

**Agilent 4284A Precision LCR Meter**

# **Step-by-Step Operation Manual**

## **Power Inductor Measurement**

**February 2004**



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## Notices

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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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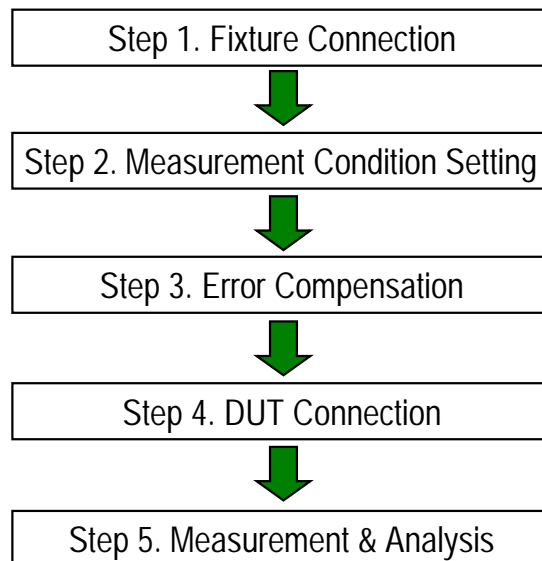
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## Fundamental Measurement Procedures



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.

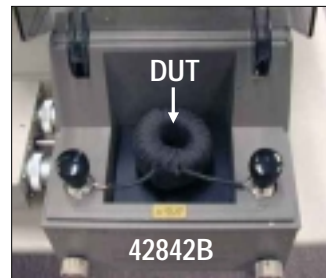
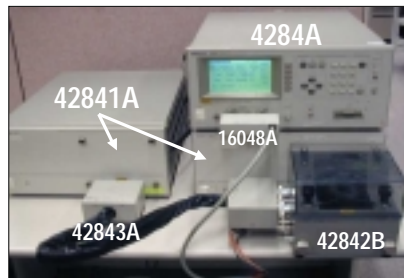
## Power Inductor Measurement

Equipment and Test 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

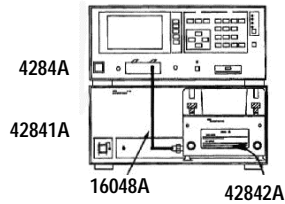
16048A Test Leads

# Power Inductor Measurement

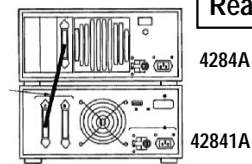
## Step 1. Fixture Connection

### 20 A configuration

Front View



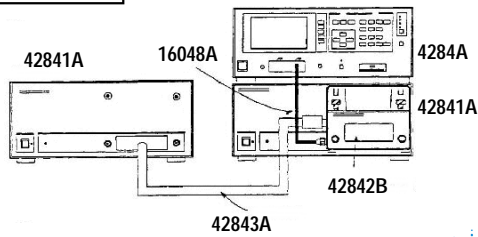
Rear View



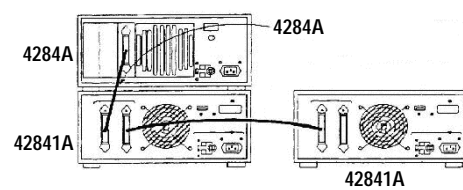
1. Fixture Connection
2. Measurement Condition Setting
3. Error Compensation
4. DUT Connection
5. Measurement & Analysis

