

DC1000 with LCR - Sweep Software Demo

Simplifying Saturation Testing with your LCR meter

Voltech

Free software for all DC1000 users to automate inductance measurements over DC Bias

Voltech is pleased to announce the launch of our new DC1000 Control Software.

This **FREE** software simplifies the process of testing and characterising the behaviour of your inductors over a range of DC Bias currents.

The software automates the control of the DC current and the LCR readings, removing any human error.

The software currently supports the following popular LCR meters - Keysight E4980AL (USB or GPIB) - Agilent HP4284A (GPIB) - Tonghui TH2830/31/32 (USB)

The software supports both the original DC1000 and the improved DC1000A.

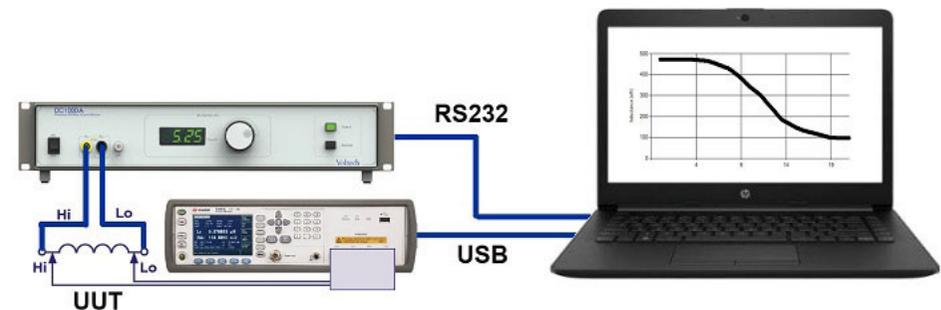
SIMPLE SET UP

The software controls both your LCR meter and the DC1000A, giving you a fast way to see and understand the core saturation behaviour over your chosen DC current range.

Users simply set the LCR Voltage and LCR frequency for the sweep, as well as the start and finish DC Bias current, and number of DC steps that you wish to test.

Extra precision can be obtained by the built-in compensation function, which simplifies the process of applying open and short circuit compensations to the LCR meter.

The software can also control multiple stacked DC1000s for customers wishing to test at currents over 25 A. For a quick guide on using multiple DC1000s in parallel to extend the test current see our web page <https://www.voltech.com/Products/DC1000A/Stackable>



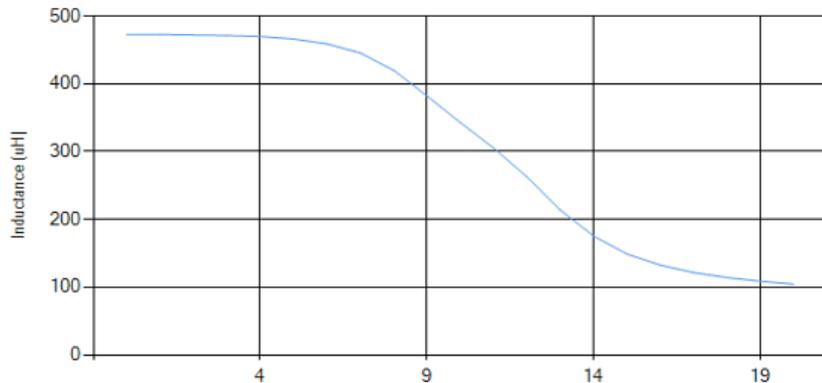
FULL RESULTS + GRAPHING

The software records AC Resistance, Reactance, Series Inductance and Q factor for each DC bias level in your sweep.

Results are stored as

A, an EXCEL / CSV file (see right)
and

B, a graph showing Series Inductance Vs DC BIAS for easy manipulation and presentation. (see Below)



