PC Link User Manual

Automatic Transformer Test System

3in1	Model	Version	Date
	6265+7703+7605 +7521+7050	1.0	2020/5

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Chapter 1. Overview

1.1 Brief Introduction

This manual is applicable to Microtest ThreeInOne tester connection software Ver1.XX; the contents include introductions to program installation, settings, operations and files etc.
This connection software sup
ports Microtest's current ThreeInOne testers.
ThreeInOne including instrument: 6265, 7703, 7605, 7521 and 7050.
Please confirm with Microtest Corporation to see whether other or customized ThreeInOne testers are supported.

1.2 Check before connecting

The following components are required for connection:

- Microtest ThreeInOne tester includes:
  - 6265 transformer tester
  - 7703 impulse winding tester
  - 7605 Hi-Pot tester
  - 7521 Relay Box
  - 7050 power supply
  - F7721 transformer comprehensive test system fixture
- A computer with the Windows® 7 or Windows® 10 operating system installed
- Microtest ThreeInOne tester connection software installation software

Chapter 2. Installation and Settings

2.1 ThreeInOne connection software system requirements

Minimum system requirements for the computer:

- Windows® 10 / Windows® 7 operating system
- 2.0 GHz Pentium® IV or AMD Athlon® processor
- 1024x768 or above resolution
- 20 GB available hard drive space
- 4GB RAM

2.2 ThreeInOne connection program installation

1. Installation process:

(1) Installing the ThreeInOne connection software

(2) Install the .NET3.5 kit (can be downloaded from the Microsoft official website) https://www.microsoft.com/zh-tw/download/details.aspx?id=25150

2. Installation steps:

(1) Click **D:\Setup.exe** from Windows Explorer to enter the following screen

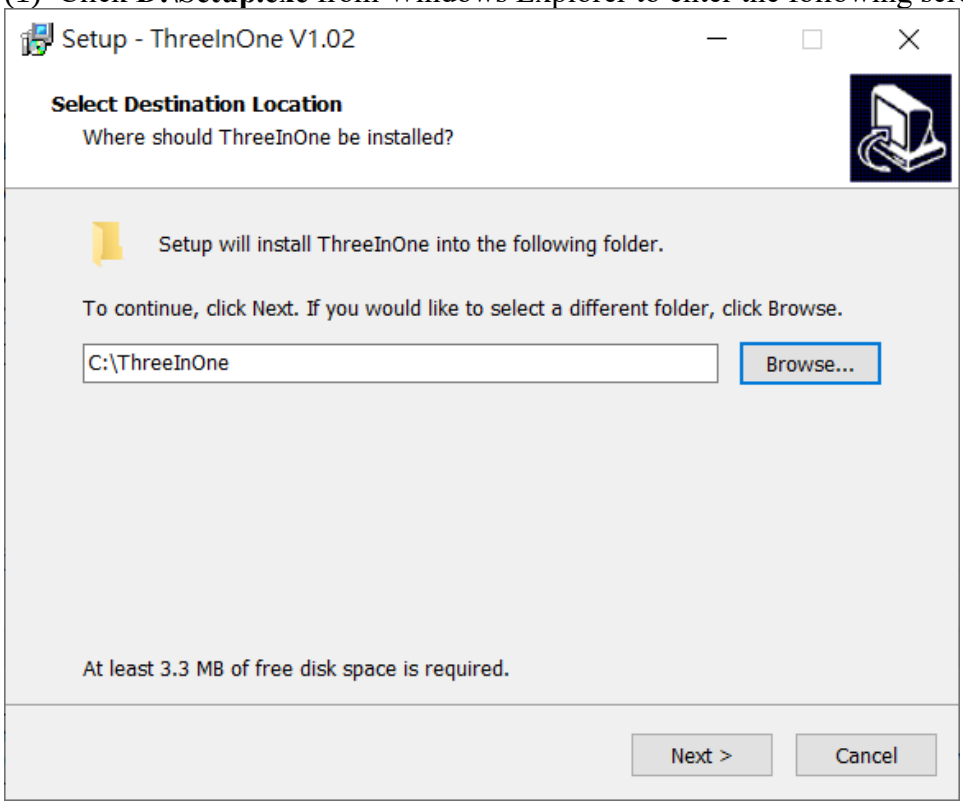


Figure 2-2-1 Software installation contents

(2) Please press the [**NEXT**] button continually
(3) After installation is complete, execute the ThreeInOne connection software; the screen is as shown in the figure below

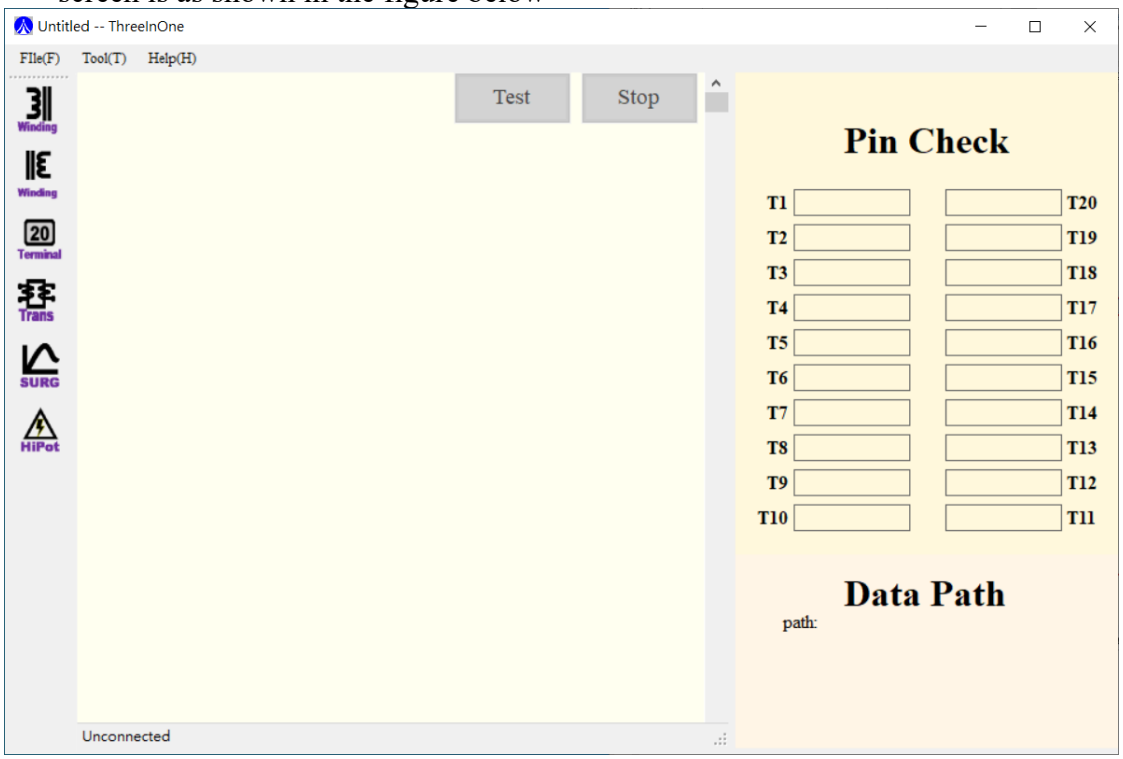
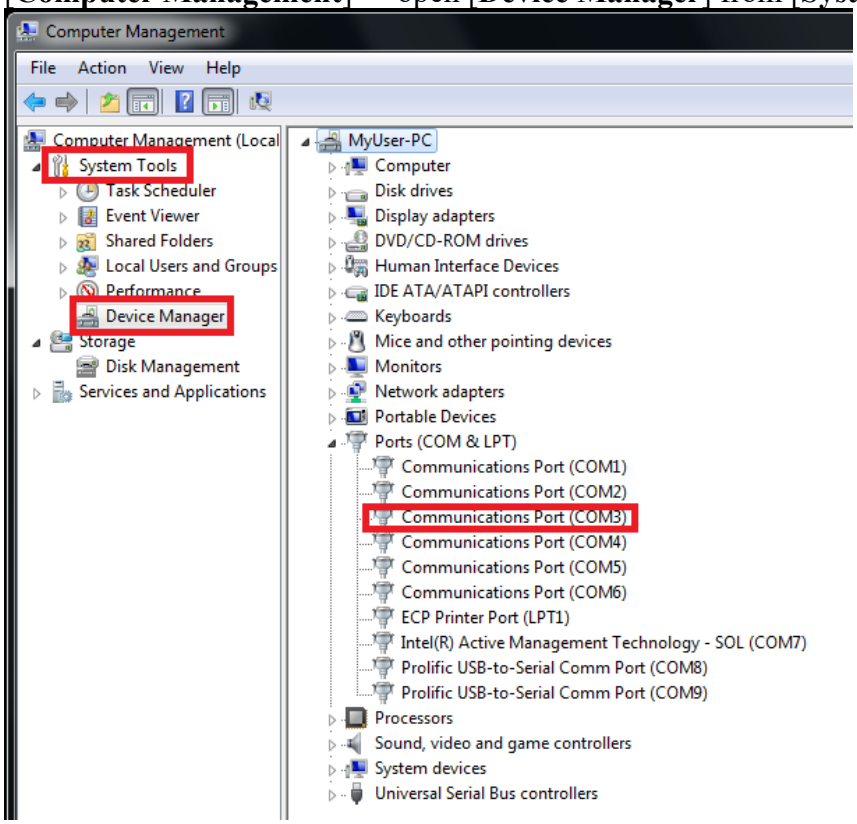


Figure 2-2-2 ThreeInOne connection software screen

(4) When the connection software is opened, if the system displays a prompt, install the .NET3.5 kit and then the connection software can be executed normally.
   - Click [**dotnetfx35.exe**] to install the .NET3.5 kit; following the instructions of the installation program to complete the installation of .NET3.5 (simply keep pressing [**Next**] to complete the installation).

