PW8001

HIOKI

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Communication Command
Instruction Manual

POWER ANALYZER

EN

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- ✓ This instruction manual explains the communication commands for Model PW8001 Power Analyzer.
- ✓ Before using PW8001, be sure to read the instruction manual of PW8001.
- ✓ For details regarding the command settings, please refer to “9 Connecting to a PC” in the instruction manual for Model PW8001.
- ✓ Although all reasonable care has been taken in the production of this instruction manual, should you find any points which are unclear or in error, please contact your local distributor or HIOKI’s website.(https://www.hioki.com/contact)

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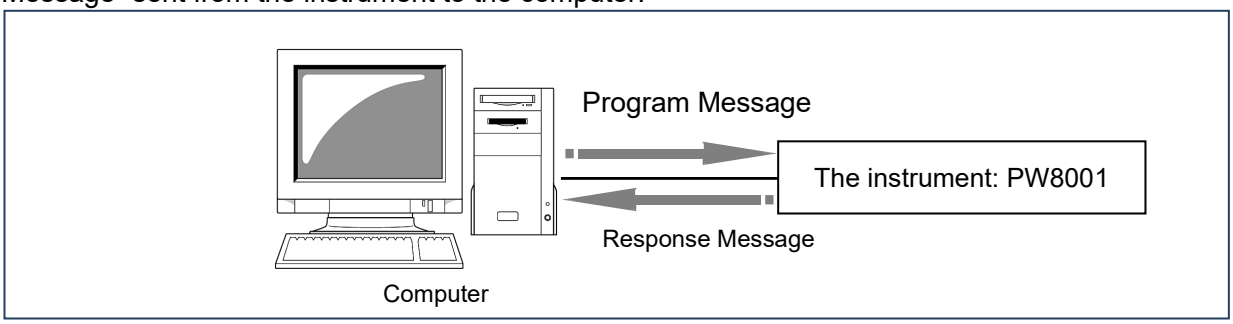
1 Communications

1.1 Communication Method

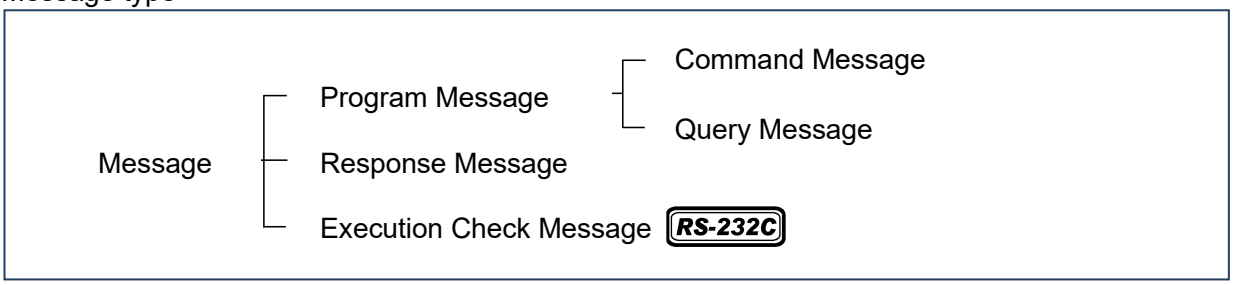
In this manual, PW8001 is represented as the instrument.

You can control the instrument by sending messages from a computer to the instrument via interfaces.

The messages include “Program Message” sent from a computer to the instrument and “Response Message” sent from the instrument to the computer.



Message type



Message type	Subject
Command Message	This message is used to control setting and reset for the instrument.
Query Message	This message is used to query operation result, measurement result and setting of the instrument.
Response Message	This message is sent from the instrument to the computer. This message is created when the instrument receives a query message and checks the syntax.
Execution Check Message	This message is used to synchronize the instrument with the computer.

Collective term of Command Message and Query Message is “Command”.

The SCPI language is used for the commands.

The instrument uses **TCP/IP port 23** as a listening port for the communication commands. LAN

Reference

- For the commands containing data, enter the data in a specified format.
- During communications via GPIB, the instrument enters the remote mode and the [REMOTE/LOCAL] key of the instrument will light.
- When the instrument is in the remote mode, the operational keys other than the [REMOTE/LOCAL] key will be disabled.

1.2 Message Format

1.2.1 Command Message

This message is used to control setting and reset for the instrument.

Example: Voltage range setting message

:VOLTAGE1:RANGE 300

Header Space Data (parameter)

1.2.2 Query Message

This message is used to query operation result, measurement result and setting of the instrument.

Example: a message querying the present voltage range

:VOLTAGE1:RANGE?

Header Question mark

1.2.3 Response Message

This message is sent from the instrument to the computer. A response message is created when the instrument receives a query message and checks the syntax. You can select the presence of a header with a **:HEADer** command.

Query Message		**:VOLTAGE1:RANGE?**	What is the voltage range for CH1?
Response Message	With a header	**:VOLTAGE1:RANGE 300**	Voltage range for CH1 is 300V.
	Without a header	**300**	

Reference

- If an error occurs when a query message is received, no response message is generated for that query.

1.2.4 Command Syntax

For the command names, the character strings are chosen so that they can easily be associated with functions to be executed. You can send the commands in their shortened form. The original command name and its abbreviation are referred to as the “long form” and the “short form”, respectively. This manual indicates the short form in uppercase letters and the remaining long form in lowercase letters. The instrument recognizes the commands indicated in either type of letters. The long form in uppercase letters is used for the response messages from the instrument.

HEADer?	OK	Symbols in this manual
HEADER?	OK	Long form
HEAD?	OK	Short form
HEADE?	Error	
HEA?	Error	

1.2.5 Command Program Header

The commands require a header. There are three types of headers: Simple, Compound, and Standard.

Command type	Example	Description
Simple command type	**:HEADer ON**	Header consisting of a word
Compound command type	**:VOLTage1:RANGe 300**	Headers consisting of multiple headers of simple command type separated by colons ":".
Standard command type	***RST**	Headers starting with an asterisk "*" indicating that it is a standard command defined by IEEE 488.2.

1.2.6 Query Program Header

The query messages are used to query the instrument about the results of operations, measurement results, and the current state of instrument settings.

As shown in the following examples, a query is formed by appending a question mark "?" after a program header.

Command type	Example	Description
Simple command type	**:HEADer?**	Header consisting of a word
Compound command type	**:VOLTage1:RANGe?**	Headers consisting of multiple simple command type headers separated by colons ":".
Standard command type	***IDN?**	Headers starting with an asterisk "*" indicating that it is a standard command defined by IEEE 488.2.

1.2.7 Message Terminators

Message terminators show an end of one message transfer.

The instrument recognizes the following message terminators (delimiters):

Interface	Message terminator
GP-IB RS-232C LAN	LF CR+LF

The following terminator is used for the response messages.

Interface	Message terminator
GP-IB RS-232C LAN	LF CR+LF

1.2.8 Separator

Separator type	Description
Message unit Separator	The compound messages can be written in one line by connecting them via semicolons ";". If one command contains an error, all subsequent messages up to the next terminator will be ignored.

:VOLTage1:RANGe 300;*IDN?

Header separator	In a message consisting of a header and data, the header is separated from the data by a space (blank).

:VOLTage1:RANGe 300

Data separator	In a message containing multiple data items, the data items are separated from one another by a comma ",".

:CLOCk 2021,12,01,12,00,00

1.2.9 Data

The instrument uses the character data and the decimal numerical data as the data depending on the commands.

<table>
<tr><th>Data</th><th colspan="3">Description</th></tr>
<tr><td rowspan="2">Character data</td><td colspan="3">The character data consists of alphabetical and numerical characters. The instrument recognizes the character data in both uppercase and lowercase letters. The uppercase letters are used for the response messages from the instrument.
The character data consists of 8-bit ASCII characters.</td></tr>
<tr><td colspan="3">:HEAD ON</td></tr>
<tr><td rowspan="4">Decimal numeric data</td><td colspan="3">Three formats are used for numeric data: NR1, NR2 and NR3 (NRf format). The instrument recognizes the data of both signed and unsigned numerical values. The data of unsigned numerical values are handled as positive numerical values. In addition, if the smallest digit of a numerical value is smaller than the resolution setting of the target, the smallest digit is rounded off or rounded down.
The instrument recognizes numerical data in the NRf format. The response data is sent in a format specified for each command.</td></tr>
<tr><td>NR1</td><td>Integer data</td><td>Example: +12, −23, 34</td></tr>
<tr><td>NR2</td><td>Decimal data</td><td>Example: +1.23, −23.45, 3.456</td></tr>
<tr><td>NR3</td><td>Floating-point exponential representation data</td><td>Example: +1.0E−2, −2.3E+4</td></tr>
</table>

Reference

- The instrument does not completely support IEEE 488.2. Use data as shown in the Command Reference in this manual whenever possible.
- Be careful not to overflow the input buffer or the output queue with a single command.

1.2.10 Compound Command Header Omission

If several commands having a common header are combined to form a compound command, the common portion can be omitted after its initial occurrence when the commands are written together in sequence. This common portion is called the “current path” and subsequent commands are analysed presuming that the current path is omitted until this current path is cleared.

This usage of the current path is shown in the following example:

	Example
Full expression	**:VOLTage1:AUTO OFF;:VOLTage1:RANGe 300**
Compacted expression	**:VOLTage1:AUTO OFF;RANGe 300**

The portion underlined becomes the current path. You can omit the portion in the next command.
The current path is cleared when a message terminator is detected, by a reset with key operations, when a colon “:” is detected at the start of a command, or when the power is turned ON.
Messages of the standard command type can be executed regardless of the current path. They have no effect upon the current path.
A colon “:” is not required at the start of the simple and compound command type headers. However, to avoid confusion with abbreviated forms and malfunction of the instrument, we recommend placing a colon “:” at the start of a command.

1.3 Output Queue and Input Buffer

1.3.1 Output Queue

The output queue is used to temporarily store the response messages in the instrument.

The response messages stored in the output queue are cleared after the data is read by the computer. In addition, the output queue is cleared in the following situations:

Interface	
GP-IB	Power on Query error
RS-232C LAN	Power on

The output queue of the instrument has a capacity of 400 KB. If response messages overflow this capacity, a query error is generated and the output buffer is cleared.

1.3.2 Input Buffer

The input buffer is used to temporarily store the received data in the instrument.

The input buffer has a capacity of 400 KB. The instrument cannot accept data larger than 400 KB.

Reference

- Ensure that the length of a single line never exceeds 400 KB.

1.4 Status Byte Register

1.4.1 Status Byte Register (STB)

Status Byte Register (STB) is an 8-bit register in which information for event register and output queue is set. Service Request Enable Register (SRER) allows you to enable necessary bits of the STB. When any STB bit among the enabled bits has switched from “0” to “1”, the MSS bit becomes “1”. The MSS bit can be read with an ***STB?** query. It is not cleared until the event is cleared with a ***CLS** command or other means.

Bit 7	-	Unused
Bit 6	MSS	This represents the logical sum of the other bits of the STB.
Bit 5	ESB	Standard event summery bit This is the logical sum of the Standard Event Status Register (SESR).
Bit 4	MAV	Message available Indicates that a message is present in the output queue.
Bit 3	ESB3	Device-specific event summery bit 3 This is the logical sum of Device-specific Event Status Register 3 (ESR3).
Bit 2	ESB2	Device-specific event summery bit 2 This is the logical sum of Device-specific Event Status Register 2 (ESR2).
Bit 1	ESB1	Device-specific event summery bit 1 This is the logical sum of Device-specific Event Status Register 1 (ESR1).
Bit 0	ESB0	Device-specific event summery bit 0 This is the logical sum of Device-specific Event Status Register 0 (ESR0).

1.4.2 Service Request Enable Register (SRER)

Setting a bit of the Service Request Enable Register (SRER) to “1” enables the corresponding bit of the Status Byte Register (STB).

1.5 Event Registers

1.5.1 Standard Event Status Register (SESR)

The Standard Event Status Register (SESR) is an 8-bit register.

Bit 7	PON	**Power-On Flag** Set to “1” when the power is turned on, or upon recovery from an outage.
Bit 6	URQ	**User Request** Unused
Bit 5	CME	**Command Error (The command to the message terminator is ignored.)** This bit is set to “1” when a received command contains a syntax or semantic error: • Program header error • Incorrect number of data parameters • Invalid parameter format • Received a command not supported by the instrument
Bit 4	EXE	**Execution Error** This bit is set to “1” when a received command cannot be executed for the following reasons: • The specified data value is outside of the set range. • The specified data cannot be set. • Execution is prevented by another operation being performed.
Bit 3	DDE	**Device-dependent Error** This bit is set to “1” when a command cannot be executed due to some reason other than a command error, a query error, or an execution error. • Internal error • Received a command related to unimplemented options.
Bit 2	QYE	**Query Error (the output queue is cleared)** This bit is set to “1” when a query error is detected by the output queue control. • When the data overflows the output queue. • The next command is received while there is data in the output queue.
Bit 1	RQC	**Control Request** (Unused)
Bit 0	OPC	**Operation Complete** This bit is set to “1” in response to an ***OPC** command. It indicates the completion of operations of all messages up to the ***OPC** command.

The content of the SESR is cleared in the following situations:

• When the instrument is powered on.

• When a ***CLS** command is executed.

• When an ***ESR?** query (a query for SESR) is executed.

Reference

- Beeps when a communication error occurs if the beep function is enabled for this instrument.

1.5.2 Standard Event Status Enable Register (SESER)

Setting any bit of the Standard Event Status Enable Register (SESER) to “1” enables access to the corresponding bit of the Standard Event Status Register (SESR).

Logical sum of SESR and SESER

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
SESR	PON	URQ	CME	EXE	DDE	QYE	RQC	OPC
Logical Sum	&	&	&	&	&	&	&	&
SESER	PON	URQ	CME	EXE	DDE	QYE	RQC	OPC

When any SESR bit enabled by SESER is switched from “0” to “1”, the ESB bit of the Status Byte Register (STB) becomes “1”.

	Bit 5							
Status Byte Register (STB)			ESB					

1.5.3 Device-specific Event Status Register (ESR0, ESR1, ESR2, ESR3)

The instrument provides four Device-specific Event Status Registers (ESR0 through ESR3) for controlling events. These registers are an 8-bit register.

Device-specific Event Status Register 0 (ESR0)		
Bit 7	DS	Data update
Bit 6	UCU	Calculation unavailable (e.g., the data is invalid because the measurement is immediately after a range change)
Bit 5	ZP	Power calculation (synchronized source) with forced zero-cross
Bit 4	ZI	Current frequency with forced zero-cross
Bit 3	ZU	Voltage frequency with forced zero-cross
Bit 2	DP	Power calculation (synchronized source) without data update
Bit 1	DI	Current frequency without data update
Bit 0	DU	Voltage frequency without data update

Device-specific Event Status Register 1 (ESR1)		
Bit 7	PU8	CH8 voltage peak exceeded
Bit 6	PU7	CH7 voltage peak exceeded
Bit 5	PU6	CH6 voltage peak exceeded
Bit 4	PU5	CH5 voltage peak exceeded
Bit 3	PU4	CH4 voltage peak exceeded
Bit 2	PU3	CH3 voltage peak exceeded
Bit 1	PU2	CH2 voltage peak exceeded
Bit 0	PU1	CH1 voltage peak exceeded

Device-specific Event Status Register 2 (ESR2)		
Bit 7	PI8	CH8 current peak exceeded
Bit 6	PI7	CH7 current peak exceeded
Bit 5	PI6	CH6 current peak exceeded
Bit 4	PI5	CH5 current peak exceeded
Bit 3	PI4	CH4 current peak exceeded
Bit 2	PI3	CH3 current peak exceeded
Bit 1	PI2	CH2 current peak exceeded
Bit 0	PI1	CH1 current peak exceeded

Device-specific Event Status Register 3 (ESR3)		
Bit 7	-	Unused
Bit 6	-	Unused
Bit 5	-	Unused
Bit 4	-	Unused
Bit 3	RG	CHG overload
Bit 2	RE	CHE overload
Bit 1	RC	CHC overload
Bit 0	RA	CHA overload

The contents of ESR0 through ESR3 are cleared in the following situations:

• When the instrument is powered on.

• When a ***CLS** command is executed.

• When any of **:ESR0?**, **:ESR1?**, **:ESR2?**, or **:ESR3?** queries (queries for ESR0 through ESR3) is executed.

The contents of ESR1 and ESR2 are cleared in the following situations:

• When settings are changed.

1.5.4 Device-specific Event Status Enable Registers (SESER0, SESER1, SESER2 and SESER3)

Setting any bit of the Device-specific Event Status Enable Registers (SESER0 to SESER3) to “1” enables the corresponding bit of the Device-specific Event Status Registers (ESR0 to ESR3). (Similar policy to ones for SESER.)

Example: Logical sum of ESR0 and ESER0

ESR0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Logical Sum	&	&	&	&	&	&	&	&
ESER0	Valid setting	Valid setting	Valid setting	Valid setting	Valid setting	Valid setting	Valid setting	Valid setting

When any ESR* bit enabled by ESER* is switched from “0” to “1”, the ESB* bit of the Status Byte Register (STB) becomes “1”. (“*” takes a numerical value from 0 to 3)

• ESR0: ESB0 bit (bit 0) of the Status Byte Register is “1”.

• ESR1: ESB1 bit (bit 1) of the Status Byte Register is “1”.

• ESR2: ESB2 bit (bit 2) of the Status Byte Register is “1”.

• ESR3: ESB3 bit (bit 3) of the Status Byte Register is “1”.

					Bit 3	Bit 2	Bit 1	Bit 0
Status Byte Register (STB)					ESB3	ESB2	ESB1	ESB0

1.5.5 Queries and Settings for Registers

Register	Abbreviation	Query	Setting
Status Byte Register	STB	***STB?**	-
Service Request Enable Register	SRER	***SRE?**	***SRE**
Standard Event Status Register	SESR	***ESR?**	-
Standard Event Status Enable Register	SESER	***ESE?**	***ESE**
Device-specific Event Status Register 0	ESR0	**:ESR0?**	-
Device-specific Event Status Enable Register 0	ESER0	**:ESE0?**	**:ESE0**
Device-specific Event Status Register 1	ESR1	**:ESR1?**	-
Device-specific Event Status Enable Register 1	ESER1	**:ESE1?**	**:ESE1**
Device-specific Event Status Register 2	ESR2	**:ESR2?**	-
Device-specific Event Status Enable Register 2	ESER2	**:ESE2?**	**:ESE2**
Device-specific Event Status Register 3	ESR3	**:ESR3?**	-
Device-specific Event Status Enable Register 3	ESER3	**:ESE3?**	**:ESE3**

1.5.6 GP-IB Command

Since the instrument does not support the interface function, the following commands supported by the previous models cannot be used.

Command
GTL, **LLO**, **DCL**, **SDC**, **GET**

1.6 Initialization Items

✓: Factory initialization. △: Partial initialization. –: No initialization.

Item	Factory default	Power on	System Reset	*RST Command	*CLS Command	Device Clear
GP-IB address	1	–	–	–	–	–
RS-232C setting	115200	–	–	–	–	–
LAN setting	*1	–	–	–	–	–
Language	*1	–	–	–	–	–
Instrument setting other than the above	*1	–	✓	✓	–	–
Output queue	Clear	✓	–	–	–	✓
Input buffer	Clear	✓	–	–	–	✓
Status Byte Register	0	✓	–	–	△*3	△*4
Standard Event Status Register	0	△*2	–	–	✓	–
Device-specific Event Status Register	0	✓	–	–	✓	–
Enable Register	0	✓	–	–	–	–
Current path	Clear	✓	–	–	–	✓
Presence of header	OFF	✓	–	–	–	–
Response message separator	Semicolon	✓	–	–	–	–
Saved data item	0	–	✓	✓	–	–
Communication output data item	0	✓	–	–	–	–

Reference

*1: For details, refer to the PW8001 instruction manual.

*2: All the bits other than Power-ON Flag (bit 7: PON) are cleared.

*3: All the bits other than Message Available (bit 4: MAV) are cleared.

*4: Only Message Available (bit 4: MAV) is cleared. (As output queue is cleared.)

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3 Command Reference

3.1 Standard Command

Clearing Event Status Register and Status Byte Register(STB) (Except Output Queue)

Syntax
Command ***CLS**

Description
Command Clears Standard Event Status Register (SESR) and Device-specific Event Status Registers (ESR0 through ESR3). The Status Byte Register (STB) bits corresponding to these registers are also cleared.

Reference
- The output queue, enable registers, and MAV of the STB (bit 4) are not affected by this command.

Setting and Querying Standard Event Status Enable Register (SESER)

Syntax
Command ***ESE <0 to 255(NR1)>**
Query ***ESE?**
Response <0 to 255(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PON	URQ	CME	EXE	DDE	QYE	RQC	OPC

Description
Command Sets a mask pattern for the Standard Event Status Enable Register (SESER).
Query Returns the content of the SESER set with an ***ESE** command in a numerical NR1 value.

Example
Command ***ESE 36**
Sets SESER bits 5 and 2 to “1”.
Query ***ESE?**
Response (HEADER ON) *ESE 36
(HEADER OFF) 36

Reference
- The initial value (at power-ON) is “0”.
- URQ (bit 6) and RQC (bit 1) are not used by the instrument. Therefore, these events will not be triggered even if they are set to “1”.

Querying and Clearing Standard Event Status Register (SESR)

Syntax
Query ***ESR?**
Response <0 to 255(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PON	URQ	CME	EXE	DDE	QYE	RQC	OPC

Description
Query Returns the content of the Standard Event Status Register (SESR) in a numerical NR1 value and clears the content.

Example
Query ***ESR?**
Response 32

Reference
- The response message has no header.

Querying Instrument's ID (Identification Code)

Syntax	Query	***IDN?**
	Response	<HIOKI>, <Model name>, <Serial No.>, <Software version>
Description	Query	Returns <HIOKI>, <Model name>, <Serial No.> and <Software version> in a string.
Example	Query	***IDN?**
	Response	HIOKI,PW8001-13,012345678,V1.00
Reference		• The response message has no header.

Setting OPC bit of Standard Event Status Register (SESR) after All Running Operations Completed

Syntax	Command	***OPC**
Description	Command	After the command before ***OPC** command from the commands sent is completed, OPC bit (bit 0) of Standard Event Status Register (SESR) is set.
Example	Command	**:MEAS?;*OPC**
		Sets the OPC bit of the SESR after the **:MEAS?** query finishes processing.
Reference		• The response message has no header.

Setting "1" to Output Queue after All Operations Running Completed

Syntax	Query	***OPC?**
	Response	1
Description	Query	After the command before ***OPC** command from the commands sent is completed, "1" is stored in the output queue.
Example	Query	**:DEMA;*OPC?**
		"1" is stored in the output queue after the execution of zero adjustment is completed.
Reference		• The response message has no header.

Querying Instrument's Options

Syntax

Query ***OPT?**

Response <CH1 Module model number>, <CH1 Sensor type>, <CH2 Module model number>, <CH2 Sensor type>, <CH3 Module model number>, <CH3 Sensor type>, <CH4 Module model number>, <CH4 Sensor type>, <CH5 Module model number>, <CH5 Sensor type>, <CH6 Module model number>, <CH6 Sensor type>, <CH7 Module model number>, <CH7 Sensor type>, <CH8 Module model number>, <CH8 Sensor type>, <Motor option>, <D/A output or CAN output option>, <Optical synchronization option>

Module model number	U7001, U7005, NONE
Sensor type	Sensor model number, sensor rating information, PROBE2
Motor option	MOTOR, NONE
D/A output option CAN output option	DA, CAN, NONE
Optical synchronization option	OPTICAL, NONE

Description

Query Returns the options implemented or mounted on the instrument in a character string.

Example

Query ***OPT?**

Response U7005,50A_ACDC,U7005,50A_ACDC,U7005,50A_ACDC,U7005,50A_ACDC,U7001,PROBE2,U7001,PROBE2,U7001,PROBE2,U7001,PROBE2,MOTOR,NONE,OPTICAL

Reference

- The response message has no header.
- If Probe1 is selected and no sensor is mounted, the sensor type becomes "50A_ACDC".
- If the corresponding module or option is not implemented, NONE is returned.

Initializing Instrument

Syntax

Command ***RST**

Description

Command Executes the system reset and then moves to the wiring selection screen.

Reference

- For the items initialized with the system reset, refer to "6.3 Default Settings" in the PW8001 instruction manual.

Setting and Querying Service Request Status Enable Register (SRER)

Syntax

Command ***SRE <0 to 255 (NR1)>**

Query ***SRE?**

Response <0 to 255(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	ESB	MAV	ESB3	ESB2	ESB1	ESB0

Description

Command Sets a mask pattern for the Service Request Enable Register (SRER) with a numerical value.

Query Returns the content of the SRER set with an ***SRE** command in a numerical NR1 value.

Example

Command ***SRE 33**

Sets SRER bits 5 and 0.

Query ***SRE?**

Response (HEADER ON) *SRE 33

(HEADER OFF) 33

Reference

- The data is initialized to “0” at power-ON.
- The value of unused bits (bit 7, 6) is always set to “0”.

Querying Status Byte Register (STB)

Syntax

Query ***STB?**

Response <0 to 127(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	MSS	ESB	MAV	ESB3	ESB2	ESB1	ESB0

Description

Query Returns the content of the Status Byte Register (STB) in a numerical NR1 value.

Example

Query ***STB?**

Response 16

Reference

- The response message has no header.

Sampling Request

Syntax

Command ***TRG**

Description

Command Performs a one-time measurement in the hold state and the peak hold state.

Example

Command ***TRG**

Reference

Executing Self-test and Querying Result

Syntax

Query ***TST?**

Response PASS Normal

FAIL Error

Description

Query Returns the result of the self-test at the time of start-up in a character string.

Example

Query ***TST?**

Response PASS

Reference

- The response message has no header.

Executing the next command once measurement data update processing is complete.

Syntax	Command	***WAI**
Description	Command	No commands after ***WAI** are run until the next measurement data update is completed.
Example	Command	***WAI;:MEAS? Urms1;*WAI;:MEAS? Urms1** Queries measured data for every measurement data update.
Reference		• When combining ***WAI** and **MEAS?**, input the ***WAI** command before querying the measurement data. Set the number of measurement parameters such that the corresponding number of response characters can be received within the measurement data refresh rate time. • When the data refresh rate is 10ms, the measured data refresh rate is 10ms. • When the data refresh rate is 50ms, the measured data refresh rate is 50ms. • When the data refresh rate is 200ms, the measured data refresh rate is 200ms.

3.2 Device-specific Commands

3.2.1 Device-specific Event Status Register

Setting and Querying Device-specific Event Status Enable Register 0 (ESER0)

Syntax

Command **:ESE0 <0 to 255(NR1)>**

Query **:ESE0?**

Response <0 to 255(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DS	UCU	ZP	ZI	ZU	DP	DI	DU

Bit 7	DS	Data update
Bit 6	UCU	Calculation unavailable (e.g., the data is invalid because the measurement is immediately after a range change)
Bit 5	ZP	Power calculation (synchronized source) with forced zero-cross
Bit 4	ZI	Current frequency with forced zero-cross
Bit 3	ZU	Voltage frequency with forced zero-cross
Bit 2	DP	Power calculation (synchronized source) without data update
Bit 1	DI	Current frequency without data update
Bit 0	DU	Voltage frequency without data update

Description

Command Sets the enable setting of Device-specific Event Status Register 0 (ESR0) to Device-specific Event Status Enable Register 0 (ESER0).

Query Returns the content of ESR0 set with the **:ESE0** command in a numerical NR1 value.

Example

Command **:ESE0 56**

Sets bits 5, 4 and 3 of ESER0.

Query **:ESE0?**

Response (HEADER ON) :ESE0 56

(HEADER OFF) 56

Reference

- The data is initialized to “0” at power-ON.

Setting and Querying Device-specific Event Status Enable Register 1 (ESER1)

Syntax

Command **:ESE1 <0 to 255(NR1)>**

Query **:ESE1?**

Response <0 to 255(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PU8	PU7	PU6	PU5	PU4	PU3	PU2	PU1

Bit 7	PU8	CH8 voltage peak exceeded
Bit 6	PU7	CH7 voltage peak exceeded
Bit 5	PU6	CH6 voltage peak exceeded
Bit 4	PU5	CH5 voltage peak exceeded
Bit 3	PU4	CH4 voltage peak exceeded
Bit 2	PU3	CH3 voltage peak exceeded
Bit 1	PU2	CH2 voltage peak exceeded
Bit 0	PU1	CH1 voltage peak exceeded

Description

Command Sets enable setting of Device-specific Event Status Register 1 (ESR1) to Device-specific Event Status Enable Register 1 (ESER1).

Query Returns the content of ESR1 set with an **:ESE1** command in a numerical NR1 value.

Example

Command **:ESE1 63**

Sets bits 5, 4, 3, 2, 1 and 0 of ESER1.

Query **:ESE1?**

Response (HEADER ON) :ESE1 63

(HEADER OFF) 63

Reference

- The data is initialized to “0” at power-ON.

Setting and Querying Device-specific Event Status Enable Register 2 (ESER2)

Syntax

Command **:ESE2 <0 to 255(NR1)>**

Query **:ESE2?**

Response <0 to 255(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PI8	PI7	PI6	PI5	PI4	PI3	PI2	PI1

Bit 7	PI8	CH8 current peak exceeded
Bit 6	PI7	CH7 current peak exceeded
Bit 5	PI6	CH6 current peak exceeded
Bit 4	PI5	CH5 current peak exceeded
Bit 3	PI4	CH4 current peak exceeded
Bit 2	PI3	CH3 current peak exceeded
Bit 1	PI2	CH2 current peak exceeded
Bit 0	PI1	CH1 current peak exceeded

Description

Command Sets enable setting of Device-specific Event Status Register 2 (ESR2) to Device-specific Event Status Enable Register 2 (ESER2).

Query Returns the content of ESR2 set with an **:ESE2** command in a numerical NR1 value.

Example

Command **:ESE2 63**

Sets bits 5, 4, 3, 2, 1 and 0 of ESER2.

Query **:ESE2?**

Response (HEADER ON) :ESE2 63

(HEADER OFF) 63

Reference

- The data is initialized to “0” at power-ON.

Setting and Querying Device-specific Event Status Enable Register 3 (ESER3)

Syntax

Command **:ESE3 <0 to 255(NR1)>**

Query **:ESE3?**

Response <0 to 85(NR1)>

128	64	32	16	8	4	2	1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	RG	RE	RC	RA

Bit 7	-	Unused
Bit 6	-	Unused
Bit 5	-	Unused
Bit 4	-	Unused
Bit 3	RG	CHG overload
Bit 2	RE	CHE overload
Bit 1	RC	CHC overload
Bit 0	RA	CHA overload

Description

Command: Sets enable setting of Device-specific Event Status Register 3 (ESR3) to Device-specific Event Status Enable Register 3 (ESER3).

Query: Returns the content of ESR3 set with an **:ESE3** command in a numerical NR1 value.

Example

Command **:ESE3 5**

Sets bits 2 and 0 to ESER3.

Query **:ESE3?**

Response (HEADER ON) :ESE3 5

(HEADER OFF) 5

Reference

- The data is initialized to “0” at power-ON.

Querying Device-specific Event Status Registers 0, 1, 2, 3 (ESR0 to ESR3)

Syntax

Query **:ESR0?**
:ESR1?
:ESR2?
:ESR3?

Response <0 to 255(NR1)>

Description

Query: Returns the content of the Device-specific Event Status Register (ESR0 to ESR3) in a numerical NR1 value.

Example

Query **:ESR3?**

Response 5

Reference

- The response message has no header.
- When **ESR0?** is executed, the content of ESR0 is cleared.
- When **ESR1?** is executed, the content of ESR1 is cleared.
- When **ESR2?** is executed, the content of ESR2 is cleared.
- When **ESR3?** is executed, the content of ESR3 is cleared.

3.2.2 Simple Command

Setting and Querying Beep Tone

Syntax

Command	**:BEEPer <ON/OFF(String)>**	
Query	**:BEEPer?**	
Response	ON	Beep ON
	OFF	Beep OFF

Description

Command	Sets a beep tone.
Query	Returns setting for beep tone in a string.

Example

Command **:BEEP ON**

Sets beep ON.

Query **:BEEP?**

Response (HEADER ON) :BEEPER ON

(HEADER OFF) ON

Reference

Executing and Querying Zero Adjustment

Syntax

Command	**:DEMAg**		
Query	**:DEMAg?**		
Response	<Result>		
	Result	OK	Normal complete
		BUSY	Executing the zero adjustment of the voltage current channel or motor input channel
		YET	Not executed yet before start
		ERROR	Zero adjustment failure

Description

Command	Executes the zero adjustment of the voltage current channel of all channels and the demagnetization of the current sensor.
Query	Returns the result of zero adjustment in a string.

Example

Command **:DEMA**

Executes the zero adjustment of all channels and the demagnetization of the current sensor.

Query **:DEMA?**

Response (HEADER ON) :DEMAG OK

(HEADER OFF) OK

Reference

- It takes 30 seconds or more to complete the execution of the zero adjustment. During this period, some of the commands may result in an execution error.
- If the zero adjustment of the voltage current channel is already being executed, an execution error occurs when the zero adjustment of the motor channel is being executed.
- Send a command combined with ***OPC?**, such as **:DEMAG;*OPC?**, and send the next command after a response to ***OPC?** is returned. The response to ***OPC?** shows that DEMAg has been completed.

Setting and Querying Header Availability for Response Message

Syntax

Command **:HEADer <ON/OFF(String)>**

Query **:HEADer?**

Response ON Attaches a header to a response message.

OFF Attaches no header to a response message.

Description

Command Sets header availability for a response message.

Query Returns header availability setting for a response message in a string.

Example

Command **:HEAD ON**

Sets the response message header to ON.

Query **:HEAD?**

Response (HEADER ON) :HEADER ON

(HEADER OFF) OFF

Reference

- The header setting is initialized to OFF at power-ON.

Setting and Querying Hold State

Syntax

Command **:HOLD <OFF/ON/PEAK(String)>**

Query **:HOLD?**

Response OFF Hold OFF

ON Hold ON

PEAK Peak hold ON

Description

Command Sets hold state.

Query Returns hold state in a string.

Example

Command **:HOLD ON**

Sets the hold state to ON.

Query **:HOLD?**

Response (HEADER ON) :HOLD ON

(HEADER OFF) ON

Reference

- Use ***TRG** command in the hold state or the peak hold state to update the data.

Querying Key Lock

Syntax

Query **:KEYLock?**

Response ON Key lock ON

OFF Key lock OFF

Description

Query Returns key lock setting in a string.

Example

Query **:KEYL?**

Response (HEADER ON) :KEYLOCK ON

(HEADER OFF) ON

Reference

Setting and Querying Instrument Language

Syntax

Command :LANGuage <Language(String)>

Query :LANGuage?

Response <Language>

Language	JAPANESE, ENGLISH, CHINESE

Description

Command Sets a language used for the instrument.

Query Returns language setting used for the instrument.

Example

Command :LANG ENGLISH

Set English as the language to be used for display.

Query :LANG?

Response (HEADER ON) :LANGUAGE ENGLISH

(HEADER OFF) ENGLISH

Reference

Setting and Querying Equation for Three-phase Power

Syntax

Command :MATH <1/2/3(NR1)>

Query :MATH?

Response

1	TYPE1: Compatible with the respective TYPE1 of PW3390, 3193, and 3390
2	TYPE2: Compatible with the respective TYPE2 of 3192 and 3193
3	TYPE3: The sign of the active power is added to the absolute values of the power factor and power phase angle of TYPE1

Description

Command Sets equations for apparent power, reactive power, and power factor of three-phase power.

Query Returns the setting of equations for apparent power, reactive power, and power factor of three-phase power in a numerical NR1 value.

Example

Command :MATH 1

Set the equations for three-phase power to TYPE1.

Query :MATH?

Response (HEADER ON) :MATH 1

(HEADER OFF) 1

Reference

- TYPE1, TYPE2, and TYPE3 are compatible with TYPE of the equations for PW6001.

Setting and Querying Measurement Mode

Syntax

Command :MODE <WIDE/IEC(String)>

Query :MODE?

Response

WIDE	WideBand Mode
IEC	IEC Mode

Description

Command Sets Measurement Mode.

Query Returns Measurement Mode setting in a string.

Example

Command :MODE WIDE

Set the MeasurementMode toWideBand Mode.

Query :MODE?

Response (HEADER ON) :MODE WIDE

(HEADER OFF) WIDE

Reference

Setting and Querying Data Refresh Rate

Syntax

Command :RATE <Refresh rate(String)>

Query :RATE?

Response <Refresh rate>

Refresh rate 1ms, 10ms, 50ms, 200ms

Description

Command Sets a data refresh rate.

Query Returns data refresh rate setting in a string.

Example

Command :RATE 10ms

Set the data refresh rate to 10ms.

Query :RATE?

Response (HEADER ON) :RATE 10ms

(HEADER OFF) 10ms

Reference

Executing Shutdown

Syntax

Command :SHUTDOWN

Description

Command Shut down the unit.

To completely turn off the power, the power key must be operated on the unit.

Example

Command :SHUTDOWN

Reference

Setting and Querying Synchronization Source

Syntax

Command :SOURce[CH] <Synchronization source(String)>

Query :SOURce[CH]?

Response <Synchronization source>

Synchronization source U1, U2, U3, U4, U5, U6, U7, U8, I1, I2, I3, I4, I5, I6, I7, I8, DC, Ext1, Ext2, Ext3, Ext4, Zph1, Zph3, CHB, CHD, CHF, CHH

Description

Command Sets the synchronization source. [CH]: 1 to 8.

Query Returns the synchronization source setting in a character string.

Example

Command :SOUR1 U1

Sets the synchronization source to voltage CH1.

Query :SOUR1?

Response (HEADER ON) :SOURCE1 U1

(HEADER OFF) U1

Reference

- The settings of other channels included in the combination of measurement lines are also changed.
- Depending on the availability of the motor analysis option and the motor wiring state, the items related to the motor may not be available for the synchronization source setting.

Setting and Querying Zero Suppression

Syntax

Command :ZEROsp <Level(String)>

Query :ZEROsp?

Response Level OFF, 0.5%

Description

Command Sets zero suppression mode.

Query Returns setting for zero suppression in a string.

Example

Command :ZERO OFF

Sets the zero suppression level to OFF

Query :ZERO?

Response (HEADER ON) :ZEROSP OFF

(HEADER OFF) OFF

Reference

3.2.3 D/A Output Option

Querying D/A Output Option

Syntax

Query :AOUT:EXISt?

Response Y D/A output option available

N D/A output option unavailable

Description

Query Returns availability of the D/A output option in a character string.

Example

Query :AOUT:EXIS?

Response (HEADER ON) :AOUT:EXIST Y

(HEADER OFF) Y

Reference

Setting and Querying Full-scale D/A Integration

Syntax

Command :AOUT:INTEGrate <Scale data(String)>

Query :AOUT:INTEGrate?

Response <Scale data>

Scale data 1/10, 1/2, 1, 5, 10, 50, 100, 500, 1000, 5000, 10000

Description

Command Sets full-scale D/A output integration coefficient.

Query Returns full-scale D/A output integration coefficient setting in a string.

Example

Command :AOUT:INTEG 1

Sets full-scale D/A output integration coefficient to “1”.

Query :AOUT:INTEG?

Response (HEADER ON) :AOUT:INTEGRATE 1

(HEADER OFF) 1

Reference

- If the D/A output option is not implemented, a device dependent error occurs.

Setting and Querying Full-scale D/A Output Waveform

Syntax

Command **:AOUT:SCALe <1/2(NR1)>**

Query **:AOUT:SCALe?**

Response 1 ±1V f.s.

2 ±2V f.s.

Description

Command Sets full-scale D/A waveform output.

Query Returns the setting for the full-scale of the D/A waveform output in a numerical NR1 value.

Example

Command **:AOUT:SCAL 1**

Set the full scale of the D/A waveform output to ±1 Vf.s.

Query **:AOUT:SCAL?**

Response (HEADER ON) :AOUT:MONITOR:SCALE 1

(HEADER OFF) 1

Reference

- If the D/A output option is not implemented, a device dependent error occurs.

Collective Setting and Querying for the D/A Trend Output Items

Syntax

Command **:AOUT:TRENd:ITEM <Item 1(String)>,<Item 2(String)>,..,<Item 20(String)>**

Query **:AOUT:TRENd:ITEM?**

Response <Item 1>,<Item 2>, ... ,<Item 19>,<Item 20>

Item 1 to Item 20 See “4.1 Parameters for Normal Measurement Items”.

Description

Command Collectively set the trend output items of the D/A output channels.

The number of the specified output items should be within a range from 1 to 20.

The output items of the unspecified D/A channels will not be changed.

Query Returns the settings for the trend output items of all D/A output channels in a character string.

Example

Command **:AOUT:TREN:ITEM Urms1,Irms1,P1,Q1,S1,PF1**

Set the D/A trend output items starting from channel 1 in order as follows:
Voltage CH1 RMS, Current CH1 RMS, Active power CH1, Reactive power CH1, Apparent power CH1, Power factor CH1

Query **:AOUT:TREN:ITEM?**

Response (HEADER ON) :AOUT1:TREND:ITEM Urms1,Irms1,P1,Q1,S1,PF1

(HEADER OFF) Urms1,Irms1,P1,Q1,S1,PF1

Reference

- If the D/A output option is not implemented, a device dependent error occurs.
- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Collective Setting and Querying for D/A Waveform Output Items

Syntax

Command **:AOUT:WAVE:ITEM <Item 1(String)>,<Item 2(String)>,…,<Item 20(String)>**

Query **:AOUT:WAVE:ITEM?**

Response <Item 1>,<Item 2>,.....,<Item 19>,<Item 20>

Item 1 to Item 20 U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, U7, I7, U8, I8

Description

Command Collectively set the waveform output items of the D/A output channels.

The number of the specified output items should be within a range from 1 to 20.

The output items of the unspecified D/A channels will not be changed.

Query Returns the settings for the waveform output items of all D/A output channels in a character string.

Example

Command **:AOUT:WAVE:ITEM U1,I1,U2,I2,U3,I3**

Set the D/A waveform output items to U1, I1, U2, I2, U3, and I3, starting from channel 1 in order.

Query **:AOUT:WAVE:ITEM?**

Response (HEADER ON) :AOUT1:WAVE:ITEM U1,I1,U2,I2,U3,I3

(HEADER OFF) U1,I1,U2,I2,U3,I3

Reference

- If the D/A output option is not implemented, a device dependent error occurs.

Setting and Querying D/A Output Types

Syntax

Command **:AOUT[CH]:TYPE <WAVE/TREND(String)>**

Query **:AOUT[CH]:TYPE?**

Response WAVE Waveform output

TREND Trend output

Description

Command Sets the output type of the specified D/A output channel. [CH]: 1 to 20.

Query Returns the setting for the output type of the specified D/A output channel in a character string.

Example

Command **:AOUT1:TYPE WAVE**

Set the output type of D/A1 to the waveform output.

Query **:AOUT1:TYPE?**

Response (HEADER ON) :AOUT1:TYPE WAVE

(HEADER OFF) WAVE

Reference

- If the D/A output option is not implemented, a device dependent error occurs.

Setting and Querying the D/A Trend Output Item

Syntax

Command: **:AOUT[CH]:TRENd:ITEM <Normal measurement item(String)>**

Query: **:AOUT[CH]:TRENd:ITEM?**

Response: <Normal measurement item>

Normal measurement item See “4.1 Parameters for Normal Measurement Items”.

Description

Command: Sets the trend output item of the specified D/A output channel. [CH]: 1 to 20.

Query: Returns the settings for the trend output item of the specified D/A output channel in a character string.

Example

Command: **:AOUT1:TREN:ITEM Urms1**

Sets the trend output item of D/A1 to Urms1.

Query: **:AOUT1:TREN:ITEM?**

Response: (HEADER ON) :AOUT1:TREND:ITEM Urms1

(HEADER OFF) Urms1

Reference

- If the D/A output option is not implemented, a device dependent error occurs.
- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Setting and Querying D/A Waveform Output Item

Syntax

Command: **:AOUT[CH]:WAVE:ITEM <Waveform output item(String)>**

Query: **:AOUT[CH]:WAVE:ITEM?**

Response: <Waveform output item>

Waveform output item U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, U7, I7, U8, I8

Description

Command: Sets the waveform output item of the specified D/A output channel. [CH]: 1 to 20.

Query: Returns the setting for the waveform output item of the specified D/A output channel in a character string.

Example

Command: **:AOUT1:WAVE:ITEM U1**

Sets the waveform output item of D/A1 to U1.

Query: **:AOUT1:WAVE:ITEM?**

Response: (HEADER ON) :AOUT1:WAVE:ITEM U1

(HEADER OFF) U1

Reference

- If the D/A output option is not implemented, a device dependent error occurs.

3.2.4 Averaging Mode

Setting and Querying Averaging Mode

Syntax

Command :AVEraging:MODE <OFF/MOV/FAST/MID/SLOW(String)>

Query :AVEraging:MODE?

Response

OFF	No
MOV	Movement average
FAST	Exponential average (response speed: FAST)
MID	Exponential average (response speed: MID)
SLOW	Exponential average (response speed: SLOW)

Description

Command Sets the averaging mode.

Query Returns the averaging mode setting in a character string.

Example

Command :AVE:MODE MOV

Sets the averaging mode to movement average.

Query :AVE:MODE?

Response (HEADER ON) :AVERAGING:MODE MOV

(HEADER OFF) MOV

Reference

- Changing the averaging mode setting restarts the averaging process.

Setting and Querying Averaging Count for Movement Average

Syntax

Command :AVEraging:TIMEs <Averaging count(NR1)>

Query :AVEraging:TIMEs?

Response <Averaging count>

Averaging count	8, 16, 32, 64

Description

Command Sets the averaging count for movement average.

