HIOKI

Instruction Manual

For 3169-20, 3169-21
RS-232C

EN

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Contents

Introduction

This instruction manual provides details of the RS-232C communications interface for the 3169-20/21 CLAMP ON POWER HiTESTER.
For the specifications of the RS-232C and connection with a PC, see Chapter 9 "Using the Instrument with a Computer" (145 page), of the instruction manual.

NOTE

To connect the 3169-20/21 to a PC, use the optional 9612 RS-232C CABLE.

Safety Notes

This manual contains information and warnings essential for safe operation of the product and for maintaining it in safe operating condition. Before using the product, be sure to carefully read the following safety notes.

Safety Symbols

The following symbols in this manual indicate the relative importance of cautions and warnings.

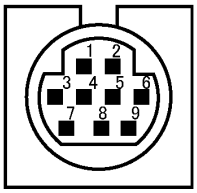
⚠DANGER	Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
⚠WARNING	Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
⚠CAUTION	Indicates that incorrect operation presents a possibility of injury to the user or damage to the product.
NOTE	Advisory items related to performance or correct operation of the product.

Specification Chapter 1

Transfer Method

Transfer method	Full duplex
Synchronous method	Asynchronous communication method
Baud rate	2400/ 9600/ 19200/ 38400 bps
Data length	8 bits
Parity check	None
Stop bit	1
Message Terminators (Delimiter)	CR+LF, CR
Flow control	None, XON/XOFF, RTS/CTS

Connector Specifications

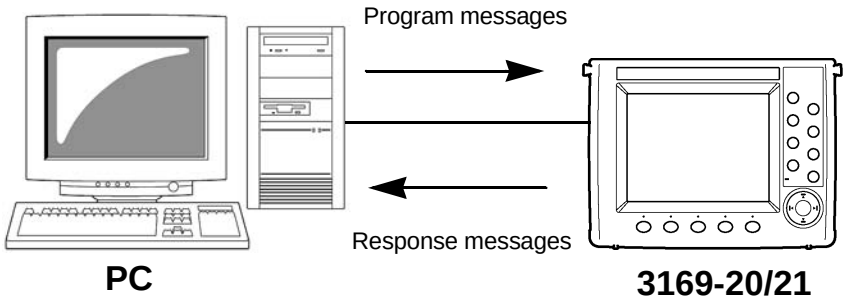


Pin	Functions	CCITT Circuit No.	EIA Code Addr.	JIS Code Addr.	Signal Name	Pin
2	Receive Data	104	BB	RD	RxD	2
3	Send Data	103	BA	SD	TxD	3
5	Signal Ground	102	AB	SG	GND	5
7	Request to Send	105	CA	RS	RTS	7
8	Clear to Send	106	CB	CS	CTS	8

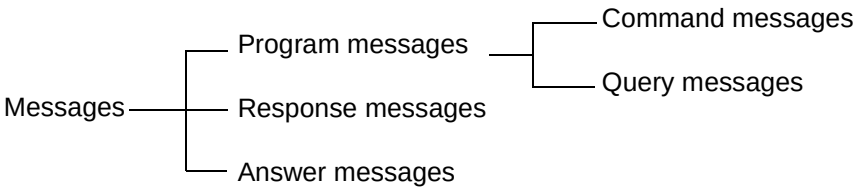
Details on Interface
RS-232C
Chapter 2

2.1 Communication Methods

Various messages are supported in order to control the 3169-20/21 through the interface.
Messages are divided into program messages, which are sent to the 3169-20/21 from the PC, and response messages, which are sent to the PC from the 3169-20/21.



The message system has the following hierarchy.



2.1.1 Message Format

Program Message

Program messages can be divided into either command messages or query messages.

- Command Message
  Orders for controls of the unit, such as for making measurement condition settings or for reset or the like.
  (example)
  Command message which sets the frequency

```
:FREQUENCY 60
```

Header portion Space Data portion

- Query Message
  Orders for responses relating to results of operation, results of measurement, or the state of device settings.
  (example)
  Queries the current frequency

```
:FREQUENCY?
```

Header portion Question mark

Response messages

After a query message has been received, a response message is produced the moment that its syntax has been checked.
Whether or not headers are prefixed to response messages is set by the **HEADer** command.
The response-message unit parameter can be changed from a semicolon (;) to a comma (,) using the **:TRANsmit:SEParator** command. The parameter is set to a semicolon (;) by default.
Header ON `U1_INST[V] +101.25E+0;I1_INST[A]_1 +50.246E+0`
Header OFF `+101.25E+0;+50.246E+0`

Answer Message

An answer message is a character string created after one line of data (up to the terminator) from a PC has been analyzed and processed. This string is returned to the PC. Using this data, the 3169-20/21 is synchronized with the PC.

Command Syntax

The names of commands for the 3169-20/21 are as far as possible mnemonic. Furthermore, all commands have a long form, and an abbreviated short form.
In command references in this manual, the short form is written in upper case letters, and then this is continued in lower case letters so as to constitute the long form.
Either of these forms will be accepted during operation, but intermediate forms will not be accepted. Further, during operation both lower case letters and upper case letters will be accepted without distinction.

MEASure?	OK (long form)
MEAS?	OK (short form)
MEASU	Error
MEA	Error

Response messages generated by the 3169-20/21 are in long form and in upper case letters.

Headers

It is essential to prefix headers to program messages.
The response messages to the **:CARD:PICKout?** and **:MEMory:PICKout?** queries will not have a header, regardless of whether the queries have a header.

(1) Command program headers

There are two types of command: simple commands and compound commands.

- Simple command header
  This header is a sequence of letters and digits.
  :HOLD
- Compound command header
  This header is made up from a plurality of simple command type headers marked off by colons " **:**".
  :CARD:FORMat

(2) Query program headers

These are for commands used for interrogating the unit about the results of operations, about measured values, or about the current states of settings for the unit. As shown by the following examples, they can be recognized as queries by a question mark "**?**" appearing after the program header.

:FREQuency?
:VT?

Message Terminators (Delimiter)

The 3169-20/21 supports the CR+LF and CR message terminators.
In addition, the 3169-20/21 sends response messages in conjunction with the CR+LF or CR message terminator.

Separators

(1) Message unit separator

A semicolon ";" is used as a message unit separator when it is desired to set out several messages on a single line.

```
:VT 2.0;:VOLTage:RANGe 150;:BEEPer ON
```

Do not link `:CARD:PICKout?` and `:MEMory:PICKout?` queries with other commands or queries.

(2) Header separator

In a message which has a header and data, a space " " is used as the header separator to separate the header from the data.

```
:VOLTage:RANGe 300
```

(3) Data separator

If a message has several data items, commas are required as data separators for separating these data items from one another.

```
:CARD:PICKout? filename,1,1000
```

Data Formats

The main unit uses character string data and decimal numeric data, and the type used varies according to the command in question.

(1) Character data

The character data can be either alphabetic characters or numerals. Although in character data either upper case letters or lower case letters are accepted, response messages output by the main unit are always in upper case letters.

```
:INTERVAL 10S
```

(2) Decimal data

The numeric data values are all represented in decimal, in three formats identified as NR1, NR2 and NR3, and each of these can appear as either a signed number or an unsigned number. Unsigned numbers are taken as positive.
Further, if the accuracy of a numerical value exceeds the range with which the main unit can deal, it is rounded off. (5 and above is rounded up; 4 and below is rounded down).

- NR1 integer data .....(examples: +12, -23, 34)
- NR2 fixed point numbers .....(examples: +1.23, -23.45, 3.456)
- NR3 floating point numbers ..(examples: +1.0E-2, -2.3E+4)

The term "NRf format" includes all these three formats.
When the main unit is receiving it accepts NRf format.
For the response data, the format is specified for each commands and the data in specified format is transmitted. The VT ratio will be set to 5 in all the examples below.

```
:VT 5
:VT 5.2
:VT 4.998E2
```

Abbreviation of Compound Commands

When several compound commands have a common head portion, for example **:STARt:TIME** and **:STARt:TIME?**, then, when and only when writing them directly following on from one another, this common portion (**:STARt:** in this example) can be omitted from each command.
This common portion is called "the current path", by analogy with the general concept of the current directory in the directory structure of UNIX or MS-DOS, and until it is cleared the analysis of following commands is performed by deeming them to be preceded by the current path which has been curtailed in the interests of brevity. This manner of using the current path is shown in the following example:

Normal expression

```
:STARt:TIME 2001,12,10,10,15;:STARt:TIME?
```

Abbreviated expression

```
:STARt:TIME 2001,12,10,10,15;TIME?
```

This becomes the current path, and can be curtailed from the following messages.

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

It is not necessary to prefix a colon "**:**" at the start of headers of simple commands and compound commands. However, in order to prevent confusion with abbreviated forms and mistakes in operation, it is recommended practice always to prefix "**:**" to headers.

On the 3169-20/21, the current paths are as follows**:**

```
:AOUT
:CARD
:CURRent
:DATAout
:DISPlay
:FILEname
:MEMory
:RS232c
:STARt
:STOP
:TIME
:TRANsmit
:VOLTage
```

2.1.2 Output Queue and Input Buffer

Output Queue

Response messages are stored in the output queue. If data is read out on the PC, the queue will be cleared. The output queue is also cleared in the following cases:

- When the power is turned off and turned on again.
- When a query error is generated.

The 3169-20/21 has an output queue of 50 K bytes capacity. If the response messages overflow this limit of 50 K bytes, a query error is generated, and the output queue is cleared.

Input Buffer

The 3169-20/21 has an input buffer of 2048 bytes capacity.
When data exceeding 2048 bytes is transmitted and the buffer becomes full, data will be deleted until analysis of the input buffer is complete. Make sure that each command line is shorter than 2048 bytes.

The length of a single command should be less than 2048 bytes.

2.1.3 Setting Command

The following setting commands are enabled only when the time-series measurement is stopped and Hold is OFF. However, queries are enabled even when the measurement data is held.

:AOUT:CH1
:AOUT:CH2
:AOUT:CH3
:AOUT:CH4
:AOUT:RATE
:AVEraging
:CIRcuitnum
:CLOCk
:CT
:CURRent:RANGe
:DATAout:COPY:MEDIa
:DATAout:ITEM
:DATAout:MEDIa
:DATAout:WAVE
:FREQuency
:ID
:INTErval
:LANGuage
:OPERationvar
:PT
:RS232c:CONNect
:SAMPling
:START:METHod
:STARt:TIME
:STOP:METHod
:STOP:TIME
:VOLTage:RANGe
:VT
:WIRing

Answer Message

Upon receiving a command, the 3169-20/21 returns to the PC an answer message indicating whether the command has been successfully received. When creating a program, make sure the PC accepts this answer message.
An answer message contains one of the following contents (character strings), according to the status.

Status		Message
Operating normally		**ALL RIGHT**
Errors	Execution error	**EXECUTE ERROR**
	Command error	**COMMAND ERROR**
	Query error	**QUERY ERROR**
	Device-dependent error	**DEVICE ERROR**

ALL RIGHT will not be returned upon receipt of the **RS232:BAUD** command or any query. For details, see Command Reference.

2.2 Flow Control

If the input buffer of a device has small capacity, the device may not be able to receive all data. To avoid this problem, a receiving device must send a signal to a sending device to stop sending data before the input buffer becomes full. This is referred to as "flow control." There are two types of flow control: hardware handshaking and software handshaking.

(1) Hardware Handshaking
Data flow is controlled by turning ON and OFF the RTS (RS) or CTS (CS) signal line.

- Receiving
  When the input buffer is more than 3/4 full, RTS is set to Low.
  When the input buffer is 1/4 full or less, RTS is set to Hi.

- Sending
  When CTS = low, the sending device stops sending data.
  When CTS = Hi, the sending device sends data.

(2) Software Handshaking
Data flow is controlled by sending XON and XOFF codes.

- Receiving
  When the input buffer is more than 3/4 full, XOFF (13H) is sent.
  When the input buffer is 1/4 full or less, XON (11H) is sent.

- Sending
  If the sending device receives 13H (XOFF), it stops sending data.
  If the sending device receives 11H (XON), it sends data.

