WT3001E/WT3002E/WT3003E/WT3004E
Precision Power Analyzer
Communication Interface

USER’S MANUAL

YOKOGAWA
Yokogawa Meters & Instruments Corporation

IM WT3001E-17EN
1st Edition
Thank you for purchasing the WT3001E, WT3002E, WT3003E, or WT3004E Precision Power Analyzer. This Communication Interface User’s Manual describes the functions of the GP-IB, RS-232, USB, and Ethernet interfaces and communication commands. To ensure correct use, please read this manual thoroughly before beginning operation. After reading the manual, keep it in a convenient location for quick reference whenever a question arises during operation.

List of Manuals

The following manuals, including this one, are provided as manuals for this instrument. Please read all manuals.

<table>
<thead>
<tr>
<th>Manual Title</th>
<th>Manual No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT3001E/WT3002E/WT3003E/WT3004E Precision Power Analyzer User’s Manual</td>
<td>IM WT3001E-01EN</td>
<td>Explains all functions and procedures of this instrument excluding the expansion functions and communication functions.</td>
</tr>
<tr>
<td>WT3001E/WT3002E/WT3003E/WT3004E Precision Power Analyzer Communication Interface User’s Manual (CD)</td>
<td>IM WT3001E-17EN</td>
<td>This manual. Explains the functions for controlling this instrument using communication commands.</td>
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<tr>
<td>WT3001E/WT3002E/WT3003E/WT3004E Precision Power Analyzer Expansion Function User’s Manual</td>
<td>IM WT3001E-51EN</td>
<td>Explains the expansion functions of this instrument and their operating procedures.</td>
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The “EN” and “Z1” in the manual numbers are the language codes.

Contact information of Yokogawa offices worldwide is provided on the following sheet.

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Note

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument’s performance and functions. The figures given in this manual may differ from those that actually appear on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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USB Interface and Ethernet Interface

- The items below are needed on the PC to use the communication functions via the USB interface.
  - DL/WT series library (TMCTL)
  - USB connection device driver between the PC and this instrument
- The item below is needed on the PC to use the communication functions via the Ethernet interface.
  - DL/WT series library (TMCTL)

The library and driver above can be downloaded from the following Web page.
http://www.yokogawa.com/ymi/

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Revisions

- 1st Edition June 2015
Structure of the Manual

This User’s Manual consists of the following sections:

**Chapter 1  GP-IB Interface**  
Describes the functions and specifications of the GP-IB interface.

**Chapter 2  RS-232 Interface (Option)**  
Describes the functions and specifications of the RS-232 interface.

**Chapter 3  USB Interface (Option)**  
Describes the functions and specifications of the USB interface.

**Chapter 4  Ethernet Interface (Option)**  
Describes the functions and specifications of the Ethernet interface.

**Chapter 5  Before Programming**  
Describes the syntax used to transmit commands.

**Chapter 6  Communication Commands**  
Describes all the commands one by one.

**Chapter 7  Status Reports**  
Describes the status byte, various registers, queues, and other information.

**Appendix**  
Describes reference material such as an ASCII character code table.

**Index**
Conventions Used in This Manual

Unit and Note

<table>
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<th>Symbol</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>k</td>
<td>1000</td>
<td>Example: 100 kHz</td>
</tr>
<tr>
<td></td>
<td>K</td>
<td>1024</td>
<td>Example: 640 KB (file data size)</td>
</tr>
</tbody>
</table>

Note: Note calls attention to information that is important for proper operation of the instrument.

Subheadings

On pages that describe operating procedures, the following symbols, displayed characters, and terminology are used to distinguish the procedures from their explanations:

- **Procedure**: Follow the numbered steps. All procedures are written with inexperienced users in mind; experienced users may not need to carry out all the steps.

- **Explanation**: This subsection describes the setup parameters and the limitations on the procedures.

Displayed Characters and Terminology Used in the Procedural Explanations

**Panel Keys and Soft keys**

Bold characters used in the procedural explanations indicate characters that are marked on the panel keys or the characters of the soft keys or menus displayed on the screen.

**SHIFT + Panel Key**

SHIFT + key means you will press the SHIFT key to turn ON the SHIFT key followed by the operation key. The setup menu marked in purple below the panel key that you pressed appears on the screen.

Symbols Used in the Syntax

Symbols which are used in the syntax descriptions in Chapter 6 are shown below. These symbols are referred to as BNF (Backus-Naur Form) symbols. For details on the data, see section 5.4.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Example</th>
<th>Example of Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;&gt;</td>
<td>Defined value.</td>
<td>ELEMENT&lt;x&gt;</td>
<td>ELEMENT2</td>
</tr>
<tr>
<td>{ }</td>
<td>Select from values given in { }.</td>
<td>MODE:{RMS</td>
<td>MEAN</td>
</tr>
<tr>
<td></td>
<td>Exclusive OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ]</td>
<td>Can be omitted.</td>
<td>NUMeric[:NORMAL]:VALUE?</td>
<td>NUMERIC:VALUE?</td>
</tr>
</tbody>
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<th>Description</th>
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<th>Description</th>
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<td>Error Messages</td>
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<td>App-5</td>
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Chapter 1  GP-IB Interface

1.1 Names and Functions of Parts

Front Panel

REMOTE indicator
Turns ON when this instrument is in the remote mode (controlled via communications).

LOCAL key
Press this key to clear the remote mode (controlled via communications) and enter the local mode in which key operations are enabled.

MISC key
Press this key to configure communications.

Rear Panel

GP-IB connector
Connector used to connect this instrument to the controller (PC) using a GP-IB cable.
1.2 GP-IB Interface Functions

GP-IB Interface Functions

Listener Capability
- All of the information that you can set with the panel keys can be set through the GP-IB interface except for turning ON/OFF the power and setting the communication parameters.
- Receives commands from a controller requesting the output of setup parameters, measured/computed data, waveform data, and other information.
- Also receives status report commands.

Talker Capability
- Outputs setup parameters, measured/computed data, waveform data, and other information.

Note
- Talk-only, listen-only, and controller functions are not available on this instrument.

Switching between Remote and Local Modes

When Switching from Local to Remote Mode
Receiving a REN (Remote Enable) message from the controller when the instrument is in the local mode causes the instrument to switch to the remote mode.
- The REMOTE indicator is turned ON.
- All keys except the LOCAL key are disabled.
- Settings entered in local mode are retained even when this instrument switches to remote mode.

When Switching from Remote to Local Mode
Pressing LOCAL key in remote mode puts the instrument in local mode. However, this act is invalid if the instrument has been set to Local Lockout mode (see page 1-6) by the controller.
- The REMOTE indicator is turned OFF.
- Key operations are enabled.
- Settings entered in remote mode are retained even when this instrument switches to local mode.

Note
- The GP-IB interface cannot be used simultaneously with other communication interfaces (RS-232, USB, or Ethernet).
1.3 GP-IB Interface Specifications

GP-IB Interface Specifications

Supported device: National Instruments
- GPIB-USB-HS
- PCI-GPIB and PCI-GPIB+
- PCMCIA-GPIB and PCMCIA-GPIB +
- NI-488.2M driver version 1.60 or later

Electrical and mechanical specifications: Conforms to IEEE Std’d 488-1978
Functional specifications: See table below.
Protocol: Conforms to IEEE Std’d 488.2-1992
Code used: ISO (ASCII) code
Mode: Addressable mode
Address setting: The address can be set in the range from 0 to 30.
Clear remote mode: Remote mode can be cleared by pressing LOCAL key except when the instrument has been set to Local Lockout mode by the controller.

Functional specifications

<table>
<thead>
<tr>
<th>Function</th>
<th>Subset Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source handshaking</td>
<td>SH1</td>
<td>Full source handshaking capability.</td>
</tr>
<tr>
<td>Acceptor handshaking</td>
<td>AH1</td>
<td>Full acceptor handshaking capability.</td>
</tr>
<tr>
<td>Talker</td>
<td>T6</td>
<td>Basic talker capability, serial polling, untalk on MLA (My Listen Address), and no talk-only capability.</td>
</tr>
<tr>
<td>Listener</td>
<td>L4</td>
<td>Basic listener capability, unlisten on MTA (My Talk Address), and no listen-only capability.</td>
</tr>
<tr>
<td>Service request</td>
<td>SR1</td>
<td>Full service request capability</td>
</tr>
<tr>
<td>Remote local</td>
<td>RL1</td>
<td>Full remote/local capability</td>
</tr>
<tr>
<td>Parallel polling</td>
<td>PP0</td>
<td>No parallel polling capability</td>
</tr>
<tr>
<td>Device clear</td>
<td>DC1</td>
<td>Full device clear capability</td>
</tr>
<tr>
<td>Device trigger</td>
<td>DT1</td>
<td>Full device trigger capability</td>
</tr>
<tr>
<td>Controller</td>
<td>C0</td>
<td>No controller capability</td>
</tr>
<tr>
<td>Electrical characteristics</td>
<td>E1</td>
<td>Open collector</td>
</tr>
</tbody>
</table>
1.4 Connecting the GP-IB Cable

GP-IB Cable

The GP-IB connector used on this instrument is a 24-pin connector that conforms to the IEEE St'd 488-1978. Use a GP-IB cable that conforms to this standard.

Connection Procedure

Connect the cable as shown below.

Precautions to Be Taken When Making Connections

- Firmly tighten the screws on the GP-IB cable connector.
- Use an NI (National Instruments) model GP-IB port (or card) on the PC side. For details, see section 1.3.
- If a converter is used along the communication cable connecting the WT and PC (for example, a GP-IB-to-USB converter), malfunctions can occur. For details, consult with your Yokogawa dealer or representative.
- Multiple cables can be used to connect multiple devices. However, no more than 15 devices including the controller can be connected on a single bus.
- When connecting multiple devices, each device must have its own unique address.
- Use a cable of length 2 m or less for connecting the devices.
- Make sure the total cable length does not exceed 20 m.
- When communicating, have at least two-thirds of the devices turned ON.
- To connect multiple devices, wire them in a daisy-chain or star configuration as shown below. You can also mix these configurations. Loop configuration is not allowed.

---

CAUTION

When connecting or disconnecting communication cables, make sure to turn OFF the PC and this instrument. Otherwise, erroneous operation or damage to the internal circuitry may result.

---

French

ATTENTION

Lors de la connexion ou déconnexion des câbles de communication, veiller à mettre le PC et cet instrument hors tension. À défaut, des dysfonctionnements et/ou un endommagement du circuit interne risquent de se produire.
1.5 Setting the GP-IB Control

Procedure

To exit the menu during operation, press ESC located above the soft keys.

In the procedural explanation below, the phrase “press the cursor keys” may be used. This phrase refers to the procedures for selecting items and entering values and character strings. For details on the procedures, see section 3.14 in the User’s Manual, IM WT3001E-01EN.

1. Press MISC to display the Misc menu.
2. Press the Remote Control soft key to display the Remote Ctrl menu.
3. Press the Device soft key to select GP-IB. Only the communication interface selected here is enabled. This instrument does not accept commands that are transmitted to other unselected communication interfaces.
4. Press the cursor keys to set the address.

Explanation

Enter the following settings when using a controller to set information that can be specified through key operation on this instrument or when outputting setup parameters or output waveform display data to the controller.

Address

Set the address of this instrument within the following range for the addressable mode. 0 to 30

Each device that can be connected via GP-IB has a unique address within the GP-IB system. This address is used to distinguish the device from others. Therefore, when you connect this instrument to a PC, for example, make sure to assign a unique address to this instrument.

Note

Do not change the address while the controller or other devices are using the GP-IB system.
1.6 Responses to Interface Messages

Responses to Interface Messages

Responses to a Uni-Line Message

• IFC (Interface Clear)
  Clears the talker and listener functions. Stops output if data are being output.

• REN (Remote Enable)
  Switches between the remote and local modes.

  IDY (Identify) is not supported.

Responses to a Multi-Line Message (Address Command)

• GTL (Go To Local)
  Switches to the local mode.

• SDC (Selected Device Clear)
  • Clears the program message (command) being received and the output queue (see page 7-9).
  • *OPC and *OPC? commands in execution are void.
  • The *WAI and COMMunicate:WAIT commands are immediately terminated.

• GET (Group Execute Trigger)
  Same operation as the *TRG command.

  PPC (Parallel Poll Configure) and TCT (Take Control) are not supported.

Responses to a Multi-Line Message (Universal Command)

• LLO (Local Lockout)
  Disables LOCAL on the front panel to prohibit switching to the local mode.

• DCL (Device Clear)
  Same operation as the SDC message.

• SPE (Serial Poll Enable)
  Sets the talker function on all devices on the bus to serial polling mode. The controller polls the devices in order.

• SPD (Serial Poll Disable)
  Clears the serial polling mode of the talker function on all devices on the bus.

  PPU (Parallel Poll Unconfigure) is not supported.

What Is an Interface Message

Interface messages are also referred to as interface commands or bus commands. They are commands that are issued by the controller. They are classified as follows:

Uni-Line Messages

A single control line is used to transmit uni-line messages. The following three types are available.

• IFC (Interface Clear)
• REN (Remote Enable)
• IDY (Identify)
1.6 Responses to Interface Messages

Multi-Line Messages
Eight data lines are used to transmit multi-line messages. The messages are classified as follows:

- **Address Commands**
  These commands are valid when the instrument is designated as a listener or as a talker. The following five types are available.
  - Commands that are valid on an instrument that is designated as a listener
    - GTL (Go To Local)
    - SDC (Selected Device Clear)
    - PPC (Parallel Poll Configure)
    - GET (Group Execute Trigger)
  - Commands that are valid on an instrument that is designated as a talker
    - TCT (Take Control)

- **Universal Commands**
  These commands are valid on all instruments regardless of the listener and talker designations. The following five types are available.
  - LLO (Local Lockout)
  - DCL (Device Clear)
  - PPU (Parallel Poll Unconfigure)
  - SPE (Serial Poll Enable)
  - SPD (Serial Poll Disable)

In addition, listener address, talker address, and secondary commands are also considered interface messages.

Interface messages that this instrument supports are indicated with * marks.

**Note**

The differences between SDC and DCL
In multi-line messages, SDC messages are those that require talker or listener designation and DCL messages are those that do not require the designation. Therefore, SDC messages are directed at a particular instrument while DCL messages are directed at all instruments on the bus.
2.1 Names and Functions of Parts

Front Panel

REMOTE indicator
Turns ON when this instrument is in the remote mode (controlled via communications).

LOCAL key
Press this key to clear the remote mode (controlled via communications) and enter the local mode in which key operations are enabled.

MISC key
Press this key to configure communications.

Rear Panel

RS-232 connector
EIA-574 compliant: For the 9-pin EIA-232 (RS-232)
Connector used to connect this instrument to the controller (PC) using an RS-232 interface cable.
2.2 RS-232 Interface Functions and Specifications

Receiving Function
You can specify the same settings as those specified by front panel key operations.
Receives output requests for measured and computed data, setup parameters of the panel, and error codes.

Sending Function
Outputs measured and computed data.
Outputs panel setup parameters and the status byte.
Outputs error codes that have occurred.

Switching between Remote and Local Modes

When Switching from Local to Remote Mode
If this instrument receives a "*:COMMunicate:REMote ON" command from the PC when it is in the local mode, it switches to the remote mode.
• The REMOTE indicator is turned ON.
• All keys except the LOCAL key are disabled.
• Settings entered in local mode are retained even when this instrument switches to remote mode.

When Switching from Remote to Local Mode
Pressing LOCAL key in remote mode puts the instrument in local mode. However, this is void when this instrument has received a "*:COMMunicate:LOCKout ON" command from the PC (local lockout condition). When this instrument receives a "*:COMMunicate:REMote OFF" command from the PC, this instrument switches to the local mode regardless of the local lockout condition.
• The REMOTE indicator is turned OFF.
• Key operations are enabled.
• Settings entered in remote mode are retained even when this instrument switches to local mode.

Note
The RS-232 interface cannot be used simultaneously with other communication interfaces (GP-IB, USB, or Ethernet).

RS-232 Interface Specifications

Electrical characteristics: Conforms to EIA-574 (9-pin EIA-232 (RS-232))
Connection: Point-to-point
Transmission mode: Full-duplex
Synchronization: Start-stop synchronization
Baud rate: 1200, 2400, 4800, 9600, 19200, and 38400
Start bit: Fixed to 1 bit
Data length: 7 or 8 bits
Parity: Even, odd, or no parity
Stop bit: 1 or 2 bits
Connector: DELC-J9PAF-13L6 (JAE or equivalent)
Hardware handshaking: Select whether to fix the CA and CB signals to TRUE or use the signals for flow control.
Software handshaking: Select whether to use the X-ON and X-OFF signals to control the transmission data or both transmission and reception data.
X-ON (ASCII 11H)
X-OFF (ASCII 13H)
Received buffer length: 256 bytes
2.3 Combination of Handshaking Methods

When using the RS-232 interface for transferring data, it is necessary for equipment on both sides to agree on a set of rules to ensure the proper transfer of data. The set of rules is called handshaking. Because there are various handshaking methods that can be used between this instrument and the PC, one must make sure that the same method is chosen by both this instrument and the PC.

You can choose any of the four methods in the table below.

<table>
<thead>
<tr>
<th>Handshake Method</th>
<th>Data Sending Control (control method when sending data to a computer)</th>
<th>Data Receiving Control (control method when receiving data from a computer)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Software Handshake</td>
<td>Hardware Handshake</td>
</tr>
<tr>
<td></td>
<td>Sending stops when X-off is received, and sending is resumed when X-on is received.</td>
<td>Sending stops when CB(CTS) is False, and sending is resumed when CB is True.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The menu of this instrument</th>
<th>NO-NO</th>
<th>○</th>
<th>○</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF-OFF</td>
<td>XON-XON</td>
<td>XON-XON</td>
<td></td>
</tr>
<tr>
<td>XON-RS</td>
<td>XON-RTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS-RS</td>
<td>CTS-RS</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

OFF-OFF

Data Transmission Control
There is no handshaking between this instrument and the PC. The “X-OFF” and “X-ON” signals are treated as data, and the CS signal is ignored.

Data Reception Control
There is no handshaking between this instrument and the PC. When the received buffer becomes full, all overflow data are discarded.

RS = True (fixed).

XON-XON

Data Transmission Control
Software handshaking is performed between this instrument and the PC. When an “X-OFF” code is received while sending data to the PC, this instrument stops the data transmission. When this instrument receives the next “X-ON” code, this instrument resumes the data transmission. The CS signal received from the PC is ignored.

Data Reception Control
Software handshaking is performed between this instrument and the PC. When the free area of the receive buffer decreases to 64 bytes, this instrument sends an “X-OFF” code. When the free area increases to 192 bytes, it sends an “X-ON” code.

RS = True (fixed).
2.3 Combination of Handshaking Methods

**XON-RS**

**Data Transmission Control**
Software handshaking is performed between this instrument and the PC. When an “X-OFF” code is received while sending data to the PC, this instrument stops the data transmission. When this instrument receives the next “X-ON” code, this instrument resumes the data transmission. The CS signal received from the PC is ignored.

**Data Reception Control**
Hardware handshaking is performed between this instrument and the PC. When the free area of the receive buffer decreases to 64 bytes, the instrument sets “RS = False.” When the free area increases to 192 bytes, it sets “RS = True.”

**CS-RS**

**Data Transmission Control**
Hardware handshaking is performed between this instrument and the PC. When the CS signal becomes False while sending data to the PC, this instrument stops the data transmission. When the CS signal becomes True, this instrument resumes the data transmission. The “X-OFF” and “X-ON” signals are treated as data.

**Data Reception Control**
Hardware handshaking is performed between this instrument and the PC. When the free area of the receive buffer decreases to 64 bytes, the instrument sets “RS = False.” When the free area increases to 192 bytes, it sets “RS = True.”

**Precautions Regarding Data Reception Control**
When handshaking is used to control the reception of data, data may still be sent from the PC even if the free space in the receive buffer drops below 64 bytes. In this case, after the receive buffer becomes full, the excess data will be lost, whether or not handshaking is in effect. Data storage of data resumes when there is free space in the buffer.

Data Receiving Control using Handshaking

<table>
<thead>
<tr>
<th>256 bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used</td>
</tr>
<tr>
<td>Free, 64 bytes</td>
</tr>
</tbody>
</table>

When handshaking is in use, reception of data will stop when the free space in the buffer drops to 64 bytes since data cannot be passed to the main program fast enough to keep up with the transmission.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Used</td>
</tr>
<tr>
<td>Free, 192 bytes</td>
</tr>
</tbody>
</table>

After reception of data stops, data continues to be passed to the internal program. Reception of data starts again when the free space in the buffer increases to 192 bytes.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Used</td>
</tr>
</tbody>
</table>

Whether handshaking is in use or not, if the buffer becomes full, any additional data received is no longer stored and is lost.

**Note**
The PC program must be designed so that the received buffers of both this instrument and the PC do not become full.
2.4 Combination of Data Formats

The RS-232 interface of this instrument performs communications using start-stop synchronization. In start-stop synchronization, characters are transmitted one at a time. Each character consists of a start bit, data bits, a parity bit, and a stop bit (see the following figure).
2.5 Connection via the RS-232 Interface

When you connect this instrument to a PC, you must set this instrument so that the handshaking method, baud rate, data format, and other parameters match those on the PC side.

For details on the settings, see the following pages. In addition, use an interface cable that meets the specifications of this instrument.

Connector and Signal Names

- **2 RD (Received Data):** Received data from the PC.
  - Signal direction: Input
- **3 SD (Send Data):** Transmitted data to the PC.
  - Signal direction: Output
- **5 SG (Signal Ground):** Signal ground.
- **7 RS (Request to Send):** Handshaking signal to receive data from the PC.
  - Signal direction: Output
- **8 CS (Clear to Send):** Handshaking signal to send data to the PC.
  - Signal direction: Input

* Pins 1, 4, 6, and 9 are not used.

9-Pin to 25-Pin Adapter and Signal Names

The numbers inside the parentheses are pin numbers for the 25-pin connector.

Signal Direction

The following figure shows the direction of the signals used by the RS-232 interface of this instrument.
## RS-232 Standard Signals and Their JIS and CCITT Abbreviations

<table>
<thead>
<tr>
<th>Pin No. (9-pin connector)</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>AB (GND)</td>
<td>102</td>
</tr>
<tr>
<td>3</td>
<td>BA (TXD)</td>
<td>103</td>
</tr>
<tr>
<td>2</td>
<td>BB (RXD)</td>
<td>104</td>
</tr>
<tr>
<td>7</td>
<td>CA (RTS)</td>
<td>105</td>
</tr>
<tr>
<td>8</td>
<td>CB (CTS)</td>
<td>106</td>
</tr>
</tbody>
</table>

### Signal Wiring Example

The pin numbers are for the 9-pin connector.

In general, use a cross cable.

- **OFF-OFF / XON-XON**

  - PC: SD 3
  - This instrument: 3 SD

- **XON-RTS(XON-RS)**

  - PC: SD 3
  - This instrument: 3 SD

- **CTS-RTS(CS-RS)**

  - PC: SD 3
  - This instrument: 3 SD
2.6 Setting the RS-232 Control

Procedure

Selecting the RS-232 Control
1. Press MISC to display the Misc menu.
2. Press the Remote Control soft key to display the Remote Ctrl menu.
3. Press the Device soft key to select RS232.
   Only the communication interface selected here is enabled. This instrument does not accept commands that are transmitted to other unselected communication interfaces.

Selecting the Baud Rate
4. Press the cursor keys to select Baud Rate.

Selecting the Data Format, Handshaking, and Terminator
4. Press the Format (data format), Rx-Tx (handshaking), or Terminator soft key and select the setting for the respective item.
2.6 Setting the RS-232 Control

**Explanation**

Enter the following settings when using a controller to set information that can be specified through key operation on this instrument or when outputting setup parameters or output waveform data to the controller.

**Baud Rate**
Select the baud rate from the following:
1200, 2400, 4800, 9600, 19200, or 38400

**Data Format**
Select the combination of data length, parity, and stop bit from the following:
8-NO-1, 7-EVEN-1, 7-ODD-1, or 7-NO-2

**Handshaking Method**
Select the transmit data control and receive data control from the following:
NO-NO, XON-XON, XON-RTS, or CTS-RTS

**Terminator**
Select the terminator from below. On the menu of this instrument, select the terminator that is used when transmitting data from this instrument. Use "Lf" or "Cr+Lf" for the terminator for receiving data on this instrument.
Cr, Lf, or Cr+Lf
3.1 Names of Parts

Front Panel

REMOTE indicator
Turns ON when this instrument is in the remote mode (controlled via communications).

LOCAL key
Press this key to clear the remote mode (controlled via communications) and enter the local mode in which key operations are enabled.

MISC key
Press this key to configure communications.

Rear Panel

USB connector for connecting to a PC
A connector used to connect this instrument to the controller (such as a PC) using a USB cable. For the connection procedure, see page 3-3.
3.2 USB Interface Functions and Specifications

Reception Function
You can specify the same settings as those specified by front panel key operations. Receives output requests for measured and computed data, setup data, and error codes.

Transmission Function
Outputs measured and computed data. Outputs panel setup parameters and the status byte. Outputs error codes that have occurred.

Switching between Remote and Local Modes
When Switching from Local to Remote Mode
Remote mode is activated when the \texttt{COMMunicate:REMote ON} command is received from a controller while local mode is active.
• The REMOTE indicator is turned ON.
• All keys except the LOCAL key are disabled.
• Settings entered in local mode are retained even when this instrument switches to remote mode.

When Switching from Remote to Local Mode
Pressing the LOCAL key when this instrument is in the remote mode causes the instrument to switch to the local mode. However, this is not possible when the \texttt{COMMunicate:LOCKout ON} command is received from the PC while Local Lockout mode is active. Local mode is activated when the \texttt{COMMunicate:REMote OFF} command is received regardless of Local Lockout.
• The REMOTE indicator is turned OFF.
• Key operations are enabled.
• Settings entered in remote mode are retained even when this instrument switches to local mode.

Note
The USB interface cannot be used simultaneously with other communication interfaces (GP-IB, RS-232, and Ethernet).

USB Interface Specifications
Electrical and mechanical specifications: Conforms to USB Rev.1.1
Connector: Type B connector (receptacle)
Number of ports: 1
Power supply: Self-powered
PC system supported: A controller such as a PC running Windows Vista, Windows 7, or Windows 8/8.1 that is equipped with a USB port as standard (a separate device driver is required for the connection with a PC)
3.3 Connection via the USB Interface

Connector and Signal Names

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vbus:</td>
<td>+5 V</td>
</tr>
<tr>
<td>2</td>
<td>D-:</td>
<td>-Data</td>
</tr>
<tr>
<td>3</td>
<td>D+:</td>
<td>+Data</td>
</tr>
<tr>
<td>4</td>
<td>GND:</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Precautions to Be Taken When Making Connections

- Connect the USB cable by inserting the connector firmly into the USB connector.
- When connecting multiple devices using USB hubs, connect this instrument to the USB hub that is closest to the controller.
- Do not connect or disconnect the USB cable after the power is turned ON until this instrument boots up completely (until this instrument is ready for operation, approximately 20 to 30 s). If you do, this instrument may malfunction.
3.4 Setting the USB Control

Procedure

To exit the menu during operation, press ESC located above the soft keys.

In the procedural explanation below, the phrase "press the cursor keys" may be used. This phrase refers to the procedures for selecting items and entering values and character strings. For details on the procedures, see section 3.14 in the User’s Manual, IM WT3001E-01EN.

Selecting USB Control

1. Press MISC to display the Misc menu.
2. Press the Remote Control soft key to display the Remote Ctrl menu.
3. Press the Device soft key and select USB.
   Only the communication interface selected here is enabled. This instrument does not accept commands that are transmitted to other unselected communication interfaces.
4. Press the cursor keys to set the ID value.
### Explanation

You can control this instrument from a PC using the USB interface. YOKOGAWA's dedicated USB connection device driver and library software (TMCTL) must be installed on the PC in addition to entering the settings described above.

#### Setting the ID Value

Set the ID value of this instrument within the following range.

1 to 127

You can connect multiple devices to a controller using the USB interface. If multiple devices are connected in a single USB system, the ID value is used by the controller to identify each device. Therefore, a unique ID value must be assigned to each device within a single system.

#### Note

Do not change the ID value while communicating via the USB interface.
Chapter 4   Ethernet Interface (Option)

4.1 Names and Functions of Parts

Front Panel

REMOTE indicator
Turns ON when this instrument is in the remote mode (controlled via communications).

LOCAL key
Press this key to clear the remote mode (controlled via communications) and enter the local mode in which key operations are enabled.

MISC key
Press this key to configure communications.

Rear Panel

Ethernet port (100BASE-TX)
Port used to connect to the controller (PC) via the network or by a one-to-one connection. For the connection procedure, see section 5.1 in the Expansion Function User's Manual IM WT3001E-51EN.
4.2 Ethernet Interface Functions and Specifications

You can control this instrument from a PC using the Ethernet interface. Details about specific functions and how to enter settings are provided below.

Receiving Function

You can specify the same settings as those specified by front panel key operations. Receives output requests for measured and computed data, setup parameters of the panel, and error codes.

Sending Function

Outputs measured and computed data.
Outputs panel setup parameters and the status byte.
Outputs error codes that have occurred.

Switching between Remote and Local Modes

When Switching from Local to Remote Mode

If this instrument receives a ":COMMUnicate:REMote ON" command from the PC when it is in the local mode, it switches to the remote mode.
- The REMOTE indicator is turned ON.
- All keys except the LOCAL key are disabled.
- Settings entered in local mode are retained even when this instrument switches to remote mode.

When Switching from Remote to Local Mode

Pressing LOCAL key in remote mode puts the instrument in local mode. However, this is void when this instrument has received a ":COMMUnicate:LOCKout ON" command from the PC (local lockout condition). When this instrument receives a ":COMMUnicate:REMote OFF" command from the PC, this instrument switches to the local mode regardless of the local lockout condition.
- The REMOTE indicator is turned OFF.
- Key operations are enabled.
- Settings entered in remote mode are retained even when this instrument switches to local mode.

Note

The Ethernet interface cannot be used simultaneously with other communication interfaces (GP-IB, USB, or RS-232).

Ethernet Interface Specifications

Electrical and mechanical specifications: Conforms to IEEE 802.3.
Number of simultaneous connections: 1
Port number: 10001/tcp
For details on other specifications, see chapter 5 in the Expansion Function User’s Manual IM WT3001E-51EN.
4.2 Ethernet Interface Functions and Specifications

User Authentication Function
You must enter the user name and password to access this instrument from a PC using the Ethernet interface. The user name and password for accessing this instrument can be specified in the User Account screen under the Misc menu. For details, see “Setting the Ethernet Control” in the next section.

Connecting this instrument and the PC
For the procedure of connecting this instrument to a PC, see section 5.1 in the Expansion Function User’s Manual IM WT3001E-51EN.
4.3 Setting the Ethernet Control

Procedure

Selecting the Ethernet Control
1. Press MISC to display the Misc menu.
2. Press the Remote Control soft key to display the Remote Ctrl menu.
3. Press the Device soft key and select Network.

Only the communication interface selected here is enabled. This instrument does not accept commands that are transmitted to other unselected communication interfaces.
Setting the User account (user name and password)
5. Press the User Account soft key to display the User Account dialog box.
6. Press the cursor keys to select User Name.
7. Press SET. A keyboard appears.
8. Use the keyboard to enter the user name.
   For keyboard operations, see section 3.14, “Entering Values and Strings” in the User’s Manual IM WT3001E-01EN.
9. Press the cursor keys to select Password. The password setting is entered twice.
10. Press SET. A keyboard appears.
11. Use the keyboard to enter the password.
   • A password is not required if the login name is anonymous.
   • For keyboard operations, see section 3.14, “Entering Values and Strings” in the User’s Manual IM WT3001E-01EN.

Setting the Timeout Value
12. Press the cursor keys to select Time Out.
13. Press SET. The timeout value entry box appears.
14. Press the cursor keys to set the timeout value.
15. Press SET or ESC to close the box.

Entering TCP/IP Settings
You must enter TCP/IP settings to control this instrument from a PC using the Ethernet interface. For the setup procedure, see section 5.2 in the Expansion Function User’s Manual IM WT3001E-51EN.

Restarting the Instrument
You must restart the instrument after changing or entering a new setting for the user account, timeout value, or TCP/IP in order for the settings to take effect.
4.3 Setting the Ethernet Control

Explanation

You can control this instrument from a PC using the Ethernet interface. YOKOGAWA’s dedicated library software (TMCTL) must be installed on the PC in addition to entering the settings described above.

Retail Software
WTViewer (760122)
You can use WTViewer by setting this instrument as WT3000 emulate mode.
A trial version is available for download from the following URL.
http://tmi.yokogawa.com/products/digital-power-analyzers/power-measurement-application-software/wtviewer-760122/

Setting the User Name
• Enter the user name to allow access to this instrument.
• Enter up to 15 characters.
• The characters that can be used are 0-9, A-Z, %, _, ( ) (parentheses), - (minus sign).
• If you specify anonymous, this instrument can be accessed from the outside (PC) without a password.

Setting the Password
• Enter the password for the user name to allow access to this instrument.
• Enter up to 15 characters.
• The characters that can be used are 0-9, A-Z, %, _, ( ) (parentheses), - (minus sign).
• If the user name is set to anonymous, this instrument can be accessed from the outside (PC) without a password.
• The password setting is entered twice.

Setting the Timeout Value
This instrument closes the connection to the network if there is no access for a certain period of time (timeout time).
The available settings are 0 to 3600 s, or Infinite. The default value is Infinite.

Note
To apply new settings, this instrument must be power cycled.
Messages and Queries
Messages are used to exchange information between the controller and the instrument. Messages sent from the controller to this instrument are called program messages. Program messages that request a response to be sent from this instrument to the controller are called queries. Messages that the controller receives from this instrument are called response messages. If a query is included in a program message, this instrument sends a response message after receiving the program message. A single response message is always returned in response to a single program message.

Program Messages
The program message format is shown below.

```
<PMT>;<<Program message unit><PMT>
```

**<Program Message Unit>**
A program message consists of one or more program message units; each unit corresponds to one command. The instrument executes the received commands in order. Each program message unit is separated by a semicolon (;).

For details regarding the format of the program message unit, see the next section.

Example

```
:INPut:CFACtor 3;INDependent OFF<PMT>
```

**<PMT>**
PMT is a program message terminator. The following three types are available.

- **NL (New Line)**
  Same as LF (Line Feed). ASCII code “0AH.”

- **^END**
  The END message (EOI signal) as defined in the IEEE488.1. (The data byte that is sent with the END message is the last data of the program message.)

- **NL^END**
  NL with an END message attached. (NL is not included in the program message.)

Program Message Unit Format
The program message unit format is shown below.

```
<Program header> Space <Program data> <PMT>
```

**<Program Header>**
The program header indicates the command type. For details, see page 5-3.

**<Program Data>**
If certain conditions are required in executing a command, program data is added. A space (ASCII code “20H”) separates the program data from the header. If there are multiple sets of program data, they are separated by commas (,).

For details, see page 5-6.

Example

```
:INPut:CFACtor 3<PMT>
```

Response Message
The response message format is shown below.

```
<Response message unit><RMT>
```

**<Response Message Unit>**
A response message consists of one or more response message units; each response message unit corresponds to one response. Response message units are separated by a semicolon (;).

For details regarding the format of the response message unit, see the next section.

Example

```
:INPUT:CFACtor 3;INDependent 0<RMT>
```

**<RMT>**
A response message terminator. It is NL^END.
5.1 Messages

Response Message Unit Format
The response message unit format is shown below.

- **<Response header>**
  A response header sometimes precedes the response data. A space separates the data from the header. For details, see page 5-5.

- **<Response Data>**
  Response data contains the content of the response. If there are multiple sets of response data, they are separated by commas (,). For details, see page 5-6.

Example

```
100.00E-03<RMT> :DISPLAY:MODE WAVE<RMT>
```

If there are multiple queries in a program message, responses are made in the same order as the queries. In most cases, a single query returns a single response message unit, but there are a few queries that return multiple units. The first response message unit always corresponds to the first query, but the $n^{th}$ response unit may not necessarily correspond to the $n^{th}$ query. Therefore, if you want to make sure that every response is retrieved, divide the program messages into individual messages.

Precautions to Be Taken when Transferring Messages

- If a program message containing multiple message units is sent, and the message contains incomplete units, the instrument attempts to execute the ones that are believed to be complete. However, these attempts may not always be successful. In addition, if the message contains queries, the responses may not be returned.

Deadlock
The instrument can store in its buffer program and response messages of length 1024 bytes or more (The number of available bytes varies depending on the operating conditions). When both the transmit and receive buffers become full at the same time, the instrument can no longer continue its communication operation. This state is called a deadlock. In this case, operation can be resumed by discarding the program message.

Deadlock will not occur if the program message (including the <PMT>) is kept below 1024 bytes. Furthermore, deadlock never occurs if a program message does not contain a query.
5.2 Commands

Commands
There are three types of commands (program headers) that are sent from the controller to the instrument. They differ in their program header formats.

Common Command Header
Commands that are defined in the IEEE 488.2-1992 are called common commands. The header format of a common command is shown below. An asterisk (*) is always placed in the beginning of a command.

\[ *<\text{Mnemonic}> \]

Common command example: \(*\text{CLS}\)

Compound Header
Dedicated commands used by the instrument are classified and arranged in a hierarchy according to their functions. The format of a compound header is shown below. A colon (:) must be used to specify a lower hierarchy.

\[ :<\text{Mnemonic}> \]

Compound header example: \(:\text{DISPlay:MODE}\)

Simple Header
These commands are functionally independent and do not have a hierarchy. The format of a simple header is shown below.

\[ :<\text{Mnemonic}> \]

Simple header example: \(:\text{HOLD}\)

Note
A &lt;mnemonic&gt; is a character string made up of alphanumeric characters.

When Concatenating Commands

Command Group
A command group is a group of commands that have common compound headers arranged in a hierarchy. A command group may contain sub-groups.

Example Group of commands related to harmonic measurement

\[
:\text{INTEGrate}\?
\,:\text{INTEGrate:MODE}
\,:\text{INTEGrate:ACAL}
\,:\text{INTEGrate:TIMer}
\,:\text{INTEGrate:RTIMe}\?
\,:\text{INTEGrate:RTIMe:STA}\text{RT}
\,:\text{INTEGrate:RTIMe:END}
\,:\text{INTEGrate:STA}\text{RT}
\,:\text{INTEGrate:STOP}
\,:\text{INTEGrate:RESet}
\]

When Concatenating Commands of the Same Group

The instrument stores the hierarchical level of the command that is currently being executed, and performs analysis on the assumption that the next command sent will also belong to the same level. Therefore, common header sections can be omitted for commands belonging to the same group.

Example

\[
:\text{INTEGrate:MODE NORMal;}
\,\text{ACAL ON &lt;PMT&gt;}
\]

When Concatenating Commands of Different Groups

If the following command does not belong to the same group, a colon (:) is placed in front of the header.

Example

\[
:\text{INTEGrate:MODE NORMal};:
\,\text{DISPlay:MODE NUMeric&lt;PMT&gt;}
\]

When Concatenating Simple Headers

If a simple header follows another command, a colon (:) is placed in front of the simple header.

Example

\[
:\text{INTEGrate:MODE NORMal};:
\,\text{HOLD ON&lt;PMT&gt;}
\]

When Concatenating Common Commands

Common commands that are defined in the IEEE 488.2-1992 are independent of hierarchy. Colons (:) are not needed before a common command.

Example

\[
:\text{INTEGrate:MODE NORMal};*\text{CLS};
\,\text{ACAL ON&lt;PMT&gt;}
\]

When Separating Commands with &lt;PMT&gt;

If a terminator is used to separate two commands, each command is a separate message. Therefore, the common header must be specified for each command even when commands belonging to the same command group are being concatenated.

Example

\[
:\text{INTEGrate:MODE NORMal&lt;PMT&gt;};
\,\text{INTEGrate:ACAL ON&lt;PMT&gt;}
\]
5.2 Commands

Upper-Level Query
An upper-level query is a query that is made by appending a question mark to a command higher in the group. The controller can receive all of the settings in a group collectively by executing a highest-level query. Some query groups which are comprised of more than three hierarchical levels can output all the lower level settings.

Example
:INTEGRate?<PMT> ->
:INTEGRATE:MODE NORMAL;
ACAL 0;TIMER 0,0,0<RMT>

The response to an upper-level query can be transmitted as a program message back to the instrument. In this way, the settings that existed when the upper-level query was made can be restored. However, some upper-level queries do not return setup information that is not currently in use. It is important to remember that not all the group’s information is necessarily returned as part of a response.

Header Interpretation Rules
The instrument interprets the header that is received according to the rules below.

- Mnemonics are not case sensitive.
  Example "CURSor" can also be written as "cursor" or "CURsor."
- The lower-case section of the header can be omitted.
  Example "CURSor" can also be written as "CURSO" or "CURS."
- The question mark (?) at the end of a header indicates that it is a query. The question mark (?) cannot be omitted.
  Example: The shortest abbreviation for CURSor? is CURS?.
- If the <x> (value) at the end of a mnemonic is omitted, it is interpreted as a 1.
  Example if "ELEMent<x>" is written as "ELEM," it means "ELEMent1."
- The section enclosed by braces ([]) can be omitted.
  Example "[:INPut]:SCALing[:STATe][:ALL] ON" can be written as "SCAL ON."
  However, the last section enclosed by braces ([]) cannot be omitted in an upper-level query.
  Example "SCALing?" and "SCALing:STATe?" are different queries.
5.3 Responses

When the controller sends a message unit that has a question mark (?) in its program header (query), the instrument returns a response message to the query. A response message is returned in one of the following two forms.

- **Response Consisting of a Header and Data**
  If the response can be used as a program message without any change, it is returned with a command header attached.
  
  **Example**: `:DISPlay:MODE?<PMT> -> :DISPLAY:MODE WAVE<RMT>`

- **Response Consisting of Data Only**
  If the response cannot be used as a program message unless changes are made to it (query-only command), only the data section is returned. However, there are query-only commands that return responses with the header attached.
  
  **Example**: `[:INPut]:POVer?<PMT> -> 0<RMT>`

**When You Wish to Return a Response without a Header**

Responses that return both header and data can be set so that only the data section is returned. The "COMMunicate:HEAder" command is used to do this.

**Abbreviated Form**

Normally, the lower-case section is removed from a response header before the response is returned to the controller. Naturally, the full form of the header can also be used. For this, the "COMMunicate:VERBose" command is used. The sections enclosed by braces ([[]]) are also omitted in the abbreviated form.
5.4 Data

Data
A data section comes after the header. A space must be included between the header and the data. The data contains conditions and values. Data is classified as below.

<table>
<thead>
<tr>
<th>Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Decimal&gt;</td>
<td>A value expressed as a decimal number.</td>
</tr>
<tr>
<td>&lt;Voltage&gt;&lt;Current&gt;</td>
<td>A physical value.</td>
</tr>
<tr>
<td>&lt;Time&gt;&lt;Frequency&gt;</td>
<td>A physical value.</td>
</tr>
<tr>
<td>&lt;Register&gt;</td>
<td>Register value expressed as binary, octal, decimal or hexadecimal.</td>
</tr>
<tr>
<td>&lt;Character Data&gt;</td>
<td>Predefined character string (mnemonic). Can be selected from {}.</td>
</tr>
<tr>
<td>&lt;Boolean&gt;</td>
<td>Indicates ON and OFF. Set using ON, OFF or a value.</td>
</tr>
<tr>
<td>&lt;String data&gt;</td>
<td>An arbitrary character string.</td>
</tr>
<tr>
<td>&lt;Filename&gt;</td>
<td>Indicates a file name.</td>
</tr>
<tr>
<td>&lt;Block data&gt;</td>
<td>Arbitrary 8-bit data.</td>
</tr>
</tbody>
</table>

<Decimal>
<Decimal> indicates a value expressed as a decimal number, as shown in the table below. Decimal values are given in the NR form as specified in the ANSI X3.42-1975.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NR1&gt;</td>
<td>Integer</td>
<td>125</td>
</tr>
<tr>
<td>&lt;NR2&gt;</td>
<td>Fixed-point number</td>
<td>125.0E0</td>
</tr>
<tr>
<td>&lt;NR3&gt;</td>
<td>Floating-point number</td>
<td>125.0E+0</td>
</tr>
</tbody>
</table>

- The instrument can receive decimal values that are sent from the controller in any of the forms, <NR1> to <NR3>. This is represented by <NRf>.  
- For response messages that the instrument returns to the controller, the form (<NR1> to <NR3> to be used) is determined by the query. The same form is used regardless of the size of the value.

- For the <NR3> format, the “+” sign after the “E” can be omitted. However, the “-” sign cannot be omitted.  
- If a value outside the setting range is entered, the value is normalized so that it is just inside the range.  
- If a value has more significant digits than the available resolution, the value is rounded.

<Voltage>, <Current>, <Time>, and <Frequency>
<Voltage>, <Current>, <Time>, and <Frequency> indicate that data have physical dimensions. <Multiplier> or <Unit> can be attached to the <NRf> form that was described earlier. It is expressed in one of the following forms.

<table>
<thead>
<tr>
<th>Form</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NRf&gt;&lt;Multiplier&gt;&lt;Unit&gt;</td>
<td>5MV</td>
</tr>
<tr>
<td>&lt;NRf&gt;&lt;Unit&gt;</td>
<td>5E-3V</td>
</tr>
<tr>
<td>&lt;NRf&gt;&lt;Multiplier&gt;</td>
<td>5M</td>
</tr>
<tr>
<td>&lt;NRf&gt;</td>
<td>5E-3</td>
</tr>
</tbody>
</table>

<Multiplier>
<br>Symbol | Word | Multiplier |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EX</td>
<td>Eca</td>
<td>10^18</td>
</tr>
<tr>
<td>PE</td>
<td>Peta</td>
<td>10^15</td>
</tr>
<tr>
<td>T</td>
<td>Tera</td>
<td>10^12</td>
</tr>
<tr>
<td>G</td>
<td>Giga</td>
<td>10^9</td>
</tr>
<tr>
<td>MA</td>
<td>Mega</td>
<td>10^6</td>
</tr>
<tr>
<td>M</td>
<td>Milli</td>
<td>10^-3</td>
</tr>
<tr>
<td>U</td>
<td>Micro</td>
<td>10^-6</td>
</tr>
<tr>
<td>N</td>
<td>Nano</td>
<td>10^-9</td>
</tr>
<tr>
<td>P</td>
<td>Pico</td>
<td>10^-12</td>
</tr>
<tr>
<td>F</td>
<td>Femto</td>
<td>10^-15</td>
</tr>
</tbody>
</table>

<Unit>
<br>Symbol | Word | Meaning |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>Volt</td>
<td>Voltage</td>
</tr>
<tr>
<td>A</td>
<td>Ampere</td>
<td>Current</td>
</tr>
<tr>
<td>S</td>
<td>Second</td>
<td>Time</td>
</tr>
<tr>
<td>HZ</td>
<td>Hertz</td>
<td>Frequency</td>
</tr>
<tr>
<td>MHZ</td>
<td>Megahertz</td>
<td>Frequency</td>
</tr>
</tbody>
</table>

- <Multiplier> and <Unit> are not case sensitive.  
- “U” is used to indicate micro “µ”.  
- “MA” is used for Mega to distinguish it from Milli. However, “MA” is interpreted as milliampere for current. In addition, megahertz is expressed as “MHZ.” Therefore, the “M (Milli)” multiplier cannot be used for frequencies.  
- If both <Multiplier> and <Unit> are omitted, the default unit (V, A, S, or HZ) is used.  
- Response messages are always expressed in the <NR3> form. Response messages are returned using the default unit without the <Multiplier> or <Unit>.
Before Programming

5.4 Data

<Register>
<Register> indicates an integer, and can be expressed in hexadecimal, octal, or binary as well as a decimal number. It is used when each bit of the value has a particular meaning. It is expressed in one of the following forms.

<table>
<thead>
<tr>
<th>Form</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NRf&gt;</td>
<td>1</td>
</tr>
<tr>
<td>#H&lt;Hexadecimal value made up of the digits 0 to 9 and A to F&gt;</td>
<td>#H0F</td>
</tr>
<tr>
<td>#O&lt;Octal value made up of the digits 0 to 7&gt;</td>
<td>#O777</td>
</tr>
<tr>
<td>#B&lt;Binary value made up of the digits 0 and 1&gt;</td>
<td>#B001100</td>
</tr>
</tbody>
</table>

- <Register> is not case sensitive.
- Response messages are always expressed as <NR1>.

<Character Data>
<Character Data> is a specified string of character data (a mnemonic). It is mainly used to indicate options and is chosen from the character strings given in { }. For interpretation rules, refer to "Header Interpretation Rules" on page 5-4.

<table>
<thead>
<tr>
<th>Form</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>{AUTO</td>
<td>NORMal}</td>
</tr>
</tbody>
</table>

- As with the header, the "COMMunicate:VERBose" command can be used to select whether to return the response in the full form or in the abbreviated form.
- The "COMMunicate:HEADer" setting does not affect the character data.

<Boolean>
<Boolean> is data that indicates ON or OFF. It is expressed in one of the following forms.

<table>
<thead>
<tr>
<th>Form</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

- When <Boolean> is expressed in the <NRf> form, "OFF" is selected if the rounded integer value is 0, and ON for all other cases.
- A response message is always returned with a 1 if the value is ON and 0 if the value is OFF.

<String Data>
<String data> is not a specified character string like <Character data>. It is an arbitrary character string. The character string must be enclosed in single quotation marks (') or double quotation marks ("').

- If a character string contains a double quotation mark ('"'), the double quotation mark is replaced by two concatenated double quotation marks (""'). This rule also applies to a single quotation mark within a character string.
- A response message is always enclosed in double quotation marks (" '" ).
- <String data> is an arbitrary character string. Therefore the instrument assumes that the remaining program message units are part of the character string if no single (' ') or double quotation mark ('"') is encountered. As a result, no error is detected if a quotation mark is omitted.

<Filename>
<Filename> is data that indicates a file name. It is expressed in one of the following forms.

<table>
<thead>
<tr>
<th>Form</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;NRf&gt;</td>
<td>&lt;Character data&gt;</td>
</tr>
</tbody>
</table>

- <NRf> is rounded to an 8-digit integer and converted to ASCII code. The result is the file name (example: 1 becomes "00000001"). Negative values are not allowed.
- For <Character data> and <String data>, the first eight characters become the file name.
- Response messages are always returned in the <String data> form.

