# ΗΙΟΚΙ

**Communication Command Instruction Manual** 

## PW3335(-01,-02,-03,-04) Power Meter

- This manual explains the communication commands for the above Power Meter models only.
- ✓ Be sure to review the Instruction Manual for your Power Meter before using the instrument.
- Please refer to the instruction manual for your Power Meter for details regarding command settings.
- ✓ All reasonable care has been taken in the production of this manual, but if you find any points which are unclear or in error, please contact your supplier or the International Sales and Marketing Department at HIOKI headquarters.
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## **1** Introduction

This manual is for Power Meter models PW3335(-01, -02, -03,-04).

Messages are provided in the interface to control the Power Meter.

There are two types of messages: program messages that are sent from the controller (such as a computer) to the Power Meter and response messages that are sent from the Power Meter to the controller.

There are also execution confirmation messages for synchronization with the controller in the RS-232C interface.



Message types are further categorized as follows.



When issuing commands that contain data, make sure that the data is provided in the specified format.

When connecting via LAN, connect to TCP/IP port 3300.

## NOTE

During communication the Power Meter will enter the Remote state and the **REMOTE Indicator** on the unit will turn ON.

When this occurs, all operation keys except for SHIFT(EXIT/LOCAL) will be disabled.

However, if the Power Meter is in the Local Lock Out state via GP-IB (GP-IB command <u>LLO:Local Lock Out -></u> <u>P.</u>11), the **SHIFT(EXIT/LOCAL)** Key will also be disabled. If this occurs, execute the GTL (Go To Local) interface function or turn the Power Meter OFF and ON again to return to the Local state.

If the Power Meter enters the Remote state when on the settings screen, it will automatically change to the measurement display.

#### **Message Format**

#### Program Messages

Program messages can be either Command Messages or Query Messages.

#### (1) Command Messages

Instructions to control the instrument, such as to change settings or reset Example: Instruction to set the voltage range.

# :VOLTAGE:RANGE 300 ▲ ▲ Header portion Space

#### (2) Query Messages

Requests for responses relating to results of operation or measurement, or the state of instrument settings Example: Request for the current measurement range :VOLTAGE:RANGE?

Header portion Question mark

See: "Headers (p. 2)", "Separators (p. 3)", "Data Formats (p.4)"

#### Response Messages

When a query message is received, its syntax is checked and a response message is generated.-The :<u>HEADer</u> command determines whether headers are prefixed to response messages.

:VOLTAGE:RANGE 300

Header ON Header OFF

**300** (The current voltage range is 300 V.)

At power-on, Header ON is selected.

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

#### Command Syntax

Command names are chosen to mnemonically represent their function, and can be abbreviated. The full command name is called the "long form", and the abbreviated name is called the "short form". The command references in this manual indicate the short form in upper-case letters, extended to the long form in lower case letters, although the commands are not case-sensitive in actual usage.

DISPLAY?	OK ( long form )
DISP?	OK ( short form )
DISPL?	Error
DIS?	Error

Response messages generated by the instrument are in long form and in upper case letters.

#### Headers

Headers must always be prefixed to program messages.

(1) Command Program Headers

There are three types of commands: Simple, Compound, and Standard.

- Headers for Simple Commands
   This header type is a sequence of letters and digits.
   :ESE0
- Headers for Compound Commands

These headers consist of multiple simple command type headers separated by colons ":". :VOLTage:RANGE

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Headers for Standard Commands
 This header type begins with an asterisk "\*", indicating that it is a standard command defined by IEEE 488.2.
 \*RST

(2) Query Program Header

These commands are used to query the instrument about the results of operations, measured values, and the current states of instrument settings.

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

### :VOLTage:RANGe?

Characters within square brackets [] may be omitted.

#### :MEASure[:NORMAL]:VALue?

Either form is valid :MEASure:VALue?

#### Message Terminators

The instrument recognizes the following message terminators (delimiters):



• LF with an EOI

• CR+LF • EOI

	<b>RS-232C</b>
-	• LF
•	CR+LF

Depending on the instrument's interface settings, the following can be selected as the terminator for response messages.

For information on settings, see "Terminator Setting" (p. 111).



• CR+ LF with an EOI (default)



## Separators

(1) Message Unit Separator

Multiple messages can be written in one line by separating them with semicolons ";".

## :VOLTage:RANGe 300 AVERaging 10

• When messages are combined in this way and if one command contains an error, all subsequent messages up to the next terminator will be ignored.

#### (2) Header Separator

In a message consisting of both a header and data, the header is separated from the data by a space "" (ASCII code 20H).

## : VOLTage: RANGe 300

#### (3) Data Separator

In a message containing multiple data items, commas are required to separate the data items from one another.

## :MEASure? U, I

#### Data Formats

The instrument uses character data, decimal numeric data and character string data depending on the command.

#### (1) Character Data

Character data always begins with an alphabetic character, and subsequent characters may be either alphabetic or numeric. Character data is not case-sensitive, although response messages from the instrument are only upper case. When the command data portion contains <1/0/ON/OFF>, the operation will be the same as when 0 is OFF and 1 is ON.

## :HEADER OFF

#### (2) Decimal Numeric Data

Three formats are used for numeric data: NR1, NR2 and NR3. Numeric values may be signed or unsigned. Unsigned numeric values are handled as positive values. Values exceeding the precision handled by the instrument are rounded to the nearest valid digit or truncated.

- NR1 Integer data (e.g.: +12, -23, 34)
- NR2 Fixed-point data (e.g.: +1.23, -23.45, 3.456)
- NR3 Floating-point exponential representation data (e.g.: +1.0E-2, -2.3E+4)

The term "NRf format" includes all three of the above numeric decimal formats.

The instrument accepts NRf format data. The format of response data is specified for each command, and the data is sent in that format.

#### :AVERAGING 10



The instrument does not completely support IEEE 488.2. Use referenced data whenever possible. Also be careful not to overflow the input buffer or output queue with a single command.

#### **Compound Command Header Omission**

When several commands having a common header are combined to form a compound command (for example, :VOLTage:AUTO and :VOLTage:RANGe), if they are written together in sequence, the common portion (here, :VOLTage:) can be omitted after its initial occurrence.

This common portion is called the "current path" (analogous to the path concept in computer file storage), and until it is cleared, the interpretation of subsequent commands presumes that they share the same common portion.

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

:VOLTage:AUTO OFF;:VOLTage:RANGe 300

Compacted expression :VOLTage:AUTO OFF;RANGe 300

The current path allows you to abbreviate the next command.

The current path is cleared when the power is turned on, when reset by key input, by a colon ":" at the start of a command, and when a message terminator is detected.

Standard command messages 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 header of a Simple or Compound command. However, to avoid confusion with abbreviated forms and operating mistakes, we recommend always placing a colon at the start of a header.

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## **Output Queue and Input Buffer**

#### Output Queue

Response messages are stored in the output queue until read by the controller. The output queue is also cleared in the following circumstances:

- Power on
- Device clear



• Query error

The output queue capacity of the instrument is 4,096 bytes. If response messages overflow the buffer, a query error is generated and the output queue is cleared.



The input buffer capacity of the instrument is 1,024 bytes.

If 1,024 bytes are allowed to accumulate in this buffer so that it becomes full, the GP-IB interface bus enters the waiting state until space is cleared in the buffer.

The RS-232C and LAN interfaces will not accept data beyond 1,024 bytes.

Note: Ensure that the length of a single line never exceeds 1,024 bytes.

### **Status Byte Register**

The instrument uses the status model defined by the IEEE 488.2 standard for items related to serial polling via the service request function.

Events are what trigger service requests.



Overview of Service Request Occurrence

The Status Byte Register contains information about the event registers and the output queue. Required items are selected from this information by masking with the Service Request Enable Register.

When any bit selected by the mask is set, bit 6 (MSS; the Master Summary Status) of the Status Byte Register is also set, which generates an SRQ (Service Request) message and dispatches a service request.

SRQs (Service Requests) can be used only with the GP-IB interface.

However, SRER setting (**\*SRE**?) and STB read (**\*STB**?) queries can be used even with the RS-232C and LAN interfaces.

#### Status Byte Register (STB)

During serial polling, the contents of the 8-bit Status Byte Register are sent from the instrument to the controller. When any Status Byte Register bit enabled by the Service Request Enable Register has switched from 0 to 1, the MSS bit becomes 1. Consequently, the SRQ bit is set to 1, and a service request is dispatched.

The SRQ bit is always synchronous with service requests, and is read and simultaneously cleared during serial polling. Although the MSS bit is only read by an **\*STB?** query, it is not cleared until a clear event is initiated by the **\*CLS** command.

Bit 7	-	unused
Dit o	SRQ	Set to 1 when a service request is dispatched.
Bit 6	MSS	This is the logical sum of the other bits of the Status Byte Register.
Bit 5	ESB	Standard Event Status (logical sum) bit This is the logical sum of the Standard Event Status Register.
Bit 4	MAV	Message available Indicates that a message is present in the output queue.
Bit 3		unused
Bit 2		unused
Bit 1	ESB1	Event Summary (logical sum) bit 1 This is the logical sum of Event Status Register 1.
Bit 0	ESB0	Event Summary (logical sum) bit 0 This is the logical sum of Event Status Register 0.

#### Service Request Enable Register (SRER)

Setting a bit of this register to 1 enables the corresponding bit of the Status Byte Register to be used.

### **Event Registers**

#### Standard Event Status Register (SESR)

The Standard Event Status Register is an 8-bit register. If any bit in the Standard Event Status Register is set to 1(after masking by the Standard Event Status Enable Register), bit 5 (ESB) of the Status Byte Register is set to 1.

See: "Standard Event Status Enable Register (SESER)" (p. 9)

The Standard Event Status Register is cleared in the following situations:

- When a \*CLS command is executed
- When an event register query (\*ESR?) is executed
- When the instrument is powered on

Bit 7	PON	<b>Power-On Flag</b> Set to 1 when the power is turned on, or upon recovery from an outage.
Bit 6	URQ	User Request unused
Bit 5	CME	<ul> <li>Command error (The command to the message terminator is ignored.)</li> <li>This bit is set to 1 when a received command contains a syntactic or semantic error:</li> <li>Program header error</li> <li>Incorrect number of data parameters</li> <li>Invalid parameter format</li> <li>Received a command not supported by the instrument</li> </ul>
Bit 4	EXE	<ul> <li>Execution Error</li> <li>This bit is set to 1 when a received command cannot be executed for some reason.</li> <li>The specified data value is outside of the set range</li> <li>The specified data cannot be set (data format discrepancy)</li> <li>Execution is prevented by some other operation being performed</li> </ul>
Bit 3	DDE	<ul> <li>Device-dependent Error</li> <li>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.</li> <li>An internal error occurred and execution cannot be performed (error displayed)</li> <li>A command was received that cannot be executed during a restricted operation (integration, hold, etc.)</li> <li>When "o.r", "S.Err" or "" occurs and the error data is read by a <u>*MEASure?</u> query.</li> </ul>
Bit 2	QYE	<ul> <li>Query Error (the output queue is cleared)</li> <li>This bit is set to 1 when a query error is detected by the output queue control.</li> <li>When an attempt is made to read the output queue when the output queue is empty (GP-IB only)</li> <li>When the data overflows the output queue</li> <li>When the next command is received while there is data in the output queue</li> <li>When there is a query after a <u>*IDN?</u> on the same line.</li> </ul>
Bit 1	RQC (unused)	Request Control
Bit 0	OPC	<ul> <li>Operation Complete</li> <li>This bit is set to 1 in response to an <u>*OPC</u> command.</li> <li>It indicates the completion of operations of all messages up to the *OPC command</li> </ul>

#### Standard Event Status Enable Register (SESER)

Setting any bit of the Standard Event Status Enable Register to 1 enables access to the corresponding bit of the Standard Event Status Register.

Standard Event Status Register (SESR) and Standard Event Status Enable Register (SESER)



#### Device-specific Event Status Registers (ESR0, and ESR1)

This instrument provides four Event Status Registers for controlling events. Each event register is an 8-bit register.

When any bit in one of these Event Status Registers enabled by its corresponding Event Status Enable Register is set to 1, the following happens:

- For Event Status Register 0, bit 0 (ESB0) of the Status Byte Register (STB) is set to 1.
- For Event Status Register 1, bit 1 (ESB1) of the Status Byte Register (STB) is set to 1.

Event Status Registers 0 through 1 are cleared in the following situations:

• When a \*CLS command is executed

• When an Event Status Register query (:ESR0?, or :ESR1?) is executed

• When the instrument is powered on

Event Status Register 0 (ESR0)			
Bit 7	DataSet Data updated.		
Bit 6	ChangeData became invalid due to a hardware-related setting change.Setting(For example, immediately after the range was changed.)Err		
Bit 5	<b>S</b> yncErr	A synchronization error occurred on ch1, ch2, or ch3.	
Bit 4	IntegrateEnd	Integration has completed.	
Bit 3	<b>AV</b> era <b>G</b> e update	Averaged data updated.	
Bit 2	Current Protection	Instrument protection mode activated.	
Bit 1		Unused.	
Bit 0	Ext.Sync Error	Failed external synchronization for the data update.	

Event Status Register 1 (ESR1)			
Bit 7	Frequency Out of Range	The frequency(voltage or current) is invalid.	
Bit 6	Over DataIntegrate	A peak overflow of voltage or current occurred in the active power integration value.	
Bit 5	CurrentOver DataIntegrate	A peak overflow of current occurred in the current integration value.	
Bit 4	Over-I	A peak overflow occurred in the current input.	
Bit 3	Over-U	A peak overflow occurred in the voltage input.	
Bit 2	High-P	The active power is over range.	
Bit 1	High-I	The current is over range.	
Bit 0	High-U	The voltage is over range.	

Event Status Register 0 to 1 (ESR0 to ESR1) and Event Status Enable Register 0 to 1 (ESER0 to ESER1)





Event Status Enable Register 1 (ESER1)

## Register Reading and Writing

Register	Read	Write
Status Byte Register	*STB?	-
Service Request Enable Register	*SRE?	*SRE
Standard Event Status Register	*ESR?	-
Standard Event Status Enable Register	*ESE?	*ESE
Event Status Register 0	:ESR0?	-
Event Status Enable Register 0	:ESE0?	:ESE0
Event Status Register 1	:ESR1?	-
Event Status Enable Register 1	:ESE1?	:ESE1

## GP-IB Commands

The following commands can be used through interface functions.

Command	Description	
GTL	Go To Local	Changes the instrument from the Remote state to the Local state.
LLO	Local Lock Out	Locks all keys on the instrument, including the Local Key.
DCL	Device CLear	Clears the input buffer and output queue.
SDC	Selected Device Clear	Clears the input buffer and output queue.
GET	Group Execute Trigger	Updates the displayed value while it is being held.

## **Initialization Items**

Initialization Method Item	At Power-on	System Reset	*RST Command	Device Clear (GP-IB only)	*CLS Command	Factory Default
GP-IB address	-	-	-	-	-	1
RS-232C setting (baud rate)	-	-	-	-	-	38400
LAN setting	-	-	-	-	-	*4
Device-specific functions (range, etc.)	-	•	•	-	-	*4
Output Queue	•	•	-	•	-	•
Input Buffer	•	•	-	•	-	•
Status Byte Register	•	•	-	-*1	•*2	•
Event registers	●*3	•	-	-	•	•
Enable register	•	•	-	-	-	0
Current path	•	•	-	•	-	•
Headers on/off	•	•	•	-	-	ON
Output items	•	•	•			*5,
Response message terminator	•	•	-	-	-	CR+LF
Response message separator	•	•	•	-	-	;

\*1. Only the MAV bit (bit 4) is cleared.

\*2. All bits except the MAV bit are cleared.

\*3. Except the PON bit (bit 7).

\*4. Refer to the user's manual for the instrument.

\*5. See below.

Output Item Initialization

Measurement Item	
Voltage (U)	0
Current (I)	0
Active power (P)	0
Apparent power (S)	0
Reactive power (Q)	0
Power factor (PF)	0
Phase angle (DEG)	0
Voltage frequency	0
(FREQU)	č
Current frequency	0
(FREQI)	Ŭ
Harmonic wave voltage	○ (first-order only)
effective value (HU)	
Harmonic wave current	○ (first-order only)
effective value (HU)	
Harmonic wave power	○ (first-order only)
effective value (HU)	

Output for all items other than those listed above is OFF by default.

#### **Command Execution Time**

Command execution time indicates the time for analyzing and processing long form commands. However, the command execution time for commands with data is the time described according to the data format specified in the <data portion>, and for query commands it is the time when the header is ON.

• The instrument performs measurements, calculations, and updates the display repeatedly in 200 ms cycles. Measurements and calculations are given priority over command processing, and require a maximum of 150 ms. Therefore, a maximum delay of 150 ms may be encountered from the time a command is received until analysis begins.



(200 ms) Display update rate: 5 times per second

- Updating the display may be delayed if the analysis processing is not completed in time, even if the internal processing time is met.
- All commands are sequential.
- When communicating with a controller, the time required to transfer the data must be added.
- The amount of time required for the data transfer depends on the controller (communications).

The RS-232C transfer time for a starting bit, data length of 8, no parity bit, and a stop bit (10 bits total) with a baud rate setting of N bps is calculated as follows:

Transfer Time T [1 character/second] = Baud Rate N [bps] / 10 [bits]

The measurement value is 11 characters so the time required to transfer one piece of data would be 11/T. (Example) 9600 bps: 11 / (9600 / 10) = 11 ms (approximately)

• Wait a few moments after making any changes via setting commands to allow the measurements to stabilize.

Command	Execution time (excluding communication time and delays to the start of analysis)
*WAI	200ms or less
The other commands	10 ms or less

### **Errors During Communications**

An error occurs when messages are executed in the following cases:

- Command Error
  - When message syntax (spelling) is invalid

When the data format in a command or query is invalid

- Query Error
- When the response message exceeds 4,000 bytes
- When there is a query after an <u>\*IDN?</u> query
- Execution Error
- When invalid character or numeric data is present
- Device-dependent Error
- When an error occurs during self-testing

When a restricted operation (such as changing the range) is attempted during an integration operation (when the INTEGRATOR indicator is lit or flashing)

When a restricted operation (such as changing the range) is attempted during the Hold state When the <u>\*TRG</u> command is executed in any state other than the Hold state

#### Note:

A command error will always occur if a message is spelled incorrectly or if any data is present after a query. When an error occurs with a query, no response message will be generated for that query.

## 2 Message List

The information in angled brackets < > represents the data format.

When the GP-IB interface is used, you can send an SRQ interrupt to the controller by setting the Event Status Register and \*SRE.

## **Standard Commands**

	Message	Data Formats (Response data for queries)	Description	Reference Page
*CLS			Clears the event registers and the Status Byte Register.	35
*ESE *ESE?		0 to 255	Sets/Queries the Standard Event Status Enable Register.	35
*ESR?		0 to 255	Queries the Standard Event Status Register.	35
*IDN?		<manufacturer name="">, <model name="">, <model type="">, <software version=""> <serial number=""></serial></software></model></model></manufacturer>	Queries the Device ID.	33
*OPC			Sets bit 0 of the Standard Event Status Registe to 1 after an operation completes.	r 34
*OPC?		1	Queries execution completion.	34
*OPT?			Queries the device options.	33
*RST			Initializes the device.	33
*SRE *SRE?		0 to 127	Sets/Queries the Service Request Enable Register.	36
*STB?		0 to 127	Queries the Status Byte Register.	36
*TRG			Updates the display once.	36
*TST?		0 to 4	Initiates a self-test and queries the result.	34
*WAI			Waits until the next display update completes.	34

## **Device-specific Commands (Event Registers)**

Message	Data Formats (Response data for queries)	Description	Reference Page
:ESE0 :ESE0?	0 to 255	Sets/Queries Event Status Enable Register 0.	37
:ESR0?	(0 to 255)	Queries Event Status Register 0.	37
:ESE1 :ESE1?	0 to 255	Sets/Queries Event Status Enable Register 1.	37
:ESR1?	(0 to 255)	Queries Event Status Register 1.	37

## **Device-specific Commands (Measurement Settings)**

	Data Formats		Reference
Message	(Response data for queries)	Description	Page
1/2/5/10/25/50/100		Sets/Queries the number of times to perform averaging.	38
:INTEGrate?		Queries the integration set time and the integration state.	<b>3</b> 9
:INTEGrate:STATe :INTEGrate:STATe?	START/STOP/RESET	Sets/Queries the integration state.	39
:INTEGrate:TIME :INTEGrate:TIME?	<hour(nr1)>, <minutes(nr1)></minutes(nr1)></hour(nr1)>	Sets/Queries the integration time.	40
:INTEGrate:AUTO :INTEGrate:AUTO?	OFF/ON	Sets/Queries the auto-rage integration.	40
:HARMonic:ORDer:UPPer :HARMonic:ORDer:UPPer?	<order (2="" 50)="" to=""></order>	Sets/Queries the upper limit order for harmonic wave analysis.	40
:HOLD :HOLD?	OFF/ON/MAX/MIN/RESET	Sets/Queries the holds or releases the display value.	41
:ZEROadjust		Performs a zero adjustment.	41
:ZEROadjust	<zero adjustment="" execution="" state=""></zero>	Queries the zero adjustment execution state.	41
:DEMAg		Performs a zero adjustment.	
:DEMAg?	<zero adjustment="" execution="" state=""></zero>	Queries the zero adjustment execution state.	41
:SYNC:CONTrol :SYNC:CONTrol?	<synchronization control="" setting=""></synchronization>	Sets/Queries the synchronization control function.	42

## **Device-specific Commands (Voltage Range)**

Message	Data Formats (Response data for queries)	Description	Reference Page
:VOLTage?	( <auto>,<voltage range="">)</voltage></auto>	Queries the voltage range setting item (ch1 only).	42
:VOLTage:AUTO :VOLTage:AUTO?	ON/OFF	Sets (all channels) or queries (ch1 only) the voltage automatic range.	42
:VOLTage:RANGe :VOLTage:RANGe?	<voltage (nr1)="" range=""></voltage>	Sets (all channels) or queries (ch1 only) the voltage range.	43
:VOLTage:SELect:ALL?	ON/OFF	Sets whether to select all voltage ranges.	45
:VOLTage:SELect:U6V :VOLTage:SELect:U6V?	ON/OFF	Sets/Queries whether to select the 6 V voltage range.	45
:VOLTage:SELect:U15V :VOLTage:SELect:U15V?	ON/OFF	Sets/Queries whether to select the 15 V voltage range.	45
:VOLTage:SELect:U30V :VOLTage:SELect:U30V?	ON/OFF	Sets/Queries whether to select the 30 V voltage range.	45
:VOLTage:SELect:U60V :VOLTage:SELect:U60V?	ON/OFF	Sets/Queries whether to select the 60 V voltage range.	45
:VOLTage:SELect:U150V :VOLTage:SELect:U150V?	ON/OFF	Sets/Queries whether to select the 150 V voltage range.	45
:VOLTage:SELect:U300V :VOLTage:SELect:U300V?	ON/OFF	Sets/Queries whether to select the 300 V voltage range.	45
:VOLTage:SELect:U600V :VOLTage:SELect:U600V?	ON/OFF	Sets/Queries whether to select the 600 V voltage range.	45
:VOLTage:SELect:U1000V :VOLTage:SELect:U1000V?	ON/OFF	Sets/Queries whether to select the 1,000 V voltage range.	45
:VOLTage:SELect :VOLTage:SELect?	<voltage (nr1)="" range="" selection=""></voltage>	Sets/Queries whether to select the voltage range (3332-compatible).	45

## **Device-specific Commands (Current Range)**

Message	Data Formats (Response data for queries)	Description	Reference Page
:CURRent?	( <auto>, <current range="">,)</current></auto>	Queries the current range setting item (ch1 only).	46
:CURRent:AUTO :CURRent:AUTO?	ON/OFF	Sets (all channels) or queries (ch1 only) the current automatic range.	46
:CURRent:RANGe :CURRent:RANGe?	<current (nr1)="" range=""></current>	Sets (all channels) or queries (ch1 only) the current range.	47
:CURRent:SELect:ALL	ON/OFF	Sets whether to select all current ranges.	t 47
:CURRent:SELect:I1mA :CURRent:SELect:I1mA?	ON/OFF	Sets/Queries whether to select the 1 m/ current range (*1).	48
:CURRent:SELect:I2mA :CURRent:SELect:I2mA?	ON/OFF	Sets/Queries whether to select the 2 m/ current range (*1).	48
:CURRent:SELect:I5mA :CURRent:SELect:I5mA?	ON/OFF	Sets/Queries whether to select the 5 m/ current range (*1).	48
:CURRent:SELect:I10mA :CURRent:SELect:I10mA?	ON/OFF	Sets/Queries whether to select the 10 m/current range (*1).	48
:CURRent:SELect:I20mA :CURRent:SELect:I20mA?	ON/OFF	Sets/Queries whether to select the 20 m/ current range (*1).	48
:CURRent:SELect:I50mA :CURRent:SELect:I50mA?	ON/OFF	Sets/Queries whether to select the 50 m/ current range (*1).	48
:CURRent:SELect:I100mA	ON/OFF	Sets/Queries whether to select the 100 m/ current range (*1).	48
:CURRent:SELect:I200mA :CURRent:SELect:I200mA?	ON/OFF	Sets/Queries whether to select the 200 m/ current range (*1).	48
:CURRent:SELect:I500mA :CURRent:SELect:I500mA?	ON/OFF	Sets/Queries whether to select the 500 m/ current range (*1).	48
:CURRent:SELect:I1A :CURRent:SELect:I1A?	ON/OFF	Sets/Queries whether to select the 1 A current range (*1).	48
:CURRent:SELect:I2A :CURRent:SELect:I2A?	ON/OFF	Sets/Queries whether to select the 2 A current range (*1).	48
:CURRent:SELect:I5A :CURRent:SELect:I5A?	ON/OFF	Sets/Queries whether to select the 5 A current range (*1).	48
:CURRent:SELect:I10A :CURRent:SELect:I10A?	ON/OFF	Sets/Queries whether to select the 10 A current range (*1).	48
:CURRent:SELect:I20A?	ON/OFF	Sets/Queries whether to select the 20 A current range (*1).	48
:CURRent:SELect :CURRent:SELect?	ON/OFF	Sets/queries whether to select the current range (3332-compatible).	49
:CURRent:EXTRange :CURRent:EXTRange?	<clamp current="" range=""></clamp>	Sets (all channels) or queries (ch1 only) the current range (current sensor).	50
:CURRent:SELect:C1A :CURRent:SELect:C1A?	ON/OFF	Sets or queries whether to select the 1 A current sensor range.	48
:CURRent:SELect:C2A :CURRent:SELect:C2A?	ON/OFF	Sets or queries whether to select the 2 A current sensor range.	48
:CURRent:SELect:C5A?	ON/OFF	Sets or queries whether to select the 5 A current sensor range.	48
:CURRent:TYPe :CURRent:TYPe?	<current sensor="" type=""></current>	Sets (all channels) or queries (ch1 only) the current sensor type.	49

\*1: There is no abbreviated format available for the current range portion of the command (the "m" cannot be omitted).

# Device-specific Commands (Frequency Range [Zero-crossing Filter]) The frequency range and zero-crossing filter settings are linked.

Message	Data Formats (Response data for queries)	Description	Reference Page
:FREQuency?	<frequency (nr3)="" range=""></frequency>	Queries the frequency range (zero-crossing filter).	51
:FREQuency:RANGe :FREQuency:RANGe?	<frequency (nr3)="" range=""></frequency>	Sets or queries the frequency range (zero-crossing filter).	51

## **Device-specific Commands (Synchronization Source)**

Message	Data Formats (Response data for queries)	Description	Reference Page
:SOURce :SOURce?	<synchronization source=""></synchronization>	Sets (all channels) or queries (ch1 only) the synchronization source.	<b>5</b> 2
:SOURce:TIMEOut :SOURce:TIMEOut?	0.1/1/10	Sets (all channels) or queries (ch1 only) the synchronization timeout.	<b>5</b> 2
:SOURce:FILTer:LEVel:ALL	1~15	Sets all synchronization source detection levels	. 52
:SOURce:FILTer:LEVel:U6V :SOURce:FILTer:LEVel:U6V?	1~15	Sets/Queries the voltage synchronization source detection level.	<b>5</b> 3
:SOURce:FILTer:LEVel:U15V :SOURce:FILTer:LEVel:U15V?	1~15	Sets/Queries the voltage synchronization source detection level.	<b>5</b> 3
:SOURce:FILTer:LEVel:U30V :SOURce:FILTer:LEVel:U30V?	1~15	Sets/Queries the voltage synchronization source detection level.	<b>5</b> 3
:SOURce:FILTer:LEVel:U60V :SOURce:FILTer:LEVel:U60V?	1~15	Sets/Queries the voltage synchronization source detection level.	<b>5</b> 3
:SOURce:FILTer:LEVel:U150V :SOURce:FILTer:LEVel:U150V?	1~15	Sets/Queries the voltage synchronization source detection level.	53
:SOURce:FILTer:LEVel:U300V :SOURce:FILTer:LEVel:U300V?	1~15	Sets/Queries the voltage synchronization source detection level.	53
:SOURce:FILTer:LEVel:U600V :SOURce:FILTer:LEVel:U600V?	1~15	Sets/Queries the voltage synchronization source detection level.	53
:SOURce:FILTer:LEVel:U1000V :SOURce:FILTer:LEVel:U1000V?	1~15	Sets/Queries the voltage synchronization source detection level.	<b>5</b> 3
:SOURce:FILTer:LEVel:11mA :SOURce:FILTer:LEVel:11mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	53
:SOURce:FILTer:LEVel:12mA :SOURce:FILTer:LEVel:12mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	53
:SOURce:FILTer:LEVel:15mA :SOURce:FILTer:LEVel:15mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	53
:SOURce:FILTer:LEVel:110mA :SOURce:FILTer:LEVel:110mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	53
:SOURce:FILTer:LEVel:120mA :SOURce:FILTer:LEVel:120mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	53
:SOURce:FILTer:LEVel:150mA :SOURce:FILTer:LEVel:150mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	53
:SOURce:FILTer:LEVel:1100mA :SOURce:FILTer:LEVel:1100mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	<b>5</b> 3
:SOURce:FILTer:LEVel:1200mA :SOURce:FILTer:LEVel:1200mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	<b>5</b> 3
:SOURce:FILTer:LEVel:1500mA :SOURce:FILTer:LEVel:1500mA?	1~15	Sets/Queries the current synchronization source detection level (*1).	<b>5</b> 3
:SOURce:FILTer:LEVel:11A :SOURce:FILTer:LEVel:11A?	1~15	Sets/Queries the current synchronization source detection level.	e 53
:SOURce:FILTer:LEVel:12A :SOURce:FILTer:LEVel:12A?	1~15	Sets/Queries the current synchronization source detection level.	<b>5</b> 3
:SOURce:FILTer:LEVel:15A	1~15	Sets or queries the current synchronization	

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:SOURce:FILTer:LEVel:15A?		source detection level.	
:SOURce:FILTer:LEVel:110A :SOURce:FILTer:LEVel:110A?	1~15	Sets or queries the current synchronization source detection level.	53
:SOURce:FILTer:LEVel:120A :SOURce:FILTer:LEVel:120A?	1~15	Sets or queries the current synchronization source detection level.	53
:SOURce:FILTer:LEVel:C1A :SOURce:FILTer:LEVel:C1A?	1~15	Sets or queries the current (external sensor) synchronization source detection level.	54
:SOURce:FILTer:LEVel:C2A :SOURce:FILTer:LEVel:C2A?	1~15	Sets or queries the current (external sensor) synchronization source detection level.	54
:SOURce:FILTer:LEVel:C5A :SOURce:FILTer:LEVel:C5A?	1~15	Sets or queries the current (external sensor) synchronization source detection level.	54

\*1: There is no abbreviated format available for the current range portion of the command (the "m" in "1 mA" and similar text cannot be omitted).

## Device-specific Commands (VT/CT Ratio)

Message	Data Formats (Response data for queries)	Description	Reference Page
:SCALe?	( <vt ratio="">, <ct ratio="">)</ct></vt>	Queries the VT and CT ratios.	55
:SCALe:VT :SCALe:VT?	<vt (nrf)="" ratio=""></vt>	Sets or queries the VT ratio.	55
:SCALe:CT :SCALe:CT?	<ct (nrf)="" ratio=""></ct>	Sets or queries the CT ratio.	55

## **Device-specific Commands (D/A Output)**

Message	Data Formats (Response data for queries)	Description	Reference Page
:AOUT?	(10000100 222 101 420100)	Queries (D/A1 output items only) D/A output items.	56
:AOUT:ITEM:DA1 :AOUT:ITEM:DA1?	<output item=""></output>	Sets/Queries the D/A1 terminal output item.	56
:AOUT:ITEM:DA2 :AOUT:ITEM:DA2?	<output item=""></output>	Sets/Queries the D/A2 terminal output item.	56
:AOUT:ITEM:DA3 :AOUT:ITEM:DA3?	<output item=""></output>	Sets/Queries the D/A3 terminal output item.	56
:AOUT:ITEM:DA4 :AOUT:ITEM:DA4?	<output item=""></output>	Sets/Queries the D/A4 terminal output item.	56
:AOUT:ITEM:DA5 :AOUT:ITEM:DA5?	<output item=""></output>	Sets/Queries the D/A5 terminal output item.	56
:AOUT:ITEM:DA6 :AOUT:ITEM:DA6?	<output item=""></output>	Sets/Queries the D/A6 terminal output item.	56
:AOUT:ITEM:DA7 :AOUT:ITEM:DA7	<output item=""></output>	Sets/Queries the D/A7terminal output item.	56
:AOUT:IRANge:DA1 :AOUT: IRANge:DA1?	<integrated (nr2)="" current="" range="" value=""></integrated>	Sets/Queries the current range selected outp item when outputting the D/A1 termin integrated value.	
:AOUT:IRANge:DA2 :AOUT: IRANge:DA2	<integrated (nr2)="" current="" range="" value=""></integrated>	Sets/Queries the current range selected outp item when outputting the D/A2 termin integrated value.	
:AOUT:IRANge:DA3 :AOUT: IRANge:DA3?	<integrated (nr2)="" current="" range="" value=""></integrated>	Sets/Queries the current range selected outp item when outputting the D/A3 termin integrated value.	
:AOUT:IRANge:DA4 :AOUT: IRANge:DA4?	<integrated (nr2)="" current="" range="" value=""></integrated>	Sets/Queries the current range selected outp item when outputting the D/A4 termin integrated value.	
:AOUT:IRANge:DA5 :AOUT: IRANge:DA5?	<integrated (nr2)="" current="" range="" value=""></integrated>	Sets/Queries the current range selected outp item when outputting the D/A5 termin integrated value.	
:AOUT:IRANge:DA6 :AOUT: IRANge:DA6?	<integrated (nr2)="" current="" range="" value=""></integrated>	Sets/Queries the current range selected outp item when outputting the D/A6 termin integrated value.	
:AOUT:IRANge:DA7 :AOUT: IRANge:DA7?	<integrated (nr2)="" current="" range="" value=""></integrated>	Sets/Queries the current range selected outp item when outputting the D/A7 termin integrated value.	

