Electronic Components Measurement using R&S®HM8118 LCR measuring bridge

Step-By-Step Application Guide

Products:

| R&S® HM8118

The purpose of this document is to allow participant to practice and navigate some of the key features of R&S®HM8118 LCR measuring bridge. By completing the exercise, user should learn how to demo some of the key feature of the equipment and explains some of the concepts and settings. The document is separated into two part, with the first part explaining the main controls of the instrument. The second part of the document contains the lab exercise with the R&S®HM8118.

Heng Wee Boo
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ROHDE&SCHWARZ

History

History		
01.06.2016	Heng Wee Boo	first version

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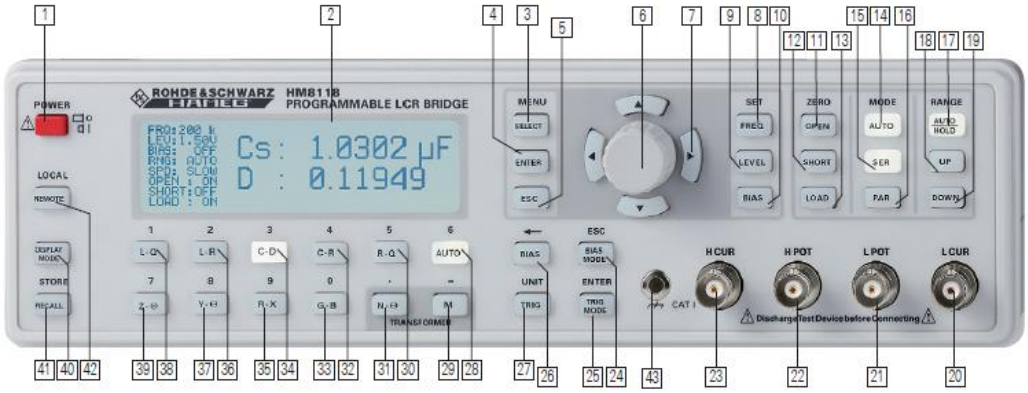
1 Introduction of Operating Elements

R&S®HM8118 Programmable LCR Bridge

Front panel of R&S®HM8118

1. POWER – Turning on/off the instrument
2. DISPLAY (LCD) – Display of measurement results and units, ranges, frequencies, level equivalent circuit, functions and parameters
3. SELECT – Opening the submenus SETUP, CORR, SYST and BIN
4. ENTER – Confirmation of input values
5. ESC – Cancel the menu function
6. Rotary knob (Knob/Pushbutton) – Selection of functions and parameters
7. Arrow buttons – Pushbuttons for parameter selection
8. FREQ – Setting of the test signal frequency with rotary knob or arrow buttons
9. LEVEL – Setting of the test signal level with rotary knob and cursor position with arrow buttons
10. BIAS – Setting of the bias voltage or current with rotary knob and cursor position with arrow buttons
11. OPEN – Activating the OPEN calibration
12. SHORT – Activating the SHORT calibration
13. LOAD – Activating the LOAD calibration
14. AUTO – Activating the automatic selection of equivalent circuit
15. SER – Activating the series equivalent circuit
16. PAR – Activating the parallel equivalent circuit
17. AUTO/HOLD – Activating the automatic measurement range (LED lights up) or the range HOLD function
18. UP – Range up
19. DOWN – Range down
20. L CUR (BNC socket) – Low Current; signal output for series measurements (signal generator)
21. L POT (BNC socket) – Low Potential; signal input for parallel measurement (voltage measurements)
22. H POT (BNC socket) – High Potential; signal input / output for parallel measurements (measurement bridge)
23. H CUR (BNC socket) – High Current; signal input for series measurements (current measurements)
24. BIAS MODE/ESC – Activating of internal / external bias voltage resp. cancelling the editing mode (ESC)
25. TRIG MODE/ENTER – Changing the trigger mode resp. confirming an input value
26. BIAS / – Activating the bias voltage resp. erasing the last character of an numeric input
27. TRIG / UNIT – Single trigger in manual trigger mode resp. selection of a parameter unit
28. AUTO / 6 – Activating the automatic measurement function resp. entering numeric value 6
29. M / – – Selection of the measurement function “Mutual Inductance” resp. parameter input of the character “-“.
30. R-Q / 5 – Selection of the measurement function ‘Resistance‘ R und ‘Quality factor‘ Q resp. entering numeric value 5


