

IR5050, IR5051
HIGH VOLTAGE
INSULATION TESTER

communication specification

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April 2024

Edition 1

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1. Connect the Communication Interface

Step 1: Connect the USB cable to a USB port on the computer.

Step 2: Connect the USB cable and install the USB driver, and the PC will add a virtual COM port.

2. Interface Parameters

To operate IR5050, IR5051 by host computer or terminal, the parameters of the instrument and PC interface must match.

The following settings can be used for communication.

Table 1

Item	Parameter	Setting
1	Baud Rate	9600 bps
2	Data Length	8 bit
3	Parity Check	None
4	Stop Bit	1 bit

3. About Commands

3.1. Terminator

The terminator is a character sent by the host that identifies the end of the command sequence. A valid terminator consists of the following 2 bytes of data.

<CR> (Carriage Return, ASC(&H0D))
<LF> (Line Feed, ASC(&H0A))

3.2. Response Results

IR5050, IR5051 returns a response in the following format after executing a query command.

<Result> + <CR> <LF>

3.3. Data Types

The response from the instrument is an ASCII string message.

Table 2

Data Type	Explanation	Example
<NR1>	An integer	+10000, -10000, 123, -100
<NR2>	This numeric representation has an explicit radix point.	+13.234, -.00002, 3.4567
<NR3>	This representation has an explicit radix point and an exponent.	-1.000000E+02
<Boolean>	String ASCII-encoded byte, is return for the setting query.	0 or 1
<Literal>	ASCII string	General, TIMER, A, Lr0

4. List of Commands

Table 3.

Command	Parameter	Description
:SET:PCMODE	A<Boolean>	PC communication mode setting
:SET:PCMODE?		PC communication mode inquiry de
:TIME	A\$<Literal>	Time setting
:TIME?		Time acquisition
:MEM:NUM?	A\$<Literal>	Manual data count acquisition
:MEM:DATA?	A\$<Literal>,(A<NR1>)	Manual memory data acquisition
:MEM:LOGNUM?	A\$<Literal>	Logging data count acquisition
:MEM:LOGDATA?	A\$<Literal>	Logging memory data acquisition
:MEM:CLEAR	A\$<Literal>	Memory data deletion
:SET:PI	A<NR1>,B<NR1>	PI time setting
:SET:PI?		PI time acquisition
:SET:DAR	A<NR1>,B<NR1>	DAR time setting
:SET:DAR?		DAR time setting
:SET:STEP	A<NR1>	SV time setting
:SET:STEP?		SV time acquisition
:SET:RAMP	A<NR1>	RAMP (V/min) setting
:SET:RAMP?		RAMP (V/min) acquisition
:SET:DD	A<NR1>	DD time setting
:SET:DD?		DD time acquisition
:SET:TIMER	A<NR1>	TIMER time setting
:SET:TIMER?		TIMER time acquisition
:SET:COMP	A<NR2>,A\$<Literal>	Comparator value setting
:SET:COMP?		Comparator value acquisition
:SET:CUSTOMIZE	A<NR1>	decimal separator setting
:SET:CUSTOMIZE?		Obtaining the decimal separator setting

5. Command Details

5.1. Command Description

IR5050 and IR5051 accept uppercase commands.

Always turn on PC communication mode before sending commands. ":SET:PCMODE" and Except for the two commands ":SET:PCMODE?", "EXE_ERR" will be returned if the PC communication mode is not turned on.

For the setting range of each setting, see "7.3 Insulation diagnosis functions" in the instruction manual.

Table 4.

Command	Explanation
:SET:PCMODE	PC communication mode setting Syntax: :SET:PCMODE A<Boolean> A: 0 (off) or 1 (on) Syntax example: :SET:PCMODE 1 Response: "OK" or "CMD ERR"
:SET:PCMODE?	PC communication mode inquiry Syntax: :SET:PCMODE? Response: 0 (off) or 1 (on)
:TIME	Time setting Syntax: :TIME A<NR1> A: YYYYMMDDhhmmss Syntax Example: :TIME 20240415102030 Response: "OK" or "CMD ERR"
:TIME?	Time acquisition Syntax: :TIME? Response: YYYYMMDDhhmmss Response Example: "20240415102030"
:MEM:NUM?	Manual data count acquisition Syntax: :MEM:NUM? A\$<Literal> A\$: Memory module Syntax example: :MEM:NUM? A Response: Number of manual memory data saved Response Example: 50