## **Device-specific Commands (Instrument Display Settings)**

Message ([ ]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:DISPlay[:NORMal]	( <display a="">, <display b="">,</display></display>	Sets/Queries instrument display items (a)	•
:DISPlay[:NORMal]?	<display c="">, <display d="">)</display></display>	through (d).	62
:DISPlay:NORMal:A			
:DISPlay:NORMal:A?	<display a=""></display>	Sets/Queries instrument display item (a).	62
:DISPlay:NORMal:B			
:DISPlay:NORMal:B?	<display b=""></display>	Sets/Queries instrument display item (b).	62
:DISPlay:NORMal:C			00
:DISPlay:NORMal:C?	<display c=""></display>	Sets/Queries instrument display item (c).	62
:DISPlay:NORMal:D			00
:DISPlay:NORMal:D?	<display d=""></display>	Sets/Queries instrument display item (d).	62
:DISPlay:MODE	Display Operification	Sets/Queries the instrument display mode	66
:DISPlay:MODE?	<display specification=""></display>	(normal/harmonic wave).	66
:DISPlay:HARMonic:ORDer	<harmonic order<="" th="" wave=""><th>Sets/Queries the display order for harmonic</th><th>; 66</th></harmonic>	Sets/Queries the display order for harmonic	; 66
:DISPlay:HARMonic:ORDer?	0 to 50>	wave order common display.	66
:DISPlay:HARMonic:B:ITEM	<harmonic th="" wave<=""><th>Sets/Queries the display item (b) for</th><th>66</th></harmonic>	Sets/Queries the display item (b) for	66
:DISPlay:HARMonic:B:ITEM?	Display Item>	harmonic wave order common display.	00
:DISPlay:HARMonic:C:ITEM	<harmonic th="" wave<=""><th>Sets/Queries the display item (c) for</th><th>66</th></harmonic>	Sets/Queries the display item (c) for	66
:DISPlay:HARMonic:C:ITEM?	Display Item>	harmonic wave order common display.	00
:DISPlay:HARMonic:D:ITEM	<harmonic th="" wave<=""><th>Sets/Queries the display item (d) for</th><th>66</th></harmonic>	Sets/Queries the display item (d) for	66
:DISPlay:HARMonic:D:ITEM?	Display Item>	harmonic wave order common display.	00
:DISPlay:HORDerSel:A:ORDer	<harmonic order<="" th="" wave=""><th>Display order (a) for harmonic wave order</th><th>67</th></harmonic>	Display order (a) for harmonic wave order	67
:DISPlay:HORDerSel:A:ORDer?	0 to 50>	individual display.	07
:DISPlay:HORDerSel:A:ITEM	<harmonic th="" wave<=""><th>Display item (a) for harmonic wave order</th><th>67</th></harmonic>	Display item (a) for harmonic wave order	67
:DISPlay:HORDerSel:A:ITEM?	Display Item>	individual display.	07
:DISPlay:HORDerSel:B:ORDer	<harmonic order<="" th="" wave=""><th>Display order (b) for harmonic wave order</th><th>67</th></harmonic>	Display order (b) for harmonic wave order	67
:DISPlay:HORDerSel:B:ORDer?	0 to 50>	individual display.	07
:DISPlay:HORDerSel:B:ITEM	<harmonic th="" wave<=""><th>Display item (b) for harmonic wave order</th><th>67</th></harmonic>	Display item (b) for harmonic wave order	67
:DISPlay:HORDerSel:B:ITEM?	Display Item>	individual display.	07
:DISPlay:HORDerSel:C:ORDer	<harmonic order<="" th="" wave=""><th>Display order (c) for harmonic wave order</th><th>67</th></harmonic>	Display order (c) for harmonic wave order	67
:DISPlay:HORDerSel:C:ORDer?	0 to 50>	individual display.	01
:DISPlay:HORDerSel:C:ITEM	<harmonic th="" wave<=""><th>Display item (c) for harmonic wave order</th><th>67</th></harmonic>	Display item (c) for harmonic wave order	67
:DISPlay:HORDerSel:C:ITEM?	Display Item>	individual display.	07
:DISPlay:HORDerSel:D:ORDer	<harmonic order<="" th="" wave=""><th>Display order (d) for harmonic wave order</th><th>67</th></harmonic>	Display order (d) for harmonic wave order	67
:DISPlay:HORDerSel:D:ORDer?	0 to 50>	individual display.	07
:DISPlay:HORDerSel:D:ITEM	<harmonic th="" wave<=""><th>Display item (d) for harmonic wave order</th><th>67</th></harmonic>	Display item (d) for harmonic wave order	67
:DISPlay:HORDerSel:D:ITEM?	Display Item>	individual display.	01

## **Device-specific Commands (Measurement Value Output)**

Note: :MEASure[:NORMAL]:ITEM:U:CH1(?)  $\rightarrow$  Setting Command:MEASure[:NORMAL]:ITEM:U:CH1 :MEASure[:NORMAL]:ITEM:U:CH1? Query

Message ([]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:MEASure[:POWer]? :MEASure[:NORMal]:VALue?	<measurement 1="" item=""> Maximum 180</measurement>	Queries measurement data.	68
:MEASure:ITEM:ALLClear		Turns OFF all output items (including harmonic wave)	15
:MEASure[:NORMal]:ITEM?		Queries output items.	75
:DATAout:ITEM(?)	( <output 1="" item="">, <output 2="" item="">)</output></output>	":MEASure?" query output specification (3332-compatible)	76
:MEASure[:NORMAL]:ITEM:STATus:INST(?) :MEASure[:NORMAL]:ITEM:STATus:MAXmin(?)	<output 0="" 1="" item=""></output>	":MEASure?" query Set/Query the measurement status output.	77
:MEASure[:NORMAL]:ITEM:U:ALL :MEASure[:NORMAL]:ITEM:U:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the voltage (instantaneous value) data output.	78
:MEASure[:NORMAL]:ITEM:U_MAX:ALL :MEASure[:NORMAL]:ITEM:U_MAX:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the voltage (maximum value) data output.	78
:MEASure[:NORMAL]:ITEM:U_MIN:ALL :MEASure[:NORMAL]:ITEM:U_MIN:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the voltage (minimum value) data output.	78
:MEASure[:NORMAL]:ITEM:I:ALL :MEASure[:NORMAL]:ITEM:I:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the current (instantaneous value) data output.	78
:MEASure[:NORMAL]:ITEM:I_MAX:ALL :MEASure[:NORMAL]:ITEM:I_MAX:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the current (maximum value) data output.	78
MEASure[:NORMAL]:ITEM:I_MIN:ALL MEASure[:NORMAL]:ITEM:I_MIN:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the current (minimum value) data output.	78
:MEASure[:NORMAL]:ITEM:P:ALL :MEASure[:NORMAL]:ITEM:P:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the active power (instantaneous value) data output.	79
:MEASure[:NORMAL]:ITEM:P_MAX:ALL :MEASure[:NORMAL]:ITEM:P_MAX:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the active power (maximum value) data output.	79
:MEASure[:NORMAL]:ITEM:P_MIN:ALL :MEASure[:NORMAL]:ITEM:P_MIN:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the active power (minimum value) data output.	79

	Data Formats (Response data		Reference
Message ([]: Can be omitted)	for queries)	Description	Page
:MEASure[:NORMAL]:ITEM:S:ALL :MEASure[:NORMAL]:ITEM:S:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the apparent power (instantaneous value) data output.	79
:MEASure[:NORMAL]:ITEM:S_MAX:ALL :MEASure[:NORMAL]:ITEM:S_MAX:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the apparent power (maximum value) data output.	79
:MEASure[:NORMAL]:ITEM:S_MIN:ALL :MEASure[:NORMAL]:ITEM:S_MIN:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the apparent power (minimum value) data output.	79
:MEASure[:NORMAL]:ITEM:Q:ALL :MEASure[:NORMAL]:ITEM:Q:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the reactive power (instantaneous value) data output.	80
:MEASure[:NORMAL]:ITEM:Q_MAX:ALL :MEASure[:NORMAL]:ITEM:Q_MAX:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the reactive power (maximum value) data output.	80
:MEASure[:NORMAL]:ITEM:Q_MIN:ALL :MEASure[:NORMAL]:ITEM:Q_MIN:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the reactive power (minimum value) output data.	80
:MEASure[:NORMAL]:ITEM:PF:ALL :MEASure[:NORMAL]:ITEM:PF:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the power factor (instantaneous value) data output.	80
:MEASure[:NORMAL]:ITEM:PF_MAX:ALL :MEASure[:NORMAL]:ITEM:PF_MAX:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the power factor (maximum value) data output.	80
:MEASure[:NORMAL]:ITEM:PF_MIN:ALL :MEASure[:NORMAL]:ITEM:PF_MIN:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the power factor (minimum value) data output.	80
:MEASure[:NORMAL]:ITEM:DEG:ALL :MEASure[:NORMAL]:ITEM:DEG:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the phase angle (instantaneous value) data output.	81
:MEASure[:NORMAL]:ITEM:DEG_MAX:ALL :MEASure[:NORMAL]:ITEM:DEG_MAX:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the phase angle (maximum value) data output.	81
:MEASure[:NORMAL]:ITEM:DEG_MIN:ALL :MEASure[:NORMAL]:ITEM:DEG_MIN:CH1(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the phase angle (minimum value) data output.	81
:MEASure[:NORMAL]:ITEM:FREQU:ALL :MEASure[:NORMAL]:ITEM:FREQU:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage frequency (instantaneous value) data output.	81
:MEASure[:NORMAL]:ITEM:FREQU_MAX:ALL :MEASure[:NORMAL]:ITEM:FREQU_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage frequency (maximum value) data output.	81

	Data Formats (Response data		Reference
Message ([]: Can be omitted)	for queries)	Description	Page
:MEASure[:NORMAL]:ITEM:FREQU_MIN:ALL :MEASure[:NORMAL]:ITEM:FREQU_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage frequency (minimum value) data output.	81
:MEASure[:NORMAL]:ITEM:FREQI:ALL :MEASure[:NORMAL]:ITEM:FREQI:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current frequency (instantaneous value) data output.	82
:MEASure[:NORMAL]:ITEM:FREQI_MAX:ALL :MEASure[:NORMAL]:ITEM:FREQI_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current frequency (maximum value) data output.	82
:MEASure[:NORMAL]:ITEM:FREQI_MIN:ALL :MEASure[:NORMAL]:ITEM:FREQI_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current frequency (minimum value) data output.	82
:MEASure[:NORMAL]:ITEM:TIME(?) (Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:TIME:I200mA(?) :MEASure[:NORMAL]:ITEM:TIME:I500mA(?) :MEASure[:NORMAL]:ITEM:TIME:I1A(?) :MEASure[:NORMAL]:ITEM:TIME:I2A(?) :MEASure[:NORMAL]:ITEM:TIME:I5A(?) :MEASure[:NORMAL]:ITEM:TIME:I10A(?) :MEASure[:NORMAL]:ITEM:TIME:I20A(?) :MEASure[:NORMAL]:ITEM:TIME:BACKup(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the integration time data output.	82
:MEASure[:NORMAL]:ITEM:IH:ALL :MEASure[:NORMAL]:ITEM:IH:CH1(?) (Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:IH:CH1:I200mA(?) :MEASure[:NORMAL]:ITEM:IH:CH1:I500mA(?) :MEASure[:NORMAL]:ITEM:IH:CH1:I1A(?) :MEASure[:NORMAL]:ITEM:IH:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:IH:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:IH:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:IH:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:IH:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:IH:CH1:BACKup(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the integration current (tota sum) data output.	1 83
:MEASure[:NORMAL]:ITEM:PIH:ALL :MEASure[:NORMAL]:ITEM:PIH:CH1(?) (Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:PIH:CH1:I200mA(?) :MEASure[:NORMAL]:ITEM:PIH:CH1:I500mA(?) :MEASure[:NORMAL]:ITEM:PIH:CH1:I1A(?) :MEASure[:NORMAL]:ITEM:PIH:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:PIH:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:PIH:CH1:I10A(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the positive integration current data output.	84

:MEASure[:NORMAL]:ITEM:PIH:CH1:I10A(?) :MEASure[:NORMAL]:ITEM:PIH:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:PIH:CH1:BACKup(?)

	Data Formats		
Message ([]: Can be omitted)	(Response data for queries)	Description	Reference Page
:MEASure[:NORMAL]:ITEM:MIH:ALL	ioi quenes)	Description	Faye
:MEASure[:NORMAL]:ITEM:MIH:CH1(?)			
(Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:MIH:CH1:I200mA(?) :MEASure[:NORMAL]:ITEM:MIH:CH1:I500mA(?) :MEASure[:NORMAL]:ITEM:MIH:CH1:I1A(?) :MEASure[:NORMAL]:ITEM:MIH:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:MIH:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:MIH:CH1:I10A(?) :MEASure[:NORMAL]:ITEM:MIH:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:MIH:CH1:BACKup(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the negative integration current data output.	85
:MEASure[:NORMAL]:ITEM:WP:ALL			
:MEASure[:NORMAL]:ITEM:WP:CH1(?)			
(Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:WP:CH1:I200mA(?) :MEASure[:NORMAL]:ITEM:WP:CH1:I500mA(?) :MEASure[:NORMAL]:ITEM:WP:CH1:I1A(?) :MEASure[:NORMAL]:ITEM:WP:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:WP:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:WP:CH1:I10A(?) :MEASure[:NORMAL]:ITEM:WP:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:WP:CH1:BACKup(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the integration active powe (total sum) data output.	r 86
:MEASure[:NORMAL]:ITEM:PWP:ALL :MEASure[:NORMAL]:ITEM:PWP:CH1(?)			
(Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:PWP:CH1:I200mA(?) :MEASure[:NORMAL]:ITEM:PWP:CH1:I500mA(?) :MEASure[:NORMAL]:ITEM:PWP:CH1:I1A(?) :MEASure[:NORMAL]:ITEM:PWP:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:PWP:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:PWP:CH1:I10A(?) :MEASure[:NORMAL]:ITEM:PWP:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:PWP:CH1:BACKup(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the integration active powe (positive) data output.	r 87
:MEASure[:NORMAL]:ITEM:MWP:ALL			
:MEASure[:NORMAL]:ITEM:MWP:CH1(?) (Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:MWP:CH1:I200mA(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:I500mA(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:I1A(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:I5A(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:I10A(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:MWP:CH1:BACKup(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the integration active powe (negative) data output.	r <sup>88</sup>
:MEASure[:NORMAL]:ITEM:UPK:ALL :MEASure[:NORMAL]:ITEM:UPK:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage waveform peak value (instantaneous value) data output.	89

Message ([]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:MEASure[:NORMAL]:ITEM:UPK_MAX:ALL :MEASure[:NORMAL]:ITEM:UPK_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage waveform peak value (maximum value) data output.	89
:MEASure[:NORMAL]:ITEM:UPK_MIN:ALL :MEASure[:NORMAL]:ITEM:UPK_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage waveform peak value (minimum value) data output.	89
:MEASure[:NORMAL]:ITEM:IPK:ALL :MEASure[:NORMAL]:ITEM:IPK:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current waveform peak (instantaneous value) data output.	89
:MEASure[:NORMAL]:ITEM:IPK_MAX:ALL :MEASure[:NORMAL]:ITEM:IPK_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current waveform peak value (maximum value) data output.	89
:MEASure[:NORMAL]:ITEM:IPK_MIN:ALL :MEASure[:NORMAL]:ITEM:IPK_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current waveform peak value (minimum value) data output.	89
:MEASure[:NORMAL]:ITEM:MCR:ALL :MEASure[:NORMAL]:ITEM:MCR:CH1(?)	<output setting=""></output>	":MEASure?" query Sets/Queries the Maximum Current Ratio (instantaneous value) data output.	90
:MEASure[:NORMAL]:ITEM:MCR_MAX:ALL :MEASure[:NORMAL]:ITEM:MCR_MAX:CH1(?)	<output setting=""></output>	":MEASure?" query Sets/Queries the Maximum Current Ratio (maximum value) data output.	90
:MEASure[:NORMAL]:ITEM:MCR_MIN:ALL :MEASure[:NORMAL]:ITEM:MCR_MIN:CH1(?)	<output setting=""></output>	":MEASure?" query Sets/Queries the Maximum Current Ratio (minimum value) data output.	90
:MEASure[:NORMAL]:ITEM:UCFactor:ALL :MEASure[:NORMAL]:ITEM:UCFactor:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage crest factor (instantaneous value) data output.	90
:MEASure[:NORMAL]:ITEM:UCF_MAX:ALL :MEASure[:NORMAL]:ITEM:UCF_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage crest factor (maximum value) data output.	90
:MEASure[:NORMAL]:ITEM:UCF_MIN:ALL :MEASure[:NORMAL]:ITEM:UCF_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage crest factor (minimum value) data output.	90
:MEASure[:NORMAL]:ITEM:ICFactor:ALL :MEASure[:NORMAL]:ITEM:ICFactor:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current crest factor (instantaneous value) data output.	91

Message ([ ]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:MEASure[:NORMAL]:ITEM:ICF_MAX:ALL :MEASure[:NORMAL]:ITEM:ICF_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current crest factor (maximum value) data output.	91
:MEASure[:NORMAL]:ITEM:ICF_MIN:ALL :MEASure[:NORMAL]:ITEM:ICF_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current crest factor (minimum value) data output.	91
:MEASure[:NORMAL]:ITEM:ITAVerage:ALL :MEASure[:NORMAL]:ITEM:ITAVerage:CH1(?) (Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:200mA(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:500mA(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:11A(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:12A(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:15A(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:15A(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:10A(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:120A(?) :MEASure[:NORMAL]:ITEM:ITAVerage:CH1:120A(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the time average current data output.	92
:MEASure[:NORMAL]:ITEM:PTAVerage:ALL :MEASure[:NORMAL]:ITEM:PTAVerage:CH1(?) (Data by current range during auto-range integration) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I200mA(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I500mA(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I2A(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I10A(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I20A(?) :MEASure[:NORMAL]:ITEM:PTAVerage:CH1:I20A(?)	<output item<br="">(Rectification Method)&gt;</output>	":MEASure?" query Sets/Queries the time average active power data output.	93
:MEASure[:NORMAL]:ITEM:URF:ALL :MEASure[:NORMAL]:ITEM:URF:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage ripple factor (instantaneou value) data output.	93 JS
:MEASure[:NORMAL]:ITEM:URF_MAX:ALL :MEASure[:NORMAL]:ITEM:URF_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage ripple factor (maximum value) data output.	93
:MEASure[:NORMAL]:ITEM:URF_MIN:ALL :MEASure[:NORMAL]:ITEM:URF_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the voltage ripple factor (minimum value) data output.	93
:MEASure[:NORMAL]:ITEM:IRF:ALL :MEASure[:NORMAL]:ITEM:IRF:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current ripple factor (instantaneou value) data output.	us 94
:MEASure[:NORMAL]:ITEM:IRF_MAX:ALL :MEASure[:NORMAL]:ITEM:IRF_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current ripple factor (maximum value) data output.	94
:MEASure[:NORMAL]:ITEM:IRF_MIN:ALL :MEASure[:NORMAL]:ITEM:IRF_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the current ripple factor (minimum value) data output. PW3335A	94 \985-01

	Data Formats		Reference
Message ([]: Can be omitted)	(Response data for queries)	Description	Page
		":MEASure?" query	Fdyt
:MEASure[:NORMal]:ITEM:UTHD:ALL :MEASure[:NORMal]:ITEM:UTHD:CH1(?)	<output 0="" 1="" setting=""></output>	Sets/Queries the total harmonic wave voltage distortion factor (instantaneous value) data output.	94 a
:MEASure[:NORMal]:ITEM:UTHD_MAX:ALL :MEASure[:NORMal]:ITEM:UTHD_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the total harmonic wave voltage distortion factor (maximum value) data output.	94
:MEASure[:NORMal]:ITEM:UTHD_MIN:ALL :MEASure[:NORMal]:ITEM:UTHD_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the total harmonic wave voltage distortion factor data output.	94
:MEASure[:NORMal]:ITEM:ITHD:ALL :MEASure[:NORMal]:ITEM:ITHD:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the total harmonic wave current distortion factor (instantaneous value) dat output.	95 a
:MEASure[:NORMal]:ITEM:ITHD_MAX:ALL :MEASure[:NORMal]:ITEM:ITHD_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the total harmonic wave current distortion factor (maximum value) data output.	95 1
:MEASure[:NORMal]:ITEM:ITHD_MIN:ALL :MEASure[:NORMal]:ITEM:ITHD_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure?" query Sets/Queries the total harmonic wave current distortion factor (minimum value) data output.	95

#### Device-specific Commands (Measurement Value Output Settings [Harmonic Wave])

Note: :MEASure:HARMonic:ITEM:U:CH1(?) → Setting Command :MEASure:HARMonic:ITEM:U:CH1 Query :MEASure:HARMonic:ITEM:U:CH1?

Message ([]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:MEASure:HARMonic[:VALue]?	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	Harmonic wave measurement data output.	96
:MEASure:HARMonic:ITEM:ALLClear		":MEASure:HARMonic?" Turns OFF all query output.	98
:MEASure:HARMonic:ITEM:LIST(?)	( <output 1="" item="">, <output 2="" item="">, <output 3="" item="">, <output 4="" item="">, <output 5="" item="">, <output 6="" item="">)</output></output></output></output></output></output>	":MEASure:HARMonic?"query. Sets/Queries output items.	99
:MEASure:HARMonic:ITEM:ORDer(?)	( <lower limit="" order="">, <upper limit="" order="">, <odd all="" even="">)</odd></upper></lower>	Sets/Queries the output order of ":MEASure:HARMonic?" queries.	100
:MEASure:HARMonic:ITEM:STATus:INST(?) :MEASure:HARMonic:ITEM:STATus:MAXmin(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" query Sets/Querys the measurement status output	
:MEASure:HARMonic:ITEM:U:ALL :MEASure:HARMonic:ITEM:U:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the output of the harmonic wave voltage effective value output for the above query.	101
:MEASure:HARMonic:ITEM:U_MAX:ALL :MEASure:HARMonic:ITEM:U_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the output of the harmonic wave voltage effective value (maximum value) output for the above query.	101
:MEASure:HARMonic:ITEM:U_MIN:ALL :MEASure:HARMonic:ITEM:U_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the output of the harmonic wave voltage effective value (minimum value) output for the above query.	101
:MEASure:HARMonic:ITEM:I:ALL :MEASure:HARMonic:ITEM:I:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the output of the harmonic wave current effective value output for the above query.	101
:MEASure:HARMonic:ITEM:I_MAX:ALL :MEASure:HARMonic:ITEM:I_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the output of the harmonic wave current effective value (maximum value) output for the above query.	101

Message ([]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:MEASure:HARMonic:ITEM:I_MIN:ALL :MEASure:HARMonic:ITEM:I_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the output of the harmonic wave current effective value (minimum value) output for the above query.	101
:MEASure:HARMonic:ITEM:P:ALL :MEASure:HARMonic:ITEM:P:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave active power output for the above query.	102
:MEASure:HARMonic:ITEM:P_MAX:ALL :MEASure:HARMonic:ITEM:P_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave active power (maximum value) output for the above query.	102
:MEASure:HARMonic:ITEM:P_MIN:ALL :MEASure:HARMonic:ITEM:P_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave active power (minimum value) output for the above query.	102
:MEASure:HARMonic:ITEM:UCON:ALL :MEASure:HARMonic:ITEM:UCON:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage content for the above query.	102
:MEASure:HARMonic:ITEM:UCON_MAX:ALL :MEASure:HARMonic:ITEM:UCON_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage content (maximum value) for the above query.	102
:MEASure:HARMonic:ITEM:UCON_MIN:ALL :MEASure:HARMonic:ITEM:UCON_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage content (minimum value) for the above query.	102
:MEASure:HARMonic:ITEM:ICON:ALL :MEASure:HARMonic:ITEM:ICON:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave current content for the above query.	103
:MEASure:HARMonic:ITEM:ICON_MAX:ALL :MEASure:HARMonic:ITEM:ICON_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave current content (maximum value) for the above query.	103
:MEASure:HARMonic:ITEM:ICON_MIN:ALL :MEASure:HARMonic:ITEM:ICON_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave current content (minimum value) for the above query.	103
:MEASure:HARMonic:ITEM:PCON:ALL :MEASure:HARMonic:ITEM:PCON:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave active power content for the above query.	103
:MEASure:HARMonic:ITEM:PCON_MAX:ALL :MEASure:HARMonic:ITEM:PCON_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave active power content (maximum value) for the above query.	103

Message ([]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:MEASure:HARMonic:ITEM:PCON_MIN:ALL :MEASure:HARMonic:ITEM:PCON_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave active power content (minimum value) for the above query.	103
:MEASure:HARMonic:ITEM:UPHAse:ALL :MEASure:HARMonic:ITEM:UPHAse:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage phase angle for the above query.	104
:MEASure:HARMonic:ITEM:UPHAse_MAX:ALL :MEASure:HARMonic:ITEM:UPHAse_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage phase angle (maximum value) for the above query.	
:MEASure:HARMonic:ITEM:UPHAse_MIN:ALL :MEASure:HARMonic:ITEM:UPHAse_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage phase angle (minimum value) for the above query.	104
:MEASure:HARMonic:ITEM:IPHAse:ALL :MEASure:HARMonic:ITEM:IPHAse:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave current phase angle for the above query.	104
:MEASure:HARMonic:ITEM:IPHAse_MAX:ALL :MEASure:HARMonic:ITEM:IPHAse_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave current phase angle (maximum value) for the above query.	104
:MEASure:HARMonic:ITEM:IPHAse_MIN:ALL :MEASure:HARMonic:ITEM:IPHAse_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave current phase angle (minimum value) for the above query.	104
:MEASure:HARMonic:ITEM:PPHAse:ALL :MEASure:HARMonic:ITEM:PPHAse:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage current phase difference for the above query.	105
:MEASure:HARMonic:ITEM:PPHAse_MAX:ALL :MEASure:HARMonic:ITEM:PPHAse_MAX:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage current phase difference (maximum value) for the above query.	105
:MEASure:HARMonic:ITEM:PPHAse_MAX:ALL :MEASure:HARMonic:ITEM:PPHAse_MIN:CH1(?)	<output 0="" 1="" setting=""></output>	":MEASure:HARMonic?" Sets/Queries the harmonic wave voltage current phase difference (minimum value) for the above query.	105

## **Device-specific Commands (Communications)**

Message ([]: Can be omitted)	Data Formats (Response data for queries)	Description	Reference Page
:RS232c?		Queries the RS232-C setting items.	106
:RS232c:BAUD :RS232c:BAUD?	<rs baud="" rate=""></rs>	Sets/Queries the RS232-C baud rate.	106
:RS232c:ANSWer :RS232c:ANSWer?	ON/OFF	Sets/Queries the execution confirmation message.	107
:RS232c:ERRor?		Sets/Queries RS232-C communications errors.	107
:RS232c:BTINit :RS232c:BTINit?	OK/BUSY/ERROR/NONE		108
:RS232c:CONNect :RS232c:CONNect?	PC/BT		108
:IP:ADDRess :IP:ADDRess?	<pre>(<address (nr1)="" 1="">, <address (nr1)="" 2="">, <address (nr1)="" 3="">, Address 3 (NR1)&gt;,</address></address></address></pre>	Sets/Queries the LAN IP address.	109
:IP:DEFaultgateway :IP:DEFaultgateway?	<address (nr1)="" 4="">) (<address (nr1)="" 1="">, <address (nr1)="" 2="">, <address (nr1)="" 3="">,</address></address></address></address>	Sets/Queries the LAN default gateway.	109
:IP:SUBNetmask	<address (nr1)="" 4="">) (<address (nr1)="" 1="">, <address (nr1)="" 2="">,</address></address></address>	Sets/Queries the LAN subnet mask.	109
:IP:SUBNetmask?	<address (nr1)="" 3="">, <address (nr1)="" 4="">)</address></address>	Sets/Queries the LAN subhet mask.	109
:GPIB?		Queries the GP-IB setting items.	110
:GPIB:ADDRess :GPIB:ADDRess?	<address (nr1)=""></address>	Sets/Queries the GP-IB address.	110
:HEADer :HEADer?	ON/OFF	Sets/Queries the header.	110
:LOCAL	0/1 (NR1)	Changes to the Local (manual operation) state.	110
:TRANsmit:SEParator :TRANsmit:SEParator?	0/1 (NR1)	Sets/Queries the message unit separator.	111
:TRANsmit:TERMinator :TRANsmit:TERMinator?	0/1 (NR1)	Sets/Queries the message unit terminator.	111

## Device-specific Commands (Dummy commands for maintaining compatibility with other models (333x, PW3336, PW3337, etc.))

Message	Data Formats (Response data for queries)	Description	Reference Page
:WIRing :Wiring?	TYPE1 to TYPE7	Sets/Queries the wire connection setting.	-
:MODE :MODE?	1/2 (for 3331 interchangeability)	Queries will always return "TYPE1	
:RECTifier :RECTifier?	ACDC,ACDC_UMEAN,DC,AC,FN D,1,2,3	Sets/Queries the rectifier. Queries v always return "ALL."	will
:RESPonse :RESPonse?	FAST/SLOW/AUTO (For 3331 compatibility)	Sets/Queries the display upda speed. Queries will always retu "AUTO."	

## **3 Message Reference**

### **Message Reference Interpretation**

 Indicates the contents (character or numeric parameters) of the data portion of a message. Character parameters are returned as all capital letters.

Numeric Parameters :

- NRf Number format may be any of NR1, NR2 and NR3
- NR1 Integer data (e.g.: +12, -23, 34)
- NR2 Fixed-point data (e.g.: +1.23, -23.45, 3.456)
  - NR3 Floating-point exponential representation data
    - (e.g.: +1.0E-2, -2.3E+4)

description.	Syntax	Command	*ESE	<0 ~	255	(NR1)	)> 🔸			
Shows the message syntax.		Query	*ESE	?						
esponse message.		Response	<0 ~ 2	-	(1)>					
	Description	Command	The SES	ER ma	sk is set	to the r	numerica	al value	0 to 25	5. The init
Describes the message.			value (at	power-	on) is 0.					
		Query	The con	tents of	the SE	SER, a	s set b	y the *I	ESE col	mmand, a
			returned	as an N	IR1 valu	e (0 to 2	255).			
			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
			-							
hows an example of an actual .	Example	*ESE 36								



Controller

## **Standard Commands**

### (1) System Data Command

Syntax	Query	*IDN?				
	Response	<manufacturer <serial numbe<="" td=""><td></td><td>del name&gt;, &lt;</td><td><model type="">, &lt;</model></td><td><software< td=""></software<></td></serial></manufacturer 		del name>, <	<model type="">, &lt;</model>	<software< td=""></software<>
		<manufacturer na<br=""><model name=""></model></manufacturer>		) /3335"	Fixed No. of chanr	nels: 1
		<model type=""></model>	RS-232c	GP-IB	D/A output	Current Sensor Input
		00	•	-	-	-
		01	-	•	-	-
		02	•	-	•	-
		03	•	-	-	•
		04	•	•	•	•
Example	Query Response	*IDN? HIOKI,PW33		400.45		
Note	"*IDN?" m	The Device output,current ponse message h nust be the last qu	ID is HIOr sensor input), has no header ery message	<ul> <li>FW3335</li> <li>software ve</li> <li>in a program</li> </ul>	-04 (RS-232c rsion 1.00, 123 n message.	456789.
	"*IDN?" m ∙Therefor will occur	output,current ponse message h	ID is HIOF sensor input), has no header ery message ery is detected	<ol> <li>PW3335</li> <li>software ve</li> <li>in a program</li> <li>l after this qu</li> </ol>	-04 (RS-232c rsion 1.00, 123 n message.	456789.
uery Device Op	"*IDN?" m •Therefor will occur	output,current ponse message h nust be the last qu re, if any other que and no response	ID is HIOF sensor input), has no header ery message ery is detected	<ol> <li>PW3335</li> <li>software ve</li> <li>in a program</li> <li>l after this qu</li> </ol>	-04 (RS-232c rsion 1.00, 123 n message.	456789.
	"*IDN?" m •Therefor will occur	output,current ponse message h just be the last qu re, if any other que	ID is HIOF sensor input), has no header ery message ery is detected message will	(I PW3335 software ve in a program I after this qu be output.	-04 (RS-232c rsion 1.00, 123 n message. lery on the sam	456789. ne line, a qu
<mark>tuery Device Or</mark> Syntax	"*IDN?" m • Therefor will occur <mark>otions Query Response</mark>	output,current i ponse message h iust be the last qui and no response *OPT? <if type="">, <d <br=""><if type=""> <d a="" capa<br="" output="">&lt; External cur sensor presence</d></if></d></if>	ID is HIOk sensor input), has no header ery message ery is detected message will A output capa ability> rent input	<ul> <li>All PW3335</li> <li>software ve</li> <li>in a program</li> <li>after this qu</li> <li>be output.</li> </ul> bility>,< Extended bility>,< Extended CURR_SEN	-04 (RS-232c rsion 1.00, 123 n message. lery on the sam ernal current inp S_GPIB/NONE DNE	456789. ne line, a qu
Query Device Or Syntax	"*IDN?" m • Therefor will occur <mark>otions Query Response</mark>	output,current i ponse message h iust be the last qui and no response *OPT? <if type="">, <d <br=""><if type=""> <d a="" capa<br="" output="">&lt; External cur sensor presence options available *OPT? GPIB,DA_OU Instrument is e</d></if></d></if>	ID is HIOP sensor input), has no header ery message ery is detected message will A output capa ability> rent input > on the instru JT,CURR_S	<ul> <li>All PW3335</li> <li>software ve</li> <li>in a program</li> <li>after this qu</li> <li>be output.</li> </ul> bility>,< Extended bility>,< Extended curpose curpose curpose curpose curpose ment. ENSOR	-04 (RS-232c rsion 1.00, 123 n message. lery on the sam ernal current inp S_GPIB/NONE DNE SOR/NONE	456789. le line, a qu put sensor
uery Device Or Syntax Description	"*IDN?" m •Therefor will occur Descriptions Query Response Queries the Query Response	output, current : ponse message h iust be the last qu and no response *OPT? <if type="">, <d <br=""><if type=""> <d a="" capa<br="" output="">&lt; External cur sensor presence options available *OPT? GPIB, DA_OU</d></if></d></if>	ID is HIOP sensor input), has no header ery message ery is detected message will A output capa ability> rent input a on the instru UT,CURR_S equipped with	<ul> <li>A PW3335</li> <li>software ve</li> <li>in a program</li> <li>after this qu</li> <li>be output.</li> </ul> bility>,< Extended bility>,< Extended curpose <pcurpose< p=""> curpose <pcurpose< p=""> &lt;</pcurpose<></pcurpose<>	-04 (RS-232c rsion 1.00, 123 n message. lery on the sam ernal current inp S_GPIB/NONE DNE SOR/NONE	456789. le line, a qu put sensor

Initialize Device		
Syntax	Command	*RST
Description	Command	Resets the instrument to its initial state.
Note	for inform • The com	the user's manual for the instrument (in the System Reset section) mation about the initial settings. nmunications state is not initialized. nmand can be executed even when a system error has occurred.

Execute Self-test and Query Result					
Syntax	Query	*TST?			
	Response	<0 $\sim$ 4 (NR1)>			
		0:No error			
		1:ROM error			
		2:RAM error			
		3:FPGA error			
		4:Backup data error			
Description	Perform the	e instrument self-test and return the result as a numerical value 0 to 4.			
	Returns ze	ro when no error occurs.			
Example	Query	*TST?			
	Response	2			
		A RAM error was detected.			
		The instrument may not be able to perform measurements correctly.			
•• •		Stop use immediately and send the instrument in for repairs.			
Note	•	onse message has no header.			
		-dependent error will occur if this command is executed during integration			
		INTEGRATOR indicator is lit) or when in the Hold state			
		HOLD indicator is lit).			
	• This com	mand can be executed even when a system error has occurred.			

## (3) Synchronization Commands

Set OPC Bit of S	ESR when Finished with All Pending Operations			
Syntax	Command <b>*OPC</b>			
Description	<b>5</b> ( )			
Example	to <b>*OPC</b> have finished processing. :MEAS?;*OPC			
Example	Sets the OPC bit of the SESR after the :MEAS? query finishes processing.			
Respond with ASCII "1" when Finished with All Pending Operations				
Syntax	Query <b>*OPC?</b>			
	Response 1			
Description	Responds with ASCII "1" when all commands prior to <b>*OPC</b> have finished processing.			
Example	:MEAS?;*OPC?			
	"1" is stored in the output queue after the data for the :MEAS? query is generated.			
	Response (When HEADER ON) *OPC 1			
	(When HEADER OFF) 1			
Note	The response message has no header.			
Wait until display	y update finishes before executing the next command.			
Syntax	Command *WAI			
Description	No commands after *WAI are run until the next display update completes.			
<b>F</b>	(200ms max)			
Example	:MEAS?;*WAI;:MEAS?			
Note	Data is loaded after each display update. • The displayed data will not be updated even if this command is executed, while the			
NOLE	display is held, the maximum/minimum values are being held, and the averaged values			
	are displayed.			
	• The display data will not be updated even during a range switch ("" display) even			
	if this command is executed.			
## (4) Status and Event Control Commands

Clear Event Regi	ister, Statu	is Byte Register (Except Output Queue)				
	Command	*CLS				
Description Note	event statu • The outp affected.	event status registers. The Status Byte Register bits corresponding to the is registers are also cleared. (SESR, ESR0, ESR1, RS232c:ERRor) but queue, enable registers, and bit 4 of the status byte register (MAV) are not normand can be executed even when a system error has occurred.				
		vent Status Enable Register (SESER)				
Syntax	Command Query Response	*ESE <0~255(NR1)> *ESE? <0~255(NR1)>				
Description	Command	The SESER mask is set to the numerical value 0 to 255. The initial value (at power-on) is 0. Although NRf numerical values are accepted, values to the right of the decimal are truncated. URQ (bit 6) and RQC (bit 1) is not used by the instrument. Therefore, these events will not be triggered even if a value of 1 is specified.				
	Query	The contents of the SESER, as set by the *ESE command, are returned as an NR1 value (0 to 255).         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				
Example	Command Query Response	(Sets bits 5 and 2 of SESER) ery *ESE?				
Read and Clear S	Standard E	vent Status Register (SESR)				
Syntax	Query Response	* <b>ESR?</b> <0~255 (NR1)>				
Description	contents.	contents of the SESR as an NR1 value from 0 to 255, then clears register				
	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				
Example	32	SESR has been set to 1. $\rightarrow$ A CME (Command Error) has occurred.				
Note		nmand can be executed even when a system error has occurred.				

Write and Read	Serv	vice Re	quest	Enabl	e Regi	ster (S	RER)			
Syntax	Cor	nmand	*SRE	<0 <sup>^</sup>	~255 (	NR1)>				
	Que	ery	*SRE	?						
	Res	ponse	<0~2	55 (NR1	)>					
Description	Command Query		The SRER mask is set to the numerical value 0 to 255. Although NRf numerical values are accepted, values to the right of the decimal are truncated. Bit 6 and unused bits (bit 7) are ignored. The data is initialized to zero at power-on. The contents of the SRER, as set by the <b>*SRE</b> command, are returned as an NR1 value (0 to 255). Bit 6 and unused bits (bit 7,3,2) always return as zero.							
		128	64	32	16	8	4	2	1	
		bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0	
		unused	0	ESB	MAV	unused	unused	ESB1	ESB0	
Example	Cor	nmand	*SRE	33	1	1				1
	Que	ery	Set SRER bits 0 and 5 to 1. *SRE?							
	Res	ponse	(When HEADER ON) <b>*SRE 33</b> (When HEADER OFF) <b>33</b>							
	SRER bits 0 and 5 have been set to 1.									
Read Status Byte	e Re	egister								
Syntax	Que	ry	*STB	<b>}?</b>						
	Res	oonse	<0~25	55 (NR1	)>					
Description		e content e respons					NR1 value	e (0 to 2	55).	

		128	64	32	16	8	4	2	1
		bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
			DIL U	DIL J		DICO		DILI	DILO
		unused	MSS	ESB	MAV	unused	unused	ESB1	ESB0
Example	Que	ery	*STI	3?					
•	Res	sponse	(When	HEADER	ON) 16	5			
			(When	HEADER	OFF) 16	<b>;</b>			

STB bit 4 has been set to 1.

**Note** • The value of bit 6 is the value of the MSS bit.

• The MSS bit will not be cleared even if the service requests have been cleared through serial polling.

This command can be executed even when a system error has occurred.

#### **Request a Sample**

SyntaxCommand\*TRGDescription<br/>ExampleUpdates the measurement display once when the instrument is in the Hold state.<br/>:HOLD ON;\*TRG;:MEAS?Note• A device-dependent error occurs if this command is executed in any other state than<br/>the Hold state.<br/>• While the averaged value is displayed, the displayed averaged value is updated by<br/>executing this command.

