HIOKI

SM7420

Communications Command
Instruction Manual

SUPER MEGOHM METER

- ✓ This manual explains the communication commands for Model SM7420 Super Megohm Meter.
- ✓ Please refer to the instruction manual for Model SM7420 for details regarding command settings.
- ✓ Although all reasonable care has been taken in the production of this manual, should you find any points which are unclear or in error, please contact your local distributor or the HIOKI International Sales Department at os-com@hioki.co.jp.
- ✓ In the interest of product development, the contents of this manual may be subject to revision without notice.
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EN

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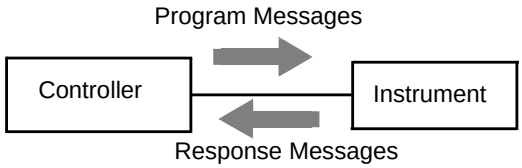
Contents

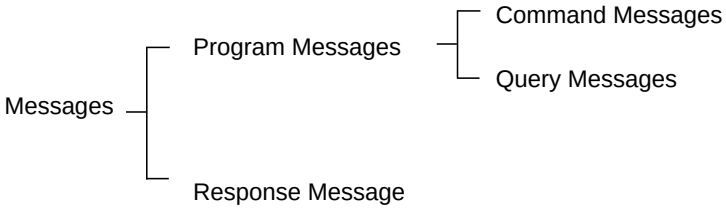
1 Introduction

If the [COMMAND MONITOR] function is used at the time of program creation, commands and responses will be conveniently displayed on the measurement screen. For information on the [COMMAND MONITOR] function, see the instruction manual of the instruments.

Various messages are supported for controlling the instrument through the interfaces.
Messages can be either program messages, sent from the controller such as PC to the instrument, or response messages, sent from the instrument to the controller.



Message types are further categorized as follows.



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

Message Format

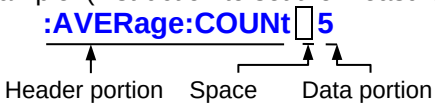
Program Messages

Program messages can be either Command Messages or Query Messages.

(1) Command Messages

Instructions to control the instrument, such as to change settings or reset

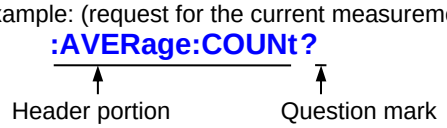
Example: (instruction to set the measurement average)



(2) Query Messages

Requests for responses relating to results of operation or measurement, or the state of instrument settings

Example: (request for the current measurement average)



See: “Headers (p.2)”, “Separators (p.3)”, “Data Formats (p.3)”

Response Messages

When a query message is received, its syntax is checked and a response message is generated. **:SYSTem:HEADer** command determines whether headers are prefixed to response messages.

Header ON	**:RANGE 1,200pA**
Header OFF	**1,200pA**
	(The current measurement range of CH1 is 200pA)

At power-on, Header OFF is selected.
If an error occurs when a query message is received, no response message is generated for that query.
Some query message has no header, such as **:MEASure?**.

Command Syntax

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

:CALibration?	OK (long form)
:CALIBRATION?	OK (long form)
:CAL?	OK (short form)
:CALIB?	Error
:CA?	Error

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

Headers

Headers must always be prefixed to program messages.

(1) Command Program Headers

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

- **Headers for Simple Commands**
  This header type is a sequence of letters and digits
  :RANGe
- **Headers for Compound Commands**
  These headers consist of multiple simple command type headers separated by colons “:”
  :RANGe:AUTO
- **Headers for Standard Commands**
  This header type begins with an asterisk “*”, indicating that it is a standard command defined by IEEE 488.2.
  ***RST**

(2) Query Program Header

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

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

:AVERage?
:MEASure?
:MEASure:MONItor?

Message Terminators

This instrument recognizes the following message terminators (delimiters):

- CR
- CR+LF

Also the terminator for response messages is as follows:

- CR+LF(USB, RS-232C, GP-IB)
- LF(Only GP-IB)

Separators

(1) Message Unit Separator

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

:RANGe 1,200pA;*IDN?

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

(2) Header Separator

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

:AVERage:COUNt 5

Header portion Space Data portion

(3) Data Separator

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

:COMParator:BEEPer HI,TYPE1,1

Header data portion comma Data portion

Data Formats

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

(1) Character Data

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

:HEADER OFF
:HEADER 0

(2) Decimal Numeric Data

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

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

The term "NRf format" includes all three of the above numeric decimal formats.
The instrument accepts NRf format data. The format of response data is specified for each command, and the data is sent in that format.

- e.g.: NR1 **:AVERage:COUNt 5**
- e.g.: NR3 **:OPEN:WORK 50E-12**

Compound Command Header Omission

When several commands having a common header are combined to form a compound command (for example, **:DISPlay:CONTrast** and **:DISPlay:BACKlight**), if they are written together in sequence, the common portion (here, **:DISPlay:**) may be omitted after its initial occurrence.
This common portion is called the “current path” (analogous to the path concept in computer file storage), and until it is cleared, the interpretation of subsequent commands presumes that they share the same common portion.

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

Full expression
:DISPlay:CONTrast 60;:DISPlay:BACKlight 80

Compacted expression
:DISPlay:CONTrast 60;BACKlight 80

This portion becomes the current path, and can be omitted from the messages immediately following.

The current path is cleared when the power is turned on, when reset by key input, by a colon “:” at the start of a command, and when a message terminator is detected.
Standard command messages can be executed regardless of the current path. They have no effect upon the current path.

A colon “:” is not required at the start of the header of a Simple or Compound command. However, to avoid confusion with abbreviated forms and operating mistakes, we recommend always placing a colon at the start of a header.

Output Queue and Input Buffer

Output Queue

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

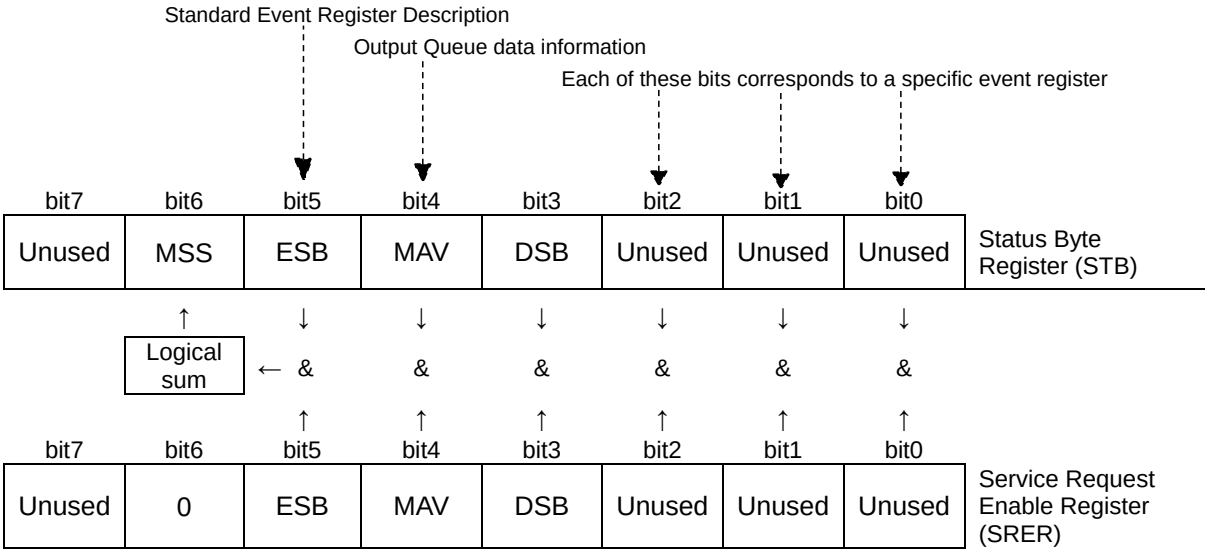
- Power on

Input Buffer

The input buffer capacity of the instrument is 256 bytes.
If 10k bytes are allowed to accumulate in this buffer so that it becomes full, the interface will not accept data beyond 10k bytes.

Note: Ensure that no command ever exceeds 10k bytes.

Status Byte Register



Overview of Service Request Occurrence

The Status Byte Register contains information about the event registers and the output queue. Required items are selected from this information by masking with the Service Request Enable Register. When any bit selected by the mask is set, bit 6 (MSS; the Master Summary Status) of the Status Byte Register is also set.

Status Byte Register (STB)

When any Status Byte Register bit enabled by the Service Request Enable Register has switched from 0 to 1, the MSS bit becomes 1.

Although the MSS bit is only read by an ***STB?** query, it is not cleared until a clear event is initiated by the ***CLS** command.

Bit 7	ERR	Fatal Error.
Bit 6	MSS	This is the logical sum of the other bits of the Status Byte Register.
Bit 5	ESB	Standard Event Status (logical sum) bit This is logical sum of the Standard Event Status Register.
Bit 4	MAV	Message arrival
Bit 3	DSB	Event summary (logical sum) bit 1 This is logical sum of the Event Status Register.
Bit 2	-	Unused
Bit 1	-	Unused
Bit 0	-	Unused

Service Request Enable Register (SRER)

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

Event Registers

Standard Event Status Register (SESR)

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

See: “Standard Event Status Register (SESR) and Standard Event Status Enable Register (SESER)” (p.7)

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

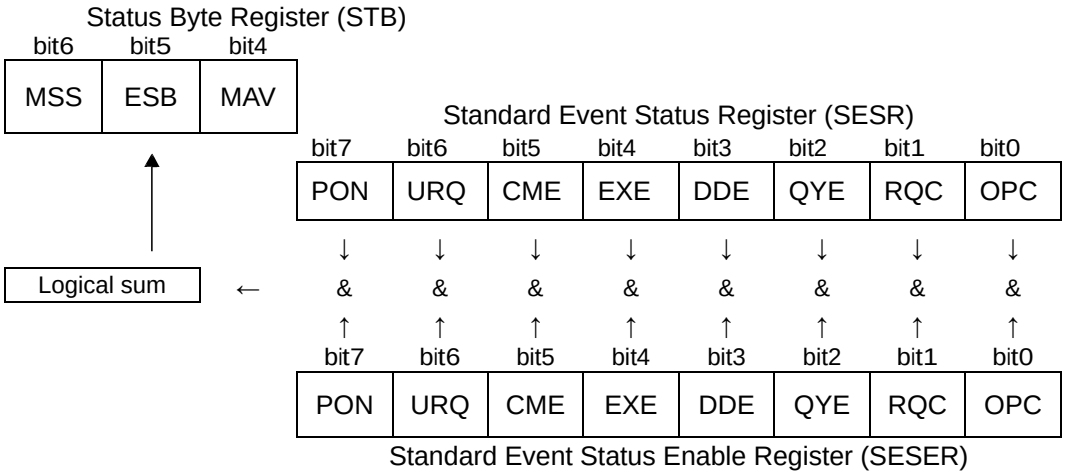
- When a ***CLS** command is executed
- When an event register query (***ESR?**) is executed
- When the instrument is powered on

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

Standard Event Status Enable Register (SESER)

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

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



Device-Specific Event Status Registers (DESR)

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

When any bit in one of these Event Status Registers enabled by its corresponding Event Status Enable Register is set to 1, Status Byte Register, bit 3 (DSB) is set to 1.