NOTE

- The input buffer of the 3169-20/21 has a capacity of 2048 bytes. The output queue size is 50 KB.
- Flow control for the 3169-20/21 is normally set to OFF. The flow-control setting is selectable from among four presets: OFF, RTS/CTS, XON/XOFF, and Both RTS/CTS and XON/XOFF.

(3) Precautions on using **:CARD:PICKout?** and **:MEMory:PICKout?**

These queries are used for the transmission of data from the PC card or internal memory. Since a large amount of data may be transmitted, executing queries without flow control may result in data not being transmitted correctly. Before executing these queries, set flow control between the 3169-20/21 and PC to XON/XOFF, then perform measurement. For binary data files, set flow control to RTS/CTS.

(4) Flow-Control Setting Commands

Use these commands when measurement has been performed with flow control set to OFF and **:MEMory:PICKout?** is to be executed with flow control. Flow control setting can be changed using the following commands without affecting the saved data.

:RS232C:FLOW <characters>

<Characters>	Flow Control
XONXOFF	XON/XOFF
RTSCTS	RTS/CTS
BOTH	Both XON/XOFF and RTS/CTS
OFF	OFF

NOTE

- After the response message has been received, set flow control back to OFF if necessary.
- This setting can be changed when time-series measurement is not performed and display not held.
- The current setting can be checked using **:RS232C:FLOW?**.

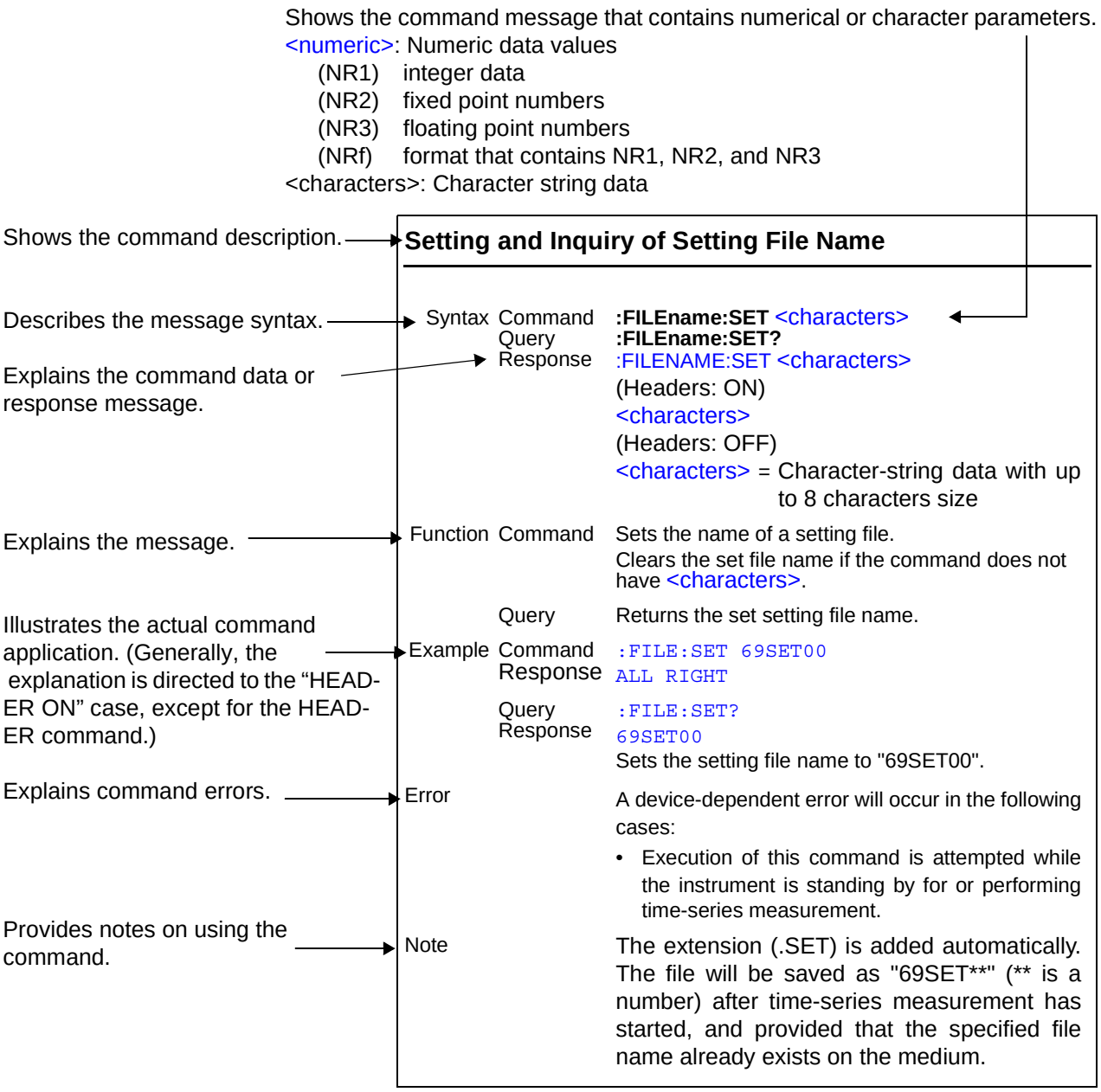
Command Function

Chapter 3

3.1 Command Reference

This chapter explains each command.

3.1.1 Command Reference Format



NOTE

- A query is an inquiry for acquiring various data, such as the current instrument settings and measurement results. If an error occurs in a query, a response message to the query will not be created.
- In case of a system error, a query will not be executed and the error will be detected as a device-dependent error.

Setting and Inquiry of Output Items of D/A Output Channel 1

Syntax

Command **:AOUT:CH1** <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>

Query **:AOUT:CH1?**

Response :AOUT:CH1 <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>
(Headers: ON)
<numeric 1>,<numeric 2>,<characters 3>,<numeric 4>,<numeric 5>
(Headers: OFF)
<numeric 1> = 1/2/3/4 (Circuit No.)
<numeric 2> = 0/1/2/3/4/5
0: Normal measurement
1: Level
2: Content
3: Phase angle
4: Total value
5: THD
<characters 3> = U1,U2,U3,UAVE,I1,I2,I3,I4,IAVE,P,Q,S,PF,F,
WP+,WP-,WQ+,WQ-
<numeric 4> = 1 to 40 (Output ordinals)
<numeric 5> = 1/10/100 (Output magnification)

Function

Command CommandSets the data output items of D/A output channel 1.

Query QueryReturns the data-output items setting of D/A output channel 1.

Example

Command
```
:AOUT:CH1 1,0,P,1,1
```
Response
```
ALL RIGHT
```

Query
```
:AOUT:CH1?
```
Response
```
1,0,P,1,1
```
Makes settings so that the active power of circuit 1 is output to D/A output channel 1.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A setting item not available with the current connection method has been set.
- Items that cannot be measured (e.g., harmonic of S, THD of P) have been selected.

Note

<Numeric 4> will be ignored when <numeric 2> is normal measurement, total value, or THD.
<Numeric 5> will be ignored unless <numeric 2> is level or content.

Setting and Inquiry of Output Items of D/A Output Channel 2

Syntax

Command **:AOUT:CH2** <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>

Query **:AOUT:CH2?**

Response :AOUT:CH2 <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>
(Headers: ON)
<numeric 1>,<numeric 2>,<characters 3>,<numeric 4>,<numeric 5>
(Headers: OFF)
<numeric 1> = 1/2/3/4 (Circuit No.)
<numeric 2> = 0/1/2/3/4/5
0: Normal measurement
1: Level
2: Content
3: Phase angle
4: Total value
5: THD
<characters 3> = U1,U2,U3,UAVE,I1,I2,I3,I4,IAVE,P,Q,S,PF,F,
WP+,WP-,WQ+,WQ-
<numeric 4> = 1 to 40 (Output ordinals)
<numeric 5> = 1/10/100 (Output magnification)

Function

Command CommandSets the data output items of D/A output channel 2.

Query QueryReturns the data-output items setting of D/A output channel 2.

Example

Command `:AOUT:CH2 1,0,Q,1,1`

Response `ALL RIGHT`

Query `:AOUT:CH2?`

Response `1,0,Q,1,1`

Makes settings so that the reactive power of circuit 1 is output to D/A output channel 2.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A setting item not available with the current connection method has been set.
- Items that cannot be measured (e.g., harmonic of S, THD of P) have been selected.

Note

<Numeric 4> will be ignored when <numeric 2> is normal measurement, total value, or THD.
<Numeric 5> will be ignored unless <numeric 2> is level or content.

Setting and Inquiry of Output Items of D/A Output Channel 3

Syntax

Command **:AOUT:CH3** <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>

Query **:AOUT:CH3?**

Response :AOUT:CH3 <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>
(Headers: ON)
<numeric 1>,<numeric 2>,<characters 3>,<numeric 4>,<numeric 5>
(Headers: OFF)
<numeric 1> = 1/2/3/4 (Circuit No.)
<numeric 2> = 0/1/2/3/4/5
0: Normal measurement
1: Level
2: Content
3: Phase angle
4: Total value
5: THD
<characters 3> = U1,U2,U3,UAVE,I1,I2,I3,I4,IAVE,P,Q,S,PF,F,
WP+,WP-,WQ+,WQ-
<numeric 4> = 1 to 40 (Output ordinals)
<numeric 5> = 1/10/100 (Output magnification)

Function

Command CommandSets the data output items of D/A output channel 3.

Query QueryReturns the data-output items setting of D/A output channel 3.

Example

Command `:AOUT:CH3 1,0,S,1,1`

Response `ALL RIGHT`

Query `:AOUT:CH3?`

Response `1,0,S,1,1`

Makes settings so that the apparent power of circuit 1 is output to D/A output channel 3.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:

- A setting item not available with the current connection method has been set.
- Items that cannot be measured (e.g., harmonic of S, THD of P) have been selected.

Note

<Numeric 4> will be ignored when <numeric 2> is normal measurement, total value, or THD.
<Numeric 5> will be ignored unless <numeric 2> is level or content.

Setting and Inquiry of Output Items of D/A Output Channel 4

Syntax

Command **:AOUT:CH4** <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>

Query **:AOUT:CH4?**

Response :AOUT:CH4 <numeric 1>,<numeric 2>,
<characters 3>,<numeric 4>,<numeric 5>
(Headers: ON)
<numeric 1>,<numeric 2>,<characters 3>,
<numeric 4>,<numeric 5>
(Headers: OFF)
<numeric 1> = 1/2/3/4 (Circuit No.)
<numeric 2> = 0/1/2/3/4/5
0: Normal measurement
1: Level
2: Content
3: Phase angle
4: Total value
5: THD
<characters 3> = U1,U2,U3,UAVE,I1,I2,I3,I4,IAVE,P,Q,S,PF,F,
WP+,WP-,WQ+,WQ-
<numeric 4> = 1 to 40 (Output ordinals)
<numeric 5> = 1/10/100 (Output magnification)

Function

Command CommandSets the data output items of D/A output channel 4.

Query QueryReturns the data-output items setting of D/A output channel 4.

Example

Command `:AOUT:CH4 1,0,F,1,1`
Response `ALL RIGHT`

Query `:AOUT:CH4?`
Response `1,0,F,1,1`
Makes settings so that the frequency of circuit 1 is output to D/A output channel 4.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A setting item not available with the current connection method has been set.
- Items that cannot be measured (e.g., harmonic of S, THD of P) have been selected.

Note

<Numeric 4> will be ignored when <numeric 2> is normal measurement, total value, or THD.
<Numeric 5> will be ignored unless <numeric 2> is level or content.

Setting and Inquiry of D/A Output Integration Rate

Syntax

Command **:AOUT:RATE** <characters>

Query **:AOUT:RATE?**

Response :AOUT:RATE <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = 1K/5K/10K/50K/100K/500K/1000K

Function

Command Sets the output rate to be used when D/A output is set to the integration results.

Query Returns the set output rate to be used when D/A output is set to the integration results.

Example

Command
```
:AOUT:RATE 50K
```
Response
```
ALL RIGHT
```

Query
```
:AOUT:RATE?
```
Response
```
50K
```
Sets the D/A output integration rate to 5 V/50 kWh (5 V/50 kvarh).

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Number of Measurements to be Averaged

Syntax

Command **:AVEraging** <numeric>

Query **:AVEraging?**

Response :AVERAGING <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 1/2/5/10/20

Function

Command Sets the number of measurements to be averaged.