Query Returns the averaging count for movement average in a numerical NR1 value.

Example

Command :AVE:TIME 16

Sets the averaging count for movement average to 16.

Query :AVE:TIME?

Response (HEADER ON) :AVERAGING:TIMES 16

(HEADER OFF) 16

Reference

3.2.5 Efficiency and Loss Calculation

Setting and Querying Efficiency and Loss calculation modes

Syntax

Command **:CALCulate:MODE <Mode(String)>**

Query **:CALCulate:MODE?**

Response <Mode>

mode	FIXED	Normal Mode
	AUTO	Auto Mode

Description

Command Sets calculation mode for efficiency and loss calculations.

Query Returns the calculation mode setting for efficiency and loss operations as a string.

Example

Command **:CALC:MODE FIXED**

Sets normal mode for efficiency and loss calculations.

Query **:CALC:MODE?**

Response (HEADER ON) :CALCULATE:MODE FIXED

(HEADER OFF) FIXED

Reference

Setting and Querying Pin for Efficiency and Loss Equations

Syntax

Command **:CALCulate[number]:PIN <Item 1(String)>,<Item 2(String)>, <Item 3(String)>,<Item 4(String)>,<Item 5(String)>,<Item 6(String)>**

Query **:CALCulate[number]:PIN?**

Response <Item 1>,<Item 2>,<Item 3>,<Item 4>,<Item 5>,<Item 6>

Item 1 to Item 6 OFF, P1, P2, P3, P4, P5, P6, P7, P8,
P12, P23, P34, P45, P56, P67, P78,
P123, P234, P345, P456, P567, P678,
Pfnd1, Pfnd2, Pfnd3, Pfnd4, Pfnd5, Pfnd6, Pfnd7, Pfnd8,
Pfnd12, Pfnd23, Pfnd34, Pfnd45, Pfnd56, Pfnd67, Pfnd78,
Pfnd123, Pfnd234, Pfnd345, Pfnd456, Pfnd567, Pfnd678,
Pm1, Pm2, Pm3, Pm4

Description

Command Sets Pin items for efficiency and loss equations. Specify each efficiency and loss equation by entering 1 to 4 in [number].

Query Returns Pin setting items for efficiency and loss equations in a string.

Example

Command **:CALC1:PIN P1,P34,P12,OFF,OFF,OFF**

Sets P1 for Pin1, P34 for Pin2, P12 for Pin3, and OFF for Pin4, Pin5 and Pin6 in efficiency and loss equation 1.

Query **:CALC1:PIN?**

Response (HEADER ON) :CALCULATE1:PIN P1,P34,P12,OFF,OFF,OFF

(HEADER OFF) P1,P34,P12,OFF,OFF,OFF

Reference

- If the number of items is less than 6, the items that have not been set will not be changed.
- If the efficiency and loss calculation mode is Auto Mode, the setting cannot be changed and an execution error will result.
- To specify secondary normal measurement items add [SC] at the end of the parameters given in the list above.
  Example: P1SC

Setting and Querying Pout for Efficiency and Loss Equations

Syntax

Command: **:CALCulate[number]:POUT <Item 1(String)>,<Item 2(String)>, <Item 3(String)>,<Item 4(String)>,<Item 5(String)>,<Item 6(String)>**

Query: **:CALCulate[number]:POUT?**

Response: <Item 1>,<Item 2>,<Item 3>,<Item 4>,<Item 5>,<Item 6>

Item 1 to Item 6: OFF, P1, P2, P3, P4, P5, P6, P7, P8, P12, P23, P34, P45, P56, P67, P78, P123, P234, P345, P456, P567, P678, Pfnd1, Pfnd2, Pfnd3, Pfnd4, Pfnd5, Pfnd6, Pfnd7, Pfnd8, Pfnd12, Pfnd23, Pfnd34, Pfnd45, Pfnd56, Pfnd67, Pfnd78, Pfnd123, Pfnd234, Pfnd345, Pfnd456, Pfnd567, Pfnd678, Pm1, Pm2, Pm3, Pm4

Description

Command: Sets Pout items for efficiency and loss equations. Specify each efficiency and loss equation by entering 1 to 4 in [number].

Query: Returns Pout setting items for efficiency and loss equations in a string.

Example

Command: **:CALC1:POUT P12,Pm1,Pm2,OFF,OFF,OFF**

Sets P12 for Pout1, Pm1 for Pout2, Pm2 for Pout3, and OFF for Pout4, Pout5, and Pout6 in efficiency and loss equation 1.

Query: **:CALC1:POUT?**

Response: (HEADER ON) :CALCULATE1:POUT P12,Pm1,Pm2,OFF,OFF,OFF

(HEADER OFF) P12,Pm1,Pm2,OFF,OFF,OFF

Reference

- If the number of items is less than 6, the items that have not been set will not be changed.
- If the efficiency and loss calculation mode is Auto Mode, the setting cannot be changed and an execution error will result.
- To specify secondary normal measurement items add [SC] at the end of the parameters given in the list above.
  Example: P1SC

3.2.6 CAN output option

Querying CAN Analysis Option

Syntax

Query: **:CAN:EXISt?**

Response: Y Option available

N Option unavailable

Description

Query: Returns a string indicating whether or not the CAN output option is available.

Example

Query: **:CAN:EXIS?**

Response: (HEADER ON) :CAN:EXIST Y

(HEADER OFF) Y

Reference

Setting and Querying CAN protocol

Syntax

Command **:CAN:MODE <0/1/2(NR1)>**

Query **:CAN:MODE?**

Response 0 CAN
1 CAN FD(ISO)
2 CAN FD(nonISO)

Description

Command Sets the CAN protocol.

Query Returns CAN protocol settings as NR1 value.

Example

Command **:CAN:MODE 1**

Set CAN protocol to CAN FD(ISO).

Query **:CAN:MODE?**

Response (HEADER ON) :CAN:MODE 1
(HEADER OFF) 1

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.
- Changing the CAN protocol will initialize database settings.

CAN: Setting and Querying Transmission speed

Syntax

Command **:CAN:SPEED <transmission speed(String)>**

Query **:CAN:SPEED?**

Response transmission speed(bps) 125k, 250k, 500k, 1M

Description

Command Sets the transmission speed in CAN mode.

Query Returns the transmission speed setting in CAN mode in a string.

Example

Command **:CAN:SPEED 125k**

Sets the transmission speed to 125 kbps in CAN mode.

Query **:CAN:SPEED?**

Response (HEADER ON) :CAN:SPEED 125k
(HEADER OFF) 125k

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

CAN: Setting and Querying Sampling point

Syntax

Command **:CAN:SAMPling <sampling point(NR2)>**

Query **:CAN:SAMPling?**

Response sampling point(%) 0.0 to 99.9

Description

Command Sets the sampling point in CAN mode. Unit is [%].

Query Returns the sampling point setting in CAN mode in a numerical NR2 value.

Example

Command **:CAN:SAMP 50.0**

Set the number of sampling points to 50% in CAN mode.

Query **:CAN:SAMP?**

Response (HEADER ON) :CAN:SAMPLING 50.0
(HEADER OFF) 50.0

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

Setting and Querying Terminal resistor.

Syntax

Command :CAN:RESist <ON/OFF(String)>

Query :CAN:RESist?

Response ON Terminal resistor ON

OFF Terminal resistor OFF

Description

Command Set the terminal resistor.

Query Returns the terminal resistor setting in a string.

Example

Command :CAN:RES ON

Set the terminal resistor to ON.

Query :CAN:RES?

Response (HEADER ON) :CAN:RESIST ON

(HEADER OFF) ON

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

CAN FD: Setting and Querying Arbitration field transmission speed

Syntax

Command :CAN:FD:ASPeed <transmission speed(String)>

Query :CAN:FD:ASPeed?

Response transmission speed(bps) 500k, 1M

Description

Command Sets the transmission speed of the arbitration field in CAN FD mode.

Query Returns the transmission speed setting for the arbitration field in CAN FD mode in a string.

Example

Command :CAN:FD:ASP 500k

Sets the CAN FD arbitration field transmission speed to 500 kbps in CAN FD mode.

Query :CAN:FD:ASP?

Response (HEADER ON) :CAN:FD:ASPEED 500k

(HEADER OFF) 500k

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

CAN FD: Setting and Querying Arbitration field Sampling point

Syntax

Command :CAN:FD:ASAMPling <sampling point(NR2)>

Query :CAN:FD:ASAMPling?

Response sampling point(%) 0.0 to 99.9

Description

Command Sets the sampling point for the arbitration field in CAN FD mode. Unit is [%].

Query Returns the setting of the sampling point for the arbitration field in CAN FD mode in NR2 numerical value.

Example

Command :CAN:FD:ASAMP 50.0

Set the number of arbitration field sampling points to 50% in CAN FD mode.

Query :CAN:FD:ASAMP?

Response (HEADER ON) :CAN:FD:ASAMPLING 50.0

(HEADER OFF) 50.0

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

CAN FD: Setting and Querying Data field transmission speed

Syntax

Command :CAN:FD:DSPeed <transmission speed(String)>

Query :CAN:FD:DSPeed?

Response transmission speed(bps) 500k, 1M, 2M, 4M, 5M, 8M

Description

Command Sets the transmission speed of the data field in CAN FD mode.

Query Returns the transmission speed setting for the data field in CAN FD mode in a string.

Example

Command :CAN:FD:DSP 500k

Sets the CAN FD data field transmission speed to 500 kbps in CAN FD mode.

Query :CAN:FD:DSP?

Response (HEADER ON) :CAN:FD:DSPEED 500k

(HEADER OFF) 500k

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

CAN FD: Setting and Querying Data field Sampling point

Syntax

Command :CAN:FD:DSAMPling <sampling point(NR2)>

Query :CAN:FD:DSAMPling?

Response sampling point(%) 0.0 to 99.9

Description

Command Sets the sampling point for the data field in CAN FD mode. Unit is [%].

Query Returns the setting of the sampling point for the data field in CAN FD mode in NR2 numerical value.

Example

Command :CAN:FD:DSAMP 50.0

Set the number of data field sampling points to 50% in CAN FD mode.

Query :CAN:FD:DSAMP?

Response (HEADER ON) :CAN:FD:DSAMPLING 50.0

(HEADER OFF) 50.0

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

CAN Data Base: Setting and Querying Output Items

Syntax

Command: **:CAN:DB:ITEM <Message No.(NR1)>,<Item 1(String)>,⋯,<Item N(String)>**

Query: **:CAN:DB:ITEM? <Message No.(NR1)>**

Response: <Message No.>,<Item 1>,⋯,<Item N>

Message No.	1 to 32 The message at the top of the display is message No. 1
Item	The item “4.1 Parameters for Normal Measurement Items” TIME COUNT
Maximum number of output items	(In CAN mode) 2 (In CAN FD mode) 16

Description

Command: Sets output items for the specified message number.
If one of the output items is set to anything other than OFF, the output of that message is turned ON.

Query: Returns the output item of the specified message number in a string.

Example

Command: **:CAN:DB:ITEM 1,Urms1,Urms2**

In CAN mode, set the output items for message number 1 to Urms1 and Urms2.

Query: **:CAN:DB:ITEM? 1**

Response: (HEADER ON) :CAN:DB:ITEM 1,Urms1,Urms2

(HEADER OFF) 1,Urms1,Urms2

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.
- When the number of items is less than the maximum number, the unset items are set to OFF.
- Status items and Integrated elapsed time items cannot be set, resulting in a Command error.

CAN Data Base: Setting and Querying Message ID

Syntax

Command: **:CAN:DB:ID <Message No.(NR1)>,<Message ID(String)>**

Query: **:CAN:DB:ID? <Message No.(NR1)>**

Response: <Message No.>,<Message ID>

Message No.	1 to 32 The message at the top of the display is message No. 1
Message ID	(in Standard format) 0x0 to 0x7FF (in Extention format) 0x0 to 0x1FFFFFFF

Description

Command: Sets the ID of the specified message.
The ID must be specified in hexadecimal format with 0x at the beginning.

Query: Returns the ID of the specified message in a string.

Example

Command: **:CAN:DB:ID 1,0x1**

Sets the message ID of message number 1 to 0x1.

Query: **:CAN:DB:ID? 1**

Response: (HEADER ON) :CAN:DB:ID 1,0x1

(HEADER OFF) 1,0x1

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.
- If duplicate IDs are set, normal CAN communication may not be possible.

CAN Data Base: Setting and Querying CAN Message Format

Syntax

Command **:CAN:DB:FORMat <STD/EXT(String)>**

Query **:CAN:DB:FORMat?**

Response STD Standard format

EXT Extention format

Description

Command Set the message format.

Query Returns the message format in a string.

Example

Command **:CAN:DB FORM STD**

Set the message format to Standard format.

Query **:CAN:DB:FORM?**

Response (HEADER ON) :CAN:DB:FORMAT STD

(HEADER OFF) STD

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

Saving DBC files

Syntax

Command **:CAN:DB:SAVE <Save File Name(String)>**

Save File Name Up to 32 alphanumeric characters.
The file is saved as <Save File Name>.DBC.

Description

Command Saves a DBC file with the specified file name in a USB flash drive.
If the Save to FTP Server setting is enabled, the configuration file is saved in the FTP server.

Example

Command **:CAN:DB:SAVE TEST1**

Saves the DBC file “TEST1.DBC” to the HIOKI/PW8001 folder on a USB flash drive connected to the instrument.

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.
- The available characters are ASCII characters from H'20 to H'7E (excluding !"*+,/=.:;<>?[¥]`|).
- The conditions under which the setting file can be saved are the same as the conditions under which it can be saved on the screen of the instrument. When it fails to save the setting file, an execution error occurs.
- If a DBC file with the same name already exists, the file will be overwritten.
- This command is case-sensitive in the parameter section.

Querying CAN Output Status

Syntax

Query :CAN:OUT:STATe?

Response <Status>

Status
NONE
READY
OK
WARNING
SETUP_ERR
SEND_ERR
BUS_OFF

Description

Query Returns the CAN output status in a string.

Example

Query :CAN:OUT:STAT?

Response (HEADER ON) :CAN:OUT:STAT NONE

(HEADER OFF) NONE

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

Setting and Querying CAN output mode

Syntax

Command :CAN:OUT:MODE <output mode(String)>

Query :CAN:OUT:MODE?

Response <output mode>

output mode		
	OFF	CAN output is OFF
	CONTINUE	Interval output mode

Description

Command Sets the output mode.

Query Returns the output mode setting in a string.

Example

Command :CAN:OUT:MODE OFF

Set the CAN output mode to OFF.

Query :CAN:OUT:MODE?

Response (HEADER ON) :CAN:OUT:MODE OFF

(HEADER OFF) OFF

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

Setting and Querying CAN output interval

Syntax

Command **:CAN:OUT:INTERval <output interval(String)>**

Query **:CAN:OUT:INTERval?**

Response <output interval>

output interval 1ms, 10ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s, 15s, 30s, 1min, 5min, 10min, 15min, 30min, 60min

Description

Command Sets the output interval.

Query Returns the output interval setting in a string.

Example

Command **:CAN:OUT:INTER 1min**

Set the CAN output interval to 1 minute.

Query **:CAN:OUT:INTER?**

Response (HEADER ON) :CAN:OUT:INTERVAL 1min

(HEADER OFF) 1min

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.
- The output interval cannot be set to less than data refresh rate.

Setting and Querying CAN output count

Syntax

Command **:CAN:OUT:COUNt <output count(NR1)>**

Query **:CAN:OUT:COUNt?**

Response <output count>

output count 0 to 10000

Description

Command Sets the count of outputs.
If 0 is specified, it is set to infinite times.

Query Returns the output frequency setting in numerical NR1 values.

Example

Command **:CAN:OUT:COUN 50**

Set the count of CAN outputs to 50 times.

Query **:CAN:OUT:COUN?**

Response (HEADER ON) :CAN:OUT:COUNT 50

(HEADER OFF) 50

Reference

- When the CAN output option is not implemented, a device-dependent error occurs.

3.2.7 Calendar and Clock

Setting and Querying Clock

Syntax

Command **:CLOCk <Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Hour(NR1)>,<Minute(NR1)>,<Second(NR1)>**

Query **:CLOCk?**

Response <Year or Month or Date>,<Year or Month or Date>,<Year or Month or Date>,<Hour>,<Minute>,<Second>

Year	2020 to 2099 (20 to 99 can be used for setting)
Month	1 to 12
Date	1 to 31
Hour	0 to 23
Minute	0 to 59
Second	0 to 59

Description

Command Sets time for the clock in the instrument.

Query Returns time of the clock in the instrument as an NR1 value.

Example

Command **:CLOC 2021,12,19,12,0,0**

Sets 12:00:00 on December 19, 2021.

Query **:CLOC?**

Response (HEADER ON) :CLOCK 2021,12,19,12,00,30

(HEADER OFF) 2021,12,19,12,00,30

Reference

- As the instrument takes into account the difference in the number of days between months and leap years, specifying a date that does not exist results in an execution error.
- The order of the year, month, and date varies depending on the date format setting.

Setting and Querying Time Zone

Syntax

Command **:TIMEZone <Hour(NR1)>(,<Minute(NR1)>)**

Query **:TIMEZone?**

Response <Hour>,<Minute>

Hour	-12 to +14
Minute	0,30,45

Description

Command Sets the time zone of the clock in the instrument.

Query Returns the time zone setting of the clock in the instrument in numerical NR1 values.

Example

Command **:TIMEZ +9,30**

Sets the time zone to GMT+9:30.

Query **:TIMEZ?**

Response (HEADER ON) :TIMEZONE +9,30

(HEADER OFF) +9,30

Reference

- The available time zone is limited to the time that can be set on the instrument.
- The parameter to specify the minutes can be omitted. If it is omitted, “0” will be set.

Setting and Querying Date Format

Syntax

Command :DATE:FORMat <Date Format(String)>

Query :DATE:FORMat?

Response <Date Format>

Date Format		
	YMD	YYYY MM DD
	MDY	MM DD YYYY
	DMY	DD MM YYYY

Description

Command Sets the date display format used for the display on the instrument and for saving.

Query Returns the setting of the date display format used for the display on the instrument and for saving, in a string.

Example

Command :DATE:FORM DMY

Sets the date display format as “DD MM YYYY”.

Query :DATE:FORM?

Response (HEADER ON) :DATE:FORMat DMY

(HEADER OFF) DMY

Reference

Setting and Querying Date Separator

Syntax

Command :DATE:SEParator <Date Separator(String)>

Query :DATE:SEParator?

Response <Date Separator>

Date Separator		
	HYPHEN	Hyphen (-)
	SLASH	Slash (/)
	PERIOD	Period (.)

Description

Command Sets the date separator used for the display on the instrument and for saving.

Query Returns the setting of the date separator used for the display on the instrument and for saving, in a string.

Example

Command :DATE:SEP HYPHEN

Sets a hyphen (-) as the date separator.

Query :DATE:SEP?

Response (HEADER ON) :DATE:SEPARATOR HYPHEN

(HEADER OFF) HYPHEN

Reference

Querying Adjustment Date

Syntax

Query :DATE:ADJust?

Response <Year or Month or Date>,<Year or Month or Date>,<Year or Month or Date>

Year	2020 to 2099
Month	1 to 12
Date	1 to 31

Description

Query Returns the latest adjustment date of the PW8001 instrument in a numerical NR1 value.

Example

Query :DATE:ADJ?

Response (HEADER ON) :DATE:ADJUST 2021,12,01

(HEADER OFF) 2021,12,01

Reference

- The order of the year, month, and date varies depending on the date format setting.

Querying Calibration Date

Syntax

Query **:DATE:CALibrate?**

Response <Year or Month or Date>,<Year or Month or Date>,<Year or Month or Date>

Year 2020 to 2099

Month 1 to 12

Date 1 to 31

Description

Query Returns the latest calibration date of the PW8001 instrument in a numerical NR1 value.

Example

Query **:DATE:CAL?**

Response (HEADER ON) :DATE:CALIBRATE 2021,12,01

(HEADER OFF) 2021,12,01

Reference

- The order of the year, month, and date varies depending on the date format setting.

3.2.8 Δ–Y Calculation

Setting and Querying ON/OFF for Δ–Y Calculation

Syntax

Command **:DELTay[CH] <ON/OFF(String)>**

Query **:DELTay[CH]?**

Response ON Execute Δ–Y calculation.

OFF Does not execute Δ–Y calculations.

Description

Command Sets the Δ–Y calculation for the wiring including the specified channel. [CH]: 1 to 8.

Query Returns the setting of the Δ–Y calculation for the wiring including the specified channel, in a string.

Example

Command **:DELT1 OFF**

Sets the Δ–Y calculation for the wiring including CH1 so that it is not executed.

Query **:DELT1?**

Response (HEADER ON) :DELTAY1 OFF

(HEADER OFF) OFF

Reference

- If the wiring method of the target channel is not 3P3W3M or 3V3A or 3P4W, the Δ–Y calculation cannot be set to “ON” and it becomes an execution error.

3.2.9 Time Control

All Wiring Integration: Setting and Querying Real-Time Control

Syntax

Command **:STIMe:CONTrol <ON/OFF(String)>**

Query **:STIMe:CONTrol?**

Response
- ON Real-time control ON
- OFF Real-time control OFF

Description

Command Sets the real-time control for all wiring integration to ON or OFF.

Query Returns the setting of the real-time control for all wiring integration as ON or OFF.

Example

Command **:STIM:CONT ON**

Sets the real-time control for all wiring integration to ON.

Query **:STIM:CONT?**

Response
- (HEADER ON) :STIME:CONTROL ON
- (HEADER OFF) ON

Reference

- If the integration control method is not all wiring integration, it becomes an execution error.

All Wiring Integration: Setting and Querying Real-Time Control Start Time

Syntax

Command **:STIMe:STARttime <Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Hour(NR1)>,<Minute(NR1)>,<Second(NR1)>**

Query **:STIMe:STARttime?**

Response <Year or Month or Date>,<Year or Month or Date>,<Year or Month or Date>,<Hour>,<Minute>,<Second>
- Year 2020 to 2099 (20 to 99 can be used for setting)
- Month 01 to 12
- Date 01 to 31
- Hour 00 to 23
- Minute 00 to 59
- Second 00 to 59

Description

Command Sets the real-time control start time for all wiring integration.

Query Returns the setting of the real-time control start time for all wiring integration in numerical NR1 values of year, month, date, hours, minutes, and seconds.

Example

Command **:STIM:STAR 2021,12,01,12,30,00**

Sets the real-time control start time for all wiring integration to 12:30:00 on December 01, 2021.

Query **:STIM:STAR?**

Response
- (HEADER ON) :STIME:STARTTIME 2021,12,01,12,30,00
- (HEADER OFF) 2021,12,01,12,30,00

Reference

- If the integration control method is not all wiring integration, it becomes an execution error.
- The order of the year, month, and date varies depending on the date format setting.
- As the instrument takes into account the difference in the number of days between months and leap years, specifying a date that does not exist results in an execution error.
- If the start time is set to a time after the stop time, the stop time will be set to 1 second after the start time.

All Wiring Integration: Setting and Querying Real-Time Control Stop Time

Syntax

Command: **:STIMe:STOPtime <Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Hour(NR1)>,<Minute(NR1)>,<Second(NR1)>**

Query: **:STIMe:STOPtime?**

Response: <Year or Month or Date>,<Year or Month or Date>,<Year or Month or Date>,<Hour>,<Minute>,<Second>

Year	2020 to 2099 (20 to 99 can be used for setting)
Month	01 to 12
Date	01 to 31
Hour	00 to 23
Minute	00 to 59
Second	00 to 59

Description

Command: Sets the real-time control stop time for all wiring integration.

Query: Returns the setting of the real-time control stop time for all wiring integration in numerical NR1 values of year, month, date, hours, minutes, and seconds.

Example

Command: **:STIM:STOP 2021,12,01,12,30,01**

Sets the real-time control stop time for all wiring integration to 12:30:01 on December 01, 2021.

Query: **:STIM:STOP?**

Response: (HEADER ON) :STIME:STOPTIME 2021,12,01,12,30,01

(HEADER OFF) 2021,12,01,12,30,01

Reference

- If the integration control method is not all wiring integration, it becomes an execution error.
- The order of the year, month, and date varies depending on the date format setting.
- As the instrument takes into account the difference in the number of days between months and leap years, specifying a date that does not exist results in an execution error.
- If a stop time is set to a time before the start time, it becomes an execution error.

Integration by Wiring: Setting and Querying Real-Time Control

Syntax

Command: **:STIMe[CH]:CONTrol <ON/OFF(String)>**

Query: **:STIMe[CH]:CONTrol?**

Response:

ON	Real-time control ON
OFF	Real-time control OFF

Description

Command: Sets the real-time control for the wiring including the specified channel to ON or OFF. [CH]: 1 to 8.

Query: Returns the setting of real-time control for the wiring including the specified channel as ON or OFF.

Example

Command: **:STIM1:CONT ON**

Sets the real-time control for the wiring including CH1 to ON.

Query: **:STIM1:CONT?**

Response: (HEADER ON) :STIME1:CONTROL ON

(HEADER OFF) ON

Reference

- If the integration control method is not integration by wiring, it becomes an execution error.

Integration by Wiring: Setting and Querying Real-Time Control Start Time

Syntax

Command **:STIMe[CH]:STARttime <Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Hour(NR1)>,<Minute(NR1)>,<Second(NR1)>**

Query **:STIMe[CH]:STARttime?**

Response <Year or Month or Date>,<Year or Month or Date>,<Year or Month or Date>,<Hour>,<Minute>,<Second>

Year	2020 to 2099 (20 to 99 can be used for setting)
Month	01 to 12
Date	01 to 31
Hour	00 to 23
Minute	00 to 59
Second	00 to 59

Description

Command Sets the real-time control start time for the wiring including the specified channel. [CH]: 1 to 8.

Query Returns the settings of the real-time control start time for the wiring including the specified channel in numerical values of year, month, date, hours, minutes, and seconds.

Example

Command **:STIM1:STAR 2021,12,01,12,30,00**

Sets the real-time control start time for the wiring including CH1 to 12:30:00 on December 01, 2021.

Query **:STIM1:STAR?**

Response (HEADER ON) :STIME1:STARTTIME 2021,12,01,12,30,00

(HEADER OFF) 2021,12,01,12,30,00

Reference

- If the integration control method is not integration by wiring, it becomes an execution error.
- The order of the year, month, and date varies depending on the date format setting.
- As the instrument takes into account the difference in the number of days between months and leap years, specifying a date that does not exist results in an execution error.
- If the start time is set to a time after the stop time, the stop time will be set to 1 second after the start time.

Integration by Wiring: Setting and Querying Real-Time Control Stop Time

Syntax

Command **:STIMe[CH]:STOPtime <Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Year or Month or Date(NR1)>,<Hour(NR1)>,<Minute(NR1)>,<Second(NR1)>**

Query **:STIMe[CH]:STOPtime?**

Response <Year or Month or Date>,<Year or Month or Date>,<Year or Month or Date>,<Hour>,<Minute>,<Second>

Year	2020 to 2099 (20 to 99 can be used for setting)
Month	01 to 12
Date	01 to 31
Hour	00 to 23
Minute	00 to 59
Second	00 to 59

Description

Command: Sets the real-time control stop time for the wiring including the specified channel. [CH]: 1 to 8.

Query: Returns the settings of the real-time control stop time for the wiring including the specified channel in numerical NR1 values of year, month, date, hours, minutes, and seconds.

Example

Command **:STIM1:STOP 2021,12,01,12,30,01**

Sets the real-time control stop time for the wiring including CH1 to 12:30:01 on December 01, 2021.

Query **:STIM1:STOP?**

Response (HEADER ON) :STIME1:STOPTIME 2021,12,01,12,30,01

(HEADER OFF) 2021,12,01,12,30,01

Reference

- If the integration control method is not integration by wiring, it becomes an execution error.
- The order of the year, month, and date varies depending on the date format setting.
- As the instrument takes into account the difference in the number of days between months and leap years, specifying a date that does not exist results in an execution error.
- If a stop time is set to a time before the start time, it becomes an execution error.

All Wiring Integration: Setting and Querying Timer Control

Syntax

Command **:TIMEr:CONTrol <ON/OFF(String)>**

Query **:TIMEr:CONTrol?**

Response

ON	Timer control ON
OFF	Timer control OFF

Description

Command: Sets the timer control for all wiring integration to ON or OFF.

Query: Returns the setting of the timer control for all wiring integration as ON or OFF.

Example

Command **:TIME:CONT ON**

Sets the timer control for all wiring integration to ON.

Query **:TIME:CONT?**

Response (HEADER ON) :TIMER:CONTROL ON

(HEADER OFF) ON

Reference

- If the integration control method is not all wiring integration, it becomes an execution error.

All Wiring Integration: Setting and Querying Time for Timer

Syntax

Command **:TIMEr:TIME <Hour(NR1)>,<Minute(NR1)>,<Second(NR1)>**

Query **:TIMEr:TIME?**

Response <Hour>,<Minute>,<Second>

Hour	0000 to 9999
Minute	00 to 59
Second	00 to 59

Description

Command Sets the time for the timer for all wiring integration.

Query Returns the settings of the time for the timer for all wiring integration in numerical values of hours, minutes, and seconds.

Example

Command **:TIME:TIME 1,0,0**

Sets the time for the timer for all wiring integration to 1 hour.

Query **:TIME:TIME?**

Response (HEADER ON) :TIMER:TIME 0001,00,00

(HEADER OFF) 0001,00,00

Reference

- If the integration control method is not all wiring integration, it becomes an execution error.
- The allowable setting range of the timer is from 1 seconds to 9999 hours, 59 minutes and 59 seconds.

Integration by Wiring: Setting and Querying Timer Control

Syntax

Command **:TIMEr[CH]:CONTrol <ON/OFF(String)>**

Query **:TIMEr[CH]:CONTrol?**

Response

ON	Timer control ON
OFF	Timer control OFF

Description

Command Sets the timer control for the wiring including the specified channel to ON or OFF. [CH]: 1 to 8.

Query Returns the setting of timer control for the wiring including the specified channel as ON or OFF.

Example

Command **:TIME1:CONT ON**

Sets the timer control for the wiring including CH1 to ON.

Query **:TIME1:CONT?**

Response (HEADER ON) :TIMER1:CONTROL ON

(HEADER OFF) ON

Reference

- If the integration control method is not integration by wiring, it becomes an execution error.

Integration by Wiring: Setting and Querying Time for Timer

Syntax

Command **:TIMEr[CH]:TIME <Hour(NR1)>,<Minute(NR1)>,<Second(NR1)>**

Query **:TIMEr[CH]:TIME?**

Response <Hour>,<Minute>,<Second>

Hour	0000 to 9999
Minute	00 to 59
Second	00 to 59

Description

Command Sets the time for the timer for the wiring including the specified channel. [CH]: 1 to 8.

Query Returns the settings of the time for the timer for the wiring including the specified channel in numerical values of hours, minutes, and seconds.

Example

Command **:TIME1:TIME 1,0,0**

Sets the time for timer for the wiring including CH1 to 1 hour.

Query **:TIME1:TIME?**

Response (HEADER ON) :TIMER1:TIME 0001,00,00

(HEADER OFF) 0001,00,00

Reference

- If the integration control method is not integration by wiring, it becomes an execution error.
- The allowable setting range of the timer is from 1 seconds to 9999 hours, 59 minutes and 59 seconds.

3.2.10 Current Input

Setting and Querying Current Auto Range

Syntax

Command **:CURRent[CH]:AUTO <ON/OFF(String)>**

Query **:CURRent[CH]:AUTO?**

Response

ON	Measures current in auto range mode.
OFF	Measures current in manual-range mode.

Description

Command Sets current Auto range. [CH]: 1 to 8.

Query Returns current Auto range setting in a string.

Example

Command **:CURR1:AUTO ON**

Sets CH1 current Auto range to ON.

Query **:CURR1:AUTO?**

Response (HEADER ON) :CURRENT1:AUTO ON

(HEADER OFF) ON

Reference

- If a range is set with the **CURRent[CH]:RANGe** command, the Auto range for the specified channel will be set to OFF.
- Setting of the current auto range mode for other channels included in the measurement line combination will also be changed.

Setting and Querying Phase Compensation Calculation for Current Sensors

Syntax

Command: **:CURRent[CH]:CORRect <ON/OFF/AUTO(String)>**

Query: **:CURRent[CH]:CORRect?**

Response:

ON	Performs the phase compensation calculation for current sensors.
OFF	Does not perform phase compensation calculation for current sensors
AUTO	Performs phase compensation calculation using compensation values saved in the current sensor.

Description

Command: Sets phase compensation calculation for current sensors. [CH]: 1 to 8.

Query: Returns setting for phase compensation calculation for current sensors in a string.

Example

Command: **:CURR1:CORR ON**

Sets the phase compensation calculation for the CH1 current sensor to ON.

Query: **:CURR1:CORR?**

Response: (HEADER ON) :CURRENT1:CORRECT ON

(HEADER OFF) ON

Reference

- This setting must be made for each channel even if they use the same wiring.
- “AUTO” can be set only when a sensor with memory is connected. In this case, the phase compensation calculation is performed using the compensation value saved in the sensor.

Setting and Querying Phase Compensation Angle for Current Sensors

Syntax

Command: **:CURRent[CH]:DEGRee <Phase compensation angle(NR2)>**

Query: **:CURRent[CH]:DEGRee?**

Response: <Phase compensation angle>

Phase compensation angle (°) -180.000 to +180.000

Description

Command: Sets phase compensation angle for current sensors. [CH]: 1 to 8.

Query: Returns setting for phase compensation angle for current sensors in a numerical NR2 value. (The plus sign cannot be omitted.)

Example

Command: **:CURR1:DEGR 90.000**

Sets the phase compensation angle for the CH1 current sensor to +90°.

Query: **:CURR1:DEGR?**

Response: (HEADER ON) :CURRENT1:DEGREE +90.000

(HEADER OFF) +90.000

Reference

- Numerical values in NRf format are acceptable, but the values are rounded to the third decimal place.
- This setting must be made for each channel even if they use the same wiring.
- When the setting of the phase compensation calculation for current sensors is “AUTO”, the phase compensation angle cannot be changed. In this case, the compensation value saved in the sensor will be returned in response to a query.

Setting and Querying Phase Compensation Frequency for Current Sensors

Syntax

Command :CURRent[CH]:FREQuency <Compensation frequency [kHz](NR2)>

Query :CURRent[CH]:FREQuency?

Response <Compensation frequency [kHz]>

Compensation frequency [kHz] 000.1 to 5000.0

Description

Command Sets phase compensation frequency for current sensors. [CH]: 1 to 8.

Query Returns setting for phase compensation frequency for current sensors in a numerical NR2 value.

Example

Command :CURR1:FREQ 200.0

Sets the phase compensation frequency for the CH1 current sensor to 200kHz.

Query :CURR1:FREQ?

Response (HEADER ON) :CURRENT1:FREQUENCY 200.0

(HEADER OFF) 200.0

Reference

- This setting must be made for each channel even if they use the same wiring.
- When the setting of the phase compensation calculation for current sensor is “AUTO”, the phase compensation frequency cannot be changed. In this case, the compensation value saved in the sensor will be returned in response to a query.

Setting and Querying Current Sensor Terminals

Syntax

Command :CURRent[CH]:INPut <PROBE1/PROBE2(String)>

Query :CURRent[CH]:INPut?

Response PROBE1 Probe 1

PROBE2 Probe 2

Description

Command Sets type of current sensor terminal. [CH]: 1 to 8.

Query Returns setting for current sensor terminal in a string.

Example

Command :CURR1:INP PROBE1

Sets the CH1 current sensor terminal to PROBE1.

Query :CURR1:INP?

Response (HEADER ON) :CURRENT1:INPUT PROBE1

(HEADER OFF) PROBE1

Reference

- The settings for the current sensor terminals of other channels included in the measurement line combination will also be changed.
- PROBE2 can be set only on the U7001.

Setting and Querying Current Rectification Method

Syntax

Command **:CURRent[CH]:MEAN <ON/OFF(String)>**

Query **:CURRent[CH]:MEAN?**

Response ON Sets current rectification method to MEAN.

OFF Sets current rectification method to RMS.

Description

Command Sets current rectification method. [CH]: 1 to 8.

Query Returns setting for current rectification method in a string.

Example

Command **:CURR1:MEAN OFF**

Sets the CH1 current rectification method to RMS.

Query **:CURR1:MEAN?**

Response (HEADER ON) :CURRENT1:MEAN OFF

(HEADER OFF) OFF

Reference

- Setting of the current rectification method for other channels included in the measurement line combination will also be changed.

Setting and Querying Current Range

Syntax

Command **:CURRent[CH]:RANGe <Current range(NR2)>**

Query **:CURRent[CH]:RANGe?**

Response <Current range>

Current range	0.04, 0.08, 0.2, 0.4, 0.8, 2	(2A sensor)
	0.4, 0.8, 2, 4, 8, 20	(20A sensor)
	4, 8, 20, 40, 80, 200	(200A sensor)
	40, 80, 200, 400, 800, 2000	(2000A sensor)
	0.10, 0.20, 0.50, 1, 2, 5	(5A sensor)
	1, 2, 5, 10, 20, 50	(50A sensor)
	10, 20, 50, 100, 200, 500	(500A sensor)
	100, 200, 500, 1000, 2000, 5000	(5000A sensor)
	20, 40, 100, 200, 400, 1000	(1000A sensor)
	1000, 2000, 5000,10000, 20000, 50000	(0.1mV/A)
	100, 200, 500, 1000, 2000, 5000	(1mV/A)
	10, 20, 50, 100, 200, 500	(10mV/A)
	1, 2, 5, 10, 20, 50	(100mV/A)
	0.10, 0.20, 0.50, 1, 2, 5	(1V/A)

Description

Command Sets a current range. The unit is [A]. [CH]: 1 to 8.

Query Returns current range setting in a numerical NR2 value.

Example

Command **:CURR1:RANG 5**

Sets the CH1 current range to 5 A.

Query **:CURR1:RANG?**

Response (HEADER ON) :CURRENT1:RANGE 5

(HEADER OFF) 5

Reference

- The range allowed depends on the current sensor type.
- Numerical values are accepted in NRf format, but the values are rounded to the third decimal place.
- Do not set a unit for the current range.
- After you change the range, wait a few moments until the internal circuitry stabilizes before you read any measured values.
- If a range is specified, the Auto range of the specified channel will be turned OFF.
- Setting of the current range for other channels included in the measurement line combination will also be changed.

Setting and Querying Current Sensor Rate

Syntax	Command	**:CURRent[CH]:RATE <Rating(String)>**
	Query	**:CURRent[CH]:RATE?**
	Response	<Rating>
		Rating (Probe 1) 1A_AC, 2A_AC, 5A_AC, 10A_AC, 20A_AC, 50A_AC, 100A_AC, 200A_AC, 500A_AC, 1kA_AC, 2kA_AC, 5kA_AC, 1A_ACDC, 2A_ACDC, 5A_ACDC, 10A_ACDC, 20A_ACDC, 50A_ACDC, 100A_ACDC, 200A_ACDC, 500A_ACDC, 1kA_ACDC, 2kA_ACDC, 5kA_ACDC
		Rating (Probe 2) 0.1mV/A , 1mV/A , 10mV/A , 100mV/A , 1V/A
Description	Command	Sets the current sensor rate. [CH]: 1 to 8. The setting can be changed only for the channel for which Probe2 is selected for the current sensor terminal.
	Query	Returns the current sensor rate in a string.
Example	Command	**:CURR1:RATE 1mV/A** Sets the CH1 current sensor rate to 1 mV/A.
	Query	**:CURR1:RATE?**
	Response	(HEADER ON) :CURRENT1:RATE 1mV/A (HEADER OFF) 1mV/A
Reference		• Setting of the current sensor rate for other channels included in the measurement line combination will also be changed.

3.2.11 Save Item

Save Item: Initialized Save Data Items

Syntax	Command	**:DATAout:ITEM:ALLClear**
Description	Command	Initializes the save data items. All the save data items, including harmonics items, associated with :DATAout:ITEM: will be turned OFF.
Example	Command	**:DATA:ITEM:ALLC**
Reference		

Save Item: Setting and Querying Voltage Data

Syntax

Command **:DATAout:ITEM:U <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>, <FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>, <DEG(NR1)>,<FREQ(NR1)>**

Query **:DATAout:ITEM:U?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Urms8	Urms723	Urms6	Urms5	Urms4	Urms3	Urms2	Urms1
MN	Umn8	Umn7	Umn6	Umn5	Umn4	Umn3	Umn2	Umn1
AC	Uac8	Uac7	Uac6	Uac5	Uac4	Uac3	Uac2	Uac1
DC	Udc8	Udc7	Udc6	Udc5	Udc4	Udc3	Udc2	Udc1
FND	Ufnd8	Ufnd7	Ufnd6	Ufnd5	Ufnd4	Ufnd3	Ufnd2	Ufnd1
PK+	PUpk8	PUpk7	PUpk6	PUpk5	PUpk4	PUpk323	PUpk2	PUpk1
PK-	MUpk8	MUpk7	MUpk6	MUpk5	MUpk4	MUpk3	MUpk2	MUpk1
THD	Uthd8	Uthd7	Uthd6	Uthd5	Uthd4	Uthd3	Uthd2	Uthd1
RF	Urf8	Urf7	Urf6	Urf5	Urf4	Urf3	Urf2	Urf1
DEG(ø)	Udeg8	Udeg7	Udeg6	Udeg5	Udeg4	Udeg3	Udeg2	Udeg1
FREQ	FU8	FU7	FU6	FU5	FU4	FU3	FU2	FU1

Description

Command Sets save items of voltage data in a value from 0 to 255.

Query Returns setting for a save item of voltage data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:U 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:DATA:ITEM:U?**

Response (HEADER ON) :DATAOUT:ITEM:U 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Save Item: Setting and Querying Total Voltage Data

Syntax

Command **:DATAout:ITEM:USUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:DATAout:ITEM:USUM?**

Response <RMS1>,<RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Urms78	Urms67	Urms56	Urms45	Urms34	Urms23	Urms12
RMS2			Urms678	Urms567	Urms456	Urms345	Urms234	Urms123
MN1	-	Umn78	Umn67	Umn56	Umn45	Umn34	Umn23	Umn12
MN2			Umn678	Umn567	Umn456	Umn345	Umn234	Umn123
UNB	-	-	Uunb 678	Uunb 567	Uunb 456	Uunb 345	Uunb 234	Uunb 123

Description

Command Sets save items of total voltage data in a value from 0 to 255.

Query Returns setting for a save item of total voltage data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:USUM 2,0,2,0,0**

Sets Urms23 and Umn23 to ON.

Query **:DATA:ITEM:USUM?**

Response (HEADER ON) :DATAOUT:ITEM:USUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Save Item: Setting and Querying Current Data

Syntax

Command **:DATAout:ITEM:I <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>,<FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>,<DEG(NR1)>,<FREQ(NR1)>**

Query **:DATAout:ITEM:I?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Irms8	Irms7	Irms6	Irms5	Irms4	Irms3	Irms2	Irms1
MN	Imn8	Imn7	Imn6	Imn5	Imn4	Imn3	Imn2	Imn1
AC	Iac8	Iac7	Iac6	Iac5	Iac4	Iac3	Iac2	Iac1
DC	Idc8	Idc7	Idc6	Idc5	Idc4	Idc3	Idc2	Idc1
FND	Ifnd8	Ifnd7	Ifnd6	Ifnd5	Ifnd4	Ifnd3	Ifnd2	Ifnd1
PK+	Plpk8	Plpk7	Plpk6	Plpk5	Plpk4	Plpk3	Plpk2	Plpk1
PK-	Mlpk8	Mlpk7	Mlpk6	Mlpk5	Mlpk4	Mlpk3	Mlpk2	Mlpk1
THD	Ithd8	Ithd7	Ithd6	Ithd5	Ithd4	Ithd3	Ithd2	Ithd1
RF	Irf8	Irf7	Irf6	Irf5	Irf4	Irf3	Irf2	Irf1
DEG(ø)	Ideg8	Ideg7	Ideg6	Ideg5	Ideg4	Ideg3	Ideg2	Ideg1
FREQ	FI8	FI7	FI6	FI5	FI4	FI3	FI2	FI1

Description

Command Sets save items of current data in a value from 0 to 255.

Query Returns setting for a save item of current data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:I 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:DATA:ITEM:I?**

Response (HEADER ON) :DATAOUT:ITEM:I 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Save Item: Setting and Querying Total Current Data

Syntax

Command **:DATAout:ITEM:ISUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:DATAout:ITEM:ISUM?**

Response <RMS1>,<RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Irms78	Irms67	Irms56	Irms45	Irms34	Irms23	Irms12
RMS2			Irms678	Irms567	Irms456	Irms345	Irms234	Irms123
MN1	-	Imn78	Imn67	Imn56	Imn45	Imn34	Imn23	Imn12
MN2			Imn678	Imn567	Imn456	Imn345	Imn234	Imn123
UNB	-	-	Iunb 678	Iunb 567	Iunb 456	Iunb 345	Iunb 234	Iunb 123

Description

Command Sets save items of total current data in a value from 0 to 255.

Query Returns setting for a save item of total current data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:ISUM 2,0,2,0,0**

Sets Irms23 and Imn23.