Event Status Registers are cleared in the following situations:

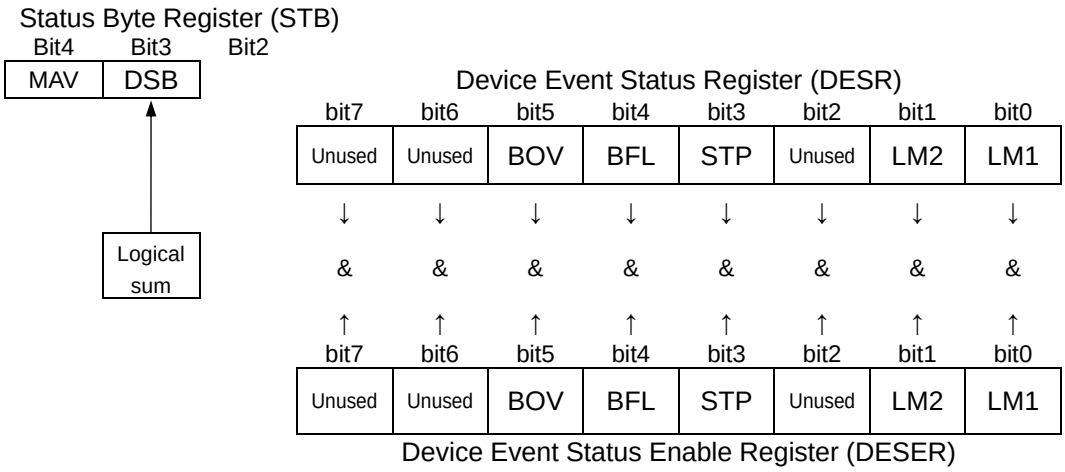
- When a *CLS command is executed
- When an Event Status Register query (:DSR?) is executed
- When the instrument is powered on

Device Event Status Register (DESR)		
Bit 7	-	Unused
Bit 6	-	Unused
Bit 5	BOV	**Measured data buffer overflow** Set when data is lost due to overflow of the measured data buffer. Reset by reading this register.
Bit 4	BFL	**Measure data buffer full** Set when the measured data buffer becomes full. Reset when the buffer becomes empty.
Bit 3	STP	**Measurement stop event** Set by one of the following factors: The [STOP] key is pressed. STOP was input by the handler interface. The :STOP command is received. Reset by reading this register.
Bit 2	-	Reserved bit
Bit 1	LM2	Reserved bit
Bit 0	LM1	Reserved bit

Device-Specific Event Status Enable Register (DESER)

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

Device-Specific Event Status Register (DESR) and Device-Specific Event Status Enable Register (DESER)



Register Reading and Writing

Register	Read	Write
Status Byte Register	***STB?**	-
Service Request Enable Register	***SRE?**	***SRE**
Standard Event Status Register	***ESR?**	-
Standard Event Status Enable Register	***ESE?**	***ESE**
Device Event Status Register 0	**:DSR?**	-
Device Event Status Enable Register 0	**:DSE?**	**:DSE**

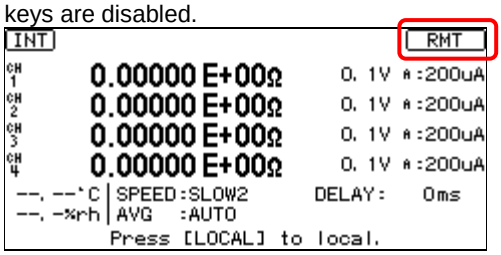
Initialization Items

Item \ Initialization Method	At Power-on	*RST Command	:RESet:SYSTem Command	:RESet:NORMal Command	*CLS Command
Interface setting	-	-	-	-	-
Device-specific functions (range, etc.)	-	●	●	●	-
Panel save data	-	-	●	-	-
Input buffer	●	-	-	-	-
Status Byte Register	●	-	-	-	●
Event registers	●*1	-	-	-	●
Enable register	●	-	-	-	-
Current path	●	-	-	-	-
Headers on/off	OFF	-	-	-	-

*1. Except the PON bit (bit 7).

Local Function

The Remote state is entered during communication. [RMT] is displayed in the measurement display and operation keys are disabled.



Canceling the Remote state

- Pressing the LOCAL key on the front panel cancels the Remote state and enables key operations.
- Sending **:SYSTem:LOCal** command can also cancel the Remote state.

Command Execution Time

Command execution time indicates the time for analyzing and processing long form commands.

- Display delays may occur depending on the frequency of communication processes and process contents.
- All commands except ***TRG** and **:CAL** are processed sequentially.
- In communications with the controller, time must be added for data transmission. Transfer time depends on the controller.
  The Transfer time, with start bit 1, data length 8, no parity, and stop bit 1, has a total of 10-bit. When the transfer speed (baud rate) setting is N bps, the general result will be as follows:
  Transfer time T [1 character/sec] = Baud rate N [bps]/10 [bits]
  If a measurement value is 11 characters, a 1 data transfer time will be 11/T.
  (Example) For 9600 bps, 11/(9600/10) = Approx. 11 ms

Errors During Communications

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

- Command Error
  When message syntax (spelling) is invalid
  When the data format in a command or query is invalid
- Execution Error
  When invalid character or numeric data is present

2 Message List

category	command	function
Standard Commands	*IDN?	Query Instrument ID (Identification Code)
	*RST	Internal Operation
	*TST?	Execute Self-Test and Query Result
	*OPC	Set OPC bit of SESR when Finished with All Pending Operations
	*OPC?	Respond with ASCII “1” when Finished with All Pending Operations
	*WAI	Wait for Pending Commands to Finish
	*CLS	Clear Event Register, Status Byte Register (Except Output Queue)
	*ESE	Set Standard Event Status Enable Register (SESER)
	*ESE?	Query Standard Event Status Enable Register (SESER)
	*ESR?	Query and Clear Standard Event Status Register (SESR)
	*SRE	Set Service Request Enable Register (SRER)
	*SRE?	Query Service Request Enable Register (SRER)
	*STB?	Query Status Byte and MSS Bit
	*TRG	Request a Sample
Measurement status	:STARt	Measurement start
	:STOP	Measurement stop
	:STATe?	Query measurement status
Reading Measured Values	:MEASure?	Query Measurement value
	:MEASure:COMParator?	Query Judgment of Measured Value
	:MEASure:RESult?	Query Measurement value and Judgment
	:MEASure:CLEar	Clear Measuremt Value and Judgment Value
Tempureture and Humidity value	:MEASure:TEMPerature?	Query Tempureture value
	:MEASure:HUMidity?	Query Humidity value
Measured value display mode	:MEASure:MODE	Set Measured value display mode
	:MEASure:MODE?	Query Measured value display mode
Measuremt Format	:MEASure:FORMat	Set Measuremt format
	:MEASure:FORMat?	Query Measuremt format
The Number of Displayed digits	:MEASure:DIGit	Set The Number of Displayed digits
	:MEASure:DIGit?	Query The Number of Displayed digits
Current Channel	:CCHannel	Set Current channel
	:CCHannel?	Query Current channel
Applied Voltage	:VOLTage	Set Applied Voltage
	:VOLTage?	Query Applied Voltage
Measurement Speed	:SPEEd	Set Measurement Speed
	:SPEEd?	Query Measurement Speed
Range	:RANGe	Set Current Range
	:RANGe?	Query Current Range
	:RANGe:AUTO	Set Auto Range
	:RANGe:AUTO?	Query Auto Range
Delay	:DELay	Set Delay time
	:DELay?	Query Delay time
Average	:AVERage	Set Average
	:AVERage?	Query Average
	:AVERage:COUNt	Set average hold times
	:AVERage:COUNt?	Query average hold times

category	command	function
Trigger	:TRIGger	Set Trigger Source
	:TRIGger?	Query Trigger Source
Self-Calibration	:CALibration?	Execute and Query Self-Calibration
	:CALibration:AUTO	Set Self-Calibration AUTO
	:CALibration:AUTO?	Query Self-Calibration AUTO
	:CALibration:TIME	Set Self-Calibration time
	:CALibration:TIME?	Query Self-Calibration time
Contact check	:CONTactcheck:FREQuency	Set contact check frequency
	:CONTactcheck:FREQuency?	Query contact check frequency
	:CONTactcheck:WORKc	Set contact check range
	:CONTactcheck:WORKc?	Query contact check range
	:CONTactcheck:CABLe	Set contact check cable length
	:CONTactcheck:CABLe?	Query contact check cable length
	:CONTactcheck:CABLe:AUTO?	Query contact check cable length auto
	:CONTactcheck:DELay	Set contact check delay
	:CONTactcheck:DELay?	Query contact check delay
	:OPEN?	Query Jig capacity open correction
	:OPEN:VALue?	Query Jig capacity open value
	:OPEN:ERRor?	Query Jig capacity open judgment
	:CONTactcheck:STATe	Set contact check state
	:CONTactcheck:STATe?	Query contact check state
	:CONTactcheck:LIMit	Set contact check limit
	:CONTactcheck:LIMit?	Query contact check limit
	:CONTactcheck?	Execute and Query contact check
	:CONTactcheck:VALue?	Query contact check value
Drawing update during measurement	:DISPlay:UPDate	Set drawing update during measurement
	:DISPlay:UPDate?	Query drawing update during measurement
Resistivity measurement	:ELECtric:D1	Set Diameter of the main electrode (D1)
	:ELECtric:D1?	Query Diameter of the main electrode (D1)
	:ELECtric:D2	Set Internal Diameter of the counter electrode (D2)
	:ELECtric:D2?	Query Internal Diameter of the counter electrode (D2)
	:ELECtric:T	Set Thickness of sample(t)
	:ELECtric:T?	Query Thickness of sample(t)
	:ELECtric:K	Set Electrode constant (K)
	:ELECtric:K?	Query Electrode constant (K)
Comparator	:COMParator:LIMit	Set Comparator
	:COMParator:LIMit?	Query Comparator
	:COMParator:BEEPer	Set Comparator Beeper
	:COMParator:BEEPer?	Query Comparator Beeper
Panel saving and loading	:PANel:SAVE	Set Panel saving
	:PANel:SAVE?	Query already panel saving
	:PANel:LOAD	Load panel data
	:PANel:NAME	Set panel name
	:PANel:NAME?	Query panel name
	:PANel:CLEar	Delete panel data