Query Returns the set number of measurements to be averaged.

Example

Command
```
:AVE 5
```
Response
```
ALL RIGHT
```

Query
```
:AVE?
```
Response
```
5
```
Sets the number of measurements to be averaged to 5.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Backlight

Syntax

Command **:BACKlight** <characters>
Query **:BACKlight?**
Response :BACKLIGHT <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = ON/OFF/AUTO

Function

Command Sets the LCD backlight.

Query Returns the LCD backlight setting.

Example

Command `:BACK ON`
Response `ALL RIGHT`

Query `:BACK?`
Response `ON`
Turns the backlight ON.

Setting and Inquiry of Beeper

Syntax

Command **:BEEPer** <characters>
Query **:BEEPer?**
Response :BEEPER <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = ON/OFF

Function

Command Turns the beeper ON/OFF.

Query Returns the ON/OFF setting of the beeper.

Example

Command `:BEEP OFF`
Response `ALL RIGHT`

Query `:BEEP?`
Response `OFF`
Turns OFF the beeper.

Deletion of Files on PC Card

Syntax Command **:CARD:DELete** <file name>

Function Command Deletes the file with the specified <file name> from the PC card.

Example Command `:CARD:DEL 69MEAS00.CSV`
Response `ALL RIGHT`
Deletes the file "69MEAS00.CSV" from the PC card.

Error A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A file name that does not exist in the PC file has been specified.
- The PC card is not installed in the 3169-20/21.

Download of File from Internal Memory to PC Card

Syntax Command **:CARD:DOWNload** <file name1>,<file name2>
<file name1> = File name used in internal memory
<file name2> = File name to use when saving onto the PC card

Function Command Reads out the file with the specified <file name1> from internal memory, and downloads it to the PC card as <file name2>.

Example Command `:CARD:DOWN 69BACK00.CSV,69MEAS00.CSV`
Response `ALL RIGHT`
Downloads the file "69BACK00.CSV" from internal memory to the PC card as "69MEAS00.CSV".

Error A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A file name that does not exist in the internal memory has been specified.
- The specified file name already exists on the PC card.
- The PC card is full.
- The PC card is not installed in the 3169-20/21.

Note Do not press any key while this command is being executed.

Download of All Files in Internal Memory to PC Card

Syntax Command **:CARD:DOWNload:ALL**

Function Command Reads out all files saved in internal memory, and downloads the files to the PC card using the same file names.

Example
Command `:CARD:DOWN:ALL`
Response `ALL RIGHT`
Reads out all files saved in internal memory, and downloads the files to the PC card using the same file names.

Error
A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- Downloads all files in internal memory to the PC card using the same file names.
- The PC card is not installed in the 3169-20/21.

Note Do not press any key while this command is being executed.

Inquiry of Installation of PC Card

Syntax
Query **:CARD:EXISt?**
Response :CARD:EXIST <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = Y/N
Y: The PC card is installed.
N: The PC card is not installed.

Function Query Returns an answer indicating whether the PC card is installed.

Example
Query `:CARD:EXIS?`
Response `Y`
This indicates that the PC card is installed.

Inquiry of File Name on PC Card

Syntax

Query: **:CARD:FILEname?** <characters>
<characters> = MEAS/INST/BMP/WAVE/SET
MEAS: Measurement file
INST: Short-term interval file
BMP: Screen file
WAVE: Waveform file
SET: Setting file

Response: <file name>,<size>,...

Function

Query: Searches for the specified type of file among the files saved on the PC card, and returns the file name and file size.

Example

Query: `:CARD:FILE? MEAS`
Response: `69MEAS00,45342`
This indicates that the measurement file "69MEAS00.CSV" (size: 45342 bytes) is on the PC card.

Error

An execution error will occur in the following cases:
- The PC card is not installed in the 3169-20/21.

Note

Returns NO FILES if the specified file does not exist.

Formatting of PC Card

Syntax

Command: **:CARD:FORMat**

Function

Command: Formats the PC card installed in the 3169-20/21.

Example

Command: `:CARD:FORM`
Response: `ALL RIGHT`
Formats the PC card.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- The PC card is not installed in the 3169-20/21.

Note

Do not press any key while this command is being executed.

File Transfer from PC Card

Syntax

Query: **:CARD:PICKout?** <file name1>,<numeric 2>,<numeric 3>

Response: STX(02)+Data to be transferred+ETX(03)

<file name1> = Name of file to be transferred

<numeric 2> = Start position

<numeric 3> = Stop position

Function

Query: Reads out the file with the specified <file name1> on the PC card from the start position to the stop position, adds "STX(02)" to the head of the read data and "ETX(03)" to the tail, then transfers the data.

Example

Query:
```
:CARD:PICK? 69MEAS00.CSV,1,1000
```
Response:
```
STX(02)HIOKI 3169.......ETX(03)
```
Returns the data from the first byte to the 1000th byte of the file "69MEAS00.CSV".

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted to transfer data exceeding 1024 bytes, while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:

- A file name that does not exist in the PC file has been specified.
- The PC card is not installed in the 3169-20/21.
- The start position exceeds the file size.

Note

- The response message will not have a header.
- If the stop position exceeds the file size, the data in the specified file will be transferred to the end.
- The response data of a circuit not in use will be treated as meaningless data.

Storage of Setting File on PC Card

Syntax Command **:CARD:SETting:SAVE** <characters>
<characters> = Character-string data with up to 8 characters size

Function Command Saves the current settings as a setting file on the PC card by naming the file with the specified character string. If no character string is specified, the file is saved with the setting file name. If there is no setting file name, the file is saved with the automatic file name.

Example Command `:CARD:SET:SAVE 69SET00`
Response `ALL RIGHT`
Saves the current settings on the PC card as the setting file "69SET00.SET".

Error A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- You have attempted to save more than 10 setting files. (Up to 10 files can be stored on the PC card.)
- The PC card is not installed in the 3169-20/21.

Note The extension (.SET) is automatically added to the file.

Reading of Setting File from PC Card

Syntax

Command **:CARD:SETting:LOAD** <characters>
<characters> = Character-string data with up to 8 characters size

Function

Command Searches for the setting file with the specified character string with file extension (.SET) as the file name on the PC card, reads the setting, then changes the current settings.

Example

Command `:CARD:SET:LOAD 69SET00`
Response `ALL RIGHT`
Reads out the setting information from the file "69SET00.SET" on the PC card to the 3169-20/21.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A file name that does not exist in the PC file has been specified.
- The PC card is not installed in the 3169-20/21.

Setting and Inquiry of Number of Circuits to be Measured

Syntax

Command **:CIRCuitnum** <numeric>
Query **:CIRCuitnum?**
Response :CIRCUITNUM <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 1/2/3/4 (Circuit No.)

Function

Command Sets the number of circuits to be measured.

Query Returns the set number of circuits to be measured.

Example

Command `:CIRC 2`
Response `ALL RIGHT`

Query `:CIRC?`
Response `2`
Sets the number of circuits to be measured to 2.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A number of circuits not available with the current connection method has been specified.

Setting and Inquiry of Actual Time

Syntax

Command **:CLOCk** <year>,<month>,<day>,<hour>,<min>,<sec>

Query **:CLOCk?**

Response CLOCK <year>,<month>,<day>,<hour>,<min>,<sec>
(Headers: ON)
<year>,<month>,<day>,<hour>,<min>,<sec>
(Headers: OFF)

Function

Command Sets the actual time.

Query Returns the current actual time.

Example

Command `:CLOC 2002,4,1,15,30,0`

Response `ALL RIGHT`

Query `:CLOC?`

Response `2002,4,1,15,30,30`

Sets the actual time to 15:30:00, April 1, 2002.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of CT Ratio

Syntax

Command **:CT** <numeric 1>,<numeric 2>

Query **:CT?**

Response CT <numeric 3>,<numeric 4>,<numeric 5>,<numeric 6>
(Headers: ON)
<numeric 3>,<numeric 4>,<numeric 5>,<numeric 6>
(Headers: OFF)
<numeric 1> = 1/2/3/4 (Circuit No.)
<numeric 2> = 0.01 to 9999.99 (CT ratio)
<numeric 3> = CT ratio of Circuit 1
<numeric 4> = CT ratio of Circuit 2
<numeric 5> = CT ratio of Circuit 3
<numeric 6> = CT ratio of Circuit 4

Function

Command Sets the CT ratio of the circuit of the specified number.

Query Returns the set CT ratios to all circuits.

Example

Command
```
:CT 1,2.0;:CT 2,3.0;:CT 3,4.0;:CT 4,5.0
```
Response
```
ALL RIGHT
```

Query
```
:CT?
```
Response
```
2.0,3.0,4.0,5.0
```
Sets the CT ratios of Circuits 1, 2, 3, and 4 to 2.0, 3.0, 4.0, and 5.0, respectively.

Error

An execution error will occur in the following cases:
- A circuit number not available with the current connection method has been set.

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The response data of a circuit not in use will be treated as meaningless data.

Setting and Inquiry of Current Range

Syntax

Command **:CURRent:RANGe** <numeric 1>,<numeric 2>

Query **:CURRent:RANGe?**

Response :CURRENT:RANGE <numeric 3>,<numeric 4>,
<numeric 5>,<numeric 6>
(Headers: ON)
<numeric 3>,<numeric 4>,<numeric 5>,<numeric 6>
(Headers: OFF)
<numeric 1> = 1/2/3/4 (Circuit No.)
<numeric 2> = 0.5 to 5000.0 (Current range)
<numeric 3> = Current range of Circuit 1
<numeric 4> = Current range of Circuit 2
<numeric 5> = Current range of Circuit 3
<numeric 6> = Current range of Circuit 4

Function

Command Sets the current range of the circuit of the specified number. The unit is amperes (A).

Query Returns the set current ranges to all circuits.

Example

Command
```
:CURR:RANG 1,5.0;RANG 2,5.0;RANG 3,5.0;
RANG 4,5.0
```
Response
```
ALL RIGHT
```

Query
```
:CURR:RANG?
```
Response
```
5.0,5.0,5.0,5.0
```
Sets the current ranges of Circuits 1, 2, 3, and 4 to the 5-A range.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A circuit number not available with the current connection method has been set.

Note

The response data of a circuit not in use will be treated as meaningless data.

Storage of Screen Data

Syntax
Command: **:DATAout:COPY**

Function
Command: Performs the same function as the **COPY** key on the 3169-20/21.

Example
Command: `:DATA:COPY`
Response: `ALL RIGHT`
Saves screen data on the set medium.

Error
A device-dependent error will occur in the following cases:
- The medium for saving/printing out the screen data is set to PRINTER.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- The PC card is selected as the medium for saving data, but a PC card is not installed in the 3169-20/21. (Failure to save screen data will result in data not being saved in internal memory as backup.)

Setting and Inquiry of Medium to Save/Print Out Screen Data

Syntax
Command: **:DATAout:COPY:MEDIa** <characters>
Query: **:DATAout:COPY:MEDIa?**
Response: :DATAOUT:COPY:MEDIA <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = PRINTER/CARD/MEMORY
PRINTER: Printer
CARD: PC card
MEMORY: Internal memory

Function
Command: Sets the medium for saving/printing out the screen data.
Query: Returns the set medium for saving/printing out the screen data.

Example
Command: `:DATA:COPY:MEDI CARD`
Response: `ALL RIGHT`

Query: `:DATA:COPY:MEDI?`
Response: `CARD`
Sets the medium for saving/printing out the screen data to the PC card.

Error
A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and inquiry of Harmonics Data Output

Syntax

Command **:DATAout:HARMonics** <characters>
Query **:DATAout:HARMonics?**
Response :DATAOUT:HARMONICS <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = OFF/ON

Function

Command Sets whether to output a harmonics data (ON/OFF).

Query Returns the ON/OFF setting of harmonics data output.

Example

Command
```
:DATA:HARM ON
```
Response
```
ALL RIGHT
```

Query
```
:DATA:HARM?
```
Response
```
ON
```
Turns ON harmonics data output.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The data to be output using command are the items specified in DATAout:ITEM, or on the save/print items setting screen.

