HIOKI

Communication Command Handling Instruction Manual

3390

Power Analyzer

✓ This instruction manual handles only parts related to commands.

✓ For communication settings, please refer to the instruction manual for the main unit

✓ Care has been taken to ensure the accuracy of the contents in this instruction manual, however, please approach HIOKI's Sales Planning Division or your nearest HIOKI dealer should you have any queries or found any mistakes.

✓ Improvements may be made to this instruction manual without prior notice.

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1. Communication Command Overview

The 3390 Power Analyzer uses a TCP/IP connection to control the functions, and acquire measurement data and record data from a PC connected by LAN through text commands and queries.
The port number of TCP/IP is fixed to 3390.

Commands/Messages

Data sent and received from the communication device are called messages and are classified as follows.

```
                                                  ┌──────────────┐
                                                  │ Command      │
                                   ┌──────────────┤ Program      │
                    ┌──────────────┤ Program      │ Message      │
                    │              │ Message      └──────────────┘
   ┌──────────────┐ │              ├──────────────┐
   │ Message      ├─┤              │ Query        │
   └──────────────┘ │              │ Program      │
                    │              │ Message      │
                    │              └──────────────┘
                    │ ┌──────────────┐
                    └─┤ Response     │
                      │ Message      │
                      └──────────────┘
```
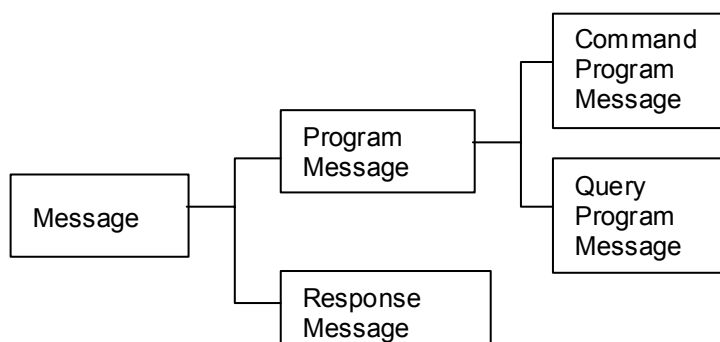
Program Message	Message sent from the controller to the instrument.
Response Message	Message sent from the instrument to the controller. This message is created at the time when a query program message is received and syntax checked.
Command Program Message	Command to control settings and resetting of the instrument.
Query Program Message	Order to interrogate instrument on operation results, measurement results, and setting status.

Command/Program message, and Query Program Message are collectively known as commands.

Command Syntax

Commands are accepted in uppercase, lowercase or a mixture of both types of letters. 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 uppercase letters, extended to the long form in lower case letters.
The response message from the main device is returned as long form in uppercase letters.

Example

Description as shown in this manual (Command Name)	Short Form	Long Form
DISPlay	DISP	DISPLAY

A mixture of uppercase and lowercase letters such as DiSpLay is accepted, but DISPLA, DISPL and DIS are considered as errors.

Command Program Header

A header shows what kind of function that command has.

A command always requires a header and comes in three types, "Simple Command Type", "Compound Command Type", and "Standard Command Type".

Types of Commands	Description / Explanation
Simple Command Type	A sequence of letters [Example] **:HEADer ON** → Data → Simple Command Type
Compound Command Type	Multiple simple command type headers separated by colons ":" [Example] **:VOLTage1:RANGe 600** → Data → Compound Command Type
Standard Command Type	Begins with an asterisk "*", indicating that it is a standard command defined by IEEE 488.2. [Example] ***RST**

Query Program Header

These commands are used to interrogate the instrument about the results of operations and settings. A query is formed by appending a question mark "?" after a program header

Types of Commands	Description
Simple Command Type	A sequence of letters [Example] **:HEADer?** → Simple Command Type
Compound Command Type	Multiple simple command type headers separated by colons ":" [Example] **:VOLTage1:RANGe?** → Compound Command Type
Standard Command Type	Begins with an asterisk "*", indicating that it is a standard command defined by IEEE 488.2. [Example] ***IDN?**

Response Message

The response message to a query, like the program message, consists of the header and data and is in principle outputted in the same format as the program message in response to the query. The header can be omitted.

[Example]

Query Program Message	:VOLTage1:RANGe?	
Response Message	:VOLTAGE1:RANGE 300 300	(When header is ON) (When header is OFF)

Terminator and Separator

(1) Message Terminator

The message terminator means the division of one message forwarding.

However, there is no message in the terminator.

Main instrument/Communication Software Setting	ANSI Word code (hexadecimal)	Meaning	English Name
CR+LF	0Dh 0Ah	Recovery + Change line	Carriage Return + Line Feed

(2) Message Unit Separator

The semicolon ";" is a message unit separator and is used to write multiple messages in one line.

[Example] :VOLTage1:RANGe 600;:CURRent:RANGe 50

Message Unit Separator

(3) Header Separator

In a message containing header and data, a space (header separator) is used to separate the header from the data.

[Example] :VOLTage1:RANGe 600

Header Separator

(4) Data Separator

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

[Example]   :AOUT:ITEM Urms1,Irms1,P1,Q1,S1,PF1

Data Separator

Multiple-Command Header Omission

When several commands having a common header are combined to form a compound command
if they are written together in sequence, the common portion can be omitted. This common portion is
called the "current path", 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   :VOLTage1:RANGe 600;:VOLTage1:MEAN OFF
    Compacted Expression   :VOLTage1:RANGe 600;MEAN OFF

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.

2. Command Reference (Standard Command)

Clear Standard Event Status Register (SESR) (except Output Queue)

Syntax   Command   *CLS

Example   **Clear Event Register.** (SESR)

Note   ・No effect on Output Cue.

Read Standard Event Status Register (SESR)

Syntax   Query   *ESR?

Example   Return SESR Contents as NR1 numerical values 0-255.

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
PON	URQ	CME	EXE	DDE	QYE	RQC	OPC

PON: Power-On Flag. Set to 1 when the power is turned on, or upon recovery from an outage.

URQ:User Request. Unused.

CME:Command error. (The command to the message terminator is ignored.)

This bit is set to 1 when a received command contains a syntactic or semantic error:

• Program header error

• Incorrect number of data parameters

• Invalid parameter format

EXE: Execution Error

This bit is set to 1 when a received command cannot be executed for some reason.

• The specified data value is outside of the set range

• The specified setting data cannot be set (Invalid data format)

• Cannot be executed when another function is in operation (during hold, integration, etc.)

DDE:Device-Dependent Error

This bit is set to 1 when a command cannot be executed due to   some reason other than a command error, a query error or an execution error.

• Execution is impossible due to an internal instrument fault

QYE:Query Error (the output queue is cleared)

This bit is set to "1" when an abnormality occurs in processing an output queue.

• When the data overflows the output queue

RQC: Controller privilege request. Unused

OPC: Operation Complete. Unused

Example   Response   *ESR 32 (when HEADER is ON)

32 (when HEADER is OFF)

Query Device ID (Recognition Code)

Syntax   Query   *IDN?

Example   **Query Instrument ID.**

Response   "Maker's name", "Model name", "Serial number", "Software version"

Description   Response   HIOKI,3390,081225345,V1.00

InstrumentID is HIOKI,3390,081225345, and software version is 1.00.

Note   "*IDN?" is the last query message inside the program message.

Therefore, any subsequent query (in the same line) that is detected will lead to a query error and no response message will be outputted.

Set 1 for Output Queue When Finished All Pending Operations

Syntax   Query   *OPC?

Description   When the command (of transferred commands) prior to the *OPC command has finished processing, "1" is stored in the output queue.

Response   1

Example   :DEMAG;*OPC?

:After DEMAG command has finished processing, 1 is stored in the output queue.

Query Instrument Options

Syntax   Query   *OPT?

Description Queries the types of options available in the instrument.

Options are available from 9791, 9792, or 9793 or 0 when it is not available.

Response   CH1 sensor, CH2 sensor, CH3 sensor, CH4 sensor, option, option serial

Response Example

ACDC500, ACDC500, ACDC500, ACDC500, 9793, 081108288

Note   "*OPT?" is the last query message inside the program message.

Therefore, any subsequent query (in the same line) that is detected will lead to a query error and no response message will be outputted.

Initialize Instrument

Syntax   Command   *RST

Description Initializes all instrument settings besides language and communication setting and returns them to factory default.

Example   *RST

Request a Sampling

Syntax   Command   *TRG

Description Performs one measurement when the display values or peak values are held.

Example   :HOLD ON;*TRG;:MEAS?

Execute Next Command after Command Has Finished Processing

Syntax   Command   *WAI

Description Commands after *WAI will not be executed until the next update has finished.

Example   :MEAS?;*WAI;*MEAS?

Data will be retrieved each time the display is updated.

Note   Display data will not change even when a command is executed when peak values are held.

3. Command Reference (Device-Specific Commands)

Set and Query Frequency Full Scale

Syntax   Command   :AOUT:FREQuency (Frequency Data)

               Query   :AOUT:FREQuency?

               Response   Frequency Data   :100Hz/500Hz/1kHz/5kHz

Description Command   Sets the maximum frequency of D/A output's Frequency Full Scale and the motor.

               Query   Sets the maximum frequency of D/A output's Frequency Full Scale and returns it as words.

Example   Command   :AOUT:FREQ 100Hz

                           Set the Frequency Full Scale of D/A output as 100Hz.

               Query   :AOUT:FREQ?

               Response   :AOUT:FREQUENCY 100Hz (when HEADER is ON)

                           100Hz (when HEADER is OFF)

Note   The settings for the D/A output's Frequency Full Scale and the motor measured maximum frequency are the same.

Set and Query Coefficient of Integrated Full Scale

Syntax   Command   :AOUT:INTEGrate <Magnification data>

               Query   :AOUT:INTEGrate?

               Response   Magnification Data   :1/10,1/2,1,5,10,50,100,500,1000,5000,10000

Description Command   Sets the integration full scale coefficient of D/A Output.

               Query   Sets the integration full scale coefficient of D/A output and returns it as words.

Example   Command   :AOUT:INTEG 1

                           Set the coefficient of the D/A integration full scale as 1.

               Query   :AOUT:INTEG?

               Response   :AOUT:INTEGRATE 1 (when HEADER is ON)

                           1 (when HEADER is OFF)

Set and Query D/A Output Items

Syntax	Command	:AOUT:ITEM "Item 1", "Item 2",......,"Item 16"
	Query	:AOUT:ITEM?
	Response	"Item 1", "Item 2", "Item 3",......,"Item 15", "Item 16"
		"Item 1 – 16" = Basic measured item parameters (Refer to 4. Basic Measured Item Parameters)

Description	Command	Sets the D/A output item. Output items can be specified from 1 to 16.
		Output items in the unspecified D/A channels will not be changed.
	Query	Sets the D/A output items and return them as words.
Example	Command	:AOUT:ITEM Urms1,Irms1,P1,Q1,S1,PF1
		Set the D/A outputs from Channel 1 in sequence as Voltage CH1 RMs, Current CH1 RMS, Effective Current CH1, Ineffective Current CH1, Apparent Power CH1, and Power Factor Ch1.
	Query	:AOUT:ITEM?
	Response	:AOUT:ITEM
		Urms1,Irms1,P1,Q1,S1,PF1,OFF,OFF,OFF,OFF,OFF,OFF ,OFF,OFF,OFF,OFF (when HEADER is ON)
		Urms1,Irms1,P1,Q1,S1,PF1,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF ,OFF (when HEADER is OFF) (when HEADER is OFF)

Select and Query Waveform Output

Syntax	Command	:AOUT:MONitor <ON/OFF>
	Query	:AOUT:MONitor?
	Response	ON : Waveform output ON
		OFF : Waveform output OFF

Description	Command	Sets the Waveform output ON/OFF.
	Query	Returns the setting of the waveform output as ON or OFF.

Example	Command	:AOUT:MON ON
		Set the Monitor output as ON.
	Query	:AOUT:MON?
	Response	:AOUT:MONITOR ON (when HEADER is ON)
		ON (when HEADER is OFF)

Select and Query Auto Range Limit

Syntax	Command	:AUTOrange <WIDE/NARROW>
	Query	:AUTOrange?
	Response	<WIDE/NARROW>
	WIDE	: Widen the auto range limit.
	NARROW	: Narrow the auto range limit.

Description	Command	Selects to widen or narrow the auto range limit.
	Query	Returns the auto range limit as words.

Example	Command	:AUTO WIDE
		Widen the auto range limit.
	Query	:AUTO?
	Response	:AUTORANGE WIDE (when HEADER is ON)
		WIDE (when HEADER is OFF)

Set and Query Average

Syntax	Command	:AVEraging:MODE <OFF/FAST/MID/SLOW>
	Query	:AVEraging:MODE?
	Response	<OFF/FAST/MID/SLOW>

Explanation	Command	Sets the average.
	Query	Returns the average setting as words.

Example	Command	:AVE:MODE FAST
		Set the average to FAST.
	Query	:AVE:MODE?
	Response	:AVERAGING:MODE FAST (when HEADER is ON)
		FAST (when HEADER is OFF)

Note When the average setting is changed, the average processing will be restarted.

Set and Query LCD Backlight

Syntax	Command	:BACKlight <ON/1min/5min/10min/30min/60min>
	Query	:BACKlight?
	Response	<ON/1min/5min/10min/30min/60min>

Description	Command	Sets the LCD Backlight.
	Query	Returns the LCD Backlight setting as words.

Example	Command	:BACK 30min
		Set the LCD Backlight to turn off automatically 30 minutes later.
	Query	:BACK?
	Response	:BACKLIGHT 30min (when HEADER is ON)
		30min (when HEADER is OFF)

Select and Query Beep Sound

Syntax	Command	:BEEPer <ON/OFF>
	Query	:BEEPer?
	Response	<ON/OFF>

Description	Command	Set the beep sound ON/OFF.
	Query	Returns the On/OFF beep sound setting as ON or OFF.

Example	Command	:BEEP ON
		Set the beep sound ON.
	Query	:BEEP?
	Response	:BEEPER ON (when HEADER is ON)
		ON (when HEADER is OFF)

Set and Query Efficiency, Pin of Loss Calculation Formula

Syntax Command :CALCulate[number]:PIN <P1/P2/P3/P4/P12/P34/P123/Pm>

Query :CALCulate[number]:PIN?

[number] ···· 1,2,3

Response "P1/P2/P3/P4/P12/P34/P123/Pm"

Description Command Sets Efficiency, Pin of Loss Calculation Formula.

Query Returns the settings of efficiency, Pin of Loss Calculation Formula as words.

Example Command :CALC1:PIN P1

Set the Pin of the Calculation formula 1 as P1.

Query :CALC1:PIN?

