Flying probe tester APT-9411 series

Programmable DC Power Supply Board PDC-9500 Operator's Guide



Preface

The Programmable DC Power Supply Board PDC-9500 is an option integrated into the Takaya Fixtureless tester *APT-9411 Series* and the sister models to extend its capabilities.

Please read this manual thoroughly before using this option. Then keep this manual handy for answers to any questions you may have.

If you have any questions or thoughts you would like to share with us - we would like to hear from you.

(NOTE)

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Introduction

Safety symbols

Symbol	Explanation
WARNING	Calls attention to a procedure, practice, or condition that could possibly cause serious accident or death.
DANGER	Calls attention to a procedure, practice, or condition that could possibly cause bodily injury or damage to the product.
CAUTION	Calls attention to a procedure, practice, or condition that could possibly damage to the product.
(/)	Calls attention to general instruction. Failing to follow this could loss of data stored on disks causes possibly misjudge the unit under test, or damage to the product.
	Calls attention to "One-point advice" which should be useful when you are at a loss to operate the products.

Programming DC Power Supply Board

Outline

By integrating the Programming DC Power Supply Board PDC-9500 (hereinafter called "PDC-9500") into the APT-9411 Series and the sister models, users can apply the specified voltage DC1.0V \sim 25.0V on the PC boards through the flying probes and/or bottom probes in order to conduct simple function test of:

- 1. Relay components (On test)
- 2. 3-terminal regulators
- 3. Small isolated circuits
- 4. Current consumption

System Configuration

Hardware

The PDC-9500 consists of a PC board (TAKAYA TVX-13M) and the exclusive power supplies.



Software

To enable the PDC-9500 in the tester, select the box "Input/Output Function of I/O Step" in Option mode. (Refer to Fig.1)

Option Mode	×
RS-232C port no. Camera system Inline application Signal tower setting Serial number / Auto data loading Stamp Input / Output function of I/O step DDE communication IC Open Menu customize PCB Support Jigs Vacuum unit	 ✓ Input / Output Function of I/O Step ✓ Jump all I/O steps following a failed step Eailed step number to jump I/O step 1 _ 1 _ 2 1255[step(s)] □ Jump I/O steps when OP step judged SHORT ✓ Jump I/O steps following this group □ Use I/O-9500 option (TVX-07 board) □ Use Power Relay Board Standard Scanner □ User Definition Terminal 1 Unregistered Terminal 3 Unregistered Terminal 4 Unregistered Terminal 5 Unregistered
▲ Previous Next ▶	
□ <u>W</u> orkstation Mode	✓ <u>Q</u> K

[Fig.1] Input / Output Function of I/O Step

Specifications

The PDC-9500 enables two functions below.

1. Functional test by applying DC voltages

The PDC-9500 is able to apply the user specified DC voltage (DC1.0V \sim 25.0V) to the UUT via the probes (including the bottom probes).

2. Current measurement

Current measurement while applying DC voltage enables to test the small isolated circuits and measure current consumption.

Current and voltage specifications

Applied voltage	DC constant voltage: 1.0 ~ 25.0V (Programmable by 0.1V)			
Max. Current	1A (Current limit adjustable)			
Current limit	8 ranges: 5mA, 10mA, 25mA, 50mA, 100mA, 200mA, 500mA,1A			
Ammeter	4 ranges: 0.1 ~ 1.0mA, 1 ~ 10mA , 10 ~ 100mA, 100 ~ 1000mA			

Option mode setup

When the PDC-9500 is used for the first time, Option mode requires initial setup by users. This setting will be saved in Master.mdt file in the system directory.

Setup procedure

1. Choose [Tool] > [Mode Setting] > [Option mode] to open Option mode window.



[Fig.2] Tool > Mode Setting > Option mode

2. Click on Input / Output function of I/O step and select the box "Input / Output Function of I/O step".



[Fig.3] Input / Output Function of I/O Step

3. At this moment, the box "Jump all I/O steps following a failed step" is already selected as default. Be sure to hold this setting because it is preferred for most users to jump (skip) the I/O steps when some failure was detected in the previous test. In addition, the following parameters affect the treatment of I/O steps following the failed step, so users should configure them carefully;

Failed step number to jump I/O step

The I/O steps are not jumped (skipped) until the failed steps reach the specified numbers. But remember this box is specified by "1" as default. If this setting remains unchanged, the I/O steps are jumped (skipped) even if one failure was detected in the previous test.

□ Jump I/O steps when OP step judged SHORT

When the Failed step numbers to jump I/O step is specified by other than 1 (let's suppose "10"), the I/O steps are not jumped (skipped) until the failed steps reach the specifed numbers.

However, if the box "Jump I/O steps when OP step judged SHORT" is selected, the I/O steps are jumped (skipped) if any OP step (Function is substituted by OP) is judged fail even when the failed steps have not reached the specifed numbers yet.

□ Jump I/O steps following this group

If the box is selected, the I/O steps to be jumped (skipped) are applied to other groups, not only the group where the failure was detected.

4. Click on the OK button to leave Option mode window.

Simple function test

To implement simple function test, users need to configure the I/O step by specifying I/O command, time and probe to apply signal and the applied voltage so on. Once the I/O step gets executed, the PDC-9500 applies voltage to the UUT in accordance with the established conditions.

There are two ways of configuring the I/O steps;

1. I/O Function (Edit list menu > Tool > I/O Function)

On the I/O Function window, users should select appropriate I/O command (IO/V, IO/P, or IO/C) in accordance with the intended use. The limitation of applying voltage and the measuring contents vary depending on the I/O commands. Users should understand the specification and the property of each I/O command in that way.

I/O command	General application
IO/V	This I/O command uses two probes to have the PDC-9500 apply DC voltage to the UUT and use another two probes to measure the output DC voltage.
IO/P	This I/O command uses two bottom probes to have the PDC-9500 apply DC voltage to the UUT and test multiple test tests by measuring the output voltage or current. (Power on test)
IO/C	This I/O command uses two probes to have the PDC-9500 apply DC voltage to the UUT and measure the output current at the same time.

2. Viewable Setup of Function steps (Edit list menu > Tool > Viewable Setup of Function steps) Users don't have to select I/O command in accordance with the intended use, but he can use the mouse to simply specify necessary connection on a graphic setup window. Users can recognize the reality of whole connection with ease.

Basic precautions of I/O steps



The I/O step may cause serious damage to the PC boards and/or the measuring unit if users misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of users.



Mentioned below are very important things to know. Be sure to read through them to fully understand in advance.

- 1. If other than DC-VM mode is used while the PCB is applied with the specified voltage, from time to time it shows "The PCB is charged with high voltage!" on the display. In this case, User should change to DC-VM mode or set "JP".
- 2. The I/O steps must follow the normal RCLD measurement steps. In addition, be sure to select the box "Jump all I/O steps following a failed step" on the Select Input / Output function of I/O step window in Option mode. With this, users can prevent any I/O step following the fail step from execution.
- 3. In case of Point system, the maximum pin numbers is limited to 3,200.
- 4. The I/O command is not available in case of the following tests:
 - ü Optical steps
 - ü Combination test steps
 - ü Special generation steps ("CM-x" in Aux. filed)
 - ü IC Open test steps ("ICOP" in Aux. filed)- Coordinates revision steps
 - ü Kelvin measurement steps ("Kel." in Aux. filed)
 - ü ZD (Zener diode) steps
 - ü Digital transistor steps ("DGTR" in Aux. filed)
 - ü FET steps ("FET" in Aux. filed)
 - ü Pattern open check test ("PT-x" in Aux. filed)
 - ü Photo coupler steps ("PC" in Aux. filed)
 - ü Zone set steps ("ZONE" in Aux. filed)
- 5. The I/O steps aren't supported by Coordinates Sort function. If executed, it shows an error of "No execution possible due to I/O step existed!" on the display.
- 6. The I/O steps aren't supported by Combination measurements.
- 7. If the I/O step is released, all other than "Parts", "Value" and "Comment" column are initialized and put back to the normal step.
- 8. If the test program is converted to APT-8000 series, the I/O steps (IO/P, IO/V, IO/C) are released. Means, all other than "Parts", "Value" and "Comment" column are initialized and put back to the normal step.
- 9. The reference value of the I/O steps cannot be input automatically during the Reference Value Input function. Users should input the reference value in the Step Review menu.
- 10. The Data Average function is unable to apply the voltage at the I/O steps (IO/P, IO/V, IO/C). In addition, neither the voltage nor the current is averaged.
- 11. The Reference Value Generation function does not create the reference value of the I/O steps (IO/P, IO/V, IO/C).
- 12. Location name of the I/O steps (IO/P, IO/V, IO/C) is not changeable at Change Step Data function.
- 13. Location name of the I/O steps (IO/P, IO/V, IO/C) is not changeable at Group Addition function.
- 14. Location name of the I/O steps (IO/P, IO/V, IO/C) is not changeable at Auto Location Set function.
- 15. When using either IO/P or IO/C command, the Fail retry test isn't performed.

I/O Function window

This chapter describes the procedures to generate I/O steps (basic data programming and reference input) using the I/O Function window.

IO/V Command

The IO/V command uses two probes to have the PDC-9500 apply DC voltage to the UUT and use another two probes to measure the output DC voltage. For example, users can perform On test of the relay's contact and test the output voltage from the 3-TERMINAL regulators. (Refer to Fig.1)





Basic knowledge of IO/V step

- 1. Users can select the probes to apply voltage and the measurement probes from the flying probes and the bottom probes.
- 2. To use the bottom probe, first of all users need to select the flying probe and move to Step data review to change it to the bottom probe.
- 3. No guard point can be set.
- 4. The Loc column of the IO/V step is substituted by "IO/V".
- 5. After the IO/V step was finished, the voltage output is suspended automatically.
- 6. The output voltage is shown in the Volt column on the Step Edit list. (Refer to Fig.2)

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Step :	Mode	Range	Tim	e	Volt	1-Xcoor	1-70	coor	BFRL	2-Xcoo	r 2-	Ycoor
000001:	DC-CC	Range	3 1.0	msec	*	[****.**	**,****	*.***]		[****.	****,**	**.***
000002:	DC-CV	Range	3 2.0	msec	*	[-112.64	00,-070	5.9325]		[****.	****,**	**.***
000003:	DC-CC	Range	3 1.0	msec	*	[-112.64	00,-070	5.9325]		[****.	****,**	**.***
000004:	DC-CV	Range	3 2.0	msec	*	[-110.73	50,-075	5.6625]		[****.	****,**	**.***
000005:	DC-CV	Range	3 2.0	msec	*	[-106.41	75,-076	5.5513]		[****.	****,**	**.***
000006:	DC-CC	Range	3 1.0	msec	*	[-107.68	75,-079	9.8938]	хх	[****.	****,**	**.***
000007:	DC-CV	Range	3 2.0	msec	*	[-110.73	50,-075	5.6625]		[****.	****,**	**.***
000008:	M-AUTO	R-AUTO	0.0	msec	5.0V	[-167.25	00,-110	5.9325]	хх	[-155.	1850,-0	96.108
000009:												

[Fig.2] IO/V command

Programming Steps

- (1) Click on Step Edit (or Step List) from Edit menu on Menu bar.
- (2) It displays "Enter step number (1 x)".

Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.

(3) The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.3)

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File Mode	Edit Optimiza	ation Tool Reference	Test Total Coordina	te Self-diag. Convert Help
Edit List	Erase Search	Change Pin coor. Pin Er.	DEST DEN DSet	A.Gen. Print Undo Se
Step :Au	ix. Parts	Value	Comment	H-pir
000001:	R7	100.00	175	1193
000002:	R8	1K0	54	966
000003:	R9	100.00	175	1194
000004:	R10	3.3KO	60	966
000005:	R11	3.3KO	60	1204
000006:	R12	100.00	175	1429
000007:	R13	1K0	54	966
000008:				

[Fig.3] Step Edit list

(4) Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.4)



[Fig.4] I/O Function > I/O Step Set

- (5) It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- (6) It displays I/O Command Generation window. (Refer to Fig.5)

VO Command Generation	×
I/O Command Select	
I/O Command Select	
[IOM Step] This is I/O command to use external measuring equipment connected terminals while applying voltage or signal from external equipment connected to terminals.	_
। ✓ <u>Back</u> <u>N</u> ext ► <mark>X C</mark> ancel	

[Fig.5] I/O Command Generation

(7) Select "IO/V" from the right pull-down menu and click on the Next button. (Refer to Fig.6)

I/O Command Select
I/O Command Select IO/T IO/T IO/M IO/M IO/V IO/P IO/P IO/C IO/U IO/U IO/U IO/U IO/U IO/U IO/X
[IO/T Step] This is I/O command to measure with internal measuring unit while applying voltage or signal from external equipment connected to terminals.
✓ Back Next ► X Cancel

[Fig.6] I/O Command Select

(8) It displays the Coordinate Set window where enables to specify the pin number (in Point system).

CO Command Generation	<u>^</u>
Input the Pin Number	
High-Pin	
0 🗘 032000 ID	Net
Low-Pin	
0 2 032000 ID	Net
Voltage (+)	
0 032000 ID	Net
Voltage (-)	
0 2 032000 ID	Net
	Coordinates input
	■ Back Next ► ▲ Cancel

[Fig.7] Coordinate Set (Point system)

Specify High-Pin and Low-Pin by the XY coordinates or the pin numbers where is to output after the voltage was applied. In the example of Fig.1, it should be the contact point of the relay. Specify Voltage (+) and Voltage (-) by the XY coordinates or the pin numbers where the voltage is applied. In the example of Fig.1, it should be the coil of the relay.

After the XY coordinates or the pin numbers was specified, click on the Next button.

(9) It displays Other conditions windows. (Refer to Fig.8)



[Fig.8] Other conditions

Wait time	Specify Wait time by [0.0]sec - [25.5]sec.
Voltage	Specify Voltage by [0.0]V - [25.5]V. (Here this should be the operating voltage of the relay)
Limit current	Specify Limit current by [5mA], [10mA], [25mA], [50mA], [100mA], [200mA], [500mA] or [1A]. (Here this should be the limit value of the current flown across the Coil of the relay. Refer to for the spec list of the relay)

(Remarks) Wait time, Voltage and Limit current are changeable also in Step data review. After the conditions are set properly, click on the OK button.

(10) Move to Step Edit list. (Refer to Fig.9)

[AUX.] and [Loc] column is substituted by "IO/V".

Enter remarks in [Parts] and [Value] column according to the test contents.

Enter something in [Comment] column if necessary.

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Edit List Er	ase Search Change	Pin coor. Pin Er.	DEsit D.Pin D.Set	Print Undo Sel	Edit List Er	ase Search Chan	ge Pin coor. Pin Er.	DEat DPin D.Set	A.Gen. Print Undo Se
Step :Aux.	Parts	Value	Comment	H-pin	Step :Aux.	Parts	Value	Comment	H-pir
000001:	R7	100.00	175	1193	000001:	R7	100.00	175	1193
000002:	R8	1KO	54	966	000002:	R8	1KO	54	966
000003:	R9	100.00	175	1194	000003:	R9	100.00	175	1194
000004:	R10	3.3KO	60	966	000004:	R10	3.3KO	60	966
000005:	R11	З.ЗКО	60	1204	000005:	R11	3.3KO	60	1204
000006:	R12	100.00	175	1429	000006:	R12	100.00	175	1429
000007:	R13	1KO	54	966	000007:	R13	1KO	54	966
000008:IO/V	*	*	*	2	000008:IO/V	*	ON-TEST	*	2
000009:					000009:				

[Fig.9] Step Edit list (Point system)

[Fig.10] Step Edit list (Point system)

Step data review at IO/V step

Step data review window enables to input the reference value. In addition, it's also possible to change the measuring conditions (Voltage, Time etc). The measuring conditions should be changed after due consideration.

