



Transformer Analyzer

5435/5436/5437

1.0

3st NOV. 2006

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1. SAFETY

1.1 General

This equipment has been designed to meet the requirements of EN61010-1 safety requirements for electrical equipment for measurement control & laboratory use ,and has left the factory in a safe condition .

This product is not intended for use in atmospheres that are explosive corrosive or adversely polluted (e.g. containing conductive or excessive dust). This equipment is only used in the manner specified .If it is not used in such a manner the protection provided by the equipment may be leak electricity

If the equipment is damaged, do not use it and have it marked.

Microtest Electronics and the associated sales organizations accept no responsibility for personal or material damage , or for any consequential damage that results from irresponsible or unspecified operation or misuse .

1.2 AC power supply

Power cable and connector requirements vary between countries, always use a cable that conforms to local regulations, terminated in an IEC 320connector at the instrument end .If the plug is fused, a 3-amp fuse should be fitted .If the power cable electrical connection to AC power plug is through screw terminals, then adjusted the rear panel 115v\230v on or off button ensure that is set to voltage of the local AC power supply.

WARNING!

Any interruption of the protective ground conductor inside or outside the equipment or disconnection of the protective ground terminal is likely to make the equipment dangerous intentional interruption is prohibited.

1.3 Adjustment, Maintenance and Repair

WARNING!

The equipment must be disconnected from all voltage sources before it is opened for and adjustment, maintenance or repair.

When the equipment is connected to the local AC power supply internal terminals may be live and the opening of the covers or removal of parts (except those to which access can be gained by hand) is likely to expose live parts. Capacitors

inside the equipment many still be charged even if the equipment has been disconnected from all voltage sources.

Any adjustment, maintenance or repair of the opened equipment under voltage must be carried out by skilled person who is aware of the hazards involved service personnel should be trained against unexpected hazards.

1.4 Static electricity

The unit supplied uses static-sensitive devices.

- 1) The work surface should be a conductive grounded mat
- 2) Soldering irons must be grounded and tools must be in contact with a conductive surface to ground when not in use.
- 3) Any person handling static-sensitive parts must wear a wrist strap which provides a leaky path to ground impedance not greater than 1M.
- 4) Components or circuit board assemblies must be stored in or on conductive foam or mat while work is in progress.

2. INTRODUCTION

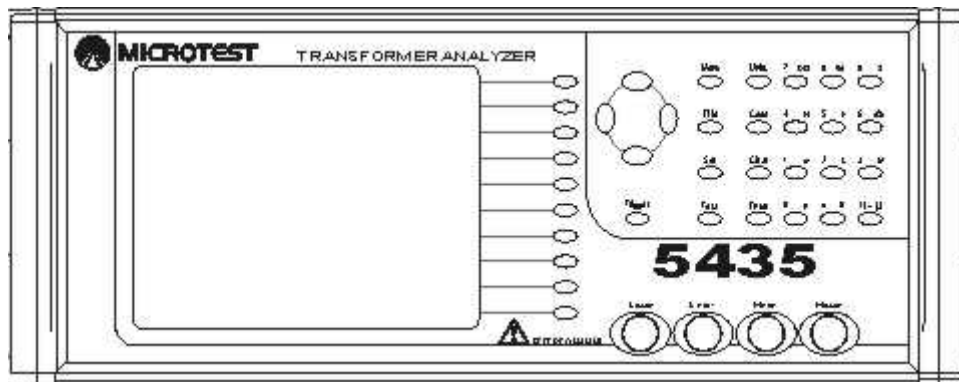


Figure 2-1 5435 Transformer Analyzer

543x series provides 4-terminal comprehensive analyze of transformer, including DC measurement and AC measurement over frequency range 20 Hz to 200kHz/500kHz/1MHz. Impedance measurement are perform at drive level between 10mV to 2V rms, while measuring turns ratio, can be up to 10Vrms

Display and control

- Transformer Fixture Setting
- Winding Mapping and Learning
- Fixture Pin Short Setting
- Fixture Open and Short Correction
- Balance
- Font Selection for Measurement Results
- Automatic measurement function
- Timely Statistics function
- Link to the computer

3. INSTALLATION

3.1 AC line connections

The unit is provided with a power cable capable of carrying the input current for both 115V and 230V operation. This cable should be connected via a suitable connector to the local mains power supply. Terminated in an IEC 320 connector at the instrument end, the use must ensure the connective is fine. If the plug is fused, a 3-amp fuse should be fitted. If the power cable electrical connection to AC power plug is through screw terminals, then adjusted the rear panel 115v\230v on or off button ensure that is set to voltage of the local AC power supply.