Response :CALCULATE1:PIN P1 (when HEADER is ON)

P1 (when HEADER is OFF)

Note When P12/P34/P123 cannot be selected because of wiring settings, they cannot be specified. Pm cannot be specified except when it can be selected during the implementation of the motor analysis option.

Set and Query Efficiency, Pout of Loss Calculation Formula

Syntax Command :CALCulate[number]:POUT <P1/P2/P3/P4/P12/P34/P123/Pm>

Query :CALCulate[number]:POUT?

[number] ···· 1,2,3

Response "P1/P2/P3/P4/P12/P34/P123/Pm"

Description Command Sets the items for Efficiency, Pout of Loss Calculation Formula.

Query Returns the setting items for Pout of Loss Calculation Formula as words.

Example Command :CALC1:POUT Pm

Set the Pout item of Calculation Formula 1 as P1.

Query :CALC1:POUT?

Response :CALCULATE1:POUT Pm (when HEADER is ON)

Pm (when HEADER is OFF)

Note When P12/P34/P123 cannot be selected because of wiring settings, they cannot be specified.

Pm cannot be specified except when it can be selected during the implementation of the motor analysis option.

Set and Query Automatic Saving

Syntax   Command   :CARD:AUTO:SAVE <ON/OFF>

            Query   :CARD:AUTO:SAVE?

            Response   <ON/OFF>

                       ON: Automatic Save on

                       OFF: Automatic Save off

Description Command   Sets the automatic saving to the CF Card On or OFF

            Query   Returns the setting for the automatic saving to the CF Card as On or OFF.

Example   Command   :CARD:AUTO:SAVE ON

                       Set the automatic saving to the CF Card ON.

            Query   :CARD:AUTO:SAVE?

            Response   :CARD:AUTO:SAVE ON (when HEADER is ON)

                       ON (when HEADER is OFF)

Query Existence of CF Card

Syntax   Query   :CARD:EXISt?

            Response   <Y/N>

                       Y:CF Card Exist

                       N:CF Card Doesn't exist

Description Query   Returns the existence of the CF Card in the instrument with Y or N.

Example   Query   :CARD:EXIS?

            Response   :CARD:EXIST Y (when HEADER is ON)

                       Y (when HEADER is OFF)

Acquire File Name in CF Card

Syntax	Query	:CARD:FILEname? "Specified Folder Name"
		"Specified Folder Name"
		Acquire the file name under the specified folder name.
		When omitted, acquire the file name under the root folder.
	Response	"File name", "Byte count", "File name", "Byte count"…
		The order of "File name", "Byte count" will continue for as long as there are files.
		When there are no more files, the words "NO_FILE" will be returned.

Description	Query	Acquires the file name under the folder specified from the CF card.

Example	Query	:CARD:FILE? HI3390
		Acquire and return the file name under the HI3390 folder from the CF card.
	Response	:CARD:FILENAME H3390001.BMP,44862,M3390000.CSV,578 (when HEADER is ON)
		3390001.BMP,44682,M3390000.CSV,578 (when HEADER is OFF)

Note	Up to 90 files displayed from the start of the screen can be acquired.
	When more than 90 files exist in the same folder, subsequent file names cannot be acquired.

Acquire Folder Name in CF Card

Syntax	Query	:CARD:FOLDername?
	Response	"Folder name", "Folder name", "Folder name"…
		Folder names will continue for as long as there are folders.
		When there are no more folders, the words "NO_FOLDER" will be returned.

Description	Query	Acquires the folder name under the root of the CF card.

Example	Query	:CARD:FOLD?
	Response	:CARD:FOLDERNAME HI3390 (when HEADER is ON)
		HI3390 (when HEADER is OFF))

Note	Up to 215 folders displayed from the start of the screen can be acquired.
	When more than 215 folders exist in the root, subsequent folder names cannot be acquired.

Acquire File Data in CF Card

Syntax Query   :CARD:PICKout? "File name", "Start position", "Stop position",

                                   "Specified folder name",

              Response   "File name", "Start position", "Stop position", "Specified folder name"

                                   File name   : File name to be forwarded

                                   Start position   : Specify the acquired start position in the file with byte count

                                   Stop position   : Specify the acquired stop position in the file with byte count

                                   Specified Folder Name : Search for file name under the specified folder

                                                When omitted, search for the file name under the root.

Description Query   Reads the specified file name under the folder from the CF card from the

                                   start position to the stop position, attach STX (02) to the start and ETX (03) to

                                   the end of the data to be forwarded, and forward data.

Example Query   :CARD:PICK? 02030100.CSV,1,1000,HI3390

                                   Return the 1-100 byte data of the 02030100.CSV file under the HI3390 folder

                                   from the CF card.

              Response   STX(02)HIOKI 3390・・・・・ETX(03)

Note   Even when the header is set as ON, headers will not attach to Response data.

              Specify "1" if the beginning of the file is made the start position.

              STX/ETX is not a ASCII Code but (02)/(03) of the Binary Data.

Set and Query Time

Syntax   Command   :CLOCk "Year Data", "Month Data", "Day Data", "Hour Data", "Minute Data", "Second Data"

              Query   :CLOCk?

              Response   "Year Data", "Month Data", "Day Data", "Hour Data", "Minute Data", "Second Data"

                                Year Data: 2000 - 2079 (can be set 00 – 79)

                                Month Data: 01- 12

                                Day Data: 01 - 31

                                Hour Data: 00 - 23

                                Minute Data: 00 - 59

                                Second Data: 0

Description Command   Sets the time of the clock in the main instrument.

              Query   Returns the time setting of the main instrument as NRI numerical values.

Example   Command   :CLOC 08,12,25,12,30,0

                                Set as 2008 December 25th 12:30:0

              Query   :CLOC?

              Response   :CLOCK 2008,12,25,12,30,45 (when HEADER is ON)

                                2008,12,25,12,30,45 (when HEADER is OFF)

Note   The instrument can interpret days of the month as well as leap years, so specifying an improbable date will lead to an error.

            Always set 0 for the second data.

Set and Query Current Auto Range

Syntax   Command   :CURRent[CH]:AUTO <ON/OFF>

Query   :CURRent[CH]:AUTO?

[CH] ···· 1,2,3,4

Response   ON: Measure current with auto range.

OFF: Measure current with manual range.

Description Command   Set the current auto range ON/OFF.

Query   Returns the current auto range setting with ON or OFF.

Example   Command   :CURR1:AUTO ON

Set the auto range of the Current Channel 1 to ON.

Query   :CURR1:AUTO?

Response   :CURRENT1:AUTO ON (when HEADER is ON)

ON (when HEADER is OFF)

Note   When the range is set with the :CURRent[CH]:RANGeCommand, the auto range of the specified channel will be OFF.

By combining measurement lines (for above IP3W), the auto ranges of other channels which are combined are also set.

Select and Query Current Rectifier Type

Syntax   Command   :CURRent[CH]:MEAN <ON/OFF>

Query   :CURRent[CH]:MEAN?

[CH] ···· 1,2,3,4

Response   ON: Set the current rectifier type to MEAN.

OFF: Set the current rectifier type to RMS.

Description Command   Select the RMS/MEAN of the current rectifier type.

Query   Returns the selection of the RMS/MEAN of the rectifier type as ON (MEAN) or OFF (RMS).

Example   Command   :CURR1:MEAN OFF

Select the current rectifier type of Current Channel 1 as RMS.

Query   :CURR1:MEAN?

Response   :CURRENT1:MEAN OFF (when HEADER is ON)

                  OFF (WHEN HEADER IS OFF)

Note   By combining measurement lines (for above IP3W), the current rectifier types of other channels which are combined are also set.

Set and Query Current Range

Syntax   Command   :CURRent[CH]:RANGe <Current Range(NR2)>

           Query   :CURRent[CH]:RANGe?

                      [CH] ···· 1,2,3,4

           Response   0.4/0.8/1.0/2.0/4.0/5.0/8.0/10.0/20.0/40.0/50.0/80.0/100.0/200.0/500.0

Description Command   Specifies current range. (Unit is [A])

                          The numerical value can be in NRf format, but rounding is performed for figures beyond the last valid decimal place. (Valid digits: 4 digits)

           Query   Queries the current range setting. Returns the current range as a numerical value in NR2 format.

Example   Command   :CURR1:RANG 1.0

                          Set the current Channel 1 to 1A range.

           Query   :CURR1:RANG?

           Response   :CURRENT1:RANGE 1.0 (WHEN HEADER IS ON)

                          1.0 (WHEN HEADER IS OFF)

Note   • Do not add a unit to the measurement range.

        • Wait until the internal circuit has stabilized after changing a range before reading measurements.

        • When the range is specified, the auto range of the specified channel will be OFF.

        • By combining measurement lines (for above IP3W), the settings for the auto ranges of other channels which are combined are also changed.

Initialize Data of Saved Items

Syntax   Command   :DATAout:ITEM:ALLClear

Description Command   Initializes the saved data items.

Returns the saved data items to factory defaults.

Example   Command   :DATA:ITEM:ALLC

Initialize the saved data items.

Set and Query Efficiency, Saved Items of Loss Calculation Value

Syntax   Command   :DATAout:ITEM:EFFiciency <0 to 255>

Query   :DATAout:ITEM:EFFiciency?

Response

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
-	LOSS3	LOSS2	LOSS1	-	EFFI3	EFFI2	EFFI1

Description Command   Sets the efficiency, saved items of loss calculation values between

0 and 255.

Query   Returns the setting of efficiency, saved items of loss calculation values with

values of 0 – 255.

Example   Command   :DATA:ITEM:EFF 17

Set "1" of efficiency calculation value, and "1" of loss calculation value to ON.

Query   :DATA:ITEM:EFF?

Response   :DATAOUT:ITEM:EFF 17 (WHEN HEADER IS ON)

17 (WHEN HEADER IS OFF)

Set and Query Saved Items of Option Input

Syntax   Command   :DATAout:ITEM:EXTernalin <0 to 255>

Query   :DATAout:ITEM:EXTernalin?

Response

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
TEMP	-	-	-	SLIP	PM	EXTB	EXTA

Description Command   Sets option saved items between 0 and 255.

Query   Returns setting of option saved items with values of 0 – 255.

Example   Command   :DATA:ITEM:EXT 7

Set the EXTA, EXTB, PM of motor analysis option calculation value to ON.

Query   :DATA:ITEM:EXT?

Response   :DATAOUT:ITEM:EXTERNALIN 7 (WHEN HEADER IS ON)

7 (WHEN HEADER IS OFF)

Initialize Harmonic Saved Data Items

Syntax   Command   :DATAout:ITEM:HARMonic:ALLClear

Description Command   Initializes harmonic saved data items.

All harmonic saved data items become OFF (factory defaults).

Example   Command   :DATA:ITEM:HARM:ALLC

Initialize harmonic saved data items.

Select and Query Harmonic List Saved Items

Syntax   Command   :DATAout:ITEM:HARMonic:LIST <Level UI>,<Level P>,

<Content UI>, <ContentP>, <Phase Angle UI>, <Phase Angle P>

Query   :DATAout:ITEM:HARMonic:LIST?

Response   <Level UI>, <LevelP>, <Content UI>, <Content P>,<Phase Angle
UI>,<Phase Angle P>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Level UI	HI4	HI3	HI2	HI1	HU4	HU3	HU2	HU1
Level P	FREQ	HP123	HP34	HP12	HP4	HP3	HP2	HP1
Content UI	HI4	HI3	HI2	HI1	HU4	HU3	HU2	HU1
Content P	-	HP123	HP34	HP12	HP4	HP3	HP2	HP1
Phase Angle UI	HI4	HI3	HI2	HI1	HU4	HU3	HU2	HU1
Phase Angle P	-	HP123	HP34	HP12	HP4	HP3	HP2	HP1

Description Command   Sets the harmonic saved items between 0 and 255.

Here, specify the harmonic list (level, content, phase angle).

To set the items, use the ON/OFF of the bits above, and specify a numerical
value between 0 and 255.

Query   Returns the harmonic list setting of the harmonic saved items with values of
0 – 255.

Example   Command   :DATA:ITEM:HARM:LIST 1,1,1,1,1,1

Set U1, P1 level, content and phase angle as the harmonic saved item list.

Query   :DATA:ITEM:HARM:LIST?

Response   :DATAOUT:ITEM:HARMONIC:LIST 1,1,1,1,1,1 (WHEN HEADER IS ON)

1,1,1,1,1,1 (WHEN HEADER IS OFF)

Note   For the order of saving, set it with the ":DATAout:ITEM:HARMonic:ORDer"Command.

When an unselectable item is specified, an execution error will occur and other items will also

not be set.

Set and Query Output Order of Harmonic Data Saving

Syntax   Command   :DATAout:ITEM:HARMonic:ORDer <Lower limit order>, <Upper limit

order>,<ODD/EVEN/ALL>

Query   :DATAout:ITEM:HARMonic:ORDer?

Response   Lower limit order (NR1)   :0 - 100

Upper limit order (NR1)   :0 - 100

ODD   : Odd-number order only

EVEN   : Even-number order only

ALL   : All orders

Description Command   Sets the upper limit, lower limit orders, even-number,

odd-number and all orders for the harmonic saved items.

Use in combination with

":DATAout:ITEM:HARMonic:LIST"Command.

Query   Returns the setting for the order of the harmonic saved items with numerical

and character string.

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

Set the odd-number order from 1 – 15 to the default output.

Query   :DATA:ITEM:HARM:ORD?

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

1,15,ODD (WHEN HEADER IS OFF)

Set and Query Saved Items of Integration Values

Syntax Command :DATAout:ITEM:INTEGrate

<PIH>,<MIH>,<IH>,<PWP>,<MWP>,<WP>,

<PWP_SUM>,<MWP_SUM>,<WP_SUM>,<Elapsed time>

Query :DATAout:ITEM:INTEGrate?

Response

<PIH>,<MIH>,<IH>,<PWP)>,<MWP>,<WP>,<PWP_SUM>,<MWP_SUM>,<WP_SUM>,

<Elapsed time>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
PIH	-	-	-	-	PIH4	PIH3	PIH2	PIH1
MIH	-	-	-	-	MIH4	MIH3	MIH2	MIH1
IH	-	-	-	-	IH4	IH3	IH2	IH1
PWP	-	-	-	-	PWP4	PWP3	PWP2	PWP1
MWP	-	-	-	-	MWP4	MWP3	MWP2	MWP1
WP	-	-	-	-	WP4	WP3	WP2	WP1
PWP_SUM	-	-	-	-	-	PWP123	PWP34	PWP12
MWP_SUM	-	-	-	-	-	MWP123	MWP34	MWP12
WP_SUM	-	-	-	-	-	WP123	WP34	WP12
Elapsed time	-	-	-	-	-	-	ms unit	time

Description Command Sets the integration value saved items between 0 and 255.

Query Returns the setting for the integration value saved items with values of 0 and 255.