Clauto Input Clauto Input<
Ext List Esse Seven Crange Pricer Price Din Dist
Examine LCR meter
Step 2 START Test Accepted Debug status 2 3g PArts Value //O-V 10V Voltage_Apply 10.00 V Loc Element Function Temp.Value IOV DIODE BLANK (**) 10.00 V
DC-VM + 4- 40V (Range3) + 1.0 msec
How The second
0 × H × 0 × 0 × 0 × (+,P+,P-,-) × 3 5
Data Search Measure Auto Input Input Part name Input Delete Value Store Search Pin number
High-Pin (+) 110 🛊 net1111
Low-Pin (-) 211 = net2222
Voltage (+) 293 + net 3333
Voltage (-) 355 net4444

[Fig.11] IO/V step in Step data review (Point system)

(1) [Loc]

It displays I/O command name and is not configurable.

(2) [Element]

It displays type of the measurement.

(3) [Function]

It displays the measurement function.

(4) [Temp. Value]

It displays the value obtained by pressing either [Auto Input] or [Input]. This value is changeable in the same Measuring Mode and Range. This value is saved as Reference value if [Store] button is clicked.

(5) [Measure Mode]

It displays Measuring Mode.

(6) [Measure Range]

It displays Measuring Range.

(7) [Measure Time]

It displays Measuring Time. Specify within 1 ~ 999 (m sec).

(8) [+%] [-%]

It displays upper/lower tolerance by percentage based on the reference value. [+Limit] and [-Limit] change in sync with change of +%, -%.

(9) [+Limit][-Limit]

It displays upper/lower tolerance based on the reference value.

+% and -% change in sync with change of [+Limit], [-Limit].

(10) [Voltage]

It displays the applied voltage. Specify within 0.1 ~ 25.0V.

(11) [Limit i]

Use [Limit i] column to specify the current limit value.

Select from 5mA, 10mA, 25mA, 50mA, 100mA, 200mA, 500mA and 1A.

(12) [Func. Wait]

It displays Wait time (from applied voltage to measure).

(13) [Probe Access]

It indicates Probe 1,2,3,4 from the left.

- $[\ N \] \quad \rightarrow \quad Unused$
- $[+] \rightarrow H-pin$
- $[\ \text{-}\] \quad \rightarrow \quad \text{L-pin}$
- $[\mathsf{P+}] \rightarrow \mathsf{Probe to apply Voltage(+)}$
- $[\ \mathsf{P-} \] \ \ \rightarrow \ \ \mathsf{Probe to apply Voltage(-)}$
- (14) [i] (underneath [AV] field)

It displays the current value measured after the Wait time passed.

(15) [Pin number]

It displays the pin number of H-pin (High Pin), L-pin (Low Pin), G-P1 (Guard Pin1) and G-P2 (Guard Pin2). The Net name is also available at the right.

Reference input

Users should specify [Element] and [Measure Mode] column in case of components that is measured while applying the voltage.

When [Element] column is specified by RESISTOR, CAPACITOR or COIL, select "Auto" in [Measure Mode] column and click on the Auto Input button. The value obtained from the measurement is displayed in [Temp. Value] column. Also, specify [Function] and [Measure Time] as needed. If the Store is selected, the Temp. Value will be saved as the reference value.

When [Element] column is specified by DIODE to go for VF measurement, select "DC-CC" in [Measure Mode. On the other hand, when [Element] column is specified by DIODE to go for DC voltage measurement, select "DC-VM" in [Measure Mode]. In these cases, be sure to click the Input button to input the reference value. The value obtained from the measurement is displayed in [Temp. Value] column. If the Store is selected, the Temp. Value will be saved as the reference value.



The I/O step may cause serious damage to the PC boards and/or the measuring unit if users misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of users.

To go for DC voltage measurement, be sure to select the Input button to input the reference value. If the Auto Input button was used by mistake, from time to time the Measuring Mode is initialized and an unintentional Measuring mode is set automatically.
 If other Measuring mode than DC-VM mode is used while voltage is applied on the UUT, from time to time the error of "The PCB is charged with high voltage!" appears on the display. In this case, it's no longer possible to use other Measuring mode than DC-VM mode.

About the error "Current limit over!"

There is a chance of getting the error "Current limit over!" during the reference value input. In this case, users should improve the Wait time to be longer.

Change to Bottom probes

Go through the following steps to use the bottom probes in test.

(1) Click on [Probe Access] to select "Bottom Set" from the pull-down menu (Refer to Fig.12)

Examine	ECR me	eter					
Step	8	Ĵ	⊟ Co	n <u>t</u> act			START
Debu	ig status	J					
-							-
F	°arts) V	alue		Co	mment	
*		ON-TES	ЭT	*			
Loc	Eler	nent)	Function		Ten	np.Value
10/V	AUTO	-	BLAN	IK (**)	-		
Measu	ire Mode		Auto Ra	nge		Measur	e Time 🔡
AUTO	*	AUTO			✓ 0.0 m:	sec	
+%	-% +	_imit] -	-Limit 🗋	Voltage	Limi	it i 📃	Wait Time 🛛
10	10			5.0 V	50 mA	. 💌 1	.0 sec
speed	pos P1	P2 F	2 P4	Probe A	Access		
0 -	Н 🕶 О 🕶	0 • 0	• 0 •	(+,P+,-	P-) 🔹		
				AUTO			
Data-		Guard-		(+,P+,-,	P-)	Meas	Jre
Auto	Input	Inpl	ıt	(-,P+,+,	P-)R	Pola	rity check
Inp	out	Dele	te	Bottom.	Set		ampling
LSto	ore	Sear	ch	[Pin nu	mber		out / Store

[Fig.12] Bottom Set

(2) It displays the Bottom probe window. Select the probes to be changed to the bottom probes and specify the bottom probe number. Then click on the OK button.

Step no.	8	
□ Polarity +	Bottom probe	- 1 - 12
□ Polarity PDC(+)	Bottom probe	- 1 - 12
□ Polarity -	Bottom probe	- 1 - 12
□ Polarity PDC(-)	Bottom probe	• 1 12
		OK Kancel

[Fig.13] Bottom Set

(3) Move back to Step data review window.

As shown in Fig.14 below, "Bottom probe" column appears to show the use of the bottom probes.

Examine LCR mete	ər		
Step 8	Con <u>t</u> a	ict	START
Debug status			
-			•
Parts (Value	(Cc	omment
*	ON-TEST	*	
Loc Elem	ent) Fi	unction)	Temp.Value
IO/V AUTO	- BLANK	(**) 💌	
Measure Mode	Auto Range	1)(e	Measure Time
AUTO	AUTO	🚽 0.0 m:	Sec
+% -% +Li	mit C-Limit V	oltage Limi	t i 📄 Wait Time 🛛
10 10	5.0	0 V 50 mA	- 1.0 sec
speed pos P1	P2 P3 P4	Probe Access	Bottom probe
0 • H • 0 •	0 - 0 - 0 - (+ P+ - P-) 💌	(N, N1, N, N2)
Deta	2 uord C) o or o b	Manaura
		Part name	Rolarity check
	Delete	Value	Sampling
Store	Search	Pin number	A Input / Store
			(Crampary otoro)

[Fig.14] Step data review

Fig.14 indicates that the bottom probe 1,2 are used for applying the voltage and the flying probes 1,3 are for the measurement at this step.

IO/P command

This I/O command uses two bottom probes to have the PDC-9500 apply DC voltage to the UUT and test multiple test steps by measuring the output voltage or current. The IO/P step is configured just to apply DC voltage to the UUT, so that users should program the measurement step following to the IO/P step.

Users can measure DC current while applying DC voltage to the UUT. When this DC current is set by the tolerance, the DC voltage output to the UUT could be terminated if it measured out of the tolerance.



[Fig.15]

Basic knowledge of IO/P step

- 1. Listed below are conditions to terminate the voltage output to the UUT.
 - * IO/P step configured by "0V" is executed.
 - * At the end of test
 - * The step using the bottom probe is executed.
 - * Any of IO/M, IO/T, IO/V, IO/C or IO/U step is executed.
 - * When the box "Current measurement" is selected, it measures out of the tolerance.
- 2. If the step using the bottom probe is changed to IO/P step, the Probe access using the bottom probe at the step is initialized.
- 3. The probe to apply voltage isn't assignable to the flying probes.
- 4. The Loc column of the IO/P step is substituted by "IO/P".
- 5. The Volt column on the Step Edit list displays the voltage specified by users. (Refer to Fig.16)

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Edit List Erase	🍫 👯 Search Char	ge Pin coor.	Pin Er. D.Edit I	D.Pin D.Set	A.Gen. Print	Undo Select Cut Copy Paste Cascade	Tile
Step :udge	Cat.	Mode	Range	Time	Volt	1-Xcoor 1-Ycoor BFRL 2	2-Xco
000001:		DC-CC	Range 3	1.0 msec	*	[**** **** **** ****]	[****
000002:		DC-CV	Range 3	2.0 msec	*	[-112.6400,-076.9325]	[****
000003:	<u>19</u> 2	DC-CC	Range 3	1.0 msec	*	[-112.6400,-076.9325]	[****
000004:	-	DC-CV	Range 3	2.0 msec	*	[-110.7350,-075.6625]	[****
000005:		DC-CV	Range 3	2.0 msec	*	[-106.4175,-076.5513]	[****
000006:		DC-CC	Range 3	1.0 msec	*	[-107.6875,-079.8938] x x	[****
000007:	<u>1</u> 22	DC-CV	Range 3	2.0 msec	*	[-110.7350,-075.6625]	[****
000008:		DC-IM	R-AUTO	0.0 msec	5.0V	[**** **** **** ****]	[****
000009.							-

[Fig.16] Step Edit list

Programming Steps

The way of programming IO/P step is no difference between Teaching system and Point system.

- (1) Click on Step Edit (or Step List) from Edit menu on Menu bar.
- (2) It displays "Enter step number (1 x)".

Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.

(3) The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.17)

Edit Search	<u>M</u> ove <u>T</u> ool	⊻iew		
File Mode I	Edit Optimizat	ion Tool Reference	Test Total Coordinate	Self-diag. Convert Help
Edit List	Erase Search	Change Pin coor. Pin Er.	DEdit D.Pm D.Set	A.Gen. Print Undo Se
Step :Aux	. Parts	Value	Comment	H-pir
000001:	R7	100.00	175	1193
000002:	R8	1KO	54	966
000003:	R9	100.00	175	1194
000004:	R10	З.ЗКО	60	966
000005:	R11	З.ЗКО	60	1204
000006:	R12	100.00	175	1429
000007:	R13	1KO	54	966
000008:				

[Fig.17] Step Edit list



Edit Searc	h <u>M</u> ove	<u>T</u> ool <u>V</u> iew		
File Mode	Edit Op	<u>C</u> oordinates Map	F1	ate Self-diag. Convert Help
Edit List	Erase S	Set Comb Measurement	s ,	A.Gen. Print Undo S
Step :Au	x. Pa			H-pi
000001:	R7	G <u>e</u> neration	•	119
000002:	R8	Ground	•	96
000003:	R9	Bottom probe	•	119
000004:	R1	Cluster Eurotion	•	96
000005:	R1			120
000006:	R1:	I/O Function		I/O Step <u>S</u> et 142
000007:	R1	⊻iewable Setup of Func	tion steps F4	I/O Step <u>C</u> lear 96
000008:		Coordinates input Auto Generation Change Step Data Select <u>R</u> evise Area Mod High-fly / No-contact-	Ctrl+C le zone Shift+Ctrl+H	

[Fig.18] I/O Function > I/O Step Set

- (5) It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- (6) It displays I/O Command Generation window. (Refer to Fig.19)

D Command Generation
/O Command Select
I/O Command Select IO/T
IO/T Step] This is I/O command to measure with internal measuring unit while applying
voltage or signal from external equipment connected to terminals. ✓ Back Next ► X Cancel

[Fig.19] I/O Command Generation

(7) Select "IO/P" from the right pull-down menu and click on the Next button. (Refer to Fig.20)

/O Command Generation
I/O Command Select
I/O Command Select IO/P ▼ IO/T IO/M IO/P IO/P IO/C IO/L IO/U IO/X
[IO/P Step] This is I/O command to apply voltage from Programmable DC Power Supply Board continuously over plural steps.
Back Next > Scance

[Fig.20] I/O Command Select

(8) It displays the next window where allows to specify the voltage output to the UUT. (Refer to Fig.21) After specified the voltage, click on the Next button.

VO Command Generation	X DO Command Generation
Voltage	Voltage
<u>00</u> <u>5</u> 0.025.0[V]	5.0 J U.U.25.0[V]
	Cancel A Back Next > K Cancel

[Fig.21] I/O Command generation

(9) It displays the next window where allows to specify the bottom probe. (Refer to Fig.22)

voltage (+) 1 ↓ Bottom probe	
⊻oltage (+) 1	
Voltage (-) 1Bottom probe ⊂ Current measurement	

[Fig.22] Select output probe

Specify Voltage (+) and Voltage (-) by the bottom probe number.

Click the box "Current measurement" if the current measurement is required when the voltage is applied to the UUT. The DC voltage output to the UUT could be terminated if the current was measured out of the tolerance preset in the Step data review window.

Click on the Next button.

(10) It displays Other conditions windows. (Refer to Fig.23)

/O Command Generation	×
Other conditions	
Wait time 0.0 2 0.025.5[sec]	
Limit current	
	▲ <u>B</u> ack ✓ <u>Q</u> K ¥ <u>C</u> ancel
[Fig.23] Othe	er conditions

Wait time	Specify Wait time by [0.0]sec ~ [25.5]sec.
Limit current	Specify Limit current by [5mA], [10mA], [25mA], [50mA], [100mA], [200mA], [500mA] or [1A]. (Here this should be the limit value of the current flown across the Coil of the relay. Refer to for the spec list of the relay)

(Remarks) Wait time and Limit current are changeable also in Step data review. After the conditions are set properly, click on the OK button.

(11) Move to Step Edit list. (Refer to Fig.24) [AUX.] and [Loc] column is substituted by "IO/P".

After this IO/P step, program a measurement step.

📔 Edit Search	Move Tool	⊻iew				
File Mode Ed	dit Optimizat	ion Tool Reference	Test Total Co	ordinate Se	elf-diag. Conv	ert Help
₽ ₽	1 1	· # # 5			1 💷	n
Edit List	Erase Search	Change Pin coor. Pin Er.	D.Edit D.Pin	D.Set A.	Gen. Print	Undo Se
Step :Aux.	. Parts	Value	H-pin	L-pin	Comment	
000001:	R7	100.00	1193	1190	175	
000002:	R8	1KO	966	1196	54	
000003:	R9	100.00	1194	1196	175	
000004:	R10	3.3KO	966	1436	60	
000005:	R11	З.ЗКО	1204	1432	60	
000006:	R12	100.00	1429	1432	175	
000007:	R13	1K0	966	1099	54	
000008:10/1	+5.0V	INPUT	*	*	*	

[Fig.24] Step Edit list

Programming the step to terminate the voltage output to the UUT

(1) Click on Step Edit (or Step List) from Edit menu on Menu bar.

As the pop-up window "Enter step number (1 - x)" appeared, specify the step which is used to terminate the voltage output to the UUT and click on the OK button.

(2) Let's make the step on the last step as shown in Fig.25 below.