2.3 Verify whether the computer can detect the COM Port successfully

From [**Windows Explorer**] -> right click on [**Computer/Local Disk**] -> open [**Computer Management**] -> open [**Device Manager**] from [**System Tools**].



Confirm that the COM Port to use (COM3 in the example) appears here.

- ✧ If the devices do not appear at the correct location described above, or have yellow or red warnings, it means that the device was not installed correctly; possible countermeasures are as follows
  - Did not appear: Driver not installed; please reinstall the driver
  - Yellow warning: Device cannot be identified or the hardware resource conflicted with other devices; please restart the computer, unplug and reinsert the device. If the yellow warning still appears, please try to change the configuration of hardware resources (ask MIS for support)
  - Red warning: The device might be damaged; please verify on another computer and ask MIS for help
- ✧ Eliminate the problem by following the descriptions above, and confirm that all devices to use can operate normally
- ✧ Connect the other end of the RS-232 cable to the instrument
- ✧ Start the connection program to confirm whether connection can be established normally

If connection cannot be established, please change the cable or try to connect other devices to determine whether it is a problem with the connecting device or the instrument; keep testing over again until connection can be established normally.

2.4 Instrument Setting and Connection

2.4.1 Instrument Setting

Press [**Menu**] -> [**SYSTEM**] on the 6265 tester.

1. Confirm that the [**RS-232 Baud Rate**] is set as the same speed as the connection software
2. Set the [**Communication Interface**] as RS-232



Figure 2-4-1 6265 instrument display screen

※[Explanation] [1]RS-232 Baud Rate: RS-232 transmission rate. [2]Communication Interface: Data upload method.

Press [**sys**] -> [**SYSTEM**] on the 7703 tester and make sure that the [**RS232 BUAD RATE**] is the same as the speed set in the connection software.

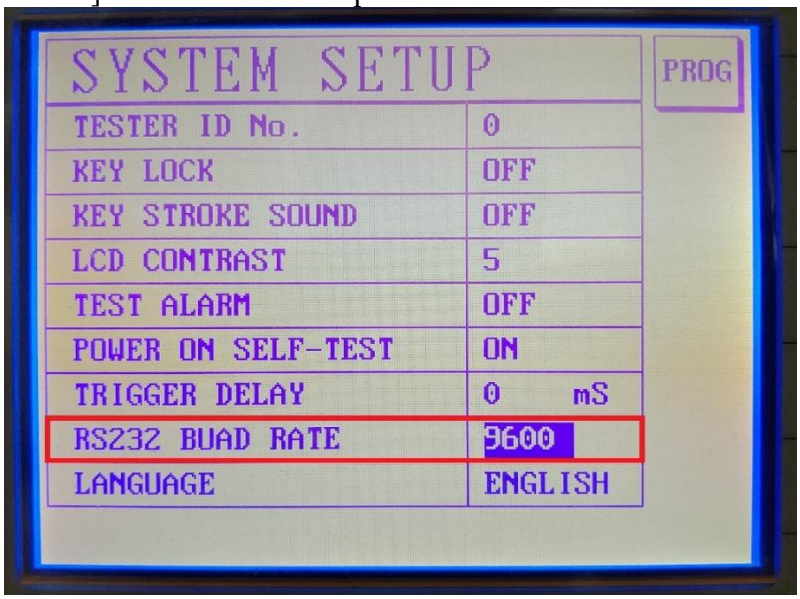


Figure 2-4-1 7703 instrument display screen

※[Explanation] [1]RS-232 Baud Rate: RS-232 transmission rate.

Press [**SYS**] on the 7631 Precision Hi-Pot tester.

1. Confirm that the [**RS-232 Baud Rate**] is set as the same speed as the connection software
2. Set [**Upload Data**] as RS-232 or BOTH

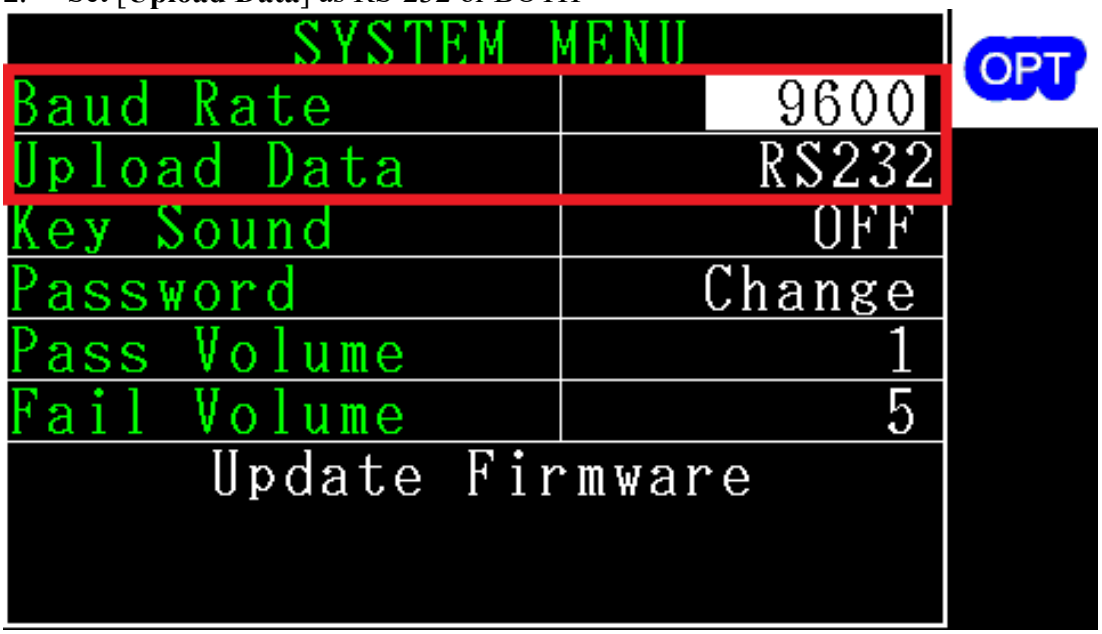


Figure 2-4-1 7605 instrument display screen

※[Explanation] [1]RS-232 Baud Rate: RS-232 transmission speed. [2]Upload data: Data upload method.

Press [**sys**] -> [**Serial Port**] on the GW7050 tester, confirm that [**Active**] is ON and the [**Baudrate**] is set as the same speed as set on the connection software.

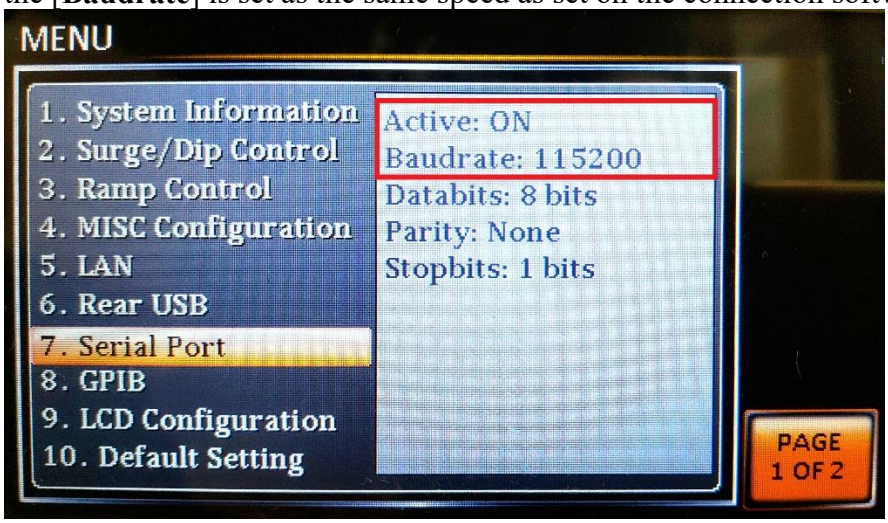


Figure 2-4-1 7050 instrument display screen

※[Explanation] Baudrate: RS-232 transmission rate.

