

Agilent 4284A Precision LCR Meter

Step-by-Step Operation Manual

Power Inductor Measurement

February 2004



No. 16000-95104

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Step-by-Step Easy Operations

Agilent 4284A 20 Hz to 1 MHz LCR Meter Power Inductor Measurement



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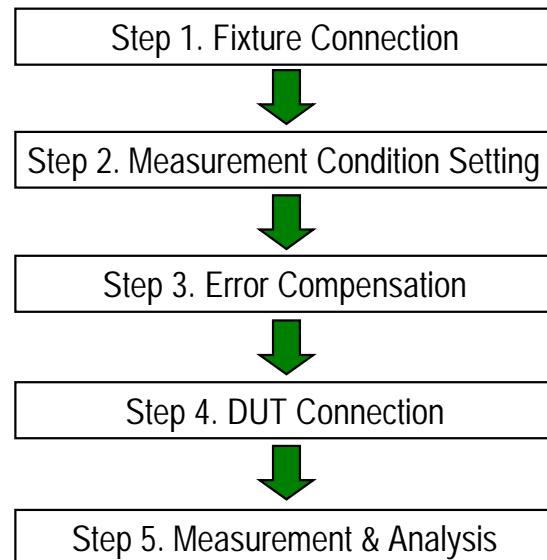
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Fundamental Measurement Procedures



The fundamental measurement procedures of the Agilent 4284A are shown in this slide.

1. Fixture Connection

The appropriate fixture is selected and connected to the instrument.

2. Measurement Condition Setting

The measurement conditions of the instrument, such as frequency, test signal level, and measurement parameters are set.

3. Error Compensation

In this step, stray admittance and residual impedance are eliminated by the open, short, and load corrections.

4. DUT Connection

The DUT is connected to the fixture.

5. Measurement & Analysis

After obtaining the measurement results, they are processed and/or analyzed in this step.

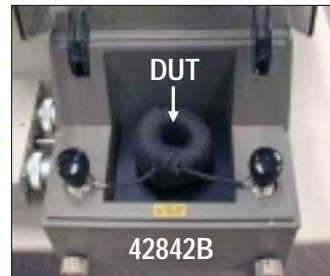
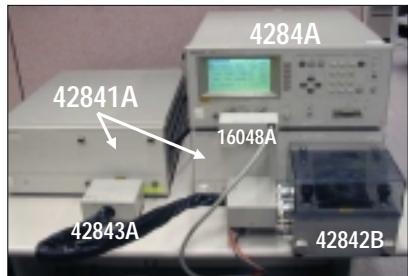
Power Inductor Measurement

Equipment and Text Fixtures:

42841A x 2 ea., 42842B, 42843A and 16048A

DUT:

Power Inductor (Agilent P/N: 9140-1358)



Two 42841A units, 42842B, 42843A, and 16048A are required for a power inductor measurement.

42841A Bias Current Source

42842B Bias Current Test Fixture

42843A Bias Current Cable

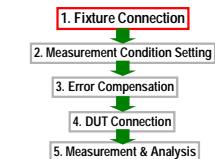
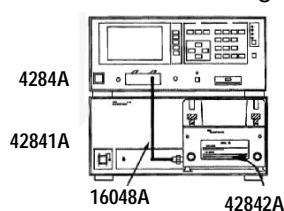
16048A Test Leads