Accumulator and DC power unsuitable this unit

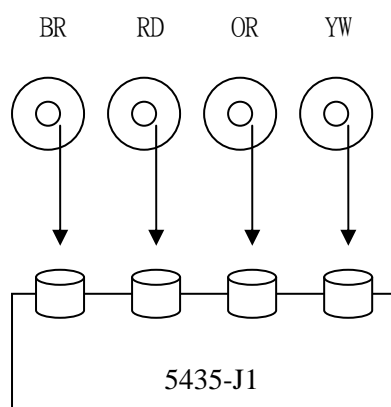
The switch of power and select on rear panel

3.2 Accessories

543x can be used with any Microtest leads or fixtures, only use qualified accessories to ensure accuracy of measurement.

Auto Scanning BOX model F5240, Part No. 5435-J1

3.3 Measurement connection



4. OPERATION

WARNING!

This equipment is intended for use by suitably trained and competent persons.

This product can cause hazard if it is not used in accordance with these instructions (connective ground or touch the part component unmoral)Read them carefully and follow them in all respects .Double check connections to the unit and accessories before use.

Do not use this equipment if it damaged

4.1 THE REAR PANEL

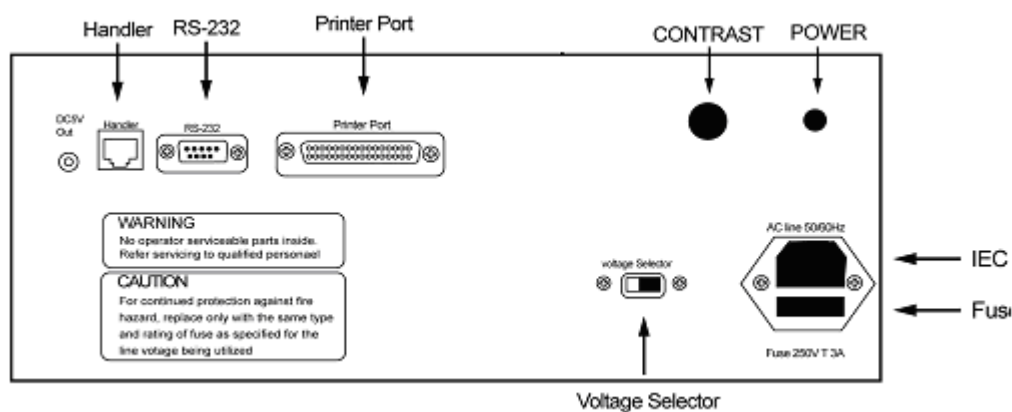


Figure 4-1 The 5435 Series Rear Panel

4.1.1 Voltage Selector

The instrument can be operated from an AC power source of either 115V or 230V. Before applying AC power to the IEC socket, ensure that the voltage selector is set to the voltage of the local AC power supply.

4.1.2 IEC Socket and FUSE Holder

Please read section 1.2 - AC Power supply before connecting the IEC socket to the AC power source.

4.1.3 Rear panel control connections

Label	Type	Use	Reference
DC 5V out	Stereo phone jack	1. Duplicates action of front panel trigger key. 2. DC 5V output	Section 4.1.4
RS-232	9-way D-type (male)	Reserved	
PRINTER Port	25-way D-type (female)	Reserved	
Handler	RJ45 connector	OPTIONAL - to interface to PASS /FAIL signal	

4.1.4 DC 5V Out

4.1.4.1 External Trigger (A-B)

Function same as front panel control, use TTL compatible signal. While connected to low level, function as Trigger.

4.1.4.2 DC 5V Output (A-C)

DC 5V output terminal is designed for user to output DC, the terminal supply DC 5V with maximum current of 1.5A .

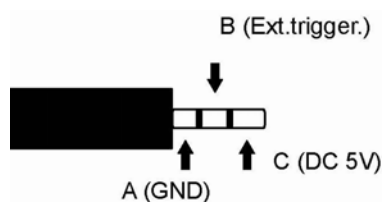


Figure 4-2 the contact assignment of the phone jack

4.1.5 Switch the instrument on

Press the **POWER** switch located on the rear panel, the instrument model will display and then the instrument will display the mode and settings when the instrument was last switched off.