Query **:DATA:ITEM:ISUM?**

Response (HEADER ON) :DATAOUT:ITEM:ISUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Save Item: Setting and Querying Power Data

Syntax

Command **:DATAout:ITEM:P <P(NR1)>,<Pfnd(NR1)>,<S(NR1)>,<Sfnd(NR1)>, <Q(NR1)>,<Qfnd(NR1)>,<PF(NR1)>,<PFfnd(NR1)>,<DEG(NR1)>**

Query **:DATAout:ITEM:P?**

Response <P>,<Pfnd>,<S>,<Sfnd>,<Q>,<Qfnd>,<PF>,<PFfnd>,<DEG>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P	P8	P7	P6	P5	P4	P3	P2	P1
Pfnd	Pfnd8	Pfnd7	Pfnd6	Pfnd5	Pfnd4	Pfnd3	Pfnd2	Pfnd1
S	S8	S7	S6	S5	S4	S3	S2	S1
Sfnd	Sfnd8	Sfnd7	Sfnd6	Sfnd5	Sfnd4	Sfnd3	Sfnd2	Sfnd1
Q	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1
Qfnd	Qfnd8	Qfnd7	Qfnd6	Qfnd5	Qfnd4	Qfnd3	Qfnd2	Qfnd1
PF(λ)	PF8	PF7	PF6	PF5	PF4	PF3	PF2	PF1
PFfnd	PFfnd8	PFfnd7	PFfnd6	PFfnd5	PFfnd4	PFfnd3	PFfnd2	PFfnd1
DEG(ø)	DEG8	DEG7	DEG6	DEG5	DEG4	DEG3	DEG2	DEG1

Description

Command Sets save items of power data in a value from 0 to 255.

Query Returns setting for a save item of power data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:P 1,0,1,0,1,0,1,0,1**

Sets P, S, Q, PF, and DEG for CH1 to ON.

Query **:DATA:ITEM:P?**

Response (HEADER ON) :DATAOUT:ITEM:P 1,0,1,0,1,0,1,0,1

(HEADER OFF) 1,0,1,0,1,0,1,0,1

Reference

Save Item: Setting and Querying Total Power Data

Syntax

Command **:DATAout:ITEM:PSUM <P1(NR1)>,<P2(NR1)>,<Pfnd1(NR1)>,<Pfnd2(NR1)>,<S1(NR1)>,<S2(NR1)>,<Sfnd1(NR1)>,<Sfnd2(NR1)>,<Q1(NR1)>,<Q2(NR1)>,<Qfnd1(NR1)>,<Qfnd2(NR1)>,<PF1(NR1)>,<PF2(NR1)>,<PFfnd1(NR1)>,<PFfnd2(NR1)>,<DEG1(NR1)>,<DEG2(NR1)>**

Query **:DATAout:ITEM:PSUM?**

Response <P1>,<P2>,<Pfnd1>,<Pfnd2>,<S1>,<S2>,<Sfnd1>,<Sfnd2>,<Q1>,<Q2>,<Qfnd1>,<Qfnd2>,<PF1>,<PF2>,<PFfnd1>,<PFfnd2>,<DEG1>,<DEG2>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P1	-	P78	P67	P56	P45	P34	P23	P12
P2			P678	P567	P456	P345	P234	P123
Pfnd1	-	Pfnd78	Pfnd67	Pfnd56	Pfnd45	Pfnd34	Pfnd23	Pfnd12
Pfnd2			Pfnd678	Pfnd567	Pfnd456	Pfnd345	Pfnd234	Pfnd123
S1	-	S78	S67	S56	S45	S34	S23	S12
S2			S678	S567	S456	S345	S234	S123
Sfnd1	-	Sfnd78	Sfnd67	Sfnd56	Sfnd45	Sfnd34	Sfnd23	Sfnd12
Sfnd2			Sfnd678	Sfnd567	Sfnd456	Sfnd345	Sfnd234	Sfnd123
Q1	-	Q78	Q67	Q56	Q45	Q34	Q23	Q12
Q2			Q678	Q567	Q456	Q345	Q234	Q123
Qfnd1	-	Qfnd78	Qfnd67	Qfnd56	Qfnd45	Qfnd34	Qfnd23	Qfnd12
Qfnd2			Qfnd678	Qfnd567	Qfnd456	Qfnd345	Qfnd234	Qfnd123
PF(λ)1	-	PF78	PF67	PF56	PF45	PF34	PF23	PF12
PF(λ)2			PF678	PF567	PF456	PF345	PF234	PF123
PFfnd1	-	PFfnd78	PFfnd67	PFfnd56	PFfnd45	PFfnd34	PFfnd23	PFfnd12
PFfnd2			PFfnd 678	PFfnd 567	PFfnd 456	PFfnd 345	PFfnd 234	PFfnd 123
DEG(ø)1	-	DEG78	DEG67	DEG56	DEG45	DEG34	DEG23	DEG12
DEG(ø)2			DEG678	DEG567	DEG456	DEG345	DEG234	DEG123

Description

Command Sets save items of total power data in a value from 0 to 255.

Query Returns setting for a save item of total power data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0**

Sets P12, S12, Q12, PF12, and DEG12 to ON.

Query **:DATA:ITEM:PSUM?**

Response (HEADER ON) :DATAOUT:ITEM:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

(HEADER OFF) 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

Reference

Save Item: Setting and Querying Integration Data

Syntax

Command **:DATAout:ITEM:INTEGrate <PIH(NR1)>,<MIH(NR1)>,<IH(NR1)>, <PWP(NR1)>,<MWP(NR1)>,<WP(NR1)>,<PWP_SUM1(NR1)>, <PWP_SUM2(NR1)>,<MWP_SUM1(NR1)>,<MWP_SUM2(NR1)>, <WP_SUM1(NR1)>,<WP_SUM2(NR1)>,<Elapsed time(NR1)>**

Query **:DATAout:ITEM:INTEGrate?**

Response <PIH>,<MIH>,<IH>,<PWP>,<MWP>,<WP>,<PWP_SUM1>,<PWP_SUM2>, <MWP_SUM1>,<MWP_SUM2>,<WP_SUM1>,<WP_SUM2>,<Elapsed time>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PIH	PIH8	PIH7	PIH6	PIH5	PIH4	PIH3	PIH2	PIH1
MIH	MIH8	MIH7	MIH6	MIH5	MIH4	MIH3	MIH2	MIH1
IH	IH8	IH7	IH6	IH5	IH4	IH3	IH2	IH1
PWP	PWP8	PWP7	PWP6	PWP5	PWP4	PWP3	PWP2	PWP1
MWP	MWP8	MWP7	MWP6	MWP5	MWP4	MWP3	MWP2	MWP1
WP	WP8	WP7	WP6	WP5	WP4	WP3	WP2	WP1
PWP SUM1	-	PWP78	PWP67	PWP56	PWP45	PWP34	PWP23	PWP12
PWP SUM2			PWP678	PWP567	PWP456	PWP345	PWP234	PWP123
MWP SUM1	-	MWP78	MWP67	MWP56	MWP45	MWP34	MWP23	MWP12
MWP SUM2			MWP678	MWP567	MWP456	MWP345	MWP234	MWP123
WP SUM1	-	WP78	WP67	WP56	WP45	WP34	WP23	WP12
WP SUM2			WP678	WP567	WP456	WP345	WP234	WP123
Elapsed time	-	-	-	-	-	-	-	Time

Description

Command Sets save items of integration data in a value from 0 to 255.
If elapsed time is set to ON, the elapsed time is saved in hours, minutes, seconds and ms units.

Query Returns setting for a save item of integration data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:INTEG 0,0,0,1,1,1,0,0,0,0,0,0,1**

Sets all the integrated power values to ON and integrated elapsed time to ON for CH1.

Query **:DATA:ITEM:INTEG?**

Response (HEADER ON) :DATAOUT:ITEM:INTEGRATE 0,0,0,1,1,1,0,0,0,0,0,0,1
(HEADER OFF) 0,0,0,1,1,1,0,0,0,0,0,0,1

Reference

Save Item: Setting and Querying Motor

Syntax

Command **:DATAout:ITEM:EXTernalin <Torque(NR1)>,<RPM(NR1)>,<Motor power(NR1)>,<Slip(NR1)>,<Independent input(NR1)>**

Query **:DATAout:ITEM:EXTernalin?**

Response <Torque>,<RPM>,<Motor power>,<Slip>,<Independent input>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Torque	-	-	-	-	Tq4	Tq3	Tq2	Tq1
RPM	-	-	-	-	Spd4	Spd3	Spd2	Spd1
Motor power	-	-	-	-	Pm4	Pm3	Pm2	Pm1
Slip	-	-	-	-	Slip4	Slip3	Slip2	Slip1
Independent input	CHH	CHG	CHF	CHE	CHD	CHC	CHB	CHA

Description

Command Sets save items of motor in a value from 0 to 255.

Query Returns setting for a save item of motor in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:EXT 3,3,0,0,0**

Sets M1Tq1, M1Tq2, M1Spd1, and M1Spd2 to ON.

Query **:DATA:ITEM:EXT?**

Response (HEADER ON) :DATAOUT:ITEM:EXTERNALIN 3,3,0,0,0

(HEADER OFF) 3,3,0,0,0

Reference

Save Item: Setting and Querying Calculated Efficiency and Loss Values

Syntax

Command **:DATAout:ITEM:EFFiciency <EFF(NR1)>,<LOSS(NR1)>**

Query **:DATAout:ITEM:EFFiciency?**

Response <EFF>,<LOSS>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
EFF (η)	-	-	-	-	EFF4	EFF3	EFF2	EFF1
LOSS	-	-	-	-	LOSS4	LOSS3	LOSS2	LOSS1

Description

Command Sets save items of calculated efficiency (EFF) and loss (LOSS) values in numerical values from 0 to 255.

Query Returns the settings for a save item of the calculated efficiency and loss values in numerical NR1 values.

Example

Command **:DATA:ITEM:EFF 3,8**

Sets all calculated efficiency values 1 and 2 (EFF1 and EFF2) and calculated loss value 4 (LOSS4) to ON.

Query **:DATA:ITEM:EFF?**

Response (HEADER ON) :DATAOUT:ITEM:EFFICIENCY 3,8

(HEADER OFF) 3,8

Reference

Save Item: Setting and User-defined Formulas

Syntax

Command **:DATAout:ITEM:UDF <UDF1 to 8(NR1)>,<UDF9 to 16(NR1)>, <UDF 17 to 20(NR1)>**

Query **:DATAout:ITEM:UDF?**

Response <UDF1 to 8>,<UDF9 to 16>,<UDF17 to 20>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
UDF1 to 8	UDF8	UDF7	UDF6	UDF5	UDF4	UDF3	UDF2	UDF1
UDF9 to 16	UDF16	UDF15	UDF14	UDF13	UDF12	UDF11	UDF10	UDF9
UDF17 to 20	-	-	-	-	UDF20	UDF19	UDF18	UDF17

Description

Command Sets save items of user-defined formula in a value from 0 to 255.

Query Returns setting for a save item of user-defined formula in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:UDF 3,3,0**

Sets UDF1, UDF2, UDF9, and UDF10 to ON.

Query **:DATA:ITEM:UDF?**

Response (HEADER ON) :DATAOUT:ITEM:UDF 3,3,0

(HEADER OFF) 3,3,0

Reference

Save Item: Setting and Flicker Measurement

Syntax

Command **:DATAout:ITEM:FLICker <Pst(NR1)>,<PstMax(NR1)>,<Plt(NR1)>, <PinstMax(NR1)>,<PinstMin(NR1)>,<dc(NR1)>,<dmax(NR1)>, <Tmax(NR1)>**

Query **:DATAout:ITEM:FLICker?**

Response <Pst>,<PstMax>,<Plt>,<PinstMax>,<PinstMin>,<dc>,<dmax>,<Tmax>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Pst	Pst8	Pst7	Pst6	Pst5	Pst4	Pst3	Pst2	Pst1
Pst Max	PstMax8	PstMax7	PstMax6	PstMax5	PstMax4	PstMax3	PstMax2	PstMax1
Plt	Plt8	Plt7	Plt6	Plt5	Plt4	Plt3	Plt2	Plt1
Pinst Max	Pins tMax8	Pinst Max7	Pinst Max6	Pinst Max5	Pinst Max4	Pinst Max3	Pinst Max2	Pinst Max1
Pinst Min	Pinst Min8	Pinst Min7	Pinst Min6	Pinst Min5i	Pinst Min4	Pinst Min3	Pinst Min2	Pinst Min1
dc	DC8	DC7	DC6	DC5	DC4	DC3	DC2	DC1
dmax	DMax8	DMax7	DMax6	DMax5	DMax4	DMax3	DMax2	DMax1
Tmax	TMax8	TMax7	TMax6	TMax5	TMax4	TMax3	TMax2	TMax1

Description

Command Sets save items of Flicker Measurement in a value from 0 to 255.

Query Returns setting for a save item of Flicker Measurement in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:FLIC 0,0,0,0,0,3,3,3**

Sets UDF1, UDF2, UDF9, and UDF10 to ON.

Query **:DATA:ITEM:FLIC?**

Response (HEADER ON) :DATAOUT:ITEM:FLICKER 0,0,0,0,0,3,3,3

(HEADER OFF) 0,0,0,0,0,3,3,3

Reference

Save Item: Initialized Save Data Items for Harmonics		
Syntax	Command	**:DATAout:ITEM:HARMonic:ALLClear**
Description	Command	Initializes the settings for the communication output data items for harmonics and the settings for the output order. All the save data items for harmonics will be turned OFF.
Example	Command	**:DATA:ITEM:HARM:ALLC**
Reference		

Save Item: Setting and Querying Harmonics Data

Syntax

Command **:DATAout:ITEM:HARMonic:LIST <Level U(NR1)>,<Level I(NR1)>, <Level P(NR1)>,<Level Psum1(NR1)>,<Level Psum2(NR1)>, <Content percentage U(NR1)>,<Content percentage I(NR1)>, <Content percentage P(NR1)>,<Content percentage Psum1(NR1)>, <Content percentage Psum2(NR1)>,<Phase angle U(NR1)>, <Phase angle I(NR1)>,<Phase angle P(NR1)>,<Phase angle Psum1(NR1)>, <Phase angle Psum2(NR1)>,<Synchronization frequency fHRM(NR1)>**

Query **:DATAout:ITEM:HARMonic:LIST?**

Response <Level U>,<Level I>,<Level P>,<Level Psum1>,<Level Psum2>,<Content percentage U>, <Content percentage I>,<Content percentage P>,<Content percentage Psum1>, <Content percentage Psum2>,<Phase angle U>,<Phase angle I>,<Phase angle P>, <Phase angle Psum1>,<Phase angle Psum2>,<Synchronization frequency fHRM>

Harmonics List	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Level U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Level I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Level P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Level Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Level Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Content percentage U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Content percentage I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Content percentage P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Content percentage Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Content percentage Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Phase angle U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Phase angle I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Phase angle P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Phase angle Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Phase angle Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Synchronization frequency fHRM	HF8	HF7	HF6	HF5	HF4	HF3	HF2	HF1

Description

Command Sets save items of harmonics value in a value from 0 to 255.
You must specify a harmonics list (level, content percentage, phase angle, synchronization frequency) here.
You must set items by using ON/OFF for each bit, and specify values with numerical data from 0 to 255.

Query Returns harmonics list settings for save items of harmonics data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:HARM:LIST 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0**
Sets HU1, HI1, and HP1 for the level, HU1, HI1, and HP1 for the content percentage, and HU1, HI1, and HP1 for the phase angle.

Query **:DATA:ITEM:HARM:LIST?**

Response (HEADER ON) :DATAOUT:ITEM:HARMONIC:LIST 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0
(HEADER OFF) 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0

Reference

- Use **:DATAout:ITEM:HARMonic:ORDer** command to set the order to be saved.

Save Item: Setting and Querying InterHarmonics Data

Syntax

Command **:DATAout:ITEM:HARMonic:INTER <Level U(NR1)>,<Level I(NR1)>, <Content percentage U(NR1)>,<Content percentage I(NR1)>**

Query **:DATAout:ITEM:HARMonic:INTER?**

Response <Level U>,<Level I>, <Content percentage U>,<Content percentage I>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Level iU	iHU8	iHU7	iHU6	iHU5	iHU4	iHU3	iHU2	iHU1
Level iI	iHI8	iHI7	iHI6	iHI5	iHI4	iHI3	iHI2	iHI1
Content percentage iU	iHU8	iHU7	iHU6	iHU5	iHU4	iHU3	iHU2	iHU1
Content percentage iI	iHI8	iHI7	iHI6	iHI5	iHI4	iHI3	iHI2	iHI1

Description

Command Sets save items of Interharmonics value in a value from 0 to 255.
You must specify a Interharmonics list (level, content percentage) here.
You must set items by using ON/OFF for each bit, and specify values with numerical data from 0 to 255.

Query Returns Interharmonics list settings for save items of harmonics data in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:ITEM:HARM:INTER 1,0,1,0**

Sets iHU1 for the level, HU1 for the content percentage.

Query **:DATA:ITEM:HARM:INTER?**

Response (HEADER ON) :DATAOUT:ITEM:HARMONIC:INTER 1,0,1,0
(HEADER OFF) 1,0,1,0

Reference

- Use **:DATAout:ITEM:HARMonic:ORDer** command to set the order to be saved.

Save Item: Setting and Querying Output Order for Harmonics Data

Syntax

Command **:DATAout:ITEM:HARMonic:ORDer <Lower limit order(NR1)>, <Upper limit order(NR1)>,<ODD/EVEN/ALL(String)>**

Query **:DATAout:ITEM:HARMonic:ORDer?**

Response <Lower limit order>,<Upper limit order>,<ODD/EVEN/ALL>

Lower limit order	0 to 500
Upper limit order	0 to 500
ODD	Odd order only
EVEN	Even order only
ALL	All orders

Description

Command Sets the upper limit order, lower limit order, and target order for output, for save items of harmonics data.

Query Returns order settings for save items of harmonics data in a numerical NR1 value and a string.

Example

Command **:DATA:ITEM:HARM:ORD 1,15,ODD**

Sets odd orders from 1 to 15 as outputs.

Query **:DATA:ITEM:HARM:ORD?**

Response (HEADER ON) :DATAOUT:ITEM:HARMONIC:ORDER 1,15,ODD
(HEADER OFF) 1,15,ODD

Reference

- Use this command as a combination with **:DATAout:ITEM:HARMonic:LIST** command.

Save Item: Initialized Save Data Items (Secondary)

Syntax

Command **:DATAout:SECond:ALLClear**

Description

Command Initializes the save data items (Secondary).
All the save data items, including harmonics items, associated with :DATAout:SECond: will be turned OFF.

Example

Command **:DATA:SEC:ALLC**

Reference

Save Item: Setting and Querying Voltage Data (Secondary)

Syntax

Command **:DATAout:SECond:U <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>,<FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>,<DEG(NR1)>,<FREQ(NR1)>**

Query **:DATAout:SECond:U?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Urms8	Urms723	Urms6	Urms5	Urms4	Urms3	Urms2	Urms1
MN	Umn8	Umn7	Umn6	Umn5	Umn4	Umn3	Umn2	Umn1
AC	Uac8	Uac7	Uac6	Uac5	Uac4	Uac3	Uac2	Uac1
DC	Udc8	Udc7	Udc6	Udc5	Udc4	Udc3	Udc2	Udc1
FND	Ufnd8	Ufnd7	Ufnd6	Ufnd5	Ufnd4	Ufnd3	Ufnd2	Ufnd1
PK+	PUpk8	PUpk7	PUpk6	PUpk5	PUpk4	PUpk323	PUpk2	PUpk1
PK-	MUpk8	MUpk7	MUpk6	MUpk5	MUpk4	MUpk3	MUpk2	MUpk1
THD	Uthd8	Uthd7	Uthd6	Uthd5	Uthd4	Uthd3	Uthd2	Uthd1
RF	Urf8	Urf7	Urf6	Urf5	Urf4	Urf3	Urf2	Urf1
DEG(ø)	Udeg8	Udeg7	Udeg6	Udeg5	Udeg4	Udeg3	Udeg2	Udeg1
FREQ	FU8	FU7	FU6	FU5	FU4	FU3	FU2	FU1

Description

Command Sets save items of voltage data (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of voltage data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:U 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:DATA:SEC:U?**

Response (HEADER ON) :DATAOUT:SECOND:U 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Save Item: Setting and Querying Total Voltage Data (Secondary)

Syntax

Command **:DATAout:SECond:USUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:DATAout:SECond:USUM?**

Response <RMS1>,<RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Urms78	Urms67	Urms56	Urms45	Urms34	Urms23	Urms12
RMS2			Urms678	Urms567	Urms456	Urms345	Urms234	Urms123
MN1	-	Umn78	Umn67	Umn56	Umn45	Umn34	Umn23	Umn12
MN2			Umn678	Umn567	Umn456	Umn345	Umn234	Umn123
UNB	-	-	Uunb 678	Uunb 567	Uunb 456	Uunb 345	Uunb 234	Uunb 123

Description

Command Sets save items of total voltage data (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of total voltage data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:USUM 2,0,2,0,0**

Sets Urms23 and Umn23 to ON.

Query **:DATA:SEC:USUM?**

Response (HEADER ON) :DATAOUT:SECOND:USUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Save Item: Setting and Querying Current Data (Secondary)

Syntax

Command **:DATAout:SECond:I <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>,<FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>,<DEG(NR1)>,<FREQ(NR1)>**

Query **:DATAout:SECond:I?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Irms8	Irms7	Irms6	Irms5	Irms4	Irms3	Irms2	Irms1
MN	Imn8	Imn7	Imn6	Imn5	Imn4	Imn3	Imn2	Imn1
AC	Iac8	Iac7	Iac6	Iac5	Iac4	Iac3	Iac2	Iac1
DC	Idc8	Idc7	Idc6	Idc5	Idc4	Idc3	Idc2	Idc1
FND	Ifnd8	Ifnd7	Ifnd6	Ifnd5	Ifnd4	Ifnd3	Ifnd2	Ifnd1
PK+	Plpk8	Plpk7	Plpk6	Plpk5	Plpk4	Plpk3	Plpk2	Plpk1
PK-	Mlpk8	Mlpk7	Mlpk6	Mlpk5	Mlpk4	Mlpk3	Mlpk2	Mlpk1
THD	Ithd8	Ithd7	Ithd6	Ithd5	Ithd4	Ithd3	Ithd2	Ithd1
RF	Irf8	Irf7	Irf6	Irf5	Irf4	Irf3	Irf2	Irf1
DEG(ø)	Ideg8	Ideg7	Ideg6	Ideg5	Ideg4	Ideg3	Ideg2	Ideg1
FREQ	FI8	FI7	FI6	FI5	FI4	FI3	FI2	FI1

Description

Command Sets save items of current data (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of current data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:I 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:DATA:SEC:I?**

Response (HEADER ON) :DATAOUT:SECOND:I 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Save Item: Setting and Querying Total Current Data (Secondary)

Syntax

Command **:DATAout:SECond:ISUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:DATAout:SECond:ISUM?**

Response <RMS1>,<RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Irms78	Irms67	Irms56	Irms45	Irms34	Irms23	Irms12
RMS2			Irms678	Irms567	Irms456	Irms345	Irms234	Irms123
MN1	-	Imn78	Imn67	Imn56	Imn45	Imn34	Imn23	Imn12
MN2			Imn678	Imn567	Imn456	Imn345	Imn234	Imn123
UNB	-	-	Iunb 678	Iunb 567	Iunb 456	Iunb 345	Iunb 234	Iunb 123

Description

Command Sets save items of total current data (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of total current data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:ISUM 2,0,2,0,0**

Sets Irms23 and Imn23.

Query **:DATA:SEC:ISUM?**

Response (HEADER ON) :DATAOUT:SECOND:ISUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Save Item: Setting and Querying Power Data (Secondary)

Syntax

Command **:DATAout:SECond:P <P(NR1)>,<Pfnd(NR1)>,<S(NR1)>,<Sfnd(NR1)>,<Q(NR1)>,<Qfnd(NR1)>,<PF(NR1)>,<PFfnd(NR1)>,<DEG(NR1)>**

Query **:DATAout:SECond:P?**

Response <P>,<Pfnd>,<S>,<Sfnd>,<Q>,<Qfnd>,<PF>,<PFfnd>,<DEG>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P	P8	P7	P6	P5	P4	P3	P2	P1
Pfnd	Pfnd8	Pfnd7	Pfnd6	Pfnd5	Pfnd4	Pfnd3	Pfnd2	Pfnd1
S	S8	S7	S6	S5	S4	S3	S2	S1
Sfnd	Sfnd8	Sfnd7	Sfnd6	Sfnd5	Sfnd4	Sfnd3	Sfnd2	Sfnd1
Q	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1
Qfnd	Qfnd8	Qfnd7	Qfnd6	Qfnd5	Qfnd4	Qfnd3	Qfnd2	Qfnd1
PF(λ)	PF8	PF7	PF6	PF5	PF4	PF3	PF2	PF1
PFfnd	PFfnd8	PFfnd7	PFfnd6	PFfnd5	PFfnd4	PFfnd3	PFfnd2	PFfnd1
DEG(ø)	DEG8	DEG7	DEG6	DEG5	DEG4	DEG3	DEG2	DEG1

Description

Command Sets save items of power data (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of power data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:P 1,0,1,0,1,0,1,0,1**

Sets P, S, Q, PF, and DEG for CH1 to ON.

Query **:DATA:SEC:P?**

Response (HEADER ON) :DATAOUT:SECOND:P 1,0,1,0,1,0,1,0,1

(HEADER OFF) 1,0,1,0,1,0,1,0,1

Reference

Save Item: Setting and Querying Total Power Data (Secondary)

Syntax

Command **:DATAout:SECond:PSUM <P1(NR1)>,<P2(NR1)>,<Pfnd1(NR1)>,<Pfnd2(NR1)>,<S1(NR1)>,<S2(NR1)>,<Sfnd1(NR1)>,<Sfnd2(NR1)>,<Q1(NR1)>,<Q2(NR1)>,<Qfnd1(NR1)>,<Qfnd2(NR1)>,<PF1(NR1)>,<PF2(NR1)>,<PFfnd1(NR1)>,<PFfnd2(NR1)>,<DEG1(NR1)>,<DEG2(NR1)>**

Query **:DATAout:SECond:PSUM?**

Response <P1>,<P2>,<Pfnd1>,<Pfnd2>,<S1>,<S2>,<Sfnd1>,<Sfnd2>,<Q1>,<Q2>,<Qfnd1>,<Qfnd2>,<PF1>,<PF2>,<PFfnd1>,<PFfnd2>,<DEG1>,<DEG2>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P1	-	P78	P67	P56	P45	P34	P23	P12
P2			P678	P567	P456	P345	P234	P123
Pfnd1	-	Pfnd78	Pfnd67	Pfnd56	Pfnd45	Pfnd34	Pfnd23	Pfnd12
Pfnd2			Pfnd678	Pfnd567	Pfnd456	Pfnd345	Pfnd234	Pfnd123
S1	-	S78	S67	S56	S45	S34	S23	S12
S2			S678	S567	S456	S345	S234	S123
Sfnd1	-	Sfnd78	Sfnd67	Sfnd56	Sfnd45	Sfnd34	Sfnd23	Sfnd12
Sfnd2			Sfnd678	Sfnd567	Sfnd456	Sfnd345	Sfnd234	Sfnd123
Q1	-	Q78	Q67	Q56	Q45	Q34	Q23	Q12
Q2			Q678	Q567	Q456	Q345	Q234	Q123
Qfnd1	-	Qfnd78	Qfnd67	Qfnd56	Qfnd45	Qfnd34	Qfnd23	Qfnd12
Qfnd2			Qfnd678	Qfnd567	Qfnd456	Qfnd345	Qfnd234	Qfnd123
PF(λ)1	-	PF78	PF67	PF56	PF45	PF34	PF23	PF12
PF(λ)2			PF678	PF567	PF456	PF345	PF234	PF123
PFfnd1	-	PFfnd78	PFfnd67	PFfnd56	PFfnd45	PFfnd34	PFfnd23	PFfnd12
PFfnd2			PFfnd 678	PFfnd 567	PFfnd 456	PFfnd 345	PFfnd 234	PFfnd 123
DEG(ø)1	-	DEG78	DEG67	DEG56	DEG45	DEG34	DEG23	DEG12
DEG(ø)2			DEG678	DEG567	DEG456	DEG345	DEG234	DEG123

Description

Command Sets save items of total power data (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of total power data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0**

Sets P12, S12, Q12, PF12, and DEG12 to ON.

Query **:DATA:SEC:PSUM?**

Response (HEADER ON) :DATAOUT:SECOND:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

(HEADER OFF) 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

Reference

Save Item: Setting and Querying Integration Data (Secondary)

Syntax

Command **:DATAout:SECond:INTEGrate <PIH(NR1)>,<MIH(NR1)>,<IH(NR1)>, <PWP(NR1)>,<MWP(NR1)>,<WP(NR1)>,<PWP_SUM1(NR1)>, <PWP_SUM2(NR1)>,<MWP_SUM1(NR1)>,<MWP_SUM2(NR1)>, <WP_SUM1(NR1)>,<WP_SUM2(NR1)>,<Elapsed time(NR1)>**

Query **:DATAout:SECond:INTEGrate?**

Response <PIH>,<MIH>,<IH>,<PWP>,<MWP>,<WP>,<PWP_SUM1>,<PWP_SUM2>, <MWP_SUM1>,<MWP_SUM2>,<WP_SUM1>,<WP_SUM2>,<Elapsed time>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PIH	PIH8	PIH7	PIH6	PIH5	PIH4	PIH3	PIH2	PIH1
MIH	MIH8	MIH7	MIH6	MIH5	MIH4	MIH3	MIH2	MIH1
IH	IH8	IH7	IH6	IH5	IH4	IH3	IH2	IH1
PWP	PWP8	PWP7	PWP6	PWP5	PWP4	PWP3	PWP2	PWP1
MWP	MWP8	MWP7	MWP6	MWP5	MWP4	MWP3	MWP2	MWP1
WP	WP8	WP7	WP6	WP5	WP4	WP3	WP2	WP1
PWP SUM1	-	PWP78	PWP67	PWP56	PWP45	PWP34	PWP23	PWP12
PWP SUM2			PWP678	PWP567	PWP456	PWP345	PWP234	PWP123
MWP SUM1	-	MWP78	MWP67	MWP56	MWP45	MWP34	MWP23	MWP12
MWP SUM2			MWP678	MWP567	MWP456	MWP345	MWP234	MWP123
WP SUM1	-	WP78	WP67	WP56	WP45	WP34	WP23	WP12
WP SUM2			WP678	WP567	WP456	WP345	WP234	WP123
Elapsed time	-	-	-	-	-	-	-	Time

Description

Command Sets save items of integration data (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of integration data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:INTEG 0,0,0,1,1,1,0,0,0,0,0,0,0**

Sets all the integrated power values to ON for CH1.

Query **:DATA:SEC:INTEG?**

Response (HEADER ON) :DATAOUT:SECOND:INTEGRATE 0,0,0,1,1,1,0,0,0,0,0,0,0

(HEADER OFF) 0,0,0,1,1,1,0,0,0,0,0,0,0

Reference

- Elapsed time is always 0.

Save Item: Setting and Querying Motor (Secondary)

Syntax

Command **:DATAout:SECond:EXTernalin <Torque(NR1)>,<RPM(NR1)>,<Motor power(NR1)>,<Slip(NR1)>,<Independent input(NR1)>**

Query **:DATAout:SECond:EXTernalin?**

Response <Torque>,<RPM>,<Motor power>,<Slip>,<Independent input>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Torque	-	-	-	-	Tq4	Tq3	Tq2	Tq1
RPM	-	-	-	-	Spd4	Spd3	Spd2	Spd1
Motor power	-	-	-	-	Pm4	Pm3	Pm2	Pm1
Slip	-	-	-	-	Slip4	Slip3	Slip2	Slip1
Independent input	CHH	CHG	CHF	CHE	CHD	CHC	CHB	CHA

Description

Command Sets save items of motor (Secondary) in a value from 0 to 255.

Query Returns setting for a save item of motor (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:EXT 3,3,0,0,0**

Sets M1Tq1, M1Tq2, M1Spd1, and M1Spd2 to ON.

Query **:DATA:SEC:EXT?**

Response (HEADER ON) :DATAOUT:SECOND:EXTERNALIN 3,3,0,0,0

(HEADER OFF) 3,3,0,0,0

Reference

Save Item: Initialized Save Data Items for Harmonics (Secondary)

Syntax

Command **:DATAout:SECond:HARMonic:ALLClear**

Description

Command Initializes the settings for the communication output data items (Secondary) for harmonics and the settings for the output order.

All the save data items for harmonics will be turned OFF.

Example

Command **:DATA:SEC:HARM:ALLC**

Reference

Save Item: Setting and Querying Harmonics Data (Secondary)

Syntax

Command **:DATAout:SECond:HARMonic:LIST <Level U(NR1)>,<Level I(NR1)>,<Level P(NR1)>,<Level Psum1(NR1)>,<Level Psum2(NR1)>,<Content percentage U(NR1)>,<Content percentage I(NR1)>,<Content percentage P(NR1)>,<Content percentage Psum1(NR1)>,<Content percentage Psum2(NR1)>,<Phase angle U(NR1)>,<Phase angle I(NR1)>,<Phase angle P(NR1)>,<Phase angle Psum1(NR1)>,<Phase angle Psum2(NR1)>,<Synchronization frequency fHRM(NR1)>**

Query **:DATAout:SECond:HARMonic:LIST?**

Response <Level U>,<Level I>,<Level P>,<Level Psum1>,<Level Psum2>,<Content percentage U>,<Content percentage I>,<Content percentage P>,<Content percentage Psum1>,<Content percentage Psum2>,<Phase angle U>,<Phase angle I>,<Phase angle P>,<Phase angle Psum1>,<Phase angle Psum2>,<Synchronization frequency fHRM>

Harmonics List	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Level U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Level I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Level P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Level Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Level Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Content percentage U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Content percentage I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Content percentage P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Content percentage Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Content percentage Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Phase angle U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Phase angle I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Phase angle P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Phase angle Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Phase angle Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Synchronization frequency fHRM	HF8	HF7	HF6	HF5	HF4	HF3	HF2	HF1

Description

Command Sets save items of harmonics value (Secondary) in a data from 0 to 255.
You must specify a harmonics list (level, content percentage, phase angle, synchronization frequency) here.
You must set items by using ON/OFF for each bit, and specify values with numerical data from 0 to 255.

Query Returns harmonics list settings for save items of harmonics data (Secondary) in a numerical NR1 value from 0 to 255.

Example

Command **:DATA:SEC:HARM:LIST 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0**
Sets HU1, HI1, and HP1 for the level, HU1, HI1, and HP1 for the content percentage, and HU1, HI1, and HP1 for the phase angle.

Query **:DATA:SEC:HARM:LIST?**

Response (HEADER ON) :DATAOUT:SECOND:HARMONIC:LIST 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0
(HEADER OFF) 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0

Reference

- Use **:DATAout:SECond:HARMonic:ORDer** command to set the order to be saved.

Save Item: Setting and Querying Output Order for Harmonics Data (Secondary)

Syntax

Command **:DATAout:SECond:HARMonic:ORDer <Lower limit order(NR1)>,<Upper limit order(NR1)>,<ODD/EVEN/ALL(String)>**

Query **:DATAout:SECond:HARMonic:ORDer?**

Response <Lower limit order>,<Upper limit order>,<ODD/EVEN/ALL>

Lower limit order	0 to 50
Upper limit order	0 to 50
ODD	Odd order only
EVEN	Even order only
ALL	All orders

Description

Command: Sets the upper limit order, lower limit order, and target order for output, for save items of harmonics data (Secondary).

Query: Returns order settings for save items of harmonics data (Secondary) in a numerical NR1 value and a string.

Example

Command **:DATA:SEC:HARM:ORD 1,15,ODD**

Sets odd orders from 1 to 15 as outputs.

Query **:DATA:SEC:HARM:ORD?**

Response (HEADER ON) :DATAOUT:SECOND:HARMONIC:ORDER 1,15,ODD

(HEADER OFF) 1,15,ODD

Reference

- Use this command as a combination with **:DATAout:SECond:HARMonic:LIST** command.

3.2.12 Screen display

Setting and Querying Displayed Items of CUSTOM screen

Syntax

Command **:DISPlay:CUSTom[number] <Item name(String)>,…,<Item name(String)>**

Query **:DISPlay:CUSTom[number]?**

Response <Item name>,...,<Item name>

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command: Sets items for CUSTOM screen. Specify “8”, “16”, “36”, or “64” for [number].

Maximum number of <Item name> is the figure shown in the number.

Items after <Item name> omitted will not be changed.

Query: Returns items for CUSTOM screen in a string. Specify “8”, “16”, “36”, or “64” for [number].

Example

Command **:DISP:CUST8 Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4**

Query **:DISP:CUST8?**

Response (HEADER ON) :DISPLAY:CUSTOM8 Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

(HEADER OFF) Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Single Setting and Querying for Displayed Item on CUSTOM screen

Syntax

Command **:DISPlay:CUSTom[number]:POINT <Line number(NR1)>,<Row number(NR1)>,<Item name(String)>**

Query **:DISPlay:CUSTom[number]:POINT? <Line number(NR1)>,<Row number(NR1)>**

Response <Line number>,<Row number>,<Item name>

Line number 1 to Number of displayed items in the horizontal direction

Row number 1 to Number of displayed items in the vertical direction

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command Sets the item specified by the line number and row number on the CUSTOM screen.

Specify “8”, “16”, “36”, or “64” for [number].

Query Returns the item specified by the line number and row number on the CUSTOM screen in a string.

Specify “8”, “16”, “36”, or “64” for [number].

Example

Command **:DISP:CUST64:POINT 3,12,Urms1**

Changes the item in the 3rd line from the left and the 12th row from the top on the 64 items in the display page of the CUSTOM screen to Urms1.

Query **:DISP:CUST64:POINT? 3,12**

Response (HEADER ON) :DISPLAY:CUSTOM64:POINT 3,12,Urms1

(HEADER OFF) 3,12,Urms1

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Collective Row Setting and Querying for Displayed Items on CUSTOM screen

Syntax

Command **:DISPlay:CUSTom[number]:ROW <Row number(NR1)>,<Item name(String)>,…,<Item name(String)>**

Query **:DISPlay:CUSTom[number]:ROW? <Row number (NR1)>**

Response <Row number>,<Item name>,…,<Item name>

Row number 1 to Number of displayed items in the vertical direction

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command Sets the items in the row specified by the row number on the CUSTOM screen collectively.

Specify “8”, “16”, “36”, or “64” for [number].

The maximum number of <Item names> is the number of items per row.

Items after <Item name> omitted will not be changed.

Query Returns the items in the row specified by the row number on the CUSTOM screen in a string.

Specify “8”, “16”, “36”, or “64” for [number].

Example

Command **:DISP:CUST64:ROW 12,Urms1,Urms2,Urms3,Urms4**

Changes the items in the 12th row from the top on the 64 items in the display page of the CUSTOM screen to Urms1, Urms2, Urms3, and Urms4 in order from the left.

Query **:DISP:CUST64:ROW? 12**

Response (HEADER ON) :DISPLAY:CUSTOM64:ROW 12,Urms1,Urms2,Urms3,Urms4

(HEADER OFF) 12,Urms1,Urms2,Urms3,Urms4

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Collective Line Setting and Querying for Displayed Items on CUSTOM screen

Syntax

Command **:DISPlay:CUSTom[number]:LINE <Line number(NR1)>, <Item name(String)>,…,<Item name(String)>**

Query **:DISPlay:CUSTom[number]:LINE? <Line number(NR1)>**

Response <Line number>,<Item name>,…,<Item name>

Line number 1 to Number of displayed items in the horizontal direction

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command Sets the items in the line specified by the line number on the CUSTOM screen collectively.

Specify “8”, “16”, “36”, or “64” for [number].

The maximum number of <Item names> is the number of items per line.

Items after <Item name> omitted will not be changed.

Query Returns the items in the line specified by the line number on the CUSTOM screen in a string.

Specify “8”, “16”, “36”, or “64” for [number].

Example

Command **:DISP:CUST16:LINE 2,Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4**

Changes the items in the 2nd line from the left on the 16 items in the display page of the CUSTOM screen to Urms1, Umn1, Urms2, Umn2, Urms3, Umn3, Urms4, and Umn4 in order from the top.

Query **:DISP:CUST16:LINE? 2**

Response (HEADER ON) :DISPLAY:CUSTOM16:LINE 2,Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

(HEADER OFF) 2,Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Key Operations of The Instrument

Syntax Command **:DISPlay:KEY <Key name(String)>**

Description Command Performs the same process as when the key on the instrument is operated.

<Key name>	
RUN	Waveform storage RUN/STOP
SINGLE	Single trigger
MANUAL	Manual trigger
KNOBR	Press right knob
KNOBL	Press left knob
PHOLD	Peak hold
START	Integration START/STOP
DRESET	Data reset
HOLD	Hold key
IRA	Current range AUTO
IRM	Current range -
IRP	Current range +
URA	Voltage range AUTO
URM	Voltage range -
URP	Voltage range +
COPY	Screen hardcopy
SAVE	Data save
0ADJ	Zero adjustment
CHL	Channel selection keys(Left)
CHR	Channel selection keys(Right)
FILE	FILE key
SYSTEM	SYSTEM key
INPUT	INPUT key
MEAS	MEAS key

Example Command **:DISP:KEY MEAS**

Behaves the same with the ones for MEAS key.

Reference

- This command operates even in the key lock state.

Switching Display

Syntax

Command **:DISPlay:PAGE <Screen type(String)>**

Query **:DISPlay:PAGE?**

Response <Screen type>

Screen type				
	BASIC	VECTOR2	EFF	COM
	CUSTOM	VECTOR4	UDF	OUTPUT
	WAVE	LIST	MOTOR	CAN
	WAVEVALUE	BAR	FLICKER	FILE
	WAVEZOOM	WIRING	CONFIG	
	WAVEFFT	CH	TIME	
	VECTOR1	COMMON	DATA	

Description

Command Switches the screen.

Query Returns current screen name in a string.

Example

Command **:DISP:PAGE WAVE**

Switches to the WAVE screen.

Query **:DISP:PAGE?**

Response (HEADER ON) :DISPLAY:PAGE WAVE

(HEADER OFF) WAVE

Reference

- When the corresponding option is not implemented, the parameters “MOTOR”, “CAN” and “OUTPUT” become a device-dependent error.

Changing Number of Displayed Items on CUSTOM screen

Syntax

Command **:DISPlay:PAGE:CUSTom <8/ 16/ 36/ 64(NR1)>**

Query **:DISPlay:PAGE:CUSTom?**

Response Number of displayed items 8, 16, 36, 64

Description

Command Switch the number of displayed items on CUSTOM screen.

Query Returns the number of displayed items on the CUSTOM screen in a string.

Example

Command **:DISP:PAGE:CUST 16**

Sets the number of displayed items on the CUSTOM screen to “16”.

Query **:DISP:PAGE:CUST?**

Response (HEADER ON) :DISPLAY:PAGE:CUSTOM 16

(HEADER OFF) 16

Reference

Changing Number of Displayed Items on WAVE+VALUE screen

Syntax

Command :DISPlay:PAGE:WVALue <8/ 32(NR1)>

Query :DISPlay:PAGE:WVALue?

Response Number of displayed items 8, 32

Description

Command Switch the number of displayed items on WAVE+VALUE screen.

Query Returns the number of displayed items on the WAVE+VALUE screen in a string.

Example

Command :DISP:PAGE:WVAL 8

Sets the number of displayed items on the WAVE+VALUE screen to “8”.

Query :DISP:PAGE:WVAL?

Response (HEADER ON) :DISPLAY:PAGE:WVALUE 8

(HEADER OFF) 8

Reference

Setting and Querying Start-up Screen

Syntax

Command :DISPlay:SET:STARting <BACKUP/WIRING(String)>

Query :DISPlay:SET:STARting?

Response BACKUP Last shut down screen

WIRING Wiring screen

Description

Command Sets the startup screen.

Query Returns the startup screen setting in a string.

Example

Command :DISP:SET:STAR BACKUP

Sets the startup screen to the last shut down screen.

Query :DISP:SET:STAR?

Response (HEADER ON) :DISPLAY:SET:STARTING BACKUP

(HEADER OFF) BACKUP

Reference

Setting and Querying Displayed Items of WAVE+VALUE screen

Syntax

Command :DISPlay:WVALue[number] <Item name(String)>,…,<Item name(String)>

Query :DISPlay:WVALue[number]?

Response <Item name>,...,<Item name>

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command Sets items for WAVE+VALUE screen. Specify “8” or “32” for [number].

Maximum number of <Item name> is the figure shown in the number.

Items after <Item name> omitted will not be changed.

Query Returns items for WAVE+VALUE screen in a string. Specify “8” or “32” for [number].

Example

Command :DISP:WVAL8 Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

Query :DISP:WVAL8?

Response (HEADER ON) :DISPLAY:WVALUE8 Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

(HEADER OFF) Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Single Setting and Querying for Displayed Item on WAVE+VALUE screen

Syntax

Command **:DISPlay:WVALue[number]:POINT <Line number(NR1)>,<Row number(NR1)>,<Item name(String)>**

Query **:DISPlay:WVALue[number]:POINT? <Line number(NR1)>,<Row number(NR1)>**

Response <Line number>,<Row number>,<Item name>

Line number 1 to Number of displayed items in the horizontal direction

Row number 1 to Number of displayed items in the vertical direction

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command Sets the item specified by the line number and row number on the WAVE+VALUE screen.

Specify “8” or “32” for [number].

Query Returns the item specified by the line number and row number on the WAVE+VALUE screen in a string.

Specify “8” or “32” for [number].

Example

Command **:DISP:WVAL32:POINT 3,2,Urms1**

Changes the item in the 3rd line from the left and the 2th row from the top on the 32 items in the display page of the WAVE+VALUE screen to Urms1.

Query **:DISP:WVAL32:POINT? 3,2**

Response (HEADER ON) :DISPLAY:WVALUE32:POINT 3,2,Urms1

(HEADER OFF) 3,2,Urms1

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Collective Row Setting and Querying for Displayed Items on WAVE+VALUE screen

Syntax

Command **:DISPlay:WVALue[number]:ROW <Row number(NR1)>,<Item name(String)>,…,<Item name(String)>**

Query **:DISPlay:WVALue[number]:ROW? <Row number (NR1)>**

Response <Row number>,<Item name>,…,<Item name>

Row number 1 to Number of displayed items in the vertical direction

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command Sets the items in the row specified by the row number on the WAVE+VALUE screen collectively.