Edit	Search	n <u>M</u> ove	Tool	⊻iew									
File	Mode	Edit C	Optimizat	tion Too	Refe	erence '	Test T	'otal	Coordinate	Self-dia	g. Conv	ert Help	5
	-		4	ų,	<u>H</u>						-	n	4
Edit	List	Erase	Search	Change	Pin coor.	Pin Er.	D.Edit		D.Set	A.Gen.	Print	Undo	Se
Step	:Au	х. Р	arts		Val	ue		Comm	lent			H-p	bir
00000	1:	R	7		100	.00		175				11	.93
00000	2:	R	8		1K0			54				9	166
00000	3:	R	9		100	.00		175				11	.94
00000	4:	R	10		3.3	KO		60				9	166
00000	5:	R	11		3.3	ко		60				12	204
00000	6:	R	12		100	.00		175				14	129
00000	7:	R	13		1K0			54				9	166
00000	8:IO,	/P +	5.0V		INP	UT		*					*
00000	9:	T	P1-GN	ID	+5.	0V		OUTE	UT				*
00001	.0:	T	P2-GN	ID	+3.	0V		*					*
00001	1:												

[Fig.25] Step Edit list

(3) Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.26)



[Fig.26] I/O Function > I/O Step Set

- (4) It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- (5) It displays I/O Command Generation window. (Refer to Fig.27)

I/O Command Generation
I/O Command Select
I/O Command Select IOπ
[IO/T Step]
This is I/O command to measure with internal measuring unit while applying voltage or signal from external equipment connected to terminals.
<u> </u>

[Fig.27] I/O Command Generation

(6) Select "IO/P" from the right pull-down menu and click on the Next button. (Refer to Fig.28)

70 Command Generation	<u>×</u>
I/O Command Select	_
//O Command Select [O/P □ IO/T IO/M IO/M IO/P IO/C IO/L IO/U IO/X	
[IO/P Step] This is I/O command to apply voltage from Programmable DC Power Supply Board continuously over plural steps.	
Back Next > X Cancel	

[Fig.27] I/O Command select

(7) It displays the next window where allows to specify the voltage output to the UUT. (Refer to Fig.28) Change nothing ("0,0V remains unchanged)" and click on the Next button.

	<u>~</u>
Voltage	
voluge	
0.0 25.00.0	
U.U20.0[V]	

[Fig.28] I/O Command select

(8) Move to Step Edit list. (Refer to Fig.29)

📔 Edit Search	Move <u>⊺</u> ool <u>V</u> iew					
File Mode E	dit Optimization To	iol Reference 1	Fest Total Co	ordinate S	elf-diag. Conve	ert Help
Edit List	Erase Search Change	Pin coor. Pin Er.		D.Set A	.Gen. Print	n Undo Se
Step :Aux	. Parts	Value	H-pin	L-pin	Comment	
000001:	R7	100.00	1193	1190	175	
000002:	R8	1K0	966	1196	54	
000003:	R9	100.00	1194	1196	175	
000004:	R10	3.3KO	966	1436	60	
000005:	R11	3.3KO	1204	1432	60	
000006:	R12	100.00	1429	1432	175	
000007:	R13	1KO	966	1099	54	
000008:10/1	+5.0V-GND	INPUT	*	*	*	
000009:	TP1-GND	+5.0V	*	*	OUTPUT	
000010:	TP2-GND	+3.0V	*	*	OUTPUT	
000011:10/1	P +5.0V-GND	STOP	*	*	*	
000012:						

[Fig.29] Step Edit list

Step data review at IO/P step

It's possible to change the measuring conditions (Voltage, Time etc) in the Step data review.

🏐 []Auto Input [2]input [3]Test [4]Polarity [5]P. access [6]Search [7]Step move [8]LOR meter [9]Reverse [0]Store AuxX
File Mode Edit Optimization Tool Reference Test Total Coordinate Self-diag. Convert Help	
	A-side
Edit List Erase Search Change Pin.coor. Pin.Er. D.Edit D.Pin D.Set	
Examine LCR meter	
Step o V	
- Jg	
+5.0V-GND INPLIT * Reference 1000	
Loc Flement Function Temp Value	
IO/P DIODE T BLANK (**) T Polarity	
Measure Mode Auto Range Measure Time +	
Unregistered AUTO	
+% -% +Limit -Limit Voltage Limit i Wait Time Reading	
10 10 5.0 V 25 mA 0.5 sec 1	
Probe Access Bottom probe	0.0 0.0
(P+,P-,N,N) 🖌 (N1, N2, N, N) 4	
Data Guard Coarch Moasuro	
Auto Input Input Part name Polarity check	
Input Delete Value Sampling Av	
Store Search Pin number A.Input / Store OVP edit	

[Fig.30] Step data review

(1) [Loc]

It displays I/O command name. (not configurable)

(2) [Element]

It displays [DIODE]. (not configurable)

(3) [Function]

It displays the measuring conditions.

(4) [Temp. Value]

It displays the current value obtained by pressing either [Auto Input] or [Input]. This value is changeable in the same Measuring Mode and Range. It appears when the Measuring Mode is specified by "DC-IM". (It means when the box "Current measure" is selected)

(5) [Measure Mode]

When "DC-IM" is in [Measure Mode], it performs the current measurement. The voltage output is terminated if the current was measured out of the tolerance. When "Unregistered" is in [Measure Mode], it doesn't performs the current measurement.

(6) [Measure Range]

It displays Measuring Range. Select from 1mA, 10mA and 100mA. It appears when the Measuring Mode is specified by "DC-IM".

(7) [Measure Time]

This is unused.

(8) [+%] [-%]

It displays upper/lower tolerance by percentage based on the reference value. [+Limit] and [-Limit] change in sync with change of +%, -%. It appears when the Measuring Mode is specified by "DC-IM".

(9) [+Limit][-Limit]

It displays upper/lower tolerance based on the reference value. +% and -% change in sync with change of [+Limit], [-Limit]. It appears when the Measuring Mode is specified by "DC-IM". (10) [Voltage]

It displays the applied voltage. Specify within 0.1 ~ 25.0V.

(11) [Limit i]

Use [Limit i] column to specify the current limit value.

Select from 5mA, 10mA, 25mA, 50mA, 100mA, 200mA, 500mA and 1A.

(12) [Func. Wait]

It displays Wait time (from applied voltage to move to the next step).

- (13) [Probe Access]
 - $[P+] \rightarrow Probe to apply Voltage(+)$
 - $[P-] \rightarrow Probe to apply Voltage(-)$
 - $[\,N\,] \quad \rightarrow \quad Unused$
 - $[N] \rightarrow Unused$

Click on [Probe Access] to select "Bottom Set" from the pull-down menu. (Refer to Fig.31) On this window, users can change the bottom probe number.(Fig.31 appears when IO/P command is selected)

Bottom probe			×
Step no.	: 8		
Polarity PDC(+)	Bottom probe	12	
Polarity PDC(-)	Bottom probe	2 12	
		<u> </u>	
			_

[Fig.31] Bottom set

(14) Bottom probe

It displays the status of the bottom probes.

- $[N1] \rightarrow Use of Bottom probe 1$
- [N2] \rightarrow Use of Bottom probe 2
- $[N] \rightarrow Unused$
- $[N] \rightarrow Unused$

Reference input

Users should input the reference value (Current) when the Measure Mode is specified by "DC-IM".But the reference input is unnecessary when the Measure Mode is shown by "Unregistered".

After verified [Voltage], [Limit i] and [Wait time], click on either the Auto Input button or the Input button on the Step data review window. Then the Temp Value column indicates a current value. If users found this current value is right, click on the Store button o save to the reference value.

When the Measure Range and the Measure Time are set in advance, click on the Input button. (If the Auto Input button was clicked by mistake, there is a chance the Measure Range and the Measure Time is initialized and in the worst case they will be set wrong!)



The I/O step may cause serious damage to the PC boards and/or the measuring unit if users misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of users.

When the reference value is input or when [+%], [+Limit] are changed, there is a chance of displaying the error "Temp.value or +limit is over than limit current(limit i)". (Refer to Fig.32) In this case, users should change the limit current setting (Limit i) after due consideration.



[Fig.32] Warning message at IO/P step in Step data review

In addition, users need to use the Step data review window to input the reference value for the measurement step following to the IO/P step as he isn't allowed to do this in Auto reference input.

IO/C command

This I/O command uses two flying probes to have the PDC-9500 apply DC voltage to the UUT and measure the output current at the same time. The measured current is used to determine if the step is pass or fail. With the IO/C command, users can measure the consumption current while applying DC voltage to the device or the circuit and measure the current surge caused by faulty device inside the circuit.



[Fig.1]

Basic knowledge of IO/C step

- 1. Use can specify either the flying probes or the bottom probes.
- 2. To use the bottom probe, first of all users need to select the flying probe and move to Step data review to change it to the bottom probe.
- 3. If the step using the bottom probe is changed to IO/C step, the Probe access using the bottom probe at the step is initialized.
- 4. The Loc column of the IO/C step is substituted by "IO/C".
- 5. No guard point can be set.
- 6. After the IO/C step was finished, the voltage output is suspended automatically.

Programming Steps

- (1) Click on Step Edit (or Step List) from Edit menu on Menu bar.
- (2) It displays "Enter step number (1 x)".

Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.

(3) The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.2)

	Edit Ş	Search	Move	Iool	⊻iew									1
Fil	e M	ode E	idit (Optimiza	tion Too	ol Refe	erence	Test 1	otal 0	Coordinat	e Self-dia	g. Com	/ert Help	1
			Π.	de	ųL	142	П,					-	ഫ	
-	Edit	List	Erase	Search	Change	Pin coor.	Pin Er.	D.Edit		D.Set	A.Gen.	Print	Undo S	No. 1
st	ep	:Aux	. P	arts		Val	ue		Comme	ent			H-pi	ľ
00	0001	:	R	7		100	.00		175				119	
00	0002	:	R	8		1K0			54				96	ę
00	0003	:	R	9		100	.00		175				119	4
00	0004	:	R	10		3.3	KO		60				96	ę
00	0005	:	R	11		3.3	KO		60				120	4
00	0006		R	12		100	.00		175				142	9
00	0007	:	R	13		1K0			54				96	e
00	0008		-											

[Fig.2] Step Edit list

(4) Move to Tool > I/O function and click on "I/O Step Set". (Refer to Fig.3)



[Fig.3] I/O Function > I/O Step Set

- (5) It displays "Use board ref.point and aux.ref.point for alignment?". Select Yes or No.
- (6) It displays I/O Command Generation window. (Refer to Fig.4)

I/O Command Generation	×
I/O Command Select	
I/O Command Select	
[IO/M Step] This is I/O command to use external measuring equipment connected term while applying voltage or signal from external equipment connected to term	ninals ninals.
<u>≺Back</u> Next ► ×	Cancel

[Fig.4] I/O Command Generation

(7) Select "IO/C" from the right pull-down menu and click on the Next button. (Refer to Fig.5)

/O Command Generation
I/O Command Select
I/O Command Select IO/C • IO/T IO/M IO/M IO/P IO/C IO/U IO/V IO/X
[IO/C Step]
This is I/O command to measure current while applying voltage from Programmable DC Power Supply Board.
Back▲▲▲

[Fig.5] I/O Command Select

(8) It displays the next window where allows to specify Pin numbers of Voltage (+) and Voltage (-).

1/O Command Generation						×
Input the Pin Nu	mber					
Voltage (+) Voltage (-) 0	032000			Coordin	ates input	
		■ <u>B</u> ack		<u>N</u> ext ⊳	× <u>C</u> ance	el

[Fig.6]

(9) Click on the Next button, and it displays Other conditions windows. (Refer to Fig.7)

70 Command Generation	×
Other conditions	
Wait time 0.0 ‡ 0.025.5[sec]	
0.0 0.025.0[V]	
Limit current 5mA -	
	▲ Back ✓ OK ¥ Cancel

[Fig.7] Other conditions

Wait time	Specify Wait time by [0.0]sec - [25.5]sec.
Voltage	Specify Voltage by [0.0]V - [25.5]V.
Limit current	Specify Limit current by [5mA], [10mA], [25mA], [50mA], [100mA], [200mA], [500mA] or [1A].

(Remarks) Wait time, Voltage and Limit current are changeable also in Step data review. After the conditions are set properly, click on the OK button.

(10) Move to Step Edit list. (Refer to Fig.8)

[AUX.] and [Loc] column is substituted by "IO/C".

Enter remarks in [Parts] and [Value] column according to the test contents. Enter something in [Comment] column if necessary.

Edit Search	Move <u>T</u> ool ⊻ie	3W	1 1	1 I I I I
File Mode Edi	t Optimization	Tool Reference T	est Total Coordinate	Self-diag. Convert Help
Edit List E	irase Search Char	nge Pin coor. Pin Er.	OEdit D.Pn D.Set	A.Gen. Print Undo Se
Step :Aux.	Parts	Value	Comment	H-pin
000001:	R7	100.00	175	1193
000002:	R8	1K0	54	966
000003:	R9	100.00	175	1194
000004:	R10	3.3KO	60	966
000005:	R11	З.ЗКО	60	1204
000006:	R12	100.00	175	1429
000007:	R13	1K0	54	966
000008:IO/C	TP1-GND	CURRENT	*	232
000009:				

[Fig.8] Step Edit list

Step data review at IO/C step

Step data review window enables to input the reference value. In addition, it's also possible to change the measuring conditions (Voltage, Time etc). The measuring conditions should be changed after due consideration.



[Fig.9] IO/C step in Step data review (Point system)

(1) [Loc]

It displays I/O command name. (not configurable)

(2) [Element]

It displays [DIODE]. (not configurable)

(3) [Function]

It displays the measuring conditions.

(4) [Temp. Value]

It displays the current value obtained by pressing either [Auto Input] or [Input]. This value is changeable in the same Measuring Mode and Range. This value is saved as Reference value if [Store] button is clicked.

(5) [Measure Mode]

When "DC-IM" is in [Measure Mode], it performs the current measurement.

(6) [Measure Range]

It displays Measuring Range. Select from 1mA, 10mA and 100mA.

(7) [Measure Time]

It displays Measuring Time. Specify within 1 ~ 999 (m sec).

(8) [+%] [-%]

It displays upper/lower tolerance by percentage based on the reference value. [+Limit] and [-Limit] change in sync with change of +%, -%

(9) [+Limit][-Limit]

It displays upper/lower tolerance based on the reference value.

+% and -% change in sync with change of [+Limit], [-Limit].

(10) [Voltage]

It displays the applied voltage. Specify within $0.1 \sim 25.0V$.

(11) [Limit i]

Use [Limit i] column to specify the current limit value. Select from 5mA, 10mA, 25mA, 50mA, 100mA, 200mA, 500mA and 1A.

(12) [Func. Wait time]

It displays Wait time (from applied voltage to move to the next step).

(13) [Probe Access]

 $[P+] \rightarrow Probe to apply Voltage(+)$

- $[P-] \rightarrow Probe to apply Voltage(-)$
- $[\,N\,] \ \rightarrow \ Unused$
- $[N] \rightarrow Unused$

(14) [Pin number]

It displays the pin number of H-pin (High Pin), L-pin (Low Pin), G-P1 (Guard Pin1) and G-P2 (Guard Pin2). The Net name is also available at the right.

Reference input

After verified [Voltage], [Limit i] and [Wait time], click on either the Auto Input button or the Input button on the Step data review window. Then the Temp Value column indicates a current value. If users found this current value is right, Click on the Store button o save to the reference value.