<Block Data>
<Block data> is arbitrary 8-bit data. It is only used in response messages on this instrument. The syntax is as follows:

<table>
<thead>
<tr>
<th>Form</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>#N&lt;N-digit decimal number&gt;</td>
<td>&lt;Data byte sequence&gt;</td>
</tr>
</tbody>
</table>

- #N Indicates that the data is <Block data>. "N" indicates the number of succeeding data bytes (digits) in ASCII code characters.
- <N-digit decimal number> Indicates the number of bytes of data (example: 0012 = 12 bytes).
- <Data byte sequence> Expresses the actual data (example: ABCDEFGHIJKL).
- Data is comprised of 8-bit values (0 to 255). This means that the ASCII code "0AH," which stands for "NL," can also be a code used for data. Hence, care must be taken when programming the controller.
5.5 Synchronization with the Controller

Overlap Commands and Sequential Commands
There are two types of commands, overlap commands and sequential commands. In the case of overlap commands, the execution of the next command may start before the execution of the previous command is completed.

For example, if the next program message is transmitted when specifying the voltage range and querying the result, the response always returns the most recent setting (100 V in this case).

```
:INPut:VOLTage:RANge;ELEMent1 100V; ELEMent?<PMT>
```

This is because the next command is forced to wait until the processing of "INPut:VOLTage:RANge:ELEMent1" itself is completed. This type of command is called a sequential command.

On the contrary, let us assume that you send the next program message when you wish to load a file and query the voltage range of the result.

```
:FILE:LOAD:SETup "FILE1";:INPut:VOLTage:RANge:ELEMent1?<PMT>
```

In this case, "FILE:LOAD:SETup "FILE1";" is executed before the loading of the file is completed, and the voltage range that is returned is the value before the file is loaded.

The act of executing the next command before the processing of itself is completed such as with "FILE:LOAD:SETup" is called an overlap operation. A command that operates in this way is called an overlap command.

In such case, the overlap operation can be prevented by using the methods below.

Synchronizing with Overlap Commands
Using the "WAI Command
The "WAI" command holds the subsequent commands until the overlap command is completed.

Example
```
:COMMunicate:OPSE #H0040;:FILE:LOAD:SETup 
"FILE1";*WAI;;INPut:VOLTage:RANge:ELEMent1?<PMT>
```

"COMMunicate:OPSE" is a command used to select the "WAI" target. Here, media access is specified. Because "WAI" is executed immediately before 

```
*:INPut:VOLTage:RANge:ELEMent1?,
```

is not executed until the loading of the file is completed.

Using the COMMunicate:OVERlap command
The COMMunicate:OVERlap command enables (or disables) overlap operation.

Example
```
```

"COMMunicate:OVERlap #HFFBF" enables overlap operation on commands other than media access. Because the overlap operation of file loading is disabled, "FILE:LOAD:SETup" operates in the same way as a sequential command. Therefore, 

```
*:INPut:VOLTage:RANge:ELEMent1?,
```

is not executed until the loading of the file is completed.
5.5 Synchronization with the Controller

Using the *OPC Command
The *OPC command sets the OPC bit, bit 0 of the standard event register (see page 7-5), to 1 when the overlap operation is completed.

Example
```
*OPC? [PMT]
```
(Read the response to *OPC?)

```
:COMMunicate:OPSE #H0040;
  *ESE 1;*ESR?;*SRE 32;:FILE:LOAD:
  SETup "FILE1";OPC[PMT>

(Read the response to *ESR?)
(Wait for a service request)
:INPut:VOLTage:RANGe:
  ELEMENT1[PMT>
```

"COMMunicate:OPSE" is a command used to select the "*OPC" target. Here, media access is specified. "*ESE 1" and "*SRE 32" indicate that a service request is generated only when the OPC bit is 1. "*ESR?" clears the standard event register. In the example above, "*:INPut:VOLTage:
  RANGe:ELEMENT1[PMT>" is not executed until a service request is generated.

Using the *OPC? Query
The *OPC? query generates a response when an overlap operation is completed.

Example
```
:COMMunicate:OPSE #H0040;:FILE:
  LOAD:SETup "FILE1";*OPC<PMT>

(Read the response to *OPC)
:INPut:VOLTage:RANGe:
  ELEMENT1<PMT>
```

"COMMunicate:OPSE" is a command used to select the "*OPC?" target. Here, media access is specified. Because "*OPC?" does not generate a response until the overlap operation is completed, the loading of the file will have been completed by the time the response to "*OPC?" is read.

Note
Most commands are sequential commands. Overlay commands are indicated as overlay commands in chapter 6. All other commands are sequential commands.

Achieving Synchronization without Using Overlap Commands
Even for sequential commands, synchronization is sometimes required to correctly query the measured data. If you wish to query the most recent numeric data on every time measured data is updated, for example, sending the "*:NUMeric[:NORMal]:VALue?" command at an arbitrary timing can cause data that is the same as the previous data to be received. This is because this instrument returns the current measured data regardless of whether the measured data has been updated since the previous query. In this case, the following method must be used to synchronize with the end of the updating of the measured data.

Using the STATus:CONDition? query
The "STATus:CONDition?" query is used to query the contents of the condition register (page 7-7). You can determine whether the measured data is being updated by reading bit 0 of the condition register. If bit 0 of the condition register is 1, the measured data is being updated. If it is 0, the measured data can be queried.
### 5.5 Synchronization with the Controller

#### Using the Extended Event Register

The changes in the condition register can be reflected in the extended event register (page 7-7).

Example:
```
:STATus:FILTer1 FALL; :STATus: EESE 1; EESR?; *SRE 8<PMT>
```
(Read the response to :STATus:EESR?)

Loop

(Wait for a service request)
```
:NUMeric[:NORMal]:VALue?<PMT>
```
(Read the response to :NUMeric[:NORMal]:VALue?)

```
:STATus:EESR?<PMT>
```
(Read the response to :STATus:EESR?)

(Return to LOOP)

The "STATus:FILTer1 FALL" command sets the transition filter so that bit 0 (FILTer1) of the extended event register is set to 1 when bit 0 of the condition register changes from 1 to 0.

The ":STATus:EESE 1" command is used to reflect only bit 0 of the extended event register to the status byte.

The ":STATus:EESR?" command is used to clear the extended event register.

The "*SRE 8" command is used to generate a service request solely on the cause of the extended event register.

The ":NUMeric[:NORMal]:VALue?" command is not executed until a service request is generated.

#### Using the COMMunicate:WAIT command

The "COMMunicate:WAIT" command halts communications until a specific event is generated.

Example:
```
:STATus:FILTer1 FALL; :STATus: EESR? <PMT>
```
(Read the response to :STATus:EESR?)

Loop

COMMunicate:WAIT 1<PMT>

```
:NUMeric[:NORMal]:VALue? <PMT>
```
(Read the response to :NUMeric[:NORMal]:VALue?)

```
:STATus:EESR?<PMT>
```
(Read the response to :STATus:EESR?)

(Return to LOOP)

For a description of "STATus:FILTer1 FALL" and "STATus:EESR?" see the previous section regarding the extended event register.

The "COMMunicate:WAIT 1" command indicates that the program will wait for bit 0 of the extended event register to be set to "1."

The ":NUMeric[:NORMal]:VALue?" command is not executed until bit 0 of the extended event register is set to "1."
# Chapter 6  Communication Commands

## List of Commands

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<thead>
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<th>Command</th>
<th>Function</th>
<th>Page</th>
</tr>
</thead>
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<td></td>
<td></td>
</tr>
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<td>6-17</td>
</tr>
<tr>
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<td>Sets the output byte order of the waveform sampling data (FLOAT format) that is transmitted by &quot;:ACQuisition:SEND?&quot; or queries the current setting.</td>
<td>6-17</td>
</tr>
<tr>
<td>:ACQuisition:END</td>
<td>Sets the output end point of the waveform display data that is transmitted by &quot;:ACQuisition:SEND?&quot; or queries the current setting.</td>
<td>6-17</td>
</tr>
<tr>
<td>:ACQuisition:FORMat</td>
<td>Sets the format of the waveform sampling data that is transmitted by &quot;:ACQuisition:SEND?&quot; or queries the current setting.</td>
<td>6-17</td>
</tr>
<tr>
<td>:ACQuisition:HOLD</td>
<td>Sets whether to hold (ON) or release (OFF) all the waveform sampling data or queries the current setting.</td>
<td>6-17</td>
</tr>
<tr>
<td>:ACQuisition:LENGTH?</td>
<td>Queries the total number of points of the waveform sampling specified by &quot;:ACQuisition:TRACe.&quot;</td>
<td>6-18</td>
</tr>
<tr>
<td>:ACQuisition:SEND?</td>
<td>Queries the waveform sampling data specified by &quot;:ACQuisition:TRACe.&quot;</td>
<td>6-18</td>
</tr>
<tr>
<td>:ACQuisition:SRATe?</td>
<td>Queries the sampling rate of the retrieved data</td>
<td>6-18</td>
</tr>
<tr>
<td>:ACQuisition:STARt</td>
<td>Sets the output start point of the waveform display data that is transmitted by &quot;:ACQuisition:SEND?&quot; or queries the current setting.</td>
<td>6-18</td>
</tr>
<tr>
<td>:ACQuisition:TRACe</td>
<td>Sets the target trace of &quot;:ACQuisition:SEND?&quot; or queries the current setting.</td>
<td>6-18</td>
</tr>
<tr>
<td><strong>AOUTput Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AOUTput?</td>
<td>Queries all settings related to the D/A output.</td>
<td>6-19</td>
</tr>
<tr>
<td>:AOUTput:NORMal?</td>
<td>Queries all settings related to the D/A output.</td>
<td>6-19</td>
</tr>
<tr>
<td>:AOUTput[:NORMal]:CHANnel&lt;x&gt;</td>
<td>Sets the D/A output items (function, element, and harmonic order) or queries the current setting.</td>
<td>6-19</td>
</tr>
<tr>
<td>:AOUTput[:NORMal]:IRTime</td>
<td>Sets the rated integration time for the D/A output of integrated values or queries the current setting.</td>
<td>6-19</td>
</tr>
<tr>
<td>:AOUTput[:NORMal]:MODE&lt;x&gt;</td>
<td>Sets the method of setting the rated value for the D/A output items or queries the current setting.</td>
<td>6-20</td>
</tr>
<tr>
<td>:AOUTput[:NORMal]:RATE&lt;x&gt;</td>
<td>Manually sets the rated maximum and minimum values for the D/A output items or queries the current setting.</td>
<td>6-20</td>
</tr>
<tr>
<td><strong>CBCycle Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CBCycle?</td>
<td>Queries all settings related to the Cycle by Cycle measurement function.</td>
<td>6-21</td>
</tr>
<tr>
<td>:CBCycle:COUNt</td>
<td>Sets the number of cycles for Cycle by Cycle measurement or queries the current setting.</td>
<td>6-21</td>
</tr>
<tr>
<td>:CBCycle:DISPLAY?</td>
<td>Queries all settings related to the Cycle by Cycle display.</td>
<td>6-21</td>
</tr>
<tr>
<td>:CBCycle:DISPLAY:CURSor</td>
<td>Sets the cursor position of the Cycle by Cycle display or queries the current setting.</td>
<td>6-21</td>
</tr>
<tr>
<td>:CBCycle:DISPLAY:ITEM&lt;x&gt;</td>
<td>Sets the displayed items (function and element) of the Cycle by Cycle display or queries the current setting.</td>
<td>6-21</td>
</tr>
<tr>
<td>:CBCycle:DISPLAY:PAGE</td>
<td>Sets the number of the displayed page of the Cycle by Cycle display or queries the current setting.</td>
<td>6-21</td>
</tr>
<tr>
<td>:CBCycle:FILTER?</td>
<td>Queries all settings related to the filter for Cycle by Cycle measurement.</td>
<td>6-22</td>
</tr>
<tr>
<td>:CBCycle:FILTER:LINE?</td>
<td>Queries all settings related to the line filter for Cycle by Cycle measurement.</td>
<td>6-22</td>
</tr>
<tr>
<td>:CBCycle:FILTER[:LINE][:ALL]</td>
<td>Collectively sets the line filters of all elements for Cycle by Cycle measurement</td>
<td>6-22</td>
</tr>
<tr>
<td>:CBCycle:FILTER[:LINE]:ELEMENT&lt;x&gt;</td>
<td>Sets the line filter of individual elements for Cycle by Cycle measurement or queries the current setting</td>
<td>6-22</td>
</tr>
<tr>
<td>:CBCycle:FILTER[:LINE]:MOTOR</td>
<td>Sets the motor input line filters for Cycle by Cycle measurement or queries the current setting</td>
<td>6-22</td>
</tr>
<tr>
<td>:CBCycle:RESET</td>
<td>Resets Cycle by Cycle measurement.</td>
<td>6-22</td>
</tr>
<tr>
<td>:CBCycle:START</td>
<td>Starts Cycle by Cycle measurement.</td>
<td>6-22</td>
</tr>
<tr>
<td>:CBCycle:SYNCronize?</td>
<td>Queries all settings related to the synchronization source for Cycle by Cycle measurement.</td>
<td>6-22</td>
</tr>
</tbody>
</table>
## 5.1 List of Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>:CBCycle:SYNChronize:SLOPe</td>
<td>Sets the slope of the synchronization source of Cycle by Cycle measurement or queries the current setting.</td>
</tr>
<tr>
<td>:CBCycle:SYNChronize:SOURce</td>
<td>Sets the synchronization source for Cycle by Cycle measurement or queries the current setting.</td>
</tr>
<tr>
<td>:CBCycle:TIMEout</td>
<td>Sets the timeout value for Cycle by Cycle measurement or queries the current setting.</td>
</tr>
<tr>
<td>:CBCycle:TRIGger?</td>
<td>Queries all settings related to triggers or queries the current setting.</td>
</tr>
<tr>
<td>:CBCycle:TRIGger:LEVEL</td>
<td>Sets the trigger level or queries the current setting.</td>
</tr>
<tr>
<td>:CBCycle:TRIGger:MODE</td>
<td>Sets the trigger mode or queries the current setting.</td>
</tr>
<tr>
<td>:CBCycle:TRIGger:SLOPe</td>
<td>Sets the trigger slope or queries the current setting.</td>
</tr>
<tr>
<td>:CBCycle:TRIGger:SOURce</td>
<td>Sets the trigger source or queries the current setting.</td>
</tr>
</tbody>
</table>

Description
This is the same setting or query as with the "DISPLAY:WAVE:TRIGger:SOURce" command.

### COMMunicate Group

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>:COMMunicate?</td>
<td>Queries all settings related to communications.</td>
</tr>
<tr>
<td>:COMMunicate:HEAder</td>
<td>Sets whether to add a header to the response to a query (example DISPLAY:MODE NUMERIC) or not add the header (example NUMERIC).</td>
</tr>
<tr>
<td>:COMMunicate:LOCKout</td>
<td>Sets or clears local lockout.</td>
</tr>
<tr>
<td>:COMMunicate:OPSE (Operation Pending Status Enable register)</td>
<td>Sets the overlap command that is used by the *OPC, *OPC?, and *WAI commands or queries the current setting.</td>
</tr>
<tr>
<td>:COMMunicate:OPSR? (Operation Pending Status Register)</td>
<td>Queries the value of the operation pending status register.</td>
</tr>
<tr>
<td>:COMMunicate:OVERlap</td>
<td>Sets the commands that will operate as overlap commands or queries the current setting.</td>
</tr>
<tr>
<td>:COMMunicate:REmote</td>
<td>Sets remote or local. ON is remote mode.</td>
</tr>
<tr>
<td>:COMMunicate:VERBose</td>
<td>Sets whether to return the response to a query using full spelling (example :INPUT:VOLTAGE:RANGE:ELEMENT1 1.000E+03) or using abbreviation (example :VOLT:RANG:ELEM 1.000E+03).</td>
</tr>
<tr>
<td>:COMMunicate:WAIT</td>
<td>Waits for one of the specified extended events to occur.</td>
</tr>
<tr>
<td>:COMMunicate:WAIT?</td>
<td>Creates the response that is returned when the specified event occurs.</td>
</tr>
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### CURSor Group

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<tr>
<td>:CURSor?</td>
<td>Queries all settings related to the cursor measurement.</td>
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<tr>
<td>:CURSor:BAR?</td>
<td>Queries all settings related to the cursor measurement of the bar graph display.</td>
</tr>
<tr>
<td>:CURSor:BAR:POSitio&lt;x&gt;n</td>
<td>Sets the cursor position (order) on the bar graph display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:BAR[:STATe]</td>
<td>Turns ON/OFF the cursor display on the bar graph display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:BAR:Y&lt;x&gt;</td>
<td>DY</td>
</tr>
<tr>
<td>:CURSor:FFT</td>
<td>Queries all settings related to the cursor measurement on the FFT waveform display.</td>
</tr>
<tr>
<td>:CURSor:FFT:POSitio&lt;x&gt;n</td>
<td>Sets the cursor position on the FFT waveform display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:FFT[:STATe]</td>
<td>Turns ON/OFF the cursor display on the FFT waveform display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:FFT:TRACe&lt;x&gt;</td>
<td>Sets the cursor target on the FFT waveform display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:FFT:TRACe:Y&lt;x&gt;</td>
<td>DY</td>
</tr>
<tr>
<td>:CURSor:TRENd?</td>
<td>Queries all settings related to the cursor measurement of the trend display.</td>
</tr>
<tr>
<td>:CURSor:TRENd:POSitio&lt;x&gt;n</td>
<td>Sets the cursor position on the trend display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:TRENd[:STATe]</td>
<td>Turns ON/OFF the cursor display on the trend display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:TRENd:TRACe&lt;x&gt;</td>
<td>Sets the cursor target on the trend display or queries the current setting.</td>
</tr>
<tr>
<td>:CURSor:TRENd:Y&lt;x&gt;</td>
<td>DY</td>
</tr>
<tr>
<td>:CURSor:WAVE?</td>
<td>Queries all settings related to the cursor measurement on the waveform display.</td>
</tr>
<tr>
<td>:CURSor:WAVE:PATH</td>
<td>Sets the cursor path on the waveform display or queries the current setting.</td>
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<td>:CURSor:WAVE:POSITION&lt;x&gt;</td>
<td>Sets the cursor position on the waveform display or queries the current setting.</td>
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<tr>
<td>:CURSor:WAVE[:STATe]</td>
<td>Turns ON/OFF the cursor display on the waveform display or queries the current setting.</td>
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</tr>
<tr>
<td>:CURSor:WAVE:TRACE&lt;x&gt;</td>
<td>Sets the cursor target on the waveform display or queries the current setting.</td>
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<tr>
<td>:CURSor:WAVE:{X&lt;x&gt;</td>
<td>DX}</td>
<td>Queries the cursor measurement value on the waveform display.</td>
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### DISPLAY Group

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<td>Queries all settings related to the screen display.</td>
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<tr>
<td>:DISPLAY:BAR?</td>
<td>Queries all settings related to the bar graph.</td>
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<tr>
<td>:DISPLAY:BAR:FORMAT</td>
<td>Sets the display format of the bar graph or queries the current setting.</td>
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</tr>
<tr>
<td>:DISPLAY:BAR:ITEM&lt;x&gt;</td>
<td>Sets the bar graph item (function and element) or queries the current setting.</td>
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<tr>
<td>:DISPLAY:BAR:ORDER</td>
<td>Sets the start and end orders of the bar graph or queries the current setting.</td>
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<tr>
<td>:DISPLAY:CBCycle?</td>
<td>Queries all settings related to the Cycle by Cycle display.</td>
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<tr>
<td>:DISPLAY:CBCycle:CURSor</td>
<td>Sets the cursor position of the Cycle by Cycle display or queries the current setting.</td>
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<tr>
<td>:DISPLAY:CBCycle:ITEM&lt;x&gt;</td>
<td>Sets the displayed items (function and element) of the Cycle by Cycle display or queries the current setting.</td>
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<tr>
<td>:DISPLAY:CBCycle:PAGE</td>
<td>Sets the number of the displayed page of the Cycle by Cycle display or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT?</td>
<td>Queries all settings related to the FFT waveform display.</td>
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<tr>
<td>:DISPLAY:FFT:FFT&lt;x&gt;?</td>
<td>Queries all settings related to the FFT waveform.</td>
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<tr>
<td>:DISPLAY:FFT:FFT&lt;x&gt;:LABel</td>
<td>Sets the label of the FFT waveform or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT:FFT&lt;x&gt;:OBJECT</td>
<td>Sets the source waveform of the FFT computation or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT:FFT&lt;x&gt;[:STATe]</td>
<td>Turns ON/OFF the FFT waveform display or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT:FORMat</td>
<td>Sets the display format of the FFT waveform or queries the current setting.</td>
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</tr>
<tr>
<td>:DISPLAY:FFT:POINt</td>
<td>Sets the number of points of the FFT computation or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT:SCOpe</td>
<td>Sets the display range of the FFT waveform or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT:SPectrum</td>
<td>Sets the display spectrum format of the FFT waveform or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT:VSCale</td>
<td>Sets the display scale of the vertical axis of the FFT waveform or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FFT:WINDOW</td>
<td>Sets the window function of the FFT computation or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FLICKer?</td>
<td>Queries all settings related to flicker measurement display.</td>
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<tr>
<td>:DISPLAY:FLICKer:ELEMENT</td>
<td>Sets the element to be displayed for flicker measurement display or queries the current setting.</td>
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</tr>
<tr>
<td>:DISPLAY:FLICKer:PAGE</td>
<td>Sets the page numbers to be displayed for flicker measurement display or queries the current setting.</td>
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<tr>
<td>:DISPLAY:FLICKer:PERiod</td>
<td>Sets the display observation period number for flicker measurement display or queries the current setting.</td>
<td>6-32</td>
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<tr>
<td>:DISPLAY:INFormation?</td>
<td>Queries all settings related to the display of the setup parameter list.</td>
<td>6-32</td>
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<tr>
<td>:DISPLAY:INFormation:PAGE</td>
<td>Sets the page number of the display of setup parameter list or queries the current setting.</td>
<td>6-32</td>
</tr>
<tr>
<td>:DISPLAY:INFormation[:STATe]</td>
<td>Turns ON/OFF the display of the setup parameter list or queries the current setting.</td>
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<tr>
<td>:DISPLAY:MATH?</td>
<td>Queries all settings related to the computed waveform display.</td>
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<tr>
<td>:DISPLAY:MATH:CONSTant&lt;x&gt;</td>
<td>Sets the constant to be used in the waveform computing equation or queries the current setting.</td>
<td>6-33</td>
</tr>
<tr>
<td>:DISPLAY:MATH:MATH&lt;x&gt;?</td>
<td>Queries all settings related to the computed waveform.</td>
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</tr>
<tr>
<td>:DISPLAY:MATH:MATH&lt;x&gt;:EXPRession</td>
<td>Sets the equation of the waveform computation or queries the current setting.</td>
<td>6-33</td>
</tr>
<tr>
<td>:DISPLAY:MATH:MATH&lt;x&gt;:LABel</td>
<td>Sets the label of the computed waveform or queries the current setting.</td>
<td>6-33</td>
</tr>
<tr>
<td>:DISPLAY:MATH:MATH&lt;x&gt;:SCALing?</td>
<td>Queries all settings related to the scaling of the computed waveform.</td>
<td>6-33</td>
</tr>
<tr>
<td>:DISPLAY:MATH:MATH&lt;x&gt;:SCALing:CENTER</td>
<td>Sets the center value of the manual scaling of the computed waveform or queries the current setting.</td>
<td>6-34</td>
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<tr>
<td>:DISPLAY:MATH:MATH&lt;x&gt;:SCALing:MODE</td>
<td>Sets the scaling mode of the computed waveform or queries the current setting.</td>
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<td>:DISPlay:MATH:MATH&lt;x&gt;:SCA:DIv</td>
<td>Sets the scale/division value of the manual scaling of the computed waveform or queries the current setting.</td>
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<tr>
<td>:DISPlay:MATH:MATH&lt;x&gt;:UNIT</td>
<td>Sets the unit to be added to the result of the waveform computation or queries the current setting.</td>
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<tr>
<td>:DISPlay:MATH:MATH&lt;x&gt;:MODE</td>
<td>Sets the display mode or queries the current setting.</td>
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<tr>
<td>:DISPlay:Numer&lt;x&gt;:FM0?</td>
<td>Queries all settings related to the numeric display.</td>
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<tr>
<td>:DISPlay:Numer&lt;x&gt;:NORMa?</td>
<td>Queries all settings related to the numeric display (all display).</td>
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</tr>
<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:CUR Sor</td>
<td>Sets the cursor position on the numeric display (all display) or queries the current setting.</td>
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</tr>
<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:OPAGE</td>
<td>Sets the displayed harmonic order on the harmonic measurement function display page of the numeric display (all display) or queries the current setting.</td>
<td>6-36</td>
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<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:FORMat</td>
<td>Sets the numeric display format or queries the current setting.</td>
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</tr>
<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:LIST?</td>
<td>Queries all settings related to the numeric display (list display).</td>
<td>6-36</td>
</tr>
<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:LIST:CUR Sor</td>
<td>Sets the cursor position on the numeric display (list display) or queries the current setting.</td>
<td>6-37</td>
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<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:LIST:HEADer</td>
<td>Sets the cursor position in the header section on the numeric display (list display) or queries the current setting.</td>
<td>6-37</td>
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<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:ITEM&lt;x&gt;</td>
<td>Sets the displayed items (function and element) on the numeric display (list display) or queries the current setting.</td>
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<tr>
<td>:DISPlay:Numer&lt;x&gt;:ALL:ORDer</td>
<td>Sets the harmonic order cursor position in the data section on the numeric display (list display) or queries the current setting.</td>
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<tr>
<td>:DISPlay:Numer&lt;x&gt;:VAL4</td>
<td>VAL8</td>
<td>VAL16:PRESet</td>
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<td>:DISPlay:TRENd?</td>
<td>Queries all settings related to the trend.</td>
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<tr>
<td>:DISPlay:TRENd:ALL</td>
<td>Collectively turns ON/OFF all trends.</td>
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<tr>
<td>:DISPlay:TRENd:CLEar</td>
<td>Clears the trend.</td>
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<tr>
<td>:DISPlay:TRENd:FORMat</td>
<td>Sets the display format of the trend or queries the current setting.</td>
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<tr>
<td>:DISPlay:TRENd:ITEM&lt;x&gt;:SCALing?</td>
<td>Queries all settings related to the scaling of the trend.</td>
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<tr>
<td>:DISPlay:TRENd:ITEM&lt;x&gt;:SCALing:MODE</td>
<td>Sets the scaling mode of the trend or queries the current setting.</td>
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<tr>
<td>:DISPlay:TRENd:ITEM&lt;x&gt;:SCALing:VALue</td>
<td>Sets the upper and lower limits of manual scaling of the trend or queries the current setting.</td>
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<tr>
<td>:DISPlay:TRENd:T DIV</td>
<td>Sets the horizontal axis (T/div) of the trend or queries the current setting.</td>
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<tr>
<td>:DISPlay:TRENd:Tx&lt;x&gt;</td>
<td>Turns ON/OFF the trend or queries the current setting.</td>
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<tr>
<td>:DISPlay:VECTOR:FM0?</td>
<td>Queries all settings related to the vector display.</td>
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<tr>
<td>:DISPlay:VECTOR:NUMer</td>
<td>Turns ON/OFF the numeric data display for the vector display or queries the current setting.</td>
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<td>:DISPlay:VECTOR:OBJECT</td>
<td>Sets the wiring unit to be displayed during vector display or queries the current setting.</td>
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<td>:DISPlay:VECTOR:UMAG</td>
<td>IMAG</td>
<td>Sets the zoom factor of the [voltage</td>
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<td>:DISPlay:WAVE?</td>
<td>Queries all settings related to the waveform display.</td>
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<tr>
<td>:DISPlay:WAVE:ALL</td>
<td>Collectively turns ON/OFF all waveform displays.</td>
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<tr>
<td>:DISPlay:WAVE:FORMat</td>
<td>Sets the display format of the waveform or queries the current setting.</td>
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<tr>
<td>:DISPlay:WAVE:GRATicule</td>
<td>Sets the graticule (grid) type or queries the current setting.</td>
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<td>Sets the interpolation method of the waveform or queries the current setting.</td>
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<td>:DISPlay:WAVE:MAPPING?</td>
<td>Queries all settings related to the waveform mapping to the split screen.</td>
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<tr>
<td>:DISPlay:WAVE:MAPPING[:MODE]</td>
<td>Sets the waveform mapping method for the split screen or queries the current setting.</td>
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<td>:DISPlay:WAVE:MAPPING:U&lt;x&gt;</td>
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<td>:DISPlay:WAVE:POSITION?</td>
<td>Queries all settings related to the vertical position (level of the center position) of the waveform.</td>
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<tr>
<td>:DISPlay:WAVE:POSITION[:UALL]</td>
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<td>Collectively sets the vertical position (level of the center position) of the waveform (voltage</td>
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<td>:DISPlay:WAVE:POSITION:U&lt;x&gt;</td>
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<td>Sets the vertical position (level of the center position) of the waveform (voltage</td>
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<td>:DISPlay:WAVE:SVALUE {Scale VALUE}</td>
<td>Turns ON/OFF the scale value display or queries the current setting.</td>
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<td>:DISPlay:WAVE:TDIV</td>
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<td>:DISPlay:WAVE:TRIGGER:SLOPe</td>
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<td>:DISPlay:WAVE:TRIGGER:SOURce</td>
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<td>:DISPlay:WAVE:VZOOM?</td>
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<td>:DISPlay:WAVE:VZOOM:UALL</td>
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<td>Collectively sets the vertical zoom factor of the waveform (voltage</td>
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<tr>
<td>:DISPlay:WAVE:VZOOM:U&lt;x&gt;</td>
<td>I&lt;x&gt;</td>
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<td>:FILE:DELETE:NUMeric:{ASCii</td>
<td>FLO\nat}</td>
<td>Deletes the numeric data file.</td>
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<td>:FILE:DELETE:SETup</td>
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<tr>
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<td>:FILE:SAVE:ACQuisition:TRACe</td>
<td>Sets the waveform sampling data to be saved to a file or queries the current setting.</td>
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<tr>
<td>:FILE:SAVE:ACQuisition:TYPE</td>
<td>Sets the format of the waveform sampling data to be saved or queries the current setting.</td>
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<td>:FILE:SAVE:ANAMing</td>
<td>Sets whether to automatically name the files to be saved or queries the current setting.</td>
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<tr>
<td>:FILE:SAVE:COMMENT</td>
<td>Sets the comment to be added to the file to be saved or queries the current setting.</td>
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</tr>
<tr>
<td>:FILE:SAVE:NUMeric?</td>
<td>Queries all settings related to the saving of numeric data files.</td>
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<tr>
<td>:FILE:SAVE:NUMeric:CBCycle?</td>
<td>Queries all settings related to Cycle by Cycle measurement items saved to numeric data files or queries the current setting.</td>
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</tr>
<tr>
<td>:FILE:SAVE:NUMeric:CBCycle:ALL</td>
<td>Collectively turns ON/OFF the output of all elements and functions when saving numeric data from Cycle by Cycle measurement to a file.</td>
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</tr>
<tr>
<td>:FILE:SAVE:NUMeric:CBCycle:{ELEMENT&lt;x&gt;</td>
<td>SIGMA</td>
<td>SIGMB}</td>
</tr>
<tr>
<td>:FILE:SAVE:NUMeric:CBCycle:&lt;Function&gt;</td>
<td>Turns ON/OFF the output of each function when saving numeric data from Cycle by Cycle measurement to a file or queries the current setting.</td>
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<tr>
<td>:FILE:SAVE:NUMeric[:EXECute]</td>
<td>Saves the numeric data to a file.</td>
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<tr>
<td>:FILE:SAVE:NUMeric:NORMal?</td>
<td>Queries all settings related to the items saved to numeric data files.</td>
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<tr>
<td>:FILE:SAVE:NUMeric:NORMal:PRESet&lt;x&gt;</td>
<td>Presets the output ON/OFF pattern of the element function for saving the numeric data to file.</td>
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<tr>
<td>:FILE:SAVE:NUMeric:NORMal:ALL</td>
<td>Collectively turns ON/OFF the output of all element functions when saving the numerical data file.</td>
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<tr>
<td>:FILE:SAVE:NUMeric:NORMal:{ELEMENT&lt;x&gt;</td>
<td>ΣA</td>
<td>ΣB}</td>
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<tr>
<td>:FILE:SAVE:NUMeric:NORMal:&lt;Function&gt;</td>
<td>Turns ON/OFF the output of the function when saving the numerical data file or queries the current setting.</td>
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</tr>
<tr>
<td>:FILE:SAVE:NUMeric:TYPE</td>
<td>Sets the format of the numeric data to be saved or queries the current setting.</td>
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<tr>
<td>:FILE:SAVE:SETup[:EXECute]</td>
<td>Saves the setup parameter file.</td>
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<tr>
<td>:FILE:SAVE:WAVE?</td>
<td>Queries all settings related to the saving of waveform display data files.</td>
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<tr>
<td>:FILE:SAVE:WAVE[:EXECute]</td>
<td>Executes the saving of the waveform display data file.</td>
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<tr>
<td>:FILE:SAVE:WAVE:TRACe</td>
<td>Sets the waveform to be saved or queries the current setting.</td>
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</tr>
<tr>
<td>:FILE:SAVE:WAVE:TYPE</td>
<td>Sets the format of the waveform display data to be saved or queries the current setting.</td>
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### FLICKer Group

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<td>Queries all settings related to flicker measurement.</td>
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<tr>
<td>:FLICKer:COUNT</td>
<td>Sets the number of measurements for the short-term flicker value Pst or queries the current setting.</td>
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<tr>
<td>:FLICKer:DC?</td>
<td>Sets all settings related to the relative steady-state voltage change dc or queries the current setting.</td>
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</tr>
<tr>
<td>:FLICKer:DC:LIMIT</td>
<td>Sets the limit of the relative steady-state voltage change dc or queries the current setting.</td>
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<tr>
<td>:FLICKer:DC[:STATe]</td>
<td>Turns ON/OFF judgment of the relative steady-state voltage change dc or queries the current setting.</td>
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<tr>
<td>:FLICKer:DISPLAY?</td>
<td>Queries all settings related to flicker measurement display.</td>
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<tr>
<td>:FLICKer:DISPLAY:ELEMENT</td>
<td>Sets the element to be displayed for flicker measurement display or queries the current setting.</td>
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<tr>
<td>:FLICKer:DISPLAY:PAGE</td>
<td>Sets the page numbers to be displayed for flicker measurement display or queries the current setting.</td>
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<tr>
<td>:FLICKer:DISPLAY:PERiod</td>
<td>Sets the display observation period number for flicker measurement display or queries the current setting.</td>
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<tr>
<td>:FLICKer:DMAX?</td>
<td>Sets all settings related to the maximum relative voltage change dmax or queries the current setting.</td>
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<tr>
<td>:FLICKer:DMAX:LIMIT</td>
<td>Sets the limit of the maximum relative voltage change dmax or queries the current setting.</td>
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<tr>
<td>:FLICKer:DMAX[:STATe]</td>
<td>Turns ON/OFF judgment of the maximum relative voltage change dmax or queries the current setting.</td>
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<tr>
<td>:FLICKer:DMIN?</td>
<td>Sets all settings related to the steady-state range dmin or queries the current setting.</td>
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<tr>
<td>:FLICKer:DMIN:LIMit</td>
<td>Sets the limit of the steady-state range dmin or queries the current setting.</td>
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<tr>
<td>:FLICKer:DT?</td>
<td>Sets all settings related to the relative voltage change time d(t) or queries the current setting.</td>
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<tr>
<td>:FLICKer:DT:LIMIT</td>
<td>Sets the limit of the relative voltage change time d(t) or queries the current setting.</td>
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<tr>
<td>:FLICKer:DT[:STATe]</td>
<td>Turns ON/OFF judgment of the relative voltage change time d(t) or queries the current setting.</td>
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<tr>
<td>:FLICKer:EDITion</td>
<td>Sets the IEC standard edition for flicker measurement or queries the current setting.</td>
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<tr>
<td>:FLICKer:ELEMent&lt;x&gt;</td>
<td>Sets the target element flicker measurement or queries the current setting.</td>
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<tr>
<td>:FLICKer:FREQuency</td>
<td>Sets the target frequency for flicker measurement or queries the current setting.</td>
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<tr>
<td>:FLICKer:INITialize</td>
<td>Initializes flicker measurement.</td>
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<tr>
<td>:FLICKer:INTERval</td>
<td>Sets the time per measurement of the short-term flicker value Pst or queries the current setting.</td>
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<tr>
<td>:FLICKer:JUDGE</td>
<td>Finishes measurement of dmax caused by manual switching and performs judgment.</td>
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<tr>
<td>:FLICKer:MEASurement</td>
<td>Sets the flicker measurement method or queries the current setting.</td>
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<tr>
<td>:FLICKer:MOVe</td>
<td>Moves the observation period number for measurement of dmax caused by manual switching.</td>
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<tr>
<td>:FLICKer:PLT?</td>
<td>Queries all settings related to the long-term flicker value Plt.</td>
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<tr>
<td>:FLICKer:PLT:LIMIT</td>
<td>Sets the limit of the long-term flicker value Plt or queries the current setting.</td>
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<tr>
<td>:FLICKer:PLT:VALUE</td>
<td>Sets constant N for the equation used to compute the long-term flicker value Plt or queries the current setting.</td>
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<td>:FLICKer:PLT[:STATe]</td>
<td>Turns ON/OFF judgment of the long-term flicker value Plt or queries the current setting.</td>
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<td>:FLICKer:PST?</td>
<td>Queries all settings related to the short-term flicker value Pst.</td>
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<tr>
<td>:FLICKer:PST:LIMIT</td>
<td>Sets the limit for the short-term flicker value Pst or queries the current setting.</td>
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<tr>
<td>:FLICKer:PST[:STATe]</td>
<td>Turns ON/OFF judgment of the short-term flicker value Pst or queries the current setting.</td>
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<tr>
<td>:FLICKer:PLT3</td>
<td>Sets the edition of IEC 61000-3-3 or queries the current setting.</td>
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<tr>
<td>:FLICKer:P4D15</td>
<td>Sets the edition of IEC 61000-4-15 or queries the current setting.</td>
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<tr>
<td>:FLICKer:RESet</td>
<td>Resets measured flicker data.</td>
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<td>:FLICKer:START</td>
<td>Starts flicker measurement.</td>
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<tr>
<td>:FLICKer:STATe?</td>
<td>Queries the status of flicker measurement.</td>
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<td>:FLICKer:TMAX?</td>
<td>Queries all settings related to Tmax.</td>
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<tr>
<td>:FLICKer:TMAX:LIMIT</td>
<td>Sets the limit of the Tmax or queries the current setting.</td>
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<tr>
<td>:FLICKer:TMAX[:STATe]</td>
<td>Turns ON/OFF judgment of the Tmax or queries the current setting.</td>
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<tr>
<td>:FLICKer:UN?</td>
<td>Queries all settings related to rated voltage Un.</td>
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<tr>
<td>:FLICKer:UN:MODE</td>
<td>Sets the assignment method for rated voltage Un or queries the current setting.</td>
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<td>Sets the predefined value of rated voltage Un or queries the current setting.</td>
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<tr>
<td>:FLICKer:VOLTage</td>
<td>Function Sets the flicker target voltage or queries the current setting.</td>
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### HARMOnics Group
- **:HARMOnics?** Queries all settings related to harmonic measurement. 6-57
- **:HARMOnics:FBANd** Sets the frequency bandwidth of the harmonic measurement or queries the current setting. 6-57
- **:HARMOnics:IEC?** Queries all settings related to IEC harmonic measurement. 6-57
- **:HARMOnics:IEC:OBJect** Sets the IEC harmonic measurement target or queries the current setting. 6-57
- **:HARMOnics:ORDer** Sets the maximum and minimum orders to be measured or queries the current setting. 6-57
- **:HARMOnics:PLLSource** Sets the PLL source or queries the current setting. 6-58
- **:HARMOnics:PLLWarning?** Queries all settings related to the warning messages of the PLL source. 6-58
- **:HARMOnics:THD** Sets the equation used to calculate the THD (total harmonic distortion) or queries the current setting. 6-58

### HCOPy Group
- **:HCOPy? (Hard COPY)** Queries all settings related to the printing. 6-59
- **:HCOPy:ABORt** Aborts printing or paper feeding. 6-59
- **:HCOPy:AUTO:INTerval** Sets the auto print interval or queries the current setting. 6-59
- **:HCOPy:AUTO:(START|END)** Sets the (start|stop) reservation time of the auto print or queries the current setting. 6-59
- **:HCOPy:AUTO[:STATe]** Turns ON/OFF the auto print or queries the current setting. 6-59
- **:HCOPy:AUTO:SYNChronize** Sets the synchronization mode of the auto print or queries the current setting. 6-59
- **:HCOPy:COMMent** Sets the comment displayed at the bottom of the screen or queries the current setting. 6-60
- **:HCOPy:DIRection** Sets the printer or queries the current setting. 6-60
- **:HCOPy:EXECute** Executes printing. 6-60
- **:HCOPy:NETPrint?** Queries all settings related to the printing on the network printer. 6-60
- **:HCOPy:NETPrint:COLOR** Turns ON/OFF color printing on the network printer or queries the current setting. 6-60
- **:HCOPy:NETPrint:FORMat** Sets the printer description language for printing on a network printer or queries the current setting. 6-60
- **:HCOPy:PRINter?** Queries all settings related to printing on the built-in printer. 6-60
- **:HCOPy:PRINter:FEED** Executes paper feeding of the built-in printer. 6-60
- **:HCOPy:PRINter:FORMat** Sets the contents to be printed on the built-in printer or queries the current setting. 6-60
- **:HCOPy:PRINter:LIST?** Queries all settings related to the printing of the numeric data list on the built-in printer. 6-61
- **:HCOPy:PRINter:LIST:INFORMATION** Sets whether to add setup parameters when printing the numeric data list on the built-in printer or queries the current setting. 6-61
- **:HCOPy:PRINter:LIST:NORMa1?** Queries all settings related to the printed items of the numeric data list using the built-in printer. 6-61
- **:HCOPy:PRINter:LIST:NORMa1:ALL** Collectively turns ON/OFF the output of all element functions when printing the numeric data list on the built-in printer. 6-61
- **:HCOPy:PRINter:LIST:NORMa1:[ELEMent][E][SIGMA][SIGMB]** Turns ON/OFF the output of {each element} when printing the numeric data list on the built-in printer. 6-61
- **:HCOPy:PRINter:LIST:NORMa1::PR ESet<x>** Presets the output ON/OFF pattern of the element functions when printing the numeric data list on the built-in printer. 6-61
- **:HCOPy:PRINter:LIST:NORMa1::<F unction>** Turns ON/OFF the output of the function when printing the numerical data list using the built-in printer or queries the current setting. 6-62

### HOLD Group
- **:HOLD** Sets the output data (display, communications, etc.) hold or queries the current setting. 6-63
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<td><code>:IMAGe?</code></td>
<td>Queries all settings related to the saving of screen image data.</td>
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<td><code>:IMAGe:ABORT</code></td>
<td>Aborts the saving of the screen image data.</td>
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<tr>
<td><code>:IMAGe:COLOR</code></td>
<td>Sets the color tone of the screen image data to be saved or queries the current setting.</td>
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<tr>
<td><code>:IMAGe:COMMENT</code></td>
<td>Sets the comment displayed at the bottom of the screen or queries the current setting.</td>
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<tr>
<td><code>:IMAGe:COMPReSSion</code></td>
<td>Enables or disables the data compression of screen image data in BMP format or queries the current setting.</td>
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<tr>
<td><code>:IMAGe:EXECute</code></td>
<td>Saves the screen image data.</td>
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<tr>
<td><code>:IMAGe:FORMAT</code></td>
<td>Sets the format of the screen image data to be saved or queries the current setting.</td>
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<tr>
<td><code>:IMAGe:SAVE?</code></td>
<td>Queries all settings related to the saving of screen image data.</td>
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<td><code>:IMAGe:SAVE:ANAMing</code></td>
<td>Sets whether to automatically name the screen image data files to be saved or queries the current setting.</td>
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<tr>
<td><code>:IMAGe:SAVE:CDIRectory</code></td>
<td>Changes the save destination directory for the screen image data.</td>
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<td><code>:IMAGe:SAVE:DRIVE</code></td>
<td>Sets the save destination drive of the screen image data.</td>
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<tr>
<td><code>:IMAGe:SAVE:NAME</code></td>
<td>Sets the name of the file for saving the screen image data or queries the current setting.</td>
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<tr>
<td><code>:IMAGe:SEND?</code></td>
<td>Queries the screen image data.</td>
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| **INPut Group** | | 6-66 |
| `:INPut?` | Queries all settings related to the input element. | 6-66 |
| `[:INPut]:CFACtor` | Sets the crest factor or queries the current setting. | 6-66 |
| `[:INPut]:CURRent?` | Queries all settings related to the current measurement. | 6-66 |
| `[:INPut]:CURRent:AUTO?` | Queries the current auto range setting (ON/OFF) of all elements. | 6-66 |
| `[:INPut]:CURRent:AUTO[:ALL]` | Collectively turns ON/OFF the current auto range of all elements. | 6-66 |
| `[:INPut]:CURRent:AUTO:ELEMeNT<x>` | Turns ON/OFF the current auto range of the element or queries the current setting. | 6-67 |
| `[:INPut]:CURRent:AUTO:{SIGMA|SIGMB}` | Collectively turns ON/OFF the current auto range of all elements belonging to wiring unit {ΣA|ΣB}. | 6-67 |
| `[:INPut]:CURRent:MODE?` | Queries the current mode of all elements. | 6-67 |
| `[:INPut]:CURRent:MODE[:ALL]` | Collectively sets the current mode of all elements. | 6-67 |
| `[:INPut]:CURRent:MODE:ELEMeNT<x>` | Sets the current mode of the element or queries the current setting. | 6-67 |
| `[:INPut]:CURRent:MODE:{SIGMA|SIGMB}` | Collectively sets the current mode of all elements belonging to wiring unit {ΣA|ΣB}. | 6-67 |
| `[:INPut]:CURRent:RANGe?` | Queries the current ranges of all elements. | 6-67 |
| `[:INPut]:CURRent:RANGe[:ALL]` | Collectively sets the current ranges of all elements. | 6-67 |
| `[:INPut]:CURRent:RANGe:ELEMeNT<x>` | Sets the current range of the element or queries the current setting. | 6-68 |
| `[:INPut]:CURRent:RANGe:{SIGMA|SIGMB}` | Collectively sets the current range of all elements belonging to wiring unit {ΣA|ΣB}. | 6-68 |
| `[:INPut]:CURRent:SRATio?` | Queries the current sensor scaling constants of all elements. | 6-69 |
| `[:INPut]:CURRent:SRATio[:ALL]` | Collectively sets the current sensor scaling constants of all elements. | 6-69 |
| `[:INPut]:CURRent:SRATio:ELEMeNT<x>` | Sets the current sensor scaling constant of the element or queries the current setting. | 6-69 |
| `[:INPut]:FILTer?` | Queries all settings related to the filter. | 6-69 |
| `[:INPut]:FILTer:FREQuency?` | Queries the frequency filter settings of all elements. | 6-69 |
| `[:INPut]:FILTer:FREQuency[:ALL]` | Collectively sets the frequency filter of all elements. | 6-69 |
| `[:INPut]:FILTer:FREQuency:ELEMeNT<x>` | Sets the frequency filter of the element or queries the current setting. | 6-69 |
| `[:INPut]:FILTer:LINE?` | Queries the line filter settings of all elements. | 6-69 |
| `[:INPut]:FILTer:LINE[:ALL]` | Collectively sets the line filters of all elements. | 6-69 |
| `[:INPut]:FILTer:LINE:ELEMeNT<x>` | Sets the line filter of the element or queries the current setting. | 6-69 |
| `[:INPut]:INDependent` | Turns ON/OFF the independent setting of input elements or queries the current setting. | 6-69 |
| `[:INPut]:MODUle?` | Queries the input element type. | 6-70 |
| `[:INPut]:NULL` | Turns ON/OFF the NULL function or queries the current setting. | 6-70 |
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<td>Queries the peak over information.</td>
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<tr>
<td>[:INPut]:SCALing?</td>
<td>Queries all settings related to scaling.</td>
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<tr>
<td>[:INPut]:SCALing:{VT</td>
<td>CT</td>
<td>SFACtor or}?</td>
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<tr>
<td>[:INPut]:SCALing:{VT</td>
<td>CT</td>
<td>SFACtor}{:ALL}</td>
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<tr>
<td>[:INPut]:SCALing:{VT</td>
<td>CT</td>
<td>SFACtor}{:ELEMENT&lt;&lt;}</td>
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<td>[:INPut]:SCALing:STATE?</td>
<td>Queries the scaling ON/OFF states of all elements.</td>
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<tr>
<td>[:INPut]:SCALing:STATE{:ALL}</td>
<td>Collectively turns ON/OFF the scaling of all elements.</td>
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<tr>
<td>[:INPut]:SCALing:STATE{:ELEMENT&lt;x&gt;}</td>
<td>Turns ON/OFF the scaling of the element or queries the current setting.</td>
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<tr>
<td>[:INPut]:SYNChronize?</td>
<td>Queries the synchronization source of all elements.</td>
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<tr>
<td>[:INPut]:SYNChronize{:ALL}</td>
<td>Collectively sets the synchronization source of all elements.</td>
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<tr>
<td>[:INPut]:SYNChronize:ELEMENT&lt;x&gt;</td>
<td>Sets the synchronization source of the element or queries the current setting.</td>
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<tr>
<td>[:INPut]:SYNChronize{:SIGMA</td>
<td>SIGMB}</td>
<td>Collectively sets the synchronization source of all elements belonging to wiring unit {ΣA</td>
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<td>[:INPut]:VOLTage?</td>
<td>Queries all settings related to the voltage measurement.</td>
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<td>[:INPut]:VOLTage:AUTO?</td>
<td>Queries the voltage auto range setting (ON/OFF) of all elements.</td>
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<tr>
<td>[:INPut]:VOLTage:AUTO{:ALL}</td>
<td>Collectively turns ON/OFF the voltage auto range of all elements.</td>
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<tr>
<td>[:INPut]:VOLTage:AUTO:ELEMENT&lt;x&gt;</td>
<td>Turns ON/OFF the voltage auto range of the element or queries the current setting.</td>
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<tr>
<td>[:INPut]:VOLTage:AUTO{:SIGMA</td>
<td>SIGMB}</td>
<td>Collectively turns ON/OFF the voltage auto range of all elements belonging to wiring unit {ΣA</td>
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<td>[:INPut]:VOLTage:MODE?</td>
<td>Queries the voltage mode of all elements.</td>
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<tr>
<td>[:INPut]:VOLTage:MODE{:ALL}</td>
<td>Collectively sets the voltage mode of all elements.</td>
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<tr>
<td>[:INPut]:VOLTage:MODE:ELEMENT&lt;x&gt;</td>
<td>Sets the voltage mode of the element or queries the current setting.</td>
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</tr>
<tr>
<td>[:INPut]:VOLTage:MODE{:SIGMA</td>
<td>SIGMB}</td>
<td>Collectively sets the voltage mode of all elements belonging to wiring unit {ΣA</td>
</tr>
<tr>
<td>[:INPut]:VOLTage:RANGE?</td>
<td>Queries the voltage ranges of all elements.</td>
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<tr>
<td>[:INPut]:VOLTage:RANGE{:ALL}</td>
<td>Collectively sets the voltage range of all elements.</td>
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<tr>
<td>[:INPut]:VOLTage:RANGE:ELEMENT&lt;x&gt;</td>
<td>Sets the voltage range of the element or queries the current setting.</td>
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</tr>
<tr>
<td>[:INPut]:VOLTage:RANGE{:SIGMA</td>
<td>SIGMB}</td>
<td>Collectively sets the voltage range of all elements belonging to wiring unit {ΣA</td>
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<tr>
<td>[:INPut]:WIRing</td>
<td>Sets the wiring system or queries the current setting.</td>
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**INTEGrate Group**

- [:INTEGrate]?          | Queries all settings related to the integration.                        | 6-74 |
- [:INTEGrate:ACAL]       | Turns ON/OFF the auto calibration or queries the current setting.       | 6-74 |
- [:INTEGrate:MODE]       | Sets the integration mode or queries the current setting.               | 6-74 |
- [:INTEGrate:RESet]      | Resets the integrated value.                                            | 6-74 |
- [:INTEGrate:RTIME]:START| Queries the integration start and stop times for real-time integration mode. | 6-74 |
- [:INTEGrate:RTIME]:END | Sets the integration (start|stop) time for real-time integration mode or queries the current setting. | 6-74 |
- [:INTEGrate:START]      | Starts integration.                                                    | 6-74 |
- [:INTEGrate:STATE]      | Queries the integration condition.                                     | 6-74 |
- [:INTEGrate:STOP]       | Stops integration.                                                     | 6-74 |
- [:INTEGrate:TIMer<x>]   | Sets the integration timer time or queries the current setting.         | 6-75 |
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<td>Queries all settings related to averaging.</td>
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<td>:MEASURE:AVERaging:COUNT</td>
<td>Sets the averaging coefficient or queries the current setting.</td>
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<td>:MEASURE:AVERaging[:STATe]</td>
<td>Turns ON/OFF averaging or queries the current setting.</td>
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<td>:MEASURE:AVERaging:TYPE</td>
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<td>Queries all settings related to the compensation computation.</td>
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<td>:MEASURE:COMPensation:Efficien cy</td>
<td>Turns ON/OFF the efficiency compensation or queries the current setting.</td>
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<td>:MEASURE:COMPensation:V3A3</td>
<td>Queries all settings related to the two-wattmeter method or queries the current setting.</td>
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<td>:MEASURE:DMeasure[:SIGMA]</td>
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<tr>
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<tr>
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<td>Sets the synchronization source used to compute the rotating speed and torque or queries the current setting.</td>
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<tr>
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<td>:MOTor:TORQue:UPPer</td>
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<tr>
<td>:MOTor:TORQue:SCALEing</td>
<td>Sets the scaling factor used for torque computation or queries the current setting.</td>
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<tr>
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### NUMeric Group

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<td>Sets the output end cycle of the numeric list data output by :NUMeric:CB_CYCLE:VALUE? or queries the current setting.</td>
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<td>:NUMeric:CB_CYCLE:ITEM</td>
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<td>Sets the output start cycle of the numeric list data output by :NUMeric:CB_CYCLE:VALUE? or queries the current setting.</td>
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<td>Queries the numeric list data from Cycle by Cycle measurement.</td>
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<td>Queries all settings related to output of numeric data from flicker measurement.</td>
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<td>:NUMeric:FLICKer:COUNT?</td>
<td>Queries the number of the measurement within the specified observation period at which flicker measurement stops.</td>
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<td>Queries all settings related to output of measured flicker data (variable format).</td>
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<td>:NUMeric:FLICKer:FUNCtion:CLEar</td>
<td>Clears (sets to NONE) the output items of measured flicker data (variable format).</td>
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<td>:NUMeric:FLICKer:FUNCtion:DELe te</td>
<td>Deletes the output items of measured flicker data (variable format).</td>
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<td>:NUMeric:FLICKer:FUNCtion:NUMb er</td>
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<tr>
<td>:NUMeric:FLICKer:FUNCtion:VAL ue?</td>
<td>Queries the measured flicker data (variable format).</td>
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<td>Queries all settings related to output of flicker judgment results (variable format).</td>
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**RATE Group**

:RATE Sets the data update interval or queries the current setting. 6-102
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- **:SYSTem:CLOCK?** Sets all date/time related settings or queries the current setting. 6-109
- **:SYSTem:CLOCK:DISPLAY** Turns ON/OFF the date/time display or queries the current setting. 6-109
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- **:SYSTem:CLOCK:SNTP[:EXECute]** Sets the date/time via SNTP. 6-109
- **:SYSTem:CLOCK:SNTP:GMTTime** Sets the difference from Greenwich Mean Time or queries the current setting. 6-109
- **:SYSTem:CLOCK:TYPE** Sets the date/time setting method or queries the current setting. 6-109
- **:SYSTem:DATE** Sets the date or queries the current setting. 6-109
- **:SYSTem:EClear** Clears the error message displayed on the screen. 6-109
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### WAVeform Group

- **:WAVeform?** Queries all settings related to the output of waveform display data. 6-112
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6.2 ACQuisition Group

The commands in this group deal with output of the waveform sampling data (acquisition data).
There are no front panel keys that correspond to the commands in this group.
The commands in this group are valid only when the advanced computation function (/G6 option) is installed.