category	command	function
Key Beeper	:KEY:BEEPer	Set Key Beeper
	:KEY:BEEPer?	Query Key Beeper
Key-lock	:SYSTem:KLOCk	Set Key-Lock State
	:SYSTem:KLOCk?	Query Key-Lock State
Internal memory	:MEMory?	Query measurement value in memory
	:MEMory:RANGe?	Query measurement value in memory (range specification)
	:MEMory:STATe	Set memory state
	:MEMory:STATe?	Query memory state
	:MEMory:COUNt?	Query number of measurement value
	:MEMory:CLEar	Set Memory clear
D/A output function	:DAOutput	Set D/A output function
	:DAOutput?	Query D/A output function
LCD	:DISPlay:MODE	Set Display Mode
	:DISPlay:MODE?	Query Display Mode
	:DISPlay:CONTrast	Set Contrast
	:DISPlay:CONTrast?	Query Contrast
	:DISPlay:BACKlight	Set Backlight
	:DISPlay:BACKlight?	Query Backlight
Line Frequency	:SYSTem:LFRequency	Set Line Frequency
	:SYSTem:LFRequency?	Query Line Frequency
	:SYSTem:LFRequency:AUTO?	Query Automatic detection Line Frequency
Reset	Reset	Initialize Instrument (System Reset)
ExternalI/O	:IO:EDGE	Set Trigger edge
	:IO:EDGE?	Query Trigger edge
	:IO:FILTer:STATe	Set TRIG Signal's Filter
	:IO:FILTer:STATe?	Query TRIG Signal's Filter
	:IO:FILTer:TIME	Set TRIG Signal's Filter Tim
	:IO:FILTer:TIME?	TRIG Signal's Filter Tim
	:IO:EOM:MODE	Set EOM Output Method
	:IO:EOM:MODE?	Query EOM Output Method
	:IO:EOM:PULSe	Set EOM Pulse Width
	:IO:EOM:PULSe?	Query EOM Pulse Width
	:IO:OUTPin?	Query Output Pin Status
	:IO:MODE?	Query NPN/PNP Switch Status
Device Event Status Enable Register	:DSE	Set Device Event Status Enable Register
	:DSE?	Query Device Event Status Enable Register
	:DSR?	Query Device Event Status Register
	:ERR?	Query error register
Command header	:HEADer	Set Header Presence
	:HEADer?	Query Header Presence
Communication setting	:SYSTem:LOCal	Return to Local Control
	:SYSTem:TERMinator	Set Delimiter
	:SYSTem:TERMinator?	Query Delimiter

3 Message Reference

Message Reference Interpretation

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

Numeric Parameters:

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

Shows the command description.

Shows the message syntax.
Explains the command data or response message.
Describes the message.

Shows an example of an actual command application. (Normally described with HEADER OFF [except the HEADER command itself].)

Read/Write the Standard Event Status Enable Register (SESER)

Syntax

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

Query: ***ESE?**

Response: <0 to 255 (NR1)>

Description

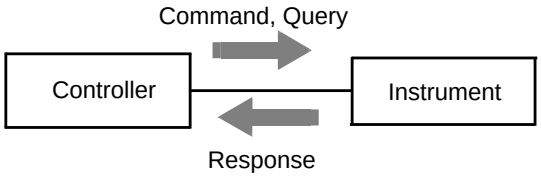
Command: The SESER mask is set to the numerical value 0 to 255. The initial value (at power-on) is 0.

Query: The contents of the SESER, as set by the *ESE command, are returned as an NR1 value (0 to 255).

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

Example ***ESE 36**

(Sets bits 5 and 2 of SESER)



Standard Commands

(1) System Data Command

Query Instrument ID (Identification Code)

Syntax

Query ***IDN?**

Response <Manufacturer name>,<Model name>,<Serial number>,<Software version>

Example

*IDN?
HIOKI, SM7420,123456789,V1.00
The Instrument ID is HIOKI SM71420, serial number 123456789, software version 1.00.

(2) Internal Operation Command

Initialize Instrument (Normal Reset)

Syntax

Command ***RST**

Description

Command Resets the instrument to factory settings excluding the communication state, , zero adjustment value and saved data.(Normal Reset)
The initial display is displayed after initialization.

Note

The communication state is not initialized.
Use the **:RESet:SYSTem** command to initialize the zero adjustment value and saved data.

Execute Self-Test and Query Result

Syntax

Query ***TST?**

Response <0 to 1 (NR1)>
<0> = No error
<1> = ROM error

Description

Perform the instrument self-test and return the result as NR1 value 0 or 1.
Returns zero when no error occurs.
The response message has no header.

Example

*TST?
1
A ROM error occurred.

(3) Synchronization Commands

Set OPC bit of SESR when Finished with All Pending Operations

Syntax

Command ***OPC**

Description

Sets OPC bit 0 of the Standard Event Status Register (SESR) when all commands prior to *OPC have finished processing.

Example

A;B;*OPC;C
The OPC bit of SESR is set after A and B command processing has been completed.

Respond with ASCII “1” when Finished with All Pending Operations

Syntax

Query ***OPC?**

Response **1**

Description

Responds with ASCII “1” when all commands prior to *OPC have finished processing.
The response message has no header.

Wait for Pending Commands to Finish

Syntax Command ***WAI**

Description The instrument waits until all prior commands finish before executing any subsequent commands.

Example
:TRIGger EXTernal
*TRG;*WAI;MEASure?
Reads the measurement value after waiting for the measurement triggered by the *TRG command to finish.

Note The *WAI command is accepted, as it is a mandatory command under IEEE Standard 488.2-1987. However, since all the device-specific commands implemented in this instrument, except the *TRG are sequential, the *WAI command has no effect even if used.

(4) Status and Event Control Commands

Clear Event Register, Status Byte Register (Except Output Queue)

Syntax Command ***CLS**

Description Clears the event status registers. The Status Byte Register bits corresponding to the event status registers are also cleared. (STB, SESR, DESR)

Note The output queue is unaffected.

Set and Query Standard Event Status Enable Register (SESER)

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

Description
Command: The SESER mask is set to the numerical value 0 to 255. The initial value (at power-on) is 0.

Query: The contents of the SESER, as set by the *ESE command, are returned as an NR1 value (0 to 255).

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

Example *ESE 32
Sets bit 5 of SESER.

Query and Clear Standard Event Status Register (SESR)

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

Description Returns the contents of the SESR as an NR1 value from 0 to 255, then clears register contents.
The response message has no header.

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

Example
*ESR?
32
Bit 5 of the SESR has been set to 1.

Set and Query Service Request Enable Register (SRER)

Syntax

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

Description

Command: The SRER mask is set to the numerical value 0 to 255.
Although NRf numerical values are accepted, values to the right of the decimal are rounded to the nearest integer.
Bit 6 and unused bits 0, 1, 2 and 6 are ignored. The data is initialized to 0 at power-on.

Query: The contents of the SRER, as set by the *SRE command, are returned as an NR1 value (0 to 255). Bit 6 and unused bits 0, 1, 2 and 6 always return as zero.

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
ERR	0	ESB	MAV	DSB	Unused	Unused	Unused

Example

*SRE 40
Set SRER bits 3 and 5 to 1.

*SRE?
40
SRER bits 3 and 5 have been set to 1.

Query Status Byte and MSS Bit

Syntax

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

Description

The contents of the STB are returned as an NR1 value (0 to 255).
The response message has no header.

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
ERR	MSS	ESB	MAV	DSB	Unused	Unused	Unused

Example

*STB?
1
STB bit 0 has been set to 1.

Request a Sample

Syntax

Command ***TRG**

Description

Performs one measurement when external triggering (:TRIGger EXTernal) is enabled.

Example

:TRIGger EXTernal
*TRG;MEASure?
Reads the measurement value after waiting for the measurement triggered by *TRG command to finish.

Note

An execution error occurs when the trigger source is :TRIGger INTernal

Device-Specific Commands

(1) Measurement status

Measurement start

Syntax command **:STARt**

Description Measuremet start.

Example :STARt
Measuremet start.

Measurement stop

Syntax command **:STOP**

Description Measuremet stop.

Example :STOP
Measuremet stop.

Query measurement status

Syntax Query **:STATe?**
Response <0～3 (NR1)>

Description

0	Stop
1	Trigger wait
2	INDEX
3	EOM

Example :STATe?
0
Now stopping.

(2) Reading Measured Values

Query Measurement value

Syntax Query **:MEASure?**

Response <CH1 measurement value(NR3)>,<CH2 measurement value(NR3)>,
<CH3 measurement value(NR3)>,<CH4 measurement value(NR3)>

Description Returns the measurement value for measured value display mode and the number of displayed digits

Example :MEASure?
6.33802E-12, 6.14502E-12, 6.33247E-12, 6.45789E-12
Measurement data (CH1) is 6.33802pA. Measurement data (CH2) is 6.14502pA.
Measurement data (CH3) is 6.33247pA. Measurement data (CH4) is 6.45789pA.
(For current measurement mode)

Query Judgment of Measured Value

Syntax Query **:MEASure:COMParator?**

Response <CH1 Judge>,<CH2 Judge>,<CH3 Judge>,<CH4 Judge>

Description Return the judgment of measured value
<Judge> = <NO/HI/IN/LO>

Example :MEASure:COMParator?
HI,IN,IN,IN
Judgment of Measured Value (CH1) has been HI
Judgment of Measured Value (CH2 – CH4) has been IN

Query Measurement value and Judgment

Syntax Query **:MEASure:RESult?** <Channel No.(NR1)>,<1～255>

Response <Measurent value and judgment value>

Description Return the measurement value and judgment value for camma
Rrsponse data is set to 0 to 255

128 bit 7	64 bit 6	32 bit 5	16 bit 4	8 bit 3	4 bit 2	2 bit 1	1 bit 0
Contact check value	Contact check result	Humidity	Tempereture	Unused	Comparator Judgment value	Measurement value	Unused

Example :MEASure:RESult? 1,70
6.33802E-12,HI,1
Measuremt value has been 6.33802pA. Judgment value has been HI
Contact check result is OK

Clear Measuremt Value and Judgment Value

Syntax command **:MEASure:CLEar**

Description Clear Measuremt Value and Judgment Value

Example :MEASure:CLEar
Clear Measuremt Value and Judgment Value

(3) Tempureture and Humidity value

Query Tempureture value

Syntax

Query **:MEASure:TEMPerature?**

Response <Tempureture(℃)(NR2)>

Description

Return tempureture value
When Z2011 has not set, return tempreture value has been 99.99

Example

:MEASure:TEMPerature?
23.45
Tempureture has been 23.45℃

Query Humidity value

Syntax

Query **:MEASure:HUMidity?**

Response <Humidity(%rh)(NR2)>

Description

Return humidity value
When Z2011 has not set, return humidity value has been 99.99

