

# Generation and Measurement of voltage signals using Power Supply and Digital Multimeter

## Step-By-Step Application Guide

### Products:

- | R&S® HMC8043
- | R&S® 4040
- | R&S® HMC8012

The purpose of this document is to allow participant to practice and navigate some of the key features of R&S®HMC8043/ R&S®HMP4040 Power Supply and R&S®HMC8012 Digital Multimeter. By completing the exercise, user should learn how to demo some of the key feature of both 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 each instrument. The second part of the document contains the lab exercise with the R&S®HMC8043 / R&S®HMP4040 generating a voltage signal and R&S®HMC8012 displaying the generated signal.

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## History

History		
01.06.2016	Heng Wee Boo	first version

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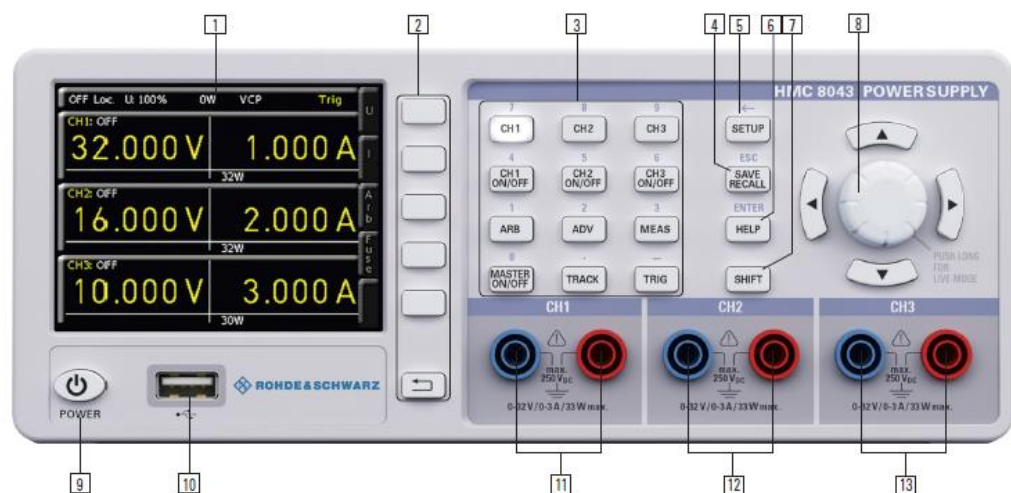
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# 1 Introduction of Operating Elements

## R&S®HMC8043 Power Supply

Front panel of R&S®HMC 8043

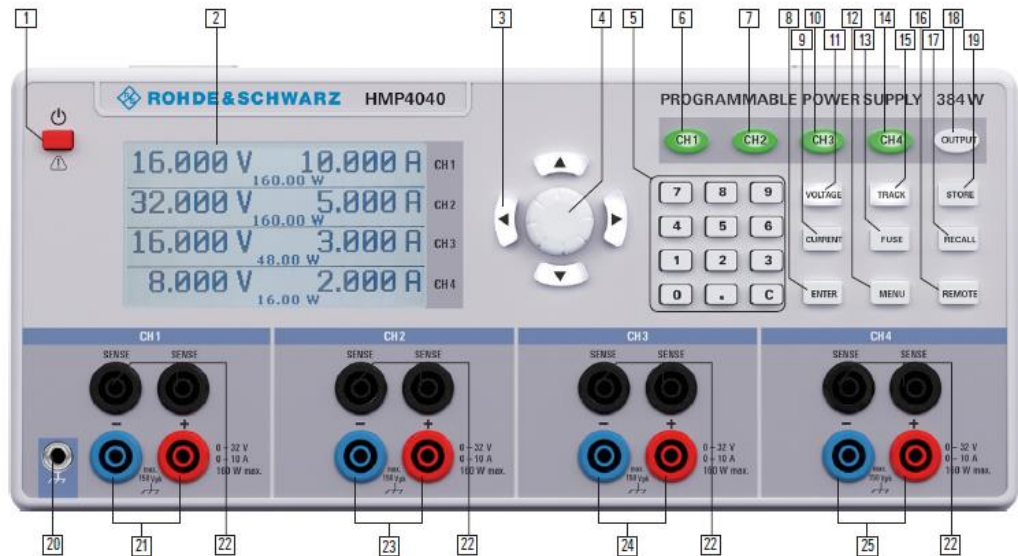
<ol style="list-style-type: none"> <li>1. Display - Color display (320 x 240 pixel)</li> <li>2. Interactive soft menu keys</li> <li>3. Function keys – To be used as numeric keypad in SHIFT function CH1 - Settings for channel 1 CH2 - Settings for channel 2 CH3 - Settings for channel 3 CH1 ON/OFF - Activating / Deactivating channel 1 CH2 ON/OFF - Activating / Deactivating channel 2 CH3 ON/OFF - Activating / Deactivating channel 3 ARB - EasyArb function ADV - Advanced functions (e.g. OVP, OPP, Fuse etc.) MEAS - Logging function / power display MASTER ON/OFF - Selected channels may be switched ON or OFF TRACK - Activating the tracking function TRIG - Manual trigger</li> </ol>	<ol style="list-style-type: none"> <li>4. SAVE/RECALL – Loading/storing of instrument settings</li> <li>5. SETUP – Access to basic instrument settings</li> <li>6. HELP – Integrated help display</li> <li>7. SHIFT – Shift key to activate the numeric keypad</li> <li>8. Universal knob with arrow keys – Setting desired values (edit keys)</li> <li>9. POWER – On/Off for standby mode</li> <li>10. USB connector – USB connector to save parameters</li> <li>11. CH1 (4 mm safety sockets) Outputs channel 1; 0 V to 32 V / 3 A (33 W max.)</li> <li>12. CH2 (4 mm safety sockets) Outputs channel 2; 0 V to 32 V / 3 A (33 W max.)</li> <li>13. CH3 (4mm safety sockets) Outputs channel 3; 0 V to 32 V / 3 A (33 W max.)</li> </ol>
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## R&S®HMP4040 Power Supply