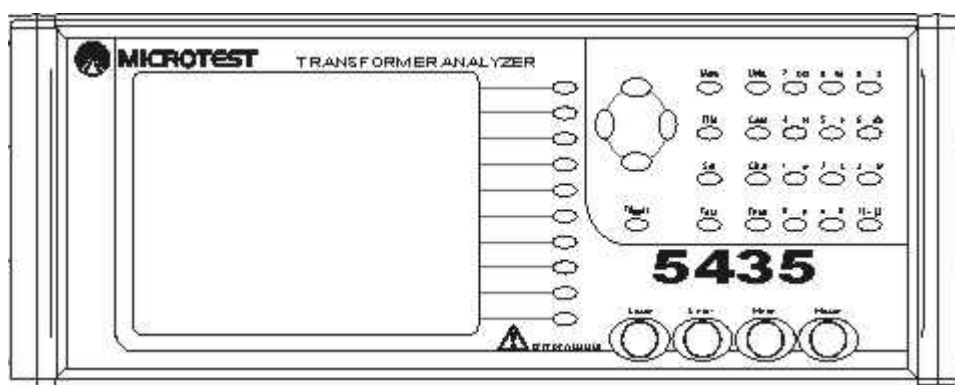
If the display is too bright or too dark, use the **CONTRAST** control on the rear panel to set the contrast level.

To return to the **MAIN MANU** press the **Menu** control key.

4.1.6 Switch the instrument off

The power can be switched **OFF** at any time without damage to the instrument, but to avoid losing trim and calibration data, the instrument should be switched **OFF** when it is in a quiescent state rather than when is running a routine, e.g. trimming, calibration.

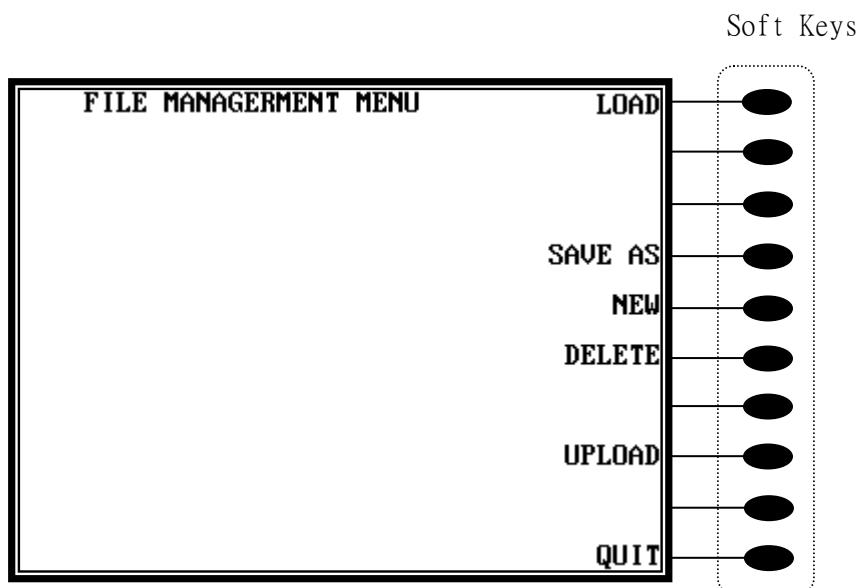
4.2 The front panel



The 5435 Series Front Panel

4.2.1 The Soft Keys

543x series instrument has 10 soft keys, the functions of the soft keys change according to the mode selected, soft keys are located on the right side of display, used to select corresponding function on the display.



4.2.2 The Navigation Keys

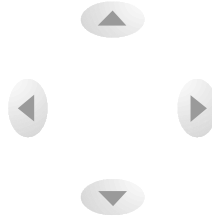






Figure 4-2 The Navigation Keys

Press the   to set parameter on screen, press the   to set Comp.

4.2.3 The control keys

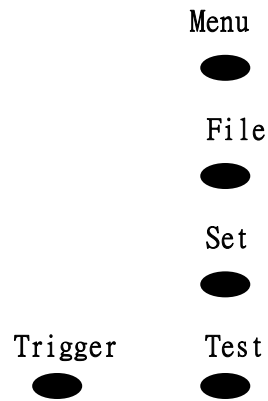
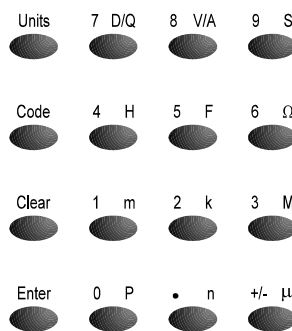


Figure 4-3 The Control Keys

4.2.4 The Data Entry Keypad



Data Entry Keypad

The Data Entry Keypad is a multifunction key set permitting manual entry of data values, measurement units and control codes,

The Units key must be used prior to keying a unit. Where more than one unit is available on a key, e.g. D/Q or V/A, pressing the key will display the first unit, press the key again will display the second unit. Terminate the units mode with **Enter** to accept the key sequence.