Specify “8” or “32” for [number].

The maximum number of <Item names> is the number of items per row.

Items after <Item name> omitted will not be changed.

Query Returns the items in the row specified by the row number on the WAVE+VALUE screen in a string.

Specify “8” or “32” for [number].

Example

Command **:DISP:WVAL32:ROW 2,Urms1,Urms2,Urms3,Urms4**

Changes the items in the 2th row from the top on the 32 items in the display page of the WAVE+VALUE screen to Urms1, Urms2, Urms3, and Urms4 in order from the left.

Query **:DISP:WVAL32:ROW? 2**

Response (HEADER ON) :DISPLAY:WVALUE32:ROW 2,Urms1,Urms2,Urms3,Urms4

(HEADER OFF) 2,Urms1,Urms2,Urms3,Urms4

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

Collective Line Setting and Querying for Displayed Items on WAVE+VALUE screen

Syntax

Command **:DISPlay:WVALue[number]:LINE <Line number(NR1)>, <Item name(String)>,…,<Item name(String)>**

Query **:DISPlay:WVALue[number]:LINE? <Line number(NR1)>**

Response <Line number>,<Item name>,…,<Item name>

Line number 1 to Number of displayed items in the horizontal direction

Item name Selects from “4.1 Parameters for Normal Measurement Items”.

Description

Command Sets the items in the line specified by the line number on the WAVE+VALUE screen collectively.

Specify “8” or “32” for [number].

The maximum number of <Item names> is the number of items per line.

Items after <Item name> omitted will not be changed.

Query Returns the items in the line specified by the line number on the WAVE+VALUE screen in a string.

Specify “8” or “32” for [number].

Example

Command **:DISP:WVAL32:LINE 2,Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4**

Changes the items in the 2nd line from the left on the 32 items in the display page of the WAVE+VALUE screen to Urms1, Umn1, Urms2, Umn2, Urms3, Umn3, Urms4, and Umn4 in order from the top.

Query **:DISP:WVAL32:LINE? 2**

Response (HEADER ON) :DISPLAY:WVALUE32:LINE 2,Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

(HEADER OFF) 2,Urms1,Umn1,Urms2,Umn2,Urms3,Umn3,Urms4,Umn4

Reference

- To specify secondary normal measurement items add [SC] at the end of the parameters given in the Normal Measurement Items list.

3.2.13 Motor analysis option

Querying Motor Analysis Option

Syntax

Query **:EXTernalin:EXISt?**

Response Y Option available

N Option unavailable

Description

Query Returns availability of options in a string.

Example

Query **:EXT:EXIS?**

Response (HEADER ON) :EXTERNALIN:EXIST Y

(HEADER OFF) Y

Reference

Executing and Querying Motor Channel Zero Adjustment

Syntax

Command **:EXTernalin:ZEROadjust**

Query **:EXTernalin:ZEROadjust?**

Response <Result>

Result	OK	Normal complete
	BUSY	Executing the zero adjustment of the voltage current channel or motor input channel
	YET	Not executed yet before start
	ERROR	Zero adjustment failure

Description

Command Executes the motor channel zero adjustment.

Query Returns the execution result of the motor channel zero adjustment in a string.

Example

Command **:EXT:ZERO**

Executes the motor channel zero adjustment.

Query **:EXT:ZERO?**

Response (HEADER ON) :EXTERNALIN:ZEROADJUST OK

(HEADER OFF) OK

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- An execution error occurs when the motor channel zero adjustment is already running or when the voltage current channel zero adjustment is running.
- It takes 20 seconds or more to complete the execution of the zero adjustment. During this period, some of the commands may result in an execution error.
- Send a command combined with ***OPC?**, such as **:EXTernal:ZEROadjust;*OPC?**, and send the next command after a response to ***OPC?** is returned.

Setting and Querying Z-Phase Reference

Syntax

Command **:EXTernalin:[PAIR]:ZSLOPe <RISING/FALLING(String)>**

Query **:EXTernalin:[PAIR]:ZSLOPe?**

Response

RISING	Rising edge
FALLING	Falling edge

Description

Command Sets the Z-phase reference.

Specify “A_D” or “E_H” for [PAIR].

Query Returns the setting of the Z-phase reference in a string.

Example

Command **:EXT:A_D:ZSLOP RISING**

Sets the Z-phase references of motors A to D to RISING.

Query **:EXT:A_D:ZSLOP?**

Response (HEADER ON) :EXTERNALIN:A_D:ZSLOPE RISING

(HEADER OFF) RISING

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.

Setting and Querying Analog Lowpass Filter

Syntax

Command **:EXTernalin:[CH]:ANALog:LPF <Frequency data(String)>**

Query **:EXTernalin:[CH]:ANALog:LPF?**

Response <Frequency data>

Frequency data OFF, 1kHz

Description

Command Sets the analog lowpass filter for the specified motor channel.

For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.

Query Returns the analog lowpass filter of the specified motor channel in a string as the response.

Example

Command **:EXT:CHA:ANAL:LPF 1kHz**

Sets the analog lowpass filter of motor channel A to 1kHz.

Query **:EXT:CHA:ANAL:LPF?**

Response (HEADER ON) :EXTERNALIN:CHA:ANALOG:LPF 1kHz

(HEADER OFF) 1kHz

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.

Setting and Querying Voltage Range for Motor Analog Channel

Syntax

Command **:EXTernalin:[CH]:ANALog:RANGe <Range value(NR1)>**

Query **:EXTernalin:[CH]:ANALog:RANGe?**

Response <Range value>

Range value 1, 5, 10

Description

Command Sets the voltage range for the specified motor channel.

For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.

Query Returns the voltage range of the specified motor channel in a numerical NR1 value.

Example

Command **:EXT:CHA:ANAL:RANG 10**

Sets the voltage range of motor channel A to ±10 V.

Query **:EXT:CHA:ANAL:RANG?**

Response (HEADER ON) :EXTERNALIN:CHA:ANALOG:RANGE 10

(HEADER OFF) 10

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.

Torque meter Correction: Setting and Querying Friction Correction Function		
Syntax	Command	**:EXTernalin:[CH]:COMP:SPEED <ON/OFF(String)>**
	Query	**:EXTernalin:[CH]:COMP:SPEED?**
	Response	ON Sets the friction correction function to ON. OFF Sets the friction correction function to OFF.
Description	Command	Sets the friction correction function of the specified motor channel to ON or OFF. For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.
	Query	Returns the ON or OFF setting of the friction correction function of the specified channel in a string.
Example	Command	**:EXT:CHA:COMP:SPEED ON** Sets the friction correction function of motor channel A to ON.
	Query	**:EXT:CHA:COMP:SPEED?**
	Response	(HEADER ON) :EXTERNALIN:CHA:COMP:SPEED ON (HEADER OFF) ON
Reference		• When the motor analysis option is not implemented, a device-dependent error occurs.

Torque meter Correction: Setting and Querying Friction Correction Value

Syntax

Command: **:EXTernalin:[CH]:COMP:SPEED:VALue <RPM calibration point 1(String)>,<Torque calibration value 1(String)>,<RPM calibration point 2(String)>,<Torque calibration value 2(String)>,...,<RPM calibration point 11(String)>,<Torque calibration value 11(String)>**

Query: **:EXTernalin:[CH]:COMP:SPEED:VALue?**

Response: <RPM calibration point 1>,<Torque calibration value 1>,<RPM calibration point 2>,<Torque calibration value 2>,...,<RPM calibration point 11>,<Torque calibration value 11>

RPM calibration point	Signed significant number of 6 digits and an SI prefix. "n", "u", "m", "k", "M", "G", or "T" can be specified for the SI prefix.
Torque calibration value	Signed significant number of 6 digits and an SI prefix. "n", "u", "m", "k", "M", "G", or "T" can be specified for the SI prefix.

Description

Command: Sets the correction value of the friction correction function of the specified channel.
For [CH], specify "CHA", "CHC", "CHE", or "CHG".

Query: Returns the correction value of the friction correction function of the specified channel in a string.

Example

Command: **:EXT:CHA:COMP:SPEED:VAL +1.00000,+1.00000,+2.00000,+2.00000,+3.00000,+3.00000,+4.00000,+4.00000,+5.00000,+5.00000,+6.00000,+6.00000,+7.00000,+7.00000,+8.00000,+8.00000,+9.00000,+9.00000,+10.0000,+10.0000,+11.0000,+11.0000**

Query: **:EXT:CHA:COMP:SPEED:VAL?**

Response:

(HEADER ON) :EXTERNALIN:CORR1:SPEED:VALUE +1.00000,+1.00000,+2.00000,+2.00000,+3.00000,+3.00000,+4.00000,+4.00000,+5.00000,+5.00000,+6.00000,+6.00000,+7.00000,+7.00000,+8.00000,+8.00000,+9.00000,+9.00000,+10.0000,+10.0000,+11.0000,+11.0000

(HEADER OFF) +1.00000,+1.00000,+2.00000,+2.00000,+3.00000,+3.00000,+4.00000,+4.00000,+5.00000,+5.00000,+6.00000,+6.00000,+7.00000,+7.00000,+8.00000,+8.00000,+9.00000,+9.00000,+10.0000,+10.0000,+11.0000,+11.0000

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- Be sure to enter the torque calibration value for the RPM calibration point. If the total number of parameters is not an even number, a command error occurs.
- Enter the RPM calibration points in ascending order. Otherwise, a command error occurs.
- When the number of parameters is less than 22, insufficient parameters are processed as unentered.
- Unentered parameters do not return a response. When all items are unentered, NONE is returned.
- When only NONE is entered for the parameters, it is determined that all items are unentered.
- This command is case-sensitive in the parameter section.

Torque meter Correction: Setting and Querying Nonlinearity Correction Function		
Syntax	Command	**:EXTernalin:[CH]:COMP:TORQue <ON/OFF(String)>**
	Query	**:EXTernalin:[CH]:COMP:TORQue?**
	Response	ON Sets the nonlinearity correction function to ON. OFF Sets the nonlinearity correction function to OFF.
Description	Command	Sets the nonlinearity correction function of the specified motor channel to ON or OFF. For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.
	Query	Returns the ON or OFF setting of the nonlinearity correction function of the specified channel in a string.
Example	Command	**:EXT:CHA:COMP:TORQ ON** Sets the nonlinearity correction function of motor channel A to ON.
	Query	**:EXT:CHA:COMP:TORQ?**
	Response	(HEADER ON) :EXTERNALIN:CHA:COMP:TORQUE ON (HEADER OFF) ON
Reference		• When the motor analysis option is not implemented, a device-dependent error occurs.

Torque meter Correction: Setting and Querying Nonlinearity Correction Value

Syntax

Command
:EXTernalin:[CH]:COMP:TORQue:VALue <Torque calibration point 1(String)>,<Torque calibration value 1(String)>,<Torque calibration point 2(String)>,<Torque calibration value 2(String)>,…,<Torque calibration point 11(String)>,<Torque calibration value 11(String)>

Query
:EXTernalin:[CH]:COMP:TORQue:VALue?

Response
<Torque calibration point 1>,<Torque calibration value 1>,<Torque calibration point 2>,<Torque calibration value 2>,…,<Torque calibration point 11>,<Torque calibration value 11>

Torque calibration point: Signed significant number of 6 digits and an SI prefix. "n", "u", "m", "k", "M", "G", or "T" can be specified for the SI prefix.

Torque calibration value: Signed significant number of 6 digits and an SI prefix. "n", "u", "m", "k", "M", "G", or "T" can be specified for the SI prefix.

Description

Command
Sets the correction value of the nonlinearity correction function of the specified channel. For [CH], specify "CHA", "CHC", "CHE", or "CHG".

Query
Returns the correction value of the nonlinearity correction function of the specified channel in a string.

Example

Command
:EXT:CHA:COMP:TORQ:VAL +1.00000,+1.00000,+2.00000,+2.00000,+3.00000,+3.00000,+4.00000,+4.00000,+5.00000,+5.00000,+6.00000,+6.00000,+7.00000,+7.00000,+8.00000,+8.00000,+9.00000,+9.00000,+10.0000,+10.0000,+11.0000,+11.0000

Query
:EXT:CHA:COMP:TORQ:VAL?

Response
(HEADER ON) :EXTERNALIN:CORR1:TORQUE:VALUE +1.00000,+1.00000,+2.00000,+2.00000,+3.00000,+3.00000,+4.00000,+4.00000,+5.00000,+5.00000,+6.00000,+6.00000,+7.00000,+7.00000,+8.00000,+8.00000,+9.00000,+9.00000,+10.0000,+10.0000,+11.0000,+11.0000

(HEADER OFF) +1.00000,+1.00000,+2.00000,+2.00000,+3.00000,+3.00000,+4.00000,+4.00000,+5.00000,+5.00000,+6.00000,+6.00000,+7.00000,+7.00000,+8.00000,+8.00000,+9.00000,+9.00000,+10.0000,+10.0000,+11.0000,+11.0000

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- Be sure to enter the torque calibration value for the torque calibration point. If the total number of parameters is not an even number, a command error occurs.
- Enter the torque calibration value in ascending order. Otherwise, a command error occurs.
- When the number of parameters is less than 22, insufficient parameters are processed as unentered.
- Unentered parameters do not return a response. When all items are unentered, NONE is returned.
- When only NONE is entered for the parameters, it is determined that all items are unentered.
- This command is case-sensitive in the parameter section.

Setting and Querying Upper Motor Frequency Limit

Syntax

Command **:EXTernalin:[CH]:FREQuency:UPPer <Upper frequency limit(String)>**

Query **:EXTernalin:[CH]:FREQuency:UPPer?**

Response <Upper frequency limit>

Upper frequency limit 100Hz, 500Hz, 1kHz, 5kHz, 10kHz, 50kHz, 100kHz, 500kHz, 1MHz, 2MHz

Description

Command Sets the upper frequency limit of the specified motor channel.

For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.

Query Returns the upper frequency limit of the specified motor channel in a string.

Example

Command **:EXT:CHA:FREQ:UPP 1kHz**

Sets the upper frequency limit of motor channel A to 1kHz.

Query **:EXT:CHA:FREQ:UPP?**

Response (HEADER ON) :EXTERNALIN:CHA:FREQUENCY:UPPER 1kHz

(HEADER OFF) 1kHz

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- The setting of another channel may be changed depending on the motor wiring state.
- When the upper frequency limit is set to 100Hz, the lower frequency limit value may be changed.

Setting and Querying Motor Lower Frequency Limit

Syntax

Command **:EXTernalin:[CH]:FREQuency:LOWer <Lower frequency limit(String)>**

Query **:EXTernalin:[CH]:FREQuency:LOWer?**

Response <Lower frequency limit>

Lower frequency limit 0.1Hz, 1Hz, 10Hz, 100Hz

Description

Command Sets the lower frequency limit of the specified motor channel.

For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.

Query Returns the lower frequency limit of the specified motor channel in a string.

Example

Command **:EXT:CHA:FREQ:LOW 10Hz**

Sets the lower frequency limit of motor channel A to 10Hz.

Query **:EXT:CHA:FREQ:LOW?**

Response (HEADER ON) :EXTERNALIN:CHA:FREQUENCY:LOWER 10Hz

(HEADER OFF) 10Hz

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- The setting of another channel may be changed depending on the motor wiring state.
- When the lower frequency limit is set to 100Hz, the upper frequency limit value may be changed.

Setting and Querying Center Frequency

Syntax

Command :EXTernalin:[CH]:FREQuency:CENTer <Center frequency [kHz](NR2)>

Query :EXTernalin:[CH]:FREQuency:CENTer?

Response <Center frequency [kHz]>

Center frequency 1.000000 to 500.0000 (1kHz to 500kHz)

Description

Command Sets the center frequency of the input frequency range (unit: kHz).

For [CH], specify “CHA”, “CHB”, “CHC”, “CHE”, “CHF”, or “CHG”.

Query Returns the center frequency of the input frequency range in a numerical value.

Example

Command :EXT:CHA:FREQ:CENT 10

Sets the center frequency of motor channel A to 10kHz.

Query :EXT:CHA:FREQ:CENT?

Response (HEADER ON) :EXTERNALIN:CHA:FREQUENCY:CENTER 10.00000

(HEADER OFF) 10.00000

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- The center frequency can be set with a value using a 7-digit floating point number (unit: kHz).
- Set the center frequency so that the two conditions shown below are satisfied. If these conditions are not satisfied, an execution error occurs.

(Center frequency + frequency range) ≤ 500kHz

(Center frequency − frequency range) ≥ 1kHz

Setting and Querying Frequency Range

Syntax

Command :EXTernalin:[CH]:FREQuency:RANGe <Frequency range [kHz](NR2)>

Query :EXTernalin:[CH]:FREQuency:RANGe?

Response <Frequency range [kHz]>

Frequency range 1.000000 to 500.0000 (1kHz to 500kHz)

Description

Command Sets the frequency range of the input frequency range (unit: kHz).

For [CH], specify “CHA”, “CHB”, “CHC”, “CHE”, “CHF”, or “CHG”.

Query Returns the frequency range of the input frequency range in a numerical value.

Example

Command :EXT:CHA:FREQ:RANG 10

Sets the center frequency of motor channel A to 10kHz.

Query :EXT:CHA:FREQ:RANG?

Response (HEADER ON) :EXTERNALIN:CHA:FREQUENCY:RANGE 10.00000

(HEADER OFF) 10.00000

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- The center frequency can be set with a value using a 7-digit floating point number (unit: kHz).
- Set the center frequency so that the two conditions shown below are satisfied. If these conditions are not satisfied, an execution error occurs.

(Center frequency + frequency range) ≤ 500kHz

(Center frequency − frequency range) ≥ 1kHz

Setting and Querying Motor Channel Input Type

Syntax

Command: **:EXTernalin:[CH]:MODE <ANALOG/PULSE(String)>**

Query: **:EXTernalin:[CH]:MODE?**

Response:

ANALOG	Analog DC input
PULSE	Pulse input, Frequency input

Description

Command: Sets the input type of the specified motor channel.
For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.

Query: Returns the input type of the specified motor channel in a string.

Example

Command: **:EXT:CHA:MODE ANALOG**

Sets the input type of motor channel A to ANALOG.

Query: **:EXT:CHA:MODE?**

Response: (HEADER ON) :EXTERNALIN:CHA:MODE ANALOG
(HEADER OFF) ANALOG

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- The input type may not be set depending on the motor wiring state. In this case, an execution error occurs.

Setting and Querying Pulse Noise Filter

Syntax

Command: **:EXTernalin:[CH]:PULSe:PNF <OFF/WEAK/STRONG(String)>**

Query: **:EXTernalin:[CH]:PULSe:PNF?**

Response:

OFF	Noise filter: OFF
WEAK	Noise filter: weak
STRONG	Noise filter: strong

Description

Command: Sets the pulse noise filter of the specified motor channel.
For [CH], specify “CHA”, “CHB”, “CHC”, “CHD”, “CHE”, “CHF”, “CHG”, or “CHH”.

Query: Returns the pulse noise filter setting of the specified motor channel in a string.

Example

Command: **:EXT:CHA:PULS:PNF OFF**

Sets the pulse noise filter of motor channel A to OFF.

Query: **:EXT:CHA:PULS:PNF?**

Response: (HEADER ON) :EXTERNALIN:CHA:PULSE:PNF OFF
(HEADER OFF) OFF

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.

Setting and Querying Pulse Number

Syntax

Command :EXTernalin:[CH]:PULSe:NUMBer <Pulse number(NR1)>

Query :EXTernalin:[CH]:PULSe:NUMBer?

Response <Pulse number>

Pulse number ±1 to 60000

Description

Command Sets the pulse number of the specified motor channel.

For [CH], specify “CHB”, “CHC”, “CHD”, “CHF”, “CHG”, or “CHH”.

Query Returns the pulse count of the specified motor channel in a numerical NR1 value.

Example

Command :EXT:CHB:PULS:NUMB 360

Sets the pulse number of motor channel B to 360.

Query :EXT:CHB:PULS:NUMB?

Response (HEADER ON) :EXTERNALIN:CHB:PULSE:NUMBER 360

(HEADER OFF) 360

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.

Setting and Querying No. of Poles

Syntax

Command :EXTernalin:[CH]:PULSe:POLes <No. of poles(NR1)>

Query :EXTernalin:[CH]:PULSe:POLes?

Response <No. of poles>

No. of poles Any even value from 2 to 254

Description

Command Sets the number of poles of the specified motor channel.

For [CH], specify “CHB”, “CHC”, “CHD”, “CHF”, “CHG”, or “CHH”.

Query Returns the number of poles of the specified motor channel in a numerical NR1 value.

Example

Command :EXT:CHB:PULS:POL 8

Sets the number of poles of motor channel B to 8.

Query :EXT:CHB:PULS:POL?

Response (HEADER ON) :EXTERNALIN:CHB:PULSE:POLES 8

(HEADER OFF) 8

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- Only an even number can be entered. If an odd number is entered, an execution error occurs.

Setting and Querying RPM Scaling

Syntax

Command **:EXTernalin:[CH]:SCALe:SPEED <RPM scaling(NR2)>**

Query **:EXTernalin:[CH]:SCALe:SPEED?**

Response <RPM Scaling>

RPM Scaling ±0.00001 to 99999.9

Description

Command Sets the RPM scaling of the specified motor channel.

For [CH], specify “CHC” or “CHG”.

Query Returns the RPM scaling of the specified motor channel in a numerical value.

Example

Command **:EXT:CHC:SCAL:SPEED 3000**

Sets the RPM scaling of motor channel C to 3000.

Query **:EXT:CHC:SCAL:SPEED?**

Response (HEADER ON) :EXTERNALIN:CHC:SCALE:SPEED +3000.00

(HEADER OFF) +3000.00

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.

Setting and Querying Torque Scaling

Syntax

Command **:EXTernalin:[CH]:SCALe:TORQue <Torque scaling(String)>**

Query **:EXTernalin:[CH]:SCALe:TORQue?**

Response <Torque Scaling>

Torque Scaling ±0.01 to 9999.99 (m/k)

Description

Command Sets the torque scaling of the specified motor channel.

For [CH], specify “CHA”, “CHB”, “CHC”, “CHE”, “CHF”, or “CHG”.

Query Returns the torque scaling of the specified motor channel in a string.

Example M

Command **:EXT:CHA:SCAL:TORQ 10**

Sets the torque scaling of motor channel A to 10.

Query **:EXT:CHA:SCAL:TORQ?**

Response (HEADER ON) :EXTERNALIN:CHA:SCALE:TORQUE +10.00

(HEADER OFF) +10.00

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- When the input type of the specified channel is “pulse”, set the rating torque value.
- SI prefixes “m” and “k” can be used.

Setting and Querying Input Frequency Source for Slip Calculation

Syntax

Command **:EXTernalin:[CH]:SLIP <Frequency source(String)>**

Query **:EXTernalin:[CH]:SLIP?**

Response <Frequency source>

Frequency source fU1, fU2, fU3, fU4, fU5, fU6, fU7, fU8,
fI1, fI2, fI3, fI4, fI5, fI6, fI7, fI8

Description

Command Sets the input frequency source for slip calculation of the specified motor channel.
For [CH], specify “CHB”, “CHC”, “CHD”, “CHF”, “CHG”, or “CHH”.

Query Returns the setting of the input frequency source for slip calculation of the specified motor channel in a string.

Example

Command **:EXT:CHB:SLIP fU1**

Sets the input frequency source for slip calculation of motor channel B to fU1.

Query **:EXT:CHB:SLIP?**

Response (HEADER ON) :EXTERNALIN:CHB:SLIP fU1
(HEADER OFF) fU1

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.

Setting and Querying Motor Channel Synchronization Source

Syntax

Command **:EXTernalin:[CH]:SOURce <Synchronization source(String)>**

Query **:EXTernalin:[CH]:SOURce?**

Response <Synchronization source>

Synchronization source U1, U2, U3, U4, U5, U6, U7, U8,
I1, I2, I3, I4, I5, I6, I7, I8,
DC,
Ext1, Ext2, Ext3, Ext4, Zph1, Zph3,
CHB, CHD, CHF, CHH

Description

Command Sets the motor synchronization source of the specified motor channel.
For [CH], specify “CHA”, “CHC”, “CHE”, or “CHG”.

Query Returns the setting of the motor synchronization source of the specified motor channel in a string.

Example

Command **:EXT:CHA:SOUR U1**

Sets the synchronization source of motor channel A to the channel 1 voltage.

Query **:EXT:CHA:SOUR?**

Response (HEADER ON) :EXTERNALIN:CHA:SOURCE U1
(HEADER OFF) U1

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- The setting of another channel may be changed depending on the motor wiring state.
- For details about synchronization source usage conditions, check the synchronization source setting.

Setting and Querying Motor Wiring

Syntax

Command **:EXTernalin:[CH]:WIRing <Motor wiring(String)>**

Query **:EXTernalin:[CH]:WIRing?**

Response <Motor wiring>

Motor wiring	IND	Individual Input
	TSP	Torque Speed(Pulse)
	TSDO	Torque Speed Direction Origin
	TSD	Torque Speed Direction
	TSO	Torque Speed Origin
	TSA	Torque Speed(Analog)

Description

Command Sets the motor wiring including the specified motor channel.
For [CH], specify “CHA”, “CHB”, “CHC”, “CHD”, “CHE”, “CHF”, “CHG”, or “CHH”.

Query Returns the motor wiring including the specified motor channel in a string.

Example

Command **:EXT:CHA:WIR TSDO**
Sets the motor wiring including motor channel A to Torque Speed Direction Origin.

Query **:EXT:CHA:WIR?**

Response (HEADER ON) :EXTERNALIN:CHA:WIRING TSDO
(HEADER OFF) TSDO

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- The setting of another channel may be changed.

3.2.14 FFT Analysis

Querying FFT Analysis Complex Number Data

Syntax

Query: **:FFT:COMPlex? <Data type(NR1)>,<Start index(NR1)>, <Number of points(NR1)>**

Data types	1	U data
	2	I data
starting index	0 ~ 40% of the number of FFT analysis points - 1 (0 if not specified)	
points	FFT analysis points to transfer. (number of points after the start index if not specified)	

Response: Binary response data

Description

Query: Returns FFT analysis complex data and its information in response data format. .
For more information on binary data, please see "Output data format for FFT analysis complex data query".

Example

Query: **:FFT:COMPlex? 1,0,500**

Response: Binary response data

Reference

- If multi-phase wiring is specified for the channel to be analyzed, the data of the CH with the smallest value is responded.Cannot be output when motor option is selected.
- If the MOTOR is selected for the channel to be analyzed, binary data will not be output.
- If FFT analysis cannot be performed or the parameters are invalid, only the character string "00000000000:" is returned.

Querying FFT Analysis Calculation Number Data

Syntax

Query: **:FFT:DOWNload? <Data type(NR1)>,<Start index(NR1)>, <Number of points(NR1)>**

Data types	1	U or CHA data
	2	I or CHC data
	3	P or CHE data
	4	CHG data
	5	θ (Voltage Current Phase Difference) data
starting index	0 ~ 40% of the number of FFT analysis points - 1 (0 if not specified)	
points	FFT analysis points to transfer. (number of points after the start index if not specified)	

Response: Binary response data

Description

Query: Returns FFT analysis calculation data and its information in response data format.
For more information on binary data, please see "Output data format for FFT analysis data query".

Example

Query: **:FFT:DOWNload? 1,0,500**

Response: Binary response data

Reference

- When the target channel for analysis is CH1 to CH678, 4 cannot be selected in <Data Type>.
- When the target channel for analysis is CH12 to CH678 or MOTOR, 5 cannot be selected for <Data Type>.
- If FFT analysis cannot be performed, or if the parameter is invalid, only the string "00000000000:" will be returned.

Setting and querying Measurement Channels for FFT Analysis

Syntax

Command **:FFT:ITEM <Measurement channels(String)>**

Query **:FFT:ITEM?**

Response <Measurement channels>

Measurement channels CH1, CH2, CH3, CH4, CH5, CH6, CH7, CH8, CH12, CH23, CH34, CH45, CH56, CH67, CH78, CH123, CH234, CH345, CH456, CH567, CH678, MOTOR

Description

Command Sets the measurement channel for FFT analysis.

Query Returns the setting of the measurement channel for FFT analysis as a string.

Example

Command **:FFT:ITEM CH1**

Sets the measurement channel for FFT analysis to CH1.

Query **:FFT:ITEM?**

Response (HEADER ON) :FFT:ITEM CH1

(HEADER OFF) CH1

Reference

Setting and querying Lower Limt Frequency for FFT Analysis

Syntax

Command **:FFT:LOWerfreq <Frequency(NR1)>**

Query **:FFT:LOWerfreq?**

Response <Frequency>

Frequency 0～6000(kHz)

Description

Command Sets the lower limit frequency for FFT analysis.

Query Returns the FFT analysis lower frequency limit setting as an NR1 number.

Example

Command **:FFT:LOW 50**

Sets the lower limit frequency for FFT analysis to 50 kHz.

Query **:FFT:LOW?**

Response (HEADER ON) :FFT:LOWERFREQ 50

(HEADER OFF) 50

Reference

Setting and querying Anti-Aliasing LPF for FFT Analysis

Syntax

Command **:FFT:LPF <ON/OFF(String)>**

Query **:FFT:LPF?**

Response ON Anti-aliasing LPF enabled

OFF Anti-aliasing LPF disabled

Description

Command Turn on/off the anti-aliasing filter for FFT analysis.

Query Returns ON/OFF of the anti-aliasing filter for FFT analysis as a string.

Example

Command **:FFT:LPF ON**

Enable anti-aliasing filter for FFT analysis.

Query **:FFT:LPF?**

Response (HEADER ON) :FFT:LPF ON

(HEADER OFF) ON

Reference

- Enabling or disabling LPF may affect FFT analysis results.

Setting and querying Number of Points for FFT Analysis

Syntax

Command **:FFT:POINt <Number of points(NR1)>**

Query **:FFT:POINt?**

Response <Number of points>

Number of points 1000, 5000, 10000, 50000, 100000, 500000, 1000000, 5000000

Description

Command Sets the number of points for FFT analysis.

Query Returns the setting of the number of points for FFT analysis as an NR1 number.

Example

Command **:FFT:POIN 1000**

Sets the number of points for FFT analysis to 1000.

Query **:FFT:POIN?**

Response (HEADER ON) :FFT:POINT 1000

(HEADER OFF) 1000

Reference

Setting and querying Sampling Rate for FFT Analysis

Syntax

Command **:FFT:SAMPling <Sampling Rate(String)>**

Query **:FFT:SAMPling?**

Response <Sampling Rate>

Sampling Rate 10kHz, 25kHz, 50kHz, 100kHz, 250kHz, 500kHz, 1MHz, 2.5MHz, 5MHz, 7.5MHz, 15MHz

Description

Command Sets the sampling rate for FFT analysis.

Query Returns the setting of the sampling rate for FFT analysis as a string.

Example

Command **:FFT:SAMP 10kHz**

Sets the sampling rate for FFT analysis to 10 kHz.

Query **:FFT:SAMP?**

Response (HEADER ON) :FFT:SAMPLING 10kHz

(HEADER OFF) 10kHz

Reference

Querying Number of Stored Points for FFT Analysis

Syntax

Query **:FFT:SAVEDPOINt?**

Response <Number of points>

Number of points 400, 2000, 4000, 20000, 40000, 200000, 400000, 2000000

Description

Query Returns the number of stored points for FFT analysis as an NR1 number.

Example

Query **:FFT:SAVEDPOIN?**

Response (HEADER ON) :FFT:SAVEDPOINT 400

(HEADER OFF) 400

Reference

Setting and querying Start Position for FFT Analysis

Syntax

Command **:FFT:STARt <Start Position(NR1)>**

Query **:FFT:STARt?**

Response <Start Position(dot)>

Start Position(dot) 0～999

Description

Command Sets the starting position for FFT analysis.

Query Returns the setting of the starting position of FFT analysis as an NR1 number.

Example

Command **:FFT:STAR 100**

Sets the starting position of FFT analysis to 100.

Query **:FFT:STAR?**

Response (HEADER ON) :FFT:START 100

(HEADER OFF) 100

Reference

- The start position of FFT analysis corresponds to a dot in the waveform display area of the main unit screen. A starting position of 0 corresponds to the left end of the waveform display area, and 999 corresponds to the right end.

Setting and querying Vertical Axis Scale of Result Display for FFT Analysis

Syntax

Command **:FFT:VSCAle <0/1(NR1)>**

Query **:FFT:VSCAle?**

Response 0 %f.s.

1 rms

Description

Command Sets the vertical axis scale of result display for FFT analysis.

Query Returns the vertical axis scale of result display for FFT analysis as an NR1 number.

Example

Command **:FFT:VSCAle 0**

Sets the vertical axis scale of result display for FFT analysis to %f.s.

Query **:FFT:VSCAle?**

Response (HEADER ON) :FFT:VSCALE 0

(HEADER OFF) 0

Reference

Setting and querying Window Function for FFT Analysis

Syntax

Command **:FFT:WINDow <0/1/2(NR1)>**

Query **:FFT:WINDow?**

Response 0 Rectangular

1 Hanning

2 Flat top

Description

Command Sets the window function for FFT analysis.

Query Returns the window function for FFT analysis as an NR1 number.

Example

Command **:FFT:WIND 0**

Sets the window function for FFT analysis to Rectangular.

Query **:FFT:WIND?**

Response (HEADER ON) :FFT:WINDOW 0

(HEADER OFF) 0

Reference

3.2.15 Media Operation

Acquiring File Data on USB Flash Drive Collectively

Syntax

Query **:FILE:DOWNload? <Specified file path(String)>**

File path Path of file to be transferred

Response File data

Description

Query Reads the specified file from a USB flash drive and transfers data.

Example

Query **:FILE:DOWN? HIOKI/PW8001/123456.CSV**

Transfers the file “123456.CSV” in the HIOKI/PW8001 on a USB flash drive connected to the instrument.

Response Date,Time,Status,.....

Reference

- The maximum file size that can be transferred is 512MB.
- Even when the header is set as ON, no header is attached to Response data.
- This command is valid only for LAN connection and RS-232C connection.
- The maximum number of characters used for the specified file path is 80.
- This command is case-sensitive in the parameter section.

Deleting File or Folder

Syntax

Command **:FILE:DELete <Specified file/folder path(String)>**

Description

Command Deletes the specified file or folder.

Example

Command **:FILE:DEL? HIOKI/PW8001/TEST1.CSV**

Deletes the HIOKI/PW8001/TEST1.CSV file on a USB flash drive connected to the instrument.

Reference

- The maximum number of characters used for the specified file and folder path is 80.
- The deletion operation may fail during execution of the file operation.
- This command is case-sensitive in the parameter section.

Querying Availability of USB Flash Drive

Syntax

Query **:FILE:EXISt?**

Response Y USB flash drive available

N USB flash drive unavailable

Description

Query Returns availability of USB flash drive in a string.

Example

Query **:FILE:EXIS?**

Response (HEADER ON) :FILE:EXIST Y

(HEADER OFF) Y

Reference

Querying File Name

Syntax

Query **:FILE:FILEname? <Specified folder path(String)>**

Response <File name 1>,<Bytes 1>,<File name 2>,<Bytes 2>, and so on

Description

Query Returns the file name in the specified folder path.
It continues for the number of files in the order of <File name>, <Bytes>.

Example

Query **:FILE:FILE? HIOKI/PW8001/TEST1**
Returns the file name and size of the file in the HIOKI/PW8001/TEST1 on a USB flash drive connected to the instrument.

Response (HEADER ON) :FILE:FILENAME SETTING.SET,3824
(HEADER OFF) SETTING.SET,3824

Reference

- If there is no file, the string “NO_FILE” is returned.
- The maximum number of characters used for the specified folder path is 80.
- Number of files obtainable is up to 1000.
- If the file name contains any two-byte character, the file name cannot be obtained.
- The response may take some time during file operation.
- This command is case-sensitive in the parameter section.

Querying Folder Name

Syntax

Query **:FILE:FOLDername? <Specified folder path(String)>**

Response <Folder name 1>,<Folder name 2>,<Folder name 3>,<Folder name 4>, and so on

Description

Query Returns the folder name in the specified folder path.
The folder name listing continues for the number of folders.

Example

Query **:FILE:FOLD? HIOKI/PW8001**
Returns the folder name in the HIOKI/PW8001 on a USB flash drive connected to the instrument.

Response (HEADER ON) :FILE:FOLDERNAME TEST1
(HEADER OFF) TEST1

Reference

- If there is no folder, the string “NO_FOLDER” is returned.
- The maximum number of characters used for the specified folder path is 80.
- Number of folders obtainable is up to 1000.
- If the folder name contains any two-byte character, the folder name data cannot be acquired.
- The response may take some time during file operation.
- This command is case-sensitive in the parameter section.

Formatting USB Flash Drive

Syntax

Command **:FILE:FORMat**

Description

Command Formats a USB flash drive.

Example

Command **:FILE:FORM**
Formats a USB flash drive.

Reference

Acquisition of Divided File Data on USB Flash Drive

Syntax

Query: **:FILE:PICKout? <Specified file path(String)>,<Start position(NR1)>, <Stop position(NR1)>**

File path	Path of file to be transferred (Example: HIOKI/PW8001/123456.CSV)
Start position	Specify the acquired start position in the file with byte count.
Stop position	Specify the acquired stop position in the file with byte count.

Response: STX(02) File data ETX(03)

Description

Query: Reads the specified file from the start position to the stop position on a USB flash drive, and puts STX (02) at the top of the data to be transferred and EXT (03) at the end, and then transfers the data.

Example

Query: **:FILE:PICK? HIOKI/PW8001/123456.CSV,1,100**

Transfers the data from the 1st byte to the 100th byte of the file “123456.CSV” in the HIOKI/PW8001 on a USB flash drive connected to the instrument.

Response: STX(02).....ETX(03)

Reference

- The maximum file size that can be transferred is 512MB.
- Even when the header is set as ON, no header is attached to Response data.
- Specify “1” if the beginning of the file is set as the start position.
- Only a text (CSV) file can be acquired.
- STX/ETX is not an ASCII Code but (02)/(03) of the Binary Data.
- This command is valid only for LAN connection and RS-232C connection.
- The maximum number of characters used for the specified file path is 80.
- This command is case-sensitive in the parameter section.

Querying File Size

Syntax

Query: **:FILE:SIZE? <Specified file path(String)>**

Response: <File size (Bytes)>

Description

Query: Returns the size of the file specified on a USB flash drive in a numerical NR1 value.

Example

Query: **:FILE:SIZE? HIOKI/PW8001/123456.CSV**

Returns the size of the file “123456.CSV” in the HIOKI/PW8001 on a USB flash drive connected to the instrument.

Response: (HEADER ON) :FILE:SIZE 55628

(HEADER OFF) 55628

Reference

- The maximum number of characters used for the specified file path is 80.
- During execution of file operation, it may take some time to get a response.
- This command is case-sensitive in the parameter section.

Reading Setting File

Syntax

Command **:FILE:SETTing:LOAD <Specified setting file path(String)>**

File path Setting file path to be read (Example: HIOKI/PW8001/123456.SET)

Description

Command Reads the specified setting file saved on a USB flash drive.
If the Save to FTP Server setting is enabled, the configuration file in the FTP server is loaded.

Example

Command **:FILE:SETT:LOAD HIOKI/PW8001/123456.SET**

Reads the setting file “123456.SET” in the HIOKI/PW8001 folder on a USB flash drive connected to the instrument.

Reference

- The maximum number of characters used for the specified file path is 80.
- Specify the file path name so that it ends with “.SET”. Otherwise, a command error occurs.
- The conditions under which the setting file can be read are the same as the conditions under which it can be read on the screen of the instrument. When it fails to read the setting file, an execution error occurs.
- This command is case-sensitive in the parameter section.

Saving Setting File

Syntax

Command **:FILE:SETTing:SAVE <Setting file path at saving destination(String)>**

File path Setting file path at saving destination (Example: HIOKI/PW8001/123456.SET)

Description

Command Saves the setting file with the specified file name to the specified saving destination on a USB flash drive.
If the Save to FTP Server setting is enabled, the configuration file is saved in the FTP server.

Example

Command **:FILE:SETT:SAVE HIOKI/PW8001/123456.SET**

Saves the setting file “123456.SET” to the HIOKI/PW8001 folder on a USB flash drive connected to the instrument.

Reference

- The maximum number of characters used for the specified file path is 80.
- Specify the file path name so that it ends with “.SET”. Otherwise, a command error occurs.
- The available characters are ASCII characters from H'20 to H'7E (excluding !"*+,/=.:;<>?[¥]`|).
- You cannot specify a folder that does not exist.
- The conditions under which the setting file can be saved are the same as the conditions under which it can be saved on the screen of the instrument. When it fails to save the setting file, an execution error occurs.
- This command is case-sensitive in the parameter section.

Saving User-defined Formulas Setting File

Syntax

Command **:FILE:SETTing:SAVE:UDF <Setting file name(String)>**

Setting file name Up to 32 alphanumeric characters.
The file is saved as <Setting file name>.JSON.

Description

Command Saves a user-defined formulas setting file (JSON format) with the specified file name in a USB flash drive.
If the Save to FTP Server setting is enabled, the configuration file is saved in the FTP server.

Example

Command **:FILE:SETT:SAVE:UDF TEST1**

Saves the user-defined formulas setting file “TEST1.JSON” to the HIOKI/PW8001 folder on a USB flash drive connected to the instrument.

Reference

- The available characters are ASCII characters from H'20 to H'7E (excluding !"*+,/=.:;<>?[¥]`|).
- The conditions under which the setting file can be saved are the same as the conditions under which it can be saved on the screen of the instrument. When it fails to save the setting file, an execution error occurs.
- This command is case-sensitive in the parameter section.

3.2.16 Flicker Measurement

Setting and Querying Rated Voltage

Syntax

Command **:FLICker:NOMinal[CH]:VALue <Rated Voltage(NR2)>**

Query **:FLICker:NOMinal[CH]:VALue?**

Response <Rated Voltage>

Rated Voltage 0.001～999.999(7 significant digits)

Description

Command Sets Rated Voltage for Flicker Measurement. [CH]: 1 to 8.

Query Returns the Rated Voltage in a numerical value.

Example

Command **:FLIC:NOM1:VAL 100.0**

Set the Rated Voltage of CH1 to 100V.

Query **:FLIC:NOM1:VAL?**

Response (HEADER ON) :FLICKER:NOMINAL1:VALUE 100.000

(HEADER OFF) 100.000

Reference

Setting and Querying Automatic Rated Voltage setting function

Syntax

Command :FLICker:NOMinal[CH]:AUTO <ON/OFF(String)>

Query :FLICker:NOMinal[CH]:AUTO?

Response ON Auto-setting function ON

OFF Auto-setting function OFF

Description

Command Turn ON/OFF the Automatic rated voltage setting function for flicker calculation.
[CH]: 1 to 8.

Query Returns ON/OFF of the automatic rated voltage setting function for flicker calculation as a string.

Example

Command :FLIC:NOM1:AUTO ON

Set the automatic rated voltage setting function of CH1 to ON.

Query :FLIC:NOM1:AUTO?

Response (HEADER ON) :FLICKER:NOMINAL1:AUTO ON

(HEADER OFF) ON

Reference

Setting and Querying Measured Voltage

Syntax

Command :FLICker:VOLTage <120V/230V(String)>

Query :FLICker:VOLTage?

Response 120V Measured Voltage is 120V

230V Measured Voltage is 230V

Description

Command Sets the measured voltage for flicker calculation.

Query Returns the measured voltage setting for the flicker calculation as a string.

Example

Command :FLIC:VOLT 120V

Set the measured voltage to 120V.

Query :FLIC:VOLT?

Response (HEADER ON) :FLICKER:VOLTAGE 120V

(HEADER OFF) 120V

Reference

Setting and Querying Period covered by Pst calculation

Syntax

Command :FLICker:INTerval <Minute(NR1)>(,<Second(NR1)>)

Query :FLICker:INTerval?

Response <Minute(NR1)>,<Second(NR1)>

Minute 00～15

Second 00～59

Description

Command Sets the period covered by Pst calculation.

Query Returns the period covered by Pst calculation as a numerical value in minutes and seconds.

Example

Command :FLIC:INT 10,0

Set the period covered by Pst calculation to 10 minutes.

Query :FLIC:INT?

Response (HEADER ON) :FLICKER:INTERVAL 10,0

(HEADER OFF) 10,0

Reference

- The settable range is from 0 min 30 sec to 15 min 00 sec。

Setting and Querying number of Pst to be subject to Plt calculation

Syntax

Command **:FLICker:COUNt < Number of subject Pst (NR1)>**

Query **:FLICker:COUNt?**

Response < Number of subject Pst (NR1)>

Number of subject Pst 1～1008

Description

Command Sets the number of subject Pst for Plt calculation.

Query Returns a numerical value setting the number of subject Pst for Plt calculation.

Example

Command **:FLIC:COUN 10**

Set the number of subject Pst for Plt calculation to 10.

Query **:FLIC:COUN?**

Response (HEADER ON) :FLICKER:COUNT 10

(HEADER OFF) 10

Reference

Setting and Querying Threshold to determine steady state

Syntax

Command **:FLICker:DMIN <Threshold(NR2)>**

Query **:FLICker:DMIN?**

Response <Threshold>

Threshold 0.10～9.99

Description

Command Sets the threshold for steady-state determination in %.

Query Returns the threshold setting for steady-state determination as an NR2 number in %.

Example

Command **:FLIC:DMIN 0.20**

Set the threshold to 0.20%.