When the Measure Range and the Measure Time are set in advance, click on the Input button. (If the Auto Input button was clicked by mistake, there is a chance the Measure Range and the Measure Time is initialized and in the worst case they will be set wrong!)



The I/O step may cause serious damage to the PC boards and/or the measuring unit if users misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of users.

When the reference value is input or when [+%], [+Limit] are changed, there is a chance of displaying the error "Temp.value or +limit is over than limit current(limit i)". (Refer to Fig.32) In this case, users should change the limit current setting (Limit i) after due consideration.

(1) Auto input [2] Input [3] Test [4] Polarity [5] P. access [6] Search [7] Step move	[8]LCR meter [9]Reverse [0]Stor	Aux		- 8 >
File Mode Edit Optimization Tool Reference Test Total Coordi	ate Self-diag. Convert Help			
Edit List Erase Search Change D.Edit D.Set				
Examine LCR meter				
Step 11 P.Center	START	est		
Debug status	1	Accepted		
	✓ 2			
Parts Value Commer	Jg			
TP1-GND * *	Refere	ence 1000		
Loc Element Function To	mp.Value			
10/C DIODE BLANK (**) 10.0 m	A A A A			
Measure Mode Auto Range 🔬 Warning				
DC-IM AUTO Please ch	e or +ilmit is over than ilm ange the limit current.	it current(limit I). $\checkmark OK$		
+% -% +Limit -Limit Voltage Limit i	Wait Time			
10 10 ++++++ ++++ 5.0 V 5 mA 🗸	1.0 sec Read	ing		
speed pos P1 P2 P3 P4 Probe Access	1			
0 v H v 0 v 0 v 0 v (P+,N,N,P-) v	2			
	3	0	0.0	0.0
	4	Probe 2	Prol	oe 3
Data Guard Search Meas	ure ur	[****************	**] [***.**	***,***.*****]
Auto Input Input Part name Po	arity check	Probe 1	P+ Prol	pe 4 P-
Input Delete Value	Sampling	[+001.6000,+001.6	3000] [+005.20	100,+001.6000]
Store Search Pin number A.	nput / Store			

[Fig.10] Warning message at IO/C step in Step data review

Change to Bottom probes

Go through the following steps to use the bottom probes in test.

(1) Click on [Probe Access] to select "Bottom Set" from the pull-down menu (Refer to Fig.11)



[Fig.11] Bottom Set

(2) It displays the Bottom probe window. Select the probes to be changed to the bottom probes and specify the bottom probe number. Then click on the OK button.

(toni prose			
Step no.	1951		
Polarity PDC(-)	Bottom probe	• 2	€ 12
Polarity PDC(+)	Bottom probe	- 1	€ 12
			2
		✓ <u>O</u> K	X Cancel

[Fig.12] Bottom Set

(3) Move back to Step data review window.

As shown in Fig.14 below, "Bottom probe" column appears to show the use of the bottom probes.

Parts	Value		Comment
TP1-GND	CURRENT	*	
Loc Elem	ent F	unction	Temp.Value
IO/C DIODE	- BLANK	(**) 💌	0.000 mA
Measure Mode	Measure Ra	nge	Measure Time
DC-IM	1 mA (Range1)	▼ 10.0	msec
+% -% +Li	mit -Limit V	/oltage Lir	nit i 🛛 Wait Time 🗍
10 10 0.00	0 mA 0.000 mA 5	0 V 5 mA	▼ 5.0 sec
speed pos P1	P2 P3 F <mark>4</mark>	Probe Access	Bottom probe
		(P-,N,P+,N)	(N2, N, N1, N)
		search	- Wieasure
Auto Input	Input	Part name	Polarity check
Input	Delete	Value	Sampling
Store	Search	Pin number	A.Input / Store

[Fig.13] Step data review

Fig.13 indicates that the bottom probe 1,2 are used for applying the voltage.

Viewable Setup of Function steps

This chapter describes the procedures to generate I/O steps (basic data programming and reference input) using the Viewable Setup of Function steps window (Step Edit list > Tool > Viewable Setup of Function steps window).

Unlike the I/O Function Window (Step Edit list > Tool > I/O Function > I/O Step Set), users don't have to select I/O command according to his application but he can use the mouse to simply specify necessary connection from the tester to the PDC-9500 on a graphic setup window. Users can recognize the reality of whole connection with ease.

The Aux. column on the step configured on the Viewable Setup of Function steps window is substituted by [IO/F].

[Example 1] Relay On test

Users can have the PDC-9500 apply DC voltage to the Coil and conduct the On-test of the contact point of the relay.



[Fig.1]

Basic knowledge of IO/F step

- 1. Users can select the probes to apply voltage and the measurement probes from the flying probes and the bottom probes.
- 2. No guard point can be set.
- 3. The Loc column is substituted by "IO/F".
- 4. When the flying probes are used to apply the voltage, the voltage output is suspended automatically after the IO/F step is finished.
- 5. The output voltage is shown in the Volt column on the Step Edit list. (Refer to Fig.2)

Edit	Search	Move	<u>T</u> ool <u>V</u> iew	Ę		-				-			1251						_ 8 ×
File	Mode	Edit	Optimizat	ion 1	Tool	Refere	nce Test	Total	Coordinat	e Self-diag	ą. I	Conve	ert Help	1					
Edit	List	Erase	Search	Chang	ge f	He Pin coor.	Pin Er. D	D /	Pin D.Set	A.Gen.	e Pr	(j. int	f) Undo	Select	L I	97 - opy P	aste		
Step	: Re	feren	ce Te	st		Juc	lge	Cat.	Mode	Range		Tim	e	Volt	1-X	coor		1-Ycoor	BFRL 2
000001	.: 4	6.4 K	o 4	6.4	KO			-	DC-CV	Range	5	10.	0 msec	*	[+0	25.30	0,	085.6050]	[
000002	: 0	.33 0	0	.37	0			1	DC-CC	Range	2	10.	0 msec	*	[**		·		[
000003	: 0	.86 0	1	.21	0			120	DC-CC	Range	2	1.0	msec	и.	[+0	29.61	25,-	089.2775]	[
000004	: 4	7.2 0	4	7.4	0			1770	DC-CC	Range	3	1.0	msec	يد ا	[+0	11.98	2 5,-	067.3875]	[
000005	: 4	8.1 0	4	7.4	0			-	DC-CC	Range	3	1.0	msec	*	[+0	11.98	75,-	066.3800]]
000006	: 0.	925 n	F 0.9	914	nF			-	AC-160K	Range	3	7.0	msec	*	[+0	08.61	25,-	066.5725]	[
000007	: 0.	924 n	F					<u>(14</u>)	AC-160K	Range	3	7.0	msec	4	[**	uu_uu	·		[
000008	1: 4	.80 V						170	DC-VM	Range	3	5.0	msec	5.0V	[+0	32.80	75,	+000.000]	[

[Fig.2] IO/F step

Programming Steps

- (1) Click on Step Edit (or Step List) from Edit menu on Menu bar.
- (2) It displays "Enter step number (1 x)".

Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.

(3) The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.3)

Optimizatio	on Tool Reference	Test Total Coordinate S
1 4.		
1	H 400 800	1 = D
ase Search I	Change D.Edit D.Set	A.Gen. Print U Undo
Parts	Value	Comment
R7	100.00	175
R8	1K0	54
R9	100.00	175
R10	3.3KO	60
R11	3.3KO	60
R12	100.00	175
R13	1K0	54
	Asse Search Parts R7 R7 R8 R9 R10 R11 R12 R13 R13	See Search Change DEat DSet Parts Value R7 100.00 R8 1K0 R9 100.00 R10 3.3K0 R11 3.3K0 R12 100.00 R13 1K0

[Fig.3] Step Edit list

(4) Move to Tool and click on "Viewable Setup of Function steps". (Refer to Fig.4)



[Fig.4] Viewable Setup of Function steps

(5) It displays the Viewable Setup of Function steps window (Fig.5).

Viewable Setup of Function steps						X
Probe Probe -1 Probe -2 Probe -3 Probe -4 Bottom -1 Bottom -2	Step N	10.	8	1 Au	х.	
Pin No. 0	Parts	Ĩ	+			_
X Coordinates +000,0000 +000,0000	Valu	8				_
Y Coordinates +000.0000 +000.0000	Comm	ent	*			
	Locati	on .				
Measuring unit	Functi	on	BLANK	(**)		¥.
High-Pin	Wait ti	me	0.0	\$		
Low-Pin	Standa	rd Sc	anner Bo	ard		
	T1	Unre	gistered			
	T3 1	Unre	distered			
	TA)	Unre	gistered			
	<u></u>])	Unre	gistered			
Programmable DC						
Voltage (+)						
Voltage (-)						
Elear Set IO/F V	K.		Cance			y .

[Fig.5] Viewable Setup of Function steps (Point system)

(6) Click on [Set IO/F] button to activate each function on the window.

vable Setup of Function ste	99								
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.
Pin No.	0			i			Parts)•	
X Coordinates	+000.0000			+000.0000			Value	ŀ	
Y Coordinates	+000.0000			+000.0000			Comment)•	
							Location) •	
Measuring unit							Function	BLANK	(**)
High Die							Wait time	0.0	\$ 0.0.25.5[sec]
Low-Pin							Standard S	canner Boar	d
			•••••				T1 Unr	egistered	
							T2 Unr	egistered	
							T4 Upr	egistered	
							T5 Unr	egistered	
Programmable DC									
Voltage (+)									
Voltage (-)									
10 Coursets	Oliver	1						e Constal) Analy
EwErobetty	Cieat					× 1	20		Apply

[Fig.6] Viewable Setup of Function steps (Point system)

(7) Click on [Programmable DC] button. After the Programmable DC On/Off window (Fig.7) appears on the display, select [ON].

rogrammable DC		×
00008:*	* *	*
OUTPUT		
ON(1)	• OFF (0)	
		✓ <u>O</u> K X <u>Cancel</u>

[Fig.7] Programmable DC On/Off widow

(8) It displays the Programmable DC Setup window (Fig.8).



[Fig.8] Programmable DC Setup widow

Voltage	Specify the operating voltage of the relay.
Limit current	Specify the limit value of the current flown across the Coil of the relay. Refer to for the spec list of the relay
Check for current limit over	Specify as needed.
Check current limit over to stop the test	When this box is selected, the test is suspended if it measured over the specified limit current.
Current measurement	Remain unselected.

(9) After each setup was finished, click on the OK button. The display comes back to the Viewable Setup of Function steps window and [Voltage (+)] button of Programmable DC is flashing and [Probe-1] to [Bottom-2] buttons are flashing in yellow as well. (Now the Programmable DC is ready to connect to either probe)

Viewable Setup of Function step	98					
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2
Pin No.	0			0		
X Coordinates	+000.0000			+000.0000		
Y Coordinates	+000.0000			+000.0000		
Measuring unit						
High-Pin						
Low-Pin				+		
		•••••		••••••	•••••	
Programmable DC						
Voltage (+)	•••••	••••••		••••••		
voluge (+)	••••••			••••••		
Voltage (-)						
Compex /	••••••		••••••	••••••		

[Fig.9] Viewable Setup of Function steps (Point system)

(10) Specify the connection of [Voltage (+)].

Specify other than [Probe-1] and [Probe-4] as they are already connected to the Measuring unit. Here let's select [Probe-2]. After this, [Voltage (+)] is connected to [Probe-2] with a green line. (Refer to Fig.10)



[Fig.10] Viewable Setup of Function steps (Point system)

(11) [Voltage (-)] button of Programmable DC is flashing.

Here let's select [Probe-3]. After this, [Voltage (-)] is connected to [Probe-3] with a green line. (Refer to Fig.11)

iewable Setup of Function step	2				
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1 Bottom - 2
Pin No.		0		Ó	
X Coordinates	+000.0000	+000.0000	+000.0000	+000.0000	
Y Coordinates	+000.0000	+000.0000	+000.0000	+000.0000	
Measuring unit					
High-Pin					
Low-Pin				i	
		•••••	••••••		
			••••••		
Programmable DC					
Voltage (+)					
Voltage (-)					

[Fig.11] Viewable Setup of Function steps (Point system)



At this stage, the Measuring unit is connected to [Probe-1] and [Probe-4] and the Programmable DC is to [Probe-2] and [Probe-3]. But after the coordinate are input, their connection may be changed automatically according to the positional relation.

(12) Click on [Property] button on the window to display the Measuring unit window (Fig. 12).

Use the keyboard to fill in the Parts column. In addition, enter the Value, Comment and Location column as needed.

Fill in the Function, Element and Measure Mode column if the measurement content is already determined as they will assist in inputting the reference value.

	<u>P</u> arts :	*				(11 characters)
	<u>∨</u> alue :	*				(11 characters)
	Comment :	*				(20 characters)
	Location :	*				(4 characters)
	Eunction :	BLANK	(**)	•		
	Element :	AUTO		•		
Mea	sure Mode :	AUTO		*		

[Fig.12] Measuring unit

(13) Click on the Next button, and it displays the Programmable DC Setup window (Fig.13). This is the same window as Fig.8 and enables to change the configuration.

Programmable DO
000008:ABC * * * *
OUTPUT © ON(1) © OFF(Q)
Programmable DC Voltage : 0.1 🔮 0.125.0[V] Limit current : 5mA
Current measurement
■ Back Next ► X Cancel
- Eren Hevre, A Sameer

[Fig.13] Programmable DC Setup

(14) Click on the Next button, and it displays the Coordinate set window (Fig.14).

Specify High-Pin and Low-Pin by the pin numbers where are to output after the voltage was applied. In the example of Fig.1, it should be the contact point of the relay.

Specify Voltage (+) and Voltage (-) by the XY coordinates or the pin numbers where the voltage is applied. In the example of Fig.1, it should be the coil of the relay.

After the pin numbers were specified, click on the Next button.

Coordinate Set						>
000008:ABC	*		*		*	
		Pin No.		X coor	Y coor	
	High - Pin:	0	032000	+000.0000	+000.0000	
	Low - Pin :	0	032000	+000.0000	+000.0000	
V	/oltage(+):	0	032000	+000.0000	+000.0000	
١	/oltage (-):	0	032000	+000.0000	+000.0000	
				(Coordinat	tes input
1						
				<u>⊲ B</u> ack	✓ OK	X Cancel

[Fig.14] Coordinate Set (Point system)

(15) Click on the OK button, and it displays the Viewable Setup of Function steps window.

Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step 1	No.	8	Au	
Pin No.	100	300	400	200			Part	IS)	ABC		
X Coordinates	-162.8050	-136.1350	-112.1575	-081.5250			Valu	Je	•		
Y Coordinates	114.2163	-126.6400	-097.0688	-054.0500			Comm	nent	•		
							Locati	ion	٠		
Managering							Functi	ion	BLANK	(**)	
measuring unit							Wait ti	ime	0.0	¢ 0	.025.5
High-Pin	••••••						Standa	ard Se	canner Bo	ard	
Lowin							T1	Unre	aistered		
							12	Unre	gistered		
		•••••					T3	Unre	gistered		
							14	Unre	gistered		
Voltage (-)											

[Fig.15] Viewable Setup of Function steps (Point system)

(16) Click on the OK button, and it displays the Step Edit list.

Now the AUX. column is substituted by "IO/F".