Setting and Inquiry of Data Output Items

Syntax

Command **:DATAout:ITEM** <numeric 1>,<numeric 2>,
<numeric 3>,<numeric 4>,<numeric 5>,
<numeric 6>,<numeric 7>,<numeric 8>,
<numeric 9>

Query **:DATAout:ITEM?**

Response :DATAOUT:ITEM <numeric 1>,<numeric 2>,<numeric 3>,
<numeric 4>,<numeric 5>,<numeric 6>,<numeric 7>,
<numeric 8>,<numeric 9>
(Headers: ON)
<numeric 1>,<numeric 2>,<numeric 3>,<numeric 4>,
<numeric 5>,<numeric 6>,<numeric 7>,<numeric 8>,<numeric 9>
(Headers: OFF)

Function

Command Sets the data output items. The setting governs the following data output:

- :MEASURE? query (Only the instantaneous values are output in case of harmonics.)
- Measurement files to be saved on the PC card
- Measurement files to be saved in internal memory
- Measurement data to be output to the printer

Query Returns the setting of the data output items.

Example

Command
```
:DATA:ITEM 64,15,0,0,0,0,0,0,0
```
Response
```
ALL RIGHT
```

Query
```
:DATA:ITEM?
```
Response
```
64,15,0,0,0,0,0,0,0
```
Sets the data output items to the instantaneous, average, maximum, and minimum values of normal measurement.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:

- A circuit number not available with the current number of circuits for measurement has been specified.
- U/I/P selection data not available with the current connection method has been specified.

Note

- When "all ordinals," "all odd ordinals," and "all even ordinals" are selected simultaneously, "all ordinals" is enabled.
- Individual ordinal data can also be selected when "all ordinals," "all odd ordinals," or "all even ordinals" is selected. However, "all ordinals," "all odd ordinals," or "all even ordinals" will override the individual ordinal data.
- When “all odd ordinals” and “all even ordinals” are selected, “all ordinals” is enabled.

<numeric 1>: Normal measurement/THD/total value/phase angle/content/level selection data

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
	Normal measurement		THD	Total value	Phase angle	Content	Level

<numeric 2>: All ordinals/odd ordinals/even ordinals/integrated value/ minimum value/maximum value/average value/
instantaneous value selection data

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
All ordinals	All odd ordinals	All even ordinals	Integrated value	Min. value	Max. value	Ave. value	Instantaneous value

<numeric 3>: Circuit No. data

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
				4	3	2	1

<numeric 4>: U/I/P selection data

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
P	I4	I3	I2	I1	U3	U2	U1

<numeric 5>: Ordinal data to be output from 1 to 8

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
8th	7th	6th	5th	4th	3th	2th	1th

<numeric 6>: Ordinal data to be output from 9 to 16

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
16th	15th	14th	13th	12th	11th	10th	9th

<numeric 7>: Ordinal data to be output from 17 to 24

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
24th	23th	22th	21th	20th	19th	18th	17th

<numeric 8>: Ordinal data to be output from 25 to 32

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
32th	31th	30th	29th	28th	27th	26th	25th

<numeric 9>: Ordinal data to be output from 33 to 40

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
40th	39th	38th	37th	36th	35th	34th	33th

Setting and Inquiry of Medium for Saving Data

Syntax

Command **:DATAout:MEDIa** <characters>

Query **:DATAout:MEDIa?**

Response :DATAOUT:MEDIA <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = CARD/MEMORY
CARD: PC card
MEMORY: Internal memory

Function

Command Sets the medium for saving data.

Query Returns the set medium for saving data.

Example

Command `:DATA:MEDI CARD`

Response `ALL RIGHT`

Query `:DATA:MEDI?`

Response `CARD`

Sets the medium for saving data to the PC card.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Storage of Measurement Data

Syntax

Command **:DATAout:SAVE**

Function

Command Performs the same function as the **SAVE** key on the 3169-20/21.

Example

Command :DATA:SAVE

Response `ALL RIGHT`

Saves measurement data on the medium set with :DATAOUT:MEDIA.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- The PC card is selected as the medium for saving data, but a PC card is not installed in the 3169-20/21. (Failure to save the measurement data will result in data not being saved in internal memory as backup.)

Setting and Inquiry of Waveform Data File Storage

Syntax

Command **:DATAout:WAVE** <characters>
Query **:DATAout:WAVE?**
Response :DATAOUT:WAVE <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = OFF/ON

Function

Command Sets whether to save a waveform data file (ON/OFF).

Query Returns the ON/OFF setting of waveform data file storage.

Example

Command `:DATA:WAVE ON`
Response `ALL RIGHT`

Query `:DATA:WAVE?`
Response `ON`
Turns ON waveform data file storage.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The waveforms to be saved using this command are the items specified by <numeric 3> and <numeric 4> (circuit No. and U/I/P selection data) in DATAout:ITEM, or on the save/print items setting screen. To save waveforms, harmonics storage must be ON.

Setting and Inquiry of Measurement Item to be Displayed

Syntax

Command: **:DISPlay:MEAS** <numeric 1>,<numeric 2>,<numeric 3>

:DISPlay:MEAS?

Query: :DISPLAY:MEAS <numeric 1>,<numeric 2>,<numeric 3>

Response:
(Headers: ON)
<numeric 1>,<numeric 2>,<numeric 3>
(Headers: OFF)
<numeric 1> = 0/1/2/3/4/5/6/7/8/9 (Screen)
0: Main
1: Power
2: Integrate
3: Demand
4: Zoom
5: Harmonic list
6: Harmonic graph
7: Waveform
8: Wiring check
9: Wiring diagram
<numeric 2> = 1/2/3/4 (Circuit No.)
<numeric 3> = 0/1/2/3 (Page)
0: Instantaneous value
1: Average value
2: Maximum value
3: Minimum value

Function

Command: Sets the measurement item to be displayed.

Query: Returns the set measurement item to be displayed.

Example

Command: `:DISP:MEAS 0,1,0`
Response: `ALL RIGHT`

Query: `:DISP:MEAS?`
Response: `0,1,0`
Makes settings so that the instantaneous values of Circuit 1 are displayed on the main screen.

Error

An execution error will occur in the following cases:
- An execut <numeric 1> is set to 5, 6, or 7, and <numeric 3> is set to a number other than 0 (instantaneous value).
  (Be sure to set <numeric 3> to 0 (instantaneous value).)
- <numeric 2> is set to a circuit number not available with the wiring method or the set number of circuits to be measured.

Note

If <numeric 1> is 8 or 9, <numeric 2> and <numeric 3> will be ignored.

Setting and Inquiry of Display Mode

Syntax

Command **:DISPlay:MODE** <characters>

Query **:DISPlay:MODE?**

Response :DISPLAY:MODE <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = MEAS/SET/FILE
MEAS: Measurement screen
SET: Setting screen
FILE: File screen

Function

Command Switches over to another screen.

Query Returns the currently displayed screen.

Example

Command `:DISP:MODE MEAS`

Response `ALL RIGHT`

Query `:DISP:MODE?`

Response `MEAS`

Sets the display mode to the measurement screen.

Change of File Name

Syntax

Command **:FILEname:CHANge** <characters 1>,<file name2>,<file name3>
<characters 1> = CARD/MEMORY
CARD: PC card
MEMORY: Internal memory
<file name2> = File name before change
<file name3> = File name after change

Function

Command Changes the name of a file on the specified medium.

Example

Command `:FILE:CHAN CARD,69MEAS00.CSV,MEASURE.CSV`

Response `ALL RIGHT`

Changes "69MEAS00.CSV" to "MEASURE.CSV" on the PC card.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:

- <file name2> does not exist on the specified medium.

Setting and Inquiry of Measurement File Name

Syntax

Command **:FILEname:MEAS** <characters>
Query **:FILEname:MEAS?**
Response :FILENAME:MEAS <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = Character-string data with up to 8 characters size

Function

Command Sets the name of a measurement file.
Clears the set file name if the command does not have <characters>.

Query Returns the set measurement file name.

Example

Command `:FILE:MEAS 69MEAS00`
Response `ALL RIGHT`

Query `:FILE:MEAS?`
Response `69MEAS00`
Sets the measurement file name to "69MEAS00".

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The files with the following names are saved:
- Measurement file: "Character string.CSV"
- Waveform file: "Character string.WUI"
- Short-term interval file: "Character string.BIN"

The file will be saved as "69MEAS**" (** is a number) after time-series measurement has started, and provided that the specified file name already exists on the medium.

Setting and Inquiry of Setting File Name

Syntax

Command **:FILEname:SET** <characters>

Query **:FILEname:SET?**

Response :FILENAME:SET <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = Character-string data with up to 8 characters size

Function

Command Sets the name of a setting file.
Clears the set file name if the command does not have <characters>.

Query Returns the set setting file name.

Example

Command
```
:FILE:SET 69SET00
```
Response
```
ALL RIGHT
```

Query
```
:FILE:SET?
```
Response
```
69SET00
```
Sets the setting file name to "69SET00".

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The extension (.SET) is added automatically. The file will be saved as "69SET**" (** is a number) after time-series measurement has started, and provided that the specified file name already exists on the medium.

Setting and Inquiry of Measured Line Frequency

Syntax

Command **:FREQuency** <numeric>
Query **:FREQuency?**
Response :FREQUENCY <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 50/60
50: 50 Hz
60: 60Hz

Function

Command Sets the frequency of the line to be measured.

Query Returns the set frequency of the line to be measured.

Example

Command `:FERQ 50`
Response `ALL RIGHT`

Query `:FREQ?`
Response `50`
Sets the frequency of the line to be measured to 50 Hz.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Communications Output Header

Syntax

Command **:HEADer** <characters>
Query **:HEADer?**
Response :HEADER <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = ON/OFF

Function

Command Sets whether to add a communications output header (ON/OFF).

Query Returns the ON/OFF setting of the communications output header.

Example

Command `:HEAD OFF`
Response `ALL RIGHT`

Query `:HEAD?`
Response `OFF`
Turns OFF the communications output header.

Setting and Inquiry of Hold State

Syntax

Command **:HOLD** <characters>
Query **:HOLD?**
Response :HOLD <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = ON/OFF

Function

Command Sets whether to hold display (ON/OFF).

Query Returns the ON/OFF setting of the Hold function.

Example

Command `:HOLD OFF`
Response `ALL RIGHT`

Query `:HOLD?`
Response `OFF`
Turns OFF the Hold function.

Setting and Inquiry of ID Number

Syntax

Command **:ID** <numeric>
Query **:ID?**
Response :ID <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 1 to 999

Function

Command Sets the ID No.

Query Returns the set ID No.

Example

Command `:ID 1`
Response `ALL RIGHT`

Query `:ID?`
Response `1`
Sets the response ID No. to 1.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Interval

Syntax

Command **:INTErval** <characters>

Query **:INTErval?**

Response :INTERVAL <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = ALL/0.1S/0.2S/0.5S/1S/2S/5S/10S/1M/2M/5M/10M/15M/30M/60M
ALL: All waves
0.1S: 100 ms
0.2S: 200 ms
0.5S: 500 ms
1S: 1 second
2S: 2 seconds
5S: 5 seconds
10S: 10 seconds
1M: 1 minute
2M: 2 minutes
5M: 5 minutes
10M: 10 minutes
15M: 15 minutes
30M: 30 minutes
60M: 60 minutes

Function

Command Sets the interval.

Query Returns the set interval.

Example

Command `:INTE 1S`
Response `ALL RIGHT`

Query `:INTE?`
Response `1S`
Sets the interval to 1 second.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Language

Syntax

Command **:LANGuage** <characters>

Query **:LANGuage?**

Response :LANGUAGE <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = JAPANESE/ENGLISH/GERMAN/ITALIAN
/CHINESE1/CHINESE2/FRENCH/SPANISH/
KOREAN
JAPANESE: Japanese
ENGLISH : English
GERMAN : German
ITALIAN : Italian
CHINESE1: Chinese (simple)
CHINESE2: Chinese (trad)
FRENCH : French
SPANISH : Spanish
KOREAN : Korean

Function

Command Sets the language.

Query Returns the set language.

Example

Command `:LANG JAPANESE`

Response `ALL RIGHT`

Query `:LANG?`

Response `JAPANESE`

Sets the language to Japanese.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Inquiry of Measurement Data

Syntax

Query **:MEASure?**

Response <headers> <numeric> (Headers: ON)
<numeric> (Headers: OFF)

Function

Query

Outputs in text form the items specified with :DATAout:ITEM among the data displayed on the 3169-20/21. (The data will be arranged in the same order as on the PC card.)

