURR:PROT:STAT](#) OFF).

Command

```
INITiate[:IMMEDIATE]:SEQuence5
PROGram[:SElected]:EXECute
```

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PROG:EXEC

Queries the sequence execution state.

Command

PROGram:EXECuting?

Response

Returns the execution state (STOP, RUN, or PAUSE) <CHAR>, elapsed step time (the unit is seconds) <NR3>, present repetition number <NR1>, and step number ("-1" if the sequence is not being executed) <NR1> in this order as a comma-separated list in response to PROG:EXEC?.

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PROG:STAT

Changes the execution state of the sequence.

This command is not valid when the action that is performed when the current limit is exceeded is CC ([CURR:PROT:STAT](#) OFF).

If the EX05-PCR-LE is in use (optional) and the signal source is set to external signal source ([FUNC:SOUR](#) EXT), this command is invalid.

If the EX06-PCR-LE is in use (optional) and the AC voltage is being controlled with an external signal ([VOLT:EXT:SOUR](#) VOLT), this command is invalid.

Command

```
PROG:STATe {STOP|RUN|PAUSE|CONTINUE}
```

Parameter

Value	STOP	Stops the sequence
	RUN	Executes the sequence
	PAUSE	Pauses the sequence
	CONTINUE	Continues the sequence that has been paused

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TRIG:SEQ5/ TRIG:PROG

Executes a software trigger for a sequence group 5.

Command

```
TRIGger:SEQuence5[:IMMediate]
TRIGger:PROGram[:IMMediate]
```

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PROG:EDIT:PHAS:UOFF

Sets the U phase offset of a sequence step.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
PROG:EDIT:PHAS:UOFFset <step_NR1>,<enable_bool>,[<phase_numeric>]
PROG:EDIT:PHAS:UOFFset? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <enable_bool> {ON|OFF|1|0}

Value ON(1) The U phase offset is set
OFF(0) The U phase offset is not set

Parameter <phase_numeric> {numeric|MAXimum|MINimum}

Value 0 to 359 U phase offset value
Unit DEG

Response

Returns the U phase offset value of the specified step in the following order in response to PROG:EDIT:PHAS:UOFF? <step_NR1>.

Whether the U phase offset is set or not set <NR1>, U phase offset value <NR3>

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PROG:EDIT:PHAS:UV

Configures the U-V phase difference settings of a sequence step.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
PROG:EDIT:PHAS:UV <step_NR1>,<enable_bool>,[<phase_numeric>]
PROG:EDIT:PHAS:UV? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <enable_bool> {ON|OFF|1|0}

Value ON(1) Enables U-V phase difference control

OFF(0) Disables U-V phase difference control

Parameter <phase_numeric> {numeric|MAXimum|MINimum}

Value 0 to 359 U-V phase difference angle

Unit DEG

Response

Returns the U-V phase difference settings of the specified step in the following order in response to PROG:EDIT:PHAS:UV? <step_NR1>.

Whether the U-V phase difference is controlled <NR1>,U-V phase difference angle <NR3>

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PROG:EDIT:PHAS:UW

Configures the U-W phase difference settings of a sequence step.
This command is valid in three-phase output (PCR-LE optional).

Command

```
PROG:EDIT:PHAS:UW <step_NR1>,<enable_bool>,[<phase_numeric>]
PROG:EDIT:PHAS:UW? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <enable_bool> {ON|OFF|1|0}

Value ON(1) Enables U-W phase difference control
OFF(0) Disables U-W phase difference control

Parameter <phase_numeric> {numeric|MAXimum|MINimum}

Value 0 to 359 U-W phase difference angle
Unit DEG

Response

Returns the U-W phase difference settings of the specified step in the following order in response to PROG:EDIT:PHAS:UW? <step_NR1>.

Whether the U-W phase difference is controlled <NR1>,U-W phase difference angle <NR3>

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PROG:EDIT:VOLT

Configures the unbalanced AC voltage settings of a sequence step.

This command is valid in single-phase three-wire output or three-phase output (optional).

Command**All phases**

```
PROG:EDIT:VOLTage[0] <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage[0]? <step_NR1>
```

U phase

```
PROG:EDIT:VOLTage1 <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage1? <step_NR1>
```

V phase

```
PROG:EDIT:VOLTage2 <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage2? <step_NR1>
```

W phase (Three-phase output only)

```
PROG:EDIT:VOLTage3 <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage3? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <volt_numeric> {numeric|MAXimum|MINimum}

Value 0 to 305 Unbalanced voltage

Unit V

Response

In case of the single-phase three-wire output, PROG:EDIT:VOLT? <step_NR1> returns a comma-separated list of the AC voltage <NR3> of the specified step for U and V phases.

In case of the three-phase output, PROG:EDIT:VOLT? <step_NR1> returns a comma-separated list of the AC voltage <NR3> of the specified step for U, V, and W phases.

Returns the AC voltage in NR3 format of U phase of the specified step in response to PROG:EDIT:VOLT1? <step_NR1>.

Returns the AC voltage in NR3 format of V phase of the specified step in response to PROG:EDIT:VOLT2? <step_NR1>.

Returns the AC voltage in NR3 format of W phase of the specified step in response to PROG:EDIT:VOLT3? <step_NR1>.

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PROG:EDIT:VOLT:OFFS

Configures the unbalanced DC voltage settings of a sequence step.

This command is valid in two-phase output or three-phase output (optional).

Command

All phases

```
PROG:EDIT:VOLTage[0]:OFFSet <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage[0]:OFFSet? <step_NR1>
```

U phase

```
PROG:EDIT:VOLTage1:OFFSet <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage1:OFFSet? <step_NR1>
```

V phase

```
PROG:EDIT:VOLTage2:OFFSet <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage2:OFFSet? <step_NR1>
```

W phase (Three-phase output only)

```
PROG:EDIT:VOLTage3:OFFSet <step_NR1>,<volt_numeric>
PROG:EDIT:VOLTage3:OFFSet? <step_NR1>
```

Parameter <step_NR1>

Value 0 to 599 Number of the step that you want to configure

Parameter <volt_numeric> {numeric|MAXimum|MINimum}

Value 0 to 305 Unbalanced voltage

Unit V

Response

In case of the two-phase output, PROG:EDIT:VOLT:OFFS? <step_NR1> returns a comma-separated list of the DC voltage <NR3> of the specified step for U and V phases.