Command	Explanation
:MEM:DATA?	<p>Manual memory data acquisition (all data of the module).</p> <p>If you want to get all the data of the memory module.</p> <p>There will be one argument.</p> <p>Syntax: :MEM:DATA? A\$<Literal></p> <p>A\$: manual memory module</p> <p>Syntax example: :MEM:DATA? A</p> <p>Response (test method: TIMER): *1</p> <p>Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], Final voltage [V], Final resistance [Ω], Final current [A], 1-minute voltage [V], 1-minute resistance [Ω], 1-minute current [A], Capacitance [F]</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p>Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], Final voltage [V], Final resistance [Ω], Final current [A], 1-minute voltage [V], 1-minute resistance [Ω], 1-minute current [A], Capacitance [F]</p> <p>Response Example:</p> <p>A00,General,2024-03-02,19:04:25,17.0,48.0,500,76,524, 8.17e+9,64.2e-9,524,8.17e+9,64.2e-9,0.0e-9</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p>A99,General,2024-03-02,19:04:25,17.0,48.0,500,76,524,. 8.17e+9,64.2e-9,524,8.17e+9,64.2e-9,0.0e-9</p>

*1 Responses differ for each test method. For details, see [5.2 Manual Memory Data Storage Contents](#)

Command	Explanation
:MEM:DATA?	<p>Manual memory data acquisition (specified memory number only)</p> <p>Two arguments are required to obtain only the specified memory number.</p> <p>Syntax: :MEM:DATA? A\$<Literal>,B<NR1></p> <p>A\$: manual memory module B: memory number</p> <p>Syntax example: :MEM:DATA? A,0</p> <p>Response (test method: TIMER): *1</p> <p>Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], Final voltage [V], Final resistance [Ω], Final current [A], 1-minute voltage [V], 1-minute resistance [Ω], 1-minute current [A], Capacitance [F]</p> <p>Response Example:</p> <p>A00,General,2024-03-02,19:04:25,17.0,48.0,500,76,524,8.17E+9,64.2E-9,524,8.17E+9,64.2E-9,0.0E-9</p>
:MEM:LOGNUM?	<p>Logging data acquisition</p> <p>Syntax: :MEM:LOGNUM? A<Literal>.</p> <p>A: Logging memory module</p> <p>Example syntax: :MEM:LOGNUM? Lr0</p> <p>Response: Number of logging data</p> <p>Response Example: 100</p>

Command	Explanation
:MEM:LOGDATA?	<p>Logging memory data acquisition</p> <p>After logging setup data is returned, logging data is returned in sequence.</p> <p>Syntax: :MEM:LOGDATA? A\$<Literal>.</p> <p>A\$: Logging memory module</p> <p>Example syntax: :MEM:LOGDATA? Lr0</p> <p>Response:</p> <p>Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], Logging interval [s]</p> <p>Logging number, Voltage [V], Resistance [Ω], Current [A]</p> <p>.</p> <p>.</p> <p>.</p> <p>Logging number, Voltage [V], Resistance [Ω], Current [A]</p> <p>Response Example:</p> <p>Lr3,General,2024-03-02,16:49:21,26.0,10.0,250,240,5</p> <p>1,260,8.25E+9,31.5E-9</p> <p>.</p> <p>.</p> <p>.</p> <p>48,260,8.25E+9,31.5E-9</p>
:MEM:CLEAR	<p>Memory data erasure</p> <p>You can specify the memory unit or all data to be erased.</p> <p>Syntax: :MEM:CLEAR A\$:<Literal></p> <p>A\$: Memory module or "ALL"</p> <p>Example syntax: :MEM:CLEAR Lr0</p> <p>Response: "OK" or "CMD ERR"</p>
:SET:PI	<p>PI time setting</p> <p>Syntax: :SET:PI A<NR1>,B<NR1></p> <p>A: T1 time [sec] B: T2 time [sec]</p> <p>Example syntax: :SET:PI 60,600</p> <p>Response: "OK" or "CMD ERR"</p>