Edit Search Move Iool View	_ @ ×
File Mode Edit Optimization Tool Reference Test Total Coordinate Self-diag. Convert Help	
🕒 🗣 🍡 🖉 🦊 💯 🧶 🤕 H 🧑 💷 💷 🗛 🕑 🛬 🛫 🚍	
n cui cui cui con contra la la cui componta in a cui con	9 Doforondo
step :Aux. Parts value comment H-pin L-pin F. +6	-8 Reference
000001: R/ 100.00 175 1193 1190 ** 10	10 100.0 0
000002: R8 1K0 54 966 1196 ** 10	10 1.000 KO
000003: R9 100.00 175 1194 1196 ** 10	10 100.0 O
000004: R10 3.3KO 60 966 1436 ** 10	10 3.300 KO
000005: R11 3.3KO 60 1204 1432 ** 10	10 3.300 ко
000006: R12 100.00 175 1429 1432 ** 10	10 100.0 0
000007: R13 1K0 54 966 1099 ** 10	10 1.000 KO
000008:IO/F ABC * * 100 200 ** 10	10
000009:	

[Fig.15] Step Edit list (Point system)

Step data review at IO/F step

Step data review window enables to input the reference value. In addition, it's also possible to change the measuring conditions (Voltage, Time etc). The measuring conditions should be changed after due consideration.



[Fig.16] IO/F step in Step data review (Point system)

(1) [Element]

It displays type of the measurement.

(2) [Function]

It displays the measurement function.

(3) [Temp. Value]

It displays the value obtained by pressing either [Auto Input] or [Input]. This value is changeable in the same Measuring Mode and Range. This value is saved as Reference value if [Store] button is clicked.

(4) [Measure Mode]

It displays Measuring Mode.

(5) [Measure Range]

It displays Measuring Range.

(6) [Measure Time]

It displays Measuring Time. Specify within 1 ~ 999 (m sec).

(7) [+%] [-%]

It displays upper/lower tolerance by percentage based on the reference value. [+Limit] and [-Limit] change in sync with change of +%, -%.

(8) [+Limit][-Limit]

It displays upper/lower tolerance based on the reference value. +% and -% change in sync with change of [+Limit], [-Limit].

(9) [Voltage]

It displays the applied voltage. Specify within 0.1 ~ 25.0V.

(10) [Limit i]

Use [Limit i] column to specify the current limit value. Select from 5mA, 10mA, 25mA, 50mA, 100mA, 200mA, 500mA and 1A. (11) [Func. Wait]

It displays Wait time (from applied voltage to measure).

(12) [Probe Access]

It indicates Probe 1,2,3,4 from the left.

- $[N] \rightarrow Unused$
- $[+] \rightarrow H-pin$
- $[-] \rightarrow L-pin$
- $[P+] \longrightarrow Probe to apply Voltage(+)$
- $[\ P- \] \qquad \rightarrow \quad \text{Probe to apply Voltage(-)}$
- (13) [IO/F edit]

Click on the IO/F edit button, and it displays the Viewable Setup of Function steps window for verification or correction.

(14) [Programmable DC]

Clicking on either the Auto Input or Input button displays the current which is flown when the voltage is applied. This is displayed only at IO/F steps.

(15) [Pin number]

It displays the pin number of H-pin(High Pin), L-pin(Low Pin), G-P1(Guard Pin1) and G-P2(Guard Pin2). The Net name is also available at the right.

Reference input

Users should specify [Element] and [Measure Mode] column in case of components that is measured while applying the voltage.

When [Element] column is Specified by RESISTOR, CAPACITOR or COIL, select "Auto" in [Measure Mode] column and click on the Auto Input button. The value obtained from the measurement is displayed in [Temp. Value] column. Also, specify [Function] and [Measure Time] as needed. If the Store is selected, the Temp. Value will be saved as the reference value.

When [Element] column is specified by DIODE to go for VF measurement, select "DC-CC" in [Measure Mode. On the other hand, when [Element] column is specified by DIODE to go for DC voltage measurement, select "DC-VM" in [Measure Mode]. In these cases, be sure to click the Input button to input the reference value. The value obtained from the measurement is displayed in [Temp. Value] column. If the Store is selected, the Temp. Value will be saved as the reference value.



The I/O step may cause serious damage to the PC boards and/or the measuring unit if users misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of users.

\bigcirc	1.	To go for DC voltage measurement, be sure to select the Input button to input the reference value. If the Auto Input button was used by mistake, from time to time the Measuring Mode is initialized and an unintentional Measuring mode is set automatically.
·	2.	If other Measuring mode than DC-VM mode is used while voltage is applied on the UUT, from time to time the error of "The PCB is charged with high voltage!" appears on the display. In this case, it's no longer possible to use other Measuring mode than DC-VM mode.

About the error "Current limit over!"

There is a chance of getting the error "Current limit over!" during the reference value input. In this case, users should improve the Wait time to be longer.

[Example 2] Multiple test measurement by applying voltage

Users can use two bottom probes to have the PDC-9500 apply DC voltage to the UUT and test multiple test steps. But they cannot use any flying probes test multiple test steps while applying DC voltage. In addition, it's possible to measure DC current while applying DC voltage to the UUT. When DC current is set by the tolerance, DC voltage output to the UUT could be terminated if it measured out of the tolerance. When DC current is measured, users should program one step to apply DC voltage and measure DC current and then program the next step to measure after applied DC voltage. As for the programming process to apply DC voltage and measure DC current, refer to [Example 3] explained later.



[Fig.17]

Basic knowledge of IO/F step

- 1. Listed below are conditions to terminate the DC voltage output to the UUT.
 - * IO/F step configured by "OFF" is executed.
 - * At the end of test
 - * The step using the bottom probe is executed.
- 2. If the step using the bottom probe was changed to IO/F step, the Probe access using the bottom probe at the step is initialized.
- 3. The Loc column is substituted by "IO/F".
- 4. The Volt column on the Step Edit list displays the voltage specified by users. (Refer to Fig.18)

File	Mode	Edit	Optimizat	ion Too	ol Refer	ence Test	Total	Coordinate	Self-diag	Conve	rt Help	1				
Edit	List	Erase	Search	Change	Pin coor.	Pin Er. D	🔵 🍐	in D.Set	A.Gen.	201 Print	n) Undo	Select C	rt Copy Pa	iste		
Step	: Re	ferend	ce Te	st	Ju	ıdge	Cat.	Mode	Range	Time		Volt	1-Xcoor	1-Ycoor	BFRL	2
000001	: 4	6.4 KG	0 4	6.4 K	0		100	DC-CV	Range	5 10.0	msec	*	[+025.300	0,-085.6050]		[
000002	: 0	.33 0	0	.37 0			-	DC-CC	Range	2 10.0) msec	*	[+066.380	00,-066.3800]		[
000003	: 0	.86 0	1	.21 0			020	DC-CC	Range	2 1.0	msec	*	[+029.612	25,-089.2775]]
000004	: 4	7.2 0	4	7.4 0			1772	DC-CC	Range	3 1.0	msec	÷	[+011.982	25,-067.3875]		[
000005	: 4	8.1 0	4	7.4 0				DC-CC	Range	3 1.0	msec	*	[+011.987	75,-066.3800]		[
000006	: 0.	925 nl	.0.5	914 nH	3		(# 1)	AC-160K	Range	3 7.0	msec	*	[+008.612	5,-066.5725]		[
000007	: 0.	924 nl	7				<u>9-6</u> 7	AC-160K	Range	3 7.0	msec	u.	[+032.807	75,+000.0000]]
800000	:						170	DC-VM	R-AUTO	5.0	msec	5.0V	[[

[Fig.18] Step Edit list

Programming Steps

The way of programming IO/F step below is explained in use of Point system. Also, the explanation is targeted at users who don't want to measure DC current. As for the way of measuring DC current, refer to [Example 3] explained later.

- (1) Click on Step Edit (or Step List) from Edit menu on Menu bar.
- (2) It displays "Enter step number (1 x)".

Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.

(3) The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.19)

Edit	<u>S</u> earcl	n <u>M</u> ove	Tool	⊻iew								
File N	lode	Edit (Optimiza	tion Too	I Refe	erence	Test	Total	Coordinate	Self-diag.	Convert	Help
Edit	List	Erase	- Search	Change	HA Pin coor.	Pin Er.	DEd		A D Set	A Gen.	Print	n, Undo Se
Step	:Au:	х. Р	arts		Val	ue	107 974 88	Com	nent	1.00000		H-pir
000001		R	7		100	.00		175				119:
000002	2:	R	8		1KC			54				966
000003	3:	R	9		100	.00		175				1194
000004	1:	R	10		3.3	KO		60				966
000005	5:	R	11		3.3	KO		60				1204
000000	5:	R	12		100	.00		175				1429
000007	1:	R	13		1KC			54				966
000008	3:											

[Fig.19] Step Edit list

(4) Move to Tool and click on "Viewable Setup of Function steps". (Refer to Fig.20)

Edit	Searc	ch	Mor	/e	Tool	⊻iew					
File	Mode	Ed	it	Op		<u>C</u> oordinates Map	F1	ate	Self-diag	. Com	vert Help
Edit	List		Erase	s		Set Comb Measurements Clear Comb Measurements		N do	J Select	9 Cut	Gopy
Step	:Au	1X .		Pai	-						F.
0000	01:			R7		Generation	,	•			* *
0000	02:		1	R8		Ground)	•			* *
0000	03:		1	R9		Bottom probe)	•			* *
0000	04:		1	R10		Cluster Eurotion	,				* *
0000	05:		1	R1:		-1					* *
0000	06:		1	R1:		I/O Function)	•			* *
0000	07:		1	R1:		⊻iewable Setup of Function steps	F4	1			* *
0000	08:				8.8	Auto Consenting					
					5.8	Auto Generation					
					*	Change Step Data C	trl+C				
						Select <u>R</u> evise Area Mode					
						High-fly / No-contact-zone Shift+C	trl+H				

[Fig.20] Viewable Setup of Function steps

(5) It displays the Viewable Setup of Function steps window (Fig.21).

Viewable Setup of Function steps				×
Probe Probe - 1 Probe - 2 Probe - 3 Probe - 4 Bottom - 1 Bottom - 2	Step No.	8	‡ Aux.	
Pin No. 0 0	Parts]•		
X Coordinates +000 0000 +000 0000	Value	ŀ		
Y Coordinates +000.0000 +000.0000	Comment)•		
	Location)•		
Measuring unit	Function	BLANK	(**)	*
	Wait time	0.0	0.0	.25.6[sec]
Low.Pin	Standard S	Scanner Bo	ard	
	T1 Unr	egistered		
	T2 Unr	egistered		
	T4 Unr	egistered		
	15 Unr	egistered		
Programmable DC				
Voltage (+)				
Voltage (-)				
Property Clear Set IO/F		💢 <u>C</u> ancel		Apply

[Fig.21] Viewable Setup of Function steps (Point system)

(6) Click on [Set IO/F] button to activate each function on the window.

Viewable Setup of Function step	20									×
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step N	lo. 8	Aux.	
Pin No.	ò			Ó			Parts			
X Coordinates	+000.0000			+000.0000			Value			
Y Coordinates	+000.0000			+000.0000			Comme	ent 📍		
							Locatio	on *		
Measuring unit							Functio	BLANK	(**)	-
High-Pin							Wait tin	ne D.O	0.025.5[s	ec]
Low-Pin	-						Standar	rd Scanner Bo	ard	
		••••••		••••••	••••••		11 L	Unregistered		
							12	Inregistered		
							T4 L	Inregistered		
		••••••			••••••		L	Jnregistered		
Deservation DC										
Frogrammable DC										
Voltage (+)										
Maltana ()										
vonage (-)										
Property	Clear						2K	🔀 <u>C</u> ance		у

[Fig.22] Viewable Setup of Function steps (Point system)

(7) Click on [Programmable DC] button. After the Programmable DC On/Off window (Fig.23) appears on the display, select [ON].

rogrammable DC		X
000008:*	* *	*
OUTPUT ON (<u>1</u>)	° OFF (<u>0</u>)	
		✓ <u>O</u> K × <u>C</u> ancel

[Fig.23] Programmable DC On/Off widow

(8) It displays the Programmable DC Setup window (Fig.24).



[Fig.24] Programmable DC Setup widow

Voltage	Specify the voltage (0.0V~25.5V) applied to the UUT.							
Limit current	Specify from [5mA], [10mA], [25mA], [50mA], [100mA], [200mA], [500mA] and [1A].							
Check for current limit over	Specify as needed.							
Check current limit over to stop the test	When this box is selected, the test is suspended if it measured over the specified limit current.							
Current measurement	Remain unselected.							

(9) After each setup was finished, click on the OK button. The display comes back to the Viewable Setup of Function steps window and [Voltage (+)] button of Programmable DC is flashing and [Probe-1] to [Bottom-2] buttons are flashing in yellow as well. (Now the Programmable DC is ready to connect to either probe)

Viewable Setup of Function step	52					
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2
Pin No.	i i			0		
X Coordinates	+000.0000			+000.0000		
Measuring unit						
						•••••
Programmable DC						
Voltage (+)						
Voltage (-)						

[Fig.25] Viewable Setup of Function steps (Point system)

(10) Specify the connection of [Voltage (+)].

Specify other than [Probe-1] and [Probe-4] as they are already connected to the Measuring unit. Here let's select [Bottom-1]. After this, [Voltage (+)] is connected to [Bottom-1] with a green line.

Viewable Setup of Function step	12					
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2
Pin No.	0			0		
X Coordinates	+000.0000			+000.0000		
r Coordinates	+000.0000			+000.0000		
Measuring unit						
High Pin	•					
r						
			•••••	••••••	•••••	••••••
-rogrammable DC						
Voltage (+)						
Voltage (,)						
- neget /						

[Fig.26] Viewable Setup of Function steps (Point system)

(11) [Voltage (-)] button of Programmable DC is flashing.

Here let's select [Bottom-2]. After this, [Voltage (-)] is connected to [Bottom-2] with a green line.

fewable Setup of Function step	19					
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2
Pin No.	- O			0		
X Coordinates	+000.0000			+000.0000		
Y Coordinates	+000.0000			+000.0000		
Measuring unit						
High-Pin						
Low-Pin				.		
					•••••	
Barran and a DC						
Programmable DC						
Voltage (+)						
Maltana ()						
Voltage (-)						-

[Fig.27] Viewable Setup of Function steps (Point system)

(12) Click on [Property] button on the window to display the Measuring unit window (Fig.28).

Use the keyboard to fill in the Parts column. In addition, enter the Value, Comment and Location column as needed. Fill in the Function, Element and Measure Mode column if the measurement content is already determined as they will assist in inputting the reference value.

Measuring unit	X
000008:* *	* *
Parts information	
Parts	* (11 characters)
Value	* (11 characters)
Comment	* (20 characters)
Location	* (4 characters)
Eunction :	BLANK (**)
Element	AUTO
Measure Mode	AUTO
	Back Next > X Cancel

[Fig.28] Measuring unit

(13) Click on the Next button, and it displays the Programmable DC Setup window (Fig.29). This is the same window as Fig.24 and enables to change the configuration.

rogrammable DC					2
00008:ABC	*	*	•	,	
OUTPUT ° ON (1)	○ OFF (<u>0</u>)				
Programmable [⊻oltage :)C 0.1 ‡ 0 5m4	.125.0[V]	1		
Check for cur	rent limit over	⊏ Ch	eck current limit	over to stop	the <u>t</u> est
Current meas	urement				
			_ <u>∎</u> ack	Next⊳	X Cancel

[Fig.29] Programmable DC Setup

(14) Click on the Next button, and it displays the Coordinate set window (Fig.30).

Specify High-Pin and Low-Pin by the pin numbers where are to output after the voltage was applied.

After the pin numbers were specified, click on the Next button.



[Fig.30] Coordinate Set (Point system)

(15) Click on the OK button, and it displays the Viewable Setup of Function steps window.