Example

:MEASure:HUMidity?
50.1
Humidity has been 50.1 %rh

(4) Measured value display mode

Set and Query Measured value display mode

Syntax

command **:MEASure:MODE** <R/A/RS/RV/RL>
Query **:MEASure:MODE?**
Response <R/A/RS/RV/RL>

Description

R … Resistance
A … Current
RS … Surface resistivity
RV … Volume resistivity
RL … Liquid volume resistivity

Example

:MEASure:MODE R
Set Resistance mode

:MEASure:MODE?
R
Measured value mode has been Resistance

(5) Measuremt Format

Set and Query Measuremt format

Syntax

command **:MEASure:FORMat** <UNIT/EXP>
Query **:MEASure:FORMat?**
Response <UNIT/EXP>

Description

UNIT … Unit format
EXP … Exponent format

Example

:MEASure:FORMat UNIT
Set unit format

:MEASure:FORMat?
UNIT
Measurement format has been Unit

(6) The Number of Displayed digits

Set and Query The Number of Displayed digits

Syntax

command	**:MEASure:DIGit** <3～6(NR1)>
Query	**:MEASure:DIGit?**
Response	<3～6(NR1)>

Example

:MEASure:DIGit 3
Set the number of displayed digits to 3

:MEASure:DIGit?
3
The number of displayed digits has been 3

(7) Current Channel

Set and Query Current channel

Syntax

command	**:CCHannel** <1～4(NR1)>
Query	**:CCHannel?**
Response	<1～4(NR1)>

Example

:CCHannel 1
Set the number of current channel to CH1

:CCHannel?
1
The number of current channel has been set to CH1

(8) Applied Voltage

Set and Query Voltage value setting for resistance calculation

Syntax

Command	**:VOLTage** <Channel No.(NR1)>,<Voltage(V)(NR2)>
Query	**:VOLTage?** <Channel No.(NR1)>
Response	<Channel No.(NR1)>,<Voltage(V)(NR2)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the voltage for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
< Voltage(V)(NR2)> = 0.1～5000.0

Example

:VOLTage 1,100
Set to Voltage of CH1 to 100V.

:VOLTage? 1
1,100
Voltage of CH1 has been set to 100V.

(9) Measurement Speed

Set and Query Measurement Speed

Syntax

command	**:SPEEd** <SLOW2/SLOW/MED/FAST2/FAST>
Query	**:SPEEd?**
Response	<SLOW2/SLOW/MED/FAST2/FAST>

Example

:SPEEd SLOW2
Set measurement speed to SLOW2.

:SPEEd?
SLOW2
Measurement speed has been set to SLOW2.

(10) Range

Set and Query Current Range

Syntax

Command: **:RANGe** <Channel No.(NR1)>,
<20pA/200pA/2nA/20nA/200nA/2uA/20uA/200uA/2mA>

Query: **:RANGe?** <Channel No.(NR1)>

Response: <Channel No.(NR1)>,
<20pA/200pA/2nA/20nA/200nA/2uA/20uA/200uA/2mA>

Description

<Channel No.(NR1)> = 1～4

Specifying 0 when issuing as a command sets the current range for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.

Example

:RANGe 1,20pA

Set current range of CH1 to 20pA.

:RANGe? 1

1,20pA

Current range of CH1 has been set to 20pA.

Set and Query Auto Range

Syntax

Command: **:RANGe:AUTO** <Channel No.(NR1)>,<ON/OFF>

Query: **:RANGe:AUTO?** <Channel No.(NR1)>

Response: <Channel No.(NR1)>,<ON/OFF>

Description

<Channel No.(NR1)> = 1～4

Specifying 0 when issuing as a command sets the auto range for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.

ON … Auto range is ON.

OFF … Auto range is OFF (HOLD range)

Example

:RANGe:AUTO 1,ON

Set auto range of CH1 to ON.

:RANGe:AUTO? 1

1,ON

Auto range of CH1 has been set to ON.

(11) Delay

Set and Query Delay time

Syntax

Command: **:DELay** <Delay time(s)(NR2)>

Query: **:DELay?**

Response: <Delay time(s)(NR2)>

Description

<Delay time(s)(NR2)> = 0.0～999.9

Example

:DELay 12.3

Set delay time to 12.3 seconds

:DELay?

12.3

Delay time has been 12.3 seconds

(12) Average

Set and Query Average

Syntax

Command	**:AVERage** <OFF/HOLD/AUTO>
Query	**:AVERage?**
Response	<OFF/HOLD/AUTO>

Description

OFF … Average is OFF
HOLD … Moving average
AUTO … The number of times of averaging is automatically changed based on the variation of the measured values

Example

:AVERage HOLD
Set average to moving average

:AVERage?
HOLD
Average has been moving average

Set and Query average hold times

Syntax

Command	**:AVERage:COUNt** <2～255(NR1)>
Query	**:AVERage:COUNt?**
Response	<2～255(NR1)>

Example

:AVERage:COUNt 5
Set average hold time to 5

:AVERage:COUNt?
5
Average hold time has been 5

(13) Trigger

Set and Query Trigger Source

Syntax

Command	**:TRIGger** <INTernal/EXTernal>
Query	**:TRIGger?**
Response	<INTERNAL/EXTERNAL>

Description

INTernal … Internal triggering
EXTernal … External triggering

Example

:TRIGger INTernal
Set the trigger source to internal triggering.

:TRIGger?
INTERNAL
The trigger source has been set to internal triggering.

(14) Self-Calibration

Execute and Query Self-Calibration

Syntax

Query	**:CALibration?**
Response	<0～1(NR1)>

Description

Execute self-calibration, return judgement
0 … Fail (NG)
1 … Success(OK)

Example

:CALibration?
1
Self-calibration has been success

Set and Query Self-Calibration AUTO

Syntax

Command	**:CALibration:AUTO** <ON/OFF>
Query	**:CALibration:AUTO?**
Response	<ON/OFF>

Example

:CALibration:AUTO ON
Set Self-calibration to AUTO

:CALibration:AUTO?
ON
Self-calibration has been AUTO

Set and Query Self-Calibration time

Syntax

Command	**:CALibration:TIME** <time(s)(NR1)>
Query	**:CALibration:TIME?**
Response	<time(s)(NR1)>

Description

<time(s)(NR2)> = 1～600

Example

:CALibration:TIME 60
Set self-calibration time to 60 seconds

:CALibration:TIME?
60
Self-calibration time has been 60 seconds

(15) Contact check

Set and Query contact check frequency

Syntax

Command	**:CONTactcheck:FREQuency** <Channel No.(NR1)>, <245kHz/300kHz>
Query	**:CONTactcheck:FREQuency?** <Channel No.(NR1)>
Response	<Channel No.(NR1)>,<245kHz/300kHz>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the contact check frequency for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.

Example

:CONTactcheck:FREQuency 1,245kHz
Set contact check frequency of CH1 to 245kHz

:CONTactcheck:FREQuency? 1
1,245kHz
Contact check frequency of CH1 has been 245kHz

Set and Query contact check range

Syntax

Command **:CONTactcheck:WORKc** <Channel No.(NR1)>,<NORMal/LOW>
Query **:CONTactcheck:WORKc?** <Channel No.(NR1)>
Response <Channel No.(NR1)>,<NORMAL/LOW >

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the contact check range for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
NORMal …capacitor upper 10pF
LOW … capacitor Lower 10pF

Example

:CONTactcheck:WORKc 1,NORMal
Set contact check range of CH1 to Normal

:CONTactcheck:WORKc? 1
1,NORMAL
Contact check frequency has been Normal.

Set and Query contact check cable length

Syntax

Command **:CONTactcheck:CABLe** <Channel No.(NR1)>,
<cable length(m)(NR2)>
Query **:CONTactcheck:CABLe?** <Channel No.(NR1)>
Response <Channel No.(NR1)>,< cable length (m)(NR2)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the contact check cable length for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
< cable length (m)(NR2)> = 0.5～3.0

Example

:CONTactcheck:CABLe 1,2.0
Set contact check cable length of CH1 to 2.0m

:CONTactcheck:CABLe? 1
1,2.0
Contact check cable length of CH1 has been 2.0m

Query contact check cable length auto

Syntax

Query **:CONTactcheck:CABLe:AUTO?**

Response <CH1 result 0～1(NR1)>, <CH2 result 0～1(NR1),
<CH3 result 0～1(NR1)>, <CH4 result 0～1(NR1)>

Description

0 … cable length auto NG
1 … cable length auto OK

Example

:CONTactcheck:CABLe:AUTO?
1,1,1,1
Contact check cable length has been set.

Set and Query contact check delay

Syntax

Command **:CONTactcheck:DELay** <Channel No.(NR1)>,<delay time(s)(NR2)>
Query **:CONTactcheck:DELay?** <Channel No.(NR1)>
Response <Channel No.(NR1)>,< delay time(s)(NR2)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the delay time for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
<delay time(s)(NR2)> = 0.0～999.9

Example

:CONTactcheck:DELay 1,1.23
Set delay time of CH1 to 1.23 seconds

:CONTactcheck:DELay? 1
1,1.230
Delay time of CH1 has been 1.23 seconds

Query Jig capacity open correction

Syntax

Query **:OPEN?**
Response <CH1 result <0～1(NR1)>, <CH2 result <0～1(NR1)>,
<CH3 result <0～1(NR1)>, <CH4 result <0～1(NR1)>

Description

Execute jig capacity open, return the judgnent
0 … Fail (NG)
1 …Success (OK)

Example

:OPEN?
1,1,1,1
Success jig capacity open

Query Jig capacity open value

Syntax

Query **:OPEN:VALue?** <Channel No.(NR1)>
Response <open value(F)(NR3)>

Description

<Channel No.(NR1)> = 1～4
By specifying 0 when issuing as a query, you can acquire a comma-delimited list of values for all channels.