:ACQuisition?
Function Queries all settings related to the output of the waveform sampling data.
Syntax :ACQuisition?
Example :ACQUISITION? -> :ACQUISITION:TRACE U1;FORMAT ASCII;START 0;END 199999;HOLD 0

:ACQuisition:BYTeorder
Function Sets the output byte order of the waveform sampling data (FLOAT format) that is transmitted by ":ACQuisition:SEND?" or queries the current setting.
Syntax :ACQuisition:BYTeorder {LSBFirst|MSBFirst}
:ACQuisition:BYTeorder?
Example :ACQUISITION:BYTeorder LSBFIRST

:ACQuisition:END
Function Sets the output end point of the waveform display data that is transmitted by ":ACQuisition:SEND?" or queries the current setting.
Syntax :ACQuisition:END {<NRf>}
:ACQuisition:END?
Example :ACQUISITION:END 199999
:ACQUISITION:END? -> :ACQUISITION:END 199999

:ACQuisition:FORMat
Function Sets the format of the waveform sampling data that is transmitted by ":ACQuisition:SEND?" or queries the current setting.
Syntax :ACQuisition:FORMat {ASCII|FLOAT}
:ACQuisition:FORMat?
Example :ACQUISITION:FORMat FLOAT
:ACQUISITION:FORMat? -> :ACQUISITION:FORMat FLOAT

:ACQuisition:HOLD
Function Sets whether to hold (ON) or release (OFF) all the waveform sampling data or queries the current setting.
Syntax :ACQuisition:HOLD {<Boolean>}
:ACQuisition:HOLD?
Example :ACQUISITION:HOLD ON
:ACQUISITION:HOLD? -> :ACQUISITION:HOLD 1

Description
• This command is valid when the measurement mode is set to MATH or FFT. Otherwise, an error occurs.
• When ":ACQuisition:HOLD" is turned ON, this instrument stops sampling the waveform sampling data and holds all of the waveform sampling data at that point internally. Be sure to set :ACQuisition:HOLD to ON before executing ":ACQuisition:SEND?".
• For example, if you wish to retrieve the waveform sampling data of U1 and I1 at the same point, do the following:
  :ACQuisition:HOLD ON
  :ACQuisition:TRACe U1
  :ACQuisition:SEND?
(Receive the waveform sampling data of U1)
  :ACQuisition:TRACe I1
  :ACQuisition:SEND?
(Receive the waveform sampling data of I1)
  :ACQuisition:HOLD OFF

• To retrieve new waveform sampling data, set :ACQuisition:HOLD to OFF to resume sampling, and then set :ACQuisition:HOLD to ON again.
6.2 ACQuisition Group

:ACQuisition:LENGTH?
Function Queries the total number of points of the waveform sampling specified by "ACQuisition:TRACE."
Syntax :ACQuisition:LENGTH?
Example :ACQUISITION:LENGTH? -> 100000
Description • When the measurement mode is MATH, the number of data is determined by the data update interval (:RATE) setting.
  length = rate(sec) × 200000
• When the measurement mode is FFT, the number of data is determined by the setting for the number of FFT computation points (:DISPLAY:FFT:POINT) as follows:
  (1) When "ACQuisition:TRACE" is FFT<x>
      length = point/2+1 = 10001 or 100001
  (2) When "ACQuisition:TRACE" is not FFT<x>
      length = point = 20000 or 200000
• In a mode other than MATH or FFT, an error occurs since there is no acquisition data, and 0 is returned.

:ACQuisition:SEND?
Function Queries the waveform sampling data specified by "ACQuisition:TRACE."
Syntax :ACQuisition:SEND?
Example • When "ACQuisition:FORMAT" is set to {ASCII}
  :ACQUISITION:SEND? -> <NR3>,<NR3>,...
• When "ACQuisition:FORMAT" is set to {FLOAT}
  :ACQUISITION:SEND? -> #8 (number of bytes, 8 digits)(data byte sequence)
Description • The format of the waveform sampling data that is output varies depending on the "ACQuisition:FORMAT" setting as follows:
  (1) When "ASCII" is specified
      The physical value is output in the <NR3> format. The data of each point is delimited by a comma.
  (2) When "FLOAT" is specified
      The physical value is output in IEEE single-precision floating point (4-byte) format. The output byte order of the data of each point follows the order that is set using the "ACQuisition:BYTEorder" command.
• This instrument outputs the waveform sampling data in the range specified by "ACQuisition:START[END]." However, data exceeding the waveform sampling data range, 0 to (the total number of data points – 1), is not output.

:ACQuisition:SRATe?
Function Queries the sampling rate of the retrieved data
Syntax :ACQuisition:SRATe?
Example :ACQUISITION:SRATE? -> 195.312E+03
Description This command is valid when the measurement mode is set to MATH or FFT. Otherwise, an error occurs (returns NAN), because there is no waveform sampling data.

:ACQuisition:STARt
Function Sets the output start point of the waveform display data that is transmitted by "ACQuisition:SEND?" or queries the current setting.
Syntax :ACQuisition:STARt {<NRf>}
Example :ACQUISITION:START 0
Description Set the point in the range up to (the total number of data points – 1). The total number of data points can be queried using "ACQuisition:LENGTH?.."

:ACQuisition:TRACe
Function Sets the target trace of "ACQuisition:SEND?" or queries the current setting.
Syntax :ACQuisition:TRACe {U<x>|I<x>|SPEed|TORque|MATH<x>|FFT<x>}
Example :ACQUISITION:TRACE U1
Description {SPEed|TORque} are valid only on models with the motor evaluation function (/MTR option).
6.3 AOUTput Group

The commands in this group deal with the D/A output.

You can make the same settings and inquiries as when the “D/A Output Items” menu of MISC on the front panel is used. However, the commands in this group are valid only when the D/A output (/DA option) is installed.

**:AOUTput?**
Function Queries all settings related to the D/A output.
Syntax :AOUTput?
Example :AOUTPUT? -> Same as the response to "**:AOUTput:NORMal?"  

**:AOUTput:NORMal?**
Function Queries all settings related to the D/A output.
Syntax :AOUTput:NORMal?
Example :AOUTPUT:NORMAL? -> :AOUTPUT:

**:AOUTput:NORMal**:CHANnel<x>
Function Sets the D/A output items (function, element, and harmonic order) or queries the current setting.
Syntax :AOUTput[:NORMal]:CHANnel<x> {NONE|<Function>,<Element>,<Order>}
Example :AOUTPUT:NORMAL:CHANNEL1 U,1,TOTAL

**:AOUTput**:IRTime
Function Sets the rated integration time for the D/A output of integrated values or queries the current setting.
Syntax :AOUTput[:NORMal]:IRTime {<NRf>,<NRf>,<NRf>}
Example :AOUTPUT:NORMAL:IRTIME 1,0,0

Description • If <Element> is omitted, element 1 is set. • If <Order> is omitted, TOTal is set. • <Element> or <Order> is omitted from response to functions that do not need them.
6.3 AOUTput Group

:AOUTput[:NORMal]:MODE<x>

Function  Sets the method of setting the rated value for the D/A output items or queries the current setting.

Syntax  :AOUTput[:NORMal]:MODE<x> {FIXed|MANual}
        :AOUTput[:NORMal]:MODE<x>?  
        <x> = 1 to 20 (output channel)

Example  :AOUTput:NORMAL:MODE1 FIXED
          :AOUTput:NORMAL:MODE1? ->
          :AOUTput:NORMAL:MODE1 FIXED

:AOUTput[:NORMal]:RATE<x>

Function  Manually sets the rated maximum and minimum values for the D/A output items or queries the current setting.

Syntax  :AOUTput[:NORMal]:MODE<x> {<NRf>,<NRf>}
        :AOUTput[:NORMal]:MODE<x>?  
        <x> = 1 to 20 (output channel)
        <NRf> = -9.999E+30 to 9.999E+30 (rated value)

Example  :AOUTput:NORMAL:RATE1 100,-100
          :AOUTput:NORMAL:RATE1? ->
          :AOUTput:NORMAL:RATE1 100.0E+00,-100.0E+00

Description  
- Set the maximum value and then the minimum value.
- This setting is valid when the method of setting the rated value (:AOUTput[:NORMal]:MODE<x>) is set to FIXed.
6.4 CBCycle Group

The CBCycle group contains commands related to Cycle by Cycle measurement functions. These commands allow you to enter and query the same settings that are available under ITEM in the “CbyC Items” menu and under FORM in the “CbyC Form” menu on the front panel.

:CBCycle?
Function Queries all settings related to the Cycle by Cycle measurement function.
Syntax :CBCycle? 
Example :CBCycle? SOURCE U1;SLOPE RISE;CBCycle:TRIGGER:MODE AUTO;SOURCE U1;
SLOPE RISE;LEVEL 0.0;CBCycle:COUNT 100;TIMEOUT 10;FILTER:LINE:
ELEMENT1 50.0E+03;
ELEMENT2 50.0E+03;
ELEMENT3 50.0E+03;ELEMENT4 50.0E+03

:CBCycle:COUNt
Function Sets the number of cycles for Cycle by Cycle measurement or queries the current setting.
Syntax :CBCycle:COUNt {<NRF>}
Example :CBCycle:COUNt 100

:CBCycle:DISPlay?
Function Queries all settings related to the Cycle by Cycle display.
Syntax :CBCycle:DISPlay?
Example :CBCycle:DISPlay? TEM1 FREQ;
ITEM2 U,1;ITEM3 I,1;ITEM4 P,1;
ITEM5 S,1;CURSOR 1

:CBCycle:DISPlay:ITEM<x>
Function Sets the displayed items (function and element) of the Cycle by Cycle display or queries the current setting.
Syntax :CBCycle:DISPlay:ITEM<x> {<Function>,<Element>}
Example :CBCycle:DISPlay:ITEM1 U,1

:CBCycle:DISPlay:PAGE
Function Sets the number of the displayed page of the Cycle by Cycle display or queries the current setting.
Syntax :CBCycle:DISPlay:PAGE {<NRF>}
Example :CBCycle:DISPlay:PAGE 1

:CBCycle:DISPlay:CURSor
Function Sets the cursor position of the Cycle by Cycle display or queries the current setting.
Syntax :CBCycle:DISPlay:CURSor {<NRF>}
Example :CBCycle:DISPlay:CURSor 1

Description • Specifies the cursor position by the cycle number.
• You can make the same setting or query with the “:DISPlay:CBCycle:CURSor” command.
6.4 CBCycle Group

:CBCycle:FILTER?
Function Queries all settings related to the filter for Cycle by Cycle measurement.
Syntax :CBCycle:FILTER?
Example :CBCycle:FILTER? ->
:cbcyle:filter:line:
:element1 50.0e+03;
:element2 50.0e+03;
:element3 50.0e+03; :element4 50.0e+03

:CBCycle:FILTER:LINE?
Function Queries all settings related to the line filter for Cycle by Cycle measurement.
Syntax :CBCycle:FILTER:LINE?
Example :CBCycle:FILTER:LINE? ->
:cbcyle:filter:line:
:element1 50.0e+03;
:element2 50.0e+03;
:element3 50.0e+03; :element4 50.0e+03

:CBCycle:FILTER[:LINE][:ALL]
Function Collectively sets the line filters of all elements for Cycle by Cycle measurement.
Syntax :CBCycle:FILTER[:LINE][:ALL] {OFF|<frequency>}
Example :CBCycle:FILTER[:LINE]:ALL 50KH
Description Does not set line filters for motor input.

:CBCycle:FILTER[:LINE]:ELEMENT<x>
Function Sets the line filter of individual elements for Cycle by Cycle measurement or queries the current setting.
Syntax :CBCycle:FILTER[:LINE]:ELEMENT<x> {OFF|<frequency>}
Example :CBCycle:FILTER[:LINE]:ELEMENT1 50KH

:CBCycle:FILTER[:LINE]:MOTor
Function Sets the motor input line filters for Cycle by Cycle measurement or queries the current setting.
Syntax :CBCycle:FILTER[:LINE]:MOTor {OFF|<frequency>}
Example :CBCycle:FILTER[:LINE]:MOTor

:CBCycle:RESet
Function Resets Cycle by Cycle measurement.
Syntax :CBCycle:RESet
Example :CBCycle:RESet

:CBCycle:START
Function Starts Cycle by Cycle measurement.
Syntax :CBCycle:START
Example :CBCycle:START

:CBCycle:STATE?
Function Queries the Cycle by Cycle measurement status.
Syntax :CBCycle:STATE?
Example :CBCycle:STATE? ->
Description The contents of the response are as follows:
RESET = Reset status
START = Measuring
COMPLETE = Measurement finished and measured results displayed
TIMEout = Timeout
ERRFreq = Measurement finished (frequency measurement error occurred)

:CBCycle:SYNChronize?
Function Queries all settings related to the synchronization source for Cycle by Cycle measurement.
Syntax :CBCycle:SYNChronize?
Example :CBCycle:SYNChronize?

:CBCycle:SYNChronize:SLOPe
Function Sets the slope of the synchronization source of Cycle by Cycle measurement or queries the current setting.
Syntax :CBCycle:SYNChronize:SLOPe {RISE|FALL}
Example :CBCycle:SYNChronize:SLOPe
### :CBCycle:SYNChronize:SOURce

**Function**
Sets the synchronization source for Cycle by Cycle measurement or queries the current setting.

**Syntax**
:CBCycle:SYNChronize:SOURce \{U<x>|I<x>|EXTernal\}
:CBCycle:SYNChronize:SOURce?

\(<x> = 1 \text{ to } 4 \text{ (element)}\)

**Example**
:CBCYCyle:SYNCHRONize:SOURce U1
:CBCYCyle:SYNCHRONize:SOURce? ->
:CBCYCyle:SYNCHRONize:SOURce U1

### :CBCycle:TIMEout

**Function**
Sets the timeout value for Cycle by Cycle measurement or queries the current setting.

**Syntax**
:CBCycle:TIMEout \{<NRf>\}
:CBCycle:TIMEout?

\(<NRf> = 0 \text{ to } 3600 \text{ (seconds)}\)

(0 = No timeout)

**Example**
:CBCYCyle:TIMEOUT 10
:CBCYCyle:TIMEOUT? ->
:CBCYCyle:TIMEOUT 10

### :CBCycle:TRIGger?

**Function**
Queries all settings related to triggers or queries the current setting.

**Syntax**
:CBCycle:TRIGger?

**Example**
:CBCYCyle:TRIGGER?

- :CBCYCyle:TRIGGER:MODE AUTO;
  SOURCE U1;SLOPE RISE;LEVEL 0.0

**Description**
This is the same query as with the ":DISPlay:WAVE:TRIGger?" command.

### :CBCycle:TRIGger:LEVel

**Function**
Sets the trigger level or queries the current setting.

**Syntax**
:CBCycle:TRIGger:LEVel \{<NRf>\}
:CBCycle:TRIGger:LEVel?

\(<NRf> = -100.0 \text{ to } 100.0(\%)\)

**Example**
:CBCYCyle:TRIGGER:LEVEL 0
:CBCYCyle:TRIGGER:LEVEL? ->
:CBCYCyle:TRIGGER:LEVEL 0.0

**Description**
This is the same setting or query as with the ":DISPlay:WAVE:TRIGger:LEVel?" command.

### :CBCycle:TRIGger:MODE

**Function**
Sets the trigger mode or queries the current setting.

**Syntax**
:CBCycle:TRIGger:MODE \{AUTO|NORMAL\}
:CBCycle:TRIGger:MODE?

**Example**
:CBCYCyle:TRIGGER:MODE AUTO
:CBCYCyle:TRIGGER:MODE? ->
:CBCYCyle:TRIGGER:MODE AUTO

**Description**
This is the same setting or query as with the ":DISPlay:WAVE:TRIGger:MODE?" command.
6.5 COMMunicate Group

The commands in this group deal with communications. There are no front panel keys that correspond to the commands in this group.

**:COMMunicate?**
Function: Queries all settings related to communications.
Syntax: :COMMunicate?
Example: :COMMUNICATE? ->
 :COMMUNICATE:HEADER 1;OPSE 96;
OVERLAP 96;VERBOSE 1

**:COMMunicate:HEADer**
Function: Sets whether to add a header to the response to a query (example DISPLAY:MODE NUMERIC) or not add the header (example NUMERIC).
Syntax: :COMMunicate:HEADer {<Boolean>}
:COMMunicate:HEADer?
Example: :COMMUNICATE:HEADer ON
:COMMUNICATE:HEADER? ->
:COMMUNICATE:HEADER 1

**:COMMunicate:LOCKout**
Function: Sets or clears local lockout.
Syntax: :COMMunicate:LOCKout {<Boolean>}
:COMMunicate:LOCKout?
Example: :COMMUNICATE:LOCKout ON
:COMMUNICATE:LOCKout? ->
:COMMUNICATE:LOCKout 1

**:COMMunicate:OPSE (Operation Pending Status Enable register)**
Function: Sets the overlap command that will operate as overlap commands or queries the current setting.
Syntax: :COMMunicate:OPSE <Register>
:COMMunicate:OPSE?
<Register> = 0 to 65535, see the command diagram for :COMMunicate:WAIT? on page 6-25.
Example: :COMMUNICATE:OPSE 65535
:COMMUNICATE:OPSE? ->
:COMMUNICATE:OPSE 96

**:COMMunicate:OPSR? (Operation Pending Status Register)**
Function: Queries the value of the operation pending status register.
Syntax: :COMMunicate:OPSR?
Example: :COMMUNICATE:OPSR? -> 0

Description: For details on the operation pending status register, see the figure for the :COMMunicate:WAIT? command (page 6-25).

**:COMMunicate:OVERlap**
Function: Sets the commands that will operate as overlap commands or queries the current setting.
Syntax: :COMMunicate:OVERlap <Register>
:COMMunicate:OVERlap?
Example: :COMMUNICATE:OVERLAP 65535
:COMMUNICATE:OVERLAP? ->
:COMMUNICATE:OVERLAP 96

Description: In the above example, all bits are set to 1 to make all overlap commands applicable. However, bits fixed to 0 are not set to 1. Thus, the response to the query indicates 1 for bits 5 and 6 only.

• For the description regarding how to synchronize the program using COMMunicate:OVERlap, see page 5-8.
• In the above example, bits 5 and 6 are set to 1 to make all overlap commands applicable (see the figure for the :COMMunicate:WAIT? command (page 6-25)).

**:COMMunicate:REMote**
Function: Sets remote or local. ON is remote mode.
Syntax: :COMMunicate:REMote {<Boolean>}
:COMMunicate:REMote?
Example: :COMMUNICATE:REMote ON
:COMMUNICATE:REMote? ->
:COMMUNICATE:REMote 1

Description: This command is dedicated to the optional RS-232, USB, or Ethernet interface. An interface message is available for the GP-IB interface.
**:COMMunicate:STATus?**

**Function:** Queries line-specific status.

**Syntax:** :COMMunicate:STATus?

**Example:** :COMMUNICATE:STATUS? -> :COMMUNICATE:STATUS 0

**Description:** The meaning of each status bit is as follows:

<table>
<thead>
<tr>
<th>Bit</th>
<th>GP-IB</th>
<th>RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Unrecoverable parity error transmission error</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Always 0</td>
<td>Framing error</td>
</tr>
<tr>
<td>2</td>
<td>Always 0</td>
<td>Break character detected</td>
</tr>
<tr>
<td>3 or greater</td>
<td>Always 0</td>
<td>Always 0</td>
</tr>
</tbody>
</table>

The value 0 is always returned for the optional USB or Ethernet interface.

The status bit is set when the corresponding cause occurs and cleared when it is read.

**:COMMunicate:VERBose**

**Function:** Sets whether to return the response to a query using full spelling (example :INPUT:VOLTAGE:RANGE:ELEMENT1 1.000E+03) or using abbreviation (example :VOLT:RANG:ELEM 1.000E+03).

**Syntax:** :COMMunicate:VERBose {<Boolean>}

**Example:** :COMMUNICATE:VERBOse ON

**:COMMunicate:WAIT**

**Function:** Waits for one of the specified extended events to occur.

**Syntax:** :COMMunicate:WAIT <Register>

<Register> = 0 to 65535 (extended event register, see page 7-7.)

**Example:** :COMMUNICATE:WAIT 1

**Description:** For the description regarding how to synchronize the program using COMMunicate:WAIT, see page 5-10.

**:COMMunicate:WAIT?**

**Function:** Creates the response that is returned when the specified event occurs.

**Syntax:** :COMMunicate:WAIT? <Register>

<Register> = 0 to 65535 (extended event register, see page 7-7.)

**Example:** :COMMUNICATE:WAIT? 65535 -> 1

**Operation pending status register/Overlap enable register**

<table>
<thead>
<tr>
<th>U</th>
<th>H</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

When bit 5 (PRN) = 1:
Built-in printer operation not complete

When bit 6 (ACS) = 1:
Access to the medium not complete.
### 6.6 CURSor Group

The commands in this group deal with cursor measurements. You can make the same settings and inquiries as when CURSOR (SHIFT+MEASURE) on the front panel is used.

:CURSor?

**Function**
Queries all settings related to the cursor measurement.

**Syntax**
:CURSor?

**Example**
:CURSOR? -> :CURSOR:BAR:
TRACE1 U1;TRACE2 I1;PATH MAX;
POSITION1 10.0E-03;
POSITION2 40.0E-03; :CURSOR:BAR:
STATE 0;POSITION1 1;POSITION2 15;
CURSOR:TREND:STATE 0;TRACE1 1;
TRACE2 2;POSITION1 100;
POSITION2 900

:CURSor:BAR?

**Function**
Queries all settings related to the cursor measurement of the bar graph display.

**Syntax**
:CURSor:BAR?

**Example**
:CURSOR:BAR? -> :CURSOR:BAR:
STATE 1;POSITION1 1;POSITION2 15

**Description**
This command is valid only on models with the advanced computation function (/G6 option).

:CURSor:BAR:POSITION<x>

**Function**
Sets the cursor position (order) on the bar graph display or queries the current setting.

**Syntax**
:CURSor:BAR:POSITION<x> {<NRf>}
:CURSor:BAR:POSITION<x>?

- `<x>` = 1, 2 (1 = C1 +, 2 = C2 x)
- `<NRf>` = 0 to 100

**Example**
:CURSOR:BAR:POSITION1 1

**Description**
This command is valid only on models with the advanced computation function (/G6 option).

:CURSor:BAR[:STATe]

**Function**
Turns ON/OFF the cursor display on the bar graph display or queries the current setting.

**Syntax**
:CURSor:BAR[:STATe] {<Boolean>}
:CURSor:BAR:STATe?

**Example**
:CURSOR:BAR:STATE ON
:CURSOR:BAR:STATE? ->
:CURSOR:BAR:STATE 1

**Description**
This command is valid only on models with the advanced computation function (/G6 option).

:CURSor:BAR: {Y<x>|DY}?

**Function**
Queries the cursor measurement value on the bar graph display.

**Syntax**
:CURSor:BAR: {Y<x>|DY}?

**Example**
:CURSOR:BAR:Y1? -> 78.628E+00

**Description**
- This command is valid only on models with the advanced computation function (/G6 option).
- When multiple bar graphs are displayed, the cursor measurement values of each bar graph are returned in order.
- If the cursor display is not turned ON on the bar graph, "NAN (Not A Number)" is returned.

:CURSor:FFT?

**Function**
Queries all settings related to the cursor measurement on the FFT waveform display.

**Syntax**
:CURSor:FFT?

**Example**
:CURSOR:FFT? -> :CURSOR:FFT:
STATE 0;TRACE1 FFT1;TRACE2 FFT2;
POSITION1 100;POSITION2 900

**Description**
This command is valid only on models with the advanced computation function (/G6 option).

:CURSor:FFT:POSITION<x>

**Function**
Sets the cursor position on the FFT waveform display or queries the current setting.

**Syntax**
:CURSor:FFT:POSITION<x> {<NRf>}
:CURSor:FFT:POSITION<x>?

- `<x>` = 1, 2 (1 = C1 +, 2 = C2 x)
- `<NRf>` = 0 to 1001

**Example**
:CURSOR:FFT:POSITION1 20
:CURSOR:FFT:POSITION1? ->
:CURSOR:FFT:POSITION1 20

**Description**
This command is valid only on models with the advanced computation function (/G6 option).
6.6 CURSor Group

:CURSor:FFT[:STATe]
Function Turns ON/OFF the cursor display on the FFT waveform display or queries the current setting.
Syntax :CURSor:FFT[:STATe] {<Boolean>}
:CURSor:FFT:STATe?
Example :CURSOR:FFT:STATE OFF
:CURSOR:FFT:STATE? ->
:CURSOR:FFT:STATE 0
Description This command is valid only on models with the advanced computation function (G6 option).

:CURSor:FFT:TRACe<x>
Function Sets the cursor target on the FFT waveform display or queries the current setting.
Syntax :CURSor:FFT:TRACe<x> {FFT<x>}
:CURSor:FFT:TRACe<x>?
Example :CURSOR:FFT:TRACE1 FFT1
:CURSOR:FFT:TRACE1? ->
:CURSOR:FFT:TRACE1 FFT1
Description This command is valid only on models with the advanced computation function (G6 option).

:CURSor:FFT:{X<x>|DX|Y<x>|DY}?
Function Queries the cursor measurement value on the FFT waveform display.
Syntax :CURSor:FFT:{X<x>|DX|Y<x>|DY}? X<x> = X-axis value of the cursor position (X1 = X+, X2 = Xx)
DX = X-axis value between cursors (△X)
Y<x> = Y-axis value of the cursor position (Y1 = Y+, Y2 = Yx)
DY = Y-axis value between cursors (△Y)
Example :CURSOR:FFT:Y1? -> 78.628E+00
Description This command is valid only on models with the advanced computation function (G6 option).

:CURSor:TRENd[:STATe]
Function Turns ON/OFF the cursor display on the trend display or queries the current setting.
Syntax :CURSor:TRENd[:STATe] {<Boolean>}
:CURSor:TRENd:STATe?
Example :CURSOR:TREND:STATE ON
:CURSOR:TREND:STATE? ->
:CURSOR:TREND:STATE 1

:CURSor:TRENd:POSition<x>
Function Sets the cursor position on the trend display or queries the current setting.
Syntax :CURSor:TRENd:POSi<x> {<NRf>}
:CURSor:TRENd:POSition<x>?
Example :CURSOR:TREND:POSITION1 10
:CURSOR:TREND:POSITION1? ->
:CURSOR:TREND:POSITION1 10

:CURSor:TRENd:TRACe<x>
Function Sets the cursor target on the trend display or queries the current setting.
Syntax :CURSor:TRENd:TRACe<x> {<NRf>}
:CURSor:TRENd:TRACe<x>?
Example :CURSOR:TREND:TRACE1 1
:CURSOR:TREND:TRACE1? ->
:CURSOR:TREND:TRACE1 1

:CURSor:TRENd:{X<x>|Y<x>|DY}?
Function Queries the cursor measurement value on the trend display.
Syntax :CURSor:TRENd:{X<x>|Y<x>|DY}? X<x> = Trend time string of the cursor position (X1 = D+, X2 = Dx)
Y<x> = Y-axis value of the cursor position (Y1 = Y+, Y2 = Yx)
DY = Y-axis value between cursors (△Y)
Example :CURSOR:TREND:X1? -> “2005/01/01 12:34:56”
:CURSOR:TREND:Y1? -> 78.628E+00
Description If the cursor display is not turned ON on the trend, the following results.
For X<x>: "****/****/****:****" is returned.
For Y<x> and DY: “NAN (Not A Number)” is returned.
6.6 CURSor Group

:CURSoR:WAVE?
Function Queries all settings related to the cursor measurement on the waveform display.
Syntax :CURSoR:WAVE?
Example :CURSoR:WAVE? -> :CURSoR:WAVE:STATE 1;TRACE1 U1;TRACE2 I1; PATH MAX;POSITION1 10.0E-03; POSITION2 40.0E-03

:CURSoR:WAVE:PATH
Function Sets the cursor path on the waveform display or queries the current setting.
Syntax :CURSoR:WAVE:PATH {MAX|MIN|MID}
Example :CURSoR:WAVE:PATH MAX

:CURSoR:WAVE:POSITION<x>
Function Sets the cursor position on the waveform display or queries the current setting.
Syntax :CURSoR:WAVE:POSITION<x> {<Time>}
Example :CURSoR:WAVE:POSITION1 10MS

:CURSoR:WAVE[:STATe]
Function Turns ON/OFF the cursor display on the waveform display or queries the current setting.
Syntax :CURSoR:WAVE[:STATe] {<Boolean>}
Example :CURSoR:WAVE:STATe ON

:CURSoR:WAVE:TRACe<x>
Function Sets the cursor target on the waveform display or queries the current setting.
Syntax :CURSoR:WAVE:TRACe<x> {U<x>|I<x>|SPEed|TORQue|MATH<x>}
Example :CURSoR:WAVE:TRACe1 U1

:CURSoR:WAVE:{X<x>|DX|PERDt|Y<x>|DY}?
Function Queries the cursor measurement value on the waveform display.
Syntax :CURSoR:WAVE:{X<x>|DX|PERDt|Y<x>|DY}?
Example :CURSoR:WAVE:Y1? -> 78.628E+00

Description If the cursor display is not turned ON in the waveform display, “NAN (Not A Number)” is returned.
6.7 DISPlay Group

The commands in this group deal with the screen display.

You can make the same settings and inquiries as when the keys in the DISPLAY area and the ITEM & ELEMENT area on the front panel are used.

:DISPlay?
Function Queries all settings related to the screen display.
Syntax :DISPlay?
Example • Example when the display mode (:DISPlay:MODE) is “NUMeric (numeric display)”
  :DISPlay? -> :DISPlay:MODE NUMERIC;
  (Response to ‘‘:DISPlay:NUMeric?’’ with the first ‘‘:DISPlay:’’ section removed); :DISPlay:INFORMATION:
  STATE 0; PAGE 1
• Example when the display mode (:DISPlay:MODE) is “WAVE (waveform display)”
  :DISPlay? -> :DISPlay:MODE WAVE;
  (Response to ‘‘:DISPlay:WAVE?’’ with the first ‘‘:DISPlay:’’ section removed); :DISPlay:INFORMATION:
  STATE 0; PAGE 1
• Example when the display mode (:DISPlay:MODE) is “NWAVe”
  :DISPlay? -> :DISPlay:MODE NWAVE;
  (Response to ‘‘:DISPlay:NUMeric?’’ with the first ‘‘:DISPlay:’’ section removed); (same as the response to “:DISPlay:WAVE?”); :DISPlay:
  INFORMATION:STATE 0; PAGE 1
Description Returns all settings corresponding to the display mode (:DISPlay:MODE).

:DISPlay:BAR?
Function Queries all settings related to the bar graph.
Syntax :DISPlay:BAR?
Example :DISPlay:BAR? -> :DISPlay:BAR:
  FORMAT SINGLE;ITEM1 U,1;ITEM2 I,1;
  ITEM3 P,1;ORDER 1,100
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPlay:BAR:FORMat
Function Sets the display format of the bar graph or queries the current setting.
Syntax :DISPlay:BAR:FORMat {SINGLE|DUAL|TRIad}
Example :DISPlay:BAR:FORMat?
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPlay:BAR:ITEM<x>
Function Sets the bar graph item (function and element) or queries the current setting.
Syntax :DISPlay:BAR:ITEM<x> [{<Function>,<Element}> | <Function> = {U|I|P|S|Q|LAMBda|...} (See the function selection list (2) on page 6-46.)<Element> = 1 to 4]
Example :DISPlay:BAR:ITEM1 U,1
Description This command is valid only on models with the advanced computation function (/G6 option).
6.7 DISPlay Group

:DISPlay:BAR:ORDER
Function Sets the start and end orders of the bar graph or queries the current setting.
Syntax :DISPlay:BAR:ORDER {<NRf>,<NRf>}
1st <NRf> = 0 to 90 (start order to be displayed)
2nd <NRf> = 10 to 100 (end order to be displayed)
Example :DISPLAY:BAR:ORDER 1,100
:DISPLAY:BAR:ORDER? ->
:DISPLAY:BAR:ORDER 1,100
Description
• This command is valid only on models with the advanced computation function (/G6 option).
• Set the start order and then the end order.
• Set the end order so that it is greater than or equal to (start order + 10).

:DISPlay:CBCycle?
Function Queries all settings related to the Cycle by Cycle display.
Syntax :DISPlay:CBCycle?
Example :DISPLAY:CBCYCLE? -> :DISPLAY:CBCYCLE:ITEM1 FREQ;ITEM2 U,1;ITEM3 I,1;ITEM4 P,1;ITEM5 S,1;CURSOR 1

:DISPlay:CBCycle:CURSor
Function Sets the cursor position of the Cycle by Cycle display or queries the current setting.
Syntax :DISPlay:CBCycle:CURSor {<NRf>}
<NRf> = 1 to 3000 (cursor position)
Example :DISPLAY:CBCYCLE:CURSOR 1
:DISPLAY:CBCycle:CURSor? ->
:DISPLAY:CBCycle:CURSOR 1
Description Specifies the cursor position by the cycle number.

:DISPlay:CBCycle:ITEM<x>
Function Sets the displayed items (function and element) of the Cycle by Cycle display or queries the current setting.
Syntax :DISPlay:CBCycle:ITEM<x> {<Function>,<Element>}
<Function> = {FREQ|U|I|P|S|Q|LAMBda|SPEed|TORQue|PM}
<Element> = {<NRf>|SIGMa|SIGMB} (<NRf> = 1 to 4)
Example :DISPLAY:CBCycle:ITEM1 U,1
:DISPLAY:CBCycle:ITEM1? ->
:DISPLAY:CBCycle:ITEM1 U,1
Description
• When <Function> = {FREQ|SPEed|TORQue|PM}, <Element> need not be specified. <Element> is omitted from the response.
• When <Element> is omitted, Element 1 is set.
• {SPEed|TORQue|PM} is only available on models with the motor evaluation function (/MTR option).

:DISPlay:CBCycle:PAGE
Function Sets the number of the displayed page of the Cycle by Cycle display or queries the current setting.
Syntax :DISPlay:CBCycle:PAGE {<NRf>}
<NRf> = 1 to 150 (page number)
Example :DISPLAY:CBCycle:PAGE 1
:DISPLAY:CBCycle:PAGE? ->
:DISPLAY:CBCycle:PAGE 1
Description When a page number is set, the cursor moves to the top of the specified page.

:DISPlay:FFT?
Function Queries all settings related to the FFT waveform display.
Syntax :DISPlay:FFT?
WINDOW RECTANGLE;SCOPE 0,10000;
VSCALE LOG;SPECTRUM LINE;FFT1:STATE 1;OBJECT U1;LABEL “FFT1”;
DISPLAY:FFT:FFT2:STATE 1;OBJECT I1;
LABEL “FFT2”
Description This command is valid only on models with the advanced computation function (/G6 option).
### 6.7 Display Group

**:DISPlay:FFT:FFT<x>?

**Function** Queries all settings related to the FFT waveform.

**Syntax**

:DISPlay:FFT:FFT<x>?

*x* = 1, 2 (FFT)

**Example**

:DISPLAY:FFT:FFT1? -> :DISPLAY:FFT: FFT1:STATE 1; OBJECT U1; LABEL "FFT1"

**Description**

This command is valid only on models with the advanced computation function (/G6 option).

**:DISPlay:FFT:FFT<x>:LABel

**Function** Sets the label of the FFT waveform or queries the current setting.

**Syntax**

:DISPlay:FFT:FFT<x>: LABel {<String>}

:DISPlay:FFT:FFT<x>:LABel?

*x* = 1, 2 (FFT)

<String> = Up to 8 characters

**Example**

:DISPLAY:FFT:FFT1: LABEL "FFT1"


**Description**

This command is valid only on models with the advanced computation function (/G6 option).

**:DISPlay:FFT:FFT<x>:OBJect

**Function** Sets the source waveform of the FFT computation or queries the current setting.

**Syntax**

:DISPlay:FFT:FFT<x>:OBJect {U<x>|I<x>|P<x>|PA|PB|Q<x>|QA|QB|SPEed|TORQue}

:DISPlay:FFT:FFT<x>:OBJect?

*x* of FFT<x> = 1, 2 (FFT)

<x> of U<x>, I<x>, P<x>, Q<x> = 1 to 4 (element)

PA, QA = PΣA, QΣA (only on models with 2 to 4 elements)

PB, QB = PΣB, QΣB (only on models with 4 elements)

**Example**

:DISPLAY:FFT:FFT1:OBJect U1


**Description**

- This command is valid only on models with the advanced computation function (/G6 option).
- {SPEed|TORQue} are valid only on models with the motor evaluation function (/MTR option).

**:DISPlay:FFT:FFT<x>[:STATe]

**Function** Turns ON/OFF the FFT waveform display or queries the current setting.

**Syntax**

:DISPlay:FFT:FFT<x>[:STATe] {<Boolean>}

:DISPlay:FFT:FFT<x>[:STATe]?

<x> = 1, 2 (FFT)

**Example**

:DISPLAY:FFT:FFT1:STATE ON


**Description**

This command is valid only on models with the advanced computation function (/G6 option).

**:DISPlay:FFT:FORMat

**Function** Sets the display format of the FFT waveform or queries the current setting.

**Syntax**

:DISPlay:FFT:FORMat {SINGle|DUAL}

:DISPlay:FFT:FORMat?

**Example**

:DISPLAY:FFT:FORMA T SINGLE


**Description**

This command is valid only on models with the advanced computation function (/G6 option).

**:DISPlay:FFT:POINt

**Function** Sets the number of points of the FFT computation or queries the current setting.

**Syntax**

:DISPlay:FFT:POINt {<NRf>}

:DISPlay:FFT:POINt?

<NRf> = 20000, 200000

**Example**

:DISPLAY:FFT:POINT 20000


**Description**

This command is valid only on models with the advanced computation function (/G6 option).

**:DISPlay:FFT:SCOPe

**Function** Sets the display range of the FFT waveform or queries the current setting.

**Syntax**

:DISPlay:FFT:SCOPe {<NRf>,<NRf>}

:DISPlay:FFT:SCOPe?

1st <NRf> = 0 to 99990 (display start point)

2nd <NRf> = 10 to 100000 (display end point)

**Example**

:DISPLAY:FFT:SCOPE 0,10000


**Description**

- This command is valid only on models with the advanced computation function (/G6 option).
- Set the start point and then the end point.
- Set the end point so that it is greater than or equal to (start point + 10).
6.7 DISPLAY Group

**:DISPLAY:FFT:SPECTrum**

Function: Sets the display spectrum format of the FFT waveform or queries the current setting.

Syntax: :DISPLAY:FFT:SPECTrum {LINE|BAR}

Example: :DISPLAY:FFT:SPECTrum LINE

Description: This command is valid only on models with the advanced computation function (/G6 option).

**:DISPLAY:FFT:VSCale**

Function: Sets the display scale of the vertical axis of the FFT waveform or queries the current setting.

Syntax: :DISPLAY:FFT:VSCale {LINEar|LOG}

Example: :DISPLAY:FFT:VSCale LOG

Description: This command is valid only on models with the advanced computation function (/G6 option).

**:DISPLAY:FFT:WINDow**

Function: Sets the window function of the FFT computation or queries the current setting.

Syntax: :DISPLAY:FFT:WINDow {RECTangle|HANNing|FLATtop}

Example: :DISPLAY:FFT:WINDow RECTANGLE

Description: This command is valid only on models with the advanced computation function (/G6 option).

**:DISPLAY:FLICKer?**

Function: Queries all settings related to flicker measurement display.

Syntax: :DISPLAY:FLICKer?

Example: :DISPLAY:FLICKer? -> :DISPLAY:FLICKer:STATE 1;PAGE 1

Description: Only available with the flicker measurement function (/FL option).

**:DISPLAY:FLICKer:PAGE**

Function: Sets the page numbers to be displayed for flicker measurement display or queries the current setting.

Syntax: :DISPLAY:FLICKer:PAGE {<NRf>}

Example: :DISPLAY:FLICKer:PAGE 1

Description: Only available with the flicker measurement function (/FL option).

**:DISPLAY:FLICKer:PERiod**

Function: Sets the display observation period number for flicker measurement display or queries the current setting.

Syntax: :DISPLAY:FLICKer:PERiod {<NRf>}

Example: :DISPLAY:FLICKer:PERiod 1

Description: Only available with the flicker measurement function (/FL option).

**:DISPLAY:INFORMATION?**

Function:Queries all settings related to the display of the setup parameter list.

Syntax: :DISPLAY:INFORMATION?

Example: :DISPLAY:INFORMATION?

**:DISPLAY:INFORMATION:PAGE**

Function: Sets the page number of the display of setup parameter list or queries the current setting.

Syntax: :DISPLAY:INFORMATION:PAGE {<NRf>}

Example: :DISPLAY:INFORMATION:PAGE 1

**:DISPLAY:INFORMATION:[STATE]**

Function: Turns ON/OFF the display of the setup parameter list or queries the current setting.

Syntax: :DISPLAY:INFORMATION[:STATE] {<Boolean>}

Example: :DISPLAY:INFORMATION:STATE 1
6.7 DISPlay Group

:DISPlay:MATH?
Function Queries all settings related to the computed waveform display.
Syntax :DISPlay:MATH?
Example :DISPLAY:MATH? -> :DISPLAY:MATH:
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPlay:MATH:CONStant<x>
Function Sets the constant to be used in the waveform computing equation or queries the current setting.
Syntax :DISPlay:MATH:CONStant<x> {<NRf>}
Example :DISPLAY:MATH:CONStant1 1.0000E+00
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPlay:MATH:MATH<x>?
Function Queries all settings related to the computed waveform.
Syntax :DISPlay:MATH:MATH<x>?
Example :DISPLAY:MATH:MATH1? -> :DISPLAY:MATH:MATH1:
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPlay:MATH:MATH<x>:EXPression
Function Sets the equation of the waveform computation or queries the current setting.
Syntax :DISPlay:MATH:MATH<x>:EXPression {<String>}
Example :DISPLAY:MATH:MATH1:EXPRESSION "U1*I1"
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPlay:MATH:MATH<x>:LABel
Function Sets the label of the computed waveform or queries the current setting.
Syntax :DISPlay:MATH:MATH<x>:LABel {<String>}
Example :DISPLAY:MATH:MATH1:LABEL "Math1"
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPlay:MATH:MATH<x>:SCALing?
Function Queries all settings related to the scaling of the computed waveform.
Syntax :DISPlay:MATH:MATH<x>:SCALing?
Example :DISPLAY:MATH:MATH1:SCALING:MODE AUTO;CENTER 0.0000E+00;SDIV 25.0000E+00;
Description This command is valid only on models with the advanced computation function (/G6 option).
6.7 Display Group

:DISPLAY:MATH:MATH<x>:SCALing:CENTer
Function Sets the center value of the manual scaling of the computed waveform or queries the current setting.
Syntax :DISPLAY:MATH:MATH<x>:SCALing:CENTer {<NRf>}
:DISPLAY:MATH:MATH<x>:SCALing:CENTer?
<x> = 1, 2 (MATH)
<NRf> = –9.9999E+30 to 9.9999E+30
Example :DISPLAY:MATH:MATH1:SCALING:
CENTER 0.0000E+00
:DISPLAY:MATH:MATH1:SCALING:
CENTER 0.0000E+00
:DISPLAY:MATH:MATH1:SCALING:
CENTER 0.0000E+00
Description • This command is valid only on models with the advanced computation function (/G6 option).
• This command is valid when the scaling mode of the computed waveform (:DISPLAY:MATH:MATH<x>:SCALing:
MODE) is set to ”MANual.”

:DISPLAY:MATH:MATH<x>:SCALing:MODE
Function Sets the scaling mode of the computed waveform or queries the current setting.
Syntax :DISPLAY:MATH:MATH<x>:SCALing:
MODE {AUTO|MANual}
:DISPLAY:MATH:MATH<x>:SCALing:MODE?
<x> = 1, 2 (MATH)
Example :DISPLAY:MATH:MATH1:SCALING:
MODE AUTO
:DISPLAY:MATH:MATH1:SCALING:
MODE AUTO
:DISPLAY:MATH:MATH1:SCALING:
MODE AUTO
Description This command is valid only on models with the advanced computation function (/G6 option).

:DISPLAY:MATH:MATH<x>:SCALing:SDIV
Function Sets the scale/division value of the manual scaling of the computed waveform or queries the current setting.
Syntax :DISPLAY:MATH:MATH<x>:SCALing:
SDIV {<NRf>}
:DISPLAY:MATH:MATH<x>:SCALing:SDIV?
<x> = 1, 2 (MATH)
<NRf> = –9.9999E+30 to 9.9999E+30
Example :DISPLAY:MATH:MATH1:SCALING:
SDIV 2,5000E+01
:DISPLAY:MATH:MATH1:SCALING:
SDIV 25,000E+00
Description • This command is valid only on models with the advanced computation function (/G6 option).
• This command is valid when the scaling mode of the computed waveform (:DISPLAY:MATH:MATH<x>:SCALing:
MODE) is set to ”MANual.”

