# INDUCTIVE LOAD TESTER

MODEL 9302-LV/9303-PU/9304-HB

INSTRUCTION MANUAL FOR SOFTWARE



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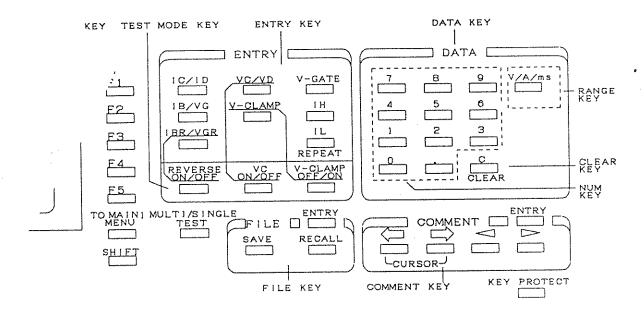
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## 1. KEYING SITE

The following keys are provided in the keying site of the front panel as shown below:

- MULTI/SINGLE TEST-key
- Function keys (F1 to F5)
- ENTRY keys
- DATA keys
- FILE keys
- COMMENT keys
- TO MAINI MENU-key
- SHIFT-key
- KEY PROTECT-key



#### 1.1 Fundamental Action

- Press TO MAIN1 MENU1-key to terminate each menu by a function key.
- Input a condition or a value by keys after setting input item by ENTRY key.
- When ENTRY key is pressed, the cursor moves to a selected item and the screen is in data input status.
- The set value is determined by the enter key (range key = V/A/ms-Key) in DATA key group.
  - When input an item shown below a key, press the key and the SHIFT-key simultaneously.
  - A key pressed during test is invalid.
  - There are some cases in which input by keys are limited by the RS232C I/F command.
  - Setting the test condition (including POLA) is possible by the panel when the programming is made on the panel.

A comment input is determined when other key (ENTRY keys or TEST START-key) is selected.

• An error message is shown at the 14th line of "SINGLE or MULTI TEST CONDITION set screen.

## 1.2 MULTI/SINGLE TEST-key

The MULTI/SINGLE TEST-key sets multi test mode or single test mode. Each time the key is pressed, the mode can be changed in turn.

When MULTI TEST mode is selected, "MULTI" is shown at the lower part of the screen.

#### 1.2.1 MULTI TEST mode

In the MULTI TEST mode, up to 3 tests can be performed consecutively under the three different conditions.

The result of a multi-test is judged by the conjunction (AND) of the results of various tests.

When a result of any of the various tests is judged as FAIL, testing of the rest of the tests is not performed and the results of the multi-test is made as FAIL.

Under the following conditions, any multi-test can not be performed:

Selection for START: GPIB, RS232C, and EXT

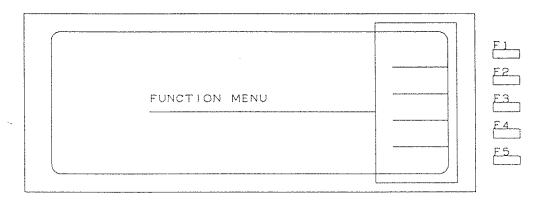
Selection for PROG: GPIB and RS232C

For the details of the setting procedure for test conditions of a multi-test, refer to "1.3.5 MULTI Menu".

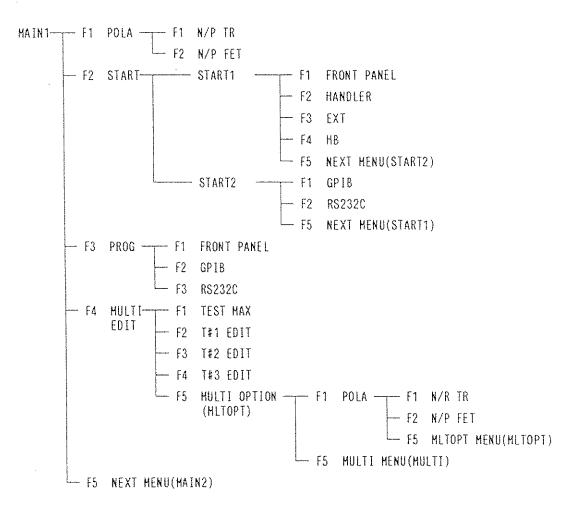
# 1.3 Function Keys and Function Menus

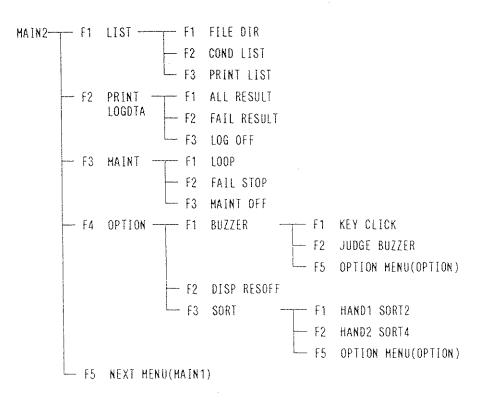
The function keys consist of F1-key to F5-key and are used to make the main menu screens and menu screens appear for setting a polarity (NPN, PNP) or maintenance mode.

The keys are also used to select the operating functions.



The figure 1.1 shows the menu and command block diagram which summarizes the relationship between the menus and commands and the function keys;





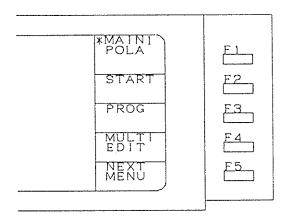
Press TO MAIN1 MENU-key to terminate a menu.

#### 1.3.1 MAIN Menu

MAIN menu consists of 2 screens (MAIN1, MAIN2). By pressing F5-key, the next MAIN menu screen appears.

Each MAIN menu screen is explained below:

#### 1.3.1.1 MAIN1 Menu Screen



## (1) POLA command

Press F1-key to go to POLA menu screens where a device type and a polarity (NPN or PNP) can be selected.

The current selection status is displayed at the upper part of the screen.

For the details of the selection procedure, refer to "1.3.2 POLA Menu".

## (2) START command

Press F2-key to go to the START menu screens where a test start mode can be selected. The current selection status is displayed at the lower part of the screen.

For the details of the selection procedure, refer to "1.3.3 START Menu".

#### (3) PROG command

Press F3-key to go to the PROG menu screen where a type of preprogrammed test conditions can be selected.

The current selection status is displayed at the lower part of the screen.

For the details of the selection procedure, refer to "1.3.4 PROG Menu".

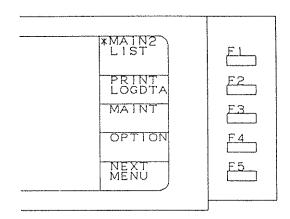
## (4) MULTI EDIT command

Press F4-key to go to MULTI EDIT menu screen where the test condition of a multi test can be made. This command is valid when the MULTI TEST mode is set by the MULTI/SINGLE TEST-key. For the details of the selection procedure, refer to "1.3.5 MULTI menu".

## (5) NEXT MENU

Press F5-key to go to the MAIN2 menu screen.

#### 1.3.1.2 MAIN2 Menu Screen



#### (1) LIST command

Press F1-key to go to the LIST menu screen where a display method whether to display the test file list or to display the test condition list can be selected and printing the test file can be selected. The multi test file in MULTI TEST mode or single test file in SINGLE TEST mode is output.

For the details of the selection procedure, refer to "1.3.6 LIST Menu".

#### (2) PRINT LOGDTA command

Press F2-key to go to PRINT menu screen where a method for outputting test results to a printer can be selected.

The current selection status is displayed at the lower part of the screen.

For the details of the selection procedure, refer to "1.3.7 PRINT LOGDTA Menu".

#### (3) MAINT command

Press F3-key to go to MAINT menu screen where a maintenance mode can be selected.

The current selection status is displayed at the lower part of the screen.

Any of the maintenance mode functions only when FRONT PANEL is selected in START menu.

For the details of the selection procedure, refer to "1.3.8 MAINT Menu".

#### (4) OPTION command

Press F4-key to go to OPTION menu screen from where you can go to sub-menu screens for selecting the options such as test result, binning mode, buzzer, and screen display.

The current selection status is displayed at the lower part of the screen.

For the details of the selecting procedure, refer to "1.3.9 OPTION Menu".

#### (5) NEXT MENU

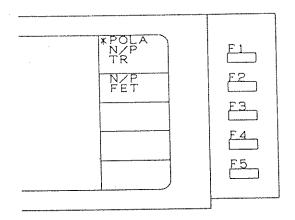
Press F5-key to go to the MAIN1 menu screen.

## 1.3.2 POLA Menu

In POLA menu, a device type and a polarity (NPN or PNP) can be selected.

Press TO MAIN1 MENU-key to terminate POLA menu and to go to MAIN1 menu.

The current selection status is displayed at the upper part of the screen.



## (1) N/P TR command

Press F1-key to set the applicable device as NPN or PNP transistor. By pressing the F1-key again, the polarity can be changed.