Command	Explanation
:SET:PI?	PI time acquisition Syntax: :SET:PI? Response: A<NR1>,B<NR1> A: T1 time [sec] B: T2 time [sec] Response Example: 30,60
:SET:DAR	DAR time setting Syntax: :SET:DAR A<NR1>,B<NR1> A: T1 time [sec] B: T2 time [sec] Example syntax: :SET:DAR 300,600 Response: "OK" or "CMD ERR"
:SET:DAR?	DAR time acquisition Syntax: :SET:DAR? Response: A<NR1>,B<NR1> A: T1 time [sec] B: T2 time [sec] Response Example: 300,600
:SET:STEP	SV time setting Syntax: :SET:STEP A<NR1> A: 1step time [sec] Example syntax: :SET:STEP 600 Response: "OK" or "CMD ERR"
:SET:STEP?	SV time acquisition Syntax: :SET:STEP? Response: A<NR1> A: 1step time [sec] Response Example: 600
:SET:RAMP	RAMP (V/min) setting Syntax: :SET:RAMP A<NR1> A: Voltage rise setting [V/min] Example syntax: :SET:RAMP 1500 Response: "OK" or "CMD ERR"
:SET:RAMP?	RAMP (V/min) acquisition Syntax: :SET:RAMP? Response: A<NR1> A: Voltage rise setting [V/min] Response Example: 1500

Command	Explanation
:SET:RAMP?	RAMP (V/min) acquisition Syntax: :SET:RAMP? Response: A<NR1> A: Voltage rise setting [V/min] Response Example: 1500
:SET:DD	DD time setting Syntax: :SET:DD A<NR1> A: DD time [sec] Example syntax: :SET:DD 1200 Response: "OK" or "CMD ERR"
:SET:DD?	DD time acquisition Syntax: :SET:DD? Response: A<NR1> A: DD time [sec] Response Example: 1200
:SET:TIMER	TIMER time setting Syntax: :SET:TIMER A<NR1> A: TIMER time [sec] Example syntax: :SET:TIMER 60 Response: "OK" or "CMD ERR"
:SET:TIMER?	TIMER time acquisition Syntax: :SET:TIMER? Response: A<NR1> A: TIMER time [sec] Response Example: 60
:SET:COMP	Comparator value setting Syntax: :SET:COMP A<NR2>,B<Literal> A: Resistance B: Auxiliary unit Example syntax: :SET:COMP 1.00,M Response: "OK" or "CMD ERR"

Command	Explanation
:SET:COMP?	<p>Comparator value acquisition</p> <p>Syntax: :SET:COMP?</p> <p>Response: A<NR2>,B<Literal></p> <p>A: Resistance B: Auxiliary unit</p> <p>Response Example: 1.00,M</p>
:SET:CUSTOMIZE	<p>Decimal separator setting</p> <p>Syntax: :SET:CUSTOMIZE A<NR1></p> <p>A · · · 0: Decimal point "." Separator “,”</p> <p>1: Decimal point "." Separator character “,”</p> <p>2: Decimal point "," delimiter “,”</p> <p>Response: "OK" or "CMD ERR"</p>
:SET:CUSTOMIZE?	<p>Obtaining the decimal separator setting</p> <p>Syntax: :SET:CUSTOMIZE?</p> <p>Response: "0" or "1" or "2"</p>

5.2. Manual Memory Data Storage Contents

Table 5.

Test Procedure	Stored Contents
General,*2 TIMER,. PV, PV_TIMER	Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], Final voltage [V], Final resistance [Ω], Final current [A], 1-minute voltage [V], 1-minute resistance [Ω], 1-minute current [A], Capacitance [F]
PI DAR	Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], T1[s], T2[s], PI value/DAR value, Final voltage [V], Final resistance [Ω], Final current [A], 1-minute voltage [V], 1-minute resistance [Ω], 1-minute current [A], Capacitance [F], T1 voltage [V], T1 resistance [Ω], T1 current [A], T2 voltage [V], T2 resistance [Ω], T2 current [A],
SV	Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], STEP interval [s], SV1 voltage [V], SV1 resistance [Ω], SV1 current [A], SV2 voltage [V], SV2 resistance [Ω], SV2 current [A], SV3 voltage [V], SV3 resistance [Ω], SV3 current [A], SV4 voltage [V], SV4 resistance [Ω], SV4 current [A], SV5 voltage [V], SV5 resistance [Ω], SV5 current [A], Capacitance [F]
Ramp	Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], Voltage rise setting [V/min], Final voltage [V], Final resistance [Ω], Final current [A], Capacitance [F]
DD	Memory number, Test method, Date, Time, Temperature [°C], Humidity [%], Set voltage [V], Elapsed time [s], DD value, Final voltage [V], Final resistance [Ω], Final current [A], 1 min current after stop [A], Capacitance [F]

*2 The test method for data saved when the insulation diagnosis function is OFF is General.

5.3. Display of Special Values

The representation of special values is shown in Table 6.

Table 6.

Special Value Type	display
invalid data	INVALID

Other

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