:DISPLAY:MATH:MATH<x>:UNIT
Function Sets the unit to be added to the result of the waveform computation or queries the current setting.
Syntax :DISPLAY:MATH:MATH<x>:
UNIT {<String>}
:DISPLAY:MATH:MATH<x>:UNIT?
<x> = 1, 2 (MATH)
<String> = Up to 8 characters
Example :DISPLAY:MATH:MATH1:UNIT “W”
:DISPLAY:MATH:MATH1:UNIT? ->
:DISPLAY:MATH:MATH1:UNIT “W”
Description This command is valid only on models with the advanced computation function (/G6 option).
**Communication Commands**

### :DISPLAY:MODE

**Function**
Sets the display mode or queries the current setting.

**Syntax**
:DISPLAY:MODE {NUMeric|WAVE|BAR|VECTor|TREnd|NNWAVE|NBAR|NTREnd|WBAR|WTRend|BTRend|MATH|NMATh|FFT|NFFT|WFFT|IECHarm|CBCyle|FLICker}

**Example**
:DISPLAY:MODE?

**Description**
- NUMeric = Displays only the numeric values.
- WAVE = Displays only the waveforms.
- BAR = Bar graph
- VECTor = Vector display
- TREnd = Trend
- NWAVE = Displays both the numeric values and the waveforms.
- NBAR = Displays both the numeric values and the bar graph.
- NTREnd = Displays both the numeric values and the trends.
- WBAR = Displays both the waveforms and the bar graph.
- WTRend = Displays both the waveforms and the trends.
- BTRend = Displays both the bar graphs and the trends.
- MATH = Displays only the waveforms (including the computed waveforms).
- NMATH = Displays both numeric values and waveforms (including the computed waveforms).
- FFT = Displays only the FFT waveforms.
- NFFT = Displays both the numeric values and the FFT waveforms.
- WFFT = Displays both the waveforms and the FFT waveforms.
- IECHarm = IEC harmonic measurement mode display (numeric values).
- CBCyle = Cycle by Cycle mode display (value).
- FLICker = Flicker measurement mode display (value).

#### Example
:DISPLAY:MODE NUMERIC

#### Description
- Example in which the numeric display format (:DISPLAY:NUMERIC[:NORMal]:FORMat) is set to “VAL4 (4-value display)”
  :DISPLAY:NUMERIC:NORMAL? ->
  :DISPLAY:NUMERIC:NORMAL:FORMat VAL4:VAL4:ITEM1 U,1,TOTAL;
  ITEM2 I,1,TOTAL;ITEM3 P,1,TOTAL;
  ...(omitted)...ITEM35 ETA3;
  ITEM36 ETA4;CURSOR U
- Example in which the numeric display format (:DISPLAY:NUMERIC[:NORMal]:FORMat) is set to “ALL (all display)”
  :DISPLAY:NUMERIC:NORMAL? ->
  :DISPLAY:NUMERIC:NORMAL:FORMat ALL;ALL:CURSOR U

### :DISPLAY:NUMeric?

**Function**
Queries all settings related to the numeric display.

**Syntax**
:DISPLAY:NUMeric?

**Example**
:DISPLAY:NUMERIC? -> (same as the response to ":DISPLAY:NUMERIC:NORMAL?")

### :DISPLAY:NUMeric:NORMal?

**Function**
Queries all settings related to the numeric display.

**Syntax**
:DISPLAY:NUMERIC:NORMAL?

**Example**
- Example in which the numeric display format (:DISPLAY:NUMERIC[:NORMal]:FORMat) is set to “VAL4 (4-value display)”
  :DISPLAY:NUMERIC:NORMAL? ->
  :DISPLAY:NUMERIC:NORMAL:FORMat VAL4:VAL4:ITEM1 U,1,TOTAL;
  ITEM2 I,1,TOTAL;ITEM3 P,1,TOTAL;
  ...(omitted)...ITEM35 ETA3;
  ITEM36 ETA4;CURSOR U
- Example in which the numeric display format (:DISPLAY:NUMERIC[:NORMal]:FORMat) is set to “ALL (all display)”
  :DISPLAY:NUMERIC:NORMAL? ->
  :DISPLAY:NUMERIC:NORMAL:FORMat ALL;ALL:CURSOR U

### :DISPLAY:NUMeric[:NORMal]:ALL?

**Function**
Queries all settings related to the numeric display (all display).

**Syntax**
:DISPLAY:NUMERIC[:NORMal]:ALL?

**Example**
:DISPLAY:NUMERIC:NORMAL:ALL? ->
:DISPLAY:NUMERIC:NORMAL:ALL:CURSOR U

### :DISPLAY:NUMeric[:NORMal]:ALL:CURSor

**Function**
Sets the cursor position on the numeric display (all display) or queries the current setting.

**Syntax**
:DISPLAY:NUMERIC[:NORMal]:ALL:CURSOR {<Function>}

**Example**
:DISPLAY:NUMERIC:NORMAL:ALL:CURSOR (Function)
:DISPLAY:NUMERIC:NORMAL:ALL:CURSOR?

**<Function> = (UI|P|S|Q)... (See the function selection list (1) on page 6-44.)**

### Example
:DISPLAY:NUMERIC:NORMAL:ALL:CURSOR U
:DISPLAY:NUMERIC:NORMAL:ALL:CURSOR U

**Description**
- Specify the cursor position in terms of the function name.
### 6.7 DISPLAY Group

#### :DISPLAY:NUMERIC[:NORMaL]:ALL:ORDER

**Function**
Sets the displayed harmonic order on the harmonic measurement function display page of the numeric display (all display) or queries the current setting.

**Syntax**

```
:DISPLAY:NUMERIC[:NORMaL]:ALL:ORDER {<Order>}
:DISPLAY:NUMERIC[:NORMaL]:ALL:ORDER?
```

- `<Order>` = `{TOTal|DC|<NRf>}`
  - `<NRf>` = 1 to 100

**Example**

```
:DISPLAY:NUMERIC:NORMAL:ALL:ORDER 1
:DISPLAY:NUMERIC:NORMAL:ALL:ORDER?
```

**Description**
- This command is valid only on models with the advanced computation function (/G6 option).
- This command is valid when the displayed page number (`:DISPLAY:NUMERIC[:NORMaL]:ALL:PAGe`) on the numeric display (all display) is 6 or 7.

#### :DISPLAY:NUMERIC[:NORMaL]:ALL:PAGe

**Function**
Sets the page number on the numeric display (all display) or queries the current setting.

**Syntax**

```
:DISPLAY:NUMERIC[:NORMaL]:ALL:PAGe {<NRf>}
:DISPLAY:NUMERIC[:NORMaL]:ALL:PAGe?
```

- `<NRf>` = 1 to 5 (page number)
- `<NRf>` = 1 to 9 (when the advanced computation function (/G6 option) is installed)

**Example**

```
:DISPLAY:NUMERIC:NORMAL:ALL:PAGe 1
:DISPLAY:NUMERIC:NORMAL:ALL:PAGe?
```

**Description**
- When the page number is set, the cursor position moves to the beginning of the page.

#### :DISPLAY:NUMERIC[:NORMaL]:FORMaT

**Function**
Sets the numeric display format or queries the current setting.

**Syntax**

```
:DISPLAY:NUMERIC[:NORMaL]:FORMaT {VAL4|VAL8|VAL16|ALL|SINGle|DUAL}
:DISPLAY:NUMERIC[:NORMaL]:FORMaT?
```

**Example**

```
:DISPLAY:NUMERIC:NORMAL:FORMAT VAL4
:DISPLAY:NUMERIC:NORMAL:FORMAT?
```

**Description**
- The contents of the displayed numeric data are as follows:
  - `{VAL4|VAL8|VAL16}`: Numeric display items are displayed in order by the item number. (The number expresses the number of items that is displayed on a single screen (page).)
  - `ALL`: All functions are displayed in order by element.
  - `SINGle`: One list display item is listed by separating the data into even and odd orders.
  - `DUAL`: Two list display items are listed in order by harmonic order.
- `{SINGle|DUAL}` are selectable only on models with the advanced computation function (/G6 option).

#### :DISPLAY:NUMERIC[:NORMaL]:LIST?

**Function**
Queries all settings related to the numeric display (list display).

**Syntax**

```
:DISPLAY:NUMERIC[:NORMaL]:LIST?
```

**Example**

```
:DISPLAY:NUMERIC:NORMAL:LIST?
```

**Description**
- This command is valid only on models with the advanced computation function (/G6 option).
**Function**
Sets the cursor position on the numeric display (list display) or queries the current setting.

**Syntax**
```
:DISPLAY:NUMERIC[:NORMAL]:LIST:CURSor [HEAder|ORDer]
:DISPLAY:NUMERIC[:NORMAL]:LIST:CURSor?
```

**Example**
```
:DISPLAY:NUMERIC:NORMAL:LIST:CURSOR ORDER
```

**Description**
This command is valid only on models with the advanced computation function (/G6 option).

**Function**
Sets the displayed items (function and element) on the numeric display (list display) or queries the current setting.

**Syntax**
```
:DISPLAY:NUMERIC[:NORMAL]:LIST:ITEM<x> {<Function>,<Element>}
:DISPLAY:NUMERIC[:NORMAL]:LIST:ITEM<x>?
```

**Example**
```
:DISPLAY:NUMERIC:NORMAL:LIST:ITEM1 U,1
```

**Description**
This command is valid only on models with the advanced computation function (/G6 option).

**Function**
Sets the harmonic order cursor position in the data section on the numeric display (list display) or queries the current setting.

**Syntax**
```
:DISPLAY:NUMERIC[:NORMAL]:LIST:ORDer {<NRf>}
:DISPLAY:NUMERIC[:NORMAL]:LIST:ORDer?
```

**Example**
```
:DISPLAY:NUMERIC:NORMAL:LIST:ORDER 1
```

**Description**
This command is valid only on models with the advanced computation function (/G6 option).
### :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8 |VAL16}?

**Function**: Queries all settings related to the numeric display ({4-value|8-value|16-value} display).

**Syntax**: :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8|VAL16}?  

**Example**: :DISPLAY:NUMERIC:NORMAL:VAL4?  

```plaintext  
:DISPLAY:NUMERIC:NORMAL:VAL4:ITEM1 U,1,TOTAL;ITEM2 I,1,TOTAL;  
ITEM3 P,1,TOTAL;ITEM4 LAMBDA,1,TOTAL;  
ITEM5 U,2,TOTAL;ITEM6 I,2,TOTAL;ITEM7 P,2,TOTAL;ITEM8 LAMBDA,2,TOTAL;  
ITEM9 U,3,TOTAL;ITEM10 I,3,TOTAL;ITEM11 P,3,TOTAL;ITEM12 LAMBDA,3,TOTAL;  
ITEM13 U,4,TOTAL;ITEM14 I,4,TOTAL;ITEM15 P,4,TOTAL;ITEM16 LAMBDA,4,TOTAL;  
ITEM17 U,SIGMA,TOTAL;ITEM18 I,SIGMA,TOTAL;ITEM19 P,SIGMA,TOTAL;ITEM20 LAMBDA,SIGMA,TOTAL;  
ITEM21 U,SIGMA,TOTAL;ITEM22 I,SIGMA,TOTAL;ITEM23 P,SIGMA,TOTAL;ITEM24 LAMBDA,SIGMA,TOTAL;  
ITEM25 WH,1;ITEM26 WH,2;ITEM27 WH,3;ITEM28 WH,4;ITEM29 WH,SIGMA;ITEM30 WH,SIGMA;  
ITEM31 ETA1;ITEM32 ETA2;ITEM33 ETA3;ITEM34 ETA4;CURSOR 1  
```

**Description**: Specify the cursor position in terms of the item number.

### :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8 |VAL16}:CURSor

**Function**: Sets the cursor position on the numeric display ({4-value|8-value|16-value} display) or queries the current setting.

**Syntax**: :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8|VAL16}:CURSor {<NRf>}  

```plaintext  
<NRf> = 1 to 36 (item number, for VAL4)  
<NRf> = 1 to 72 (item number, for VAL8)  
<NRf> = 1 to 144 (item number, for VAL16)  
NONE = No display item  
```

**Example**: :DISPLAY:NUMERIC:NORMAL:VAL4:CURSOR 1  

```plaintext  
```

**Description**:
- If `<Element>` is omitted, element 1 is set.
- If `<Order>` is omitted, TOTAl is set.
- `<Element>` or `<Order>` is omitted from response to functions that do not need them.

### :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8 |VAL16}:ITEM<x>

**Function**: Sets the displayed items (function, element, and harmonic order) on the numeric display ({4-value|8-value|16-value} display) or queries the current setting.

**Syntax**: :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8|VAL16}:ITEM<x> {NONE|<Function>,<Element>[,<Order>]}  

```plaintext  
<Function> = {U|I|P|S|Q|...} (See the function selection list (1) on page 6-44.)  
<Element> = (<NRf>|SIGMa|SIGMB) (<NRf> = 1 to 4)  
<Order> = {TOTal|DC|<NRf>} (<NRf> = 1 to 100)  
```

**Example**: :DISPLAY:NUMERIC:NORMAL:VAL4:ITEM1 U,1,TOTAL  

```plaintext  
```

**Description**: When `<Element>` is omitted, element 1 is set.

### :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8 |VAL16}:PAGE

**Function**: Sets the page number on the numeric display ({4-value|8-value|16-value} display) or queries the current setting.

**Syntax**: :DISPLAY:NUMERIC[:NORMal]:{VAL4|VAL8|VAL16}:PAGE {<NRf>}  

```plaintext  
<NRf> = 1 to 9 (page number)  
```

**Example**: :DISPLAY:NUMERIC:NORMAL:VAL4:PAGE 1  

```plaintext  
```

**Description**: When the page number is set, the cursor position moves to the beginning of the page.
### Communication Commands

#### :DISPLAY:NUMERIC[:NORMal]{:VAL4|VAL8|VAL16}:PRESet

**Function**
Sets the displayed items on the numeric display (4-value|8-value|16-value) display) to a preset pattern.

**Syntax**
```
:DISPLAY:NUMERIC[:NORMal]{:VAL4|VAL8|VAL16}:PRESet <NRf>
```

**Example**
```
:DISPLAY:NUMERIC:NORMAL:VAL4:PRESET 1
```

**Description**
Regardless of what value (1 to 4) is specified for `<NRf>`, the display pattern (order) of the numeric display items will be the same as the display order when Reset Items Exec of the ITEM setting menu, which is displayed on the screen, is executed. For details on the order of displayed items when reset is executed, see the User’s Manual IM WT3001E-01EN.

#### :DISPLAY:TRENd?

**Function**
Queries all settings related to the trend.

**Syntax**
```
:DISPLAY:TRENd?
```

**Example**
```
:DISPLAY:TREND? -> :DISPLAY:TREND:
```

#### :DISPLAY:TRENd:ALL

**Function**
Collectively turns ON/OFF all trends.

**Syntax**
```
:DISPLAY:TRENd:ALL {<Boolean>}
```

**Example**
```
:DISPLAY:TREND:ALL ON
```

#### :DISPLAY:TRENd:CLEAR

**Function**
Clears the trend

**Syntax**
```
:DISPLAY:TRENd:CLEAR
```

**Example**
```
:DISPLAY:TREND:CLEAR
```

#### :DISPLAY:TRENd:FORMat

**Function**
Sets the display format of the trend or queries the current setting.

**Syntax**
```
:DISPLAY:TRENd:FORMat {SINGLE|DUAL|TRIad|QUAD}
```

**Example**
```
:DISPLAY:TREND:FORMAT SINGLE; T1 1; T2 1; T3 1; T4 1; T5 1; T6 1; T7 1; T8 1; T9 0; T10 0; T11 0; T12 0; T13 0; T14 0; T15 0; T16 0; TDIV 0,0,3; ITEM1: FUNCTION U,1, TOTAL; SCALING: MODE AUTO; VALUE 100.0E+00,-100.0E+00
```

#### :DISPLAY:TRENd:ITEM<x>:FORMat

**Function**
Sets the trend item (function, element, and harmonic order) or queries the current setting.

**Syntax**
```
:DISPLAY:TRENd:ITEM<x>[:FUNCTION] {NONE|<Function>,<Element>,<Order>}
```

**Example**
```
:DISPLAY:TREND:ITEM1:FUNCTION U,1,TOTAL
```

#### :DISPLAY:TRENd:ITEM<x>:SCALing?

**Function**
queries all settings related to the scaling of the trend.

**Syntax**
```
:DISPLAY:TRENd:ITEM<x>:SCALing?
```

**Example**
```
:DISPLAY:TREND:ITEM1:SCALING?
```

#### :DISPLAY:TRENd:ITEM<x>:

**Function**
Sets the trend item (function, element, and harmonic order) or queries the current setting.

**Syntax**
```
:DISPLAY:TRENd:ITEM<x>:{NONE|<Function>,<Element>,<Order>}
```

**Example**
```
:DISPLAY:TREND:ITEM1:FUNCTION U,1,TOTAL; SCALING: MODE AUTO; VALUE 100.0E+00,-100.0E+00
```
6.7 DISPlay Group

`:DISPLAY:TRENd:ITEM<x>:SCALing:MODE
Function Sets the scaling mode of the trend or queries the current setting.
Syntax :DISPLAY:TRENd:ITEM<x>:SCALing:MODE {AUTO|MANual}
:DISPLAY:TRENd:ITEM<x>:SCALing:MODE?
<x> = 1 to 16 (item number)

Example
:DISPLAY:TRENd:ITEM1:SCALing:MODE AUTO
:DISPLAY:TRENd:ITEM1:SCALing:MODE?
  -> :DISPLAY:TRENd:ITEM1:SCALing:MODE AUTO

`:DISPLAY:TRENd:ITEM<x>:SCALing:VALue
Function Sets the upper and lower limits of manual scaling of the trend or queries the current setting.
Syntax :DISPLAY:TRENd:ITEM<x>:SCALing:VALue {<NRf>,<NRf>}
:DISPLAY:TRENd:ITEM<x>:SCALing:VALue?
<x> = 1 to 16 (item number)
<NRf> = –9.999E+30 to 9.999E+30

Example
:DISPLAY:TRENd:ITEM1:SCALing:VALue 100,-100
:DISPLAY:TRENd:ITEM1:SCALing:VALue?
  -> :DISPLAY:TRENd:ITEM1:SCALing:VALue 100.0E+00,-100.0E+00

Description
• Set the upper limit and then the lower limit.
• This command is valid when the scaling mode of the trend (:DISPLAY:TRENd:ITEM<x>:SCALing:MODE) is set to "MANual."

`:DISPLAY:TRENd:TDIV
Function Sets the horizontal axis (T/div) of the trend or queries the current setting.
Syntax :DISPLAY:TRENd:TDIV {<NRf>,<NRf>,<NRf>}
:DISPLAY:TRENd:TDIV?
(<NRf>, <NRf>, <NRf>) = 0, 0, 3 to 24, 0, 0
1st <NRf> = 1, 3, 6, 12, 24 (hour)
2nd <NRf> = 1, 3, 6, 10, 30 (minute)
3rd <NRf> = 3, 6, 10, or 30 (second)

Example
:DISPLAY:TRENd:TDIV 0,0,3
:DISPLAY:TRENd:TDIV?
-> :DISPLAY:TRENd:TDIV 0,0,3

Description
Set the three <NRf>’s so that one <NRf> is a non-zero value and the other two are zeroes.

`:DISPLAY:TRENd:T<x>
Function Turns ON/OFF the trend or queries the current setting.
Syntax :DISPLAY:TRENd:T<x> {<Boolean>}
:DISPLAY:TRENd:T<x>?
<x> = 1 to 16 (item number)

Example
:DISPLAY:TRENd:T1 ON
:DISPLAY:TRENd:T1?
  -> :DISPLAY:TRENd:T1 1

`:DISPLAY:VECTor?
Function Queries all settings related to the vector display.
Syntax :DISPLAY:VECTor?
Example :DISPLAY:VECTor? -> :DISPLAY:VECTor:OBJECT SIGMA;NUMERIC 1;
UMAG 1.000;IMAG 1.000

Description
This command is valid only on models with the advanced computation function (/G6 option).

`:DISPLAY:VECTor:NUMeric
Function Turns ON/OFF the numeric data display for the vector display or queries the current setting.
Syntax :DISPLAY:VECTor:NUMeric {<Boolean>}
:DISPLAY:VECTor:NUMeric?
Example
:DISPLAY:VECTor:NUMeric ON
:DISPLAY:VECTor:NUMeric? -> :DISPLAY:VECTor:NUMERIC 1

Description
This command is valid only on models with the advanced computation function (/G6 option).

`:DISPLAY:VECTor:OBJect
Function Sets the wiring unit to be displayed during vector display or queries the current setting.
Syntax :DISPLAY:VECTor:OBJect {SIGMA|SIGMB}
:DISPLAY:VECTor:OBJect?
Example
:DISPLAY:VECTor:OBJect SIGMA
:DISPLAY:VECTor:OBJect?
  -> :DISPLAY:VECTor:OBJECT SIGMA

Description
• This command is valid only on models with the advanced computation function (/G6 option).
• SIGMB is selectable only on the 4-element model.
<table>
<thead>
<tr>
<th>Function</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>**:DISPlay:VECTOR:UMAG</td>
<td>IMAG**</td>
</tr>
<tr>
<td>Syntax</td>
<td>**:DISPlay:VECTOR:UMAG</td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:VECTOR:UMAG 1</strong></td>
</tr>
<tr>
<td><strong>:DISPlay:WAVE</strong></td>
<td>Queries all settings related to the waveform display.</td>
</tr>
<tr>
<td>Syntax</td>
<td><strong>:DISPlay:WAVE</strong></td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:WAVE?</strong> -&gt; <strong>:DISPlay:WAVE:FORMAT SINGLE;U1 1;U2 1;U3 1;U4 1;I1 1;I2 1;I3 1;I4 1;TDIV 5.0E-03;TRIGGER:MODE AUTO;SOURCE U1;SLOPE RISE;LEVEL 0.0;</strong></td>
</tr>
<tr>
<td><strong>:DISPlay:WAVE:ALL</strong></td>
<td>Collectively turns ON/OFF all waveform displays.</td>
</tr>
<tr>
<td>Syntax</td>
<td><strong>:DISPlay:WAVE:ALL</strong> {Boolean}</td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:WAVE:ALL ON</strong></td>
</tr>
<tr>
<td><strong>:DISPlay:WAVE:FORMAT</strong></td>
<td>Sets the display format of the waveform or queries the current setting.</td>
</tr>
<tr>
<td>Syntax</td>
<td><strong>:DISPlay:WAVE:FORMAT</strong> {SINGLE</td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:WAVE:FORMAT SINGLE</strong></td>
</tr>
<tr>
<td><strong>:DISPlay:WAVE:GRATICule</strong></td>
<td>Sets the graticule (grid) type or queries the current setting.</td>
</tr>
<tr>
<td>Syntax</td>
<td><strong>:DISPlay:WAVE:GRATICule</strong> {GRID}</td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:WAVE:GRATICule GRID</strong></td>
</tr>
<tr>
<td><strong>:DISPlay:WAVE:INTERpolate</strong></td>
<td>Sets the interpolation method of the waveform or queries the current setting.</td>
</tr>
<tr>
<td>Syntax</td>
<td><strong>:DISPlay:WAVE:INTERpolate</strong> {OFF</td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:WAVE:INTERpolate LINE</strong></td>
</tr>
<tr>
<td><strong>:DISPlay:WAVE:MAPPING</strong></td>
<td>Queries all settings related to the waveform mapping to the split screen.</td>
</tr>
<tr>
<td>Syntax</td>
<td><strong>:DISPlay:WAVE:MAPPING</strong></td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:WAVE:MAPPING?</strong></td>
</tr>
<tr>
<td><strong>:DISPlay:WAVE:MAPPING[:MODE]</strong></td>
<td>Sets the waveform mapping method for the split screen or queries the current setting.</td>
</tr>
<tr>
<td>Syntax</td>
<td><strong>:DISPlay:WAVE:MAPPING[:MODE]</strong> {AUTO</td>
</tr>
<tr>
<td>Example</td>
<td><strong>:DISPlay:WAVE:MAPPING:MODE USER</strong></td>
</tr>
</tbody>
</table>
6.7 Display Group

:DISPLAY:WAVE:MAPPING:{U<x>|I<x>|SPE|ed|TORque|MATH<x>}
Function
Sets the mapping of the {voltage|current|rotating speed|torque|waveform computation} waveform to the split screen or queries the current setting.
Syntax
:DISPLAY:WAVE:MAPPING:{U<x>|I<x>|SPE|ed|TORque|MATH<x>} {<NRf>}
:DISPLAY:WAVE:MAPPING:{U<x>|I<x>|SPE|ed|TORque|MATH<x>}?
Example
:DISPLAY:WAVE:MAPPING:U1 0
Description
• This command is valid when the waveform mapping method (:DISPLAY:WAVE:MAPPING[:MODE]) is set to “USER.”
• {SPE|ed|TORque} are valid only on models with the motor evaluation function (/MTR option).
• MATH<x> is valid only on models with the advanced computation function (/G6 option).

:DISPLAY:WAVE:POSITION?
Function
Queries all settings related to the vertical position (level of the center position) of the waveform.
Syntax
:DISPLAY:WAVE:POSITION?
Example
:DISPLAY:WAVE:POSITION? -> :DISPLAY:WAVE:POSITION:U1 0.000; U2 0.000; U3 0.000; U4 0.000;
I1 0.000; I2 0.000; I3 0.000; I4 0.000

:DISPLAY:WAVE:POSITION:{UALL|IALL}
Function
Collectively sets the vertical position (level of the center position) of the waveform {voltage|current} of all elements.
Syntax
:DISPLAY:WAVE:POSITION:{UALL|IALL} {<NRf>}
Example
:DISPLAY:WAVE:POSITION:UALL 0

:DISPLAY:WAVE:POSITION:{U<x>|I<x>}
Function
Sets the vertical position (level of the center position) of the waveform {voltage|current} of the element or queries the current setting.
Syntax
:DISPLAY:WAVE:POSITION:{U<x>|I<x>} {<NRf>}
:DISPLAY:WAVE:POSITION:{U<x>|I<x>}?
Example
:DISPLAY:WAVE:POSITION:U1 0

:DISPLAY:WAVE:SVALUE (Scale VALUE)
Function
Turns ON/OFF the scale value display or queries the current setting.
Syntax
:DISPLAY:WAVE:SVALUE {<Boolean>}
:DISPLAY:WAVE:SVALUE?
Example
:DISPLAY:WAVE:SVALUE ON
:DISPLAY:WAVE:SVALUE?

:DISPLAY:WAVE:TDIV
Function
Sets the Time/div value of the waveform or queries the current setting.
Syntax
:DISPLAY:WAVE:TDIV {<Time>}
:DISPLAY:WAVE:TDIV?
Example
:DISPLAY:WAVE:TDIV 5MS
Description
The specifiable Time/div value is up to 1/10 of the data update interval (:RATE).

:DISPLAY:WAVE:TLABEL (Trace LABEL)
Function
Turns ON/OFF the waveform label display or queries the current setting.
Syntax
:DISPLAY:WAVE:TLABEL {<Boolean>}
:DISPLAY:WAVE:TLABEL?
Example
:DISPLAY:WAVE:TLABEL OFF
:DISPLAY:WAVE:TLABEL?

:DISPLAY:WAVE:TRIGGER?
Function
Queries all settings related to the trigger.
Syntax
:DISPLAY:WAVE:TRIGGER?
Example
SOURCE U1; SLOPE RISE; LEVEL 0.0

:DISPLAY:WAVE:TRIGGER:LEVEL
Function
Sets the trigger level or queries the current setting.
Syntax
:DISPLAY:WAVE:TRIGGER:LEVEL {<NRf>}
Example
:DISPLAY:WAVE:TRIGGER:LEVEL 0
:DISPLAY:WAVE:TRIGGER:LEVEL?

Description
Set the value in terms of a percentage of the full scale value displayed on the screen.
### :DISPlay:WAVE:TRIGger:MODE

**Function**
Sets the trigger mode or queries the current setting.

**Syntax**
:DISPlay:WAVE:TRIGger:MODE {AUTO|NORMal|OFF}
:DISPlay:WAVE:TRIGger:MODE?

**Example**
:DISPLAY:WAVE:TRIGGER:MODE AUTO

### :DISPlay:WAVE:TRIGger:SLOPe

**Function**
Sets the trigger slope or queries the current setting.

**Syntax**
:DISPlay:WAVE:TRIGger:SLOPe {RISE|FALL|BOTH}
:DISPlay:WAVE:TRIGger:SLOPe?

**Example**
:DISPLAY:WAVE:TRIGGER:SLOPE RISE
:DISPLAY:WAVE:TRIGGER:SLOPE? ->

### :DISPlay:WAVE:TRIGger:SOURce

**Function**
Sets the trigger source or queries the current setting.

**Syntax**
:DISPlay:WAVE:TRIGger:SOURce {U<x>|I<x>|EXTernal}
:DISPlay:WAVE:TRIGger:SOURce?

**Example**
:DISPLAY:WAVE:TRIGGER:SOURCE U1
:DISPLAY:WAVE:TRIGGER:SOURCE? ->

### :DISPlay:WAVE:{U<x>|I<x>|SPEed|TORQue|MATH<x>}

**Function**
Turns ON/OFF the {voltage|current|rotating speed|torque|waveform computation} waveform or queries the current setting.

**Syntax**
:DISPlay:WAVE:{U<x>|I<x>|SPEed|TORQue|MATH<x>} {<Boolean>}
:DISPlay:WAVE:{U<x>|I<x>|SPEed|TORQue|MATH<x>}?

**Example**
:DISPLAY:WAVE:U1 ON
:DISPLAY:WAVE:U1? ->

**Description**
- {SPEed|TORQue} are valid only on models with the motor evaluation function (/MTR option).
- MATH<x> is valid only on models with the advanced computation function (/G6 option).

### :DISPlay:WAVE:VZoom?

**Function**
Queries all settings related to the vertical zoom factor of the waveform.

**Syntax**
:DISPlay:WAVE:VZoom?

**Example**
:DISPLAY:WAVE:VZOOM? ->

### :DISPlay:WAVE:VZoom: (UALL|IALL)

**Function**
Collectively sets the vertical zoom factor of the waveform {voltage|current} of all elements.

**Syntax**
:DISPlay:WAVE:VZoom: (UALL|IALL) {<NRf>}

**Example**
:DISPLAY:WAVE:VZOOM:UALL 1

### :DISPlay:WAVE:VZoom: {U<x>|I<x>}

**Function**
Sets the vertical zoom factor of the waveform {voltage|current} of the element or queries the current setting.

**Syntax**
:DISPlay:WAVE:VZoom: {U<x>|I<x>} {<NRf>}

**Example**
:DISPLAY:WAVE:VZOOM:U1 1
:DISPLAY:WAVE:VZOOM:U1? ->
## 6.7 DISPLAY Group

*Function Selection (*<Function>*>) List

### Function of numeric data

#### Applicable commands

- :AOUTput[:NORMal]:CHANnel<x>
- :DISPlay:NUMeric[:NORMal]:{VAL4|VAL8|VAL16}:ITEM<x>
- :DISPlay:TRENd:ITEM<x>[:FUNCTION]
- :NUMeric[:NORMal]:ITEM<x>

<table>
<thead>
<tr>
<th>Function name used in commands</th>
<th>Function name used on the menu (Numeric display header name)</th>
<th>Elements</th>
<th>Order</th>
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### Functions that require the advanced computation function (/G6 option)

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### Functions that require the motor evaluation function (/MTR option)

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</table>
In addition, the function listed below can be used for the following command.

:DISPLAY:NUMeric[:NORMal]:ALL:CURSor
:FILE:SAVE:NUMeric[:NORMal]:<Function>
:HCOPY:PRINTER:LIST[:NORMal]:<Function>
:STORE:NUMeric[:NORMal]:<Function>

Functions that require the advanced computation function (/G6 option)

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<th>Description</th>
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<td>Xp(k)</td>
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</table>

Note

- For functions that do not require the element to be specified in the selection list above, set the parameter to 1 or omit the parameter for commands that have a parameter for specifying the element (<Element>).
- Likewise, for functions that do not require the harmonic order to be specified, set the parameter to “TOTal” or omit the parameter for commands that have a parameter for specifying the harmonic order (<Order>).

(2) Functions of the numeric list data (The advanced computation function (/G6 option) is required.)

Applicable commands

:DISPLAY:BAR:ITEM<x>
:DISPLAY:NUMeric[:NORMal]:LIST:ITEM<x>

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In addition, the function listed below can be used for the following command.

:NUMeric:LIST:ITEM<x>

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</table>
## 6.8 FILE Group

The commands in this group deal with file operations. You can make the same settings and inquiries as when FILE on the front panel is used.

### 6.8.1 :FILE?

**Function** Queries all settings related to the file operation.

**Syntax** 

- :FILE?

**Example** 

- :FILE? → (same as the response to 
"FILE:SAVE?")

### 6.8.2 :FILE:CDIRectory

**Function** Changes the current directory.

**Syntax** 

- :FILE:CDIRectory {<Filename>}

- `<Filename>` = Directory name

**Example** 

- :FILE:CDIRRECTORY "IMAGE"

**Description** Specify "." to move up to the parent directory.

### 6.8.3 :FILE:DELETE:IMAGE:{TIFF|BMP|PSCRIPT|PNG|JPEG}

**Function** Deletes the screen image data file.

**Syntax** 

- :FILE:DELETE:IMAGE:{TIFF|BMP|PSCRIPT|PNG|JPEG} {<Filename>}

**Example** 

- :FILE:DELETE:IMAGE "TIFF1"

**Description** Specify the file name without the extension.

### 6.8.4 :FILE:DELETE:NUMERIC:{ASCII|FLOAT}

**Function** Deletes the numeric data file.

**Syntax** 

- :FILE:DELETE:NUMERIC:{ASCII|FLOAT} {<Filename>}

**Example** 

- :FILE:DELETE:NUMERIC:ASCII "NUM1"

**Description** Specify the file name without the extension.

### 6.8.5 :FILE:DELETE:SETUP

**Function** Deletes the setup parameter file.

**Syntax** 

- :FILE:DELETE:SETUP {<Filename>}

**Example** 

- :FILE:DELETE:SETUP "SETUP1"

**Description** Specify the file name without the extension.

### 6.8.6 :FILE:DELETE:WAVE:{BINARY|ASCII|FLOAT}

**Function** Deletes the waveform display data file.

**Syntax** 

- :FILE:DELETE:WAVE:{BINARY|ASCII|FLOAT} {<Filename>}

**Example** 

- :FILE:DELETE:WAVE:ASCII "WAVE1"

**Description** Specify the file name without the extension.

### 6.8.7 :FILE:DRIVE

**Function** Sets the target drive.

**Syntax** 

- :FILE:DRIVE {PCCard[,<NRf>]|NETWork|USB,<NRf>[,<NRf>][,<NRf>]} 

- PCCard = PC card drive 
- <NRf> = Partition (0 to 3) 
- NETWork = Network drive 
- USB = USB memory drive 
- 1st <NRf> = ID number (address) 
- 2nd <NRf> = Partition (0 to 3) or LUN (logical unit number: 0 to 3) 
- 3rd <NRf> = Partition (0 to 3) when LUN is specified

**Example** 

- :FILE:DRIVE PCCARD

**Description**
- If the drive does not contain partitions, omit the <NRf> corresponding to partitions.
- "NETWork" can be used when the Ethernet interface (/C7 option) is installed.
- "USB" can be used when the USB port (peripheral device) (/C5 option) is installed.
- The second or third <NRf> when USB is selected can be omitted if the drive is not partitioned or divided by LUN.

### 6.8.8 :FILE:FORMAT:EXECUTE

**Function** Formats the PC card.

**Syntax** 

- :FILE:FORMAT:EXECUTE

**Example** 

- :FILE:FORMAT:EXECUTE

### 6.8.9 :FILE:FREE?

**Function** Queries the free disk space (bytes) on the drive.

**Syntax** 

- :FILE:FREE?

**Example** 

- :FILE:FREE? → 163840

### 6.8.10 :FILE:LOAD:ABORT

**Function** Aborts file loading.

**Syntax** 

- :FILE:LOAD:ABORT

**Example** 

- :FILE:LOAD:ABORT

### 6.8.11 :FILE:LOAD:SETUP

**Function** Loads the setup parameter file.

**Syntax** 

- :FILE:LOAD:SETUP {<Filename>}

**Example** 

- :FILE:LOAD:SETUP "SETUP1"

**Description**
- Specify the file name without the extension.
- This command is an overlap command.
6.8 FILE Group

**:FILE:MDIREctory**
Function Creates a directory.
Syntax :FILE:MDIREctory {<Filename>}
Example :FILE:MDIREctory "TEST"

**:FILE:PATH?**
Function Queries the absolute path of the current directory.
Syntax :FILE:PATH?
Example :FILE:PATH? -> "PC_Card\IMAGE"

**:FILE:SAVE?**
Function Queries all settings related to the saving of files.
Syntax :FILE:SAVE?
Example :FILE:SAVE? -> :FILE:SAVE:

**:FILE:SAVE:ABORt**
Function Aborts file saving.
Syntax :FILE:SAVE:ABORt
Example :FILE:SAVE:ABORT

**:FILE:SAVE:ACQuisition**
Function Queries all settings related to the file saving of the waveform sampling data.
Trace U1
Description This command is valid only on models with the advanced computation function (/G6 option).

**:FILE:SAVE:ANAMing**
Function Sets whether to automatically name the files to be saved or queries the current setting.
Syntax :FILE:SAVE:ANAMing {<Boolean>}
Example :FILE:SAVE:ANAMING ON
Description This command is valid only on models with the advanced computation function (/G6 option).

**:FILE:SAVE:COMMent**
Function Sets the comment to be added to the file to be saved or queries the current setting.
Syntax :FILE:SAVE:COMMent {<String>}
Example :FILE:SAVE:COMMENT "CASE1"
Description • This command is valid only on models with the advanced computation function (/G6 option).

**:FILE:SAVE:ACQuisition[:EXECute]**
Function Saves the waveform sampling data to a file.
Syntax :FILE:SAVE:ACQuisition [:EXECute] {<Filename>}
Example :FILE:SAVE:ACQuisition:EXECUTE "ACQ1"
Description • This command is valid only on models with the advanced computation function (/G6 option).

**:FILE:SAVE:ACQuisition[:TYPE]**
Function Sets the format of the waveform sampling data to be saved or queries the current setting.
Syntax :FILE:SAVE:ACQuisition[:TYPE] {BINary|ASCii|FLOAT}
Example :FILE:SAVE:ACQuisition:TYPE FLOAT
Description • This command is valid only on models with the advanced computation function (/G6 option).

**:FILE:SAVE:COMMat**
Function Sets the comment to be added to the file to be saved or queries the current setting.
Syntax :FILE:SAVE:COMMat {<String>}
Example :FILE:SAVE:COMMENT "CASE1"
Description • Specifying file name without the extension.
• This command is an overlap command.
### :FILE:SAVE:NUMeric?

**Function**
Queries all settings related to the saving of numeric data files.

**Syntax**
:FILE:SAVE:NUMERIC?

**Example**
:FILE:SAVE:NUMERIC?

### :FILE:SAVE:NUMeric:CBCycle?

**Function**
Queries all settings related to Cycle by Cycle measurement items saved to numeric data files or queries the current setting.

**Syntax**
:FILE:SAVE:NUMERIC:CBCycle?

**Example**

### :FILE:SAVE:NUMeric:CBCycle?:ALL

**Function**
Collectively turns ON/OFF the output of all elements and functions when saving numeric data from Cycle by Cycle measurement to a file.

**Syntax**
:FILE:SAVE:NUMERIC:CBCycle:ALL {<Boolean>}

**Example**
:FILE:SAVE:NUMERIC:CBCYCYLE:ALL ON

### :FILE:SAVE:NUMeric:CBCycle:<Function>

**Function**
Turns ON/OFF the output of each element \(\sum A\) or \(\sum B\) when saving numeric data from Cycle by Cycle measurement to a file.

**Syntax**
:FILE:SAVE:NUMERIC:CBCycle:<Function>{<Boolean>}

**Example**
:FILE:SAVE:NUMERIC:CBCYCLE:U ON

**Description**
- \(\sum A\) is only available on models with the motor evaluation function (/MTR option).
- \(\sum B\) is only available on models with 2 elements or more.
- Also, to turn output ON, wiring unit 1 must exist per the wiring system setting command [:INPut]WIRing.

### :FILE:SAVE:NUMeric:CBCycle:SIGMA

**Function**
Collectively turns ON/OFF the output of all Sigma elements and functions when saving numeric data from Cycle by Cycle measurement to a file or queries the current setting.

**Syntax**
:FILE:SAVE:NUMERIC:CBCycle:SIGMA {<Boolean>}

**Example**
:FILE:SAVE:NUMERIC:CBCYCLE:SIGMA ON

**Description**
- Available for models with 2 elements or more.
- Also, to turn output ON, wiring unit 1 must exist per the wiring system setting command [:INPut]WIRing.

### :FILE:SAVE:NUMeric:CBCycle:SIGMB

**Function**
Collectively turns ON/OFF the output of all SigmaB elements and functions when saving numeric data from Cycle by Cycle measurement to a file or queries the current setting.

**Syntax**
:FILE:SAVE:NUMERIC:CBCycle:SIGMB {<Boolean>}

**Example**
:FILE:SAVE:NUMERIC:CBCYCLE:SIGMB ON

**Description**
- Available for models with 4 elements.

### :FILE:SAVE:NUMeric:CBCycle:<Function>

**Function**
Turns ON/OFF the output of each function when saving numeric data from Cycle by Cycle measurement to a file or queries the current setting.

**Syntax**
:FILE:SAVE:NUMERIC:CBCycle:<Function>{<Boolean>}

**Example**
:FILE:SAVE:NUMERIC:CBCYCLE:U ON

**Description**
- Available for models with 2 elements or more.
- Also, to turn output ON, wiring unit 1 must exist per the wiring system setting command [:INPut]WIRing.

### :FILE:SAVE:NUMeric[:EXECute]

**Function**
Saves the numeric data to a file.

**Syntax**
:FILE:SAVE:NUMERIC[:EXECUTE] {<Filename>}

**Example**
:FILE:SAVE:NUMERIC[:EXECUTE] "NUM1"

**Description**
- Specify the file name without the extension.
- This command is an overlap command.
6.8 FILE Group

**:FILE**:SAVE:NUMericol:NORMal? Function Queries all settings related to the items saved to numeric data files.

Syntax :FILE:SAVE:NUMericol:NORMal?

Example :FILE:SAVE:NUMericol:NORMal? ->

:FILE:SAVE:NUMericol:NORMal: ELEMENT1 1;ELEMENT2 0;ELEMENT3 0; ELEMENT4 0;SIGMA 0;SIGMB 0;U 1;I 1; P 1;S 1;Q 1;LAMBDA 1;PHI 1;FU 1; FI 1;UPPEAK 0;UMPEAK 0;IPPEAK 0; IMPEAK 0;CFU 0;CFI 0;PC 0;TIME 0; WH 0;WHP 0;WHM 0;AH 0;AHN 0; WS 0;WQ 0;ETA1 0;ETA2 0;ETA3 0; ETA4 0;F1 0;F2 0;F3 0;F4 0;F5 0; F6 0;F7 0;F8 0;F9 0;F10 0;F11 0; F12 0;F13 0;F14 0;F15 0;F16 0; F17 0;F18 0;F19 0;F20 0

:FILE:SAVE:NUMericol:NORMal:ALL Function Collectively turns ON/OFF the output of all element functions when saving the numerical data file.

Syntax :FILE:SAVE:NUMericol:NORMal:ALL {<Boolean>}

Example :FILE:SAVE:NUMericol:NORMal:ALL ON

:FILE:SAVE:NUMericol:NORMal:{ELEMent<x>|SIGMA|SIGMB} Function Turns ON/OFF the output of {each element|ΣA|ΣB} when saving the numeric data to file.

Syntax :FILE:SAVE:NUMericol:NORMal:{ELEMent<x>|SIGMA|SIGMB} {<Boolean>}

Example :FILE:SAVE:NUMericol:NORMal:SIGMA ON

:FILE:SAVE:NUMericol:NORMal:{ELEMent<x>|SIGMA|SIGMB}? Function Queries the current setting of {each element|ΣA|ΣB}.


Syntax :FILE:SAVE:NUMericol:NORMal:PRESet<x> <x> = 1 to 2 (preset pattern number)

Example :FILE:SAVE:NUMericol:NORMal:PRESet1

Description For details on the output pattern when preset is executed, see the User's Manual IM WT3001E-01EN.

:FILE:SAVE:NUMericol:NORMal:<Function> Function Turns ON/OFF the output of the function when saving the numerical data file or queries the current setting.

Syntax :FILE:SAVE:NUMericol:NORMal:<Function> {<Boolean>}

Example :FILE:SAVE:NUMericol:NORMal:U ON

:FILE:SAVE:NUMericol:NORMal:<Function>? Function Queries the current setting of {each function|ΣA|ΣB}.


Example :FILE:SAVE:NUMericol:NORMal<U>?

:FILE:SAVE:NUMericol:NORMal:TYPE Function Sets the format of the numeric data to be saved or queries the current setting.

Syntax :FILE:SAVE:NUMericol:NORMal:TYPE {ASCii|FLOat}

Example :FILE:SAVE:NUMericol:NORMal:TYPE ASCII


Syntax :FILE:SAVE:SETup[:EXECute] {<Filename>}

Example :FILE:SAVE:SETup:E XECUTE "SETUP1"

Description • Specify the file name without the extension.
• This command is an overlap command.


Syntax :FILE:SAVE:WAVE?

**:FILE:SAVE:WAVE[:EXECute]**

**Function**: Executes the saving of the waveform display data file.

**Syntax**: :FILE:SAVE:WAVE[:EXECute]  
{<Filename>}

**Example**: :FILE:SAVE:WAVE:EXECUTE "WAVE1"

**Description**
- Specify the file name without the extension.
- This command is an overlap command.

**:FILE:SAVE:WAVE:TRACE**

**Function**: Sets the waveform to be saved or queries the current setting.

**Syntax**: :FILE:SAVE:WAVE:TRACE (U<x>|I<x>|SPEed|TORque|MATH<x>)  
:FILE:SAVE:WAVE:TRACE?  
<x> of U<x>, I<x> = 1 to 4 (element)  
<x> of MATH<x> = 1 to 2 (MATH)

**Example**:  
:FILE:SAVE:WAVE:TRACE U1  
:FILE:SAVE:WAVE:TRACE?  
:FILE:SAVE:WAVE:TRACE U1

**Description**
- This command is valid when the format of the waveform display data to be saved (:FILE:SAVE:WAVE:TYPE) is "FLOat." When it is {BINary|ASCii}, all waveforms of which the display is turned ON are saved.
- {SPEed|TORque} are valid only on models with the motor evaluation function (/MTR option).
- MATH<x> is valid only on models with the advanced computation function (/G6 option).

**:FILE:SAVE:WAVE:TYPE**

**Function**: Sets the format of the waveform display data to be saved or queries the current setting.

**Syntax**: :FILE:SAVE:WAVE:TYPE {BINary|ASCii|FLOat}

**Example**:  
:FILE:SAVE:WAVE:TYPE BINARY  
:FILE:SAVE:WAVE:TYPE?  
:FILE:SAVE:WAVE:TYPE BINARY
### 6.9 FLICker Group

The FLICker group contains commands related to flicker measurement.

These commands allow you to enter and query the same settings that are available under ITEM in the Flicker Items menu and under FORM in the Flicker Form menu on the front panel.

Note that the commands in this group are only available with the flicker measurement function (/FL option).

---

**FLICKER?**

**Function**
Queries all settings related to flicker measurement.

**Syntax**
:FLICker?

**Example**
:FLICKER? -> :FLICKER:

**MEASUREMENT FLICKER;ELEMENT1 1;
ELEMENT2 0;ELEMENT3 0;
INTERVAL 10,0;COUNT 12;
FREQUENCY 50;UN:MODE AUTO;
VALUE 230.00;:FLICKER:DC:STATE 1;
LIMIT 3.30;:FLICKER:DMAX:STATE 1;
LIMIT 4.00;:FLICKER:DT:STATE 1;
LIMIT 500,3.30;:FLICKER:PST:
STATE 1;LIMIT 1.000;:FLICKER:PLT:
STATE 1;LIMIT 0.65;NVALUE 12;
:FLICKER:DMIN:LIMIT 0.10

---

**FLICKER:COUNt**

**Function**
Sets the number of measurements for the short-term flicker value Pst or queries the current setting.

**Syntax**
:FLICKER:COUNt {<NRf>}

**Example**
:FLICKER:COUNt 12

**Description**
This setting is available with normal flicker measurement (:FLICKER:MEASurement FLICKER).

For measurement of dmax caused by manual switching (:FLICKER:MEASurement DMAX), the number of measurements is fixed at 24.