Query **:FLIC:DMIN?**

Response (HEADER ON) :FLICKER:DMIN 0.20

(HEADER OFF) 0.20

Reference

Setting and Querying Threshold for Tmax determination

Syntax

Command **:FLICker:TMAX <Threshold(NR2)>**

Query **:FLICker:TMAX?**

Response <Threshold>

Threshold 1.00～99.99

Description

Command Sets the threshold for Tmax determination in %.

Query Returns the threshold setting for Tmax determination as an NR2 number in %.

Example

Command **:FLIC:TMAX 3.30**

Set the threshold to 3.30%.

Query **:FLIC:TMAX?**

Response (HEADER ON) :FLICKER:TMAX 3.30

(HEADER OFF) 3.30

Reference

3.2.17 Setting Frequency

Setting and Querying Frequency (HPF) for Zero-cross Filter

Syntax

Command **:FREQuency[CH]:HPF <ON/OFF(String)>**

Query **:FREQuency[CH]:HPF?**

Response ON HPF ON

OFF HPF OFF

Description

Command Sets the frequency (HPF) for the zero-cross filter. [CH]: 1 to 8.

Query Returns the frequency (HPF) for the zero-cross filter in a string.

Example

Command **:FREQ1:HPF ON**

Sets the frequency (HPF) for the zero-cross filter of CH1 to ON.

Query **:FREQ1:HPF?**

Response (HEADER ON) :FREQUENCY1:HPF ON

(HEADER OFF) ON

Reference

Setting and Querying Lower Measurement Frequency Limit

Syntax

Command **:FREQuency[CH]:LOWer <Frequency data(String)>**

Query **:FREQuency[CH]:LOWer?**

Response <Frequency data>

Frequency data 0.1Hz, 1Hz, 10Hz, 100Hz, 1kHz, 10kHz, 100kHz

Description

Command Set a lower measurement frequency limit. [CH]: 1 to 8.

Query Returns setting for a lower measurement frequency limit.

Example

Command **:FREQ1:LOW 10Hz**

Sets the lower measurement frequency limit of CH1 to 10Hz.

Query **:FREQ1:LOW?**

Response (HEADER ON) :FREQUENCY1:LOWER 10Hz

(HEADER OFF) 10Hz

Reference

Setting and Querying Upper Measurement Frequency Limit

Syntax

Command **:FREQuency[CH]:UPPer <Frequency data(String)>**

Query **:FREQuency[CH]:UPPer?**

Response <Frequency data>

Frequency data 100Hz, 500Hz, 1kHz, 5kHz, 10kHz, 50kHz, 100kHz, 500kHz, 1MHz, 2MHz

Description

Command Set an upper measurement frequency limit. [CH]: 1 to 8.

Query Returns setting for an upper measurement frequency limit in a string.

Example

Command **:FREQ1:UPP 1kHz**

Sets the upper measurement frequency limit of CH1 to 1kHz.

Query **:FREQ1:UPP?**

Response (HEADER ON) :FREQUENCY1:UPPER 1kHz

(HEADER OFF) 1kHz

Reference

- The upper measurement frequency limit can be set to 2MHz only when the U7005 is connected.

3.2.18 FTP Automatic Data Sending

Setting and Querying Server Name at Sending Destination

Syntax

Command **:FTP:ADDRess "<Server name at sending destination(String)>"**

Query **:FTP:ADDRess?**

Response <Server name>

Server name FTP server name at sending destination (up to 45 alphanumeric characters)

Description

Command Sets the FTP server name at the sending destination for the FTP data automatic sending function.

Query Returns the current FTP server name at the automatic sending destination.

Example

Command **:FTP:ADDR "192.168.1.1"**

Sets the server name at the sending destination to “192.168.1.1”.

Query **:GPIB:ADDR?**

Response (HEADER ON) :FTP:ADDRESS "192.168.1.1"

(HEADER OFF) "192.168.1.1"

Reference

- If the parameter is not enclosed in double quotation marks ("), a command error occurs.
- If a string exceeding the maximum number of characters is entered, a command error occurs.
- The available characters are ASCII characters from H'20 to H'7E. However, ' ” ~ looks like the following:

PC	~,	~;	~~
PW8001	‘	“	~

Setting and Querying Automatic Deletion of Sent File

Syntax

Command **:FTP:AUTODel <ON/OFF(String)>**

Query **:FTP:AUTODel?**

Response ON Sent file deleting ON

OFF Sent file deleting OFF

Description

Command Sets the sent file deleting function of the FTP data automatic sending function to ON or OFF.

Query Returns the setting of the current sent file deleting function.

Example

Command **:FTP:AUTOD ON**

Sets the automatic sent file deleting function to ON.

Query **:FTP:AUTOD?**

Response (HEADER ON) :FTP:AUTODEL ON

(HEADER OFF) ON

Reference

Querying File Send Test Execution Result

Syntax

Query **:FTP:CHECk?**

Response PASS File send test has passed.

FAIL File send test has failed.

Description

Query Executes the file send test and returns the test result in a string.

Example

Query **:FTP:CHEC?**

Response (HEADER ON) :FTP:CHECK PASS

(HEADER OFF) PASS

Reference

Setting and Querying Directory at Sending Destination

Syntax

Command **:FTP:DIR "<Directory at sending destination(String)>"**

Query **:FTP:DIR?**

Response <Directory>

Directory FTP server directory at sending destination
(up to 45 alphanumeric characters)

Description

Command Sets the FTP server directory at the sending destination of the FTP data automatic sending function.

Query Returns the current FTP server directory at the automatic sending destination.

Example

Command **:FTP:DIR "PW8001/FTP"**

Sets the sending directory to “PW8001/FTP”.

Query **:FTP:DIR?**

Response (HEADER ON) :FTP:ADDRESS "PW8001/FTP"

(HEADER OFF) "PW8001/FTP"

Reference

- If the parameter is not enclosed in double quotation marks ("), a command error occurs.
- If a string exceeding the maximum number of characters is entered, a command error occurs.
- The available characters are ASCII characters from H'20 to H'7E (excluding !"&'*+,-.:;<>?¥^`|~).

Setting and Querying Send File Identifier (IP Address)

Syntax

Command **:FTP:FILE:IP <ON/OFF(String)>**

Query **:FTP:FILE:IP?**

Response ON Adds the IP address to the send file name as an identifier.

OFF Does not add the IP address to the send file name as an identifier.

Description

Command Sets whether to add the IP address to the send file name as an identifier in the FTP data automatic sending function.

Query Returns the setting of the current send file identifier (IP address).

Example

Command **:FTP:FILE:IP ON**

Adds the IP address to the send file name as an identifier.

Query **:FTP:FILE:IP?**

Response (HEADER ON) :FTP:FILE:IP ON

(HEADER OFF) ON

Reference

Setting and Querying Send File Identifier (Serial Number)

Syntax

Command :FTP:FILE:SERial <ON/OFF(String)>

Query :FTP:FILE:SERial?

Response ON Adds the instrument serial number to the send file name as an identifier.

OFF Does not add the instrument serial number to the send file name as an identifier.

Description

Command Sets whether to add the instrument serial number to the send file name as an identifier in the FTP data automatic sending function.

Query Returns the setting of the current send file identifier (instrument serial number).

Example

Command :FTP:FILE:SER ON

Adds the serial number to the file name as an identifier.

Query :FTP:FILE:SER?

Response (HEADER ON) :FTP:FILE:SERIAL ON

(HEADER OFF) ON

Reference

Setting and Querying Send File Identifier (Date and Time)

Syntax

Command :FTP:FILE:TIME <ON/OFF(String)>

Query :FTP:FILE:TIME?

Response ON Adds the date and time to the send file name as an identifier.

OFF Does not add the date and time to the send file name as an identifier.

Description

Command Sets whether to add the date and time to the send file name as an identifier in the FTP data automatic sending function.

Query Returns the setting of the current send file identifier (date and time).

Example

Command :FTP:FILE:TIME ON

Adds the date and time to the file name as an identifier.

Query :FTP:FILE:TIME?

Response (HEADER ON) :FTP:FILE:TIME ON

(HEADER OFF) ON

Reference

Setting Password and Querying Collation Result

Syntax

Command **:FTP:PASSword "<Password(String)>"**

Query **:FTP:PASSword? "<Password(String)>"**

Password Password string (up to 32 alphanumeric characters)

Response <PASS/FAIL>

PASS Entered password is correct.

FAIL Entered password is incorrect.

Description

Command Sets the password for the FTP data automatic sending function.

Query Collates the entered password with the currently set password and returns the result.

Example

Command **:FTP:PASS "abcd"**

Sets the password to “abcd”.

Query **:FTP:PASS? "abcd"**

Response (HEADER ON) :FTP:PASSWORD PASS

(HEADER OFF) PASS

Reference

- If the parameter is not enclosed in double quotation marks ("), a command error occurs.
- If a string exceeding the maximum number of characters is entered, a command error occurs.
- The available characters are ASCII characters from H'20 to H'7E. However, ' ” ~ looks like the following:

PC	~,	~;	~~
PW8001	‘	“	~

Setting and Querying Passive Mode

Syntax

Command **:FTP:PASV <ON/OFF(String)>**

Query **:FTP:PASV?**

Response ON Passive mode ON

OFF Passive mode OFF

Description

Command Sets the passive mode of the FTP data automatic sending function to ON or OFF.

Query Returns the setting of the current passive mode.

Example

Command **:FTP:PASV ON**

Sets the passive mode to ON.

Query **:FTP:PASV?**

Response (HEADER ON) :FTP:PASV ON

(HEADER OFF) ON

Reference

Setting and Querying Port Number at Sending Destination

Syntax

Command **:FTP:PORT <Port number(NR1)>**

Query **:FTP:PORT?**

Response <Port number>

Port number 0 to 65535

Description

Command Sets the port number of the server at the sending destination for the FTP data automatic sending function.

Query Returns the current port number of the server at the sending destination.

Example

Command **:FTP:PORT 1234**

Sets the port number of the server at the sending destination to 1234.

Query **:FTP:PORT?**

Response (HEADER ON) :FTP:PORT 1234

(HEADER OFF) 1234

Reference

Querying Availability of Unsent File

Syntax

Query **:FTP:PROG?**

Response YES There is an unsent file.

NO There is no unsent file.

Description

Query Returns the availability state of an unsent file in the FTP data automatic sending function.

Example

Query **:FTP:PROG?**

Response (HEADER ON) :FTP:CHECK NO

(HEADER OFF) NO

Reference

Querying Sending Status

Syntax

Query **:FTP:STATe?**

Response <A(NR1>,<B(NR1)>,<C(NR1>,<D(NR1)>

A Total number of files

B Number of sent files

C Number of sent failed files

D Number of unsent files

Description

Query Returns the file send status of the FTP data automatic sending function.

Example

Query **:FTP:STAT?**

Response (HEADER ON) :FTP:STAT 10,1,5,4

(HEADER OFF) 10,1,5,4

Reference

Setting and Querying FTP Data Automatic Sending Function ON/OFF

Syntax

Command **:FTP:USE <ON/OFF(String)>**

Query **:FTP:USE?**

Response ON FTP data automatic sending function ON

OFF FTP data automatic sending function OFF

Description

Command Sets the FTP data automatic sending function to ON or OFF.

Query Returns the current setting of the FTP data automatic sending function as ON or OFF.

Example

Command **:FTP:USE ON**

Sets the FTP data automatic sending function to ON.

Query **:FTP:USE?**

Response (HEADER ON) :FTP:USE ON

(HEADER OFF) ON

Reference

Setting and Querying Sending User

Syntax

Command **:FTP:USER "<User name(String)>"**

Query **:FTP:USER?**

Response <User name>

User name “User name (up to 32 alphanumeric characters)”

Description

Command Sets the user name for the FTP data automatic sending function.

Query Returns the current user name.

Example

Command **:FTP:USER "PW8001"**

Sets the sending user name to “PW8001”.

Query **:FTP:USER?**

Response (HEADER ON) :FTP:USER "PW8001"

(HEADER OFF) "PW8001"

Reference

- If the parameter is not enclosed in double quotation marks ("), a command error occurs.
- If a string exceeding the maximum number of characters is entered, a command error occurs.
- The available characters are ASCII characters from H'20 to H'7E. However, ' ” ~ looks like the following:

PC	~,	~;	~~
PW8001	‘	“	~

3.2.19 Communication

Setting and Querying GP-IB Address

Syntax

Command **:GPIB:ADDRess <Address(NR1)>**

Query **:GPIB:ADDRess?**

Response <Address>

Address 0 to 30

Description

Command Sets a GP-IB address.

Query Returns the setting of the GP-IB address in a numerical NR1 value.

Example

Command **:GPIB:ADDR 3**

Sets the GP-IB address to “3”.

Query **:GPIB:ADDR?**

Response (HEADER ON) :GPIB:ADDRESS 3

(HEADER OFF) 3

Reference

- The address will be changed after command transmission. Be careful of disconnection when sending commands from GP-IB.

Setting and Querying IP Address

Syntax

Command **:IP:ADDRess <Address 1(NR1)>,<Address 2(NR1)>,<Address 3(NR1)>, <Address 4(NR1)>**

Query **:IP:ADDRess?**

Response <Address 1>,<Address 2>,<Address 3>,<Address 4>

Address 1 000 to 255

Address 2 000 to 255

Address 3 000 to 255

Address 4 000 to 255

Description

Command Sets the IP address when LAN is connected.

Query Returns the IP address setting when LAN is connected in a numerical NR1 value.

Example

Command **:IP:ADDR 192,168,1,31**

Sets the IP address to “192.168.1.31”.

Query **:IP:ADDR?**

Response (HEADER ON) :IP:ADDRESS 192,168,001,031

(HEADER OFF) 192,168,001,031

Reference

- The address will be changed after command transmission. Be careful of disconnection when sending commands from LAN.
- When DHCP is ON, the address cannot be changed and an execution error occurs.
- Returns the address assigned to the DHCP server to the query as the response when DHCP is ON. Returns “255,255,255,255” as the response if it fails to assign the address from the DHCP server.

Setting and Querying Default Gateway

Syntax

Command **:IP:DEFaultgateway <Address 1(NR1)>,<Address 2(NR1)>, <Address 3(NR1)>,<Address 4(NR1)>**

Query **:IP:DEFaultgateway?**

Response <Address 1>,<Address 2>,<Address 3>,<Address 4>

Address 1 000 to 255

Address 2 000 to 255

Address 3 000 to 255

Address 4 000 to 255

Description

Command Sets the default gateway when LAN is connected.

Query Returns the default gateway setting when LAN is connected in a numerical NR1 value.

Example

Command **:IP:DEF 192,168,1,250**

Sets the default gateway to “192.168.1.250”.

Query **:IP:DEF?**

Response (HEADER ON) :IP:DEFAULTGATEWAY 192,168,001,250

(HEADER OFF) 192,168,001,250

Reference

- The address will be changed after command transmission. Be careful of disconnection when sending commands from LAN.
- When DHCP is ON, the address cannot be changed and an execution error occurs.
- Returns the address assigned to the DHCP server to the query as the response when DHCP is ON. Returns “255,255,255,255” as the response if it fails to assign the address from the DHCP server.

Setting and Querying DHCP

Syntax

Command **:IP:DHCP <ON/OFF(String)>**

Query **:IP:DHCP?**

Response ON DHCP ON

OFF DHCP OFF

Description

Command Sets DHCP when LAN is connected.

Query Returns the DHCP setting when LAN is connected in a string.

Example

Command **:IP:DHCP ON**

Sets DHCP to ON.

Query **:IP:DHCP?**

Response (HEADER ON) :IP:DHCP ON

(HEADER OFF) ON

Reference

- Each type of address will be changed after command transmission. Be careful of disconnection when sending commands from LAN.

Setting and Querying Subnet Mask

Syntax

Command **:IP:SUBNetmask <Address 1(NR1)>,<Address 2(NR1)>, <Address 3(NR1)>,<Address 4(NR1)>**

Query **:IP:SUBNetmask?**

Response <Address 1>,<Address 2>,<Address 3>,<Address 4>

Address 1	000 to 255
Address 2	000 to 255
Address 3	000 to 255
Address 4	000 to 255

Description

Command Sets the subnet mask when LAN is connected.

Query Returns the subnet mask setting when LAN is connected in a numerical NR1 value.

Example

Command **:IP:SUBN 255,255,255,0**

Sets the subnet mask to “255.255.255.0”.

Query **:IP:SUBN?**

Response (HEADER ON) :IP:SUBNETMASK 255,255,255,000

(HEADER OFF) 255,255,255,000

Reference

- The address will be changed after command transmission. Be careful of disconnection when sending commands from LAN.
- When the entered subnet mask is invalid, the address cannot be changed correctly.
- When DHCP is ON, the address cannot be changed and an execution error occurs.
- Returns the address assigned to the DHCP server to the query as the response when DHCP is ON. Returns “255,255,255,255” as the response if it fails to assign the address from the DHCP server.

Setting and Querying Availability of Execution Check Message

Syntax

Command **:RS232c:ANSWer <ON/OFF(String)>**

Query **:RS232c:ANSWer?**

Response

ON	Execution check message enabled
OFF	Execution check message disabled

Description

Command Sets the availability of the execution check message.
When this setting is set to ON, a response is returned also when commands are sent.
When this query is sent, an execution check message is attached after the response.
Format of execution check message is in 3 digits “nnn” showing that an error occurred at the “nnn”th commands.
When no error occurred, the execution check message is “000”.

Query Returns setting for execution check message in a string.

Example

Command **:RS232:ANSW ON**

Sets the execution check message to ON.

Query **:RS232:ANSW?**

Response (HEADER ON) :RS232C:ANSWER ON;000

(HEADER OFF) ON;000

Reference

- The command name is RS232C, but the same operation is performed when communicating via LAN or GPIB.
- The setting of the execution check message is initialized to OFF when the power is turned ON.

Setting and Querying RS232C Communication Speed

Syntax

Command **:RS232c:BAUD <Baud rate(String)>**

Query **:RS232c:BAUD?**

Response <Baud rate>

Baud rate 9600bps, 19200bps, 38400bps, 57600bps, 115200bps

Description

Command Sets RS232C communication speed.

Query Returns RS232C communication speed setting in a string.

Example

Command **:RS232:BAUD 38400bps**

Sets the RS232C communication speed to 38400bps.

Query **:RS232:BAUD?**

Response (HEADER ON) :RS232C:BAUD 38400bps

(HEADER OFF) 38400bps

Reference

- The baud rate is changed after commands are sent. Be careful of disconnection when sending commands from RS232C.

Setting and Querying Destination of RS232C Connection

Syntax

Command **:RS232c:CONNect <RS/EXT(String)>**

Query **:RS232c:CONNect?**

Response RS RS232C

EXT External control line

Description

Command Sets destination of RS232C connection.

Query Returns setting for destination of RS232C connection in a string.

Example

Command **:RS232:CONN RS**

Sets the RS232C connection destination to RS232C.

Query **:RS232:CONN?**

Response (HEADER ON) :RS232C:CONNECT RS

(HEADER OFF) RS

Reference

- The connection destination is changed after commands are sent. Be careful regarding this when sending from RS232C.

Setting and Querying Numeric Character Data Format

Syntax

Command **:TRANsmit:COLumn <0/1(NR1)>**

Query **:TRANsmit:COLumn?**

Response
- 0 "+" at the top and the leading "0" of the mantissa for the measured response data are omitted.
- 1 Number of mantissa characters of measured response data is constant. ("+" at the top and the leading "0" of the mantissa are not omitted.)

Description

Command Sets the numerical value data format for the response data of the following commands.
":MEASure?"
":MEASure:HARMonic?"
":MEASure:10MS?"
":MEASure:10MS:ASC?"

Query Returns numerical value data format setting for response data in a numerical NR1 value.

Example

Command **:TRAN:COL 1**

Query **:TRAN:COL?**

Response (HEADER ON) :TRANSMIT:COLUMN 1

(HEADER OFF) 1

Reference

- In case of :TRANsmit:COLumn 0
  - Query :MEAS? Urms1,Irms1
  - Response 78.013E+00,5.0120E+00
- In case of :TRANsmit:COLumn 1
  - Query :MEAS? Urms1,Irms1
  - Response +078.013E+00,+05.0120E+00
- The setting of the numerical data format is initialized to "0" when the power is turned ON.

Setting and Querying Separator per Response Message

Syntax

Command **:TRANsmit:SEParator <0/1(NR1)>**

Query **:TRANsmit:SEParator?**

Response
- 0 Semicolon ' ; '
- 1 Comma ' , '

Description

Command Sets a separator per response message when header is OFF.

Query Returns setting for a separator per response message when header is OFF in a numerical NR1 value.

Example

Command **:TRAN:SEP 1**

Query **:TRAN:SEP?**

Response (HEADER ON) :TRANSMIT:SEPARATOR 1

(HEADER OFF) 1

Reference

- The separator per response message can be set only when the header is OFF.
- The measured value response data of the **MEASure?** system query is separated by a comma (,) regardless of this setting.
- When the power is turned ON, the separator per response message is initialized with a semicolon (;).

Setting and Querying Response Message Terminator

Syntax

Command **:TRANsmit:TERMinator <0/1(NR1)>**

Query **:TRANsmit:TERMinator?**

Response 0 LF

1 CR+LF

Description

Command Sets the response message terminator.

Query Returns the setting of the response message terminator in a numerical NR1 value.

Example

Command **:TRAN:TERM 1**

Query **:TRAN:TERM?**

Response (HEADER ON) :TRANSMIT:TERMINATOR 1

(HEADER OFF) 1

Reference

- When the power is turned ON, the response message terminator is initialized to CR+LF (1).

3.2.20 Harmonics Measurement

Setting and Querying Grouping for Harmonics Measurement

Syntax

Command **:HARMonic:GROUp <OFF/TYPE1/TYPE2(String)>**

Query **:HARMonic:GROUp?**

Response OFF Grouping OFF

TYPE1 Grouping TYPE1 (harmonics subgroup)

TYPE2 Grouping TYPE2 (harmonics group)

Description

Command Sets a grouping for harmonics measurement.

Query Returns setting for a grouping for harmonics measurement in a string.

Example

Command **:HARM:GROU TYPE1**

Sets the grouping for the harmonics measurement to TYPE1.

Query **:HARM:GROU?**

Response (HEADER ON) :HARMONIC:GROUP TYPE1

(HEADER OFF) TYPE1

Reference

Setting and Querying Maximum Analysis Order for Harmonics Measurement

Syntax

Command **:HARMonic:ORDer <Maximum analysis order(NR1)>**

Query **:HARMonic:ORDer?**

Response <Maximum analysis order>

Maximum analysis order 2 to 500

Description

Command Sets a maximum analysis order for harmonics measurement.

Query Returns the setting of the maximum analysis order for the harmonics measurement in a numerical NR1 value.

Example

Command **:HARM:ORD 13**

Sets the maximum analysis order for the harmonics measurement to 13th order.

Query **:HARM:ORD?**

Response (HEADER ON) :HARMONIC:ORDER 13

(HEADER OFF) 13

Reference

Setting and Querying THD Calculation Method for Harmonics Measurement

Syntax

Command **:HARMonic:THD <F/R(String)>**

Query **:HARMonic:THD?**

Response F THD-F (Reference fundamental wave)

R THD-R (Total reference harmonics)

Description

Command Sets the THD calculation method for harmonics measurement.

Query Returns THD calculation method setting for harmonics measurement in a string.

Example

Command **:HARM:THD F**

Sets the THD calculation method for the harmonics measurement to THD-F.

Query **:HARM:THD?**

Response (HEADER ON) :HARMONIC:THD F

(HEADER OFF) F

Reference

Setting and Querying Harmonics Synchronization Source

Syntax

Command **:HARMonic:ZSOURce[CH] <Target synchronization source(String)>**

Query **:HARMonic:ZSOURce[CH]?**

Response <Target synchronization source>

Target synchronization source Zph1/Zph3/Ext1/Ext3

Description

Command Sets the harmonics synchronization source when the synchronization source of the wiring including the specified channel is set to Zph.
[CH]: 1 to 8.

Query Returns the setting of the harmonics synchronization source in a string when the synchronization source of the wiring including the specified channel is set to Zph.

Example

Command **:HARM:ZSOUR1 Ext1**

Sets the harmonics synchronization source of the wiring including CH1 to Ext1.

Query **:HARM:ZSOUR1?**

Response (HEADER ON) :HARMONIC:SOURCE1 Ext1

(HEADER OFF) Ext1

Reference

- When Zph1 or Zph3 is not selected for the synchronization source of the specified channel, an execution error occurs.
- When Zph1 is selected for the synchronization source, only Zph1 and Ext1 can be set. When Zph3 is selected, only Zph3 and Ext3 can be set.

3.2.21 IEC Mode

Setting and Querying Measurement Frequency

Syntax

Command **:IEC:FREQuency <50Hz/60Hz(String)>**

Query **:IEC:FREQuency?**

Response 50Hz Measurement Frequency is 50Hz

60Hz Measurement Frequency is 60Hz

Description

Command Sets the Measurement Frequency in IEC Mode.

Query Returns the setting of Measurement Frequency in a string.

Example

Command **:IEC:FREQ 50Hz**

Sets the Measurement Frequency to50Hz.

Query **:IEC:FREQ?**

Response (HEADER ON) :IEC:FREQUENCY 50Hz

(HEADER OFF) 50Hz

Reference

3.2.22 Integration

Setting and Querying Integration Control Method

Syntax

Command **:INTEGrate:CONTrol <ALL/EACH(String)>**

Query **:INTEGrate:CONTrol?**

Response ALL All wiring integration

EACH Each wiring integration

Description

Command Sets the integration control method.

Query Returns the setting of the integration control method in a string.

Example

Command **:INTEG:CONT EACH**

Sets the integration control method to each wiring integration.

Query **:INTEG:CONT?**

Response (HEADER ON) :INTEGRATE:CONTROL EACH

(HEADER OFF) EACH

Reference

Setting and Querying Integration Mode

Syntax

Command **:INTEGrate:MODE[CH] <DC/RMS(String)>**

Query **:INTEGrate:MODE[CH]?**

Response DC Integrated DC mode

RMS Integrated RMS mode

Description

Command Sets integration mode. [CH]: 1 to 8.

Query Returns integration mode setting in a string.

Example

Command **:INTEG:MODE1 DC**

Sets the integration mode of CH1 to DC mode.

Query **:INTEG:MODE1?**

Response (HEADER ON) :INTEGRATE:MODE1 DC

(HEADER OFF) DC

Reference

- The integrated DC mode can be set to only 1P2W wiring.
- When the wiring method is changed, all channels become the integrated RMS mode.

Executing Reset for Integrated Data

Syntax

Command **:INTEGrate:RESet (<Channel string targeted for execution (up to 8 channels)>)**

Channel string targeted for execution CH1 to CH8

Description

Command All wiring integration mode (without parameter)

Resets the integrated data of all wiring integration.
If the integration control method is not all wiring integration, it becomes an execution error.
When the integration state is WAIT, RUN, 0ADJ, or OTHER, an execution error occurs.

Integration mode for each wiring (with parameter)

Resets the integrated data of the wiring including the channel specified by the parameter.
If the integration control method is not integration by wiring, it becomes an execution error.
Each wiring integration is executed in only the channel of the target channels that can be reset.
When the integration state is WAIT, RUN, 0ADJ, or OTHER, the integration is not executed in this channel. When there is a channel that has not executed each wiring integration, an execution error occurs.

Example

Command **:INTEG:RES**

Resets the integrated data of all wiring integration.

:INTEG:RES CH1,CH2,CH3,CH4

Each wiring integration of the wiring including CH1, CH2, CH3, and CH4 resets the data.

Reference

Executing Integration (Time Control) Start

Syntax

Command **:INTEGrate:STARt (<Channel string targeted for execution (up to 8 channels)>)**

Channel string targeted for execution CH1 to CH8

Description

Command

All wiring integration mode (without parameter)

Starts the integration (time control) of all wiring integration.

If the integration control method is not all wiring integration, it becomes an execution error.

When the integration state is RUN, 0ADJ, or OTHER, an execution error occurs.

Integration mode for each wiring (with parameter)

Starts the integration (time control) of the wiring including the channel specified by the parameter.

If the integration control method is not integration by wiring, it becomes an execution error.

Each wiring integration is executed in only the channel of the target channels that can start the integration.

When the integration state is RUN, 0ADJ, or OTHER, the integration is not executed in this channel. When there is a channel that has not executed each wiring integration, an execution error occurs.

Example

Command **:INTEG:STAR**

Starts the integration of all wiring integration.

:INTEG:STAR CH1,CH2,CH3,CH4

Starts each wiring integration of the wiring including CH1, CH2, CH3, and CH4.

Reference

Executing Integration (Time Control) Stop

Syntax

Command

:INTEGrate:STOP (<Channel string targeted for execution (up to 8 channels)>)

Channel string targeted for execution CH1 to CH8

Description

Command

All wiring integration mode (without parameter)

Stops the integration (time control) of all wiring integration.

If the integration control method is not all wiring integration, it becomes an execution error.

When the integration state is RESET, STOP, 0ADJ, or OTHER, an execution error occurs.

Integration mode for each wiring (with parameter)

Stops the integration (time control) of the wiring including the channel specified by the parameter.

If the integration control method is not integration by wiring, it becomes an execution error.

The integration stop is executed in only the channel of the target channels that can stop the integration.

When the integration state is RESET, STOP, 0ADJ, or OTHER, each wiring integration cannot be executed in this channel. When there is a channel that has not executed each wiring integration, an execution error occurs.

Example

Command

:INTEG:STOP

Stops the integration of all wiring integration.

:INTEG:STOP CH1,CH2,CH3,CH4

Stops each wiring integration of the wiring including CH1, CH2, CH3, and CH4.

Reference

Querying Integration State

Syntax

Query: **:INTEGrate:STATe?**

Response:

All wiring integration is selected		<All wiring Integration state>
Each wiring integration is selected		<CH1 Integration state>,<CH2 Integration state>, …,<CH8 Integration state>

<Integration state>

Integration state	RESET	Integration is in reset
	STOP	Integration is in stop
	WAIT	Integration is in standby
	RUN	Integration is in process
	OTHER	States other than the above
	0ADJ	Various zero adjustments are in process

Description

Query

Returns integration state of the instrument in a string.
The number of responses may vary depending on the setting of the integration control method.
Returns the states for all channels regardless of the wiring method when the integration control method is each wiring integration.

Example

Query: **:INTEG:STAT?**

Response:

(HEADER ON)	:INTEGRATE:STATE RUN
(HEADER OFF)	RUN

Reference

- Returns only “0ADJ” regardless of the integration control method when various zero adjustments are in process.

3.2.23 Lowpass Filter

Setting and Querying Lowpass Filter (LPF)

Syntax

Command **:LPF[CH] <Frequency data(String)>**

Query **:LPF[CH]?**

Response <Frequency data>

Frequency data OFF, 500Hz, 1kHz, 5kHz, 10kHz, 50kHz, 100kHz, 500kHz, 2MHz

Description

Command Sets a cutoff frequency for lowpass filter (LPF). [CH]: 1 to 8.

Query Returns cutoff frequency setting for lowpass filter (LPF) in a string.

Example

Command **:LPF1 500Hz**

Sets the cutoff frequency for the lowpass filter of CH1 to 500Hz.

Query **:LPF1?**

Response (HEADER ON) :LPF1 500Hz

(HEADER OFF) 500Hz

Reference

- The lowpass filter (LPF) settings for other channels included in the combination of lines to be measured are also changed.
- Only the U7005 Input Unit can set the cutoff frequency to 2MHz.

3.2.24 Measured Value Acquisition

Querying Measurement Data

Syntax

Query **:MEASure? (<Item 1(String)>,<Item 2(String)>, . . . ,<Item 800(String)>)**

Response <Item 1>,<Item 2>, . . . ,<Item 800>

Items 1 to 800 Any from “4.1 Parameters for Normal Measurement Items”.
To specify secondary normal measurement items add [SC] at the end of the parameters given in the list above.
Example: Urms1SC

Description

Query

Item designation mode (with parameter)

When at least one <Item> is described, the mode becomes this mode.

Creates measurement data specified by the <Item>. Number of maximum items is 800.

Any order of sorting <Item> is allowed. The data is created in the specified order.

No item designation mode (without parameter)

When no <Item> is specified, the mode becomes this mode.

Creates measurement data for the item specified by :MEASure:ITEM system command.

In this case, the order of the measurement data is fixed. (See direct specification item list and order table.)

Status data is always attached to the top of the data.

Data format for measured values

General measured value	±*******E±** Mantissa in 7 digits and exponent in 2 digits including decimal point
Integrated value	±*******E±** Mantissa in 7 digits and exponent in 2 digits including decimal point
Time	Elapsed time: hours, minutes, seconds (.ms) ****,**,**(,***) When the data saving interval is less than 1 second, the measured value is output including the ms unit.
Exceeded value	+99999.9E+99
Error value	+77777.7E+99

Example

Query **:MEAS? Urms1,P1,DEG1**

Queries the voltage RMS value, active power, and power phase angle of CH1 in the item designation mode.

Response (HEADER ON) Urms1 151.63E+00,P1 5.74E+00,DEG1 83.80E+00

(HEADER OFF) 151.63E+00,5.74E+00,83.80E+00

Reference

- <Item> can be specified arbitrarily from Parameters for Normal Measurement Items. When any other value is specified, a command error occurs.
- Some items cannot be selected in accordance with the wiring setting or integration mode setting. If an item that cannot be selected in the <Item designation mode> is specified, an error value is output. If an item that cannot be selected in the <No item designation mode> is specified, nothing is output.
- **:TRANsmit:COLumn** command specifies whether “+” at the top and the leading “0” of the mantissa are omitted. If nothing is specified, “+” at the top and the leading “0” of the mantissa are omitted.

Querying Measurement Data Collectively

Syntax

Query: **:MEASure:10MS? (<Item 1(String)>,<Item 2(String)>,…, <Item 800(String)>)**

Response: <Item 1>,<Item 2>,…,<Item 800> × Measured data for 5 samples

Items 1 to 800: Any from “4.1 Parameters for Normal Measurement Items”.
To specify secondary normal measurement items add [SC] at the end of the parameters given in the list above.
Example: Urms1SC

Description

Query

Returns the measurement data every 10ms for 5 samples collectively as the response.

When the data refresh rate is 50ms or more, the measurement data for 1 sample is output.

The measurement data is output in order from the newest measurement data.

Even when the **:MEASure:10MS?(:MEASure:10MS:ASC?)** query is sent continuously, the measurement data to be output is not duplicated. Therefore, a response may be returned after the data update has been put in standby.

For details about the following settings, see the **:Measure?** command section.

Item designation mode (with parameter)

No item designation mode (without parameter)

Data format for measured values

Example

Query: **:MEAS:10MS? Urms1,Urms2**

Queries the voltage RMS values of CH1 and CH2 in the Item designation mode.

Response (HEADER ON)
Urms1 151.63E+00,Urms2 152.25E+00,
Urms1 151.62E+00,Urms2 152.26E+00,
Urms1 151.66E+00,Urms2 152.28E+00,
Urms1 151.70E+00,Urms2 152.24E+00,
Urms1 151.69E+00,Urms2 152.19E+00

(HEADER OFF)
151.63E+00,152.25E+00,151.62E+00,152.26E+00,151.66E+00,152.28E+00,151.70E+00,152.24E+00,151.69E+00,152.19E+00

Reference

- <Item> can be specified arbitrarily from the normal measurement item parameters. When any other value is specified, a command error occurs.
- Some items cannot be selected in accordance with the wiring setting or integration mode setting. If an item that cannot be selected in the <Item designation mode> is specified, a meaningless number is output. If an item that cannot be selected in the <No item designation mode> is specified, nothing is output.
- The **:TRANsmit:COLumn** command specifies whether “+” at the top and the leading “0” of the mantissa are omitted. If nothing is specified, “+” at the top and the leading “0” of the mantissa are omitted.

Querying Measurement Data Collectively (Ascending Order)

Syntax

Query: **:MEASure:10MS:ASC? (<Item 1(String)>,<Item 2(String)>,…, <Item 800(String)>)**

Response: <Item 1>,<Item 2>,…,<Item 800> × Measured data for 5 samples

Items 1 to 800: Any from “4.1 Parameters for Normal Measurement Items”.
To specify secondary normal measurement items add [SC] at the end of the parameters given in the list above.
Example: Urms1SC

Description

Query

Returns the measurement data every 10ms for 5 samples collectively as the response.

When the data refresh rate is 50ms or more, the measurement data for 1 sample is output.

The measurement data is output in order from the oldest measurement data.

Even when the **:MEASure:10MS?(:MEASure:10MS:ASC?)** query is sent continuously, the measurement data to be output is not duplicated. Therefore, a response may be returned after the data update has been put in standby.

For details about the following settings, see the :Measure? command section.

Item designation mode (with parameter)

No item designation mode (without parameter)

Data format for measured values

Example

Query: **:MEAS:10MS:ASC? Urms1,Urms2**

Queries the voltage RMS values of CH1 and CH2 in the Item designation mode.

Response (HEADER ON)
Urms1 151.63E+00,Urms2 152.25E+00,
Urms1 151.62E+00,Urms2 152.26E+00,
Urms1 151.66E+00,Urms2 152.28E+00,
Urms1 151.70E+00,Urms2 152.24E+00,
Urms1 151.69E+00,Urms2 152.19E+00

(HEADER OFF)
151.63E+00,152.25E+00,151.62E+00,152.26E+00,151.66E+00,152.28E+00,151.70E+00,152.24E+00,151.69E+00,152.19E+00

Reference

- <Item> can be specified arbitrarily from the normal measurement item parameters. When any other value is specified, a command error occurs.
- Some items cannot be selected in accordance with the wiring setting or integration mode setting. If an item that cannot be selected is specified, a meaningless number is output in case of <Item designation mode>. Nothing is output in case of <No item designation mode>.
- The **:TRANsmit:COLumn** command specifies whether “+” at the top and the leading “0” of the mantissa are omitted. If nothing is specified, “+” at the top and the leading “0” of the mantissa are omitted.

Querying Measured Harmonics Data

Syntax

Query: **:MEASure:HARMonic? (<Item 1(String)>,<Item 2(String)>,…, <Item 800(String)>)**

Response: <Item 1>,<Item 2>, . . . ,<Item 800>

Items 1 to 800 Any from "4.3 List and Order of Direct Specification Items for :MEASure:HARMonic?"

Description

Query

Item designation mode (with parameter)

When at least one <Item> is described, the mode becomes this mode.

Creates measurement data specified by the <Item>. Number of maximum items is 800.

Any order of sorting <Item> is allowed and the data is created in the order as specified.

No item designation mode (without parameter)

When no <Item> is specified, the mode becomes this mode.

Creates measurement data for the item specified by :MEASure:ITEM:HARMonic system command.

In this case, the order of the measurement data is fixed. (See direct specification item list and order table.)

Status data is always attached to the top of the data.

Responses containing 18000 or more items cannot be returned via GP-IB. The number of response items needs to be adjusted by the **:MEAS:ITEM:HARMonic** system command.

Data format for measured values

Harmonics measured value	±*******E±** Mantissa in 7 digits and exponent in 2 digits including decimal point
Exceeded value	+99999.9E+99
Error value	+77777.7E+99

Example

Query: **:MEAS:HARM? HU1L001,HU1D001,HP1L001,HU1L003,HU1D003,HP1L003**

Queries first and third-order harmonic voltage RMS values, harmonic wave voltage content ratio, and harmonic wave active power of CH1 in the item designation mode.

Response (HEADER ON) HU1L001 90.45E+00,HU1D001 100.00E+00,HP1L001 0.0043E+03,HU1L003 0.20E+00,HU1D003 0.22E+00,HP1L003 -0.0000E+03

(HEADER OFF) 90.45E+00,100.00E+00,0.0043E+03,0.20E+00,0.22E+00,-0.0000E+03

Reference

- <Item> can be specified arbitrarily from the direct designation item list and order of the **:MEASure:HARMonic?** query. When any other item is specified, a command error occurs.
- Some items cannot be selected depending on the wiring setting. If an item that cannot be selected in the <Item designation mode> is specified, an error value is output. If an item that cannot be selected in the <No item designation mode> is specified, nothing is output.
- **:TRANsmit:COLumn** command specifies whether "+" at the top and the leading "0" of the mantissa are omitted. If nothing is specified, "+" at the top and the leading "0" of the mantissa are omitted.

Querying measurement data in binary format

Syntax

Query **:MEASure:BIN:FAST?**

Response <response data size><binary data>

response data size: Byte-size string of the binary data part.
Total 12 bytes of 11 numeric digits and a colon (:).
Example: If the size of the binary data section is 40,000 bytes, then 0000000040000:".

binary data:
(Data refresh rate 1ms)
Outputs 100 samples of binary format measurements in ascending order.
(Data refresh rate 10ms)
Outputs 10 samples of binary format measurements in ascending order.
(Other)
Outputs binary format measurement values for one sample.

Description

Query

Creates measurement data in binary format for the item specified in :MEASure:ITEM..

The number of samples to output depends on the data refresh rate.

The order of measurement data is fixed.
(See the table in "4.2 List and Order of Direct Specification Items for :MEASure?")

Status data is always attached to the top of the data.

Even when the query is sent continuously, the measurement data to be output is not duplicated. Therefore, a response may be returned after the data update has been put in standby.

The data format of the measured values is as follows. Byte order is little-endian.

size	Type	Description
4	long	Status
4	float	General measured value
4	float	Integrated value
8	float*2	Elapsed time (seconds + milliseconds)
4	float	Exceeded value (77777.7E+30)
4	float	Error value (99999.9E+30)

Example

Query **:MEAS:BIN:FAST?**

Response 00000040000:[binary data]

Reference

Communication Output Item: Initializing Communication Output Data Items

Syntax

Command **:MEASure:ITEM:ALLClear**

Description

Command

Initializes the communication output data items.

All output data items related to the **:MEASure:ITEM:** command including the harmonics items are OFF.

Example

Command **:MEAS:ITEM:ALLC**

Reference

Communication Output Item: Setting and Querying Voltage Data

Syntax

Command **:MEASure:ITEM:U <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>,<FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>,<DEG(NR1)>,<FREQ(NR1)>**

Query **:MEASure:ITEM:U?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Urms8	Urms7	Urms6	Urms5	Urms4	Urms3	Urms2	Urms1
MN	Umn8	Umn7	Umn6	Umn5	Umn4	Umn3	Umn2	Umn1
AC	Uac8	Uac7	Uac6	Uac5	Uac4	Uac3	Uac2	Uac1
DC	Udc8	Udc7	Udc6	Udc5	Udc4	Udc3	Udc2	Udc1
FND	Ufnd8	Ufnd7	Ufnd6	Ufnd5	Ufnd4	Ufnd3	Ufnd2	Ufnd1
PK+	PUpk8	PUpk7	PUpk6	PUpk5	PUpk4	PUpk3	PUpk2	PUpk1
PK-	MUpk8	MUpk7	MUpk6	MUpk5	MUpk4	MUpk3	MUpk2	MUpk1
THD	Uthd8	Uthd7	Uthd6	Uthd5	Uthd4	Uthd3	Uthd2	Uthd1
RF	Urf8	Urf7	Urf6	Urf5	Urf4	Urf3	Urf2	Urf1
DEG(ø)	Udeg8	Udeg7	Udeg6	Udeg5	Udeg4	Udeg3	Udeg2	Udeg1
FREQ	FU8	FU7	FU6	FU5	FU4	FU3	FU2	FU1

Description

Command Sets communication output items of voltage data in a value from 0 to 255.

Query Returns the setting of the communication output item of the voltage data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:U 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:MEAS:ITEM:U?**

Response (HEADER ON) :MEASURE:ITEM:U 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Communication Output Item: Setting and Querying Total Voltage Data

Syntax

Command **:MEASure:ITEM:USUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:MEASure:ITEM:USUM?**

Response <RMS1>,<RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 7	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Urms78	Urms67	Urms56	Urms45	Urms34	Urms23	Urms12
RMS2	-	-	Urms678	Urms567	Urms456	Urms345	Urms234	Urms123
MN1	-	Umn78	Umn67	Umn56	Umn45	Umn34	Umn23	Umn12
MN2	-	-	Umn678	Umn567	Umn456	Umn345	Umn234	Umn123
UNB	-	-	Uunb 678	Uunb 567	Uunb 456	Uunb 345	Uunb 234	Uunb 123

Description

Command Sets communication output items of total voltage data in a value from 0 to 255.

Query Returns setting for communication output item of total voltage data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:USUM 2,0,2,0,0**

Sets Urms23 and Umn23 to ON.

Query **:MEAS:ITEM:USUM?**

Response (HEADER ON) :MEASURE:ITEM:USUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Communication Output Item: Setting and Querying Current Data

Syntax

Command **:MEASure:ITEM:I <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>,<FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>,<DEG(NR1)>,<FREQ(NR1)>**

Query **:MEASure:ITEM:I?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Irms8	Irms7	Irms6	Irms5	Irms4	Irms3	Irms2	Irms1
MN	Imn8	Imn7	Imn6	Imn5	Imn4	Imn3	Imn2	Imn1
AC	Iac8	Iac7	Iac6	Iac5	Iac4	Iac3	Iac2	Iac1
DC	Idc8	Idc7	Idc6	Idc5	Idc4	Idc3	Idc2	Idc1
FND	Ifnd8	Ifnd7	Ifnd6	Ifnd5	Ifnd4	Ifnd3	Ifnd2	Ifnd1
PK+	Ipk8	Ipk7	Ipk6	Ipk5	Ipk4	Ipk3	Ipk2	Ipk1
PK-	Mpk8	Mpk7	Mpk6	Mpk5	Mpk4	Mpk3	Mpk2	Mpk1
THD	Ithd8	Ithd7	Ithd6	Ithd5	Ithd4	Ithd3	Ithd2	Ithd1
RF	Irf8	Irf7	Irf6	Irf5	Irf4	Irf3	Irf2	Irf1
DEG(ø)	Ideg8	Ideg7	Ideg6	Ideg5	Ideg4	Ideg3	Ideg2	Ideg1
FREQ	FI8	FI7	FI6	FI5	FI4	FI3	FI2	FI1

Description

Command Sets communication output items of current data in a value from 0 to 255.