2.4.2 Instrument Connection

Please complete the fixture connection according to the schematic diagram below.

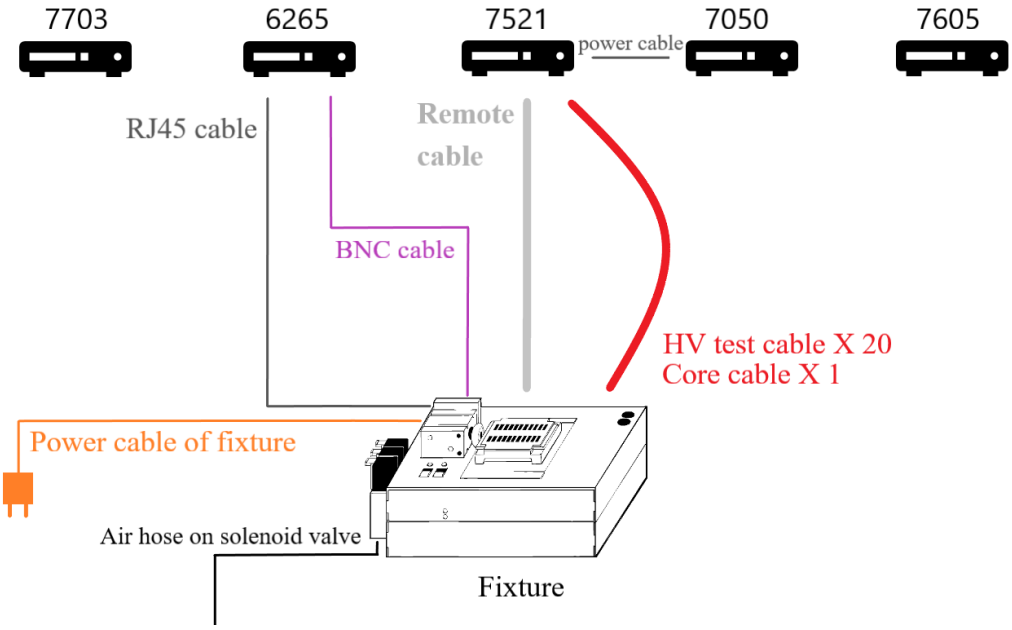


Figure 2-4-2 instrument connection schematic diagram

2.5 Software restrictions

- The instrument version must be the following; if it does not match, there might be errors when using this connection software:
  - Applicable to all versions of 6265 transformer testers
  - 7703 impulse winding tester V2.38
  - 7050 power supply V2.09
  - 7605 Hi-Pot tester V1.03
  - Applicable to all versions of 7521 RelayBox
- Transformer test items must be used with: Can only be used with 7521 and 6265
- Impulse winding test items must be used with: Can only be used with 7521 and 7703
- Hi-Pot test items must be used with: Can only be used with 7521, 7050 and 7605

Chapter 3. Using the Connection Software

3.1 Starting the main program

Use any one of the following methods to start the connection software

▲ Click [**Start**] -> [**Programs**] -> [**ThreeInOne.exe**].

▲ Click [**ThreeInOne.exe**] in the installation folder of ThreeInOne (the default path is C:\ThreeInOne)

3.2 Entering the main screen

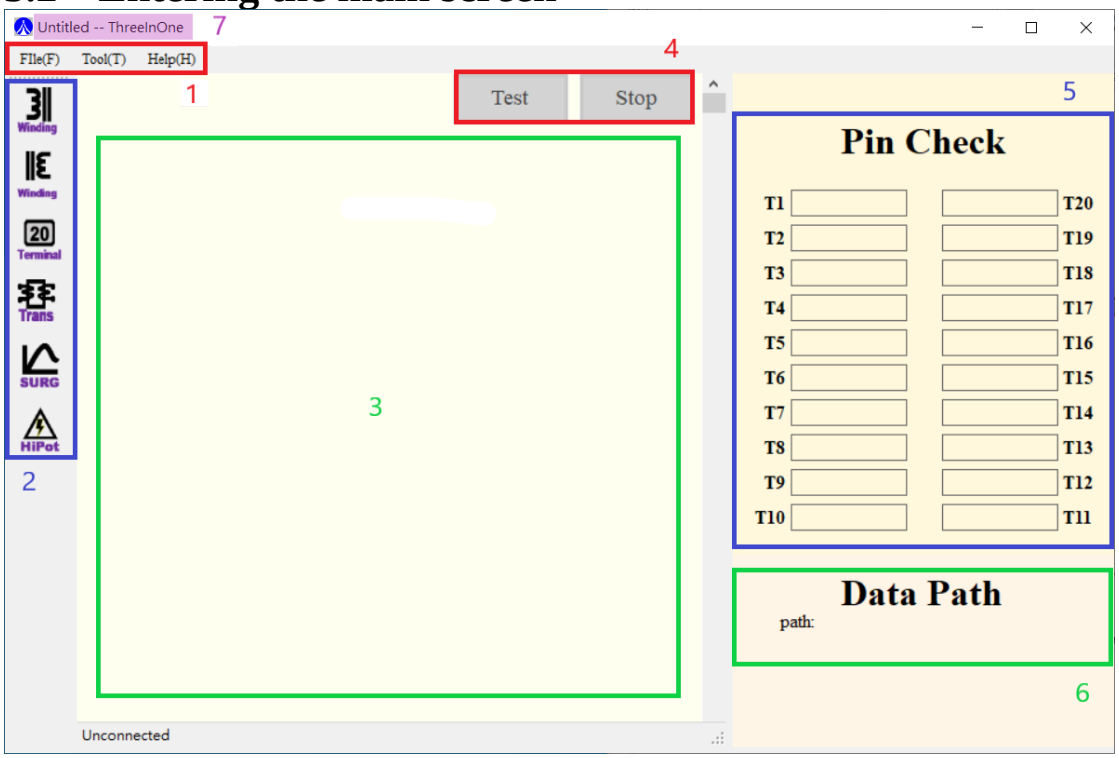


Figure 3-2-1 ThreeInOne connection software screen

The main screen is divided into 1-7; their descriptions are as follows

(1) Main menu area
(2) Object button
(3) Edit area
(4) Test/stop button
(5) Pin confirmation area
(6) Data Path display area
(7) Displays the currently used project file

Details will be explained later

3.3 Main screen area descriptions

3.3.1 Main menu area

- [**File**]:
  - [**New**]: Create new project
  - [**Open**]: Open old project
  - [**Save**]: Save project
  - [**Save As**]: Save as new project
  - [**Date Path Setup**]: Sets the data file path
- [**Tool**]:
  - [**Environment Setup**]: [**Communication**] in the environment setting is used to perform communication configurations
  - [**Mode**]: Display/hide specific areas
    a. [**Edit Mode**]: Edit area
    b. [**Transformer Result**]: Transformer test result area
    c. [**Hi-Pot Result**]: Hi-Pot test result area
    d. [**Impules/Surge Result**]: Impulse winding test result area
    e. [**Pin Check**]: Pin confirmation area
  - [**TF6265 Correction**]: Opens the 6265 correction window
  - [**Test Status**]: Opens the test status window (test count and total PASS/FAIL)
- [**Help**]: [**About**] Information on version of the connection software

3.3.2 Object buttons



← Creates a winding

← Creates a winding

← Creates a terminal (represents the pins of the fixture)

← Creates a transformer test item

← Creates an impulse winding test item

← Creates a Hi-Pot test item

3.3.2 Edit area

Items created in [**(2) Object button**] will all be displayed in the [**(3) Edit area**]; these objects are used to draw group images of the DUT and edit the contents of the test items. (Draw group images, please refer to **3.4.2 Draw group images**)

3.4 Entering the program for the first time

3.4.1 Connection setting

Open environment setting from [**(1) Main menu area**] -> [**Tool**] -> [**Environment**]. Connection setting can be performed in the [**Communication**] tab. After selecting the correct COM Port and Baud Rate, click [**Check**] to check the connection and save the connection information.