An invalid keypad entry may cause the entry line to be cleared and an error message as shown in Figure below, in which case the existing settings will be preserved.

Units mismatched

The +/- key may be used before or after a value to change its sign. Keep pressing the key will toggle the value between positive and negative, For numbers which are positive only, the key is disabled.

4.2.5 Keypad Codes

A number of special functions are available by press **Code** followed by a valid code number and terminated with **Enter**. The code

4.3 System

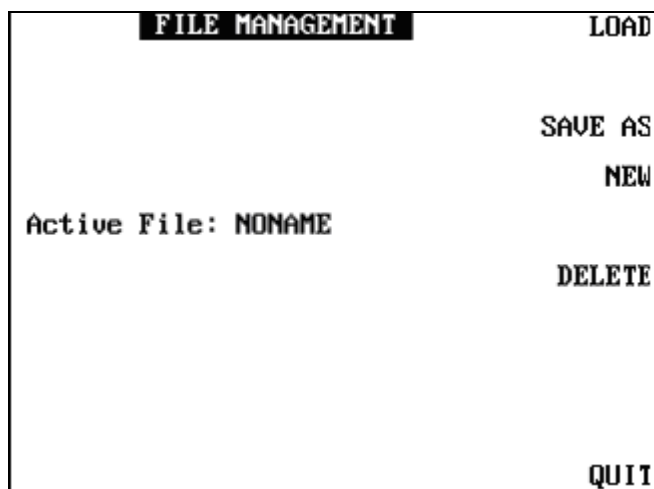
Transformer Analyzer 5435		Prog
Ver 1.10 May 05 2006		
Lock edit key	: No	
Inverse LCD	: No	Set password
Beep	: OFF	
Trigger mode	: Single	
Trigger delay	: 0 mS	
Display test data	: All steps	
Display font	: Small	
Print test data	: No	
Break test	: No	
Fail lock	: No	
		EXIT

Table 1

Press **Menu**, menu display on the screen, press **System** to enter system set up, use **▲ ▼** to shift the items.

- 1) **Line frequency:** 50Hz or 60Hz
- 2) **Beep:** Use ◀ ▶ to choose test success beep, failure beep or mute.
- 3) **Trigger mode:**
 - a. Single: single trigger single test.
 - b. Repeptive: single trigger repeptive test
- 4) **Trigger delay:** Trigger time
- 5) **Display test data:** Display test result. Can chose to display All steps or Fail steps only
- 6) **Display font:** Display font size
- 7) **Inverse LCD:** LCD back light
- 8) **Print test data:** Automatic print of test result, or press the print key for printing.
- 9) **Upload test data:** pass the test result to computer via RS-232 (Figure 2)

4.4 File Catalogue



- 1) **LOAD:** Load saved file
- 2) **SAVE AS:** Save as new file
- 3) **NEW:** Set up new file
- 4) **DELETE:** Delete file
- 5) **QUIT:** Return to the previous display

4.5 Transformer, Fixture Test Set

Switch the instrument on. Connect leads or fixture to BNC connectors on front panel. Every time while there is lead or fixture change, make correction according to

Following are the practice order of measurement

4.5.1 WINDING/FIXTURE

- 1) Press the **Set** key, the menu will display
- 2) Press the soft key **FIXTURE** to enter measurement mode, set the transformer Pin to corresponding fixture channel. (Figure 1)
- 3) **Mapping:** Use the Mapping to set channels automatically, it can also be set manually.
- 4) **Clear:** clear current setting.
- 5) **Clear all:** clear all current settings.