# (2) N/P FET command

Press F2-key to set the applicable device as N-FET or P-FET. By pressing the F2-key again, the polarity can be changed.

# 1.3.3 START Menu

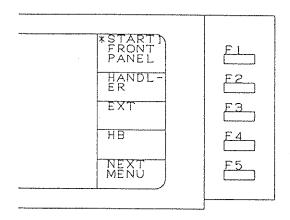
In START menu, a test start command can be selected. This menus consists of 2 screens (START1 and START2). By pressing F5-key in one screen, the screen goes to the other screen.

Press TO MAIN1 MENU-key to terminate START menus and to go to MAIN1 menu.

The current selection status is displayed at the lower part of the screen.

Note: The commands in MAINT menu are only enabled when FRONT PANEL command is selected in START1 menu and in PROG menu.

# 1.3.3.1 START1 Menu Screen



#### (1) FRONT PANEL command

This command executes testing a device when the START switch in the front panel is pushed.

## (2) HANDLER command

This command executes testing of a device by a test start signal which comes from the HANDLER connector in the rear panel. (For the details, refer to the Hardware Manual.) MAINT mode is disabled when HANDLER command is selected.

Binning is set by SORT SELECT command in OPTION menu. For the detail of selecting binning, refer to "1.3.9.2 SORT Sub-menu".

In SORT sub-menu screen, there are 2 commands for selecting sort numbers and binning mode is shown at the lower part of the screen.

HAND 1 SORT-2 command: 2 sorts (PASS, FAIL)

HAND 2 SORT-4 command: 4 sorts (PASS, FAIL1, FAIL2, REJECT)

# (3) EXT command

This command executes testing by a test start signal which comes from the EXT connector in the rear panel. (For the details, refer to the Hardware Manual.)

The function of this command is disabled if MULTI TEST mode has been selected.

MAINT mode is disabled when EXT command is selected.

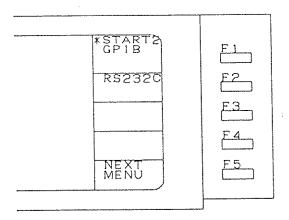
## (4) HB command

This command executes testing by pushing START switch in the front panel of the test head 9304-HB.

#### (5) NEXT MENU

Press F5-key in the START1 menu screen to go to the START2 menu screen.

## 1.3.3.2 START2 Menu Screen



# (1) GPIB command

This command executes testing by the test start command of GP-IB interface.

The function of this command is disabled if MULTI TEST mode has been selected.

MAINT mode is disabled when GPIB command is selected.

For further information, refer to "4. GP-IB INTERFACE".

## (2) RS232C command

This command executes testing by the test start command of RS-232-C interface. The function of this command is disabled if MULTI TEST mode has been selected. MAINT mode is disabled when RS232C command is selected. For further information, refer to "5. RS-232-C INTERFACE".

# (3) NEXT MENU

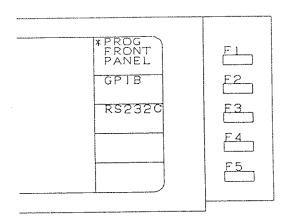
Press F5-key in the START2 menu screen to go to the START1 menu screen.

#### 1.3.4 PROG Menu

In PROG menu screen, a type of preprogrammed test conditions can be selected.

Press TO MAIN1 MENU-key to terminate PROG menu and to go to MAIN1 menu. The current selection status is displayed at the lower part of the screen.

Note: The commands in MAINT menu are only enabled when FRONT PANEL command is selected in START1 menu and in PROG menu.



#### (1) FRONT PANEL command

This command executes testing of devices using a test program created on the front panel. Testing is performed by the test program which is currently displayed on the screen.

## (2) GPIB command

This command executes testing of devices by the test conditions which are transferred by the command of the GP-IB interface.

The function of GPIB command is disabled if MULTI TEST mode has been selected.

MAINT mode is disabled when GPIB command is selected.

For the details of GPIB command, refer to the "4. GP-IB INTERFACE".

# (3) RS232C command

This command executes testing of devices by the test conditions which are transferred by the command of RS-232-C interface.

The function of RS232C command is disabled if MULTI TEST mode has been selected.

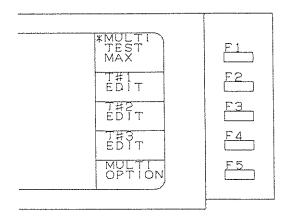
MAINT mode is disabled when RS232C command is selected.

For further information, refer to "5. RS-232-C interface".

#### 1.3.5 MULTI Menu

In MULTI menu, there are commands to create a test program of the multi-test.

Press TO MAIN1 MENU-key to terminate MULTI menu and to go to MAIN1 menu.



## (1) TEST MAX command

This command executes setting a test max for a multi-test.

A test max can be input by the following steps:

- (a) Press F1-key and the cursor moves to the TMAX position in the screen.
- (b) Enter a test max (1 to 3) with the number keys and the range key (V/A/ms-key).

# (2) T#1 EDIT

This command edits the T#1 test condition. Press F2-key and T#1 is shown in inverse video, which means possibility of editing the T#1 test condition. Individual test condition is set by ENTRY keys, DATA keys or enter key (V/A/ms-key).

The T#1 test condition can be copied in the T# position in inverse video by pressing F2-key and SHIFT-key simultaneously

#### (3) T#2 EDIT

This command edits the T#2 test condition. Press F3-key and T#2 is shown in inverse video, which means possibility of editing the T#2 test condition. Individual test condition is set by ENTRY keys, DATA keys or enter key (V/A/ms-key).

The T#2 test condition can be copied in the T# position in inverse video by pressing F2-key and SHIFT-key simultaneously

#### (4) T#3 EDIT

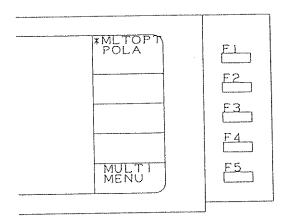
This command edits the T#3 test condition. Press F4-key and T#3 is shown in inverse video, which means possibility of editing the T#3 test condition. Individual test condition is set by ENTRY keys, DATA keys or enter key (V/A/ms-key).

The T#3 test condition can be copied in the T# position in inverse video by pressing F2-key and SHIFT-key simultaneously

#### (5) MULTI OPTION

This command sets the applicable device and the polarity. For the details of MULTI OPTION, refer to "1.3.5.1 MLTOPT Sub-menu".

# 1.3.5.1 MLTOPT Sub-menu



# (1) POLA command

This command sets the applicable device and the polarity (NPN/PNP). Press F-5 key to terminate POLA sub-menu and to go to MULTI OPTION menu.

For the details of POLA command, refer to "1.3.2 POLA Menu".

# (2) MULTI MENU

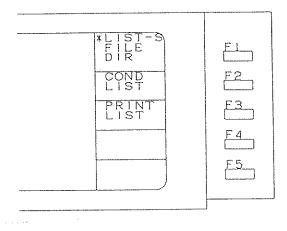
Press F5-key to go to MULTI menu screen.

## 1.3.6 LIST Menu

In LIST menu, there are commands to display test file list or test condition list and to print the test file. The multi test file in MULTI TEST mode or single test file in SINGLE TEST mode is output.

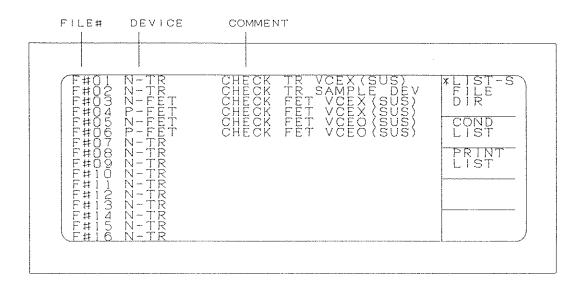
As the menu title "\*LIST-M" is shown in MULTI TEST mode and "\*LIST-S" in SINGLE TEST mode.

Press TO MAIN1 MENU-key to terminate LIST menu and to go to MAIN1 menu.



## (1) FILE DIR command

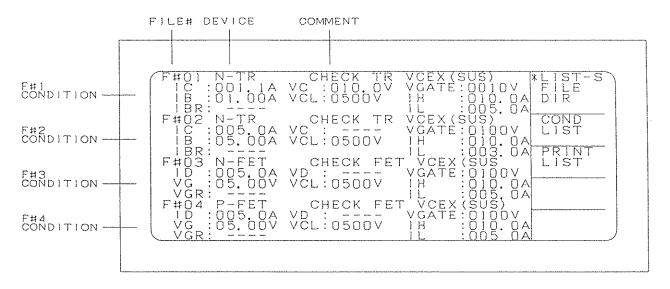
This command displays the 16 files in file lists of a test program.