Query Returns the setting of the communication output item of the current data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:I 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:MEAS:ITEM:I?**

Response (HEADER ON) :MEASURE:ITEM:I 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Communication Output Item: Setting and Querying Total Current Data

Syntax

Command **:MEASure:ITEM:ISUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:MEASure:ITEM:ISUM?**

Response <RMS1>, <RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Irms78	Irms67	Irms56	Irms45	Irms34	Irms23	Irms12
RMS2	-	-	Irms678	Irms567	Irms456	Irms345	Irms234	Irms123
MN1	-	Imn78	Imn67	Imn56	Imn45	Imn34	Imn23	Imn12
MN2	-	-	Imn678	Imn567	Imn456	Imn345	Imn234	Imn123
UNB	-	-	Iunb 678	Iunb 567	Iunb 456	Iunb 345	Iunb 234	Iunb 123

Description

Command Sets communication output items of total current data in a value from 0 to 255.

Query Returns setting for communication output item of total current data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:ISUM 2,0,2,0,0**

Sets Irms23 and Imn23.

Query **:MEAS:ITEM:ISUM?**

Response (HEADER ON) :MEASURE:ITEM:ISUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Communication Output Item: Setting and Querying Power Data

Syntax

Command **:MEASure:ITEM:P <P(NR1)>,<Pfnd(NR1)>,<S(NR1)>,<Sfnd(NR1)>, <Q(NR1)>,<Qfnd(NR1)>,<PF(NR1)>,<PFfnd(NR1)>,<DEG(NR1)>**

Query **:MEASure:ITEM:P?**

Response <P>,<Pfnd>,<S>,<Sfnd>,<Q>,<Qfnd>,<PF>,<PFfnd>,<DEG>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P	P8	P7	P6	P5	P4	P3	P2	P1
Pfnd	Pfnd8	Pfnd7	Pfnd6	Pfnd5	Pfnd4	Pfnd3	Pfnd2	Pfnd1
S	S8	S7	S6	S5	S4	S3	S2	S1
Sfnd	Sfnd8	Sfnd7	Sfnd6	Sfnd5	Sfnd4	Sfnd3	Sfnd2	Sfnd1
Q	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1
Qfnd	Qfnd8	Qfnd7	Qfnd6	Qfnd5	Qfnd4	Qfnd3	Qfnd2	Qfnd1
PF(λ)	PF8	PF7	PF6	PF5	PF4	PF3	PF2	PF1
PFfnd	PFfnd8	PFfnd7	PFfnd6	PFfnd5	PFfnd4	PFfnd3	PFfnd2	PFfnd1
DEG(ø)	DEG8	DEG7	DEG6	DEG5	DEG4	DEG3	DEG2	DEG1

Description

Command Sets communication output items of power data in a value from 0 to 255.

Query Returns the setting of the communication output item of the power data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:P 1,0,1,0,1,0,1,0,1**

Sets P, S, Q, PF and DEG of CH1 to ON.

Query **:MEAS:ITEM:P?**

Response (HEADER ON) :MEASURE:ITEM:P 1,0,1,0,1,0,1,0,1

(HEADER OFF) 1,0,1,0,1,0,1,0,1

Reference

Communication Output Item: Setting and Querying Total Power Data

Syntax

Command **:MEASure:ITEM:PSUM <P1(NR1)>,<P2(NR1)>,<Pfnd1(NR1)>,<Pfnd2(NR1)>,<S1(NR1)>,<S2(NR1)>,<Sfnd1(NR1)>,<Sfnd2(NR1)>,<Q1(NR1)>,<Q2(NR1)>,<Qfnd1(NR1)>,<Qfnd2(NR1)>,<PF1(NR1)>,<PF2(NR1)>,<PFfnd1(NR1)>,<PFfnd2(NR1)>,<DEG1(NR1)>,<DEG2(NR1)>**

Query **:MEASure:ITEM:PSUM?**

Response <P1>,<P2>,<Pfnd1>,<Pfnd2>,<S1>,<S2>,<Sfnd1>,<Sfnd2>,<Q1>,<Q2>,<Qfnd1>,<Qfnd2>,<PF1>,<PF2>,<PFfnd1>,<PFfnd2>,<DEG1>,<DEG2(NR1)>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P1	-	P78	P67	P56	P45	P34	P23	P12
P2	-	-	P678	P567	P456	P345	P234	P123
Pfnd1	-	Pfnd78	Pfnd67	Pfnd56	Pfnd45	Pfnd34	Pfnd23	Pfnd12
Pfnd2	-	-	Pfnd678	Pfnd567	Pfnd456	Pfnd345	Pfnd234	Pfnd123
S1	-	S78	S67	S56	S45	S34	S23	S12
S2	-	-	S678	S567	S456	S345	S234	S123
Sfnd1	-	Sfnd78	Sfnd67	Sfnd56	Sfnd45	Sfnd34	Sfnd23	Sfnd12
Sfnd2	-	-	Sfnd678	Sfnd567	Sfnd456	Sfnd345	Sfnd234	Sfnd123
Q1	-	Q78	Q67	Q56	Q45	Q34	Q23	Q12
Q2		-	Q678	Q567	Q456	Q345	Q234	Q123
Qfnd1	-	Qfnd78	Qfnd67	Qfnd56	Qfnd45	Qfnd34	Qfnd23	Qfnd12
Qfnd2		-	Qfnd678	Qfnd567	Qfnd456	Qfnd345	Qfnd234	Qfnd123
PF(λ)1	-	PF78	PF67	PF56	PF45	PF34	PF23	PF12
PF(λ)2		-	PF678	PF567	PF456	PF345	PF234	PF123
PFfnd1	-	PFfnd78	PFfnd67	PFfnd56	PFfnd45	PFfnd34	PFfnd23	PFfnd12
PFfnd2	-	-	PFfnd 678	PFfnd 567	PFfnd 456	PFfnd 345	PFfnd 234	PFfnd 123
DEG(ø)1	-	DEG78	DEG67	DEG56	DEG45	DEG34	DEG23	DEG12
DEG(ø)2	-	-	DEG678	DEG567	DEG456	DEG345	DEG234	DEG123

Description

Command Sets communication output items of total power data in a value from 0 to 255.

Query Returns setting for communication output item of total power data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0**

Sets P12, S12, Q12, PF12, and DEG12 to ON.

Query **:MEAS:ITEM:PSUM?**

Response (HEADER ON) :MEASURE:ITEM:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

(HEADER OFF) 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

Reference

Communication Output Item: Setting and Querying Integration Data

Syntax

Command **:MEASure:ITEM:INTEGrate <PIH(NR1)>,<MIH(NR1)>,<IH(NR1)>,<PWP(NR1)>,<MWP(NR1)>,<WP(NR1)>,<PWP_SUM1(NR1)>,<PWP_SUM2(NR1)>,<MWP_SUM1(NR1)>,<MWP_SUM2(NR1)>,<WP_SUM1(NR1)>,<WP_SUM2(NR1)>,<Elapsed time(NR1)>**

Query **:MEASure:ITEM:INTEGrate?**

Response <PIH>,<MIH>,<IH>,<PWP>,<MWP>,<WP>,<PWP_SUM1>,<PWP_SUM2>,<MWP_SUM1>,<MWP_SUM2>,<WP_SUM1>,<WP_SUM2>,<Elapsed time>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PIH	PIH8	PIH7	PIH6	PIH5	PIH4	PIH3	PIH2	PIH1
MIH	MIH8	MIH7	MIH6	MIH5	MIH4	MIH3	MIH2	MIH1
IH	IH8	IH7	IH6	IH5	IH4	IH3	IH2	IH1
PWP	PWP8	PWP7	PWP6	PWP5	PWP4	PWP3	PWP2	PWP1
MWP	MWP8	MWP7	MWP6	MWP5	MWP4	MWP3	MWP2	MWP1
WP	WP8	WP7	WP6	WP5	WP4	WP3	WP2	WP1
PWP SUM1	-	PWP78	PWP67	PWP56	PWP45	PWP34	PWP23	PWP12
PWP SUM2	-	-	PWP678	PWP567	PWP456	PWP345	PWP234	PWP123
MWP SUM1	-	MWP78	MWP67	MWP56	MWP45	MWP34	MWP23	MWP12
MWP SUM2	-	-	MWP678	MWP567	MWP456	MWP345	MWP234	MWP123
WP SUM1	-	WP78	WP67	WP56	WP45	WP34	WP23	WP12
WP SUM2	-	-	WP678	WP567	WP456	WP345	WP234	WP123
Elapsed time	-	-	-	-	-	-	-	Time

Description

Command Sets communication output items of integration data in a value from 0 to 255.
When the time of the elapsed time is set to ON, hours, minutes, and seconds, and the elapsed time in units of ms are output.

Query Returns the setting for the communication output item of integration data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:INTEG 0,0,0,1,1,1,0,0,0,0,0,0,1**

Sets all the integrated power values to ON and integrated elapsed time to ON for CH1.

Query **:MEAS:ITEM:INTEG?**

Response (HEADER ON) :MEASURE:ITEM:INTEGRATE 0,0,0,1,1,1,0,0,0,0,0,0,1

(HEADER OFF) 0,0,0,1,1,1,0,0,0,0,0,0,1

Reference

Communication Output Item: Setting and Querying Motor

Syntax

Command **:MEASure:ITEM:EXTernalin <Torque (NR1)>,<RPM (NR1)>, <Motor power(NR1)>,<Slip (NR1)>,<Independent input(NR1)>**

Query **:MEASure:ITEM:EXTernalin?**

Response <Torque>,<RPM>,<Motor power>,<Slip>,<Independent input>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Torque	-	-	-	-	Tq4	Tq3	Tq2	Tq1
RPM	-	-	-	-	Spd4	Spd3	Spd2	Spd1
Motor power	-	-	-	-	Pm4	Pm3	Pm2	Pm1
Slip	-	-	-	-	Slip4	Slip3	Slip2	Slip1
Independent input	CHH	CHG	CHF	CHE	CHD	CHC	CHB	CHA

Description

Command Sets communication output items of motor in a value from 0 to 255.

Query Returns the settings of motor communication output items in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:EXT 3,3,0,0,0**

Sets Tq1, Tq2, Spd1, and Spd2 to ON.

Query **:MEAS:ITEM:EXT?**

Response (HEADER ON) :MEASURE:ITEM:EXTERNALIN 3,3,0,0,0

(HEADER OFF) 3,3,0,0,0

Reference

- A model without a motor analysis option causes an execution error.

Communication Output Item: Setting and Querying Calculated Efficiency and Loss Values

Syntax

Command **:MEASure:ITEM:EFFiciency <EFF(NR1)>,<LOSS(NR1)>**

Query **:MEASure:ITEM:EFFiciency?**

Response <EFF>,<LOSS>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
EFF (η)	-	-	-	-	EFF4	EFF3	EFF2	EFF1
LOSS	-	-	-	-	LOSS4	LOSS3	LOSS2	LOSS1

Description

Command Sets the values of communication output items of calculated efficiency (EFF) and loss (LOSS) values to 0 to 255.

Query Returns the settings of communication output items of calculated efficiency and loss values in a numerical NR1 value.

Example

Command **:MEAS:ITEM:EFF 3,8**

Sets calculated efficiency values 1 and 2 (EFF1 and EFF2) and calculated loss value 4 (LOSS4) to ON.

Query **:MEAS:ITEM:EFF?**

Response (HEADER ON) :MEASURE:ITEM:EFFICIENCY 3,8

(HEADER OFF) 3,8

Reference

Communication Output Item: Setting and User-defined Formulas

Syntax

Command **:MEASure:ITEM:UDF <UDF1 to 8(NR1)>,<UDF9 to 16(NR1)>, <UDF 17 to 20(NR1)>**

Query **:MEASure:ITEM:UDF?**

Response <UDF1 to 8>,<UDF9 to 16>,<UDF17 to 20>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
UDF1 to 8	UDF8	UDF7	UDF6	UDF5	UDF4	UDF3	UDF2	UDF1
UDF9 to 16	UDF16	UDF15	UDF14	UDF13	UDF12	UDF11	UDF10	UDF9
UDF17 to 20	-	-	-	-	UDF20	UDF19	UDF18	UDF17

Description

Command Sets the values of communication output items of user-defined formula in a value from 0 to 255.

Query Returns the settings of communication output items of user-defined formula in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:UDF 3,3,0**

Sets UDF1, UDF2, UDF9, and UDF10 to ON.

Query **:MEAS:ITEM:UDF?**

Response (HEADER ON) :MEASURE:ITEM:UDF 3,3,0

(HEADER OFF) 3,3,0

Reference

Communication Output Item: Setting and Flicker Measurement

Syntax

Command **:MEASure:ITEM:FLICker <Pst(NR1)>,<PstMax(NR1)>,<Plt(NR1)>, <PinstMax(NR1)>,<PinstMin(NR1)>,<dc(NR1)>,<dmax(NR1)>, <Tmax(NR1)>**

Query **:MEASure:ITEM:FLICker?**

Response <Pst>,<PstMax>,<Plt>,<PinstMax>,<PinstMin>,<dc>,<dmax>,<Tmax>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Pst	Pst8	Pst7	Pst6	Pst5	Pst4	Pst3	Pst2	Pst1
Pst Max	PstMax8	PstMax7	PstMax6	PstMax5	PstMax4	PstMax3	PstMax2	PstMax1
Plt	Plt8	Plt7	Plt6	Plt5	Plt4	Plt3	Plt2	Plt1
Pinst Max	Pins tMax8	Pinst Max7	Pinst Max6	Pinst Max5	Pinst Max4	Pinst Max3	Pinst Max2	Pinst Max1
Pinst Min	Pinst Min8	Pinst Min7	Pinst Min6	Pinst Min5i	Pinst Min4	Pinst Min3	Pinst Min2	Pinst Min1
dc	DC8	DC7	DC6	DC5	DC4	DC3	DC2	DC1
dmax	DMax8	DMax7	DMax6	DMax5	DMax4	DMax3	DMax2	DMax1
Tmax	TMax8	TMax7	TMax6	TMax5	TMax4	TMax3	TMax2	TMax1

Description

Command Sets the values of communication output items of Flicker Measurement in a value from 0 to 255.

Query Returns the settings of communication output items of Flicker Measurement in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:FLIC 0,0,0,0,0,3,3,3**

Sets UDF1, UDF2, UDF9, and UDF10 to ON.

Query **:MEAS:ITEM:FLIC?**

Response (HEADER ON) :MEASURE:ITEM:FLICKER 0,0,0,0,0,3,3,3

(HEADER OFF) 0,0,0,0,0,3,3,3

Reference

Communication Output Item: Initializing Harmonic Communication Output Data Items

Syntax

Command **:MEASure:ITEM:HARMonic:ALLClear**

Description

Command Initializes the settings of harmonic communication output data items and the settings of output order.

Example

Command **:MEAS:ITEM:HARM:ALLC**

Reference

- All the communication output data items for harmonics will be turned OFF.

Communication Output Item: Setting and Querying Harmonic Data

Syntax

Command **:MEASure:ITEM:HARMonic:LIST <Level U(NR1)>,<Level I(NR1)>, <Level P(NR1)>,<Level Psum1(NR1)>,<Level Psum2(NR1)>, <Content percentage U(NR1)>,<Content percentage I(NR1)>, <Content percentage P(NR1)>,<Content percentage Psum1(NR1)>, <Content percentage Psum2 (NR1)>,<Phase angle U(NR1)>, <Phase angle I(NR1)>,<Phase angle P(NR1)>,<Phase angle Psum1(NR1)>, <Phase angle Psum2(NR1)>,<Synchronization frequency fHRM(NR1)>**

Query **:MEASure:ITEM:HARMonic:LIST?**

Response <Level U>,<Level I>,<Level P>,<Level Psum1>,<Level Psum2>,<Content percentage U>,<Content percentage I>,<Content percentage P>,<Content percentage Psum1>,<Content percentage Psum2>,<Phase angle U>,<Phase angle I>,<Phase angle P>,<Phase angle Psum1>,<Phase angle Psum2>,<Synchronization frequency fHRM>

Harmonics List	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Level U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Level I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Level P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Level Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Level Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Content percentage U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Content percentage I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Content percentage P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Content percentage Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Content percentage Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Phase angle U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Phase angle I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Phase angle P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Phase angle Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Phase angle Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Synchronization frequency fHRM	HF8	HF7	HF6	HF5	HF4	HF3	HF2	HF1

Description

Command Returns transmission items of data responded by **MEASure:HARMonic?** in a numerical value from 0 to 255.
Specify a harmonics list (level, content percentage, phase angle, synchronizing frequency) here.
Set items by using ON/OFF for the bits above and by specifying values with a numerical NR1 value from 0 to 255.

Query Returns transmission item settings of data responded by **MEASure:HARMonic?** in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:HARM:LIST 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0**

Sets HU1, HI1, and HP1 for the level, HU1, HI1, and HP1 for the content percentage, and HU1, HI1, and HP1 for the phase angle.

Query **:MEAS:ITEM:HARM:LIST?**

Response (HEADER ON) :MEASURE:ITEM:HARMONIC:LIST1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0

(HEADER OFF) 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0

Reference

- Use **:MEASure:ITEM:HARMonic:ORDer** command to set the order to be saved.

Communication Output Item: Setting and Querying InterHarmonics Data

Syntax

Command **:MEASure:ITEM:HARMonic:INTER <Level U(NR1)>,<Level I(NR1)>, <Content percentage U(NR1)>,<Content percentage I(NR1)>**

Query **:MEASure:ITEM:HARMonic:INTER?**

Response <Level U>,<Level I>, <Content percentage U>,<Content percentage I>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Level iU	iHU8	iHU7	iHU6	iHU5	iHU4	iHU3	iHU2	iHU1
Level iI	iHI8	iHI7	iHI6	iHI5	iHI4	iHI3	iHI2	iHI1
Content percentage iU	iHU8	iHU7	iHU6	iHU5	iHU4	iHU3	iHU2	iHU1
Content percentage iI	iHI8	iHI7	iHI6	iHI5	iHI4	iHI3	iHI2	iHI1

Description

Command Returns transmission items of data responded by **MEASure:HARMonic?** in a numerical value from 0 to 255.

Specify a Interharmonics list (level, content percentage) here.

You must set items by using ON/OFF for each bit, and specify values with numerical data from 0 to 255.

Query Returns transmission item settings of data responded by **MEASure:HARMonic?** in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:ITEM:HARM:INTER 1,0,1,0**

Sets iHU1 for the level, HU1 for the content percentage.

Query **:MEAS:ITEM:HARM:INTER?**

Response (HEADER ON) :MEASURE:ITEM:HARMONIC:INTER 1,0,1,0

(HEADER OFF) 1,0,1,0

Reference

- Use **:DATAout:ITEM:HARMonic:ORDer** command to set the order to be saved.

Communication Output Item: Setting and Querying Output Order for Harmonics Data

Syntax

Command: **:MEASure:ITEM:HARMonic:ORDer <Lower limit order(NR1)>,<Upper limit order(NR1)>,<ODD/EVEN/ALL(String)>**

Query: **:MEASure:ITEM:HARMonic:ORDer?**

Response: <Lower limit order>,<Upper limit order>,<ODD/EVEN/ALL>

Lower limit order (NR1)	0 to 500
Upper limit order (NR1)	0 to 500
ODD	Odd order only
EVEN	Even order only
ALL	All orders

Description

Command: Sets upper limit order, lower limit order and output-targeted order of transmission items of data to be responded by:**MEASure:HARMonic?**.

Query: Returns the setting for order of transmission items of data to be responded by **:MEASure:HARMonic?** in a numerical NR1 value and a string.

Example

Command: **:MEAS:ITEM:HARM:ORD 1,15,ODD**

Sets odd orders from 1 to 15 as outputs.

Query: **:MEAS:ITEM:HARM:ORD?**

Response: (HEADER ON) :MEASURE:ITEM:HARMONIC:ORDER 1,15,ODD

(HEADER OFF) 1,15,ODD

Reference

- Use this command as a combination with "**:MEASure:ITEM:HARMonic:LIST**" command.

Communication Output Item: Initializing Communication Output Data Items (Secondary)

Syntax

Command: **:MEASure:SECond:ALLClear**

Description

Command: Initializes the communication output data items.

All output data items related to the **:MEASure:SECond:** command including the harmonics items are OFF.

Example

Command: **:MEAS:SEC:ALLC**

Reference

Communication Output Item: Setting and Querying Voltage Data (Secondary)

Syntax

Command **:MEASure:SECond:U <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>,<FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>,<DEG(NR1)>,<FREQ(NR1)>**

Query **:MEASure:SECond:U?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Urms8	Urms7	Urms6	Urms5	Urms4	Urms3	Urms2	Urms1
MN	Umn8	Umn7	Umn6	Umn5	Umn4	Umn3	Umn2	Umn1
AC	Uac8	Uac7	Uac6	Uac5	Uac4	Uac3	Uac2	Uac1
DC	Udc8	Udc7	Udc6	Udc5	Udc4	Udc3	Udc2	Udc1
FND	Ufnd8	Ufnd7	Ufnd6	Ufnd5	Ufnd4	Ufnd3	Ufnd2	Ufnd1
PK+	PUpk8	PUpk7	PUpk6	PUpk5	PUpk4	PUpk3	PUpk2	PUpk1
PK-	MUpk8	MUpk7	MUpk6	MUpk5	MUpk4	MUpk3	MUpk2	MUpk1
THD	Uthd8	Uthd7	Uthd6	Uthd5	Uthd4	Uthd3	Uthd2	Uthd1
RF	Urf8	Urf7	Urf6	Urf5	Urf4	Urf3	Urf2	Urf1
DEG(ø)	Udeg8	Udeg7	Udeg6	Udeg5	Udeg4	Udeg3	Udeg2	Udeg1
FREQ	FU8	FU7	FU6	FU5	FU4	FU3	FU2	FU1

Description

Command Sets communication output items of voltage data in a value from 0 to 255.

Query Returns the setting of the communication output item of the voltage data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:U 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:MEAS:SEC:U?**

Response (HEADER ON) :MEASURE:SECOND:U 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Communication Output Item: Setting and Querying Total Voltage Data (Secondary)

Syntax

Command **:MEASure:SECond:USUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:MEASure:SECond:USUM?**

Response <RMS1>,<RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 7	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Urms78	Urms67	Urms56	Urms45	Urms34	Urms23	Urms12
RMS2	-	-	Urms678	Urms567	Urms456	Urms345	Urms234	Urms123
MN1	-	Umn78	Umn67	Umn56	Umn45	Umn34	Umn23	Umn12
MN2	-	-	Umn678	Umn567	Umn456	Umn345	Umn234	Umn123
UNB	-	-	Uunb 678	Uunb 567	Uunb 456	Uunb 345	Uunb 234	Uunb 123

Description

Command Sets communication output items of total voltage data in a value from 0 to 255.

Query Returns setting for communication output item of total voltage data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:USUM 2,0,2,0,0**

Sets Urms23 and Umn23 to ON.

Query **:MEAS:SEC:USUM?**

Response (HEADER ON) :MEASURE:SECOND:USUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Communication Output Item: Setting and Querying Current Data (Secondary)

Syntax

Command **:MEASure:SECond:I <RMS(NR1)>,<MN(NR1)>,<AC(NR1)>,<DC(NR1)>,<FND(NR1)>,<PK+(NR1)>,<PK-(NR1)>,<THD(NR1)>,<RF(NR1)>,<DEG(NR1)>,<FREQ(NR1)>**

Query **:MEASure:SECond:I?**

Response <RMS>,<MN>,<AC>,<DC>,<FND>,<PK+>,<PK->,<THD>,<RF>,<DEG>,<FREQ>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS	Irms8	Irms7	Irms6	Irms5	Irms4	Irms3	Irms2	Irms1
MN	Imn8	Imn7	Imn6	Imn5	Imn4	Imn3	Imn2	Imn1
AC	Iac8	Iac7	Iac6	Iac5	Iac4	Iac3	Iac2	Iac1
DC	Idc8	Idc7	Idc6	Idc5	Idc4	Idc3	Idc2	Idc1
FND	Ifnd8	Ifnd7	Ifnd6	Ifnd5	Ifnd4	Ifnd3	Ifnd2	Ifnd1
PK+	Ipk8	Ipk7	Ipk6	Ipk5	Ipk4	Ipk3	Ipk2	Ipk1
PK-	Mpk8	Mpk7	Mpk6	Mpk5	Mpk4	Mpk3	Mpk2	Mpk1
THD	Ithd8	Ithd7	Ithd6	Ithd5	Ithd4	Ithd3	Ithd2	Ithd1
RF	Irf8	Irf7	Irf6	Irf5	Irf4	Irf3	Irf2	Irf1
DEG(ø)	Ideg8	Ideg7	Ideg6	Ideg5	Ideg4	Ideg3	Ideg2	Ideg1
FREQ	FI8	FI7	FI6	FI5	FI4	FI3	FI2	FI1

Description

Command Sets communication output items of current data in a value from 0 to 255.

Query Returns the setting of the communication output item of the current data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:I 3,3,3,0,0,3,3,0,0,0,0**

Sets RMS, MN, AC, PK+, and PK− for CH1 and CH2 to ON.

Query **:MEAS:SEC:I?**

Response (HEADER ON) :MEASURE:SECOND:I 3,3,3,0,0,3,3,0,0,0,0

(HEADER OFF) 3,3,3,0,0,3,3,0,0,0,0

Reference

Communication Output Item: Setting and Querying Total Current Data (Secondary)

Syntax

Command **:MEASure:SECond:ISUM <RMS1(NR1)>,<RMS2(NR1)>,<MN1(NR1)>,<MN2(NR1)>,<UNB(NR1)>**

Query **:MEASure:SECond:ISUM?**

Response <RMS1>, <RMS2>,<MN1>,<MN2>,<UNB>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RMS1	-	Irms78	Irms67	Irms56	Irms45	Irms34	Irms23	Irms12
RMS2	-	-	Irms678	Irms567	Irms456	Irms345	Irms234	Irms123
MN1	-	Imn78	Imn67	Imn56	Imn45	Imn34	Imn23	Imn12
MN2	-	-	Imn678	Imn567	Imn456	Imn345	Imn234	Imn123
UNB	-	-	Iunb 678	Iunb 567	Iunb 456	Iunb 345	Iunb 234	Iunb 123

Description

Command Sets communication output items of total current data in a value from 0 to 255.

Query Returns setting for communication output item of total current data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:ISUM 2,0,2,0,0**

Sets Irms23 and Imn23.

Query **:MEAS:SEC:ISUM?**

Response (HEADER ON) :MEASURE:SECOND:ISUM 2,0,2,0,0

(HEADER OFF) 2,0,2,0,0

Reference

Communication Output Item: Setting and Querying Power Data (Secondary)

Syntax

Command **:MEASure:SECond:P <P(NR1)>,<Pfnd(NR1)>,<S(NR1)>,<Sfnd(NR1)>,<Q(NR1)>,<Qfnd(NR1)>,<PF(NR1)>,<PFfnd(NR1)>,<DEG(NR1)>**

Query **:MEASure:SECond:P?**

Response <P>,<Pfnd>,<S>,<Sfnd>,<Q>,<Qfnd>,<PF>,<PFfnd>,<DEG>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P	P8	P7	P6	P5	P4	P3	P2	P1
Pfnd	Pfnd8	Pfnd7	Pfnd6	Pfnd5	Pfnd4	Pfnd3	Pfnd2	Pfnd1
S	S8	S7	S6	S5	S4	S3	S2	S1
Sfnd	Sfnd8	Sfnd7	Sfnd6	Sfnd5	Sfnd4	Sfnd3	Sfnd2	Sfnd1
Q	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1
Qfnd	Qfnd8	Qfnd7	Qfnd6	Qfnd5	Qfnd4	Qfnd3	Qfnd2	Qfnd1
PF(λ)	PF8	PF7	PF6	PF5	PF4	PF3	PF2	PF1
PFfnd	PFfnd8	PFfnd7	PFfnd6	PFfnd5	PFfnd4	PFfnd3	PFfnd2	PFfnd1
DEG(ø)	DEG8	DEG7	DEG6	DEG5	DEG4	DEG3	DEG2	DEG1

Description

Command Sets communication output items of power data in a value from 0 to 255.

Query Returns the setting of the communication output item of the power data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:P 1,0,1,0,1,0,1,0,1**

Sets P, S, Q, PF and DEG of CH1 to ON.

Query **:MEAS:SEC:P?**

Response (HEADER ON) :MEASURE:SECOND:P 1,0,1,0,1,0,1,0,1

(HEADER OFF) 1,0,1,0,1,0,1,0,1

Reference

Communication Output Item: Setting and Querying Total Power Data (Secondary)

Syntax

Command: **:MEASure:SECond:PSUM <P1(NR1)>,<P2(NR1)>,<Pfnd1(NR1)>,<Pfnd2(NR1)>,<S1(NR1)>,<S2(NR1)>,<Sfnd1(NR1)>,<Sfnd2(NR1)>,<Q1(NR1)>,<Q2(NR1)>,<Qfnd1(NR1)>,<Qfnd2(NR1)>,<PF1(NR1)>,<PF2(NR1)>,<PFfnd1(NR1)>,<PFfnd2(NR1)>,<DEG1(NR1)>,<DEG2(NR1)>**

Query: **:MEASure:SECond:PSUM?**

Response: <P1>,<P2>,<Pfnd1>,<Pfnd2>,<S1>,<S2>,<Sfnd1>,<Sfnd2>,<Q1>,<Q2>,<Qfnd1>,<Qfnd2>,<PF1>,<PF2>,<PFfnd1>,<PFfnd2>,<DEG1>,<DEG2(NR1)>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
P1	-	P78	P67	P56	P45	P34	P23	P12
P2	-	-	P678	P567	P456	P345	P234	P123
Pfnd1	-	Pfnd78	Pfnd67	Pfnd56	Pfnd45	Pfnd34	Pfnd23	Pfnd12
Pfnd2	-	-	Pfnd678	Pfnd567	Pfnd456	Pfnd345	Pfnd234	Pfnd123
S1	-	S78	S67	S56	S45	S34	S23	S12
S2	-	-	S678	S567	S456	S345	S234	S123
Sfnd1	-	Sfnd78	Sfnd67	Sfnd56	Sfnd45	Sfnd34	Sfnd23	Sfnd12
Sfnd2	-	-	Sfnd678	Sfnd567	Sfnd456	Sfnd345	Sfnd234	Sfnd123
Q1	-	Q78	Q67	Q56	Q45	Q34	Q23	Q12
Q2		-	Q678	Q567	Q456	Q345	Q234	Q123
Qfnd1	-	Qfnd78	Qfnd67	Qfnd56	Qfnd45	Qfnd34	Qfnd23	Qfnd12
Qfnd2		-	Qfnd678	Qfnd567	Qfnd456	Qfnd345	Qfnd234	Qfnd123
PF(λ)1	-	PF78	PF67	PF56	PF45	PF34	PF23	PF12
PF(λ)2		-	PF678	PF567	PF456	PF345	PF234	PF123
PFfnd1	-	PFfnd78	PFfnd67	PFfnd56	PFfnd45	PFfnd34	PFfnd23	PFfnd12
PFfnd2	-	-	PFfnd 678	PFfnd 567	PFfnd 456	PFfnd 345	PFfnd 234	PFfnd 123
DEG(ø)1	-	DEG78	DEG67	DEG56	DEG45	DEG34	DEG23	DEG12
DEG(ø)2	-	-	DEG678	DEG567	DEG456	DEG345	DEG234	DEG123

Description

Command: Sets communication output items of total power data in a value from 0 to 255.

Query: Returns setting for communication output item of total power data in a numerical NR1 value from 0 to 255.

Example

Command: **:MEAS:SEC:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0**

Sets P12, S12, Q12, PF12, and DEG12 to ON.

Query: **:MEAS:SEC:PSUM?**

Response: (HEADER ON) :MEASURE:SECOND:PSUM 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

(HEADER OFF) 1,0,0,0,1,0,0,0,1,0,0,0,1,0,0,0,1,0

Reference

Communication Output Item: Setting and Querying Integration Data (Secondary)

Syntax

Command **:MEASure:SECond:INTEGrate <PIH(NR1)>,<MIH(NR1)>,<IH(NR1)>,<PWP(NR1)>,<MWP(NR1)>,<WP(NR1)>,<PWP_SUM1(NR1)>,<PWP_SUM2(NR1)>,<MWP_SUM1(NR1)>,<MWP_SUM2(NR1)>,<WP_SUM1(NR1)>,<WP_SUM2(NR1)>,<Elapsed time(NR1)>**

Query **:MEASure:SECond:INTEGrate?**

Response <PIH>,<MIH>,<IH>,<PWP>,<MWP>,<WP>,<PWP_SUM1>,<PWP_SUM2>,<MWP_SUM1>,<MWP_SUM2>,<WP_SUM1>,<WP_SUM2>,<Elapsed time>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PIH	PIH8	PIH7	PIH6	PIH5	PIH4	PIH3	PIH2	PIH1
MIH	MIH8	MIH7	MIH6	MIH5	MIH4	MIH3	MIH2	MIH1
IH	IH8	IH7	IH6	IH5	IH4	IH3	IH2	IH1
PWP	PWP8	PWP7	PWP6	PWP5	PWP4	PWP3	PWP2	PWP1
MWP	MWP8	MWP7	MWP6	MWP5	MWP4	MWP3	MWP2	MWP1
WP	WP8	WP7	WP6	WP5	WP4	WP3	WP2	WP1
PWP SUM1	-	PWP78	PWP67	PWP56	PWP45	PWP34	PWP23	PWP12
PWP SUM2	-	-	PWP678	PWP567	PWP456	PWP345	PWP234	PWP123
MWP SUM1	-	MWP78	MWP67	MWP56	MWP45	MWP34	MWP23	MWP12
MWP SUM2	-	-	MWP678	MWP567	MWP456	MWP345	MWP234	MWP123
WP SUM1	-	WP78	WP67	WP56	WP45	WP34	WP23	WP12
WP SUM2	-	-	WP678	WP567	WP456	WP345	WP234	WP123
Elapsed time	-	-	-	-	-	-	-	Time

Description

Command Sets communication output items of integration data in a value from 0 to 255.

Query Returns the setting for the communication output item of integration data in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:INTEG 0,0,0,1,1,1,0,0,0,0,0,0,0**

Sets all the integrated power values to ON for CH1.

Query **:MEAS:SEC:INTEG?**

Response (HEADER ON) :MEASURE:SECOND:INTEGRATE 0,0,0,1,1,1,0,0,0,0,0,0,0

(HEADER OFF) 0,0,0,1,1,1,0,0,0,0,0,0,0

Reference

- Elapsed time is always 0.

Communication Output Item: Setting and Querying Motor (Secondary)

Syntax

Command **:MEASure:SECond:EXTernalin <Torque (NR1)>,<RPM (NR1)>, <Motor power(NR1)>,<Slip (NR1)>,<Independent input(NR1)>**

Query **:MEASure:SECond:EXTernalin?**

Response <Torque>,<RPM>,<Motor power>,<Slip>,<Independent input>

	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Torque	-	-	-	-	Tq4	Tq3	Tq2	Tq1
RPM	-	-	-	-	Spd4	Spd3	Spd2	Spd1
Motor power	-	-	-	-	Pm4	Pm3	Pm2	Pm1
Slip	-	-	-	-	Slip4	Slip3	Slip2	Slip1
Independent input	CHH	CHG	CHF	CHE	CHD	CHC	CHB	CHA

Description

Command Sets communication output items of motor in a value from 0 to 255.

Query Returns the settings of motor communication output items in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:EXT 3,3,0,0,0**

Sets Tq1, Tq2, Spd1, and Spd2 to ON.

Query **:MEAS:SEC:EXT?**

Response (HEADER ON) :MEASURE:SECOND:EXTERNALIN 3,3,0,0,0

(HEADER OFF) 3,3,0,0,0

Reference

- A model without a motor analysis option causes an execution error.

Communication Output Item: Initializing Harmonic Communication Output Data Items (Secondary)

Syntax

Command **:MEASure:SECond:HARMonic:ALLClear**

Description

Command Initializes the settings of harmonic communication output data items and the settings of output order.

Example

Command **:MEAS:SEC:HARM:ALLC**

Reference

- All the communication output data items for harmonics will be turned OFF.

Communication Output Item: Setting and Querying Harmonic Data (Secondary)

Syntax

Command **:MEASure:SECond:HARMonic:LIST <Level U(NR1)>,<Level I(NR1)>, <Level P(NR1)>,<Level Psum1(NR1)>,<Level Psum2(NR1)>, <Content percentage U(NR1)>,<Content percentage I(NR1)>, <Content percentage P(NR1)>,<Content percentage Psum1(NR1)>, <Content percentage Psum2 (NR1)>,<Phase angle U(NR1)>, <Phase angle I(NR1)>,<Phase angle P(NR1)>,<Phase angle Psum1(NR1)>, <Phase angle Psum2(NR1)>,<Synchronization frequency fHRM(NR1)>**

Query **:MEASure:SECond:HARMonic:LIST?**

Response <Level U>,<Level I>,<Level P>,<Level Psum1>,<Level Psum2>,<Content percentage U>,<Content percentage I>,<Content percentage P>,<Content percentage Psum1>,<Content percentage Psum2>,<Phase angle U>,<Phase angle I>,<Phase angle P>,<Phase angle Psum1>,<Phase angle Psum2>,<Synchronization frequency fHRM>

Harmonics List	128	64	32	16	8	4	2	1
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Level U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Level I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Level P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Level Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Level Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Content percentage U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Content percentage I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Content percentage P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Content percentage Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Content percentage Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Phase angle U	HU8	HU7	HU6	HU5	HU4	HU3	HU2	HU1
Phase angle I	HI8	HI7	HI6	HI5	HI4	HI3	HI2	HI1
Phase angle P	HP8	HP7	HP6	HP5	HP4	HP3	HP2	HP1
Phase angle Psum1	-	HP78	HP67	HP56	HP45	HP34	HP23	HP12
Phase angle Psum2	-	-	HP678	HP567	HP456	HP345	HP234	HP123
Synchronization frequency fHRM	HF8	HF7	HF6	HF5	HF4	HF3	HF2	HF1

Description

Command Returns transmission items of data responded by **MEASure:HARMonic?** in a numerical value from 0 to 255.
Specify a harmonics list (level, content percentage, phase angle, synchronizing frequency) here.
Set items by using ON/OFF for the bits above and by specifying values with a numerical NR1 value from 0 to 255.

Query Returns transmission item settings of data responded by **MEASure:HARMonic?** in a numerical NR1 value from 0 to 255.

Example

Command **:MEAS:SEC:HARM:LIST 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0**

Sets HU1, HI1, and HP1 for the level, HU1, HI1, and HP1 for the content percentage, and HU1, HI1, and HP1 for the phase angle.

Query **:MEAS:SEC:HARM:LIST?**

Response (HEADER ON) :MEASURE:SECOND:HARMONIC:LIST1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0

(HEADER OFF) 1,1,1,0,0,1,1,1,0,0,1,1,1,0,0,0

Reference

- Use **:MEASure:SECond:HARMonic:ORDer** command to set the order to be saved.

Communication Output Item: Setting and Querying Output Order for Harmonics Data (Secondary)

Syntax

Command **:MEASure:SECond:HARMonic:ORDer <Lower limit order(NR1)>, <Upper limit order(NR1)>,<ODD/EVEN/ALL(String)>**

Query **:MEASure:SECond:HARMonic:ORDer?**

Response <Lower limit order>,<Upper limit order>,<ODD/EVEN/ALL>

Lower limit order (NR1)	0 to 50
Upper limit order (NR1)	0 to 50
ODD	Odd order only
EVEN	Even order only
ALL	All orders

Description

Command Sets upper limit order, lower limit order and output-targeted order of transmission items of data to be responded by:**MEASure:HARMonic?**.

Query Returns the setting for order of transmission items of data to be responded by **:MEASure:HARMonic?** in a numerical NR1 value and a string.

Example

Command **:MEAS:SEC:HARM:ORD 1,15,ODD**

Sets odd orders from 1 to 15 as outputs.

Query **:MEAS:SEC:HARM:ORD?**

Response (HEADER ON) :MEASURE:SECOND:HARMONIC:ORDER 1,15,ODD

(HEADER OFF) 1,15,ODD

Reference

- Use this command as a combination with "**:MEASure:SECond:HARMonic:LIST**" command.

Querying FFT Analysis Measurement Data

Syntax

Query `:MEASure:NOISepeak?`

Response (Analysis channels: CH1 to CH678)

<frequency of voltage maximum 1>,<numerical value of voltage maximum 1>,...,<frequency of voltage maximum 10>,<numerical value of voltage maximum 10>,<frequency of current maximum 1>,<numerical value of current maximum 1>,...,<frequency of current maximum 10>,<numerical value of current maximum 10>,<frequency of power maximum 1>,<numerical value of power maximum 1>,...,<frequency of power maximum 10>,<numerical value of power maximum 10>

(Analysis channels: MOTOR)

<frequency of CHA maximum 1>,<numerical value of CHA maximum 1>,...,<frequency of CHA maximum 10>,<numerical value of CHA maximum 10>,<frequency of CHC maximum 1>,<numerical value of CHC maximum 1>,...,<frequency of CHC maximum 10>,<numerical value of CHC maximum 10>,<frequency of CHE maximum 1>,<numerical value of CHE maximum 1>,...,<frequency of CHE maximum 10>,<numerical value of CHE maximum 10>,<frequency of CHG maximum 1>,<numerical value of CHG maximum 1>,...,<frequency of CHG maximum 10>,<numerical value of CHG maximum 10>

Description

Query (Analysis channels: CH1 to CH678)

Returns the top 10 frequencies and numerical values of the maximum values of voltage, current, and power for which FFT analysis was performed. (30 data in total)

(Analysis channels: MOTOR)

Returns the top 10 frequencies and numerical values of the maximum values of CHA, CHC, CHE, and CHG for which FFT analysis was performed.(40 data in total).

Data format of measurement values

General Measurement value	±□□□□□□E±□□ 6-digit mantissa including decimal point and 2 digits in exponent part
FFT unanalyzed	ERR
Peak over value	+99999.9E+99

Example

Query `:MEAS:NOIS?`

Response (HEADER ON) UNf01 0.00000E+03,UN01 0.00007E+00,…,UNf10 2.03000E+03,UN10 0.00004E+00,INf01 0.00000E+03,IN01 0.00106E+00, … ,INf10 0.26000E+03,IN10 0.00002E+00,PNf01 0.05000E+03,PN01 0.00000E+00, ... ,PNf10 0.11000E+03,PN10 0.00000E+00

(HEADER OFF) 0.00000E+03,0.00007E+00,…,2.03000E+03,0.00004E+00,0.00000E+03,0.00106E+00, … ,0.26000E+03,0.00002E+00,0.05000E+03,0.00000E+00, ... ,0.11000E+03,0.00000E+00

Reference

- To update the measured values after FFT analysis, it is necessary to set "WAVE+FFT" on the main unit's screen.
- **:TRANsmit:COLumn** command specifies whether “+” at the top and the leading “0” of the mantissa are omitted. If nothing is specified, “+” at the top and the leading “0” of the mantissa are omitted.

Querying FFT Analysis Voltage Measurement Data

Syntax	Query	**:MEASure:NOISepeak:U?**
	Response	<frequency of voltage maximum 1>,<numerical value of voltage maximum 1>,...,<frequency of voltage maximum 10>,<numerical value of voltage maximum 10 >
Description	Query	Returns the top 10 frequencies and numerical values of the maximum values of voltage for which FFT analysis was performed (20 data in total). The data format of the measured values is the same as for "**:MEASure:NOISepeak?**".
Example	Query	**:MEAS:NOIS:U?**
	Response	(HEADER ON) UNf01 0.00000E+03,UN01 0.00007E+00,…,UNf10 2.03000E+03,UN10 0.00004E+00
		(HEADER OFF) 0.00000E+03,0.00007E+00,…,2.03000E+03,0.00004E+00
Reference		• If the target channel for FFT analysis is a motor, an execution error occurs. • To update the measured values after FFT analysis, it is necessary to set "WAVE+FFT" on the main unit's screen. • **:TRANsmit:COLumn** command specifies whether "+" at the top and the leading "0" of the mantissa are omitted. If nothing is specified, "+" at the top and the leading "0" of the mantissa are omitted.

Querying FFT Analysis Current Measurement Data

Syntax	Query	**:MEASure:NOISepeak:I?**
	Response	<frequency of current maximum 1>,<numerical value of current maximum 1>,...,<frequency of current maximum 10>,<numerical value of current maximum 10 >
Description	Query	Returns the top 10 frequencies and numerical values of the maximum values of current for which FFT analysis was performed (20 data in total). The data format of the measured values is the same as for "**:MEASure:NOISepeak?**".
Example	Query	**:MEAS:NOIS:I?**
	Response	(HEADER ON) INf01 0.00000E+03,IN01 0.00106E+00,…,INf10 0.26000E+03,IN10 0.00002E+00
		(HEADER OFF) 0.00000E+03,0.00106E+00,…,0.26000E+03,0.00002E+00
Reference		• If the target channel for FFT analysis is a motor, an execution error occurs. • To update the measured values after FFT analysis, it is necessary to set "WAVE+FFT" on the main unit's screen. • **:TRANsmit:COLumn** command specifies whether "+" at the top and the leading "0" of the mantissa are omitted. If nothing is specified, "+" at the top and the leading "0" of the mantissa are omitted.