---

**FLICKER:DC?**

**Function**
Sets all settings related to the relative steady-state voltage change dc or queries the current setting.

**Syntax**
:FLICKER:DC?

**Example**

---

**FLICKER:DC:LIMit**

**Function**
Sets the limit of the relative steady-state voltage change dc or queries the current setting.

**Syntax**
:FLICKER:DC:LIMit {<NRf>}

**Example**
:FLICKER:DC:LIMit 3.30

---

**FLICKER:DC[:STATe]**

**Function**
Turns ON/OFF judgment of the relative steady-state voltage change dc or queries the current setting.

**Syntax**
:FLICKER:DC[:STATe] {<Boolean>}

**Example**
:FLICKER:DC[:STATe] ON

---

**FLICKER:DISPLAY?**

**Function**
Queries all settings related to flicker measurement display.

**Syntax**
:FLICKER:DISPLAY?

**Example**
:FLICKER:DISPLAY? -> :FLICKER:DISPLAY:ELEMent 1;PERIOD 1

---

**FLICKER:DISPLAY:ELEMent**

**Function**
Sets the element to be displayed for flicker measurement display or queries the current setting.

**Syntax**
:FLICKER:DISPLAY:ELEMent {<NRf>}

**Example**
:FLICKER:DISPLAY:ELEMent 1

---

**FLICKER:DISPlay**

**Function**
Sets all settings related to the relative steady-state voltage change dc or queries the current setting.

**Syntax**
:FLICKER:DISPlay

**Example**
:FLICKER:DISPlay -> :FLICKER:DISPlay:ELEMENT 1;PERIOD 1

---

**FLICKER:DC[:STATe]**

**Function**
Sets all settings related to the relative steady-state voltage change dc or queries the current setting.

**Syntax**
:FLICKER:DC[:STATe]

**Example**
:FLICKER:DC[:STATe] ON

**Description**
You can make the same setting or query with the "DISPLAY:FLICKER:ELEMent" command.
### Communication Commands

**:FLICKer:DISPLAY:PAGE**

**Function**: Sets the page numbers to be displayed for flicker measurement display or queries the current setting.

**Syntax**: :FLICKer:DISPLAY:PAGE <NRf> :FLICKer:DISPLAY:PAGE?

<NRf> = 1 to 9 (page number)

**Example**: :FLICKER:DISPLAY:PAGE 1

**Description**: You can make the same setting or query with the "DISPLAY:FLICKer:PAGE" command.

---

**:FLICKer:DISPLAY:PERiod**

**Function**: Sets the display observation period number for flicker measurement display or queries the current setting.

**Syntax**: :FLICKer:DISPLAY:PERiod <NRf> :FLICKer:DISPLAY:PERiod?

<NRf> = 1 to 99 (observation period number)

**Example**: :FLICKER:DISPLAY:PERIOD 1

**Description**: You can make the same setting or query with the "DISPLAY:FLICKer:PERiod" command.

---

**:FLICKer:DMIN?**

**Function**: Sets all settings related to the steady-state range dmin or queries the current setting.

**Syntax**: :FLICKer:DMIN?

**Example**: :FLICKER:DMIN?

**:FLICKer:DMIN:LIMit**

**Function**: Sets the limit of the steady-state range dmin or queries the current setting.

**Syntax**: :FLICKer:DMIN:LIMit <NRf> :FLICKer:DMIN:LIMit?

<NRf> = 0.10.00 to 9.99 (limit[%])

**Example**: :FLICKER:DMIN:LIMIT 0.10

---

**:FLICKer:DMAX?**

**Function**: Sets all settings related to the maximum relative voltage change dmax or queries the current setting.

**Syntax**: :FLICKer:DMAX?

**Example**: :FLICKER:DMAX?

**:FLICKer:DMAX:LIMit**

**Function**: Sets the limit of the maximum relative voltage change dmax or queries the current setting.

**Syntax**: :FLICKer:DMAX:LIMit <NRf> :FLICKer:DMAX:LIMit?

<NRf> = 1.00 to 99.99 (limit[%])

**Example**: :FLICKER:DMAX:STATE 1;LIMIT 4.00

---

**:FLICKer:DT?**

**Function**: Sets all settings related to the relative voltage change time d(t) or queries the current setting.

**Syntax**: :FLICKer:DT?

**Example**: :FLICKER:DT?

**:FLICKer:DT:LIMit**

**Function**: Sets the limit of the relative voltage change time d(t) or queries the current setting.

**Syntax**: :FLICKer:DT:LIMit <NRf>,<NRf> :FLICKer:DT:LIMit?

1st <NRf> = 1 to 99999 (limit[ms])

2nd <NRf> = 1.00 to 99.99 (threshold level[%])

**Example**: :FLICKER:DT:LIMIT 500,3.30

---

**:FLICKer:DT[:STATe]**

**Function**: Turns ON/OFF judgment of the relative voltage change time d(t) or queries the current setting.

**Syntax**: :FLICKer:DT[:STATe] {<Boolean>}

**Example**: :FLICKER:DT:STATE ON

---

**:FLICKer:DMIN**

**Function**: Sets all settings related to the steady-state range dmin or queries the current setting.

**Syntax**: FLICKer:DMIN?

**Example**: FLICKER:DMIN? -> FLICKER:DMIN:LIMIT 0.10

---

**:FLICKer:DMAX:LIMit**

**Function**: Sets all settings related to the maximum relative voltage change dmax or queries the current setting.

**Syntax**: FLICKER:DMAX:LIMit <NRf> FLICKER:DMAX:LIMit?

<NRf> = 0.10.00 to 9.99 (limit[%])

**Example**: FLICKER:DMAX:LIMIT 0.10
6.9 FLICKer Group

**:FLICKer:EDITion**
Function: Sets the IEC standard edition for flicker measurement or queries the current setting.
Syntax: :FLICKer:EDITion {<Edition>}
<Edition> = {ED2P0|ED1P1}
Example: :FLICKer:EDITion ED2P0
Description: ED2P0: IEC61000-4-15 Ed2.0
ED1P1: IEC61000-4-15 Ed1.1

**:FLICKer:ELEMENT<x>**
Function: Sets the target element flicker measurement or queries the current setting.
Syntax: :FLICKer:ELEMENT<x> {<Boolean>}
<x> = 1 to 4 (element)
Example: :FLICKer:ELEMENT1 ON
:FLICKer:ELEMENT1? -> :FLICKer:ELEMENT1 1
Description: When turned ON (1), that element is targeted for flicker measurement.

**:FLICKer:FREQuency**
Function: Sets the target frequency for flicker measurement or queries the current setting.
Syntax: :FLICKer:FREQuency {<NRf>}
<NRf> = 50, 60 (target frequency [Hz])
Example: :FLICKer:FREQuency 50

**:FLICKer:INITialize**
Function: Initializes flicker measurement.
Syntax: :FLICKer:INITialize
Example: :FLICKer:INITialize

**:FLICKer:INTerval**
Function: Sets the time per measurement of the short-term flicker value Pst or queries the current setting.
Syntax: :FLICKer:INTerval {<NRf>,<NRf>}
<NRf> = 0,30 to 15,00 (measurement time: minutes, seconds)
Example: :FLICKer:INTerval 10,00
:FLICKer:INTerval? -> :FLICKer:INTerval 10,00
Description: This setting is available with normal flicker measurement (:FLICKer:MEASurement FLICKer). The time per measurement of dmax caused by manual switching (:FLICKer:MEASurement DMAX) is fixed at 1 (min) 00 (sec).
• The setting resolution for the measurement time is 2 seconds. When an odd number of seconds is set, it is rounded up to the next second.

**:FLICKer:JUDGe**
Function: Finishes measurement of dmax caused by manual switching and performs judgment.
Syntax: :FLICKer:JUDGe
Example: :FLICKer:JUDGe
Description: This command can be executed with normal flicker measurement (:FLICKer:MEASurement FLICKer). An error occurs if used during normal flicker measurement (:FLICKer:MEASurement DMAX).

**:FLICKer:MEASurement**
Function: Sets the flicker measurement method or queries the current setting.
Syntax: :FLICKer:MEASurement {FLICKer|DMAX}
Example: :FLICKer:MEASurement FLICKer
DMAX = Normal flicker measurement
DMAX = measurement of dmax caused by manual switching
6.9 FLICker Group

:**FLICker:**MOVe
Function Moves the observation period number for measurement of dmax caused by manual switching.
Syntax :FLICker:MOVe <NRf>
<NRf> = 1 to 24 (observation period number of destination)
Example :FLICker:MOVe 1
Description • The command re-executes measurement if dmax measurement of certain observation periods is not made correctly.
• This command can be executed with measurement of dmax caused by manual switching (:FLICker:MEASurement DMAX). An error occurs if used during normal flicker measurement (:FLICker:MEASurement FLICker).

:**FLICker:**PLT?
Function Queries all settings related to the long-term flicker value Plt.
Syntax :FLICker:PLT?
Example :FLICKER:PLT? -> :FLICKER:PLT: STATE 1;LIMIT 0.65;NVALUE 12

:**FLICker:**PLT:LIMit
Function Sets the limit of the long-term flicker value Plt or queries the current setting.
Syntax :FLICker:PLT:LIMit {<NRf>}
<NRf> = 0.10 to 99.99 (limit)
Example :FLICKER:PLT:LIMIT 0.65

:**FLICker:**PLT:NVALue
Function Sets constant N for the equation used to compute the long-term flicker value Plt or queries the current setting.
Syntax :FLICker:PLT:NVALue {<NRf>}
<NRf> = 1 to 99 (constant N)
Example :FLICKER:PLT:NVAL 12

:**FLICker:**PLT[:STATe]
Function Turns ON/OFF judgment of the long-term flicker value Plt or queries the current setting.
Syntax :FLICker:PLT[:STATe] {<Boolean>}
Example :FLICKER:PLT:STATE ON

:**FLICker:**P3D3
Function Sets the edition of IEC 61000-3-3 or queries the current setting.
Syntax :FLICker:P3D3 {<Edition>}
<Edition> = {ED3P0|ED2P0}
ED3P0:IEC61000-3-3 Ed 3.0
ED2P0:IEC61000-3-3 Ed 2.0
Example :FLICKER:P3D3 ED2P0
:FLICKER:P3D3? -> :FLICKER:P3D3 ED2P0

:**FLICker:**P4D15
Function Sets the edition of IEC 61000-4-15 or queries the current setting.
Syntax :FLICker:P4D15 {<Edition>}
<Edition> = (ED2P0|ED1P1)
ED2P0:IEC61000-4-15 Ed2.0
ED1P1:IEC61000-4-15 Ed1.1
Example :FLICKER: P4D15 ED2P0
:FLICKER:P4D15 ? -> :FLICKER:P4D15 ED2P0

Description This is the same setting or query as with the "::FLICKer:EDITion" command.

:**FLICker:**RESet
Function Resets measured flicker data.
Syntax :FLICker:RESet
Example :FLICKER:RESet
6.9 FLICKer Group

### :FLICKer:START
- **Function**: Starts flicker measurement.
- **Syntax**: :FLICKer:START
- **Example**: :FLICKER:START

### :FLICKer:STATE?
- **Function**: Queries the status of flicker measurement.
- **Syntax**: :FLICKer:STATE?
- **Example**: :FLICKER:STATE? -> RESET
- **Description**: The contents of the response are as follows:
  - RESET = Reset status
  - INITialize = Initializing
  - READY = Measurement start wait state
  - START = Measuring
  - COMPLETE = Measurement stopped, judgment results displayed

### :FLICKer:TMAX?
- **Function**: Queries all settings related to T_max.
- **Syntax**: :FLICKer:TMAX?
- **Example**: :FLICKER:TMAX? -> :FLICKER:TMAX:STATE 1; LIMIT 500,3.30
- **Description**: This is the same query as with the ":FLCK:DT?” command.

### :FLICKer:TMAX:LIMit
- **Function**: Sets the limit of the T_max or queries the current setting.
- **Syntax**: :FLICKer:TMAX:LIMit {<NRf>:LIMit {<NRf>}},<NRf>}
  - > :FLICKER:TMAX:LIMIT 500,3.30
- **Example**: :FLICKER:TMAX:LIMIT 500,3.30
- **Description**: This is the same setting or query as with the "FLICK:DT:LIMIT" command.

### :FLICKer:TMAX[:STATe]
- **Function**: Turns ON/OFF judgment of the T_max or queries the current setting.
- **Syntax**: :FLICKer:TMAX[:STAtE] {<Boolean>}
  - > :FLICKER:TMAX:STATE 1
- **Example**: :FLICKER:TMAX:STATE ON
- **Description**: This is the same setting or query as with the "FLICK:ST:STATE” command.

### :FLICKer:UN?
- **Function**: Queries all settings related to rated voltage Un.
- **Syntax**: :FLICKer:UN?
- **Example**: :FLICKER:UN? -> :FLICKER:UN: MODE AUTO; VALUE 230.00

### :FLICKer:UN:MODE
- **Function**: Sets the assignment method for rated voltage Un or queries the current setting.
- **Syntax**: :FLICKer:UN:MODE {AUTO|SET}
  - > :FLICKER:UN:MODE AUTO
- **Example**: :FLICKER:UN:MODE AUTO

### :FLICKer:UN:VALue
- **Function**: Sets the predefined value of rated voltage Un or queries the current setting.
- **Syntax**: :FLICKer:UN:VALue {<NRf>}
  - > :FLICKER:UN:VALUE 230.00
- **Example**: :FLICKER:UN:VALUE 230.00

### :FLICKer:VOLTage
- **Function**: Sets the flicker target voltage or queries the current setting.
- **Syntax**: :FLICKer:VOLTage {<NRf>}
  - > :FLICKER:VOLTAGE 230
- **Example**: :FLICKER:VOLTAGE 230

### :FLICKer:TMAX?
- **Function**: Queries all settings related to Tmax.
- **Syntax**: :FLICKer:TMAX?
- **Example**: :FLICKER:TMAX? -> :FLICKER:TMAX:STATE 1; LIMIT 500,3.30
- **Description**: This is the same query as with the "FLICK:DT?” command.

### :FLICKer:TMAX:LIMit
- **Function**: Sets the limit of the Tmax or queries the current setting.
- **Syntax**: :FLICKer:TMAX:LIMit {<NRf>:LIMit {<NRf>}},<NRf>}
  - > :FLICKER:TMAX:LIMIT 500,3.30
- **Example**: :FLICKER:TMAX:LIMIT 500,3.30
- **Description**: This is the same setting or query as with the "FLICK:DT:LIMIT" command.

### :FLICKer:TMAX[:STATe]
- **Function**: Turns ON/OFF judgment of the Tmax or queries the current setting.
- **Syntax**: :FLICKer:TMAX[:STAtE] {<Boolean>}
  - > :FLICKER:TMAX:STATE 1
- **Example**: :FLICKER:TMAX:STATE ON
- **Description**: This is the same setting or query as with the "FLICK:ST:STATE” command.
6.10 HARMonics Group

The commands in this group deal with harmonic measurement.

You can make the same settings and inquiries as when the HRM SET on the front panel is used.

However, the commands in this group are valid only when the advanced computation function (/G6 option) is installed.

:\HARMonics?
Function Queries all settings related to harmonic measurement.
Syntax :HARMonics?
Example :HARMonics?

:\HARMonics:FBANd
Function Sets the frequency bandwidth of the harmonic measurement or queries the current setting.
Syntax :HARMonics:FBANd {NORMAL|WIDE}
Example :HARMonics:FBANd NORMAL

:\HARMonics:IEC?
Function Queries all settings related to IEC harmonic measurement.
Syntax :HARMonics:IEC?
Example :HARMonics:IEC?

:\HARMonics:ORDer
Function Sets the maximum and minimum orders to be measured or queries the current setting.
Syntax :HARMonics:ORDer {<NRF>,<NRF>}
Example :HARMonics:ORDer 1,100

:\HARMonics:IEC:OBJect
Function Sets the IEC harmonic measurement target or queries the current setting.
Syntax :HARMonics:IEC:OBJect {ELEMent<x>|SIGMA|SIGMB}
Example :HARMonics:IEC:OBJect ELEMENT1

:\HARMonics:IEC:UGrouping
Function Sets the voltage grouping of the IEC harmonic measurement or queries the current setting.
Syntax :HARMonics:IEC:UGrouping {OFF|TYPE1|TYPE2}
Example :HARMonics:IEC:UGrouping OFF

:\HARMonics:IEC:IGrouping
Function Sets the current grouping of the IEC harmonic measurement or queries the current setting.
Syntax :HARMonics:IEC:IGrouping {OFF|TYPE1|TYPE2}
Example :HARMonics:IEC:IGrouping OFF

:\HARMonics:THD
Function Sets the THD measurement or queries the current setting.
Syntax :HARMonics:THD {THD TOTAL|THD DIFF}
Example :HARMonics:THD THD TOTAL

Description
- This command is valid only on models with the advanced computation function (/G6 option).
- For details on the frequency bandwidth corresponding to {NORMAL|WIDE}, see the Expansion Function User’s Manual IM WT3001E-51EN.

Description
- This command is valid only on models with the advanced computation function (/G6 option).
- For details on the grouping corresponding to {OFF|TYPE1|TYPE2}, see the Expansion Function User’s Manual IM WT3001E-51EN.

Description
- This command is valid only on models with the advanced computation function (/G6 option).
- For details on the grouping corresponding to {OFF|TYPE1|TYPE2}, see the Expansion Function User’s Manual IM WT3001E-51EN.
6.10 HARMonics Group

:HARMonics:PLLSource
Function  Sets the PLL source or queries the current setting.
Syntax    :HARMonics:PLLSource {U<x>|I<x>|EXTernal|SAMPle}
          :HARMonics:PLLSource?
          <x> = 1 to 4 (element)
EXTernal = External clock input (Ext Clk)
SAMPle = Sampling clock input (Smp Clk)
Example  :HARMONICS:PLLSOURCE U1
          :HARMONICS:PLLSOURCE? ->
          :HARMONICS:PLLSOURCE U1
Description  •  “SAMPle” is selectable only on models with the advanced computation function (/G6 option).
              •  If SAMPle is selected, it is used in wide bandwidth harmonic measurement mode. In other measurement modes, EXTernal is used.
              “EXTernal” is also returned in response to a query.

:HARMonics:PLLWarning?
Function  Queries all settings related to the warning messages of the PLL source.
Syntax    :HARMonics:PLLWarning?
Example   :HARMONICS:PLLWARNING? ->
          :HARMONICS:PLLWARNING:STATE 1
Description  This command is valid only on models with the advanced computation function (/G6 option).

:HARMonics:PLLWarning[:STATe]
Function  Sets whether to generate a warning message when the PLL source is not applied or queries the current setting.
Syntax    :HARMonics:PLLWarning [:STATe] {<Boolean>}
          :HARMONICS:PLLWARNING:STATe?
Example   :HARMONICS:PLLWARNING:STATE ON
          :HARMONICS:PLLWARNING:STATE? ->
          :HARMONICS:PLLWARNING:STATE 1
Description  •  This command is valid only on models with the advanced computation function (/G6 option).
              •  This setting is valid only in wide bandwidth harmonic measurement mode.

:HARMonics:THD
Function  Sets the equation used to calculate the THD (total harmonic distortion) or queries the current setting.
Syntax    :HARMonics:THD {TOTAL|FUNDamental}
          :HARMonics:THD?
Example   :HARMONICS:THD TOTAL
          :HARMONICS:THD? ->
          :HARMONICS:THD TOTAL
6.11 HCOPy Group

The commands in this group deal with printing to the built-in printer or network printer. You can make the same settings and inquiries as when PRINT and MENU (SHIFT+PRINT) on the front panel is used. However, the commands in this group are valid only when the built-in printer (/B5 option) or Ethernet interface (/C7 option) is installed.

:HCOPY? (Hard COPY)
Function Queries all settings related to the printing.
Syntax :HCOPY?
Example :HCOPY? -> :HCOPY:
DIRECTION PRINTER;PRINTER:
FORMAT HCOPY;HCOPY:AUTO:STATE 0;
HCOPY:COMMENT "THIS IS TEST."

:HCOPY:ABORT
Function Aborts printing or paper feeding.
Syntax :HCOPY:ABORT
Example :HCOPY:ABORT

:HCOPY:AUTO?
Function Queries all settings related to the auto print.
Syntax :HCOPY:AUTO?
Example :HCOPY:AUTO? -> :HCOPY:AUTO:
STATE 1;SYNCHRONIZE TIMER;
START 2005,1,1,0,0,0;
END 2005,1,1,1,0,0;INTERVAL 0,0,10

:HCOPY:AUTO:INTerval
Function Sets the auto print interval or queries the current setting.
Syntax :HCOPY:AUTO:INTERVAL
{<NRf>,<NRf>,<NRf>}
:HCOPY:AUTO:INTERVAL?
{<NRf>,<NRf>,<NRf>} = 0, 0, 10 to 99, 59, 59
1st <NRf> = 0 to 99 (hour)
2nd <NRf> = 0 to 59 (minute)
3rd <NRf> = 0 to 59 (second)
Example :HCOPY:AUTO:INTERVAL 0,0,10
:HCOPY:AUTO:INTERVAL? ->
:HCOPY:AUTO:INTERVAL 0,0,10

:HCOPY:AUTO:{START|END}
Function Sets the {start|stop} reservation time of the auto print or queries the current setting.
Syntax :HCOPY:AUTO:{START|END}
{<NRf>,<NRf>,<NRf>,<NRf>,<NRf>,<NRf>}
:HCOPY:AUTO:{START|END}?
{<NRf>,<NRf>,<NRf>,<NRf>,<NRf>,<NRf>} = 2001, 1, 1, 0, 0, 0 to 2099, 12, 31, 23, 59, 59
1st <NRf> = 2001 to 2099 (year)
2nd <NRf> = 1 to 12 (month)
3rd <NRf> = 1 to 31 (day)
4th <NRf> = 0 to 23 (hour)
5th <NRf> = 0 to 59 (minute)
6th <NRf> = 0 to 59 (second)
Example :HCOPY:AUTO:START 2005,1,1,0,0,0
:HCOPY:AUTO:START? ->
:HCOPY:AUTO:START 2005,1,1,0,0,0

Description This setting is valid when the synchronization mode (:HCOPY:AUTO:SYNChronize) is set to TIMER (timer synchronized printing).

:HCOPY:AUTO[:STATe]
Function Turns ON/OFF the auto print or queries the current setting.
Syntax :HCOPY:AUTO[:STATe] {<Boolean>}
:HCOPY:AUTO:STATe?
Example :HCOPY:AUTO:STATe ON
:HCOPY:AUTO:STATe? ->
:HCOPY:AUTO:STATe 1

:HCOPY:AUTO:SYNChronize
Function Sets the synchronization mode of the auto print or queries the current setting.
Syntax :HCOPY:AUTO:SYNChronize {TIMER|INTEGRate}
:HCOPY:AUTO:SYNChronize?
TIMER = Timer synchronized printing
INTEGRate = Integration synchronized printing
Example :HCOPY:AUTO:SYNChronize TIMER
:HCOPY:AUTO:SYNChronize? ->
:HCOPY:AUTO:SYNChronize TIMER
6.11 HCOPy Group

**:HCOPY:**COMMENT
Function Sets the comment displayed at the bottom of the screen or queries the current setting.
Syntax 
:HCOPY:COMMENT {<String>}
:HCOPY:COMMENT?
<String> = 25 characters or less (However, only the first 20 characters are displayed.)
Example 
:HCOPY:COMMENT "THIS IS TEST."
:HCOPY:COMMENT? -> :HCOPY:COMMENT "THIS IS TEST."

**:HCOPY:**DIRECTION
Function Sets the printer or queries the current setting.
Syntax 
:HCOPY:DIRECTION {PRINTER|NETPrint}
:HCOPY:DIRECTION?
PRINTER = Built-in printer
NETPrint = Network printer
Example 
:HCOPY:DIRECTION PRINTER
Description
- PRINTER is valid only when the built-in printer (/B5 option) is installed.
- NETPrint is valid only when the Ethernet interface (/C7 option) is installed.

**:HCOPY:**EXECute
Function Executes printing.
Syntax 
:HCOPY:EXECute
Example 
:HCOPY:EXECUTE
Description
This command is an overlap command.

**:HCOPY:**NETPrint?
Function Queries all settings related to printing on the network printer.
Syntax 
:HCOPY:NETPrint?
Example 
:HCOPY:NETPrint? -> :HCOPY:NETPRINT:FORMAT BJ,180;COLOR 0
Description
This command is valid only on models with the Ethernet interface (/C7 option).

**:HCOPY:**NETPrint:COLOR
Function Turns ON/OFF color printing on the network printer or queries the current setting.
Syntax 
:HCOPY:NETPrint:COLOR {<Boolean>}
:HCOPY:NETPrint:COLOR?
Example 
:HCOPY:NETPrint:COLOR OFF
:HCOPY:NETPrint:COLOR? -> :HCOPY:NETPrint:COLOR 0
Description
This command is valid only on models with the Ethernet interface (/C7 option).
### Communication Commands

#### :HPy:PRINTER:LIST?

<table>
<thead>
<tr>
<th>Function</th>
<th>Queries all settings related to the printing of the numeric data list on the built-in printer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>:HPy:PRINTER:LIST? -&gt; :HPy:PRINTER:LIST:INFORMATION 1;NORMAL:ELEMENT1 1;ELEMENT2 0;ELEMENT3 0;ELEMENT4 0;SIGMA 0;SIGMB 0;U 1;I 1;P 1;S 1;Q 1;LAMBDA 1;PHI 1;FU 1;FI 1;UPPEAK 0;UMPEAK 0;IPPEAK 0;IMPEAK 0;CFU 0;CFI 0;PC 0;TIME 0;WH 0;WHM 0;AH 0;AHP 0;AHM 0;WS 0;WSQ 0;ETA1 0;ETA2 0;ETA3 0;ETA4 0;F1 0;F2 0;F3 0;F4 0;F5 0;F6 0;F7 0;F8 0;F9 0;F10 0;F11 0;F12 0;F13 0;F14 0;F15 0;F16 0;F17 0;F18 0;F19 0;F20 0</td>
</tr>
<tr>
<td>Example</td>
<td>:HPy:PRINTER:LIST:INFORMATION ON -&gt; :HPy:PRINTER:LIST:INFORMATION 1</td>
</tr>
<tr>
<td>Description</td>
<td>This command is valid only when the built-in printer (/B5 option) is installed.</td>
</tr>
</tbody>
</table>

#### :HPy:PRINTER:LIST:INFORMATION

<table>
<thead>
<tr>
<th>Function</th>
<th>Sets whether to add setup parameters when printing the numeric data list on the built-in printer or queries the current setting.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>:HPy:PRINTER:LIST:INFORMATION {&lt;Boolean&gt;}</td>
</tr>
<tr>
<td>Example</td>
<td>:HPy:PRINTER:LIST:INFORMATION ON -&gt; :HPy:PRINTER:LIST:INFORMATION 1</td>
</tr>
<tr>
<td>Description</td>
<td>This command is valid only when the built-in printer (/B5 option) is installed.</td>
</tr>
</tbody>
</table>

#### :HPy:PRINTER:LIST:NORMAL?

<table>
<thead>
<tr>
<th>Function</th>
<th>Queries all settings related to the printed items of the numeric data list using the built-in printer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>:HPy:PRINTER:LIST:NORMAL? -&gt; :HPy:PRINTER:LIST:NORMAL:ELEMENT1 1;ELEMENT2 0;ELEMENT3 0;ELEMENT4 0;SIGMA 0;SIGMB 0;U 1;I 1;P 1;S 1;Q 1;LAMBDA 1;PHI 1;FU 1;FI 1;UPPEAK 0;UMPEAK 0;IPPEAK 0;IMPEAK 0;CFU 0;CFI 0;PC 0;TIME 0;WH 0;WHM 0;AH 0;AHP 0;AHM 0;WS 0;WSQ 0;ETA1 0;ETA2 0;ETA3 0;ETA4 0;F1 0;F2 0;F3 0;F4 0;F5 0;F6 0;F7 0;F8 0;F9 0;F10 0;F11 0;F12 0;F13 0;F14 0;F15 0;F16 0;F17 0;F18 0;F19 0;F20 0</td>
</tr>
<tr>
<td>Example</td>
<td>:HPy:PRINTER:LIST:NORMAL:ELEMENT1 1</td>
</tr>
<tr>
<td>Description</td>
<td>This command is valid only when the built-in printer (/B5 option) is installed.</td>
</tr>
</tbody>
</table>

#### :HPy:PRINTER:LIST[:NORMal]:ALL

<table>
<thead>
<tr>
<th>Function</th>
<th>Collectively turns ON/OFF the output of all element functions when printing the numeric data list on the built-in printer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>:HPy:PRINTER:LIST[:NORMal]:ALL {&lt;Boolean&gt;}</td>
</tr>
<tr>
<td>Example</td>
<td>:HPy:PRINTER:LIST[:NORMal]:ALL ON</td>
</tr>
<tr>
<td>Description</td>
<td>This command is valid only when the built-in printer (/B5 option) is installed.</td>
</tr>
</tbody>
</table>

#### :HPy:PRINTER:LIST[:NORMal]:{ELEMen	x|SIGMA|SIGMB}

| Function | Turns ON/OFF the output of {each element|ΣA|ΣB} when printing the numeric data list on the built-in printer. |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| Syntax   | :HPy:PRINTER:LIST[:NORMal]:{ELEMENT<x>|SIGMA|SIGMB} {<Boolean>} |
| Example  | :HPy:PRINTER:LIST:NORMAL:ELEMENT1 ON |
| Description | • This command is valid only when the built-in printer (/B5 option) is installed. |
|           | • :HPy:PRINTER:LIST[:NORMal]:SIGMA is valid on models with two or more elements. To turn the output ON, wiring unit ΣA must exist by setting the wiring system beforehand using the [:INPut]WIRing command. |
|           | • :HPy:PRINTER:LIST[:NORMal]:SIGMB is valid on models with four elements. To turn the output ON, wiring unit ΣB must exist by setting the wiring system beforehand using the [:INPut]WIRing command. |

#### :HPy:PRINTER:LIST[:NORMal]:PRESet

<table>
<thead>
<tr>
<th>Function</th>
<th>Presets the output ON/OFF pattern of the element functions when printing the numeric data list on the built-in printer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>:HPy:PRINTER:LIST[:NORMal]:PRESet{x}</td>
</tr>
<tr>
<td>Example</td>
<td>:HPy:PRINTER:LIST[:NORMal]:PRESet1</td>
</tr>
<tr>
<td>Description</td>
<td>• This command is valid only when the built-in printer (/B5 option) is installed.</td>
</tr>
<tr>
<td></td>
<td>• For details on the print pattern when preset is executed, see the Expansion Function User’s Manual IM WT3001E-51EN.</td>
</tr>
</tbody>
</table>
6.11 HCOPy Group

:HCOPy:PRINter:LIST[:NORMal][:Function]

Function
urns ON/OFF the output of the function when printing the numerical data list using the built-in printer or queries the current setting.

Syntax
:HCOPy:PRINter:LIST[:NORMal]:
<Function> {<Boolean>}
:HCOPy:PRINter:LIST[:NORMal]:
<Function>?
<Function> = {U|I|P|S|Q|...}(See the function selection list (1) of “DISPlay group” on page 6-44.)

Example
:HCOPY:PRINTER:LIST:NORMAL:U ON
:HCOPY:PRINTER:LIST:NORMAL:U? ->
:HCOPY:PRINTER:LIST:NORMAL:U 1

Description
This command is valid only when the built-in printer (/B5 option) is installed.
6.12  HOLD Group

The commands in this group deal with the hold function of output data.
You can make the same settings and inquiries as when HOLD on the front panel is used.

: HOLD
  Function  Sets the output data (display, communications, etc.) hold or queries the current setting.
  Syntax   :HOLD {<Boolean>}
            :HOLD?
  Example  :HOLD OFF
            :HOLD? -> :HOLD 0
6.13 IMAGe Group

The commands in this group deal with the saving of screen image data. You can make the same settings and inquiries as when IMAGE SAVE and MENU (SHIFT + IMAGE SAVE) on the front panel is used.

:IMAGe?
Function Queries all settings related to the saving of screen image data.
Syntax :IMAGe?
Example :IMAGe? -> :IMAGe:FORMAT TIFF; COLOR OFF; COMMENT "THIS IS TEST.";
SAVE:ANAMING 1; NAME ""

:IMAGe:ABORt
Function Aborts the saving of the screen image data.
Syntax :IMAGe:ABORt
Example :IMAGe:ABORT

:IMAGe:COLor
Function Sets the color tone of the screen image data to be saved or queries the current setting.
Syntax :IMAGe:COLor {OFF|COLOR|REVerse|GRAY}
:IMAGe:COLor?
Example :IMAGe:COLOR OFF
:IMAGe:COLOR? -> :IMAGe:COLOR OFF
Description This command is valid when the format (:IMAGe:FORMAT) is not PSCRipt.

:IMAGe:COMMent
Function Sets the comment displayed at the bottom of the screen or queries the current setting.
Syntax :IMAGe:COMMent {<String>}
Example :IMAGe:COMMent "THIS IS TEST."
:IMAGe:COMMent? -> :
:IMAGe:COMMent "THIS IS TEST."

:IMAGe:COMPression
Function Enables or disables the data compression of screen image data in BMP format or queries the current setting.
Syntax :IMAGe:COMPression {<Boolean>}
Example :IMAGe:COMPRESS ion ON
:IMAGe:COMPRESS ion? -> :IMAGe:COMPRESS ion 1
Description This command is valid when the format (:IMAGe:FORMAT) is BMP and the color tone (:IMAGe:COLor) is {COLOR|REVerse|GRAY},

:IMAGe:EXECute
Function Saves the screen image data.
Syntax :IMAGe:EXECute
Example :IMAGe:EXECUTE

:IMAGe:FORMAT
Function Sets the format of the screen image data to be saved or queries the current setting.
Syntax :IMAGe:FORMAT {TIFF|BMP|PSCRipt|PNG|JPEG}
Example :IMAGe:FORMAT TIFF
:IMAGe:FORMAT? -> :

:IMAGe:SAVE?
Function Queries all settings related to the saving of screen image data.
Syntax :IMAGe:SAVE?
Example :IMAGe:SAVE? -> :
:IMAGe:SAVE:ANAMING 1; NAME ""

:IMAGe:SAVE:ANAMing
Function Sets whether to automatically name the screen image data files to be saved or queries the current setting.
Syntax :IMAGe:SAVE:ANAMing {<Boolean>}
Example :IMAGe:SAVE:ANAMing ON
:IMAGe:SAVE:ANAMing? -> :
:IMAGe:SAVE:ANAMing 1

:IMAGe:SAVE:CDIRectory
Function Changes the save destination directory for the screen image data.
Syntax :IMAGe:CDIRectory {<Filename>}
Example :IMAGe:CDIRECTORY "IMAGE"
Description Specify ". . . " to move up to the parent directory.
**:IMAGE:SAVE:DRIVE**

**Function**: Sets the save destination drive of the screen image data.

**Syntax**: 

```
:IMAGE:SAVE:DRIVE {PCCard[,<NRf>]|
NETWork,USB[,<NRf>][,<NRf>][,<NRf>]}

PCCard = PC card drive
<NRf> = Partition (0 to 3)
NETWork = Network drive
USB = USB memory drive

1st <NRf> = ID number (address)
2nd <NRf> = Partition (0 to 3) or LUN (logical unit number: 0 to 3)
3rd <NRf> = Partition (0 to 3) when LUN is specified
```

**Example**: 

```
:IMAGE:SAVE:DRIVE PCCARD
```

**Description**: 

- If the drive does not contain partitions, omit the `<NRf>` corresponding to partitions.
- "NETWork" can be used when the Ethernet interface (/C7 option) is installed.
- "USB" can be used when the USB port (peripheral device) (/C5 option) is installed.
- The second or third `<NRf>` when USB is selected can be omitted if the drive is not partitioned or divided by LUN.

---

**:IMAGE:SAVE:NAME**

**Function**: Sets the name of the file for saving the screen image data or queries the current setting.

**Syntax**: 

```
:IMAGE:SAVE:NAME {<Filename>}
:IMAGE:SAVE:NAME?
```

**Example**: 

```
:IMAGE:SAVE:NAME "IMAGE1"
:IMAGE:SAVE:NAME? -> "IMAGE1"
```

**Description**: 

- Set the save destination drive with the 
  ":IMAGE:SAVE:DRIVE" command and the directory with the 
  ":IMAGE:SAVE:CDIRectory" command.
- Specify the file name without the extension.

---

**:IMAGE:SEND?**

**Function**: Queries the screen image data.

**Syntax**: 

```
:IMAGE:SEND?
```

**Example**: 

```
:IMAGE:SEND? -> #6(number of bytes, 6 digits)(data byte sequence)
```

**Description**: 

- The number of bytes of <Block data> is \[2 + 6 \times \text{number of data points} + 1 \text{ (delimiter)}\].
- For details on <Block data>, see page 5-7.
6.14 INPUT Group

The commands in this group deal with the measurement condition of the input element.
You can make the same settings and inquiries as when the keys in the measurement condition setup area (area enclosed in light blue), SCALING, LINE FILTER, FREQ FILTER (SHIFT+LINE FILTER), SYNC SOURCE, and NULL(SHIFT+SYNC SOURCE) on the front panel are used.

**:INPut?**
Function Queries all settings related to the input element.
Syntax :INPut?
Example :INPut? -> :INPut:CFACtor 3;
WIRing P1W2,P1W2,P1W2,P1W2;
INDependent 0;VOLTAGE:RANGE:
ELEMENT1 1.000E+03;
ELEMENT2 1.000E+03;
ELEMENT3 1.000E+03;
ELEMENT4 1.000E+03;
:INPUT:VOLTAGE:
AUTO:ELEMENT1 0;ELEMENT2 0;
ELEMENT3 0;ELEMENT4 0;:INPUT:
VOLTAGE:MODE:ELEMENT1 RMS;
ELEMENT2 RMS;ELEMENT3 RMS;
ELEMENT4 RMS;:INPUT:CURRENT:RANGE:
ELEMENT1 30.0E+00;
ELEMENT2 30.0E+00;
ELEMENT3 30.0E+00;
ELEMENT4 30.0E+00;
:INPUT:CURRENT:
AUTO:ELEMENT1 0;ELEMENT2 0;
ELEMENT3 0;ELEMENT4 0;:INPUT:
CURRENT:MODE:ELEMENT1 RMS;
ELEMENT2 RMS;ELEMENT3 RMS;
ELEMENT4 RMS;:INPUT:CURRENT:SRATIO:
ELEMENT1 10.0000;ELEMENT2 10.0000;
ELEMENT3 10.0000;ELEMENT4 10.0000;
:INPUT:FILTER:LINE:ELEMENT1 OFF;
ELEMENT2 OFF;ELEMENT3 OFF;
:INPUT:FILTER
FREQUENCY:ELEMENT1 0;ELEMENT2 0;
ELEMENT3 0;ELEMENT4 0;:INPUT:
SCALING:STATE:ELEMENT1 0;
ELEMENT2 0;ELEMENT3 0;ELEMENT4 0;:
INPUT:SCALING:VT:ELEMENT1 1.0000;
ELEMENT2 1.0000;ELEMENT3 1.0000;
ELEMENT4 1.0000;:INPUT:SCALING:CT:
ELEMENT1 1.0000;ELEMENT2 1.0000;
ELEMENT3 1.0000;ELEMENT4 1.0000;
:INPUT:SCALING:SFACTOR:
ELEMENT1 1.0000;ELEMENT2 1.0000;
ELEMENT3 1.0000;ELEMENT4 1.0000;
:INPUT:SYNCHRONIZE:ELEMENT1 11;
ELEMENT2 I2;ELEMENT3 I3;
ELEMENT4 I4;:INPUT:NuLL 0

[[:INPut]:CFACtor]
Function Sets the crest factor or queries the current setting.
Syntax [:INPut]:CFACtor {<NRF>}
[:INPut]:CFACtor?
<NRF> = 3 or 6
Example :INPut:CFACtor 3

[[:INPut]:CURRENT]
Function Queries all settings related to the current measurement.
Syntax [:INPut]:CURRENT?
Example :INPut:CURRENT? -> :INPut:CURRENT:
RANGE:ELEMENT1 30.0E+00;
ELEMENT2 30.0E+00;
ELEMENT3 30.0E+00;
ELEMENT4 30.0E+00;
:INPut:CURRENT:
AUTO:ELEMENT1 0;ELEMENT2 0;
ELEMENT3 0;ELEMENT4 0;:INPut:
CURRENT:MODE:ELEMENT1 RMS;
ELEMENT2 RMS;ELEMENT3 RMS;
ELEMENT4 RMS;:INPut:CURRENT:SRATIO:
ELEMENT1 10.0000;ELEMENT2 10.0000;
ELEMENT3 10.0000;ELEMENT4 10.0000

[[:INPut]:CURRENT:AUTO?]
Function Queries the current auto range setting (ON/OFF) of all elements.
Syntax [:INPut]:CURRENT:AUTO?
Example :INPut:CURRENT:AUTO? ->
:INPut:CURRENT:AUTO:ELEMENT1 0;
ELEMENT2 0;ELEMENT3 0;ELEMENT4 0

[[:INPut]:CURRENT:AUTO[:ALL]]
Function Collectively turns ON/OFF the current auto range of all elements.
Syntax [:INPut]:CURRENT:AUTO[:ALL] {<Boolean>}
Example :INPut:CURRENT:AUTO:ALL ON
Communication Commands

### [:INPut]:CURRent:AUTO:ELEMent<x>

**Function**
Turns ON/OFF the current auto range of the element or queries the current setting.

**Syntax**
[:INPut]:CURRent:AUTO:ELEMent<x> {<Boolean>}
[:INPut]:CURRent:AUTO:ELEMent<x>?

**Example**
:INPUT:CURRENT:AUTO:ELEMent1 ON

### [:INPut]:CURRent:AUTO:SIGMA|SIGMB

**Function**
Collectively turns ON/OFF the current auto range of all elements belonging to wiring unit {ΣA|ΣB}.

**Syntax**
[:INPut]:CURRent:AUTO:SIGMA|SIGMB {<Boolean>}

**Example**
:INPUT:CURRENT:AUTO:SIGMA ON

**Description**
- [:INPut]:CURRent:AUTO:SIGMA is valid only on models with 2 to 4 elements.
- [:INPut]:CURRent:AUTO:SIGMB is valid only on models with 4 elements.
- This command is invalid, if the wiring unit {ΣA|ΣB} does not exist as a result of the wiring system setting ([:INPut]:WIRing).

### [:INPut]:CURRent:MODE?

**Function**
Queries the current mode of all elements.

**Syntax**
[:INPut]:CURRent:MODE?

**Example**
:INPUT:CURRENT:MODE? -> :INPUT:CURRENT:MODE:ELEMENT1 RMS; ELEMENT2 RMS; ELEMENT3 RMS; ELEMENT4 RMS

### [:INPut]:CURRent:MODE[:ALL]

**Function**
Collectively sets the current mode of all elements.

**Syntax**
[:INPut]:CURRent:MODE[:ALL] {RMS|MEAN|DC|RMEAN}

**Example**
:INPUT:CURRENT:MODE:ALL RMS

### [:INPut]:CURRent:MODE:ELEMent<x>

**Function**
Sets the current mode of the element or queries the current setting.

**Syntax**
[:INPut]:CURRent:MODE:ELEMent<x> {RMS|MEAN|DC|RMEAN}
[:INPut]:CURRent:MODE:ELEMent<x>?

**Example**
:INPUT:CURRENT:MODE:ELEMent1 RMS

### [:INPut]:CURRent:MODE:{SIGMA|SIGMB}

**Function**
Collectively sets the current mode of all elements belonging to wiring unit {ΣA|ΣB}.

**Syntax**
[:INPut]:CURRent:MODE:{SIGMA|SIGMB} {<Current>|<Voltage>}

**Example**
:INPUT:CURRENT:MODE:SIGMA 30A

**Description**
- When all the input elements of this instrument are 30 A input elements
  - When the crest factor is set to 3
    - <Current> = 500 (mA), 1, 2, 5, 10, 20, 30 (A) (for direct current input)
    - <Voltage> = 50, 100, 200, 500 (mV), 1, 2, 5, 10 (V) (for external current sensor input)
  - When the crest factor is set to 6
    - <Current> = 250, 500 (mA), 1, 2.5, 5, 10, 15 (A) (for direct current input)
    - <Voltage> = 25, 50, 100, 250, 500 (mV), 1, 2.5, 5 (V) (for external current sensor input)
- When all the input elements of this instrument are 2 A input elements
  - When crest factor is set to 3
    - <Current> = 5, 10, 20, 50, 100, 200, 500 (mA), 1, 2, (A) (with direct current input)
    - <Voltage> = 50, 100, 200, 500 (mV), 1, 2, 5, 10 (V) (with external current sensor input)
  - When crest factor is set to 6
    - <Current> = 2.5, 5, 10, 25, 50, 100, 250, 500 (mA), 1 (A) (with direct current input)
    - <Voltage> = 25, 50, 100, 250, 500 (mV), 1, 2.5, 5 (V) (with external current sensor input)

**Example**
:INPUT:CURRENT:MODE:ALL 30A
:INPUT:CURRENT:RANGE:ALL 30A

**Description**
For models that have both 2 A input elements and 30 A input elements installed, the direct current input range cannot be set collectively. Error 863 will occur.
6.14 INPut Group

[:INPut]:CURRent:RANGe:ELEMent<x>  
Function: Sets the current range of the element or queries the current setting.
Syntax:

[:INPut]:CURRent:RANGe:ELEMent<x>  
{<Current>|EXTERNAL,<Voltage>})
[:INPut]:CURRent:RANGe:ELEMent<x>?  

<x> = 1 to 4 (element)  
For the 30 A input element
• When the crest factor is set to 3  
  <Current> = 500 (mA), 1, 2, 5, 10, 20, 30 (A) (for direct current input)  
  <Voltage> = 50, 100, 200, 500 (mV), 1, 2, 5, 10 (V) (for external current sensor input)  
• When the crest factor is set to 6  
  <Current> = 250, 500 (mA), 1, 2.5, 5, 10, 15 (A) (for direct current input)  
  <Voltage> = 25, 50, 100, 250, 500 (mV), 1, 2.5, 5 (V) (for external current sensor input)

For the 2 A input element
• When crest factor is set to 3  
  <Current> = 5, 10, 20, 50, 100, 200, 500 (mA), 1, 2, (A) (with direct current input)  
  <Voltage> = 50, 100, 200, 500 (mV), 1, 2, 5, 10 (V) (with external current sensor input)  
• When crest factor is set to 6  
  <Current> = 2.5, 5, 10, 25, 50, 100, 250, 500 (mA), 1 (A) (with direct current input)  
  <Voltage> = 25, 50, 100, 250, 500 (mV), 1, 2.5, 5 (V) (with external current sensor input)

Example:

:INPUT:CURRENT:RANGE:ELEMENT1 30A  
:INPUT:CURRENT:RANGE:ELEMENT1?  
:INPUT:CURRENT:RANGE:  
ELEMENT1 30.00E+00

[:INPut]:CURRent:RANGe:{SIGMA|SIGMB}  
Function: Collectively sets the current range of all elements belonging to wiring unit {ΣA|ΣB}.
Syntax:

[:INPut]:CURRent:RANGe:{SIGMA|SIGMB}  
{<Current>|EXTERNAL,<Voltage>})

For the 30 A input element
• When the crest factor is set to 3  
  <Current> = 500 (mA), 1, 2, 5, 10, 20, 30 (A) (for direct current input)  
  <Voltage> = 50, 100, 200, 500 (mV), 1, 2, 5, 10 (V) (for external current sensor input)  
• When the crest factor is set to 6  
  <Current> = 250, 500 (mA), 1, 2.5, 5, 10, 15 (A) (for direct current input)  
  <Voltage> = 25, 50, 100, 250, 500 (mV), 1, 2.5, 5 (V) (for external current sensor input)

For the 2 A input element
• When crest factor is set to 3  
  <Current> = 5, 10, 20, 50, 100, 200, 500 (mA), 1, 2, (A) (with direct current input)  
  <Voltage> = 50, 100, 200, 500 (mV), 1, 2, 5, 10 (V) (with external current sensor input)  
• When crest factor is set to 6  
  <Current> = 2.5, 5, 10, 25, 50, 100, 250, 500 (mA), 1 (A) (with direct current input)  
  <Voltage> = 25, 50, 100, 250, 500 (mV), 1, 2.5, 5 (V) (with external current sensor input)

Example:

:INPUT:CURRENT:RANGE:SIGMA 30A

Description:
• [:INPut]:CURRent:RANGe:SIGMA is valid only on models with 2 to 4 elements.
• [:INPut]:CURRent:RANGe:SIGMB is valid only on models with 4 elements.
• This command is invalid, if the wiring unit {ΣA|ΣB} does not exist as a result of the wiring system setting ([:INPut]:WIRing).
6.14 INPut Group

[:INPut]:CURRent:SRATio?
Function Queries the current sensor scaling constants of all elements.
Syntax [:INPut]:CURRent:SRATio?
Example :INPUT:CURRENT:SRATIO? -> :INPUT:CURRENT:SRATIO:ELEMENT1 10.0000; ELEMENT2 10.0000; ELEMENT3 10.0000; ELEMENT4 10.0000

[:INPut]:CURRent:SRATio[:ALL]
Function Collectively sets the current sensor scaling constants of all elements.
Syntax [:INPut]:CURRent:SRATIO[:ALL] {<NRf>}
Example :INPUT:CURRENT:SRATIO:ALL 10

[:INPut]:CURRent:SRATio:ELEMent<x>
Function Sets the current sensor scaling constant of the element or queries the current setting.
Syntax [:INPut]:CURRent:SRATio: {<NFr>}
Example :INPUT:CURRENT:SRATIO:ELEMENT1 10

[:INPut]:FILTer?
Function Queries all settings related to the filter.
Syntax [:INPut]:FILTer?
Example :INPUT:FILTER? -> :INPUT:FILTER:LINE:ELEMENT1 OFF; ELEMENT2 OFF; ELEMENT3 OFF; ELEMENT4 OFF

[:INPut]:FILTer:FREQuency?
Function Queries the frequency filter settings of all elements.
Syntax [:INPut]:FILTer:FREQuency?
Example :INPUT:FILTER:FREQUENCY? -> :INPUT:FILTER:FREQUENCY:ELEMENT1 0; ELEMENT2 0; ELEMENT3 0; ELEMENT4 0

[:INPut]:FILTer:FREQuency[:ALL]
Function Collectively sets the frequency filter of all elements.
Syntax [:INPut]:FILTer:FREQuency[:ALL] {OFF|<Frequency>}
Example :INPUT:FILTER:FREQUENCY[:ALL] OFF

[:INPut]:FILTer:FREQuency:ELEMent<x>
Function Sets the frequency filter of the element or queries the current setting.
Syntax [:INPut]:FILTer:FREQuency:ELEMent<x> {<Boolean>}
Example :INPUT:FILTER:FREQUENCY:ELEMENT1 ON

[:INPut]:FILTer:LINE?
Function Queries the line filter settings of all elements.
Syntax [:INPut]:FILTer:LINE?
Example :INPUT:FILTER:LINE? -> :INPUT:FILTER:LINE:ELEMENT1 OFF; ELEMENT2 OFF; ELEMENT3 OFF; ELEMENT4 OFF

[:INPut]:FILTer:[LINE][:ALL]
Function Collectively sets the line filters of all elements.
Syntax [:INPut]:FILTer:[LINE][:ALL] {OFF|<Frequency>}
Example :INPUT:FILTER:LINE[:ALL] OFF

[:INPut]:FILTer:[LINE]:ELEMent<x>
Function Sets the line filter of the element or queries the current setting.
Syntax [:INPut]:FILTer:[LINE]: {<Boolean>}
Example :INPUT:FILTER:LINE:ELEMENT1 OFF

[:INPut]:INDependent
Function Turns ON/OFF the independent setting of input elements or queries the current setting.
Syntax [:INPut]:INDependent {<Boolean>}
Example :INPUT:INDEPENDENT 1

Description This command is valid only on models with 2 to 4 elements.
6.14 INPut Group

[:INPut]:MODUle?
Function Queries the input element type.
Syntax [:INPut]:MODUle? {<NRf>}
<NRf> = 1 to 4 (element)
Example :INPUT:MODULE? 1 -> 30
:INPUT:MODULE? -> 30,30,30,30
Description • The response information is as follows:
   30 = (standard) power element (max. current range = 30 A)
   2 = low current range power element (max. current range = 2 A)
   0 = No input element
• If the parameter is omitted, the input element types of all elements are output in order starting with element 1.