If not all test items need to be tested, you can only connect the instruments needed:

- Transformer test items requires connecting 7521 and 6265
- Impulse winding test item requires connecting 7521 and 7703
- Hi-Pot test items require connecting 7521, 7605 and (7050)
  ※[Explanation] If [**Open V**], [**MAGI**] and [**WATT**] are not included in the Hi-Pot test item, 7050 does not need to be connected

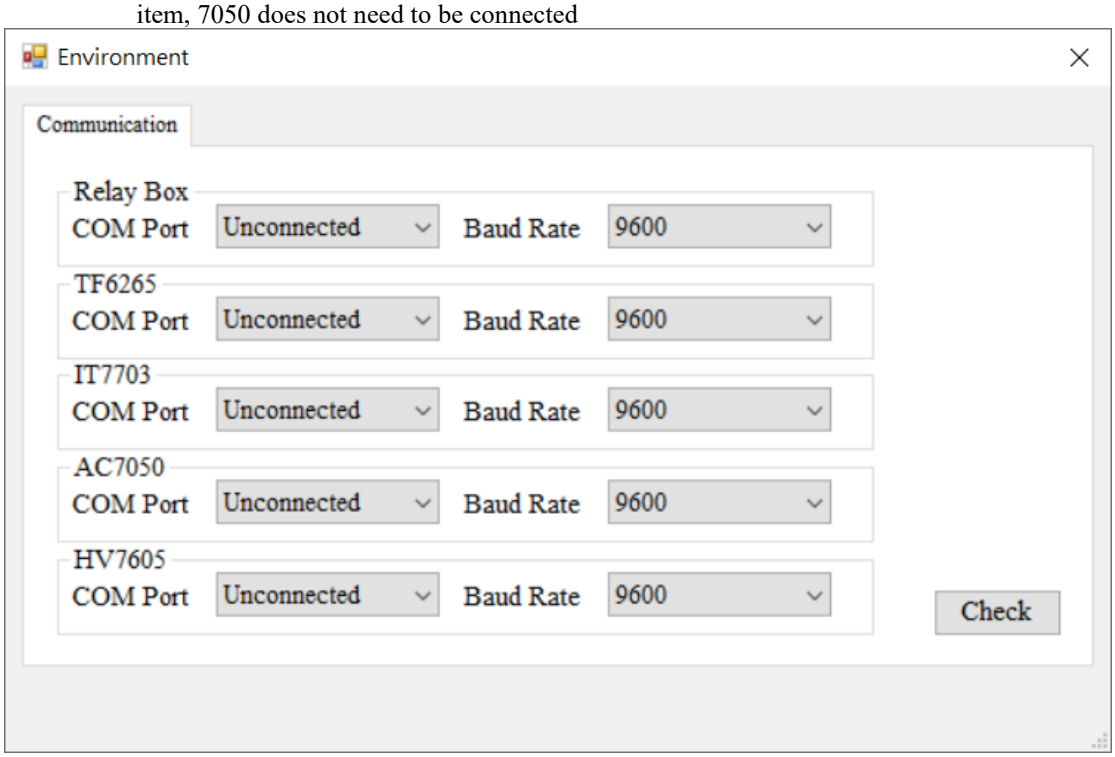


Figure 3-4-1 ThreeInOne connection setting screen

3.4.2 Draw group images

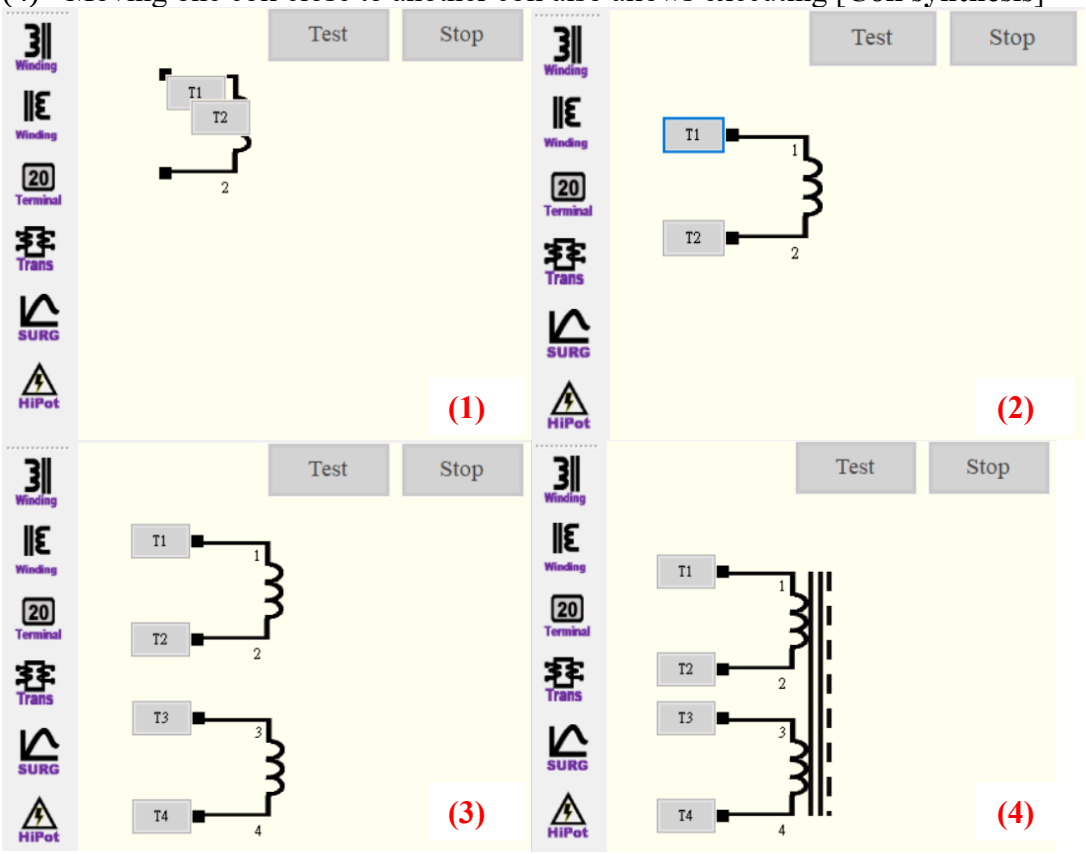
- Basic drawing steps:

(1) Click [**Winding**] or [**Terminal**] in [**(2) Object button**] to create the coil and fixture pin needed

(2) Pressing the mouse on the coil and fixture pin allows them to be dragged; after moving the coil to a suitable position, move the fixture pin to the two ends of the coil and release the mouse. The fixture pins will assemble with the coil automatically

(3) If multiple sets are needed, simply repeat the operations in steps 1 and 2

(4) Moving one coil close to another coil also allows executing [**Coil synthesis**]

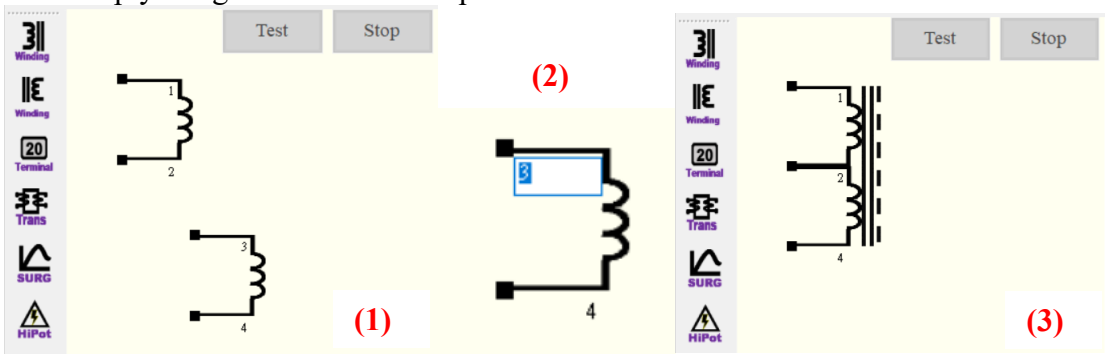


- Multi-pin coil drawing steps:

(1) Execute [**Basic 1**] to create the coil, and make sure **not** to perform [**Coil synthesis**]

(2) Double-clicking on the names on the two ends of the coil allows [**Renaming**]; press [**Enter**] after input to confirm the renaming

(3) To [**Rename**] one of the synthesized coils into the same name as another coil, simply merge them into multi-pin coils



- Add/delete Core: Press the [**Right button**] of the mouse on any coil to open the function menu; click [**Add Core**] to add a new core, and click [**Delete Core**] to delete a core

- Delete coil: Single coils can be deleted directly by clicking the [**Right button**] of the mouse to open the function menu and delete it; combined coils require first clicking the [**Ungroup**] button from the function menu to ungroup them first before they can be deleted

- Delete fixture pin: Press the [**Right button**] of the mouse on any fixture pin to open the function menu, and then click [**Delete**] to delete it

3.5 Edit test item

After drawing group images and confirming there are no problems with the pins, test items that you want to test can be created with object buttons.