In case of the three-phase output, PROG:EDIT:VOLT:OFFS? <step_NR1> returns a comma-separated list of the DC voltage <NR3> of the specified step for U, V, and W phases.

Returns the DC voltage in NR3 format of U phase of the specified step in response to PROG:EDIT:VOLT1:OFFS? <step_NR1>.

Returns the DC voltage in NR3 format of V phase of the specified step in response to PROG:EDIT:VOLT2:OFFS? <step_NR1>.

Returns the DC voltage in NR3 format of W phase of the specified step in response to PROG:EDIT:VOLT3:OFFS? <step_NR1>.

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PROG:EDIT:PHAS:RAMP

Sets the phase change of a sequence step.
Set the U phase angle with the U phase offset (PROG:EDIT:PHAS:UOFF).
Set the V phase angle with the U-V phase difference (PROG:EDIT:PHAS:UV).
Set the W phase angle with the U-W phase difference (PROG:EDIT:PHAS:UW).
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
PROG:EDIT:PHAS:RAMP <step_NR1>,<u-phase_char>[,<v-phase_char>[,<w-phase_char>]]  
PROG:EDIT:PHAS:RAMP? <step_NR1>
```

Parameter <step_NR1>
Value 0~599 Number of the step that you want to configure

Parameter <u-phase_char>U phase change, <v-phase_char>V phase change, <w-phase_char>W phase change {OFF|LEAD|LAG}
Value OFF Ramp off
LEAD Ramp on, leading phase
LAG Ramp on, lagging phase

Response

Returns the phase change settings of the specified step in the following order in response to PROG:EDIT:PHAS:RAMP? <step_NR1>.
U phase change<char>, V phase change<char>, W phase change<char>

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SYST:CONF:PHAS:UOFF:INIT

Clears the U phase offset setting.
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command
`SYSTem:CONFigure:PHASe:UOFFset:INITialize`

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SYST:ERR

Reads the oldest error information or event information from the error queue. The error queue can store up to 255 errors.-> [Tutorial](#)

Use the [*CLS](#) command to clear the error queue.

Command

SYSTem:ERRor[:NEXT]?

Response

Returns the oldest error or event information in the error/event queue in response to SYST:ERR? as follows:

(Example) When there are no errors or events

+0,"No error"

(Example) When a command that cannot be executed under the current operating conditions has been received

-221,"Settings conflict"

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SYST:CONF:TRAC

Sets whether to display communication errors by performing a debug trace. If the debug trace function is turned on, error codes (example: Err-100) are shown on the PCR-M/ PCR-LE display.

Command