	A	B	C	D	E	F
1	DC1000 Control Software Test Report					
2	Test Software: VPN: 28-362 Issue 1.10					
3	Test Date: 2019-07-30 11:22:31					
4	Test Time: 11:22:31					
5	Test Voltage: 1V					
6	Test Frequency: 1kHz					
7	LCR Meter: E4980AL					
8	Integration: Medium					
9						
	Step	Current (Amps)	R (ohms)	X (ohms)	Inductance (uH)	Q
10	1	0	0.141	2.967	472.379	21.114
11	2	1	0.142	2.968	472.623	20.871
12	3	2	0.139	2.964	471.890	21.341
13	4	3	0.143	2.959	471.134	20.706
14	5	4	0.143	2.950	469.702	20.630
15	6	5	0.140	2.927	466.105	20.851
16	7	6	0.143	2.882	458.898	20.216
17	8	7	0.138	2.797	445.427	20.326
18	9	8	0.140	2.638	420.064	18.854
19	10	9	0.144	2.400	382.205	16.705
20	11	10	0.142	2.153	342.882	15.121
21	12	11	0.145	1.917	305.271	13.197
22						

DOWNLOAD TODAY

Get your free copy from our Downloads page.
<https://www.voltech.com/Support/Downloads>

See a short video of the DC Control Software in action.
<https://www.voltech.com/Products/DC1000A/Software>

If your LCR meter is not currently supported, please let us know the make and model for possible future implementation.

DEMO KIT - QUICK START GUIDE

If you have a DC1000A Demo kit from Voltech, and have one of the supported LCR Meters, then you can use the following steps to set up the software and perform quick sweep on the sample inductor we have provided.

1, INSTALL

Install the DC1000 /DC1000A Control Software on your PC from our downloads page..

If using GPIB/IEEE , please note that the software only supports National Instruments (NI) USB-IEEE adapters.

The DC1000 software will install and then automatically install the NI-VISA software immediately afterwards.

2A, USB - to LCR Meter (E4980AL)

Connect your E4980AL to the PC using the USB lead provided in the DC1000 box (77-083)

OR

2B, GPIB to LCR Meter (E4980 or HP4284A)

Connect the LCR meter using a GPIB cable to your IEEE port- NOTE: The software ONLY support National Instruments GPIB card.

3, RS232 - DC1000

Connect the DC1000 RS232 IN port to the PC using the RS232 cable (77-045) and RS232- USB adapter (77-084) provided.

4 On initial connection, the USB-RS232 adapter will automatically install its drivers. You will need to be connected to the internet for Windows to do this. **(see Right).**

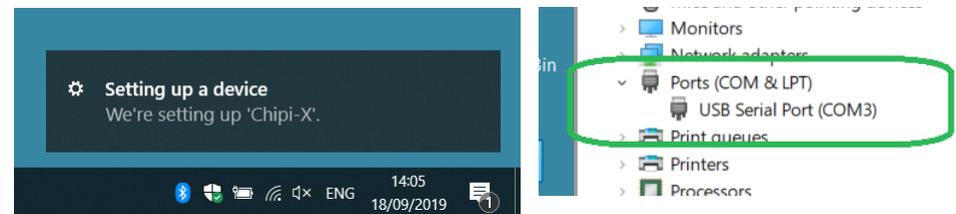
5 Once installed, the USB-RS232 adapter will appear in Windows Device Manager as a valid COM PORT (in this case COM 3, but the com port number may be different on your PC) **(see Far Right)**