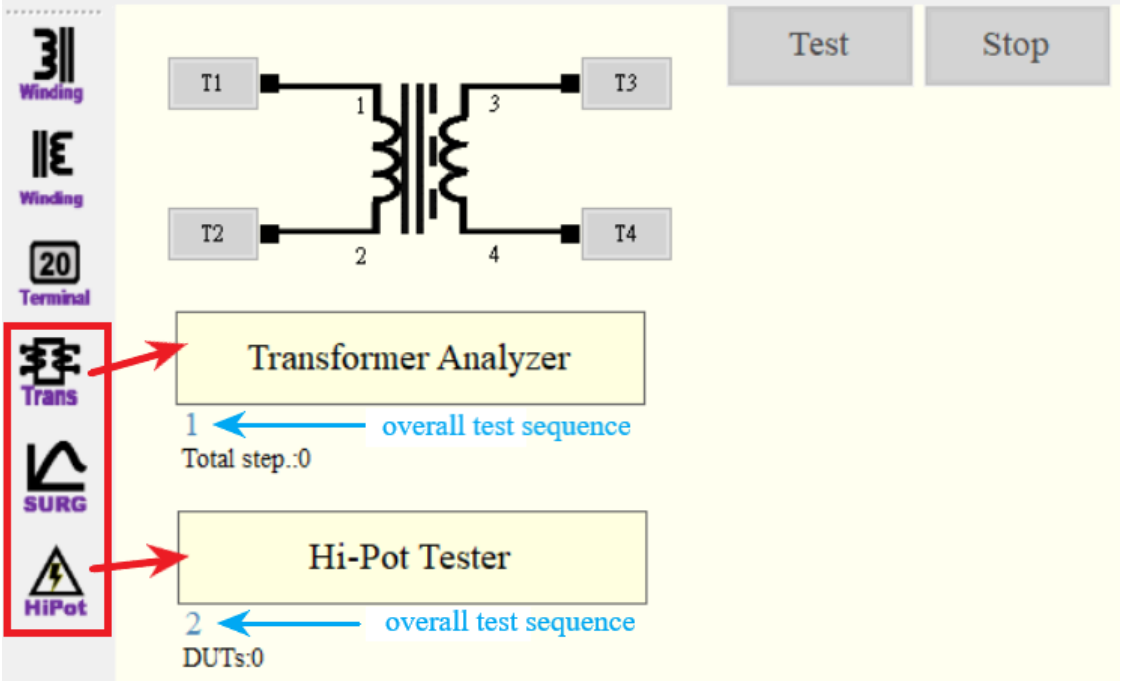


Figure 3-5 ThreeInOne create test item (it will enter the edit screen directly when created; this is after closing the edit screen)

3.5.1 Edit transformer test items (Transformer Analyzer)

[**Test Seq.**]: Sets the overall test sequence; test will not be performed if set as blank.
[**Save**]: Save



【Seq. tab】

*[**Selection**]: Items that can be tested*	*[**Test Seq.**]: Currently opened test items*

Moving the contents of [**Selection**] to the right to [**Test Seq.**] means open that test item; otherwise moving the [**Test Seq.**] in to the left to [**Selection**] means closing that test item.
The arrow to the right of [**Test Seq.**] can adjust the test sequence of the test items.

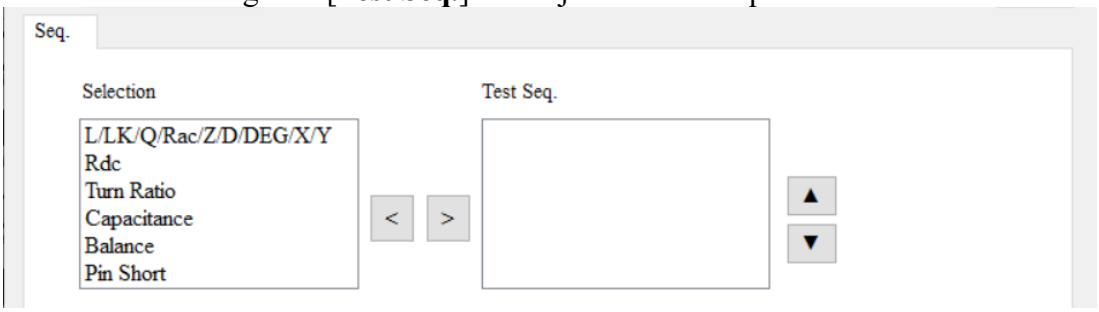


Figure 3-5-1 ThreeInOne 【**Seq. tab**】editing screen

【L/LK/Q/Rac/Z/D/DEG/X/Y tab】

*[**Setting**]: Edited test item settings* *[**Edit**]: Edit test item*

After editing is completed in [**Edit**], pressing [<] at the center can set the contents into [**Setting**].
Use [<][>] under [**Setting**] to switch between the items set; [**Copy**] can copy the contents of the current test item and insert it into the next position, and [**Remove**] deletes the current test item setting.

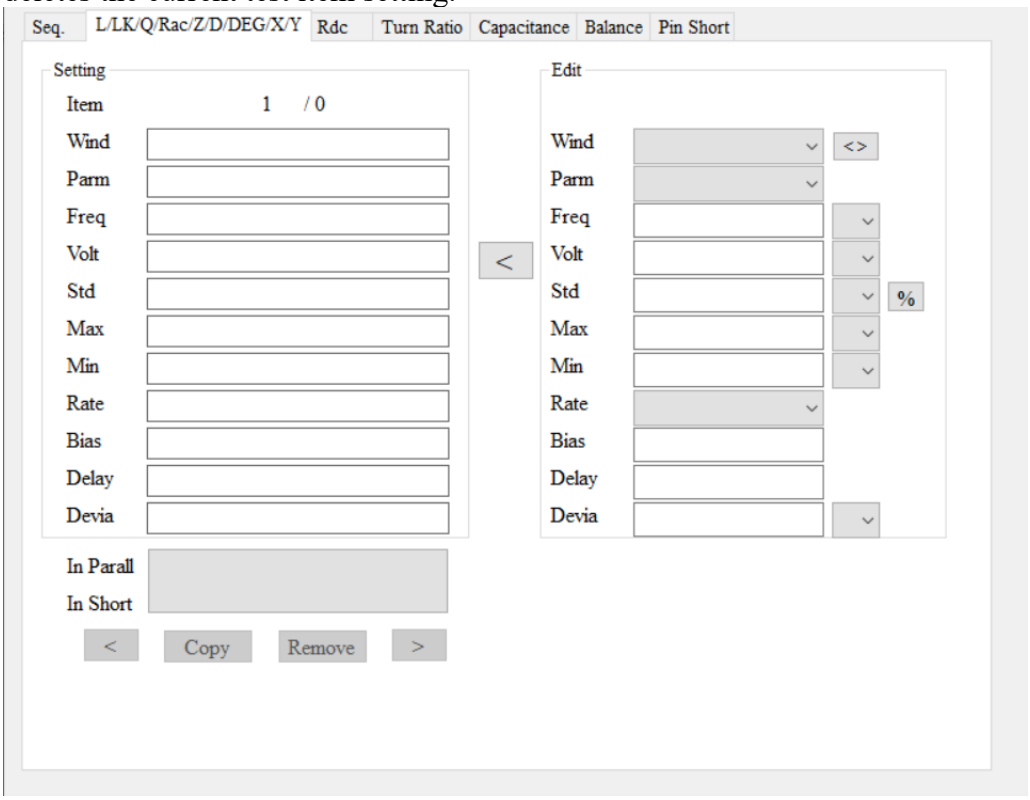


Figure 3-5-1 ThreeInOne 【**L/LK/Q/Rac/Z/D/DEG/X/Y tab**】editing screen

Edit field descriptions:

- Wind: Transformer coil winding setting field
- < >: Exchanges pins for the current winding
- Parm: Test item fields; test parameters include Ls, Lp, Lk, Q, Rs, Z, D, θ, Rp, X and Y etc.
- Freq: Sets the test frequency field
- Volt: Sets the test voltage field
- Std: Sets the standard value; enter the value with the number buttons directly
- %: Sets the percentage of standard value for upper limit and lower limit
- Max and Min: Sets the upper limit and lower limit fields; values can be entered directly
- Rate: Sets the measurement speed field; four measuring speeds can be selected, MAX/FAST/MED/SLOW
- Bias: DC Bias Current function; allowed setting range is from 0–100mA
- Delay: Delay time setting field; allowed setting range is from 0–9999mS
- Devia: Sets the compensation value
- In Parall/In Short: Performs parallel connection and short circuit related settings for the current winding

【Rdc tab】

*[**Setting**]: Edited test item settings* *[**Edit**]: Edit test item*

Same as the editing method of **【L/LK/Q/Rac/Z/D/DEG/X/Y tab】**.