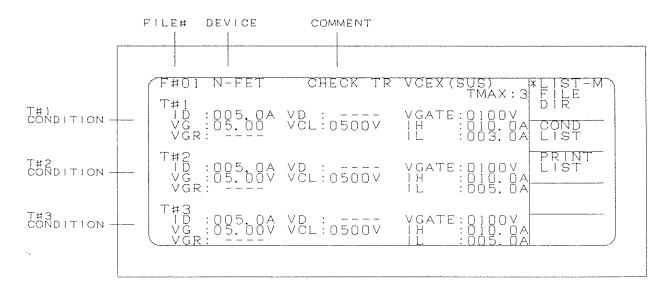
## (2) COND LIST command

This command displays the test condition of a test program.

In SINGLE TEST mode each time F2-key is pressed, four files are displayed in turn in the screen.



In MULTI TEST mode each time F2-key is pressed, one file is displayed in turn in the screen.



# (3) PRINT LIST command

The test program is output to a printer which is interfaced with the PARALLEL connector (Centronics interface) in the rear panel.

<<<< style="color: blue;">C<<<< style="color: blue;">C<<<< style="color: blue;">C<<<< style="color: blue;">C<<< style="color: blue;">C<<< style="color: blue;">C<<< style="color: blue;">C<<< style="color: blue;">C<<< style="color: blue;">C<</td>

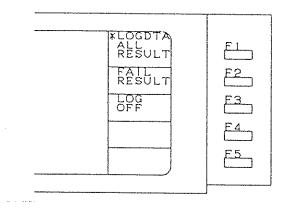
F#	DEAICE		COM	MENT	VGATE	IH	IL	IC/ID	IB/VG	IBR/VGR	AC\AD	ACTVMB	RPT
1	N-TR	CHECK	TR '	VCEX(SUS)	0010V	010.01	005.01	001.04	01.004		010.07	9500V	001
2	N-TR	CHECK	TR	VCEX(SUS)	01007	A0.010	A0.800	005.04	05.00A			05007	001
3	N-FET	CHECK	FET	VCDX (SUS)	01007	010.04	005.0A	005.04	00.07			05007	()() I
4	P-FET	CHECK	FET	VCDX(SUS)	0100V	010.04	005.04	005.04	00.07	-		0500V	001
5	N-TR				00000	000.00	000.00	000.00	00.00A		*** *** *** ***		001
6	N-TE				0000V	000.0A	000.00	000.00	00.00A				001
7	N-TR				00007	000.0A	A0.000	000.00	00.001				100
8	N-TR				00000	000.0A	A0.000	000.0A	00.00A				001
9	N-TR				00007	A0.000	000.0A	000.04	00.00A				001
10	N-TR				0000V	000.0A	000.00	000.04	A00.00A				001
11	N-TR				00000	000.04	000.01	000.00	00.00A				U() I
12	N-TR				0000V	000.00	000.01	000.00	00.00A		,		1
13	N-TR				00000	000.01	000.04	000.0A	00.00A		****		J01
14	N-TR				00000	000.0A	000.00	000.0A	00.00A				001
15	AT-K				00000	000.0A	000.0A	000.00	A00.00A			****	001
16	N-TE			•	00004	000.00	000.00	000.00	00.00A			****	001

#### 1.3.7 PRINT LOGDTA Menu

In PRINT menu, a printing mode can be selected for outputting a test result or judgement result to a printer during measurement which is interfaced with the PARALLEL connector (Centronics interface) in the rear panel.

Press TO MAIN1 MENU-key to terminate LOGDTA menu and to go to MAIN1 menu. The current selection status is displayed at the lower part of the screen.

Note: When the test condition is changed, printing job is canceled.



# (1) ALL RESULT command

This command executes outputting a test result and a judgement result of a DUT to the printer during measurement.

## (2) FAIL RESULT command

This command executes outputting a test result only of a DUT to the printer during measurement, which is judged as FAIL.

## (3) LOG OFF command

This command cancels outputting a test result and a judgement result of a DUT to the printer during measurement.

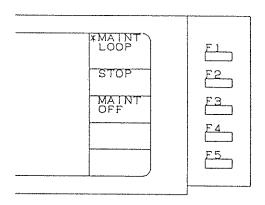
#### 1.3.8 MAINT Menu

In MAINT menu, a test is performed repeatedly under the same conditions for maintenance or adjustment.

Press TO MAIN1 MENU-key to terminate MAINT menu and to go to MAIN1 menu.

The current selection status is displayed at the lower part of the screen.

Note: The commands in MAINT menu are only enabled when FRONT PANEL command is selected in START1 menu and in PROG menu.



# (1) LOOP command

This command executes performing a loop test. (repeat test under the same test condition) To stop the loop test, press any key in the front panel.

## (2) FAIL STOP command

This command executes performing a loop test which has a function to stop testing when the test result of a DUT is FAIL.

To stop the loop test, press any key in the front panel.

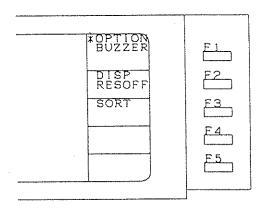
## (3) MAIN OFF command

Press F3-key to cancel the maintenance function.

#### 1.3.9 OPTION Menu

In OPTION menu, there are commands to go to sub-menu screens where optional functions for test result display, binning mode, buzzer, etc. can be selected.

Press TO MAIN1 MENU-key to terminate OPTION menu and to go to MAIN1 menu.



## (1) BUZZER command

When this command is selected, the screen goes to the BUZZER sub-menu screen.

In the BUZZER sub-menu screen, audio sound is turned ON or OFF.

For the details, refer to "1.3.9.1 BUZZER Sub-menu".

# (2) DISP RESOFF command

This command sets whether to display or not a test result or a judgement result. Each time F2-key is pressed, the setting is changed. The current selection status is displayed at the lower part of the screen. When "RES" is shown, no test result or no judgement result is displayed.

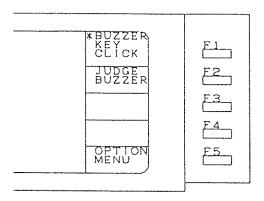
## (3) SORT command

This command sets the number of sort at a handler. When this command is selected, the screen goes to the SORT sub-menu screen.

For the details, refer to "1.3.9.2 SORT Sub-menu".

# 1.3.9.1 BUZZER Sub-menu

In BUZZER sub-menu, audio sound is activated.



# (1) KEY CLICK command

This command activates a click sound.

Press F1-key to change the setting.

# (2) JUDGE BUZZER command

This command activates 1 buzzer each time a device is judged as PASS and 5 buzzers in succession each time a device is judged as FAIL.

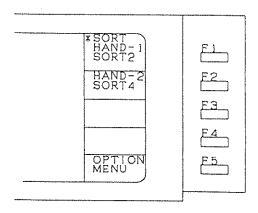
Press F2-key to change the setting.

# (3) OPTION MENU

Press F5-key to go to the OPTION menu screen.

# 1.3.9.2 SORT sub-menu

In SORT sub-menu, bin number of judgement result is set.

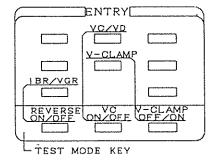


- (1) HAND-1 SORT2 command
  In this command, 2 sorts (PASS, FAIL) are set.
- (2) HAND-2 SORT4 command
  In this command, 4 sorts (PASS, FAIL1, FAIL2, REJECT) are set.
- (3) OPTION MENU command
  Press F5-key to go to the OPTION menu.

#### 1.4 Test Mode key

The 9302-LV can measure a device by the following measurement method, which are selected by the test mode keys. For the details, refer to "the Instruction Manual for Hardware 1.5 Functions".

- Constant current measurement
- Constant voltage measurement
- · Reverse measurement
- Non-reverse measurement
- Clamp measurement
- Non-clamp measurement



#### (1) VC ON/OFF-key

This key turns measurement of collector constant voltage ON or OFF.

Collector power source is set at constant voltage mode by VC ON and set at constant current mode by VC OFF. By setting VC ON the test condition VC/VD can be input.

## (2) REVERSE ON/OFF-key

This key turns reverse measurement ON or OFF.

Reverse measurement is performed by REVERSE ON and non-reverse measurement by REVERSE OFF. By setting REVERSE ON the test condition IBR/VGR can be input.

#### (3) V-CLAMP OFF/ON-key

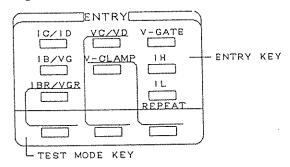
This key turns V-clamp measurement ON or OFF.

Non V-clamp measurement is performed by V-CLAMP OFF and V-clamp measurement by V-CLAMP ON.

By setting V-CLAMP ON the test condition VCL can be input.

## 1.5 ENTRY Keys

Each of these keys selects the corresponding item where test conditions are to be input. When one of the keys is pressed, the cursor appears at the corresponding item position waiting for a value to be input.



## (1) IC/ID-key

This key is for setting a collector current IV or drain current ID.

(2) IB/VG-key

This key is for setting a base current IB or gate voltage VG.