- Header
  The same header as that used on the PC card is used. (See the operations manual of the 3169-20/21.)
- Data

Date	yyyy/mm/dd	4-digit year, 2-digit month, 2-digit day
Time	hh:mm:ss	2-digit hour, 2-digit minute, 2-digit second
Elapsed time	hhhhh:mm:ss	5-digit hour, 2-digit minute, 2-digit second
Electric energy	±1234.56E+00	6-digit number + decimal point
Data other than that on electric energy	±123.45E+00	5-digit number + decimal point
Status data	1234567890	10 digits

Example

Query
```
:MEAS?
```
Response
```
DATE 2002/04/03;TIME 12:00:00;ETIME
00005:00:00;STATUS 0000000000;U1_INST[V]
+100.00E+00;...
```
(Headers: ON)
```
2002/04/03;12:00:00;00005:00:00;0000000000;
+100.00E+00;...
```
(Headers: OFF)
Inquires for measurement data
Outputs the character string +000000E+99 if there is no data.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted while the setting screen or file screen appears on the 3169-20/21's display.

Note

Only the instantaneous values are output in case of harmonics. The message unit separator can be changed using the :TRAN:SEP command.

Inquiry of File Name in Internal Memory

Syntax

Query: **:MEMory:FILEname?** <characters>

Response: :MEMORY:FILE <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = MEAS/INST/BMP/WAVE/SET
MEAS: Measurement file
INST: Short-term interval file
BMP: Screen file
WAVE: Waveform file
SET: Setting file

Function

Query: Searches for the specified type of file among the files saved in internal memory, and returns the file name and file size.

Example

Query:
```
:MEM:FILE? MEAS
```
Response:
```
69MEAS00,45342
```
This indicates that the measurement file "69MEAS00.CSV" (size: 45342 bytes) is in internal memory.

Note

Returns NO FILES if the specified file does not exist.

Formatting of Data File in Internal Memory

Syntax

Command: **:MEMory:FORMat**

Function

Command: Formats the data files in internal memory.

Example

Command:
```
:MEM:FORM
```
Response:
```
ALL RIGHT
```
Formats the data files in internal memory.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

- Setting files cannot be formatted using this command.
- Setting files are formatted using the MEMory:SETting:FORMat command.
- Do not press any key while this command is being executed.

File Transfer from Internal Memory

Syntax

Query: **:MEMory:PICKout?** <file name1>,<numeric 2>,<numeric 3>
Response: :STX(02)+Data to be transferred+ETX(03)
<file name1> = Name of file to be transferred
<numeric 2> = Start position
<numeric 3> = Stop position

Function

Query: Reads out the file with the specified <file name1> in internal memory from the start position to the stop position, adds "STX(02)" to the head of the read data and "ETX(03)" to the tail, then transfers the data.

Example

Query: `:MEM:PICK? 69MEAS00.CSV,1,1000`
Response: `STX(02)HIOKI 3169.....ETX(03)`
Returns the data from the first byte to the 1000th byte of the file "69MEAS00.CSV".

Error

A device-dependent error will occur in the following cases:
- The name of a file that does not exist in internal memory has been specified.

An execution error will occur in the following cases:
- A file name that does not exist in the internal memory has been specified.
- The start position exceeds the file size.

Note

- The response message will not have a header.
- If the stop position exceeds the file size, the data in the specified file will be transferred to the end.
- Setting data cannot be transferred.
- Do not press any key while this command is being executed.

Deletion of Setting Files in Internal Memory

Syntax

Command: **:MEMory:SETting:DELete** <characters>
:<characters> = Character-string data with up to 8 characters size (file name)

Function

Command: Deletes the setting file named with the specified <characters> from internal memory.

Example

Command: `:MEM:SET:DEL 69SET00`
Response: `ALL RIGHT`
Deletes the setting file "69SET00.SET" from internal memory.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A file name that does not exist in the internal memory has been specified.

Formatting of Setting Files in Internal Memory

Syntax Command **:MEMory:SETting:FORMat**

Function Command Formats the setting files in internal memory.

Example Command `:MEM:SET:FORM`
Response `ALL RIGHT`
Formats the setting files in internal memory.

Error A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note Data files are formatted using the MEMory:FORMat command.

Storage of Setting File in Internal Memory

Syntax Command **:MEMory:SETting:SAVE** <characters>
<characters> = Character-string data with up to 8 characters size (file name)

Function Command Saves the current settings as a setting file in internal memory by naming the file with the specified character string.
If any character string is not specified, the file is saved with the setting file name. If there is no setting file name, it is saved with the automatic file name.

Example Command `:MEM:SET:SAVE 69SET00`
Response `ALL RIGHT`
Saves the current settings in internal memory as the setting file "69SET00.SET".

Error A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- An attempt is made to save more than 5 setting files in internal memory. (Up to 5 files can be stored in internal memory.)

Note The extension (.SET) is automatically added to the file.

Reading of Setting File from Internal Memory

Syntax

Command **:MEMory:SETting:LOAD** <characters>
<characters> = Character-string data with up to 8 characters size (file name)

Function

Command Searches the setting file with the specified character string with the setting-file extension (.SET) as the file name in internal memory, reads the settings, then changes the current settings.

Example

Command `:MEM:SET:LOAD 69SET00`
Response `ALL RIGHT`
Reads out the file "69SET00.SET" from internal memory, and uses it as the settings for the 3169-20/21.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- A file name that does not exist in the internal memory has been specified.

Setting and Inquiry of Use of Reactive Power-Meter Method

Syntax

Command **:OPERationvar** <characters>
Query **:OPERationvar?**
Response :OPERATIONVAR <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = ON/OFF

Function

Command Sets whether to use the reactive power-meter method.

Query Returns the setting on whether to use the reactive power-meter method.

Example

Command `:OPER ON`
Response `ALL RIGHT`

Query `:OPER?`
Response `ON`
Makes settings so that the reactive power-meter method is used.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of PT (VT) Ratio

Syntax

Command **:PT** <numeric>
Query **:PT?**
Response :PT <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 0.01 to 9999.99 (PT ratio)

Function

Command Sets the PT ratio.

Query Returns the set PT ratio.

Example

Command `:PT 2.0`
Response `ALL RIGHT`

Query `:PT?`
Response `2.0`
Sets the PT ratio to 2.0.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Execution of System Reset

Syntax

Command **:RESEt**

Function

Command Executes a system reset.

Example

Command `:RESE`
Response `ALL RIGHT`
Executes a system reset.

Setting and Inquiry of Baud Rate

Syntax

Command **:RS232c:BAUD** <numeric>

Query **:RS232c:BAUD?**

Response :RS232C:BAUD <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 2400/9600/19200/38400

Function

Command Sets the baud rate of the RS-232C.

Query Returns the set baud rate of the RS-232C.

Example

Command `:RS232:BAUD 38400`

Response None
Changes the baud rate to 38400.

Query `:RS232:BAUD?`

Response `38400`
Changes the baud rate to 38400.

Note

The response ALL RIGHT will not be returned to the command, as the command changes the baud rate. In addition, response data will not be sent for other commands on the same line. If the baud rate cannot be changed, an error will be returned.

Setting and Inquiry of Device to Which RS-232C is Connected

Syntax

Command **:RS232c:CONNect** <characters>
Query **:RS232c:CONNect?**
Response :RS232C:CONNECT <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = PC/PRINTER

Function

Command Sets the device to which the RS-232C is connected.

Query Returns the set device to which the RS-232C is connected.

Example

Command `:RS232:CONN PC`
Response `ALL RIGHT`

Query `:RS232:CONN?`
Response `PC`
Sets the device to a PC.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The response ALL RIGHT will be returned to the command only when the device is set to PC, to avoid setting it to another device. If PRINTER is selected for the <character> of the command, the command will not be accepted.

Setting and Inquiry of Flow Control

Syntax

Command **:RS232c:FLOW** <characters>

Query **:RS232c:FLOW?**

Response :RS232C:FLOW <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = OFF/XONXOFF/RTSCTS/BOTH
OFF: Flow control is not used.
XONXOFF: XON/XOFF control
RTSCTS: RTS/CTS control
BOTH: Both XON/XOFF and RTS/CTS are used.

Function

Command Sets flow control.

Query Returns the flow-control setting.

Example

Command `:RS232:FLOW OFF`

Response `ALL RIGHT`

Query `:RS232:FLOW?`

Response `OFF`

Turns OFF flow control.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Sampling Method

Syntax

Command **:SAMPling** <characters>
Query **:SAMPling?**
Response :SAMPLING <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = PLL/FIX
PLL: PLL
FIX: Fixed clock

Function

Command Sets the sampling method.

Query Returns the set sampling method.

Example

Command `:SAMP PLL`
Response `ALL RIGHT`

Query `:SAMP?`
Response `PLL`
Sets the sampling method to PLL.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The 3169-20/21 cannot obtain accurate measurements if this setting is not correct.

Setting and Inquiry of Clamp-On Sensor

Syntax

Command **:SENSor** <numeric 1>,<characters 1>
Query **:SENSor?**
Response :SENSOR <characters 2>,<characters 3>,<characters 4>,<characters 5>
(Headers: ON)
<characters 2>,<characters 3>,<characters 4>,<characters 5>
(Headers: OFF)
<numeric 1> = 1/2/3/4 (Circuit No.)
<characters 1> = Sensor
<characters 2> = Sensor for Circuit 1
<characters 3> = Sensor for Circuit 2
<characters 4> = Sensor for Circuit 3
<characters 5> = Sensor for Circuit 4
<characters 1> to <characters 5> = 9660/9661/9667-5k/9667-500/9669/9694/9695-02/9695-03

Function

Command Sets the sensor for the circuit of the specified number.

Query Returns the set sensors to all circuits.

Example

Command `:SENS 1,9660;SENS 2,9660;SENS 3,9660;SENS 4;9660`
Response `ALL RIGHT`

Query `:SENS?`
Response `9660,9660,9660,9660`
Sets the sensors for Circuits 1 to 4 to 9660.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

An execution error will occur in the following cases:
- The response data of a circuit not in use will be treated as meaningless data.

Note

The response data of a circuit not in use will be treated as meaningless data.

Start and Standby of Time-Series Measurement

Syntax

Command **:STARt**

Function

Command Takes the following action in accordance with the time-series measurement startup procedure:
- Sets the 3169-20/21 starting time-series measurement when the start method is set to manual.
- Sets the 3169-20/21 standing by for time-series measurement when the start time is set.

Example

Command `:STAR`
Response `ALL RIGHT`
Sets the 3169-20/21 starting or standing by for time-series measurement.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Time-Series Measurement Start Method

Syntax

Command **:STARt:METHod** <characters>
Query **:STARt:METHod?**
Response :START:METHOD <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = MANUAL/TIME/JUST
MANUAL: Start manually.
TIME: Start at set time.
JUST: Start at the exact time with regard to the set interval.

Function

Command Sets the time-series measurement start method.

Query Returns the set time-series measurement start method.

Example

Command `:STAR:METH TIME`
Response `ALL RIGHT`

Query `:STAR:METH?`
Response `TIME`
Sets the time-series measurement start method to time setting one.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Time-Series Measurement Start Time

Syntax

Command: **:STARt:TIME** <year>,<month>,<day>,<hour>,<min>

Query: **:STARt:TIME?**

Response: :STARt:TIME <year>,<month>,<day>,<hour>,<min>
(Headers: ON)
<year>,<month>,<day>,<hour>,<min>
(Headers: OFF)

Function

Command: Sets the time-series measurement start time.

Query: Returns the set time-series measurement start time.

Example

Command: `:STAR:TIME 2002,4,2,8,0`

Response: `ALL RIGHT`

Query: `:STAR:TIME?`

Response: `2002,4,2,8,0`

Sets the time-series measurement start time to 8:00, April 2, 2002.

Error

A device-dependent error will occur in the following cases:

- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Inquiry of Time-Series Measurement Status

Syntax

Query: **:STATe?**

Response: :STATE <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 0/1/2
0: Time-series measurement is stopped.
1: Time-series measurement is on standby.
2: Time-series measurement is in progress.