[:INPut]:NULL
Function Turns ON/OFF the NULL function or queries the current setting.
Syntax [:INPut]:NULL {<Boolean>}
Example :INPUT:NULL ON
:INPUT:NULL? -> :INPUT:NULL 1

[:INPut]:POVer?
Function Queries the peak over information.
Syntax [:INPut]:POVer?
Example :INPUT:POVER? -> 0
Description • The peak over information of each element is mapped as shown below. A sum of decimal values of each bit is returned for the response.
   • For example, if the response is “16,” for example, peak over is occurring at U3.
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Sp: Rotating speed
Tq: Torque

[:INPut]:SCALing?
Function Queries all settings related to scaling.
Syntax [:INPut]:SCALing?
Example :INPUT:SCALing? -> :INPUT:SCALing:
 STATE:ELEMENT1 0;ELEMENT2 0;
 ELEMENT3 0;ELEMENT4 0; INPUT:SCALing:VT:ELEMENT1 1.0000;
 ELEMENT2 1.0000;ELEMENT3 1.0000;
 ELEMENT4 1.0000; INPUT:SCALing:CT:
 ELEMENT1 1.0000;ELEMENT2 1.0000;
 ELEMENT3 1.0000;ELEMENT4 1.0000;
 ELEMENT1 1.0000;ELEMENT2 1.0000;
 ELEMENT3 1.0000;ELEMENT4 1.0000

[:INPut]:SCALing:{VT|CT|SFACtor}?
Function Queries the {VT ratio|CT ratio|power factor} of all elements.
Syntax [:INPut]:SCALing:{VT|CT|SFACtor}?
Example :INPUT:SCALing:{VT|CT|SFACtor}?
[:ALL] {<NRf>}
<NRf> = 0.0001 to 99999.9999
Example :INPUT:SCALing:VT:ALL 1

[:INPut]:SCALing:{VT|CT|SFACtor}:ELEMENT<x>
Function Sets the {VT ratio|CT ratio|power factor} of the element or queries the current setting.
Syntax [:INPut]:SCALing:{VT|CT|SFACtor}:ELEMENT<x> {<NRf>}
<x> = 1 to 4 (element)
Example :INPUT:SCALing:VT:ELEMENT1 1

[:INPut]:SCALing:STATe?
Function Queries the scaling ON/OFF states of all elements.
Syntax [:INPut]:SCALing:STATe?
Example :INPUT:SCALing:STATe?
[:ALL] {<Boolean>}
Example :INPUT:SCALing:STATe:ALL OFF

[:INPut]:SCALing:STATe{ALL}
Function Collectively turns ON/OFF the scaling of all elements.
Syntax [:INPut]:SCALing:STATe{ALL} {<Boolean>}
Example :INPUT:SCALing:STATe{ALL}
[:INPut]:SCALing[:STATe]:ELEMENT<x>

Function: Turns ON/OFF the scaling of the element or queries the current setting.

Syntax: [:INPut]:SCALing[:STATe]:ELEMENT<x> {<Boolean>}
[:INPut]:SCALing[:STATe]:ELEMENT<x>?

Example: INPUT:SCALING:STATE:ELEMENT1 OFF

[:INPut]:SYNChronize?

Function: Queries the synchronization source of all elements.

Syntax: [:INPut]:SYNChronize?

Example: INPUT:SYNCHRONIZE? ->
:INPUT:SYNCHRONIZE:ELEMENT1 I1; ELEMENT2 I2; ELEMENT3 I3; ELEMENT4 I4

[:INPut]:SYNChronize[:ALL]

Function: Collectively sets the synchronization source of all elements.

Syntax: [:INPut]:SYNChronize[:ALL] {U<x>|I<x>|EXTernal|NONE}

Example: INPUT:SYNCHRONIZE:ALL I1

[:INPut]:SYNChronize:ELEMent<x>

Function: Sets the synchronization source of the element or queries the current setting.

Syntax: [:INPut]:SYNChronize:ELEMent<x> {U<x>|I<x>|EXTernal|NONE}
[:INPut]:SYNChronize:ELEMent<x>? <x> = 1 to 4 (element)

Example: INPUT:SYNCHRONIZE:ELEMENT1 I1
:INPUT:SYNCHRONIZE:ELEMENT1? -> :INPUT:SYNCHRONIZE:ELEMENT1 I1

[:INPut]:SYNChronize:{SIGMA|SIGMB}

Function: Collectively sets the synchronization source of all elements belonging to wiring unit {ΣA|ΣB}.

Syntax: [:INPut]:SYNChronize:{SIGMA|SIGMB} {U<x>|I<x>|EXTernal|NONE}

Example: INPUT:SYNCHRONIZE:SIGMA I1

[:INPut]:VOLTage?

Function: Queries all settings related to the voltage measurement.

Syntax: [:INPut]:VOLTage?

Example: :INPUT:VOLTAGE? -> :INPUT:VOLTAGE:RANGE:ELEMENT1 1.000E+03;
ELEMENT2 1.000E+03;
ELEMENT3 1.000E+03;
ELEMENT4 1.000E+03;

[:INPut]:VOLTage:AUTO?

Function: Queries the voltage auto range setting (ON/OFF) of all elements.

Syntax: [:INPut]:VOLTage:AUTO?

Example: :INPUT:VOLTAGE:AUTO? ->
:INPUT:VOLTAGE:AUTO:ELEMENT1 0;
ELEMENT2 0;
ELEMENT3 0;
ELEMENT4 0

[:INPut]:VOLTage:AUTO[:ALL]

Function: Collectively turns ON/OFF the voltage auto range of all elements.

Syntax: [:INPut]:VOLTage:AUTO[:ALL] {<Boolean>}

Example: :INPUT:VOLTAGE:AUTO:ALL ON

[:INPut]:VOLTage:AUTO:ELEMent<x>

Function: Turns ON/OFF the voltage auto range of the element or queries the current setting.

Syntax: [:INPut]:VOLTage:AUTO:ELEMent<x> {<Boolean>}
[:INPut]:VOLTage:AUTO:ELEMent<x>? <x> = 1 to 4 (element)

Example: :INPUT:VOLTAGE:AUTO:ELEMENT1 ON

[:INPut]:VOLTage:AUTO:{SIGMA|SIGMB}

Function: Collectively turns ON/OFF the voltage auto range of all elements belonging to wiring unit {ΣA|ΣB}.

Syntax: [:INPut]:VOLTage:AUTO:{SIGMA|SIGMB} {<Boolean>}

Example: :INPUT:VOLTAGE:AUTO:SIGMA I1

Description: • [:INPut]:VOLTage:AUTO:SIGMA is valid only on models with 2 to 4 elements.
• [:INPut]:VOLTage:AUTO:SIGMB is valid only on models with 4 elements.
• This command is invalid, if the wiring unit {ΣA|ΣB} does not exist as a result of the wiring system setting [:INPut]:WIRing.
6.14 INPut Group

[:INPut]:VOLTage:MODE?
Function Queries the voltage mode of all elements.
Syntax [:INPut]:VOLTage:MODE?
Example :INPUT:VOLTAGE:MODE? ->
:INPUT:VOLTAGE:MODE:ELEMENT1 RMS;
ELEMENT2 RMS;ELEMENT3 RMS;
ELEMENT4 RMS

[:INPut]:VOLTage:MODE[:ALL]
Function Collectively sets the voltage mode of all elements.
Syntax [:INPut]:VOLTage:MODE[:ALL] {RMS|MEAN|DC|RMEAN}
Example :INPUT:VOLTAGE:MODE:ALL RMS

[:INPut]:VOLTage:MODE:ELEMENT<x>
Function Sets the voltage mode of the element or queries the current setting.
Syntax [:INPut]:VOLTage:MODE:ELEMENT<x> {RMS|MEAN|DC|RMEAN}
[:INPut]:VOLTage:MODE:ELEMENT<x>?<x> = 1 to 4 (element)
Example :INPUT:VOLTAGE:MODE:ELEMENT1 RMS

[:INPut]:VOLTage:MODE:{SIGMA|SIGMB}
Function Collectively sets the voltage mode of all elements belonging to wiring unit {ΣA|ΣB}.
Syntax [:INPut]:VOLTage:MODE:{SIGMA|SIGMB} {RMS|MEAN|DC|RMEAN}
Example :INPUT:VOLTAGE:MODE:SIGMA RMS

Description • [:INPut]:VOLTage:MODE:SIGMA is valid only on models with 2 to 4 elements.
• [:INPut]:VOLTage:MODE:SIGMB is valid only on models with 2 to 4 elements.
• This command is invalid, if the wiring unit {ΣA|ΣB} does not exist as a result of the wiring system setting (:INPut):WIRing).

[:INPut]:VOLTage:RANGe? Function Queries the voltage range of all elements.
Syntax [:INPut]:VOLTage:RANGe?
Example :INPUT:VOLTAGE:RANGE? ->
:INPUT:VOLTAGE:RANGE:
ELEMENT1 1.000E+03;
ELEMENT2 1.000E+03;
ELEMENT3 1.000E+03;
ELEMENT4 1.000E+03

[:INPut]:VOLTage:RANGe[:ALL]
Function Collectively sets the voltage range of all elements.
Syntax [:INPut]:VOLTage:RANGe[:ALL] {<Voltage>}
Example :INPUT:VOLTAGE:RANGE:ALL 1000V

[:INPut]:VOLTage:RANGe:ELEMENT<x>
Function Sets the voltage range of the element or queries the current setting.
Syntax [:INPut]:VOLTage:RANGe:ELEMENT<x> {<Voltage>}
[:INPut]:VOLTage:RANGe:ELEMENT<x>?<x> = 1 to 4 (element)
Example :INPUT:VOLTAGE:RANGE:ELEMENT1 1000V
INPUT:VOLTAGE:RANGE:ELEMENT1? -> :INPUT:VOLTAGE:RANGE:ELEMENT1 1.000E+03

[:INPut]:VOLTage:RANGe:{SIGMA|SIGMB}
Function Collectively sets the voltage range of all elements belonging to wiring unit {ΣA|ΣB}.
Syntax [:INPut]:VOLTage:RANGe:{SIGMA|SIGMB} {<Voltage>}
Example :INPUT:VOLTAGE:RANGE:SIGMA 1000V

Description • [:INPut]:VOLTage:RANGe:SIGMA is valid only on models with 2 to 4 elements.
• [:INPut]:VOLTage:RANGe:SIGMB is valid only on models with 2 to 4 elements.
• This command is invalid, if the wiring unit {ΣA|ΣB} does not exist as a result of the wiring system setting (:INPut):WIRing).
[:INPut]:WIRing

**Function**
Sets the wiring system or queries the current setting.

**Syntax**

```
[:INPut]:WIRing ( { (P1W2|P1W3|P3W3|P3W4|V3A3|NONE) }, { (P1W2|P1W3|P3W3|P3W4|V3A3|NONE) }, { (P1W2|NONE) } )
[:INPut]:WIRing?
```

- P1W2 = Single-phase, two-wire system [1P2W]
- P1W3 = Single-phase, three-wire system [1P3W]
- P3W3 = Three-phase, three-wire system [3P3W]
- P3W4 = Three-phase, four-wire system [3P4W]
- V3A3 = Three-phase, three-wire (three-voltage, three-current) [3P3W(3V3A)]
- NONE = No wiring

**Example**

- **Example for a 4-element model**
  
  ```
  :INPUT:WIRING P1W2,P1W2,P1W2,P1W2
  :INPUT:WIRING? -> :INPUT:WIRING P1W2,P1W2,P1W2,P1W2
  :INPUT:WIRING P1W3,P3W3
  ```

- **Example for a 3-element model**
  
  ```
  :INPUT:WIRING P3W3,P1W2
  :INPUT:WIRING P3W4
  ```

**Description**

- Set the wiring system pattern in order starting from the element with the smallest number.
- Some wiring system patterns may not be selectable depending on the model type. For details on the wiring system patterns, see the User's Manual IM WT3001E-01EN.
- The pattern is fixed to P1W2 on the 1-element model. All other settings are not allowed.
The commands in this group deal with integration. You can make the same settings and inquiries as when INTEG on the front panel is used.

**:INTEGrate?**

Function: Queries all settings related to the integration.

Syntax: `:INTEGrate?`

Example: `:INTEGrate?` -> `:INTEGRATE:MODE NORMAL; ACAL 0; TIMER 1, 0, 0`

**:INTEGrate:ACAL**

Function: Turns ON/OFF the auto calibration or queries the current setting.

Syntax: `:INTEGrate:ACAL {<Boolean>}`

Example: `:INTEGRATE:ACAL OFF` -> `:INTEGRATE:ACAL 0`

**:INTEGrate:MODE**

Function: Sets the integration mode or queries the current setting.

Syntax: `:INTEGrate:MODE {NORMAL|CONTinuous|RNORmal|RCONtinuous}`

Example: `:INTEGRATE:MODE NORMAL` -> `:INTEGRATE:MODE NORMAL`

**:INTEGrate:RESet**

Function: Resets the integrated value.

Syntax: `:INTEGrate:RESet`

Example: `:INTEGRATE:RESet`

**:INTEGrate:RTIME?**

Function: Queries the integration start and stop times for real-time integration mode.

Syntax: `:INTEGrate:RTIME?<NRf>,<NRf>,<NRf>,<NRf>,<NRf>,<NRf>`

Example: `:INTEGRATE:RTIME: START 2005,1,1,0,0,0; END 2005,1,1,1,0,0`

**:INTEGrate:RTIME:{START|END}**

Function: Sets the integration [start]stop time for real-time integration mode or queries the current setting.

Syntax: `:INTEGrate:RTIME:{START|END} {<NRf>,<NRf>,<NRf>,<NRf>,<NRf>,<NRf>}`

Example: `:INTEGRATE:RTIME:{START|END} 2001,1,1,0,0,0 to 2099,12,31,23,59,59 1st <NRf> = 2001 to 2099 (year) 2nd <NRf> = 1 to 12 (month) 3rd <NRf> = 1 to 31 (day) 4th <NRf> = 0 to 23 (hour) 5th <NRf> = 0 to 59 (minute) 6th <NRf> = 0 to 59 (second)`

**:INTEGrate:START**

Function: Starts integration.

Syntax: `:INTEGrate:START`

Example: `:INTEGRATE:START`

**:INTEGrate:STATE?**

Function: Queries the integration condition.

Syntax: `:INTEGrate:STATE?`

Example: `:INTEGRATE:STATE?` -> `RESET`

Description: The response information is as follows:
- **RESet** = Integration reset
- **READY** = Waiting (real-time integration mode)
- **START** = Integration in progress
- **STOP** = Integration stop
- **ERRor** = Abnormal integration termination (integration overflow, power failure)
- **TIMeup** = Integration stop due to integration timer time

**:INTEGrate:STOP**

Function: Stops integration.

Syntax: `:INTEGrate:STOP`

Example: `:INTEGRATE:STOP`
:INTEGRate:TIMEr<x>

Function  Sets the integration timer time or queries the current setting.

Syntax
:INTEGRate:TIMEr \{<NRf>,<NRf>,<NRf>\}

:INTEGRate:TIMEr?
\{<NRf>,<NRf>,<NRf>\} = 0, 0, 0 to 10000, 0, 0
1st <NRf> = 0 to 10000 (hour)
2nd <NRf> = 0 to 59 (minute)
3rd <NRf> = 0 to 59 (second)

Example
:INTEGRate:TIMEr 1,0,0
:INTEGRate:TIMEr? ->
:INTEGRate:TIMEr 1,0,0
6.16 MEASURE Group

The commands in this group deal with computation.

You can make the same settings and inquiries as when MEASURE, AVG, “Frequency Meas. Item” menu of ITEM, and “Formula,” “Compensation,” and “& Measure” menus of WIRING on the front panel are used.

:MEASURE?
Function Queries all settings related to the computation.
Syntax :MEASURE? -> :MEASURE:AVERAGING:
Example

:MEASURE:FUNCTION20:
STATE 0;EXPRESSION "I(E1,ORT)";
UNIT "A"; :MEASURE:FUNCTION20:
STATE 0;EXPRESSION "I(E1,ORT)";
UNIT "A"; :MEASURE:FUNCTION20:
SYNCHRONIZE MASTER;MHOLD 0;
COMPENSATION:WIRING:ELEMENT1 OFF;
ELEMENT2 OFF;ELEMENT3 OFF;
ELEMENT4 OFF; :MEASURE:COMPENSATION:
EFFICIENCY 0

:MEASURE:AVERAGING?
Function Queries all settings related to averaging.
Syntax :MEASURE:AVERAGING?
Example :MEASURE:AVERAGING? ->
:MEASURE:AVERAGING:STATE 0;
TYPE EXPONENT;COUNT 2

:MEASURE:AVERAGING:COUNt
Function Sets the averaging coefficient or queries the current setting.
Syntax :MEASURE:AVERAGING:[COUNt {<NRf>}]
:MEASURE:AVERAGING:COUNt?
Example :MEASURE:AVERAGING:COUNt 2
:MEASURE:AVERAGING:COUNt?

Description The averaging of measurement functions of harmonic measurement (option) is valid only when TYPE = EXPonent (attenuation constant).
For details, see the User's Manual IM WT3001E-01EN.

:MEASURE:AVERAGING[:STATE]
Function Turns ON/OFF averaging or queries the current setting.
Syntax :MEASURE:AVERAGING[:STATE] {<Boolean>}
:MEASURE:AVERAGING:STATE?
Example :MEASURE:AVERAGING:STATE ON
:MEASURE:AVERAGING:STATE?
:MEASURE:AVERAGING:STATE 1
**:MEASure:AVERaging:TYPE**

**Function** Sets the averaging type or queries the current setting.

**Syntax**

`:MEASure:AVERaging:TYPE {EXPonent|LINEar}`

`:MEASure:AVERaging:TYPE?`

**Example**

`:MEASURE:AVERAGING:TYPE EXPONENT`


**Description**

The averaging of measurement functions of harmonic measurement (option) is valid only for “EXPonent.” For details, see the User’s Manual IM WT3001E-01EN.

**:MEASure:COMPensation?**

**Function** Queries all settings related to the compensation computation.

**Syntax**

`:MEASure:COMPensation?`

**Example**

`:MEASURE:COMPENSATION?` → `:MEASURE:COMPENSATION:WIRING:ELEMENT1 OFF;ELEMENT2 OFF;ELEMENT3 OFF;ELEMENT4 OFF;:MEASURE:COMPENSATION:EFFICIENCY 0`

**:MEASure:COMPensation:EFFiciency**

**Function** Turns ON/OFF the efficiency compensation or queries the current setting.

**Syntax**

`:MEASure:COMPensation:EFFiciency {<Boolean>}`

**:MEASure:COMPensation:EFFiciency?`<x> = 1 to 4 (element)

**Example**

`:MEASURE:COMPENSATION:EFFICIENCY ON`


**:MEASure:COMPensation:V3A3**

**Function** Turns ON/OFF the compensation for the two-wattmeter method or queries the current setting.

**Syntax**

`:MEASure:COMPensation:V3A3 {<Boolean>}`

**:MEASure:COMPensation:V3A3?`<x> = 1 to 4 (element)

**Example**

`:MEASURE:COMPENSATION:V3A3 ON`


**Description**

- This command is valid only on models with 3 to 4 elements.
- This command is valid when the wiring system [[:INPut]:WIRing] is set to V3A3.
### 6.16 MEASure Group

#### :MEASURE:DMeasure[:SIGMA]

**Function**
Sets the delta computation mode for wiring unit ΣA or queries the current setting.

**Syntax**
```
:MEASURE:DMeasure[:SIGMA] {OFF|DIFFerence|P3W3_V3A3|ST_DT|DT_ST}
```

**Example**
```
:MEASURE:DMeasure[:SIGMA] OFF
```

**Description**
The selections are as shown below: The wiring system of wiring unit ΣA determines the selectable modes.
- OFF = No delta computation (single-phase, two-wire system (1P2W) only)
- DIFFerence = Differential voltage, differential current (single-phase, three-wire system (1P3W), three-phase, three-wire system (3P3W) only)
- P3W3_V3A3 = 3P3W-to-3V3A conversion (single-phase, three-wire system (1P3W), three-phase, three-wire system (3P3W) only)
- ST_DT = Star-to-Delta conversion (three-phase, four-wire system (3P4W) only)
- DT_ST = Delta->Star conversion (three-phase, three-wire (three-voltage, three current) system [3P3W (3V3A)] only)

#### :MEASURE:DMeasure:SIGMB

**Function**
Sets the delta computation mode for wiring unit ΣB or queries the current setting.

**Syntax**
```
:MEASURE:DMeasure:SIGMB {OFF|DIFFerence|P3W3_V3A3|ST_DT|DT_ST}
```

**Example**
```
:MEASURE:DMeasure:SIGMB OFF
```

**Description**
The selections are the same as the ":MEASURE:DMeasure[:SIGMA]" command. The wiring system of wiring unit ΣB determines the selectable modes.

#### :MEASURE:EFFiciency?

**Function**
Queries all settings related to the efficiency computation.

**Syntax**
```
:MEASURE:EFFiciency?
```

**Example**
```
:MEASURE:EFFiciency ETA1 PB,PA
```

**Description**
- Set the numerator and then the denominator.
  - The numerator can be omitted. The numerator is set to 1 when omitted.
  - The numerator is omitted when the numerator is 1 in the response to a query.

#### :MEASURE:EFFiciency:ETA<x>

**Function**
Sets the efficiency equation or queries the current setting.

**Syntax**
```
:MEASURE:EFFiciency:ETA<x> [(OFF|P<x>|PA|PB|PM|UDEF<x>)]
```

**Example**
```
:MEASURE:EFFiciency:ETA1 PB,PA
```

**Description**
- Set the numerator and then the denominator.
  - The numerator can be omitted. The numerator is set to 1 when omitted.
  - The numerator is omitted when the numerator is 1 in the response to a query.

#### :MEASURE:EFFiciency:UDEF<x>

**Function**
Sets the user-defined parameter used in the efficiency equation or queries the current setting.

**Syntax**
```
:MEASURE:EFFiciency:UDEF<x> [(NONE|P<x>|PA|PB|PM)]
```

**Example**
```
:MEASURE:EFFiciency:UDEF1 P1,P2,P3
```

**Description**
- Set the parameters in the order parameter 1, parameter 2, parameter 3, and parameter 4.
  - Parameters 2 to 4 can be omitted. Omitted parameters are set to NONE.
  - Parameters are omitted when all of the subsequent parameters are NONE for parameters 2 to 4 in the response to a query.
### :MEASURE:FREQuency?

**Function:** Queries all settings related to frequency measurement.

**Syntax:** 
:MEASURE:FREQuency?

**Example:** 
:MEASURE:FREQuency?

**Description:** This command is invalid on models with the frequency measurement add-on (/FQ) option, because the frequency can be measured simultaneously on all input elements.

### :MEASURE:FREQuency:ITEM<x>

**Function:** Sets the frequency measurement item or queries the current setting.

**Syntax:** 
:MEASURE:FREQuency:ITEM<x> {U<x>|I<x>}
:MEASURE:FREQuency:ITEM<x>?

**Example:** 
:MEASURE:FREQUENCY:ITEM1 U1
:MEASURE:FREQUENCY:ITEM1?

**Description:** This command is invalid on models with the frequency measurement add-on (/FQ) option, because the frequency can be measured simultaneously on all input elements.

### :MEASURE:FUNCTION<x>?

**Function:** Queries all settings related to user-defined functions.

**Syntax:** 
:MEASURE:FUNCTION<x>?

**Example:** 
:MEASURE:FUNCTION1?

### :MEASURE:FUNCTION<x>:EXPRession

**Function:** Sets the equation of the user-defined function or queries the current setting.

**Syntax:** 
:MEASURE:FUNCTION<x>:EXPRession {<String>}
:MEASURE:FUNCTION<x>:EXPRession?

**Example:** 
:MEASURE:FUNCTION1:EXPRESSION "UMN(E1)";UNIT "V"

### :MEASURE:FUNCTION<x>[:STATE]

**Function:** Enables (ON) or Disables (OFF) the user-defined function or queries the current setting.

**Syntax:** 
:MEASURE:FUNCTION<x>[:STATE] {<Boolean>}
:MEASURE:FUNCTION<x>:STATE?

**Example:** 
:MEASURE:FUNCTION1:STATE ON
:MEASURE:FUNCTION1:STATE? -> :MEASURE:FUNCTION1:STATE 1

### :MEASURE:FUNCTION<x>:UNIT

**Function:** Sets the unit to be added to the computation result of the user-defined function or queries the current setting.

**Syntax:** 
:MEASURE:FUNCTION<x>:UNIT {<String>}
:MEASURE:FUNCTION<x>:UNIT?

**Example:** 
:MEASURE:FUNCTION1:UNIT "V"
:MEASURE:FUNCTION1:UNIT? -> :MEASURE:FUNCTION1:UNIT "V"

**Description:** This command does not affect the computation result.

### :MEASURE:MHOLd

**Function:** Enables (ON) or Disables (OFF) MAX HOLD function used in the user-defined function or queries the current setting.

**Syntax:** 
:MEASURE:MHOLd {<Boolean>}
:MEASURE:MHOLd?

**Example:** 
:MEASURE:MHOLD ON
:MEASURE:MHOLD? -> :MEASURE:MHOLD 1

**Description:**
- The MAX HOLD operation starts when the MAX HOLD function is specified by the user-defined function and :MEASURE:MHOLd is set to ON.
- When :MEASURE:MHOLd is set to OFF, the MAX HOLD operation terminates, and the MAX HOLD value becomes “no data.”
- If ON is specified while :MEASURE:MHOLd is ON, the MAX HOLD value is reset once, and the MAX HOLD operation starts again.
- For details on the designation of the MAX HOLD function, see the User’s Manual IM WT3001E-01EN.

### :MEASURE:PC?

**Function:** Queries all settings related to the computation of Pc (Corrected Power).

**Syntax:** 
:MEASURE:PC?

**Example:** 
:MEASURE:PC? -> :MEASURE:PC: IEC 1976;P1 0.5000;P2 0.5000
### 6.16 MEASure Group

#### :MEASure:PC:IEC

**Function**: Sets the equation used to compute Pc (Corrected Power) or queries the current setting.

**Syntax**: :MEASure:PC:IEC {<NRf>}

**Example**: :MEASure:PC:IEC 1976

**Description**: Specify the year when the equation used to calculate the Pc was issued by IEC76-1.

#### :MEASure:PC:P<x>

**Function**: Sets the parameter used to compute Pc (Corrected Power) or queries the current setting.

**Syntax**: :MEASure:PC:P<x> {<NRf>}

**Example**: :MEASure:PC:P1 0.5

**Description**: This parameter is used when the "MEASure:PC:IEC" setting is set to "1976(IEC76-1(1976))."

#### :MEASure:PHASE

**Function**: Sets the display format of the phase difference or queries the current setting.

**Syntax**: :MEASure:PHASE {<NRf>}

**Example**: :MEASure:PHASE 180

**Description**: Displays the phase using ±0 to 180° (Lead/Lag) for "180" and 0 to 360° for "360."

#### :MEASure:SAMPling

**Function**: Sets the sampling frequency or queries the current setting.

**Syntax**: :MEASure:SAMPling {AUTO|CLKA|CLKB|CLKC}

**Example**: :MEASure:SAMPling AUTO

**Description**: For details on the sampling frequency corresponding to {AUTO|CLKA|CLKB|CLKC}, see the User's Manual IM WT3001E-01EN.

#### :MEASure:SQFormula

**Function**: Sets the equation used to compute S (apparent power) and Q (reactive power) or queries the current setting.

**Syntax**: :MEASure:SQFormula {TYPE1|TYPE2|TYPE3}

**Example**: :MEASure:SQFormula TYPE1

**Description**: "TYPE3" is selectable only on models with the advanced computation function (/G6 option).
6.17 MOTor Group

The commands in this group deal with the motor evaluation function.
You can make the same settings and inquiries as when MOTOR SET (SHIFT+SCALING) on the front panel is used.
However, the commands in this group are valid only on models with the motor evaluation function (/MTR option).

:MOToR?
Function Queries all settings related to the motor evaluation function.
Syntax :MOToR?
Example :MOToR? -> :MOToR:SPeed:
TYPE ANALOG;RANGE 20.0E+00;AUTO 0;
SCALING 1.0000;UNIT "rpm";
MOToR:TPeR:LINE OFF;
MOToR:SYNCHRONIZE NONE;

:MOToR:FILTer?
Function Queries all settings related to the input filter.
Syntax :MOToR:FILTer?
Example :MOToR:FILTer? -> :MOToR:FILTer:LINE OFF

:MOToR:FILTer[:LINE]
Function Sets the line filter or queries the current setting.
Syntax :MOToR:FILTer[:LINE]
Example :MOToR:FILTer:LINE OFF

:MOToR:PM?
Function Queries all settings related to the motor output (Pm).
Syntax :MOToR:PM?
Example :MOToR:PM? -> :MOToR:PM:
SCALING 1.0000;UNIT "W"

:MOToR:PM:SCALing
Function Sets the scaling factor used for motor output computation or queries the current setting.
Syntax :MOToR:PM:SCALing <NRf>={0.0001 to 99999.9999}
Example :MOToR:PM:SCALing 1

:MOToR:PM:UNIT
Function Sets the unit to add to the motor output computation result or queries the current setting.
Syntax :MOToR:PM:UNIT <String>
Example :MOToR:PM:UNIT "W"

:MOToR:POLE
Function Sets the motor’s number of poles or queries the current setting.
Syntax :MOToR:POLE <NRf>{1 to 99}
Example :MOToR:POLE 2

:MOToR:SPeed?
Function Queries all settings related to the rotating speed.
Syntax :MOToR:SPeed?
Example :MOToR:SPeed? -> :MOToR:SPeed:
TYPE ANALOG;RANGE 20.0E+00;AUTO 0;
SCALING 1.0000;UNIT "rpm"

:MOToR:SPeed:AUTO
Function Turns ON/OFF the voltage auto range of the revolution signal input (analog input format) or queries the current setting.
Syntax :MOToR:SPeed:AUTO <Boolean>
Example :MOToR:SPeed:AUTO ON

Description This command does not affect the computation result.
6.17 MOTor Group

:MOTo:r:SPeed:PRANge
Function  Sets the range of the rotating speed (pulse input format) or queries the current setting.
Syntax  :MOTo:r:SPeed:PRANge {<NRf>,<NRf>}
:MOTo:r:SPeed:PRANge?
<NRf> = 0.0000 to 99999.9999
Example  :MOTo:r:SPeed:PRANge 10000,0
:MOTo:r:SPeed:PRANge? -> :MOTo:r:SPeed:PRANge 10000.0000,0.0000
Description
• Set the upper limit and then the lower limit.
• This command is valid when the revolution signal input type (:MOTo:r:SPeed:TYPE) is "PULSe (pulse input)."

:MOTo:r:SPeed:PULSe
Function  Sets the pulse count of the revolution signal input (pulse input) or queries the current setting.
Syntax  :MOTo:r:SPeed:PULSe {<NRf>}
:MOTo:r:SPeed:PULSe?
<NR> = 1 to 9999
Example  :MOTo:r:SPeed:PULSe 60
:MOTo:r:SPeed:PULSe? -> :MOTo:r:SPeed:PULSe 60
Description
This command is valid when the revolution signal input type (:MOTo:r:SPeed:TYPE) is "PULSe (pulse input)."

:MOTo:r:SPeed:RANge
Function  Sets the voltage range of the revolution signal input (analog input format) or queries the current setting.
Syntax  :MOTo:r:SPeed:RANge {<Voltage>}
:MOTo:r:SPeed:RANge?
<voltage> = 1, 2, 5, 10, or 20 (V)
Example  :MOTo:r:SPeed:RANge 20V
:MOTo:r:SPeed:RANge? -> :MOTo:r:SPeed:RANge 20.0E+00
Description
This command is valid when the revolution signal input type (:MOTo:r:SPeed:TYPE) is "ANALog (analog input)."

:MOTo:r:SPeed:SCALing
Function  Sets the scaling factor for rotating speed computation or queries the current setting.
Syntax  :MOTo:r:SPeed:SCALing {<NRf>}
:MOTo:r:SPeed:SCALing?
<NRf> = 0.0001 to 99999.9999
Example  :MOTo:r:SPeed:SCALing 1
:MOTo:r:SPeed:SCALing? -> :MOTo:r:SPeed:SCALing 1.0000

:MOTo:r:SPeed:TYPE
Function  Sets the input type of the revolution signal input or queries the current setting.
Syntax  :MOTo:r:SPeed:TYPE {ANALog|PULSe}
:MOTo:r:SPeed:TYPE?
Example  :MOTo:r:SPeed:TYPE ANALOG

:MOTo:r:SPeed:UNIT
Function  Sets the unit to add to the rotating speed computation result or queries the current setting.
Syntax  :MOTo:r:SPeed:UNIT {<String>}
:MOTo:r:SPeed:UNIT?
<String> = Up to 8 characters
Example  :MOTo:r:SPeed:UNIT "rpm"
Description
This command does not affect the computation result.

:MOTo:r:SSPEED(Sync SPeed source)
Function  Sets the frequency measurement source used to compute the synchronous speed (SyncSp) or queries the current setting.
Syntax  :MOTo:r:SSPEED {U<x>|I<x>}
:MOTo:r:SSPEED?
<x> = 1 to 4 (element)
Example  :MOTo:r:SSPEED I1
:MOTo:r:SSPEED? -> :MOTo:r:SSPEED I1

:MOTo:r:SYNChronize
Function  Sets the synchronization source used to compute the rotating speed and torque or queries the current setting.
Syntax  :MOTo:r:SYNChronize {U<x>|I<x>|EXTernal|NONE}
:MOTo:r:SYNChronize?
<x> = 1 to 4 (element)
EXTernal = External clock input (Ext Clk)
NONE = No synchroniza
tion source
Example  :MOTo:r:SYNChronize NONE

:MOTo:r:TORQue?
Function  Queries all settings related to the torque.
Syntax  :MOTo:r:TORQue?
Example  :MOTo:r:TORQue? -> :MOTo:r:TORQue:
TYPE ANALOG;RANGE 20.0E+00;AUTO 0;
SCALING 1.0000;UNIT "Nm"
### :MOTOR:TORQue:AUTO

**Function**
Turns ON/OFF the voltage auto range of the torque signal input (analog input format) or queries the current setting.

**Syntax**
```
:MOTOR:TORque:AUTO {<Boolean>}
```

**Example**
```
:MOTOR:TORQUE:AUTO ON
```

**Description**
This command is valid when the torque signal input type (:MOTOR:TORQue:TYPE) is "ANALog (analog input)."

### :MOTOR:TORQue:PRANge

**Function**
Sets the range of the torque (pulse input format) or queries the current setting.

**Syntax**
```
:MOTOR:TORque:PRAnge {<NRf>,<NRf>}
```

**Example**
```
:MOTOR:TORQUE:PRANGE 50,-50
```

**Description**
- Set the upper limit and then the lower limit.
- This command is valid when the torque signal input type (:MOTOR:TORQue:TYPE) is "PULSe (pulse input)."

### :MOTOR:TORQue:RANGE

**Function**
Sets the voltage range of the torque signal input (analog input format) or queries the current setting.

**Syntax**
```
:MOTOR:TORque:RANGE {<Voltage>}
```

**Example**
```
:MOTOR:TORQUE:RANGE 20V
```

**Description**
This command is valid when the torque signal input type (:MOTOR:TORQue:TYPE) is "ANALog (analog input)."

### :MOTOR:TORQue:RATE?

**Function**
Queries all settings related to the rated value of the torque signal (pulse input format).

**Syntax**
```
:MOTOR:TORque:RATE?
```

**Example**
```
:MOTOR:TORQUE:RATE? ->
UPPER 50.0000,15.00E+03;
LOWER -50.0000,5.00E+03
```

**Description**
This command does not affect the computation result.

### :MOTOR:TORQue:RATE:{UPPer|LOWer}

**Function**
Sets the rated value (upper limit|lower limit) of the torque signal (pulse input format) or queries the current setting.

**Syntax**
```
:MOTOR:TORque:RATE:{UPPer|LOWer} {<NRf>,<Frequency>}
```

**Example**
```
:MOTOR:TORQUE:RATE:UPPER 50,15kHz
```

**Description**
This command is valid when the torque signal input type (:MOTOR:TORQue:TYPE) is "PULSe (pulse input)."

### :MOTOR:TORQue:SCALing

**Function**
Sets the scaling factor used for torque computation or queries the current setting.

**Syntax**
```
:MOTOR:TORque:SCALing {<NRf>}
```

**Example**
```
:MOTOR:TORQUE:SCALING 1
```

**Description**
This command is valid when the torque signal input type (:MOTOR:TORQue:TYPE) is "ANALog (analog input)."

### :MOTOR:TORQue:TYPE

**Function**
Sets the input type of the torque signal input or queries the current setting.

**Syntax**
```
:MOTOR:TORque:TYPE {ANALog|PULSe}
```

**Example**
```
:MOTOR:TORQUE:TYPE ANALOG
```

**Description**
This command does not affect the computation result.

### :MOTOR:TORQue:UNIT

**Function**
Sets the unit to add to the torque computation result or queries the current setting.

**Syntax**
```
:MOTOR:TORque:UNIT {<String>}
```

**Example**
```
:MOTOR:TORQUE:UNIT "Nm"
```

**Description**
This command does not affect the computation result.
### 6.18 NUMerics Group

The commands in this group deal with numeric data output. There are no front panel keys that correspond to the commands in this group. The NUMERIC key on the front panel can be used to specify the same settings. The DISPlay group commands can be used to query the settings.

#### :NUMeric?

**Function**
Queries all settings related to the numeric data output.

**Syntax**
:NUMERIC?

**Example**
:NUMERIC? -> :NUMERIC:FORMAT ASCII;
NORMAL:NUMBER 15;ITEM1 U,1,TOTAL;
ITEM2 I,1,TOTAL;ITEM3 P,1,TOTAL;
ITEM4 S,1,TOTAL;ITEM5 Q,1,TOTAL;
ITEM6 LAMBDA,1,TOTAL;
ITEM7 PHI,1,TOTAL;ITEM8 FU,1;
ITEM9 FI,1;ITEM10 UPPEAK,1;
ITEM11 IPPEAK,1;ITEM12 IPPEAK,1;
ITEM13 IMPEAK,1;ITEM14 CFU,1;
ITEM15 CFI,1;
:NUMERIC:FORMAT ASCII;
NORMA:NUMBER 15;ITEM1 U,1,TOTAL;
ITEM2 I,1,TOTAL;ITEM3 P,1,TOTAL;
ITEM4 S,1,TOTAL;ITEM5 Q,1,TOTAL;
ITEM6 LAMBDA,1,TOTAL;
ITEM7 PHI,1,TOTAL;ITEM8 FU,1;
ITEM9 FI,1;ITEM10 UPPEAK,1;
ITEM11 IPPEAK,1;ITEM12 IPPEAK,1;
ITEM13 IMPEAK,1;ITEM14 CFU,1;
ITEM15 CFI,1:

#### :NUMeric:CBCycle:ITEM

**Function**
Sets the numeric list data output items (function and element) of Cycle by Cycle measurement or queries the current setting.

**Syntax**
:NUMERIC:CBCycle:ITEM {<Function>, <Element>}
:NUMERIC:CBCycle:ITEM? <Function> = {FREQ|U|I|P|S|Q|LAMBda|SPEed|TORQue|PM|PKU|PKI|PKSPeed|PKTorque}
<Element> = {<NRf>|SIGMa|SIGMB}

**Example**
:NUMERIC:CBCYCLE:ITEM U,1
:NUMERIC:CBCYCLE:ITEM? ->
:NUMERIC:CBCYCLE:ITEM U,1

**Description**
- When <Function> = {FREQ|SPEed|TORQue|PM|PKSPeed|PKTorque}, <Element> need not be specified. <Element> is omitted from the response.
- When <Function> is omitted, Element 1 is set.
- {SPEed|TORQue|PM|PKSPeed|PKTorque} is only available on models with the motor evaluation function (/MTR option).

#### :NUMeric:CBCycle:START

**Function**
Sets the output start cycle of the numeric list data output by :NUMeric:CBCycle:VALUE? or queries the current setting.

**Syntax**
:NUMERIC:CBCycle:START {<NRf>}
:NUMERIC:CBCycle:START?

**Example**
:NUMERIC:CBCYCLE:ITEM U,1
:NUMERIC:CBCYCLE:ITEM? ->
:NUMERIC:CBCYCLE:ITEM U,1

#### :NUMeric:CBCycle:END

**Function**
Sets the output end cycle of the numeric list data output by :NUMeric:CBCycle:VALUE? or queries the current setting.

**Syntax**
:NUMERIC:CBCycle:END {<NRf>}
:NUMERIC:CBCycle:END?

**Example**
:NUMERIC:CBCYCLE:ITEM U,1
:NUMERIC:CBCYCLE:ITEM? ->
:NUMERIC:CBCYCLE:ITEM U,1

#### :NUMeric:CBCycle:VALUE

**Function**
Sets the numeric list data output value (function and element) of Cycle by Cycle measurement or queries the current setting.

**Syntax**
:NUMERIC:CBCycle:VALUE {<Function>, <Element>}
:NUMERIC:CBCycle:VALUE?

**Example**
:NUMERIC:CBCYCLE:ITEM U,1
:NUMERIC:CBCYCLE:ITEM? ->
:NUMERIC:CBCYCLE:ITEM U,1

**Description**
- When <Function> = {FREQ|U|I|P|S|Q|LAMBda|SPEed|TORQue|PM|PKU|PKI|PKSPeed|PKTorque}, <Element> need not be specified. <Element> is omitted from the response.
- When <Function> is omitted, Element 1 is set.
- {SPEed|TORQue|PM|PKSPeed|PKTorque} is only available on models with the motor evaluation function (/MTR option).
### Communication Commands

#### 6.18 NUMeric Group

**:NUMeric:CBCycle:VALue?**

**Function:** Queries the numeric list data from Cycle by Cycle measurement.

**Syntax:**

`:NUMeric:CBCycle:VALue? {
\{<Function>,<Element>\}

\(<Function> = \{\text{FREQ|U|I|P|S|Q|LAMBda|SPEed|TORque|PM|PKU|PKI|PKSPeed|PKTorque}\}

\(<Element> = \{<NRf>|S\text{IGMa}|SIGMB}\)\n
(\(<NRf> = 1 \text{ to } 4\))

**Example**

- **Example when parameters specified**
  
  (For :NUMeric:CBCycle:STARt 1; END 100)
  
  :NUMERIC:CBCycle:VALUE? U,1 -> 100.001E+00,100.002E+00, 100.003E+00,100.004E+00, ...

- **Example when parameters omitted**
  
  (For :NUMeric:CBCycle:ITEM U,1)
  
  :NUMERIC:CBCycle:VALUE? -> 100.001E+00,100.002E+00, 100.003E+00,100.004E+00, ...

- **Example in which ":NUMeric:FORMat" is set to FLOat.**
  
  :NUMERIC:CBCycle:VALUE? -> #6 (number of bytes, six digits) (data byte sequence)

**Description**

- Numeric list data consists of up to 3000 numeric data from ":NUMeric:CBCycle:STARt" to ":NUMeric:CBCycle:END."
- If a parameters are specified, the numeric list data of that item is output. For a description of the contents of <Function> and <Element>, see the description for ":NUMeric:CBCycle:ITEM".
- If the parameter is omitted, the numeric list data for the items specified in ":NUMeric:CBCycle:ITEM" is output.
- For the format of the individual numeric data that are output, see “Numeric Data Format” at the end of this group (page 6-97).

**:NUMeric:FLICker?**

**Function:** Queries all settings related to output of numeric data from flicker measurement.

**Syntax:** `:NUMeric:FLICker?`

**Example:**

`:NUMERIC:FLICKER? -> :NUMERIC:FLICKER:FUNCTION:NUMBER 8; ITEM1 TIME;ITEM2 UN,1;ITEM3 FU,1; ITEM4 DC,1,CURRENT;ITEM5 DMAX,1, CURRENT;ITEM6 DT,1,CURRENT; ITEM7 PST,1,CURRENT;ITEM8 PLT,1; : NUMERIC:FLICKER:INFORMATION:NUMBER 7;ITEM1 JTOtal,TOTAL; ITEM2 JDC,1,ALL;ITEM3 JDMAX,1,ALL; ITEM4 JDT,1,ALL;ITEM5 JPST,1,ALL; ITEM6 JPLT,1;ITEM7 JTOTAL,1`

**Description**

- **Only available with the flicker measurement function (FL option).**

**:NUMeric:FLICker:COUNT?**

**Function:** Queries the number of the measurement within the specified observation period at which flicker measurement stops.

**Syntax:** `:NUMeric:FLICker:COUNT?`

**Example:**

`:NUMERIC:FLICKER:COUNT? -> 0`

**Description**

- **Only available with the flicker measurement function (FL option).**
- Returns the number displayed on the right of the Count bar graph in the flicker measurement display screen.

**:NUMeric:FLICker:FUNCTION?**

**Function:** Queries all settings related to output of measured flicker data (variable format).

**Syntax:** `:NUMeric:FLICker:FUNCTION?`

**Example:**

`:NUMERIC:FLICKER:FUNCTION? -> :NUMERIC:FLICKER:FUNCTION:NUMBER 8; ITEM1 TIME;ITEM2 UN,1;ITEM3 FU,1; ITEM4 DC,1,CURRENT;ITEM5 DMAX,1, CURRENT;ITEM6 DT,1,CURRENT; ITEM7 PST,1,CURRENT;ITEM8 PLT,1`

**Description**

- **Only available with the flicker measurement function (FL option).**
- For the values of ":NUMeric:FLICker:FUNCTION:ITEM<x>“, only the number of numeric data output items specified in ":NUMeric:FLICker:FUNCTION:NUMber“ are output.
6.18 NUMeric Group

:NUMeric:FLICKer:FUNCTION:CLEar
Function:
Clears (sets to NONE) the output items of measured flicker data (variable format).

Syntax:
:NUMeric:FLICKer:FUNCTION:
CLEar {ALL|<NRf>[]}]
ALL = Clears all items
1st <NRf> = 1 to 32 (item number to start clearing)
2nd <NRf> = 1 to 32 (item number to stop clearing)

Example:
:NUMERIC:FLICKER:FUNCTION:CLEAR ALL

Description:
• Only available with the flicker measurement function (/FL option).
• If the 2nd <NRf> is omitted, the output items from the start clear number to the last item (32) are cleared.

:NUMeric:FLICKer:FUNCTION:DELETE
Function:
Deletes the output items of measured flicker data (variable format).

Syntax:
:NUMeric:FLICKer:FUNCTION:
DELETE {<NRf>[]}]
1st <NRf> = 1 to 32 (item number to start deleting)
2nd <NRf> = 1 to 32 (item number to stop deleting)

Example:
:NUMERIC:FLICKER:FUNCTION:DELETE 1
(Deletes ITEM1 and shifts ITEM2 and subsequent items forward)
:NUMERIC:FLICKER:FUNCTION:
DELETE 1,3
(Deletes ITEM1 to 3 and shifts ITEM4 and subsequent items forward)

Description:
• Only available with the flicker measurement function (/FL option).
• Output items subsequent to the deleted output items are shifted in order into the deleted items’ position, and NONE is set in the open positions on the end.
• If the 2nd <NRf> is omitted, only the output item of the start delete number is deleted.

:NUMeric:FLICKer:FUNCTION:ITEM<x>
Function:
Sets output items (function, element, and observation period) of measured flicker data (variable format) or queries the current setting.

Syntax:
:NUMeric:FLICKer:FUNCTION:
ITEM<x> {NONE|<Function>,
<Element>[],<Period>[]}]
<x> = 1 to 32 (item number)
NONE = No output items
<Function> = {TIME|UN|FU|DC|DMAX|DT|TMAX|PST|PLT}
<Element> = {<NRf>} | (<NRf> = 1 to 4)
<Period> = {CURRent|<NRf>|ALL}
(<NRf> = 1 to 99)

Example:
:NUMERIC:FLICKER:FUNCTION:
ITEM1 DC,1,1
:NUMERIC:FLICKER:FUNCTION:ITEM1? ->
:NUMERIC:FLICKER:FUNCTION:
ITEM1 DC,1,1

Description:
• Only available with the flicker measurement function (/FL option).
• The contents that are output for each of the selections for <Function> are as follows:

<table>
<thead>
<tr>
<th>&lt;Function&gt;</th>
<th>&lt;Element&gt;</th>
<th>&lt;Period&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>Elapsed measurement time [sec]</td>
<td>Not required</td>
</tr>
<tr>
<td>UN</td>
<td>RMS voltage (rated voltage) Un[V]</td>
<td>Required</td>
</tr>
<tr>
<td>FU</td>
<td>Voltage frequency Freq[Hz]</td>
<td>Required</td>
</tr>
<tr>
<td>DC</td>
<td>Relative steady-state voltage change dc[%]</td>
<td>Required</td>
</tr>
<tr>
<td>DMAX</td>
<td>Maximum relative voltage change dmax[%]</td>
<td>Required</td>
</tr>
<tr>
<td>DT</td>
<td>Relative voltage change time d(t)[ms]</td>
<td>Required</td>
</tr>
<tr>
<td>TMAX</td>
<td>Tmax[ms]</td>
<td>Required</td>
</tr>
<tr>
<td>PST</td>
<td>Short-term flicker value Pst</td>
<td>Required</td>
</tr>
<tr>
<td>PLT</td>
<td>Long-term flicker value Plt</td>
<td>Required</td>
</tr>
</tbody>
</table>

• When <Element> is omitted, Element 1 is set.
• The contents of the selections for <Period> are as follows. If <Period> is omitted, CURRCurrent is set.
  CURRCurrent: The observation period currently being measured (rows of the numeric list marked with an asterisk (*) in the flicker measurement display screen). When in measurement complete status, same as ALL.
  ALL: Overall observation period (Result row of the numeric list in the flicker measurement display screen).
  <NRf> = 1 to 99 Specified observation period.
• <Element> or <Period> is omitted from the response to the output items in the table above for which specification of <Element> or <Period> is not required.
• TMAX, a new function defined in IEC61000-3-3 Ed3.0, can be used. TMAX represents the same content as the conventional DT function, and the measured data that is output is also the same.