Geweble Setup of Function step	10								×
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.
Pin No.	11			6			Parts	+5.0V-GND	
X Coordinates	-167.2500			-073.0163			Value	TP1-GND	
Y Coordinates	-115.6675			-048.9925			Comment	+5.0V_UT	
							Location	ŀ	
Measuring unit							Function	BLANK	(**)
High Rin							Wait time	0.0	\$ 0.025.5[sec]
Low-Pin							Standard	Scanner Boar	d
							11 Un	registered	
		••••••			••••••	•••••	•• 12 Un	registered	
							13 Un	iregistered	
							14 Un	iregistered	
							··[_13_][01	registered	
Programmable DC									
Voltage (+)									
Mattering ()						-			
voltage (-)									
Property	Clear						OK][X Cancel	Apply

[Fig.31] Viewable Setup of Function steps (Point system)

- (16) Click on the OK button, and it displays the Step Edit list.
 - Now the AUX. column is substituted by "IO/F".

📃 Edit Search 📐	tove <u>⊺</u> ool ⊻iew							-
File Mode Edit	Optimization Too	I Reference Test	Total Coordinate	Self-diag. Cor	wert Help			
Edit List Er	ase Search Change	Pin coor. Pin Er.) H (D) t D.Pn D.Set	A.Gen. Print	n 🥖	1 8-		Cescade Tile
Step :Aux.	Parts	Value	Comment		H-pin	L-pin	F. +% -	& Referenc
000001:	R7	100.00	175		1193	1190	** 10 1	0 100.0 0
000002:	R8	1KO	54		966	1196	** 10 1	0 1.000 KC
000003:	R9	100.00	175		1194	1196	** 10 1	0 100.0 0
000004:	R10	3.3KO	60		966	1436	** 10 1	0 3.300 KC
000005:	R11	3.3KO	60		1204	1432	** 10 1	0 3.300 KC
000006:	R12	100.00	175		1429	1432	** 10 1	0 100.0 0
000007:	R13	1KO	54		966	1099	** 10 1	0 1.000 KC
000008:IO/F	+5.0V-GND	TP1-GND	+5.0V OUT		6	11	** 10 1	0
000009:			100					

[Fig.32] Step Edit list (Point system)

(17) Press the Esc key to close the Step Edit list.Or, add other measuring steps after the above IO/F step if there is. In this case, use the down-arrow key to move the cursor to the next step.

Edit Search M	<u>⊿</u> ove <u>T</u> ool <u>V</u> iew							_
File Mode Edit	Optimization Too	ol Reference Te	st Total Coordinate	Self-diag. C	onvert Help			
🕞 🕞 🗍	b. % ♥	H 🍡		11 -	1 n J	1 20		
Edit List Er	ase Search Change	Pin coor. Pin Er.	D.Edit D.Pin D.Set	A.Gen. Prin	t Undo Sele	et out	Copy Pa	ste Cascade Tile
Step :Aux.	Parts	Value	Comment		H-pin	L-pin	F. +%	-% Reference
000001:	R7	100.00	175		1193	1190	** 10	10 100.0 0
000002:	R8	1KO	54		966	1196	** 10	10 1.000 KO
000003:	R9	100.00	175		1194	1196	** 10	10 100.0 0
000004:	R10	3.3KO	60		966	1436	** 10	10 3.300 KO
000005:	R11	3.3KO	60		1204	1432	** 10	10 3.300 KO
000006:	R12	100.00	175		1429	1432	** 10	10 100.0 0
000007:	R13	1KO	54		966	1099	** 10	10 1.000 KO
000008:IO/F	+5.0V-GND	TP1-GND	+5.0V OUT		6	11	** 10	10
000009:								(, -))

[Fig.33] Step Edit list (Point system)

- (18) Move to Tool and click on "Viewable Setup of Function steps".
 - It displays the Viewable Setup of Function steps window (Fig.34) which indicates the existing configuration of the Programmable DC.



[Fig.34] Viewable Setup of Function steps (Point system)

- (19) Click on [Set IO/F] button to activate each function on the window.(Here users don't have to configure the Programmable DC again as Step 000008 hold it)
- (20) Click on [Property] button on the window to display the Measuring unit window. Then repeat the same operation after Process #12 in order to program as shown in Fig.35.

	•					•	•		
Edit Search M	love <u>T</u> ool ⊻iew								1
File Mode Edit	Optimization Too	I Reference Tes	t Total Coordinate	Self-diag. C	onvert Help				
Edit List Ers	ase Search Change	Pin coor. Pin Er.	🗩 🛃 🧑 Dedit D.Pin D.Set	A.Gen. Prin	t Undo Sele		Copy	Paste	Cascade Tie
Step :Aux.	Parts	Value	Comment		H-pin	L-pin	F. +	8 - 8	Referen
000001:	R7	100.00	175		1193	1190	** 1	0 10	100.0 0
000002:	R8	1KO	54		966	1196	** 1	0 10	1.000 K
000003:	R9	100.00	175		1194	1196	** 1	0 10	100.0 0
000004:	R10	3.3KO	60		966	1436	** 1	0 10	3.300 K
000005:	R11	3.3KO	60		1204	1432	** 1	0 10	3.300 K
000006:	R12	100.00	175		1429	1432	** 1	0 10	100.0 0
000007:	R13	1KO	54		966	1099	** 1	0 10	1.000 K
000008:IO/F	+5.0V-GND	TP1-GND	+5.0V OUT		6	11	** 1	0 10	
000009:IO/F	+5.0V-GND	TP2-GND	+3.0V OUT		12	20	** 1	0 10	-
000010:			107 - 101						

[Fig.35] Step Edit list

Programming the step to terminate the voltage output to the UUT

- After proceed with Process (1)~(4) in Page 40, move to Tool and click on "Viewable Setup of Function steps".
- (2) Click on [Set IO/F] button to activate each function on the Viewable Setup of Function steps window.



[Fig.35] Viewable Setup of Function steps (Point system)

(3) Click on [Programmable DC] button.

After the Programmable DC On/Off window (the left window in Fig.36) appears on the display, select [**OFF**]. Then click on the OK button on the right window in Fig.36.

Programmable DC 🔀	Programmable DC
000009:* * * *	000009:* * * *
Programmable 00 x 000009:* * OUTPUT OFF (0) Programmable DC Votage: [5.0] Votage: [5.0] Utimit current: [50mA] P Check for current limit over © Check current limit over to stop the test © Current measurement •	Programmable CO X 000009:* * ○ OPUT ○ OFF(Q)
QK X_Cancel	QK ∭ X Cancel

[Fig.36] Programmable DC On/Off widow

(4) The display moves back to the Viewable Setup of Function steps window.

Viewable Satup of Function step	10									×
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	9	Aux.	
Pin No.	ò			Ó			Parts	ŀ		
X Coordinates	+000.0000			+000.0000			Value	ŀ		
Y Coordinates	+000.0000			+000.0000			Comment	ŀ		
							Location	ŀ		
Measuring unit							Function	BLANK	(")	
High Dia							Wait time	0.0	\$ 0.0	.25.5[sec]
Low-Pin							Standard S	canner Bo	ard	
							T1 Unr	egistered		
						••••••	T2 Unr	egistered		
							T4 Unr	egistered edistered		
							T5 Unr	egistered		
Programmable DC										
No beaution and										
vonage (*)	••••••			••••••	••••••					
Voltage (-)					••••••					
								. /	50 AD 50	In a cont
Property	Clear						2K] [X Carros		- WINNE

[Fig.37] Viewable Setup of Function steps (Point system)

(5) Click on the OK button, and the display moves back to the Step Edit list (Fig.38). For better understanding the step, users should fill in Parts column and Value column with some remarks as shown in Fig.39.

Edit Search M	tove <u>⊺</u> ool ⊻iew					
File Mode Edit	Optimization Too	I Reference Test	Total Coordinate Self-dia	g. Convert Help		
Edit List Erd	ase Search Change		D D AND A CON	Print Undo Select Out	Copy Paste	Cascade Tile
Step :Aux.	Parts	Value	Comment	H-pin L-pin	F. +% -%	Reference
000001:	R7	100.00	175	1193 1190	** 10 10) 100.0 O
000002:	R8	1KO	54	966 1196	** 10 10	1.000 ко
000003:	R9	100.00	175	1194 1196	** 10 10	100.0 0
000004:	R10	3.3KO	60	966 1436	** 10 10	3.300 КО
000005:	R11	3.3KO	60	1204 1432	** 10 10	3.300 КО
000006:	R12	100.00	175	1429 1432	** 10 10	100.0 0
000007:	R13	1KO	54	966 1099	** 10 10) 1.000 ко
000008:IO/F	+5.0V-GND	TP1-GND	+5.0V OUT	6 11	** 10 10)
000009:IO/F	+5.0V-GND	TP2-GND	+3.0V OUT	12 20	** 10 10	0 -
000010:IO/F	*	*	* _	* *	** 10 10)
000011:						

[Fig.38] Step Edit list

📄 Edit Search 🛯	<u>≬</u> ove <u>⊺</u> ool <u>V</u> iew							_
File Mode Edit Optimization Tool Reference Test Total Coordinate Self-diag. Convert Help								
Edit List Er	ase Search Change	Pin coor. Pin Er. D.E.	H DPn DSH A.Gen.	Print Undo Sele	f 3 <u>-</u> a ca	Copy Pa	ste Casca	
Step :Aux.	Parts	Value	Comment	H-pin	L-pin :	F. +%	-% R	eferenc
000001:	R7	100.00	175	1193	1190	** 10	10 1	0.00
000002:	R8	1K0	54	966	1196	** 10	10 1	.000 KO
000003:	R9	100.00	175	1194	1196	** 10	10 1	00.00
000004:	R10	3.3KO	60	966	1436	** 10	10 3	.300 KO
000005:	R11	3.3KO	60	1204	1432	** 10	10 3	.300 KO
000006:	R12	100.00	175	1429	1432	** 10	10 1	00.00
000007:	R13	1K0	54	966	1099	** 10	10 1	.000 KO
000008:IO/F	+5.0V-GND	TP1-GND	+5.0V OUT	6	11	** 10	10	
000009:IO/F	+5.0V-GND	TP2-GND	+3.0V OUT	12	20	** 10	10	
000010:IO/F	+5.0V-GND	OFF	*	*	*	** 10	10	
000011:								

[Fig.39] Step Edit list

Step data review at IO/F step

Step data review window enables to input the reference value. In addition, it's also possible to change the measuring conditions (Voltage, Time etc).



[Fig.40] Step data review

(1) [Element]

It displays type of the measurement.

 $\mathsf{RESISTOR} \quad \rightarrow \mathsf{Resistor}$

 $\mathsf{CAPACITOR} \to \mathsf{Capacitor}$

 $COIL \longrightarrow Inductor$

DIODE \rightarrow VF measurement, DC voltage measurement

(2) [Function]

It displays the measurement function.

(3) [Temp. Value]

It displays the value obtained by pressing either [Auto Input] or [Input]. This value is changeable in the same Measuring Mode and Range. This value is saved as Reference value if [Store] button is clicked.

(4) [Measure Mode]

It displays Measuring Mode.

(For example, it displays "DC-VM" when DC voltage is measure)

(5) [Measure Range]

It displays Measuring Range.

(6) [Measure Time]

It displays Measuring Time. Specify within 1 ~ 999 (m sec).

(7) [+%] [-%]

It displays upper/lower tolerance by percentage based on the reference value. [+Limit] and [-Limit] change in sync with change of +%, -%.

(8) [+Limit][-Limit]

It displays upper/lower tolerance based on the reference value. +% and -% change in sync with change of [+Limit], [-Limit].

(9) [Voltage]

It displays the applied voltage. Specify within $0.1 \sim 25.0$ V.

(10) [Limit i]

Use [Limit i] column to specify the current limit value. Select from 5mA, 10mA, 25mA, 50mA, 100mA, 200mA, 500mA and 1A.

(11) [Func. Wait]

It displays Wait time (from applied voltage to move to the next step).

- (12) [Probe Access] It displays the state of probe access.
- (13) [Bottom probe]

It displays the state of bottom probe access. (P+,P-) Bottom probe 1 is used for "Voltage (+) of Programmable DC. Bottom probe 2 is used for "Voltage (-) of Programmable DC.

Reference input

Users should specify [Element] and [Measure Mode] column in case of components that is measured while applying the voltage.

When [Element] column is specified by RESISTOR, CAPACITOR or COIL, select "Auto" in [Measure Mode] column and click on the Auto Input button. The value obtained from the measurement is displayed in [Temp. Value] column. Also, specify [Function] and [Measure Time] as needed. If the Store is selected, the Temp. Value will be saved as the reference value.

When [Element] column is specified by DIODE to go for VF measurement, select "DC-CC" in [Measure Mode. On the other hand, when [Element] column is specified by DIODE to go for DC voltage measurement, select "DC-VM" in [Measure Mode]. In these cases, be sure to click the Input button to input the reference value. The value obtained from the measurement is displayed in [Temp. Value] column. If the Store is selected, the Temp. Value will be saved as the reference value.



The I/O step may cause serious damage to the PC boards and/or the measuring unit if users misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of users.

	1.	To go for DC voltage measurement, be sure to select the Input button to input the
\bigcirc		reference value. If the Auto Input button was used by mistake, from time to time the Measuring Mode is initialized and an unintentional Measuring mode is set automatically.
	2.	If other Measuring mode than DC-VM mode is used while voltage is applied on the UUT, from time to time the error of "The PCB is charged with high voltage!" appears on the display. In this case, it's no longer possible to use other Measuring mode than DC-VM mode.

About the error "Current limit over!"

There is a chance of getting the error "Current limit over!" during the reference value input. In this case, users should improve the Wait time to be longer.

[Example 3] Multiple test measurement by applying voltage

This I/O command uses two flying probes to have the PDC-9500 apply DC voltage to the UUT and measure the output current at the same time. The measured current is used to determine if the step is pass or fail. With the IO/F command, users can measure the consumption current while applying DC voltage to the device or the circuit and measure the current surge caused by faulty device inside the circuit.



[Fig.41]

Basic knowledge of IO/F step

- At the step where DC current is measured at the same time as applying DC voltage, user cannot execute any other measurement. Therefore, they should program other measuring steps following the IO/F step. In this case, the Programmable DC must be connected to the bottom probes. The voltage output to the UUT lasts until "OFF Step" is executed. (If the flying probes are specified, the voltage output to the UUT is terminated right after the IO/F step is executed.)
- 2. No guard point can be set.

Programming Steps

- (1) Click on Step Edit (or Step List) from Edit menu on Menu bar.
- (2) It displays "Enter step number (1 − x)".

Let's put a new step on the last step. Use the keyboard to enter the last step number and click on the OK button.

(3) The cursor is flickering on the last step. Use the down-arrow key to move the cursor to the next step. (Refer to Fig.19)

Edit	Search	n <u>M</u> ove	<u>T</u> ool	View								
File	Mode	Edit	Optimiza	tion Too	I Ref	erence	Test	Total	Coordinate	Self-diag	a. Com	vert Help
Edit	List	Erase	√∕∕ Search	Change	5/ Pin coor.	Pin Er.	D.Ed) H t D.Pin	D.Set	A.Gen.	en ji Print	n Undo Se
Step	:Au	x. P	arts		Val	.ue		Comn	ent			H-pir
0000	01:	R	7		100	.00		175				1193
0000	02:	R	8		1 KC)		54				966
0000	03:	R	9		100	.00		175				1194
0000	04:	R	10		3.3	ко		60				966
0000	05:	R	11		3.3	KO		60				1204
0000	06:	R	12		100	.00		175				1429
0000	07:	R	13		1KC)		54				966
0000	0.8.											