# **Device-specific Commands**

## (1) Event Status Register

		ific Even				gister i	ESERU		
Syntax	Command	:ESE0		255 (NF	R1)>				
	Query	:ESE0?							
	Response	<0~255	(NR1)>						
Description	Command	Sets the m	nask patt	ern in Ev	ent Stat	us Enabl	e Regist	er 0 (ES	ER0)
		for the Eve	ent Statu	s Registe	ər.				
		•			alues ar	e accept	ed, valu	es to th	e right of tl
		decimal ai 128	e trunca 64	ted. 32	16	0	4	2	1
			•			8	•	_	-
		bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
		DS	CSE	SE	IE	AVG	HP	ODI	ESE
Example	Command	:ESE0 4							
	<u> </u>	Set ESER	0 bit 2 to	01.					
	Query Response	:ESE0?							
	Response	(When HEAD	,	:ESE0	4				
Noto	The data is	(When HEAD	,		-				
Note	The data is	initialized to	o zero at	power-o	n.				
Set and Query De	vice-spec	ific Even	t Statu	is Enal	ole Reg	gister l	ESER1		
Syntax	Command	:ESE1	<0~2	255 (NF	<b>R1)&gt;</b>				
	Query	:ESE1?		•	· ·				
	Response	<0~255	(NR1)>						
Decemination	Command							4 (50)	
Description	Command	Sets the m	•			us Enabl	e Regist	er 1 (ES	ER1)
Description	Command	for the Eve	ent Statu	s Registe	ər.		Ū	·	
Description	Command	for the Eve Although	ent Statu NRf nun	s Registe nerical va	er. alues ar	e accept	ed, valu	·	ER1) e right of tl
Description	Command	for the Eve	ent Statu NRf nun	s Registe nerical va	er. alues ar	e accept	ed, valu	·	
Description	Command	for the Eve Although decimal ar	ent Statu NRf nun e trunca	s Registen nerical va ted to the	er. alues ar e neares	e accept t integer.	ed, valu	ies to th	e right of th
Description	Command	for the Eve Although decimal ar 128	ent Statu NRf num re trunca 64	s Registen nerical va ted to the 32	er. alues ar e neares 16	e accept t integer. 8	ed, valu 4	es to th	e right of th
2000.pro.	Command	for the Eve Although decimal au 128 bit 7	ent Statu NRf nun e trunca 64 bit 6 ODI	s Registe nerical va ted to the 32 bit 5	er. alues an e neares 16 bit 4	e accept t integer. 8 bit 3	ed, valu 4 bit 2	es to th 2 bit 1	e right of th 1 bit 0
2000.pron		for the Eve Although decimal au 128 bit 7 FOR	ent Statu NRf nun e trunca 64 bit 6 ODI	s Registe nerical va ted to the 32 bit 5 CODI	er. alues an e neares 16 bit 4 IO	e accept t integer. 8 bit 3	ed, valu 4 bit 2	es to th 2 bit 1	e right of th 1 bit 0
2000.pro.		for the Eve Although decimal au 128 bit 7 FOR <b>:ESE1 24</b>	ent Statu NRf nun e trunca 64 bit 6 ODI	s Registe nerical va ted to the 32 bit 5 CODI	er. alues an e neares 16 bit 4 IO	e accept t integer. 8 bit 3	ed, valu 4 bit 2	es to th 2 bit 1	e right of th 1 bit 0
2000.pro.	Command	for the Eve Although decimal au 128 bit 7 FOR <b>:ESE1 24</b> Set ESER	ent Statu NRf nun e trunca 64 bit 6 ODI 1 bits 3 a	s Registe nerical va ted to the 32 bit 5 CODI	er. alues ard e neares 16 bit 4 IO 1.	e accept t integer. 8 bit 3	ed, valu 4 bit 2	es to th 2 bit 1	e right of th 1 bit 0
2000.pro.	Command Query	for the Eve Although decimal au 128 bit 7 FOR :ESE1 24 Set ESER :ESE1?	ent Statu NRf nun e trunca 64 bit 6 ODI 1 bits 3 a ER ON)	s Register nerical va ted to the 32 bit 5 CODI and 4 to 7 <b>:ESE1</b>	er. alues ard e neares 16 bit 4 IO 1.	e accept t integer. 8 bit 3	ed, valu 4 bit 2	es to th 2 bit 1	e right of th 1 bit 0

Set and Query Device-specific Event Status Enable Registers ESER0 to ESER3					
Syntax	Query	:ESR0? :ESR1?			
	Response	<0~255 (NR1)>			
Description Note		Returns the contents of the Event Status Register in NR1 format. R0? is executed, the content of ESR0 is cleared. R1? is executed, the content of ESR1 is cleared.			

# (2) Measurement Settings

Setting and Querying the N	umber of Times to Perform Averaging
Command	

Syntax	Command	:AVERaging <number (nr1)="" averaging="" of="" perform="" times="" to=""></number>
	Query	:AVERaging?
	Response	<number (nr1)="" averaging="" of="" perform="" times="" to=""></number>
		1/2/5/10/25/50/100
Description		Sets or queries the number of times to perform averaging. Although NRf numerical values are accepted, values to the right of the decimal are truncated.
Example	Command	:AVER 10
	Query	Set the number of times to perform averaging to 10. <b>:AVER?</b>
	Response	(When HEADER ON) :AVERAGING 10 (When HEADER OFF) 10
Note	<ul> <li>You cann</li> </ul>	e number of times to perform averaging is changed, averaging restarts. ot change this setting while the display is held or when the maximum/ values are being held.

#### **Querying the Integration Set Time and Status**

	<u> </u>	
Syntax	Query	:INTEGrate?
	Response	<0000 to 9999 (NR1)>,<00 to 59 (NR1)>; <integration status=""></integration>
Description		Returns the integration set time (hours, minutes) and the status of
		integration calculations as a numerical value and string, respectively.
		See ":INTEGrage:TIME?", "INTEGrage:STATe?" for details on the return
		values.
Example	Query	:INTEG?
	Response	(When HEADER ON) :INTEGRATE:TIME 0100,00,STATE START
		(When HEADER OFF) 0100,00;START
Note	<ul> <li>You can a</li> </ul>	use the :TRANsmit:SEParator command to change the message unit
	separator	from a semicolon ";" to a comma ",".

## Set and Query the Integration Status

Syntax	Command	:INTEGrate:STATe <integration status=""></integration>					
	Query	:INTEGrate:STATe?					
	Response	<integration status=""></integration>					
		START/STOP/RESET					
Description	Query	Indicates the integration operation.					
	Response	Returns the integration status as a string.					
Example	Command	INTEG:STAT START					
		Starts the integration operation.					
	Query	:INTEG:STAT?					
	Response	(When HEADER ON) :INTEGRATE:STATE START					
		When HEADER OFF) START					

**Note** • Depending on the integration state, a device-dependent error may occur (see the table below).

• A device-dependent error will occur if the integration value reaches ±9999999M or if the integration time reaches 10,000 hours.

		Instrument Status						
	RUN Indicator			(command) cator OFF	Integration from an External Terminal EXT Indicator ON			
		EXT Indicator OFF (Reset state)	OFF ON R		RUN indicator ON (Integration in progress)	RUN indicator Flashing (Stopped)		
pu	START	0	×	0	×	×		
Command	STOP	×	0	×	×	×		
ပိ	RESET	0	×	0	×	0		

 $\circ:$  The command is executed.

**x**: A device-dependent error occurs.

#### Set and Query the Integration Time

Syntax	Command	:INTEGrate:TIME <0000 to 9999 (NR1)>,<00to 59 (NR1)>
	Query	:INTEGrate:TIME?
	Response	<0000 to 9999(NR1)>,<00 to 59(NR1)>
Description		Sets or queries the hours and minutes for the integration time.
		The setting range is 1 minute to 9,999 hours and 59 minutes. The unit is 1 minute.
		If the integration time is set to 0 hours and 0 minutes, integration is performed for 10,000 hours (approximately 417 days).
		Although NRf numerical values are accepted, values to the right of the
		decimal are truncated.
Example	Command	:INTEG:TIME 100,20
		Sets the integration time to 100 hours and 20 minutes.
	Query	:INTEG:TIME?
	Response	(When HEADER ON) :INTEGRATE:TIME 0100,20
		(When HEADER OFF) 0100,20
Note	<ul> <li>You cann</li> </ul>	ot change this setting during integration, while the display is held, or when

**Note** • You cannot change this setting during integration, while the display is held, or when the maximum/minimum values are being held.

#### Set and Query Auto-range Integration

Syntax	Command	:INTEGrate:AUTO <off on=""></off>				
	Query	:INTEGrate:AUTO?				
	Response	<off on=""></off>				
Description Example	Command	Sets auto-range integration. :INTEG:AUTO ON				
	Query Response	Enables auto-range integration. :INTEG:AUTO?				
	Response	(When HEADER ON) :INTEGRATE:AUTO ON (When HEADER OFF) ON				
Note		You cannot change this setting during integration, while the display is held, or when				
	the meximu	m/minimum values are being hald				

the maximum/minimum values are being held.

#### Set and Query the Harmonic Wave Analysis Order Upper Limit

Syntax	Command	:HARMonic:ORDer:UPPer <2 to 50 (NR1)>					
	Query	:HARMonic:ORDer:UPPer?					
	Response	<2 to 50 (NR1)>					
Description		Sets or queries the upper limit for the harmonic wave analysis order.					
		Although NRf numerical values are accepted, values to the right of the					
	<b>a</b> 1	decimal are truncated.					
Example	Command	:HARM:ORD:UPP 50					
	_	Sets the upper limit for the harmonic wave analysis order to 50.					
	Query	:HARM:ORD:UPP?					
	Response	(When HEADER ON) :HARMONIC:ORDER:UPPER 50					
		(When HEADER OFF) 50					
Note	<ul> <li>You cann</li> </ul>	ot change this setting during integration, while the display is held, or when					

the maximum/minimum values are being held.

## Set and Query the Display Hold Status

Syntax	Command	:HOLD <on max="" min="" off="" reset=""></on>					
	Query	:HOLD?					
	Response	<on max="" min="" off="" reset=""></on>					
		ON Keeps the current display value (display hold state).					
		OFF Releases the currently held display value.					
		MAX Displays the maximum value (maximum value hold).					
		MIN Displays the minimum value (minimum value hold).					
		RESET Resets the maximum, minimum, and averaged values.					
Description	Command	Specifies the type of hold to perform on the display value or resets the					
		maximum and minimum values.					
		Although NRf numerical values are accepted, values to the right of the					
		decimal are truncated.					
	Query	Returns the current display value hold setting.					
Example	Command	:HOLD ON					
	-	Holds the current display value.					
	Query	:HOLD?					
	Response	(When HEADER ON) :HOLD ON					
		(When HEADER OFF) ON					
Note	• Auto-range	operation may cease to function if the hold state is triggered and canceled at					

**Note** • Auto-range operation may cease to function if the hold state is triggered and canceled at a short period of around 200 ms.

Execute and Que	ery Zero Ad	ljustment (Degaussing)						
Syntax	Command	:ZEROadjust						
		:DEMAg						
	Query	:ZEROadjust?						
		:DEMAg?						
	Response	<ok busy="" error=""></ok>						
		OK Operation completed successfully.						
		BUSY Currently performing a zero adjustment.						
	<b>a</b>	ERROR Zero adjustment failed.						
Description	Command	Performs a zero adjustment.						
	Query	Returns the zero adjustment execution results or current status.						
Example	Command	:ZERO						
	Query	:ZERO?						
	Response	(When HEADER ON) :ZEROADJUST OK						
		(When HEADER OFF) OK						
Note	• Some time is required to perform a zero adjustment (approximately 30 seconds).							
	During this time, some commands may result in an execution error. Use this command							
	-	vay that the next command is sent only after the zero adjustment						
	(degaussir	ng)is complete. For example, ":ZERO;*WAI".						
		adjustment has not been performed since the instrument was						
		n, :ZEROadjust? will return "OK".						
	-	this instrument does not provide degauss operation, DEMAG(?) will trigger the						
	•	eration as :ZEROadjust.						
	•	not change this setting during integration, while the display is held, or when						
		um/minimum values are being held.						

Set and Query the Multiple Instrument Synchronization Control Function						
Syntax	Command	:SYNC:CONTrol <off in="" out=""></off>				
	Query	:SYNC:CONTrol?				
	Response	<off in="" out=""></off>				
		OFF Turns OFF the synchronization control function.				
		IN Sets the instrument as the slave device.				
		OUT Sets the instrument as the master device.				
Description	Command	Sets or queries the I/O settings for multiple device synchronization control.				
Example	Command	:SYNC:CONT OUT				
-	Query	:SYNC:CONT?				
	Response	(When HEADER ON) :SYNC:CONTROL OUT				
		When HEADER OFF) OUT				
Note	<ul> <li>Reset the</li> </ul>	integration value for both the master and slaves before starting synchronized				

measurement of integration.

# (3) Voltage Range

Syntax	Query	:VOLTage?					
	Response	<voltage (nr1)="" range="">;<auto off="" on="" range="">;&lt; Select (NR1)&gt;</auto></voltage>					
Description		Queries the voltage range setting.					
Example	Query	:VOLT?					
-	Response	(When HEADER ON) :VOLTAGE:RANGE 15;AUTO ON;SELECT 63					
		(When HEADER OFF) 15; ON; 63					
Note	<ul> <li>You can</li> </ul>	use the :TRANsmit:SEParator command to change the message unit					
	separato	pr from a semicolon ";" to a comma ",".					
	<ul> <li>Instead of</li> </ul>	nstead of : VOLtage?, you can also use : VOLtage1?.					
	(Both of	these commands perform the same operation.)					

Set and Query the Voltage Auto Range							
Syntax	Command	:VOLTage:AUTO <on off=""></on>					
	Query	:VOLTage:AUTO?					
	Response	<on off=""></on>					
		ON Measures the voltage in an automatic range.					
		OFF Turns off the voltage automatic range operation.					
Description	Command	Turns ON or OFF the voltage auto range.					
-	Query	Returns the voltage auto range setting.					
Example	Command	:VOLT:AUTO ON					
•	Query	:VOLT:AUTO?					
	Response	(When HEADER ON) :VOLTAGE:AUTO ON					
		(When HEADER OFF) ON					
Note	<ul> <li>If you set</li> </ul>	the voltage range via a command such as :VOLTage:RANGe, the auto range					
	<ul> <li>You cann</li> </ul>	<ul> <li>operation will be turned OFF for the specified channel.</li> <li>You cannot change this setting during integration, while the display is held.</li> <li>Instead of : VOLtage:AUTO(?), you can also use : VOLtage1:AUTO(?).</li> </ul>					

(Both of these commands perform the same operation.)

# Set and Query the Voltage Range Setting

	•	Valige Setting						
Syntax	Command	:VOLTage:RANGe <voltage (nr1)="" range=""></voltage>						
	Query	:VOLTage:RANGe?						
	Response	<voltage (nr1)="" range=""></voltage>						
		<voltage (nr1)="" range=""> = 6/15/30/60/150/300/600/1000</voltage>						
Description	Command	Sets the voltage range setting. (The unit is in volts [V].)						
		The numerical value is accepted in NRf format.						
	Query	Returns the voltage range setting in NR1 format.						
Example	Command	:VOLT:RANG 15						
	Query	:VOLT:RANG?						
	Response	(When HEADER ON) :VOLTAGE:RANGE 15						
		(When HEADER OFF) 15						
Note	・Do not ap	opend a unit to the voltage range.						
	After you change the range, wait a few moments until the internal circuitry stabilizes							
	before you read any measurement values.							
	<ul> <li>If a negative value is specified, the absolute value will be used.</li> </ul>							
	<ul> <li>If the number of times to perform averaging is set to any value other than 1 and the range is changed, averaging is restarted.</li> </ul>							
	<ul> <li>If any value other than <voltage (nr1)="" range=""> is specified, the set value will be set to the range that can be measured.</voltage></li> </ul>							
	However, i	f the specified value exceeds the full scale of the range, the next highest be set instead.						
		is specified, the auto range operation is turned OFF. Additionally, range select						
		ot change this setting during integration, while the display is held.						
		: VOLtage: RANGe (?), you can also use : VOLtage1: RANGe (?).						
		hese commands perform the same operation.)						
	•	,						

## Set Whether to Select All Voltage Ranges

Syntax	Query	:VOLTage:SELect:ALL <on off=""></on>							
Description		Sets whether to select all voltage ranges.							
Example	Query	:VOLT:SEL:ALL ON?							
	Response	(When HEADER ON) :VOLTAGE:RANGE 15;AUTO ON;SELECT 63							
		(When HEADER OFF) 15; ON; 63							
Note	<ul> <li>The 1,000 V range is always on, regardless of the value of this setting.</li> </ul>								
	·Specifying a voltage range with the ":VOLTage:RANGe" command will cause range								
	select for th	select for the specified range to be turned on.							
		te the :TRANsmit:SEParator command to change the message unit rom a semicolon ";" to a comma ",".							
	• You can	ot change this setting during integration, while the display is held, or when							

• You cannot change this setting during integration, while the display is held, or when the maximum/minimum values are being held.

### Set and Query Voltage Range Select

and Query V	onage Ran	ye select					
Syntax	Command	:VOLTag	e:SELect:U6V <on off=""></on>				
		:VOLTag	e:SELect:U15V <on off=""></on>				
		:VOLTag	e:SELect:U30V <on off=""></on>				
		:VOLTag	e:SELect:U60V <on off=""></on>				
		:VOLTag	e:SELect:U150V <on off=""></on>				
		:VOLTag	e:SELect:U300V <on off=""></on>				
		:VOLTag	e:SELect:U600V <on off=""></on>				
	Query	:VOLTag	e:SELect:U6V?				
		:VOLTage:SELect:U15V?					
		:VOLTag	e:SELect:U30V?				
		:VOLTag	e:SELect:U60V?				
		:VOLTag	e:SELect:U150V?				
		:VOLTag	e:SELect:U300V?				
		:VOLTage:SELect:U600V?					
		:VOLTage:SELect:U1000V?					
	Response	<on off=""></on>					
		ON	Performs measurement using the voltage range in				
			question during range key operation, auto-range				
		OFF	operation, and auto-range integration.				
		OFF Disables use of the voltage range in question during range key operation, auto-range operation, and					
			auto-range integration.				
Description	Command	Toggles use	e of the voltage range in question during auto-range operation				
	_	and auto-ra	nge integration.				
	Query		ether the voltage range in question is used during auto-range				
Evennle	Command	•	nd auto-range integration.				
Example	Query	:VOLT:SEI	L:U30V ON				
	Response	(When HEADE					
		(When HEADE					
Note	<ul> <li>Specifyin</li> </ul>	1	ange with the ":VOLTage:RANGe" command will cause range				
			ange to be turned on.				
			s setting during integration, while the display is held, or when				
	the maximum/minimum values are being held.						

•Since use of the 1,000 V range is always enabled, queries will always return ON.

# Set and Query Voltage Range Select

Syntax	Command	:VOLT	age:Sl	ELect	<data(< th=""><th>NR1)&gt;</th><th></th><th></th><th></th></data(<>	NR1)>			
	Query	:VOLT	:VOLTage:SELect?						
	Response	<data></data>							
		128	64	32	16	8	4	2	1
		<data(n< th=""><th>VR1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></data(n<>	VR1)>						
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
		-	1000V	600V	300V	150V	60V	30V	15V
Description			-	-	-				operation,
			• •			•	•		e from 0 to
			0		al values	are accep	oted, valu	es to the	right of the
<b>F</b>	Command		are trunca						
Example	Commanu		SEL 124		a that th	a 15 V a	nd 20 \/		wa akinpad
	Query	Configures the setting so that the 15 V and 30 V ranges are skipped. :VOLT:SEL?							
	Response	(When HEADER ON) :VOLTAGE:SELECT 124							
	•	1	(When HEADER OFF) 124						
Note	This comm	This command is provided to ensure compatibility with control programs for existing							
	models (333					•			•
	recommend	led to use	comman	ds such a	s :VOLTa	age:SELe	ct:6V.	•	
		recommended to use commands such as :VOLTage:SELect:6V. <ul> <li>This query cannot be used to query the 6 V range use setting.</li> </ul>							
	<ul> <li>If this com</li> </ul>	mand is u	sed to se	t whether	to select	voltage ra	anges, the	e 6 V rang	ge use
	setting will b	be set to C	DFF.						
	<ul> <li>This comm</li> </ul>					•		•	,
	<ul> <li>Specifying</li> </ul>					RANGe"	command	d will caus	se range
	select for th		-			on while t	ha dianla	via hold	orwhon
	You cann     the maxim	•		• •	•	Jii, wrille t	ne displa	y is neid,	or when
	the maxim		um value	s are bell	ig neid.				

## (4) Current Range

Batch Query of Current Range Settings							
Syntax	Query	:CURRent?					
	Response	<current (nr2)="" range="">;<auto off="" on="" range="">,<current sensor="" type="">,<current range="" sensor="">,<select (nr1)="">, <select (nr1)=""></select></select></current></current></auto></current>					
Description		Queries the current range setting.					
Example	Query	:CURR?					
	Response	(When HEADER ON)	:CURRENT:RANGE 0.2;AUTO OFF; TYPE TYPE2;EXTRANGE C50;SELECT				
			255,32				
		(When HEADER OFF)	0.2; OFF; TYPE2; C50				
Note	・You can	You can use the :TRANsmit:SEParator command to change the message unit					
	separator	from a semicolon ";	" to a comma ",".				
	<ul> <li>See the second se</li></ul>	e sections on :CURRent:RANGe,AUTO,TYPe,EXTRange,SELect for details on					
	•	onses for this query. of :CURRent?, you can also use :CURRent1?.					

(Both of these commands perform the same operation.)

uciy the ounci	IL AULO MUI	
Syntax	Command	:CURRent:AUTO <on off=""></on>
	Query	:CURRent:AUTO?
	Response	<on off=""></on>
		ON Measures the current in an automatic range.
		OFF Turns off the current automatic range operation.
Description	Command	Turns ON or OFF the current auto range.
	Query	Returns the current auto range setting.
Example	Command	:CURR:AUTO ON
	Query	:CURR:AUTO?
	Response	(When HEADER ON) :CURRENT: AUTO ON
		(When HEADER OFF) ON
Note	<ul> <li>If you set</li> </ul>	the current range via a command such as :CURRent:RANGe,
	<ul> <li>You canne</li> </ul>	nge operation will be turned OFF for the specified channel. ot change this setting during integration, while the display is held. :CURRent:AUTO(?), you can also use :CURRent1:AUTO(?).

(Both of these commands perform the same operation.)

Syntax	Command	:CURRent:RANGe <current (nr2)="" range=""></current>
2	Query	:CURRent:RANGe?
	Response	<current (nr2)="" range=""></current>
		<current (nr2)="" range=""> =</current>
		0.001/0.002/0.005/0.01/0.02/0.05/0.1/0.2/0.5/1/2/5/10/20
Description	Command	Sets the current range setting. (The unit used for current is amperes [A].)
		NRf numerical values are accepted
	Query	Returns the current range setting in NR1 format.
Example	Command	:CURR:RANG 0.2
	Query	:CURR:RANG?
	Response	(When HEADER ON) :CURRENT:RANGE 0.2
		(When HEADER OFF) 0.2
		pend a unit to the current range.
		he change the range, wait a few moments until the internal circuitry stabilizes
		read any measurement values.
		s specified, the auto range operation is turned OFF. Range select will be turned
	DN.	per of times to perform averaging is set to any value other than 1 and the range
		averaging is restarted.
		e other than <current (nr2)="" range=""> is specified, the set value will be set to th</current>
	•	an be measured.
	However, if	the specified value exceeds the full scale of the range, the next highest range
	will be set in	
	-	ve value is specified, the absolute value will be used.
		t change this setting during integration, while the display is held.
	•	using a current sensor, use the :CURRent:EXTRange(?) command. RANGe(?) performs the same operation.

# Set Whether to Select All Auto-range Current Ranges

Syntax	Command	:CURRent:SELect:ALL ON/OFF
Description	Command	Sets whether to enable use of all current ranges and external current
Example	Command	sensors during auto-range operation and auto-range integration. :CURR:SEL:ALL ON
Note	<ul> <li>Use of the</li> </ul>	100 mA and 20 A ranges as well as the external current sensor C5A range is
	,	bled, regardless of the value of this setting. a current range with the ":CURRent:RANGe" command will cause range
	select for th	e specified range to be turned on.
	You cannot ch	ange this setting during integration, while the display is held, or when the

• You cannot change this setting during integration, while the display is held, or when the maximum/minimum values are being held.

C.mta-	Command	CUDDanti SEL actult - A CNVOSS
Syntax	Command	:CURRent:SELect:I1mA ON/OFF
		:CURRent:SELect:I2mA ON/OFF
		:CURRent:SELect:I5mA ON/OFF
		:CURRent:SELect:I10mA ON/OFF
		:CURRent:SELect:I20mA ON/OFF
		:CURRent:SELect:I50mA ON/OFF
		:CURRent:SELect:I200mA ON/OFF
		:CURRent:SELect:I500mA ON/OFF
		:CURRent:SELect:I1A ON/OFF
		:CURRent:SELect:I2A ON/OFF
		:CURRent:SELect:I5A ON/OFF
		:CURRent:SELect:I10A ON/OFF
		:CURRent:SELect:C1A ON/OFF
		:CURRent:SELect:C2A ON/OFF
	Query	:CURRent:SELect:I1mA?
		:CURRent:SELect:I2mA?
		:CURRent:SELect:I5mA?
		:CURRent:SELect:I10mA?
		:CURRent:SELect:I20mA?
		:CURRent:SELect:I50mA?
		:CURRent:SELect:I100mA?
		:CURRent:SELect:I200mA?
		:CURRent:SELect:I500mA?
		:CURRent:SELect:I1A?
		:CURRent:SELect:I2A?
		:CURRent:SELect:I5A?
		:CURRent:SELect:I10A?
		:CURRent:SELect:I20A?
		:CURRent:SELect:C1A?
		:CURRent:SELect:C2A?
		:CURRent:SELect:C5A?
	Response	<on off=""></on>
		ON Performs measurement using the current range in
		question during range key operation, auto-range
		operation, and auto-range integration.
		OFF Disables use of the current range in question during
		range key operation, auto-range operation, and
Description	Command	auto-range integration. Toggles use of the current range in question during range key operatior
Description		auto-range operation, and auto-range integration.
	Query	Returns whether the current range in question is used during range ke
		operation, auto-range operation, and auto-range integration
Example	Command	:CURR:SEL:I5A ON
	Query	:CURR:SEL:I5A?
	Response	(When HEADER ON) :CURRENT:SELECT:I5A ON
		(When HEADER OFF) ON
Note	command •You canno	g a current range with the :CURRent:RANGe or :CURRent:EXTRange d will cause range select for the specified range to be turned on. ot change this setting during integration, while the display is held, or when th /minimum values are being held.
		e of the 100 mA and 20 A ranges as well as the external current sensor 5 A
		always enabled, queries will always return "ON."
	-	

(the "m" in "1 mA" an similar text cannot be omitted).

Syntax	Command	:CURF	Rent:S	ELect	<data1< th=""><th>(NR1)&gt;, •</th><th><data2(n< th=""><th>IR1)&gt;</th><th></th></data2(n<></th></data1<>	(NR1)>, •	<data2(n< th=""><th>IR1)&gt;</th><th></th></data2(n<>	IR1)>	
	Query	:CURF	Rent:S	ELect?					
	Response		, <data2></data2>						
		128	64	32	16	8	4	2	1
		<data1< td=""><td>, ,</td><td>- · · -</td><td></td><td></td><td></td><td></td><td></td></data1<>	, ,	- · · -					
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
		200mA	100mA	50mA	20mA	10mA	5mA	2mA	1mA
		<data2< td=""><td>ì í</td><td>LUE</td><td>1.11.4</td><td></td><td></td><td>1.114</td><td></td></data2<>	ì í	LUE	1.11.4			1.114	
		Bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
Description		-	-	20A	10A	5A	2A	1A	500mA
Description			-		-	e settings le integrat	-		-
			or from 0		auto-rang	einegia	lion as a		11 0 10 2
		. ,			alues are	accepte	d. values	to the ri	aht of t
		•	are trunca				,		0
Example	Command		SEL 25						
	0	-		etting sc	that the	1 mA ar	nd 2 mA	ranges a	re skip
	Query	:CURR	-						
	Response	`	ADER ON)			LECT 2	53, 63		
		(	'	253, 63					
Note	This com		ovided to	ensure co	ompatibili	ty with co	ntrol prog	rams for e	existing
	models (33 To take ma		vantago (	of the DM	2225' c fi	unctionalit	vitic roo	ommond	ad to us
	commands					Inclionalit	y, it is rec	ommenu	
	•This com					uerv exte	rnal curre	nt sensor	range u
	settings.		,			,			<b>J</b>
	This com	mand cann	ot be use	d to set th	ne 100 m	A or 20 A	ranges (\	which are	always
	<ul> <li>Specifyin</li> </ul>	g a current	range wi	th the :Cl	JRRent:R	ANGe co	mmand w	vill cause	range se
		posified rer	nao to ho	turned or	1				
	for the sp You cannot c								

## Set and Query External Current Sensor Input

Syntax	Command	:CURRent:TYPe <external current="" sensor="" type=""></external>
	Query	:CURRent:TYPe?
	Response	<external current="" sensor="" type=""></external>
		<external current="" sensor="" type=""> = OFF/TYPE1/TYPE2</external>
Description	Command	Sets the external current sensor type.
	Query	Returns the current sensor range setting as a string.
Example	Command	:CURR:TYPE TYPE1
-	Query	:CURR:TYPE?
	Response	(When HEADER ON) :CURRENT:TYPE TYPE1
		When HEADER OFF) <b>TYPE1</b>

 $\textbf{Note} \cdot \textbf{After you change this setting, wait a few moments until the internal circuitry stabilizes}$ 

before you read any measurement values.

• If the number of times to perform averaging is set to any value other than 1 and the range is changed, averaging is restarted.

• You cannot change this setting during integration, while the display is held, or when the maximum/minimum values are being held.

• If the instrument does not have external current sensor input, a hardware error will result.

Set and Query th	e Current	Range (When Using an External Current Sensor)	
	Command Query Response	:CURRent:EXTRange <external current="" range="" sensor=""> :CURRent:EXTRange? <external current="" range="" sensor=""> <external current="" range="" sensor=""> = C1/C2/C5</external></external></external>	
Description		Sets the external current range. Unlike other commands such as :CURRent:RANGe, an error will occur if any value other than the above <external current="" range="" sensor=""> is specified.</external>	
Example	Query Command Query Response	Returns the external current sensor range setting as a string. :CURR:EXTR C5 :CURR:EXTR? (When HEADER ON) :CURRENT:EXTRANGE C5 (When HEADER OFF) C5	
Note	<ul> <li>After you the change the range, wait a few moments until the internal circuitry stabilizes before you read any measurement values.</li> <li>If a range is specified, the auto range operation is turned OFF.</li> <li>If the number of times to perform averaging is set to any value other than 1 and the range is changed, averaging is restarted.</li> <li>An error will occur if any value other than the above <external current="" range="" sensor=""> is specified.</external></li> <li>You cannot change this setting during integration, while the display is held, or when the maximum/minimum values are being held.</li> </ul>		

# (5) Frequency Range (Zero-crossing Filter)

Syntax	Query	:FREQuency?
	Response	<frequency (nr3)="" range=""></frequency>
Description		Queries the frequency range setting.
Example	Query	:FREQuency?
	Response	(When HEADER ON) :FREQUENCY:RANGE +500.0E+0
		(When HEADER OFF) +500.0E+0
Note		uency range and zero-crossing filter settings are linked.
		of :FREQuency?, you can also use :FREQuency1?.
	(Both d	of these commands perform the same operation.)
	-	
and Query th		
Syntax	Command	:FREQuency:RANGe <frequency (nr3)="" range=""></frequency>
	Query	:FREQuency:RANGe?
	Response	<frequency (nr3)="" range=""></frequency>
		<frequency (nr3)="" range=""> =</frequency>
	- ·	+100.0E+0,+500.0E+0,+5.0E+3,+100.0E+3
Description	Command	Sets the frequency range. (The unit used for frequency is hertz [Hz].)
	•	NRf numerical values are accepted.
	Query	Returns the frequency range setting in NR3 format.
Example		:FREQ:RANG 500E+0
	Query	:FREQ:RANG?
	Response	(When HEADER ON) :FREQUENCY:RANGE +500.0E+0
	_	(When HEADER OFF) +500.0E+0
Note		append a unit to the frequency range.
	•	u the change the range, wait a few moments until the internal circuitry
		before you read any measurement values.
		ne setting is applied to all channels which are a part of a wiring type.
		imber of times to perform averaging is set to any value other than 1 and the
		changed, averaging is restarted.
	-	alue other than <frequency (nr3)="" range=""> is specified, the set value will be s</frequency>
		nge that can be measured. , if the specified value exceeds the full scale of the range, the next highest
		I be set instead.
	U U	cution error will occur if any value that exceeds the maximum range (100 kHz
		egative value is specified.
		not change this setting during integration, while the display is held, or when
		num/minimum values are being held.
	<ul> <li>Instead c</li> </ul>	of :FREQuency:RANGe(?), you can also use :FREQuency1:RANGe(?).

## (6) Synchronization Source

	-	
Set and Query th	le Synchron	ization Source
Syntax	Command	:SOURce <synchronization source=""></synchronization>
	Query	:SOURce?
	Response	<synchronization source=""></synchronization>
		<synchronization source=""> = U / I / DC</synchronization>
Description		Sets or queries the synchronization source setting.
Example	Command	:SOUR U
-	Query	:SOUR?
	Response	(When HEADER ON) :SOURCE U
		(When HEADER OFF) U
Note	<ul> <li>After you cl</li> </ul>	nange this setting, wait a few moments until the internal circuitry stabilizes
	before you r	ead any measurement values.
	The same s	setting is applied to all channels which are a part of a wiring type.
	<ul> <li>If the numb</li> </ul>	er of times to perform averaging is set to any value other than 1 and this
	settina is ch	anged, averaging is restarted.
	•	change this setting during integration, while the display is held, or when
		n/minimum values are being held.
		SOURce?, you can also use :SOURce1?.

(Both of these commands perform the same operation.)

#### Set and Query the Synchronization Timeout

Syntax	Command	:SOURce:TIMEOut <timeout (nr2)="" value=""></timeout>
	Query	:SOURce:TIMEOut?
	Response	<timeout (nr2)="" value=""></timeout>
		<Timeout value> = 0.1/1/10
Description		Sets or queries the synchronization timeout.
		(The unit used is seconds [sec].)
Example	Command	:SOUR:TIMEO 1
	Query	:SOUR:TIMEO?
	Response	(When HEADER ON) :SOURCE:TIMEOUT 1.0
		(When HEADER OFF) 1.0
Note	・Do not app	end a unit to this setting.
	<ul> <li>After you cl</li> </ul>	nange this setting, wait a few moments until the internal circuitry stabilizes
	before you r	ead any measurement values.

• If the number of times to perform averaging is set to any value other than 1 and this setting is changed, averaging is restarted.

• You cannot change this setting during integration, while the display is held, or when the maximum/minimum values are being held.

Instead of :SOURce:TIMOut(?), you can also use :SOURce1:TIMOut(?).

(Both of these commands perform the same operation.)

Set All Zero-cross Threshold Levels						
Syntax	Command	:SOURce:FILTer:LEVel:ALL <1~15(NR1)>				
Description	Command	Sets the zero-cross threshold level for all voltage and current ranges.				
Example	Command	:SOUR:FILT:LEV:ALL 1				
Note	<ul> <li>Changing</li> </ul>	·Changing this setting when the number of times to perform averaging is set to a value				
	<ul> <li>Although N truncated.</li> <li>You cann</li> </ul>	I will cause averaging processing to be restarted. NRf numerical values are accepted, values to the right of the decimal are ot change this setting during integration, while the display is held, or when um/minimum values are being held.				

Syntax	Command	:SOURce:FILTer:LEVel:U6V <1~15 (NR1)>
		:SOURce:FILTer:LEVel:U15V <1~15 (NR1)>
		:SOURce:FILTer:LEVel:U30V <1~15 (NR1)>
		:SOURce:FILTer:LEVel:U60V <1~15 (NR1)>
		:SOURce:FILTer:LEVel:U150V <1~15 (NR1)>
		:SOURce:FILTer:LEVel:U300V <1~15 (NR1)>
		:SOURce:FILTer:LEVel:U600V <1~15 (NR1)>
		:SOURce:FILTer:LEVel:U1000V <1~15 (NR1)>
	Query	:SOURce:FILTer:LEVel:U6V?
		:SOURce:FILTer:LEVel:U15V?
		:SOURce:FILTer:LEVel:U30V?
		:SOURce:FILTer:LEVel:U60V?
		:SOURce:FILTer:LEVel:U150V?
		:SOURce:FILTer:LEVel:U300V?
		:SOURce:FILTer:LEVel:U600V?
		:SOURce:FILTer:LEVel:U1000V?
	Response	<1~15(NR1)>
Description	Command	Sets zero-cross threshold values.
		Although NRf numerical values are accepted, values to the right of the
	Query	decimal are truncated.
Example	Command	Queries zero-cross threshold values. :SOUR:FILT:LEV:U6V 1
Lyampie	Query	:SOUR:FILT:LEV:U6V?
	Response	(When HEADER ON) :SOURCE:FILTER:LEVEL:U6V 1
		(When HEADER OFF) 1
Note	<ul> <li>Changing</li> </ul>	this setting when the number of times to perform averaging is set to a value
	other than	1 will cause averaging processing to be restarted.
	<ul> <li>You can</li> </ul>	not change this setting during integration, while the display is held, or when

You cannot change this setting during integration, the maximum/minimum values are being held.

Set and Query Zero-cross	Threshold Values (Current Ranges)
Syntax Command	:SOURce:FILTer:LEVel:I1mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I2mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I5mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I10mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I20mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I50mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I100mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I200mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I500mA <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I1A <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I2A <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I5A <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I10A <1~15 (NR1)>
	:SOURce:FILTer:LEVel:I20A <1~15 (NR1)>
Query	:SOURce:FILTer:LEVel:I1mA?
	:SOURce:FILTer:LEVel:I2mA?
	:SOURce:FILTer:LEVel:I5mA?
	:SOURce:FILTer:LEVel:I10mA?
	:SOURce:FILTer:LEVel:I20mA?

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		:SOURce:FILTer:LEVel:I50mA?
		:SOURce:FILTer:LEVel:I100mA?
		:SOURce:FILTer:LEVel:I200mA?
		:SOURce:FILTer:LEVel:I500mA?
		:SOURce:FILTer:LEVel:I1A?
		:SOURce:FILTer:LEVel:I2A?
		:SOURce:FILTer:LEVel:I5A?
		:SOURce:FILTer:LEVel:I10A?
	-	:SOURce:FILTer:LEVel:I20A?
	Response	<1~15(NR1)>
Description	Command	Sets zero-cross threshold values.
		Although NRf numerical values are accepted, values to the right of the
	_	decimal are truncated.
	Query	Queries zero-cross threshold values.
Example	Command	:SOUR:FILT:LEV:I1A 1
	Query	:SOUR:FILT:LEV:I1A?
	Response	(When HEADER ON) :SOURCE:FILTER:LEVEL:I1A 1
		(When HEADER OFF) 1
Note		this setting when the number of times to perform averaging is set to a value 1 will cause averaging processing to be restarted.

• You cannot change this setting during during integration, while the display is held, or when the maximum/minimum values are being held.