Transformer Fixture Setting					WINDING	
File: 2						
TF	Fix	TF	Fix	TF	Fix	Mapping
Pin	Ch	Pin	Ch	Pin	Ch	
1	1	11	21	31		
2		12	22	32		
3		13	23	33		Clear
4		14	24	34		
5		15	25	35		
6		16	26	36		
7		17	27	37		Clear all
8		18	28	38		
9		19	29	39		
10		20	30	40		EXIT

Figure 1

- 6) Press **WINDING** key to enter winding setting . (Figure 2)

Transformer Winding Setting						FIXTURE
File: 2						N20-N40
Wind	Pin+	Pin-	Wind	Pin+	Pin-	Swap
N1	■	-	N11	-	-	
N2	-	-	N12	-	-	
N3	-	-	N13	-	-	Clear
N4	-	-	N14	-	-	
N5	-	-	N15	-	-	
N6	-	-	N16	-	-	
N7	-	-	N17	-	-	Clear all
N8	-	-	N18	-	-	
N9	-	-	N19	-	-	
N10	-	-	N20	-	-	EXIT

Figure 2

- 7) **Clear:** single clear
- 8) **Clear all:** to clear all settings
- 9) **Exit:** return to main menu

4.5.2 L/LK/Q/Rac/Z/D/Ø/X/Y measurement parameters

Press L/LK/Q/Rac/Z/D/Ø/X/Y on the main menu to enter setup menu (Figure 1)

SETTING	WINDING/FIXTURE
	SEQUENCE
	L/Lk/Q/Rac/Z/D/Ø/X/Y
	Rdc
Active File: 2	TURN RATIO
	C
	BALANCE
	PIN SHORT
	CORRECTION
	TE DEVIATION

Figure 1

- 1) **Set wind:**

1 **Wind:** to set winding to be tested (Figure 2)

- 2 **Meas**: start measurement
- 3 **Copy**: copy previous setting
- 4 **Delete**: delete current settings
- 5 **PIN SHORT**: fixture relay short setting, press **Short** key to set up
- 6 **%**: Set the maximum and minimum values
- 7 **Exit**: return to main menu

L/Lk/Q/Rac/Z/D/θ/X/Y Setting				Wind
File: 05350				1/4
Wind	N1	c		Meas
	(1-2)			
Para	Ls			Copy
Freq	100.00k			Delete
Volt	1.00 V			
Std	51.365mH			SHORT
Max	56.501mH			%
Min	46.228mH			EXIT
Rate	Max			

Figure 2

- 2) **Para**: to select the parameters, press **Para** to select parameter to be tested (Figure 3)

L/Lk/Q/Rac/Z/D/θ/X/Y Setting				Prog
File: AAA				1/1
Wind	N10			Meas
	(2-1)			
Para	Ls			Para
Freq	1.0000k			— Ls
Volt	1.00 V			— Lp
Std	8.5100mH			— Lk
Max	9.3610mH			— Q
Min	7.6590mH			— Rs
Rate	Med			— Z
				EXIT

Figure 3

- 3) **Freq**: measurement frequency,

Ranges: 5435: 20Hz~200KHz ; 5436:20Hz~500KHz ;
5437:20Hz~1MHz。 (Figure 4)

4) Volt: set voltage : 10mV~2V。

L/Lk/Q/Rac/Z/D/θ/X/Y Setting				Meas
File: AAA			1/1	
Wind	N10 (2-1)			Copy
Para	Lp			
Freq	1.0000k			Delete
Volt	1.00 V			
Std	8.5100mH			SHORT
Max	9.3610mH			
Min	7.6590mH			%
Rate	Med			
				EXIT

Figure 4

5) Std: setup standard values, press Meas key to start measurement, press Accept to accept the value (figure 5)

L/Lk/Q/Rac/Z/D/θ/X/Y Setting				Accept
File: AAA			1/1	
Wind	N10 (2-1)			Quit
P	STEP 1			
F	N10(2-1)			
U	Freq: 20.000 Hz			
S	Volt: 10mV			
M	Lp -352.7 kH			
M	O/S CORRECTION ERROR			
Rate	Med			

Figure 5

6) Max: to set Maximum value Min: to set Minimum value, press key % to setup (Figure 6)

L/Lk/Q/Rac/Z/D/θ/X/Y Setting				Meas
File: AAA				1/1
Wind	N10 (2-1)			Copy
Para	Lp			Copy
Freq	2			Delete
Volt		STD 3.5060MH		SHORT
Std	3	MAX +10.00 %		%
Max	5	MIN -10.00 %		EXIT
Min	3.1554MH			
Rate	Med			

Figure 6

4.5.3 DCR

- 1) **Wind:** to set winding to be tested
- 2) **Meas:** start measurement
- 3) **Copy:** copy previous setting
- 4) **Delete:** delete setting
- 5) **%:** Set the maximum and minimum values
- 6) **Exit:** return to main menu
- 7) **Std:** setup standard values, press **Meas** key to start measurement, press **Accept** to accept the value
- 8) **Max:** to set Maximum value **Min:** to set Minimum value, press key **%** to setup
- 9) **Rate:** setup measurement speed rate
- 10) **Dly:** set delay time