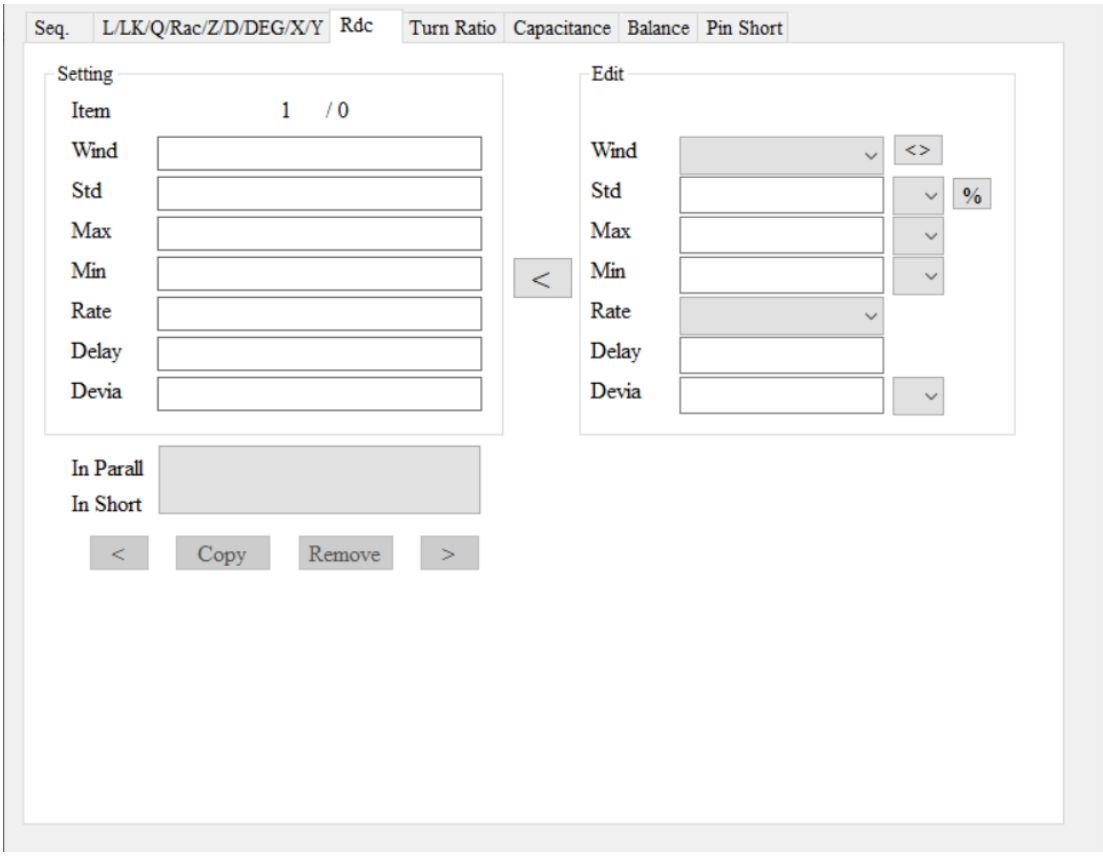


Figure 3-5-1 ThreeInOne **【Rdc tab】**editing screen

Edit field descriptions:

- Wind: Transformer coil winding setting field
- < >: Exchanges pins for the current winding
- Std: Sets the standard value; enter the value with the number buttons directly
- %: Sets the percentage of standard value for upper limit and lower limit
- Max and Min: Sets the upper limit and lower limit fields; values can be entered directly
- Rate: Measurement speed setting field; four measuring speeds can be selected, MAX/FAST/MED/SLOW
- Delay: Delay time setting field; allowed setting range is from 0–9999mS
- Devia: Sets the compensation value
- In Parall/In Short: Performs parallel connection and short circuit related settings for the current winding

【Turn Ratio tab】

*[**Setting**]: Edited test item settings* *[**Edit**]: Edit test item*

Same as the editing method of **【L/LK/Q/Rac/Z/D/DEG/X/Y tab】**.

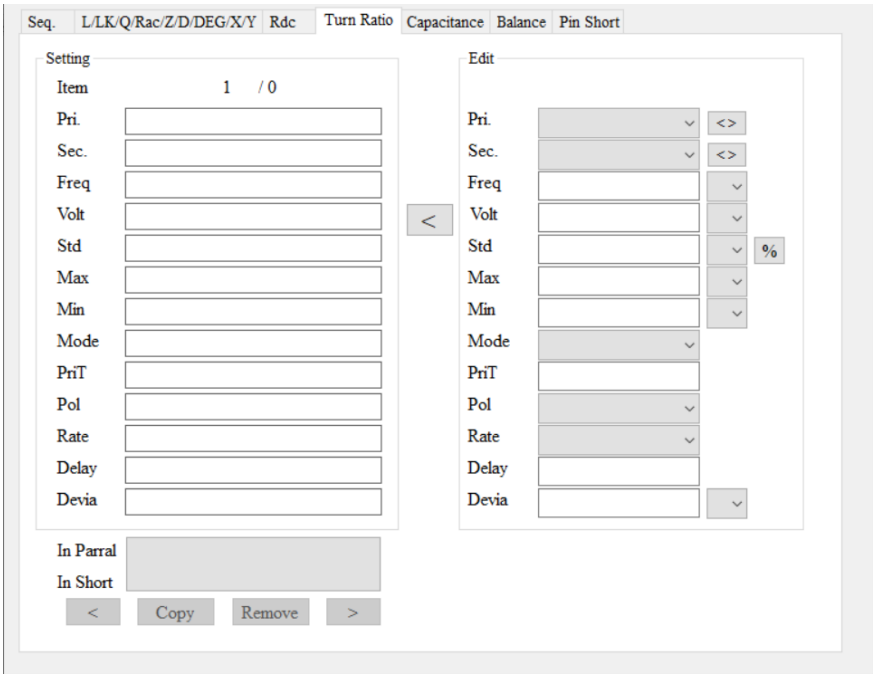


Figure 3-5-1 ThreeInOne **【Turn Ratio】**editing screen

Edit field descriptions:

- Pri.: Transformer cable primary winding setting field
- Sec.: Transformer cable secondary winding setting field
- < >: Exchanges pins for the current winding
- Freq: Sets the test frequency field
- Volt: Sets the test voltage field
- Std: Sets the standard value; enter the value with the number buttons directly
- %: Sets the percentage of standard value for upper limit and lower limit
- Max and Min: Sets the upper limit and lower limit fields; values can be entered directly
- Mode: Measurement mode setting field; two measurement modes are available for selection, TURN and VOLT
  - TURN: Test value is displayed by lap ratio
  - VOLT: Test value is displayed by voltage value
- PriT: Primary winding lap number setting field
- Pol: Polarity setting field; “+”, “-” or “OFF” can be selected
- Rate: Measurement speed setting field; four measuring speeds can be selected, MAX/FAST/MED/SLOW
- Delay: Delay time setting field; allowed setting range is from 0–9999mS
- Devia: Sets the compensation value
- In Parall/In Short: Performs parallel connection and short circuit related settings for the Sec. winding

【Capacitance tab】

*[**Setting**]: Edited test item settings* *[**Edit**]: Edit test item*

Same as the editing method of 【L/LK/Q/Rac/Z/D/DEG/X/Y tab】.