(3) IBR/VGR-key

This key is for setting a reverse-bias base current IBR or reverse-bias gate voltage VGR.

(4) VC/VD-key

This key is for setting a collector voltage VC or drain voltage VD.

Note: VC/VD value must be smaller than VCL value.

(5) VCL

This key is for setting clamp voltage V-CLAMP.

Note: A VCL value must be 30 V or more for constant-voltage measurement of collector and a VCL value must be 40 V or more for constant-current measurement.

(6) VGATE-key

This key is for setting a voltage limit V-GATE.

(7) IH-key

This key is for setting an IH limit current.

(8) IL-key

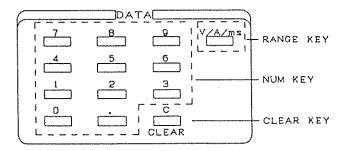
This key is for setting an IL current.

(9) REPEAT (SHIFT-key + IL-key)

This key is for setting the consecutively repeated number of a test under the same conditions. The max input number is 250.

# 1.6 DATA Keys

The DATA keys, consisting of the number keys, range key (V/A/ms-key), and CLEAR-key, are used to input values to items selected by ENTRY keys.



## (1) Number keys

These keys, consisting of 0-key to 9-key, and --key, are used to input a value. When --key is simultaneously pressed with SHIFT-key, all the set values retrieve to the values set at the time of shipment from the TESEC factory.

# (2) Range key (V/A/ms-key)

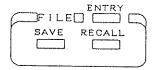
This key is used for selecting an input range and for setting an input value. V/A/ms-key sets an input value x 1 as the input value.

# (3) CLEAR-key

This key clears the item selected by any of ENTRY keys. When this key is simultaneously pressed with SHIFT-key, all the test conditions (IC, IB, VCL, etc.) which have been set are initialized.

#### 1.7 FILE Keys

These keys, consisting of FILE ENTRY-key, SAVE-key, and RECALL-key, are used to save into a file and recall from a file the test programs which have been created in the screen. The multi test files in MULTI TEST mode and single test files in SINGLE TEST mode are saved or recalled.



# (1) FILE ENTRY-key

This key sets the file No. of a file where a test program is to be saved to or recalled from. File Nos. can be set from 1 to 16.

A file can be saved or recalled by the following procedure.

- (a) Press FILE ENTRY-key and the cursor moves to the F# position.
- (b) Enter a file No. with the number key(s).
- (c) Press SAVE-key or RECALL-key to save or recall the file as follows;
  - SAVE-key

By pressing SAVE-key, the following message is displayed; "SAVE-Are you sure? [SAVE/RECALL]"

By pressing SAVE-key again, the file is saved.

RECALL-key

By pressing RECALL-key, the following message is displayed;

"RECALL-Are you sure? [RECALL/SAVE]"

By pressing RECALL-key again, the file is recalled.

## (2) SAVE-key

This key saves a test program to a specified file No.

By pressing SAVE-key, the following message is displayed;

"SAVE-Are you sure? [SAVE/RECALL]"

By pressing SAVE-key again, the file is saved.

Max 16 single test files and max 16 multi test files can be stored respectively.

#### ° (3) RECALL-key

This key recalls in the screen the test program of a specified file No.

By pressing RECALL-key, the following message is displayed;

"RECALL-Are you sure? [RECALL/SAVE]"

By pressing RECALL-key again, the file is recalled.

The file storing status can be confirmed by LIST command in MAIN2 menu.

# 1.8 COMMENT Keys/Digital keys

The following keys are for inputting a comment (up to 20 characters and spaces) to a test program and for inputting digitally various values of test conditions with ENTRY-key (setting a value at each digit).



# (1) COMMENT ENTRY-key

This key moves the cursor to the comment position for entering a comment.

## $(2) \leftarrow -\text{key}$

This key moves the cursor in a comment leftward.

(a) When COMMENT ENTRY-key is pressed.

This key moves the cursor in a comment leftward.

(b) When one of test condition ENTRY keys is pressed.

This key moves the cursor in a test condition leftward (to the digit where a figure is input).

## $(3) \Rightarrow -\text{key}$

## (a) COMMENT ENTRY-key

This key moves the cursor in a comment rightward.

(b) When one of test condition ENTRY keys is pressed.

This key moves the cursor in a test condition rightward (to the digit where a figure is input).

## (4) ⊲-key

## (a) COMMENT ENTRY-key

This key sets alphanumerics for a comment. Each time this key is pressed, the character at the cursor position in the comment line of the test program changes as follows:

(b) When one of test condition ENTRY keys is pressed.

This key increments the value at the cursor position.

(Example) IC = 009.8 A

Cursor at the last digit : 009.9 A (plus 0.1 to the IC value)

Cursor at the 3rd significant digit : 010.8 A (plus 1.0 to the IC value)

Cursor at the 2nd significant digit : 019.8 A (plus 10.0 to the IC value)

Note: No range can be changed by inputting with the digital switch (▶-key). Use the range key (V/A/ms -key) and NUM-keys to change the range.

# (5) ⊳-key

# (a) COMMENT ENTRY-key

This key sets alphanumerics for a comment. Each time this key is pressed, the character at the cursor position in the comment line of the test program changes as follows:

(b) When one of test condition ENTRY keys is pressed.

This key decrements the value at the cursor position.

(Example) IC = 010.8 A

Cursor at the last digit : 010.7 A (minus 0.1 to the IC value)

Cursor at the 3rd significant digit : 009.8 A (minus 1.0 to the IC value)

Cursor at the 2nd significant digit : 000.8 A (minus 10.0 to the IC value)

Note: No range can be changed by inputting with the digital switch (>-key). Use the

range key (V/A/ms-key) and NUM-keys to change the range.

# 1.9 SHIFT-Key

By pressing this key simultaneously with one of the keys described below, the following functions become available;

## (1) SHIFT-key + IL-key

These keys set the consecutively repeated number of a test under the same conditions. The max input range is 250.

The REPEAT measurement performs repeatedly the specified number of a test, and the test results and the judged result are displayed. When the test result of a DUT is FAIL, the test is stopped immediately and the test result and judgement result are output. When SHIFT-key and IL-key are pressed simultaneously, the cursor moves to the REPEAT at the lower part of the screen, and the number of repeat test is waiting for a value to be input.

# (2) SHIFT-key + C-key (CLEAR-key)

These keys clear all the test conditions (IC, IB, VCL, etc.) which have been set.

# (3) SHIFT-key + --key (RESET-key)

These keys delete the registered file of the test programs and the multi-test program and retrieve the setting the same as the ones which were made at the time of shipment from TESEC factory.

## 1.10 KEY PROTECT-key

This key disables to change a test condition by the keys on the front panel.

When KEY PROTECT-key is pressed, "KEY" is displayed at the lower part of the screen and only other keys than START-key is invalidated. By pressing SHIFT-key and KEY PROTECT-key simultaneously the key protection function is canceled.

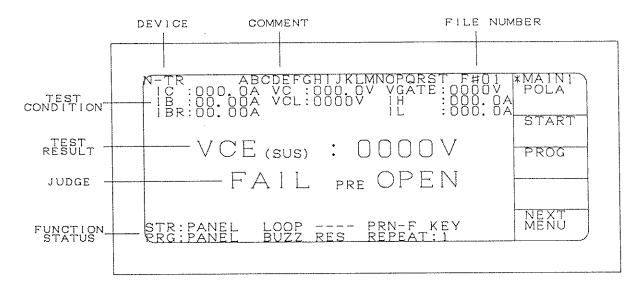
## 2. DISPLAY

There are 2 kinds of display format screens (condition set screen and multi-test screen).

## 2.1 Condition Set Screen

When one of the function keys or ENTRY keys is pressed, the following screen is displayed.

#### 2.1.1 SINGLE TEST Mode



## (1) Test result

(a) VCE(SUS): OOOO V

Non-reverse measurement is performed and the VSUS value at the specified current IH is displayed.

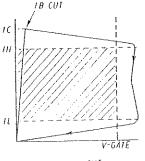
(b) VCEX(SUS): OOOO V

Reverse measurement is performed and the VSUS value at the specified current IH is displayed.

[B CUI]

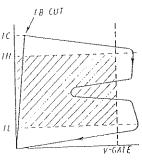
- (2) Judgement result
  - (a) PASS

VSUS value ≥ V-GATE value between IH and IL



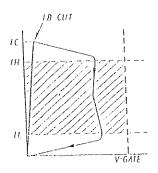
(b) FAIL1

VSUS value decreases than V-GATE value between IH and IL



(c) FAIL2

VSUS value < V-GATE value at IH



(d) pre-OPEN

The IB is ON before VSUS is measured, and the current IC is

1/5 or less than that of the specified value.

(e) pre-SHORT

The IB is OFF before VSUS is measured, and the current IC

is 1/5 or more than that of the specified value.