6 POWER ON

Turn on the DC1000 AND E4980AL and run the DC1000 Control software on your PC

7 SELECT LCR

On the software, select the LCR meter on the Test Set up Tab

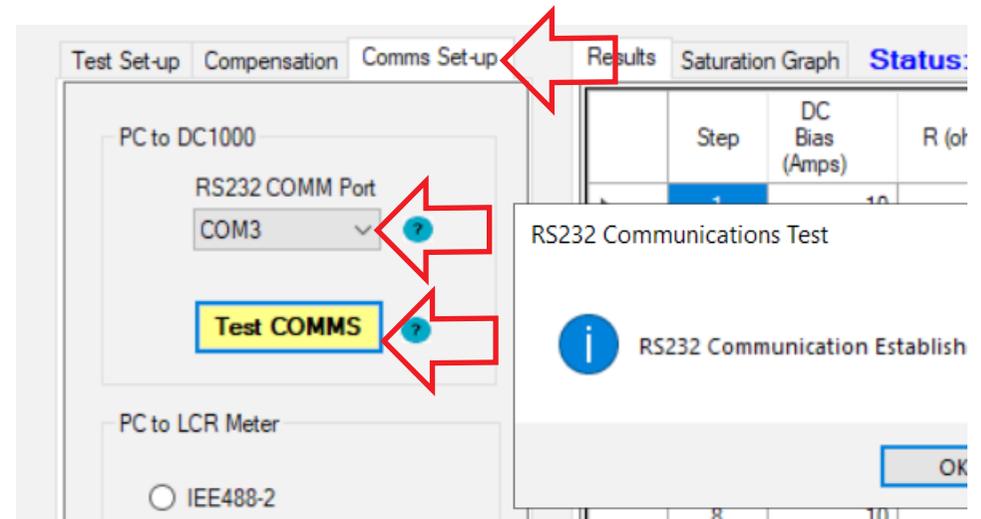


Next we will check the communications between software and E4980AL and software and DC1000.

8 TEST COMMS to DC1000 (RS232)

Click on the **Comm Set-Up**,
Select the PC -DC1000 **COM PORT** (here COM 3)
Click **Test COMMS**

If all is OK you will get a confirmation (see right)

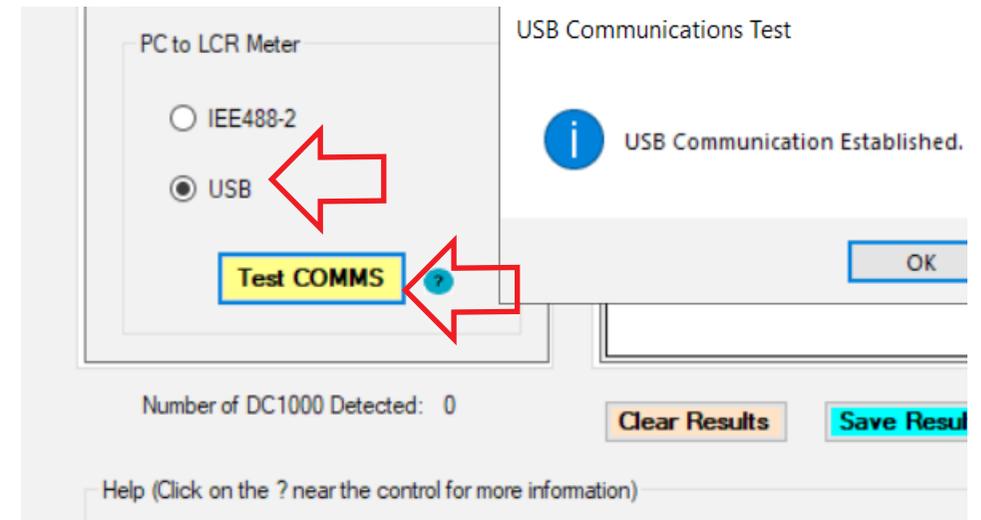


9 TEST COMMS to LCR (USB OR IEEE)

For the LCR-PC USB comms test
Select **USB**
Click on **Test COMMS**

If using GPIB, then
Select **IEE488-2** and enter the **GPIB address**
Then press TEST COMMS.

If all is OK you will get a confirmation (see right)



RUNNING A TEST SWEEP

10 INTERLOCK

Fit the provided Interlock override plug into the rear of the DC1000A in the port marked **Safety Interlock IN**

11 CONNECT SAMPLE

Connect the LCR test leads to the LCR terminals and connect to one of the sample **MURATA 1447385C** inductors provided in the box.

Connect the **DC1000 test leads** to the **DC1000 output sockets** and the other ends across the **inductor**.

Make sure that the **POLARITY of both is the SAME**.

The LCR HI side should be connected to the same point on the inductor as the DC1000 HI side (**HI = RED + YELLOW** and **LO = BLACK-BLACK** - see picture)

Note ; For a quick first run, we recommend running the sweep without compensation. The topic of compensation will be returned to at the end of this document.