Set and Query Ze	ero-cross T	hreshold Values (external current sensor)
Syntax	Command	:SOURce:FILTer:LEVel:C1A <1~15 (NR1)>
		:SOURce:FILTer:LEVel:C2A <1~15 (NR1)>
		:SOURce:FILTer:LEVel:C5A <1~15 (NR1)>
	Query	:SOURce:FILTer:LEVel:C1A?
		:SOURce:FILTer:LEVel:C2A?
		:SOURce:FILTer:LEVel:C5A?
	Response	<1~15(NR1)>
Description	Command	Sets zero-cross threshold values.
		Although NRf numerical values are accepted, values to the right of the
	Query	decimal are truncated. Queries zero-cross threshold values.
Example	<b>,</b>	:SOUR:FILT:LEV:C1A 1
Liniple	Query	:SOUR:FILT:LEV:C1A?
	Response	(When HEADER ON) :SOURCE:FILTER:LEVEL:C1A 1
		(When HEADER OFF) 1
Note	other than 1 • You canno	this setting when the number of times to perform averaging is set to a value will cause averaging processing to be restarted. t change this setting during integration, while the display is held, or when m/minimum values are being held.

## (7) VT Ratio/CT Ratio

· · ·	0						
Syntax		:SCALe?					
	Response	<vt (nr2)="" ratio="">,<ct ratio(nr2)=""></ct></vt>					
Description	_	Queries the VT (PT) ratio and CT ratio setting values.					
Example	Query	:SCAL?					
	Response	(When HEADER ON) :SCALE:VT 2.0;CT 3.000					
		(When HEADER OFF) 2.0;3.000					
et and Query th	o VT Ratio	Setting					
Syntax	Command	:SCALe:VT <vt (nr2)="" ratio=""></vt>					
Oymax	Query	• •					
	Response	:SCALe:VT?					
	Response	<vt (nr2)="" ratio=""></vt>					
Description	Command	<vt< math=""> ratio (NR2)&gt; = 0.001 to 1000</vt<>					
Description	Command	Sets the VT (PT) ratio.					
	Query	NRf numerical values are accepted.					
Example	Command	Returns the VT ratio setting in NR2 format. :SCAL:VT 1.2					
Lyampie	Query	:SCAL:VT?					
	Response	(When HEADER ON) :SCALE:VT 1.200					
	·	(When HEADER OFF) 1.200					
Note	<ul> <li>If the num</li> </ul>	ber of times to perform averaging is set to any value other than 1 and the					
		nged, averaging is restarted.					
		the setting will cause the maximum and minimum values to be reset.					
	• You cann	ot change this setting during integration, while the display is held, or when					
	the maximum/minimum values are being held.						
	the maxim	um/minimum values are being held.					

perform the same operation.)

Set and Quer	y the CT	Ratio	Setting
--------------	----------	-------	---------

Syntax	Command	:SCALe:CT <ct (nr2)="" ratio=""></ct>
-	Query	:SCALe:CT?
	Response	<ct (nr2)="" ratio=""></ct>
		<ct (nr2)="" ratio=""> = 0.001 to 1000</ct>
Description	Command	Sets the CT ratio.
•		NRf numerical values are accepted.
	Query	Returns the CT ratio setting in NR2 format.
Example	Command	:SCAL:CT 2.1
•	Query	:SCAL:CT?
	Response	(When HEADER ON) :SCALE:CT 2.100
		(When HEADER OFF) 2.100
Note	<ul> <li>If the numbe</li> </ul>	r of times to perform averaging is set to any value other than 1 and the

range is changed, averaging is restarted.

· Changing the setting will cause the maximum and minimum values to be reset.

• You cannot change this setting during integration, while the display is held, or when the maximum/minimum values are being held.

# (8) D/A output

Set and Query D	A Output	(D/A1) Settings		
Syntax	Command	Output Terminal D/A1	:AOUT	<output item=""></output>
	Query	Output Terminal D/A1	:AOUT?	
	Response	<output item=""></output>		
				em Specifications for details about the
		<output item=""> fi</output>	eld.	
Description	Command	D/A1 Output Iter	n	
	Query	Returns the D/A	1 output item	. (Same as :AOUT:ITEM:DA1.)
Example	Command	:AOUT S		
	Query	:AOUT?		
	Response	(When HEADER ON)	:AOUT	:ITEM:DA1 S
		When HEADER OFF		
Note	You can u	use the AOUT ITEM(?	) command t	o query and set DA1 through DA7.

Note You can use the AOUT:ITEM(?) command to query and set DA1 through DA7. •A device error will occur on units that do not have a D/A output.

## Set and Query the D/A Output Terminal (D/A1 to D/A7) Output Items

	Commond						
Syntax	Command	Output Terminal D/A1	:AOUT:ITEM:DA1	<d a="" item="" output=""></d>			
		Output Terminal D/A2	:AOUT:ITEM:DA2	<d a="" item="" output=""></d>			
		Output Terminal D/A3	:AOUT:ITEM:DA3	<d a="" item="" output=""></d>			
		Output Terminal D/A4	:AOUT:ITEM:DA4	<d a="" item="" output=""></d>			
		Output Terminal D/A5	:AOUT:ITEM:DA5	<d a="" item="" output=""></d>			
		Output Terminal D/A6	:AOUT:ITEM:DA6	<d a="" item="" output=""></d>			
		Output Terminal D/A7	:AOUT:ITEM:DA7	<d a="" item="" output=""></d>			
	Query	Output Terminal D/A1	:AOUT:ITEM:DA1	?			
		Output Terminal D/A2	:AOUT:ITEM:DA2	?			
		Output Terminal D/A3	:AOUT:ITEM:DA3	?			
		Output Terminal D/A4	:AOUT:ITEM:DA4	?			
		Output Terminal D/A5	:AOUT:ITEM:DA5	?			
		Output Terminal D/A6	:AOUT:ITEM:DA61	?			
		Output Terminal D/A7	:AOUT:ITEM:DA7	?			
	Response	<d a="" ite<="" output="" th=""><th>m&gt;</th><th></th></d>	m>				
		See the D/A or	utput item specification lis	<u>st</u> for details.			
Description		Sets or queries	the output (rectification m	ethod) of the D/A output terminals			
-		(DA1 to DA7).					
Example	Command	:AOUT:ITEM:	DA1 WP				
	Query	:AOUT:ITEM:	:DA1?				
	Response	(When HEADER Of	N) :AOUT:ITEM:DA1	WP			
		(When HEADER OF	-F) <b>WP</b>				
Note: A device error will easily on units that do not have a D/A output							

 $\ensuremath{\textbf{Note}}\xspace A$  device error will occur on units that do not have a D/A output.

# Set and Query Current Range Select during D/A Output Terminal (D/A 1 to 7) Integrated Value Output

legrated value	Output		
Syntax	Command	Output Terminal D/A1	:AOUT:IRANge:DA1 <integrated (nr2)="" current="" range="" value=""></integrated>
-		Output Terminal D/A2	:AOUT:IRANge:DA2 < integrated value current range (NR2)>
		Output Terminal D/A3	:AOUT:IRANge:DA3 < integrated value current range (NR2)>
		Output Terminal D/A4	:AOUT:IRANge:DA4 < integrated value current range (NR2)>
		Output Terminal D/A5	:AOUT:IRANge:DA5 < integrated value current range (NR2)>
		Output Terminal D/A6	:AOUT:IRANge:DA6 <integrated (nr2)="" current="" range="" value=""></integrated>
		Output Terminal D/A7	:AOUT:IRANge:DA7 <integrated (nr2)="" current="" range="" value=""></integrated>
	Query	Output Terminal D/A1	:AOUT:IRANge:DA1?
		Output Terminal D/A2	:AOUT:IRANge:DA2?
		Output Terminal D/A3	:AOUT:IRANge:DA3?
		Output Terminal D/A4	:AOUT:IRANge:DA4?
		Output Terminal D/A5	:AOUT:IRANge:DA5?
		Output Terminal D/A6	:AOUT:IRANge:DA6?
	_	Output Terminal D/A7	:AOUT:IRANge:DA7?
	Response		alue current range (NR2)>
		0	
		BACKUP	1 / 2 / 5 / 10 / 20
Description			es exist for each current range when auto-range integration
		-	This command sets or queries the current range for which to
			en outputting integrated values. (Unit: ampere [A])
			values are accepted.
			e 0 is selected, integrated values for all ranges are added,
Example	Command		ng total value is output. rrent range setting as an NR2-format value or string.
Example	Query	:AOUT:IRAN	
	Response	(When HEADER OI	•
		(When HEADER OF	,
Note	A device e	i.	its that do not have a D/A output.
	When auto	o-range integration is	s off, changing the setting results in an execution error. For DA
	•		output regardless of the setting.
			<integrated (nr2)="" current="" range="" value=""> will cause the setting</integrated>
			an measure the specified value." However, the next range up
		-	ull-scale value is exceeded. I, the absolute value will be used.
	n a negativ		

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# D/A output item specification list

(For :AOUT:ITEM	I:DA1∼	7)	-				
Description			0.4		Parameter L		
			(Values in parentheses can also be used.)				
Quitout itomo	Speed	Full-scale or output range	Rectification Method				
Output items	Speed	(5 V f.s.)	ACDC	ACDC UMEAN	DC	AC	FND
	Level	2Vf.s.	U (V,V1,U1)	UMN	UDC	UAC	UFND
		5Vf.s.	U_5V	UMN_5V	UDC_5V	UAC_5V	UFND_5V
Voltage (U)	High-	2Vf.s.	U_F				
	speed level	5Vf.s.	U_F5V				
	Wave form	1Vf.s.	U_WV				
	Level	2Vf.s.	l (A,A1,I1)	(IMN)	IDC	IAC	IFND
		5Vf.s.	I_5V	(IMN_5)	IDC_5V	IAC_5V	IFND_5V
Current (I)	High-	2Vf.s.	I_F				
	speed level	5Vf.s.	I_F5V				
	Wave form	1Vf.s.	I_WV				
	Level	2Vf.s.	P (W,W1,P1)	PMN	PDC	PAC	PFND
Active power		5Vf.s.	P_5V	PMN_5V	PDC_5V	PAC_5V	PFND_5V
	High-	2Vf.s.	P_F	<u>_F</u>			
(P)	speed level	5Vf.s.	P_F5V	V			
	Wave form	1Vf.s.	P_WV				
Apparent power	Level	2Vf.s.	S (VA,VA1,S1)	SMN		SAC	SFND
(S)		5Vf.s.	S_5V	SMN_5V		SAC_5V	SFND_5V
Inactive power (Q)	Level	2Vf.s.	Q (VAR,VAR1, Q1)	QMN		QAC	QFND
		5Vf.s.	Q_5V	QMN_5V		QAC_5V	QFND_5V
Power factor (λ)	Level	2Vf.s.	PF (PF1)	PFMN		PFAC	PFFND
		5Vf.s.	PF_5V	PFMN_5V		PFAC_5V	PFFND_5V
Phase angle (φ)	Level	2Vf.s.				DEGAC	DEGFND
	Lovoi	5Vf.s.				DEGAC_5V	DEGFND_5V
		0.5Hz			FREQU_(		
		5Hz			FREQU_		
		50Hz		FREQU_50 or			
Voltage	Level		FREQU				
frequency (f)		500Hz			FREQU_5	00	
		5kHz			FREQU_5		
		50kHz			FREQU_5		
		500kHz			FREQU_50		
		0.5Hz			FREQI_0		
Current	Level	5Hz			FREQI_		
frequency (f)		50Hz			FREQI_5 or	0	
	1		UI				

Desc		Parameter List (Values in parentheses can also be used.)						
		Full-scale or	(**		ectification Me			
Output items	Speed	output range (5 V f.s.)	ACDC	ACDC UMEAN	DC	AC	FND	
				ONLAR	FREQI			
		500Hz			FREQI 50	)0		
		5kHz		FREQI 5K				
		50kHz		FREQI_50K				
		500kHz			FREQI_50	0K		
		5mAh			PIHDC_0005	/	1 /	
		50mAh	/	/	PIHDC_005	/		
		500mAh			PIHDC_05			
		5Ah			PIHDC_5	/		
					PIHDC_	/		
Positive		50Ah			50 or			
current					PIHDC	/		
integration	Level	500Ah			PIHDC_500			
(See Note 1.)		5kAh			PIHDC_5K			
,		50kAh			PIHDC_50K			
		500kAh			PIHDC_500K			
		5MAh			PIHDC_5M			
		50MAh			PIHDC_50M			
		500MAh	/	/	PIHDC_500M	/	/	
		5000MAh	/	/	PIHDC_5000M	/	/	
		5mAh			MIHDC_0005	/		
		50mAh			MIHDC_005	/	/	
		500mAh	- /		MIHDC_05	/		
		5Ah			MIHDC_5 MIHDC_50			
		50Ah			or			
Negative		00/11			MIHDC			
current	Level	500Ah			MIHDC_500	/		
integration		5kAh			MIHDC_5K			
(See Note 1.)		50kAh			MIHDC_50K			
		500kAh			MIHDC_500K			
		5MAh			MIHDC_5M			
		50MAh			MIHDC_50M			
		500MAh	/	/	MIHDC_500M	/	/	
		5000MAh 5mAh			MIHDC_5000M	1	<u>/</u> /	
		50mAh	IH_0005 IH_005	IHMN_0005 IHMN_005	IHDC_0005 IHDC_005	/	/	
		500mAh	IH_05	IHMN_05	IHDC_005	/	/	
		5Ah	IH_5	IHMN_5	IHDC_5	/		
			IH_50			/		
Current			or	IHMN_50	IHDC_50	/		
Current integration		50Ah	IH	or	or	/		
(total sum)	Level		(AH,AH1,	IHMN	IHDC	/		
(See Note 1.)		FOOAL	IH1)			/		
(See Note 2.)		500Ah	IH_500	IHMN_500	IHDC_500	/		
		5kAh 50kAh	IH_5K IH_50K	IHMN_5K IHMN_50K	IHDC_5K IHDC_50K	/		
		500kAh	IH_500K	IHIVIN_500K	IHDC_500K	/		
		500kAn 5MAh	IH_5M	IHMN_500K	IHDC_500K	/		
		50MAh	IH_50M	IHMN_50M	IHDC_50M	/	/	
		500MAh	IH_500M	IHMN_500M	IHDC_500M	/	/	
L	1						v	

Desc		Parameter List (Values in parentheses can also be used.)																				
		Full-scale or			ectification M																	
Output items	Speed	output range (5 V f.s.)	ACDC	ACDC UMEAN	DC	AC	FND															
		5000MAh	IH_5000M	IHMN_5000M	IHDC_5000M																	
		5mWh	PWP_0005	PWPMN_0005	PWPDC_0005		/															
		50mWh	PWP_005	PWPMN_005	PWPDC_005		/															
		500mWh	PWP_05	PWPMN_05	PWPDC_05	. /																
		5Wh	PWP_5	PWPMN_5	PWPDC_5																	
		50Wh	PWP_50	PWPMN_50	PWPDC_50																	
Positive Active power integration (See Note 1.)	Level	500Wh	PWP_500 Or PWP (PWH, PWH1, PWP1)	PWPMN_500 Or PWPMN	PWPDC_500 Or PWPDC																	
(See Note 1.)		5kWh	PWP_5K	PWPMN_5K	PWPDC_5K																	
		50kWh	PWP_50K	PWPMN_50K	PWPDC_50K		/															
		500kWh	PWP_500K	PWPMN_500K	PWPDC_500K																	
		5MWh	PWP_5M	PWPMN_5M	PWPDC_5M																	
		50MWh	PWP_50M	PWPMN_50M	PWPDC_50M																	
		500MWh	PWP_500M	PWPMN_500M	PWPDC_500M																	
		5000MW	PWP_5000M	PWPMN_5000M	PWPDC_5000M																	
		5mWh	MWP_0005	MWPMN_0005	MWPDC_0005																	
		50mWh	MWP_005	MWPMN_005	MWPDC_005		//															
		500mWh	MWP_05	MWPMN_05	MWPDC_05	- /	/ /															
		5Wh	MWP_5	MWPMN_5	MWPDC_5																	
		50Wh	MWP_50 MWP_500	MWPMN_50	MWPDC_50	- /																
Negative active power integration (See Note 1.)	Level	500Wh	Or MWP (MWH, MWH1, MWP1)	MWPMN_500 Or MWPMN	MWPDC_500 Or MWPDC																	
(,																	5kWh	MWP_5K	MWPMN_5K	MWPDC_5K		
		50kWh	MWP_50K	MWPMN_50K	MWPDC_50K																	
		500kWh 5MWh	MWP_500K MWP_5M	MWPMN_500K	MWPDC_500K		/															
		50MWh	MWP_50M	MWPMN_5M MWPMN_50M	MWPDC_5M MWPDC_50M		/															
		500MWh	MWP_500M	MWPMN_500M	MVPDC_500M		/															
		5000MW	MWP_5000M	MWPWN_5000M	MWPDC_5000M																	
		5mWh	WP_0005	WPMN_0005	WPDC_0005	/	/															
Active power (total sum of integration) (See Note 1.)		50mWh	WP_005	WPMN_005	WPDC_005	/	/															
		500mWh	WP_05	WPMN_05	WPDC_05	/																
		5Wh	WP_5	WPMN_5	WPDC_5																	
		50Wh	WP_50	WPMN_5 0	WPDC_50																	
	Level	500Wh	WP_500 Or WP (WH, WH1, WP1)	WPMN_500 Or WPMN	WPDC_500 Or PWPDC																	
		5kWh	WP_5K	WPMN_5K	WPDC_5K	/	/															
		50kWh	WP_50K	WPMN_50K	WPDC_50K	/	/															

Dese	cription		Parameter List (Values in parentheses can also be used.)					
		Full-scale or			ectification M		,	
Output items	Speed	output range (5 V f.s.)	ACDC	ACDC UMEAN	DC	AC	FND	
		500kWh	WP_500K	WPMN_500K	WPDC_500K			
		5MWh	WP_5M	WPMN_5M	WPDC_5M			
		50MWh	WP_50M	WPMN_50M	WPDC_50M			
		500MWh	WP_500M	WPMN_500M	WPDC_500M			
		5000MW	WP_5000M	WPMN_5000M	WPDC_5000M			
Maximun		2Vf.s.	MCR					
Current Ratio (MCR)	Level	5Vf.s.	MCR_5V					
Voltage		2Vf.s.	UCF					
crest factor (Ucf)	Level	5Vf.s.	UCF_5V					
Current		2Vf.s.	ICF					
crest factor (Icf)	Level	5Vf.s.	ICF_5V					
Time average		2Vf.s.	ITAV	ITAVMN	ITAVDC			
current (T.AV I) (See Note 1.) (See Note 2.)	Level	5Vf.s.	ITAV_5V	ITAVMN_5V	ITAVDC_5V			
Time average		2Vf.s.	PTAV	PTAVMN	PTAVDC	/		
power (T.AV P) (See Note 1.)	Level	5Vf.s.	PTAV_5V	PTAVMN_5V	PTAVDC_5V			
Voltage		2Vf.s.	URF					
ripple factor (Urf)	Level	5Vf.s.	URF_5V					
Current ripple		2Vf.s.	IRF					
factor (Irf)	Level	5Vf.s.	IRF_5V					
Voltage		2Vf.s.	UTHD			_		
total distortion factor (Uthd)	Level	5Vf.s.	UTHD_5V					
Current		2Vf.s.	ITHD					
total distortion factor (Ithd)	Level	5Vf.s.	ITHD_5V				-	

Note 1: Outputs the measured value for the current range specified with :AOUT:IRANge:DAx. Note 2: During auto-range integration mode operation, ACDC and ACDC UMEAN result in invalid data, triggering 0 V output.

## (9) Instrument Display Settings

Set and Query In	strumen	t Display Items	(Normal Measuremen	t Items)
Syntax	Command	Display Area: a to d	:DISPlay[:NORMal]	<display a="">,<display b="">,</display></display>
				<display c="">,<display d=""></display></display>
		Display Area: a	:DISPlay:NORMal:A	<display a=""></display>
		Display Area: b	:DISPlay:NORMal:B	<display b=""></display>
		Display Area: c	:DISPlay:NORMal:C	<display c=""></display>
		Display Area: d	:DISPlay:NORMal:D	<display d=""></display>
	Query	Display Area: a to d	:DISPlay[:NORMal]?	
		Display Area: a	:DISPlay:NORMal:A?	2
		Display Area: b	:DISPlay:NORMal:B?	?
		Display Area: c	:DISPlay:NORMal:C?	
		Display Area: d	:DISPlay:NORMal:D?	?
	Response		isplay b>, <display c="">,<displa< th=""><th>•</th></displa<></display>	•
			asurement Item Specificatio	ns for details about the
Description	Command	<display items<="" th=""><th></th><th></th></display>		
Description	Command	"d".	the items to display in the inst	frument display areas a to
Example	Command	:DISP U,I,P,TI	ME	
•			display area settings are as fo	bllows:
		Display Are	ea "a": Voltage (acdc)	
			ea "b": Current (acdc)	
			ea "c": Active power (acdc)	
	Query	Display Are :DISP?	ea "d": Integration time	
	Response	(When HEADER ON	) :DISPLAY U,I,P,TIME	
		1	F) <b>U,I,P,TIME</b>	
Note	$\cdot$ The va	1	intaneous value, maximum va	lue, or minimum value)
	•	s on the HOLD state		
			ubsequent output values are	as follows:
		HOLD State	Displayed Content	
		OFF	Instantaneous value	
		ON	HOLD value	
	Maxi	mum value hold	Maximum value	

• If this command is issued while in harmonic wave display mode, use the :DISPlay:MODE command to change to normal display mode.

Minimum value hold

• The above-mentioned "instantaneous value" corresponds to the averaged value while the value is being averaged.

Minimum value

# Normal Measurement Display Items List (For :DISPlay[:NORMal])

Description			:DISPlay
Output items	Rectificati	Parameter List	:NORMal
Odipar nemo	on Method		Compatibility
	ACDC	U (U1/V can also be used.)	a,b,c,d
Voltage (U)	ACDC UMEAN	UMN (UMN1 can also be used.)	a,b,c,d
voliage (U)	DC	UDC (UDC1 can also be used.)	a,b,c,d
	AC	UAC (UAC1 can also be used.)	a,b,c,d
	FND	UFND (UFND1 can also be used.)	a,b,c,d
	ACDC	I (I1/A can also be used.)	a,b,c,d
Current (I)	DC	IDC (IDC1 can also be used.)	a,b,c,d
	AC	IAC (IAC1 can also be used.)	a,b,c,d
	FND	IFND (IFND1 can also be used.)	a,b,c,d
	ACDC	P (P1/W can also be used.)	a,b,c,d
Active power (P)	ACDC UMEAN	PMN (PMN1 can also be used.)	a,b,c,d
	DC	PDC (PDC1 can also be used.)	a,b,c,d
	AC	PAC (PAC1 can also be used.)	a,b,c,d
	FND	PFND (PFND1 can also be used.)	a,b,c,d
	ACDC	S (S1/VA can also be used.)	a,b,c,d
Apparent power (S)	ACDC UMEAN	SMN (SMN1 can also be used.)	a,b,c,d
	AC	SAC (SAC1 can also be used.)	a,b,c,d
	FND	SFND (SFND1 can also be used.)	a,b,c,d
	ACDC	Q (Q1/VAR can also be used.)	a,b,c,d
Inactive power (Q)	ACDC UMEAN	QMN (QMN1 can also be used.)	a,b,c,d
	AC	QAC (QAC1 can also be used.)	a,b,c,d
	FND	QFND (QFND1 can also be used.)	a,b,c,d
	ACDC	PF (PF1 can also be used.)	a,b,c,d
Power factor (λ)	ACDC UMEAN	PFMN (PFMN1 can also be used.)	a,b,c,d
	AC	PFAC (PFAC1 can also be used.)	a,b,c,d
	FND	PFFND (PFFND1 can also be used.)	a,b,c,d
	AC	DEGAC (DEGAC1 can also be used.)	a,b,c,d
Phase angle (φ)	FND	DEGFND (DEGFND1 can also be used.)	a,b,c,d
Voltage frequency (f)	-	FREQU (FREQU1 can also be used.)	a,b
Current frequency (f)	-	FREQI (FREQI1 can also be used.)	a,b
		PIHDC (PIHDC1 can also be used.) PIHDC_TOTAL	a,b
Positive current integration	DC	During Auto-range integration operation: Data	a hi See
current integration		by current range	a,b: See Note 1.
		PIHDC IRANGE	NOLE T.
		MIHDC (MIHDC1 can also be used.) MIHDC_TOTAL	a,b
Negative	DC	During Auto-range integration operation: Data	
current integration		by current range	a,b: See
		MIHDC IRANGE	Note 1.
	ACDC	IH (IH1/AH can also be used.) IH_TOTAL	a,b,c,d
	ACDC UMEAN	IHMN (IHMN1 can also be used.) IHMN_TOTAL	a,b,c,d
Current integration (total sum)		IHDC (IHDC1 can also be used.) IHDC_TOTAL	a,b,c,d
	DC	During Auto-range integration operation: Data by current range IHMN_IRANGE	a,b,c,d: See Note 1.

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Description			:DISPlay
Output items	Rectificati on Method	Parameter List	:NORMal Compatibility
		PWP (PWP1/PWH/PINTEG can also be used.) PWP_TOTAL	a,b
	ACDC	During Auto-range integration operation: Data by current range PWP_IRANGE	a,b: See Note 1.
		PWPMN (PWPMN1 can also be used.) PWPMN_TOTAL	a,b
Positive Active power integration	ACDC UMEAN	During Auto-range integration operation: Data by current range PWPMN_IRANGE	a,b: See Note 1.
		PWPDC (PWPDC1 can also be used.) PWPDC_TOTAL	a,b
	DC	During Auto-range integration operation: Data by current range PWPDC IRANGE	a,b: See Note 1.
		MWP (MWP1/MWH/MINTEG can also be used.) MWP_TOTAL	a,b
	ACDC	During Auto-range integration operation: Data by current range MWP IRANGE	a,b: See Note 1.
		MWPMN (MWPMN1 can also be used.) MWPMN_TOTAL	a,b
Negative active power integration	ACDC UMEAN	During Auto-range integration operation: Data by current range MWPMN_IRANGE	a,b: See Note 1.
	DC	MWPDC (MWPDC1 can also be used.) MWPDC_TOTAL	a,b
		During Auto-range integration operation: Data by current range MWPDC_IRANGE	a,b: See Note 1.
		WP (WP1/WH/INTEG can also be used.) WP_TOTAL	a,b,c,d
	ACDC	During Auto-range integration operation: Data by current range WP_IRANGE	a,b,c,d: See Note 1.
Active power		WPMN (WPMN1 can also be used.) WPMN_TOTAL	a,b,c,d
(total sum of integration)	ACDC UMEAN	During Auto-range integration operation: Data by current range WPMN IRANGE	a,b,c,d: See Note 1.
		WPDC (WPDC1 can also be used.) WPDC_TOTAL	a,b,c,d
	DC	During Auto-range integration operation: Data by current range WPDC_IRANGE	a,b,c,d: See Note 1.
		TIME TIME_TOTAL	a,b,c,d
Integration time	-	During Auto-range integration operation: Data by current range TIME_IRANGE	a,b,c,d: See Note 1.
Voltage waveform peak value (Upk)	-	UPK (UPK1 can also be used.)	a,b
Current waveform peak value (Ipk)		IPK (IPK1 can also be used.)	a,b
Max Current Ratio(MCR)	-	MCR	c,d
Voltage crest factor (Ucf)	-	UCF (UCF1 can also be used.)	c,d
Current crest factor (Icf)	-	ICF (ICF1 can also be used.)	c,d

Description			:DISPlay
Output items	Rectificati on Method	Parameter List	:NORMal Compatibility
	ACDC	ITAV (ITAV1 can also be used.) ITAV_TOTAL	a,b,c,d
<b>T</b> ime and the second s	ACDC UMEAN	ITAVMN (ITAVMN1 can also be used.) ITAVMN_TOTAL	a,b,c,d
Time average current (T.AV I)		ITAVDC (ITAVDC1 can also be used.) ITAVDC_TOTAL	a,b,c,d
	DC	During Auto-range integration operation: Data by current range ITAVDC_IRANGE	a,b,c,d: See Note 1.
		PTAV (PTAV1 can also be used.) PTAV_TOTAL	a,b,c,d
	ACDC	During Auto-range integration operation: Data by current range ITAV_IRANGE	a,b,c,d: See Note 1.
<b>-</b>	ACDC UMEAN	PTAVMN (PTAVMN1 can also be used.) PTAVMN_TOTAL	a,b,c,d
Time average power (T.AV P)		During Auto-range integration operation: Data by current range PTAVMN_IRANGE	a,b,c,d: See Note 1.
		PTAVDC (PTAVDC1 can also be used.) PTAVDC_TOTAL	a,b,c,d
	DC	During Auto-range integration operation: Data by current range PTAVDC_IRANGE	a,b,c,d: See Note 1.
Voltage ripple factor (Urf)	-	URF (URF1 can also be used.)	c,d
Current ripple factor (Irf)	-	IRF (IRF1 can also be used.)	c,d
Voltage total distortion factor (Uthd)	-	UTHD (UTHD1 can also be used.)	c,d
Current total distortion factor (Ithd)	-	ITHD (ITHD1 can also be used.)	c,d

\*Note 1: Valid data is displayed only when using auto-range integration.

### Toggle and Query the Normal Measurement and Harmonic Wave Measurement Display Modes

spiay modes							
Syntax	Command	:DISPlay:MODE <norm hcon<="" hrms="" th=""></norm>					
		/HOSRMS/HOSCON>					
	Query	:DISPlay:MODE?					
	Response	<norm hcon="" hoscon="" hosrms="" hrms=""></norm>					
		NORM: Normal measurement values					
		HRMS: Harmonic wave level display, all orders					
		(a: order, b/c/d: harmonic wave measurement)					
		HCON: Harmonic wave content display, all orders					
		(a: order, b/c/d: harmonic wave measurement)					
		HOSRMS: Harmonic wave level display, individual orders					
		(a/b/c/d: harmonic wave measurement)					
		HOSCON: Harmonic wave content display, individual orders (a/b/c/d: harmonic wave measurement)					
Description		Toggles or queries the content of the display area (normal measurement or					
-		harmonic wave measurement).					
Example	Command	:DISP:MODE NORM					
	Query	:DISP:MODE?					
	Response	(When HEADER ON) :DISPLAY:MODE NORM					
	·	(When HEADER OFF) NORM					

Set and Query th	e Display	ed Order for Harmonic Wave Common Order Display Mode
Syntax	Command	:DISPlay:HARMonic:ORDer <0 to 50 (NR1)>
	Query	:DISPlay:HARMonic:ORDer?
	Response	<0 to 50 (NR1)>
Description		Sets or queries the order for harmonic wave common order display mode. Although NRf numerical values are accepted, values to the right of the decimal are dropped.
Example	Command	:DISP:HARM:ORD 21
	Query	:DISP:HARM:ORD?
	Response	(When HEADER ON) :DISPLAY:HARMONIC:ORDER 21
		(When HEADER OFF) 21
Note	<ul> <li>If the dis</li> </ul>	play is in any other mode other than harmonic wave (all orders) display mode,
	the display	will not be immediately affected by this command.

the display will not be immediately affected by this command. The setting will be applied when the display mode is changed via a command such as :DISPlay:MODE.

Set and Query th	e Display	/ Items for Harmonic Wav	e Con	nmon Order Display Mode
Syntax	Command	Display Area: b :DISPlay:HARM	onic:I	<b>3:ITEM</b> <harmonic display="" item="" wave=""></harmonic>
		Display Area: c :DISPlay:HARM	onic:(	C:ITEM <harmonic display="" item="" wave=""></harmonic>
		Display Area: d :DISPlay:HARM	onic:I	<b>D:ITEM</b> <harmonic display="" item="" wave=""></harmonic>
	Query	Display Area: b :DISPlay:HARM		
		Display Area: c :DISPlay:HARM	onic:(	C:ITEM?
		Display Area: d :DISPlay:HARM	onic:I	D:ITEM?
	Response	<harmonic display="" item="" wave=""></harmonic>	•	
		Harmonic wave voltage	HU	(HU1 can also be used.)
		Harmonic wave current	HI	(HI1 can also be used.)
		the harmonic wave	HP	(HP1 can also be used.)
		active power output	aa far b	
Description		mode.	ns for n	armonic wave common order display
Example	Command	:DISP:HARM:B:ITEM HU		
•	Query	:DISP:HARM:B:ITEM?		
	Response	(When HEADER ON) :DISPLAY	:HARN	IONIC:B:ITEM HU
		When HEADER OFF) HU		
Note	<ul> <li>If the di</li> </ul>	,	nan hari	monic wave (all orders) display mode,
	•	y will not be immediately affected	•	
	Change	e the display mode via a comman	d such a	as :DISPlay:MODE.

Set and Query th	e Display	ved Order for Harmonic Wave Individual Order Display Mode
Syntax	Command	Display Area: a :DISPIay:HORDerSel:A:ORDer <0 to 50 (NR1)>
		Display Area: b :DISPlay:HORDerSel:B:ORDer <0 to 50 (NR1)>
		Display Area: c :DISPIay:HORDerSel:C:ORDer <0 to 50 (NR1)>
		Display Area: d :DISPIay:HORDerSel:D:ORDer <0 to 50 (NR1)>
	Query	Display Area: a :DISPlay:HORDerSel:A:ORDer?
		Display Area: b :DISPlay:HORDerSel:B:ORDer?
		Display Area: c :DISPlay:HORDerSel:C:ORDer?
		Display Area: d :DISPlay:HORDerSel:D:ORDer?
	Response	<0 to 50 (NR1)>
Description		Sets or queries the displayed order for harmonic wave individual order
		display mode.
Example	Command	:DISP:HORDS:A:ORD 39
	Query	:DISP:HORDS:A:ORD?
	Response	(When HEADER ON) :DISPLAY:HORDERSEL:A:ORDER 39
		(When HEADER OFF) 39
Note	<ul> <li>If the d</li> </ul>	isplay is in any other mode other than harmonic wave (individual order) display

mode, the display will not be immediately affected by this command. Change the display mode via a command such as :DISPlay:MODE.

Set and Query th	e Display	/ Items for Harmonic Wave Individual Order Display Mode
Syntax	Command	Display Area: a :DISPIay:HORDerSel:A:ITEM <harmonic display="" item="" wave=""></harmonic>
		Display Area: b :DISPIay:HORDerSel:B:ITEM <harmonic display="" item="" wave=""></harmonic>
		Display Area: c :DISPIay:HORDerSel:C:ITEM <harmonic display="" item="" wave=""></harmonic>
		Display Area: d :DISPIay:HORDerSel:D:ITEM <harmonic display="" item="" wave=""></harmonic>
	Query	Display Area: a :DISPIay:HORDerSel:A:ITEM?
		Display Area: b :DISPlay:HORDerSel:B:ITEM?
		Display Area: c :DISPIay:HORDerSel:C:ITEM?
		Display Area: d :DISPIay:HORDerSel:D:ITEM?
	Response	<harmonic display="" item="" wave=""></harmonic>
		See the :DISPlay:HARMonic:B:ITEM section for details.
Description		Sets or queries the display items for harmonic wave individual order display
		mode.
Example	Command	:DISP:HORDS:A:ITEM HI1
	Query	:DISP:HORDS:A:ITEM?
	Response	(When HEADER ON) :DISPLAY:HORDERSEL:A:ITEM HI1
		(When HEADER OFF) HI1
Note	<ul> <li>If the d</li> </ul>	isplay is in any other mode other than harmonic wave (individual order) display
	mode, th	ne display will not be immediately affected by this command.

Change the display mode via a command such as :DISPlay:MODE.

## (10) Measurement Value Output

Syntax	Query		er]? ( <output 1="" item="">)</output>			
		:MEASure[:NORMal]:VALue? ( <output 1="" item="">) Up to a maximum of 180 ite</output>				
	Response	<output 1="" item=""><measu< td=""><td>irement value 1&gt;,<output ite<="" td=""><td></td></output></td></measu<></output>	irement value 1>, <output ite<="" td=""><td></td></output>			
		value 2>				
		-	t Item Specifications for de	tails about the		
		<measurement item=""> fie</measurement>	eld.			
		Output Format	Data Form			
		Header Portion Measurement	NR3 numerical value data			
		Values	characters)	a (always 10		
		U,I,P,S,Q,PF,	±ddddddE±e			
		DEG,	(ddddd: 6-character num	erical value data		
		FREQU,FREQI, UPK,IPK,	including decimal point, e: coefficient 0, 3, c	or 6)		
		MCR,UCF,ICF,	e. coencient 0, 0, 0	51 0)		
		ITAV,PTAV,				
		URF,IRF,				
		UTHD,ITHD Integration Values	NR3 numerical value data	(always 11		
		IH,PIH,MIH,	characters)	(always II		
		WP,PWP,MWP	±ddddddE±e			
			(dddddd: 7-character nu	merical value data		
			including decimal point, e: coefficient 0, 3,	or 6)		
		Time Values	NR1 numerical value data			
		TIME	characters)			
			hhhhh,mm,ss (hours, min	utes, seconds)		
		Error Data				
		Headers	s Measurement Values	Integration		
			U,I,P,S,Q,PF,DEG,	Values		
			FREQU,FREQI,	IH,PIH,MIH,		
			UPK,IPK,	WP,PWP,MWP		
			MCR,UCF,ICF,			
		_	ITAV, PTAV, URF, IRF,			
		Error	UTHD,ITHD			
		Over range (Instrument	±999.99E+9	None		
		display: "o.r")	2000.002.00	140116		
		Scaling error				
		(Instrument	±888.88E+9	±8888.88E+9		
		display: "S.Err")				
	_	No data	±777.77E+9	±7777.77E+9		
escription	Query		ent value as a numerical value			
			e specified directly as parame via a :MEASure:ITEM comm			
			er]? is specified without an or			
			advance via a :MEASure:I	TEM? command		
		output.	items are output in the orde	r they were specif		
			output items listed in the			
		Specified :MEASure Q	uery Items below.			
			ut items in advance via :MEA			
		commands, the items w of Directly Specified :	ill be output in the order that t	iney appear in the		
Example	Query	:MEAS? U,I,P				
-20011010	-		rent, and active power values	S.		
	Response		150.00E+0;1 +020.00E+0;			
			·, ···································			

#### (When HEADER OFF) +150.00E+0;+020.00E+0;+03.000E+3

Note

• When all output items are set to OFF (immediately after executing :MEASure:ITEM:ALLClear), the measurement values for the items shown in display areas (a) through (d) will be output.

• You can use the :TRANsmit:SEParator command to change the message unit separator from a semicolon ";" to a comma ",".

· If the display is blank (such as when the range has been changed),

the response message will be "no data" (±777.77E+9) until the measurement data is displayed.