(f) post-OPEN

The IB is ON after the 1st VSUS measurement is performed

in the repeat test or multi test and the current IC is 1/5 or less

than that of the specified value.

(g) post-SHORT

The IB is OFF after the VSUS measurement is performed,

and the current IC is 1/5 or more than that of the specified

value.

(h) IC/ID ERROR

IC/ID current does not reach the specified value.

(3) Setting status of functions

(a) <u>STR</u>:

Test start mode

"PANEL"

..... from FRONT PANEL

"HAND-1"

.... from the handler (2-sorts)

"HAND-2"

.... from the handler (4-sorts)

"EXT"

.... from EXT connector (external tester)

"HB"

..... from a test head

"GPIB"

..... from GP-IB interface

"RS232C"

.... from RS-232-C interface

(b) <u>PRG</u>:

Destination of input test program

"PANEL"

.... to FRONT PANEL

"GPIB"

.... to GP-IB interface (9302-LV data format)

"RS232C"

.... to RS-232-C interface

(c) MULTI:

to carry out multi-test

(d) BUZZ:

to activate JUDGE BUZZER function

(e) PRN:

to output LOG DATA (all data) to a printer

(f) PRN-F:

to output only FAIL DATA (FAIL judgement result) to a printer

(g) STOP:

to activate FAIL STOP function of maintenance mode

(h) LOOP:

to activate LOOP test function of maintenance mode

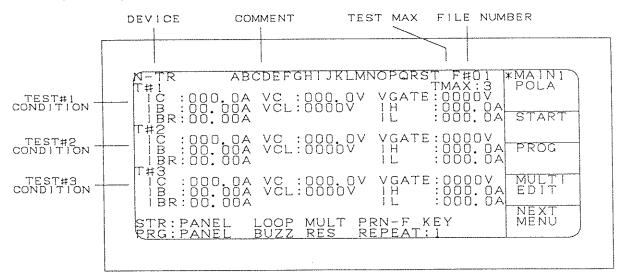
(i) RES:

not to display test results

(j) KEY:

to activate key-input protecting function at the front panel

## 2.1.2 MULTI TEST Mode

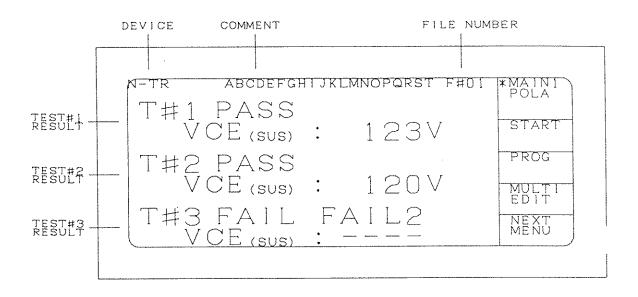


- (1) Max item number of multi test
- (2) Test condition of T#1
- (3) Test condition of T#2
- (4) Test condition of T#3
- (5) Setting status of functions

(a) <u>STR</u> :	Test start mode				
"PANEL"	from FRONT PANEL				
"HAND-1"	from the handler (2-sorts)				
"HAND-2"	from the handler (4-sorts)				
"EXT"	from EXT connector				
"HB"	from a test head				
"GPIB"	from GP-IB interface				
"RS232C"	from RS-232-C interface				
(b) <u>PRG</u> :	Destination of input test program				
"PANEL"	to FRONT PANEL				
"GPIB"	to GP-IB interface (9302-LV data format)				
"RS232C"	to RS232C interface				
(c) MULTI:	to carry out multi-test				
(d) BUZ:	to activate JUDGE BUZZER function				
(e) PRN:	to output LOG DATA to a printer				
(f) PRN-F:	to output FAIL DATA to a printer				
(g) STOP:	to activate FAIL STOP function of maintenance mode				
(h) LOOP:	to activate LOOP test function of maintenance mode				
(i) RES:	not to display test results				
(j) KEY:	to activate key-input protecting function at the front panel				

# 2.2 MULTI Test Screen

If MULTI TEST mode is selected, the following screen is displayed during measurement.



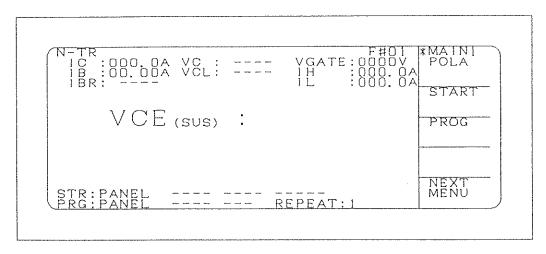
## 3. OPERATION

To create a test program, follow the steps described below:

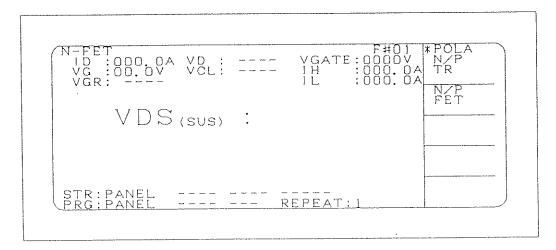
The described steps are one example for creating a test program.

# 3.1 Creation of Single Test Program for Test File

(1) By MULTI/SINGLE TEST-key set SINGLE TEST mode and the test condition set screen.



(2) Press F-1 key to go to the POLA menu screen, and in the POLA menu screen, select N-FET command by pressing F2-key.

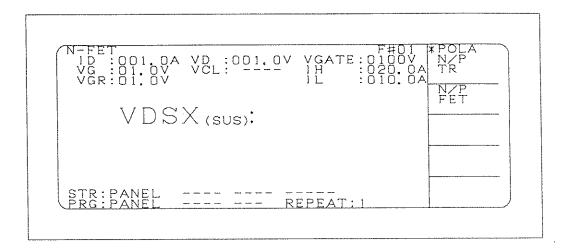


(3) Set test conditions with ENTRY keys and DATA keys as follows.

# (Example)

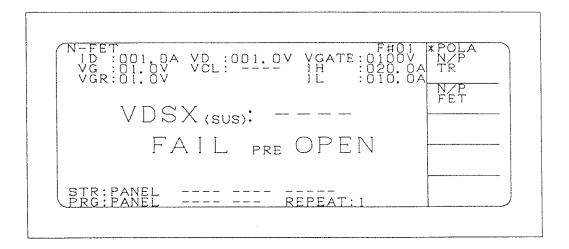
# Operation procedure:

- (a) Set the reverse measurement mode by REVERSE ON/OFF-key. (make possible to input VGR)
- (b) Press VGR (ENTRY)-key.
- (c) Press 1-key of the number keys.
- (d) Press V/A/ms-key (range key).
- (e) Carry out steps (a) to (d) for all other test conditions in similar manner.



When all the test conditions have been set, the tester is ready to start testing when the START switch in the front panel is pushed.

(4) Push the START switch and start testing.

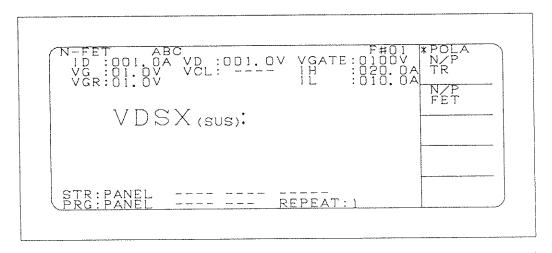


If a device to be tested is not set, pre OPEN is displayed.

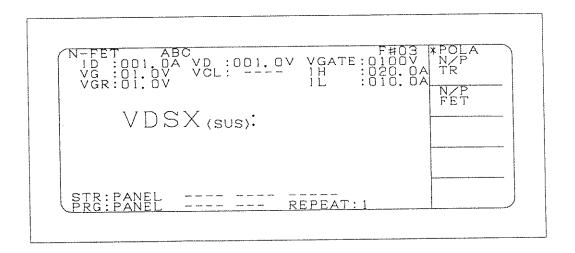
(5) Input a comment "ABC", using COMMENT keys as follows:

Operation procedure:

- (a) Press ENTRY (COMMENT)-key.
- (b) Press ▶-key and confirm that a character "A" is displayed.
- (c) Press  $\Rightarrow$ -key to move the cursor rightward by one step.
- (d) Press >-key 2 times and confirm that a character "B" is displayed.
- (e) Press ⇒-key to move the cursor rightward by one step and press ▶-key 3 times to display a character "C".

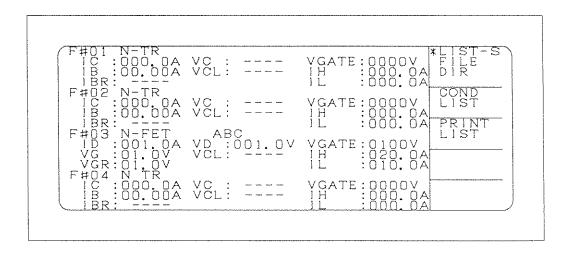


- (6) Save this test program into the test file at F#3, using FILE keys as follows: Operation procedure:
  - (a) Press ENTRY (FILE)-key.
  - (b) Press 3-key of the number keys and confirm that "F#3" is displayed at the F# position in the screen.
  - (c) Press SAVE-key.