[Fig.42] Step Edit list

(4) Move to Tool and click on "Viewable Setup of Function steps". (Refer to Fig.43)



[Fig.43] Viewable Setup of Function steps

(5) It displays the Viewable Setup of Function steps window (Fig.44).

emable Setup of Function steps		
Probe Probe -1 Probe - 2 Probe - 3 Probe - 4 Bottom - 1 Bottom	2 Step No.	B 🗘 Aux.
Pin No. 0	Parts	r -
X Coordinates +000.0000 +000.0000	Value	ľ
Y Coordinates +000.0000 +000.0000	Comment	ŀ
	Location	<u></u>
Measuring unit	Function	BLANK (**)
High Pin	Wait time	0.0 🔅 0.025.5[sec]
Low-Pin	Standard S	icanner Board
	<u>T1</u> Unr	egistered
	T3 Unr	egistered eaistered
	<u>14</u> Unr	egistered
	<u>15</u> Unr	egistered
Programmable DC		
Maltana (+)		
vonage (*)		
Voltage (-)		
WPronetty Clear Set IO/F	W OK	
Alter and a set of the	· ~ .	

[Fig.44] Viewable Setup of Function steps (Point system)

(6) Click on [Set IO/F] button to activate each function on the window.

Viewable Setup of Function step	2								×	Viewable Setup of Function step	28								
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8 🗘 /	AUX.	Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	8	Aux.
Pin No.	Ů.			Û.			Parts	ŀ		Pin No.							Parts	ŀ	
X Coordinates	+000.0000			+000.0000			Value	•		X Coordinates							Value	ŀ	
Y Coordinates	+000.0000	J		+000.0000			Comment	*		Y Coordinates							Comment	ŀ	
							Location	•									Location)•	
Manualization							Function	BLANK (**		Mananaira							Function	BLANK	0
Measuring unit							Wait time	0.0	0.025.5[sec]	Measuring unit							Wait time	0.0	\$ 0.025.5[sec]
High-Pin -	••••••						Standard S	canner Roard		High-Pin							Standard S	Scanner Ros	vrd
Low-rin j-							T1 Uno	agistered		Low-rin							TIUn	edistered	
							T2 Unn	egistered									T2 Unr	egistered	
			••••••			•••••	T3 Unn	egistered								•••••	T3 Unr	egistered	
							T5 Unn	agistered									14 Unr	egistered	
								sgistered										egiscereu	
Programmable DC										Programmable DC									
Voltage (+)										Voltage (+)									
Value ()										Velone ()									
vonage (-)			•••••	•••••						vonage (-)	•••••								
		-										-							e is 🖬 🖪 🌶 🖫
El Property	Clear					1	2K	K Cancel	Apply	#Property	Clear					× .	QK	X Cancer	II SPPN

[Fig.45] Viewable Setup of Function steps (Point system)

Click on [Clear] button, and High-pin and Low-pin of [Measuring unit] is disconnected from [Probe-1] and [Probe-4].

When DC voltage is applied to the UUT, users are not allowed to measure the DC current while connecting High-pin and/or Low-pin of [Measuring unit] to [Probe-1] ~ [Bottom-2]. If they try to select the box "Current measurement" when High-pin and/or Low-pin of [Measuring unit] is connected to [Probe-1] ~ [Bottom-2], it shows an error message below;



In this case users should click on the Clear button to disconnect High-pin and Low-pin of [Measuring unit] from [Probe-1] ~ [Bottom-2].

(7) Click on [Programmable DC] button. After the Programmable DC On/Off window (Fig.46) appears on the display, select [ON].



[Fig.46] Programmable DC On/Off widow

(8) It displays the Programmable DC Setup window (Fig.47).

Programmable DC					×
000008:*	*	*		•	
OUTPUT · ON(1)	○ OFF (<u>0</u>)				
Programmable	DC				
⊻oltage	: 0.1 🗘 0	.125.0[V]			
Limit current	: 5mA	•			
☑ Check for cut	rrent limit over	Check	current limit	over to stop	the test
Current meas	surement				
				1	
				✓ OK	X Cancel

[Fig.47] Programmable DC Setup widow

Voltage	Specify the voltage (0.0V~25.5V) applied to the UUT.
Limit current	Specify from [5mA], [10mA], [25mA], [50mA], [100mA], [200mA], [500mA] and [1A].
Check for current limit over	Select this check box.
Check current limit over to stop the test	When this box is selected, the test is suspended if it measured over the specified limit current.
Current measurement	Select this check box.

The error message appears if the box "Current measurement" is selected when High-pin and/or Low-pin of [Measuring unit] is disconnected to any of [Probe-1] ~ [Bottom-2] on Fig.45.

Marning This function is not configurable as the Measurement unit is designate to use.

Move back to the Viewable Setup of Function steps (Fig.45) and click on the Clear button to disconnect High-pin and Low-pin of [Measuring unit] from [Probe-1] \sim [Bottom-2].

✓ OK

(9) After each setup was finished, click on the OK button. The display comes back to the Viewable Setup of Function steps window and [Voltage (+)] button of Programmable DC is flashing and [Probe-1] to [Bottom-2] buttons are flashing in yellow as well. (Now the Programmable DC is ready to connect to either probe)

If the flying probes (Probe-1 ~ Probe-4) are specified, the voltage output to the UUT is terminated right after the IO/F step is executed.

iewable Setup of Function step	20
Probe Pin No.	Probe -1 Probe -2 Probe -3 Probe -4 Bottom -1 Bottom -2
X Coordinates Y Coordinates	
Measuring unit	
Low-Pin	
Programmable DC	
Voltage (+)	
Voltage (-)	

[Fig.48] Viewable Setup of Function steps (Point system)

- (10) Specify the connection of [Voltage (+)] from [Probe-1] ~ [Bottom-2].
 - Here let's select [Probe-1]. After this, [Voltage (+)] is connected to [Probe-1] with a green line.

Viewable Setup of Function step	98
Probe	Probe -1 Probe -2 Probe -3 Probe -4 Bottom -1 Bottom -2
Pin No.	
X Coordinates	
Y Coordinates	+000.0000
Measuring unit	
High-Pin	
Low-Pin_J	
Deserve weekle DC	
Flogrammable DC	
Voltage (+)	
	•
voltage (-)	

[Fig.49] Viewable Setup of Function steps (Point system)

(11) [Voltage (-)] button of Programmable DC is flashing.

Here let's select [Probe-4]. After this, [Voltage (-)] is connected to [Probe-4] with a green line.



[Fig.50] Viewable Setup of Function steps (Point system)

(12) Click on [Property] button on the window to display the Measuring unit window (Fig.51).

Use the keyboard to fill in the Parts column. In addition, enter the Value, Comment and Location column as needed.

Fill in the Function, Element and Measure Mode column if the measurement content is already determined as they will assist in inputting the reference value.

	<u>P</u> arts :	'			(11 characters)
	<u>V</u> alue :	1			(11 characters)
	Comment :	•			(20 characters)
	Location :	ľ			(4 characters)
	Eunction :	BLANK	(**)	¥		
	Element :	AUTO		•		
Mea	sure Mode :	AUTO		¥.		

[Fig.51] Measuring unit

(13) Click on the Next button, and it displays the Programmable DC Setup window (Fig.52). This is the same window as Fig.47 and enables to change the configuration.

Programmable DC
000008:ABC * * * *
OUTPUT © ON(1) OFF(0)
Programmable DC Voltage : 0.1
Current measurement

[Fig.52] Programmable DC Setup



When the Programmable DC is connected to the bottom probes, the OK button is displayed in place of the Next button. In this case, click on the OK button after the setup on Fig.52 was complete.

(14) Click on the Next button, and it displays the Coordinate set window (Fig.53). Specify High-Pin and Low-Pin by the pin numbers where the voltage is applied.



[Fig.53] Coordinate Set (Point system)

(15) Click on the OK button, and it displays the Viewable Setup of Function steps window.

Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step	No.	8	1 A	UX.
Pin No.	2			6			Par	ts	+5.0V-GNE		
X Coordinates	-167 2500			-073.0163			Vali	ue	•		
Y Coordinates	-116.9325			-048.9925			Comn	nent			
							Loca	tion			
							Func	tion	BLANK	(**)	
measuring unit							Waitt	time	na	1.	0.0.25.50
High-Pin				••••••			Ctand	and C	non no De		(
Low-Pin						·····	T1	l Inne	canner ou	aru	
							12	Unre	aistered		
							T3	Unre	gistered		
				••••••		••••••	T4	Unre	gistered		
							15	Unre	egistered		
ogrammable DC											
Matterns (••••••							
voltage (+)	••••••			••••••	••••••						
Voltage (-)											

[Fig.54] Viewable Setup of Function steps (Point system)

(16) Click on the OK button, and it displays the Step Edit list.

Now the AUX. column is substituted by "IO/F".

Eila Mada	Edit	Ontimiza			roncol -	Foct IT	otol 1	Coordinato	Solf diag	1 Come	ort Molr							
Edit List	Erase	Search	Change	Pin coor.	Pin Er.	D.Edit	DPn	D Set	A.Gen.	Print	n Undo	Sele	f 2- a cut	() Cop		ste C	ascade Tie	
Step :Au	x. F	Parts		Val	ue		Comm	ent			H-P	in	L-pin	F.	+8	- %	Refer	enc
000001:	F	17		100	.00		175				11	93	1190	**	10	10	100.0	0
000002:	F	18		1K0			54				9	66	1196	**	10	10	1.000	KC
000003:	F	19		100	.00		175				11	94	1196	* *	10	10	100.0	0
000004:	F	10		3.3	KO		60				9	66	1436	**	10	10	3.300	KC
000005:	F	11		3.3	KO		60				12	04	1432	* *	10	10	3.300	KC
000006:	F	12		100	.00		175				14	29	1432	**	10	10	100.0	0
000007:	F	13		1K0			54				9	66	1099	* *	10	10	1.000	KC
000008:10	/F T	P1-GN	1D	CUR	RENT		*					50	100	* *	10	10		
000009:																		

[Fig.55] Step Edit list

(17) When the Programmable DC is connected to the bottom probes to measure other points, program those steps following to this IO/F step. (Refer to Fig.56)

📃 Edit Search M	<u>t</u> ove <u>T</u> ool <u>V</u> iew								<u></u>
File Mode Edit	Optimization Too	I Reference Test	Total Coordin	ate Self-dia	g. Convert He	p			
	↓ ¹ / ↓		🐑 H 🐢		Si A.	3 20	4		
	Develop	No luc	Comment	. All Aloen.		Select Cut	COPY P		Defenses a
step :Aux.	Parts	varue	comment		н-	эти г-рти	1. +8	- 8	Reference
000001:	R7	100.00	175		1	L93 1190	** 10	10	100.0 0
000002:	R8	1K0	54			966 1196	** 10	10	1.000 KO
000003:	R9	100.00	175		1	L94 1196	** 10	10	100.0 O
000004:	R10	3.3KO	60			966 1436	** 10	10	3.300 KO
000005:	R11	3.3KO	60		1	204 1432	** 10	10	3.300 KO
000006:	R12	100.00	175		1	429 1432	** 10	10	100.0 0
000007:	R13	1K0	54			966 1099	** 10	10	1.000 KO
000008:IO/F	TP1-GND	CURRENT	*			50 100	** 10	10	
000009:IO/F	TP1-GND	TP2-GND	+3.0V OU	Т	2	510 5842	** 10	10	_
000010:			100.0						_

[Fig.56] Step Edit list

Programming the step to terminate the voltage output to the UUT

When the Programmable DC is connected to the bottom probes, users should program another step to terminate the voltage output to the UUT. The programming steps are described below.

- (1) Proceed with Process (1)~(3) in Page 50.
- (2) Move to Tool and click on "Viewable Setup of Function steps".

📃 Edit Search 🖪	<u>A</u> ove <u>T</u> ool	⊻iew		
File Mode Edit	Op	Qoordinates Map F1	ate	e Self-diag. Convert Help
Edit List Er	ase s	Set Comb Measurements Clear Comb Measurements	•	A.Gen. Print Undo S
Step :Aux.	Pai			H-pi
000001:	R7	Generation	•	119
000002:	R8	Ground	+	96
000003:	R9	Bottom probe		119
000004:	R1(Cluster Function		96
000005:	R1:			120
000006:	R1:	I/O Function	+	142
000007:	R1:	⊻iewable Setup of Function steps F4		96
000008:IO/F	TP:			5
000009:IO/F	TP:	Coordinates input	Г	251
000010:		Auto Generation		
	ų	Change Step Data Ctrl+C		
		Select Revise Area Mode		
		High-fly / No-contact-zone Shift+Ctrl+H		

[Fig.57] Viewable Setup of Function steps

(3) It displays the Viewable Setup of Function steps window (Fig.58).

Viewable Setup of Function step	× ×
Vendels Sety of Fraction etc Probe Prin No. X Coordinates Y Coordinates Measuring unit High Pin Low Pin	2 Prober 7 Pr
Programmable DC Voltage (+) Voltage (-)	
(御Broperty	Cler Set IOF VCK X Carpen Annu

[Fig.58] Viewable Setup of Function steps (Point system)

(4) Click on [Set IO/F] button to activate each function on the Viewable Setup of Function steps window.

Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	10	Aux.
Pin No.	ò			Ó			Parts	ŀ	
X Coordinates	+000.0000			+000.0000			Value	ŀ	
Y Coordinates	+000.0000			+000.0000			Comment	•	
							Location		
Monouring unit							Function	BLANK	. m
measuring unit							Wait time	0.0	\$ 0.025.5[s
High-Pin	•						Standard	Scanner F	Board
							T1 Un	registere	d
							T2 Un	registere	d
		••••••		••••••	•••••		T3 Un	registere	d
		••••••	••••••				T4 Un	registere	d
								rogiotoro	<u> </u>
Voltage (-)					•••••				

[Fig.59] Viewable Setup of Function steps (Point system)

(5) Click on [Programmable DC] button.

After the Programmable DC On/Off window (the left window in Fig.60) appears on the display, select [**OFF**]. Then click on the OK button on the right window in Fig.60.

Programmable DC	Programmable DC
000009:* * * *	000009:* * * *
OUTPUT • OFF (0) Programmable DC Voltage : [5.0 1.1.25.0[V] Limit current : [50mA · · · Juinit current : [50mA · · P Check for current limit over r r Check current limit over to stop the test P Check for current limit over r Check current limit over to stop the test Current measurement	OUTPUT ° ON(1) ° OFF(0)
✓ <u>OK</u> × <u>Cancel</u>	OK X Cancel

[Fig.60] Programmable DC On/Off widow

(6) The display moves back to the Viewable Setup of Function steps window.

Viewable Setup of Function step	¢									×
Probe	Probe - 1	Probe - 2	Probe - 3	Probe - 4	Bottom - 1	Bottom - 2	Step No.	10	Aux.	
Pin No.	ò			Ó			Parts	ŀ		
X Coordinates	+000.0000			+000.0000			Value	ŀ		
Y Coordinates	+000.0000			+000.0000			Comment	ŀ		
							Location	r		
Measuring unit							Function	BLANK	m	•
High Din							Wait time	0.0	\$ 0.025.5	sec]
Low-Pin							Standard S	canner Bo	ard	
		••••••	••••••			••••••	T1 Unr	egistered		
							T2 Unr	egistered		
							T4 Unr	egistered		
			•••••			•••••	T5 Unr	egistered		
Programmable DC										
Voltage (+)	••••••	••••••	••••••	••••••						
Voltage (-)										
[All Dessorts] [Cloor							V Concel	0.00	
Concroberty	Clear						20	♦ Cat little	1 46 M E E	9 0405

[Fig.61] Viewable Setup of Function steps (Point system)

(7) Click on the OK button, and the display moves back to the Step Edit list (Fig.62). For better understanding the step, users should fill in Parts column and Value column with some remarks as shown in Fig.63.