Querying FFT Analysis Power Measurement Data

Syntax	Query	**:MEASure:NOISepeak:P?**
	Response	<frequency of power maximum 1>,<numerical value of power maximum 1>,...,<frequency of power maximum 10>,<numerical value of power maximum 10 >
Description	Query	Returns the top 10 frequencies and numerical values of the maximum values of power for which FFT analysis was performed (20 data in total). The data format of the measured values is the same as for "**:MEASure:NOISepeak?**".
Example	Query	**:MEAS:NOIS:P?**
	Response	(HEADER ON) PNf01 0.05000E+03,PN01 0.00000E+00,...,PNf10 0.11000E+03,PN10 0.00000E+00 (HEADER OFF) 0.05000E+03,0.00000E+00,...,0.11000E+03,0.00000E+00
Reference		• If the target channel for FFT analysis is a motor, an execution error occurs. • To update the measured values after FFT analysis, it is necessary to set "WAVE+FFT" on the main unit's screen. • **:TRANsmit:COLumn** command specifies whether "+" at the top and the leading "0" of the mantissa are omitted. If nothing is specified, "+" at the top and the leading "0" of the mantissa are omitted.

Querying FFT Analysis Motor Measurement Data

Syntax	Query	**:MEASure:NOISepeak:[CH]?**
	Response	<frequency of [CH] maximum 1>,<numerical value of [CH] maximum 1>,...,<frequency of [CH] maximum 10>,<numerical value of [CH] maximum 10 >
Description	Query	Returns the top 10 frequencies and numerical values of the maximum values of motorCH[ch] for which FFT analysis was performed (20 data in total). For [CH], specify "CHA", "CHC", "CHE", or "CHG". The data format of the measured values is the same as for "**:MEASure:NOISepeak?**".
Example	Query	**:MEAS:NOIS:CHA?**
	Response	(HEADER ON) ANf01 0.00000E+03,AN01 0.00025E+00,...,ANf10 2.71000E+03,AN10 0.00000E+00 (HEADER OFF) 0.00000E+03,0.00025E+00, ... ,2.71000E+03,0.00000E+00
Reference	Query	• If the target channel for FFT analysis is not a motor, an execution error occurs. • To update the measured values after FFT analysis, it is necessary to set "WAVE+FFT" on the main unit's screen. • **:TRANsmit:COLumn** command specifies whether "+" at the top and the leading "0" of the mantissa are omitted. If nothing is specified, "+" at the top and the leading "0" of the mantissa are omitted.

3.2.25 Modbus/TCP Server

Modbus/TCP Server: Setting and Querying output items

Syntax

Command **:MODBus:ITEM <Output number(NR1)>,<Item(String)>**

Query **:MODBus:ITEM?**

Response <Output number>,<Item>

Output number(NR1)	1 to 1000
Item(String)	Select any item from “4.1 Parameters for Normal Measurement Items” and “4.3 List and Order of Direct Specification Items for :MEASure:HARMonic?”. (Integrated elapsed time and various statuses cannot be selected)

Description

Command Sets output items for the specified output number.

Query Returns the output item of the specified output number as a string.

Example

Command **:MODB:ITEM 1,Urms1**

Set the output item for output number 1 to Urms1.

Query **:MODB:ITEM?**

Response (HEADER ON) :MODBUS:ITEM 1,Urms1

(HEADER OFF) 1,Urms1

Reference

- For details on the Modbus/TCP server function, please refer to the "PW8001 Modbus/TCP Communication Instruction Manual".

Modbus/TCP Server: Initializing output item.

Syntax

Command **:MODBus:ITEM:ALLClear**

Description

Command Initializes output items.
Sets all output items for all output numbers to OFF.

Example

Command **:MODB:ITEM:ALLC**

Initializes output items.

Reference

- For details on the Modbus/TCP server function, please refer to the "PW8001 Modbus/TCP Communication Instruction Manual".

Modbus/TCP Server: Setting output item presets

Syntax

Command **:MODBus:ITEM:PRESet <Preset number(NR1)>**

Preset number(NR1) 1

Description

Command Set to the specified preset.

Example

Command **:MODB:ITEM:PRES 1**

Set the output item to preset 1.

Reference

- For details on the Modbus/TCP server function, please refer to the "PW8001 Modbus/TCP Communication Instruction Manual".

3.2.26 Phase Zero Adjustment

Executing Phase Zero Adjustment

Syntax Command **:PADJust[CH]:SET**

Description Command Executes phase zero adjustment of wiring including a specified channel.
[CH]: 1 to 8.

Example Command **:PADJ1:SET**

Executes phase zero adjustment of wiring including CH1.

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- If a selected synchronous source of a wiring connection including a specified channel is other than Ext1 to Ext4, a command execution error occurs.
- The same setting can be made even by PW6001 series communication command **:PHASe:ZEROadjust <CH1 to CH8>,SET**.

Executing Reset for Phase Zero Adjustment Value

Syntax Command **:PADJust[CH]:RESET**

Description Command Resets the phase zero adjustment value of a wiring connection including a specified channel.
[CH]: 1 to 8.

Example Command **:PADJ1:RESET**

Resets the phase zero adjustment value of a wiring connection including CH1.

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- If a selected synchronous source of a wiring connection including a specified channel is other than Ext1 to Ext4, a command execution error occurs.
- The same setting can be made even by PW6001 series communication command **:PHASe:ZEROadjust <CH1 to CH8>,CLEAR**.

Setting and Querying Phase Zero Adjustment Degree

Syntax

Command **:PADJust[CH]:VALue <Compensated value(NR2)>**

Query **:PADJust[CH]:VALue?**

Response <Compensated value>

Compensated value	Phase zero adjustment degree (Unit: °) -180.0000 to +180.0000(7 significant digits)

Description

Command Sets the phase zero adjustment degree of a wiring connection including a specified channel.
[CH]: 1 to 8.

Query Returns the phase zero adjustment degree of a wiring connection including a specified channel in a numerical NR2 value.

Example

Command **:PADJ1:VAL 10.5**

Sets the phase zero adjustment value of a wiring connection including CH1 to 10.5.

Query **:PADJ1:VAL?**

Response (HEADER ON) :PADJUST1:VALUE +10.50000

(HEADER OFF) +10.50000

Reference

- When the motor analysis option is not implemented, a device-dependent error occurs.
- If a selected synchronous source of a wiring connection including a specified channel is other than Ext1 to Ext4, the setting cannot be made, and therefore, a command execution error occurs.
- The same setting can be made even by PW6001 series communication command **:PHASe[CH]:ZEROadjust**.

3.2.27 Saving Function

Setting and Querying Delimiter for CSV File

Syntax

Command **:SAVE:SEParator <CSV/SSV(String)>**

Query **:SAVE:SEParator?**

Response CSV Delimited by comma (,), and use of period (.) for decimal point

SSV Delimited by semicolon (;), and use of comma (,) for decimal point

Description

Command Sets a delimiter for CSV file.

Query Returns a delimiter for CSV file in a string.

Example

Command **:SAVE:SEP CSV**

Sets the delimiter to comma and sets the decimal point to period, for the CSV file.

Query **:SAVE:SEP?**

Response (HEADER ON) :SAVE:SEPARATOR CSV

(HEADER OFF) CSV

Reference

- The same setting can be made even by PW6001 series communication command **:FILE:SEParator**.

Setting and Querying File Format for Saving Measured Data

Syntax

Command **:SAVE:FORMat <TEXT/BIN(String)>**

Query **:SAVE:FORMat?**

Response TEXT Text format

BIN Binary format

Description

Command Sets the file format for saving measured data.

Query Returns the setting of the file format for saving measured data in a string.

Example

Command **:SAVE:FORM TEXT**

Sets the measured data file save format to TEXT.

Query **:SAVE:FORM?**

Response (HEADER ON) :SAVE:AUTO:FORMAT TEXT

(HEADER OFF) TEXT

Reference

Setting and Querying Save to FTP server function

Syntax

Command **:SAVE:FTPS <ON/OFF(String)>**

Query **:SAVE:FTPS?**

Response ON Save to FTP server enabled

OFF Save to FTP server disabled

Description

Command Sets the Save to FTP server function to ON or OFF.

Query Returns the setting of the Save to FTP server function by ON or OFF.

Example

Command **:SAVE:FTPS ON**

Sets the Save to FTP server function to ON.

Query **:SAVE:FTPS?**

Response (HEADER ON) :SAVE:FTPS ON

(HEADER OFF) ON

Reference

.

Setting and Querying File Format for Saving Waveform Data

Syntax

Command **:SAVE:WAVE:FORMat <TEXT/BIN/MAT(String)>**

Query **:SAVE:WAVE:FORMat?**

Response
- TEXT Text format
- BIN Binary format
- MAT MATLAB format

Description

Command Sets the file format for saving waveform data.

Query Returns the setting of the file format for saving waveform data in a string.

Example

Command **:SAVE:WAVE:FORM TEXT**

Sets the file format for saving waveform data to TEXT.

Query **:SAVE:WAVE:FORM?**

Response (HEADER ON) :SAVE:WAVE:FORMAT TEXT

(HEADER OFF) TEXT

Reference

- MATLAB is a registered trademark or trademark of the MathWorks, Inc. in the United States of America, Japan, and other countries.

Auto Save: Setting and Querying Auto-save Function

Syntax

Command **:SAVE:AUTO <ON/OFF(String)>**

Query **:SAVE:AUTO?**

Response
- ON Auto-save function ON
- OFF Auto-save function OFF

Description

Command Sets the auto-save function to ON or OFF.

Query Returns the setting of the auto-save function by ON or OFF.

Example

Command **:SAVE:AUTO ON**

Sets the auto-save function to ON.

Query **:SAVE:AUTO?**

Response (HEADER ON) :SAVE:AUTO ON

(HEADER OFF) ON

Reference

- The same setting can be made even by PW6001 series communication command **:FILE:AUTO:SAVE**.

Auto Save: Setting and Querying Folder Name for Saving Destination

Syntax

Command **:SAVE:AUTO:FOLDername <Folder name(String)>**

Query **:SAVE:AUTO:FOLDername?**

Response <Folder name>

Description

Command Sets a folder name for auto-save destination.

Query Returns a folder name for auto-save destination in a string.

Example

Command **:SAVE:AUTO:FOLD AUTO8001**

Query **:SAVE:AUTO:FOLD?**

Response (HEADER ON) :SAVE:AUTO:FOLDERNAME AUTO8001

(HEADER OFF) AUTO8001

Reference

- The folder name is a string consisting of up to 8 characters.
- The available characters are ASCII characters from H'20 to H'7E (excluding !"&'*+,-.:;<>?¥^`|~).
- This command is case-sensitive in the parameter section.
- If “NO_FOLDER” is specified for the folder name, the destination folder is specified to be /HIOKI/PW8001/.

Auto Save: Setting and Querying Intervals for Saving Data

Syntax

Command **:SAVE:AUTO:INTERval <Time data(String)>**

Query **:SAVE:AUTO:INTERval?**

Response <Time data>

Time data OFF, 1ms, 10ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s, 15s, 30s, 1min, 5min, 10min, 15min, 30min, 60min

Description

Command Sets the intervals of auto-save operation.

Query Returns the interval setting of auto-save operation in a string.

Example

Command **:SAVE:AUTO:INTER 1min**

Sets the interval for saving data to 1 minute.

Query **:SAVE:AUTO:INTER?**

Response (HEADER ON) :SAVE:AUTO:INTERVAL 1min

(HEADER OFF) 1min

Reference

- The data save interval cannot be set to less than data refresh rate.

Manual Save: Setting and Querying Comment Save for Manual Save

Syntax

Command **:SAVE:MANual:COMMent <ON/OFF(String)>**

Query **:SAVE:MANual:COMMent?**

Response ON Comment save ON

OFF Comment save OFF

Description

Command Sets Comment save for manual save.

Query Returns comment save setting for manual save in a string.

Example

Command **:SAVE:MAN:COMM ON**

Sets the comment for manual saving to ON.

Query **:SAVE:MAN:COMM?**

Response (HEADER ON) :SAVE:MANUAL:COMMENT ON

(HEADER OFF) ON

Reference

- The same setting can be made even by PW6001 series communication command **:SAVE:COMMent**.

Manual Save: Setting and Querying Folder Name for Saving Destination

Syntax

Command **:SAVE:MANual:FOLDername <Folder name(String)>**

Query **:SAVE:MANual:FOLDername?**

Response <Folder name>

Description

Command Sets a folder name for manual-save destination.

Query Returns a folder name for manual-save destination in a string.

Example

Command **:SAVE:MAN:FOLD DATA8001**

Query **:SAVE:MAN:FOLD?**

Response (HEADER ON) :SAVE:MANUAL:FOLDERNAME DATA8001

(HEADER OFF) DATA8001

Reference

- The folder name is a string consisting of up to 8 characters.
- The available characters are ASCII characters from H'20 to H'7E (excluding !"&'*+,-.:;<>?¥^`|~).
- This command is case-sensitive in the parameter section.
- If “NO_FOLDER” is specified for the folder name, the destination folder is specified to be /HIOKI/PW8001/.
- The same setting can be made even by PW6001 series communication command: **:SAVE:FOLDername**.

Screen Save: Setting and Querying Comment Save for Saving

Syntax

Command **:SAVE:SCReen:COMMent <OFF/TEXT/BMP(String)>**

Query **:SAVE:SCReen:COMMent?**

Response OFF Comment save OFF

TEXT Text comment

BMP Handwritten image comment

Description

Command Sets the comment save for screen hardcopy.

Query Returns comment save setting for screen hardcopy in a string.

Example

Command **:SAVE:SCR:COMM TEXT**

Sets the comment save during screen hardcopy to the text comment format.

Query **:SAVE:SCR:COMM?**

Response (HEADER ON) :SAVE:SCREEN:COMMENT TEXT

(HEADER OFF) TEXT

Reference

- The same setting can be made even by PW6001 series communication command **:COPY:COMMent**.

Screen Save: Setting and Querying Folder Name for Saving Destination

Syntax

Command **:SAVE:SCReen:FOLDername <Folder name(String)>**

Query **:SAVE:SCReen:FOLDername?**

Response <Folder name>

Description

Command Sets a folder name for the saving destination of screen hardcopy.

Query Returns the folder name for the saving destination of screen hardcopy in a string.

Example

Command **:SAVE:SCR:FOLD H8001**

Sets the folder name for saving destination of screen hardcopy to H8001.

Query **:SAVE:SCR?**

Response (HEADER ON) :SAVE:SCREEN:FOLDERNAME H8001

(HEADER OFF) H8001

Reference

- The folder name is a string consisting of up to 8 characters.
- The available characters are ASCII characters from H'20 to H'7E (excluding !"&'*+,-.:;<>?¥^`|~).
- If “NO_FOLDER” is specified for the folder name, the destination folder is specified to be /HIOKI/PW8001/.
- The same setting can be made even by PW6001 series communication command :COPY:FOLDername.

Screen Save: Setting and Querying Registered Information Save for Saving

Syntax

Command **:SAVE:SCReen:INFormation <ON/OFF(String)>**

Query **:SAVE:SCReen:INFormation?**

Response ON Setting information save ON

OFF Setting information save OFF

Description

Command Sets the registered information save specification for screen hardcopy.

Query Returns the registered information save specification for screen hardcopy in a string.

Example

Command **:SAVE:SCR:INF ON**

Sets registered information save for screen hardcopy to ON.

Query **:SAVE:SCR:INF?**

Response (HEADER ON) :SAVE:SCREEN:INFOMATION ON

(HEADER OFF) ON

Reference

- The same setting can be made even by PW6001 series communication command **:COPY:INFormation**.

3.2.28 Scaling

Setting and Querying CT Ratio

Syntax

Command **:SCALe[CH]:CT <CT ratio(NR2)>**

Query **:SCALe[CH]:CT?**

Response <CT ratio>

CT ratio 0.00001 to 9999.99

Description

Command Sets a CT ratio. [CH]: 1 to 8.

Query Returns the setting of CT ratio in a numerical NR2 value.

Example

Command **:SCAL1:CT 2.0**

Sets the CT ratio for CH1 to 2.

Query **:SCAL1:CT?**

Response (HEADER ON) :SCALE1:CT 2.00000

(HEADER OFF) 2.00000

Reference

- To set the CT ratio to OFF, specify “1.0”. If the CT ratio is OFF, “1.00000” is returned in response to the query.
- Even in the same wiring connection, each channel must be used to set the CT ratio.
- Prevent VT × CT from being more than 1.0E+06.

Setting and Querying VT Ratio

Syntax

Command **:SCALe[CH]:VT <VT ratio(NR2)>**

Query **:SCALe[CH]:VT?**

Response <VT ratio>

VT ratio 0.00001 to 9999.99

Description

Command Sets a VT ratio. [CH]: 1 to 8.

Query Returns the setting of VT ratio in a numerical NR2 value.

Example

Command **:SCAL1:VT 10.0**

Sets the VT ratio for CH1 to 10.

Query **:SCAL1:VT?**

Response (HEADER ON) :SCALE1:VT 10.0000

(HEADER OFF) 10.0000

Reference

- To sets the VT ratio to OFF, specify “1.0”. If the VT ratio is OFF, “1.00000” is returned in response to the query.
- Prevent VT × CT from being more than 1.0E+06.

3.2.29 Secondary Unit Settings

Setting and Querying Secondary Unit of the Optical link

Syntax

Command :SECond:[Setting commands]

Query :SECond:[Query for getting settings]?

Response Secondary unit setting information

Description

Command Sets the secondary unit for the optical link.

Query Obtains the settings of the secondary unit during the optical link.

Example

Command :SEC:VOLT1:RANG 6

Set the voltage range of CH1 on the secondary unit to 6V.

Query :SEC:VOLT1:RANG?

Response (HEADER ON) :SECOND:VOLTAGE:RANGE 6

(HEADER OFF) 6

Reference

- The commands that can be set are listed in "Available commands for secondary units during optical link".

3.2.30 Acquisition of Sensor Information

Querying Sensor Information

Syntax

Query :SENSor[CH]:ID?

Response <Sensor type>,<Rated value of sensor>,<Sensor serial number>

Sensor type	Probe1, Probe2, <Sensor model number>
Rated value of sensor	(Probe1) 1A_AC, 2A_AC, 5A_AC, 10A_AC, 20A_AC, 50A_AC, 100A_AC, 200A_AC, 500A_AC, 1kA_AC, 2kA_AC, 5kA_AC, 1A_ACDC, 2A_ACDC, 5A_ACDC, 10A_ACDC, 20A_ACDC, 50A_ACDC, 100A_ACDC, 200A_ACDC, 500A_ACDC, 1kA_ACDC,2kA_ACDC, 5kA_ACDC (Probe2) 0.1mV/A, 1mV/A, 10mV/A, 100mV/A, 1V/A
Sensor serial number	9-digit numerical NR1 value

Description

Query Returns the information of the sensor connected to the specified channel.
[CH]: 1 to 8.

Example

Query :SENS1:ID?

Response (HEADER ON) :SENSOR1:ID CT6872,50A_ACDC,123456789

(HEADER OFF) CT6872,50A_ACDC,123456789

Reference

- A hyphen (-) is returned if the sensor does not allow the instrument to acquire the serial number.
- The rated value of sensor is "50A_ACDC" if the Probe 1 sensor is not connected.
- If Probe 2 is selected, the set rating information is acquired regardless of the sensor connection state.
- If no module is connected, "NONE,-,-" is returned.

Querying Adjustment Date of Sensor

Syntax

Query `:SENSor[CH]:ADATE?`

Response <Year or Month or Day(NR1)>,<Year or Month or Day(NR1)>,<Year or Month or Day(NR1)>

Year	2020 to 2099
Month	1 to 12
Date	1 to 31

Description

Query Returns the final adjustment date of the sensor connected to a specified channel in a numerical NR1 value.
[CH]: 1 to 8.

Example

Query `:SENS1:ADATE?`

Response (HEADER ON) :SENSOR1:ADATE 2021,12,01

(HEADER OFF) 2021,12,01

Reference

- The order of the year, month, and date varies depending on the date format setting.
- If sensor does not allow the instrument to acquire the adjustment date, "-,-,-" is returned when the sensor is disconnected.

Querying Sensor Calibration Date

Syntax

Query `:SENSor[CH]:CDATE?`

Response <Year or Month or Day(NR1)>,<Year or Month or Day(NR1)>,<Year or Month or Day(NR1)>

Year	2020 to 2099
Month	1 to 12
Date	1 to 31

Description

Query Returns the final calibration date of the sensor connected to the specified channel in a numerical NR1 value.
[CH]: 1 to 8.

Example

Query `:UNIT1:CDATE?`

Response (HEADER ON) :UNIT1:CDATE 2021,12,01

(HEADER OFF) 2021,12,01

Reference

- The order of the year, month, and date varies depending on the date format setting.
- If sensor does not allow the instrument to acquire the calibration date, "-,-,-" is returned when the sensor is disconnected.

3.2.31 Synchronization Interface

Querying Optical Link Option

Syntax

Query `:SYNC:EXISt?`

Response

Y	Option available
N	Option unavailable

Description

Query Returns availability of options in a string.

Example

Query `:SYNC:EXIS?`

Response (HEADER ON) :SYNC:EXIST Y

(HEADER OFF) Y

Reference

Setting and Querying Optical Link

Syntax

Command **:SYNC:CONTrol <Control method(String)>**

Query **:SYNC:CONTrol?**

Response <Control method>

OFF	Synchronization function off
PRIM	Optical Link Primary Operation
SEC	Optical Link Secondary Operation

Description

Command Sets the control method for the optical link

Query Returns the setting of the control method of the optical link as a string.

Example

Command **:SYNC:CONT PRIM**

Set the control method to primary.

Query **:SYNC:CONT?**

Response (HEADER ON) :SYNC:CONTROL PRIM

(HEADER OFF) PRIM

Reference

- If the optical link option is not implemented, an equipment-dependent error occurs.
- In the standby state for optical link connection, the setting change command will result in an execution error except for some settings.

Querying Optical link synchronization status

Syntax

Query **:SYNC:STATus?**

Response

Y	Synchronized state
N	asynchronous state / Synchronization OFF

Description

Query Returns the synchronization status of the optical link as a string.

Example

Query **:SYNC:STAT?**

Response (HEADER ON) :SYNC:STATUS Y

(HEADER OFF) Y

Reference

- If the optical link option is not implemented, an equipment-dependent error occurs.

Setting and Querying BNC Synchronization

Syntax

Command **:SYNC:BNC:CONTrol <Control method(String)>**

Query **:SYNC:BNC:CONTrol?**

Response <Control method>

OFF	Synchronization function off
PRIM	BNC synchronous Primary operation
SEC	BNC synchronous Secondary operation

Description

Command Sets the control method for the BNC Synchronization

Query Returns the setting of the control method of the BNC Synchronization as a string.

Example

Command **:SYNC:BNC:CONT PRIM**

Set the control method to primary.

Query **:SYNC:BNC:CONT?**

Response (HEADER ON) :SYNC:BNC:CONTROL PRIM

(HEADER OFF) PRIM

Reference

- In the standby state for BNC Synchronization connection, the setting change command will result in an execution error except for some settings.

Querying BNC synchronization status

Syntax

Query **:SYNC:BNC:STATus?**

Response Y Synchronized state

N asynchronous state / Synchronization OFF

Description

Query Returns the BNC synchronization status as a string.

Example

Query **:SYNC:STAT?**

Response (HEADER ON) :SYNC:STATUS Y

(HEADER OFF) Y

Reference

3.2.32 Trigger

Setting and Querying Auto Trigger

Syntax

Command **:TRIGger:AUTO <ON/OFF(String)>**

Query **:TRIGger:AUTO?**

Response ON Auto Trigger ON

OFF Auto Trigger OFF

Description

Command Configures the auto trigger settings.

Query Returns configuration of the auto trigger settings in a string.

Example

Command **:TRIG:AUTO ON**

Sets the auto trigger to ON.

Query **:TRIG:AUTO?**

Response (HEADER ON) :TRIGGER:AUTO ON

(HEADER OFF) ON

Reference

Setting and Querying Pre-trigger

Syntax

Command **:TRIGger:PRETrig <Pre-trigger data(NR1)>**

Query **:TRIGger:PRETrig?**

Response <Pre-trigger data>

Pre-trigger data 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

Description

Command Sets pre-trigger. The pre-trigger can be set in units of 10 percentage points for the recording length.

Query Returns the configuration of the pre-trigger settings in a numerical NR1 value.

Example

Command **:TRIG:PRET 10**

Sets the pre-trigger to 10%.

Query **:TRIG:PRET?**

Response (HEADER ON) :TRIGGER:PRETRIG 10

(HEADER OFF) 10

Reference

Setting and Querying Trigger detection method

Syntax

Command **:TRIGger:DETEct <LEVEL/EVENT(String)>**

Query **:TRIGger:DETEct?**

Response LEVEL Level Trigger

EVENT Event Triggers

Description

Command Sets trigger detection method.

Query Returns the trigger detection method setting as a string.

Example

Command **:TRIG:DETE LEVEL**

Set the trigger detection method to Level Trigger.

Query **:TRIG:DETE?**

Response (HEADER ON) :TRIGGER:DETECT LEVEL

(HEADER OFF) LEVEL

Reference

Level Trigger: Setting and Querying Trigger Level

Syntax

Command **:TRIGger:LEVEl <Trigger level(NR2)>**

Query **:TRIGger:LEVEl?**

Response <Trigger level>

Trigger level -300.0 to 300.0

Description

Command Sets a trigger level in the level trigger. The trigger level can be set in units of 0.1 percent point.

Query Returns the trigger level setting in the level trigger in a numerical NR2 value.

Example

Command **:TRIG:LEVE 50**

Sets the trigger level in the level trigger to 50%.

Query **:TRIG:LEVE?**

Response (HEADER ON) :TRIGGER:LEVEL 50.0

(HEADER OFF) 50.0

Reference

Level Trigger: Setting and Querying Slope

Syntax

Command **:TRIGger:SLOPe <RISING/FALLING(String)>**

Query **:TRIGger:SLOPe?**

Response RISING Rising edge

FALLING Falling edge

Description

Command Sets a trigger slope in the level trigger.

Query Returns the setting of trigger slope in the level trigger in a string.

Example

Command **:TRIG:SLOP RISING**

Sets a trigger slope in the level trigger at rising.

Query **:TRIG:SLOP?**

Response (HEADER ON) :TRIGGER:SLOPE RISING

(HEADER OFF) RISING

Reference

Level Trigger: Setting and Querying Trigger Source

Syntax

Command **:TRIGger:SOURce <Trigger source(String)>**

Query **:TRIGger:SOURce?**

Response <Trigger source>

Voltage and current waveforms (Zero-cross Filter OFF)	U1, U2, U3, U4, U5, U6, U7, U8, I1, I2, I3, I4, I5, I6, I7, I8
Voltage and current waveforms (Zero-cross Filter ON)	U1FILT, U2FILT, U3FILT, U4FILT, U5FILT, U6FILT, U7FILT, U8FILT, I1FILT, I2FILT, I3FILT, I4FILT, I5FILT, I6FILT, I7FILT, I8FILT
Motor waveform	EXT1, EXT2, EXT3, EXT4
	CHA, CHB, CHC, CHD, CHE,CHF, CHG, CHH

Description

Command Sets a trigger source in the level trigger.

Query Returns the setting of trigger source in the level trigger in a string.

Example

Command **:TRIG:SOUR U1**

Sets the trigger source to voltage CH1.

Query **:TRIG:SOUR?**

Response (HEADER ON) :TRIGGER:SOURCE U1

(HEADER OFF) U1

Reference

Level Trigger: Setting and Querying Trigger Source Zero-cross Filter

Syntax

Command **:TRIGger:ZCFilter <ON/OFF(String)>**

Query **:TRIGger:ZCFilter?**

Response

ON	Zero-cross filter ON
OFF	Zero-cross filter OFF

Description

Command Sets a trigger source zero-cross filter.

Query Returns the setting of trigger source zero-cross filter in a string.

Example

Command **:TRIG:ZCF ON**

Sets the zero-cross filter to ON.

Query **:TRIG:ZCF?**

Response (HEADER ON) :TRIGGER:ZCFILTER ON

(HEADER OFF) ON

Reference

- If the trigger source is not set in voltage and current waveforms, the zero-cross filter cannot be set to ON and, therefore, an execution error occurs.

Event Triggers: Setting and Querying logical operators

Syntax

Command: **:TRIGger:EVENt:OPERator <Operator1(String)>,<Operator2(String)>,<Operator3(String)>**

Query: **:TRIGger:EVENt:OPERator?**

Response: <Operator1>,<Operator2>,<Operator3>

Operator	OFF
	AND
	OR

Description

Command: Sets the logical operator of the Event Trigger.

Query: Returns the logical operator setting of the Event Trigger as a string.

Example

Command: **:TRIG:EVEN:OPER AND,AND,AND**

Query: **:TRIG:EVEN:OPER?**

Response: (HEADER ON) :TRIGGER:EVENT:OPERATOR AND,AND,AND

(HEADER OFF) AND,AND,AND

Reference

Event Triggers: Setting and Querying Inequality Sign

Syntax

Command: **:TRIGger:EVENt[number]:INEQuality <LT/GT(String)>**

Query: **:TRIGger:EVENt[number]:INEQuality?**

Response: <LT/GT>

LT	Inequality "<" (small)
GT	Inequality ">" (large)

Description

Command: Sets the inequality sign of the Event Trigger. [number]: 1 to 4.

Query: Returns a string setting the inequality of the Event Trigger.

Example

Command: **:TRIG:EVEN1:INEQ LT**

Query: **:TRIG:EVEN1:INEQ?**

Response: (HEADER ON) :TRIGGER:EVENT1:INEQUALITY LT

(HEADER OFF) LT

Reference

Event Triggers: Setting and Querying Trigger Source

Syntax

Command: **:TRIGger:EVENt[number]:SOURce <Item(String)>**

Query: **:TRIGger:EVENt[number]:SOURce?**

Response: <Item > See “4.1 Parameters for Normal Measurement Items”.

Description

Command: Sets the trigger source for Event Trigger. [number]: 1 to 4.

Query: Returns the Event Trigger trigger source setting as a string.

Example

Command: **:TRIG:EVEN1:SOUR Urms1**

Query: **:TRIG:EVEN1:SOUR?**

Response: (HEADER ON) :TRIGGER:EVENT1:SOURCE Urms1

(HEADER OFF) Urms1

Reference

・

Event Triggers：Setting and Querying Boundary values

Syntax

Command **:TRIGger:EVENt[number]:THREshold <Boundary Values(String)>**

Query **:TRIGger:EVENt[number]:THREshold?**

Response <Boundary Values>

Boundary values ±0.00001(a unit character) to ±99999.9(a unit character):
Signed significant number of 6 digits and a unit character.
Any one of n, u, m, k, M, G, and T can be specified as the unit character.
Can be set in the range of ±0.00001n to ±99999.9T.

Description

Command Sets the Boundary Value for Event Trigger. [number]: 1 to 4.

Query Returns the boundary value setting for Event Trigger as a string.

Example

Command **:TRIG:EVEN1:THRE 100.000**

Query **:TRIG:EVEN1:THRE?**

Response （HEADER ON） :TRIGGER:EVENT1:THRESHOLD +100.000

（HEADER OFF） +100.000

Reference

This command is case-sensitive in the parameter section.

3.2.33 User-defined Formulas

Setting and Querying Constants for User-defined Formulas

Syntax

Command **:UDF[number]:CONStant <Constant 1(String)>,…,<Constant 16(String)>**

Query **:UDF[number]:CONStant?**

Response <Constant 1>,<Constant 2>,…,<Constant 16>

Constant 1 to 16 ±0.00001(a unit character) to ±999999(a unit character):
Signed significant number of 6 digits and a unit character.
Any one of n, u, m, k, M, G, and T can be specified as the unit character.
Can be set in the range of ±1.00000n to ±999.999T.

Description

Command Set a constant used for user-defined formula. [number]: 1 to 20.

Query Returns a constant used for user-defined formula in a numeric value.

Example

Command **:UDF1:CONS 1,2,3,4,5,6,7,8,1n,2u,3m,4k,5M,6G,7T,8**

Query **:UDF1:CONS?**

Response （HEADER ON） :UDF1:CONSTANT
+1.00000,+2.00000,+3.00000,+4.00000,+5.00000,+6.00000,+7.00000,+8.00000,+1.00000n,+2.00000u,+3.00000m,+4.00000k,+5.00000M,+6.00000G,+7.00000T,+8.00000

（HEADER OFF） +1.00000,+2.00000,+3.00000,+4.00000,+5.00000,+6.00000,+7.00000,+8.00000,+1.00000n,+2.00000u,+3.00000m,+4.00000k,+5.00000M,+6.00000G,+7.00000T,+8.00000

Reference

- If the number of arguments is less than 16, remaining items will not be changed.
- This command is case-sensitive in the parameter section.

Setting and Querying Basic Formulas for User-defined Formulas

Syntax

Command: **:UDF[number]:FUNCtion <Formula 1(String)>,…,<Formula 16(String)>**

Query: **:UDF[number]:FUNCtion?**

Response: <Formula 1>,<Formula 2>,…,<Formula 16>

Formula 1 to 16	NONE	No conversion
	NEG	Reversed sign
	SIN	Sine
	COS	Cosine
	TAN	Tangent
	SQRT	Square root
	SQR	Squared
	ABS	Absolute value
	LOG10	Common logarithm
	LOG	Logarithm
	EXP	Exponent
	ASIN	Arc sine
	ACOS	Arc cosine
	ATAN	Arc tangent

Description

Command: Sets a basic formula for user-defined formula. [number]: 1 to 20.

Query: Returns setting for basic formula for user-defined formula in a string.

Example

Command: **:UDF1:FUNC SIN,COS,TAN,SQRT,NONE,SIN,COS,TAN,SQRT,NONE,SIN,COS,TAN,SQRT,NONE,SIN**

Query: **:UDF1:FUNC?**

Response:

(HEADER ON) :UDF1:FUNCTION SIN,COS,TAN,SQRT,NONE,SIN,COS,TAN,SQRT,NONE,SIN,COS,TAN,SQRT,NONE,SIN

(HEADER OFF) SIN,COS,TAN,SQRT,NONE,SIN,COS,TAN,SQRT,NONE,SIN,COS,TAN,SQRT,NONE,SIN

Reference

- If the number of arguments is less than 16, remaining items will not be changed.

Setting and Querying Integration function for User-defined Formulas

Syntax

Command: **:UDF[number]:INTEG <ON/OFF(String)>**

Query: **:UDF[number]:INTEG?**

Response:

ON	Integration function ON.
OFF	Integration function OFF.

Description

Command: Sets Integration function for user-defined Formulas. [number]: 1 to 20.

Query: Returns setting for Integration function for user-defined formula in a string.

Example

Command: **:UDF1:INTEG ON**

Query: **:UDF1:INTEG?**

Response:

(HEADER ON) :UDF1:INTEG ON

(HEADER OFF) ON

Reference

Setting and Querying Items for User-defined Formulas

Syntax

Command: **:UDF[number]:ITEM <Item 1(String)>,…,<Item 16(String)>**

Query: **:UDF[number]:ITEM?**

Response: <Item 1>,<Item 2>,…,<Item 16>

Item 1 to 16 See “4.1 Parameters for Normal Measurement Items”.

Description

Command: Sets items for user-defined formula. [number]: 1 to 20.
When specifying constant input CONST.

Query: Returns items for user-defined formula in a string.
Returns CONST when a constant is specified.

Example

:UDF1:ITEM
Urms1,Irms1,Urms2,Irms2,Urms3,Irms3,Urms4,Irms4,Urms5,Irms5,Urms6,Irms6,Urms7,Irms7,Urms8,Irms8

:UDF1:ITEM?

Response (HEADER ON) :UDF1:ITEM
Urms1,Irms1,Urms2,Irms2,Urms3,Irms3,Urms4,Irms4,Urms5,Irms5,Urms6,Irms6,Urms7,Irms7,Urms8,Irms8

Response (HEADER OFF) Urms1,Irms1,Urms2,Irms2,Urms3,Irms3,Urms4,Irms4,Urms5,Irms5,Urms6,Irms6,Urms7,Irms7,Urms8,Irms8

Reference

- If the number of arguments is less than 4, remaining items will not be changed.

Setting and Querying Formula names for User-defined Formulas

Syntax

Command: **:UDF[number]:NAME “<Formula Name(String)>”**

Query: **:UDF[number]:NAME?**

Response: Formula Name Up to 8 alphanumeric characters

Description

Command: Sets formula names for user-defined Formulas. [number]: 1 to 20.

Query: Returns setting for formula names for user-defined formula in a string.

Example

Command: **:UDF1:NAME “Example1”**

Set the formula name of UDF1 to "Example1".

Query: **:UDF1:NAME?**

Response (HEADER ON) :UDF1:UNIT “Example1”

Response (HEADER OFF) “Example1”

Syntax

- This command is case-sensitive in the parameter section.
- If the parameter is not enclosed in double quotation marks ("), a command error occurs.
- The available characters are ASCII characters from H'20 to H'7E. However, ' ” ~ looks like the following:

PC	~,	~;	~~
PW8001	‘	“	~

Setting and Querying Operators for User-defined Formulas

Syntax

Command: **:UDF[number]:OPERator <Operator 1(String)>,…,<Operator 15(String)>**

Query: **:UDF[number]:OPERator?**

Response: <Operator 1>,<Operator 2>,…,<Operator 15>

NONE	No conversion
PLUS	Addition
MINUS	Subtraction
MULTI	Multiplication
DIV	Division

Description

Command: Sets operator for user-defined formula. [number]: 1 to 20.

Query: Returns operators for user-defined formula in a string.

Example

Command: **:UDF1:OPER PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS**

Query: **:UDF1:OPER?**

Response:

(HEADER ON) :UDF1:OPERATOR PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS

(HEADER OFF) PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS,MINUS,PLUS

Reference

- If the number of arguments is less than 15, remaining items will not be changed.

Setting and Querying Unit for User-defined Formulas

Syntax

Command: **:UDF[number]:UNIT <Unit(String)>**

Query: **:UDF[number]:UNIT?**

Response: Unit — Up to 8 alphanumeric characters

Description

Command: Set a unit for user-defined formula. [number]: 1 to 20.

Query: Returns unit for user-defined formula in a string.

Example

Command: **:UDF1:UNIT “K”**

Sets the unit for user-defined formulas 1 to "K".

Query: **:UDF1:UNIT?**

Response:

(HEADER ON) :UDF1:UNIT “K”

(HEADER OFF) “K”

Syntax

- This command is case-sensitive in the parameter section.
- If the parameter is not enclosed in double quotation marks ("), a command error occurs.
- The available characters are ASCII characters from H'20 to H'7E. However, ' ” ~ looks like the following:

PC	~,	~;	~~
PW8001	‘	“	~

Setting and Querying maximum value for User-defined Formulas

Syntax

Command **:UDF[number]:UPPer <Max. value(String)>**

Query **:UDF[number]:UPPer?**

Response

Max. value 0.00001(a unit character) to 999999(a unit character):
Signed significant number of 6 digits and a unit character.
Any one of n, u, m, k, M, G, and T can be specified as the unit character.
Can be set in the range of ±1.00000n to ±999.999T.

Description

Command Sets a maximum value for user-defined formula. [number]: 1 to 20.

Query Returns maximum value for user-defined formula in a string.

Example

Command **:UDF1:UPP 100G**

Sets the maximum value for user-defined formulas 1 to "100G".

Query **:UDF1:UPP?**

Response (HEADER ON) :UDF1:UPPER +100.000G

(HEADER OFF) +100.000G

Reference

- This command is case-sensitive in the parameter section.

Setting and Querying automatic maximum value setting function for User-defined Formulas

Syntax

Command **:UDF[number]:UPPer:AUTO <ON/OFF(String)>**

Query **:UDF[number]:UPPer:AUTO?**

Response ON automatic maximum value setting function ON.

OFF automatic maximum value setting function OFF.

Description

Command Sets automatic maximum value setting function for user-defined Formulas. [number]: 1 to 20.

Query Returns setting forautomatic maximum value setting function for user-defined formula in a string.

Example

Command **:UDF1:UPP:AUTO ON**

Query **:UDF1:UPP:AUTO?**

Response (HEADER ON) :UDF1:UPPER:AUTO ON

(HEADER OFF) ON

Reference

3.2.34 Acquisition of Module Information

Querying Information of Specified Module

Syntax

Query **:UNIT[CH]:ID?**

Response <Module type>,<Module serial No.>

Module type	U7001, U7005
Module serial No.	9-digit numerical NR1 value

Description

Query Returns the information of the module connected to the specified channel.
[CH]: 1 to 8.

Example

Query **:UNIT1:ID?**

Response (HEADER ON) :UNIT1:ID U7005,123456789

(HEADER OFF) U7005,123456789

Reference

- Returns “NONE,-” as the response if no module is connected to the specified channel.

Querying Adjustment Date of Specified Module

Syntax

Query **:UNIT[CH]:ADATE?**

Response <Year or Month or Day>,<Year or Month or Day>,<Year or Month or Day>

Year	2020 to 2099
Month	1 to 12
Date	1 to 31

Description

Query Returns the final adjustment date of the module connected to the specified channel in a numerical NR1 value.
[CH]: 1 to 8.

Example

Query **:UNIT1:ADATE?**

Response (HEADER ON) :UNIT1:ADATE 2021,12,01

(HEADER OFF) 2021,12,01

Reference

- The order of the year, month, and date varies depending on the date format setting.
- Returns “-,-,-” if no module is connected to the specified channel.

Querying Calibration Date of Specified Module

Syntax

Query **:UNIT[CH]:CDATE?**

Response <Year or Month or Day>,<Year or Month or Day>,<Year or Month or Day>

Year	2020 to 2099
Month	1 to 12
Date	1 to 31

Description

Query Returns the final calibration date of the module connected to the specified channel in a numerical NR1 value.
[CH]: 1 to 8.

Example

Query **:UNIT1:CDATE?**

Response (HEADER ON) :UNIT1:CDATE 2021,12,01

(HEADER OFF) 2021,12,01

Reference

- The order of the year, month, and date varies depending on the date format setting.
- Returns "-,-,-" if no module is connected to the specified channel.

3.2.35 Voltage Input

Setting and Querying Voltage Auto Range

Syntax

Command **:VOLTage[CH]:AUTO <ON/OFF(String)>**

Query **:VOLTage[CH]:AUTO?**

Response

ON	Measures the voltage in auto range mode.
OFF	Voltages are measured in manual range mode.

Description

Command Sets the voltage auto range. [CH]: 1 to 8.

Query Returns the voltage auto range setting in a string.

Example

Command **:VOLT1:AUTO ON**

Sets the voltage range for CH1 to auto range.

Query **:VOLT1:AUTO?**

Response (HEADER ON) :VOLTAGE1:AUTO ON

(HEADER OFF) ON

Reference

- If the range is set by the VOLTage[CH]:RANGe command, the auto range for the specified channel is OFF.
- Setting of the voltage auto range for other channels included in the combination of measurement lines will also be changed.

Setting and Querying Phase Compensation Calculation for Voltage

Syntax

Command **:VOLTage[CH]:CORRect <ON/OFF/AUTO(String)>**

Query **:VOLTage[CH]:CORRect?**

Response ON Performs the phase compensation calculation for voltage.

OFF Does not perform phase compensation calculation for voltage

Description

Command Sets phase compensation calculation for voltage. [CH]: 1 to 8.

Query Returns setting for phase compensation calculation for voltage in a string.

Example

Command **:VOLT1:CORR ON**

Sets the phase compensation calculation for the CH1 voltage to ON.

Query **:VOLT1:CORR?**

Response (HEADER ON) :VOLTAGE1:CORRECT ON

(HEADER OFF) ON

Reference

- This setting must be made for each channel even if they use the same wiring.

Setting and Querying Phase Compensation Angle for Voltage

Syntax

Command **:VOLTage[CH]:DEGRee <Phase compensation angle(NR2)>**

Query **:VOLTage[CH]:DEGRee?**

Response <Phase compensation angle>

Phase compensation angle (°) -180.000 to +180.000

Description

Command Sets phase compensation angle for voltage. [CH]: 1 to 8.

Query Returns setting for phase compensation angle for voltage in a numerical NR2 value. (The plus sign cannot be omitted.)

Example

Command **:VOLT1:DEGR 90.000**

Sets the phase compensation angle for the CH1 voltage to +90°.

Query **:VOLT1:DEGR?**

Response (HEADER ON) :VOLTAGE1:DEGREE +90.000

(HEADER OFF) +90.000

Reference

- Numerical values in NRf format are acceptable, but the values are rounded to the third decimal place.
- This setting must be made for each channel even if they use the same wiring.

Setting and Querying Phase Compensation Frequency for Voltage

Syntax

Command **:VOLTage[CH]:FREQuency <Compensation frequency [kHz](NR2)>**

Query **:VOLTage[CH]:FREQuency?**

Response <Compensation frequency [kHz]>

Compensation frequency [kHz] 000.1 to 5000.0

Description

Command Sets phase compensation frequency for voltage. [CH]: 1 to 8.

Query Returns setting for phase compensation frequency for voltage in a numerical NR2 value.

Example

Command **:VOLT1:FREQ 200.0**

Sets the phase compensation frequency for the CH1 voltage to 200kHz.

Query **:VOLT1:FREQ?**

Response (HEADER ON) :VOLTAGE1:FREQUENCY 200.0

(HEADER OFF) 200.0

Reference

- This setting must be made for each channel even if they use the same wiring.

Setting and Querying Voltage Rectification Method

Syntax

Command **:VOLTage[CH]:MEAN <ON/OFF(String)>**

Query **:VOLTage[CH]:MEAN?**

Response ON Sets voltage rectification method to MEAN.

OFF Sets voltage rectification method to RMS.

Description

Command Sets a voltage rectification method. [CH]: 1 to 8.

Query Returns voltage rectification method in a string.

Example

Command **:VOLT1:MEAN OFF**

Sets the voltage rectification method for CH1 to RMS.

Query **:VOLT1:MEAN?**

Response (HEADER ON) :VOLTAGE1:MEAN OFF

(HEADER OFF) OFF

Reference

- Setting of the voltage rectification method for other channels included in the combination of measurement lines will also be changed.