(7) Confirm the test programs of the test file by LIST menu.

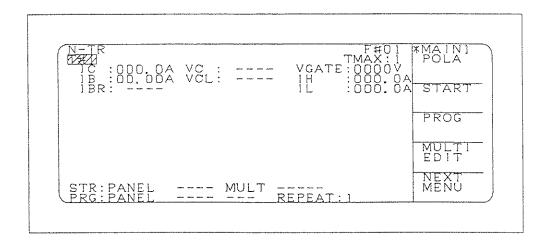
In LIST menu, when COND LIST command is executed, the following list is displayed.



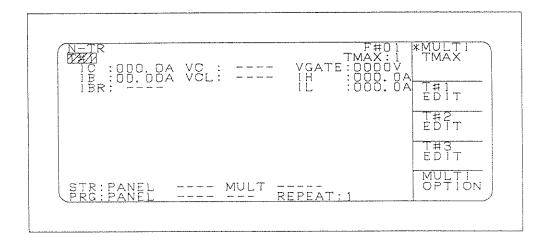
(8) Carry out steps (1) to (6)(a). Save the created test program at F#1 of the test file and carry out step (7) to see if the created test program is saved at F#1.

# 3.2 Creation of Multi-test Program

(1) By the MULTI/SINGLE TEST-key set MULTI TEST mode and make the test condition set screen.



(2) Press F-4 key in MAIN1 menu to go to the MULTI menu screen.

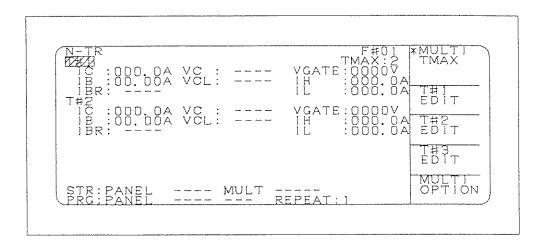


### (3) Set TEST MAX

Press F1-key (TEST MAX) and make TMAX be 2.

### Operation procedure:

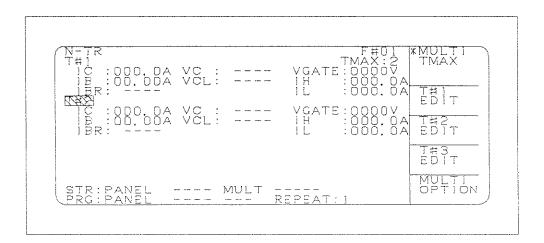
- (a) In the MULTI menu screen, select TEST MAX command by pressing F1-key.
- (b) Press 2-key of the number keys and confirm that "TMAX : 2" is displayed at TMAX position in the screen.
- (c) Press V/A/ms-key (range key) to set the TMAX to be 2.



(4) Input the T#2 test condition of multi test program.

### Operation procedure:

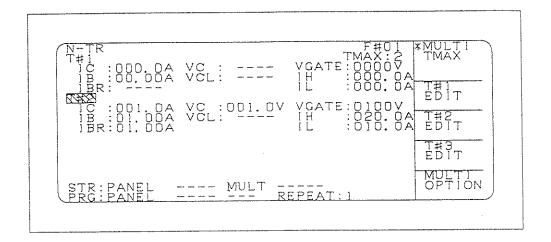
(a) Press F4-key (T#2 EDIT) in the MULTI menu and confirm that the "T#2" is displayed in inverse video in the test condition set screen.



(5) Set the test conditions with the test mode keys, ENTRY and DATA keys as follows: (Example)

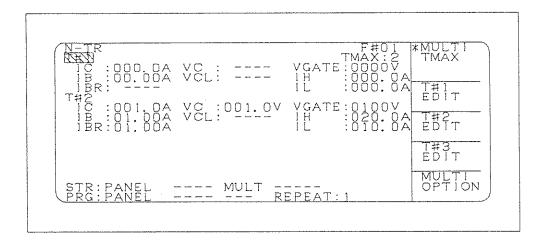
## Operation procedure:

- (a) Set the reverse measurement mode by REVERSE ON/OFF-key. (make possible to input VGR)
- (b) Press IBR (ENTRY)-key.
- (c) Press 1-key of the number keys.
- (d) Press V/A/ms-key (range key).
- (e) Carry out steps (b) to (d) for all other test conditions in similar manner.



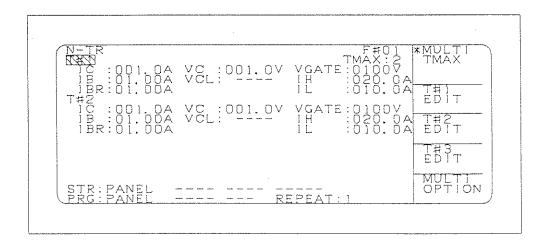
(6) Input the T#1 test conditions (same as the T#2 test conditions) of the multitest program. (Example)

Press F2-key (T#1 EDIT) in MULTI menu and confirm that the "T#1" is displayed in inverse video in the test condition set screen.



(7) Copy the T#2 test conditions by pressing SHIFT-key and a function key simultaneously. Operation procedure:

Press SHIFT-key and F3-key (T#2 EDIT-key) simultaneously and the T#2 test conditions are copied to the T#1 test conditions.



#### 4. GP-IB INTERFACE

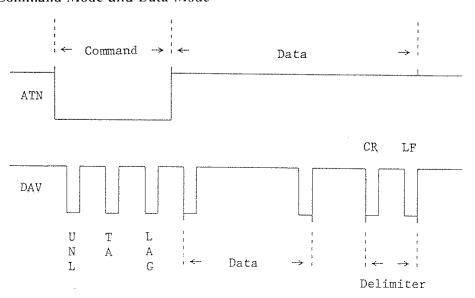
Data formats which are described in items 4.3 are used for the GP-IB interface. When the GP-IB interface is used, the following items must be set with the function keys in the front panel.

- When starting measurement by the GP-IB interface, GPIB command must be selected in "1.3.3.2 START2 Menu Screen".
- When setting test conditions by the GP-IB interface, GPIB command must be selected in "1.3.4 PROG Menu".

Notes: (1) If a command by the GP-IB interface is received during a measurement, the command is executed after the measurement is over.

(2) In the case that GPIB command is set in PROG menu, measurement will start even if other command than GPIB is selected in START menu.

#### 4.1 Command Mode and Data Mode



The commands are output prior to data in the order of UNL (unlisten), TA (talker address), and LAG (listener address group) as shown above.

Delimiter executes CR (carriage return) and LF (line feed).

### 4.2 GP-IB Address

A GP-IB address can be set by the SW-2 switch in the rear panel.

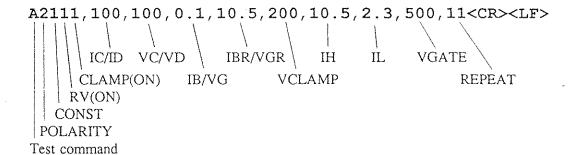
One address out of 1 to 30 can be set.

For the details, refer to the Hardware Manual.

#### 4.3 9302-LV Format

#### 4.3.1 Test Conditions

Data format of the test conditions consists of 10 blocks.

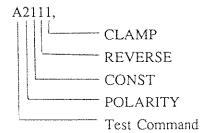


In the comment block, values and units must be set.

If other characters than values and units are set or if the values and units exceed specified significant digits for each block (if a value and unit which can not be input for the block are set at FRONT PANEL), testing for the block is not performed but an error code is set to the judgement result block of the test result.

For the details, refer to "4.3.2 Test Result".

### (1) Comment block



### (a) Test command

Selects a test command.

A: Measurement is performed by the succeeding test conditions.

B: Measurement is performed with no relation to the succeeding test conditions. ("B" only is acceptable.)

However, measurement is not performed if other test start command than GPIB command at the front panel has been selected.

### (b) POLARITY

(i) Selects a device type and polarity.

0 : P-FET

1: N-FET

2: PNP transistor

3: NPN transistor

#### (ii) Test condition lock function

When the polarity of test conditions is set as shown below, this function enables the user to use the test conditions for the measurement thereafter.

The test condition lock function is unlocked when other command is selected in START menus and/or in PROG menu.

- ; : PNP transistor
- < : NPN transistor
- 9 : P-FET
- :: N-FET

#### (c) CONST

The measurement method is selected.

- 0 : IC/ID constant current
- 1 : VC/VD constant voltage

### (d) RV

The reverse measurement is selected.

- 0: Reverse measurement is OFF.
- 1; Reverse measurement is ON.

#### (e) CLAMP

The clamp measurement is selected.

- 0: Non-clamp measurement is OFF.
- 1 : Non-clamp measurement is ON.

#### (2) IC/ID block

Up to 4 significant digits can be set.