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

Set all the integration current values and the integration times in Channel 1 to ON.

Query :DATA:ITEM:INTEG?

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

0,0,0,1,1,1,0,0,0,1 (WHEN HEADER IS OFF)

Note Some items are unselectable due to the wiring and integration mode.

When an unselectable item is specified, an execution error will occur and other items will also not be set.

Set and Query Noise Peak Value Saving

Syntax   Command   :DATAout:ITEM:NOISepeak <ON/OFF>

           Query   :DATAout:ITEM:NOISepeak?

           Response   ON   : Output noise peak value

                      OFF   : Do not output noise peak value

Description   Command   Sets noise peak value saving.

           Query   Returns noise peak value save setting with ON or OFF.

Example   Command   :DATA:ITEM:NOIS ON

                      Set the noise peak value saving to ON.

           Query   :DATA:ITEM:NOIS?

           Response   :DATAOUT:ITEM:NOISEPEAK ON (WHEN HEADER IS ON)

                      ON (WHEN HEADER IS OFF)

Set and Query Saved Items of Normal Measurement Values in Respective Channels

Syntax   Command   :DATAout:ITEM:NORMal <U Data>,<I Data>,<P Data>,<S Data>,

<Q Data>,<PF Data>,<DEG Data>,<FREQ Data>

Query   :DATAout:ITEM:NORMal?

Response   <U Data>,<I Data>,<P Data>,<S Data>,<Q Data>,

<PF Data>,<DEG Data>,<FREQ Data>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
U Data	-	-	-	-	U4	U3	U2	U1
I Data	-	-	-	-	I4	I3	I2	I1
P Data	-	-	-	-	P4	P3	P2	P1
S Data	-	-	-	-	S4	S3	S2	S1
Q Data	-	-	-	-	Q4	Q3	Q2	Q1
PF Data	-	-	-	-	PF4	PF3	PF2	PF1
DEG Data	-	-	-	-	DEG4	DEG3	DEG2	DEG1
FREQ Data	-	-	-	-	FREQ4	FREQ3	FREQ2	FREQ1

Description Command   Sets the saved normal measurement value items to the

numerical value 0 - 255.

Query   Returns the saved normal measurement value items of the respective

channels as numerical values.

Example   Command   :DATA:ITEM:NORM 1,1,1,0,0,1,0,0

Set the voltage, current, effective power and power factor data of Channel 1

to ON.

Query   :DATA:ITEM:NORM?

Response   :DATAOUT:ITEM:NORMAL 1,1,1,0,0,1,0,0 (WHEN HEADER IS ON)

1,1,1,0,0,1,0,0 (WHEN HEADER IS OFF)

Note   Under this command, when U is turned to ON, all the U items in the specified channel

(:DATAout:ITEM:U) become ON, and when U is turned OFF, all the U items in the specified

channel become OFF.

  (:DATAout:ITEM:I) become ON, and when I is turned OFF, all the I items in the specified

channel become OFF.

To specify individually saved items in the U data and I data,

use :DATAout:ITEM:U, :DATAout:ITEM:I after this command is executed.

During Query, if even 1 item in the channel is turned to ON, the channel will become ON.

Set and Query Saved Items of SUM's Normal Measurement Values

Syntax   Command   :DATAout:ITEM:SUM <U Data>,<I Data>,<P Data>,<S Data>,

                                 <Q Data>,<PF Data>,<DEG Data>

          Query   : DATAout:ITEM:SUM?

          Response   <U Data>, <I Data>,<P Data>,<S Data>,<Q Data>,<PF Data>,<DEG Data>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
U Data	-	-	-	-	-	U123	U34	U12
I Data	-	-	-	-	-	I123	I34	I12
P Data	-	-	-	-	-	P123	P34	P12
S Data	-	-	-	-	-	S123	S34	S12
Q Data	-	-	-	-	-	Q123	Q34	Q12
PF Data	-	-	-	-	-	PF123	PF34	PF12
DEG Data	-	-	-	-	-	DEG123	DEG34	DEG12

Description Command   Sets the saved normal measurement value items of SMU to the

                             numerical value 0 – 255.

          Query   Returns the saved normal measurement value items of SMU as numerical values.

Example   Command   :DATA:ITEM:SUM 0,0,1,1,0,1,0

                             Set the effective power, apparent power, power factor data of SUM12 to ON.

          Query   :DATA:ITEM:SUM?

          Response   :DATAOUT:ITEM:SUM 0,0,1,1,0,1,0 (WHEN HEADER IS ON)

                             0,0,1,1,0,1,0 (WHEN HEADER IS OFF)

Note   To specify individually saved items in the U data and I data, use :DATAout:ITEM:U, :DATAout:ITEM:I Command after this command is executed.

During Query, if even 1 item in the channel is turned to ON, the channel will become ON.

Some items are unselectable due to the wiring and integration mode.

When an unselectable item is specified, an execution error will occur and other items will also not be set.

Set and Query Saved Items of Voltage Data

Syntax   Command   :DATAout:ITEM:U <CH 1>,< CH 2>,< CH 3>,< CH

4>,<SUM12>,<SUM34>,<SUM123>

Query   :DATAout:ITEM:U?

Response   <CH 1>,< CH 2>,< CH 3>,< CH 4>,<SUM12>,<SUM34>,<SUM123>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
CH 1	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
CH 2	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
CH 3	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
CH 4	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
SUM12	-	-	-	-	-	-	MN	RMS
SUM34	-	-	-	-	-	-	MN	RMS
SUM123	-	-	-	-	UNB	-	MN	RMS

Description Command   Sets the saved voltage data items to the numerical value 0 – 255.

Query   Returns the saved voltage data items as numerical values.

Example   Command   :DATA:ITEM:U 1,1,1,1,0,0,0

Set the voltage RMSdata of Channels 1 – 4 to ON.

Query   :DATA:ITEM:U?

Response   :DATAOUT:ITEM:U 1,1,1,1,0,0,0 (WHEN HEADER IS ON)

1,1,1,1,0,0,0 (WHEN HEADER IS OFF)

Note   Data in the THD/RF items changes according to the integration mode setting.

Some items are unselectable due to the wiring and integration mode.

When an unselectable item is specified, an execution error will occur and other items will also

not be set.

Use this command after :DATAout:ITEM:NORMal and :DATAout:ITEM:SUMCommand.

Set and Query Saved Items of Current Data

Syntax   Command   :DATAout:ITEM:I <CH 1>,< CH 2>,< CH 3>,< CH 4>,<SUM12>,<SUM34>,<SUM123>

Query   :DATAout:ITEM:I?

Response   <CH 1>,< CH 2>,< CH 3>,< CH 4>,<SUM12>,<SUM34>,<SUM123>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
CH 1	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
CH 2	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
CH 3	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
CH 4	PK-	PK+	THD/RF	FND	DC	AC	MN	RMS
SUM12	-	-	-	-	-	-	MN	RMS
SUM34	-	-	-	-	-	-	MN	RMS
SUM123	-	-	-	-	UNB	-	MN	RMS

Description   Command   Sets the saved current data items to the numerical value 0 – 255.

Query   Returns the saved current data items as numerical values.

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

Set the current RMS and MEANdata of Channels 1 – 4 to ON.

Query   :DATA:ITEM:I?

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

3,3,3,3,0,0,0 (WHEN HEADER IS OFF)

Note   Data in the THD/RF items changes according to the integration mode setting.

Some items are unselectable due to the wiring and integration mode.

When an unselectable item is specified, an execution error will occur and other items will also not be set.

Use this command after :DATAout:ITEM:NORMal and :DATAout:ITEM:SUMCommand.

Select and Query ON/OFF of Δ-Y Calculation

Syntax   Command   :DELTay <ON/OFF>

Query   :DELTay?

Response   ON   : Process Δ-Ycalculation.

OFF   : Do not process Δ-Y calculation.

Description Command   Sets Δ-Y calculation ON/OFF.

Query   Returns ON/OFF setting for Δ-Y calculation with ON or OFF.

Example   Command   :DELT OFF

Set Δ-Y calculation OFF.

Query   :DELT?

Response   :DELTAY OFF (WHEN HEADER IS OFF)

OFF (WHEN HEADER IS ON)

Execute and Query Zero Adjust

Syntax   Command   :DEMAg

Query   DEMAg?

Response   <OK/BUSY/ERROR>

OK   :Normal completion

BUSY   :Degaussing

ERROR :Zero adjust failed

Description Command   Executes zero adjust.

Query   Returns result of zero adjust as character string.

Example   Command   :DEMA

Query   :DEMA?

Response   :DEMAG OK (WHEN HEADER IS OFF)

OK (WHEN HEADER IS ON)

Note   The execution of :DEMAgCommand takes more than 30 seconds and in the interval, an execution error Command appears.

Combine with a *OPC? such as ":DEMAG;*OPC?" and after the *OPC? Response is returned, send the next Command. A *OPC? Response indicates that the DEMAg has finished.

If DEMAgCommand has never been executed after the main instrument is turned on, OK will be returned on :DEMAg.

Select and Query Display Screen Color

Syntax	Command	:DISPlay:SET:COLor <COLOR1/COLOR2/COLOR3/COLOR4/MONO>
	Query	:DISPlay:SET:COLor?
	Response	<COLOR1/COLOR2/COLOR3/COLOR4/MONO>

Description	Command	Sets the display screen color.
	Query	Returns the display screen color setting as character string.

Example	Command	:DISP:SET:COL COLOR1
	Query	:DISP:SET:COL?
	Response	:DISPLAY:SET:COLOR COLOR1 (WHEN HEADER IS ON)
		COLOR1 (WHEN HEADER IS OFF)

Select and Query Start Up Screen

Syntax	Command	:DISPlay:SET:STARting <BACKUP/WIRING>
	Query	:DISPlay:SET:STARting?
	Response	BACKUP: Last shut down screen
		WIRING: Wiring confirmation screen

Description	Command	Sets the start up screen.
	Query	Returns the start up screen setting as character string.

Example	Command	:DISP:SET:STAR BACKUP
		Set the screen to start up with the last shut down screen.
	Query	:DISP:SET:STAR?
	Response	:DISPLAY:SET:STARTING BACKUP (WHEN HEADER IS ON)
		BACKUP (WHEN HEADER IS OFF)

Change Display Screen

Syntax   Command   :DISPlay:KEY <Key name>

Description Command   Execute same operation as the key operations from the main
                            instrument.

                                        <Key name>

MEAS	: MEAS key	ESC	: ESC key
SYSTEM	: SYSTEM key	ENTER	: ENTER key
FILE	: FILE key	UP	: Up key
F1 - F6	: F1 - F6 key	DOWN	: Down key
PAGEL	: Page left key	LEFT	: Left key
PAGER	: Page right key	RIGHT	: Right key

Example   Command   :DISP:KEY MEAS

                                      Execute same operation as when MEAS key is pressed.

Select and Query Motor Analysis Option Channel A Input

Syntax   Command   :EXTernalinA:FREQuency <ON/OFF>
              Query   :EXTernalinA:FREQuency?
              Response   ON   : Frequency input
                            OFF   : Input Analog DC input

Description Command   Sets the motor analysis option of Channel A input.
              Query   Returns the setting of motor analysis option of Channel A input as ON or Off.

Example   Command   :EXTA:FREQ ON
                            Set the Channel A input as frequency.
              Query   :EXTA:FREQ?
              Response   :EXTERNALINA:FREQUENCY ON (WHEN HEADER IS ON)
                            ON (WHEN HEADER IS OFF)

Note   When the Channel A input is set to Analog DC, and Channel A's unit is "Hz", the unit changes to
            "V". When the Channel A input is set to frequency and Channel A's unit is "V", the unit changes
            to "Hz".

Set and Query Motor Analysis Option Channel A Input Frequency Range

Syntax	Command	:EXTernalinA:FREQuency:RANGe <fc>,<fd>
	Query	:EXTernalinA:FREQuency:RANGe?
	Response	fc :3000 to 98000 (3kHz to 98kHz)
		fd :1000 to 48000 (1kHz to 48kHz)

Description	Command	Sets the fc and fd of the Channel A input frequency.
	Query	Returns the setting for fc and fd of Channel A input frequency as numerical values.

Example	Command	:EXTA:FREQ:RANG 10000,1000
		Set fc as 10kHz and fd as 1kHz.
	Query	:EXTA:FREQ:RANG?
	Response	:EXTERNALINA:FREQUENCY:RANGE 10000,1000 (WHEN HEADER IS ON)
		10000, 1000 (WHEN HEADER IS OFF)

Note   Key only appears in the setting when it is fc + fd <100kHz and fc – fd>1kHz.

Always set fc, fd in multiples of 1000.

This command is only effective under the :EXTernalinA:FREQuency ON and key settings.

Set and Query Motor Analysis Option Channel A Rating Torque

Syntax	Command	:EXTernalinA:FREQuency:TORQue <Rating Torque>
	Query	:EXTernalinA:FREQuency:TORQue?
	Response	Rating Torque :001 to 999

Description	Command	Sets the rating torque value of Channel A.
	Query	Returns the setting for Channel A's rating torque value as a 3-digit numerical value.

Example	Command	:EXTA:FREQ:TORQ 10
		Set the rating torque for Channel A to 10.
	Query	:EXTA:FREQ:TORQ?
	Response	:EXTERNALINA:FREQUENCY:TORQUE 010 (WHEN HEADER IS ON)
		010 (WHEN HEADER IS OFF)

Note   The value set here can be used in combination with the unit set under :EXTrnalinA:UNIT.

This command is only effective under the :EXTernalinA:FREQuency ON and key settings.

Select and Query Low-pass Filter of Motor Analysis Option

Syntax   Command   :EXTernalinA:LPF <ON/OFF>

Query   :EXTernalinA:LPF?

Response   ON   : Low pulse filter ON

OFF   : Low pulse filter OFF

Description Command   Sets the ON/OFF for the low pulse filter of the motor analysis]
option.

Query   Returns the setting for the low pulse filter as ON or OFF.

Example   Command   :EXTA:LPF OFF

Set the low pulse filter to OFF.

Query   :EXTA:LPF?

Response   :EXTERNALINA:LPF OFF (WHEN HEADER IS ON)

OFF (WHEN HEADER IS OFF)

Note   This setting is effective for both Channel A and Channel B.

This command is only effective under the :EXTernalinA:FREQuency OFF and key settings.

Execute and Clear Motor Analysis Option's Phase Zero Adjust

Syntax   Command   :EXTernalinA:PHASe:ZEROadjust <SET/CLEAR>

SET   : Phase zero adjust execution

CLEAR   : Phase zero adjust value clear

Description Command   Executes the phase zero adjust of the motor analysis option, or clear the
phase zero adjust value.

Same operation as the SHIFT+0ADJ from the main instrument, or the
SHIFT+DATA RESET key.