### 40 A configuration

Front View



Rear View

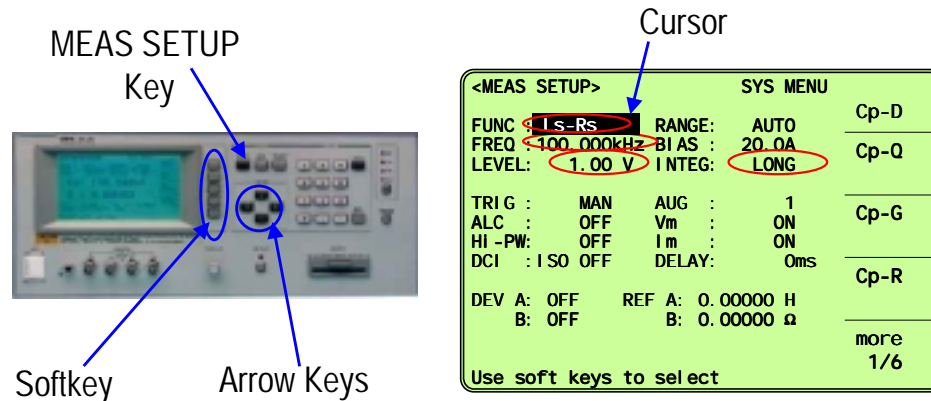
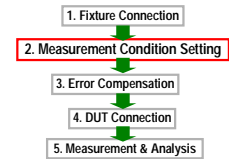


The first step of the measurement procedure is fixture connection.

## 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

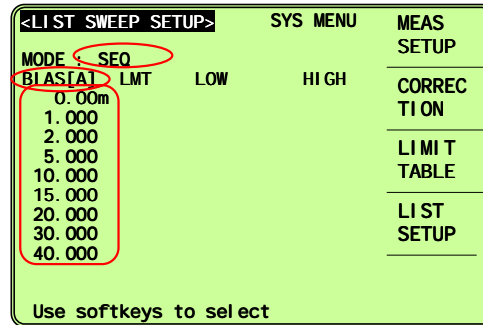
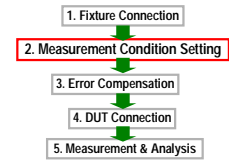
' ' : Softkey on the display



# 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

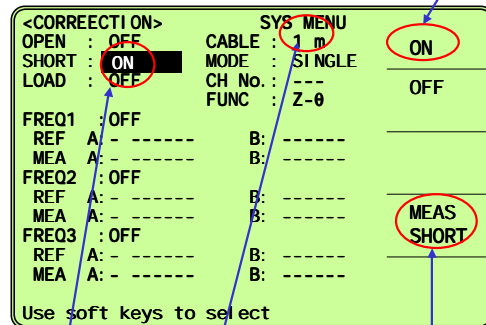
#### 1) Make the short condition

- Open the cover and connect the shorting bar
- Close the cover



Shorting bar

#### 2) Cable length setting and short correction



① Cable length setting

②

③



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.

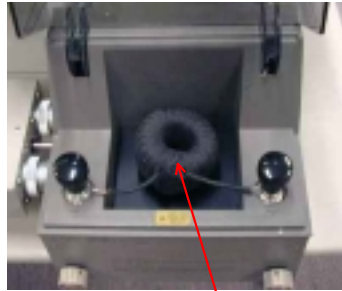
Perform error compensation by using the following key strokes.

	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

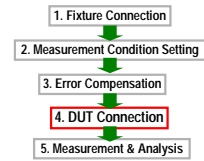


- 2) Close the cover

DUT: Power Inductor



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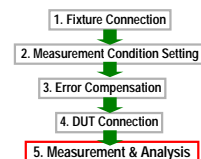


The fourth step is DUT connection.

- 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		BI N
LEVEL : 1.00V	INTEG: LONG		No.
	COMP : OFF		
Ls: 536.143μH			BI N
Rs: 47.2674 Ω			COUNT
Vm : 397.0mV Im : 22.02mA			LI ST
CORR: SHORT			SWEEP

Measurement Result (List Sweep)

<LIST SWEEP DISPLAY>				SYS MENU	MEAS DISP
MODE : SEQ					
BIAS[A]	Ls[ H ]	Rs[ Ω ]		CMP	BI N
0.00m	537.093μ	37.8013			No.
1.000	503.450μ	32.9476			
2.000	472.115μ	26.1257			BI N
5.000	422.476μ	22.8214			COUNT
10.000	375.580μ	18.9543			
15.000	339.753μ	14.4228			LI ST
20.000	232.429μ	11.9476			SWEEP
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



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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	Measure-ment	[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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