```
SYSTem:CONFigure:TRACe {ON|OFF|1|0}  
SYSTem:CONFigure:TRACe?
```

Parameter

- Value ON(1) Display communication errors
- OFF(0) Not display communication errors (default)

Response

Returns whether to display communication errors in NR1 format in response to SYST:CONF:TRAC?.

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SYST:LOC (RS232C, USB or LAN only)

Sets the PCR-M/ PCR-LE to local mode (Remote Disable; the REMOTE LED turns off). This is a substitute command for the IEEE488.1 ren FALSE (remote disable) command. The Remote Disable state enables both panel operations and commands.

Use [SYST:REM](#) or [SYST:RWL](#) to switch to remote mode (Remote Enable; the REMOTE LED lights).

Command

SYSTem:LOCa1

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SYST:REM (RS232C, USB or LAN only)

Sets the PCR-M/ PCR-LE operation to remote mode. All panel keys except the LOCAL key are locked. This is a substitute command for the IEEE488.1 REN (Remote Enable) command and address designation.
Use the [SYST:LOC](#) command to return the PCR-M/ PCR-LE to local mode.

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SYST:RWL (RS232C, USB or LAN only)

Sets the PCR-M/ PCR-LE operation to remote mode. All panel keys are locked (the LOCAL key is also locked). This is a substitute command for the IEEE488.1 llo (Local Lock Out) command.

Use the [SYST:LOC](#) command to return the PCR-M/ PCR-LE to local mode.

Command

SYSTem:RWLock

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SYST:SLE:EXEC

Activates sleep mode immediately.

This command is valid even when the sleep function has been turned off ([SYST:SLE OFF](#)).

This command is not valid when the output is on ([OUTP ON](#)), when an alarm has occurred, when a sequence is being executed, and when the PCR is in the [WTG state](#).

Command

SYSTem:SLEep:EXECute

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SYST:VERS

Queries the version of the SCPI specifications to which the PCR-M/ PCR-LE conforms.

Command

SYSTem:VERSion?

Response

Returns 1999.0 in response to SYST:VERS?.

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Status byte register

The status byte register stores STB and RQS (MSS) messages as defined by the IEEE488.1 standard. The status byte register can be read using IEEE488.1 serial polling or the IEEE488.2 common command ***STB?**.

When serial polling is carried out, bit 6 responds with the request service (RQS). The status byte value is not changed by serial polling.

***STB?** makes the device transmit the contents of the status byte register and the master status summary (MSS) message.

***STB?** does not change the status byte, MSS, or RQS.

Bit	Bit weight	Bit name	Description
0	1	Reserved	Reserved for future use by the IEEE488. The bit value is notified as zero.
1	2	Reserved	
2	4	Error/Event Queue	If data exists in the error or event queue, this bit is set to true.
3	8	Questionable Status Register (QUES)	This bit is set to true when a bit is set in the QUESTIONable event status register and the corresponding bit in the QUESTIONable status enable register is true.
4	16	Message Available (MAV)	This bit is set to true when a request is received from the digital programming interface and the PCR is ready to output the data byte.
5	32	Standard Event Status Bit Summary (ESB)	This bit is set to true when a bit is set in the event status register.
6	64	Request Service (RQS)	This bit is set to true when a bit is set in the service request enable register, and the corresponding bit exists in the status byte. The SRQ line of the GPIB is set.
		Master Status Summary (MSS)	This bit is set to true when a bit in the status byte register is set to 1 and the corresponding bit in the service request enable register is set to 1.
7	128	Operation Status Register (OPER)	This bit is set to true when a bit is set in the OPERATION event status register and the corresponding bit in the OPERATION status enable register is set.
8 to 15		Not Used	--

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Event status register

The event status register bits are set when certain events occur during PCR operation. All bits of the event status register are set by the error event queue.

The register is defined by the IEEE488.2 standard and is controlled by the IEEE488.2 common commands [*ESE](#), [*ESE?](#), and [*ESR?](#).

See [SYST:ERR?](#) for the descriptions of the errors.

Bit	Bit weight	Bit name	Description	Error code
0	1	Operation Complete(OPC)	Set when an *OPC command is received and all operations in standby are complete.	-800 to -899
1	2	Request Control (RQC)	Not used	--
2	4	Query Error(QYE)	Set when an attempt is made to read data from the output queue when there is no output or the error queue is in wait status. Indicates that there is no data in the error queue.	-400 to -499
3	8	Device Dependent Error(DDE)	Set when there is a device-specific error.	-300 to -399, 100 to 999
4	16	Execution Error(EXE)	Set when the PCR evaluates that the program data following the header is outside the formal input range or does not match the performance of the PCR. This indicates that a valid SCPI command may not be executed correctly depending on the conditions of the PCR.	-200 to -299
5	32	Command Error(CME)	Set when an IEEE 488.2 syntax error is detected, when an unidentifiable header is received, or when a group execution trigger enters the internal IEEE 488.2 SCPI command input buffer.	-100 to -199
6	64	Reserved	Not used	--
7	128	Power ON(PON)	Set when the power is turned on.	--
8 to 15		Reserved	Not used	--

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OPERation status register (PCR-LE/PCR-LE2)

The OPERation status register is a 16-bit register that contains conditions that are part of the PCR normal operations.

Bit	Bit weight	Bit name	Description
0	1	NOT USED	--
1	2	NOT USED	--
2	4	NOT USED	--
3	8	NOT USED	--
4	16	MEASuring *1	Indicates whether measurement is in progress on the PCR-LE/PCR-LE2.
5	32	Waiting for TRIGger *2	Indicates whether the PCR-LE/PCR-LE2 is waiting for a trigger (TRIG)
6	64	NOT USED	--
7	128	BUSY	The period when the PCR-LE/PCR-LE2 is returning from sleep mode or when the output cannot be turned on after an OCP2 or OC has occurred
8	256	CV	CV output
9	512	NOT USED	--
10	1024	SYNC	Indicates whether the synchronization function is in operation.
11	2048	SIMuration	Indicates whether a power line abnormality simulation is being performed.
12	4096	RISE	Indicates whether a soft start is being performed.
13	8192	INSTrument Summary	Summary bit of OPERation:INSTrument sub register
14	16384	PROGram	Indicates whether a sequence is being performed.
15	32768	NOT USED	Always zero

*1. A summary bit of the STAT:OPER:MEAS register. Further detailed information can be obtained by referring to this register.

*2. A summary bit of the STAT:OPER:TRIG register. Further detailed information can be obtained by referring to this register.

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STAT:OPER

Queries the [event](#) of the OPERation status register.

A query clears the contents of the register.

Command

```
STATus:OPERation[:EVENT]?
```

Response

Returns the event of the OPERation status register in NR1 format.

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STAT:OPER:COND

Queries the [condition](#) of the OPERation status register.
A query does not clear the contents of the register.

Command

STATus:OPERation:CONDition?

Response

Returns the condition of the OPERation status register in NR1 format.

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STAT:OPER:ENAB

Sets the [enable](#) register of the OPERation status register.

Command

```
STATus:OPERation:ENABle <NR1>  
STATus:OPERation:ENABle?
```

Parameter

Value : 0 to 32767

Response

Returns the enable register setting of the OPERation status register in NR1 format.

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STAT:OPER:NTR

Sets the [negative transition](#) of the OPERation status register.

Command

```
STATus:OPERation:NTRansition <NR1>
STATus:OPERation:NTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the negative transition of the OPERation status register in NR1 format.

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STAT:OPER:PTR

Sets the [positive transition](#) of the OPERation status register.

Command

```
STATus:OPERation:PTRansition <NR1>
STATus:OPERation:PTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the positive transition of the OPERation status register in NR1 format.

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QUESTionable status register (PCR-LE/PCR-LE2)

The QUESTionable status register is a 16-bit register that stores information related to the questionable events and status during PCR operation.

These register bits may indicate problems with the measured data of the PCR.

Bit	Bit weight	Bit name	Description
0	1	OV(Over Voltage Protection)	Overvoltage protection has been activated
1	2	OC(Over Current Protection)	Overcurrent protection has been activated
2	4	PU	Device error has occurred
3	8	UV(Under Voltage Protection)	Undervoltage protection has been activated
4	16	OHP(Over Heat Protection)	Overtemperature protection has been activated
5	32	SHUT DOWN	Shut down the output
6	64	OCP2	Overcurrent internal semiconductor protection has been activated
7	128	NOT USED	--
8	256	CAL(CALibration)	Calibration data is invalid
9	512	OP(Over Power protection)	Overpower protection has been activated
10	1024	CL-PEAK	Current limit control has been activated
11	2048	Not Used	--
12	4096	CL-RMS(Current Limit on RMS)	TRIP ENABLE: During overload judgment TRIP DISABL: During output voltage control
13	8192	INSTrument Summary	Summary bit of QUESTionable:INSTrument sub register
14	16384	OCP2-W	The PCR-LE/PCR-LE2 is waiting for internal semiconductor protection judgment
15	32768	Not Used	Always zero

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STAT:QUES

Queries the [event](#) of the QUESTionable status register.

A query clears the contents of the register.

Command