Example   Command   :EXTA:PHAS:ZERO SET

Execute the phase zero adjust.

Set and Query Motor Analysis Option Channel A Range

Syntax   Command   :EXTernalinA:RANGe <1/5/10>

             Query   :EXTernalinA:RANGe?

             Response   <1/5/10>Range value

Description Command   Sets the voltage range of Channel A.

             Query   Returns the range setting of Channel A as a numerical value.

Example   Command   :EXTA:RANG 10

                          Set Channel A to 10v range.

             Query   :EXTA:RANG?

             Response   :EXTERNALINA:RANGE 10 (WHEN HEADER IS ON)

                              10 (WHEN HEADER IS OFF)

Note   This command is only effective under the :EXTernalinA:FREQuency OFF and key settings.

Set and Query Motor Analysis Option Channel A Scaling

Syntax   Command   :EXTernalinA:SCALe <Scaling value>

             Query   :EXTernalinA:SCALe?

              Response   Scaling Value   :0000.01 to 9999.99

Description Command   Sets the scaling value for Channel A.

             Query   Returns the scaling setting for Channel A as numerical values.

Example   Command   :EXTA:SCAL 2.0

                          Set the scaling value for Channel A to 2.0.

             Query   :EXTA:SCAL?

              Response   :EXTERNALINA:SCALE 0002.00 (WHEN HEADER IS ON)

                              0002.00 (WHEN HEADER IS OFF)

Note   This command is only effective under the :EXTernalinA:FREQuency OFF and key settings.

Set and Query Input Frequency Source for Motor Analysis Option's Slip Calculation

Syntax   Command   :EXTernalinA:SLIP <f1/f2/f3/f4>

            Query   :EXTernalinA:SLIP?

            Response   <f1/f2/f3/f4>   :Frequency measurement channels 1 - 4

Description Command   Set the frequency source for slip calculation.

            Query   Return the setting for frequency source for slip calculation as a character string.

Example   Command   :EXTA:SLIP f1

            Set the frequency source for slip calculation to F1.

            Query   :EXTA:SLIP?

            Response   :EXTERNALINA:SLIP f1 (WHEN HEADER IS ON)

            f1 (WHEN HEADER IS OFF)

Set and Query Motor Analysis Option's Motor Synchronized Sources

Syntax   Command   :EXTernalinA:SOURce < Synchronized Sources >

            Query   :EXTernalinA:SOURce?

            Response   < Synchronized Sources >

            :U1/U2/U3/U4/I1/I2/I3/I4/Ext/DC50ms/DC100ms

Description Command   Sets the motor synchronized sources.

            Query   Returns the motor synchronized Sources as character strings.

Example   Command   :EXTA:SOUR U1

            Set the motor synchronized Sources to U1.

            Query   :EXTA:SOUR?

            Response   :EXTERNALINA:SOURCE U1 (WHEN HEADER IS ON)

            U1 (WHEN HEADER IS OFF)

Note   Ext can only be set with key and when chB is set as the pulse.

Select and Query Motor Analysis Option Channel A Unit

Syntax   Command   :EXTrnalinA:UNIT <Unit data>

                Query   :EXTernalinA:UNIT?

                Response   <Unit data>   :V/Hz/mNm/Nm/kNm

Description Command   Sets the unit for Channel A.

                Query   Returns the unit setting for Channel A as a character string.

Example   Command   :EXTA:UNIT V

                              Set the Channel A unit to V.

                Query   :EXTA:UNIT?

                Response   :EXTERNALINA:UNIT V (WHEN HEADER IS ON)

                                  V (WHEN HEADER IS OFF)

Note   During Analog DC setting, when Channel A sets to "Hz", Channel A input setting changes to frequency, and during frequency setting, when Channel A sets to "V", Channel A input setting changes to Analog DC.

Execute Zero Adjust of Motor Analysis Option

Syntax   Command   :EXTernalinA:ZEROadjust

Description Command   Executes the zero adjust for motor analysis option.

Example   Command   :EXTA:ZERO

                              Execute zero adjust.

Set and Query Motor Analysis Option Channel B Range

Syntax   Command   :EXTernalinB:RANGe <1/5/10>

              Query   :EXTernalinB:RANGe?

              Response   <1/5/10>Range value

Description Command   Sets the voltage range of Channel B.

              Query   Returns the range setting of Channel B as a numerical value.

Example   Command   :EXTB:RANG 5

                                  Set Channel B to 5v range.

              Query   :EXTB:RANG?

              Response   :EXTERNALINB:RANGE 5 (WHEN HEADER IS ON)

                                  5 (WHEN HEADER IS OFF)

Note   This command is only effective under the :EXTernalinB:PULSE OFF and key settings.

Set and Query Pulse ON/OFF of Motor Analysis Option Channel B Input

Syntax   Command   :EXTernalinB:PULSe <ON/OFF>

              Query   :EXTernalinB:PULSe?

               Response   ON   : Pulse input

                                 OFF   : Analog DC input

Description Command   Sets the pulse/analog DC of Channel B input.

              Query   Returns the settings of Channel B input as ON or OFF.

Example   Command   :EXTB:PULS OFF

                                    Set Channel B input to analog DC.

              Query   :EXTB:PULS?

               Response   :EXTERNALINB:PULSE OFF (WHEN HEADER IS ON)

                                  OFF (WHEN HEADER IS OFF)

Set and Query ON/OFF of Motor Analysis Option Channel Z Input

Syntax   Command   :EXTernalinB:PULSe:CHZ <ON/OFF>

Query   :EXTernalinB:PULSe:CHZ?

Response   ON   : Validate Channel Z

OFF   : Invalidate Channel Z

Description Command   Sets the ON/OFF of Channel Z input.

Query   Returns the setting for Channel Z input as ON or OFF.

Example   Command   :EXTB:PULS:CHZ OFF

Set the Channel Z input to OFF.

Query   :EXTB:PULS:CHZ?

Response   :EXTERNALINB:PULSE:CHZ OFF (WHEN HEADER IS ON)

OFF (WHEN HEADER IS OFF)

Note   This command is only effective under the :EXTernalinB:PULSE ON and key settings.

Set and Query Motor Analysis Option Channel B Measured Maximum Frequency

Syntax   Command   :EXTernalinB:PULSe:FREQuency <100Hz/500Hz/1kHz/5kHz>

Query   :EXTernalinB:PULSe:FREQuency?

Response   <100Hz/500Hz/1kHz/5kHz>   :Set frequency

Description Command   Sets the maximum frequency for Channel B during pulse input.

Query   Returns the setting for maximum frequency for Channel B   pulse input as a

character string.

Example   Command   :EXTB:PULS:FREQ 500Hz

Set the maximum frequency for Channel B during pulse input to 500Hz.

Query   :EXTB:PULS:FREQ?

Response   :EXTERNALINB:PULSE:FREQUENCY 500Hz (WHEN HEADER IS ON)

500Hz (WHEN HEADER IS OFF)

Note   The setting for this command is common with that of ":AOUT:FREQuency" Command.

Set and Query Motor Analysis Option Motor Pole Value

Syntax   Command   :EXTernalinB:PULSe:MOTorpoles <Pole value>

Query   :EXTernalinB:PULSe:MOTorpoles?

Response   Pole value data   :even numbers in 02 - 98

Description Command   Sets the pole value.

Query   Returns the setting for the pole value.

Example   Command   :EXTB:PULS:MOT 8

Set the motor pole value to 8.

Query   :EXTB:PULS:MOT?

Response   :EXTERNALINB:PULSE:MOTORPOLES 8 (WHEN HEADER IS ON)

08 (WHEN HEADER IS OFF)

Note   When an odd number is selected, an even number smaller than the selected number will be set.

Set and Query Pulse Values of Motor Analysis Option Channel B

Syntax   Command   :EXTernalinB:PULSe:NUMBer <Pulse>

Query   :EXTernalinB:PULSe:NUMBer?

Response   Pulse   :00001 to 60000

Description Command   Sets the pulse for Channel B.

Query   Returns the pulse setting for Channel B as a numerical value.

Example   Command   :EXTB:PULS:NUMB 360

Set the pulse to 360.

Query   :EXTB:PULS:NUMB?

Response   :EXTERNALINB:PULSE:NUMBER 00360 (WHEN HEADER IS ON)

00360 (WHEN HEADER IS OFF)

Note   Only 1/2 multiples of the motor pole values can be set.

Set and Query Motor Analysis Option Channel B Scaling

Syntax Command :EXTernalinB:SCALe <Scaling Value>

      Query   :EXTernalinB:SCALe?

      Response Scaling Value :0000.01 to 9999.99

Description Command Sets the scaling value for Channel B.

      Query   Returns the scaling setting for Channel B as numerical values.

Example Command :EXTB:SCAL 2.0

           Set the scaling value for Channel B to 2.0.

      Query   :EXTB:SCAL?

      Response :EXTERNALINB:SCALE 0002.00 (WHEN HEADER IS ON)

           0002.00 (WHEN HEADER IS OFF)

Note This command is only effective under the :EXTernalinB:PULSe OFF and key settings.

Select and Query Motor Analysis Option Channel B Units

Syntax Command :EXTrnalinB:UNIT <Unit data>

      Query   :EXTernalinB:UNIT?

      Response <Unit data>   : V/Hz/rpm

Description Command Sets the unit for Channel B.

      Query   Returns the unit setting for Channel B as a character string.

Example Command :EXTB:UNIT V

           Set the Channel B unit to V.

      Query   :EXTB:UNIT?

      Response :EXTERNALINB:UNIT V (WHEN HEADER IS ON)

           V (WHEN HEADER IS OFF)

Note During the pulse setting, when Channel B sets to "V", Channel B input setting changes to Analog DC.

Select and Query Noise Analysis Measurement Channel

Syntax   Command   :FFT:ITEM <CH1/CH2/CH3/CH4>

Query   :FFT:ITEM?

Response   <CH1/CH2/CH3/CH4>   : Measurement channel character string

Description Command   Sets noise analysis measurement channel

Query   Returns setting for noise analysis measurement channel as a character string.

Example   Command   FFT:ITEM CH1

Set noise analysis measurement channel to Channel 1.

Query   FFT:ITEM?

Response   FFT:ITEM CH1 (WHEN HEADER IS ON)

CH1 (WHEN HEADER IS OFF)

Set and Query Noise Lower Limit Frequency

Syntax   Command   :FFT:LOWerfreq <frequency data>

Query   :FFT:LOWerfreq?

Response   <frequency data> :

<OFF/1kHz/2kHz/3kHz/4kHz/5kHz/6kHz/7kHz/8kHz/9kHz/10kHz>

Description Command   Sets noise lower limit frequency.

Query   Returns the noise lower limit frequency setting as a character string data.

Example   Command   FFT:LOW 10kHz

Set the noise lower limit frequency to 10kHz.

Query   :FFT:LOW?

Response   :FFT:LOWERFREQ 10kHz (WHEN HEADER IS ON)

10kHz (WHEN HEADER IS OFF)

Note   Specify OFF when set to 0kHz.

The key upper limit may be restricted depending on the sampling speed setting.

Select and Query Noise Analysis Point Values

Syntax	Command	:FFT:POINt <Point value>
	Query	:FFT:POINt?
	Response	<Point value> : <1000/5000/10000/50000>

Description	Command	Sets the noise analysis point value.
	Query	Returns the setting for the noise analysis point value as a numerical value.

Example	Command	:FFT:POIN 1000
		Set the noise analysis point value to 1000.
	Query	:FFT:POIN?
	Response	:FFT:POINT 1000 (WHEN HEADER IS ON)
		1000 (WHEN HEADER IS OFF)

Select and Query Noise Analysis Sampling Speed

Syntax	Command	:FFT:SAMPling <Sampling>
	Query	:FFT : SAMPling?
	Response	<Sampling> : <10kS/25kS/50kS/100kS/250kS/500kS>

Description	Command	Sets the noise analysis sampling speed.
	Query	Returns the noise analysis sampling speed as a character string.

Example	Command	:FFT:SAMP 10kS
		Set the noise analysis sampling speed to 10kS/s.
	Query	:FFT:SAMP?
	Response	:FFT:SAMPLING 10kS (WHEN HEADER IS ON)
		10kS (WHEN HEADER IS OFF)

Note   The key lower limit may be restricted depending on the noise lower limit frequency setting.

Set and Query Noise Analysis Window Function

Syntax	Command	:FFT:WINDow <0/1/2>
	Query	:FFT:WINDow?
	Response	0 :Rectangular
		1 :Hanning
		2 :Flat top

Description	Command	Sets the noise analysis window function.
	Query	Returns the noise analysis window function setting as a numerical value.

Example	Command	:FFT:WIND 0
		Set the noise analysis window function to rectangular.
	Query	:FFT:WIND?
	Response	:FFT:WINDOW 0 (WHEN HEADER IS ON)
		0 (WHEN HEADER IS OFF)

Set and Query Zero Cross Filter

Syntax	Command	:FILTer <STRONG/WEAK/OFF>
	Query	:FILTer?
	Response	STRONG:Filter strong
		WEAK :Filter weak
		OFF :Filter OFF

Description	Command	Sets the zero cross filter.
	Query	Returns the zero cross filter setting as a character string.

Example	Command	:FILT STRONG
		Set the zero cross filter to strong.
	Query	:FILT?
	Response	:FILTER STRONG (WHEN HEADER IS ON)
		STRONG (WHEN HEADER IS OFF)

Set and Query Measurement Lower Limit Frequency

Syntax   Command   :FREQuency:LOWer <frequency data>

Query   :FREQuency:LOWer?

Response   <frequency data> :0.5Hz/1Hz/2Hz/5Hz/10Hz/20Hz

Description   Command   Sets the measurement lower limit frequency.

Query   Returns the measurement lower limit frequency setting with a

character string.

Example   Command   :FREQ:LOW 10Hz

Set the measurement lower limit frequency to 10Hz.

Query   :FREQ:LOW?

Response   :FREQUENCY:LOWER 10Hz (WHEN HEADER IS ON)

10Hz (WHEN HEADER IS OFF)

Select and Query Frequency Measurement Source

Syntax   Command   :FREQuency:SOURce[CH] <U/I>

Query   :FREQuency:SOIURce[CH]?

[CH] ···· 1,2,3,4

Response   U   : frequency source is voltage

I   : frequency source is current

Description   Command   Sets the specified channel's frequency measurement source.

Query   Returns the specified channel's frequency measurement source

setting as a character string.

Example   Command   :FREQ:SOUR1 U

Select voltage as the frequency measurement source for Channel 1.

Query   :FREQ:SOUR1?

Response   :FREQUENCY:SOURCE1 U (WHEN HEADER IS ON)

U (WHEN HEADER IS OFF)

Select and Query Harmonic Synchronized Source

Syntax   Command   :HarmonicOURce <Synchronized source>

          Query   :HarmonicOURce?

