**HT9980 3-in-1 PV Safety Tester Communication Interface Operation Manual**

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## Communication Interface

HT9980 has standard communication RS232 and GPIB communication as optional.
In this chapter, you may learn the following:

- Setting communication parameters
- SCPI instruction set
- Internal register
- Trigger system

### 6.1 RS232 communication mode

1. Press the "**Page**" button on the measurement page to select the "**Settings**" page.
2. Rotate the encoder to **Mode** to select communication mode, and set the baud rate to 9600, 19200,38400 and press the "**ESC**" button to go to the testing page.

### 6.2 SCPI Commands

Instrument commands are divided into two types: common command and SCPI command (Standard Commands for Programmable Instruments). Common command defined by the IEEE488.2-1987 standard.

These commands are to be used with all instruments, but this instrument does not support all common commands. SCPI command is a tree structure.
1. ***IDN?** command
Function: Query version number
Example:
Send: *IDN?
Return: HOPETECH, HT9980, V1.0

#### 6.2.2 SCPI Command Structure

The commands at the top of the command tree are called "root command" or simply "root." To access lower-level commands in the tree, you need to specify a specific path.
**Command terminator:** command input terminator, such as NL (newline character, ASCII code 10)
**Colon (:)**
A colon is the level of command, means to lower the level of the current command
**Semicolon (;)**

A semicolon indicates the beginning of multiple commands

**Question mark (?)**

A question mark (?) indicates query

**Comma (,)**

The following figure 6.1 shows an example of how to use colons and semicolons to efficiently access commands in the command tree.

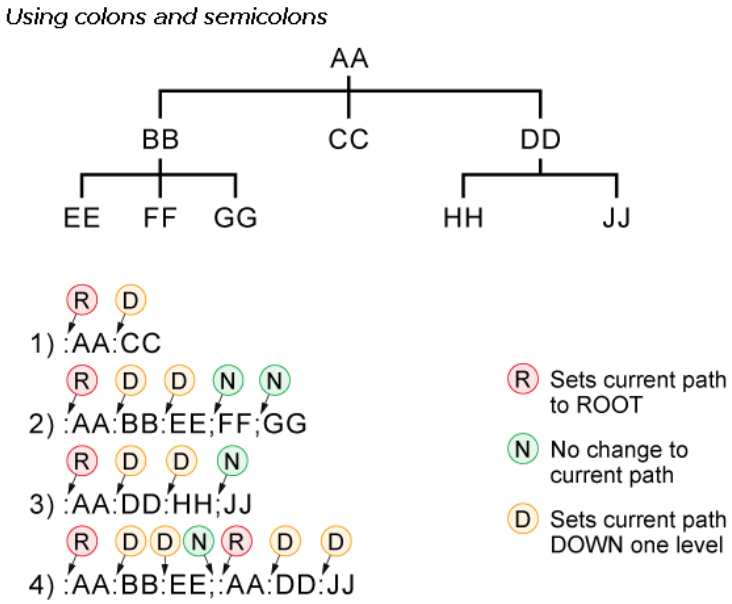


**Figure 6.1 SCPI command tree**

### 6.3 SCPI Subsystem

1. FUNCtion:STARt
Function: start the tester
Returns: None

2. FUNCtion:STOP
Function: stop the tester
Returns: None

3. FUNCtion:SOUR:GROUP?
   Function: query the current test group
   Returns: 1-6

4. FUNCtion:SOUR:GROUP
   Function: set the current test group
   For example: FUNCtion:SOUR:GROUP 1

Set Group 1 as the current test group

5. FUNCtion:SOUR:MODE?
Function: test mode for query group
For example: FUNCtion:SOUR:MODE? 1
Query the test mode for group 1
Return:AC (AC Hipot Test), DC (DC Hipot Test), IR (Insulation Test), GD (Grounding Test)