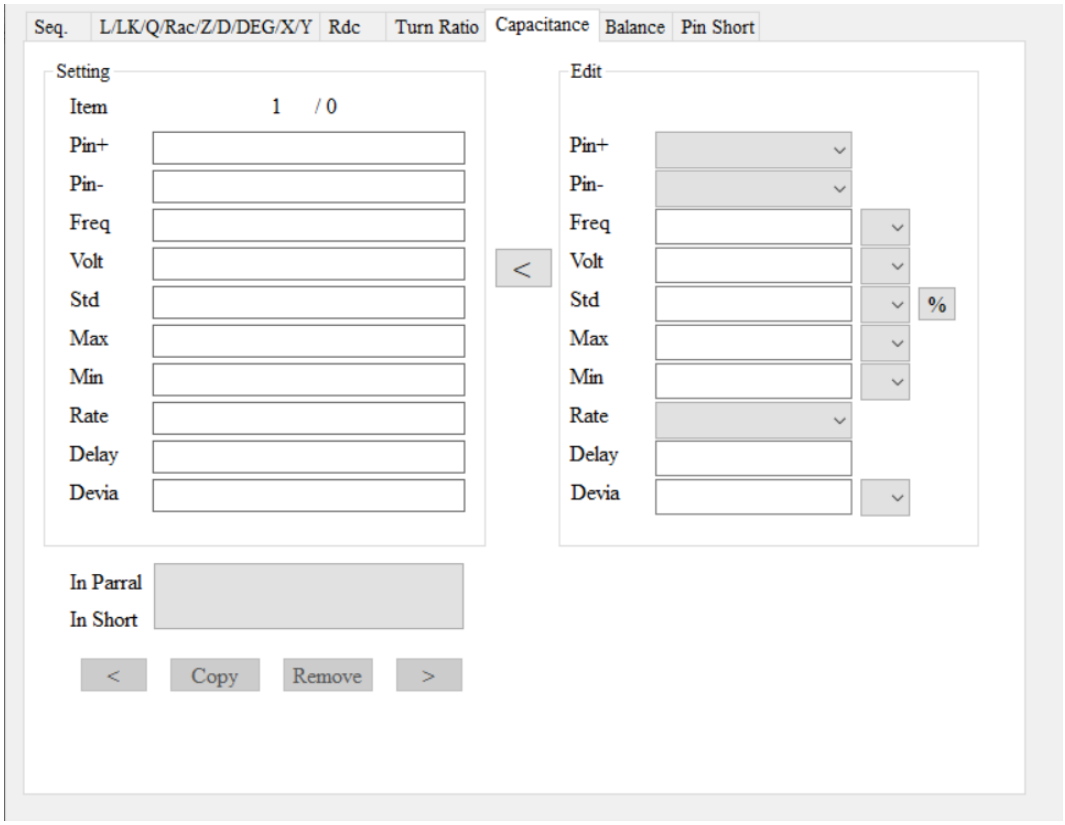


Figure 3-5-1 ThreeInOne 【**Capacitance**】editing screen

Edit field descriptions:

- Pin+ and Pin-: Sets the pin positions of the transformer measurement capacitance
- Freq: Sets the test frequency field
- Volt: Sets the test voltage field
- Std: Sets the standard value; enter the value with the number buttons directly
- %: Sets the percentage of standard value for upper limit and lower limit
- Max and Min: Sets the upper limit and lower limit fields; values can be entered directly
- Rate: Measurement speed setting field; four measuring speeds can be selected, MAX/FAST/MED/SLOW
- Delay: Delay time setting field; allowed setting range is from 0–9999mS
- Devia: Sets the compensation value
- In Parall/In Short: Performs parallel connection and short circuit related settings for the current pin

【Balance tab】

*[**Setting**]: Edited test item settings* *[**Edit**]: Edit test item*

Same as the editing method of **【L/LK/Q/Rac/Z/D/DEG/X/Y tab】**.



Figure 3-5-1 ThreeInOne **【Balance】**editing screen

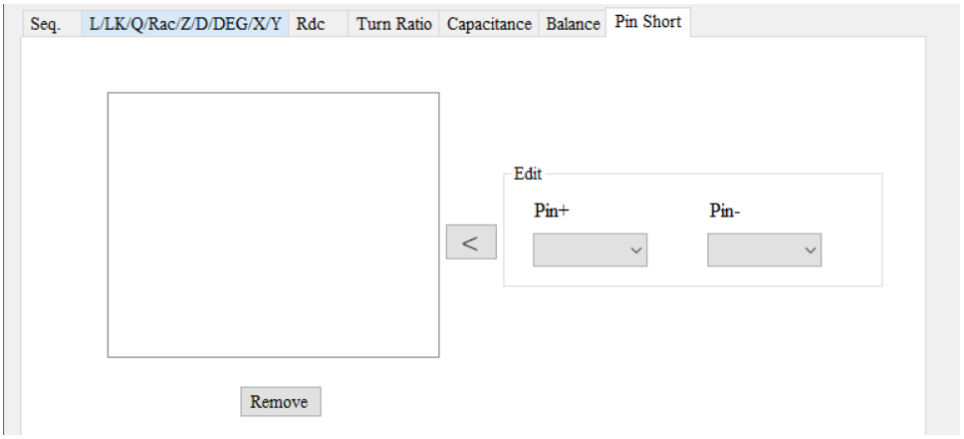
Edit field descriptions:

- RefA and RefB: Sets the windings to be compared for coil balance
- < >: Exchanges pins for the current winding
- Parm: Test item field; the test parameters include Ls, Lp, Lk, Rs, Z and DCR etc.
- Freq: Sets the test frequency field
- Volt: Sets the test voltage field
- Max and Min: Sets the upper limit and lower limit fields; values can be entered directly

【Pin Short tab】

*[**Edit**]: Edits pin combinations*

After selecting in [**Edit**], simply press [<] at the center; [**Remove**] deletes the selected combination.



- Pin+, Pin-: Sets the transformer pin combinations to perform short circuit test

3.5.2 Editing impulse winding test items (Impulse/Surge Tester)

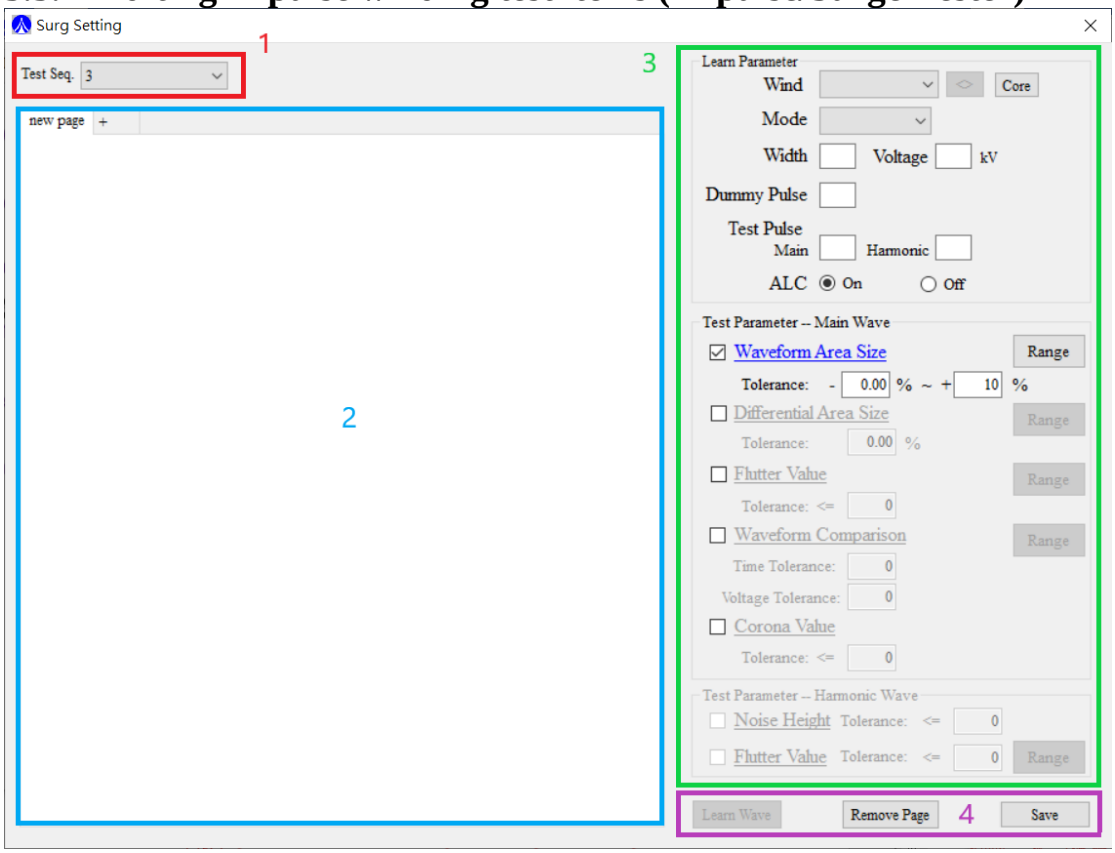


Figure 3-5-2 ThreeInOne impulse winding test item editing screen

The screen is divided into 1-4; their descriptions are as follows

(1) [**Test Seq.**]: Sets the overall test sequence; test will not be performed if set as blank.

(2) [**Waveform display**]

(3) [**Test editing**]:

- [**Learn Parameter**]: Learn the waveform setting items
- [**Test Parameter—Main Wave**]: Test item setting (main wave)
- [**Test Parameter—Harmonic Wave**]: Test item setting (harmonic wave)

(4) [**Function button**]:

- [**Learn Wave**]: Learn waveform (will not be enabled if 7703 or 7521 was not connected)
- [**Remove Page**]: Deletes this tab
- [**Save**]: Save

【Waveform display】

The waveform currently being learned will be displayed here; [**Learn wave**] and test setting must be completed in order to add a new tab (i.e. add a new test item).
After learning has completed, the test range setting item (default value is 0–255) will appear below; if you want to change it, [**Range**] at the end of the test item you want to change can be pressed, and that test item range can be set.