We recommend only using this function with a fixed range.

• If :MEASure[:POWer]? is called with no specified output items immediately after powering on the instrument, U, I, P, S, Q, PF, DEG, FREQU, and FREQI will be output for channels 1 through 3 and SUM.

• The output items specified via :MEASure:ITEM commands will not be reset even if a system reset is performed. These items are reset only when the instrument is powered on.

• Up to 180 items will be output for each :MEASure? Query. If output was specified with a :MEASure:ITEM command, up to 180 items will be output in the order indicated in the List of Directly Specified :MEASure? Query Items. Since more than 180 items cannot be output, exercise care to ensure that the number of output items is 180 or less.

#### List of Directly Specified :MEASure? Query Items

			······ · · · · · · · · · · · · · · · ·	
Measurement Item	Rectificati on Method	Туре	Parameter List	Substitute parameter (can be used with the same definition)
Status		Instantaneous value	STATUS (Details P.77)	
		Total	STATUS_MAXMIN	
Voltage	AC+DC	Instantaneous value	U	U1,V
		Maximum value	U_MAX	U1_MAX
		Minimum value	U_MIN	U1_MIN
	AC+DC UMEAN	Instantaneous value	UMN	UMN1
		Maximum value	UMN_MAX	UMN1_MAX
		Minimum value	UMN_MIN	UMN1_MIN
	AC	Instantaneous value	UAC	UAC1
		Maximum value	UAC_MAX	UAC1_MAX
		Minimum value	UAC_MIN	UAC1_MIN
	DC	Instantaneous value	UDC	UDC1
		Maximum value	UDC_MAX	UDC1_MAX
		Minimum value	UDC_MIN	UDC1_MIN
	FND	Instantaneous value	UFND	UFND1
		Maximum value	UFND_MAX	UFND1_MAX
		Minimum value	UFND_MIN	UFND1_MIN
	AC+DC	Instantaneous value	I	I1,A
		Maximum value	I_MAX	I1_MAX
		Minimum value	I_MIN	I1_MIN
	MEAN	Instantaneous value	IMN	IMN1
Current		Maximum value	IMN_MAX	IMN1_MAX
		Minimum value	IMN_MIN	IMN1_MIN
	AC	Instantaneous value	IAC	IAC1
		Maximum value	IAC_MAX	IAC1_MAX
		Minimum value	IAC_MIN	IAC1 _MIN
	DC	Instantaneous value	IDC	IDC1
		Maximum value	IDC_MAX	IDC1_MAX
		Minimum value	IDC_MIN	IDC1_MIN
	FND	Instantaneous value	IFND	IFND1
		Maximum value	IFND_MAX	IFND1_MAX
		Minimum value	IFND_MIN	IFND1_MIN
A	AC+DC	Instantaneous value	Р	P1, W
Active power		Maximum value	P_MAX	P1_MAX
		Minimum value	P_MIN	P1_MIN

	1			
Measurement Item	Rectificati	Туре	Parameter List	Substitute parameter
	on Method			(can be used with the
				same definition)
		Instantaneous value	PMN	PMN1
	MEAN	Maximum value	PMN_MAX	PMN1_MAX
		Minimum value	PMN_MIN	PMN1_MIN
		Instantaneous value	PAC	PAC1
	AC	Maximum value	PAC_MAX	PAC1_MAX
		Minimum value	PAC_MIN	PAC1_MIN
	DC	Instantaneous value	PDC	PDC1
		Maximum value	PDC_MAX	PDC1_MAX
		Minimum value	PDC_MIN	PDC1_MIN
	FND	Instantaneous value	PFND	PFND1
		Maximum value	PFND_MAX	PFND1_MAX
		Minimum value	PFND_MIN	PFND1_MIN
Apparent power	AC+DC	Instantaneous value	S	S1, VA
		Maximum value	S MAX	S1 MAX
		Minimum value	S_MIN	S1_MIN
		Instantaneous value	SMN	SMN1
	AC+DC	Maximum value	SMN_MAX	SMN1_MAX
	UMEAN	Minimum value	SMN MIN	SMN1_MIN
		Instantaneous value	SAC	SAC1
	10	Maximum value		SAC1_MAX
	AC		SAC_MAX	
		Minimum value	SAC_MIN	SAC1_MIN
	-	Instantaneous value	SFND	SFND1
	FND	Maximum value	SFND_MAX	SFND1_MAX
		Minimum value	SFND_MIN	SFND1_MIN
	AC+DC	Instantaneous value	Q	Q1, VAR
		Maximum value	Q_MAX	Q1_MAX
		Minimum value	Q_MIN	Q1_MIN
	AC+DC UMEAN	Instantaneous value	QMN	QMN1
		Maximum value	QMN_MAX	QMN1_MAX
Reactive	ONIEAN	Minimum value	QMN_MIN	QMN1_MIN
power		Instantaneous value	QAC	QAC1
	AC	Maximum value	QAC_MAX	QAC1_MAX
		Minimum value	QAC_MIN	QAC1_MIN
	FND	Instantaneous value	QFND	QFND1
		Maximum value	QFND MAX	QFND1_MAX
		Minimum value	 QFND_MIN	 QFND1_MIN
	AC+DC	Instantaneous value	PF	PF1
Power factor		Maximum value	PF MAX	PF1 MAX
		Minimum value	PF_MIN	PF1_MIN
		Instantaneous value	PFMN	PFMN1
	AC+DC		PFMN_MAX	PFMN1_MAX
	UMEAN	Maximum value	—	
		Minimum value	PFMN_MIN	PFMN1_MIN
	AC	Instantaneous value	PFAC	PFAC1
		Maximum value	PFAC_MAX	PFAC1_MAX
		Minimum value	PFAC_MIN	PFAC1_MIN
	FND	Instantaneous value	PFFND	PFFND1
		Maximum value	PFFND_MAX	PFFND1_MAX
		Minimum value	PFFND_MIN	PFFND1_MIN
Phase angle	AC	Instantaneous value	DEGAC	DEGAC1
		Maximum value	DEGAC_MAX	DEGAC1_MAX
		Minimum value	DEGAC_MIN	DEGAC1_MIN
	FND	Instantaneous value	DEGFND	DEGFND1
		Maximum value	DEGFND_MAX	DEGFND1_MAX
		Minimum value	DEGFND_MIN	DEGFND1_MIN
Voltage	-	Instantaneous value	 FREQU	FREQU1
Measurement	Rectificati			Substitute parameter
----------------------	-------------	---------------------	----------------------------------	-----------------------
Item	on Method	Туре	Parameter List	(can be used with the
nem	on Method			same definition)
frequency		Maximum value	FREQU_MAX	FREQU1_MAX
		Minimum value	FREQU_MIN	FREQU1_MIN
0		Instantaneous value	FREQI	FREQI1
Current frequency	-	Maximum value	FREQI_MAX	FREQI1_MAX
nequency		Minimum value	FREQI_MIN	FREQI1_MIN
Voltage		Instantaneous value	UPK	UPK1
waveform	-	Maximum value	UPK_MAX	UPK1_MAX
peak value		Minimum value	UPK_MIN	UPK1_MIN
Current		Instantaneous value	IPK	IPK1, IP
waveform	-	Maximum value	IPK_MAX	IPK1_MAX
peak value		Minimum value	 IPK_MIN	 IPK1_MIN
		Instantaneous value	 MCR	
Maximum	_	Maximum value	MCR_MAX	
Current Ratio		Minimum value	MCR_MIN	
		Instantaneous value	UCF	UCF1
Voltage crest	_	Maximum value	UCF_MAX	UCF1_MAX
factor	_	Minimum value	UCF_MIAX	UCF1_MAX
			_	
Current crest		Instantaneous value		
factor	-	Maximum value		ICF1_MAX
		Minimum value	ICF_MIN	ICF1_MIN
	AC+DC	Instantaneous value	ITAV (See Note 3.)	ITAV1
	AC+DC	Instantaneous value	ITAVMN	ITAVMN1
	UMEAN		(See Note 3.)	
Time			ITAVDC	ITAVDC1
Time average			During Auto-range integration	
current			operation: Data by current range	
	DC	Instantaneous value	(See Note 2.)	
	20		ITAVDC_200mA, ITAVDC_500mA,	
			ITAVDC_1A, ITAVDC_2A, ITAVDC_5A,	
			ITAVDC_10A, ITAVDC_20A,	
			ITAVDC_ BACKUP	
			PTAV	PTAV1
			During Auto-range integration	
			operation: Data by current range	
	AC+DC	Instantaneous value	(See Note 2.)	
			PTAV_200mA, PTAV_500mA,	
			PTAV_1A, PTAV_2A, PTAV_5A,	
			PTAV_10A, PTAV_20A, PTAV_ BACKUP	
			PTAVMN	PTAVMN1
			During Auto-range integration	
			operation: Data by current range	
Time	AC+DC	Instantaneous value	(See Note 2.)	
average active	UMEAN	Instantaneous value	PTAVMN_200mA, PTAVMN_500mA,	
power			PTAVMN_1A,PTAVMN_2A,PTAVMN_5A,	
			PTAVMN_10A, PTAVMN_20A,	
			PTAVMN_ BACKUP	
			PTAVDC	PTAVDC1
			During Auto-range integration	
			operation: Data by current range	
	DO		(See Note 2.)	
	DC	Instantaneous value	PTAVDC_200mA, PTAVDC_500mA,	
			PTAVDC_1A, PTAVDC_2A,PTAVDC_5A,	
			PTAVDC_10A, PTAVDC_20A,	
			PTAVDC_ BACKUP	
Voltage	-	Instantaneous value	URF	URF1

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Measurement Item	Rectificati on Method	Туре	Parameter List	Substitute parameter (can be used with the
				same definition)
ripple factor		Maximum value	URF_MAX	URF1_MAX
		Minimum value	URF_MIN	URF1_MIN
Current		Instantaneous value	IRF	IRF1
ripple factor	-	Maximum value	IRF_MAX	IRF1_MAX
		Minimum value	IRF_MIN	IRF1_MIN
Total harmonic wave		Instantaneous value Maximum value	UTHD UTHD MAX	UTHD1 UTHD1_MAX
voltage distortion factor	-	Minimum value	UTHD_MIN	UTHD1_MIN
Total		Instantaneous value	ITHD	ITHD1
harmonic wave				
current	-	Maximum value	ITHD_MAX	ITHD1_MAX
distortion factor		Minimum value	ITHD_MIN	ITHD1_MIN
			PWP	PWP1, PWH
Positive power integration	AC+DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) PWP_200mA, PWP_500mA, PWP_1A, PWP_2A, PWP_5A, PWP_10A, PWP_20A, PWP_BACKUP	
			MWP	MWP1, MWH
Negative power integration	AC+DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) MWP_200mA, MWP_500mA, MWP_1A, MWP_2A, MWP_5A, MWP_10A, MWP_20A, MWP_BACKUP	
			WP	WP1, WH
Active power integration (total sum)	AC+DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) WP_200mA, WP_500mA, WP_1A, WP_2A, WP_5A, WP_10A, WP_20A, WP_BACKUP	
			PWPMN	PWPMN
Positive power integration	AC+DC UMEAN	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) PWPMN_200mA, PWPMN_500mA, PWPMN_1A, PWPMN_2A, PWPMN_5A, PWPMN_10A, PWPMN_20A, PWPMN_BACKUP	
			MWPMN	MWPMN1
Negative power integration	AC+DC UMEAN	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) MWPMN_200mA, MWPMN_500mA, MWPMN_1A,MWPMN_2A,MWPMN_5A, MWPMN_10A, MWPMN_20A, MWPMN_BACKUP	
Active power	AC+DC	Instantaneous value	WPMN	WPMN1

	1			
Measurement Item	Type Par		Parameter List	Substitute parameter (can be used with the same definition)
integration (total sum)	UMEAN		During Auto-range integration operation: Data by current range (See Note 2.) WPMN_200mA, WPMN_500mA, WPMN_1A, WPMN_2A, WPMN_5A, WPMN_10A, WPMN_20A, WPMN_BACKUP	
			PWPDC	PWPDC1
Positive power integration	DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) PWPDC_200mA, PWPDC_500mA, PWPDC_1A, PWPDC_2A, PWPDC_5A, PWPDC_10A, PWPDC_20A, PWPDC_BACKUP	
			MWPDC	MWPDC1
Negative power integration	DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) MWPDC_200mA, MWPDC_500mA, MWPDC_1A,MWPDC_2A,MWPDC_5A, MWPDC_10A, MWPDC_20A, MWPDC_BACKUP	
			WPDC	WPDC1
Active power integration (total sum)	DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) WPDC_200mA, WPDC_500mA, WPDC_1A, WPDC_2A, WPDC_5A, WPDC_10A, WP_20A, WP_BACKUP	
Current	AC+DC	Instantaneous value	(See Note 3.)	IH1, AH
integration (total sum)	AC+DC UMEAN	Instantaneous value	IHMN (See Note 3.)	IHMN1
			PIHDC	PIHDC1
Positive current integration	DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) PIHDC_200mA, PIHDC_500mA, PIHDC_1A,PIHDC_2A,PIHDC_5A, PIHDC_10A, PIHDC_20A, PIHDC_BACKUP	
			MIHDC	MIHDC1
Negative current integration	DC	Instantaneous value	During Auto-range integration operation: Data by current range (See Note 2.) MIHDC_200mA, MIHDC_500mA, MIHDC_1A,MIHDC_2A,MIHDC_5A, MIHDC_10A, MIHDC_20A, MIHDC_BACKUP	
Current integration	DC	Instantaneous value	IHDC	IHDC1

Measurement Item	Rectificati on Method	Туре	Parameter List	Substitute parameter (can be used with the same definition)
(total sum)			During Auto-range integration operation: Data by current range (See Note 2.) IHDC_200mA, IHDC_500mA, IHDC_1A,IHDC_2A,IHDC_5A, IHDC_10A, IHDC_20A, IHDC_BACKUP	
Integration time	-	Instantaneous value	TIME During Auto-range integration operation: Data by current range (See Note 2.) TIME_200mA, TIME_500mA, TIME_1A,TIME_2A,TIME_5A, TIME_10A, TIME_20A, TIME_BACKUP	

List of Directly Specified :MEASure? Query Items

Note:  $U \rightarrow$ , V,  $I \rightarrow A$ ,  $P \rightarrow W$ ,  $S \rightarrow VA$ ,  $Q \rightarrow VAR$ ,  $IH \rightarrow AH$ ,  $PWP \rightarrow PWH$ ,  $MWP \rightarrow MWH$ ,  $WH \rightarrow WP$ , and  $WH \rightarrow INTEG$  are all valid substitutions.

For example, :MEAS? U and :MEAS? V produce the same response. However, U is always returned as the header.

Note 2: Valid only when Auto-range integration is on.

Note 3: Valid only when Auto-range integration is off.

### Perform and Query a Reset of :MEASure? and :MEASure:HARMonics? Output Items

Syntax	Command	:MEASure:ITEM:ALLClear									
Description		Clears all outputs set for :MEASure? and :MEASure:HARMonic? via :MEASure:ITEM commands.									
Example	Command	Command :MEAS:ITEM:ALLC									
Note	<ul> <li>This co</li> </ul>	<ul> <li>This command turns all output settings OFF.</li> </ul>									
	Norma U, I, Harmo	Itput settings immediately after the instrument is powered on are as follows: I Measurement Items P, S, Q, PF, DEGAC, FREQU, and FREQI. nic Wave order effective values HU, HI, and HP.									

Query:MEASure?	<b>Output Ite</b>	ms							
Syntax	Query	:MEASure[:NORMal]:ITEM?							
Description		Clears all outputs set for :MEASure? and :MEASure:HARMonic?							
		Returns the output settings for when :MEASure? is executed without any direct specifications.							
Example	Query	:MEAS:ITEM?							
	Response	(When HEADER ON) :MEASURE:NORMAL:ITEM U,I,P							
		(When HEADER OFF) U,I,P							
Note	<ul> <li>If all out</li> </ul>	utput items are turned OFF, this command returns the measurement items							
	displayed	d on the instrument (in display areas (a) through (d)).							

Syntax	Command	:DATA	out:IT	EM <d< th=""><th>lata1 (NR</th><th>1)&gt;,<data< th=""><th>2 (NR1)&gt;</th><th></th><th></th></data<></th></d<>	lata1 (NR	1)>, <data< th=""><th>2 (NR1)&gt;</th><th></th><th></th></data<>	2 (NR1)>			
	Query	:DATA	out:IT	EM?						
	Response		<data2></data2>							
		128	64	32	16	8	4	2	1	
		<data1 (n<="" th=""><th>NR1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></data1>	NR1)>							
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
		FREQU	DEG	PF	Q	S	Р	Ι	U	
		<data2 (n<="" th=""><th colspan="8"><data2 (nr1)=""></data2></th></data2>	<data2 (nr1)=""></data2>							
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
				IPK	IH	TIME	MWP	PWP	WP	
Description		Sets or queries the measurement items for the :MEASure? query as a numerical value between 0 and 255. Although NRf numerical values are accepted, values to the right of the decimal are dropped.								
	Command	numerica Although decimal	NRf nui are dropp	etween 0 merical va ped.	and 255.				,	
Example	Command	numerica Although decimal :DATA:	NRf nui are dropp TEM 7,0	etween 0 merical va ped.	and 255. alues are	e accepte	d, values	to the ri	ght of the	
	Query	numerica Although decimal :DATA:	NRf nui are dropp TEM 7,0 nables the	etween 0 merical va bed. D	and 255. alues are	e accepte	d, values	to the ri	ght of the	
		Although decimal a <b>:DATA:</b> (This er <b>:DATA:</b> (When HEA	NRf nui are dropp TEM 7,0 nables the	etween 0 merical va bed. D e output c :DATA(	and 255. alues are	e accepte age, curre	d, values	to the ri	ght of the	

This command can be used only to set or query AC/DC rectification measurement values.

In order to fully utilize the capabilities of the PW3335, we recommend using the MEASure:ITEM commands.

value Maximum/Minimum value       :MEASure[:NORMal]:ITEM:STATus:MAXmin(?)       Coutput item         Response <output (nr1)="" item=""> 128       64       32       16       8       4       2       1         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         Description       Sets the measurement data status (instantaneous value, maximum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal dropped.</output>	Syntax	Instantaneous						um valu					
value           Response       <0utput item (NR1)> 128 64 32 16 8 4 2 1 bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0 STATUS         escription       Sets the measurement data status (instantaneous value, maximum valuinmum value) output items as numerical values between 0 and 1. Although NR1 numerical values are accepted, values to the right of the decimal dropped.         If no items are specified directly via a :MEASure? query, output is based on specification of this command.         INST indicates the status for the instantaneous value at the time when the da acquired.         MAXmin indicates the total from the time the maximum and minimum values v last reset.         The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         bit31 bit30 bit22 bit21 bit20 bit13 bit12 bit11 bit10 bit15 bit14 bit13 bit12 bit11 bit10 bit9 bit8 bit23 bit22 bit21 bit20 bit19 bit18 bit17 bit16 bit15 bit14 bit13 bit12 bit11 bit10 bit9 bit8 bit15 bit14 bit13 bit12 bit1 bit10 bit9 bit8 bit2 bit2 bit2 bit2 bit2 bit2 bit2 bit2 bit2 bit2 bit2 bit1 bit0 bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0 bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0 bit8 bit2 bit1 bit0 bit8 bit2 bit1 bit0 bit8 bit2 bit1 bit0 bit9 bit8 bit2 bit1 bit0 bit8 bit2 bit1 bit0 bit19 bit8 bit8 bit2 bit1 bit0 bit8 bit10 bit	•	value			-								
1286432168421bit7bit6bit5bit4bit3bit2bit1bit0sescriptionSets the measurement data status (instantaneous value, maximum variminum value) output items as numerical values between 0 and 1. Although NRI numerical values are accepted, values to the right of the decimal dropped. If no items are specified directly via a :MEASure? query, output is based on specification of this command. INST indicates the status for the instantaneous value at the time when the da acquired. MAXmin indicates the total from the time the maximum and minimum values values the total from the time date as saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:bit31bit30bit29bit28bit27bit26bit25bit24bit31bit30bit29bit28bit27bit26bit25bit24bit31bit30bit29bit28bit21bit10bit18cCPHMCPbit3bit2bit1bit0bit15bit14bit13bit12bit1bit0bit7bit6bit5bit4bit3bit2bit1bit0bit7bit6bit5bit4bit3bit2bit1bit0cCPInstrument protection mode activatedSYSy synchronization errorRPREActive power range exceededCPInstrument protection mode activatedSYSy synchronization errorRECurrent range exceededRUV	N		im :M	<pre>' :wiEASure[:NOKMai]:IIEW:SIATUS:MAXMIN(?) <output item=""></output></pre>									
bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         status       Status       Status       Status       Status       Status         bescription       Sets the measurement data status (instantaneous value, maximum ve minimum value) output items as numerical values between 0 and 1.       Although NRf numerical values are accepted, values to the right of the decimal dropped.         If no items are specified directly via a :MEASure? query, output is based on specification of this command.       INST indicates the status for the instantaneous value at the time when the da acquired.         MAXmin indicates the total from the time the maximum and minimum values values the test.       MAXmin indicates the total from the time the maximum and minimum values values the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         bit31       bit30       bit29       bit28       bit27       bit26       bit24         a       a       a       c       CP       a       C       RP         bit31       bit30       bit29       bit28       bit27       bit30       bit8       RU         bit31       bit41       bit13       bit14       bit3       bit2       bit1       bit0         bit75       bit8       bit6       bit5       bit4		Response		<output i<="" th=""><th>tem (NR</th><th>1)&gt;</th><th></th><th></th><th></th><th></th><th></th></output>	tem (NR	1)>							
escription Sets the measurement data status (instantaneous value, maximum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal dropped. If no items are specified directly via a :MEASure? query, output is based on specification of this command. INST indicates the status for the instantaneous value at the time when the da acquired. MAXmin indicates the total from the time the maximum and minimum values values the terest. The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:            bit31         bit30         bit29         bit27         bit26         bit24           bit32         bit22         bit21         bit20         bit11         bit16           bit13         bit14         bit13         bit12         bit11         bit16           bit15         bit14         bit13         bit12         bit11         bit16           bit7         bit6         bit4         bit3         bit2         bit11           bit7         bit6         bit4         bit3         bit2         bit11           bit7         bit6         bit4         bit3         bit2         bit11           bit15         bit4         bit3         bit2         bit16         cm           bit15         bit4         bit3			_	128	64	32	16	8	4	2	1		
Sets the measurement data status (instantaneous value, maximum value) output items as numerical values between 0 and 1.         Although NRf numerical values are accepted, values to the right of the decimal dropped.         If no items are specified directly via a :MEASure? query, output is based on specification of this command.         INST indicates the status for the instantaneous value at the time when the data acquired.         MAXmin indicates the status for the instantaneous value at the time when the data acquired.         MAXmin indicates the total from the time the maximum and minimum values values the test.         The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         bit31       bit30       bit29       bit27       bit26       bit27       bit26         bit123       bit22       bit21       bit20       bit11       bit10       bit8         bit7       bit6       bit5       bit4       bit3       bit2       bit1         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         core       PI       core       PI       PU       PU       PU				bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0		
minimum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal dropped. If no items are specified directly via a :MEASure? query, output is based on specification of this command. INST indicates the status for the instantaneous value at the time when the da acquired. MAXmin indicates the total from the time the maximum and minimum values v last reset. The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:           bit31         bit30         bit29         bit27         bit26         bit25         bit24           bit31         bit30         bit29         bit28         bit27         bit26         bit25         bit24           bit31         bit30         bit29         bit28         bit27         bit30         bit29           bit31         bit30         bit29         bit28         bit27         bit30         bit9           bit7         bit6         bit5         bit4         bit3         bit2         bit1         bit0           bit7         bit6         bit5         bit4         bit3         bit2         bit1         bit0           bit7         bit6         bit5         bit4         bit3         bit2         bit1         bit0           bit7         bit6<											STATUS		
Although NRf numerical values are accepted, values to the right of the decimal dropped.         If no items are specified directly via a :MEASure? query, output is based on specification of this command.         INST indicates the status for the instantaneous value at the time when the da acquired.         MAXmin indicates the total from the time the maximum and minimum values v last reset.         The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented the 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         istant indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented the 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         ista1       bit30       bit29       bit28       bit27       bit26       bit25       bit24         ista2       bit14       bit13       bit12       bit11       bit10       bit9       bit8         ista3       bit22       bit14       bit3       bit2       bit14       bit19       bit18         ista4       bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         ista4       bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         ista7       bit6	escription										kimum va		
dropped.       If no items are specified directly via a :MEASure? query, output is based on specification of this command.         INST indicates the status for the instantaneous value at the time when the da acquired.       MAXmin indicates the total from the time the maximum and minimum values v last reset.         The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         bit31       bit30       bit29       bit26       bit27       bit26       bit25       bit24         bit31       bit30       bit29       bit20       bit19       bit18       bit17       bit16         bit12       bit14       bit13       bit12       bit11       bit10       bit9       bit8         bit15       bit14       bit15       bit4       bit3       bit2       bit1       bit0         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         c       RP       Active power range exceeded       CP       RU       PU         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         c       Synchronization error       RP       RE       Current range exceeded <th></th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>e decima</td>											e decima		
If no items are specified directly via a :MEASure? query, output is based on specification of this command. INST indicates the status for the instantaneous value at the time when the da acquired. MAXmin indicates the total from the time the maximum and minimum values v last reset. The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows: <ul> <li>bit31</li> <li>bit30</li> <li>bit29</li> <li>bit28</li> <li>bit27</li> <li>bit26</li> <li>bit25</li> <li>bit24</li> <li>Bit27</li> <li>bit18</li> <li>bit17</li> <li>bit16</li> <li>bit2</li> <li>bit11</li> <li>bit10</li> <li>bit3</li> <li>bit2</li> <li>bit11</li> <li>bit0</li> <li>bit7</li> <li>bit6</li> <li>bit5</li> <li>bit4</li> <li>bit3</li> <li>bit2</li> <li>bit1</li> <li>bit0</li> <li>bit7</li> <li>bit6</li> <li>bit5</li> <li>bit4</li> <li>bit3</li> <li>bit2</li> <li>bit1</li> <li>bit0</li> <li>current range exceeded</li> <li>RU:</li> <li>Voltage range exceeded</li> <li>PU:</li> <li>Voltage range exceeded</li> <li>PU:</li> <li>Voltage range exceeded</li> <li>PU:</li> <li>Vol</li></ul>					numene					ngni or in			
INST indicates the status for the instantaneous value at the time when the da acquired.         MAXmin indicates the total from the time the maximum and minimum values valuat reset.         The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:            bit31         bit30         bit29         bit28         bit27         bit26         bit25         bit24         -         -         HM         -         RP         bit23         bit22         bit12         bit11         bit17         bit6         bit3         bit12         bit11         bit10         bit3         bit2         bit4         bit5         bit7         bit5         bit1         bit0         bit5         bit1         bit0			lf no	If no items are specified directly via a :MEASure? query, output is based on the									
acquired.       MAXmin indicates the total from the time the maximum and minimum values v last reset.         The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         bit31       bit30       bit29       bit27       bit25       bit24         -       -       HM       -       -       RP         bit23       bit22       bit21       bit20       bit19       bit18       bit17       bit16         -       -       RP       bit23       bit22       bit11       bit10       bit8         -       -       RI       -       -       RU       bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         -       -       RI       -       -       RU       bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         -       -       RI       -       -       RU       bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         -       -       RI       -       -       RU       bit2       bit1 </td <th></th> <td></td> <td></td> <td colspan="10"></td>													
MAXmin indicates the total from the time the maximum and minimum values v last reset.         The Status data indicates the status of the warning indicators on the instrum when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:            bit31         bit30         bit29         bit28         bit27         bit26         bit25         bit24         -         -         HM         -         -         RP         bit23         bit22         bit21         bit20         bit19         bit18         bit17         bit16         bit2         bit12         bit12         bit11         bit10         bit2         bit15         bit14         bit12         bit12         bit13         bit2         bit15         bit4         bit5         bit4         bit3         bit2         bit1         bit7         bit6         bit5         bit4         bit3         bit2         bit1         bit1         bit1         bit3         bit2         bit1         bit3         bit2         bit3         bit2         bit3         bit4         bit3         bit2         bit1         bit1         bit6         bit5         bit4         bit3         bit2         bit1         bit1         bit3         bit2         bit1         bit3         bit2         bit3         bit3         bit3         bit3         bit4         bit3         bit3         bit4         bit3         bit4         bit3         bit3         bit4         bit3         bit3         bit3         bit3         bit3         bit4         bit3         bit3         bit4         bit3         bit3         bit3         bit3         bit3         bit3         bit4         bit3         bit3         bit4         bit3         bit4         bit3         bit3         bit4         bit3         bit3         bit					s ine siai		; 115181118	neous vai	ue at the		en lite ua		
The Status data indicates the status of the warning indicators on the instrum         when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows:         istation in the instrument of each of these 32 bits is as follows:         istation in the instrument of each of these 32 bits is as follows:         istation in the instrument of each of these 32 bits is as follows:         istation in the instrument of each of these 32 bits is as follows:         istation in the instrument of each of these 32 bits is as follows:         istation in the instrument of each of these 32 bits is as follows:         istation in the instrument protection bits in the instrument protection mode activated         SY:       Synchronization error         RI:       Current range exceeded         RU:       Voltage range exceeded         PU:       Voltage peak exceeded         PU:       <			MAX	min indic	ates the	total from	the time	the maxir	num and	minimun	n values v		
when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows: bit31 bit30 bit29 bit28 bit27 bit26 bit25 bit24 			last	eset.									
when the measurement data was saved. The Status data is represented to 32-bit hexadecimal value. The content of each of these 32 bits is as follows: bit31 bit30 bit29 bit28 bit27 bit26 bit25 bit24 			The	Status da	ata indica	ates the s	tatus of t	the warnir	na indica <sup>.</sup>	tors on th	he instrur		
bit31       bit30       bit29       bit28       bit27       bit26       bit25       bit24         -       -       HM       -       -       RP         bit23       bit22       bit21       bit20       bit19       bit18       bit17       bit16         -       -       -       CP       -       -       SY       bit15       bit14       bit13       bit12       bit11       bit10       bit9       bit8         -       -       -       RI       -       -       RU       bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit00         -       -       -       PI       -       -       PU       -       -       PU         HM:       Harmonic wave measurement synchronization error       RP:       Active power range exceeded       CP:       Instrument protection mode activated       SY:       Synchronization error         RI:       Current range exceeded       RU:       Voltage range exceeded       PIx:       Current peak exceeded         PUX:       Voltage peak exceeded       PUX:       Voltage peak exceeded       PUX:       Voltage peak exceeded         PUX:       Voltage peak exceeded			whei	n the me	asureme	nt data v	as save	d. The St	atus data	a is repr	esented b		
bit23       bit22       bit21       bit20       bit19       bit18       bit17       bit16         bit15       bit14       bit13       bit12       bit11       bit10       bit9       bit8         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         HM:       Harmonic wave measurement synchronization error       RI       -       -       RU         HM:       Harmonic wave measurement synchronization error       RP       -       -       PU         HM:       Harmonic wave measurement synchronization error       RP       -       -       PU         HM:       Harmonic wave measurement synchronization error       RP       -       -       PU         HM:       Current range exceeded       -       -       PU       -       -       PU         HM:       Current peak exceeded       -       -       -       PU       -       -       -       PU         HM:       Voltage peak exceeded       -       -       -       -       -       -       -       -       - <td< th=""><th></th><th></th><th>32-b</th><th>it hexade</th><th>cimal val</th><th>ue. The c</th><th>ontent of</th><th>each of th</th><th>nese 32 k</th><th>oits is as</th><th>follows:</th></td<>			32-b	it hexade	cimal val	ue. The c	ontent of	each of th	nese 32 k	oits is as	follows:		
bit23       bit22       bit21       bit20       bit19       bit18       bit17       bit16         bit15       bit14       bit13       bit12       bit11       bit10       bit9       bit8         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         HM:       Harmonic wave measurement synchronization error       RI       -       -       PU         HM:       Harmonic wave measurement synchronization error       RP:       Active power range exceeded       PU         CP:       Instrument protection mode activated       SY:       Synchronization error         RI:       Current range exceeded       RU:       Voltage range exceeded         PIx:       Current peak exceeded       PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded       PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded       PUx:       Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?       :MEAS:ITEM:STAT:INST?				hit21	hit20	hit20	hi+20	hit27	hitac		hit21		
bit23       bit22       bit21       bit20       bit19       bit18       bit17       bit16         bit15       bit14       bit13       bit12       bit11       bit10       bit9       bit8         c       RI       c       RI       c       c       RU         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         e       PI       c       c       PI       c       c       PU         HM:       Harmonic wave measurement synchronization error       RP:       Active power range exceeded       PU         CP:       Instrument protection mode activated       SY:       Synchronization error       RI:       Current range exceeded         RU:       Voltage range exceeded       PUx:       Voltage peak exceeded       PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded       PUx:       Voltage peak exceeded       Example       Command       :MEAS:ITEM:STAT:INST 1         Specifies to turn ON measurement status output.       Query       :MEAS:ITEM:STAT:INST?					01130	DILZ9							
bit15       bit14       bit13       bit12       bit11       bit10       bit9       bit8         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         PI       PI       PI       PU       PU         HM:       Harmonic wave measurement synchronization error       RP:       Active power range exceeded       PU         CP:       Instrument protection mode activated       SY:       Synchronization error         RI:       Current range exceeded       PIx:       Current peak exceeded         PIx:       Voltage range exceeded       PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded       PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded       PUx:       Voltage peak exceeded         Query       :MEAS:ITEM:STAT:INST 1       Specifies to turn ON measurement status output.					bit22	bit21			bit18	bit17			
bit15       bit14       bit13       bit12       bit11       bit10       bit9       bit8         i       RI       RI       RI       RU       Bit0       Bit1       Bit0         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         HM:       Harmonic wave measurement synchronization error       RP:       Active power range exceeded       PU         CP:       Instrument protection mode activated       SY:       Synchronization error         RI:       Current range exceeded       RU:       Voltage range exceeded         PIX:       Current peak exceeded       PUX:       Voltage peak exceeded         PUX:       Voltage peak exceeded       Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?													
bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         -       Pl       -       -       Pl       -       -       PU         HM:       Harmonic wave measurement synchronization error       RP:       Active power range exceeded       PU         CP:       Instrument protection mode activated       SY:       Synchronization error         RI:       Current range exceeded       RU:       Voltage range exceeded         PUx:       Voltage range exceeded       PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded       PUx:       Voltage peak exceeded         Query       :MEAS:ITEM:STAT:INST 1       Specifies to turn ON measurement status output.				bit15	bit14	bit13	bit12	bit11	bit10	bit9	bit8		
HM:       Harmonic wave measurement synchronization error         RP:       Active power range exceeded         CP:       Instrument protection mode activated         SY:       Synchronization error         RI:       Current range exceeded         RU:       Voltage range exceeded         PI:       Current peak exceeded         PI:       Voltage range exceeded         PI:       Current peak exceeded         PI:       Voltage peak exceeded         PU:       Voltage range         Voltage peak exceeded       PU:         Voltage peak exceeded       Voltage         PU:       Voltage range         Voltage       Voltage         PU:       Voltage         Voltage       Voltage         Voltage       Voltage         Voltage       Voltage         Voltage       Voltage         Voltage										_	RU		
HM:       Harmonic wave measurement synchronization error         RP:       Active power range exceeded         CP:       Instrument protection mode activated         SY:       Synchronization error         RI:       Current range exceeded         RU:       Voltage range exceeded         PIx:       Current peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         Query       :MEAS:ITEM:STAT:INST 1         Specifies to turn ON measurement status output.				-	_	-	RI	-	-				
RP:       Active power range exceeded         CP:       Instrument protection mode activated         SY:       Synchronization error         RI:       Current range exceeded         RU:       Voltage range exceeded         Plx:       Current peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         Query       :MEAS:ITEM:STAT:INST 1         Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?						bit5							
RP:       Active power range exceeded         CP:       Instrument protection mode activated         SY:       Synchronization error         RI:       Current range exceeded         RU:       Voltage range exceeded         PIx:       Current peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         Query       :MEAS:ITEM:STAT:INST 1         Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?						bit5	bit4		bit2		bit0		
CP:       Instrument protection mode activated         SY:       Synchronization error         RI:       Current range exceeded         RU:       Voltage range exceeded         PIx:       Current peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         Query       :MEAS:ITEM:STAT:INST 1         Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?				bit7	bit6	-	bit4 PI	bit3	bit2	bit1	bit0 PU		
SY:       Synchronization error         RI:       Current range exceeded         RU:       Voltage range exceeded         PIx:       Current peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?				bit7 - HM	bit6 - 1: Ha	armonic w	bit4 PI vave mea	bit3 - surement	bit2	bit1	bit0 PU		
RI:       Current range exceeded         RU:       Voltage range exceeded         PIx:       Current peak exceeded         PUx:       Voltage peak exceed				bit7 - HM RP	bit6 - 1: Ha : Ac	armonic w	bit4 PI vave mea er range e	bit3 - surement	bit2 - synchror	bit1 -	bit0 PU		
RU:       Voltage range exceeded         PIx:       Current peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?				bit7 - HM RP CP	bit6 - 1: Ha : Ac : In	armonic w ctive powe strumen	bit4 PI vave mea er range e t protec	bit3 - surement exceeded tion mod	bit2 - synchror	bit1 -	bit0 PU		
PIx:       Current peak exceeded         PUx:       Voltage peak exceeded         PUx:       Voltage peak exceeded         Example       Command         Image: Query       Image: Specifies to turn ON measurement status output.         Query       Image: Specifies to turn STAT: INST?				bit7 - HM RP CP SY	bit6 - 1: Ha : Ac : In : Sy	armonic w ctive powe strumen vnchroniza	bit4 PI vave mea er range e t protec ation erro	bit3 - surement exceeded tion moc	bit2 - synchror	bit1 -	bit0 PU		
Example       Command       PUx:       Voltage peak exceeded         Query       :MEAS:ITEM:STAT:INST 1       Specifies to turn ON measurement status output.         Query       :MEAS:ITEM:STAT:INST?				bit7 - HM RP CP SY RI:	bit6 - 1: Ha : Ac : In : Sy Cu	armonic w ctive powe strumen vnchroniza urrent ran	bit4 PI vave mea er range e t protec ation erro ge excee	bit3 - surement exceeded tion mod or ded	bit2 - synchror	bit1 -	bit0 PU		
Example Command :MEAS:ITEM:STAT:INST 1 Specifies to turn ON measurement status output. Query :MEAS:ITEM:STAT:INST?				bit7 - HM RP CP SY RI: RU	bit6 - 1: Ha : Ac : In : Sy Cu : Vo	armonic w ctive powe strumen vnchroniza urrent ran oltage ran	bit4 PI vave mea er range e t protec ation erro ge excee ge excee	bit3 - surement exceeded tion moc or ded ded	bit2 - synchror	bit1 -	bit0 PU		
Query Cuery				bit7 - HM RP CP SY RI: RU PIx	bit6 - 1: Ha : Ac : In : Sy Cu : Vo : Vo	armonic w ctive powe strumen vnchroniza urrent ran oltage ran urrent pea	bit4 PI vave mea er range e t protec ation erro ge excee ge excee k exceed	bit3 surement exceeded tion moc or ded ded ded	bit2 - synchror	bit1 -	bit0 PU		
Query :MEAS:ITEM:STAT:INST?		Commond		bit7 - HM RP CP SY RI: RU PIx PU	bit6 - 1: Ha : Ac : In : Sy Cu Cu : Vo :: Vo	armonic w ctive powe strumen vnchroniz urrent ran oltage ran urrent pea	bit4 PI vave mea er range e t protec ation erro ge excee ge excee k exceed	bit3 surement exceeded tion moc or ded ded ded	bit2 - synchror	bit1 -	bit0 PU		
	Example	Command		bit7 - HM RP CP SY RI: RU PIX PU <b>AS:ITEN</b>	bit6 - 1: Ha : Ac : In : Sy Cu Cu Cu Cu X: Vc A:STAT	armonic w ctive powe strumen unchroniza urrent ran oltage ran urrent pea oltage pea <b>:INST 1</b>	bit4 PI vave mea er range e t protec ation erro ge excee ge excee k exceed k exceed	bit3 surement exceeded tion mod r ded ded ded ded	bit2 synchror de activa	bit1 -	bit0 PU		
(WIGHTEADER UN) .WEASURE.NORMALITEWISTATINST	Example		S	bit7 - HM RP CP SY RI: RU PIX PU <b>AS:ITEM</b> pecifies to	bit6 - 1: Ha : Ac : In : Sy Cu : Vo :: Vo x: Vo <b>1:STAT</b> o turn ON	armonic w strumen vnchroniza urrent ran oltage ran urrent pea oltage pea :INST 1	bit4 PI vave mea er range e t protec ation erro ge excee ge excee k exceed k exceed	bit3 surement exceeded tion mod r ded ded ded ded	bit2 synchror de activa	bit1 -	bit0 PU		
(When HEADER OFF) 1	Example	Query	S ME:	bit7 - HN RP CP SY RI: RU PIx PU AS:ITEN AS:ITEN	bit6  I: Ha I: Ac I: In I: Sy Cu I: Vc I: Cu I:	armonic w strumen ynchroniza urrent ran oltage ran urrent pea oltage pea :INST 1 J measure :INST?	bit4 PI vave mea er range e t protec ation erro ge excee ge excee k exceed k exceed k exceed	bit3 surement exceeded tion moc or ded ded ded ded tus output	bit2 synchror de activa	bit1 -	bit0 PU		