6. FUNCtion:SOUR:MODE
Function: Set the test mode of the group
For example: FUNCtion:SOUR:MODE 1, AC
Set Group 1 as the AC test

7. FUNCtion:SOUR:AC:VOLTage?
Function: Query the voltage setting value in AC mode of a group
For example: FUNCtion:SOUR:AC:VOLTage? 1
Query the voltage setting value in AC mode in group 1

8. FUNCtion:SOUR:AC:VOLTage
Function: Set the voltage set value in AC mode of the setting group
For example: FUNCtion:SOUR:AC:VOLTage 1,1000
Set the voltage set value in AC mode for group 1 to 1000

9. FUNCtion:SOUR:AC:UPPC?
Function: Query the upper limit of leakage current in AC mode of a group
For example: FUNCtion:SOUR:AC:UPPC? 1
Query the upper limit of leakage current in AC mode in group 1

10. FUNCtion:SOUR:AC:UPPC
Function: Set the upper limit of leakage current in AC mode of the group
For example: FUNCtion:SOUR:AC:UPPC 1,10
Set the upper limit of leakage current in AC mode for Group 1 to 10mA

11. FUNCtion:SOUR:AC:LOWC?
Function: Query the lower limit of leakage current in AC mode of a group
For example: FUNCtion:SOUR:AC:LOWC? 1

12. FUNCtion:SOUR:AC:LOWC
Function: Set the lower limit of leakage current in AC mode of the group
For example: FUNCtion:SOUR:AC:LOWC 1,0
Set the lower limit of leakage current in AC mode for group 1 to 0mA

13. FUNCtion:SOUR:AC:TTIM?
Function: Query the test time of a group in AC mode
For example: FUNCtion:SOUR:AC:TTIM? 1
Query the test time of group 1 in AC mode

14 FUNCtion:SOUR:AC:TTIM
Function: Set the test time in AC mode of the group
For example: FUNCtion:SOUR:AC:TTIM 1,1.5
The test time in AC mode of group 1 is set to 1.5S.

15. FUNCtion:SOUR:AC:RTIM?
Function: Query the voltage rising time in AC mode of a group
For example: FUNCtion:SOUR:AC:RTIM? 1

16. FUNCtion:SOUR:AC:RTIM
Function: Set the voltage rising time in AC mode of the group
For example: FUNCtion:SOUR:AC:RTIM 1,0.8

17. FUNCtion:SOUR:AC:FTIM?
Function: Query the voltage falling time in AC mode of a group
For example: FUNCtion:SOUR:AC:FTIM? 1

18. FUNCtion:SOUR:AC:FTIM
Function: Set the voltage falling time in AC mode of the group
For example: FUNCtion:SOUR:AC:FTIM 1,0.4

19. FUNCtion:SOUR:AC:ARC?
Function: Query the arc sensitivity of a group in AC mode
For example: FUNCtion:SOUR:AC:ARC? 1

20. FUNCtion:SOUR:AC:ARC
Function: Set the arc sensitivity of the group in AC mode
For example: FUNCtion:SOUR:AC:ARC 1,5
Arc sensitivity, 0-9, 9 is the most sensitive

21. FUNCtion:SOUR:AC:FREQ?
Function: Query the voltage frequency in AC mode of a group
For example: FUNCtion:SOUR:AC:FREQ? 1

22. FUNCtion:SOUR:AC:FREQ
Function: Set the voltage frequency in AC mode of the group
For example: FUNCtion:SOUR:AC:FREQ, 1,50Hz

23. FUNCtion:SOUR:AC:CONNect?
Function: Test continuity in AC mode for query groups
For example: FUNCtion:SOUR:AC:CONNect? 1

24. FUNCtion:SOUR:AC:CONNect
Function: Set the test continuity in AC mode of the group

For example: FUNCtion:SOUR:AC:CONNect 1, All

No (do not continue the test) All (continue test), Pass (continue the test if passed).