6.18 NUMeric Group

• For IEC61000-3-3 Ed3.0, “TMAX” is returned as a response to a setting query.

**:NUMeric:FLICKer:FUNCTION:NUMBER**

Function Sets the number of measured flicker data output by "**:NUMeric:FLICKer:FUNCTION:VALUE?" or queries the current setting.

Syntax

**:NUMeric:FLICKer:FUNCTION:NUMBER** {<NRf>|ALL}

**:NUMeric:FLICKer:FUNCTION:NUMBER?**

Example

**:NUMERIC:FLICKER:FUNCTION:NUMBER** 8


Description

• Only available with the flicker measurement function (/FL option).

• If parameters are omitted from "**:NUMeric:FLICKer:FUNCTION:VALUE?" numeric data from 1 to (specified value) is output in order.

• The initial setting for the number of numeric data is 8.

**:NUMeric:FLICKer:FUNCTION:VALUE?**

Function Queries the measured flicker data (variable format).

Syntax

**:NUMeric:FLICKer:FUNCTION:VALUE?** {<NRf>}

**:NUMeric:FLICKer:FUNCTION:VALUE?** <NRf> = 1 to 32 (item number)

Example

**:NUMERIC:FLICKER:FUNCTION:VALUE? 4 -> 1.52E+00**

**:NUMERIC:FLICKER:FUNCTION:VALUE?** 4 -> 1.52E+00

**:NUMERIC:FLICKER:FUNCTION:VALUE? 4 ->** #4 (number of bytes, four digits) (data byte sequence)

Description

• Only available with the flicker measurement function (FL option).

• When <NRf> is specified, only the numeric data for that item is output.

• If <NRf> is omitted, numeric data from the item number in "**:NUMeric:FLICKer:FUNCTION:NUMBER" is output in order.

• The format of individual numeric data that is output is as follows:

  (1) Data when normal

  • Elapsed measurement time (TIME)

  ASCII: <NR1> format in units of seconds

  (Example: for 1 hour (1:00:00), 3600)

  FLOA T: IEEE single-precision floating point (4-byte) format in units of seconds

  (Example: for 1 hour (1:00:00), 0x45610000)

  • No items (NONE)

  ASCII: “NAN” (Not A Number)

  FLOA T: 0x7E951BEE (9.91E+37)

  • Other than above

  ASCII: <NR3> format (mantissa, 5 digits; exponent, 2 digits, Example :229.87E+00)

  FLOA T: IEEE single-precision floating point (4-byte) format

  (2) Error Data

  • Data does not exist (display: “-----”)

  ASCII: “NAN” (Not A Number)

  FLOA T: 0x7E951BEE (9.91E+37)

  • Overrange (display: “-O-L-”)

  • Overflow (display: “-O-F-”)

  • Data over (display: “Error”)

  • No steady-state condition (display: “Undef”)

  ASCII: “INF” (INFinity)

  FLOA T: 0x7E94F56A (9.9E+37)

**:NUMeric:FLICKer:INFORMATION?**

Function Queries all settings related to output of flicker judgment results (variable format).

Syntax

**:NUMeric:FLICKer:INFORMATION?**

Example

**:NUMERIC:FLICKER:INFORMATION? ->** :NUMERIC:FLICKER:INFORMATION:NUMBER 7;ITEM1 JTOAL,TOTAL;ITEM2 JDC,1,ALL;ITEM3 JDMAX,1,ALL;ITEM4 JDT,1,ALL;ITEM5 JPST,1,ALL;ITEM6 JPLT,1;ITEM7 JTOTAL,1

Description

• Only available with the flicker measurement function (FL option).

• For the values of "**:NUMeric:FLICKer:INFORMATION:ITEM<x>" only the number of numeric data output items specified in "**:NUMeric:FLICKer:FUNCTION:INFORMATION:NUMBER" are output.
6.18 NUMeric Group

:NUMeric:FLICker:INFo:CLEar

Function Clears (sets to NONE) the output items of flicker judgment results (variable format).

Syntax :NUMeric:FLICker:INFo:CLEar {ALL|<NRf>[,,<NRf>]}  
ALL = Clears all items  
1st <NRf> = 1 to 32 (item number to start clearing)  
2nd <NRf> = 1 to 32 (item number to stop clearing)

Example :NUMERIC:FLICKER:INFORMATION:CLEAR ALL

Description • Only available with the flicker measurement function (/FL option).
• If the 2nd <NRf> is omitted, the output items from the start clear number to the last item (32) are cleared.

:NUMeric:FLICker:INFo:DELet

Function Deletes the output items of flicker judgment results (variable format).

Syntax :NUMeric:FLICker:INFo:DELet {<NRf>[,,<NRf>]}  
1st <NRf> = 1 to 32 (item number to start deleting)  
2nd <NRf> = 1 to 32 (item number to stop deleting)

Example :NUMERIC:FLICKER:INFORMATION:DELETE 1,3 (Deletes ITEM13 and shifts ITEM4 and subsequent items forward)

Description • Only available with the flicker measurement function (/FL option).
• Output items subsequent to the deleted output items are shifted in order into the deleted items’ position, and NONE is set in the open positions on the end.
• If the 2nd <NRf> is omitted, only the output item of the start delete number is deleted.

:NUMeric:FLICker:INFo:ITEM<x>

Function Sets the output items (function, element, and observation period) of flicker judgment results (variable format) or queries the current setting.

Syntax :NUMeric:FLICker:INFo:ITEM<x> {NONE|<Function>,<Element>,<Period>}  
<x> = 1 to 32 (item number)

Example :NUMERIC:FLICKER:INFORMATION:ITEM1 JDC,1,1

Description • Only available with the flicker measurement function (/FL option).
• The contents that are output for each of the selections for <Function> are as follows:

<table>
<thead>
<tr>
<th>&lt;Function&gt;</th>
<th>&lt;Element&gt;</th>
<th>&lt;Period&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>JTOTal</td>
<td>Required</td>
<td>No required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(the judgment results displayed under [Element# Judgment:] in the upper right part of the screen)</td>
</tr>
<tr>
<td>JDC</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>JDMAX</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>JDT</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>JMAX</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>JPST</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>JPLT</td>
<td>Required</td>
<td>Not required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Tmax for IEC 61000-3-3 Edition 3.0, d(t) for IEC 61000-3-3 Edition 2.0.)</td>
</tr>
</tbody>
</table>
The contents of the selections for <Element> are as follows. When <Element> is omitted, Element 1 is set.

TOTaI The overall judgment result for all measured elements is only available when <Function> = JTOTaI (judgment result displayed under [Total Judgment:] in the upper right part of the screen)

<NRF> = 1 to 4 specified elements

The contents of the selections for <Period> are as follows.

If <Period> is omitted, ALL is set.

ALL Overall observation period (Result row of the numeric list in the flicker measurement display screen)

<NRF> = 1 to 99 specified observation periods

If <Period> is omitted from the response to output items in the table above for which specification of <Period> is not required.

JTMAX, a new function defined in IEC61000-3-3 Ed3.0, can be used. JTMAX represents the same content as the conventional DT function, and the judgment results that is output is also the same.

For IEC61000-3-3 Ed3.0, “JTMAX” is returned as a response to setting query.

---

**:NUMeric:FLICKer:INFORMATION:NUMber**

**Function**: Sets the number of flicker judgment results output by “:NUMeric:FLICKer:INFORMATION:VALue?” or queries the current setting.

**Syntax**: 

`:NUMeric:FLICKer:INFORMATION:NUMber {<NRF>|ALL}
`:NUMeric:FLICKer:INFORMATION:NUMber?

<NRF> = 1 to 32(ALL)

**Example**: 

`:NUMERIC:FLICKER:INFORMATION:NUMBER 7

**Description**: 

- Only available with the flicker measurement function (/FL option).
- If parameters are omitted from “:NUMeric:FLICKer:INFORMATION:VALue?”, judgment results from 1 to (specified value) are output in order.
- The initial setting for the number of judgment results is 7.

---

**:NUMeric:FLICKer:INFORMATION:VALue?**

**Function**: Queries the judgment results (variable format).

**Syntax**: 

`:NUMeric:FLICKer:INFORMATION:VALue? {<NRF>} 
`:NUMeric:FLICKer:INFORMATION:VALue? <NRF> = 1 to 32 (item number)

**Example**: 

- Example when <NRF> is specified
  
  `:NUMERIC:FLICKER:INFORMATION:VALUE? 1 -> 0`

- Example when <NRF> is omitted
  
  `:NUMERIC:FLICKER:INFORMATION:VALUE? -> 0,0,0,0,0,0,0`

- Example in which “:NUMeric:FORMAT” is set to “FLOAT”.
  
  `:NUMERIC:FLICKER:INFORMATION:VALUE? -> #4 (number of bytes, four digits) (data byte sequence)

**Description**: 

- Only available with the flicker measurement function (/FL option).
- When <NRF> is specified, only the judgment results for that item is output.
- If <NRF> is omitted, judgment results from the item number in “:NUMeric:FLICKer:INFORMATION:NUMber” is output in order.
- The format of individual judgment results that are output is as follows:
  
  - Judgment result (JTOTaI, JDC, JDMAX, JDT, JPST, JPLT)

---

<table>
<thead>
<tr>
<th>Pass</th>
<th>Fail</th>
<th>Error</th>
<th>-----</th>
<th>(space)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>&quot;-1&quot;</td>
<td>&quot;-2&quot;</td>
<td>&quot;1&quot;</td>
<td>&quot;1&quot;</td>
</tr>
<tr>
<td>0x00000000 (0)</td>
<td>0xBF800000 (-1)</td>
<td>0xC0000000 (-2)</td>
<td>0x3F800000 (1)</td>
<td>0x3F800000 (1)</td>
</tr>
</tbody>
</table>

- No items (NONE)

ASCII: “NAN” (Not A Number)

FLOAT: 0x7E951BEE (9.91E+37)
### 6.18 NUMeric Group

**:NUMeric:FLICKer:JUDGement?**

**Function**: Queries the judgment results (fixed format).

**Syntax**:

```
:NUMeric:FLICKer:JUDGement? [<NRf>| ALL]
```

- `<NRf>` = 1 to 9 (observation period number)
- ALL = Overall observation period (Result)

**Example**

- Example in which ":NUMeric:FORMat" is set to "ASCii"
  
  ```
  :NUMERIC:FLICKER:JUDGEMENT? 1 -> 0,0,0,0,-1,-1,-1,-1,-1
  ```

- Example in which :NUMeric:FORMat is set to "FLOat"
  
  ```
  :NUMERIC:FLICKER:JUDGEMENT? -> #4 (number of bytes, four digits) (data byte sequence)
  ```

**Description**

- Only available with the flicker measurement function (/FL option).
- The contents and order of the judgment results that are output are in the fixed format below.
- To modify the output contents and order, use the ":NUMeric:FLICKer:INFOrmation" commands.
- Numbers refer to elements. (ALL) is the overall judgment result for all measured elements.
  - JTOTAL(ALL) → JDC1 → JDMAX1 → JDT1* → JPST1 → JPLT1 → JTOTAL1
  - JDC2 → JDMAX2 → JDT2* → JPST2 → JPLT2 → JTOTAL2
  - JDC3 → JDMAX3 → JDT3* → JPST3 → JPLT3 → JTOTAL3
  - JDC4 → JDMAX4 → JDT4* → JPST4 → JPLT4 → JTOTAL4
  - (output only for 2 to 4 element models)

- JTMAX1, JTMAX2, JTMAX3, or JTMAX4 for IEC 61000-3-3 Edition 3.0, JDT1, JDT2, JDT3, or JDT4 for IEC 61000-3-3 Edition 2.0.

- If parameters are specified, the judgment results of the specified observation period are output.
- If parameters are omitted, the judgment result of the overall observation period (Result) is output (the same output occurs as when the ALL parameters are specified).
- For the format of individual numeric data, see the description for ":NUMeric:FLICKer:INFOrmation:VALue?".

---

**:NUMeric:FLICKer:PERiod?**

**Function**: Queries the observation period number currently being measured during flicker measurement.

**Syntax**:

```
:NUMeric:FLICKer:PERiod?
```

**Example**

```plaintext
```

**Description**

- Only available with the flicker measurement function (/FL option).
- Returns the observation period numbers marked with an asterisk (*) in the No. column of the numeric list in the flicker measurement screen. If no asterisks are displayed (such as after a reset or during initialization), 0 is returned.
**NUMeric:FLICKer:VALue?**

**Function**
Queries the measured flicker data (fixed format).

**Syntax**
```
:NUMeric:FLICKer:VALue? {<NRf>|ALL}
```

- `<NRf>` = 1 to 99 (observation period number)
- `ALL` = Overall observation period (Result)

**Example**
- Example in which "NUMeric:FORMat" is set to "ASCii".
  ```
  :NUMERIC:FLICKER:VALUE? 1 -> 600,229.75E+00,50.000E+00,1.52E+00,1.56E+00,3E+00,...
  ```
- Example in which "NUMeric:FORMat" is set to "FLoat".
  ```
  :NUMERIC:FLICKER:VALUE? -> #4 (number of bytes, four digits) (data byte sequence)
  ```

**Description**
- Only available with the flicker measurement function (/FL option).
- The contents and order of the numeric data that are output are in the following fixed format. To modify the output contents and order, use the "NUMeric:FLICKer:FUNCTION" commands.

**Output contents and order of numeric data**
For function names, see the description for "NUMeric:FLICKer:FUNCTION:ITEM<x>".
Numbers refer to elements.

- `TIME` → `UN1` → `FU1` → `DC1` → `DMAX1` → `DT1*` → `PST1` → `PLT1` → `UN2` → `FU2` → `DC2` → `DMAX2` → `DT2` → `PST2` → `PLT2` (output only for 2 to 4 element models)
- `UN3` → `FU3` → `DC3` → `DMAX3` → `DT3*` → `PST3` → `PLT3` (output only for 3 to 4 element models)
- `UN4` → `FU4` → `DC4` → `DMAX4` → `DT4*` → `PST4` → `PLT4` (output only for 4 element models)

* `TMAX1`, `TMAX2`, `TMAX3`, or `TMAX4` for IEC 61000-3-3 Edition 3.0, `DT1`, `DT2`, `DT3`, or `DT4` for IEC 61000-3-3 Edition 2.0.
- If the parameters are specified, the numeric data of the specified observation period is output.
- If the parameters are omitted, the measured data of the current observation period being measured is output. When in measurement complete status, the measured data of the overall observation period (Result) is output.
- For the format of individual numeric data, see the description for "NUMeric:FLICKer:FUNCTION:ITEM<x>".

**NUMeric:FORMat**

**Function**
Sets the format of the numeric data that is transmitted by ":NUMeric[:NORMal]:VALue?" or ":NUMeric:LIST:VALue?" or queries the current setting.

**Syntax**
```
:NUMeric:FORMat {ASCii|FLoat}
```

**Example**
- `NUMERIC:FORMAT ASCII`
### :NUMeric:HOLD

**Function**
Sets whether to hold (ON) or release (OFF) all the numeric data or queries the current setting.

**Syntax**
:NUMeric:HOLD {<Boolean>}

**Example**
:NUMERIC:HOLD ON
:NUMERIC:HOLD? -> :NUMERIC:HOLD 1

**Description**
- If :NUMeric:HOLD is turned ON before executing ":NUMeric[:NORMal]:VALue?" or ":NUMeric:LIST:VALue?", all the numeric data at that point can be held internally.
- As long as :NUMeric:HOLD is ON, the numeric data is held even when the numeric data on the screen is updated.
- For example, if you wish to retrieve various types of numeric data of each element at the same point, do the following:
  - :NUMeric:HOLD ON
  - :NUMeric[:NORMal]:ITEM1 U,1,TOTAL; ITEM2 I,1,TOTAL,... (set the numeric data items of element 1)
  - :NUMeric[:NORMal]:VALue?
  - (Receive the numeric data of element 1)
  - :NUMeric[:NORMal]:ITEM1 U,2,TOTAL; ITEM2 I,2,TOTAL,... (set the numeric data items of element 2)
  - :NUMeric[:NORMal]:VALue?
  - (Receive the numeric data of element 2)
  - ...(omitted)...
  - :NUMeric[:NORMal]:ITEM1 U,4,TOTAL; ITEM2 I,4,TOTAL,... (set the numeric data items of element 4)
  - :NUMeric[:NORMal]:VALue?
  - (Receive the numeric data of element 4)
  - :NUMeric:HOLD OFF

- If ON is specified when :NUMeric:HOLD is ON, the numeric data is cleared once, and the most recent numeric data is held internally. This method can be used when retrieving numeric data continuously (no need to set :NUMeric:HOLD to OFF each time).

### :NUMeric:LIST?

**Function**
Queries all settings related to the numeric list data output of harmonic measurement.

**Syntax**
:NUMeric:LIST?

**Example**
:NUMERIC:LIST? ->
:NUMERIC:LIST:NUMBER 1;
ORDER 100;SELECT ALL;ITEM1 U,1

**Description**
- This command is valid only on models with the advanced computation function (/G6 option).
- For the values of ":NUMeric:LIST:ITEM<x>," the numeric list data output items for the amount specified by ":NUMeric:LIST:NUMBER" are output.

### :NUMeric:LIST:CLEar

**Function**
Clears the output items of the numeric list data of harmonic measurement (set to "NONE").

**Syntax**
:NUMeric:LIST:CLEar {ALL|[<NRf>],[<NRf>]} ALL = Clear all items
1st <NRf> = 1 to 64 (Item number to start clearing)
2nd <NRf> = 1 to 64 (Item number to end clearing)

**Example**
:NUMERIC:LIST:CLEA R ALL

**Description**
- This command is valid only on models with the advanced computation function (/G6 option).
- If the 2nd <NRf> is omitted, the output items from the start clear number to the last item (64) are cleared.
### Communication Commands

#### :NUMeric:LIST:DElete

**Function:** Deletes the output items of the numeric list data of harmonic measurement.

**Syntax:**

```
:NUMeric:LIST:DELe {<NRf>[, <NRf>]}  
```

*1st <NRf> = 1 to 64 (Item number to start deleting)*  
*2nd <NRf> = 1 to 64 (Item number to end deleting)*

**Example:**

```
:NUMERIC:LIST:CLEAR 1 (Deletes ITEM1 and shift ITEM2 and subsequent items forward)
:NUMERIC:LIST:CLEAR 1,3 (Deletes ITEM1 to ITEM3 and shift ITEM4 and subsequent items forward)
```

**Description**

- This command is valid only on models with the advanced computation function (/G6 option).
- The subsequent output items fill the positions of deleted output items, and empty sections at the end are set to “NONE.”
- If the 2nd <NR> is omitted, only the output item of the delete start number is deleted.

#### :NUMeric:LIST:ITEM<x>

**Function:** Sets the output items (function elements) of the numeric list data of harmonic measurement or queries the current setting.

**Syntax:**

```
:NUMeric:LIST:ITEM<x> {NONE|<Function>,<Element>}  
:NUMeric:LIST:ITEM<x>?  
```

*<x> = 1 to 64 (item number)*  
*NONE = No output item*

*<Function> = {U|I|P|S|Q|LAMBda|PHI|PHLU|PHII|RS|XS|RP|XP|UHDF|IHDF}*

*<Element> = {<NRf>|SIGMa|SIGMB} (<NRf> = 1 to 4)*

**Example:**

```
:NUMERIC:LIST:ITEM1 U,1  
:NUMERIC:LIST:ITEM1? ->  
:NUMERIC:LIST:ITEM1 U,1
```

**Description**

- This command is valid only on models with the advanced computation function (/G6 option).
**6.18 NUMeric Group**

`:NUMeric:LIST:SELe
Function    Sets the output component of the numeric list data of harmonic measurement or queries the current setting.
Syntax      :NUMeric:LIST:SELe {EVEN|ODD|ALL} :NUMeric:LIST:SELe?
Example     :NUMERIC:LIST:SELECT ALL :NUMERIC:LIST:SELECT? ->
Description • This command is valid only on models with the advanced computation function (/G6 option).
• The selections are as shown below:
  EVEN = Outputs the components of TOTal, DC, and even order harmonic
  ODD = Outputs the components of TOTal, DC, and odd order harmonic
  ALL = Outputs all components

`:NUMeric:LIST:VALu
Function    Queries the numeric list data of harmonic measurement.
Syntax      :NUMeric:LIST:VALu? {<NRf>}
Example     <NRf> = 1 to 64 (item number)
• Example when <NRf> is specified
  :NUMERIC:LIST:VALUE? 1 -> 103.58E+00,0.00E+00,103.53E+00,0.09E+00,2.07E+00,0.04E+00,
  ..(omitted) ..,0.01E+00,0.01E+00 (up to 102 items of data)
• Example when <NRf> is omitted (when "NUMeric:LIST:NUMber" is 5)
  :NUMERIC:LIST:VALUE? -> 103.58E+00,0.00E+00,103.53E+00,0.09E+00,2.07E+00,0.04E+00,
  ..(omitted) ..,0.00E+00,0.00E+00 (up to 102*5 = 510 items of data)
• Example in which "NUMeric:FORMat" is set to "FLOat"
  :NUMERIC:LIST:VALUE? -> #6(number of bytes, 6 digits)(data byte sequence)
Description • This command is valid only on models with the advanced computation function (/G6 option).
• A single numeric list data consists of up to 102 items of numeric data in the following order: TOTal, DC, 1st order, ...
  "NUMeric:LIST:ORDer."
• If <NRf> is specified, only the numeric list data of the item number is output (up to 102 items of data).
• If <NRf> is omitted, the numeric list data of item numbers from 1 to "NUMeric:LIST:NUMber" is output in order (up to 102"NUMeric:LIST:NUMber" items of data).
• For the format of the individual numeric data that is output, see "Numeric Data Format" at the end of this group of commands (see page 6-97).
### Communication Commands

#### :NUMeric[:NORMal]?

**Function**
Queries all settings related to the numeric data output.

**Syntax**
:NUMeric[:NORMal]?

**Example**
:NUMERIC:NORMAL? -> :NUMERIC:

**Syntax**
:NUMeric[:NORMal]:ITEM<x>

**Example**
:NUMERIC:NORMAL:ITEM1 U,1,TOTAL

**Description**
For the values of ":NUMeric[:NORMal]:ITEM<x>" the numeric data output items for the amount specified by ":NUMeric[:NORMal]:NUMber" are output.

#### :NUMeric[:NORMal]:NUMber

**Function**
Sets the number of numeric data that is transmitted by ":NUMeric[:NORMal]:VALue?" or queries the current setting.

**Syntax**
:NUMeric[:NORMal]:NUMber {<NRf>|ALL}

**Example**
:NUMERIC:NORMAL:NUMBER 15

**Description**
- If the parameter is omitted for the ":NUMeric[:NORMal]:VALue?" command, the numeric data from 1 to (the specified value) is output in order.
- By default, the number of numeric data is set to "15."

#### :NUMeric[:NORMal]:PRESet

**Description**
- If the parameter is omitted for the ":NUMeric[:NORMal]:VALue?" command, the numeric data from 1 to (the specified value) is output in order.
- By default, the number of numeric data is set to "15."

#### Communication Commands

**Function**
Sets the numeric data output items (function, element, and harmonic order) or queries the current setting.

**Syntax**
:NUMeric[:NORMal]:ITEM<x> {NONE|<Function>,<Element>[,<Order>]}  
:NUMeric[:NORMal]:ITEM<x>?

**Example**
:NUMERIC:NORMAL:ITEM1 U,1,TOTAL

**Description**
- If <Element> is omitted, element 1 is set.
- If <Order> is omitted, TOTAL is set.
- If <Element> or <Order> is omitted from response to functions that do not need them.

---

**Example**
:NUMERIC:NORMAL:ITEM1 U,1,TOTAL

**Syntax**
:NUMeric[:NORMal]:ITEM<x> {NONE|<Function>,<Element>[,<Order>]}

**Description**
- The subsequent output items fill the positions of deleted output items, and empty sections at the end are set to "NONE."
- If the 2nd <NRf> is omitted, only the output item of the delete start number is deleted.
6.18 NUMeric Group

:NUMeric[:NORMal]:VALue?
Function: Queries the numeric data.
Syntax: :NUMeric[:NORMal]:VALue? {<NRf>}
<NRf> = 1 to 255 (item number)
Example: • Example when <NRf> is specified
:NUMERIC:NORMAL:VALUE? 1 ->
104.75E+00
• Example when <NRf> is omitted
:NUMERIC:NORMAL:VALUE? ->
104.75E+00, 105.02E+00,
-0.38E+00, ...(omitted)...
49.868E+00
• Example in which ":NUMeric:FORMat" is set to "FLOat"
:NUMERIC:NORMAL:VALUE? -> #4(number of bytes, 4 digits)(data byte sequence)
Description: • If <NRf> is specified, only the numeric data of
the item number is output.
• If <NRf> is omitted, the numeric
data of item numbers from 1 to
":NUMeric[:NORMal]:NUMber" is output in
order.
• For the format of the individual numeric data
that is output, see "Numeric Data Format" at
the end of this group of commands (see page
6-97).
* Numeric Data Format

(1) Normal Data
- Frequency (FU and FI)
  ASCII: <NR3> format (mantissa: 5 digits, exponent: 2 digits, example: 50.000E+00)
  FLOAT: IEEE single-precision floating point (4-byte) format
- Elapsed time of integration (TIME)
  ASCII: <NR1> format in units of seconds (example: for 1 hour (1:00:00), 3600)
  FLOAT: IEEE single-precision floating point (4-byte) format in units of seconds (example: for 1 hour (1:00:00), 0x45610000)
- Peak information (PKU, PKI, PKSpeed, PKTorque) for Cycle by Cycle measurement
  ASCII: <NR1> format (IEEE single-precision floating point (4-byte) format)
  FLOAT: 0x40400000 (3)

  Note: If the main unit’s peak over detection function makes a detection during the measurement period, 4 is added to the numbers above.

- No items (NONE)
  ASCII: “NAN” (Not A Number)
  FLOAT: 0x7E951BEE (9.91E+37)
- Other than above
  ASCII: <NR3> format (mantissa: maximum significant digits = 6, exponent: 2 digits, example: [-]123.456.45E+00)
  FLOAT: IEEE single-precision floating point (4-byte) format

(2) Error Data
- Data does not exist (display: “---------”)
  ASCII: “NAN” (Not A Number)
  FLOAT: 0x7E951BEE (9.91E+37)
- Overrange (display: “---O L---”)
- Overflow (display: “---O F---”)
- Data over (display: “Error ”)
  ASCII: “INF” (INFINITY)
  FLOAT: 0x7E94F56A (9.9E+37)

  Note: For the 180° (Lead/Lag) display of the phase difference \( \phi \) (PHI) of elements 1 to 4, the values are output in the range between -180.000 to 180.000 with lead (D) and lag (G) set to negative and positive values, respectively.
- For the \( \Sigma \) of power values (P, S, Q, and PC), the number of digits of the mantissa may be equal to 7 (the maximum significant digits) depending on the combination of the voltage range and current range (power range). See the list of power ranges in the User’s Manual IM WT3001E-01EN.
6.18 NUMeric Group

* List of Numeric Data Output Items That Are Preset
The list of function names used in the commands and the corresponding function
names used on the screen menu of this instrument is given in the Function Selection
List in the Display group.

**Note**
The List of Numeric Data Output Items That Are Preset indicates the measurement function
and element that are assigned to each item number (ITEM<x>). Items that are not set to be
measured are displayed or output in the same fashion as when the data does not exist. For
example, if frequency FI of the current of element 2 is not set to be measured, the output of
item number ITEM19 is the same as the output when the data does not exist (NAN for ASCII).

(1) Preset Pattern of Numeric Data Output Items
Applicable command ";NUMeric[:NORMal]:PRESet"

- **Pattern 1**

<table>
<thead>
<tr>
<th>ITEM&lt;x&gt;</th>
<th>&lt;Function&gt;, &lt;Element&gt;, &lt;Order&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U, 1, TOTal</td>
</tr>
<tr>
<td>2</td>
<td>I, 1, TOTal</td>
</tr>
<tr>
<td>3</td>
<td>P, 1, TOTal</td>
</tr>
<tr>
<td>4</td>
<td>S, 1, TOTal</td>
</tr>
<tr>
<td>5</td>
<td>Q, 1, TOTal</td>
</tr>
<tr>
<td>6</td>
<td>LAMBda, 1, TOTal</td>
</tr>
<tr>
<td>7</td>
<td>PHI, 1, TOTal</td>
</tr>
<tr>
<td>8</td>
<td>FU, 1, (TOTal)</td>
</tr>
<tr>
<td>9</td>
<td>FI, 1, (TOTal)</td>
</tr>
<tr>
<td>10</td>
<td>NONE, 1, TOTal</td>
</tr>
<tr>
<td>11 to 19</td>
<td>U to FI, 2, TOTal</td>
</tr>
<tr>
<td>20</td>
<td>NONE, 2, TOTal</td>
</tr>
<tr>
<td>21 to 29</td>
<td>U to FI, 3, TOTal</td>
</tr>
<tr>
<td>30</td>
<td>NONE, 3, TOTal</td>
</tr>
<tr>
<td>31 to 39</td>
<td>U to FI, 4, TOTal</td>
</tr>
<tr>
<td>40</td>
<td>NONE, 4, TOTal</td>
</tr>
<tr>
<td>41 to 49</td>
<td>U to FI, SIGMA, TOTal</td>
</tr>
<tr>
<td>50</td>
<td>NONE, 5, TOTal</td>
</tr>
<tr>
<td>51 to 59</td>
<td>U to FI, SIGMB, TOTal</td>
</tr>
<tr>
<td>60</td>
<td>NONE, 6, TOTal</td>
</tr>
<tr>
<td>61 to 255</td>
<td>NONE, 7, TOTal</td>
</tr>
</tbody>
</table>

- **Pattern 2**

<table>
<thead>
<tr>
<th>ITEM&lt;x&gt;</th>
<th>&lt;Function&gt;, &lt;Element&gt;, &lt;Order&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U, 1, TOTal</td>
</tr>
<tr>
<td>2</td>
<td>I, 1, TOTal</td>
</tr>
<tr>
<td>3</td>
<td>P, 1, TOTal</td>
</tr>
<tr>
<td>4</td>
<td>S, 1, TOTal</td>
</tr>
<tr>
<td>5</td>
<td>Q, 1, TOTal</td>
</tr>
<tr>
<td>6</td>
<td>LAMBda, 1, TOTal</td>
</tr>
<tr>
<td>7</td>
<td>PHI, 1, TOTal</td>
</tr>
<tr>
<td>8</td>
<td>FU, 1, (TOTal)</td>
</tr>
<tr>
<td>9</td>
<td>FI, 1, (TOTal)</td>
</tr>
<tr>
<td>10</td>
<td>UPPPeak, 1, (TOTal)</td>
</tr>
<tr>
<td>11</td>
<td>UMPeak, 1, (TOTal)</td>
</tr>
</tbody>
</table>
### 6.18 NUMeric Group

<table>
<thead>
<tr>
<th>ITEM&lt;#&gt;</th>
<th>&lt;Function&gt;,</th>
<th>&lt;Element&gt;,</th>
<th>&lt;Order&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>IPPeak,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>13</td>
<td>IMPeak,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>14</td>
<td>CFU,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>15</td>
<td>CFI,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>16 to 30</td>
<td>U to CFI,</td>
<td>2,</td>
<td>TOTal</td>
</tr>
<tr>
<td>31 to 45</td>
<td>U to CFI,</td>
<td>3,</td>
<td>TOTal</td>
</tr>
<tr>
<td>46 to 60</td>
<td>U to CFI,</td>
<td>4,</td>
<td>TOTal</td>
</tr>
<tr>
<td>61 to 75</td>
<td>U to CFI,</td>
<td>SIGMA,</td>
<td>TOTal</td>
</tr>
<tr>
<td>76 to 90</td>
<td>U to CFI,</td>
<td>SIGMB,</td>
<td>TOTal</td>
</tr>
<tr>
<td>91 to 255</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Pattern 3

<table>
<thead>
<tr>
<th>ITEM&lt;#&gt;</th>
<th>&lt;Function&gt;,</th>
<th>&lt;Element&gt;,</th>
<th>&lt;Order&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>2</td>
<td>I,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>3</td>
<td>P,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>4</td>
<td>S,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>5</td>
<td>O,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>6</td>
<td>TIME,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>7</td>
<td>WH,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>8</td>
<td>WHP,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>9</td>
<td>WHM,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>10</td>
<td>AH,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>11</td>
<td>AHP,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>12</td>
<td>AHM,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>13</td>
<td>WS,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>14</td>
<td>WQ,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
<tr>
<td>15</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 to 29</td>
<td>U to WQ,</td>
<td>2,</td>
<td>TOTal</td>
</tr>
<tr>
<td>30</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 to 44</td>
<td>U to WQ,</td>
<td>3,</td>
<td>TOTal</td>
</tr>
<tr>
<td>45</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 to 59</td>
<td>U to WQ,</td>
<td>4,</td>
<td>TOTal</td>
</tr>
<tr>
<td>60</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61 to 74</td>
<td>U to WQ,</td>
<td>SIGMA,</td>
<td>TOTal</td>
</tr>
<tr>
<td>75</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>76 to 89</td>
<td>U to WQ,</td>
<td>SIGMB,</td>
<td>TOTal</td>
</tr>
<tr>
<td>90</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91 to 255</td>
<td>NONE,</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Pattern 4

<table>
<thead>
<tr>
<th>ITEM&lt;#&gt;</th>
<th>&lt;Function&gt;,</th>
<th>&lt;Element&gt;,</th>
<th>&lt;Order&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>2</td>
<td>I,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>3</td>
<td>P,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>4</td>
<td>S,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>5</td>
<td>O,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>6</td>
<td>LAMBda,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>7</td>
<td>PHI,</td>
<td>1,</td>
<td>TOTal</td>
</tr>
<tr>
<td>8</td>
<td>FU,</td>
<td>1,</td>
<td>(TOTal)</td>
</tr>
</tbody>
</table>
6.18 NUMeric Group

9  FI,  1,  (TOTal)
10 UPPeak,  1,  (TOTal)
11 UMPPeak,  1,  (TOTal)
12 IIPPeak,  1,  (TOTal)
13 IMPeak,  1,  (TOTal)
14 CFU,  1,  (TOTal)
15 CFI,  1,  (TOTal)
16 PC,  1,  (TOTal)
17 TIME,  1,  (TOTal)
18 WH,  1,  (TOTal)
19 WHP,  1,  (TOTal)
20 WHM,  1,  (TOTal)
21 AH,  1,  (TOTal)
22 AHP,  1,  (TOTal)
23 AHM,  1,  (TOTal)
24 WS,  1,  (TOTal)
25 WQ,  1,  (TOTal)
26 to 50 U to WQ,  2,  TOTal
51 to 75 U to WQ,  3,  TOTal
76 to 100 U to WQ,  4,  TOTal
101 to 125 U to WQ, SIGMA,  TOTal
126 to 150 U to WQ, SIGMB,  TOTal
151 to 255 NONE,

(2) Preset Pattern of the Numeric List Data Output Items of Harmonic Measurement
Applicable command “:NUMeric:LIST:PRESet”

• Pattern 1
  ITEM<x>  <Function>,  <Element>
  1   U,  1
  2   I,  1
  3   P,  1
  4 to 6 U to P,  2
  7 to 9 U to P,  3
 10 to 12 U to P,  4
 13 to 64 NONE,

• Pattern 2
  ITEM<x>  <Function>,  <Element>
  1   U,  1
  2   I,  1
  3   P,  1
  4   PHIU,  1
  5   PHI,  1
  6 to 10 U to PHI,  2
 11 to 15 U to PHI,  3
 16 to 20 U to PHI,  4
 21 to 64 NONE,
### Pattern 3

<table>
<thead>
<tr>
<th>ITEM&lt;(x)&gt;</th>
<th>(&lt;\text{Function}&gt;, \text{&lt;Element&gt;})</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(U, 1)</td>
</tr>
<tr>
<td>2</td>
<td>(I, 1)</td>
</tr>
<tr>
<td>3</td>
<td>(P, 1)</td>
</tr>
<tr>
<td>4</td>
<td>(Q, 1)</td>
</tr>
<tr>
<td>5</td>
<td>(Z, 1)</td>
</tr>
<tr>
<td>6</td>
<td>(RS, 1)</td>
</tr>
<tr>
<td>7</td>
<td>(XS, 1)</td>
</tr>
<tr>
<td>8</td>
<td>(RP, 1)</td>
</tr>
<tr>
<td>9</td>
<td>(XP, 1)</td>
</tr>
<tr>
<td>10 to 18</td>
<td>(U) to (XP), 2</td>
</tr>
<tr>
<td>19 to 27</td>
<td>(U) to (XP), 3</td>
</tr>
<tr>
<td>28 to 36</td>
<td>(U) to (XP), 4</td>
</tr>
<tr>
<td>37 to 64</td>
<td>(\text{NONE})</td>
</tr>
</tbody>
</table>

### Pattern 4

<table>
<thead>
<tr>
<th>ITEM&lt;(x)&gt;</th>
<th>(&lt;\text{Function}&gt;, \text{&lt;Element&gt;})</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(U, 1)</td>
</tr>
<tr>
<td>2</td>
<td>(I, 1)</td>
</tr>
<tr>
<td>3</td>
<td>(P, 1)</td>
</tr>
<tr>
<td>4</td>
<td>(S, 1)</td>
</tr>
<tr>
<td>5</td>
<td>(Q, 1)</td>
</tr>
<tr>
<td>6</td>
<td>(\text{LAMB}da, 1)</td>
</tr>
<tr>
<td>7</td>
<td>(\text{PHI}, 1)</td>
</tr>
<tr>
<td>8</td>
<td>(\text{PHI}U, 1)</td>
</tr>
<tr>
<td>9</td>
<td>(\text{PHI}I, 1)</td>
</tr>
<tr>
<td>10</td>
<td>(Z, 1)</td>
</tr>
<tr>
<td>11</td>
<td>(RS, 1)</td>
</tr>
<tr>
<td>12</td>
<td>(XS, 1)</td>
</tr>
<tr>
<td>13</td>
<td>(RP, 1)</td>
</tr>
<tr>
<td>14</td>
<td>(XP, 1)</td>
</tr>
<tr>
<td>15 to 28</td>
<td>(U) to (XP), 2</td>
</tr>
<tr>
<td>29 to 42</td>
<td>(U) to (XP), 3</td>
</tr>
<tr>
<td>43 to 56</td>
<td>(U) to (XP), 4</td>
</tr>
<tr>
<td>57 to 64</td>
<td>(\text{NONE})</td>
</tr>
</tbody>
</table>
### 6.19 RATE Group

The commands in this group deal with the data update interval. You can make the same settings and inquiries as when UPDATE RATE on the front panel is used.

<table>
<thead>
<tr>
<th>Function</th>
<th>Sets the data update interval or queries the current setting.</th>
</tr>
</thead>
</table>
| Syntax   | :RATE {<Time>}  
:RATE?  
<Time> = 50, 100, 250, 500 (ms), 1, 2, 5, 10, or 20 (s) |
| Example  | :RATE 500MS  
:RATE? -> :RATE 500.0E-03 |
6.20 STATus Group

The commands in the STATus group are used to make settings and inquiries related to the status report. There are no front panel keys that correspond to the commands in this group. For details on the status report, see chapter 7.

:STATus?
Function Queries all settings related to the communication status function.
Syntax :STATus?
Example :STATus? -> :STATus:EESE 0;
FILTER1 NEVER;FILTER2 NEVER;
FILTER3 NEVER;FILTER4 NEVER;
FILTER5 NEVER;FILTER6 NEVER;
FILTER7 NEVER;FILTER8 NEVER;
FILTER9 NEVER;FILTER10 NEVER;
FILTER11 NEVER;FILTER12 NEVER;
FILTER13 NEVER;FILTER14 NEVER;
FILTER15 NEVER;FILTER16 NEVER;
QENABLE 1;QMESSAGE 1

:STATus:CONDition?
Function Queries the contents of the condition register.
Syntax :STATus:CONDition?
Example :STATus:CONDition? -> 16
Description For details on the condition register, see chapter 7, “Status Report.”

:STATus:EESE(Extended Event Status Enable register)
Function Sets the extended event enable register or queries the current setting.
Syntax :STATus:EESE <Register>
:STATus:EESE?
Example :STATus:EESE #B00000000000000000000000000000000
:STATus:EESE? -> :STATus:EESE 0
Description For details on the extended event enable register, see chapter 7, “Status Report.”

:STATus:EESR?(Extended Event Status Register)
Function Queries the content of the extended event register and clears the register.
Syntax :STATus:EESR?
Example :STATus:EESR? -> 0
Description For details on the extended event register, see chapter 7, “Status Report.”

:STATus:ERRor?
Function Queries the error code and message information (top of the error queue).
Syntax :STATus:ERRor?
Example :STATus:ERRor? -> 113,”Underfined Header”
Description When there is no error, “0, “No error” is returned.
• The message cannot be returned in Japanese.
• You can specify whether to add the message using the “STATus:QMESsage” command.

:STATus:FILTER<x>
Function Sets the transition filter or queries the current setting.
Syntax :STATus:FILTER<x> {RISE|FALL|BOTH|NEVer}
:STATus:FILTER<x>?
Example :STATus:FILTER2 RISE
:STATus:FILTER2? -> :STATus:FILTER2 RISE
Description Specify how each bit of the condition register is to change to set the event. If “RISE” is specified, the event is set when the bit changes from 0 to 1.
• For details on the transition, see chapter 7, “Status Report.”

:STATus:QENable
Function Sets whether to store messages other than errors to the error queue (ON/OFF) or queries the current setting.
Syntax :STATus:QENable {<Boolean>}
:STATus:QENable?
Example :STATus:QENable ON
:STATus:QENable? -> :STATus:QENable 1

:STATus:QMESsage
Function Sets whether to attach message information to the response to the “STATus:ERRor?” query (ON/OFF) or queries the current setting.
Syntax :STATus:QMESsage {<Boolean>}
:STATus:QMESsage?
Example :STATus:QMESsage ON
6.20 STATus Group

:STATus:SPOLL? (Serial Poll)
Function  Executes serial polling.
Syntax    :STATus:SPOLL?
Example   :STATUS:SPOLL? -> :STATUS:SPOLL 0
Description This command is dedicated to the optional RS-232, USB, or Ethernet interface. An interface message is available for the GP-IB interface.
6.21 STORE Group

The commands in this group deal with store and recall. You can make the same settings and inquiries as when STORE and STORE SET (SHIFT+STORE) on the front panel is used.

:STOR? Function Queries all settings related to store and recall.
Syntax :STOR?
Example :STOR? -> STORE:M

:STOR:COUN Function Sets the store count or queries the current setting.
Syntax :STOR:COUN {<NRf}>
:STOR:COUN?
Example :STOR:COUN 100

:STOR:DIRection Function Sets the store destination or queries the current setting.
Syntax :STOR:DIR {MEMORY|FILE}
:STOR:DIR?
Example :STOR:DIR:M

:STOR:FILE? Function Queries all settings related to the saving of the stored data.
Syntax :STOR:FILE?
Example :STOR:FILE? -> :STOR:FILE:

:STOR:FILE:ANAMing Function Sets whether to automatically name the files when saving the stored data or queries the current setting.
Syntax :STOR:FILE:ANAM {<Boolean>}
:STOR:FILE:ANAM?
Example :STOR:FILE:ANAM ON

:STOR:FILE:COMment Function Sets the comment to be added to the file when saving the stored data or queries the current setting.
Syntax :STOR:FILE:COM {<String>}
:STOR:FILE:COM?
Example :STOR:FILE:COM "CASE1"

:STOR:FILE:NAME Function Sets the name of the file when saving the stored data or queries the current setting.
Syntax :STOR:FILE:NAME {<Filename>}
:STOR:FILE:NAME?
Example :STOR:FILE:NAME "DATA1"

Description Set the save destination drive and directory of the stored data using the following commands.

• Destination drive: "FILE:DRIVE"
• Directory: "FILE:DIRECTORY"

The save destination path can be queried using the "FILE:PATH?" command.

:STOR:FILE:TYPE Function Sets the data format when saving the stored data or queries the current setting.
Syntax :STOR:FILE:TYPE {ASCII|FLOAT}
:STOR:FILE:TYPE?
Example :STOR:FILE:TYPE ASCII

6.21 STORE Group

:SToRe:INterval
Function Sets the store interval or queries the current setting.
Syntax :STORe:INterval {<NRf>,<NRf>,<NRf>}
:STORe:INterval?
1st <NRf> = 0 to 99 (hour)
2nd <NRf> = 0 to 59 (minute)
3rd <NRf> = 1 to 59 (second)
Example :STORE:INterval 0,0,0
:STORE:INterval? -> :STORE:INterval 0,0,0

:SToRe:ITEM
Function Sets the stored item or queries the current setting.
Syntax :STORe:ITEM {NUMer|WAVE|NWAVe}
:STORe:ITEM?
NUMeric = Store only the numeric data.
WAVE = Store only the waveform display data
NWAVe = Store both the numeric data and waveform display data
Example :STORE:ITEM NUMERIC
:STORE:ITEM? -> :STORE:ITEM NUMERIC

:SToRe:MEMory?
Function Queries all settings related to the storage memory.
Syntax :STORe:MEMory?
Example :STORE:MEMory? -> :STORE:MEMory:ALERT 1

:SToRe:MEMory:ALERT
Function Sets whether to display a confirmation message when clearing the storage memory or queries the current setting.
Syntax :STORe:MEMory:ALERT {<Boolean>}
:STORe:MEMory:ALERT?
Example :STORE:MEMory:ALERT ON
Description The initialization takes place immediately when initializing the storage memory using the "STORe:MEMory:INITialize" command regardless of the setting specified with this command.

:SToRe:MEMory:CONVert:ABORt
Function Abort converting the stored data from the memory to the file.
Syntax :STORe:MEMory:CONVert:ABORt
Example :STORE:MEMory:CONVert:ABORt

:SToRe:MEMory:CONVert:EXECute
Function Executes the converting of the stored data from the memory to the file.
Syntax :STORe:MEMory:CONVert:EXECute
Example :STORE:MEMory:CONVert:EXECute

:SToRe:MEMory:INITialize
Function Executes the initialization of the storage memory.
Syntax :STORe:MEMory:INITialize
Example :STORE:MEMory:INITialize

:SToRe:MODE
Function Sets the data storage/recall or queries the current setting.
Syntax :STORe:MODE {STORe|RECall}
Example :STORE:MODE STORe

Description The convert destination file is set using the "STORe:FILE:..." command.
• When file conversion is executed, this instrument accesses the file twice.
  To confirm the completion of the file conversion, use the "COMMUNICATE:WAIT 64" command (checks the change in bit 6 (ACS) of the condition register) and check the completion of the file access of this instrument twice. An example is indicated below.
  "STATUS:EESR?"
  (Clear the extended event register)
  "STORe:MEMory:CONVert:EXECute"
  (Start the file conversion)
  "COMMUNICATE:WAIT 64"
  (Wait for the conversion to finish, the first time)
  "STATUS:EESR?"
  (Clear the extended event register)
  "COMMUNICATE:WAIT 64"
  (Wait for the conversion to finish, the second time)
  "STATUS:EESR?"
  (Clear the extended event register)
**Communication Commands**

**:STORe:NUMeric?**

Function: Queries all settings related to the storage of numeric data.

Syntax: :STORe:NUMeric?

Example:

:STORe:NUMeric? -> :STORe:NUMeric: NORMAL:ELEMENT1 1; ELEMENT2 0;
ELEMENT3 0; ELEMENT4 0; SIGMA 0;
SIGMB 0; U 1; I 1; P 1; S 1; Q 1;
LAMBDA 1; PHI 1; FU 1; FI 1;
UPBEAK 0; IPBEAK 0; IMBEAK 0; CFU 0;
CFI 0; PC 0; TIME 0; WH 0; WHM 0;
AH 0; AHP 0; AH0; WS 0; WQ 0; ETA1 0;
ETA2 0; ETA3 0; ETA4 0; F1 0; F2 0;
F3 0; F4 0; F5 0; F6 0; F7 0; F8 0; F9 0;
F10 0; F11 0; F12 0; F13 0; F14 0;
F15 0; F16 0; F17 0; F18 0; F19 0; F20 0

**:STORe:NUMeric:NORMal?**

Function: Queries all settings related to the stored items of numeric data.

Syntax: :STORe:NUMeric:NORMal?

Example:

:STORe:NUMeric:NORMAL? -> :STORe:NUMeric:NORMAL:ELEMENT1 1;
ELEMENT2 0; ELEMENT3 0; ELEMENT4 0;
SIGMA 0; SIGMB 0; U 1; I 1; P 1;
Q 1; LAMBDA 1; PHI 1; FU 1; FI 1;
UPBEAK 0; IPBEAK 0; IMBEAK 0;
CFU 0; CFI 0; PC 0; TIME 0;
WH 0; WHM 0; AH 0; AHP 0;
WS 0; WQ 0; ETA1 0; ETA2 0;
ETA3 0; ETA4 0; F1 0; F2 0;
F3 0; F4 0; F5 0; F6 0; F7 0;
F8 0; F9 0; F10 0; F11 0;
F12 0; F13 0; F14 0; F15 0;
F16 0; F17 0; F18 0; F19 0; F20 0

**:STORe:NUMeric[:NORMal]:ALL**

Function: Collectively turns ON/OFF the output of all element functions when storing the numerical data.

Syntax: :STORe:NUMeric[:NORMal]:ALL {<Boolean>}

Example:

:STORe:NUMeric[:NORMal]:ALL ON

**:STORe:NUMeric[:NORMal]:<Function>**

Function: Turns ON/OFF the output of the function when storing the numerical data or queries the current setting.

Syntax: :STORe:NUMeric[:NORMal]:<Function> {<Boolean>}

Example:

:STORe:NUMeric[:NORMal]:U ON
:STORe:NUMeric[:NORMal]:U? -> :STORe:NUMeric[:NORMal]:U 1

**:STORe:NUMeric[:NORMal]:PRESet<x>**

Function: Presets the output ON/OFF pattern of the element function for storing the numeric data.

Syntax: :STORe:NUMeric[:NORMal]:PRESet<x> {<Boolean>}

Example:

:STORe:NUMeric[:NORMal]:PRESet1 ON

Description:

For details on the storage pattern when preset is executed, see the User’s Manual IM WT3001E-01EN.

**:STORe:NUMeric[:NORMal]:SIGMA**

Function: Turns ON/OFF the output of σA when storing the numeric data.