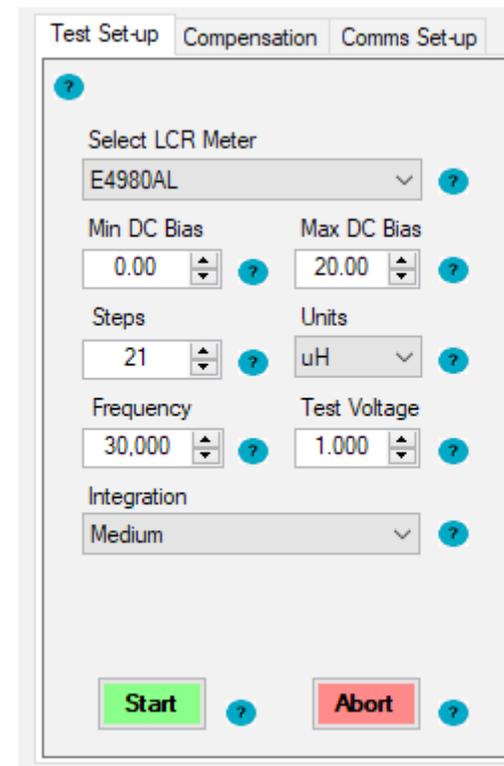
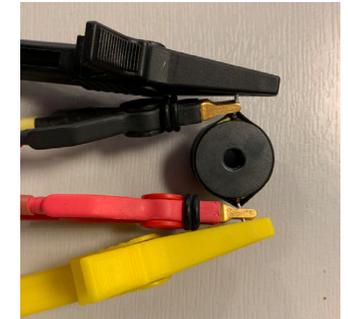
12 Program SWEEP conditions

Return to the software TEST SET UP and select the following

MIN DC	= 0 A
MAX DC	= 20 A
STEPS	= 21
FREQUENCY	= 30,000 Hz
TEST VOLTAGE	= 2.0 V
UNITS	=uH

(see right)

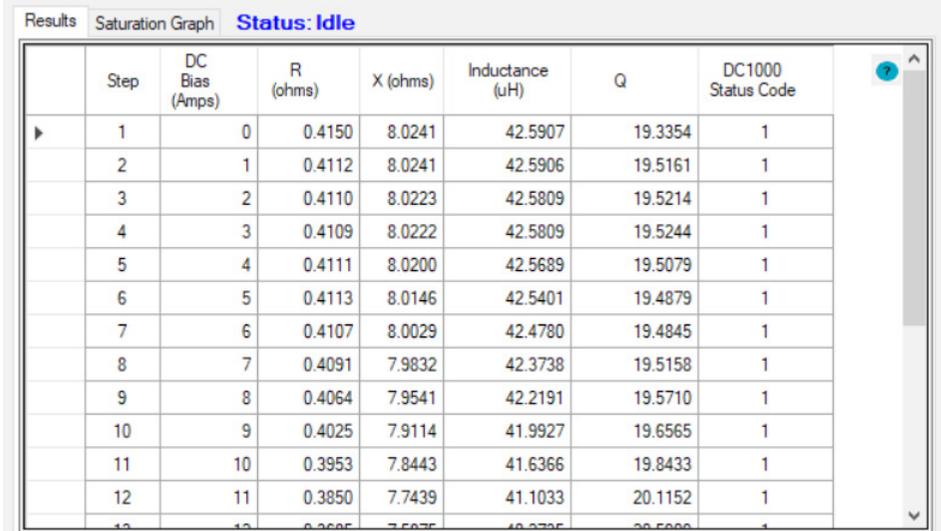
Press the **GREEN Start Button** to begin the measurements.
The 21 measurements should take around 70 seconds.



VIEWING AND SAVING RESULTS

13 RESULTS

Once the sweep has finished, the results will be shown in the **Results** Grid (right)



Step	DC Bias (Amps)	R (ohms)	X (ohms)	Inductance (uH)	Q	DC1000 Status Code
1	0	0.4150	8.0241	42.5907	19.3354	1
2	1	0.4112	8.0241	42.5906	19.5161	1
3	2	0.4110	8.0223	42.5809	19.5214	1
4	3	0.4109	8.0222	42.5809	19.5244	1
5	4	0.4111	8.0200	42.5689	19.5079	1
6	5	0.4113	8.0146	42.5401	19.4879	1
7	6	0.4107	8.0029	42.4780	19.4845	1
8	7	0.4091	7.9832	42.3738	19.5158	1
9	8	0.4064	7.9541	42.2191	19.5710	1
10	9	0.4025	7.9114	41.9927	19.6565	1
11	10	0.3953	7.8443	41.6366	19.8433	1
12	11	0.3850	7.7439	41.1033	20.1152	1
13	12	0.3695	7.5975	40.3735	20.5000	1