Return jig open value
Unexecuted … 99.999E-99
Over … 99.999E-12

Example

:OPEN:VALue? 1
1.412E-12
Jig open value has been 1.412pF

Set and Query contact check state

Syntax

Command **:CONTactcheck:STATe** <Channel No.(NR1)>,<ON/OFF>
Query **:CONTactcheck:STATe?** <Channel No.(NR1)>
Response <Channel No.(NR1)>,<ON/OFF>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the contact check auto execute for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
ON … Auto execute before measurement
OFF … No execute

Example

:CONTactcheck:STATe 1,ON
Set contact check auto execute of CH1 to ON

:CONTactcheck:STATe? 1
1,ON
Contact check auto execute of CH1 has been ON

Set and Query contact check limit

Syntax

Command **:CONTactcheck:LIMit** <Channel No.(NR1)>,
< Judgment reference value(NR3)>
Query **:CONTactcheck:LIMit?** <Channel No.(NR1)>,
Response <Channel No.(NR1)>,<Judgment reference value (F)(NR3)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the contact check limit for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
< Judgment reference value (NR3)> = 0.00～99.99E-12

Example

:CONTactcheck:LIMit 1,50E-12
Set contact check limit of CH1 to 50pF

:CONTactcheck:LIMit? 1
1,50.00E-12
Contact check limit of CH1 has been 50pF

Execute and Query contact check

Syntax

Query **:CONTactcheck?**
Response <CH1 result 0～1(NR1)>, <CH2 result 0～1(NR1)>,
<CH3 result 0～1(NR1)>, <CH4 result 0～1(NR1)>

Description

Execute contact check, return judgment
0 … contact check NG
1 …contact check OK

Example

:CONTactcheck?
1,1,1,1
Contact check has been OK

Query contact check value

Syntax

Query: **:CONTactcheck:VALue?** <Channel No.(NR1)>
Response: <contact check value(NR3)>

Description

<Channel No.(NR1)> = 1～4
By specifying 0 when issuing as a query, you can acquire a comma-delimited list of values for all channels.
Return contact check value.
Unexecuted jig capacity open correction … 99.999E-12
Unexecuted contact check … 99.999E-12

Example

:CONTactcheck:VALue? 1
1,2.907E-12
Contact check value of CH1 has been 2.907pF

(16) Drawing update during measurement

Set and Query drawing update during measurement

Syntax

Command: **:DISPlay:UPDate** <ON/OFF>
Query: **:DISPlay:UPDate?**
Response: <ON/OFF>

Description

< ON / OFF >

Example

:DISPlay:UPDate ON
Set Drawing update during measurement to ON

:DISPlay:UPDate?
ON
Drawing update during measurement has been ON

(17) Resistivity measurement function

Set and Query Diameter of the main electrode (D1)

Syntax

Command: **:ELECtric:D1** <Channel No.(NR1)>,<diameter(m)(NR2)>
Query: **:ELECtric:D1?** <Channel No.(NR1)>
Response: <Channel No.(NR1)>,<diameter (m)(NR2)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the diameter of the main electrode (D1) for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
< diameter (m)(NR2)> = 0.0000～0.1000

Example

:ELECtric:D1 1,0.001
Set diameter of the main electrode (D1) of CH1 to 0.001m

:ELECtric:D1? 1
1,0.0010
Diameter of the main electrode (D1) of CH1 has been 0.001m

Set and Query Internal Diameter of the counter electrode (D2)

Syntax

Command	**:ELECtric:D2** <Channel No.(NR1)>,<diameter of the counter(m)(NR2)>
Query	**:ELECtric:D2?** <Channel No.(NR1)>
Response	<Channel No.(NR1)>,< diameter of the counter (m)(NR2)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the diameter of the counter electrode (D2) for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
< diameter of the counter(m)(NR2)> = 0.0000～0.1000

Example

:ELECtric:D2 1,0.001
Set diameter of the counter electrode (D2) of CH1 to 0.001m

:ELECtric:D2? 1
1,0.0010
Diameter of the counter electrode (D2) of CH1 has been 0.001m

Set and Query Thickness of sample(t)

Syntax

Command	**:ELECtric:T** <Channel No.(NR1)>,< Thickness (m)(NR2)>
Query	**:ELECtric:T?** <Channel No.(NR1)>
Response	<Channel No.(NR1)>,< Thickness (m)(NR2)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the thickness of sample(t) for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
< Thickness (m)(NR2)> = 0.0000～0.1000

Example

:ELECtric:T 1,0.001
Set thickness of sample(t) of CH1 to 0.001m

:ELECtric:T? 1
1,0.0010
Thickness of sample(t) of CH1 has been 0.001m

Set and Query Electrode constant (K)

Syntax

Command	**:ELECtric:K** <Channel No.(NR1)>,<electrode constact(NR2)>
Query	**:ELECtric:K?** <Channel No.(NR1)>
Response	<Channel No.(NR1)>,< electrode constact (NR2)>

Description

<Channel No.(NR1)> = 1～4
Specifying 0 when issuing as a command sets the electrode constact(k) for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.
< electrode constact (NR2)> = 0.01～999.99

Example

:ELECtric:K 1,0.05
Set electrode constact(k) of CH1 to 0.05

:ELECtric:K? 1
1,0.05
Electrode constact(k) of CH1 has been 0.05

(18) Comparator

Set and Query Comparator

Syntax

Command **:COMParator:LIMit** <Channel No.(NR1)>,<OFF/upper limit(NR3)>,<OFF/lower limit(NR3)>

Query **:COMParator:LIMit?** <Channel No.(NR1)>

Response <Channel No.(NR1)>,<OFF/ upper limit (NR3)>,<OFF/ lower limit (NR3)>

Description

<Channel No.(NR1)> = 1～4

Specifying 0 when issuing as a command sets the comparator limit for all channels. By specifying 0 when issuing as a query, you can acquire a comma-delimited list of the settings for all channels. In that case, the command header and <Channel No.> are not included.

<Uppew limit (NR3)>,<Lower limit (NR3)> =

Resistance (Ohm)	20.000E+18～50.000E+0
Current (A)	-1.99999E-03～-1.00000E-16, 0, 1.00000E-16～1.99999E-03
Surface resistivity (Ohm)	20.000E+20～50.000E+2
Volume resistivity (Ohm/cm)	20.000E+20～50.000E+2
Liquid volume resistivity(Ohm/cm)	20.000E+20～50.000E+2

Example

:COMParator:LIMit 1,50E9,20E9

Set comparator upper limit of CH1 to 50E9, lower limit of CH1 to 20E9

:COMParator:LIMit? 1

1,50E9,20E9

Comparator upper limit of CH1 to 50E9, lower limit of CH1 to 20E9

Note

Execution error when upper limit < lower limit

Set and Query Comparator Beeper

Syntax

Command **:COMParator:BEEPer** <HI/IN/LO>,<TYPE1/TYPE2/TYPE3/OFF>,<times>

Query **:COMParator:BEEPer?** <HI/IN/LO>

Response <HI/IN/LO>,<TYPE1/TYPE2/TYPE3/OFF>,<times (NR1)>

Description

<Times(NR1)> = 1/2/3/4/5/CONT

Example

:COMParator:BEEPer HI,TYPE2,3

Set comparator beeper to TYPE2, 3 times when HI judgment

:COMParator:BEEPer? HI

HI,TYPE2,3

Comparator beeper has been TYPE2, 3 times when HI judgment

(19) Panel saving and loading

Set Panel saving

Syntax

Command **:PANel:SAVE** <1～50(NR1)>

Description

Save measurement conditions

Example

:PANel:SAVE 1

Save measurement conditions at panel 1

Note

Overweite when already save this panel

Query already panel saving

Syntax Command **:PANel:SAVE?** <1～50(NR1)>

Response <0/1(NR1)>

Description
0 … no saving data
1 … exist saving data
The response message has no header.

Example
:PANel:SAVE? 1
1
Exist saving data at panel 1

Load panel data

Syntax Command **:PANel:LOAD** <1～50(NR1)>

Description Load panel data

Example
:PANel:LOAD 1
Load panel 1 data

Note Execute error when panel data has no exist

Set and Query panel name

Syntax
Command **:PANel:NAME** <1～50(NR1)>,<panel name>
Query **:PANel:NAME?** <1～50(NR1)>
Response < panel name > = 0～9,A～Z,_

Description
Set panel name.
A panel name is 10 character effective characters above-mentioned。

Example
:PANel:NAME 1,HOGEPIYO2
Set panel name [HOGEPIYO2]

:PANel:NAME? 1
1,HOGEPIYO2
Panel name has been [HOGEPIYO2]

Note
When designating the occasion as which the panel number by which setting isn't preserved in command was designated and the invalid name, it'll be an execution error.
The occasion and the panel name as which the panel number by which setting isn't preserved in Query was designated, "----------",

Delete panel data

Syntax Command **:PANel:CLEar** <1～50(NR1)>

Description Delate panel data<1～10(NR1)>

Example
:PANel:CLEar 1
Delate panel 1 data

Note Can't return the panel data once delete

(20) Key Beeper

Set and Query Key Beeper

Syntax

Command **:KEY:BEEPer** <ON/OFF>
Query **:KEY:BEEPer?**
Response <ON/OFF>

Description

< ON / OFF >

Example

:KEY:BEEPer ON
Set key beeper to ON

:KEY:BEEPer?
ON
Key beeper has been ON

(21) Key-lock

Set and Query Key-Lock State

Syntax

Command **:SYSTem:KLOCk** <OFF/MENU/ALL>
Query **:SYSTem:KLOCk?**
Response <OFF/MENU/ALL>

Description

OFF … Disable keylock
MENU … Disable COMP, LOAD/SAVE, MENU key
ALL … Disable ALL key exept MENU[UNLOCK] key

Example

:SYSTem:KLOCk MENU
Set disable COMP, LOAD/SAVE, MENU key

:SYSTem:KLOCk?
MENU
COMP, LOAD/SAVE, MENU key has been disable

(22) Internal memory

Query measurement value in memory

Syntax

Query **:MEMory?** <Channel No.(NR1)>,<1～255>

Response < Return measurement value and judgment >

Description

Return measurement value and judgment
<Channel No.(NR1)> = 1～4
By specifying 0, you can acquire a comma-delimited list of the settings for all channels. Set the data you wish to query as a value from 1 to 255. For example, to query measured values only you would set the value 2. To query measured values along with judgment results, you would set 2 and 4 for a total of 6.
If there is no data stored in its memory, the instrument will return “0.”

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Contact check value	Contact check	Humidity	Tempereture	Unused	Comparator Judgment value	Measurement value	Unused

Example

:MEMory? 1,6
6.33802E-12,HI, 6.33533E-12,HI, 6.33833E-12,HI,……

Query measurement value in memory (range specification)

Syntax Query **:MEMory:RANGe?** <Channel No.(NR1)>,<1～255>,
<Start memory number>,<End memory number>

Response < Return measurement value and judgment >

Description Return measurement value and judgment
<Channel No.(NR1)> = 1～4
By specifying 0, you can acquire a comma-delimited list of the settings for all channels. Set the data you wish to query as a value from 1 to 255. For example, to query measured values only you would set the value 2. To query measured values along with judgment results, you would set 2 and 4 for a total of 6.
<Start memory number> = 1 to 999
<End memory number> = 1 to 999
If there is no data stored in its memory, the instrument will return “0.” Specifying a memory number in which no data is stored will result in an execution error.