25. FUNCtion:SOUR:DC:VOLTage?

Function: Query the voltage value of the group in DC mode

For example: FUNCtion:SOUR:DC:VOLTage? 1

26. FUNCtion:SOUR:DC:VOLTage

Function: Set the voltage value in DC mode of the group

For example: FUNCtion:SOUR:DC:VOLTage 1,1000

27. FUNCtion:SOUR:DC:UPPC?

Function: Query the upper limit of the leakage current in DC mode of a group

For example: FUNCtion:SOUR:DC:UPPC? 1

28. FUNCtion:SOUR:DC:UPPC

Function: Set the upper limit of leakage current in DC mode of the group

For example: FUNCtion:SOUR:DC:UPPC 1,5

29. FUNCtion:SOUR:DC:LOWC?

Function: Query the lower limit of leakage current in DC mode of a group

For example: FUNCtion:SOUR:DC:LOWC? 1

30. FUNCtion:SOUR:DC:LOWC

Function: Set the lower limit of leakage current in DC mode of the group

For example: FUNCtion:SOUR:DC:LOWC 1,0

31. FUNCtion:SOUR:DC:TTIM?

Function: Query the test time of a group in DC mode

For example: FUNCtion:SOUR:DC:TTIM? 1

32. FUNCtion:SOUR:DC:TTIM

Function: Set the test time in DC mode of the group

For example: FUNCtion:SOUR:DC:TTIM 1,0.5

33. FUNCtion:SOUR:DC:RTIM?

Function: Query the voltage rising time in DC mode of a group

For example: FUNCtion:SOUR:DC:RTIM? 1

34. FUNCtion:SOUR:DC:RTIM

Function: Set the voltage rising time in DC mode of the group

For example: FUNCtion:SOUR:DC:RTIM 1,0.8

35. FUNCtion:SOUR:DC:FTIM?

Function: Query the voltage falling time in DC mode of a group

For example: FUNCtion:SOUR:DC:FTIM? 1

36. FUNCtion:SOUR:DC:FTIM
Function: Set the voltage falling time in DC mode of the group
For example: FUNCtion:SOUR:DC:FTIM 1,0.5

37. FUNCtion:SOUR:DC:ARC?
Function: Query the arc sensitivity of a group in DC mode
For example: FUNCtion:SOUR:DC:ARC? 1

38. FUNCtion:SOUR:DC:ARC
Function: Set the arc sensitivity in DC mode of the group
For example: FUNCtion:SOUR:DC:ARC 1,5

39. FUNCtion:SOUR:DC:CONNect?
Function: Test continuity in DC mode for query groups
For example: FUNCtion:SOUR:DC:CONNect? 1

40. FUNCtion:SOUR:DC:CONNect
Function: Set the continuity of the test in DC mode of the group
For example: FUNCtion:SOUR:DC:CONNect 1,All

41. FUNCtion:SOUR:IR:VOLTage?
Function: Query the voltage value in IR mode of a group
For example: FUNCtion:SOUR:IR:VOLTage? 1

42. FUNCtion:SOUR:IR:VOLTage
Function: Set the voltage value in the IR mode of the group
For example: FUNCtion:SOUR:IR:VOLTage 1,1000

43. FUNCtion:SOUR:IR:RANGe?
Function: Query the range of a group in IR mode
For example: FUNCtion:SOUR:IR:RANGe? 1
Return: Auto, 100G, 300M, 30M, 3M, 300k

44. FUNCtion:SOUR:IR:RANGe
Function: Set the range in the IR mode of the group
For example: FUNCtion:SOUR:IR:RANGe 1, Auto

45. FUNCtion:SOUR:IR:UPPC?
Function: Query the upper limit of resistance in IR mode of a group
For example: FUNCtion:SOUR:IR:UPPC? 1

45. FUNCtion:SOUR:IR:UPPC
Function: Set the upper limit of resistance in the IR mode of the group
For example: FUNCtion:SOUR:IR:UPPC 1,500
Note: The unit is M