Set and Query :MEASure? Output Items (Instantaneous, Maximum, and Minimum Values for Voltage Data)										
	nstantaneous value Maximum value Minimum value		:MEA :MEA :MEA :MEA :MEA :MEA	Sure[:N Sure[:N Sure[:N Sure[:N Sure[:N Sure[:N	IORMal IORMal IORMal IORMal IORMal IORMal	]:ITEM: ]:ITEM: ]:ITEM: ]:ITEM: ]:ITEM:	U:ALL U:CH1( U_MAX U_MAX U_MIN:	<0utpu ?) <0ι ::ALL ::CH1(? ALL <	itput item <output ) <outj :Output it</outj </output 	item> out item>
	Response	<output 128</output 	item (NR 64	1)> 32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
					FND	DC	AC	MN	ACDC	
Description		output itte For exam Umn rec You can can spec measure Although dropped If no item	ems as nu nple, spectification i also outp cify 3 to o ement value NRf num ns are spector	umerical v cify 1 to o measurer but all rec utput both ues at the herical val ecified dir	stantaneo values bef utput the . nent value tification the AC+ e same tim lues are a	ween 0 a AC+DC re e. methods DC rectifine. ccepted, a :MEASu	nd 31. ectification together cation and values to ure? query	n or 2 to c at once. I d AC+DC the right c	output the For exam Umn rect	AC+DC ple, you iification imal are
Example		:MEAS Specifie	:ITEM:U is to outpu :ITEM:U ER ON)	:CH1 1 ut the inst :CH1?	ecificatior antaneou: IEASUR	s value of	the AC/D		Ū	

Set and Query :MEASure? Output Items (Instantaneous, Maximum, and Minimum Values for Current Data)										
Syntax	Instantaneous value			ure[:NC ure[:NC	_				item> put item>	
	Maximum value			ure[:NC ure[:NC					<ul> <li>Output it</li> <li>Outp</li> </ul>	em> out item>
	Minimum value	:	MEASı	ure[:NC ure[:NC	RMal]	ITEM:	_MIN:/	ALL `<	Output ite	
	Response		item (NR	_						
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
					FND	DC	AC	MN	ACDC	
Description				data (inst umerical v		,		n value, r	ninimum	value)

escription		Sets the current data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 31. For example, specify 1 to output the AC+DC rectification or 2 to output the
		AC+DC Umn rectification measurement value.
		You can also output all rectification methods together at once. For example, you can specify 3 to output both the AC+DC rectification and AC+DC Umn rectification measurement values at the same time.
		Although NRf numerical values are accepted, values to the right of the decimal are dropped.
		If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.
Example	Command	:MEAS:ITEM:I:CH1 1
-	_	Specifies to output the instantaneous value of the AC/DC rectified current.
	Query	:MEAS:ITEM:I:CH1?
	Response	(When HEADER ON) :MEASURE:NORMAL:ITEM:I:CH1 1 (When HEADER OFF) 1

Set and Query :MEASure? Output Items											
(Instantane	ous, Maximi										
Syntax	Instantaneous value		MEASι MEASι	ure[:NC ure[:NC	)RMal] )RMal]	ITEM:	P:ALL P:CH1	<0utput 01 <0۱ (?)	: item> Itput item:	>	
	Maximum value	: : : : : : : : : : : : : : : : : : : :	MEASι	ire[:NC	)RMal]	:ITEM:	P_MAX	Ì:ÁLL	-Output	item>	
	Minimum value	:	MEASı	ure[:NC ure[:NC	)RMal]	:ITEM:	P_MIN:	:ALL `	<output it<="" th=""><th></th></output>		
	Response	<output (nr1)="" item=""></output>									
		128	64	32	16	8	4	2	1	_	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0		
					FND	DC	AC	MN	ACDC		
Description		Sets the active power data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 31. For example, specify 1 to output the AC+DC rectification or 2 to output the AC+DC Umn rectification measurement value. You can also output all rectification methods together at once. For example, you can specify 3 to output both the AC+DC rectification and AC+DC Umn rectification measurement values at the same time. Although NRf numerical values are accepted, values to the right of the decimal are dropped. If no items are specified directly via a :MEASure? query, the measurement									
Example	,	:MEAS: Specifie	ITEM:P s to outpu ITEM:P ER ON)	ut the insta :CH1?	antaneou		the AC/D	C rectifie	d active p	ower.	

Set and Qu	erv :MEAS	ure? Oi	itout Ite	ems						
(Instantane					/alues f	or App	arent P	ower D	ata)	
Syntax	Instantane ous value						:S:ALI			
							:S:CH			
	Maximum value						:S_MA			
							I:S_MA			utput item>
	Minimum value						:S_MI			
				-	ORMa	I]:ITEM	I:S_MI	N:CH1(	<b>?)</b> <0u	tput item>
	Response		item (NR							
		128	64	32	16	8	4	2	1	1
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
					FND		AC	MN	ACDC	
Description		Sets the apparent power data (instantaneous value, maximum value, minimum								
		value) output items as numerical values between 0 and 23. For example, specify 1 to output the AC+DC rectification or 2 to output the AC+DC								
					nent valu		rectificatio	on or 2 to	output th	e AC+DC
							onether at	once Fo	rexample	e, you can
										ectification
		• •	•		same tin					
		Although	n NRf nun	nerical va	lues are a	accepted,	values to	the right	t of the de	ecimal are
		dropped								
									easureme	ent values
Example	Command		ITEM:S		ecilication		ommand.			
Example	000000	-	-	-	ontonoou		the AC/D	C rootific	donnoror	thouse
	Query	•	ITEM:S		antaneou	s value of	the AC/D	C recuire	u apparer	it power.
	Response		ADER ON)			. וא אסר	ITEM:S:	CH1 1		
		1	ADER ON)	.IMEAS		JINIMAL.				
				1						

Set and Query :MEASure? Output Items												
(Instantane	ous, Maxi	mum, a	nd Min	imum \	Values 1	for Inac	tive Po	wer Da	ita)			
Syntax	Instantane ous value					ITEM:Q						
	Maximum value	:MEASure[:NORMal]:ITEM:Q_MAX:ÁLL <output item=""> :MEASure[:NORMal]:ITEM:Q_MAX:CH1(?) <output item=""></output></output>										
	Minimum value		:MEASure[:NORMal]:ITEM:Q_MIX:CITI(:) <output item=""> :MEASure[:NORMal]:ITEM:Q_MIN:ALL <output item=""> :MEASure[:NORMal]:ITEM:Q_MIN:CH1(?) <output item=""></output></output></output>									
	Response	<output< th=""><th>item (NR</th><th>1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></output<>	item (NR	1)>								
		128	64	32	16	8	4	2	1	_		
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
					FND		AC	MN	ACDC			
Description								imum valı	ue, minim	um value)		
						tween 0 a		on or 2 to	output th	e AC+DC		
					ment valu		recuncatio	01 01 2 10	ouiput ii	E ACTDC		
		You can	also outp	ut all rect	ification n	nethods to				e, you can		
							cation and	d AC+DC	C Umn re	ectification		
					e same tin		values to	the right	t of the de	ecimal are		
		dropped		iencai va		accepteu,	values it	ine ngin				
				ecified di	irectly via	a :MEAS	Sure? que	ry, the m	easureme	ent values		
	<b>.</b>				ecificatior	n of this c	ommand.					
Example	Command		ITEM:Q		ontonoou		the AC/D	C rootific	d in a ativa	DOWOF		
	Query		ITEM:Q		antaneou	s value of	the AC/D		u macuve	power.		
	Response	(When HEA			SURE:	NORMAI	ITEM:	<b>CH1</b> 1				
	•		ADER OFF)	1								
		( ········										

Syntax	Instantaneous value					ITEM:P				
	Maximum					ITEM:P ITEM:P				
	value					ITEM:P				ut item>
	Minimum value		:MEAS	ure[:NC	)RMal]:	ITEM:P	F_MIN:	ALL <	Output ite	m>
	Response		item (NR	_			_			
		128	64	32	16	8	4	2	1	-
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
					FND	taneous	AC	MN	ACDC	
		For example AC+DC You can can sperectificat Although are drop If no ite	mple, spe Umn recti also outp cify 3 to ion meas n NRf nun ped. ms are s	ecify 1 to ification m ut all rect o output urement v nerical va	output the neasurem ification n both the values at the lues are a directly v	ues betwee he AC+D nethods to e AC+DC the same accepted, ria a :ME iffication c	C rectific ogether a rectifica time. values to ASure?	ation or t once. Fo ation and o the righ query, the	or exampl AC+DC t of the de	le, you Umn ecimal
Example	Command Query	:MEAS Specifie :MEAS	s to outpu	F:CH1 1 ut the insta F:CH1?	antaneou	s value of	the AC/D	C rectifie	d power fa	actor.
	Response	(When HE	ADER ON) ADER OFF)		URE:NO	ORMAL:	ITEM:PI	F:CH1 1		

								Data)		
Syntax	nstantaneous value			_					put item> Output ite	
	Maximum value		:MEAS	ure[:NC	DRMal]:	ITEM:D	EG_MA	X:ÁLL	- <outpu< td=""><th></th></outpu<>	
	Minimum value		:MEAS	ure[:NC	DRMal]:	ITEM:D	EG_MI	N:ALL	<output< th=""><th></th></output<>	
	Response	<output< th=""><th>item (NR</th><th>1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th>· · · · ·</th></output<>	item (NR	1)>						· · · · ·
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	1
					FND		AC	MN	ACDC	1
Description		output itu For exa rectificat You can specify 3 values a Although dropped If no iten	ems as nu mple, spo ion mease also outp 20 to out t the sam n NRf nur ns are spo	umerical v ecify 4 to urement v put all rec put both e time. nerical va ecified dir	values bei o output value. tification r the AC r alues are ectly via a	tween 0 a the AC methods t rectificatic accepted	nd 20. rectificatio ogether a on and Fl , values t re? query	on or 16 at once. F ND rectifi to the rigl	to output for examp ication me tht of the o	num value) ut the FND de, you can easurement decimal are t values are
Example	Command Query Response	:MEAS Specifie :MEAS	:ITEM:D	EG:CH1 ut the inst EG:CH1	4 antaneou ?	s value of	the AC re	ectified pc E <b>G:CH1</b>	ower facto	r.

and Quary

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Cat and Ou		·····								
Set and Qu (Instantane					/alues f	or Volt	ade Fre	auency	v Data)	
Syntax			:MEAS	ure[:NC	ORMal]:	ITEM:F	REQU:	ALL <	Output item <output i<="" th=""><th></th></output>	
	Maximum value		:MEAS	ure[:NC		ITEM:F	REQU_	MAX:Á	LL <out< th=""><th></th></out<>	
	Minimum value			_					L <outp 11(?) &lt;0</outp 	
	Response	<output< th=""><th>item (NR</th><th>1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></output<>	item (NR	1)>						
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	]
									FREQU	
Description		value) ou Although dropped If no iten	utput item NRf nur	is as num nerical va ecified dir	erical valuation of the sectly via a	ues betwe accepted a :MEASu	en 0 and , values re? quer	l 1. to the rigl	hum value, ht of the de asurement v	cimal are
Example	Command Query Response	If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command. :MEAS:ITEM:FREQU:CH1 1 Specifies to output the instantaneous value of the AC/DC rectified voltage frequency. :MEAS:ITEM:FREQU:CH1?								

Set and Qu			-		stantar	neous, I	Maximu	ım, and	l Minimu	m	
Values for		requend									
Syntax	Instantane ous value			ure[:NC					utput item:		
	Maximum			ure[:NC	_				<output it<="" th=""><th></th></output>		
	value							MAX:AL MAX:CF		ut item> utput item>	
	Minimum							MIN:ALI			
	value									tput item>	
	Response	<output< th=""><th>item (NR</th><th></th><th>///inaij.</th><th></th><th></th><th></th><th>(:) (u</th><th></th></output<>	item (NR		///inaij.				(:) (u		
		128	64	32	16	8	4	2	1		
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0		
									FREQI		
Description									im value, m	ninimum	
•			utput item								
		Although NRf numerical values are accepted, values to the right of the decimal are dropped.									
		If no iter	ms are sp						easuremen	t values	
<b>F</b>	Command		ut based			n of this c	ommand.				
Example	Command		ITEM:F			a valua of	the AC/F	C rootifio	d current fre	auonov	
	Query		:ITEM:F			s value of	the AC/L	C rectille	a current fre	equency.	
	Response	(When HE/					L:ITEM:	FREQI:C	CH1 1		
		1	ADER OFF)	1							
		(	,								
Set and Qu	iery:MEAS						-				
Syntax					A 12 1201						
Syntax			ASure	[:NOKI	nai]:i i	EM:TIN	/IE(?) <	Output ite	em>		
Jyntax				-	1.1			- i - i			
Jyntax		Data	a by cur	- rent ran	- ge durir	ng auto-	range ir	ntegratio	on		
- Oyntax		Data :ME	a by cur ASure	rent ran [:NOR	- ge durir <mark>Mal]:IT</mark>	ng auto- EM:TIN	range ir /IE:I20	ntegratic <b>0mA(?)</b>	on   < Outpu		
Jynax		Data :ME :ME	a by cur ASure ASure	rent ran [:NOR  [:NOR	- ge durir Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN	range ir /IE:I200 /IE:I500	ntegratic DmA(?) DmA(?)	on   < Outpu		
Jymax		Data :ME :ME :ME	a by cur ASure ASure ASure	rent ran [:NOR  [:NOR  [:NOR	- ge durir Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN	range ir /IE:I200 /IE:I500 /IE:I1A	ntegratic 0mA(?) 0mA(?) (?) <0	on   < Outpu	t item >	
Jyntax		Data :ME :ME :ME	a by cur ASure ASure	rent ran [:NOR  [:NOR  [:NOR	- ge durir Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN	range ir /IE:I200 /IE:I500 /IE:I1A	ntegratic 0mA(?) 0mA(?) (?) <0	on   < Outpu   < Outpu	t item > >	
Jyntax		Data :ME :ME :ME :ME :ME	a by cur ASure ASure ASure ASure ASure	rent ran [:NORI [:NORI [:NORI [:NORI [:NORI	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN	range ir AE:1200 AE:1500 AE:11A AE:12A AE:12A	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < (	on   < Outpu   < Outpu Dutput item	t item > > >	
Jymax		Data :ME :ME :ME :ME :ME	a by cur ASure ASure ASure ASure	rent ran [:NORI [:NORI [:NORI [:NORI [:NORI	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN	range ir AE:1200 AE:1500 AE:11A AE:12A AE:12A	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < (	on < Outpu ) < Outpu ) < Output Dutput item	t item > > > >	
Jymax		Data :ME :ME :ME :ME :ME :ME	A by cur ASure ASure ASure ASure ASure ASure ASure	- [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN	range ir ME:1200 ME:1500 ME:11A ME:12A ME:12A ME:15A ME:110 ME:120	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) < A(?) <	on < Outpu > < Outpu Dutput item Dutput item Cutput item < Output iten < Output iten	t item > > > > m >	
Jymax		Data :ME :ME :ME :ME :ME :ME	A by cur ASure ASure ASure ASure ASure ASure ASure	- [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN	range ir ME:1200 ME:1500 ME:11A ME:12A ME:12A ME:15A ME:110 ME:120	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) <	on < Outpu > < Outpu Dutput item Dutput item Cutput item < Output iten < Output iten	t item > > > > m >	
Jyntax	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME	A by cur ASure ASure ASure ASure ASure ASure ASure	rent ran [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN	range ir ME:1200 ME:1500 ME:11A ME:12A ME:12A ME:15A ME:110 ME:120	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) < A(?) <	on < Outpu > < Outpu Dutput item Dutput item Cutput item < Output iten < Output iten	t item > > > m > m > m >	
Jymax		Data :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure ASure	rent ran [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN	range ir ME:I200 ME:I500 ME:I1A ME:I2A ME:I5A ME:I5A ME:I200 ME:BA0	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) < A(?) <	on <ul> <li>&lt; Outpu</li> <li>&lt; Output</li> <li>Output item</li> <li>Output item</li> <li>Output itei</li> <li>&lt; Output itei</li> <li>&lt; Output itei</li> <li>&lt; Output itei</li> <li>&lt; Output itei</li> </ul>	t item > > > m > m > m >	
Jymax		Data :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure item (NR	- [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  ])>	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN	range in ME:I200 ME:I500 ME:I500 ME:I500 ME:I500 ME:I500 ME:I200 ME:BA0	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) < A(?) < CKup(1	ON < Output > < Output Output item Output item > Output item < Output item	t item > > > m > m > m >	
	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :Output 128 bit7	A Sure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6	rent ran [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  1)> 32 bit5	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN 8 bit3	range ir ME:I200 ME:I500 ME:I500 ME:I500 ME:I200 ME:I200 ME:I200 ME:BA0 4 bit2	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) < A(?) < CKup(1 bit1	ON <ul> <li>&lt; Output</li> <li>&lt; Output</li> <li>Output item</li> </ul>	t item > > > m > m > m >	
Description	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 integratic	rent ran [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  1)> 32 bit5 on time da	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN 8 bit3	range ir AE:I200 AE:I500 AE:I500 AE:I500 AE:I2	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) < A(?) < CKup(1 bit1 bit1 ue betwee	ON Output Output item Output item Output item Output item Coutput item Output Item	t item > > > m > m > put item>	
	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 NRf num	rent ran [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  [:NOR  1)> 32 bit5 on time da	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN 8 bit3	range ir AE:I200 AE:I500 AE:I500 AE:I500 AE:I2	ntegratic DmA(?) DmA(?) (?) < ( (?) < ( (?) < ( A(?) < A(?) < CKup(1 bit1 bit1 ue betwee	ON <ul> <li>&lt; Output</li> <li>&lt; Output</li> <li>Output item</li> </ul>	t item > > > m > m > put item>	
	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 integration NRf num	rent ran [:NOR]	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT dal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN B bit3 to a num accepted, a :MEAS	range ir AE:I200 AE:I500 AE:I500 AE:I500 AE:I200 AE:I5A AE	ntegratic DmA(?) DmA(?) (?) < 0 (?) < 0 (?) < 0 (?) < 0 A(?) < A(?) < CKup(1 bit1 bit1 ue betwee o the right ery, the m	ON Output Output item Output item Output item Output item Coutput item Output Item	t item > > > m > m > mut item> imal are	
Description	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 integration NRf num	rent ran [:NOR]	ge durir Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT Mal]:IT dal]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN B bit3 to a num accepted, a :MEAS	range ir AE:I200 AE:I500 AE:I500 AE:I500 AE:I200 AE:I5A AE	ntegratic DmA(?) DmA(?) (?) < 0 (?) < 0 (?) < 0 (?) < 0 A(?) < A(?) < CKup(1 bit1 bit1 ue betwee o the right ery, the m	on <ul> <li>&lt; Output</li> <li>&lt; Output</li> <li>output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>&lt; Output item</li> <li>&lt; Outp</li></ul>	t item > > > m > m > mut item> imal are	
	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 bit6 nRf nun ms are sp ut based iTEM:T	rent ran [:NOR] [:NO] [:NO	ge durir Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT 16 bit4 ta output lues are a rectly via	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN 8 bit3 to a num accepted, a :MEAS	range ir AE:I200 AE:I500 AE:I500 AE:I500 AE:I200 AE:I5A AE	ntegratic DmA(?) DmA(?) (?) < 0 (?) < 0 (?) < 0 (?) < 0 A(?) < A(?) < CKup(1 bit1 bit1 ue betwee o the right ery, the m	on <ul> <li>&lt; Output</li> <li>&lt; Output</li> <li>output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>&lt; Output item</li> <li>&lt; Outp</li></ul>	t item > > > m > m > mut item> imal are	
Description	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 integratic NRf nun ms are sp ut based <b>:ITEM:T</b> ifies to out	rent ran [:NOR]	ge durir Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT 16 bit4 ta output lues are a rectly via	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN 8 bit3 to a num accepted, a :MEAS	range ir AE:I200 AE:I500 AE:I500 AE:I500 AE:I200 AE:I5A AE	ntegratic DmA(?) DmA(?) (?) < 0 (?) < 0 (?) < 0 (?) < 0 A(?) < A(?) < CKup(1 bit1 bit1 ue betwee o the right ery, the m	on <ul> <li>&lt; Output</li> <li>&lt; Output</li> <li>output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>&lt; Output item</li> <li>&lt; Outp</li></ul>	t item > > > m > m > mut item> imal are	
Description	Response Command Query	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME :ME	A Sure ASure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 integration NRf num ms are sp ut based iTEM:T	rent ran [:NOR]	ge durir Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT val]:IT val]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN B bit3 to a num accepted, a :MEAS n of this continue.	range ir AE:I200 AE:I500 AE:I1A AE:I2A AE:I5A AE:I5A AE:I0A AE:I20A AE:BA0 4 bit2 erical values to sure? que ommand.	ntegratic DmA(?) DmA(?) (?) < 0 (?) < 0 (?) < 0 (?) < 0 (?) < 0 (?) < 0 A(?) < A(?) < CKup(?) 2 bit1 ue betwee o the right ery, the m	on <ul> <li>&lt; Output</li> <li>&lt; Output</li> <li>output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>&lt; Output item</li> <li>&lt; Outp</li></ul>	t item > > > m > m > mut item>	
Description	Response	Data :ME :ME :ME :ME :ME :ME :ME :ME :ME 20utput 128 bit7 Sets the Although dropped If no iter are outp :MEAS Spec :MEAS (When HE/	A Sure ASure ASure ASure ASure ASure ASure ASure ASure item (NR 64 bit6 integration NRf num ms are sp ut based iTEM:T	rent ran [:NOR] [:NO]	ge durir Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT Val]:IT val]:IT val]:IT	ng auto- EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN EM:TIN 8 bit3 to a num accepted, a :MEAS	range ir AE:I200 AE:I500 AE:I1A AE:I2A AE:I5A AE:I5A AE:I0A AE:I20A AE:BA0 4 bit2 erical values to sure? que ommand.	ntegratic DmA(?) DmA(?) (?) < 0 (?) < 0 (?) < 0 (?) < 0 (?) < 0 (?) < 0 A(?) < A(?) < CKup(?) 2 bit1 ue betwee o the right ery, the m	on <ul> <li>&lt; Output</li> <li>&lt; Output</li> <li>output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>Output item</li> <li>&lt; Output item</li> <li>&lt; Outp</li></ul>	t item > > > m > m > mut item>	

#### Set and Query:MEASure? Output Items (Current Integration [Total Sum])

Synta	ax
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Julput items (Current integration [ rotal Sur	nj)
:MEASure[:NORMal]:ITEM:IH:ALL <0	utput item>
:MEASure[:NORMal]:ITEM:IH:CH1(?)	<output item=""></output>

Data by current range during auto-range integration :MEASure[:NORMal]:ITEM:IH:CH1:I200mA(?) <Output item> :MEASure[:NORMal]:ITEM:IH:CH1:I500mA(?) <Output item> :MEASure[:NORMal]:ITEM:IH:CH1:I1A(?) <Output item> :MEASure[:NORMal]:ITEM:IH:CH1:I2A(?) <Output item> :MEASure[:NORMal]:ITEM:IH:CH1:I5A(?) <Output item> :MEASure[:NORMal]:ITEM:IH:CH1:I10A(?) <Output item> :MEASure[:NORMal]:ITEM:IH:CH1:I10A(?) <Output item> :MEASure[:NORMal]:ITEM:IH:CH1:I20A(?) <Output item>

	Response	Quitout	itom (ND	1)~						
		128	item (NR 64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
						DC		MN	ACDC	
Description		between	0 and 11				-			ical value e AC+DC
Example	Command	You can specify 3 measure Although dropped If no iter are outp :MEAS	also outp 3 to outp ment value NRf nun ns are sp ut based ITEM:II	but both t ues at the nerical va pecified di on the spo t:CH1 1	fication m he AC+E same tim lues are a rectly via ecificatior	a :MEAS of this co	values to values to oure? que ommand.	d AC+DC o the right ery, the m	C Umn re	e, you can ectification ecimal are ent values
		(total sur	n).		antaneou	s value of	the AC/D	C rectifie	d current i	ntegration
	Query	:MEAS:	ITEM:IF	I:CH1?						
	Response	(When HEA	ADER ON)	:MEA	SURE:	ORMAL	.:ITEM:I	H:CH1 1	l	
		(When HEA	DER OFF)	1						
Note	<ul> <li>If auto-</li> </ul>	range int	egratior	n is ON, <sup>-</sup>	the outp	ut of the	MN and	d ACDC	will be i	nvalid
	data.									

Set and Query:	IEASure? Ou	itput Ite	ems (Po	sitive (	Current	Integra	ation)				
Syntax		:MEA	Sure[:	NORM	al]:ITE	M:PIH:	ALL -	<output it<="" th=""><th>em&gt;</th></output>	em>		
		:MEA	Sure[:	NORM	al]:ITE	M:PIH:	CH1(?	) <outp< td=""><td>out item&gt;</td></outp<>	out item>		
			-		- T			· ·			
		Data	bv curre	nt range	e durina	auto-ra	inge inte	egration			
			•	•	•		•	•	utput item>		
			_		-				utput item>		
					-				tput item>		
									tput item>		
			_		-			• •	tput item>		
									utput item>		
			_		-				utput item>		
			_	NORMa	I]:ITEM	:PIH:CH	11:BACK	(up(?) <0	utput item>		
Respor	Coulput	item (NR									
	128	64	32	16	8	4	2	1	1		
	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
					DC						
Description			current in	tegration	data outp	ut items to	o a nume	rical value	e between		
	0 and 8. For ever		cify 8 to c	utout the	DC rectifi	cation ma	asurama	ant value			
									ecimal are		
	dropped				•						
							ery, the m	easureme	ent values		
Example Comma			on the sp		I OF THIS C	ommand.					
		:MEAS:ITEM:PIH:CH1 8 Specifies to output the instantaneous value of the DC rectified positive current									
		integration.									
Query	:MEAS	:MEAS:ITEM:PIH:CH1?									
Respor	nse (When HE	ADER ON)	:MEAS	SURE:NO	ORMAL:	ITEM:PI	H:CH1	B			
	(When HE	ADER OFF)	8								

Set and Query:MEASu	re? Output	ltems (Neg	gative C	urrent	Integra	tion)			
Syntax		IEASure[:		-			<output i<="" th=""><th>tem&gt;</th></output>	tem>	
	:	IEASure[:	NORM	al]:ITE	M:MIH	:CH1(?	<b>)</b> <out< td=""><td>put item&gt;</td></out<>	put item>	
				a alumina a					
		ata by curre <b>[EASure[</b> :							
		IEASure[:		-					
		utput item>						,	
		/ EASure[:	<b>NORMa</b>	I]:ITEM	:MIH:C	H1:I1A	(?) ∢	Dutput item>	
	:	IEASure[:	<b>NORM</b> a	I]:ITEM	:MIH:C	H1:I2A	(?) ∢	Dutput item>	
		IEASure[:		-				Dutput item>	
		IEASure[:							
		IEASure[:		-					
Response		IEASure[:	NORIVIA	ij:i i Eivi:	MIH:CH	1:BACK	up(?)<0	utput item>	
reeponeo	<output item<br="">128 6</output>	(NRT)> 4 32	16	8	4	2	1		
		t6 bit5	bit4	bit3	bit2	bit1	bit0		
				DC					
Description	Sets the ne between 0 a	gative curren	t integrati	on data	output ite	ems to a	numeric	al value	
		specify 8 to 0	output the	DC rectif	ication me	easureme	ent value.		
		f numerical va	lues are a	accepted,	values to	the right	of the dec	imal are	
	dropped. If no items a	e specified di	rectly via	a :MEAS	ure? quer	v, the me	asuremer	t values	
- Command	are output ba	sed on the sp	ecification						
Example Command									
	Specifies to output the instantaneous value of the DC rectified negative current integration.								
Query	0	M:MIH:CH1	?						
Response	(When HEADER	/	EASURE	:NORM	AL:ITEN	I:MIH:CI	H1 8		
	(When HEADER	OFF) <mark>8</mark>							

Set and Query:MEAS	ure? Out	tout Ite	ms (Ac	tive Po	wer Int	egratio	n [Tota			
Syntax		-	•	NORM		-		<output it<="" th=""><th></th></output>		
				NORM	-				out item>	
			•	nt range	•		•	•		
					-				Output item>	
			_	NORMa	-				Output item> Output item>	
				NORMa	-			• •	)utput item>	
				NORMa				· ·	)utput item>	
				NORMa					<0utput item>	
				<b>NORM</b> a					<output item=""></output>	
		:MEA	Sure[:	<b>NORM</b> a	]:ITEM	:WP:C	H1:BA	CKup(?)	<pre>Output item&gt;</pre>	
Response	<output< td=""><td></td><td>· ·</td><td>4.0</td><td>•</td><td></td><td></td><td></td><th></th></output<>		· ·	4.0	•					
	128 bit7	64 bit6	32 bit5	16 bit4	8 bit3	4 bit2	2 bit1	1 bit0	٦	
	DIL7	Dito	DILD	DIL4	DC	DILZ	MN	ACDC		
Description	Sets the	active po	wer integ	ration (to	-	lata outpu			rical value	
	between			output the		roctificativ	on or 2 to	outout th	ne AC+DC	
	Umn rect	tification i	measurer	nent value	ə.			•		
									e, you can ectification	
				same tin					Scincation	
	Although dropped.		nerical va	lues are a	accepted,	values to	o the righ	t of the d	ecimal are	
	••		ecified di	irectly via	a :MEAS	Sure? que	ery, the m	easurem	ent values	
	If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.									
Example Command	:MEAS:ITEM:WP:CH1 1 Specifies to output the instantaneous value of the AC/DC rectified active power									
	integration (total sum).									
Query	:MEAS:									
Response	(When HEA	/		SURE:NO	ORMAL:	ITEM:W	P:CH1 1	l		
	(When HEA	UEK UFF)	1							

Set and Query:MEAS	ure? Ou	tput Ite	ms (Po	sitive A	ctive P	ower li	ntegrat	ion)	
Syntax		:MEA	Sure[:	NORM	al]:ITE	M:PWF	P:ALL	<output< th=""><th>t item&gt;</th></output<>	t item>
		:MEA	Sure[:	NORM	al]:ITE	M:PWF	<b>P:CH1(</b>	?) <0u	itput item>
		Data I	by curre	nt range	e during	auto-ra	nge inte	egration	
		:MEA	Sure[:	NORMa	]:ITEM	:PWP:	CH1:120	0mA(?)	< Output item>
		:MEA	Sure[:	NORMa	]:ITEM	:PWP:	CH1:150	0mA(?)	< Output item>
		:MEA	Sure[:	NORMa	]:ITEM	:PWP:	CH1:I1	A(?)	<output item=""></output>
			_	NORMa	-				<output item=""></output>
				NORMa	-				<output item=""></output>
				NORMa	-				Dutput item>
				NORMa	-				Dutput item>
5				NORMa	]:ITEM	:PWP:0	CH1:BA	CKup(?)	< Output item>
Response	<output (nr1)="" item=""></output>								
	128 64 32 16 8 4 2 1 bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0								1
	bit7	DILO	bit5	bit4	DC	DILZ	MN	ACDC	-
Description	Sets the	positive	active po	wer inter	-	ta output			ical value
Decemption	between	0 and 11		-		-			
				output the nent value		rectificatio	on or 2 to	output th	e AC+DC
						gether at	once. Fo	or example	e, you can
						ation and	d AC+DC	C Umn re	ectification
				same tin		values to	the right	t of the de	ecimal are
	dropped				-		-		
							ry, the m	easureme	ent values
Example Command	are output based on the specification of this command. :MEAS:ITEM:PWP:CH1 1								
	Specifies to output the instantaneous value of the AC/DC rectified positive active								
	power integration.								
Query	:MEAS:ITEM:PWP:CH1?								
Response	(When HEA	,		SURE:NO	ORMAL:	ITEM:P	VP:CH1	1	
	(vvnen HEA	DER OFF)	1						

Set and Query:MEAS		tout Ito	me (No	astivo	Activo	Doworl	ntoara	tion)	
Syntax		-	-	-	al]:ITE		-	<outpu< th=""><th>It items</th></outpu<>	It items
Cyntax			_		al]:ITE				utput item>
	Data by current range during auto-range integration								1
					-				<output item=""></output>
					-				< Output item>
									<output item=""></output>
			_		-				<output item=""></output>
					I]:ITEM				<output item=""></output>
					I]:ITEM				Output item>
					I]:ITEM				Output item>
Response	Quitout	item (NR		NORIVIA			CHI:BA	CKUp(?)	<output item=""></output>
Rooponoo	2001put 128	64	32	16	8	4	2	1	
	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	]
					DC		MN	ACDC	
Description				ower inte	gration da	ata outpu	t items to	a nume	rical value
		0 and 11	-	outout the	AC+DC	rectificatio	on or 2 to	outout t	ne AC+DC
	Umn rec	tification i	neasurer	nent valu	ə.			-	
									e, you can ectification
			ues at the			cation an		5 Omn i	ecuncation
			nerical va	lues are a	accepted,	values to	b the righ	t of the d	ecimal are
	dropped.		ecified di	rectly via	a ·MEAS	Sure? que	orv the m	easurem	ent values
	If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.								
Example Command	Specifies to output the instantaneous value of the AC/DC rectified negative active								
	•			antaneou	s value of	the AC/D	C rectifie	d negativ	e active
Query	•	tegration.	WP:CH	12					
Response	(When HEA					L:ITEM:	MWP:CH	-11 1	
	(When HEA	,	1						

	Set and Query :MEASure? Output Items									
(Instantane	ous, Maxin	num, an	d Minir	num Va	alues fo	r the V	oltage	Navefo	rm Pea	k)
Syntax	nstantaneous value								utput item <output i<="" th=""><th></th></output>	
	Maximum value		:MEA	Sure[:N	<b>IORM</b> al	]:ITEM:	UPK_N	IAX:ÁLI		put item>
	Minimum value		:MEA	Sure[:N	IORMal IORMal	]:ITEM:	UPK_N	IIN:ALL	< Outp	ut item> utput item>
	Response	<output< th=""><th>item (NR</th><th>1)&gt;</th><th></th><th>-</th><th></th><th></th><th></th><th></th></output<>	item (NR	1)>		-				
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									UPK	
Description		Sets the voltage waveform peak value data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal are dropped. If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.								
Example	Command			PK:CH1						
		Specifies to output the instantaneous value of the AC/DC rectified voltage waveform peak value.								
	Query Response	:MEAS:ITEM:UPK:CH1? (When HEADER ON) :MEASURE:NORMAL:ITEM:UPK:CH1 1 (When HEADER OFF) 1								

and Quary

MEAC

Set and Qu (Instantane					/alues f	or the	Current	Wavef	orm Pe	eak)
Syntax	Instantane ous value		:MEAS :MEAS	Sure[:N Sure[:N	ORMa ORMa	]:ITEM I]:ITEM	:IPK:A :IPK:C	LL <0 H1(?)	utput iter Outpu>	
	Maximum value		:MEAS	Sure[:N	<b>ORMa</b>	<b>]:ITEM</b>	IPK N	/AX:ÁI	LL <0	utput item> Output item>
	Minimum value		:MEAS	Sure[:N	<b>ORMa</b>	I]:ITEM	I:IPK_N	/IN:AL	L <ou< th=""><th>tput item&gt; <output item=""></output></th></ou<>	tput item> <output item=""></output>
F	Response	:MEASure[:NORMal]:ITEM:IPK_MIN:CH1(?) <0utput item> <output (nr1)="" item=""></output>								
		128	64	32	16	8	4	2	1	_
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									IPK	
Description		Sets the current waveform peak value data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal are dropped. If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.								
Example	Command	:MEAS:ITEM:IPK:CH1 1 Specifies to output the instantaneous value of the AC/DC rectified current waveform peak value.								
	Query Response	:MEAS:ITEM:IPK:CH1? (When HEADER ON) :MEASURE:NORMAL:ITEM:IPK:CH1 1 (When HEADER OFF) 1								

#### Set and Query :MEASure? Output Items (Instantaneous, Maximum, and Minimum Values for Maximum Current Ratio Data) Instantaneous Syntax :MEASure[:NORMal]:ITEM:MCR:ALL <Output item> value :MEASure[:NORMal]:ITEM:MCR:CH1(?) <Output item> Maximum :MEASure[:NORMal]:ITEM:MCR\_MAX:ALL <Output item> value :MEASure[:NORMal]:ITEM:MCR\_MAX:CH1(?) <Output item> Minimum :MEASure[:NORMal]:ITEM:MCR\_MIN:ALL <Output item> Value :MEASure[:NORMal]:ITEM:MCR\_MIN:CH1(?) <Output item> Response <Output item (NR1)> 32 128 64 16 8 4 2 1 bit7 bit6 bit4 bit3 bit2 bit0 bit5 bit1 MCR

									mon
Description		Sets the Maximum Current Ratio data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal are dropped. If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.						1. of the decimal	
Example	Command								
	Query Response	:MEAS:		CR:CH1	?			n Current CR:CH1	Ratio data 1. 1

(When HEADER OFF) 1

Set and Que (Instantane			•		alues fo	or Volta	ge Cres	st Facto	or Data)	
Syntax	Instantaneous value				ORMal]:					
	Maximum value		:MEAS	ure[:NC	DRMal]: DRMal]: DRMal]:	ITEM:U	CF_MA	X:ALL	<outpu< th=""><th></th></outpu<>	
	Minimum value		:MEAS	ure[:NC	DRMal]: DRMal]:	ITEM:U	CF_MIN	N:ALL	<output< th=""><th>item&gt;</th></output<>	item>
	Response		item (NR			_				
		128	64	32	16	8	4	2	1	1
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									UCF	
Description		Sets the voltage crest factor data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal are dropped. If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.								
Example	Command	:MEAS	ITEM:U	CF:CH1	1					
	Query Response	:MEAS: (When HE/	ITEM:U	CF:CH1	nstantane ? SURE:NO			-		1

	Set and Query :MEASure? Output Items (Instantaneous, Maximum, and Minimum Values for Current Crest Factor Data)									
	Instantaneous value	iuiii, di	:MEAS	ure[:NC	DRMal]:	ITEM:IC	CFactor	:ALL :CH1(?)	<output< th=""><th>item&gt;</th></output<>	item>
	Maximum value		:MEAS	ure[:NC	DRMal]:	ITEM:IC	CF_MA)	(:ALL (:CH1(?)	<output< th=""><th></th></output<>	
	Minimum value		:MEAS	ure[:NC	DRMal]:	ITEM:IC	CF_MIN	:ALL :CH1(?)	Output i	item> out item>
	Response		item (NR				_			
		128	64	32	16	8	4	2	1	_
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									ICF	
Description		Sets the current crest factor data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal are dropped. If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command.								
Example	Command	:MEAS	ITEM:IC	F:CH1	1					
	Query Response	:MEAS (When HEA	es to outpu <b>ITEM:IC</b> ADER ON) ADER OFF)	F:CH1?				nt crest fa		

Set and Qu	ery:MEASu	<mark>re? Ou</mark> tj			e Avera					
Syntax					DRMal]:					
			:MEAS	ure[:NC	ORMal]:	ITEM:IT	Averag	e:CH1	(?) <outp< td=""><th>out item&gt;</th></outp<>	out item>
			Data by	/ curren	t range	durina a	auto-ran	ae inter	ration	
										Dutput item>
				-	_					Dutput item>
				-	RMal]:IT					tput item>
				_	RMal]:IT					tput item>
										tput item>
		:MEASure[:NORMal]:ITEM:ITAVerage:CH1:I5A(?) <output item=""> :MEASure[:NORMal]:ITEM:ITAVerage:CH1:I10A(?) <output item=""></output></output>								
					RMal]:IT					)utput item>
	Response <output (nr1)="" item=""></output>									
	128         64         32         16         8         4         2         1           bit7         bit6         bit5         bit4         bit3         bit2         bit1         bit0									
						DC		MN	ACDC	
Description			time ave	erage curi	ent data	output ite	ms to a n	umerical	value be	tween 0
		and 11. For exar	nole spe	cify 1 to o	utput the	AC+DC r	ectification	n or 2 to a	outout the	AC+DC
					nent value		Soundation	1012101	Juput ino	10100
					tification					
					h the AC+		cation and	d AC+DC	Umn rec	lification
					lues are a		values to	the right	of the dec	imal are
		dropped					•			
					ectly via a ecificatior			, the me	asuremer	it values
Example	Command			AV:CH1			ommana.			
•	_	Specifies to output the AC/DC rectified time average current data.								
	Query	_		AV:CH1						
	Response	(When HE/	,		SURE:NO	ORMAL:	ITEM:IT/	AVERAG	GE:CH1	1
			ADER OFF)	1						
Note	If auto-ra	ange inte	gration i	s ON, th	ne output	t of the I	MN and	ACDC v	vill be in	valid
	data.									