128 bit 7	64 bit 6	32 bit 5	16 bit 4	8 bit 3	4 bit 2	2 bit 1	1 bit 0
Contact check value	Contact check	Humidity	Tempereture	Unused	Judgment value	Measurement value	Unused

Example :MEMory:RANGe? 1,6,10,20
6.33802E-12,HI, 6.33533E-12,HI, 6.33833E-12,HI,……

Set and Query memory state

Syntax Command **:MEMory:STATe** <ON/OFF>
Query **:MEMory:STATe?**
Response <ON/OFF>

Description ON … save measurement value
OFF … no save

Example :MEMory:STATe ON
Set measurement value to save

:MEMory:STATe?
ON
Measurement value has been save

Query number of measurement value

Syntax Command **:MEMory:COUNt?**

Response <0～50(NR1)>

Description Return number of measuremet value

Example :MEMory:COUNt?
23
Mumber of measuremet value has been 23

Set Memory clear

Syntax Command **:MEMory:CLEar**

Description Clear all measurement value in memory

Example :MEMory:CLEar
Clear all measurement value in memory

Note Can't return the panel data once delete

(23) D/A output function

Set and query the D/A output function

Syntax
Command **:DAOutput** <1～4(NR1)>
Query **:DAOutput?**
Response <1～4(NR1)>

Example :DAOutput 1
Set the CH1 current value to allow D/A output.

:DAOutput?
1
The CH1 current value has been set to allow D/A output.

(24) LCD

Set and Query Display Mode

Syntax
Command **:DISPlay:MODE** <NORMal/FULL>
Query **:DISPlay:MODE?**
Response <NORMAL/FULL>

Description
NORMal … display single channel
FULL … display all channel

Example :DISPlay:MODE NORMal
Set display mode to normal

:DISPlay:MODE?
NORMAL
Display mode has been normal

Set and Query Contrast

Syntax
Command **:DISPlay:CONTrast** <0～100(NR1)>
Query **:DISPlay:CONTrast?**
Response <0～100(NR1)>

Example :DISPlay:CONTrast 50
Set the display contrast to 50%.

:DISPlay:CONTrast?
50
The display contrast has been set to 50%.

Set and Query Backlight

Syntax
Command **:DISPlay:BACKlight** <0～100(NR1)>
Query **:DISPlay:BACKlight?**
Response <0～100(NR1)>

Example
:DISPlay:BACKlight 50
Set the backlight brightness to 50%.

:DISPlay:BACKlight?
50
The backlight brightness has been set to 50%.

(25) Line Frequency

Set and Query Line Frequency

Syntax
Command **:SYSTem:LFRequency** <AUTO/50/60>
Query **:SYSTem:LFRequency?**
Response <AUTO/50/60>

Description
AUTO … Auto detect line frequency (When power on)
50 … 50Hz
60 … 60Hz

Example
:SYSTem:LFRequency AUTO
Set the line frequency to AUTO.

:SYSTem:LFRequency?
AUTO
Line frequency has been set to AUTO.

Query Automatic detection Line Frequency

Syntax
Query **:SYSTem:LFRequency:AUTO?**
Response <ERROR/50/60>

Description
ERROR ⋯ Detection error
50 ⋯ 50Hz
60 ⋯ 60Hz

Example
:SYSTem:LFRequency:AUTO?
60
Detected 60Hz

(26) Reset

Initialize Instrument (System Reset)

Syntax
Command **:RESet** <SYSTem/NORMal>

Description
SYSTem … Initializes all data incluse panel data settings
NORMal … Initializes all data except panel data settings

Example
:RESet SYSTem
Execute system reset.

(27) EXT I/O

Set and Query Trigger edge

Syntax

Command	**:IO:EDGE** <ON/OFF>
Query	**:IO:EDGE?**
Response	<ON/OFF>

Description

Set trigger edge
ON … PNP: fall、NPN:rise
OFF … PNP: rise、NPN:fall

Example

:IO:EDGE ON
Set trigger edge to ON edge

:IO:EDGE?
ON
Trigger edge has been ON edge

Set and Query TRIG Signal's Filter Function

Syntax

Command	**:IO:FILTer:STATe** <ON/OFF>
Query	**:IO:FILTer:STATe?**
Response	<ON/OFF>

Description

Set to use the trigger filter.
ON … Use trigger filter.
OFF … Not use trigger filter.

Example

:IO:FILTer:STATe ON
Set trigger filter to ON

:IO:FILTer:STATe?
ON
Trigger filter has been set to ON.

Set and Query TRIG Signal's Filter Time

Syntax

Command	**:IO:FILTer:TIME** < Filter time (s)(NR2)>
Query	**:IO:FILTer:TIME?**
Response	< Filter time (s)(NR2)>

Description

< Filter time (s)(NR2)> = 0.001～0.500

Example

:IO:FILTer:TIME 0.123
Set trigger filter time to 0.133 seconds.

:IO:FILTer:TIME?
0.123
Trigger filter time has been set to 0.123 seconds.

Set and Query GO-signal outputting logic level

Syntax

command	**:IO:GOLogic** <NORMal/ INVert >
Query	**:IO:GOLogic?**
Response	<NORMAL/INVERT>

Description

NORMAL …When a pass judgment is given for the contact check or voltage monitor check: Outputs a low-level signal. When a fail judgment is given for the contact check or voltage monitor check: Outputs a high-level signal.

INVERT …When a pass judgment is given for the contact check or voltage monitor check: Outputs a high-level signal. When a fail judgment is given for the contact check or voltage monitor check: Outputs a low-level signal.

Example

:IO:GOLogic NORMal
Set GO-signal outputting logic level to NORMAL.

:IO:GOLogic?
NORMAL
GO-signal outputting logic level has been set to NORMAL.

Set and Query EOM Output Method

Syntax

Command	**:IO:EOM:MODE** <HOLD/PULSe>
Query	**:IO:EOM:MODE?**
Response	<HOLD/PULSe>

Description

HOLD … Holds the EOM signal until measurement starts by the next trigger signal.
PULSE … Sets EOM=OFF according to the specified pulse width

Example

:IO:EOM:MODE HOLD
Set EOM output method to HOLD.

:IO:EOM:MODE?
HOLD
EOM output method has been set to HOLD.

Set and Query EOM Pulse Width

Syntax

Command	**:IO:EOM:PULSe** < Pulse width (s)(NR2)>
Query	**:IO:EOM:PULSe?**
Response	< Pulse width (s)(NR2)>

Description

< Pulse width (s)(NR2)> = 0.001～0.100

Example

:IO:EOM:PULSe 0.023
Set Pulse width to 0.023 seconds.

:IO:EOM:PULSe?
0.23
Pulse width has been set to 0.023 seconds.

Query Output Pin Status

Syntax Query **:IO:OUTPin?** <EOM/ERR/INDEx/OPENgo/
CCHeckgo1/ CCHeckgo2/ CCHeckgo3/ CCHeckgo4/
HI1/ HI2/ HI3/ HI4/
IN1/ IN2/ IN3/ IN4/
LO1/ LO2/ LO3/ LO4>

Response <0/1(NR1)>

Description Return the output pin status.

Example :IO:OUTPin? INDEx
1
INDEX pin is ON.

Query NPN/PNP Switch Status

Syntax Query **:IO:MODE?**
Response <NPN/PNP>

Description Return the NPN/PNP Switch status.

Example :IO:MODE?
NPN
NPN/PNP Switch has been set to NPN.

(28) Device Event Status Enable Register

Set and Query Device Event Status Enable Register

Syntax Command **:DSE** <0 ~ 255(NR1)>
Query **:DSE?**
Response <0 ~ 255(NR1)>

Example Command Set Device Event status enable register

Query Query Device Event status enable register

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Unused	Unused	BOV	BFL	STP	Unused	LM2 Unused	LM1 Unused

Query Device Event Status Register

Syntax Query **:DSR?**
Response <0 ~ 255(NR1)>

Note When execute DSE command, DSR register is clear

(29) Command Header

Set and Query Header Presence

Syntax

Command	**:HEADer** <ON/OFF>
Query	**:HEADer?**
Response	<ON/OFF>

Description Sets whether or not there is a header in the response message.

Example

:HEADer ON
Adds a header to the response message.

:HEADer?
:HEADER ON
A header is set to be added to the response message.

Note When turning the power on or after the ***RST** command, this is initialized to OFF (no header).

(30) Communications Settings

Return to Local Control

Syntax

Command	**:SYSTem:LOCal**

Description Disables communications remote control and re-enables local control. The panel keys are re-enabled.

Example :SYSTem:LOCal

Set Delimiter [GP-IB]

Syntax

Command	**:SYSTem:TERMinator** <LF/CRLF>
Query	**:SYSTem:TERMinator?**
Response	<LF/CRLF>

Description

LF … Set delimiter to LF.
CRLF … Set delimiter to CRLF.

Example

:SYSTem:TERMinator LF
Set delimiter to LF.

:SYSTer:TERMminator?
LF
Delimiter has been set to LF.

4 Measurement Value Format

・Current(A)

Format	Range	Max	Current Over Range	Contact check NG
UNIT/EXP	2mA	±1.99999E-03A	+9.99999E+30	+5.55555E+30
	200uA	±199.999E-06A	+999.999E+30	+555.555E+30
	20uA	±19.9999E-06A	+99.9999E+30	+55.5555E+30
	2uA	±1.99999E-06A	+9.99999E+30	+5.55555E+30
	200nA	±199.999E-09A	+999.999E+30	+555.555E+30
	20nA	±19.9999E-09A	+99.9999E+30	+55.5555E+30
	2nA	±1.99999E-09A	+9.99999E+30	+5.55555E+30
	200pA	±199.999E-12A	+999.999E+30	+555.555E+30
	20pA	±19.9999E-12A	+99.9999E+30	+55.5555E+30

Note: A “+” sign is returned as a space (ASCII code 20H).
The priority of contact check NG is higher than Current Over Range.

・Resistance(Ohm)、Resistivity(Ohm_{RS}、Ohm_{RV}、Ohm_{RL})

Format	Range	Max	Current Over Range	Contact check NG
UNIT	2mA～20pA	+999.999E±□	+000.000E-30	+555.555E-30
EXP	2mA～20pA	+9.99999E±□	+0.00000E-30	+5.55555E-30

Note: A “+” sign is returned as a space (ASCII code 20H).
The priority of contact check NG is higher than Current Over Range.

・Tempureture (℃)

Value	Reference
±□□.□□	:MEASure:TEMPerature?

・Humidity(%rh)

Value	Reference
+□□.□	:MEASure:HUMidity?

・Jig capacity open correction(F)

Value	Reference
□□.□□□E-12	:OPEN:VALue?

・Contact check value(F)

Value	Reference
□□.□□□E-12	:CONTactcheck:VALue?