46. FUNCtion:SOUR:IR:LOWC?
Function: Query the lower limit of resistance in IR mode of a group
For example: FUNCtion:SOUR:IR:LOWC? 1

47. FUNCtion:SOUR:IR:LOWC
Function: Set the lower limit of resistance in IR mode of the group
For example: FUNCtion:SOUR:IR:LOWC 1,100
Note: The unit is M

48. FUNCtion:SOUR:IR:TTIM?
Function: Query the test time in IR mode of a group
or example: FUNCtion:SOUR:IR:TTIM? 1

49. FUNCtion:SOUR:IR:TTIM
Function: Set the test time in IR mode for the group
For example: FUNCtion:SOUR:IR:TTIM 1,1.5

50. FUNCtion:SOUR:IR:RTIM?
Function: Query the voltage rising time in IR mode of a group
For example: FUNCtion:SOUR:IR:RTIM? 1

51. FUNCtion:SOUR:IR:RTIM
Function: Set the voltage rising time in IR mode of the group
For example: FUNCtion:SOUR:IR:RTIM 1,0.5

52. FUNCtion:SOUR:IR:FTIM?
Function: Query the IR mode voltage falling time of a group
For example: FUNCtion:SOUR:IR:FTIM? 1

53. FUNCtion:SOUR:IR:FTIM
Function: Set the voltage falling time in the IR mode of the group
For example: FUNCtion:SOUR:IR:FTIM 1,0.5

54. FUNCtion:SOUR:IR:WTIM?
Function: Query the waiting time of a group in IR mode
For example: FUNCtion:SOUR:IR:WTIM? 1

55. FUNCtion:SOUR:IR:WTIM
Function: Set the waiting time in IR mode for the group
For example: FUNCtion:SOUR:IR:WTIM 1,0.5

56. FUNCtion:SOUR:IR:CONNect?
Function: Test continuity in IR mode of query group
For example: FUNCtion:SOUR:IR:CONNect? 1

57. FUNCtion:SOUR:IR:CONNect
Function: Set the test continuity in IR mode of the group
For example: FUNCtion:SOUR:IR:CONNect 1,All

58. FUNCtion:SOUR:GD:CURRent?
Function: Query the current value of a group in GD mode
For example: FUNCtion:SOUR:GD:CURRent? 1

59. FUNCtion:SOUR:GD:CURRent
Function: Set the current value in GD mode of the group
For example: FUNCtion:SOUR:GD:CURRent 1,10
Note: The unit is A

60. FUNCtion:SOUR:GD:UPPC?
Function: Query the upper limit of resistance in GD mode of a group
For example: FUNCtion:SOUR:GD:UPPC? 1

61. FUNCtion:SOUR:GD:UPPC
Function: Set the upper limit of resistance in GD mode of the group
For example: FUNCtion:SOUR:GD:UPPC 1,10

62. FUNCtion:SOUR:GD:LOWC?
Function: Query the lower limit of resistance in GD mode of a group
For example: FUNCtion:SOUR:GD:LOWC? 1

63. FUNCtion:SOUR:GD:LOWC
Function: Set the upper limit of resistance in GD mode of the group
For example: FUNCtion:SOUR:GD:LOWC 1,5

64. FUNCtion:SOUR:GD:TTIM?
Function: Query the test time of a group in GD mode
For example: FUNCtion:SOUR:GD:TTIM? 1

65. FUNCtion:SOUR:GD:TTIM
Function: Set the test time in GD mode of the group
For example: FUNCtion:SOUR:GD:TTIM 1,2.5

66. FUNCtion:SOUR:GD:CONNect?
Function: Test continuity in GD mode for query groups
For example: FUNCtion:SOUR:GD:CONNect? 1

67. FUNCtion:SOUR:GD:CONNect
Function: Set the test continuity in GD mode of the group
For example: FUNCtion:SOUR:GD:CONNect 1,All