```
STATus:QUEStionable[:EVENT]?
```

Response

Returns the event of the QUESTionable status register in NR1 format.

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STAT:QUES:COND

Queries the [condition](#) of the QUESTionable status register.
A query does not clear the contents of the register.

Command

STATus:QUESTionable:CONDition?

Response

Returns the condition of the QUESTionable status register in NR1 format.

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STAT:QUES:ENAB

Sets the [enable](#) register of the QUEStionable status register.

Command

```
STATus:QUEStionable:ENABle <NR1>
STATus:QUEStionable:ENABle?
```

Parameter

Value : 0 to 32767

Response

Returns the enable register setting of the QUEStionable status register in NR1 format.

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STAT:QUES:NTR

Sets the [negative transition](#) of the QUESTionable status register.

Command

```
STATus:QUESTionable:NTRansition <NR1>
STATus:QUESTionable:NTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the negative transition of the QUESTionable status register in NR1 format.

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STAT:QUES:PTR

Sets the [positive transition](#) of the QUESTionable status register.

Command

```
STATus:QUESTionable:PTRansition <NR1>  
STATus:QUESTionable:PTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the positive transition of the QUESTionable status register in NR1 format.

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STAT:PRES

Resets the ENABLE, PTRansition, and NTRansition filter registers of all status registers (including sub registers) to their default values.

Default values:

STATus:ENABle = 0x0000

STATus:PTRansition = 0x7FFF

STATus:NTRansition = 0x0000

Command

STATus:PRESet

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OPERation:INSTrument subresister

This is the subregister (16 bits) of bit 13 of the OPERation status register.

Bit	Bit weight	Bit name	Description
0	1	NOT USED	--
1	2	INSTrument1	Summary bit of U phase(OPER:INST:ISUM1)
2	4	INSTrument2	Summary bit of V phase(OPER:INST:ISUM2)
3	8	INSTrument3	Summary bit of W phase(OPER:INST:ISUM3)
4	16	NOT USED	--
5	32	NOT USED	--
6	64	NOT USED	--
7	128	NOT USED	--
8	256	NOT USED	--
9	512	NOT USED	--
10	1024	NOT USED	--
11	2048	NOT USED	--
12	4096	NOT USED	--
13	8192	NOT USED	--
14	16384	NOT USED	--
15	32768	NOT USED	Always zero

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STAT:OPER:INST

Queries the [event](#) of the OPERation:INSTRument status register.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

A query clears the contents of the register.

Command

STATus:OPERation:INSTRument[:EVENT]?

Response

Returns the event of the OPERation:INSTRument status register in NR1 format.

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STAT:OPER:INST:COND

Queries the [condition](#) of the OPERation:INSTrument status register.
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).
A query does not clear the contents of the register.

Command

STATus:OPERation:INSTrument:CONDition?

Response

Returns the condition of the OPERation:INSTrument status register in NR1 format.

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STAT:OPER:INST:ENAB

Sets the [enable](#) register of the OPERation:INSTrument status register.
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
STATus:OPERation:INSTrument:ENABle <NR1>  
STATus:OPERation:INSTrument:ENABle?
```

Parameter

Value : 0 to 32767

Response

Returns the enable register setting of the OPERation:INSTrument status register in NR1 format.

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STAT:OPER:INST:PTR

Sets the [positive transition](#) of the OPERation:INSTrument status register.
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
STATus:OPERation:INSTrument:PTRansition <NR1>  
STATus:OPERation:INSTrument:PTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the positive transition of the OPERation:INSTrument status register in NR1 format.

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STAT:OPER:INST:NTR

Sets the [negative transition](#) of the OPERation:INSTrument status register.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
STATus:OPERation:INSTrument:NTRansition <NR1>
STATus:OPERation:INSTrument:NTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the negative transition of the OPERation:INSTrument status register in NR1 format.

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OPERation:INSTrument:ISUMmary{1|2|3} subregister

This is the subregister of bit 1 to bit 3 of the OPERation:INSTrument subregister. This is a 16-bit register that contains information about the normal operating conditions of the PCR-LE/PCR-LE2 Series

Of the parameters {1|2|3}, 1 represents U phase, 2 represents V phase, and 3 represents W phase.

For example, V phase is specified as "OPER:INST:ISUM2".

Bit	Bit weight	Bit name	Description
0	1	NOT USED	--
1	2	NOT USED	--
2	4	NOT USED	--
3	8	NOT USED	--
4	16	MEASuring	Indicates whether measurement is in progress on the PCR-LE/PCR-LE2.
5	32	Waiting for TRIGger	Indicates whether measurement is in progress on the PCR-LE/PCR-LE2.
6	64	NOT USED	--
7	128	BUSY	The period when the PCR-LE/PCR-LE2 is returning from sleep mode or when the output cannot be turned on after an OCP2 or OC has occurred
8	256	CV	CV output
9	512	NOT USED	--
10	1024	SYNC	Indicates whether the synchronization function is in operation.
11	2048	SIMuration	Indicates whether a power line abnormality simulation is being performed.
12	4096	RISE	Indicates whether a soft start is being performed.
13	8192	INSTrument Summary	--
14	16384	PROGram	Indicates whether a sequence is being performed.
15	32768	NOT USED	Always zero

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STAT:OPER:INST:ISUM{1|2|3}

Queries the [event](#) of the OPERATION:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).
A query clears the contents of the register.