Super Megohm Meter SM7420 Programming Command Compatibility with DSM8542

Setting Control Program Messages

<table>
<tr><th>DSM8542</th><th>Function</th><th>Format</th><th>Compatibility Notes</th><th>SM7420</th></tr>
<tr><td>DLM</td><td>Delimiter designation in talker mode.</td><td>DLM <0～2></td><td>・Specifying "2:<EOI>" will result in a setting of "0:LF<EOI>."
・Because this setting is backed up, cycling the power will Not cause the default value to be restored.</td><td>:SYSTem:TERMinator <LF/CRLF></td></tr>
<tr><td>DLM?</td><td>Delimiter query.</td><td>DLM?</td><td>・Because the instrument does Not support the "2:<EOI>" setting, the response will be "0."</td><td>:SYSTem:TERMinator?</td></tr>
<tr><td>DFM</td><td>Output data format designation.</td><td>DFM<0～3></td><td></td><td>Not compatible</td></tr>
<tr><td>DFM?</td><td>Query response in output data format.</td><td>DFM?</td><td></td><td>Not compatible</td></tr>
<tr><td>MON</td><td>Changeover between regular measurement.</td><td>MON <0～1></td><td></td><td>:DISPlay:MODE <NoRMal/FULL></td></tr>
<tr><td>MON?</td><td>Query response in measuring mode is same as setting.</td><td>MON?</td><td></td><td>:DISPlay:MODE?</td></tr>
<tr><td>MOD</td><td>Measuring mode setting.</td><td>MOD <0～3></td><td></td><td>:MEASure:MODE <R/A/RS/RV/RL></td></tr>
<tr><td>MOD?</td><td>Query response in screen state is same as setting.</td><td>MOD?</td><td>・When the instrument is set to liquid volume resistivity measurement mode, this query will result in a response of "3."</td><td>:MEASure:MODE?</td></tr>
<tr><td>CCH</td><td>Current CH setting.</td><td>CCH <1～4></td><td></td><td>:CCHannel <1～4(NR1)></td></tr>
<tr><td>CCH?</td><td>Query response of current CH is same as setting.</td><td>CCH?</td><td></td><td>:CCHannel?</td></tr>
<tr><td>FSM</td><td>High-speed measuring mode setting.</td><td>FSM <0～1>,<0～1>,<0～1>,<0～1></td><td>・The second, third, and fourth parameters are igNored.</td><td>:DISPlay:UPDate <ON/OFF></td></tr>
<tr><td>FSM?</td><td>Query response of trigger delay time is same as setting.</td><td>FSM?</td><td>・The response for the second, third, and fourth parameters will always be "0."</td><td>:DISPlay:UPDate?</td></tr>
<tr><td>SPL</td><td>Integral time setting (Unit, set values).</td><td>SPL <0～1>,<1～15>/<2～300></td><td>・Different combinations of units and settings can be used to make the settings listed in the following table:
■0:PLC setting
<table>
<tr><td>PLC</td><td>1～3</td><td>4～12</td><td>13～15</td></tr>
<tr><td>SPEED</td><td>MED</td><td>SLOW</td><td>SLOW2</td></tr>
</table>
■1:ms setting
<table>
<tr><td>ms(Line frequency50Hz)</td><td>2～9</td><td>10～19</td><td>20～79</td><td>80～259</td><td>260～300</td></tr>
<tr><td>SPEED</td><td>FAST</td><td>FAST2</td><td>MED</td><td>SLOW</td><td>SLOW2</td></tr>
</table>
<table>
<tr><td>ms(Line frequency60Hz)</td><td>2～7</td><td>8～15</td><td>16～65</td><td>66～215</td><td>216～300</td></tr>
<tr><td>SPEED</td><td>FAST</td><td>FAST2</td><td>MED</td><td>SLOW</td><td>SLOW2</td></tr>
</table></td><td>:SPEEd <SLOW2/SLOW/MED/FAST2/FAST></td></tr>
<tr><td>SPL?</td><td>Query response on setting number of integral time (unit, set value) is same as setting.</td><td>SPL?</td><td>・The response will vary with the instrument's SPEED setting as described in the following table:
<table>
<tr><td>SPEED</td><td>FAST</td><td>FAST2</td><td>MED</td><td>SLOW</td><td>SLOW2</td></tr>
<tr><td>Response</td><td>1,2</td><td>1,10(50Hz)
1,8(60Hz)</td><td>0,1</td><td>0,4</td><td>0,13</td></tr>
</table></td><td>:SPEEd?</td></tr>
<tr><td>DLY</td><td>Trigger delay time (ms) setting</td><td>DLY <0～9999></td><td></td><td>:DELay <Delay time(s)(NR2)></td></tr>
<tr><td>DLY?</td><td>Query response on trigger delay time is same as setting.</td><td>DLY?</td><td></td><td>:DELay?</td></tr>
<tr><td>AVE</td><td>Averaging setting.</td><td>AVE <0～1></td><td>・Specifying "1" will cause the auto averaging function to be set.
・Specifying "2: will cause the average hold function to be set (Not supported by the DSM8542).</td><td>:AVERage <OFF/HOLD/AUTO></td></tr>
<tr><td>AVE?</td><td>Query response in averaging is same as setting.</td><td>AVE?</td><td>・When the average hold function is enabled, this query will result in a response of "2."</td><td>:AVERage?</td></tr>
<tr><td>FIG</td><td>Setting number of effective columns for measured value display.</td><td>FIG <2～5></td><td>・Specifying "2" will cause the command to be igNored.</td><td>:MEASure:DIGit <3～6(NR1)></td></tr>
<tr><td>FIG?</td><td>Query response on setting number of effective columns for measured value display is same as setting.</td><td>FIG?</td><td>・Because the instrument does Not support the "2" setting, the response will be a value from "3" to "6."</td><td>:MEASure:DIGit?</td></tr>
<tr><td>RNG</td><td>Current range setting.</td><td>RNG <0～1>,<0～7></td><td>・The instrument will be configured as described in the following table based on its SPEED setting:
<table>
<tr><td>Range setting during HOLD</td><td>FAST</td><td>FAST2</td><td>MED</td><td>SLOW</td><td>SLOW2</td></tr>
<tr><td>0</td><td>2mA</td><td>2mA</td><td>2mA
Change</td><td>2mA
Change</td><td>200uA</td></tr>
<tr><td>1</td><td>2mA</td><td>200uA</td><td>200uA</td><td>200uA</td><td>20uA</td></tr>
<tr><td>2</td><td>200uA</td><td>20uA</td><td>20uA</td><td>20uA</td><td>2uA</td></tr>
<tr><td>3</td><td>20uA</td><td>2uA</td><td>2uA</td><td>2uA</td><td>200nA</td></tr>
<tr><td>4</td><td>2uA</td><td>200nA</td><td>200nA</td><td>200nA</td><td>20nA</td></tr>
<tr><td>5</td><td>200nA</td><td>20nA</td><td>20nA</td><td>20nA</td><td>2nA</td></tr>
<tr><td>6</td><td>20nA</td><td>2nA</td><td>2nA</td><td>2nA</td><td>20pA</td></tr>
<tr><td>7</td><td>2nA</td><td>2nA</td><td>200pA</td><td>20pA</td><td>20pA</td></tr>
</table>
・The selected channel will be switched.</td><td>:RANGe <Channel No.(NR1)>,<20pA/200pA/2nA/20nA/200nA/2uA/20uA/200uA/2mA></td></tr>
<tr><td>RNG?</td><td>Query response on current range is same as setting.</td><td>RNG?</td><td>・The response (HOLD) will vary with the instrument's SPEED setting as described in the following table:
<table>
<tr><td>SM7420 Range setting</td><td>FAST</td><td>FAST2</td><td>MED</td><td>SLOW</td><td>SLOW2</td></tr>
<tr><td>2mA</td><td>0,1</td><td>0,0</td><td></td><td></td><td></td></tr>
<tr><td>200uA</td><td>0,2</td><td>0,1</td><td>0,1</td><td>0,1</td><td>0,0</td></tr>
<tr><td>20uA</td><td>0,3</td><td>0,2</td><td>0,2</td><td>0,2</td><td>0,1</td></tr>
<tr><td>2uA</td><td>0,4</td><td>0,3</td><td>0,3</td><td>0,3</td><td>0,2</td></tr>
<tr><td>200nA</td><td>0,5</td><td>0,4</td><td>0,4</td><td>0,4</td><td>0,3</td></tr>
<tr><td>20nA</td><td>0,6</td><td>0,5</td><td>0,5</td><td>0,5</td><td>0,4</td></tr>
<tr><td>2nA</td><td>0,7</td><td>0,6</td><td>0,6</td><td>0,6</td><td>0,5</td></tr>
<tr><td>200pA</td><td></td><td></td><td>0,7</td><td>0,6</td><td>0,6</td></tr>
<tr><td>20pA</td><td></td><td></td><td></td><td>0,7</td><td>0,7</td></tr>
</table>
・The instrument will return range for the selected channel.</td><td>:RANGe? <Channel No.(NR1)></td></tr>
<tr><td>TGM</td><td>Trigger mode setting.</td><td>TGM <0～2></td><td>・Because the instrument does Not support the "1: Manual trigger" setting, specifying "1" will cause an external trigger to be set.</td><td>:TRIGger <INTernal/EXTernal></td></tr>
<tr><td>TGM?</td><td>Query response of trigger mode is same as setting.</td><td>TGM?</td><td>・Because the instrument does Not support the "1" setting, the response will be either "0" or "2."</td><td>:TRIGger?</td></tr>
</table>