          Response   <synchronized source>

                    :U1/U2/U3/U4/I1/I2/I3/I4/Ext/DC50ms/DC100ms

Description Command   Sets the harmonic synchronized source.

          Query   Returns the harmonic synchronized source setting as a character

                    string.

Example   Command   :HARM:SOUR U1

                    Set the harmonic synchronized source setting to U1.

          Query   :HARM:SOUR?

          Response   :HARMONICOURCE U1 (WHEN HEADER IS ON)

                    U1 (WHEN HEADER IS OFF)

Note   Only the key of Ext can be set when the motor analysis option is implemented and chB is set as
          pulse.

Set and Query THD Calculation Formula

Syntax   Command   :HARMonic:THD <F/R>

          Query   :HARMonic:THD?

          Response   F   :THD-F(Fundamental wave standard)

                    R   :THD-R(Harmonic total value standard)

Description Command   Sets the THD calculation formula.

          Query   Returns the THD calculation formula as a character string.

Example   Command   :HARM:THD F

                    Set the THD calculation formula setting to THD-F.

          Query   :HARM:THD?

          Response   :HARMONIC:THD F (WHEN HEADER IS ON)

                    F (WHEN HEADER IS OFF)

Set and Query Header for Response Message

Syntax   Command   :HEADer <ON/OFF>

Query   :HEADer?

Response   ON   : Attach header to the Response message.

OFF   : Do not attach header to the Response message.

Description Command   Sets header for the Response message.

Query   Returns setting for Response message header as ON or OFF.

Example   Command   :HEAD ON

Attach header to Response message.

Query   :HEAD?

Response   :HEADER ON (WHEN HEADER IS ON)

OFF (WHEN HEADER IS OFF)

Note   When the instrument is turned on, the setting will always return to OFF.

Set and Query Hold Status

Syntax   Command   :HOLD <OFF/ON/PEAK>

Query   :HOLD?

Response   OFF   :Hold OFF

ON   :Hold ON

PEAK   :Peak Hold ON

Description Command   Sets the hold status.

Query   Return the hold status as a character string.

Example   Command   :HOLD ON

Set to hold status.

Query   :HOLD?

Response   :HOLD ON (WHEN HEADER IS ON)

ON (WHEN HEADER IS OFF)

Note   Use *TRGCommand to update data during hold or peak hold status.

Set and Query Integration Mode

Syntax   Command   :INTEGrate:MODE[CH] <DC/RMS>

             Query   :INTEGrate:MODE[CH]?

                       [CH] ···· 1,2,3,4

             Response   DC   : Integration DC mode

                          RMS   : Integration RMS mode

Description   Command   Sets the integration mode.

                   Query   Returns the integration mode setting as DC or RMS.

Example   Command   :INTEG:MODE1 DC

                         Set the integration mode of Channel 1 to DC.

             Query   :INTEG:MODE1?

             Response   :INTEGARTE:MODE1 DC (WHEN HEADER IS ON)

                         DC (WHEN HEADER IS OFF)

Note   By combining measurement lines (for above IP3W), the settings for integration modes of other channels which are combined are also changed.

           To get the DC mode, the current sensor used for the IP2W wiring must be the AC/DC type.

Execute Integration Data Reset

Syntax   Command   :INTEGrate:RESet

Description   Command   Resets integration data. Same operation as DATA RESET key of the main instrument.

Example   Command   :INTEG:RES

                         Reset the integration data.

Note   This command is only available when the integration is in STOP status.

Execute Integration (Time) Start

Syntax   Command   :INTEGrate:STARt

Description Command   Starts integration (time).

Example   Command   :INTEG:STAR

                             Start integration (time).

Query Integration (Time)

Syntax   Query   :INTEGrate:STATe?

               Response   RESET : Integration reset status

                          STOP   : Integration stopped status

                          WAIT   : Integration waiting status

                          RUN   : Integration running status

Description Query   Returns the integration status of the main instrument as a character string.

Example   Query   :INTEG:STAT?

                             Start integration (time).

               Response   :INTEGRATE:STATE RUN (WHEN HEADER IS ON)

                           RUN (WHEN HEADER IS OFF)

Execute Integration (Time) Stop

Syntax   Command   :INTEGrate:STOP

Description Command   Stops integration (time).

Example   Command   :INTEG:STOP

                             Stop integration (time).

Note   This command is only available when integration is in RUN/WAIT status.

Set and Query Interval Time

55/92

Syntax Command   :INTERval <Time data>

Query   :ITERval?

Response

OFF/50ms/100ms/200ms/500ms/1s/5s/10s/15s/30s/1min/5min/10min/30min/60min

Description Command   Sets the interval time.

Query   Returns the interval time setting as a character string.

Example Command   :INTER 1min

Set the interval time to 1 minute.

Query   :INTER?

Response   :INTERVAL 1min (WHEN HEADER IS ON)

1min (WHEN HEADER IS OFF)

Set and Query IP Address

Syntax Command   :IP:ADDRess <Address 1>,<Address 2>,<Address 3>,<Address 4>

Query   :IP:ADDRess?

Response   Address 1   :000 to 255

Address 2   :000 to 255

Address 3   :000 to 255

Address 4   :000 to 255

Description Command   Sets IPAddress.

Query   Returns IPAddress setting as a numerical value.

Example Command   :IP:ADDR 192,168,1,1

Set IPAddress to 192.168.1.1.

Query   :IP:ADDR?

Response   :IP:ADDRESS 192.168.1.1 (WHEN HEADER IS ON)

192.168.1.1 (WHEN HEADER IS OFF)

Note The address will be changed after the command has been sent. Please be careful when sending from LAN.

Set and Query Default Gateway

Syntax Command   :IP:DEFaultgateway <Address 1>,<Address 2>,<Address 3>,<Address 4>

Query   :IP:DEFaultgateway?

Response   Address 1   :000 to 255

Address 2   :000 to 255

Address 3   :000 to 255

Address 4   :000 to 255

Description Command   Sets the default gateway.

Query   Returns the setting for default gateway as a numerical value.

Example Command   :IP:DEF 192,168,1,250

Set the default gateway to 192,168,1,250.

Query   :IP:DEF?

Response   :IP:DEFAULTGATEWAY 192,168,001,250 (WHEN HEADER IS ON)

192,168,001,250 (WHEN HEADER IS OFF)

Set and Query Subnet Mask

Syntax   Command   :IP:SUBNetmask <Address 1>,<Address 2>,<Address 3>,<Address 4>

           Query   :IP:SUBNetmask?

           Response   Address 1   :000 to 255

                              Address 2   :000 to 255

                              Address 3   :000 to 255

                              Address 4   :000 to 255

Description   Command   Sets the subnet mask.

           Query   Returns the subnet mask setting as a numerical value.

Example   Command   :IP:SUBN 255,255,255,0

                              Set the subnet mask to 255,255,255,0.

           Query   :IP:SUBN?

           Response   :IP:SUBNETMASK 255,255,255,000 (WHEN HEADER IS ON)

                              255,255,255,000 (WHEN HEADER IS OFF)

Set and Query Key Lock

Syntax   Command   :KEYLock <ON/OFF>

           Query   :KEYLock?

           Response   ON   : Turn key lock on.

                              OFF   : Turn key lock off.

Description   Command   Sets the key lock ON/OFF.

           Query   Returns the key lock setting as ON or OFF.

Example   Command   :KEYL ON

                              Set the key lock ON.

           Query   :KEYL?

           Response   :KEYLOCK ON (WHEN HEADER IS ON)

                              ON (WHEN HEADER IS OFF)

Set and Query Main Instrument Display Language

Syntax   Command   :LANGuage <Language>

            Query   :LANGuage?

            Response   <Language>   :JAPANESE/ENGLISH/CHINESE

Description Command   Sets the display language for the main instrument.

            Query   Returns the display language setting for the main instrument as

                          a character string.

Example   Command   :LANG ENGLISH

                          Set the display language of the main instrument to English.

            Query   :LANG?

            Response   :LANGUAGE ENGLISH (WHEN HEADER IS ON)

                          ENGLISH (WHEN HEADER IS OFF)

Select and Query Low Pulse Filter (LPF)

Syntax   Command   :LPF[CH] <OFF/500Hz/5kHz/100kHz>

            Query   :LPF[CH]?

                          [CH] ···· 1,2,3,4

            Response   <OFF/500Hz/5kHz/100kHz>

Description Command   Sets the cutoff frequency for the low pulse filter (LPF).

            Query   Returns the setting for the cut off frequency for the low pulse filter as a

                          character string.

Example   Command   :LPF1 500Hz

                          Set the cutoff frequency for the low pulse filter of Channel 1 to 500Hz.

            Query   :LPF1?

            Response   :LPF1 500Hz (WHEN HEADER IS ON)

                          500Hz (WHEN HEADER IS OFF)

Note   By combining measurement lines (for above IP3W), the settings for the low pulse filters (LPF)
         of other channels which are combined are also changed.

Query Measurement Data

Syntax   Query   :MEASure? <Item 1>, <Item 2>, ... ,<Item 31>,<Item 32>

              Response <Item 1>, <Item 2>, ... ,<Item 31>,<Item 32>

                       <Item 1 to 32>   : Fundamental measurement item arbitrary within the parameter.

                       （Refer to 4. Fundamental Measurement Item Parameters）

Description Query   **Item   Specified Mode (with parameters)**

                       <Item> Describing any part will change it to this mode.

                       <Item> Create measurement data specified by this. A maximum of 32 items is possible.

                       <Item> Can be arbitrarily specified within the fundamental measurement item parameter, but anything else that is specified will return a command error.

                       <Item> Order is arbitrary. Creates the data in the order specified.

                       Item   No Specified Mode (with no parameters)

                       <Item> If not part is specified, the mode will change to this.

                       Create measurement data of item specified under a type of :MEASure:ITEM Command.

                       The measurement data order is fixed. (Refer to the output item and order table)

                       Status data is always attached to the beginning of the data.

Example   Query   :MEAS? Urms1, P1, DEG1（Example of Item　specified mode）

                       Query the voltage RMS, effective power value, and power phase angle of Channel 1.

              Response Urms1 151.63E+00,P1 5.74E+00,DEG1 83.80E+00 (WHEN HEADER IS ON)

                       151.78E+00,5.58E+00,84.00E+00 (WHEN HEADER IS OFF)

Measurement data format

General Measurement value	6 digits including digits after the decimal point Index 2 digits
Integration Value	7 digits including digits after the decimal point Index 2 digits
Time	Year/Month/Date Hour/Minute/Second Elapsed time Elapsed Time (ms)
Error	Input over　+9999, 9E + 99

Note   Controls whether to omit the + at the beginning of the fraction and the preceding 0, under the :TRNSmit:COLumnCommand.

        If nothing is specified, the beginning of the fraction and the preceding 0 will be omitted (:TRNSmit:COLumn 1)

Query Harmonic Measurement Data

Syntax   Query   :MEASure:HARMonic?

Description Query   Creates measurement data of item specified under a type
                          of :MEASure:ITEM Command.
                          The measurement data order is fixed. (Refer to the output item and order
                          table)
                          Statusdata is always attached to the beginning of the data.

Example   Query   :MEAS:HARM?
                          Query the harmonic measurement data.
               Response   Status F0000000,HU1L001 90.45E+00,HU1D001 100.00E+00
                          ,HP1L001 0.0043E+03,HU1L003 0.20E+00,HU1D003 0.22E+00
                          ,HP1L003 -0.0000E+03   (WHEN HEADER IS ON)
                          F0000000,90.45E+00,100.00E+00,0.0043E+03,0.20E+00,0.22E+00
                          ,-0.0000E+03   (WHEN HEADER IS OFF)

Measurement data format

General	6 digits including digits after the decimal point
measurement data	Index 2 digits
Error	Input over +9999, 9E + 99

Note   Controls whether to omit the + at the beginning of the fraction and the preceding 0, under
            the :TRNSmit:COLumnCommand.
            If nothing is specified, the beginning of the fraction and the preceding 0 will be omitted
            (:TRNSmit:COLumn 1)

Query Noise Measurement Value Data

Syntax   Query   :MEASure:NOISepeak?

Description Query   Returns the voltage of the noise measurement value, the
frequencies of the top 10 pole current values and numerical values.
The measurement data order is fixed. (Refer to the output item and order table)
First, ten voltage followed by 10 current values will be outputted from the top in the order of frequency and numerical value.

Example   Query   :MEAS:NOIS?
Query the noise measurement's voltage and current.

Query Voltage Noise Measurement Value Data

Syntax   Query   :MEASure:NOISepeak:U?

Description Query   Returns the frequencies of the top 10 pole voltage values and numerical values.
The measurement data order is fixed. (Refer to the output item and order table)
The top 10 voltage values will be outputted from the top in the order of frequency and numerical value (20 data).

Example   Query   :MEAS:NOIS:U?
Query the noise measurement value.

Query Current Noise Measurement Value Data

Syntax   Query   :MEASure:NOISepeak:I?

Description Query   Returns the frequencies of the top 10 pole current values and numerical values.
The measurement data order is fixed. (Refer to the output item and order table)
The top 10 current values will be outputted from the top in the order of frequency and numerical value (20 data).

Example   Query   :MEAS:NOIS:I?
Query the noise measurement value of the current.

Note   Controls whether to omit the + at the beginning of the fraction and the preceding 0, under the :TRNSmit:COLumnCommand.

If nothing is specified, the beginning of the fraction and the preceding 0 will be omitted (:TRNSmit:COLumn 1)

Initialize Communication Output Item Data

Syntax   Command   :MEASure:ITEM:ALLClear

Description Command   Initializes the communication output data item.

All communication output data item   related to ":MEASure:ITEM:" will be OFF.

Example   Command   :MEAS:ITEM:ALLC

Initialize the communication output data item.

Set and Query Efficiency, Loss Calculation Value Communication Output Items

Syntax   Command   :MEASure:ITEM:EFFiciency <0 to 255>

Query   :MEASure:ITEM:EFFiciency?

Response

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
-	LOSS3	LOSS2	LOSS1	-	EFFI3	EFFI2	EFFI1

Description Command   Sets the efficiency, communication output data items of loss

calculation values between 0 and 255.

Query   Returns the setting of efficiency, communication output data items of loss

calculation values with values of 0 – 255.

Example   Command   :MEAS:ITEM:EFF 17

Set the "1" of the efficiency calculation   and the "1" of the loss calculation to ON.

Query   :MEAS:ITEM:EFF?

Response   :MEASURE:ITEM:EFF 17 (WHEN HEADER IS ON)

17 (WHEN HEADER IS OFF)

Set and Query Communication Output Items of Option Input

Syntax   Command   :MEASure:ITEM:EXTernalin <0 to 255>

Query   :MEASure:ITEM:EXTernalin?