Command

- U phase
STATus:OPERation:INSTrument:ISUMmary1[:EVENT]?
- V phase
STATus:OPERation:INSTrument:ISUMmary2[:EVENT]?
- W phase (Three-phase output only)
STATus:OPERation:INSTrument:ISUMmary3[:EVENT]?

Response

Returns the event of the OPERATION:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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STAT:OPER:INST:ISUM{1|2|3}:COND

Queries the [condition](#) of the OPERATION:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).
A query does not clear the contents of the register.

Command

- U phase
STATus:OPERation:INSTrument:ISUMmary1:CONDition?
- V phase
STATus:OPERation:INSTrument:ISUMmary2:CONDition?
- W phase (Three-phase output only)
STATus:OPERation:INSTrument:ISUMmary3:CONDition?

Response

Returns the condition of the OPERATION:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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STAT:OPER:INST:ISUM{1|2|3}:ENAB

Sets the [enable](#) register of the OPERation:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command**U phase**

```
STATus:OPERation:INSTrument:ISUMmary1:ENABle <NR1>
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```

V phase

```
STATus:OPERation:INSTrument:ISUMmary2:ENABle <NR1>
STATus:OPERation:INSTrument:ISUMmary2:ENABle?
```

W phase (Three-phase output only)

```
STATus:OPERation:INSTrument:ISUMmary3:ENABle <NR1>
STATus:OPERation:INSTrument:ISUMmary3:ENABle?
```

Parameter

Value : 0 to 32767

Response

Returns the enable register setting of the OPERation:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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STAT:OPER:INST:ISUM{1|2|3}:PTR

Sets the [positive transition](#) of the OPERation:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command**U phase**

```
STATus:OPERation:INSTrument:ISUMmary1:PTRansition <NR1>
STATus:OPERation:INSTrument:ISUMmary1:PTRansition?
```

V phase

```
STATus:OPERation:INSTrument:ISUMmary2:PTRansition <NR1>
STATus:OPERation:INSTrument:ISUMmary2:PTRansition?
```

W phase (Three-phase output only)

```
STATus:OPERation:INSTrument:ISUMmary3:PTRansition <NR1>
STATus:OPERation:INSTrument:ISUMmary3:PTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the positive transition of the OPERation:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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STAT:OPER:INST:ISUM{1|2|3}:NTR

Sets the [negative transition](#) of the OPERation:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command**U phase**

```
STATus:OPERation:INSTrument:ISUMmary1:NTRansition <NR1>
STATus:OPERation:INSTrument:ISUMmary1:NTRansition?
```

V phase

```
STATus:OPERation:INSTrument:ISUMmary2:NTRansition <NR1>
STATus:OPERation:INSTrument:ISUMmary2:NTRansition?
```

W phase (Three-phase output only)

```
STATus:OPERation:INSTrument:ISUMmary3:NTRansition <NR1>
STATus:OPERation:INSTrument:ISUMmary3:NTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the negative transition of the OPERation:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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QUEStionable:INSTrument subregister

This is the subregister (16 bits) of bit 13 of the QUEStionable status register.

Bit	Bit weight	Bit name	Description
0	1	NOT USED	--
1	2	INSTrument1	Summary bit of U phase(QUES:INST:ISUM1)
2	4	INSTrument2	Summary bit of V phase(QUES:INST:ISUM2)
3	8	INSTrument3	Summary bit of W phase(QUES:INST:ISUM3)
4	16	NOT USED	--
5	32	NOT USED	--
6	64	NOT USED	--
7	128	NOT USED	--
8	256	NOT USED	--
9	512	NOT USED	--
10	1024	NOT USED	--
11	2048	NOT USED	--
12	4096	NOT USED	--
13	8192	NOT USED	--
14	16384	NOT USED	--
15	32768	NOT USED	Always zero

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STAT:QUES:INST

Queries the [event](#) of the QUESTionable:INSTrument status register.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

A query clears the contents of the register.

Command

```
STATus:QUESTionable:INSTrument[:EVENT]?
```

Response

Returns the event of the QUESTionable:INSTrument status register in NR1 format.

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STAT:QUES:INST:COND

Queries the [condition](#) of the QUESTionable:INSTrument status register.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

A query does not clear the contents of the register.

Command

STATus:QUEStionable:INSTrument:CONDition?

Response

Returns the condition of the QUESTionable:INSTrument status register in NR1 format.

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STAT:QUES:INST:ENAB

Sets the [enable](#) register of the QUESTionable:INSTrument status register.
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
STATus:QUEStionable:INSTrument:ENABle <NR1>  
STATus:QUEStionable:INSTrument:ENABle?
```

Parameter

Value : 0 to 32767

Response

Returns the enable register setting of the QUESTionable:INSTrument status register in NR1 format.

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STAT:QUES:INST:PTR

Sets the [positive transition](#) of the QUEStionable:INSTRument status register.
This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
STATus:QUEStionable:INSTRument:PTRansition <NR1>  
STATus:QUEStionable:INSTRument:PTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the positive transition of the QUEStionable:INSTRument status register in NR1 format.

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STAT:QUES:INST:NTR

Sets the [negative transition](#) of the QUEStionable:INSTrument status register.