VCM	Selection of auto voltage check execute mode.	VCM <0～1>	・The instrument does Not support voltage check automatic execution mode. ・The command will be igNored and will Not result in a command error.	Not compatible
VCM?	Query response of auto voltage monitoring execute mode is same as setting.	VCM?	・The instrument does Not support voltage check automatic execution mode. ・This query will always result in a response of "0."	Not compatible
CCM	Selection of auto contact check execute mode.	CCM <0～1>	・The selected channel's on/off status will be toggled.	:CONTactcheck:STATe <Channel No.(NR1)>,<ON/OFF>
CCM?	Query response of auto contact check execute mode is same as setting.	CCM?		:CONTactcheck:STATe? <Channel No.(NR1)>
LCD	LCD display mode setting.	LCD <0～1>	・Specifying "0" will set the LCD and backlight to 0 and disable measured value render updates. ・Specifying "1" will set the LCD to 50 and the backlight to 80 and enable measured value render updates.	:DISPlay:CONTrast <0～100(NR1)> :DISPlay:BACKlight <0～100(NR1)> :DISPlay:UPDate <ON/OFF>
LCD?	Query response in LCD display mode is same as setting.	LCD?	・The instrument will return "0" if the LCD and backlight are set to 0 and measured value render updates are disabled. ・Otherwise, it will return "1."	:DISPlay:CONTrast? :DISPlay:BACKlight? :DISPlay:UPDate?
DSP	Display mode setting.	DSP <0～1>		:MEASure:FORMat <UNIT/EXP>
DSP?	Query response in display mode is same as setting.	DSP?		:MEASure:FORMat?
ELC	Electrode data setting.	ELC <0～1>,<0.0～999.9>,<0.1～1199.9>,<0.001～30.000>,<0.01～999.99>	・Because the instrument does Not support SIZE/ACTL selection, the SIZE/ACTL setting will be igNored.	:ELECtric:D1 <Channel No.(NR1)>, <diameter(m)(NR2)> :ELECtric:D2 <Channel No.(NR1)>, <diameter of theconter(m)(NR2)> :ELECtric:T <Channel No.(NR1)>, <Thickness (m)(NR2)> :ELECtric:K <Channel No.(NR1)>,<Electrode constact(NR2)>
ELC?	Query response electrode data is same as setting.	ELC?	・Because the instrument does Not support SIZE/ACTL selection, the SIZE/ACTL response will always be "0."	:ELECtric:D1? <Channel No.(NR1)> :ELECtric:D2? <Channel No.(NR1)> :ELECtric:T? <Channel No.(NR1)> :ELECtric:K? <Channel No.(NR1)>
CNF	Operation environment setting.	CNF <0～1>,<0～1>,<0～1>,<0～1>,<0>	・The instrument does Not support interlock control. The "Interlock control" parameter will be igNored, regardless of whether it is set to "0" or "1." ・Specifying "0" for the "Beep tone" parameter will disable all comparator judgment tones. ・Specifying "1: for the "Beep tone" parameter and "0" for the "Beep tone PASS/FAIL" parameter will set the comparator judgment tone for HI and LO judgments to Type 1 and while disabling the judgment tone for IN judgments. ・Specifying "1" for both the "Beep tone" parameter and the "Beep tone PASS/FAIL" parameter will disable the comparator judgment tone for HI and LO judgments while setting the tone for IN judgments to Type 1.	:COMParator:BEEPer <HI/IN/LO>,<TYPE1/TYPE2/TYPE3/OFF>,<Times> :KEY:BEEPer <ON/OFF>
CNF?	Query response of operation environment is same as setting.	CNF?	・The instrument does Not support interlock control. "Interlock control" queries will always result in a response of "0." ・"Beep tone" queries will result in a response of "0" when all comparator judgment tones are disabled. ・"Beep tone PASS/FAIL" queries will result in a response of "1" when the comparator judgment tone for IN judgments is Not disabled. ・"Reserve parameter" queries will result in a response of "0" when the key operation tone setting is disabled or of "1" when it is enabled.	:COMParator:BEEPer? <HI/IN/LO> :KEY:BEEPer?
SEQ	Sequential mode setting.	SEQ <0～1>,<0～9>,<0.0～999.9>,<0.0～999.9>,<0.0～999.9>,<0.0～999.9>	・Because the instrument does Not support sequence mode, this command will be igNored and will Not result in a command error.	Not compatible
SEQ?	Same as set items of query SEQ command message in sequential mode.	SEQ?	・The instrument does Not support sequence mode. ・This query will always result in a response of "0,0,0.0,0.0,0.0,0.0."	Not compatible
DEV	Deviation value display mode setting.	DEV <0～2>,<-9.9999E+30～9.9999E+30>	・Because the instrument does Not support deviation value display mode, this command will be igNored and will Not result in a command error.	Not compatible
DEV?	Query response in deviation value display mode is same as setting.	DEV?	・Because the instrument does Not support deviation value display mode, this query will always result in a response of "0,0.00E+00."	Not compatible
CMP	Comparison Measuring mode setting.	CMP <0～1>,<0～2>,<-9.9999E+30～9.9999E+30>,<-9.9999E+30～9.9999E+30>	・Because the instrument does Not support mode selection, the "Mode" setting will be igNored.	:COMParator:LIMit <Channel No.(NR1)><OFF/Upper-limit(NR3)>,<OFF/Lower-limit(NR3)>
CMP?	Query response of Comparison Measuring mode is same as setting.	CMP?	・The "Comparison execution" query will result in a response of "1" if either the upper limit value or lower limit value is enabled. ・The "Mode" query will always result in a response of "1."	:COMParator:LIMit?<Channel No.(NR1)>
WCP	Work capacity setting. Capacity of work for open correction value calculation.	WCP <0.5～99.9>,<0.5～99.9>,<0.5～99.9>,<0.5～99.9>		:CONTactcheck:LIMit <Channel No.(NR1)>,<Judgment reference value (F)(NR3)>
WCP?	Query response of work capacity is same as setting.	WCP?		:CONTactcheck:LIMit? <Channel No.(NR1)>
ACL	Auto self-calibration (current range calibration) setting.	ACL <0～1>,<10～9999>	・Because the upper limit on the instrument's automatic self-calibration interval time is 600 sec., specifying a time from 601 to 9999 sec. will cause the parameter to be set to 600 sec.	:CALibration:AUTO <ON/OFF> :CALibration:TIME <Time(s)(NR1)>
ACL?	Query response of auto self-calibration (current range calibration) is same as setting.	ACL?	・Because the valid setting range for the instrument's automatic self-calibration interval time is 1 to 600 sec., the response will be a value from "1" to "600."	:CALibration:AUTO? :CALibration:TIME?
PWS	Measuring power source setting.	PWS <0～15>,<0～15>,<0～1>,<0～4>,<0～4>	・If Not set to power supply A or B, the setting will be 0.1 V. In addition, No value will be returned for queries such as "RDT?" for channels that have Not been set. ・Because the instrument does Not support the Noise filter, measurement current limit, or charge current limit settings, the Noise filter, measurement current limit, and charge current limit settings will	Not compatible
PWS?	Measuring power source setting query. Query response in display mode is same as setting.	PWS?	・Because the instrument does Not support the Noise filter, measurement current limit, or charge current limit settings, the response to Noise filter, measurement current limit, or charge current limit settings will always be "0."	Not compatible
PWA	Setting Measuring Voltage System A.	PWA<0.1～1000.0>	・This command will cause the resistance calculation voltage value to be changed for all channels. ・You can enter a value from 0.1 to 5000.0.	:VOLTage <Channel No.(NR1)>,<Voltage(V)(NR2)>
PWA?	Query response of Measuring Voltage System A is same as setting.	PWA?	・The response will consist of the value set with the PWA command.	:VOLTage? <Channel No.(NR1)>

PWB	Setting Measuring Voltage System A.	PWB<0.1～10.0>	・You can enter a value from 0.1 to 5000.0.	Not compatible
PWB?	Query response of Measuring Voltage System A is same as setting.	PWB?	・The response will consist of the value set with the PWB command.	Not compatible
THL	Histogram display threshold setting.	THL <1～15>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>,<9.99E-29～9.99E+30>	・Because the instrument does Not provide a histogram display, this command will be igNored and will Not result in a command error.	Not compatible
THL?	Query response of threshold is same as setting.	THL?	・This query will always result in a response of "0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00."	Not compatible
SRT	Function to interact with measuring voltage ON or measurement start.	SRT		:STARt
STP	Function to interact with measuring stop (measuring voltage OFF).	STP		:STOP
MTG	Generates manual trigger.	MTG		*TRG
VCK?	Executes voltage check once and returns result of it as a response.	VCK?	・Because the instrument does Not support the voltage check function, this query will always result in a response of "1."	Not compatible
CCK?	Executes contact check once and returns result of it as a response.	CCK?		:CONTactcheck?
OST?	Executes open correction once and capacity value measured during open correction is returned as a response.	OST?	・The response range is 0 to 99.999. ・In the event of an error, the query will result in a response of 999.9.	:OPEN? :OPEN:VALue?<Channel No.(NR1)>
RHS?	Histogram counter readout.	RHS?	・The instrument does Not provide a histogram display. ・This query will always result in a response of "0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00,0.00E+00."	Not compatible
CHS	Histogram counter clear.	CHS	・The instrument does Not provide a histogram display. The command will be igNored and will Not result in a command error.	Not compatible
BSZ?	Reads number of data groups in the measured data buffer.	BSZ?		:MEMory:COUNt?
RBF?	Measured data buffer readout.	RBF? <0～1>	・The instrument will return data for the selected channel.	:MEMory? <Channel No.(NR1)>,<1～255>
CBF	Measured data buffer clear.	CBF		:MEMory:CLEar
RDT?	Measured data query.	RDT? <0～2>		:MEASure? :MEASure:COMParator? :SYSTem:TERMinator? :CONTactcheck?
ERR?	Error information clear.	ERR?	・The instrument does Not have an error register. This command will be igNored and will Not result in a command error.	Not compatible

Execution And Execution Result Program Messages

DSM8542	Function	Function	Compatibility Notes	SM7420
DSE	Sets the device event status enable register.	DSE <0～255>		:DSE <0～255(NR1)>
DSE?	Query response data of the device event status enable register is same as setting.	DSE?		:DSE?
DSR?	Query about data of the device event status enable register.	DSR?		:DSR?
*SAV	Environmental data save.	*SAV <0～9>	・The instrument uses panel numbers 1 through 10. For example, specifying "0" will cause the settings to be saved as Panel 1.	:PANel:SAVE <1～10(NR1)>
*RCL	Environmental data recall.	*RCL <0～9>	・The instrument uses panel numbers 1 through 10. For example, you would specify "0" to load Panel 1.	:PANel:LOAD <1～10(NR1)>
*IDN?	Equipment ID query.	*IDN?	・This query generates a response of "<Name of manufacturer>,<Name of model>,<Serial number>,<Software version>."	*IDN?
*CAL?	Self-calibration (current range calibration) execute.	*CAL?	・Auto-calibration takes about 5 sec.	:CALibration?
*TST	Self-diagNosis result query.	*TST?	・This query returns "0" if there is No error, or "1" if there is a ROM error. The DSM8542 uses the opposite logic.	*TST?
*TRG	The same function as the GET message.	*TRG	・Attempting to use the internal trigger will result in an execution error. ・Using the external trigger will generate one trigger event if the start state is in effect. ・The instrument will return the measured value if it is set to DSM mode: "<Channel>,<Measured value>,<Status>,<Comparison result>."	*TRG
*CLS	Status register clear.	*CLS		*CLS
*SRE	Sets the service request enable register.	*SRE <0～255>	・The instrument does Not support "Bit 0: MEC."	*SRE <0～255 (NR1)>
*SRE	Query of data in the service request enable register.	*SRE?	・The instrument does Not support "Bit 0: MEC."	*SRE?
*STB?	Query of data in the status byte register.	*STB?		*STB?
*ESE	Sets the standard event status enable register.	*ESE <0～255>		*ESE <0～255(NR1)>
*ESE?	Query of data in the standard event status enable register.	*ESE?		*ESE?
*ESR?	Query of data in the standard event status register.	*ESR?		*ESR?
*RST	Initialize.	*RST	・This command reverts the instrument to its factory defaults, with the exception of communication settings and panel data (i.e., it initiates a Normal reset).	*RST
*OPC	Sets OPC bit of the standard event status register after all operations being executed are finished.	*OPC	・This command sets the OPC bit after processing of the command received before the "*OPC" command completes.	*OPC
*OPC?	Returns "1" after all operations being executed are finished.	*OPC?	・This command returns "1" after processing of the command received before the "*OPC" command completes.	*OPC?

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