Response

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
TEMP	-	-	-	SLIP	PM	EXTB	EXTA

Description Command   Sets the communication output item of the option input as 0 –
255.

Query   Returns the setting for the communication output item of the option input as 0
– 255.

Example   Command   :MEAS:ITEM:EXT 7

Set the EXTA, EXTB, PM of the motor analysis option calculation value to
ON.

Query   :MEAS:ITEM:EXT?

Response   :MEASURE:ITEM:EXTERNALIN 7 (WHEN HEADER IS ON)

7 (WHEN HEADER IS OFF)

Initialize Harmonic Communication Output Data Items

Syntax   Command   :MEASure:ITEM:HARMonic:ALLClear

Description Command   Initializes the Harmonic communication output data item.

All Harmonic communication output data item set to OFF.

Example   Command   :MEAS:ITEM:HARM:ALLC

Initialize the Harmonic communication output data item.

Select and Query Harmonic List Communication Output Items

Syntax   Command   :MEASure:ITEM:HARMonic:LIST \<LevelUI>,\<LevelP>,

   \<Content UI>,\<Content P>,\<Phase Angle UI>,\<Phase Angle P>

   Query   :MEASure:ITEM:HARMonic:LIST?

   Response   \<Level UI>,\<Level P>,\<Content UI>,\<Content P>,\<Phase Angle

   UI>,\<Phase Angle P>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Level UI	HI4	HI3	HI2	HI1	HU4	HU3	HU2	HU1
Level P	FREQ	HP123	HP34	HP12	HP4	HP3	HP2	HP1
Content UI	HI4	HI3	HI2	HI1	HU4	HU3	HU2	HU1
Content P	-	HP123	HP34	HP12	HP4	HP3	HP2	HP1
Phase Angle UI	HI4	HI3	HI2	HI1	HU4	HU3	HU2	HU1
Phase Angle P	-	HP123	HP34	HP12	HP4	HP3	HP2	HP1

Description   Command   Sets the default send item of the response data in the default

   mode as a response to ":MEASure:HARMonic?" as 0 – 255.

   Specify the harmonic list (level, content, phase angle) here.

   To set the item, execute the ON/OFF bit as shown above and specify with 0 –

   255.

   Query   Returns the setting for the default send item of the response data in the

   default mode as a response to ":MEASure:HARMonic?" as 0 – 255.

Example   Command   :MEAS:ITEM:HARM:LIST 1,1,1,1,1,1

   Set the U1,P1 level, Content, Phase Angle as the default output.

   Query   :MEAS:ITEM:HARM:LIST?

   Response   :MEASURE:ITEM:HARMONIC:LIST 1,1,1,1,1,1 (WHEN HEADER IS ON)

   1,1,1,1,1,1 (WHEN HEADER IS OFF)

Note   Set the saving order with the ":MEASure:ITEM:HARMonic:ORDer"Command.

   When an unselectable item is specified, an execution error will occur and other items will also

   not be set.

Set and Query Communication Output Items of Integration Value

Syntax   Command   :MEASure:ITEM:INTEGrate

                                                               <PIH>,<MIH>,<IH>,<PWP>,<MWP>,<WP>,

                                                               <PWP_SUM>,<MWP_SUM>,<WP_SUM>,<Elapsed Time>

       Query   :MEASure:ITEM:INTEGrate?

       Response

       <PIH>,<MIH>,<IH>,<PWP)>,<MWP>,<WP>,<PWP_SUM>,<MWP_SUM>,<WP_SUM>,

       <Elapsed Time>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
PIH	-	-	-	-	PIH4	PIH3	PIH2	PIH1
MIH	-	-	-	-	MIH4	MIH3	MIH2	MIH1
IH	-	-	-	-	IH4	IH3	IH2	IH1
PWP	-	-	-	-	PWP4	PWP3	PWP2	PWP1
MWP	-	-	-	-	MWP4	MWP3	MWP2	MWP1
WP	-	-	-	-	WP4	WP3	WP2	WP1
PWP_SUM	-	-	-	-	-	PWP123	PWP34	PWP12
MWP_SUM	-	-	-	-	-	MWP123	MWP34	MWP12
WP_SUM	-	-	-	-	-	WP123	WP34	WP12
Elapsed Time	-	-	-	-	-	-	ms unit	Time

Description Command   Sets the integration saved item as 0 – 255.

               Query   Returns the setting for the integration saved item as 0 – 255.

Example   Command   :MEAS:ITEM:INTEG 0,0,0,1,1,1,0,0,0,1

                                 Set all the integration power values of Channel 1 and the integration

                                 elapsed time to ON.

       Query   :MEAS:ITEM:INTEG?

       Response   :MEASURE:ITEM:INTEGRATE 0,0,0,1,1,1,0,0,0,1 (WHEN HEADER IS ON)

                                   0,0,0,1,1,1,0,0,0,1 (WHEN HEADER IS OFF)

Note   Some items are unselectable due to the wiring and integration mode.

       When an unselectable item is specified, an execution error will occur and other items will also

       not be set.

Set and Query Output Order of Harmonic Data Communication Output

Syntax	Command	:MEASure:ITEM:HARMonic:ORDer <Lower limit order>,<Upper limit order>, <ODD/EVEN/ALL>
	Query	:MEASure:ITEM:HARMonic:ORDer?
	Response	Lower limit order (NR1)　　:0 to 100
		Upper limit order (NR1)　　:0 to100
		ODD　　　　　　: Odd-number order only
		EVEN　　　　　　: Even-number order only
		ALL　　　　　　: All orders

Description	Command	Sets the default send item of the response data in the default mode as a response to ":MEASure:HARMonic?" as 0 – 255.
		Use in a combination with ":MEASure:ITEM:HARMonic:LIST"Command.
	Query	Returns the setting for the default send item of the response data in the default mode as a response to ":MEASure:HARMonic?" as numerical values or character strings.

Example	Command	:MEAS:ITEM:HARM:ORD 1,15,ODD
		Set the odd-number order from 1 – 15 to the default output.
	Query	:MEAS:ITEM:HARM:ORD?
	Response	:MEASURE:HARMONIC:ORDER 1,15,ODD (WHEN HEADER IS ON)
		1,15,ODD (WHEN HEADER IS OFF)

Set and Query Normal Measurement Value Communication Output Items of Respective Channels

Syntax   Command   :MEASure:ITEM:NORMal <Udata>,<Idata>,<Pdata>,<Sdata>,
            <Qdata>,<PFdata>,<DEGdata>,<FREQdata>

    Query   :MEASure:ITEM:NORMal?

    Response   <Udata>,<Idata>,<Pdata>,<Sdata>,<Qdata>,
            <PFdata>,<DEGdata>,<FREQdata>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Udata	-	-	-	-	U4	U3	U2	U1
Idata	-	-	-	-	I4	I3	I2	I1
Pdata	-	-	-	-	P4	P3	P2	P1
Sdata	-	-	-	-	S4	S3	S2	S1
Qdata	-	-	-	-	Q4	Q3	Q2	Q1
PFdata	-	-	-	-	PF4	PF3	PF2	PF1
DEGdata	-	-	-	-	DEG4	DEG3	DEG2	DEG1
FREQdata	-	-	-	-	FREQ4	FREQ3	FREQ2	FREQ1

Description Command   Sets the normal measurement value communication output items of
            the various channels as 0 – 255.

    Query   Returns the settings for the normal measurement value communication
            output items of the various channels as numerical values.

Example   Command   :MEAS:ITEM:NORM 1,1,1,0,0,1,0,0
            Set the voltage, current, effective power, and power factor data of Channel 1
            to ON.

    Query   :MEAS:ITEM:NORM?

    Response   :MEASURE:ITEM:NORMAL 1,1,1,0,0,1,0,0 (WHEN HEADER IS ON)
            1,1,1,0,0,1,0,0 (WHEN HEADER IS OFF)

Note   When this command is used to turn U to ON, all U items in the specified Channel
        (:MEASure:ITEM:U) will be ON, when it is used to turn U to OFF, all U items in the specified
        channel will be OFF.

        When this command is used to turn I to ON, all I items in the specified Channel
        (:MEASure:ITEM:I) will be ON, when it is used to turn I to OFF, all I items in the specified
        channel will be OFF.

        To specify individually saved items in the U data and I data,
        use :MEASure:ITEM:U, :MEASure:ITEM:I Command after this command is executed.

        During Query, if even 1 item of each of the channel is turned to ON, the channel will become
        ON.

Set and Query SUM's Normal Measurement Value Communication Output Items

Syntax   Command   :MEASure:ITEM:SUM <Udata>,<Idata>,<Pdata>,<Sdata>,
                                          <Qdata>,<PFdata>,<DEGdata>

          Query   :MEASure:ITEM:SUM?

          Response   <Udata>,<Idata>,<Pdata>,<Sdata>,<Qdata>,<PFdata>,<DEGdata>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Udata	-	-	-	-	-	U123	U34	U12
Idata	-	-	-	-	-	I123	I34	I12
Pdata	-	-	-	-	-	P123	P34	P12
Sdata	-	-	-	-	-	S123	S34	S12
Qdata	-	-	-	-	-	Q123	Q34	Q12
PFdata	-	-	-	-	-	PF123	PF34	PF12
DEGdata	-	-	-	-	-	DEG123	DEG34	DEG12

Description Command   Sets the normal measurement value communication output
                     items of SUM as – 255.

          Query   Returns the normal measurement value communication output items of SUM
                     as numerical value.

Example   Command   :MEAS:ITEM:SUM 0,0,1,1,0,1,0
                     Set the effective power, apparent power and power factor data of SUM12 to
                     ON.

          Query   :MEAS:ITEM:SUM?

          Response   :MEASURE:ITEM:SUM 0,0,1,1,0,1,0 (WHEN HEADER IS ON)
                     0,0,1,1,0,1,0 (WHEN HEADER IS OFF)

Note   To specify individually saved items in the Udata and Idata,
          use :MEASure:ITEM:U, :MEASure:ITEM:I Command after this command is executed.
          During Query, if even 1 item of each of the channel is turned to ON, the channel will become
          ON.
          Some items are unselectable due to the wiring and integration mode.
          When an unselectable item is specified, an execution error will occur and other items will also
          not be set.

Set and Query Voltage Data Communication Output Items

Syntax   Command   :MEASure:ITEM:U <CH 1>,< CH 2>,< CH 3>,< CH 4>,<SUM12>,<SUM34>,<SUM123>

Query   :MEASure:ITEM:U?

Response   <CH 1>,< CH 2>,< CH 3>,< CH 4>,<SUM12>,<SUM34>,<SUM123>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
CH 1	PK-	PK+	THD	FND	DC	AC	MN	RMS
CH 2	PK-	PK+	THD	FND	DC	AC	MN	RMS
CH 3	PK-	PK+	THD	FND	DC	AC	MN	RMS
CH 4	PK-	PK+	THD	FND	DC	AC	MN	RMS
SUM12	-	-	-	-	-	-	MN	RMS
SUM34	-	-	-	-	-	-	MN	RMS
SUM123	-	-	-	-	UNB	-	MN	RMS

Description   Command   Sets the voltage data communication output items as 0 – 255.

Query   Returns the voltage data communication output items as numerical values.

Example   Command   :MEAS:ITEM:U 1,1,1,1,0,0,0

Set the voltage RMS of Channels 1 – 4 to ON.

Query   :MEAS:ITEM:U?

Response   :MEASURE:ITEM:U 1,1,1,1,0,0,0 (WHEN HEADER IS ON)

1,1,1,1,0,0,0 (WHEN HEADER IS OFF)

Note   Some items are unselectable due to the wiring and integration mode.

When an unselectable item is specified, an execution error will occur and other items will also not be set.

Use this command after :MEASure:ITEM:NORMal or :MEASure:ITEM:SUMCommand.

Set and Query Current Data Communication Output Items

Syntax   Command   :MEASure:ITEM:I <CH 1>,< CH 2>,< CH 3>,< CH 4>,<SUM12>,<SUM34>,<SUM123>

Query   :MEASure:ITEM:I?

Response   <CH 1>,< CH 2>,< CH 3>,< CH 4>,<SUM12>,<SUM34>,<SUM123>

	128	64	32	16	8	4	2	1
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
CH 1	PK-	PK+	THD	FND	DC	AC	MN	RMS
CH 2	PK-	PK+	THD	FND	DC	AC	MN	RMS
CH 3	PK-	PK+	THD	FND	DC	AC	MN	RMS
CH 4	PK-	PK+	THD	FND	DC	AC	MN	RMS
SUM12	-	-	-	-	-	-	MN	RMS
SUM34	-	-	-	-	-	-	MN	RMS
SUM123	-	-	-	-	UNB	-	MN	RMS

Description   Command   Sets the current data communication output items as 0 – 255.

Query   Returns the current data communication output items as numerical values.

Example   Command   :MEAS:ITEM:I 3,3,3,3,0,0,0

Set the current RMS and MEANData of Channels 1 – 4 to ON.

Query   :MEAS:ITEM:I?

Response   :MEASURE:ITEM:I 3,3,3,3,0,0,0 (WHEN HEADER IS ON)

3,3,3,3,0,0,0 (WHEN HEADER IS OFF)

Note   Some items are unselectable due to the wiring and integration mode.

When an unselectable item is specified, an execution error will occur and other items will also not be set.

Use this command after :MEASure:ITEM:NORMal or :MEASure:ITEM:SUMCommand.

Query Existence of USB Memory

Syntax   Query   :MEMory:EXISt?

            Response   Y   :USB Memory

                          N   :No USB Memory

Description Query   Returns the existence of the USB in the main instrument as Y or
N.

Example   Query   :MEM:EXIS?

            Response   :MEMORY:EXIST Y (WHEN HEADER IS ON)

                          Y (WHEN HEADER IS OFF)

Acquire File Name in USB Memory

Syntax   Query   :MEMory:FILEname? <Specified Folder Name>

                        < Specified Folder Name >

                        Acquires file name under the specified folder name.

                        When omitted, the file name under the root folder will be acquired.

            Response   <File name>, <byte count>, <file name>,<byte count>,,,,,

                        Continue in the <File name>, <byte count> order for as long as there are
files.

                        When there are no more folders, the words "NO_FILES" will be returned.

Description Query   Acquires the file name under the folder specified from the USB memory.

Example   Query   :MEM:FILE? HI3390

                        Acquire and return the file name under the HI3390 folder from

                        the USB memory.

            Response   :MEMORY:FILENAME H3390001.BMP,44862,M3390000.CSV,578

                        (WHEN HEADER IS ON)

                        H3390001.BMP,44682,M3390000.CSV,578 (WHEN HEADER IS OFF)

Note   Up to 90 files displayed from the start of the screen can be acquired.

        When more than 90 files exist in the same folder, subsequent file names cannot be acquired.

Acquire Folder Name in USB Memory

Syntax   Query   :MEMory:FOLDername?