This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command

```
STATus:QUEStionable:INSTrument:NTRansition <NR1>
STATus:QUEStionable:INSTrument:NTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the negative transition of the QUEStionable:INSTrument status register in NR1 format.

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QUESTionable:INSTrument:ISUMmary{1|2|3} subregister

This is the subregister of bit 1 to bit 3 of the QUESTionable:INSTrument subregister. This is a 16-bit register that stores information related to the status of and the questionable events that occur during operation of the PCR-LE/PCR-LE2 Series.

Of the parameters {1|2|3}, 1 represents U phase, 2 represents V phase, and 3 represents W phase.

For example, V phase is specified as "QUES:INST:ISUM2".

The QUESTionable status register bits may indicate that there are problems with the PCR-LE/PCR-LE2's measured data.

Bit	Bit weight	Bit name	Description
0	1	OV(Over Voltage Protection)	Overvoltage protection has been activated
1	2	OC(Over Current Protection)	Overcurrent protection has been activated
2	4	PU	Device error has occurred
3	8	UV(Under Voltage Protection)	Undervoltage protection has been activated
4	16	OHP(Over Heat Protection)	Overtemperature protection has been activated
5	32	Not Used	--
6	64	OCP2	Overcurrent internal semiconductor protection has been activated
7	128	NOT USED	--
8	256	CAL(CALibration)	Calibration data is invalid
9	512	OP(Over Power protection)	Overpower protection has been activated
10	1024	CL-PEAK	Current limit control has been activated
11	2048	Not Used	--
12	4096	CL-RMS(Current Limit on RMS)	TRIP ENABLE: During overload judgment TRIP DISABL: During output voltage control
13	8192	INSTrument Summary	--
14	16384	OCP2-W	The PCR-LE/PCR-LE2 is waiting for internal semiconductor protection judgment
15	32768	Not Used	Always zero

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STAT:QUES:INST:ISUM{1|2|3}

Queries the [event](#) of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).
A query clears the contents of the register.

Command

- U phase
STATus:QUESTionable:INSTrument:ISUMmary1[:EVENT]?
- V phase
STATus:QUESTionable:INSTrument:ISUMmary2[:EVENT]?
- W phase (Three-phase output only)
STATus:QUESTionable:INSTrument:ISUMmary3[:EVENT]?

Response

Returns the event of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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STAT:QUES:INST:ISUM{1|2|3}:COND

Queries the [condition](#) of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).
A query does not clear the contents of the register.

Command

- U phase
STATus:QUESTionable:INSTrument:ISUMmary1:CONDition?
- V phase
STATus:QUESTionable:INSTrument:ISUMmary2:CONDition?
- W phase (Three-phase output only)
STATus:QUESTionable:INSTrument:ISUMmary3:CONDition?

Response

Returns the condition of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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STAT:QUES:INST:ISUM{1|2|3}:ENAB

Sets the [enable](#) register of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command**U phase**

```
STATus:QUESTionable:INSTrument:ISUMmary1:ENABle <NR1>
STATus:QUESTionable:INSTrument:ISUMmary1:ENABle?
```

V phase

```
STATus:QUESTionable:INSTrument:ISUMmary2:ENABle <NR1>
STATus:QUESTionable:INSTrument:ISUMmary2:ENABle?
```

W phase (Three-phase output only)

```
STATus:QUESTionable:INSTrument:ISUMmary3:ENABle <NR1>
STATus:QUESTionable:INSTrument:ISUMmary3:ENABle?
```

Parameter

Value : 0 to 32767

Response

Returns the enable register setting of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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STAT:QUES:INST:ISUM{1|2|3}:PTR

Sets the [positive transition](#) of the QUEStionable:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command**U phase**

```
STATus:QUEStionable:INSTrument:ISUMmary1:PTRansition <NR1>
STATus:QUEStionable:INSTrument:ISUMmary1:PTRansition?
```

V phase

```
STATus:QUEStionable:INSTrument:ISUMmary2:PTRansition <NR1>
STATus:QUEStionable:INSTrument:ISUMmary2:PTRansition?
```

W phase (Three-phase output only)

```
STATus:QUEStionable:INSTrument:ISUMmary3:PTRansition <NR1>
STATus:QUEStionable:INSTrument:ISUMmary3:PTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the positive transition of the QUEStionable:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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DISP:AMM

Sets the measured value displayed on the lower numeric display.

Command

```
DISPlay:AMMeter "{RMS|AVG|PEAK|WATTage}"
DISPlay:AMMeter?
```

Parameter

Value	"RMS"	Current (default)
	"AVG"	Moving average of the current
	"PEAK"	Peak current
	"WATT"	Wattage

For the setting that is applied when *RST is sent, see this [table](#)

Response

Response

Returns the lower meter display value in string format in response to DISP:AMM?.

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INIT:CONT:NAM

Sets the sequence operation auto continue mode of the specified sequence group.

When the sequence operation auto continue mode is turned on

If the trigger source parameter is set to IMM, the change or measurement starts immediately. When the operation is complete, a new change or measurement automatically starts.

If the parameter is set to BUS, the change or measurement starts after receiving a software trigger. When the operation is complete, the PCR-M/ PCR-LE waits for the next trigger.

When the sequence operation auto continue mode is turned off

The change or measurement currently in progress continues unless ABOR is sent. The operation does not automatically continue to the new change or measurement.

Command

```
INITiate:CONTinuous:NAME {TRANsient|ACQuire},{ON|OFF|1|0}
INITiate:CONTinuous:NAME?
```

Parameter {TRANsient|ACQuire}

Value TRAN SEQUENCE1
ACQ SEQUENCE3

Parameter {ON|OFF|1|0}

Value ON(1) Auto continue mode on
OFF(0) Auto continue mode off (default)

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the sequence operation auto continue mode setting using a string and NR1 format in response to INIT:CONT:NAME? {TRAN|ACQ}.

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INIT:CONT:SEQ3

Sets the sequence operation auto continue mode of the sequence 3 group.

When the sequence operation auto continue mode is turned on

If the trigger source parameter is set to IMM, the change or measurement starts immediately. When the operation is complete, a new change or measurement automatically starts.

If the parameter is set to BUS, the change or measurement starts after receiving a software trigger. When the operation is complete, the PCR-M/ PCR-LE waits for the next trigger.

When the sequence operation auto continue mode is turned off

The change or measurement currently in progress continues unless ABOR is sent. The operation does not automatically continue to the new change or measurement.

Command

```
INITiate:CONTinuous:SEquence3 {ON|OFF|1|0}
INITiate:CONTinuous:SEquence3?
```

Parameter

Value ON(1) Auto continue mode on
OFF(0) Auto continue mode off (default)

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the sequence operation auto continue mode setting in NR1 format in response to INIT:CONT:SEQ3?