ROHDE&SCHWARZ
HM8118
PROGRAMMABLE LCR BRIDGE
POWER
LOCAL
REMOTE
DISPLAY MODE
STORE
RECALL
FRQ:200 k
LEV:1.50V
BIAS: OFF
RNG: AUTO
SPD: SLOW
OPEN : ON
SHORT:OFF
LOAD : ON
Cs: 1.0302 µF
D : 0.11949
MENU
SELECT
ENTER
ESC
SET
FREQ
LEVEL
BIAS
ZERO
OPEN
SHORT
LOAD
MODE
AUTO
SER
PAR
RANGE
AUTO HOLD
UP
DOWN
L-Q
L-R
C-D
C-R
R-Q
AUTO
BIAS
UNIT
TRIG
BIAS MODE
ENTER
TRIG MODE
TRANSFORMER
CAT I
H CUR
H POT
L POT
L CUR
Discharge Test Device before Connecting

2 Exercise

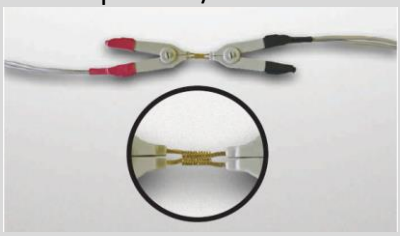
Zeroing the R&S®HM8118 Programmable LCR Bridge

Equipment Needed:

- R&S®HM8118
- HZ184 Kelvin-Test Leads

Instrument Settings:

1. Connect HZ184 onto the instrument. Do note that the 2 black cables goes to the LCUR and HPOT ports of the instrument. While the 2 red cables goes to the HCUR and HPOT ports of the instrument.
2. Push the button MENU/SELECT 3 and then the button C-D 34 in order to enter the CORR menu
3. Select the menu item MODE and use the knob 6 to change the menu entry from SGL to ALL in order to automatically perform the calibration at all 69 frequency steps provided.
4. Now start the open and short circuit calibrations by pushing the buttons ZERO/OPEN 11 resp. ZERO/SHORT 12.



Measure DUT (Capacitor, Inductor and resistor)

Equipment Needed:

- R&S®HM8118
- DUTs

Instrument Settings:

1. Connect capacitor to instrument.
2. Ensure that the “Auto” select button is selected (Button lighted up)
3. Change the measuring frequency to 50 Hz by pushing the button SET/FREQ 8 and turning the knob until 50 Hz are shown on the display
4. Record down the capacitor value
5. Connect Inductor to instrument
6. Increase the measuring frequency by one decade to 500 Hz by pushing the arrow button 7 above the knob.
7. Record down inductor value
8. Connect resistor to instrument
9. Record down inductor value

Question 1

What is the values of the three DUTs?

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Question 2

Change the HZ184 Kelvin test leads to HZ181 test fixture. With reference to the above instrument, try calibration and measurement of the DUTs using the HZ181 test fixture.

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Summary

This short exercise show how R&S®HM8118 can be used in simple measurement of capacitor, inductor and resistor. It also show the process of “OPEN and “SHORT” circuit calibration of the instrument.

About Rohde & Schwarz
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Certified Quality System
ISO 9001

Regional contact
Europe, Africa, Middle East
+49 89 4129 12345
customersupport@rohde-schwarz.com

North America
1-888-TEST-RSA (1-888-837-8772)
customer.support@rsa.rohde-schwarz.com

Latin America
+1-410-910-7988
customersupport.la@rohde-schwarz.com

Asia/Pacific
+65 65 13 04 88
customersupport.asia@rohde-schwarz.com

China
+86-800-810-8228 /+86-400-650-5896
customersupport.china@rohde-schwarz.com

Rohde & Schwarz
Regional Headquarters Singapore Pte. Ltd.
9 Changi Business Park Vista | 486041 Singapore
Phone + 65 6307 0000 | Fax + 65 6307 0303

www.rohde-schwarz.com