             Response   <Folder name>,<Folder name>,<Folder name>,,,,,

                          Folder names will continue for as long as there are folders.

                          When there are no more folders, the words "NO_FOLDER" will be returned.

Description Query   Acquires the folder name under the root of the USB memory.

Example   Query   :MEM:FOLD?

             Response   :MEMORY:FOLDERNAME HI3390 (WHEN HEADER IS ON)

                          HI3390 (WHEN HEADER IS OFF)

Note   Up to 215 folders displayed from the start of the screen can be acquired.

           When more than 215 folders exist in the root, subsequent folder names cannot be acquired.

Acquire File Data in USB Memory

Syntax   Query   :MEMory:PICKout? <File name>,<Start position (NR1)>

                                 ,<Stop position (NR1)>,<Specified folder name>

             Response   <Folder name>,<Start position>,<Stop position>,<Specified folder name>

                          File name   :File name to be forwarded

                          Start position (NRI)   :Specify the acquired start position in the file with byte count

                          Stop position (NRI)   :Specify the acquired stop position in the file with byte count

                          Specified Folder Name:Search for file name under the specified folder

                                      When omitted, search for the file name under the root.

Description Query   Reads the specified file name under the folder from the USB Memory

                        from the start position to the stop position, attach STX (02) to the start and ETX (03) to the end of the data to be forwarded, and forward data.

Example   Query   :CARD:PICK? 02030100.CSV,1,1000,HI3390

                        Return the 1-100 byte data of the 02030100.CSV file under the HI3390 folder from USB Memory.

             Response   STX(02)HIOKI 3390・・・・ETX(03)

Note   Even when the header is set as ON, headers will not attach to Response data.

           Specify "1" if the beginning of the file is made the start position.

           STX/ETX is not a ASCII Code but (02)/(03) of the Binary Data.

Select and Query Wiring Mode

Syntax   Command   :MODE <TYPE1/TYEP2/TYPE3/TYPE4/TYPE5/TYPE6/TYPE7/TYPE8>

Query   :MODE?

Response   TYPE1: 1P2W, 1P2W, 1P2W, 1P2W

TYPE2: 1P3W, 1P2W, 1P2W

TYPE3: 3P3W, 1P2W, 1P2W

TYPE4: 1P3W, 1P3W

TYPE5: 3P3W2M, 1P3W

TYPE6: 3P3W2M, 3P3W2M

TYPE7: 3P3W3M, 1P2W

TYPE8: 3P4W, 1P2W

Description Command   Selects wiring mode, and set according to the wiring of the

various channels.

Query   Sets the wiring mode and returns it as character string of TYPE.

Example   Command   :MODE TYPE1

Set the wiring modes of all channels to IP2W.

Query   :MODE?

Response   :MODE TYPE1 (WHEN HEADER IS ON)

TYPE1 (WHEN HEADER IS OFF)

Note   The wiring mode setting affects many settings. Try to set it as early as possible.

To set a wiring mode for a combination of multiple channels, the current sensors of the channels to be combined must be the same.

Set and Query Execution Confirmation Message

Syntax   Command   :RS232c:ANSWer <ON/OFF>
          Query   :RS232c:ANSWer?
          Response   ON: Execution Confirmation Message
                     OFF: No Execution Confirmation Message

Description Command   Sets the existence of execution confirmation message.
                     When there is a message, response will return even when the command is
                     being sent, and an execution confirmation message will be attached at the
                     end of the query's response during query. The execution confirmation
                     message has a 3-digit "nnn" format and shows an error at the nnnth
                     Command.
                     "000" is shown when there is an error.
          Query   Returns the setting for the execution confirmation message as ON or OFF.

Example   Command   :RS232:ANSW ON
                     Set the execution confirmation message to ON.
          Query   :RS232:ANSW?
          Response   :RS232C:ANSWER ON;000 (WHEN HEADER IS ON)
                     ON,000 (WHEN HEADER IS OFF)

Note   The command name is RS232C, but is the same operation as when communicating with LAN
          or USB.

Select and Query RS232C Communication Speed

Syntax   Command   :RS232c:BAUD <9600bps/19600bps/38400bps>
          Query   :RS232c:BAUD?
          Response   <9600bps/19600bps/38400bps>

Description Command   Sets the RS232C communication speed.
          Query   Returns the setting for the RS232C communication speed as a character
                     string.

Example   Command   :RS232:BAUD 19600bps
                     Set the RS232C communication speed to 19600bps.
          Query   :RS232:BAUD?
          Response   :RS232C:BAUD 19600 (WHEN HEADER IS ON)
                     19600 (WHEN HEADER IS OFF)

Select and Query RS232C Connection Terminal

Syntax   Command   :RS232c:CONNect <PC/PRINTER/THERMO>

Query   :RS232c:CONNect?

Response   PC   : Personal Computer（OFF in the main screen）

PRINTER   : Printer

THERMO   : Thermometer

Description Command   Sets the connection terminal of RS232C.

Query   Returns the setting for the RS232C connection terminal as a character string.

Example   Command   :RS232:CONN PRINTER

Set the RS232C connection terminal as the printer.

Query   :RS232:CONN?

Response   :RS232C:CONNECT PRINTER (WHEN HEADER IS ON)

PRINTER (WHEN HEADER IS OFF)

Set and Query Automatic Saving Folder Name

Syntax   Command   :SAVE:AUTO:FOLDername <Folder name>

Query   :SAVE:AUTO:FOLDername?

Response   The folder name is a character string of up to 8 characters.

Characters that can be used are ASCII characters H'20 – H'7E (except for " */:<>?¥|).

When "NONE" is specified in the folder name, the root will become the folder to be saved to.

Description Command   Set the folder name of the automatic saving measurement file.

Query   Returns the setting for the folder name of the automatic saving measurement file as a character string.

Example   Command   :SAVE:AUTO:FOLD AUTO3390

Set the folder name of the automatic saving measurement file to "AUTO3390".

Query   :SAVE:AUTO:FOLD?

Response   :SAVE:AUTO:FOLDERNAME AUTO3390 (WHEN HEADER IS ON)

AUTO3390 (WHEN HEADER IS OFF)

Set and Query Manual Saving Folder Name

Syntax   Command   :SAVE:FOLDername <Folder name>

Query   :SAVE:FOLDername?

Response   The folder name is a character string of up to 8 characters.

Characters that can be used are ASCII characters H'20 – H'7E (except for " */:<>?¥|).

When "NONE" is specified in the folder name, the root will become the folder to be saved to.

Description   Command   Sets the folder name of the manual saving measurement file.

Query   Returns the setting for the folder name of the manual automatic

saving measurement file as a character string.

Example   Command   :SAVE:FOLD DATA3390

Set the folder name of the manual saving measurement file to "AUTO3390".

Query   :SAVE:FOLD?

Response   :SAVE:FOLDERNAME DATA3390 (WHEN HEADER IS ON)

DATA3390 (WHEN HEADER IS OFF)

Select and Query Manual Saving Media Location

Syntax   Command   :SAVE:MEDIa <MEMORY/CARD>

Query   :SAVE:MEDIa?

Response   MEMORY :USB Memory

CARD   :CF Card

Description   Command   Sets the manual saving media location

Query   Returns the setting for the manual saving media location as a

Character string.

Example   Command   :SAVE:MEDI CARD

Set the manual saving media to the CF card.

Query   :SAVE:MEDI?

Response   :SAVE:MEDIA CARD (WHEN HEADER IS ON)

CARD (WHEN HEADER IS OFF)

Set and Query CT Ratio

Syntax   Command   :SCALe[CH]:CT <CTRatio>

Query   :SCALe[CH]:CT?

[CH] ···· 1,2,3,4

Response   CT Ratio:0000.01 to 9999.99

Description Command   Sets the CT ratio of the specified channel.

Query   Returns the setting for the CT ratio of the specified channel in numerical value.

Example   Command   :SCAL1:CT 2.0

Set the CT ratio of Channel 1 to 2.0.

Query   :SCAL1:CT?

Response   :SCALE1:CT 0002.00 (WHEN HEADER IS ON)

0002.00 (WHEN HEADER IS OFF)

Note   The setting for CT Ratio OFF is 1.0. The Query Response for OFF is 0001.00.

Settings for the other channels in the measurement line combination will also be changed.

Specify the first channel in the combination channels.

Set and Query VT Ratio

Syntax   Command   :SCALe[CH]:VT <VT Ratio>

Query   :SCALe[CH]:VT?

[CH] ···· 1,2,3,4

Response   VT Ratio :0000.01 to 9999.99

Description Command   Sets the VT ratio of the specified channel.

Query   Returns the setting for the VT ratio of the specified channel in numerical value.

Example   Command   :SCAL1:VT 10.0

Set the CT ratio of Channel 1 to 10.0.

Query   :SCAL1:VT?

Response   :SCALE1:VT 0010.00 (WHEN HEADER IS ON)

0010.00 (WHEN HEADER IS OFF)

Note   The setting for VT Ratio OFF is 1.0. The Query Response for OFF is 0001.00.

Settings for the other channels in the measurement line combination will also be changed.

Specify the first channel in the combination channels.

Set and Query Synchronized Source

Syntax   Command   :SOURce[CH] <synchronized source>

Query   :SOURce[CH]?

[CH] ···· 1,2,3,4

Response   <synchronized source>   :U1/U2/U3/U4/I1/I2/I3/I4/Ext/DC50ms/DC100ms

Description Command   Sets the synchronized source of the specified channel.

Query   Returns the setting for the synchronized source of the specified

channel as a character string.

Example   Command   :SOUR1 U1

Set the synchronized source of Channel 1 to U1.

Query   :SOUR1?

Response   :SOURCE1 U1 (WHEN HEADER IS ON)

U1 (WHEN HEADER IS OFF)

Note   Settings for the other channels in the measurement line combination will also be changed.
Only the key of Ext can be set when the motor analysis option is implemented and chB is set as
pulse.

Select and Query Actual Time ON/OFF

Syntax   Command   :STIMe:CONTrol <ON/OFF>

Query   :STIMe:CONTrol?

Response   ON   : Actual Time ON

OFF   : Actual Time OFF

Description Command   Sets the actual time ON/OFF.

Query   Returns the setting for actual time as ON or OFF.

Example   Command   :STIM:CONT ON

Set the actual time to ON.

Query   :STIM:CONT?

Response   :STIME:CONTROL ON (WHEN HEADER IS ON)

ON (WHEN HEADER IS OFF)

Set and Query Actual Time Start Time

Syntax   Command   :STIMe:STARttime <Year>,<Month>,<Date>,<Hour>,<Minute>

Query   :STIMe:STARttime?

Response   Year data:2000 to 2079 (can be set 00 - 79)

Month data:01 to 12

Date data:01 to 31

Hour data:00 to 23

Minute data:00 to 59

Description Command   Sets the actual time start time.

Query   Returns the time setting of the actual start time as numerical values of year, month, date, hour and minute.

Example   Command   :STIM:STAR 08,12,25,12,00

Set the actual time start time as 2008 Dec 25th 12:0

Query   :STIM:STAR?

Response   :STIME:STARTTIME 2008,12,25,12,00 (WHEN HEADER IS ON)

2008,12,25,12,00 (WHEN HEADER IS OFF)

Note   The instrument can interpret days of the month as well as leap years, so specifying an improbable date will lead to an error.

When a time after the stop time is set, the stop time will be set one minute after the start time.

Set and Query Actual Time Stop Time

Syntax Command :STIMe:STOPtime <Year>,<Month>,<Date>,<Hour>,<Minute>

Query :STIMe:STOPtime?

Response Year data:2000 to 2079 (can be set 00 - 79)

Month data:01 to 12

Date data:01 to 31

Hour data:00 to 23

Minute data:00 to 59

Description Command Sets the actual time stop time.

Query Returns the time setting of the actual stop time as numerical values of year, month, date, hour and minute.

Example Command :STIM:STOP 08,12,25,12,00

Set the actual time stop time as 2008 Dec 25th 12:0

Query :STIM:STOP?

Response :STIME:STOPTIME 2008,12,30,8,30 (WHEN HEADER IS ON)

2008,12,30,8,30 (WHEN HEADER IS OFF)

Note The instrument can interpret days of the month as well as leap years, so specifying an improbable date will lead to an error.

When a time before the start time is set, an execution error will occur.

Select and Query Master/Slave of Synchronized Control Master

Syntax Command   :SYNC:CONTrol <MASTER/SLAVE>

Query   :SYNC:CONTrol?

Response   MASTER : Master

SLAVE   : Slave

Description Command   Sets the master and slave of synchronized control.

Query   Returns the settings of master and slave of synchronized

controls MASTER or SLAVE.

Example Command   :SYNC:CONT MASTER

Set the master of synchronized control.

Query   :SYNC:CONT?

Response   :SYNC:CONTROL MASTER (WHEN HEADER IS ON)

MASTER (WHEN HEADER IS OFF)

Set and Query Synchronized Event Items

Syntax Command   :SYNC:EVENtitem <HOLD/SAVE/COPY>

Query   :SYNC:EVENtitem?

Response   HOLD   : Hold

SAVE   : Manual Save

COPY   : Screen Copy

Description Command   Set the synchronized events during the synchronized control.

Query   Returns the synchronized events during the synchronized control as
character strings.

Example Command   :SYNC:EVEN HOLD

Set the synchronized event as hold.

Query   :SYNC:EVEN?

Response   :SYNC:EVENTITEM HOLD (WHEN HEADER IS ON)

HOLD (WHEN HEADER IS OFF)

Set and Query Timer Control ON/OFF

Syntax
Command :TIMEr:CONTrol <ON/OFF>

Query :TIMEr:CONTrol?

Response ON : Timer ON

OFF : Timer OFF

Description Command Sets the timer ON/OFF.

Query Returns the setting for the timer as ON or OFF.

Example
Command :TIME:CONT ON

Set the timer to ON.

Query :TIME:CONT?

Response :TIMER:CONTROL ON (WHEN HEADER IS ON)

ON (WHEN HEADER IS OFF)

Set and Query Timer

Syntax
Command :TIMEr:TIME <Hour>,<Minute>,<Second>

Query :TIMEr:TIME?

Response Hour :0000 to 9999

Minute :00 to 59

Second :00 to 59

Description Command Sets the timer.

Query Returns the timing setting as hour, minute and second.

Example
Command :TIME:TIME 1,0,0

Set the timer to 1 hour.

Query :TIME:TIME?

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

0001,00,00 (WHEN HEADER IS OFF)

Note   The range for the timer is 10 seconds – 9999 hours 59 minutes 59 seconds.