(motantane		<u>, , , , , , , , , , , , , , , , , , , </u>					<u>vonago</u>		1 40101	
Syntax	Instantane ous value		:MEAS	Sure[:N	IORMa IORMa			ALL <	Output it	em> ut item>
	Maximum value		:MEAS	Sure[:N	ORMa	I]:ITEN	I:URF_	MAX:A	LL <ou< th=""><th>tput item&gt; <output item=""></output></th></ou<>	tput item> <output item=""></output>
	Minimum value		:MEAS	Sure[:N	<b>ORM</b> a	I]:ITEN	I:URF_	MIN:A	LL `<́0	utput item> Output item>
	Response	<output< th=""><th>item (NR</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></output<>	item (NR							
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									URF	
Description Example	Command	Sets the voltage ripple factor data (instantaneous value, maximum value, minimum value) output items as numerical values between 0 and 1. Although NRf numerical values are accepted, values to the right of the decimal are dropped. If no items are specified directly via a :MEASure? query, the measurement values are output based on the specification of this command. :MEAS:ITEM:URF:CH1 1								
	Query Response	Specifies to output the instantaneous value of the voltage ripple factor. <b>:MEAS:ITEM:URF:CH1?</b> (When HEADER ON) <b>:MEASURE:NORMAL:ITEM:URF:CH1 1</b> (When HEADER OFF) 1								

### Set and Query :MEASure? Output Items

(Instantane	ous, Maximu	ım, and	Minim	um Val	ues for	the Cu	rrent R	ipple Fa	actor)	
Syntax	Instantaneous value							L <out 1(?) &lt;</out 		
	Maximum value		:MEA	Sure[:N	<b>IORMal</b>	]:ITEM:	IRF_M	AX:ÁLL	<output< th=""><th>item&gt;</th></output<>	item>
	Minimum value	:MEASure[:NORMal]:ITEM:IRF_MAX:CH1(?) <output item=""> :MEASure[:NORMal]:ITEM:IRF_MIN:ALL <output item=""> :MEASure[:NORMal]:ITEM:IRF_MIN:CH1(?) <output item=""></output></output></output>								
	Response	<output (nr1)="" item=""></output>								
		128	64	32	16	8	4	2	1	_
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									IRF	
Description	Command	minimum Although are drop If no ite values a	n value) o n NRf nun ped. ms are s re output	utput item nerical va specified based on	ns as num lues are a directly v the spec	nerical val accepted, ia a :ME	ues betw values to ASure?	value, m een 0 and o the righ query, the nmand.	d 1. t of the d	lecimal
Example	Command	-	ITEM:IR	-			4		1	
	Query Response	Specifies to output the instantaneous value of the current ripple factor. :MEAS:ITEM:IRF:CH1? (When HEADER ON) :MEASURE:NORMAL:ITEM:IRF:CH1 1 (When HEADER OFF) 1								

Set and Query :MEASure?	Output Items (Instantaneous, Maximum, and Minimum
<b>Values for Total Harmonic</b>	Wave Voltage Distortion Factor Data)

Syntax	Instantane ous value Maximum value Minimum value Response	:MEASure[:NORMal]:ITEM:UTHD:ALL <output item=""> :MEASure[:NORMal]:ITEM:UTHD:CH1(?) <output item=""> :MEASure[:NORMal]:ITEM:UTHD_MAX:ALL <output item=""> :MEASure[:NORMal]:ITEM:UTHD_MAX:CH1(?) <output item=""> :MEASure[:NORMal]:ITEM:UTHD_MIN:ALL <output item=""> :MEASure[:NORMal]:ITEM:UTHD_MIN:CH1(?) <output item=""> :MEASure[:NORMal]:ITEM:UTHD_MIN:CH1(?) <output item=""></output></output></output></output></output></output></output>									
ſ	vesponse	<output 128</output 	item (NR 64	1)> 32	16	8	4	2	1		
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0		
									UTHD		
Description Sets the total harmonic wave voltage disto maximum value, minimum value) output iter 1. Although NRf numerical values are accepted dropped. If no items are specified directly via a :MEA							s as num values to Sure? que	erical values of the right	ues betwe	een 0 and	
Example	Command Query Respons	are output based on the specification of this command. :MEAS:ITEM:UTHD:CH1 1 Specifies to output the instantaneous value of the total harmonic wave voltage distortion factor. :MEAS:ITEM:UTHD:CH1? (When HEADER ON) :MEASURE:NORMAL:ITEM:UTHD:CH1 1 (When HEADER OFF) 1									

Set and Qu Values for				•				· · · · · · · · · · · · · · · · · · ·	Minim	um	
Syntax	Instantane ous value								put item> Output it		
	Maximum value		:MEASure[:NORMal]:ITEM:ITHD_MAX:ALL <output item=""> :MEASure[:NORMal]:ITEM:ITHD_MAX:CH1(?) <output item=""></output></output>								
	Minimum         :MEASure[:NORMal]:ITEM:ITHD_MIN:ALL <output item="">           value         :MEASure[:NORMal]:ITEM:ITHD_MIN:CH1(?)         <output item=""></output></output>										
	Response	<output< th=""><th>item (NR</th><th>1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></output<>	item (NR	1)>							
		128	64	32	16	8	4	2	1		
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0		
									ITHD		
Description											
-	Example Command Specifies to output the instantaneous value of the total harmonic wave current distortion factor. Query ::MEAS:ITEM:ITHD:CH1?										
	Response	(When HEA (When HEA	,	:MEA 1	SURE:	IORMAI	.:ITEM:I	THD:CH	11 1		

#### ot and Quory Output Ito (In and Minimu 84 C 8.4 ..... . . . .

<b>Query Harmonic</b>	Wave Mea	surement Data (Normal Measurement Items)
Syntax	Query	:MEASure:HARMonic[:VALue]?
	Response	<output 1="" item=""><measurement 1="" value="">,<output 2="" item=""><measurement< th=""></measurement<></output></measurement></output>
		value 2> (Maximum of 180 items) See the List of Harmonic Wave Measurement Item Specifications for
		details about the <output item=""> field.</output>
Description	Query	Outputs the items specified via :MEASure:HARMonic:ITEM commands.
		Unlike the :MEASure? query, only the items specified via :MEASure:HARMonic:ITEM commands are output.
		The measurement data is output in the order that the items are listed in the
		List of Harmonic Wave Output Item Specifications
Evennle	Query	MEACHADM2
Example	Response	:MEAS:HARM? (When HEADER ON) Status 00000000,
		HU1L001 +09.803E+0;HI1L001 +12.933E+0;
		HP1L001 -085.72E+0
		(When HEADER OFF) 0000000;+09.803E+0;+12.933E+0;-085.72E+0
Note	<ul> <li>You can u</li> </ul>	use the :TRANsmit:SEParator command to change the message unit
		from a semicolon ";" to a comma ",".
		play is blank (such as when the range has been changed), the response
		will be "no data" (±777.77E+9) until the measurement data is displayed. mend only using this function with a fixed range.
		ure:HARMonic? is called immediately after the instrument is powered on,
	the first-or	der effective values of HU, HI, and HP are output.
		ut items specified via :MEASure:HARMonic:ITEM commands will not be
		n if a system reset is performed. These items are reset only when the
		t is powered on. 0 items will be output for each :MEASure:HARMonic[:VALue]? guery. If output
		ecified with a :MEASure:HARMonic? command, up to 180 items will be output
	in the o	rder indicated in the Output Items and Their Sequence. Since more than 180
		annot be output, exercise care to adjust with :MEASure:HARMonic:ITEM so
		number of output items is 180 or less.
		marnic upper limit order (:HARMonic:ORDer:UPPer) is set to a value of less , data for orders above the limit will be 0. (The instrument will display "")
	uiaii 50	, data for orders above the infinit will be 0. (The instrument will display )

Harmonic Wave Me	easurement Items	
Status	Instantaneous value	Status
	Total	Status_MaxMin
Effective Value	Voltage 0-order	HU1L000
(Level)	Voltage 0-order (maximum value)	HU1MAXL000
	Voltage 0-order (minimum value)	HU1MINL000
	Current 0-order	HI1L000
	Current 0-order (maximum value)	HI1MAXL000
	Current 0-order (minimum value)	HI1LMIN000
	Power 0-order	HP1L000
	Power 0-order (maximum value)	HP1MAXL000
	Power 0-order (minimum value)	HP1MINL000
Content Ratio	Voltage 0-order	HU1D000
	Voltage 0-order (maximum value)	HU1MAXD000
	Voltage 0-order (minimum value)	HU1MIND000
	Current 0-order	HI1D000
	Current 0-order (maximum value)	HI1MAXD000
	Current 0-order (minimum value)	HI1MIND000
	Power 0-order	HP1D000
	Power 0-order (maximum value)	HP1MAXD000
	Power 0-order (minimum value)	HP1MIND000
Voltage Phase	Voltage 0-order	HU1P000
Difference	Voltage 0-order (maximum value)	HU1MAXP000
	Voltage 0-order (minimum value)	HU1MINP000
Current Phase	Current 0-order	HI1P000
Difference	Current 0-order (maximum value)	HI1MAXP000
	Current 0-order (minimum value)	HI1MINP000
Voltage Current	Power 0-order	HP1P000
Phase	Power 0-order (maximum value)	HP1MAXP000
Difference	Power 0-order (minimum value)	HP1MINP000
	n-order	Last three digits: n
Effective Value	Voltage 50-order	HU1L050
(Level)	Voltage 50-order (maximum value)	HU1MAXL050
	Voltage 50-order (minimum value)	HU1MINL050
	Current 50-order	HI1L050
	Current 50-order (maximum value)	HI1MAXL050
	Current 50-order (minimum value)	HI1LMIN050
	Power 50-order	HP1L050
	Power 50-order (maximum value)	HP1MAXL050
	Power 50-order (minimum value)	HP1MINL050
Content Ratio	Voltage 50-order	HU1D050
	Voltage 50-order (maximum value)	HU1MAXD050
	Voltage 50-order (minimum value)	HU1MIND050
	Current 50-order	HI1D050
		HI1MAXD050
	Current 50-order (maximum value)	
	Current 50-order (maximum value) Current 50-order (minimum value)	HI1MIND050
	Current 50-order (minimum value)	HI1MIND050

#### :MEASure:HARMonic? Output Items and their Sequence

Voltage Phase	Voltage 50-order	HU1P050
Difference	Voltage 50-order	HU1MAXP050
	(maximum value)	
	Voltage 50-order (minimum value)	HU1MINP050
Current Phase	Current 50-order	HI1P050
Difference	Current 50-order	HI1MAXP050
	(maximum value)	
	Current 50-order (minimum value)	HI1MINP050
Voltage Current	Power 50-order	HP1P050
Phase	Power 50-order (maximum value)	HP1MAXP050
Difference	Power 50-order (minimum value)	HP1MINP050

Perform and Query a Reset of :MEASure:HARMonic? Output Items										
Syntax	Command	:MEASure:HARMonic:ITEM:ALLClear								
Description		Clears all outputs set for :MEASure:HARMonic?								
		via :MEASure:HARMonic:ITEM commands.								
Example	Command	:MEAS:HARM:ITEM:ALLC								
Note	<ul> <li>This co</li> </ul>	ommand turns all output settings OFF.								
	harmor	tput settings immediately after the instrument is powered on are as follows: nic wave order effective values HU, HI, and HP.								

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Set and Query:M	EASure:HA	RMonic?	Outpu	t Items								
	Command	MEAS: dat>	Sure:H a1 (NR	ARMoı 1)>, <da< th=""><th>ta2 (NR</th><th>1)&gt;,<da< th=""><th>nta3 (NF</th><th></th><th></th></da<></th></da<>	ta2 (NR	1)>, <da< th=""><th>nta3 (NF</th><th></th><th></th></da<>	nta3 (NF					
	Query		•	1)>, <da ARMoı</da 			•	(1)>				
	Response			, <data3></data3>				>				
		128	64	32	16	8	4	2	1			
		<data1< th=""><th>(NR1)&gt;</th><th>Effective</th><th>e Value H</th><th>IU,HI</th><th></th><th></th><th></th></data1<>	(NR1)>	Effective	e Value H	IU,HI						
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
									HU			
			r í	Effective			1.10	1.114				
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
			(NIR1)>	Content	Patio HI				HP			
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
		Ditt	Dito	Dito	HICON	Dito	DILZ		HUCON			
		<data4 (nr1)=""> Content Ratio P</data4>										
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
									HPCON			
		<data5< th=""><th>(NR1)&gt;</th><th>Phase A</th><th>ngle HU</th><th>PHAse,I</th><th>- HPHAse</th><th>;</th><th></th></data5<>	(NR1)>	Phase A	ngle HU	PHAse,I	- HPHAse	;				
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
					HIPHA				HUPHA			
			(NR1)>	Phase D	oifference	HPPH/	Ase					
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
									HPPHA			
Description	S	ote or qu	orios th	0 0000	romont	itome fo	r tha M		IARMonic?			
Description		uery as a						-ASule.I	ARMONIC !			
	Â	though NF	Rf numeri					right of t	he decimal			
Fremula		e dropped			CT 47 4							
Example	Commanu			the out			nic wave	e voltan	e, current,			
				er effect			ine wave	o vonag	s, ouriont,			
	Query			ITEM:LI	ST?							
	Response	(When HE/				RMONI	C:ITEM:	LIST 17	,1,0,0,0,0			
		`	,	17,1,0,								
Note	<ul> <li>This con to specify</li> </ul>	nmand is u y the harm				e:HARM	onic:11EN	1:ORDer	command			
	<ul> <li>If you ne</li> </ul>					im values	s in additio	on to the				
	instantane						command	ls such				
	as :MEAS • Harmoni						on the inst	trument 7	This data			
	can only b											
	5		5									

Set and Query:M	EASure:HAF	RMonic? Output Items (Order)
Syntax	Command	:MEASure:HARMonic:ITEM:ORDer
		<lower (nr1)="" limit="" order="">,<upper (nr1)="" limit="" order="">,<odd all="" even=""></odd></upper></lower>
	Query	:MEASure:HARMonic:ITEM:ORDer?
	Response	<pre><lower (nr1)="" limit="" order="">, <upper (nr1)="" limit="" order="">,<odd all="" even=""> Lower limit order (NR1): 0 to 50</odd></upper></lower></pre>
		Lower limit order (NR1): 0 to 50 Upper limit order (NR1): 0 to 50
		(the lower limit must be less than or equal to the upper limit)
		ODD: Odd orders only
		EVEN: Even orders only
		ALL: All orders
Description		Sets or queries the measurement items(Order) for
Decemption		the :MEASure:HARMonic? query.
		The numerical value is accepted in NRf format, but any data after the
	<b>a</b>	decimal point is truncated.
Example	Command	:MEAS:HARM:ITEM:ORD 1,15,0DD
		Sets the output to an odd order between 1 and 15.
	Query	:MEAS:HARM:ITEM:ORD?
	Response	(When HEADER ON) :MEASURE:HARMONIC:ORDER 1,15,ODD
		(When HEADER OFF) 1,15,ODD
Note	<ul> <li>This com</li> </ul>	mand is used along with the :MEASure:HARMonic:ITEM:LIST or

:MEASure:HARMonic:ITEM:xxx commands to specify the harmonic wave output items.

## Set and Query :MEASure:HARMonic? Output Items (Measurement status data: instantaneous value, maximum value, minimum value)

Instantaneous value	:MEAS	ure:HA	RMonic	:ITEM:	STATus	s:INST(	?) <0u	tput item	>	
Maximum/ Minimum value	:MEASu	ire:HAR	Monic:IT	EM:STA	Tus:MA	Xmin(?)	) <out< th=""><th>put item&gt;</th><th></th></out<>	put item>		
Response	<output< th=""><th>item (NR</th><th>1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></output<>	item (NR	1)>							
	128	64	32	16	8	4	2	1	_	
	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0		
								STATUS		
									value,	
	minimum value) output items as numerical values between 0 and 1.									
	Although NRf numerical values are accepted, values to the right of the decimal									
					amanoot				o dala	
	•		s the tota	I from the	e time th	e maximu	um and n	ninimum	values	
	were las	t reset.								
			bout Statu	is data, re	efer to <u>:M</u>	EASure:	IEM:STA	<u>TUS</u> (paç	ge 777)	
Command		•••	TEM·ST		F 1					
						outout				
Query						aiput				
Response	(When HEA	ADER ON)	:MEA	SURE:H			I:STAT:	INST 1		
	`	(When HEADER ON)       :MEASURE:HARMONIC:ITEM:STAT:INST 1         (When HEADER OFF)       1								
	value Maximum/ Minimum value Response Command Query	Value Maximum/ Minimum value Response Response Sets the minimum Although are drop INST ind is acquir MAXmin were las For infor for detail Command Command Speci Query Response (When HEA	Value       Image:	Value       Image: Image of the matrix of the maximum/ Minimum value       Image: Image of the maximum value         Response <output (nr1)="" item=""> 128       128       64       32         bit7       bit6       bit5       128&lt;</output>	Value       IMEASure:HARMonic:ITEM:STA         Maximum/       IMEASure:HARMonic:ITEM:STA         Response <output (nr1)="" item="">         128       64       32       16         bit7       bit6       bit5       bit4         Sets the measurement data statu:       minimum value) output items as num         Although NRf numerical values are a are dropped.       INST indicates the status for the inst is acquired.         MAXmin indicates the total from the were last reset.       MAXmin indicates the total from the were last reset.         Command       :MEAS:HARM:ITEM:STAT:INST         Query       :MEAS:HARM:ITEM:STAT:INST         Response       (When HEADER ON)       :MEASURE:H</output>	Value       .MEASure:HARMonic:ITEM:STATUS:MA         Maximum/       .MEASure:HARMonic:ITEM:STATUS:MA         Response <output (nr1)="" item="">         128       64       32       16       8         bit7       bit6       bit5       bit4       bit3         Sets the measurement data status (instan minimum value) output items as numerical val Although NRf numerical values are accepted, are dropped.       INST indicates the status for the instantaneou is acquired.         MAXmin indicates the status for the instantaneou is acquired.       MAXmin indicates the total from the time th were last reset.         Command       :MEAS:HARM:ITEM:STAT:INST 1       Specifies to turn ON measurement status of the instantaneou is acquired.         Query       :MEAS:HARM:ITEM:STAT:INST?       (When HEADER ON)</output>	Maximum/       :MEASure:HARMonic:ITEM:STATus:MAXmin(?)         Maximum/       :MEASure:HARMonic:ITEM:STATus:MAXmin(?)         Response <output (nr1)="" item="">         128       64       32       16       8       4         bit7       bit6       bit5       bit4       bit3       bit2         Sets the measurement data status (instantaneous minimum value) output items as numerical values betw. Although NRf numerical values are accepted, values to are dropped.         INST indicates the status for the instantaneous value a is acquired.         MAXmin indicates the total from the time the maximu were last reset.         For information about Status data, refer to :MEASure:If for details.         Command       :MEAS:HARM:ITEM:STAT:INST 1         Specifies to turn ON measurement status output.         Query       :MEAS:HARM:ITEM:STAT:INST?</output>	Maximum/ Minimum value       :MEASure:HARMonic:ITEM:STATus:MAXmin(?) <output< td="">         Response       <output (nr1)="" item=""> 128 64 32 16 8 4 2          bit7       bit6       bit5       bit4       bit3       bit2       bit1         Sets the measurement data status (instantaneous value, m minimum value) output items as numerical values between 0 and Although NRf numerical values are accepted, values to the righ are dropped.       INST indicates the status for the instantaneous value at the time is acquired.         MAXmin indicates the total from the time the maximum and m were last reset.       MAXmin indicates the total from the time the maximum and m were last reset.         Command       :MEAS:HARM:ITEM:STAT:INST 1 Specifies to turn ON measurement status output.       Status output.         Query       :MEAS:HARM:ITEM:STAT:INST?</output></output<>	value       :MEASure:HARMonic:ITEM:STATus:MAXmin(?)       Couput item         Response <output (nr1)="" item="">       128       64       32       16       8       4       2       1         bit7       bit6       bit5       bit4       bit3       bit2       bit1       bit0         Sets the measurement data status (instantaneous value, maximum minimum value) output items as numerical values between 0 and 1.       Although NRf numerical values are accepted, values to the right of the d are dropped.         INST indicates the status for the instantaneous value at the time when th is acquired.       MAXmin indicates the total from the time the maximum and minimum were last reset.         Command       :MEAS:HARM:ITEM:STAT:INST 1       Specifies to turn ON measurement status output.         Query       :MEAS:HARM:ITEM:STAT:INST?       1</output>	

Set and Qu Minimum V									num, ar	nd
Syntax	nstantaneous value							<output ?) <ou< th=""><th></th><th></th></ou<></output 		
	Maximum value		:MEAS	ure:HA	RMonic	:ITEM:	U_MAX	:ÁLL -	<output i<="" th=""><th></th></output>	
	/linimum ralue	:MEASure:HARMonic:ITEM:U_MAX:CH1(?) <output in<br="">:MEASure:HARMonic:ITEM:U_MIN:ALL <output item=""> :MEASure:HARMonic:ITEM:U_MIN:CH1(?) <output ite<="" th=""><th>em&gt;</th></output></output></output>								em>
F	Response	<output< th=""><th></th><th></th><th></th><th></th><th>_</th><th></th><th></th><th></th></output<>					_			
		128	64	32	16	8	4	2	1	-
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									HU	
Description	by :MEA as nume The orde	Sure:HAF rical valu r output i NRf num	RMonic? ( es betwee s the orde	(instantan en 0 and er specifie	ieous valu 1. ed via <mark>ME</mark>	ue, maxim ASure:HA	ata outpu num value ARMonic: the right o	e, minimur ITEM:OR	m value) <mark>Der</mark> .	
Example	Command	<b>:MEAS:HARM:ITEM:U:CH1 1</b> Specifies to output the instantaneous value of the harmonic wave voltage effective value.								
	Query	:MEAS:	HARM:	TEM:U:	CH1?					
	Response	(When HEA (When HEA	DER ON) DER OFF)	:MEA 1	SURE:		NIC:ITEI	M:U:CH1	1	
Note	<ul> <li>This co</li> </ul>	mmand is	used alo	ng with th	ne :MEAS	ure:HARI	Monic:ITE	M:ORDe	r commar	nd to
	<ul> <li>If the space</li> </ul>	he harmor becification mand issu	n is the s	ame as th	at for the		e:HARM	onic:ITEM	I:LIST cor	mmand,

# Set and Query :MEASure:HARMonic? Output Items (Instantaneous, Maximum, and Minimum Values for the Harmonic Wave Current Effective Value)

						nective	e value			
Syntax	Instantaneous					:ITEM:I		<output< th=""><th></th><th></th></output<>		
	value					:ITEM:I				
	Maximum					:ITEM:I			Output ite	em>
	value					:ITEM:I				ut item>
	Minimum		:MEAS	ure:HA	RMonio	:ITEM:I	_MIN:A	\LL <0	utput ite	m>
	value		:MEAS	ure:HA	RMonio	:ITEM:I	_MIN:C	:H1(?)	<output< th=""><th>t item&gt;</th></output<>	t item>
l	Response	<output< th=""><th>item (NF</th><th>R1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></output<>	item (NF	R1)>						
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									HI	
Description		Sets the	harmor	nic wave	current	effective	value da	ata outpu	t items i	returned
		by :MEA	Sure:HAF	RMonic?	(instantan	eous valu	ie, maxim	num value	, minimur	n value)
		as nume	rical valu	es betwee	en 0 and	1.				
		The orde	er output i	s the orde	er specifie	ed via <mark>ME</mark>	ASure:H/	ARMonic:	TEM:OR	Der.
		Although	NRf num	nerical val	lues are a	ccepted, v	values to	the right of	of the dec	imal are
		dropped.								
Example	Command	:MEAS:	HARM:	TEM:I:C	CH1 1					
		Specifie	s to outpu	ut the inst	antaneou	s value of	the harm	ionic wave	e current o	effective
		value.								
	Query	:MEAS:	HARM:	TEM:I:C						
	Response	(When HEA	ADER ON)	:MEA	SURE:	HARMON	VIC:ITE	M:I:CH1	1	
		(When HEA	DER OFF)	1						
Note	<ul> <li>This control</li> </ul>	ommand is	used alo	ng with th	e :MEAS	ure:HARN	/lonic:ITE	M:ORDer	commar	nd to
	specify	the harmor	nic wave	output or	der.					
	<ul> <li>If the s</li> </ul>	specification	n is the s	ame as th	at for the	:MEASur	e:HARM	onic:ITEM	:LIST cor	nmand,
	the com	nmand issu	ed afterw	ards take	s precede	ence.				

Minimum \	lery : <mark>MEASu</mark> /alues for th								num, ai	nd	
Syntax	Instantaneous value		:MEASure:HARMonic:ITEM:P:ALL <output item=""> :MEASure:HARMonic:ITEM:P:CH1(?) <output item=""></output></output>								
	Maximum value		:MEASure:HARMonic:ITEM:P_MAX:ÁLL <0utput item> :MEASure:HARMonic:ITEM:P_MAX:CH1(?) <0utput item>								
	Minimum value		:MEASure:HARMonic:ITEM:P_MIN:ALL <output item=""> :MEASure:HARMonic:ITEM:P_MIN:CH1(?) <output item=""></output></output>								
	Response	<output< th=""><th>item (NR</th><th></th><th></th><th></th><th>_</th><th> ,</th><th>•</th><th></th></output<>	item (NR				_	,	•		
		128	64	32	16	8	4	2	1		
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	]	
									HP		
Description				c wave a							
		by :MEASure:HARMonic? (instantaneous value, maximum value, minimum value) as numerical values between 0 and 1.									
				es betwee is the orde						Dor	
				nerical val							
		dropped				loooptou,	valuee to	and right			
Example	Command	:MEAS	:HARM:	ITEM:P:	CH1 1						
_		Specifie	es to outp	ut the inst	antaneou	s value of	the harm	ionic wav	e active p	ower	
		effective	value.								
	Query	:MEAS	:HARM:	ITEM:P:	CH1?						
	Response	(When HE/	ADER ON)	:MEA	SURE:	<b>HARMOI</b>	NIC:ITE	M:P:CH1	1		
		(When HEA	ADER OFF)	1							
Note	<ul> <li>This co</li> </ul>	mmand is	used alo	ng with th	e :MEAS	ure:HAR	Monic:ITE	M:ORDe	r commar	nd to	
		he harmo									
		pecificatio					e:HARM	onic:ITEN	I:LIST co	mmand,	
	the com	mand issu	ied afterw	ards take	s precede	ence.					

Set and Query :MEASure:HARMonic? Output Items (Instantaneous, Maximum, and Minimum Values for the Harmonic Wave Voltage Content Ratio)

Minimum V	alues for th	ne Harm	ionic W	lave Vo	Itage C	ontent	Ratio)						
Syntax	nstantaneous	:M	EASure	:HARN	lonic:IT	EM:UC	ON:ALL	_ <output< th=""><th>item&gt;</th><th></th></output<>	item>				
- \	/alue	:M	EASure	:HARN	lonic:IT	EM:UC	ON:CH	1(?) <ou< th=""><th>tput item</th><th>&gt;</th></ou<>	tput item	>			
	Maximum	:M	EASure	:HARN	lonic:IT	EM:UC	ON_MA	X:ÁLL	<output< th=""><th>item&gt;</th></output<>	item>			
١	/alue	:M	EASure	:HARN	lonic:IT	EM:UC	ON_MA	X:CH1		put item>			
M	Minimum value												
							ON_MIN						
F	Response	<output (nr1)="" item=""></output>											
			64	32	16	8	4	2	1				
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	1			
									HUCON	-			
Description		Sets the	harmor	l nic wave	voltage	content	ratio dat	a outout		_ returned			
Description		Sets the harmonic wave voltage content ratio data output items returned by :MEASure:HARMonic? (instantaneous value, maximum value, minimum value)											
		as numerical values between 0 and 1.											
		The order output is the order specified via MEASure:HARMonic:ITEM:ORDer.											
				nerical val	ues are a	ccepted,	values to	the right o	of the dea	cimal are			
		dropped											
Example	Command	-		TEM:UC									
			s to outpu	ut the inst	antaneou	s value of	the harm	onic wave	e voltage	content			
	Quant	ratio.				40							
	Query			TEM:UC									
	Response	(	ADER :MI	ASURE	::HARM	ONIC:IT	EM:UCO	N:CH1	1				
		ON)											
		(When HEA	DER 1										
		OFF)											
Note	<ul> <li>This co</li> </ul>	mmand is	used alo	ng with th	e :MEAS	ure:HAR	Monic:ITE	M:ORDer	comma	nd to			
	specify t	he harmoi	nic wave	output or	der.								
	<ul> <li>If the sp</li> </ul>	pecificatio	n is the s	ame as th	at for the	:MEASur	e:HARMo	nic:ITEM	:LIST co	mmand,			
	the com	mand issu	ed afterw	ards take	s precede	ence.							

Set and Query :ME	ASure:HAR	Monic	Outpu	t Items	(Instan	taneou	ıs. Maxi	imum, a	and		
Minimum Values fo								,			
SyntaxInstantaneous				RMonic							
value				RMonic							
Maximum value		:MEASure:HARMonic:ITEM:ICON_MAX:ALL <output item=""> :MEASure:HARMonic:ITEM:ICON_MAX:CH1(?) <output item=""></output></output>									
Minimum value	:	MEAS	ure:HA	RMonic	:ITEM:		/IN:ALL	_ <output< th=""><th></th></output<>			
Response	<output it<="" th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></output>										
	128	64	32	16	8	4	2	1			
	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
								HICON			
Description									returned		
		by :MEASure:HARMonic? (instantaneous value, maximum value, minimum value) as numerical values between 0 and 1.									
	The order						RMonic		Der		
									ecimal are		
	dropped.				····,		5				
Example Command	:MEAS:I	HARM:	ITEM:IC	ON:CH1	1						
	Specifies	to outp	ut the inst	antaneous	s value of	the harm	ionic wave	e current o	content		
	ratio.										
Query	:MEAS:I	HARM:									
Response	(When HEAI	DER ON)	:MEAS	SURE:HA	ARMONI	C:ITEM	:ICON:C	H1 1			
	(When HEAI	DER OFF)	1								
	command is				ure:HAR	Monic:ITE	M:ORDer	commar	nd to		
	y the harmon								nmand		
	specification								ninanu,		
the command issued afterwards takes precedence.											

## Set and Query :MEASure:HARMonic? Output Items (Instantaneous, Maximum, and Minimum Values for the Harmonic Wave Active Power Content Ratio)

Willingth	values ioi	the Hai					oment	Natioj		
Syntax	nstantaneous value			ure:HA					Output iter	
v	alue		:MEAS	ure:HA	RMonic	:ITEM:	PCON:	CH1(?)	<output< th=""><th>item&gt;</th></output<>	item>
	<i>l</i> aximum							MAX:Á		tput item>
v	alue		:MEAS	ure:HA	RMonic	:ITEM:	PCON	MAX:C	H1(?) <	Output item>
	<i>l</i> inimum								L <out< th=""><th></th></out<>	
value										utput item>
Response		<output< th=""><th>item (NR</th><th></th><th></th><th></th><th></th><th>_</th><th></th><th></th></output<>	item (NR					_		
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
									HPCON	
Description       Sets the harmonic wave active power         by :MEASure:HARMonic? (instantaneous as numerical values between 0 and 1.         The order output is the order specified v         Although NRf numerical values are accord dropped.         :MEAS:HARM:ITEM:PCON:CH1 1         Specifies to output the instantaneous values						neous val 1. ed via ME accepted, 1 1	ue, maxii ASure:H/ values to	mum valu ARMonic: o the right	ie, minimu ITEM:ORI t of the de	um value) Der. ecimal are
	Query	content		ITEM:PC	ON:CH	1?				
	Response	<b>`</b>	ADER ON) ADER OFF)	:MEA 1	SURE:	ARMO	NIC:ITE	M:PCON	I:CH1 1	
Note	• This c	ommand is	used alo	ng with th	e :MEAS	ure:HAR	Monic:ITE	M:ORDe	r comman	d to
	specify • If the s	the harmon specificatio hmand issu	nic wave n is the s	output or ame as th	der. at for the	:MEASur				

Set and Query :MEASure:HARMonic? Output Items (Instantaneous, Maximum, and
Minimum Values for the Harmonic Wave Voltage Phase Angle)

	values for	пепап		vave v	onage	rnase i	Angle)					
Syntax <sup>lr</sup>	nstantaneous		:MEASure:HARMonic:ITEM:UPHAse:ALL <output item=""></output>									
v	alue		:MEAS	ure:HAR	ARMonic:ITEM:UPHAse:CH1(?) <output item=""></output>							
	laximum		:MEAS	ure:HAR	Monic:l	<b>FEM:UP</b>	HAse_M	AX:ALL	<output< th=""><th>item&gt;</th></output<>	item>		
V	alue		:MEAS	ire:HAR	Monic:l	<b>FEM:UP</b>	HAse_M	AX:CH1	(?) <out< th=""><th>tput item&gt;</th></out<>	tput item>		
N	/linimum value		:MEASure:HARMonic:ITEM:UPHAse_MIN:ALL									
			:MEASure:HARMonic:ITEM:UPHAse_MIN:CH1(?) <output item=""></output>									
Response		<output (nr1)="" item=""></output>										
		128	64	32	16	8	4	2	1			
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0			
									HUPHAse	1		
Description Example	Command	Sets the harmonic wave voltage phase angle data output items returned by :MEASure:HARMonic? (instantaneous value, maximum value, minimum valu as numerical values between 0 and 1. The order output is the order specified via MEASure:HARMonic:ITEM:ORDer. Although NRf numerical values are accepted, values to the right of the decimal a dropped. and :MEAS:HARM:ITEM:UPHA:CH1 1 Specifies to output the instantaneous value of the harmonic wave voltage phase								m value) Der. cimal are		
	Query	angle.										
	Response			ITEM:UF								
	Response	(When HEA	,		SURE:	1ARMOI	NIC:ITE	N:UPHA	:CH1 1			
		(When HEA	/	1								
Note	specify t <ul> <li>If the s </li> </ul>	he harmor pecificatior mand issu	nic wave n is the s ed afterw	output ord ame as th vards take	ler. at for the s precede	:MEASur	e:HARMo	onic:ITEM	Command LIST com This data	mand,		

be obtained through communications commands.