Power Inductor Measurement

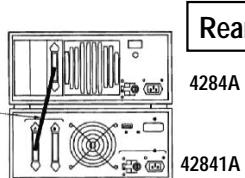
Step 1. Fixture Connection

20 A configuration

Front View

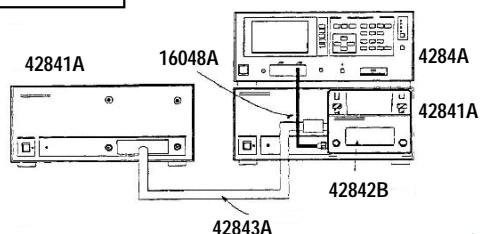


Rear View

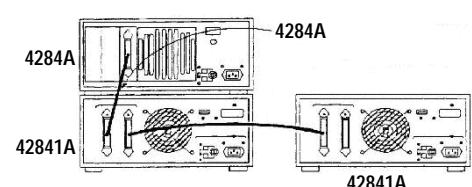


40 A configuration

Front View



Rear View



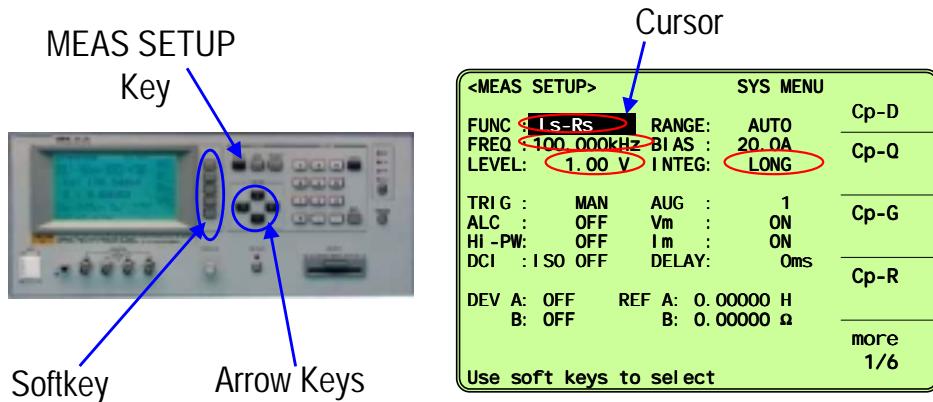
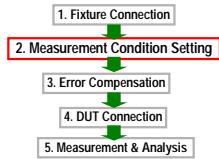
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The first step of the measurement procedure is fixture connection.

Power Inductor Measurement

Step 2. Measurement Condition Setting

Measurement setup (Single point)



The second step is measurement condition setting. Set the measurement conditions by using the following key strokes.

Setting Condition	Value	Key Stroke
Reset	-	[MEAS SETUP], (SYS MENU), 'more 1/2', 'SYSTEM RESET'
1 Meas. Parameter	Ls-Rs	[MEAS SETUP], (FUNC), 'more 1/6', 'more2/6', more3/6, 'Ls-Rs'
2 Frequency	100 kHz	(FREQ), [1], [0], [0], 'kHz'
3 Signal Level	1 V	(LEVEL), [1], 'V'
4 Bias	20 A	(BIAS), [2], [0], 'A'
5 Meas. Time	Long	(INTEG), 'LONG'
6 Trigger type	Manual	(TRIG), 'MAN'

Typeface conventions:

[] : Hard key of the instrument

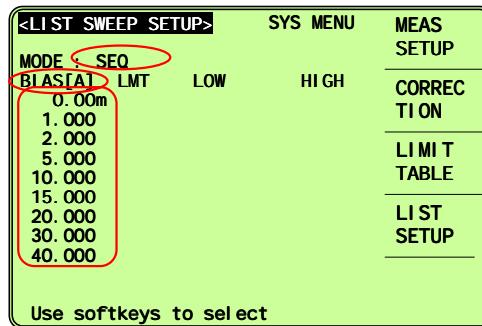
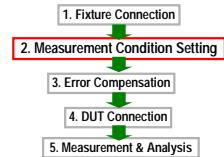
() : Moving the cursor using the arrow keys

' ' : Softkey on the display

Power Inductor Measurement

Step 2. Measurement Condition Setting

List sweep setup

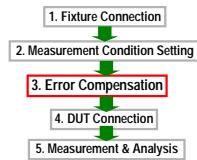


The second step is measurement condition setting. Set the measurement conditions by following key strokes.

	Setting Condition	Value	Key Stroke
1	List Setup, Mode	Seq	[MEAS SETUP], 'LIST SETUP', (MODE:), 'SEQ'
2	List parameter	Current Bias	[MEAS SETUP], 'LIST SETUP', 'BIAS [A]'
3	Sweep Value	0 mA ~ 40 A	Move to new columns and enter values as shown in this slide

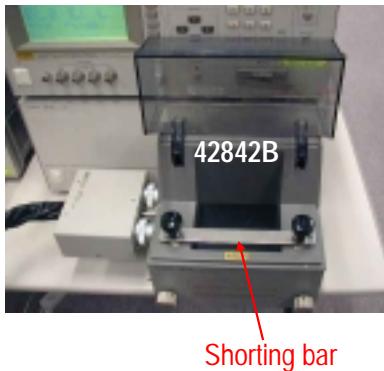
Power Inductor Measurement

Step 3. Error Compensation

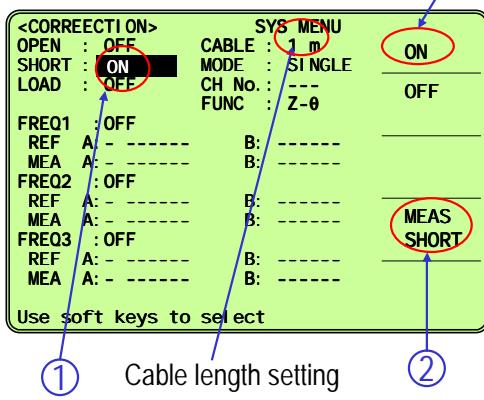


1) Make the short condition

- (i) Open the cover and connect the shorting bar
- (ii) Close the cover



2) Cable length setting and short correction



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The third step is error compensation. Cable length setting and short correction are performed.