Set and Query Numerical Data Format

Syntax	Command	:TRNSmit:COLumn <0/1>
	Query	:TRANsmit:COLumn?
	Response	0 : Omit the + at the beginning of the fraction of the response measurement value data and the preceding 0
		1 : Fixed number of characters in the fraction of the response measurement value data
		(the + at the beginning of the fraction and the preceding 0 will not be omitted)

Description	Command	Sets the response data value data format of ":MEASure?",":MEASure:HARMonic?",and " :MEASure:NOISepeak?".
	Query	Returns the setting for the response data's value data format as 0 or 1.

Example	Command	:TRAN:COL 1
		Set not to omit the fraction.
	Query	:TRAN:COL?
	Response	:TRANSMIT:COLMUN 1 (WHEN HEADER IS ON)
		1 (WHEN HEADER IS OFF)

Note   Response example of ":MEASure?"Command (WHEN HEADER IS OFF)

・**When TRANsmit:COLumn 0**

Query   :MEAS? U1_RMS,I1_RMS

Response   78.01E+00,5.0120E+00

・**When TRANsmit:COLumn 1**

Query   :MEAS? U1_RMS,I1_RMS

Response   +078.01E+00,+5.0120E+00

Set and Query Response Message Unit Separator

Syntax   Command   :TRANsmit:SEParator <0/1>

                 Query   :TRANsmit:SEParator?

                 Response   0: Semicolon ';'

                            1 : Colon ','

Description Command   Sets the message unit separator when the header is OFF.

                 Query   Returns the setting for the message unit separator when the header is OFF

                            as a numerical value.

Example   Command   TRAN:SEP 1

                            Set the message unit separator when the header is OFF as a comma (,).

                 Query   TRAN:SEP?

                 Response   :TRANSMIT:SEPARATOR 1 (WHEN HEADER IS ON)

                            1 (WHEN HEADER IS OFF)

Note   The response message unit separator can only be changed when the header is OFF.

            The measurement value Response data of the "MEASure?" type is independent of this setting

            and is separated by a ','.

Set and Query Voltage Auto Range

Syntax   Command   :VOLTage [CH]:AUTO <ON/OFF>

               Query   :VOLTage [CH]:AUTO?

                                [CH] ···· 1,2,3,4

               Response   ON   :   Measures voltage by auto range.

                                OFF   :   Measures voltage by manual range.

Description   Command   Sets the voltage auto range ON/OFF.

               Query   Returns the setting for the voltage auto range as ON or OFF.

Example   Command   :VOLT1:AUTO ON

                                Set the auto range for voltage Channel 1 to ON.

               Query   :VOLT1:AUTO?

               Response   :VOLTAGE1:AUTO ON (WHEN HEADER IS ON)

                                ON (WHEN HEADER IS OFF)

Note   When the range is set using the :VOLTage [CH]:RANGeCommand, the auto range of the specified channel will be OFF.

        By combining measurement lines (for above IP3W), the settings for the voltage auto ranges of other channels which are combined are also changed.

Select and Query Voltage Rectifier Type

Syntax   Command   :VOLTage [CH]:MEAN <ON/OFF>

               Query   :VOLTage [CH]:MEAN?

                                [CH] ···· 1,2,3,4

               Response   ON   : Sets the voltage rectifier type to MEAN.

                                OFF   : Sets the voltage rectifier type to RMS.

Description   Command   Selects the RMS/MEAN of the voltage rectifier type.

               Query   Returns the selection of the RMS/MEAN of the voltage rectifier type as ON (MEAN) or OFF (RMS).

Example   Command   :VOLT1:MEAN OFF

                                  Select the rectifier type of voltage Channel 1 as RMS.

               Query   :VOLT1:MEAN?

               Response   :VOLTAGE1:MEAN OFF (WHEN HEADER IS ON)

                                OFF (WHEN HEADER IS OFF)

Note By combining measurement lines (for above IP3W), the settings for the voltage rectifier types of other channels which are combined are also changed.

Set and Query Voltage Range

Syntax Command   :VOLTage[CH]:RANGe <Voltage range>

Query   :VOLTage[CH]:RANGe?

[CH] ···· 1,2,3,4

Response   <Voltage range> : 15/30/60/150/300/600/1500

Description Command   The numerical value can be in NRf format, but rounding is

performed for figures beyond the last valid decimal place. (Valid digits: 4 digits)

Query   Queries the voltage range. Returns the voltage range as a numerical value.

Example Command   :VOLT1:RANG 300

Sets the voltage range of channel 1 as 300V.

Query   :VOLT1:RANG?

Response   :VOLTAGE1:RANGE 300 (WHEN HEADER IS ON)

300 (WHEN HEADER IS OFF)

Note • Do not add a unit to the measurement range.

• Wait until the internal circuit has stabilized after changing a range before reading measurements.

• When the range is specified, the auto range of the specified channel will be OFF.

• By combining measurement lines (for above IP3W), the settings for the voltage ranges of other channels which are combined are also changed.

Set and Query Zero Suppress

Syntax   Command   :ZEROsp <OFF/0.1%/0.5%>

Query   :ZEROsp?

Response   <OFF/0.1%/0.5%>

Description Command   Sets zero suppress.

Query   Returns setting for zero suppress as a character string.

Example   Command   :ZERO 0.1%

Set the zero suppress level o 0.1% f.s.

Query   :ZERO?

Response   :ZEROSP 0.1% (WHEN HEADER IS ON)

0.1% (WHEN HEADER IS OFF)

4. **Fundamental Measurement Item Parameters**

Contents	Parameter List
Voltage RMS	Urms1/Urms2/Urms3/Urms4/Urms12/Urms34/Urms123
Rectified Voltage Average	Umn1/Umn2/Umn3/Umn4/Umn12/Umn34/Umn123
Voltage AC Component, Fundamental Wave Phase Angle	Uac1/Uac2/Uac3/Uac4/HU1P/HU2P/HU3P/HU4P
Voltage Simple Average, Fundamental Wave Component	Udc1/Udc2/Udc3/Udc4/Ufnd1/Ufnd2/Ufnd3/Ufnd4
Voltage ± Peak	PUpk1/PUpk2/PUpk3/PUpk4/MUpk1/MUpk2/MUpk3/MUpk4
Voltage Distortion, Voltage Ripple Rate	Uthd1/Uthd2/Uthd3/Uthd4/Urf1/Urf2/Urf3/Urf4
Current RMS	Irms1/Irms2/Irms3/Irms4/Irms12/Irms34/Irms123
Rectified Current Average	Imn1/Imn2/Imn3/Imn4/Imn12/Imn34/Imn123
Current AC Component, Fundamental Wave Phase Angle	Iac1/Iac2/Iac3/Iac4/HI1P/HI2P/HI3P/HI4P
Current Simple Average, Fundamental Wave Component	Idc1/Idc2/Idc3/Idc4/Ifnd1/Ifnd2/Ifnd3/Ifnd4
Current ± Peak	PIpk1/PIpk2/PIpk3/PIpk4/MIpk1/MIpk2/MIpk3/MIpk4
Current Distortion, Current Ripple Rate	Ithd1/Ithd2/Ithd3/Ithd4/Irf1/Irf2/Irf3/Irf4
Effective power, Reactive power	P1/P2/P3/P4/P12/P34/P123/Q1/Q2/Q3/Q4/Q12/Q34/Q123
Apparent Power	S1/S2/S3/S4/S12/S34/S123
Power factor	PF1/PF2/PF3/PF4/PF12/PF34/PF123
Power phase angle	DEG1/DEG2/DEG3/DEG4/DEG12/DEG34/DEG123
frequency, unbalance factor, temperature	FREQ1/FREQ2/FREQ3/FREQ4/UUNB123/IUNB123/TEMP
Efficiency, Loss	EFF1/EFF2/EFF3/LOSS1/LOSS2/LOSS3
Integ. current in positive/negative direction	PIH1/PIH2/PIH3/PIH4/MIH1/MIH2/MIH3/MIH4
Sum of integ. current	IH1/IH2/IH3/IH4
Energy in positive direction	PWP1/PWP2/PWP3/PWP4/PWP12/PWP34/PWP123
Energy in negative direction	MWP1/MWP2/MWP3/MWP4/MWP12/MWP34/MWP123
Sum of Energy	WP1/WP2/WP3/WP4/WP12/WP34/WP123
(Only during :AOUT:ITEM)	OFF
Motor	ExtA/ExtB/Pm/Slip (Only during motor option)

Output Items of :MEASure? and the order

Output Item		Output Item and the order			
Status		Status			
Voltage	RMS	Urms1 to Urms4	Urms12	Urms34	Urms123
	Rectified Average	Umn1 to Umn4	Umn12	Umn34	Umn123
	AC Component	Uac1 to Uac4			
	Simple Average	Udc1 to Udc4			
	Fundamental Wave Component	Ufnd1 to Ufnd4			
	Waveform peak +	PUpk1 to PUpk4			
	Waveform peak –	MUpk1 to MUpk4			
	THD/Ripple Rate	Uthd1 to Uthd4 / Urf1 to Urf4			
	Unbalance factor	Uunb123			
Current	RMS	Irms1 to Irms4	Irms12	Irms34	Irms123
	Rectified Average	Imn1 to Imn4	Imn12	Imn34	Imn123
	AC Component	Iac1 to Iac4			
	Simple Average	Idc1 to Idc4			
	Fundamental Wave Component	Ifnd1 to Ifnd4			
	Waveform peak +	PIpk1 to PIpk4			
	Waveform peak –	MIpk1 to MIpk4			
	THD/Ripple Rate	Ithd1 to Ithd4 / Irf1 to Irf4			
	Unbalance factor	Iunb123			
Effective power		P1 to P4	P12	P34	P123
Apparent Power		S1 to S4	S12	S34	S123
Reactive power		Q1 to Q4	Q12	Q34	Q123
Power factor		PF1 to PF4	PF12	PF34	PF123
Phase angle		DEG1 to DEG4	DEG12	DEG34	DEG123
frequency		FREQ1 to FREQ4			
Integration	Integ. current in positive direction	PIH1 to PIH4	PIH12	PIH34	PIH123
	Integ. current in negative direction	MIH1 to MIH4	MIH12	MIH34	MIH123
	Sum of integ. current	IH1 to IH4	IH12	IH34	IH123
	Energy in positive direction	PWP1 to PWP4	PWP12	PWP34	PWP123
	Energy in negative direction	MWP1 to MWP4	MWP12	MWP34	MWP123
	Sum of Energy	WP1 to WP4	WP12	WP34	WP123
Efficiency		Eff1 to Eff3			
Loss		Loss1 to Loss3			
Temperature		Temp			
Motor		ExtA	ExtB	Pm	Slip

Output Items of :MEASure:HARMonic? and the order

Harmonic Measurement Items					
Status	Status				
frequency	HFREQ				
Level	Voltage 0th	HU1L000 to HU4L000	HU12L000	HU34L000	HU123L000
	Current 0th	HI1L000 to HI4L000	HI12L000	HI34L000	HI123L000
	Power 0th	HP1L000 to HP4L000	HP12L000	HP34L000	HP123L000
Content	Voltage 0th	HU1D000 to HU4D000	HU12D000	HU34D000	HU123D000
	Current 0th	HI1D000 to HI4D000	HI12D000	HI34D000	HI123D000
	Power 0th	HP1D000 to HP4D000	HP12D000	HP34D000	HP123D000
Phase angle	Voltage 0th	HU1P000 to HU4P000	HU12P000	HU34P000	HU123P000
	Current 0th	HI1P000 to HI4P000	HI12P000	HI34P000	HI123P000
	Power 0th	HP1P000 to HP4P000	HP12P000	HP34P000	HP123P000
・・・	n th	Last 3 digits are n			
Level	Voltage 100th	HU1L100 to HU4L100	HU12L100	HU34L100	HU123L100
	Current 100th	HI1L100 to HI4L100	HI12L100	HI34L100	HI123L100
	Power 100th	HP1L100 to HP4L100	HP12L100	HP34L100	HP123L100
Content	Voltage 100th	HU1D100 to HU4D100	HU12D100	HU34D100	HU123D100
	Current 100th	HI1D100 to HI4D100	HI12D100	HI34D100	HI123D100
	Power 100th	HP1D100 to HP4D100	HP12D100	HP34D100	HP123D100
Phase angle	Voltage 100th	HU1P100 to HU4P100	HU12P100	HU34P100	HU123P100
	Current 100th	HI1P100 to HI4P100	HI12P100	HI34P100	HI123P100
	Power 100th	HP1P100 to HP4P100	HP12P100	HP34P100	HP123P100

Noise Measurement Items						
Noise	Voltage	UNf01	UN01	to	UNf10	UN10
	Current	INf01	IN01	to	INf10	IN10

About Status data

The status information shows the measurement status when the measurement data is being saved, and is shown as a hexadecimal of 32bit.

Contents of the individual bits in the 32bit are shown below.

bit 31	bit 30	bit 29	bit 28	bit 27	bit 26	bit 25	bit 24
HM4	HM3	HM2	HM1	MRB	MRA	MPB	MPA
bit 23	bit 22	bit 21	bit 20	bit 19	bit 18	bit 17	bit 16
ULM	----	UCU	HUL	UL4	UL3	UL2	UL1
bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
RI4	RI3	RI2	RI1	RU4	RU3	RU2	RU1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
PI4	PI3	PI2	PI1	PU4	PU3	PU2	PU1

HMx : Harmonic parameter invalid（when the Harmonic synchronization is off, etc.）

MRx : Motor analysis option A, B range over

MPx : Motor analysis option A, B peak over

ULM : Motor analysis option A, B synchronization unlock

UCU : Uncalculable（when the measuremnt data becomes invalid immediately after a range change, etc.）

HUL : Harmonic synchronization unlock

ULx : Respective channels synchronization unlock

RIx : Respective channels current range over

RUx : Respective channels voltage range over

PIx : Respective channels current peak over

PUx : Respective channels voltage peak over

（x is the channel number）

5. Troubleshooting

Please refer to the following contents for any operation that is not processed properly.

Symptoms	Causes	Solutions
Cannot communicate at all	Is the LAN cable connected correctly?	When using a HUB to connect the main instrument and the computer, use a straight cable. When connecting the main instrument and the computer as 1:1, either attach a cross conversion connector to the straight cable or use a cross cable to connect.
	Is the Interface setting correct?	Confirm the settings for the IP address, subnet mask and default gateway of the main instrument.
	Is the IPAddress the same as other instruments?	Confirm the IPAddress setting of the main and other instruments.
	Is the TCP/IP port number correct?	Specify the correct port number.
Cannot communicate well	Is the message terminator (delimiter) correct?	Insert CR+LF to divide each message that is forwarded.
Command not executed	Is there any error?	Use *ESR? and look at the contents of the standard event status register to confirm the error.
	Can the command be operated?	Many commands for settings cannot be executed during hold or integration operation.
No response at all to the queries sent	Is the response acquired correctly?	Read after sending every query. To read all at once, use a message separator and describe the Query in one line.