Setting and Querying Voltage Range

Syntax

Command **:VOLTage[CH]:RANGe <Voltage range(NR1)>**

Query **:VOLTage[CH]:RANGe?**

Response <Voltage range>

Voltage range 6, 15, 30, 60, 150, 300, 600, 1500

Description

Command Changes a voltage range. [CH]: 1 to 8.

Query Returns the voltage range in a numerical NR1 value.

Example

Command **:VOLT1:RANG 300**

Sets the voltage range for CH1 to 600V.

Query **:VOLT1:RANG?**

Response (HEADER ON) :VOLTAGE1:RANGE 300

(HEADER OFF) 300

Reference

- Do not set a unit for the measurement range.
- After you change the range, wait a few moments until the internal circuitry stabilizes before you read any measured values.
- If a range is specified, the Auto range of the specified channel will be turned OFF.
- Setting of the voltage range for other channels included in the combination of measurement lines will also be changed.

3.2.36 Regarding Waveforms

Acquisition of Waveform Data

Syntax

Query **:WAVE:DOWNload? <Target waveforms(String)>**

Target Waveforms
(Peak-to-peak compression)
U1, U2, U3, U4, U5, U6, U7, U8,
I1, I2, I3, I4, I5, I6, I7, I8,
CHA, CHC, CHE, CHG,
LOGIC
(Decimation)
U1DEC, U2DEC, U3DEC, U4DEC, U5DEC, U6DEC, U7DEC, U8DEC,
I1DEC, I2DEC, I3DEC, I4DEC, I5DEC, I6DEC, I7DEC, I8DEC,
CHADEC, CHCDEC, CHEDEC, CHGDEC

Response Binary response data

Description

Query Returns wave data and its information in the binary response data format.
For all the contents of binary data, big-endian is used.
For details on the binary response data, refer to “5 Data Format for Output of Waveform Data Acquisition Command”.

Example

Query **:WAVE:DOWN? U1**

Response U1 waveform Binary response data

Reference

- This command is effective only in LAN connection. If other interfaces are used for the execution, an execution error occurs.
- Since the maximum waveform data size is approx. 20 MB, it takes a time to output the data.

Setting and Querying Sampling Speed of Waveforms

Syntax

Command **:WAVE:SAMPling <Sampling speed(String)>**

Query **:WAVE:SAMPling?**

Response <Sampling speed>

Sampling speed 10k, 25k, 50k, 100k, 250k, 500k, 1M, 2.5M, 5M, 7.5M, 15M

Description

Command Sets the sampling speed of waveforms. The unit is samples/s.

Query Returns the setting of sampling speed of waveforms in a string.

Example

Command **:WAVE:SAMP 100k**

Sets the sampling speed of waveforms to 100k-samples/s.

Query **:WAVE:SAMP?**

Response (HEADER ON) :WAVE:SAMPLING 100k

(HEADER OFF) 100k

Reference

Setting and Querying Waveform Recording Length

Syntax

Command **:WAVE:SHOT <Recording length(String)>**

Query **:WAVE:SHOT?**

Response <Recording length>

Recording length 1k, 5k, 10k, 50k, 100k, 500k, 1M, 5M

Description

Command Sets a recording length for a waveform. The unit is word.

Query Returns setting for waveform recording length in a string.

Example

Command **:WAVE:SHOT 100k**

Sets the recording length of waveforms to 100k-words.

Query **:WAVE:SHOT?**

Response (HEADER ON) :WAVE:SHOT 100k

(HEADER OFF) 100k

Reference

Querying Waveform Acquisition State

Syntax

Query **:WAVE:STATe?**

Response <Waveform Acquisition State>

Waveform Acquisition State

STOP	Stop
WAIT_TRG	Waiting for trigger
PRE_TRG	Pre-trigger in progress
STORAGE	Storage in progress
PROCESSING	Compression in progress
ABORT	Abort in progress

Description

Query Returns waveform acquisition state as a string.

Example

Query **:WAVE:STAT?**

Response (HEADER ON) :WAVE:STATE STOP

(HEADER OFF) STOP

Reference

Querying Waveform Data State of Valid or Invalid

Syntax

Query **:WAVE:VALid?**

Response TRUE Waveform data is valid.

FALSE Waveform data is invalid.

Description

Query Returns waveform data state of valid or invalid as a character string.

Example

Query **:WAVE:VAL?**

Response (HEADER ON) :WAVE:VALID TRUE

(HEADER OFF) TRUE

Reference

3.2.37 Wiring Method

Setting and Querying Wiring

Syntax

Command **:WIRing[CH] <Wiring method(String)>(,<First channel(String)>)**

Query **:WIRing[CH]?**

Response <Wiring method>,<First channel within wiring>

Wiring method 1P2W, 1P3W, 3P3W2M, 3P3W3M, 3V3A, 3P4W

First channel CH1, CH2, CH3, CH4, CH5, CH6, CH7, CH8

Description

Command Sets the wiring method with the specified channel used as the first channel.
If the second parameter specifies the first channel, sets the wiring method with the channel used as the first channel.
[CH]: 1 to 8.

Query Returns the wiring setting for the specified channel and the first wiring channel in a string.
[CH]: 1 to 8.

Example

Command **:WIR1 1P3W**

Sets the wiring of CH1 and CH2 to 1P3W.

Command **:WIR3 3V3A,CH2**

Sets the wiring of CH2, CH3, and CH4 to 3V3A.

Query **:WIR3?**

Response (HEADER ON) :WIRING3 3V3A,CH2

(HEADER OFF) 3V3A,CH2

Reference

- If the wiring method cannot be changed depending on the combination of connection data of a channel, a command execution error occurs.
- The wiring method of other channels may change depending on the setting.

Collective Setting and Querying for Wiring

Syntax

Command **:WIRing <Wiring method 1(String)>,<Wiring method 2(String)>,…, <Wiring method n(String)>**

Query **:WIRing?**

Response <Wiring method 1>,<Wiring method 2>,…,<Wiring method n>

Wiring method 1P2W, 1P3W, 3P3W2M, 3P3W3M, 3V3A, 3P4W

Description

Command Specifies wiring settings collectively.
Wiring connections are set in order from CH1.
If the total number of channels used for wiring connections specified by the parameter exceeds the number of channels that can be used, an execution error occurs.
If the total number of channels used for wiring connections specified by the parameter is less than the number of channels that can be used, the other channels are set to 1P2W.

Query Returns the collective wiring settings in a string.

Example

Command **:WIR 1P3W,3P3W2M,3V3A**

Sets the wiring of CH1 and CH2 to 1P3W, sets the wiring of CH3 and CH4 to 3P3W2M, and sets the wiring of CH5, CH6, and CH7 to 3V3A. If not specified, CH8 is set to 1P2W.

Query **:WIR?**

Response (HEADER ON) :WIRING 1P3W,3P3W2M,3V3A,1P2W

(HEADER OFF) 1P3W,3P3W2M,3V3A,1P2W

Reference

- If no change is available depending on the combination of wiring connection data of a channel, a command execution error occurs.

4 Parameters for Normal Measurement Items

4.1 Parameters for Normal Measurement Items

Measurement items	Instru-ment's notation	Parameter list
Voltage RMS value	Urms	Urms1, Urms2, Urms3, Urms4, Urms5, Urms6, Urms7, Urms8, Urms12, Urms23, Urms34, Urms45, Urms56, Urms67, Urms78, Urms123, Urms234, Urms345, Urms456, Urms567, Urms678
Voltage average value rectifier RMS value equivalent	Umn	Umn1, Umn2, Umn3, Umn4, Umn5, Umn6, Umn7, Umn8, Umn12, Umn23, Umn34, Umn45, Umn56, Umn67, Umn78, Umn123, Umn234, Umn345, Umn456, Umn567, Umn678
Voltage AC component	Uac	Uac1, Uac2, Uac3, Uac4, Uac5, Uac6, Uac7, Uac8
Voltage simple average	Udc	Udc1, Udc2, Udc3, Udc4, Udc5, Udc6, Udc7, Udc8
Voltage fundamental wave component	Ufnd	Ufnd1, Ufnd2, Ufnd3, Ufnd4, Ufnd5, Ufnd6, Ufnd7, Ufnd8
Voltage waveform peak +	Upk+	PUpk1, PUpk2, PUpk3, PUpk4, PUpk5, PUpk6, PUpk7, PUpk8
Voltage waveform peak -	Upk-	MUpk1, MUpk2, MUpk3, MUpk4, MUpk5, MUpk6, MUpk7, MUpk8
Total voltage harmonic distortion	Uthd	Uthd1, Uthd2, Uthd3, Uthd4, Uthd5, Uthd6, Uthd7, Uthd8
Voltage ripple factor	Urf	Urf1, Urf2, Urf3, Urf4, Urf5, Urf6, Urf7, Urf8
Voltage unbalance rate	Uunb	Uunb123, Uunb234, Uunb345, Uunb456, Uunb567, Uunb678
Current RMS value	Irms	Irms1, Irms2, Irms3, Irms4, Irms5, Irms6, Irms7, Irms8, Irms12, Irms23, Irms34, Irms45, Irms56, Irms67, Irms78, Irms123, Irms234, Irms345, Irms456, Irms567, Irms678
Current average value rectification RMS value equivalent	Imn	Imn1, Imn2, Imn3, Imn4, Imn5, Imn6, Imn7, Imn8, Imn12, Imn23, Imn34, Imn45, Imn56, Imn67, Imn78, Imn123, Imn234, Imn345, Imn456, Imn567, Imn678
Current AC component	Iac	Iac1, Iac2, Iac3, Iac4, Iac5, Iac6, Iac7, Iac8
Current simple average	Idc	Idc1, Idc2, Idc3, Idc4, Idc5, Idc6, Idc7, Idc8
Current fundamental wave component	Ifnd	Ifnd1, Ifnd2, Ifnd3, Ifnd4, Ifnd5, Ifnd6, Ifnd7, Ifnd8
Current waveform peak +	Ipk+	PIpk1, PIpk2, PIpk3, PIpk4, PIpk5, PIpk6, PIpk7, PIpk8
Current waveform peak -	Ipk-	MIpk1, MIpk2, MIpk3, MIpk4, MIpk5, MIpk6, MIpk7, MIpk8
Total current harmonic distortion	Ithd	Ithd1, Ithd2, Ithd3, Ithd4, Ithd5, Ithd6, Ithd7, Ithd8
Current ripple factor	Irf	Irf1, Irf2, Irf3, Irf4, Irf5, Irf6, Irf7, Irf8

Measurement items	Instru-ment's notation	Parameter list
Current unbalance rate	Iunb	Iunb123, Iunb234, Iunb345, Iunb456, Iunb567, Iunb678
Active power	P	P1, P2, P3, P4, P5, P6, P7, P8, P12, P23, P34, P45, P56, P67, P78, P123, P234, P345, P456, P567, P678
Fundamental wave active power	Pfnd	Pfnd1, Pfnd2, Pfnd3, Pfnd4, Pfnd5, Pfnd6, Pfnd7, Pfnd8, Pfnd12, Pfnd23, Pfnd34, Pfnd45, Pfnd56, Pfnd67, Pfnd78, Pfnd123, Pfnd234, Pfnd345, Pfnd456, Pfnd567, Pfnd678
Apparent power	S	S1, S2, S3, S4, S5, S6, S7, S8, S12, S23, S34, S45, S56, S67, S78, S123, S234, S345, S456, S567, S678
Fundamental wave apparent power	Sfnd	Sfnd1, Sfnd2, Sfnd3, Sfnd4, Sfnd5, Sfnd6, Sfnd7, Sfnd8, Sfnd12, Sfnd23, Sfnd34, Sfnd45, Sfnd56, Sfnd67, Sfnd78, Sfnd123, Sfnd234, Sfnd345, Sfnd456, Sfnd567, Sfnd678
Reactive power	Q	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q12, Q23, Q34, Q45, Q56, Q67, Q78, Q123, Q234, Q345, Q456, Q567, Q678
Fundamental wave reactive power	Qfnd	Qfnd1, Qfnd2, Qfnd3, Qfnd4, Qfnd5, Qfnd6, Qfnd7, Qfnd8, Qfnd12, Qfnd23, Qfnd34, Qfnd45, Qfnd56, Qfnd67, Qfnd78, Qfnd123, Qfnd234, Qfnd345, Qfnd456, Qfnd567, Qfnd678
Power factor	λ	PF1, PF2, PF3, PF4, PF5, PF6, PF7, PF8, PF12, PF23, PF34, PF45, PF56, PF67, PF78, PF123, PF234, PF345, PF456, PF567, PF678
Fundamental wave power factor	λfnd	PFfnd1, PFfnd2, PFfnd3, PFfnd4, PFfnd5, PFfnd6, PFfnd7, PFfnd8, PFfnd12, PFfnd23, PFfnd34, PFfnd45, PFfnd56, PFfnd67, PFfnd78, PFfnd123, PFfnd234, PFfnd345, PFfnd456, PFfnd567, PFfnd678
Voltage phase angle	θU	Udeg1, Udeg2, Udeg3, Udeg4, Udeg5, Udeg6, Udeg7, Udeg8
Current phase angle	θI	Ideg1, Ideg2, Ideg3, Ideg4, Ideg5, Ideg6, Ideg7, Ideg8
Power phase angle	ø	DEG1, DEG2, DEG3, DEG4, DEG5, DEG6, DEG7, DEG8, DEG12, DEG23, DEG34, DEG45, DEG56, DEG67, DEG78, DEG123, DEG234, DEG345, DEG456, DEG567, DEG678
Voltage frequency	fU	FU1, FU2, FU3, FU4, FU5, FU6, FU7, FU8
Current frequency	fI	FI1, FI2, FI3, FI4, FI5, FI6, FI7, FI8
Positive integration current	Ih+	PIH1, PIH2, PIH3, PIH4, PIH5, PIH6, PIH7, PIH8

Measurement items	Instru-ment's notation	Parameter list
Negative integration current	Ih-	MIH1, MIH2, MIH3, MIH4, MIH5, MIH6, MIH7, MIH8
Positive and negative integration current sum	Ih	IH1, IH2, IH3, IH4, IH5, IH6, IH7, IH8
Positive integration active power sum	WP+	PWP1, PWP2, PWP3, PWP4, PWP5, PWP6, PWP7, PWP8, PWP12, PWP23, PWP34, PWP45, PWP56, PWP67, PWP78, PWP123, PWP234, PWP345, PWP456, PWP567, PWP678
Negative integration active power sum	WP-	MWP1, MWP2, MWP3, MWP4, MWP5, MWP6, MWP7, MWP8, MWP12, MWP23, MWP34, MWP45, MWP56, MWP67, MWP78, MWP123, MWP234, MWP345, MWP456, MWP567, MWP678
Positive and negative integration active power sum	WP	WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP12, WP23, WP34, WP45, WP56, WP67, WP78, WP123, WP234, WP345, WP456, WP567, WP678
Efficiency	η	Eff1, Eff2, Eff3, Eff4
Loss	Loss	Loss1, Loss2, Loss3, Loss4
Torque	Tq	Tq1, Tq2, Tq3, Tq4
RPM	Spd	Spd1, Spd2, Spd3, Spd4
Motor power	Pm	Pm1, Pm2, Pm3, Pm4
Slip	Slip	Slip1, Slip2, Slip3, Slip4
Free input in independent input mode	CH	CHA, CHB, CHC, CHD, CHE, CHF, CHG, CHH
User Difined Function	UDF	UDF1, UDF2, UDF3, UDF4, UDF5, UDF6, UDF7, UDF8, UDF9, UDF10, UDF11, UDF12, UDF13, UDF14, UDF15, UDF16, UDF17, UDF18, UDF19, UDF20
Short-term Flicker severity	Pst	Pst1, Pst2, Pst3, Pst4, Pst5, Pst6, Pst7, Pst8
Maximum Short-term Flicker severity	Pst Max	PstMax1, PstMax2, PstMax3, PstMax4, PstMax5, PstMax6, PstMax7, PstMax8
Long-term Flicker severity	Plt	Plt1, Plt2, Plt3, Plt4, Plt5, Plt6, Plt7, Plt8
Maximum Instantaneous Flicker values	Pinst Max	PinstMax1, PinstMax2, PinstMax3, PinstMax4, PinstMax5, PinstMax6, PinstMax7, PinstMax8
Minimum Instantaneous Flicker values	Pins Min	PinstMin1, PinstMin2, PinstMin3, PinstMin4, PinstMin5, PinstMin6, PinstMin7, PinstMin8
Maximum steady state voltage change during	dc	DC1, DC2, DC3, DC4, DC5, DC6, DC7, DC8
Maximum absolute voltage change	dmax	DMax1, DMax2, DMax3, DMax4, DMax5, DMax6, DMax7, DMax8
Time above threshold	Tmax	TMax1, TMax2, TMax3, TMax4, TMax5, TMax6, TMax7, TMax8

Measurement items	Instru-ment's notation	Parameter list
:AOUT:TRENd:ITEM :AOUT[CH]:TRENd:ITEM :CAN:DB:ITEM :DISPlay:CUSTom :DISPlay:WAVEValue :MODBus:ITEM :UDF[number]:ITEMe	-	OFF

To specify secondary normal measurement items add [SC] at the end of the parameters given in the list above.

Example: Urms1SC

EFF, LOSS, UDF and Flicker related items of secondary cannot be specified.

4.2 List and Order of Direct Specification Items for :MEASure?

Measurement items	Parameter list
Status	Status (Status1, Status2, Status3, Status4, Status5, Status6, Status7, Status8, StatusM)
Integrated elapsed time	Etime (Etime1, Etime2, Etime3, Etime4, Etime5, Etime6, Etime7, Etime8)
Parameters for Normal Measurement Items	This item shows the output of measured value data in the item name and order same with the parameters for normal measurement items. See 4.1 “Parameters for Normal Measurement Items” for details.

4.2.1 Statuses

Status shows the measurement status for measured data in a 32 bits-hexadecimal value.

The status is a logical sum of Status1 through Status8 and StatusM. For example, if bit 11 (ZU) of Status2 is set to ON and bit 17 (ZMA) of StatusM is set to ON, both bits 11 and 17 of Status are set to ON.

4.2.2 Integrated Elapsed Time (Etime)

If the integrated elapsed time is set to ON in the communication output item of integration data (**:MEASure:ITEM:INTEGrate**), the integrated elapsed time (Etime) is output.

Etime returns a response including ms unit when the data save interval (**:SAVE:AUTO:INTERval**) is set to less than 1s. If it is more than 1s, the integrated elapsed time in ms unit is not included in the response.

If the integration control system is in the status of integration by wiring connection, the integrated elapsed time is returned for all the channels from Etime1 to Etime8.

4.2.3 Channel Statuses (Status1, Status2, Status3, Status4, Status5, Status6, Status7, Status8)

Channel statuses are shown by Status1 to Status8. (Example: The status of channel 3 is Status3.)

If a channel not connected is specified, all bits become 0.

The 32 bits are assigned as follows:

Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
–	–	–	–	–	–	–	–
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
–	–	–	–	–	–	–	–
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
–	UCU	ZP	ZI	ZU	DP	DI	DU
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
–	–	–	–	RI	RU	PI	PU

Bit	Abbreviation	Subject
Bit 14	UCU	Calculation unavailable (e.g., the data is invalid because the measurement is immediately after a range change)
Bit 13	ZP	Power calculation (synchronized source) with forced zero-cross
Bit 12	ZI	Current frequency with forced zero-cross
Bit 11	ZU	Voltage frequency with forced zero-cross
Bit 10	DP	Power calculation (synchronized source) without data update
Bit 9	DI	Current frequency without data update
Bit 8	DU	Voltage frequency without data update
Bit 3	RI	Current overload
Bit 2	RU	Voltage overload
Bit 1	PI	Current peak exceeded
Bit 0	PU	Voltage peak exceeded

4.2.4 Status of Motor Channel (StatusM)

The status of channel is shown by StatusM.

If the motor analysis option is not implemented, all bits become 0.

The 32 bits are assigned as follows:

Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
–	–	UCUG	ZMG	RMG	UCUE	ZME	RME
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
–	–	UCUC	ZMC	RMC	UCUA	ZMA	RMA
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
–	–	–	–	–	–	–	–
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
–	–	–	–	–	–	–	–

Bit	Abbreviation	Subject
Bit 29	UCUG	CHG calculation unavailable (e.g., the data is invalid because the measurement is immediately after a range change)
Bit 28	ZMG	CHG motor synchronization source with forced zero-cross
Bit 27	RMG	CHG overload when input is set to analog
Bit 26	UCUE	CHE calculation unavailable (e.g., the data is invalid because the measurement is immediately after a range change)
Bit 25	ZME	CHE motor synchronization source with forced zero-cross
Bit 24	RME	CHE overload when input is set to analog
Bit 21	UCUC	CHC calculation unavailable (e.g., the data is invalid because the measurement is immediately after a range change)
Bit 20	ZMC	CHC motor synchronization source with forced zero-cross
Bit 19	RMC	CHC overload when input is set to analog
Bit 18	UCUA	CHA calculation unavailable (e.g., the data is invalid because the measurement is immediately after a range change)
Bit 17	ZMA	CHA motor synchronization source with forced zero-cross
Bit 16	RMA	CHA overload when input is set to analog

4.3 List and Order of Direct Specification Items for :MEASure:HARMonic?

To specify secondary normal measurement items add [SC] at the end of the parameters given in the list above.

Example: HU1L000SC

Secondary harmonics measurement items can only be set to the 0-50th order.

The Interharmonics items can be set only in IEC mode.

In IEC mode, the maximum order is limited to 200 orders

Measurement items		Instru-ment's notation	Parameter list
Status		-	Status
0-th	Harmonic voltage RMS value	Uk	HU1L000, HU2L000, HU3L000, HU4L000, HU5L000, HU6L000, HU7L000, HU8L000
	Harmonic voltage content percentage	HDUk	HU1D000, HU2D000, HU3D000, HU4D000, HU5D000, HU6D000, HU7D000, HU8D000
	Harmonic voltage phase angle	θUk	HU1P000, HU2P000, HU3P000, HU4P000, HU5P000, HU6P000, HU7P000, HU8P000
	Harmonic current RMS value	Ik	HI1L000, HI2L000, HI3L000, HI4L000, HI5L000, HI6L000, HI7L000, HI8L000
	Harmonic current content percentage	HDIk	HI1D000, HI2D000, HI3D000, HI4D000, HI5D000, HI6D000, HI7D000, HI8D000
	Harmonic current phase angle	θIk	HI1P000, HI2P000, HI3P000, HI4P000, HI5P000, HI6P000, HI7P000, HI8P000
	Harmonic active power	Pk	HP1L000, HP2L000, HP3L000, HP4L000, HP5L000, HP6L000, HP7L000, HP8L000, HP12L000, HP23L000, HP34L000, HP45L000, HP56L000, HP67L000, HP78L000, HP123L000,HP234L000,HP345L000, HP456L000, HP567L000, HP678L000
	Harmonic power content percentage	HDPk	HP1D000, HP2D000, HP3D000, HP4D000, HP5D000, HP6D000, HP7D000, HP8D000, HP12D000, HP23D000, HP34D000, HP45D000, HP56D000, HP67D000, HP78D000, HP123D000, HP234D000, HP345D000, HP456D000, HP567D000, HP678D000

	Harmonic voltage/current phase angle	θk	HP1P000, HP2P000, HP3P000, HP4P000, HP5P000, HP6P000, HP7P000, HP8P000, HP12P000, HP23P000, HP34P000, HP45P000, HP56P000, HP67P000, HP78P000, HP123P000, HP234P000, HP345P000, HP456P000, HP567P000, HP678P000
	Interharmonics voltage RMS value (0.5th)	iUk	IHU1L000, IHU2L000, IHU3L000, IHU4L000, IHU5L000, IHU6L000, IHU7L000, IHU8L000
	Interharmonics voltage content percentage (0.5th)	iHDUk	IHU1D000, IHU2D000, IHU3D000, IHU4D000, IHU5D000, IHU6D000, IHU7D000, IHU8D000
	Interharmonics current RMS value (0.5th)	iIk	IHI1L000, IHI2L000, IHI3L000, IHI4L000, IHI5L000, IHI6L000, IHI7L000, IHI8L000
	Interharmonics current content percentage (0.5th)	iHDIk	IHI1D000, IHI2D000, IHI3D000, IHI4D000, IHI5D000, IHI6D000, IHI7D000, IHI8D000
n-th	(omitted)	-	The suffix in 3 digits shows the order "n". For Interharmonics, the n.5th order is shown.
500-th	Harmonic voltage RMS value	Uk	HU1L500, HU2L500, HU3L500, HU4L500, HU5L500, HU6L500, HU7L500, HU8L500
	Harmonic voltage content percentage	HDUk	HU1D500, HU2D500, HU3D500, HU4D500, HU5D500, HU6D500, HU7D500, HU8D500
	Harmonic voltage phase angle	θUk	HU1P500, HU2P500, HU3P500, HU4P500, HU5P500, HU6P500, HU7P500, HU8P500
	Harmonic current RMS value	Ik	HI1L500, HI2L500, HI3L500, HI4L500, HI5L500, HI6L500, HI7L500, HI8L500
	Harmonic current content percentage	HDIk	HI1D500, HI2D500, HI3D500, HI4D500, HI5D500, HI6D500, HI7D500, HI8D500
	Harmonic current phase angle	θIk	HI1P500, HI2P500, HI3P500, HI4P500, HI5P500, HI6P500, HI7P500, HI8P500

	Harmonic active power	Pk	HP1L500, HP2L500, HP3L500, HP4L500, HP5L500, HP6L500, HP7L500, HP8L500, HP12L500, HP23L500, HP34L500, HP45L500, HP56L500, HP67L500, HP78L500, HP123L500,HP234L500,HP345L500, HP456L500, HP567L500, HP678L500
	Harmonic power content percentage	HDPk	HP1D500, HP2D500, HP3D500, HP4D500, HP5D500, HP6D500, HP7D500, HP8D500, HP12D500, HP23D500, HP34D500, HP45D500, HP56D500, HP67D500, HP78D500, HP123D500, HP234D500, HP345D500, HP456D500, HP567D500, HP678D500
500-th	Harmonic voltage/ current phase angle	θk	HP1P500, HP2P500, HP3P500, HP4P500, HP5P500, HP6P500, HP7P500, HP8P500, HP12P500, HP23P500, HP34P500, HP45P500, HP56P500, HP67P500, HP78P500, HP123P500, HP234P500, HP345P500, HP456P500, HP567P500, HP678P500
Harmonics synchronization frequency		fHRM	HF1, HF2, HF3, HF4, HF5, HF6, HF7, HF8

4.3.1 Harmonics Status (Status)

Harmonics status shows the measurement status for measured data in a 32 bits-hexadecimal value.

The status of measured harmonics data is one of the Statuses. (This also applies to the status set for the intermediate harmonics data.)

Assignment of the 32 bits is as follows: (The numbers 1 through 8 after abbreviation show channel number.)

Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
–	–	–	–	–	–	–	–
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
UCU8	UCU7	UCU6	UCU5	UCU4	UCU3	UCU2	UCU1
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
ZH8	ZH7	ZH6	ZH5	ZH4	ZH3	ZH2	ZH1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RF8	RF7	RF6	RF5	RF4	RF3	RF2	RF1

Bit	Abbreviation	Subject
16 to 23	UCU	Calculation unavailable (e.g., measured data is invalid because measurement is immediately after frequency fluctuation of a synchronization source.)
8 to 15	ZH	Harmonics waveform with forced zero-cross
0 to 7	RF	Frequency range over

5 Data Format for Output of Waveform Data Acquisition Command

With :WAVE:DOWNLoad? command, the target waveform data is output in the following format: The byte order uses big-endian.

size	Type	Variable name	Description
12	char	sizeStr[12]	Character string having the number of bytes of the file (number of bytes for the model name and later) excluding this variable. 12 bytes in total, made up of 11 numeric digits and colon (:). Example: When the file size is 4036 bytes, a character string of 00000004024: is entered, because 4024 bytes are obtained by subtracting 12.
4	long	samplingSpeed	Sampling speed. Example: In response to 100kS, 100000 is entered.
4	long	storageLength	Number of points after storage. Example: When the number of points after storage is 1000, 1000 is entered.
8	double	convertRate	Coefficient for converting short waveform data into floating-point (double) data Waveform data can be generated by multiplying short waveform data by this coefficient.
4	long	storageMode	Storage mode. For the peak compression, 0 is entered, and for the decimation frequency, 1 is entered.
4	long	logicCH	This represents CH which is in the logic mode of the motor. Bit 0: CHA, Bit 1: CHB, Bit 2: CHC, Bit 3: CHD, Bit 4: CHE, Bit 5: CHF, Bit 6: CHG, Bit 7: CHH

<table>
<tr>
<td>2*2*
5000000</td>
<td>short</td>
<td>waveData[5000000][2]</td>
<td>Waveform data
For the array, measured values are entered into the number of points after storage (up to 5 M points) in order of [MAX value] and [MIN value].
In the case of a decimation waveform, the measured value is entered in the order of [decimation waveform value] and [0].

For logic data, values are entered into short waveData[5000000][2] by entering them into the bits in the table below in big-endian.
<table>
<tr><th>Bit 15</th><th>Bit 14</th><th>Bit 13</th><th>Bit 12</th><th>Bit 11</th><th>Bit 10</th><th>Bit 9</th><th>Bit 8</th></tr>
<tr><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr>
<tr><td>CHH</td><td>CHG</td><td>CHF</td><td>CHE</td><td>CHD</td><td>CHC</td><td>CHB</td><td>CHA</td></tr>
</table>
Do not use bits marked with “-”.</td>
</tr>
</table>

6 FFT Analysis Output Data Formats

6.1 Output data format for FFT analysis data query

The :FFT:DOWNload? outputs data in the following format. The byte order is little-endian.

size	Type	Variable name	Description
12	char	sizeStr[12]	Character string having the number of bytes of the file (number of bytes for the model name and later) excluding this variable. 12 bytes in total, made up of 11 numeric digits and colon (:). Example: When the file size is 40,012 bytes, a character string of 00000040000: is entered, because 40,000 bytes are obtained by subtracting 12.
4	float	freqPerIndex	The waveform sampling speed by the number of FFT analysis points is stored.
4	long	fftStartIndex	The <value of the starting index> specified in the data retrieval query is stored.
4	long	fftLength	The <number of points> specified in the data acquisition query is stored.
4	long	fftCh	Stores the target channel for FFT analysis. 1 - 8 : CH1 - CH8 9 - 15 : CH12 - CH78 16 - 21 : CH123 - CH678 22 : Motor option
4*(Number of points)	float	fftData[Index]	FFT results are stored. Data is stored for the number of FFT analysis points to be transferred from the index of the FFT that starts transfer.

6.2 Output data format for FFT analysis complex data query

The :FFT:COMPlex? outputs data in the following format. The byte order is little-endian.

size	Type	Variable name	Description
12	char	sizeStr[12]	Character string having the number of bytes of the file (number of bytes for the model name and later) excluding this variable. 12 bytes in total, made up of 11 numeric digits and colon (:). Example: When the file size is 40,012 bytes, a character string of 00000040000: is entered, because 40,000 bytes are obtained by subtracting 12.
4	float	freqPerIndex	The waveform sampling speed by the number of FFT analysis points is stored.
4	long	fftStartIndex	The <value of the starting index> specified in the data retrieval query is stored.
4	long	fftLength	The <number of points> specified in the data acquisition query is stored.
4*2	float	convertRate[U/I]	Coefficient for converting FFT data in float format to a value. Multiply the FFT data in float format by this coefficient to obtain the FFT value.
4	long	fftCh	Stores the target channel for FFT analysis. 1 - 8 : CH1 - CH8
4*2*(Number of points)	float	fftData [Index][Real/Image]	The real and imaginary components of the FFT analysis results are stored. The sequence is [0th real component][0th imaginary component][1st real component][1st imaginary component]...[nth real component][nth imaginary component], with the start index as the reference.。 The data is stored for <number of points> from the index of <start index value>.

7 Available commands for secondary units during optical link

If the optical link is not connected, an effective error occurs.

:CURRent[CH]:AUTO(?)	:EXTernalin:[CH]:SOURce(?)
:CURRent[CH]:CORRect(?)	:EXTernalin:[CH]:WIRing(?)
:CURRent[CH]:DEGRee(?)	:EXTernalin:[PAIR]:ZSLOPe(?)
:CURRent[CH]:FREQuency(?)	:FREQuency[CH]:HPF(?)
:CURRent[CH]:INPut(?)	:FREQuency[CH]:LOWer(?)
:CURRent[CH]:MEAN(?)	:FREQuency[CH]:UPPer(?)
:CURRent[CH]:RANGe(?)	:HARMonic:ZSOURce[CH](?)
:CURRent[CH]:RATE(?)	:INTEGrate:MODE[CH](?)
:DELTay[CH](?)	:LPF[CH](?)
:EXTernalin:[CH]:ANALog:LPF(?)	:PADJust[CH]:RESET(?)
:EXTernalin:[CH]:ANALog:RANGe(?)	:PADJust[CH]:SET(?)
:EXTernalin:[CH]:COMP:SPEED(?)	:PADJust[CH]:VALue(?)
:EXTernalin:[CH]:COMP:SPEED:VALue(?)	:SCALe[CH]:CT(?)
:EXTernalin:[CH]:COMP:TORQue(?)	:SCALe[CH]:VT(?)
:EXTernalin:[CH]:COMP:TORQue:VALue(?)	:SOURce[CH](?)
:EXTernalin:[CH]:FREQuency:CENTer(?)	:VOLTage[CH]:AUTO(?)
:EXTernalin:[CH]:FREQuency:LOWer(?)	:VOLTage[CH]:CORRect(?)
:EXTernalin:[CH]:FREQuency:RANGe(?)	:VOLTage[CH]:DEGRee(?)
:EXTernalin:[CH]:FREQuency:UPPer(?)	:VOLTage[CH]:FREQuency(?)
:EXTernalin:[CH]:MODE(?)	:VOLTage[CH]:MEAN(?)
:EXTernalin:[CH]:PULSe:NUMBer(?)	:VOLTage[CH]:RANGe(?)
:EXTernalin:[CH]:PULSe:PNF(?)	:WIRing(?)
:EXTernalin:[CH]:PULSe:POLes(?)	:WIRing[CH](?)
:EXTernalin:[CH]:SCALe:SPEED(?)	:EXTernalin:EXISt?
:EXTernalin:[CH]:SCALe:TORQue(?)	:UNIT[CH]:ID?
:EXTernalin:[CH]:SLIP(?)	:SENSor[CH]:ID?

8 Troubleshooting

Problem	Cause	Solution/Reference
No communications.	The cable is not connected properly. The cable in use is an item other than specified.	See “9 Connecting with computers” in the PW8001 Instruction Manual.
	Power supply to some of the devices in connection is not turned ON.	Turn ON all the devices.
RS-232C	The communication port setting is not identical to the one for the instrument.	See “9 Connecting with computers” in the PW8001 Instruction Manual.
GP-IB	The address setting is not identical to the one for the instrument. The address setting is identical to the one for other device.	See “9 Connecting with computers” in the PW8001 Instruction Manual.
LAN	The communication setting is not identical to the one for the instrument. The IP address setting is identical to the one for another device.	See “9 Connecting with computers” in the PW8001 Instruction Manual.
	The TCP/IP port number is incorrect.	Set the port number to 0023.
Communications are not working properly.	The message terminator (delimiter) setting is not identical to the one for the instrument.	See “1.2.7 Message Terminators”.
	Open/close switching is repeated frequently.	Take a longer interval before reopening.
RS-232C	The communication port setting is not identical to the one for the instrument.	See “9 Connecting with computers” in the PW8001 Instruction Manual.
A command was sent but nothing happens.	Beeps when a communication error occurs if a beep function is enabled for this instrument.	Execute a ***ESR?** query to obtain Standard Event Status Register and check the error.
	An error occurred.	
RS-232C	An error occurred.	Set RS232c:ANSWer to ON and check the execution confirmation message.
Although multiple queries were sent, only one response was received.	An error occurred.	Read the response after each query is sent. To read all query responses at once, use the message separator to enter all the queries on a single line.
The query response message is not the same as what is displayed on the instrument panel.	Response messages are generated when the query is received by the instrument. Therefore, in some cases the message may not match what is displayed on the panel when the response is read by the computer.	
Any of the instrument’s keys is not available after communication.	The instrument is in remote mode (the [REMOTE] key on the panel of the instrument is lit).	Press the [REMOTE] key to cancel remote state.

Problem	Cause	Solution/Reference
The program stops running when I try to read data with an INPUT statement.	No query is sent.	You must send a query before the INPUT statement.
	Regarding the sent query, an error occurs.	Execute a ***ESR?** query to obtain Standard Event Status Register and check the error.

9 Device Documents Requirements

9.1 Device Documents Requirements

"Information on compliance to standards" based on the IEEE 488.2 standard

	Item	Subject
1	IEEE 488.1 Interface Functions	Reference: "Specifications" of "9.3 Connecting and Setting the GP-IB" of the PW8001 Instruction Manual.
2	Operation When the Address is Set to a Value Outside the Range of 0 to 30	Address settings are allowed only in the range of 0 to 30.
3	Recognizing When a User Changes the Initial Address Setting	At the moment when an address is changed, the change is recognized.
4	Device Settings When the Instrument is Powered On	All status information is cleared. Other settings are backed up. However, header, message separator, and current path settings are reset.
5	Message Exchange Option Notation	■ Input buffer capacity and operation Reference: "1.3.2 Input Buffer" ■ Queries to which multiple response messages are returned Reference: "9.2 Queries to which " ■ Queries that Generate a Response for Syntax Analysis All queries generate a response after syntax analysis. ■ Whether any queries produce responses when read: There is no query that generates a response at the moment when it is read by the computer. ■ Availability of paired interacting commands Reference: "9.3 Paired Interacting Commands"
6	List of Functional Requirements for Device-specific Commands and Explanation for Compound Command Program Header Usage	■ List of functional requirements 1.2.1 Command Message 1.2.2 Query Message 1.2.3 Response Message 1.2.4 Command Syntax 1.2.5 Command Program Header 1.2.6 Query Program Header 1.2.7 Message Terminators 1.2.8 Separator 1.2.9 Data 1.2.10 Compound Command Header Omission
7	Block Data Buffer Capacity Limits	Block data is not used.

	Item	Subject
8	List of Program Data Elements Used in <Expressions> and the Maximum Number of Nested Levels Allowed in Sub-expressions (Including Syntax Restrictions Imposed by the Device on <Expressions>)	Reference: “3 Command Reference”
9	Query Response Syntax	Reference: “3 Command Reference”
10	Message Transmission Interference Between Devices that Do Not Conform to the Defined Response Message Rules	Messages cannot be sent between devices.
11	Block Data Response Capacity	There are no block data responses.
12	List of Common Commands and Queries Used	Reference: “3.1 Standard Command”
13	Device Status After a Revised Query Completes Successfully	***CAL?** query is not used.
14	***DDT** Command Availability	***DDT** command is not used.
15	Macro Commands	Macros are not used.
16	Queries Related to Identification, Explanation of the Response to the ***IDN?** Query	Reference: “3.1 Standard Command”
17	Capacity of the User Data Storage Area Protected by Execution of ***PUD** Command or ***PUD?** Query	The ***PUD** command and ***PUD?** query are not used. No data storage area is available for users.
18	Resources When the ***RDT** Command or ***RDT?** is Used	The ***RDT** command and ***RDT?** query are not used. Explanation for resources is not saved in the device.
19	Situations When the Instrument is Affected by ***RST**, ***LRN?**, ***RCL** and ***SAV** Commands	The ***LRN?**, ***RCL**, and ***SAV** commands are not used. ***RST** command executes the system reset of the instrument. Reference: “3.1 Standard Command” Reference: “6.3 Default Settings” in the PW8001 Instruction Manual
20	Scope of the Self-testing Executed as a result of the ***TST?** Query	Reference: “3.1 Standard Command”
21	Additional Status Data Structures Used for Reporting the Device Status	Reference: “1.5 Event Registers”
22	Whether Commands are Overlap or Sequential Type	All commands are sequential.
23	Standards for Functions Required When Operation Complete Messages are Generated as Command Responses	As overlap command is not used, no explanation about standard to complete operation is available. Supplement: Operation complete messages for sequential commands are generated when analysis of the command is performed.

9.2 Queries to which Multiple Response Messages are Returned

*IDN?	:INTEGrate:STATe?
*OPT?	:MEASure?
:AOUT:TRENd:ITEM?	:MEASure:10MS?
:AOUT:WAVE:ITEM?	:MEASure:10MS:ASC?
:CLOCk?	:MEASure:HARMonic?
:CALCulate[number]:PIN?	:MEASure:ITEM:EFFiciency?
:CALCulate[number]:POUT?	:MEASure:ITEM:EXTernalin?
:CAN:DB:ITEM?	:MEASure:ITEM:FLICker?
:CAN:DB:ID?	:MEASure:ITEM:HARMonic:INTER?
:CLOCk?	:MEASure:ITEM:HARMonic:LIST?
:DATAout:ITEM:EFFiciency?	:MEASure:ITEM:HARMonic:ORDer?
:DATAout:ITEM:EXTernalin?	:MEASure:ITEM:I?
:DATAout:ITEM:FLICker?	:MEASure:ITEM:ISUM?
:DATAout:ITEM:HARMonic:INTER?	:MEASure:ITEM:INTEGrate?
:DATAout:ITEM:HARMonic:LIST?	:MEASure:ITEM:P?
:DATAout:ITEM:HARMonic:ORDer?	:MEASure:ITEM:PSUM?
:DATAout:ITEM:I?	:MEASure:ITEM:U?
:DATAout:ITEM:ISUM?	:MEASure:ITEM:USUM?
:DATAout:ITEM:INTEGrate?	:MEASure:SECond:EXTernalin?
:DATAout:ITEM:P?	:MEASure:SECond:HARMonic:LIST?
:DATAout:ITEM:PSUM?	:MEASure:SECond:HARMonic:ORDer?
:DATAout:ITEM:U?	:MEASure:SECond:I?
:DATAout:ITEM:USUM?	:MEASure:SECond:ISUM?
:DATAout:SECond:EXTernalin?	:MEASure:SECond:INTEGrate?
:DATAout:SECond:HARMonic:LIST?	:MEASure:SECond:P?
:DATAout:SECond:HARMonic:ORDer?	:MEASure:SECond:PSUM?
:DATAout:SECond:I?	:MEASure:SECond:U?
:DATAout:SECond:ISUM?	:MEASure:SECond:USUM?
:DATAout:SECond:INTEGrate?	:MEASure:NOISepeak?
:DATAout:SECond:P?	:MEASure:NOISepeak:U?
:DATAout:SECond:PSUM?	:MEASure:NOISepeak:I?
:DATAout:SECond:U?	:MEASure:NOISepeak:P?
:DATAout:SECond:USUM?	:MEASure:NOISepeak:[CH]?
:DATE:ADJust?	:MODBus:ITEM?
:DATE:CALibrate?	:SENSor[CH]:ADATE?
:DISPlay:CUSTom[Number]?	:SENSor[CH]:CDATE?
:DISPlay:CUSTom[Number]:LINE?	:SENSor[CH]:ID?

:DISPlay:CUSTom[Number]:POINT?	:STIMe:STARttime?
:DISPlay:CUSTom[Number]:ROW?	:STIMe:STOPtime?
:DISPlay:WVALue[Number]?	:STIMe[CH]:STARttime?
:DISPlay:WVALue[Number]:LINE?	:STIMe[CH]:STOPtime?
:DISPlay:WVALue[Number]:POINT?	:TIMEr:TIME?
:DISPlay:WVALue[Number]:ROW?	:TIMEr[CH]:TIME?
:EXTernalin:[CH]:COMP:SPEED:VALue?	:TIMEZone?
:EXTernalin:[CH]:COMP:TORQue:VALue?	:UDF[number]:CONStant?
:FILE:DOWNload?	:UDF[number]:FUNCtion?
:FILE:FILEname?	:UDF[number]:ITEM?
:FILE:FOLDername?	:UDF[number]:OPERator?
:FILE:PICKout?	:UNIT[CH]:ADATE?
:FLICker:COUNt?	:UNIT[CH]:CDATE?
:FTP:STATe?	:UNIT[CH]:ID?
:IP:ADDRess?	:WIRing?
:IP:DEFaultgateway?	:WIRing[CH]?
:IP:SUBNetmask?	

9.3 Paired Interacting Commands

Commands affecting	Commands to be affected
:WIRing[CH]	:WIRing[CH]
:WIRing	:CURRent[CH]:AUTO
	:CURRent[CH]:INPut
	:CURRent[CH]:MEAN
	:CURRent[CH]:RANGe
	:CURRent[CH]:RATE
	:DELTay[CH]
	:FREQuency[CH]:HPF
	:FREQuency[CH]:LOWer
	:FREQuency[CH]:UPPer
	:LPF[CH]
	:SOURce[CH]
	:VOLTage[CH]:AUTO
	:VOLTage[CH]:MEAN
	:VOLTage[CH]:RANGe
:EXTernalin:[CH]:WIRing	:EXTernalin:[CH]:SOURce
	:EXTernalin:[CH]:MODE
:RATE	:CAN:OUT:INTERval
	:SAVE:AUTO:INTERval

:EXTernalin:[CH]:FREQuency:UPPer	:EXTernalin:[CH]:FREQuency:LOWer
:FREQuency[CH]:UPPer	:FREQuency[CH]:LOWer
:IP:DHCP <ON/OFF>	:IP:ADDRess :IP:DEFaultgateway :IP:SUBNetmask
:CURRent[CH]:AUTO	:CURRent[CH]:RANGe
:VOLTage [CH]:AUTO	:VOLTage[CH]:RANGe
:CAN:MODE	:CAN:DB:ITEM :CAN:DB:ID :CAN:DB:FORMat

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