【Learn Parameter】

- Wind: Transformer coil winding setting field
- Mode: Three test modes NORMAL/LOW Q/LOW L can be set according to the features of the DUT
- Width: Sets the waveform width
- Voltage: Sets the waveform voltage
- Dummy Pulse: Before test is performed, high voltage impulse will be applied to the DUT according to the test voltage and pulse number set, and then the test will be performed; this action allows the DUT to be tested under stable conditions
- Test Pulse: The pulse value set is the actual test count, and data comparison will be performed after each test (data will not be compared for pre-pulse) to determine whether the DUT passed or failed
- ALC setting: When high voltage pulse is generated, the actual high voltage pulse applied to the DUT will become smaller due to the DUT having excessive load; this function can compensate the actual test voltage to the voltage value set; voltage compensation correction will also be performed during wave learning, and the voltage value set can be achieved while the test is being performed

[Test Parameter—Main Wave]

- Waveform Area Size: Within any range set, it checks the difference of the total areas between the test waveform and standard waveform to determine whether the DUT has passed. This item can test the loss of coil energy; for example, when the coil under test has a short circuit between layers, the short circuit part will make the energy loss greater
- Differential Area Size: Within any range set, it checks the area deviation between the test waveform and standard waveform to determine whether the DUT has passed. This item can test the difference in inductance of the coil
- Flutter Value: This item ignores the difference between waveforms; within any range set, it tests the magnitude of the high frequency part of the corona discharge, and the determined standard is determined according to the integer value entered
- Waveform Comparison: Within any range set, the voltage (vertical) difference and time (horizontal) difference of the setting and standard wave are compared
- Corona Value: Sets the corona volume generated by the waveform during the testing process

[Test Parameter—Harmonic Wave]

- Noise Height: Uses the noise height of the harmonic wave to perform comparison during the testing process
- Flutter Value: This item ignores the difference between waveforms; within any range set, it tests the magnitude of the high frequency part of the corona discharge, and the determined standard is determined according to the integer value entered

3.5.3 Edit Hi-Pot test item (Hi-Pot Tester)

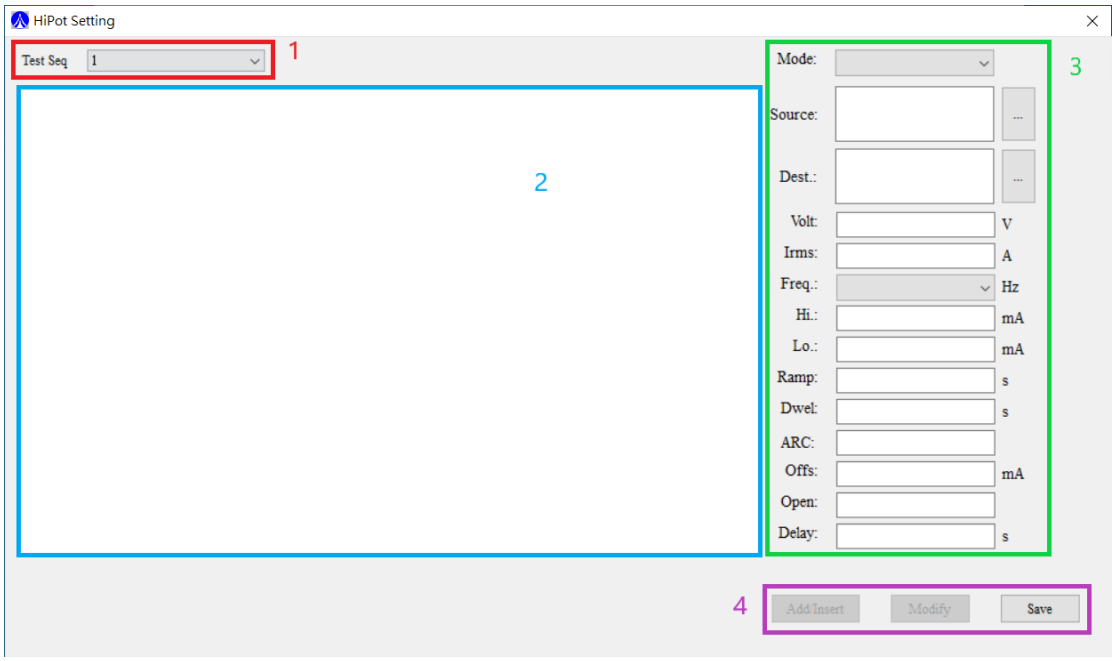


Figure 3-5-3 ThreeInOne Hi-Pot test item editing screen

The screen is divided into 1-4; their descriptions are as follows

(1) [**Test Seq.**]: Sets the overall test sequence; test will not be performed if set as blank.

(2) [**Test item list**]: Finished editing test items will be displayed here; any item can be clicked to switch

(3) [**Test editing**]

(4) [**Function button**]:

- [**Add/Insert**]: If no test item was selected, it will be added to the end; if test item was selected, it will be inserted
- [**Modify**]: Performs modification to the selected test item
- [**Save**]: Save

Edit field descriptions:

- Mode: There are six test modes ACW, DCW, IR, Open V, MAGI and WATT
- Source: Input and test points of 7050
- Dest.: Test points of 7605
- Volt: Voltage measurement
- Irms: Rated current
- Freq.: Frequency
- Hi.: Maximum value
- Lo.: Minimum value
- Ramp: Voltage rise time
- Dwel: Test time
- ARC: Arc sensitivity
- Offs: Reset deduction
- Open: Open circuit detection sensitivity
- Delay: Delay determination time

3.6 Test

3.6.1 Start test

Testing can be started once editing has been completed; pressing the [**Test**] button will start performing the test automatically according to the overall sequence specified.

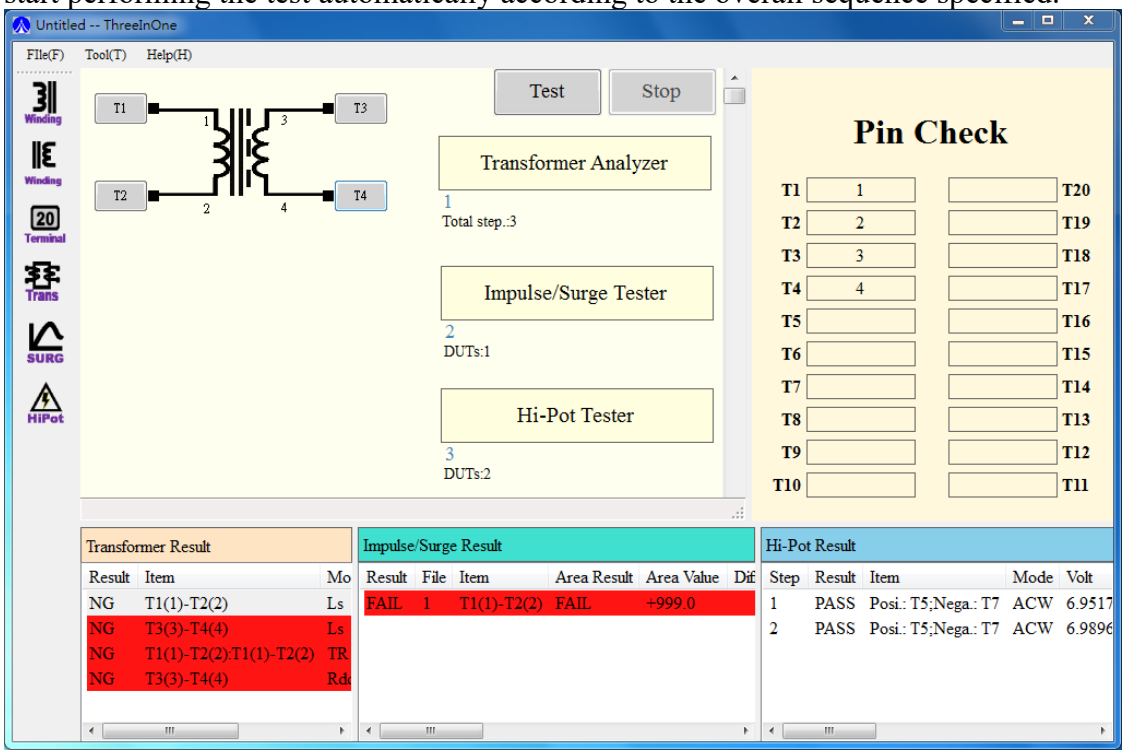


Figure 3-6 Screen after ThreeInOne testing

※[Explanation] If the [**Test**] button did not pop back up, please check whether the instrument is connected

3.6.2 Stop test

[**Stop**] can be pressed at any time during the test to stop testing.

3.6.3 Fixture trigger

There are [**START**] and [**STOP**] buttons on the fixture which are connected to the [**Test**] and [**Stop**] buttons on the connection software respectively; fixture buttons can be used directly to perform tests.

Whether the PC or fixture was used, the test result (PASS/FAIL) will all be synchronized to the indicator on the fixture.