(Examples)

Desired set value		<u>Inputting</u>
100.0 A	$\rightarrow$	100.0,
20.0 A	$\longrightarrow$	20,
100.1 A	<del>&gt;</del>	егтог

#### (3) VC/VD block

Up to 4 significant digits can be set.

(Examples)

Desired set value		Inputting
100.0 V	$\rightarrow$	100.0,
20.5 V	<b></b> →	20.5,
100.1 V	<b>→</b>	error

If constant current measurement is performed, "0" must be input, and VC/VD block is not referred to.

#### (4) IB/VG block

Up to 4 significant digits for IB and 3 significant digits for VG can be set.

#### (Example)

Desired set value		Inputting
1.2 V	$\rightarrow$	1.2,
32.5 V	<del>&gt;</del>	error
23.0 V	$\rightarrow$	error

#### (5) IBR/VGR block

Up to 4 significant digits for IBR and up to 3 significant digits for VGR can be set. (Examples)

Desired set value		Inputting
1.2	$\rightarrow$	1.2
32.5	$\rightarrow$	error
23.0	$\rightarrow$	error

If reverse measurement is OFF, "0" must be input, and VGR/IBR block is not referred to.

### (6) VCALMP block

Up to 4 significant digits can be set.

(Example)

Desired set value		Inputting	
100 V	$\rightarrow$	100,	
1999 V	$\rightarrow$	1999,	

If clamp measurement is OFF, "0" must be input, VCLAMP block is not referred to.

### (7) IH block

Up to 4 significant digits can be set.

(Example)

Desired set value		Inputting
10.2 A	<del>&gt;</del>	10.2,
32.0 A	<del>&gt;</del>	32,
100.1 A	<del>&gt;</del>	error

### (8) IL block

Up to 4 significant digits can be set.

(Example)

Desired set value		Inputting
10.2 A	>	10.2,
32.0 A	>	32,
100 1 A	<del>&gt;</del>	error

### (9) VGATE block

Up to 4 significant digits can be set.

(Example)

$$\begin{array}{ccc} \underline{\text{Desired set value}} & \underline{\text{Inputting}} \\ 32 \text{ V} & \rightarrow & 32, \\ 1999 \text{ V} & \rightarrow & 1999, \end{array}$$

### (10) REPEAT block

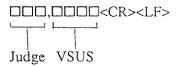
Up to 3 significant digits in the range from 001 time to 250 times can be set. (Example)

$$\begin{array}{ccc} \underline{\text{Desired set value}} & \underline{\text{Inputting}} \\ 1 \text{ time} & \rightarrow & 1, \\ 123 \text{ times} & \rightarrow & 123, \end{array}$$

If REPEAT block does not exist or "0" is set, measurement is performed one time.

#### 4.3.2 Test Result

The data format for a test result consists of 2 blocks.



The test result is immediately output after the termination of the measurement.

#### (1) VSUS blocks

Up to 4 significant digits and a unit can be set.

If an error occurs during measurement at a block and the block is not measured, "0000" is set for the block.

If the measured result of a block is OVER, "9999" is set for the block.

When a minus data value is obtained, "-" is prefixed to the value. (Example: -123.0)

- (2) Judgement result block
  - (a) The judgement results are converted into the code Nos. as shown below:

008 : PASS

011 : FAIL1

012 : FAIL2

013 : POST-OPEN

014 : POST-SHORT

015 : IC/ID-ERROR

016: PRE-OPEN

017: PRE-SHORT

- (b) Errors are converted into the code Nos, as shown below:
  - 101: Setting of test conditions is not in the applicable range, or illegal data.
  - 104: Setting of power forcing conditions is not in applicable range.
  - 105: Format error
  - 106: The test condition is not yet set.
  - 107: Measurement is impossible because the VC/VD value is greater than the V-clamp value.
  - 108: Measurement is impossible because V-clamp value is less than 30 V.
  - 109: Measurement is impossible because V-clamp value is less than 40 V.

#### 5. RS-232-C INTERFACE

The 9302-LV can measure VSUS by the following communication mode and data format when a host computer is interfaced to the SERIAL (A) connector of the 9302-LV. Regarding the connection and pin arrangement, refer to the Instruction Manual for Hardware.

#### 5.1 Setting Communication Mode

Set the communication mode of the interfaced computer side as follows.

Baud rate

9600/19200 bps

Set the baud rate of 9302-LV by SW1 at the rear panel.

For the detail, refer to the Instruction Manual for

Hardware.

Stop bit

1

Length of characters

8 bits

Parity check

None

Flow control

Hardware

### 5.2 Setting 9302-LV

When using RS-232-C interface, set the following items by the keys on the panel.

\* Testing by RS-232-C interface

Set START item to SERIAL.

\* Setting test condition by RS-232-C interface.

Set PROGRAM item to SERIAL.

#### 5.3 Protocol

All communication between the 9302-LV and a computer is made by the following protocol.

### (1) Transmitting command

Transmission protocol sends a command, and data and waits ACK and NAK.

Personal computer		9302-LV		
Command and data>		Reception		
Reception	<	ACK (0×06)	, BUSY o	or error
		code		
		*1	*2	*3

### (2) Receiving data

Reception protocol receives only the data against command or reception data.

Personal comput	er	9302-LV
Command	>	Reception
Reception	<	Data, BUSY or error code
	or	*2 *3
Reception	<	Data or command (non-synchronous)

Notes: \*1 ACK (06H): acknowledge of reception

\*2 BUSY (15H): When a command by RS-232-C interface is received during measurement or executing other command, BUSY code is returned.

<sup>\*3</sup> Error code: When the received command has not proper, an error code is returned.

#### 5.4 Data Format

The data format consists of ASCII character string, starts from two alphabets for discerning a command, and terminates with delimiter <CR><LF>

<u>AA</u> : <u>1 2 3 4 5</u> <u><CR><LF></u> Command data delimiter

Data format of each command is shown below.

(1) Setting test start method

Command

Content START item of 9302-LV is set by the indication from

a host computer.

Received data ACK: Finishing of setting test start method

SS

BUSY: During measurement or executing other

command

ERROR: (#02) Format error ERROR: (#03) Command error ERROR: (#06) Invalid data error

ERROR: (#20) PROG setting is GP-IB interface.

ERROR: (#12) Setting is impossible due to multi test

mode.

SS:PO <CR><LF>

a bc

SS:PO

a: Command

b: Test start method P: Start form the panel

H: Start from a handler

C: Start from a host computer

E: Start from an external tester

B: Start from the Test head 9304-HB

c: Binning 0: Start from other method than a handler

2: 2-bin sorting

4: 4-bin sorting

Note: Start from GP-IB interface is impossible.

### (2) Setting test condition setting method

Command

SP

Content

PROG item of 9302-LV is set by the indication from

a host computer.

Received data

ACK: Finishing of setting test condition

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error ERROR: (#03) Command error ERROR: (#06) Invalid data error

ERROR: (#16) Start setting is made by GP-IB

interface.

ERROR: (#12) Setting is impossible due to multi test

mode

Format

The data format of the setting method of test

condition consists of one block.

SP:P <CR><LF>

a:b

SP:P

a: Command

b: Test condition setting method

P: Setting by the panel

C: Setting by a host computer

Note: Setting of test condition from GP-IB interface is impossible.

#### (3) Setting test condition

Command

ST or st

Content

Each test condition of 9302-LV is set by the

indication from a host computer.

Received data

ACK: Finishing of setting test condition

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error ERROR: (#03) Command error ERROR: (#06) Invalid data error

ERROR: (#08) Setting of power forcing of test

condition is not in the applicable

range.

ERROR: (#09) VC/VD ≥ V-CLAMP

ERROR: (#10) Measurement is impossible because V-

clamp value is less than 30 V.

ERROR: (#11) Measurement is impossible because V-

clamp value is less than 40 V.

ERROR: (#05) Data error (Not in the applicable

range)

ERROR: (#18) PROG setting is made by other than

RS-232-C

ERROR: (#12) Setting is impossible due to multi test

mode

Format

The format of a test condition consists of 12 blocks.

ST: 0, TR, N000, 100, 100, 0.1, 10.5, 200, 10.5, 2.3, 500, 11 <CR><LF>(st: 0, TR, N000, 100, 100, 0.1, 10.5, 200, 10.5, 2.3, 500, 11 <CR><LF>)

1) ITEM code block (1st block)

Specify a device to be tested.

a:b

ST:0.

a: Command

ST: with the test condition lock function

st: without test condition lock function

b: Item code

0: Transistor

1: FET

Test condition block function: When the test condition set command "ST" is set, the user uses the test conditions for the measurement thereafter. The test condition lock function is unlocked when other command is selected in PROG menu.

(2) ITEM name block (2nd block)

Specify an item name by maximum 6 characters.

a

TR,

a: Item name, maximum 6 characters

Note: The item name specified by this block is shown on the LCD display.