## Set and Query :MEASure:HARMonic? Output Items (Instantaneous, Maximum, and Minimum Values for the Harmonic Wave Current Phase Angle)

		<u></u>	<u></u>			<u></u>	<u></u>			
Syntax	nstantaneous						Ase:AL			
	value						Ase:CH			m>
	<i>N</i> aximum						Ase_MA			t item>
v	alue		:MEAS	ire:HAR	Monic:l	TEM:IPH	Ase_MA	X:CH1(	?) <ou< th=""><th>tput item&gt;</th></ou<>	tput item>
Minimum			:MEAS	ıre:HAR	Monic:l	TEM:IPH	Ase_MI	N:ALL	<output< th=""><th>item&gt;</th></output<>	item>
v	value		:MEAS	ıre:HAR	Monic:l	TEM:IPH	Ase_MI	N:CH1(7	?) <out< th=""><th>put item&gt;</th></out<>	put item>
F	<output< th=""><th>item (NR</th><th>1)&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th></output<>	item (NR	1)>							
		128	64	32	16	8	4	2	1	
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	]
									HIPHAse	
Description		Sets the	e harmoi	nic wave	current	phase a	angle dat	a output	items	returned
•							ue, maxim	um value	, minimu	m value)
				es betwee						_
							ASure:HA			
		dropped		nerical val	lues are a	iccepted,	values to	the right o	or the dec	imai are
Example	Command					4				
							the harm	onic wow	ourront	nhaca
			s to outp		anianeou	5 value UI		Unic wave	current	phase
	Query	angle.	HARM		на-сн1	2				
	Response		ADER ON)			-	C:ITEM:		-СН1 1	
		· ·	ADER OFF)				<b></b>			
Note	• This co		,				Monic:ITE		comma	hd
NOLE		y the harn					NOTIO.TTE		cominal	iu ii
		•				:MEASur	e:HARMo	nic:ITEM	LIST co	mmand.
		mand issu								
							on the ins	strument.	This dat	a can
		btained t								
	-		2					-		1005 04

		:MEASure:HARMonic:ITEM:PPHAse:ALL <output item=""> :MEASure:HARMonic:ITEM:PPHAse:CH1(?) <output item=""></output></output>												
Maximum value			:MEASure:HARMonic:ITEM:PPHAse_MAX:ALL <output item=""> :MEASure:HARMonic:ITEM:PPHAse_MAX:CH1(?) <output item=""></output></output>											
		:MEASure:HARMonic:ITEM:PPHAse_MIN:ALL <output item=""> :MEASure:HARMonic:ITEM:PPHAse_MIN:CH1(?) <output item=""></output></output>												
<	<output< td=""><td colspan="9">t item (NR1)&gt;</td></output<>	t item (NR1)>												
	128	64	32	16	8	4	2	1						
	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0						
								HPCON						
as numerical values between 0 and 1. The order output is the order specified via MEASure:HARMonic:ITEM:ORDer Although NRf numerical values are accepted, values to the right of the decima dropped.														
0	-MEAS	:HARM:I		-										
1	-		it the inst	antaneous	s value of	the harm	ionic wave	e active po	ower					
-	Specifie					phase angle. :MEAS:HARM:ITEM:PPHA:CH1?								
: p	Specifie phase ar	ngle.			12									
() ; ;	Specifie phase ar :MEAS (When HE	ngle. <b>:HARM:I</b> ADER ON)	TEM:PF			NIC:ITEI	<b>VI:PPHA</b>	SE:CH1	1					
p ((	Specifie phase an :MEAS (When HEA (When HEA	ngle. :HARM:I	TEM:PF :MEA 1	PHA:CH1 ASURE:H	IARMO									
1	-		IT THE INST	antaneous	s value of	the narm	ionic wave	e a	ctive po					

data can only be obtained through communications commands.

### (11) Communications Settings

Set and Query R	S-232C \$	Settings						
Syntax	Query	:R\$232c?						
	Response	BAUD <9600BPS/38400BPS>;ANSWER <on off=""></on>						
		BAUD <9600BPS/38400BPS>: RS232C baud rate						
		ANSWER <on off="">: Turns execution confirmation message output ON or OFF.</on>						
Description		Returns the RS232-C baud rate and execution confirmation message settings						
		as string values.						
Example	Query	:RS232C?						
	Response	(When HEADER ON) :RS232C:BAUD 9600BPS;ANSWER OFF						
		(When HEADER OFF) 9600BPS; OFF						
Note	<ul> <li>This of</li> </ul>	command can be executed even when a system error has occurred.						
	• You c	an use the :TRANsmit:SEParator command to change the message unit						
		tor from a semicolon ";" to a comma ",".						

• This query can be used with the RS, LAN, and GP-IB interfaces.

Set and Query th	e RS-232C	Baud Rate Setting							
Syntax	Command	:RS232c:BAUD <9600BPS/38400BPS>							
-	Query	:RS232c:BAUD?							
	Response <	9600BPS/38400BPS>							
Description		Sets or queries the instrument's RS-232C baud rate setting.							
Example	Command	:RS232:BAUD 9600BPS							
•	Query	:RS232:BAUD?							
	Response	(When HEADER ON) :RS232C:BAUD 9600BPS							
		(When HEADER OFF) 9600BPS							
Note		can be used with the RS, LAN, and GP-IB interfaces. command can only be used with the LAN and GP-IB interfaces.							
## Set and Query the RS-232C Execution Confirmation Message Setting

Command :RS232c:ANSWer <ON/OFF>

Query :RS232c:ANSWer?

Response <<u>ON/OFF</u>>

Description

Syntax

Sets or queries the RS-232C execution confirmation message output setting (ON or OFF). When set to ON, a response is also received when sending a command.

In addition, an execution confirmation message is included after the response to a query.

The execution confirmation message is a 3-digit numerical value ("nnn"). "000" is returned when an operation is executed successfully. If an error occurs, the number of the nnnth command where the error occurred will be returned instead of "000".

Example (when HEADER OFF):

Command	Response	Comments
:RS232C:ANSWER	000	Operation completed
ON		successfully.
:ABCDF	001	"ABCDF" is an error.
:VOLT:RANGE?;CUR	15;0.1;000	Operation completed
R:RANGE?		successfully.
:VOLT:RANGE?;CUR	15;0.1;003	An error occurred with
R:RANGE? ; ABC		the third command,
		"ABC".

Example Command

Query

Response

#### :RS232:ANSW ON :RS232:ANSW?

## (When HEADER ON) :RS232C:ANSWER ON;000 (When HEADER OFF) ON;000

Note

This command and query can be executed even when a system error has occurred.
When set to ON, operation may become unstable if the controller (the device that sends commands) does not receive an execution confirmation message response.

- Please have received execution confirmation message also when sending
- blank line.
- · This command is used to synchronize operation with the controller over RS-232C,
- but can also be used with the GP-IB and LAN interfaces.
- However, be sure to always receive sent execution confirmation messages.

This query and setting command can be used with the RS, LAN, and GP-IB interfaces.

## **Query RS-232C Communications Errors**

Syntax	Query	:RS	232c:	ERRor	?				
	Response	<communications (nr1)="" error="" information=""></communications>							
						_		_	
		128	64	32	16	8	4	2	1
		bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
							Over run	Framing	
Description		Returns RS-232C communications error information in NR1 format and							
		clears that information.							
		The communications error information can also be reset to 0 via the *CLS							
		command.							
		The response message has no header.							
		bit 2: Overrun error (missed data)							
		bit 1: Framing error (erroneous data read)							
Example	Query	Query :RS232:ERR?							
-	Response	4							
Note	<ul> <li>This co</li> </ul>	<ul> <li>This command can be executed even when a system error has occurred.</li> </ul>							
	• This qu	uery can	be used	with the	RS, LAN	, and GP	-IB interfaces.		

nitialize the Blue	etooth Adap	ter for LR841	0 and Query Its Result
Syntax	Command	:RS232c:B	ΓINit
-	Query	:RS232c:B	FINit?
	Response <	OK/BUSY/ERRO	R/NONE>
		Response	Description
		OK	The initialization is successfully
		BUSY	completed.
			The initialization is in progress.
		ERROR	The initialization failed.
		NONE	No initialization is executed.
Description		LR8410Link, whiterminal. The device name by the initialization	Bluetooth Serial Adapter Parani-SD1000, used for nen Model Parani-SD1000 is connected to the RS-232C ne of Model Parani-SD1000 and other configuration are set ion.
Example	Command	:RS232:BTIN	
	Query	:RS232:BTIN	?
	Response	(When HEADER ON	) :RS232C:BTINIT OK
		(When HEADER OF	F) <b>OK</b>
Note	<ul> <li>You cannot</li> <li>The Blueto</li> <li>response is</li> </ul>	t change this sett oth adapter that "NONE" (no initi	be executed even when a system error has occurred. ing during integration. has been initialized beforehand works even if the query alization is executed). The Bluetooth adapter is required to ith Model PW3335.

Set and Query R	S-232C de	stination		
Syntax	Command	:RS232c:CONNect		
	Query	:RS232c:CC	JNNect?	
	Response	<r<u>S/BT &gt;</r<u>		
		Response	Description	
		RS	RS-232C	
		BT	Bluetooth(converter)	
Description Example	Command Query	Sets and queries :RS232:CONN :RS232:CONN	-	
	Response	(When HEADER ON) (When HEADER OFF		
Note	<ul> <li>This con</li> </ul>	nmand /query can b	e executed even when a system error has occurred.	

## Initialize the Bluetooth Adapter for LR8410 and Query Its Result

Set and Query th	e LAN IP Address Execution Confirmation Message Setting
Syntax	Command :IP:ADDRess <address (nr1)="" 1="">,<address (nr1)="" 2="">,<address (nr1)="" 3="">,<address (nr1)="" 4=""></address></address></address></address>
	Query :IP:ADDRess?
	Response <address (nr1)="" 1="">,<address (nr1)="" 2="">,<address (nr1)="" 3="">,<address (nr1)="" 4=""></address></address></address></address>
	<address (nr1)="" 1="" 4="" address="" to=""> = 0 to 255</address>
Description	Sets or queries the IP address of the instrument.
Example	Command :IP:ADDR 192,168,1,1
	Query :IP:ADDR?
	Response (When HEADER ON) :IP:ADDRESS 192,168,1,1
	(When HEADER OFF) <b>192,168,1,1</b>
Note	<ul> <li>The LAN communications settings will be changed after the command is sent.</li> </ul>
	All established connections before the settings were changed will be disconnected.

- This query can be used with the RS-232C, LAN, and GP-IB interfaces.
- This setting command can be used with the RS-232C and GP-IB interfaces.

# Set and Query the LAN Default Gateway Address Execution Confirmation Message Setting

Syntax	Command	:IP:DEFaultgateway
		<address (nr1)="" 1="">,<address (nr1)="" 2="">,<address (nr1)="" 3="">,<address (nr1)="" 4=""></address></address></address></address>
	Query	:IP:DEFaultgateway?
	Response	<address (nr1)="" 1="">,<address (nr1)="" 2="">,<address (nr1)="" 3="">,<address (nr1)="" 4=""></address></address></address></address>
		<address (nr1)="" 1="" 4="" address="" to=""> = 0 to 255</address>
Description		Sets or queries the default gateway address for the instrument.
Example	Command	:IP:DEF 192,168,1,250
	Query	:IP:DEF?
	Response	(When HEADER ON) :IP: DEFAULTGATEWAY 192,168,1,250
		(When HEADER OFF) 192,168,1,250
Note	・The LAI	N communications settings will be changed after the command is sent.
	All estab	ished connections before the settings were changed will be disconnected.

- This query can be used with the RS-232C, LAN, and GP-IB interfaces.
- This setting command can be used with the RS-232C and GP-IB interfaces.

Set and Query th	e LAN Su	Ibnet Mask Execution Confirmation Message Setting		
Syntax	Command	:IP:SUBNetmask		
		<address (nr1)="" 1="">,<address (nr1)="" 2="">,<address (nr1)="" 3="">,<address (nr1)="" 4=""></address></address></address></address>		
	Query	:IP:SUBNetmask?		
	Response	<address (nr1)="" 1="">,<address (nr1)="" 2="">,<address (nr1)="" 3="">,<address (nr1)="" 4=""></address></address></address></address>		
		<address (nr1)="" 1="" 4="" address="" to=""> = 0 to 255</address>		
Description		Sets or queries the subnet mask for the instrument.		
Example	Command	:IP:SUBN 255,255,255,0		
	Query	:IP:SUBN?		
	Response	(When HEADER ON) : IP: SUBNETMASK 255, 255, 255, 0		
		(When HEADER OFF) 255,255,255,0		
Note		N communications settings will be changed after the command is sent.		

- All established connections before the settings were changed will be disconnected.
- This query can be used with the RS-232C, LAN, and GP-IB interfaces.
- This setting command can be used with the RS-232C and GP-IB interfaces.

Syntax	Query	:GPIB?
	Response	<gp-ib (nr1)="" address=""></gp-ib>
		<gp-ib (nr1)="" address=""> = 0 to 30</gp-ib>
Description		Returns the GP-IB address setting as a string.
Example	Query	:GPIB?
•	Response	(When HEADER ON) :GPIB:ADDRESS 5
		When HEADER OFF) 5
Note	<ul> <li>This query</li> </ul>	can be used with the RS-232C, LAN, and GP-IB interfaces.
	<ul> <li>If GP-IB is</li> </ul>	not implemented by the unit, a device error will occur.

Set and Query th	Set and Query the GP-IB Address				
Syntax	Command	:GPIB:ADDRess <gpib (nr1)="" address=""></gpib>			
	Query	:GPIB:ADDRess?			
	Response	<gp-ib (nr1)="" address=""></gp-ib>			
		<gp-ib (nr1)="" address=""> = 0 to 30</gp-ib>			
Description		Sets or queries the GP-IB address of the instrument.			
Example	Command	:GPIB:ADDR 5			
	Query	:GPIB:ADDR?			
	Response	(When HEADER ON) :GPIB: ADDRESS 5			
		When HEADER OFF) 5			
Note	<ul> <li>This que</li> </ul>	ry can be used with the RS-232C, LAN, and GP-IB interfaces.			

- $\cdot$  This setting command can only be used with the RS-232C and LAN interfaces.
- If GP-IB is not implemented by the unit, a device error will occur.

# Set and Query Response Message Headers ON/OFF Status

Syntax	Command	:HEADer <on off=""></on>
	Query	:HEADer?
	Response	<on off=""></on>
		ON: A header is added to the response message.
		OFF: No header is added to the response message.
Description		Sets or queries the ON/OFF status of query response message headers.
Example	Command	:HEAD ON
	Query	:HEAD?
	Response	(When HEADER ON) :HEADER ON
		When HEADER OFF) OFF
Note	This co	mmand and query can be executed even when a system error has occurred

Note
This command and query can be executed even when a system error has occurred.
This command can not be executed during a zero adjust.

Change to the Loc	al State	
Syntax C	Command	:LOCAL
Description		Changes the instrument from the Remote state to the Local state. If the instrument is already in the Local state when this command is received, it will remain in that state.
Example C	Command	:LOCAL
Note	<ul> <li>This com</li> </ul>	mand and query can be executed even when a system error has occurred.

Query Response	<b>:TRANsmit:SEParator?</b> <0/1> 0: Semicolon ";" (default setting)	
Response		
	O Semicolon "." (default setting)	
	1: Comma ","	
	Sets or queries the message unit separator of Although NRf numerical values are accept decimal are truncated.	
Command		(Specify the separator to be a
_		semicolon.)
Response	10.038E+0 <b>□</b> +12.719E+0	(Separator is a semicolon.)
Command	:TRAN:SEP 1;:HEAD OFF;:MEAS? U1,I1	(Specify the separator to be a comma.)
Response	10.038E+0 <b>_</b> +12.719E+0	(Separator is a comma.)
Command	:TRAN:SEP 0;:HEAD ON;:MEAS? U1,I1	(Specify the separator to be a semicolon.)
Response	U1 10.038E+0⊡l1 +12.719E+0	(Separator is a semicolon.)
	:TRAN:SEP 1;:HEAD ON;:MEAS? U1,I1	(Specify the separator to be a comma.)
Response	U1 10.038E+0⊡I1 +12.719E+0	(Separator is a semicolon.) (Because headers are turned
	Response Command Response Command Response Command	decimal are truncated. However, if headers are turned ON the actusemicolons, even if the separator has been service of the set of the service o

Query Response :TRAN:SEP? (When HEADER ON) :TRANSMIT:SEPARATOR 1 (When HEADER OFF) 1

Note

• Always turn headers OFF (:HEAD OFF) when changing the message unit separator.  $\boldsymbol{\cdot}$  This command and query can be executed even when a system error has occurred.

Set and Query th	e Message	Uni	t Terminator					
Syntax	Command	:TRANsmit:TERMinator <0/1>						
	Query	:TRANsmit:TERMinator?						
	Response	<0/	1>					
			Setting I/F	RS-232c LAN	GP-IB			
			0	LF	LF with an EOI			
			1	CR+LF	LF with a CR+EOI			
Description		Altho		age unit terminator used values are accepted, v	in response messages. alues to the right of the			
Example	Command	:TR	AN:TERM 1					
	Query	:TR/	AN:TERM?					
	Response	(When HEADER ON) :TRANSMIT:TERMINATOR 1						
		(Wher	HEADER OFF) 1					
Note	<ul> <li>This comm</li> </ul>	nand	and query can be e	xecuted even when a sys	tem error has occurred.			

			o: Can	be execu	ted ×: Ca	annot be e	executed
Status	Integratio	on Reset	Integration START		Integration STOP		Question
Command	Continu ous	HOLD	Continu ous	HOLD	Continu ous	HOLD	System Error
<u>*CLS</u>	0	0	0	0	0	0	0
<u>*ESE</u>	0	0	0	0	0	0	0
<u>*ESE?</u>	0	0	0	0	0	0	0
<u>*ESR?</u>	0	0	0	0	0	0	0
<u>*IDN?</u>	0	0	0	0	0	0	0
<u>*OPC</u>	0	0	0	0	0	0	0
<u>*OPC?</u>	0	0	0	0	0	0	0
<u>*OPT?</u>	0	0	0	0	0	0	0
<u>*RST</u>	0	0	0	0	0	0	0
<u>*SRE</u>	0	0	0	0	0	0	0
<u>*SRE?</u>	0	0	0	0	0	0	0
<u>*STB?</u>	0	0	0	0	0	0	0
<u>*TRG</u>	×	0	×	0	×	0	×
<u>*TST?</u>	0	×	×	×	×	×	0
<u>*WAI</u>	0	0	0	0	0	0	×

# (12) Status-dependent Commands (Common Commands)

## **Status Descriptions**

Integration Reset	:	Integration calculations are stopped and the integration time and integration value are reset.
Integration STADT		(The INTEGRATOR RUN indicator is OFF.)
Integration START	•	Integration calculations are being performed (the INTEGRATOR RUN indicator is ON).
Integration STOP	:	Integration calculations are stopped (the INTEGRATOR RUN indicator is
		flashing).
Continuous	:	The display is updated each time sampling is performed (continuous display).
HOLD	:	The display is currently held and/or maximum/minimum values are being held.
		(The HOLD, MAX, or MIN indicator is ON.)
		However, *TRG is only valid when the HOLD indicator is ON.
System Error	:	Err. 1 to Err. 4 is currently displayed.

# (13) Status-dependent Commands (Device-specific Commands)

Can be executed ×: Cannot be executed
 Δ: While the display is held, cannot be executed.

When the maxir	num/minimum	values	are	being	neiu,can	be	executed.
When the maying	mum/minimum	valuee	aro	haina	hold can	ho	DVDCI ItDD

Status		on Reset		n START	Integratio	on STOP	
	Continu		Continu		Continu		System
Command	ous	HOLD	ous	HOLD	ous	HOLD	Error
AOUT?	0	0	0	0	0	0	0
AOUT							
:ITEM							
:DA[n]	0	0	0	0	0	0	×
<u>:DA[n]?</u>	0	0	0	0	0	0	0
:IRANge							
<u>:DA[n]</u>	0	0	0	0	0	0	×
:DA[n]?	0	0	0	0	0	0	0
AVERaging	0	×	×	×	×	×	×
AVERaging?	0	0	0	0	0	0	0
CURRent?	0	0	0	0	0	0	0
CURRent							
:AUTO	0	Δ	×	×	0	Δ	×
:AUTO?	0	0	0	0	0	0	0
:RANGe	0	Δ	×	×	0	Δ	×
:RANGe?	0	0	<b>^</b>	0	0	0	0
:EXTRange	0		×	×	0	Δ	×
:EXTRange?	0	Δ 0	<b>∧</b> ○	• •	0	Δ 0	• •
:TYPe							
	0	×	×	×	×	×	×
:TYPe?	0	0	0	0	0	0	0
:SELect	0	×	×	×	×	×	×
:SELect?	0	0	0	0	0	0	0
<u>:ALL</u>	0	×	×	×	×	×	×
<u>:I[xxx]A</u>	0	×	×	×	×	×	×
<u>:I[xxx]A?</u>	0	0	0	0	0	0	0
<u>:C[xxx]A</u>	0	×	×	×	×	×	×
:C[xxx]A?	0	0	0	0	0	0	0
DATAout:ITEM	0	0	0	0	0	0	0
DATAout:ITEM?	0	0	0	0	0	0	0
DEMAg	0	×	×	×	0	×	×
DEMAg?	0	0	0	0	0	0	0
DISPlay?	0	0	0	0	0	0	0
DISPlay			- Ŭ		Ŭ		
:HARMonic							
:[B,C,D]:ITEM	0						
	0	0	0	0	0	0	×
:[B,C,D]:ITEM?	0	0	0	0	0	0	0
:ORDer	0	0	0	0	0	0	×
:ORDer?	0	0	0	0	0	0	0

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Status	Integratio	on Reset	Integratio	n START	Integratio	on STOP	
	Continu	HOLD	Continu	HOLD	Continu	HOLD	System Error
Command	ous	HOLD	ous	HOLD	ous	HOLD	LIIUI
:HORDerSel							
:[A,B,C,D]							
<u>:ITEM</u>	0	0	0	0	0	0	×
<u>:ITEM?</u>	0	0	0	0	0	0	0
<u>:ORDer</u>	0	0	0	0	0	0	×
:ORDer?	0	0	0	0	0	0	0
:MODE	0	0	0	0	0	0	×
:MODE?	0	0	0	0	0	0	0
:NORMal	0	0	0	0	0	0	×
:[A,B,C,D]	0	0	0	0	0	0	×
<u>:[A,B,C,D]?</u>	0	0	0	0	0	0	0
ESE0	0	0	0	0	0	0	×
ESE0?	0	0	0	0	0	0	0
ESR0?	0	0	0	0	0	0	0
ESE1	0	0	0	0	0	0	×
ESE1?	0	0	0	0	0	0	0
<u>ESR1?</u>	0	0	0	0	0	0	0
FREQuency?	0	0	0	0	0	0	0
FREQuency							
:RANGe	0	×	×	×	×	×	×
:RANGe?	0	0	0	0	0	0	0
0.0100							
GPIB?	0	0	0	0	0	0	0
GPIB							
:ADDRess	0	0	0	0	0	0	×
:ADDRess?	0	0	0	0	0	0	0
HARMonic:ORDer:UPPER	0	×	×	×	×	×	×
HARMonic:ORDer:UPPER?	0	0	0	0	0	0	0
HEADer	â		0				0
HEADer?	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
HOLD	0	0	0	0	0	0	~
HOLD?	0	0	0	0	0	0	× 0
	0	0	0	0	0	0	0
INTEGrate?	0	0	0	0	0	0	0
INTEGrate				0		0	
<u>:STATe</u> (*)							
START	0	0	×	×	0	0	×
STOP	×	×	<b>^</b>	<b>~</b>	×	×	×
RESET	<b>~</b>	0	×	×	<b>^</b>	0	×
:STATe?	0	0	<b>∧</b> ○	• •	0	0	<b>∧</b> ○
:TIME	0	×	×	×	×	×	×
:TIME?	0	0	<b>^</b>	<b>~</b>	<b>^</b>	0	<b>^</b>
AUTO	0	×	×	×	×	×	×
:AUTO?	0	• 0	<b>∧</b> ○	•	• 0	•	• •
<u></u>	0	U	0	0	0	0	U

Status	Integratio	on Reset	Integratio	n START	Integratio	on STOP	
	Continu	HOLD	Continu	HOLD	Continu		System Error
Command	ous	HULD	ous	HOLD	ous	HOLD	EII0
(*See also: <u>Detailed Command</u>							
<u>Specifications</u> )							
IP							
:ADDRess	0	0	0	0	0	0	×
<u>:ADDRess?</u>	0	0	0	0	0	0	0
:DEFaultgateway :DEFaultgateway?	0	0	0	0	0	0	×
	0	0	0	0	0	0	0
:SUBNetmask :SUBNetmask?	0	0	0	0	0	0	×
<u>.SOBNetmask?</u>	0	0	0	0	0	0	0
LOCAL			0	Â	0	-	â
LOCAL	0	0	0	0	0	0	0
MEASure?	0	0	0	0	0	0	~
MEASure	0	0	0	0	0	0	×
:ITEM:ALLClear	0	0	0	0	0	0	0
:NORMal	0	0	0	0	0	0	0
:VALUE?	0	0	0	0	0	0	×
All :ITEM commands and		U				0	^
queries	0	0	0	0	0	0	0
:HARMonic?	0	0	0	0	0	0	×
:HARMonic							
:ITEM							
:LIST	0	0	0	0	0	0	0
:LIST?	0	0	0	0	0	0	0
:ORDer	0	0	0	0	0	0	0
:ORDer?	0	0	0	0	0	0	0
All :[U,I,P] commands	0	0	0	0	0	0	0
and queries	0	0	0	0	0	0	0
:[UCON,ICON,PCON]	0	0	0	0	0	0	0
:[UPHAse,IPHAse,PPHAse]	0	0	0	0	0	0	0
<u>:RS232c?</u>	0	0	0	0	0	0	0
:RS232c	0	0	0	0	0	0	0
ANSWer	0	0	0	0	0	0	0
ANSWer?	0	0	0	0	0	0	0
BAUD	0	0	0	0	0	0	×
BAUD?	0	0	0	0	0	0	0
ERRor?	0	0	0	0	0	0	0
SCALE[n]?	0	0	0	0	0	0	0
SCALE[n]							
<u>:CT</u> :CT?	0	×	×	×	×	×	×
	0	0	0	0	0	0	0
<u>:VT</u>	0	×	×	×	×	×	×
<u>:VT?</u>	0	0	0	0	0	0	0
	<u> </u>	<u> </u>		Â	Â		
SOURce[n]?	0	0	0	0	0	0	0
SOURce[n]	0	×	×	×	×	×	×
:TIMEOut?	0	0	0	0	0	0	0

PW3335A985-01

Status	Integratio	on Reset	Integratio	n START	Integratio	on STOP	
	Continu		Continu		Continu		System
Command	ous	HOLD	ous	HOLD	ous	HOLD	Error
:TIMEOut	0	×	×	×	×	×	×
:FILTer							
:LEVel							
:ALL	0	×	×	×	×	×	×
<u>:U[xxx]V</u>	0	×	×	×	×	×	×
<u>:U[xxx]V?</u>	0	0	0	0	0	0	0
<u>:I[xxx]A</u>	0	×	×	×	×	×	×
<u>:I[xxx]A?</u>	0	0	0	0	0	0	0
<u>:C[xxx]A</u>	0	×	×	×	×	×	×
<u>:C[xxx]A?</u>	0	0	0	0	0	0	0
SYNC:CONTrol	0	×	×	×	×	×	×
SYNC:CONTrol?	0	0	0	0	0	0	0
TRANsmit							
:SEParator	0	0	0	0	0	0	0
:SEParator?	0	0	0	0	0	0	0
:TERMinator	0	0	0	0	0	0	0
:TERMinator?	0	0	0	0	0	0	0
VOLTage[n]?	0	0	0	0	0	0	0
VOLTage[n]							
:AUTO	0	Δ	×	×	×	×	×
:AUTO?	0	0	0	0	0	0	0
:RANGe	0	Δ	×	×	×	×	×
:RANGe?	0	0	0	0	0	0	0
:SELect	0	Δ	×	×	×	×	×
:SELect?	0	0	0	0	0	0	0
:ALL	0	×	×	×	×	×	×
<u>:U[xxx]V</u> :U[xxx]V?	0	×	×	×	×	×	×
	0	0	0	0	0	0	0
ZEROadjust	0	>	~	~		~	~
ZEROadjust?	0	<b>×</b>	× 0	× 0	0	<b>×</b>	× ○
	0	0	0	0		0	0
MODE	0	0	0	0	0	0	0
MODE?	0	0	0	0	0	0	0
	<u> </u>						
RECTifier	0	0	0	0	0	0	0
RECTifier?	0	0	0	0	0	0	0
	-						
RESPonse	0	0	0	0	0	0	0
RESPonse?	0	0	0	0	0	0	0
	-	-			_		-
WIRing	0	0	0	0	0	0	0
WIRing?	0	0	0	0	0	0	0

## **Status Descriptions**

Integration Reset	:	Integration calculations are stopped and the integration time and integration value are reset. (The INTEGRATOR RUN indicator is OFF.)
Integration START	:	Integration calculations are being performed (the INTEGRATOR RUN indicator is ON).
Integration STOP	:	Integration calculations are stopped (the INTEGRATOR RUN indicator is flashing).
Continuous	:	The display is updated each time sampling is performed (continuous display).
HOLD	:	The display is currently held and/or maximum/minimum values are being held. (The HOLD, MAX, or MIN indicator is ON.)
System Error	:	Err. 1 to Err. 4 is currently displayed.

# 4 **Operation Problems (Communications)**

When communications are not operating properly, check the following causes and try the listed solutions.

\* Problems and solutions with no specific interface icon (RS-232C/GP-IB/LAN) can be applied for all interfaces.

Problem	Cause / Solution
The RS-232C/LAN/GP-IB interface	Are all cables properly connected?
does not work at all.	(See Chapter 4 in the Instruction Manual for the instrument.)
	<ul> <li>Are all connected devices powered ON?</li> </ul>
	<ul> <li>Are all the cables used the correct types?</li> </ul>
	(See Chapter 4 in the Instruction Manual for the instrument.)
	Do the set communications conditions (RS baud rate, etc.) on
	the instrument match up with the controller?Rs-232C
	<ul> <li>Are the address settings on the instrument the same as the</li> </ul>
	controller's destination address?
	<ul> <li>Does the instrument have the same IP address setting as</li> </ul>
	another device?
	Are the communications settings (IP address, subnet mask,
	default gateway) all correct?
	Are these IP address settings the same as those on another
	device?
	<ul> <li>Is the TCP/IP port number correct?</li> </ul>
	(Connect to TCP/IP port 3300.)
Communications are not working	Are the instrument and controller RS-232C settings (baud
properly.	rate, data length, parity, stop bit) the same? RS-232C
	The data length (8 bits), parity (none), and stop bit (1) are
	fixed values.
	<ul> <li>Is the controller's <u>message terminator (delimiter) setting</u> the</li> </ul>
	same as the instrument setting?
After communications, the keys on	Press the SHIFT/EXIT/LOCAL keys on the instrument panel
the instrument no longer work.	to take the instrument out of the Remote state.
	Or, send the :LOCAL command.
	Are you sending the <u>LLO (Local Lock Out) command</u> (see
	page 11) to the instrument?
The program stops running when I	<ul> <li>You must send a query before the INPUT statement.</li> </ul>
try to read data with an INPUT	<ul> <li>Did an error occur in the query sent before the INPUT</li> </ul>
statement. <b>RS-232C</b>	statement?
The GP-IB bus stops when I try to	<ul> <li>You must send a query before the INPUT@(ENTER)</li> </ul>
read data with an INPUT@(ENTER)	statement.
statement. GP-IB	<ul> <li>Did an error occur in the query sent before the INPUT</li> </ul>
	statement?

<b>F</b>						
I sent a command but nothing	<ul> <li>Use the <u>*ESR?</u> query to check the Standard Event Status</li> </ul>					
happens.	Register for items that have caused an error. (See page 35.)					
	Use the <u>RS232c:ERRor?</u> query to check for any RS-232C					
	communications errors. (See page 107.) <b>RS-232C</b>					
	• Set <u>RS232c:ANSWer</u> to ON to enable execution confirmation.					
	(See page 107.)					
I sent multiple queries but received	Did an error occur?					
no responses back.	• Be sure to check for and read the response after each query					
	is sent.					
	To read all query responses at once, use the message					
	separator and put all the queries on a single line. (See page 3.)					
	Are you using the <u>*IDN?</u> query?					
	Query commands after an *IDN? query are not executed.					
The query response message is not	<ul> <li>Response messages are generated when the query is</li> </ul>					
the same as what is displayed on the	received by the instrument.					
instrument panel.	Therefore, in some cases the message may not match what					
	is displayed on the panel when the response is read by the					
	controller.					
Sometimes service requests are not	Are the <u>Service Request Enable</u> and <u>Event Status Enable</u>					
executed.	registers set correctly? (See page 35.)					
	Clear all the event registers with the <u>*CLS</u> command at the					
	end of your SRQ processing subroutine.					
	If the event bits are not cleared, the service requests will not					
Learned abtain the average of data	be executed in the same event. (See page 35.)					
I cannot obtain the averaged data.	If any measurement-related settings such as the wiring,					
	voltage range, current range, number of times to perform					
	averaging, VT ratio, CT ratio, etc. are changed, averaging is					
	restarted. To obtain the average values, wait until the first					
	averaging process finishes or monitor the AVG flag in ESR0? as shown below.					
	<ol> <li>After changing these settings, wait until the first set of data</li> </ol>					
	is displayed and clear the event flags.					
	(Example: Changing the current range to 1A)					
	:CURR:RANG 1;*WAI;*CLS					
	<ol> <li>Monitor the AVG flag to see when it changes to 1.</li> </ol>					
	Read Event Status Register 0 with an :ESR0? query.					
	Repeat until the AVG flag (bit 3) changes to 1.					
	3. Read the data once the AVG flag changes to 1.					
	:MEAS?					

5 Device Documentation Requirements

GP-IB

Information Related to Standard Execution Methods Based on IEEE488.2

(1)	IEEE488.1 Interface Functions
	See Chapter 4.1.3 "GP-IB Interface Settings and Connection" in the Instruction Manual for the
	instrument.
(2)	Operation When the Address Is Set to a Value Outside the Range of 0 to 30
	Settings outside the range of 0 to 30 are not allowed.
(3)	Recognizing When a User Changes the Initial Address Setting
	The new address is recognized at the moment when the user changes the address.
(4)	Device Settings When the Instrument is Powered On
	All status information is cleared. Other data is backed up.
	However, header and response message terminator settings are reset.
(5)	Message Exchange Option Notation
	<ul> <li>Input Buffer Capacity and Operation</li> </ul>
	See: Input Buffer (page 5)
	<ul> <li>Queries that Return Multiple Response Message Units</li> </ul>
	:VOLTage? • • • • • • • • • • • • • • • • • • •
	:CURRent? • • • • • • • • • • • • • • • • • • •
	:FREQuency? $\cdot \cdot \cdot$
	:SCALE?
	:INTEGrate? $\cdot \cdot \cdot$
	:MEASure? • • • • • • • • • • • • • • • • • • •
	:MEASure:ITEM? • • • • • • • • • • • • • • • • • • •
	:MEASure:HARMonic? · · · · · · · · · · · · · · · · · · ·
	:RS232c? • • • • • • • • • • • • • • • • • • •
	.(Co252C! ************************************
	Queries that Generate a Response When Checking Syntax
	All queries generate a response when checking syntax.
	Queries that Generate a Response When Read

There are no queries that generate a response when read by the controller.

· Coupled Commands

There are no such coupled commands.

#### (6) List of Functional Requirements for Device-specific Commands and Compound Command Program Header Specifications

- Program messages
- Program message terminators
- Program message units
- Program message unit separators
- · Command message units
- Query message units
- Command program headers
- · Query program headers
- Program data
- Character program data
- Binary numerical value program data
- Compound command program headers
- (7) Block Data Buffer Capacity Limits Block data is not used.

- (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>) Sub-expressions are not used. The program data elements used in expressions are character program data and binary numerical value program data. (Excluding <u>\*IDN?</u>)
- (9) Query Response Syntax See: <u>Message Reference(page 32)</u>
- (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 See: <u>Message List(page 14)</u>
- (13)Device Status After a Revised Query Completes Successfully The \*CAL? command is not used.
- (14)"\*DDT" Command The \*DDT? command is not used.
- (15)Macro Commands Macros are not used.
- (16)Identification-related Queries and "\*IDN?" Query Responses See: <u>Standard Commands(page 33)</u>
- (17)Capacity of the User Data Storage Area Protected When the "\*PUD" Command or "\*PUD" Query Is Executed

The \*PUD? command and \*PUD query are not used. There also is no user data storage area.

- (18)Resources When the "RDT" Command or "\*RDT?" Query Is Used The \*RDT? command and \*RDT query are not used. There also is no user data storage area.
- (19) Situations When the "\*RST", "\*LRN?", "\*RCL", and "\*SAV" Commands Are Affected The \*LRN?, \*RCL, and \*SAV commands are not used. The \*RST command resets the instrument back to its initial state. See: <u>Standard Commands</u> (page 33) and <u>Initialization Items</u> (page 12)
- (20)Range of Self-testing Performed by the "\*TST?" Query See: <u>Standard Commands(page 33)</u>
- (21)Additional Status Data Structures Used for Reporting the Device Status See: <u>Event Registers</u> (page 8)
- (22)Are Commands Overwrap or Sequential Commands All commands are sequential.
- (23)Standards for Functions Required When Operation Complete Messages Are Generated as Command Responses

Operation complete messages are generated when analysis of the command is performed.





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