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SENS:AVER

With the addition of the averaging period of the measured values setting function, the function for averaging measured values has been deleted. Errors do not occur when this command is received but the command is invalid.

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STAT:QUES:INST:ISUM{1|2|3}:NTR

Sets the [negative transition](#) of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register. This command is valid in single-phase three-wire output or three-phase output (PCR-LE optional).

Command**U phase**

```
STATus:QUESTionable:INSTrument:ISUMmary1:NTRansition <NR1>
STATus:QUESTionable:INSTrument:ISUMmary1:NTRansition?
```

V phase

```
STATus:QUESTionable:INSTrument:ISUMmary2:NTRansition <NR1>
STATus:QUESTionable:INSTrument:ISUMmary2:NTRansition?
```

W phase (Three-phase output only)

```
STATus:QUESTionable:INSTrument:ISUMmary3:NTRansition <NR1>
STATus:QUESTionable:INSTrument:ISUMmary3:NTRansition?
```

Parameter

Value : 0 to 32767

Response

Returns the negative transition of the QUESTionable:INSTrument:ISUMmary{1|2|3} status register in NR1 format.

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SYST:CONF:EXT:EST:FREQ:LOW

With the addition of the measurement time setting function, the function for estimated minimum frequency has been deleted. Errors do not occur when this command is received but the command is invalid.

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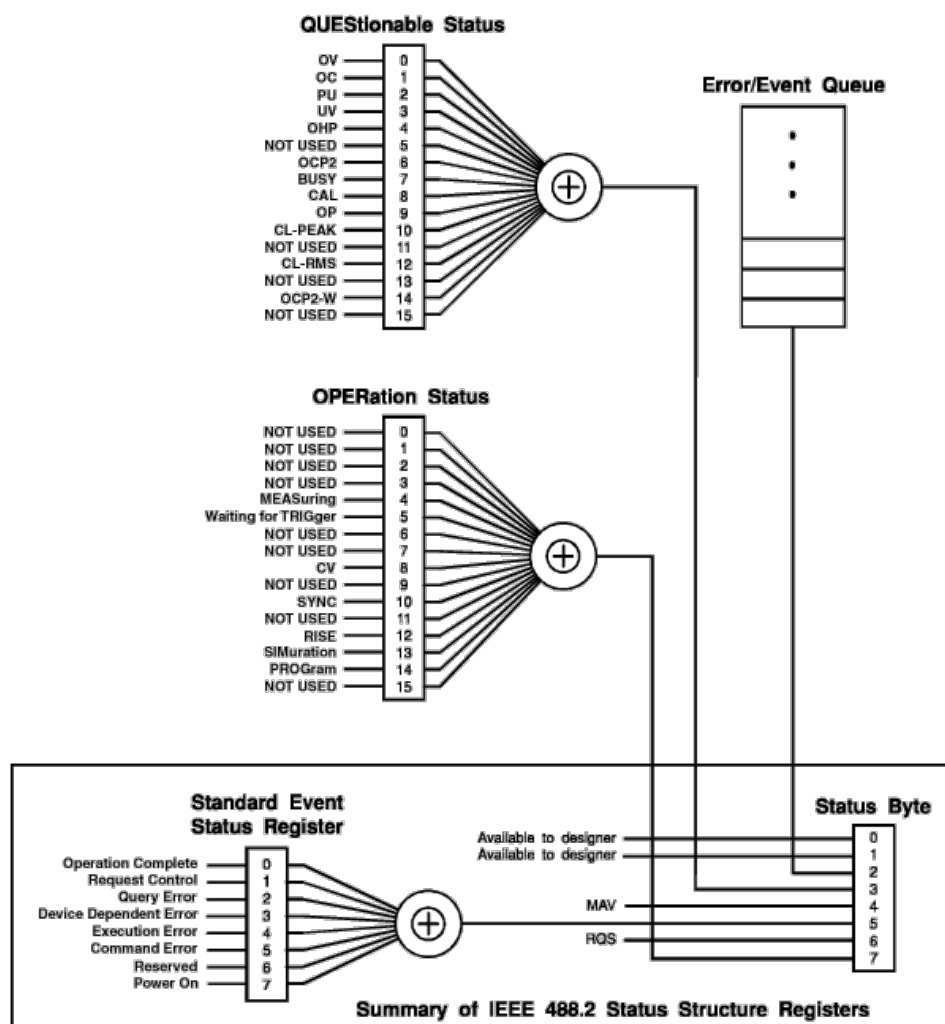
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Status report function (PCR-LE/PCR-LE2)

The SCPI status register structure is shown in the figure below. The character "+" represents the logical sum of the register bits.

-> [Status report function of single-phase, three-wire output/ three-phase output \(Optional\)](#)

1999 SCPI Syntax & Style



Partially changed SCPI Standard 1999.0 Volume1 fig.9

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State of Sequence

The three states (IDLE state, INITiated state, and WTG tate) are available in the sequence operation.

IDLE state

When the PCR-M/ PCR-LE/PCR-LE2 is turned on, all the trigger subsystems are in the IDLE state. In this state, the trigger subsystems ignore all triggers. Sending one of the following commands at any time also returns the trigger subsystems to the IDLE state.

The sequence does not start in the IDLE state, even when TRG is sent.

[:ABORt](#) (":INIT:CONT OFF;:ABOR" on the PCR-M if the auto continue mode is turned on)

[*RST](#)

[*RCL](#)

IEEE488.1 sdc(Selected Device Clear) or dcl(Device Clear)

INITiated state

If INIT is sent in the IDLE state, the trigger function starts and the PCR-M/ PCR-LE/PCR-LE2 enters the INITiated state.

If the trigger source is set to IMMEDIATE, the settings are changed immediately, or the measurement, power line abnormality simulation, or sequence starts immediately.

If the trigger source is set to BUS, the PCR-M/ PCR-LE/PCR-LE2 enters the WTG (Waiting for Trigger) state.