Function

Query: Returns the current time-series measurement status.

Example

Query: `:STAT?`

Response: `0`

This indicates that time-series measurement is stopped.

Forced stop of Time-Series Measurement

Syntax
Command **:STOP**

Function
Command Stops time-series measurement immediately.

Example
Command `:STOP`
Response `ALL RIGHT`
Stops time-series measurement immediately.

Error
A device-dependent error will occur in the following cases:
- Execution of this command is attempted while the instrument is stopped time-series measurement.

Setting and Inquiry of Time-Series Measurement Stop Method

Syntax
Command **:STOP:METHod** <characters>
Query **:STOP:METHod?**
Response :STOP:METHOD <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = MANUAL/TIME/TIMER
MANUAL: Stop manually.
TIME: Stop at set time.
TIMER: Stop with timer setting.

Function
Command Sets the time-series measurement stop method.
Query Returns the set time-series measurement stop method.

Example
Command `:STOP:METH TIME`
Response `ALL RIGHT`

Query `:STOP:TIME?`
Response `TIME`
Sets the time-series measurement stop method to time setting one.

Error
A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Time-Series Measurement Stop Time

Syntax

Command **:STOP:TIME** <year>,<month>,<day>,<hour>,<min>
Query **:STOP:TIME?**
Response :STOP:TIME <year>,<month>,<day>,<hour>,<min>
(Headers: ON)
<year>,<month>,<day>,<hour>,<min>
(Headers: OFF)

Function

Command Sets the time-series measurement stop time.

Query Returns the set time-series measurement stop time.

Example

Command `:STOP:TIME 2002,4,2,17,0`
Response `ALL RIGHT`

Query `:STOP:TIME?`
Response `2002,4,2,17,0`
Sets the time-series measurement stop time to 17:00, April 2, 2002.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of THD Calculation

Syntax

Command **:THD** <characters>
Query **:THD?**
Response :THD <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = F/R
F: THD-F
R: THD-R

Function

Command Sets the harmonics THD calculation method.

Query Returns the set harmonics THD calculation method.

Example

Command `:THD F`
Response `ALL RIGHT`

Query `:THD?`
Response `F`
Sets the THD calculation method to THD-F.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Timer

Syntax

Command **:TIMEr** <numeric 1>,<numeric 2>,<numeric 3>

Query **:TIMEr?**

Response :TIMER <numeric 1>,<numeric 2>,<numeric 3>
(Headers: ON)
<numeric 1>,<numeric 2>,<numeric 3>
(Headers: OFF)
<numeric 1> = Hour data (0 - 9999)
<numeric 2> = Minute data (0 - 59)
<numeric 3> = Second data (0 - 59)

Function

Command Sets the timer when the time-series measurement stop method is set to timer.

Query Returns the timer setting.

Example

Command
```
:TIME 1,0,0
```
Response
```
ALL RIGHT
```

Query
```
:TIME?
```
Response
```
1,0,0
```
Sets the timer to 1 hour.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Inquiry of Actual Time-Series Measurement Start Time

Syntax

Query **:TIME:STARt?**

Response :TIME:START <year>,<month>,<day>,<hour>,<min>,<sec>
(Headers: ON)
<year>,<month>,<day>,<hour>,<min>,<sec>
(Headers: OFF)

Function

Query Returns the actual time-series measurement start time.

Example

Query
```
:TIME:STAR?
```
Response
```
2002,4,2,8,0,0
This indicates that the time-series mea-
surement started at 8:00:00, April 2, 2002.
```

Error

An execution error will occur in the following cases:
- Time-series measurement has not been started after a reset is performed.

Inquiry of Actual Time-Series Measurement Stop Time

Syntax

Query: **:TIME:STOP?**

Response: :TIME:STOP <year>,<month>,<day>,<hour>,<min>,<sec>
(Headers: ON)
<year>,<month>,<day>,<hour>,<min>,<sec>
(Headers: OFF)

Function

Query: Returns the actual time-series measurement stop time.

Example

Query:
```
:TIME:STOP?
```
Response:
```
2002,4,2,17,0,0
```
This indicates that the time-series measurement ended at 17:00:00, April 2, 2002.

Error

An execution error will occur in the following cases:

- Time-series measurement has not been started after a reset is performed.

Setting and Inquiry of Message Unit Separator

Syntax

Command: **:TRANsmit:SEParator** <numeric>

Query: **:TRANsmit:SEParator?**

Response: :TRANSMIT:SEPARATOR <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<characters> = 1/2
1: ";" (semicolon)
2: "," (comma)

Function

Command: Sets the message unit separator.

Query: Returns the set message unit separator.

Example

Command:
```
:TRAN:SEP 1
```
Response:
```
ALL RIGHT
```

Query:
```
:TRAN:SEP?
```
Response:
```
1
```
Sets the message unit separator to a semicolon (;).

Setting and Inquiry of Message Terminator

Syntax

Command **:TRANsmit:TERMinator** <numeric>
Query **:TRANsmit:TERMinator?**
Response :TRANSMIT:TERMINATOR <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<characters> = 1/2
1: CR+LF
2: CR

Function

Command Sets the message terminator.

Query Returns the set message terminator.

Example

Command `:TRAN:TERM 1`
Response `ALL RIGHT`

Query `:TRAN:TERM?`
Response `1`
Sets the message terminator to "CR+LF".

Setting and Inquiry of Voltage Range

Syntax

Command **:VOLTage:RANGe** <numeric>
Query **:VOLTage:RANGe?**
Response :VOLTAGE:RANGE <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 150/300/600

Function

Command Sets the voltage range.

Query Returns the set voltage range.

Example

Command `:VOLT:RANG 150`
Response `ALL RIGHT`

Query `:VOLT:RANG?`
Response `150`
Sets the voltage range to the 150-V range.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Note

The unit is volts (V).

Setting and Inquiry of VT (PT) Ratio

Syntax

Command **:VT** <numeric>
Query **:VT?**
Response :VT <numeric>
(Headers: ON)
<numeric>
(Headers: OFF)
<numeric> = 0.01 to 9999.99 (PT ratio)

Function

Command: Sets the VT ratio.
Query: Returns the set VT ratio.

Example

Command `:VT 2.0`
Response `ALL RIGHT`

Query `:VT?`
Response `2.0`
Sets the VT ratio to 2.0.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

Setting and Inquiry of Connection Method

Syntax

Command **:WIRing** <characters>
Query **:WIRing?**
Response :WIRING <characters>
(Headers: ON)
<characters>
(Headers: OFF)
<characters> = 1P2W/1P3W/3P3W/3P3W3M/3P4W/3P4W4I

Function

Command: Sets the connection method.
Query: Returns the set connection method.

Example

Command `:WIR 1P2W`
Response `ALL RIGHT`

Query `:WIR?`
Response `1P2W`
Sets the connection method to 1P2W.

Error

A device-dependent error will occur in the following cases:
- Execution of this command is attempted during Hold.
- Execution of this command is attempted while the instrument is standing by for or performing time-series measurement.

3.2 Command List

The following commands can be used with the 3169-20/21:

3.2.1 Command List

Command	Data format (number of the data)	Explanation	Ref page
:AOUT:CH1	<numeric>,<numeric>,<characters>,<numeric>,<numeric>	Setting of Output Items of D/A Output Channel 1	17
:AOUT:CH1?		Inquiry of Output Items of D/A Output Channel 1	17
:AOUT:CH2	<numeric>,<numeric>,<characters>,<numeric>,<numeric>	Setting of Output Items of D/A Output Channel 2	18
:AOUT:CH2?		Inquiry of Output Items of D/A Output Channel 2	18
:AOUT:CH3	<numeric>,<numeric>,<characters>,<numeric>,<numeric>	Setting of Output Items of D/A Output Channel 3	19
:AOUT:CH3?		Inquiry of Output Items of D/A Output Channel 3	19
:AOUT:CH4	<numeric>,<numeric>,<characters>,<numeric>,<numeric>	Setting of Output Items of D/A Output Channel 4	20
:AOUT:CH4?		Inquiry of Output Items of D/A Output Channel 4	20
:AOUT:RATE	1K/5K/10K/50K/100K/500K/1000K	Setting of D/A Output Integration Rate	21
:AOUT:RATE?		Inquiry of D/A Output Integration Rate	21
:AVEraging	1/2/5/10/20	Setting of Number of Measurements to be Averaged	21
:AVEraging?		Inquiry of Number of Measurements to be Averaged	21
:BACKlight	ON/OFF/AUTO	Setting of Backlight	22
:BACKlight?		Inquiry of Backlight	22
:BEEPer	ON/OFF	Setting of Beeper	22
:BEEPer?		Inquiry of Beeper	22
:CARD:DELete	<file name>	Deletion of Files on PC Card	23
:CARD:DOWNload	<file name>,<file name>	Download of File from Internal Memory to PC Card	23
:CARD:DOWNload:ALL		Download of All Files in Internal Memory to PC Card	24
:CARD:EXISt?		Inquiry of Installation of PC Card	24
:CARD:FILEname?	MEAS/INST/BMP/WAVE/SET	Inquiry of File Name on PC Card	25

Command	Data format (number of the data)	Explanation	Ref page
:CARD:FORMat		Formatting of PC Card	25
:CARD:PICKout?	<file name>,<numeric>, <numeric>	File Transfer from PC Card	26
:CARD:SETting:SAVE	<characters>	Storage of Setting File on PC Card	27
:CARD:SETting:LOAD	<characters>	Reading of Setting File from PC Card	28
:CIRCuitnum	1/2/3/4	Setting of Number of Circuits to be Measured	28
:CIRCuitnum?		Inquiry of Number of Circuits to be Measured	28
:CLOCk	<year>,<month>,<day>, <hour>,<min>,<sec>	Setting of Actual Time	29
:CLOCk?		Inquiry of Actual Time	29
:CT	<numeric>,<numeric>	Setting of CT Ratio	30
:CT?		Inquiry of CT Ratio	30
:CURRent:RANGe	<numeric>,<numeric>	Setting of Current Range	31
:CURRent:RANGe?		Inquiry of Current Range	31
:DATAout:COPY		Storage of Screen Data	32
:DATAout:COPY:MEDIa	PRINTER/CARD/MEMORY	Setting of Medium to Save/Print Out Screen Data	32
:DATAout:COPY:MEDIa?		Inquiry of Medium to Save/Print Out Screen Data	32
:DATAout:HARMonics	ON/OFF	Setting of Harmonics Data Output	33
:DATAout:HARMonics?		Inquiry of Harmonics Data Output	33
:DATAout:ITEM	<numeric>,<numeric>,<numeric>,<numeric>,<numeric>,<numeric>,<numeric>,<numeric>	Setting of Data Output Items	34
:DATAout:ITEM?		Inquiry of Data Output Items	34
:DATAout:MEDIa	CARD/MEMORY	Setting of Medium for Saving Data	36
:DATAout:MEDIa?		Inquiry of Medium for Saving Data	36
:DATAout:SAVE		Storage of Measurement Data	36
:DATAout:WAVE	ON/OFF	Setting of Waveform Data File Storage	37
:DATAout:WAVE?		Inquiry of Waveform Data File Storage	37
:DISPlay:MEAS	<numeric>,<numeric>, <numeric>	Setting of Measurement Item to be Displayed	38
:DISPlay:MEAS?		Inquiry of Measurement Item to be Displayed	38
:DISPlay:MODE	MEAS/SET/FILE	Setting of Display Mode	39
:DISPlay:MODE?		Inquiry of Display Mode	39
:FILEname:CHANge	<characters>,<file name>, <file name>	Change of File Name	39
:FILEname:MEAS	<characters>	Setting of Measurement File Name	40