DCR Test Setting				Wind
File: AAA				1/2
Wind	N4 (7-8)	N6 (10-11)		Meas
Std	25.164 Ω	-14.70mΩ		Copy
Max	27.680 Ω	-16.17mΩ		Delete
Min	22.648 Ω	-13.23mΩ		%
Rate	Max	Max		EXIT
Dly	100 mS	0 mS		

Figure 1

4.5.4 TURN RATIO

- 1) **WIND:** to set winding to be tested (FIGURE 1)
- 2) **Meas:** start measurement
- 3) **Copy:** copy previous setting
- 4) **Delete:** delete setting
- 5) **%:** Set the maximum and minimum standard value
- 6) **Exit:** exit setup menu
- 7) **Pri:** setup primary winding, press **Wind** to select
- 8) **Sec:** setup secondary winding
- 9) **Freq:** measurement frequency 5435:20Hz~200KHz ; 5436:20Hz~500KHz ; 5437:20Hz~1MHz.
- 10) **Volt:** set voltage : 10mV~2V.
- 11) **Std:** setup standard values, press **Meas** key to start measurement, press **Accept** to accept the value
- 12) **Max:** to set Maximum value **Min:** to set Minimum value, press key **%** to setup

Turn Ratio Test Setting				Wind
File: AAA			2/2	Meas
Pri.	N4 (7-8)	N6 (10-11)		Copy
Sec.	N1 (1-2)	N6 (10-11)		Delete
Freq	1.0000k	1.0000k		%
Volt	1.00 V	1.00 V		Devia
Std	1.00 T	0.00 T		
Max	1.10 T	0.00 T		
Min	900mT	0.00 T		EXIT

Figure 1

4.5.5 C lose capacitance measurement item

Press C to enter (figure 1)

- 1) **Meas:** start measurement
- 2) **Copy:** copy previous setting
- 3) **Delete:** delete setting

- 4) **%**: Set the maximum and minimum standard value
- 5) **Exit**: exit this menu
- 6) **Pin+**: Define the transformer pin as pin+
- 7) **Pin-**: Define the transformer pin as pin-
- 8) **Freq** : test Frequency 5435:20Hz~200KHz ; 5436:20Hz~500KHz ; 5437:20Hz~1MHz.
- 9) **Volt**: set voltage: 10Mv~2v.
- 10) **Std**: setup standard values, press **Meas** key to start measurement, press **Accept** to accept the value
- 11) **Max**: to set Maximum value **Min**: to set Minimum value, press key **%** to setup
- 12) **Rate**: setup measurement speed rate
- 13) **Dly**: setup delay time

Capacitance Test Setting				Meas
File: AAA			1/1	
Pin+	1			Copy
Pin-	2			
Freq	10.000k			
Volt	1.00 V			Delete
Std	0.0000 F			
Max	0.0000 F			
Min	0.0000 F			%
Rate	Max			
Dly	0 mS			EXIT

Figure 1

※enter pin+ display other function

4.5.6 BALANCE

Balance Test Setting				Wind
File: 2		1/1		
RefA	N1 (2-1)			
RefB	N1 (2-1)			Copy
Para	Ls			Delete
Freq	10.000k			
Volt	1.00 V			
Max	0.0000 H			
Min	0.0000 H			
				EXIT

- 1) RefA: Reference winding A
- 2) RefB: Reference winding B
- 3) Func: Comparatively item
- 4) Std: Set standard value
- 5) Max: Set the maximum standard value

4.5.7 PIN SHORT

Pin short test setting

Pin Short Test Setting		
File: 2		
Step	Pin+ Pin-	
1	■	
2		
3		
4		Clear
5		
6		
7		
8		
9		
10		
11		
12		EXIT

4.6 CORRECTION

The purpose of correction is to eliminate the effects of stray capacitance or series impedance in the connecting leads or fixtures.

The correction values are held in non-volatile memory within the instrument, and will not be lost even after switching the instrument off. To ensure accuracy of measurement, frequent correction is recommended. While drive level or test frequency changed, a correction is a must. (Please remove the transformer from the fixture before performing of correction)

Connect test fixture of F5220 transformer, press START to start correction. (Manual test fixture must be pushed entirely)