Syntax: :STORe:NUMeric[:NORMal]:SIGMA {<Boolean>}

Example:

:STORe:NUMeric[:NORMal]:SIGMA ON

**:STORe:NUMeric[:NORMal]:SIGMB**

Function: Turns ON/OFF the output of σB when storing the numeric data.

Syntax: :STORe:NUMeric[:NORMal]:SIGMB {<Boolean>}

Example:

:STORe:NUMeric[:NORMal]:SIGMB ON

Description:

• :STORe:NUMeric[:NORMal]:SIGMA is valid on models with two or more elements. To turn the output ON, wiring unit ΣA must exist by setting the wiring system beforehand using the [:INPut]WIRing command.

• :STORe:NUMeric[:NORMal]:SIGMB is valid on models with four elements. To turn the output ON, wiring unit ΣB must exist by setting the wiring system beforehand using the [:INPut]WIRing command.

**:STORe:NUMeric[:NORMal]:<Function>**

Function: Turns ON/OFF the output of the function when storing the numerical data or queries the current setting.

Syntax: :STORe:NUMeric[:NORMal]:<Function> {<Boolean>}

Example:

:STORe:NUMeric[:NORMal]:U ON
:STORe:NUMeric[:NORMal]:U? -> :STORe:NUMeric[:NORMal]:U 1
### 6.21 STORE Group

#### :STORe:RECall

**Function**: Sets the data number to be recalled or queries the current setting.

**Syntax**: :

```
:STORe:RECall <NRf>
:STORe:RECall?
```

**Example**: :

```
:STORe:RECall 1
:STORe:RECall? -> :STORe:RECall 1
```

#### :STORe:RTIME?

**Function**: Queries the store reservation time for real-time store mode.

**Syntax**: :

```
:STORe:RTIME?
```

**Example**: :

```
:STORe:RTIME?
```

#### :STORe:RTIME: {START|END}

**Function**: Sets the store [start|stop] reservation date/time for real-time store mode or queries the current setting.

**Syntax**: :

```
:STORe:RTIME: {START|END} {<NRf>, <NRf>, <NRf>, <NRf>, <NRf>} = 2001, 1, 0, 0, 0 to 2099, 12, 31, 23, 59
1st <NRf> = 2001 to 2099 (year)
2nd <NRf> = 1 to 12 (month)
3rd <NRf> = 1 to 31 (day)
4th <NRf> = 0 to 23 (hour)
5th <NRf> = 0 to 59 (minute)
6th <NRf> = 0 to 59 (second)
```

**Example**: :

```
:STORe:RTIME:START 2005,1,1,0,0,0
:STORe:RTIME:END 2005,1,1,0,0,0
```

#### :STORe:SMODe

**Function**: Sets the store mode or queries the current setting.

**Syntax**: :

```
:STORe:SMODe {MANual|RTIMe|INTEGrate}
:STORe:SMODe?
```

**Example**: :

```
:STORe:SMODe MANUAL
:STORe:SMODe? -> :STORe:SMODe MANUAL
```

#### :STORe:STARt

**Function**: Starts the data store operation.

**Syntax**: :

```
:STORe:STARt
```

**Example**: :

```
:STORe:STARt
```

#### :STORe:STOP

**Function**: Stops the data storage operation.

**Syntax**: :

```
:STORe:STOP
```

**Example**: :

```
:STORe:STOP
```

#### :STORe:WAVE?

**Function**: Queries all settings related to the storage of waveform display data.

**Syntax**: :

```
:STORe:WAVE?
```

**Example**: :

```
:STORe:WAVE? -> :STORe:WAVE:U1 1;
   U2 0;U3 0;U4 0;I1 1;I2 0;I3 0;I4 0
```

#### :STORe:WAVE:ALL

**Function**: Collectively turns ON/OFF the output of all waveforms when storing waveform display data.

**Syntax**: :

```
:STORe:WAVE:ALL {<Boolean>}
```

**Example**: :

```
:STORe:WAVE:ALL ON
```

#### :STORe:WAVE: {U<x>|I<x>|SPEed|TORQue}

**Function**: Turns ON/OFF the output of the waveform when storing the waveform display data or queries the current setting.

**Syntax**: :

```
:STORe:WAVE: {U<x>|I<x>|SPEed|TORQue} {<Boolean>}
```

**Example**: :

```
:STORe:WAVE:U1 ON
:STORe:WAVE:U1? -> :STORe:WAVE:U1 1
```

**Description**: {SPEed|TORQue} are valid only on models with the motor evaluation function (MTR option).
### 6.22 SYSTem Group

The commands in this group deal with the system. You can make the same settings and inquiries as when MISC on the front panel is used.

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
<th>Syntax</th>
<th>Example</th>
<th>Description</th>
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<tbody>
<tr>
<td>:SYSTem?</td>
<td>Queries all settings related to the system.</td>
<td>:SYSTem?</td>
<td>:SYSTEM? -&gt; :SYSTem:LANGUAGE:MESSAGE ENGLISH;MENU ENGLISH;:SYSTem:FONT GOTHIC;KLOCK 0;SLOCK 0;LCD:BRIGHTNESS 2;COLOR:GRAPH;MODE DEFAULT;:SYSTem:LC:COLOR;TEXT:MODE PRESET1</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:CLOCK:DISPLAY</td>
<td>Turns ON/OFF the date/time display or queries the current setting.</td>
<td>:SYSTem:CLOCK:DISPLAY {&lt;Boolean&gt;}</td>
<td>:SYSTEM:CLOCK:DISPLAY ON</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:CLOCK:TYPE</td>
<td>Sets the date/time setting method or queries the current setting.</td>
<td>:SYSTem:CLOCK:TYPE {MANual</td>
<td>SNTP}</td>
<td>:SYSTEM:CLOCK:TYPE MANUAL</td>
</tr>
<tr>
<td>:SYSTem:DATE</td>
<td>Sets the date or queries the current setting.</td>
<td>:SYSTem:DATE {&lt;String&gt;}</td>
<td>:SYSTEM:DATE &quot;05/01/01&quot;</td>
<td>&quot;Year&quot; is the lowest two digits of the year.</td>
</tr>
<tr>
<td>:SYSTem:ECLear</td>
<td>Clears the error message displayed on the screen.</td>
<td>:SYSTem:ECLear</td>
<td>:SYSTEM:ECLear</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:FONT</td>
<td>Sets the display font or queries the current setting.</td>
<td>:SYSTem:FONT {GOTHic</td>
<td>ROMan}</td>
<td>:SYSTEM:FONT GOTHIC</td>
</tr>
</tbody>
</table>

### Communication Commands

- **:SYSTem:CLOCk:SNTP:GMTtime**
  - Function: Sets the difference from Greenwich Mean Time or queries the current setting.
  - Syntax: :SYSTem:CLOCk:SNTP:GMTtime {<string>}
  - Example: :SYSTem:CLOCk:SNTP:GMTtime "09:00" | Available only with Ethernet (/C7 option).

- **:SYSTem:CLOCk:SNTP**
  - Function: Sets all SNTP-based date/time related settings or queries the current setting.
  - Syntax: :SYSTem:CLOCk:SNTP [{<string>}]
  - Example: :SYSTEM:CLOCK:SNTP:"05/01/01" | Available when the date/time setting method (:SYSTem:CLOCk:TYPE) is SNTP.

- **:SYSTem:CLOCk:SNTP:[EXECute]**
  - Function: Sets the date/time via SNTP.
  - Syntax: :SYSTem:CLOCk:SNTP:[EXECute]
6.22 SYSTem Group

:SYSTem:KLOCk
Function  Turns ON/OFF the key lock or queries the current setting.
Syntax   :SYSTem:KLOCk {<Boolean>}
Example  :SYSTem:KLOCk?
          :SYSTem:KLOCk OFF
          :SYSTem:KLOCk? -> :SYSTem:KLOCk 0

:SYSTem:LANGuage?
Function  Queries all settings related to the display language.
Syntax :SYSTem:LANGuage?
Example :SYSTem:LANGuage?
          :SYSTem:LANGuage MESSAGE ENGLISH;
          MENU ENGLISH

:SYSTem:LANGuage:MENU
Function  Sets the menu language or queries the current setting.
Syntax :SYSTem:LANGuage:MENU {JAPANese|ENGLish}
Example :SYSTem:LANGuage:MENU?
          :SYSTem:LANGuage:MENU ENGLISH

:SYSTem:LANGuage:MESSage
Function  Sets the message language or queries the current setting.
Syntax :SYSTem:LANGuage:MESSage {JAPANese|ENGLish}
Example :SYSTem:LANGuage:MESSage?
          :SYSTem:LANGuage:MESSage ENGLISH

:SYSTem:LCD?
Function  Queries all settings related to the LCD monitor.
Syntax :SYSTem:LCD?
Example :SYSTem:LCD?
          :SYSTem:LCD:BRIGHTNESS 2;COLOR:
          GRAPH:MODE DEFAULT;:SYSTem:LCD:
          COLOR:TEXT:MODE PRESET1

:SYSTem:LCD:COLOr?
Function  Queries all settings related to the display colors of the LCD monitor.
Syntax :SYSTem:LCD:COLOr?
Example :SYSTem:LCD:COLOr? -> :SYSTem:LCD:
          COLOR:GRAPH:MODE DEFAULT;:SYSTem:LCD:
          COLOR:TEXT:MODE PRESET1

:SYSTem:LCD:COLOr:GRAPh?
Function  Queries all settings related to the display colors of the graphic items.
Syntax :SYSTem:LCD:COLOr:GRAPh?
Example :SYSTem:LCD:COLOr:GRAPh?
          :SYSTem:LCD:COLOr:GRAPh:
          (BACKGROUND|GRATICule|CURSor|U<x>|I<x>)
          :SYSTem:LCD:COLOr:GRAPh:
          (BACKGROUND|GRATICule|CURSor|U<x> |I<x>?)
          <x> = 1 to 4
          <NRf> = 0 to 7

Example :SYSTem:LCD:COLOr:GRAPh:
          BACKGROUND 0,0,0
          CURSOR 7,7,7;U1 7,7,0;U2 7,0,7;
          U3 7,0,0;U4 0,4,7;I1 0,7,0;
          I2 0,7,7;I3 7,4,0;I4 5,5,5

:SYSTem:LCD:COLOr:GRAPh:MODE
Function  Sets the display color of the (background|graticule|cursor|voltage waveform|current waveform) or queries the current setting.
Syntax :SYSTem:LCD:COLOr:GRAPh:MODE
Example :SYSTem:LCD:COLOr:GRAPh:MODE
          BACKGROUND 0,0,0
          CURSOR 7,7,7;U1 7,7,0;U2 7,0,7;
          U3 7,0,0;U4 0,4,7;I1 0,7,0;
          I2 0,7,7;I3 7,4,0;I4 5,5,5

:SYSTem:LCD:COLOr:GRAPh:BACKGROUND
Function  Sets the display color of the background.
Syntax :SYSTem:LCD:COLOr:GRAPh:BACKGROUND
Example :SYSTem:LCD:COLOr:GRAPh:BACKGROUND
          BACKGROUND 0,0,0

:SYSTem:LCD:COLOr:GRAPh:COLOR
Function  Sets the display color of the graticule.
Syntax :SYSTem:LCD:COLOr:GRAPh:COLOR
Example :SYSTem:LCD:COLOr:GRAPh:COLOR
          BACKGROUND 0,0,0

:SYSTem:LCD:COLOr:GRAPh:CURSor
Function  Sets the display color of the cursor.
Syntax :SYSTem:LCD:COLOr:GRAPh:CURSor
Example :SYSTem:LCD:COLOr:GRAPh:CURSor
          BACKGROUND 0,0,0

:SYSTem:LCD:COLOr:GRAPh:U<x>
Function  Sets the display color of the voltage waveform.
Syntax :SYSTem:LCD:COLOr:GRAPh:U<x>
Example :SYSTem:LCD:COLOr:GRAPh:U<x>
          BACKGROUND 0,0,0

:SYSTem:LCD:COLOr:GRAPh:I<x>
Function  Sets the display color of the current waveform.
Syntax :SYSTem:LCD:COLOr:GRAPh:I<x>
Example :SYSTem:LCD:COLOr:GRAPh:I<x>
          BACKGROUND 0,0,0

Description Set the color in the order R, G, and B.

This command is valid when the display color mode of graphic items
(:SYSTem:LCD:COLOr:GRAPh:MODE) is set to
“USER.”

:SYSTem:LCD:COLOr:GRAPh:MODE
Function  Sets the display color mode of the graphic items or queries the current setting.
Syntax :SYSTem:LCD:COLOr:GRAPh:MODE
Example :SYSTem:LCD:COLOr:GRAPh:MODE
          BACKGROUND 0,0,0
          CURSOR 7,7,7;U1 7,7,0;U2 7,0,7;
          U3 7,0,0;U4 0,4,7;I1 0,7,0;
          I2 0,7,7;I3 7,4,0;I4 5,5,5
**Communication Commands**

### :SYSTem:LCD:COlor:TEXT?

**Function**: Queries all settings related to the display colors of the text items.

**Syntax**: :SYSTem:LCD:COlor:TEXT?

**Example**:

```plaintext
:SYSTEM:LCD:COLOR:TEXT? ->
LETTER 7,7,7;BACKGROUND 2,2,6;
BOX 0,0,7;SUB 3,3,3;SELECTED 0,4,7
```

### :SYSTem:LCD:COlor:TEXT: {LETTer|BACKground|BOX|SUB|SELected}

**Function**: Sets the display color of the {text (Menu Fore)|menu background (Menu Back)|selected menu (Select Box)|pop-up menu (Sub Menu)|selected key (Selected Key)} or queries the current setting.

**Syntax**: :SYSTem:LCD:COlor:TEXT: {LETter|BACKground|BOX|SUB|SELected} {<NRf>,<NRf>,<NRf>}

**Example**:

```plaintext
:SYSTEM:LCD:COLOR:TEXT:LETTER 7,7,7
:SYSTEM:LCD:COLOR:TEXT:LETTER? ->
:SYSTEM:LCD:COLOR:TEXT:LETTER 7,7,7
```

**Description**: Set the color in the order R, G, and B.

This command is valid when the display color mode of text items (:SYSTem:LCD:COlor:TEXT:MODE) is set to "USER."

### :SYSTem:LCD:COlor:TEXT:MODE

**Function**: Sets the display color mode of the text items or queries the current setting.

**Syntax**: :SYSTem:LCD:COlor:TEXT:MODE {PRESet<x>|USER}

**Example**:

```plaintext
:SYSTEM:LCD:COLOR:TEXT:MODE PRESET1
:SYSTEM:LCD:COLOR:TEXT:MODE? ->
:SYSTEM:LCD:COLOR:TEXT:MODE PRESET1
```

### :SYSTem:SLOCK

**Function**: Sets whether to continue the SHIFT key ON state or queries the current setting.

**Syntax**: :SYSTem:SLOCk {<Boolean>}

**Example**:

```plaintext
:SYSTEM:SLOCK OFF
:SYSTEM:SLOCK? -> :SYSTEM:SLOCK 0
```

### :SYSTem:TIME

**Function**: Sets the time or queries the current setting.

**Syntax**: :SYSTem:TIME {<String>}

**Example**:

```plaintext
:SYSTEM:TIME "14:30:00"
:SYSTEM:TIME? -> "14:30:00"
```

### :SYSTem:USBKeyboard

**Function**: Sets the USB keyboard type (language) or queries the current setting.

**Syntax**: :SYSTem:USBKeyboar {JAPANese|ENGLish}

**Example**:

```plaintext
:SYSTEM:USBKEYBOARD JAPANESE
:SYSTEM:USBKEYBOARD? -> :SYSTEM:USBKEYBOARD JAPANESE
```

**Description**: This command is valid only on models with the USB port (peripheral device) (/C5 option).
6.23  WAVEform Group

The commands in this group deal with the output of the retrieved waveform display data. There are no front panel keys that correspond to the commands in this group.

**:WAVEform?**
- **Function**: Queries all settings related to the output of waveform display data.
- **Syntax**: :WAVEform?
- **Example**: :WAVEform? -> :WAVEform:TRACE U1; FORMAT ASCII;START 0;END 1001; HOLD 0

**:WAVEform:BYTEorder**
- **Function**: Sets the output byte order of the waveform display data (FLOAT format) that is transmitted by "*:WAVEform:SEND?" or queries the current setting.
- **Syntax**: :WAVEform:BYTEorder {LSBFirst|MSBFirst}
- **Example**: :WAVEform:BYTEorder LSBFirst

**:WAVEform:HOLD**
- **Function**: Sets whether to hold (ON) or release (OFF) all the waveform display data or queries the current setting.
- **Syntax**: :WAVEform:HOLD {<Boolean>}
- **Example**: :WAVEform:HOLD ON

**:WAVEform:END**
- **Function**: Sets the output end point of the waveform display data that is transmitted by "*:WAVEform:SEND?" or queries the current setting.
- **Syntax**: :WAVEform:END {<NRf>}
- **Example**: :WAVEform:END 1001

**:WAVEform:FORMAT**
- **Function**: Sets the format of the waveform display data that is transmitted by "*:WAVEform:SEND?" or queries the current setting.
- **Syntax**: :WAVEform:FORMAT {ASCII|FLOAT}
- **Example**: :WAVEform:FORMAT FLOAT

**:WAVEform:LENGTH?**
- **Function**: Queries the total number of points of the waveform specified by :WAVEform:TRACE.
- **Syntax**: :WAVEform:LENGTH?
- **Example**: :WAVEform:LENGTH?

**Description**

- For the differences in the waveform display data output due to the format setting, see the description for "*:WAVEform:SEND?."
6.23 WAVeform Group

**:WAVeform:** SEND?

Function: Queries the waveform display data specified by "WAVeform:TRACe".

Syntax: :WAVeform:SEND?

Example:

- When "WAVeform:FORMat" is set to {ASCii}:
  
  :WAVEFORM:SEND? -> <NR3>,<NR3>,...

- When "WAVeform:FORMat" is set to {FLOat}:
  
  :WAVEFORM:SEND? -> #4(number of bytes, 4 digits)(data byte sequence)

Description:

- The format of the waveform display data that is output varies depending on the "WAVeform:FORMat" setting as follows:
  
  1. When "ASCii" is specified
     
     The physical value is output in the <NR3> format. The data of each point is delimited by a comma.
  
  2. When "FLOat" is specified
     
     The physical value is output in IEEE single-precision floating point (4-byte) format.
     
     The output byte order of the data of each point follows the order that is set using the "WAVeform:BYTeorder" command.
     
- If there is no waveform display data even when the display mode (:DISPlay:MODE) is set to a mode to display waveforms, the data is output as follows:
  
  1. When "ASCii" is specified
     
     The data of all points are output as "NAN."
  
  2. When "FLOat" is specified
     
     The data of all points are output as "0(0x00000000)."

**:WAVeform:** SRATe?

Function: Queries the sample rate of the retrieved waveform.

Syntax: :WAVeform:SRATe?

Example: :WAVEFORM:SRATE? -> 200.000E+03

**:WAVeform:** STARt

Function: Sets the output start point of the waveform display data that is transmitted by "WAVeform:SEND?" or queries the current setting.

Syntax: :WAVeform:STARt {<NRf>}

Example: :WAVEFORM:START 0

**:WAVeform:** TRACe

Function: Sets the target waveform for "WAVeform:SEND?" or queries the current setting.

Syntax: :WAVeform:TRACe {U<x>|I<x>|SPeed|TORQue|MATH<x>}

Example: :WAVEFORM:TRACE U1

Description: {SPeed|TORQue} are valid only on models with the motor evaluation function (/MTR option).

**:WAVeform:** TRIGger?

Function: Queries the trigger position of the retrieved waveform.

Syntax: :WAVeform:TRIGger?

Example: :WAVEFORM:TRIGGER? -> 0

Description: Since the trigger position is always at the beginning of the waveform display data, "0" is returned.
6.24 Common Command Group

The commands in the common group are defined in the IEEE488.2-1992 and are independent of the instrument’s functions. There are no front panel keys that correspond to the commands in this group.

*CAL?(CALibrate)
Function: Executes zero calibration (zero-level compensation, same operation as pressing CAL (SHIFT+SINGLE)) and queries the result.
Syntax: *CAL?
Example: *CAL? -> 0
Description: If the calibration terminates normally, 0 is returned. If an error is detected, 1 is returned.

*CLS(Clear Status)
Function: Clears the standard event register, extended event register, and error queue.
Syntax: *CLS
Example: *CLS
Description: If the *CLS command is located immediately after the program message terminator, the output queue is also cleared.
- If the *CLS command is located immediately after the program message terminator, the output queue is also cleared.

*ESE (standard Event Status Enable register)
Function: Sets the standard event enable register or queries the current setting.
Syntax: *ESE [<NRf>]
Example: *ESE 251
*ESE? -> 251
Description: Specify the value as a sum of decimal values of each bit.
- For example, specifying "*ESE 251" will cause the standard enable register to be set to "1111011." In this case, bit 2 of the standard event register is disabled which means that bit 5 (ESB) of the status byte register is not set to 1, even if a "query error" occurs.
- The default value is "*ESE 0" (all bits disabled).
- A query using *ESE? will not clear the contents of the standard event enable register.
- For details on the standard event enable register, see page 7-5.

*ESR?(standard Event Status Register)
Function: Queries the standard event register and clears the register.
Syntax: *ESR?
Example: *ESR? -> 32
Description: A sum of decimal values of each bit is returned.
- You can check what type of events occurred when an SRQ is generated.
- For example, if a value of "32" is returned, this indicates that the standard event register is set to "00100000." In this case, you can see that the SRQ occurred due to a "command syntax error."
- A query using *ESR? will clear the contents of the standard event register.
- For details on the standard event register, see page 7-5.

*IDN?(IDeNtify)
Function: Queries the instrument model.
Syntax: *IDN?
Example: *IDN? -> YOKOGAWA,WT3004E-2A0-30A4,0,F6.01
Description: The information is returned in the following form: <Manufacturer>,<Model>,<Serial No.>,<Firmware version>
- <Model> is in the format "model (7 digits)-2 A input element configuration (3 digits)-30 A input element configuration (4 digits)" For details on the model code and input element structure, see "Checking the Contents of the Package" in the user’s manual, IM WT3001E-01EN.
- In actuality, <Serial No.> is not returned (always 0).
**OPC (Operation Complete)**

**Function**
Sets bit 0 (OPC bit) of the standard event register to 1 upon the completion of the specified overlap command.

**Syntax**
*OPC*

**Example**
*OPC*

**Description**
- For the description regarding how to synchronize the program using *OPC, see page 5-9.
- The "COMMunicate:OPSE" command is used to specify the overlap command.
- If *OPC is not the last command of the message, the operation is not guaranteed.

---

**OPC? (Operation Complete)**

**Function**
ASCII code "1" is returned when the specified overlap command is completed.

**Syntax**
*OPC*

**Example**
*OPC? -> 1

**Description**
- For the description regarding how to synchronize the program using *OPC?, see page 5-9.
- The "COMMunicate:OPSE" command is used to specify the overlap command.
- If *OPC? is not the last command of the message, the operation is not guaranteed.

---

**OPT? (Option)**

**Function**
Queries the installed options.

**Syntax**
*OPT?*

**Example**
*OPT? -> G6, B5, FQ, DA, V1, C2, C7, C5, FL, MTR

**Description**
- The presence or absence of the following is returned: harmonic computation function (G6), built-in printer (B5), frequency measurement addition (FQ), 20chDA output (DA), VGA output (V1), RS-232 communications (C2), USB port (for PC, C12), Ethernet (C7), USB port (for peripherals, C5), measurement (FL), and motor evaluation function (MTR).
- If none of the options is installed, an ASCII code "0" is returned.
- The *OPT? query must be the last query of the program message. An error occurs if there is a query after this query.

---

**PSC (Power-on Status Clear)**

**Function**
Sets whether to clear the registers below at power on or queries the current setting. The register is cleared when the value rounded to an integer is a non-zero value.
- Standard event enable register
- Extended event enable register
- Transition filter

**Syntax**
*PSC {<NRf>}

<NRf> = 0 (not clear), non-zero (clear)

**Example**
*PSC 1

*PSC? -> 1

**Description**
- For details on the registers, see chapter 7.
- Also clears *OPC and *OPC? commands that have been sent earlier.
- All settings except communication settings are reset to factory default values.

---

**RST (Reset)**

**Function**
Initializes the settings.

**Syntax**
*RST*

**Example**
*RST*

**Description**
- Also clears *OPC and *OPC? commands that have been sent earlier.
- All settings except communication settings are reset to factory default values.

---

**SRE (Service Request Enable register)**

**Function**
Sets the service request enable register or queries the current setting.

**Syntax**
*SRE {<NRf>}

<NRf> = 0 to 255

**Example**
*SRE 239

*SRE? -> 175 (since the bit 6 (MSS) setting is ignored)

**Description**
- Specify the value as a sum of decimal values of each bit.
- For example, specifying "*SRE 239" will cause the service request enable register to be set to "11101111." In this case, bit 4 of the service request enable register is disabled which means that bit 4 (MAV) of the status byte register is not set to 1, even if "the output queue is not empty."
- Bit 6 (MSS) of the status byte register is the MSS bit itself, and therefore, is ignored.
- The default value is "*SRE 0" (all bits disabled).
- A query using *SRE? will not clear the contents of the service request enable register.
- For details on the service request enable register, see page 7-3.
6.24 Common Command Group

*STB? (STatus Byte)
Function Queries the status byte register.
Syntax *STB?
Example *STB? -> 4
Description
- The sum of the bits is returned as a decimal value.
  - Since the register is read without executing serial polling, bit 6 is a MSS bit not RQS.
  - For example, if a value of 4 is returned, this indicates that the status byte register is set to "00000100." In this case, you can see that "the error queue is not empty" (an error occurred).
  - A query using "STB?" will not clear the contents of the status byte register.
  - For details on the status byte register, see page 7-3.

*TRG (TRiGger)
Function Executes single measurement (the same operation as when SINGLE is pressed).
Syntax *TRG
Example *TRG
Description The multi-line message GET (Group Execute Trigger) also performs the same operation as this command.

*TST? (TeST)
Function Performs a self-test and queries the result.
Syntax *TST?
Example *TST? -> 0
Description
- The self-test involves internal memory tests.
  - "0" is returned if the self-test is successful, "1" if it is not.
  - It takes approximately 90 s for the test to complete. When receiving a response from this instrument, set the timeout to a relatively large value.

*WAI (WAIt)
Function Holds the subsequent command until the completion of the specified overlap operation.
Syntax *WAI
Example *WAI
Description
- For the description regarding how to synchronize the program using "WAI, see page 5-8.
  - The "COMMunicate:OPSE" command is used to specify the overlap command.
Status Reports

The figure below shows the status report that is read by serial polling. This status report is an extended version of the status report defined in IEEE 488.2-1992.
7.1 Status Reports

Overview of the Registers and Queues

<table>
<thead>
<tr>
<th>Name (Function)</th>
<th>Writing</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status byte</td>
<td>–</td>
<td>Serial polling (RQS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*STB? (MSS)</td>
</tr>
<tr>
<td>Service request enable register (Status byte mask)</td>
<td>*SRE</td>
<td>*SRE?</td>
</tr>
<tr>
<td>Standard event register (Changes in device status)</td>
<td>–</td>
<td>*ESR?</td>
</tr>
<tr>
<td>Standard event enable register (Standard event register mask)</td>
<td>*ESE</td>
<td>*ESE?</td>
</tr>
<tr>
<td>Extended event register (Changes in device status)</td>
<td>–</td>
<td>:STATus:EEER?</td>
</tr>
<tr>
<td>Extended event enable register (Extended event register mask)</td>
<td>:STATus:EESE</td>
<td>:STATus:EESE?</td>
</tr>
<tr>
<td>Condition register (Current device status)</td>
<td>–</td>
<td>:STATus:CONDITION?</td>
</tr>
<tr>
<td>Transition filter (Conditions that change the extended event register)</td>
<td>:STATus:FILTER&lt;x&gt;</td>
<td>:STATus:FILTER&lt;x&gt;?</td>
</tr>
<tr>
<td>Output queue (Stores a response message to a query)</td>
<td>All query commands</td>
<td>–</td>
</tr>
<tr>
<td>Error queue (Stores the error No. and message)</td>
<td>–</td>
<td>:STATus:ERROR?</td>
</tr>
</tbody>
</table>

Registers and Queues That Affect the Status Byte

Registers that affect the bits of the status byte are shown below.

**Standard Event Register**
Sets bit 5 (ESB) of the status byte to 1 or 0.

**Output Queue**
Sets bit 4 (MAV) of the status byte to 1 or 0.

**Extended Event Register**
Sets bit 3 (EES) of the status byte to 1 or 0.

**Error Queue**
Sets bit 2 (EAV) of the status byte to 1 or 0.

Enable Registers

Registers that are used to mask a bit so that the bit will not affect the status byte even when it is set to 1, are shown below.

**Status Byte**
Mask the bits using the service request enable register.

**Standard Event Register**
Mask the bits using the standard event enable register.

**Extended Event Register**
Mask the bits using the extended event enable register.

Writing/Reading from Registers

The *ESE command is used to set the bits in the standard event enable register to 1’s or 0’s. The *ESE? command is used to query whether the bits in the standard event enable register are 1’s or 0’s. For details regarding these commands, see chapter 6.
7.2 Status Byte

Status Byte

<table>
<thead>
<tr>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQS</td>
<td>ESB</td>
<td>MAV</td>
<td>EES</td>
<td>EAV</td>
<td>1</td>
<td>0</td>
<td>MSS</td>
</tr>
</tbody>
</table>

Bits 0, 1, and 7
Not used (always 0)

Bit 2 EAV (Error Available)
Set to 1 when the error queue is not empty. In other words, this bit is set to 1 when an error occurs. See the page 7-9.

Bit 3 EES (Extend Event Summary Bit)
Set to 0 when the logical product of the extended event register and the corresponding enable register is 1. In other words, this bit is set to 1 when an event takes place inside the instrument. See the page 7-7.

Bit 4 MAV (Message Available)
Set to 1 when the output queue is not empty. In other words, this bit is set to 1 when there are data to be transmitted. See the page 7-9.

Bit 5 ESB (Event Summary Bit)
Set to 0 when the logical product of the standard event register and the corresponding enable register is 1. In other words, this bit is set to 1 when an event takes place inside the instrument. See the page 7-5.

Bit 6 RQS (Request Service)/MSS (Master Status Summary)
Set to 1 when the logical AND of the status byte excluding Bit 6 and the service request enable register is not 0. In other words, this bit is set to 1 when the instrument is requesting service from the controller.

RQS is set to 1 when the MSS bit changes from 0 to 1, and cleared when serial polling is carried out or when the MSS bit changes to 0.

Bit Masking

If you wish to mask a certain bit of the status byte so that it does not cause a SRQ, set the corresponding bit of the service request enable register to 0. For example, to mask bit 2 (EAV) so that service is not requested when an error occurs, set bit 2 of the service request enable register to 0. This can be done using the *SRE command. To query whether each bit of the service request enable register is 1 or 0, use *SRE?. For details on the *SRE command, see chapter 6.
7.2 Status Byte

Operation of the Status Byte
A service request is issued when bit 6 of the status byte becomes 1. Bit 6 is set to 1 when any of the other bits becomes a 1 (when the corresponding bit of the service request enable register is also set to 1). For example, if an event occurs and any of the bits of the logical AND of the standard event register and the corresponding enable register becomes a 1, then bit 5 (ESB) is set to 1. In this case, if bit 5 of the service request enable register is 1, bit 6 (MSS) is set to 1, thus requesting service from the controller. It is also possible to check what type of event has occurred by reading the contents of the status byte.

Reading from the Status Byte
The following two methods are provided for reading the status byte.

Inquiry Using the *STB? Query
Making an inquiry using the *STB? query sets bit 6 to MSS. This causes the MSS to be read. After completion of the read-out, none of the bits in the status byte will be cleared.

Serial Polling
Execution of a serial polling changes bit 6 to RQS. This causes RQS to be read. After completion of the read-out, only RQS is cleared. It is not possible to read MSS using serial polling.

Clearing the Status Byte
No method is provided for forcibly clearing all the bits in the status byte. The bits that are cleared for each operation are shown below.

When a Query Is Made Using the *STB? Command
No bits are cleared.

When a Serial Polling Is Executed
Only the RQS bit is cleared.

When a *CLS Command Is Received
When the *CLS command is received, the status byte itself is not cleared, but the contents of the standard event register (which affects the bits in the status byte) are cleared. As a result, the corresponding bits in the status byte are cleared, except bit 4 (MAV), since the output queue cannot be emptied by the *CLS command. However, the output queue is also cleared if the *CLS command is received just after a program message terminator.
7.3 Standard Event Register

Standard Event Register

<table>
<thead>
<tr>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>PON</td>
<td>URQ</td>
<td>CME</td>
<td>EXE</td>
<td>DDE</td>
<td>QYE</td>
<td>RQC</td>
<td>OPC</td>
</tr>
</tbody>
</table>

Bit 7 PON (Power ON)
Set to 1 when the power is turned ON.

Bit 6 URQ (User Request)
Not used (always 0)

Bit 5 CME (Command Error)
Set to 1 when the command syntax is incorrect.
Example: Received a command name with a spelling error or character data not in the selection.

Bit 4 EXE (Execution Error)
Set to 1 when the command syntax is correct but the command cannot be executed in the current state.
Example: Received a command with a parameter outside the range or a command dealing with an unsupported option.

Bit 3 DDE (Device Error)
Set to 1 when execution of the command is not possible due to an internal problem in the instrument that is not a command error or an execution error.

Bit 2 QYE (Query Error)
Set to 1 if the output queue is empty or if the data is missing even after a query has been sent.
Example: No response data; data is lost due to an overflow in the output queue.

Bit 1 RQC (Request Control)
Not used (always 0)

Bit 0 OPC (Operation Complete)
Set to 1 when the operation designated by the *OPC command (see chapter 6) has been completed.

Bit Masking

If you wish to mask a certain bit of the standard event register so that it does not cause bit 5 (ESB) of the status byte to change, set the corresponding bit of the standard event enable register to 0. For example, to mask bit 2 (QYE) so that ESB is not set to 1, even if a query error occurs, set bit 2 of the standard event enable register to 0. This can be done using the *ESE command. To query whether each bit of the standard event enable register is 1 or 0, use the *ESE? command. For details on the *ESE command, see chapter 6.
Operation of the Standard Event Register

The standard event register is provided for eight different kinds of event which can occur inside the instrument. Bit 5 (ESB) of the status byte is set to 1 when any of the bits in this register becomes 1 (or when the corresponding bit of the standard event enable register becomes 1).

Example

1. A query error occurs.
2. Bit 2 (QYE) is set to 1.
3. Bit 5 (ESB) of the status byte is set to 1 if bit 2 of the standard event enable register is 1.

It is also possible to check what type of event has occurred inside the instrument by reading the contents of the standard event register.

Reading from the Standard Event Register

The contents of the standard event register can be read by the *ESR? command. After the register is read, it is cleared.

Clearing the Standard Event Register

The standard event register is cleared in the following three cases.

- When the contents of the standard event register are read using the *ESR? command.
- When a *CLS Command Is Received
- When the instrument is power cycled.
# 7.4 Extended Event Register

Reading the extended event register tells you whether changes in the condition register (reflecting internal conditions) have occurred. A transition filter can be applied which allows you to decide which events are reported to the extended event register.

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>UPD (Updating)</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>ITG (Integrate Busy)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>ITM (Integrate Timer Busy)</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>SRB (Store/Recall Busy)</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>FOV (Frequency Over)</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>PRN (Printing)</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>ACS (Accessing)</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>PLLE (PLL Source Input Error)</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>OVR1 (Element1 Measured Data Over)</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>OVR2 (Element2 Measured Data Over)</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>OVR3 (Element3 Measured Data Over)</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>OVR4 (Element4 Measured Data Over)</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>OVRM (Motor Measured Data Over)</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>POV (ElementX Input Peak Over)</td>
<td>1</td>
</tr>
</tbody>
</table>

The meaning of each bit of the condition register is as follows:

- **Bit 0 UPD (Updating)**: Set to 1 when the measured data is being updated. The falling edge of UPD (1 -> 0) signifies the end of the updating.
- **Bit 1 ITG (Integrate Busy)**: Set to 1 while integration is in progress.
- **Bit 2 ITM (Integrate Timer Busy)**: Set to 1 while the integration timer is running.
- **Bit 3 SRB (Store/Recall Busy)**: Set to 1 while storing or recalling data.
- **Bit 4 FOV (Frequency Over)**: Set to 1 when the frequency is in error.
- **Bit 5 PRN (Printing)**: Set to 1 while the built-in printer is in operation or while data is being output to a network printer.
- **Bit 6 ACS (Accessing)**: Set to 1 when the PC card interface, USB storage medium, or network drive is being accessed.
- **Bit 7 PLLE (PLL Source Input Error)**: Set to 1 when there is no input to the PLL source and synchronization cannot be achieved during harmonic measurement.
- **Bit 8 OVR1 (Element1 Measured Data Over)**: Set to 1 when the voltage or current of element 1 is overrange.
- **Bit 9 OVR2 (Element2 Measured Data Over)**: Set to 1 when the voltage or current of element 2 is overrange.
- **Bit 10 OVR3 (Element3 Measured Data Over)**: Set to 1 when the voltage or current of element 3 is overrange.
- **Bit 11 OVR4 (Element4 Measured Data Over)**: Set to 1 when the voltage or current of element 4 is overrange.
- **Bit 14 OVRM (Motor Measured Data Over)**: Set to 1 when the speed or torque of the motor input is overrange.
- **Bit 15 POV (ElementX Input Peak Over)**: Set to 1 when peak over (input exceeding the peak) is detected in any of the elements.
### 7.4 Extended Event Register

The transition filter parameters detect changes in the specified bit (numerical suffix, 1 to 16) of the condition register in the following manner and overwrite the extended event register.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISE</td>
<td>The specified bit of the extended event register is set to 1 when the bit of the condition register changes from 0 to 1.</td>
</tr>
<tr>
<td>FALL</td>
<td>The specified bit of the extended event register is set to 1 when the bit of the condition register changes from 1 to 0.</td>
</tr>
<tr>
<td>BOTH</td>
<td>The specified bit of the extended event register is set to 1 when the bit of the condition register changes from 0 to 1 or 1 to 0.</td>
</tr>
<tr>
<td>NEVER</td>
<td>Always 0.</td>
</tr>
</tbody>
</table>
7.5 Output Queue and Error Queue

Output Queue

The output queue is provided to store response messages to queries. For example, if you send the WAVeform:SEND? command, which requests the output of acquired data, the data is stored in the output queue until it is read. As shown below, data are stored in order and read from the oldest ones first. The output queue is emptied in the following cases (in addition to when read-out is performed).

- When a new message is received from the controller.
- When a deadlock occurs (see page 5-2).
- When a device clear command (DCL or SDC) is received.
- When the instrument is power cycled.

The output queue cannot be emptied using the *CLS command. To see whether the output queue is empty or not, check bit 4 (MAV) of the status byte.

Error Queue

The error queue stores the error No. and message when an error occurs. For example, if the controller sends an incorrect program message, the error number and message "113, Undefined header" are stored in the error queue when the error is displayed. The contents of the error queue can be read using the STATus:ERRor? query. As with the output queue, the messages are read from the oldest ones first. When the error queue overflows, the last message is replaced by the message "350, Queue overflow."

The error queue is emptied in the following cases (in addition to when read-out is performed).

- When a *CLS command is received
- When the instrument is power cycled.

To see whether the error queue is empty or not, check bit 2 (EAV) of the status byte.
## Appendix 1 ASCII Character Codes

The following table shows the ASCII character codes.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>66</td>
<td>100</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>30</td>
<td>48</td>
<td>50</td>
<td>64</td>
<td>80</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>21</td>
<td>31</td>
<td>41</td>
<td>51</td>
<td>61</td>
<td>71</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>22</td>
<td>32</td>
<td>42</td>
<td>52</td>
<td>62</td>
<td>72</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>23</td>
<td>33</td>
<td>43</td>
<td>53</td>
<td>63</td>
<td>73</td>
</tr>
<tr>
<td>5</td>
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<th>Listener Address</th>
<th>Talker Address</th>
<th>Secondary Command</th>
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<td>DEL</td>
<td>SP</td>
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<td>G0</td>
<td>1L0</td>
<td>41</td>
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<td>07</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>23</td>
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#### Address Command
- 0: NUL
- 1: SP
- 2: ETX
- 3: FS
- 4: GS
- 5: RS
- 6: US
- 7: SI

#### Universal Command
- 0: DEL
- 1: SOH
- 2: STX
- 3: ETX
- 4: FS
- 5: GS
- 6: RS
- 7: SI

#### Listener Address
- 0: NUL
- 1: SP
- 2: ETX
- 3: FS
- 4: GS
- 5: RS
- 6: US
- 7: SI

#### Talker Address
- 0: NUL
- 1: SP
- 2: ETX
- 3: FS
- 4: GS
- 5: RS
- 6: US
- 7: SI

#### Secondary Command
- 0: NUL
- 1: SP
- 2: ETX
- 3: FS
- 4: GS
- 5: RS
- 6: US
- 7: SI
Appendix 2  Error Messages

This section explains the communication error messages.

- The messages can be displayed in English or Japanese on this instrument. However, if a message is queried with the `:STATus:ERRor?` command and displayed on a PC, the message is displayed in English.
- If servicing is required, contact your nearest YOKOGAWA dealer for repairs.
- Only error messages related to communications are listed here. For other error messages, see User’s Manual IM WT3001E-01EN.

### Error in Communication Command (100-199)

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<td>Syntax error</td>
<td>Invalid syntax.</td>
<td>Chapter 5, 6</td>
</tr>
<tr>
<td>103</td>
<td>Invalid separator</td>
<td>Use a comma to separate the data.</td>
<td>5-1</td>
</tr>
<tr>
<td>104</td>
<td>Data type error</td>
<td>See pages 5-6 and 5-7 and write using the correct data form.</td>
<td>5-6 and 5-7</td>
</tr>
<tr>
<td>108</td>
<td>Parameter not allowed</td>
<td>Check the number of data points.</td>
<td>5-6, chapter 6</td>
</tr>
<tr>
<td>109</td>
<td>Missing parameter</td>
<td>Enter the required data.</td>
<td>5-6, chapter 6</td>
</tr>
<tr>
<td>111</td>
<td>Header separator error</td>
<td>Use a space to separate the header and data.</td>
<td>5-1</td>
</tr>
<tr>
<td>112</td>
<td>Program mnemonic too long</td>
<td>Check the mnemonic (alphanumeric character string).</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>113</td>
<td>Undefined header</td>
<td>Check the header.</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>114</td>
<td>Header suffix out of range</td>
<td>Check the header.</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>120</td>
<td>Numeric data error</td>
<td>A number is required in the <code>&lt;NRf&gt;</code> form.</td>
<td>5-6</td>
</tr>
<tr>
<td>123</td>
<td>Exponent too large</td>
<td>Use a smaller exponent for <code>&lt;NR3&gt;</code> format.</td>
<td>5-6, chapter 6</td>
</tr>
<tr>
<td>124</td>
<td>Too many digits</td>
<td>The value must be less than equal to 255 digits.</td>
<td>5-6, chapter 6</td>
</tr>
<tr>
<td>128</td>
<td>Numeric data not allowed</td>
<td>Enter in a format other than <code>&lt;NRf&gt;</code> format.</td>
<td>5-6, chapter 6</td>
</tr>
<tr>
<td>131</td>
<td>Invalid suffix</td>
<td>Check the unit of the <code>&lt;Voltage&gt;</code>, <code>&lt;Current&gt;</code>, <code>&lt;Time&gt;</code>, and <code>&lt;Frequency&gt;</code>.</td>
<td>5-6</td>
</tr>
<tr>
<td>134</td>
<td>Suffix too long</td>
<td>Check the unit of the <code>&lt;Voltage&gt;</code>, <code>&lt;Current&gt;</code>, <code>&lt;Time&gt;</code>, and <code>&lt;Frequency&gt;</code>.</td>
<td>5-6</td>
</tr>
<tr>
<td>138</td>
<td>Suffix not allowed</td>
<td>No units are allowed other than <code>&lt;Voltage&gt;</code>, <code>&lt;Current&gt;</code>, and <code>&lt;Frequency&gt;</code>.</td>
<td>5-6</td>
</tr>
<tr>
<td>141</td>
<td>Invalid character data</td>
<td>Select character data from the selections available in `[...</td>
<td>...</td>
</tr>
<tr>
<td>144</td>
<td>Character data too long</td>
<td>Check the spelling of the character strings in `[...</td>
<td>...</td>
</tr>
<tr>
<td>148</td>
<td>Character data not allowed</td>
<td>Write in a data form other than `[...</td>
<td>...</td>
</tr>
<tr>
<td>150</td>
<td>String data error</td>
<td>Enclose <code>&lt;String&gt;</code> in double quotation or single quotation marks.</td>
<td>5-7</td>
</tr>
<tr>
<td>151</td>
<td>Invalid string data</td>
<td><code>&lt;String&gt;</code> is too long or contains characters which cannot be used.</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>158</td>
<td>String data not allowed</td>
<td>Enter in a data format other than <code>&lt;String&gt;</code>.</td>
<td>Chapter 6</td>
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## Appendix 2 Error Messages

### Error in Communication Execution (200 to 299)

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<td>161</td>
<td>Invalid block data</td>
<td>&lt;Block data&gt; is not allowed.</td>
<td>5-7, chapter 6</td>
</tr>
<tr>
<td>168</td>
<td>Block data not allowed</td>
<td>&lt;Block data&gt; is not allowed.</td>
<td>5-7, chapter 6</td>
</tr>
<tr>
<td>171</td>
<td>Invalid expression</td>
<td>Equations cannot be used.</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>178</td>
<td>Expression data not allowed</td>
<td>Equations cannot be used.</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>181</td>
<td>Invalid outside macro definition</td>
<td>Macro functions defined in IEEE488.2 are not supported.</td>
<td>–</td>
</tr>
</tbody>
</table>

### Error in Communication Query (400 to 499)

<table>
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<tr>
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<th>Messages</th>
<th>Corrective Action</th>
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</thead>
<tbody>
<tr>
<td>410</td>
<td>Query INTERRUPTED</td>
<td>Check transmission/reception order.</td>
<td>5-2</td>
</tr>
<tr>
<td>420</td>
<td>Query UNTERMINATED</td>
<td>Check transmission/reception order.</td>
<td>5-2</td>
</tr>
<tr>
<td>430</td>
<td>Query DEADLOCKED</td>
<td>Limit the length of the program message including &lt;PMT&gt; to 1024 bytes or less.</td>
<td>5-2</td>
</tr>
<tr>
<td>440</td>
<td>Query UNTERMINATED after indefinite response</td>
<td>Do not specify a query after the *IDN? or *OPT? command.</td>
<td>–</td>
</tr>
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### Error in System Operation (912 to 914)

<table>
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<tr>
<td>912</td>
<td>Fatal error in Communication-driver</td>
<td>Servicing required.</td>
<td>–</td>
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</table>
## Appendix 2 Error Messages

### Warning (5)

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<tr>
<td>5</td>
<td>*OPC/? exists in message</td>
<td>Place the *OPC or *OPC? command at the end of the program message.</td>
<td>–</td>
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### Other Errors (350, 390)

<table>
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<tr>
<td>350</td>
<td>Queue overflow</td>
<td>Read the error queue.</td>
<td>7-9</td>
</tr>
<tr>
<td>390</td>
<td>Overrun error (RS-232 only)</td>
<td>Lower the baud rate.</td>
<td>–</td>
</tr>
</tbody>
</table>

**Note**

Code 350 indicates overflow of error queue. This code is returned as a response to the "STATus:ERRor?" query; it does not appear on the screen.
Appendix 3 IEEE 488.2-1992

The GP-IB interface of the instrument conforms to the IEEE 488.2-1992 Standard. This standard specifies that the following 23 points be stated in the document. This section describes these points.

(1) Of the IEEE 488.1 interface functions, the subsets that are supported
See section 1.3, "GP-IB Interface Specifications."

(2) The operation of the device when it is assigned an address outside the 0 to 30 range
The address of this instrument cannot be set to an address outside the 0 to 30 range.

(3) Reaction of the device when the user changes the address
The address change occurs when the address is specified using the MISC key menu. The new address is valid until the next time it is changed.

(4) Device settings at power-up. The commands that can be used at power-up.
Basically, the previous settings (i.e. the settings which were valid when power was turned OFF) are valid.
All commands can be used at power-up.

(5) Message exchange options
   a) Input buffer size
      1024 bytes
   b) Queries that return multiple response units
      See the example of the commands given in chapter 6.
   c) Queries that create response data when the command syntax is being analyzed
      All queries create response data when the command syntax is analyzed.
   d) Queries that create response data during reception
      There are no queries of which the response data are created upon receiving a send request from the controller.
   e) Commands that have parameters the restrict one another
      See the example of the commands given in chapter 6.

(6) Items that are included in the functional or composite header elements constituting a command
See chapter 5 and 6.

(7) Buffer sizes that affect block data transmission
During block data transmission, the output queue is expanded according to the size.

(8) A list of program data elements that can be used in equations and their nesting limitations
No equations can be used.

(9) Syntax of the responses to queries
See the example of the commands given in chapter 6.
(10) Communication between devices that do not follow the response syntax
None.

(11) Size of the response data block
1 to 30892 bytes

(12) A list of supported common commands
See section 6.24, “Common Command Group.”

(13) Device condition after a successful calibration
Measurement execution condition.

(14) The maximum length of block data that can be used for the *DDT trigger macro
definition
Not supported.

(15) The maximum length of the macro label for defining macros, the maximum
length of block data that can be used for the macro definition, and the process
when recursion is used in macro definitions
Macro functions are not supported.

(16) Reply to the IDN? query
See section 6.24, “Common Command Group.”

(17) The size of the storage area for protected user data for *PUD and *PUD?
commands
*PUD and *PUD? are not supported.

(18) The length of the *RDT and *RDT? resource names
*RDT and *RDT? are not supported.

(19) The change in the status due to *RST, *LRN?, *RCL, and *SAV
*RST
See section 6.24, “Common Command Group.”
*LRN?, *RCL, and *SAV
These common commands are not supported.

(20) The extent of the self-test using the *TST? command
Executes all the MEMORY tests (each internal memory) of the Self Test menu of
the MISC key.

(21) The structure of the extended return status
See chapter 7.

(22) Whether each command is processed in an overlap fashion or sequentially
See section 5.5, “Synchronization with the Controller” and chapter 6.

(23) The description of the execution of each command
See the functions of each command in chapter 6, User’s Manual IM WT3001E-
01EN, and Expansion Function User’s Manual IM WT3001E-51EN.
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