1) Short connection

Make the short condition by using the shorting bar furnished with the 42842B as shown in this slide.

2) Cable length setting and short correction

A cable length of 1 m is selected to eliminate phase errors that can result from an extended cable.

Open correction is not necessary for this power inductor measurement.

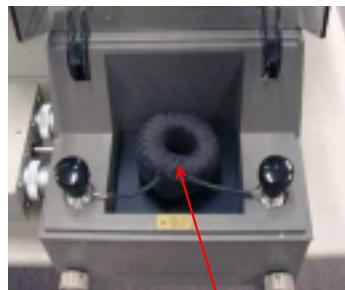
Perform error compensation by using the following key strokes.

Setting Condition	Value	Key Stroke
1 Cable Length	1 m	[MEAS SETUP], 'CORRECTION', (CABLE), '1m'
2 Open correction	Off	[MEAS SETUP], 'CORRECTION', (OPEN), 'OFF'
3 DC BIAS	On	[DC BIAS] (Indicator turns on)
4 Short correction	Measure/On	[MEAS SETUP], 'CORRECTION', (SHORT), 'MEAS SHORT', 'ON'
5 DC BIAS	Off	[DC BIAS] (Indicator turns off)

Power Inductor Measurement

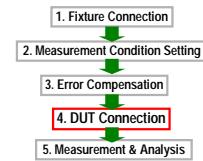
Step 4. DUT Connection

- 1) Open the cover and connect the DUT



- 2) Close the cover

DUT: Power Inductor

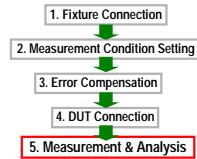


The fourth step is DUT connection.

- 1) Open the cover of the fixture and then connect the DUT as shown in this slide.
- 2) Close the cover

Power Inductor Measurement

Step 5. Measurement and Analysis



1) Press "DC Bias" key to turn it on, then press "Trigger" key

2) Measured result are displayed as shown below

Measurement Result (Single Point)

<MEAS DISPLAY>		MEAS	DISP	
FUNC : Ls-Rs	RANGE: AUTO			
FREQ : 100.000kHz	BIAS : 20.0A	BIN		
LEVEL : 1.00V	INTEGR: LONG	No.		
	COMP : OFF			
Ls: 536.143μH				
Rs: 47.2674 Ω				
Vm : 397.0mV	I _m : 22.02mA	LIST		
CORR: SHORT				

Measurement Result (List Sweep)

<LIST SWEEP DISPLAY>				SYS MENU	MEAS	DISP	
MODE : SEQ	BIAS[A]	Ls[H]	Rs[Ω]	CMP	BIN		
	0.00m	537.093μ	37.8013		No.		
	1.000	503.450μ	32.9476				
	2.000	472.115μ	26.1257				
	5.000	422.476μ	22.8214				
	10.000	375.580μ	18.9543				
	15.000	339.753μ	14.4228				
	20.000	232.429μ	11.9476				
	30.000	237.864μ	9.53725				
	40.000	211.342μ	7.91483				
Use soft keys to select							

3) Press "DC Bias" key to turn it off



The last step of the procedure is measurement and analysis. To start the measurement, press the following keys.

	Setting Condition	Value	Key Stroke
1	Display Format	Measurement	[Display Format], 'MEAS DISP'
2	DC Bias	On	[DC BIAS] (Indicator turns on)
3	Trigger	Trigger	[Trigger]
4	DC Bias	Off	[DC BIAS] (Indicator turns off)

Measurement result is shown on the display.

For list sweep measurement, press the following keys.

	Setting Condition	Value	Key Stroke
1	Display Format	List	[Display Format] 'LIST SWEEP'
2	DC Bias	On	[DC BIAS] (Indicator turns on)
3	Trigger	Trigger	[Trigger]
4	DC Bias	Off	[DC BIAS] (Indicator turns off)

Operation Examples

Thank you very much



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