(3) POLA block (3rd block)

Specify POLA, measurement method, reverse measurement and clamp measurement.

abcd

N000.

a: POLA

N: NPN

P: PNP

b: Measurement method

0: IC/ID constant current

1: VC/VD constant voltage

c: Reverse measurement 0: OFF

1: ON

d: Clamp mesurement 0: OFF

1: ON

- 4 IC/ID block (4th block)
  Set IC/ID by 4 significant digits.
- VC/VD block (5th block)Set VC/VD by 4 significant digits.However set "0" for constant current measurement.
- (6) IB/VG block (6th block)
  Set VG by 3 significant digits and IB by 4 significant digits.
- TIBR/VGR block (7th block)
  Set VGR by 3 significant digits and IBR by 4 significant digits.
  However set "0" when reverse measurement is OFF.
- (8) V-CLAMP block (8th block)
  Set V-CLAMP by 4 significant digits.
  However set "0" when clamp measurement is OFF.
- 9 IH block (9th block)Set IH by 4 significant digits.
- (10) IL block (10th block)

  Set IL by 4 significant digits.
- (1) V-GATE block (11th block)
  Input V-GATE by 4 significant digits.
- (12) REPEAT block (12th block)

  Set REPEAT times in the range from 001 to 250 by 3 significant digits.

## (4) Getting test condition

Command

Content Each test condition set in 9302-LV is obtained.

GT

Received data BUSY: During measurement or executing other

command.

ERROR: (#03) Command error

ERROR: (#12) Setting is impossible due to multi test

mode

Data: (test condition)

Format Consists of one block for a command.

GT: <CR><LF>

When this command is executed, the test condition in 12 blocks can be get.

GT: 0, TR, N00, 100, 100, 0.1, 10.5, 200, 10.5, 2.3, 500, 11 <CR><LF>

The content of each block is the same as "(3) Setting test condition".

(5) Getting LV set condition

Command

GS

Content

Each item (buzzer sound, multi test setting, etc.) set in

9302-LV is obtained.

Received data

BUSY: During measurement or executing other

command.

ERROR: (#03) Command error

DATA: (Each setting status of the 9302-LV)

Format

Consists of one block of a command only.

GS: <CR><LF>

When this command is executed, the KT set condition in 8 blocks can be obtained.

GS: POP, 11, 00, 00, 0, N, A <CR><LF>

1 Test start method/Test condition setting method (1st block)

a:b c d

GS:PPM.

a: Command

b: Test start method

P: Start from the panel

H: Start from a handler

C: Start from a host computer

G: Start from GP-IB interface

E: Start from an external tester

B: Start from the test head unit 9304-HB

c: Test condition setting method

P: Setting by the panel

G: Setting by GP-IB interface

C: Setting by a host computer

d: Test mode

S: Single test mode

M: Multi test mode

2 Printing out logging data (2nd block)

a

A,

a: Setting of printing logging data

N: No printing out

A: Printing out ALL result

F: Printing out FAIL result

3 Setting maintenance (3rd block)

a

N

a: Setting maintenance

N: Release maintenance setting

L: Loop test

S: Fail stop

4 Setting buzzer sound (4th block)

ab

00

a: Buzzer for judgement

 $1 \rightarrow ON, 0 \rightarrow OFF$ 

b: Key click

 $1 \rightarrow ON, 0 \rightarrow OFF$ 

5 Screen display format (5th block)

abc

010.

a: Enlarged screen display

(fixed to OFF)

b: Inverse video display at FAIL result

(fixed to ON)

c: Result OFF function

0: OFF

1: ON

6 Setting handler binning (6th block)

a

2

a: Setting binning

2...2 sorts

4...4 sorts

(6) Panel control

Command

CP

Content

The key input of 9302-LV is controlled.

Received data

ACK: Finishing of panel control

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error

ERROR: (#03) Command error

ERROR: (#06) Invalid data error

Format

The data format for panel control consists of one

block.

CP:0 < CR> < LF>

a:b

CP:0

a: Command

b: Panel control setting

 $1 \rightarrow \text{Prohibits input by keys}$ 

 $0 \rightarrow \text{Permits input by key}$ 

(7) Print control of test result

Command PL

Content The test result printing by printer interfaced to 9302-

LV is controlled.

Received data ACK: Finishing of print control of test result

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error
ERROR: (#03) Command error
ERROR: (#06) Invalid data error

ERROR: (#06) Invalid data error

Format The data format for printer control consists of one

block.

PL:N <CR><LF>

a:b CP:N

a: Command

b: Printer output setting A: Prints ALL test result

F: Prints FAIL test result

N: Stop printing

(8) Buzzer sound control

Command BZ

Content The buzzer sound of 9302-LV is controlled.

Received data ACK: Finishing of buzzer sound control

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error

ERROR: (#03) Command error ERROR: (#06) Invalid data error

Format The data format for buzzer sound control consists of

one block.

BZ:00<CR><LF>

a:b

BZ:00

a: Command

b: Judgement buzzer setting 0: OFF

1: ON

c: Click buzzer setting

0: OFF

1: ON

(9) LCD display control

Command

LF

Content

The LCD display of 9302-LV is controlled.

Received data

ACK: Finishing of LCD display control

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error
ERROR: (#03) Command error

ERROR: (#06) Invalid data error

Format

The data format for LCD display control consists of

one block.

LF:000<CR><LF>

a:b LF:010

a: Command

b: No display of test result

0: ON

1: OFF (No display)

(10) Test start

Command

TS

Content

Start a test.

Received data

ACK: Finishing of a test start process

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error ERROR: (#03) Command error

ERROR: (#18) START setting is made other than

RS232C

Format

Consists of one block for command only.

TS: <CR><LF>

(11) Test stop

Command

TP

Content

Terminates a test forcefully.

Received data

ACK: Finishing of a test termination process

ERROR: (#03) Command error

Format

9302-LV/9303-PU

Consists of one block for command only.

TP: <CR><LF>

## (12) Output request and output stop of test result

Command

GD

Content

The output of test results is controlled.

After the output request of test result is transmitted, transmits a test result whenever the test finishes.

After the output stop of test result is transmits, stops

to transmit the test result.

Received data

ACK: Finishing of setting

BUSY: During measurement or executing other

command.

ERROR: (#02) Format error ERROR: (#03) Command error ERROR: (#06) Invalid data error

DATA: Receives a test result whenever the test

finishes. Refer to "(13) Data format of

test result".

Format

The data format for output request and output stop of

test results consists of one block.

GD:S<CR><LF>

a b

GD:S

a: Command

b: Setting option

- S: After the command is executed, outputs a test result whenever the test finishes.
- R: Release S-option setting

#### (13) Data format of test result

When the test result output request command (GD:S <CR><LF>) is executed, the test result in the following format can be obtained every time at a test finish.

(The 9302-LV outputs the test result in the following format whenever the test finishes.)

GD:OPEN, 123.0 <CR><LF>

JUDGEMENT block (1st block) Obtain the judgement result.

a b

GD:OPEN

a: Command

b: Judgement result

**PASS** 

PRE-SHORT PRE-OPEN

**POST-SHORT** 

POST-OPEN IC/ID ERROR FAIL1 FAIL2

### 2 VSUS block (2nd block)

Consists of 4 significant digits and a unit.

Set "0000" when error occurs during testing and no measurement is carried out.

Set "9999" when the test result is "OVER".

When a minus data value is obtained, "-" is prefixed to the value.

GD:OPEN, 123.0, 53.0, 5.3 <CR><LF>

## 5.5 Error Code List

Error# Error code	Content
01 ! (0×21)	Communication error occurs.
02 " (0×22)	Data format is wrong.
03 # (0×23)	Command is wrong.
04 \$ (0×24)	Setting of option is wrong.
05 % (0×25)	Setting of data is wrong.
06 & (0×26)	Invalid data
07 '(0×27)	Test condition is not yet set.
08 ((0×28)	Setting of power forcing is not in applicable range.
09 ) (0×29)	VC/VD value ≥ V-CLAMP value
10 * (0×2A)	Measurement is impossible because V-CLAMP value is less than 30 V.
11 + (0×2B)	Measurement is impossible because V-CLAMP value is less than 40 V.
12 1 (0×31)	Setting is impossible due to multi test mode.
13 2 (0×32)	Setting is impossible because plural REPEAT tests is specified.
14 A (0×41)	Setting is impossible because START setting is made by other than panel.
15 B (0×42)	Setting is impossible because START setting is made by other than handler.
16 C (0×43)	Setting is possible because START setting is made by GPIB.
17 D (0×44)	Setting is impossible because START setting is made by RS232C.
18 E (0×45)	Setting is impossible because START setting is made by other than RS232C.
19 F (0×46)	Setting is impossible because PROG setting is made by other than panel setting.
20 G (0×47)	Setting is impossible because PROG setting is made by GPIB.
21 H (0×48)	Setting is impossible because PROG setting is made by RS232C.
22 I (0×49)	Setting is impossible because PROG setting is made by other than RS232C.

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