WTG (Waiting for Trigger) state

If a trigger is received in the WTG state, the settings are changed, or the measurement, power line abnormality simulation, or sequence starts.

Auto continue mode (TRANSIENT and ACQUIRE of PCR-M only)

If auto continue mode is turned on, measured data is automatically refreshed without having to send the INIT command each time. In normal cases, turn auto continue mode off (default).

If you are using the PCR-M series with firmware version 1.19 or earlier, see [here](#).

When the sequence operation auto continue mode is turned on

When the trigger source is set to IMMEDIATE, the settings are changed immediately, or the measurement, power line abnormality simulation, or sequence starts immediately. When the operation completes, the new change is made automatically, or the measurement, power line abnormality simulation, or sequence starts automatically. However, if auto continue mode is on, the MEASure, READ, and FETCh queries operate in the same manner. This means that sending multiple FETCh queries results in different measurement results, and simultaneity is lost.

When the trigger source is set to BUS, the PCR waits for a software trigger before making the change or starting the measurement, power line abnormality simulation, or sequence. When the operation has completed, the PCR waits for the next trigger.

The ABORt command to the measurement function is invalid, because the trigger subsystem automatically exits the IDLE state even if aborted. The *RST/*RCL command resets the continuous operation to off.

When the sequence operation auto continue mode is turned off

The change or measurement currently in progress continues unless ABOR is sent. The operation does not automatically continue to the new change or measurement.

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INIT:CONT:SEQ1

Sets the sequence operation auto continue mode of the sequence 1 group.

When the sequence operation auto continue mode is turned on

If the trigger source parameter is set to IMM, the change or measurement starts immediately. When the operation is complete, a new change or measurement automatically starts.

If the parameter is set to BUS, the change or measurement starts after receiving a software trigger. When the operation is complete, the PCR-M/ PCR-LE waits for the next trigger.

When the sequence operation auto continue mode is turned off

The change or measurement currently in progress continues unless ABOR is sent. The operation does not automatically continue to the new change or measurement.

Command

```
INITiate:CONTinuous:SEQuence1 {ON|OFF|1|0}
INITiate:CONTinuous:SEQuence1?
```

Parameter

Value ON(1) Auto continue mode on
OFF(0) Auto continue mode off (default)

For the setting that is applied when *RST is sent, see this [table](#)

Response**Response**

Returns the sequence operation auto continue mode setting in NR1 format in response to INIT:CONT:SEQ1?

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*RCL

Aborts the measurement operation and reads the contents stored in memory.
For the commands that are affected, see this [table](#).
When recalling a memory with the output turned on, a SCPI error (-102,"Operation denied while in OUTPut ON state") occurs if the output mode or voltage range switches.

Command

*RCL <NR1>

Parameter

Value	1	Memory A
	2	Memory B
	3	Memory C
	4 to 10	Memoru No. (When the optional board is installed)
A SCPI error (-222, "Data out of range") occurs if outside the range.		

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**About the values for single-phase, three-wire output and
three-phase output****Single-phase three-wire output (optional)****In DC mode**

the value is assigned to the U phase. The V phase is automatically set to the same amplitude as the U phase but with opposite polarity.

In AC+DC mode

Single-phase three-wire output

the value is assigned to the U phase. The V phase is automatically set to the same amplitude as the U phase but with opposite polarity.

Two-phase output

Sets the DC voltage of all phases at once.

Three-phase output (optional)

Sets the DC voltage of all phases at once.

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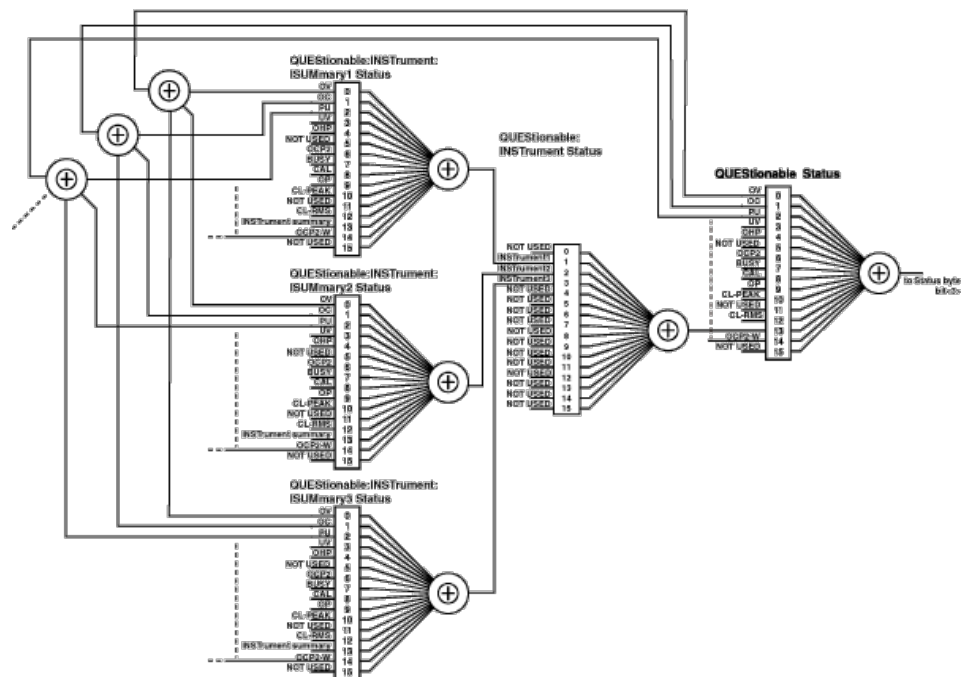
Register Structure

Status report function (PCR-LE/PCR-LE2)

The character "+" represents the logical sum of the register bits.

-> For more details, see the PDF.

OPERation Status, OPERation:INSTRument Status, OPERation:INSTRument:ISUMmary Status registers all operate the same way.



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