Command	Data format (number of the data)	Explanation	Ref page
:FILEname:MEAS?		Inquiry of Measurement File Name	40
:FILEname:SET	<characters>	Setting of Setting File Name	41
:FILEname:SET?		Inquiry of Setting File Name	41
:FREQuency	50/60	Setting of Measured Line Frequency	42
:FREQuency?		Inquiry of Measured Line Frequency	42
:HEADer	ON/OFF	Setting of Communications Output Header	42
:HEADer?		Inquiry of Communications Output Header	42
:HOLD	ON/OFF	Setting of Hold State	43
:HOLD?		Inquiry of Hold State	43
:ID	<numeric>	Setting of ID Number	43
:ID?		Inquiry of ID Number	43
:INTErval	ALL/0.1S/0.2S/0.5S/1S/2S/5S/10S/1M/2M/5M/10M/15M/30M/60M	Setting of Interval	44
:INTErval?		Inquiry of Interval	44
:LANGuage	<characters>	Setting of Language	45
:LANGuage?		Inquiry of Language	45
:MEASure?		Inquiry of Measurement Data	46
:MEMory:FILEname?	MEAS/INST/BMP/WAVE/SET	Inquiry of File Name in Internal Memory	47
:MEMory:FORMat		Formatting of Data File in Internal Memory	47
:MEMory:PICKout?	<file name>,<numeric>,<numeric>	File Transfer from Internal Memory	48
:MEMory:SETting:DELete	<characters>	Deletion of Setting Files in Internal Memory	48
:MEMory:SETting:FORMat		Formatting of Setting Files in Internal Memory	49
:MEMory:SETting:SAVE	<characters>	Storage of Setting File in Internal Memory	49
:MEMory:SETting:LOAD	<characters>	Reading of Setting File from Internal Memory	50
:OPERationvar	ON/OFF	Setting of Use of Reactive Power-Meter Method	50
:OPERationvar?		Inquiry of Use of Reactive Power-Meter Method	50
:PT	<numeric>	Setting of PT (VT) Ratio	51
:PT?		Inquiry of PT (VT) Ratio	51
:RESEt		Execution of System Reset	51
:RS232c:BAUD	2400/9600/19200/38400	Setting of Baud Rate	52
:RS232c:BAUD?		Inquiry of Baud Rate	52

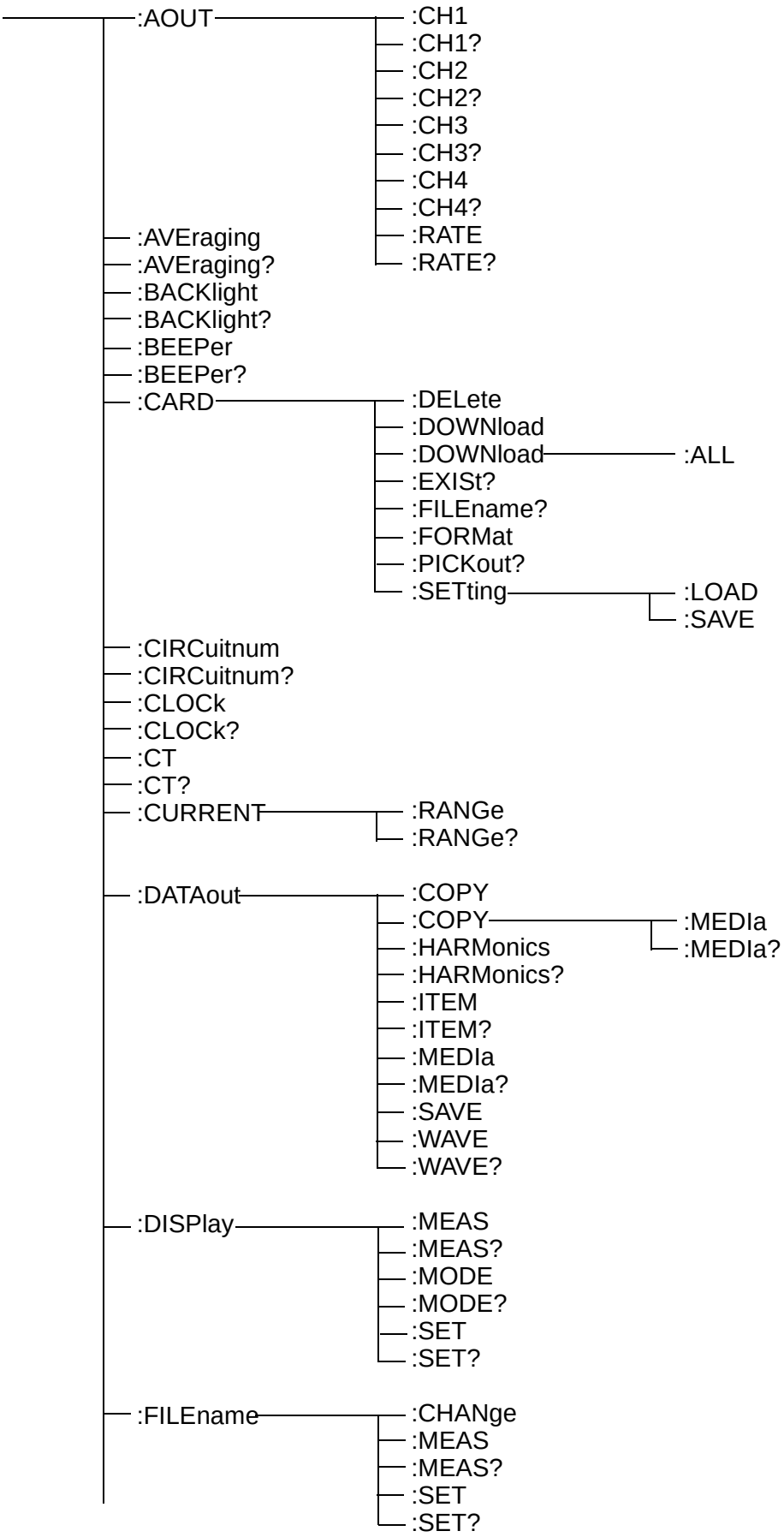
Command	Data format (number of the data)	Explanation	Ref page
:RS232c:CONNect	PC/PRINTER	Setting of Device to Which RS-232C is Connected	53
:RS232c:CONNect?		Inquiry of Device to Which RS-232C is Connected	53
:RS232c:FLOW	OFF/XONXOFF/RTSCTS/BOTH	Setting of Flow Control	54
:RS232c:FLOW?		Inquiry of Flow Control	54
:SAMPling	PLL/FIX	Setting of Sampling Method	55
:SAMPling?		Inquiry of Sampling Method	55
:SENSor	<numeric>,<characters>	Setting of Clamp-On Sensor	56
:SENSor?		Inquiry of Clamp-On Sensor	56
:STARt		Start and Standby of Time-Series Measurement	57
:STARt:METHod	MANUAL/TIME/JUST	Setting of Time-Series Measurement Start Method	57
:STARt:METHod?		Inquiry of Time-Series Measurement Start Method	57
:STARt:TIME	<year>,<month>,<day>,<hour>,<min>,<sec>	Setting of Time-Series Measurement Start Time	58
:STARt:TIME?		Inquiry of Time-Series Measurement Start Time	58
:STATe?		Inquiry of Time-Series Measurement Status	58
:STOP		Forced stop of Time-Series Measurement	59
:STOP:METHod	MANUAL/TIME/TIMER	Setting of Time-Series Measurement Stop Method	59
:STOP:METHod?		Inquiry of Time-Series Measurement Stop Method	59
:STOP:TIME	<year>,<month>,<day>,<hour>,<min>,<sec>	Setting of Time-Series Measurement Stop Time	60
:STOP:TIME?		Inquiry of Time-Series Measurement Stop Time	60
:THD	F/R	Setting of THD Calculation	60
:THD?		Inquiry of THD Calculation	60
:TIMEr	<numeric>,<numeric>,<numeric>	Setting of Timer	61
:TIMEr?		Inquiry of Timer	61
:TIME:STARt?		Inquiry of Actual Time-Series Measurement Start Time	61
:TIME:STOP?		Inquiry of Actual Time-Series Measurement Stop Time	62
:TRANsmit:SEParator	<numeric>	Setting of Message Unit Separator	62

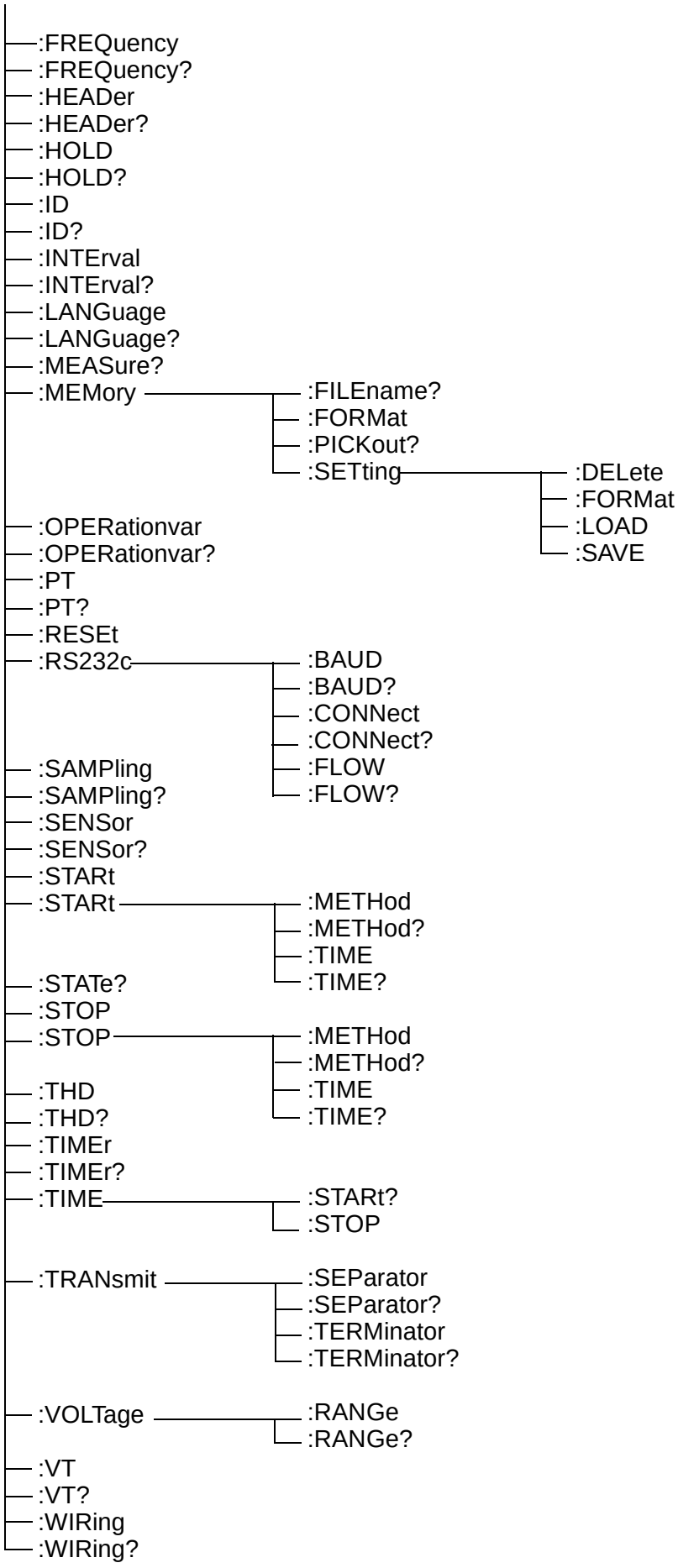
Command	Data format (number of the data)	Explanation	Ref page
:TRANsmit:SEParator?		Inquiry of Message Unit Separator	62
:TRANsmit:TERMinator	<numeric>	Setting of Message Terminator	63
:TRANsmit:TERMinator?		Inquiry of Message Terminator	63
:VOLTage:RANGe	150/300/600	Setting of Voltage Range	63
:VOLTage:RANGe?		Inquiry of Voltage Range	63
:VT	<numeric>	Setting of VT (PT) Ratio	64
:VT?		Inquiry of VT (PT) Ratio	64
:WIRing	1P2W/1P3W/3P3W/ 3P3W3M/3P4W/3P3W4I	Setting of Connection Method	64
:WIRing?		Inquiry of Connection Method	64

NOTE

Make sure that flow control is set when the CARD:PICKout? or :MEMory:PICKout? query is used. Do not link these queries with other commands or queries on a line.