Results Folder: C:\Users\Voltech\Desktop\DC1000resu

Buttons: Clear Results, Save Results, Browse, Demo

14 GRAPH

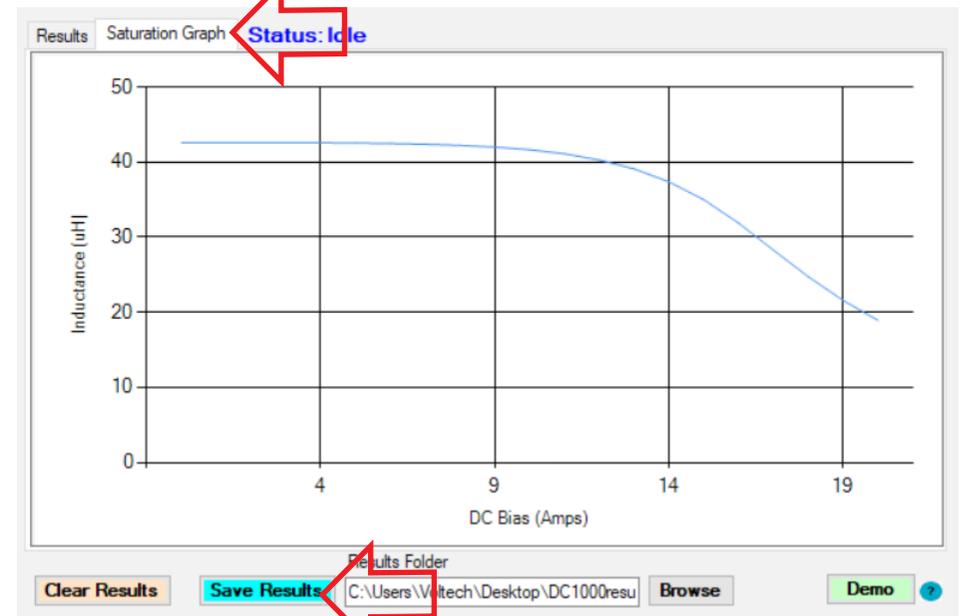
The SERIES INDUCTANCE Vs DC CURRENT graph can be seen by clicking on **Saturation Graph** (right)

15 SAVE

The results can be saved to your PC by clicking on **Save Results**

This will save

- A, a CSV results file containing all data
- B, a BMP graphics file of the graph.



16 Other Runs

Clicking Clear RESULTS will clear the data and allow you set another sweep, maybe over different DC currents, different number of steps and different Voltage and Frequency

17 Compensation

As with the Manual Demo Guide (see document 104-184), you can also use compensation to remove any effect of the test leads from the LCR measurement.

This is much easier with the DC1000 Sweep software, as it can be done totally from within the sweep software without the need to use the LCR front panel

To perform compensation before making measurements, do the following.

Ensure your **V and F settings** are as you require. The software will only compensate at the one frequency and Voltage.

Switch to the **COMPENSATION tab** (see right)

Short circuit compensation

Short all 4 connections together as shown. (below right)
Press the Green RUN button under short circuit compensation
The offset values will appear in the R and X fields when compensated

Open circuit compensation

Short the DC and LCR leads in pairs as shown
(HI to HI, LO to LO - see below far right))
Press the green RUN button under open circuit compensation.
The offset values will appear in the R and X fields when compensated

Once complete, return to the test Set-up tab and continue as normal.

The screenshot shows the 'Compensation' tab in the software. It is divided into two main sections: 'Short Circuit Compensation' and 'Open Circuit Compensation'. Each section contains two input fields, 'R' and 'X'. In the 'Short Circuit Compensation' section, both 'R' and 'X' are set to '0'. In the 'Open Circuit Compensation' section, both 'R' and 'X' are set to 'INFINITE'. Below each set of input fields is a green 'Run' button and a blue circular help icon. At the bottom of the compensation panel is a yellow button labeled 'Clear Compensation Values'. The top of the software window shows three tabs: 'Test Set-up', 'Compensation', and 'Comms Set-up', with 'Compensation' being the active tab.

**SHORT CIRCUIT
COMPENSATION**



**OPEN CIRCUIT
COMPENSATION**