Edit Search	<u>M</u> ove <u>T</u> ool <u>V</u> iew								-
File Mode Edit	Optimization To	ol Reference T	est Total Coordinate S	Self-diag. Com	ert Help				
Ecit List E	irase Search Change	Pin coor. Pin Er.	DEdit D.Pin D.Set	A.Gen. Print	N J				ascade Tie
Step :Aux.	Parts	Value	Comment		H-pin	L-pin	F. +%	- %	Referenc
000001:	R7	100.00	175		1193	1190	** 10	10	100.0 0
000002:	R8	1KO	54		966	1196	** 10	10	1.000 KC
000003:	R9	100.00	175		1194	1196	** 10	10	100.0 0
000004:	R10	3.3KO	60		966	1436	** 10	10	3.300 KC
000005:	R11	3.3KO	60		1204	1432	** 10	10	3.300 KC
000006:	R12	100.00	175		1429	1432	** 10	10	100.0 0
000007:	R13	1KO	54		966	1099	** 10	10	1.000 KC
000008:IO/F	TP1-GND	CURRENT	*		50	100	** 10	10	
000009:IO/F	TP1-GND	TP2-GND	+3.0V OUT		2510	5842	** 10	10	-
000010:IO/F	*	*	*		*	*	** 10	10	_
000011:									-

[Fig.62] Step Edit list

Edit Search M	Tone Tool Alem						-
File Mode Edit	Optimization Te	ool Reference Te	ıst Total Coordinate Self-d	ag. Convert H	telp		
Edit List Er	ase Search Change	Pin coor. Pin Er.	Deat DPn DSet A.Gen	ा। Print Und	p 🔏 Station	Copy Pr	ste Cascade Tre
Step :Aux.	Parts	Value	Comment	H	-pin L-pin	F. +%	-% Referen
000001:	R7	100.00	175		1193 1190	** 10	10 100.0 0
000002:	R8	1KO	54		966 1196	** 10	10 1.000 K
000003:	R9	100.00	175		1194 1196	** 10	10 100.0 0
000004:	R10	3.3KO	60		966 1436	** 10	10 3.300 K
000005:	R11	3.3KO	60		1204 1432	** 10	10 3.300 K
000006:	R12	100.00	175		1429 1432	** 10	10 100.0 0
000007:	R13	1K0	54		966 1099	** 10	10 1.000 K
000008:IO/F	TP1-GND	CURRENT	*		50 100	** 10	10
000009:IO/F	TP1-GND	TP2-GND	+3.0V OUT		2510 5842	** 10	10
000010:IO/F	TP1-GND	OFF	*		* *	** 10	10
000011:							

[Fig.63] Step Edit list

Step data review at IO/F step

Step data review window enables to input the reference value. In addition, it's also possible to change the measuring conditions (Voltage, Time etc).

(As shown in figures below, the Step data review differs depending on where the Programmable DC is connected.)



[Fig.64] Step data review (when using the bottom robes)

(1) Auto Input [2] Input [3] Test [4] Polarity [5] P. access [6] Search [7] Step move [8] LOR meter [9] Reverse [0] Store	Au <u>x _15 ×</u>
File Mode Edit Optimization Tool Reference Test Total Coordinate Self-diag. Convert Help	
Ext List Erzes Sewich Change Princeor, Print, DEdt DPH DSH	A-side
Examine LCR meter	
Step 8 Start Test Debug status 1	
TP1-GND CURRENT * Reference	
Loc Element Function Temp Value	
DIODE BLANK (**)	
Booline Control Reading 10 10 5.0 V 25 mA V0.0 sec 1 speed pos P1 P2 P3 P4 Probe Access 3 0 0.0 0 H V 0.0 V V V V 4 Probe 2 P-	0.0 Probe 3
Data Search Measure Min [-162.8050,-114.2163] [* Auto Input Part name Polanty check, Max Probe 1 Input Sampling Av [************************************	Probe 4 P+ 33.4725,-115.9513]
Voltage (P+) 50 ID.Net COM	
Voltage (P-) 100 10.Net \$17658	
Unused D 👮 ID.Net	
Unused 0 🔮 ID.Net	

[Fig.64] Step data review (when using the flying robes)

(1) [Element]

It displays "DIODE" (This is not changeable)

(2) [Function]

It displays the measurement function.

(3) [Temp. Value]

It displays the value obtained by pressing either [Auto Input] or [Input]. This value is changeable in the same Measuring Mode and Range. This value is saved as Reference value if [Store] button is clicked.

(4) [Measure Mode]

It displays "DC-IM" and measures the current value. (This is not changeable)

(5) [Measure Range]

It displays Measuring Range. Specify 1mA, 10mA or 100mA.

(6) [Measure Time]

It displays Measuring Time.

(7) [+%] [-%]

It displays upper/lower tolerance by percentage based on the reference value. [+Limit] and [-Limit] change in sync with change of +%, -%.

(8) [+Limit][-Limit]

It displays upper/lower tolerance based on the reference value. +% and -% change in sync with change of [+Limit], [-Limit].

(9) [Voltage]

It displays the applied voltage. Specify within 0.1 ~ 25.0V.

(10) [Limit i]

Use [Limit i] column to specify the current limit value. Select from 5mA, 10mA, 25mA, 50mA, 100mA, 200mA, 500mA and 1A.

(11) [Func. Wait]

It displays Wait time (from applied voltage to move to the next step).

(12) [Probe Access]

- $\mathsf{N} \quad \rightarrow \mathsf{Unused}$
- P+ \rightarrow Probe to apply Voltage(+)
- $\mathsf{P-} \quad \rightarrow \mathsf{Probe to apply Voltage(-)}$

(13) [Bottom probe]

It displays the state of bottom probe access.

- P+ \rightarrow Probe to apply Voltage(+)
- P- \rightarrow Probe to apply Voltage(-)

Reference input

When the Measure Mode is specified by DC-IM, input the current value as the reference value.

After verified [Voltage], [Limit i] and [Wait time], click on either the Auto Input button or the Input button on the Step data review window. Then the Temp Value column indicates a current value. If users found this current value is right, click on the Store button o save to the reference value.

When the Measure Range and the Measure Time are set in advance, click on the Input button. (If the Auto Input button was clicked by mistake, there is a chance the Measure Range and the Measure Time is initialized and in the worst case they will be set wrong!)



The I/O step may cause serious damage to the PC boards and/or the measuring unit if users misuse it (ex. wrong location, polarity so on). The use of the I/O commands must be carried out under the responsibility of users.

When the reference value is input or when [+%], [+Limit] are changed, there is a chance of displaying the error "Temp.value or +limit is over than limit current(limit i)". (Refer to Fig.65) In this case, users should change the limit current setting (Limit i) after due consideration.



[Fig.65] Warning message at IO/F step in Step data review

In addition, users need to use the Step data review window to input the reference value for the measurement step following to the IO/P step as he isn't allowed to do this in Auto reference input.

Bottom probes setting

This chapter describes the procedures to set up the bottom probes. Put a bare (unpopulated) PCB on the tester prior to proceed with following operations.

XY coordinates input for bottom probes

(1) Choose [Tool] > [Mode Setting] > [Data mode] to open Data mode window. (Refer to Fig.1)



[Fig.1] Data mode > Mode Setting

(2) Select Bottom tool and select the box "Use Bottom tools". (Refer to Fig.2, 3)

Data mode A-side	×
A Restricted area Camera / Probe offset Board reference point Coordinates management Fail map Auxiliary reference point(s) Real Map Probe's lowest position Top position of probe DDE communication Index Variant management Bottom tools Statistic function	PCB size Length(X) Width(Y) +000.0
	QK XCancel
	[Fig.2] Data mode
Data mode A-side	X
Camera / Probe offset Board reference point Coordinates management Fail map Auxiliary reference point(s) Real Map Probe's lowest position Top position of probe DDE communication Index Variant management Bottom tools Statistic function	Support Pin (0) Bottom Probe (2) Bottom Sensor (0) 7 Use Bottom probes Number of Bottom probes : 2 2 1.20 Bottom probes restricted area : 6 2 6.50[mm] 0 Description(20 characters) 1
	Configure the positions for Bottom tools Verify the positions for Bottom tools

[Fig.2] Bottom tools

Then configure Number of Bottom Probes and Bottom probes restricted area.

(Usually, Number of Bottom Probes is set to "2" and Bottom probes restricted area is "6mm".) In addition, fill in the Description box as needed.

(3) Click on [Configure the positions for Bottom tools] button, and users are ready to input XY coordinates. Turn over the PCB in Y-direction to specify the reference point for the bottom probes.

Close the cover, press [RESE	ET] SW, and then press [TEST START] SW.
Dattan Dafarana Daiat	
Bollom Reference Point	
X coor Y coor	
-100.0000 +040.0000	
TEST	
Press START to begin	set up.
0 11 1	
Jauuoni	and the balance of the second s
venen you turn the PCB, ensu	the that there are no components on the top side that exceed
the machines height limitation	 Damage will occur if the height limitation is exceeded.



When the PCB loads some tall components (over 35mm), the camera and the flying probes are definitely hitting to them. So please be sure to use a bare (unpopulated) PCB.

(4) Depress the TEST START SW on the operation panel, and it displays the camera JOG window and Probe 4 moves to the Board reference point.

Users should set the Bottom reference point to the point which is visible from both sides. (ex. a plated through hole)

Use the keypad arrow key on the operation panel to drive the camera and set the Target marker on the center of the Bottom reference point and depress the ENTER SW on the operation panel. Then Probe 4 moves back to the home position.

(5) It displays Fig.5 below.



[Fig.5]

Depress the ENTER SW on the operation panel, and the camera moves to the Bottom reference point.

Use the keypad arrow key on the operation panel to drive the camera to the XY coordinates of Bottom probe 1.

Depress the ENTER SW on the operation panel to determine the XY coordinates of Bottom probe 1. Depress the ENTER SW on the operation panel, and it displays Fig.5 to enter the XY coordinates of Bottom probe 2.

Use the keypad arrow key on the operation panel to drive the camera to the XY coordinates of Bottom probe 2.

Depress the ENTER SW on the operation panel to determine the XY coordinates of Bottom probe 2. Click on the Next button.

(6) It displays Fig. 6 below.

Close the server proper IRESETI SM	A and then proce ITEST STARTI SIM
close the cover, press [REGET] GV	and their press [i Eor of Akr] ow.
Bottom Reference Point	
X coor Y coor	
-025.7813 +155.6000	
Drees TEST to begin out u	This step resets the Bottom reference point
Press START to begin set u	following the Y-axis turn.

[Fig.6]

Use this window to specify the Bottom reference point from the probing side again.

Open the Safety cover and turn over the PCB in Y-direction. Then close the Safety cover and depress the RESET SW on the operation panel.

(7) Depress the START SW, and the camera moves to the Bottom reference point and the camera JOG window appears.

Use the keypad arrow key on the operation panel to set the Target marker to the Bottom reference point.

Depress the ENTER SW on the operation panel to determine the XY coordinates of the Bottom reference point.

Click on the OK button.

The display moves back to Option mode (Fig.2) and now the XY coordinates input for bottom probes is finished.

Setup procedure of Bottom probes

Put the loaded PCB on the tester prior to proceed with following operations.

(1) Choose [Tool] > [Mode Setting] > [Data mode] to open Data mode window. (Refer to Fig.8)



[Fig.8] Data mode > Mode Setting

(2) Select Bottom tool > Bottom Probe.

Constitution in alle	A
✓ Restricted area Camera / Probe offset Board reference point Coordinates management Fail map Auxiliary reference point(s) Real Map Probe's lowest position Top position of probe DDE communication Index Variant management Øbitiom tools Statistic function	Support Pin (0) Bottom Probe (2) Bottom Sensor (0) Use Bottom probes Number of Bottom probes : 2 1 1.20 Bottom probes restricted area : 6 1 6.50[mm] Description(20 characters) 1 - 2 - Configure the positions for Bottom tools Verify the positions for Bottom tools
PCB Image	QK X Cancel

[Fig.9] Data mode > Bottom tools > Bottom Probe

(3) Click on [Verify the positions for Bottom tools], and it displays Fig.10. Users are ready to specify the Bottom reference point.

Depress the TEST START SW on the operation panel after verified the PCB is put on the tester.

Ensure that the PCB is on th Press [TEST START] SW to set the	ne test position. Bottom reference point.
Bottom Reference Point Coordinates	
X coor Y coor 025.7813 +155.6000	
Press START to begin set up.	

[Fig.10]

(4) It displays the camera JOG window and the camera moves to the front side.

Use the keypad arrow key on the operation panel to drive the camera and set the Target marker on the center of the Bottom reference point and depress the ENTER SW on the operation panel.

(5) It displays Fig.11 below.

Open the Safety cover to remove the PCB and close the Safety cover.

Werify the positions for Bottom tools

Close the cover, press [RESET] S Then press [TEST START] SW.	W.	
		X coor Y coor
XY coordinates for Bottom Probe	1	[+001.2000,-006.4000]
VV as audinates for Dattaux Duales	2	[+001 2000 -026 0000]

x

[Fig.11]

(6) Depress the RESET SW then the TEST START SW on the operation panel, and it displays Fig.12.

Open the cover. Place the Bottom Probe-1 in position below the CCD camera. After set, close the cover. Then press [RESET]. #1:*	
Press START to continue.	<u>S</u> Lose

[Fig.12]

Open the Safety cover and place Bottom probe 1 on the location where the Target marker indicates.

Then close the Safety cover and depress the RESET SW then the TEST START SW on the operation panel.

Now it is possible to set Bottom probe 2.

Open the Safety cover and place Bottom probe 2 on the location where the Target marker indicates.

Then close the Safety cover and depress the RESET SW then the TEST START SW on the operation panel.

Now all is finished.

Self-diagnostic test

This chapter describes the Self-diagnostic test available fro the PDC-9500. Choose [Tool] > [Self Diagnosis] and click on [Programmable DC voltage].



[Fig.1] Self Diagnosis

It displays the diagnostic menu for the PDC-9500. (Refer to Fig.2).

Programmable DC Self Test			×	
Voltage :	Mode	Value	Measure	
Current :				
Limit :				
✓ <u>E</u> xecute <u>S</u> Close				
= NOTE = This self-test can not execute under the Emergency Signal activation.Please make sure that no Emergency Signal before pressing [Execute] button.				

[Fig.2] Self Diagnosis

Clicking [Execute] button, it shows the diagnostic results.

(The left window in Fig.3 is at PASS, the right window is at FAIL)

Programmable DC Self Test	Programmable DC Self Test
Voltage : PASS Mode Value Measure	Voltage : Fail Mode Value Measure
Current : PASS	Current : Skip Voltage : 20.00V 8.94V Voltage : 25.00V 7.16V
Limit : PASS	Limit : Skip
✓ Execute OClose	✓ Execute OClose
= NOTE = This self-test can not execute under the Emergency Signal activation.Please make sure that no Emergency Signal before pressing [Execute] button.	= NOTE = This self-test can not execute under the Emergency Signal activation.Please make sure that no Emergency Signal before pressing [Execute] button.

[Fig.3 Diagnostic results (example)

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