3.2.2 Command Hierarchical Structure




:FREQuency
:FREQuency?
:HEADer
:HEADer?
:HOLD
:HOLD?
:ID
:ID?
:INTErval
:INTErval?
:LANGuage
:LANGuage?
:MEASure?
:MEMory
:FILEname?
:FORMat
:PICKout?
:SETting
:DELete
:FORMat
:LOAD
:SAVE
:OPERationvar
:OPERationvar?
:PT
:PT?
:RESEt
:RS232c
:BAUD
:BAUD?
:CONNect
:CONNect?
:FLOW
:FLOW?
:SAMPling
:SAMPling?
:SENSor
:SENSor?
:STARt
:STARt
:METHod
:METHod?
:TIME
:TIME?
:STATe?
:STOP
:STOP
:METHod
:METHod?
:TIME
:TIME?
:THD
:THD?
:TIMEr
:TIMEr?
:TIME
:STARt?
:STOP
:TRANsmit
:SEParator
:SEParator?
:TERMinator
:TERMinator?
:VOLTage
:RANGe
:RANGe?
:VT
:VT?
:WIRing
:WIRing?

3.2.3 Enabled Commands by Status

Command \ Status	Time-Series Measurement Stopped		Time-Series Measurement on Standby		Time-Series Measurement in Progress	
	Continuous	Hold	Continuous	Hold	Continuous	Hold
:AOUT:CH1	Yes	No	No	No	No	No
:AOUT:CH1?	Yes	Yes	Yes	Yes	Yes	Yes
:AOUT:CH2	Yes	No	No	No	No	No
:AOUT:CH2?	Yes	Yes	Yes	Yes	Yes	Yes
:AOUT:CH3	Yes	No	No	No	No	No
:AOUT:CH3?	Yes	Yes	Yes	Yes	Yes	Yes
:AOUT:CH4	Yes	No	No	No	No	No
:AOUT:CH4?	Yes	Yes	Yes	Yes	Yes	Yes
:AOUT:RATE	Yes	No	No	No	No	No
:AOUT:RATE?	Yes	Yes	Yes	Yes	Yes	Yes
:AVEraging	Yes	No	No	No	No	No
:AVEraging?	Yes	Yes	Yes	Yes	Yes	Yes
:BACKlight	Yes	Yes	Yes	Yes	Yes	Yes
:BACKlight?	Yes	Yes	Yes	Yes	Yes	Yes
:BEEPer	Yes	Yes	Yes	Yes	Yes	Yes
:BEEPer?	Yes	Yes	Yes	Yes	Yes	Yes
:CARD:DELete	Yes	Yes	No	No	No	No
:CARD:DOWNload	Yes	Yes	No	No	No	No
:CARD:DOWNload:ALL	Yes	Yes	No	No	No	No
:CARD:EXISt?	Yes	Yes	Yes	Yes	Yes	Yes
:CARD:FILEname?	Yes	Yes	Yes	Yes	Yes	Yes
:CARD:FORMat	Yes	Yes	No	No	No	No
:CARD:PICKout?	Yes	Yes	Yes	Yes	Yes	Yes
:CARD:SETting:SAVE	Yes	Yes	No	No	No	No
:CARD:SETting:LOAD	Yes	No	No	No	No	No
:CIRCuitnum	Yes	No	No	No	No	No
:CIRCuitnum?	Yes	Yes	Yes	Yes	Yes	Yes
:CLOCk	Yes	No	No	No	No	No
:CLOCk?	Yes	Yes	Yes	Yes	Yes	Yes
:CT	Yes	No	No	No	No	No
:CT?	Yes	Yes	Yes	Yes	Yes	Yes
:CURRent:RANGe	Yes	No	No	No	No	No
:CURRent:RANGe?	Yes	Yes	Yes	Yes	Yes	Yes
:DATAout:COPY	Yes	Yes	No	No	No	No
:DATAout:COPY:MEDIa	Yes	No	No	No	No	No
:DATAout:COPY:MEDIa?	Yes	Yes	Yes	Yes	Yes	Yes
:DATAout:HARMonics	Yes	No	No	No	No	No
:DATAout:HARMonics?	Yes	Yes	Yes	Yes	Yes	Yes

No: If a command is executed in the state "No" above, a device-dependent error will occur.

Command \ Status	Time-Series Measurement Stopped		Time-Series Measurement on Standby		Time-Series Measurement in Progress	
	Continuous	Hold	Continuous	Hold	Continuous	Hold
:DATAout:ITEM	Yes	No	No	No	No	No
:DATAout:ITEM?	Yes	Yes	Yes	Yes	Yes	Yes
:DATAout:MEDIa	Yes	No	No	No	No	No
:DATAout:MEDIa?	Yes	Yes	Yes	Yes	Yes	Yes
:DATAout:SAVE	Yes	Yes	No	No	No	No
:DATAout:WAVE	Yes	No	No	No	No	No
:DATAout:WAVE?	Yes	Yes	Yes	Yes	Yes	Yes
:DISPlay:MEAS	Yes	Yes	Yes	Yes	Yes	Yes
:DISPlay:MEAS?	Yes	Yes	Yes	Yes	Yes	Yes
:DISPlay:MODE	Yes	Yes	Yes	Yes	Yes	Yes
:DISPlay:MODE?	Yes	Yes	Yes	Yes	Yes	Yes
:FILEname:CHANge	Yes	Yes	No	No	No	No
:FILEname:SET	Yes	Yes	No	No	No	No
:FILEname:SET?	Yes	Yes	Yes	Yes	Yes	Yes
:FILEname:MEAS	Yes	Yes	No	No	No	No
:FILEname:MEAS?	Yes	Yes	Yes	Yes	Yes	Yes
:FREQuency	Yes	No	No	No	No	No
:FREQuency?	Yes	Yes	Yes	Yes	Yes	Yes
:HEADer	Yes	Yes	Yes	Yes	Yes	Yes
:HEADer?	Yes	Yes	Yes	Yes	Yes	Yes
:HOLD	Yes	Yes	Yes	Yes	Yes	Yes
:HOLD?	Yes	Yes	Yes	Yes	Yes	Yes
:ID	Yes	No	No	No	No	No
:ID?	Yes	Yes	Yes	Yes	Yes	Yes
:INTErval	Yes	No	No	No	No	No
:INTErval?	Yes	Yes	Yes	Yes	Yes	Yes
:LANGuage	Yes	No	No	No	No	No
:LANGuage?	Yes	Yes	Yes	Yes	Yes	Yes
:MEASure?	Yes	Yes	Yes	Yes	Yes	Yes
:MEMory:FILEname?	Yes	Yes	Yes	Yes	Yes	Yes
:MEMory:FORMat	Yes	Yes	No	No	No	No
:MEMory:PICKout?	Yes	Yes	Yes	Yes	Yes	Yes
:MEMory:SETting:DELete	Yes	Yes	No	No	No	No
:MEMory:SETting:FORMat	Yes	Yes	No	No	No	No
:MEMory:SETting:SAVE	Yes	Yes	No	No	No	No
:MEMory:SETting:LOAD	Yes	No	No	No	No	No
:OPERationvar	Yes	No	No	No	No	No
:OPERationvar?	Yes	Yes	Yes	Yes	Yes	Yes
:PT	Yes	No	No	No	No	No
:PT?	Yes	Yes	Yes	Yes	Yes	Yes
:RESEt	Yes	Yes	Yes	Yes	Yes	Yes

No: If a command is executed in the state "No" above, a device-dependent error will occur.

Command \ Status	Time-Series Measurement Stopped		Time-Series Measurement on Standby		Time-Series Measurement in Progress	
	Continuous	Hold	Continuous	Hold	Continuous	Hold
:RS232c:BAUD	Yes	No	No	No	No	No
:RS232c:BAUD?	Yes	Yes	Yes	Yes	Yes	Yes
:RS232c:CONNect	Yes	No	No	No	No	No
:RS232c:CONNect?	Yes	Yes	Yes	Yes	Yes	Yes
:RS232c:FLOW	Yes	No	No	No	No	No
:RS232c:FLOW?	Yes	Yes	Yes	Yes	Yes	Yes
:SAMPling	Yes	No	No	No	No	No
:SAMPling?	Yes	Yes	Yes	Yes	Yes	Yes
:STARt	Yes	No	No	No	No	No
:SENSor	Yes	No	No	No	No	No
:SENSor?	Yes	Yes	Yes	Yes	Yes	Yes
:STARt:METHod	Yes	No	No	No	No	No
:STARt:METHod?	Yes	Yes	Yes	Yes	Yes	Yes
:STARt:TIME	Yes	No	No	No	No	No
:STARt:TIME?	Yes	Yes	Yes	Yes	Yes	Yes
:STATe?	Yes	Yes	Yes	Yes	Yes	Yes
:STOP	No	No	Yes	No	Yes	No
:STOP:METHod	Yes	No	No	No	No	No
:STOP:METHod?	Yes	Yes	Yes	Yes	Yes	Yes
:STOP:TIME	Yes	No	No	No	No	No
:STOP:TIME?	Yes	Yes	Yes	Yes	Yes	Yes
:THD	Yes	No	No	No	No	No
:THD?	Yes	Yes	Yes	Yes	Yes	Yes
:TIMEr	Yes	No	No	No	No	No
:TIMEr?	Yes	Yes	Yes	Yes	Yes	Yes
:TIME:STARt?	Yes	Yes	Yes	Yes	Yes	Yes
:TIME:STOP?	Yes	Yes	Yes	Yes	Yes	Yes
:TRANsmit:SEParator	Yes	Yes	Yes	Yes	Yes	Yes
:TRANsmit:SEParator?	Yes	Yes	Yes	Yes	Yes	Yes
:TRANsmit:TERMinator	Yes	Yes	Yes	Yes	Yes	Yes
:TRANsmit:TERMinator?	Yes	Yes	Yes	Yes	Yes	Yes
:VOLTage:RANGe	Yes	No	No	No	No	No
:VOLTage:RANGe?	Yes	Yes	Yes	Yes	Yes	Yes
:VT	Yes	No	No	No	No	No
:VT?	Yes	Yes	Yes	Yes	Yes	Yes
:WIRing	Yes	No	No	No	No	No
:WIRing?	Yes	Yes	Yes	Yes	Yes	Yes

No: If a command is executed in the state "No" above, a device-dependent error will occur.

3.2.4 Initialization Item List

Initialization Method, Item	Power ON	System Reset	Defaul Setting
RS-232C baud-rate setting Delimiter	No	No	9600 bps CR+LF
Setting items (actual time)	No	No	Varies depending on the setting items
Intrinsic functions (e.g., current range) Varies depending on the setting items	No	Yes	Varies depending on the setting items
Output queue	Yes	Yes	Clear
Input queue	Yes	Yes	2048 bytesFixed
Current path	Yes	Yes	--
Header ON/OFF	No	Yes	OFF
Response-message separator	No	Yes	;

Yes: Initialized, No: Not initialized

3.2.5 RS-232C Troubleshooting

Symptom	Cause / Treatment
The RS-232C has stopped working completely.	• Are the cables properly connected? • Are all the devices powered on? • Are correct cables used? • Is the device to be connected to the RS-232C set to a PRINTER? Change the setting to a PC.
Communication failure with RS-232C.	• Set the message terminator (delimiter) of the PC correctly (see Message Terminator). • Is the PC set to suit the RS-232C connection conditions set on the 3169-20/21?
The ":CARD" command does not function properly.	• Is the PC card properly installed? • Does the specified file exist?
Data is garbled when a file is transferred using a ":CARD:PICKout?" or ":MEMory:PICKout?" query.	• Is flow control set between the 3169-20/21 and the PC?
Setting commands are rejected.	• The settings cannot be changed while time-series measurement is on standby or in progress, or the measurement data is being held.
When attempting to read data using a BASIC INPUT statement, the RS-232C bus hangs.	• Make sure a query is transmitted before every INPUT#(ENTER). • Have any of these transmitted queries resulted in as error?
The number of read data is too small.	• If the data contains a comma "," try using a LINE INPUT statement.
Although a command has been transmitted, nothing has happened.	• Has an error occurred? • Do you receive an answer message every time you send a setting command?
Sending several queries, produces only one response.	• Has an error occurred? • Send the queries one at a time, and read the responses individually. When you want to read them in all at once, try doing so by putting them all on one line separated by the message separator character.
The response message to a query differs from the display of the 3169-20/21.	• A response message is created after the 3169-20/21 has received a query. The message, therefore, may differ from the display when the PC reads the response message.

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