### Front panel of R&S® HMP 4040

<ol style="list-style-type: none"> <li>1. POWER (key): Power switch to switch the instrument on and off</li> <li>2. Display (LCD): Parameter display</li> <li>3. Arrow keys: Setting the parameters</li> <li>4. Knob: for setting and confirming the nominal values</li> <li>5. Numeric keypad (keys): Setting the nominal values</li> <li>6. CH1 (key illuminated): Option key channel 1</li> <li>7. CH2 (key illuminated): Option key channel 2</li> <li>8. Enter (key): Key to confirm values via keypad</li> <li>9. CURRENT (key illuminated): Regulating the current setting</li> <li>10. CH3 (key illuminated): Option key channel 3</li> <li>11. VOLTAGE (key illuminated): Regulating the output voltage</li> <li>12. MENU (key illuminated): Accessing the menu options</li> <li>13. FUSE (key illuminated): Electronic fuse adjustable for each channel</li> <li>14. CH4 (key illuminated): Option key channel 4</li> <li>15. TRACK (key illuminated): Activating the tracking function</li> </ol>	<ol style="list-style-type: none"> <li>16. REMOTE (key illuminated): Switching between keypad and external control</li> <li>17. RECALL (key illuminated): Loading stored measuring instrument configurations</li> <li>18. OUTPUT (key illuminated): Selected channels may be switched on or off</li> <li>19. STORE (key illuminated): Storing measuring instrument configurations</li> <li>20. Ground socket (4mm socket): Reference potential connection (connected to protective earth)</li> <li>21. CH1 (4mm safety sockets): Outputs channel 1; 0...32 V / 10 A</li> <li>22. SENSE (4mm safety sockets; 2 x per channel): Compensating the line resistances</li> <li>23. CH2 (4mm safety sockets): Outputs channel 1; 0...32 V / 10 A</li> <li>24. CH3 (4mm safety sockets): Outputs channel 3; 0...32 V / 10 A</li> <li>25. CH4 (4mm safety sockets): Outputs channel 4; 0...32 V / 10 A</li> </ol>
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## R&S®HMC8012

### Front panel of R&S® HMC 8012

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| <ol style="list-style-type: none"> <li>1. Display – Color display (320 x 240 pixel)</li> <li>2. Interactive soft menu keys – All relevant functions are directly accessible</li> <li>3. Function keys – To be used as numeric keypad in SHIFT function<br/>           DC V – DC voltage measurement<br/>           DC I – DC current measurement<br/>           AC V – AC voltage measurement<br/>           AC I – AC current measurement<br/> <math>\Omega</math> – Resistance measurement, 2- and 4-wire<br/> <math>\rightarrow/\leftarrow</math> - diode / transmission measurement<br/>           SENSOR – Temperature measurement<br/>           HOLD – Measurement with hold function<br/>           NULL – Zero point of the measurement section<br/>           CAP – Capacity measurement<br/>           MEAS – Limit measurement / mathematical functions / statistic<br/>           TRIG – Manual trigger</li> </ol> | <ol style="list-style-type: none"> <li>7. SHIFT – Shift key to activate the numeric keypad</li> <li>8. Universal knob with arrow keys – Setting desired values (edit keys)</li> <li>9. <math>V \Omega \rightarrow/\leftarrow</math> connector – Input for voltage, frequency, resistance and temperature measurement</li> <li>10. COM connector – Common measurement input for voltage, resistance, temperature and capacity measurement</li> <li>11. A connector – Input for current measurement</li> <li>12. LO/HI connectors – Sensor for resistance and temperature measurement</li> <li>13. FUSE – Measuring circuit fuse</li> <li>14. USB connector – USB connector to save parameters</li> <li>15. POWER – On/Off for standby mode</li> </ol> |
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4. SAVE/RECALL – Loading/storing of instrument settings
5. SETUP – Access to basic instrument settings
6. HELP – Integrated help display



## 2 Exercise

### Setting up the power supply

**Equipment Needed:**

- R&S®HMC8012

**Instrument Settings:**

1. Power on the R&S®HMC8012
2. Setup the power supply with the following voltage and current level:  
Channel 1 : 5 V 500mA  
Channel 2: 3 V 300mA  
Channel: 3 2 V 300mA
3. Switch Channel 1 and Channel 3 output to ON only

**Equipment Needed:**

- R&S®HMP4040

**Instrument Settings:**

4. Power on the R&S®HMP4040
5. Setup the power supply with the following voltage and current level:  
Channel 1 : 5 V 500mA  
Channel 2: 3 V 300mA  
Channel 3: 2 V 300mA  
Channel 4: 0.5 V 100mA
6. Switch Channel 1 and Channel 3 output to ON only



## Measuring the given voltage signal using a R&S®HMC8012 Digital Multimeter

### Equipment Needed:

- R&S®HMC8012
- “Banana” plugs cables

### Instrument Settings:

1. Measure the voltage output from all channels
2. Verify that only stated “ON” channel has voltage output.

### Summary

**This short exercise show how two instruments can be used to demo the functionary of both the instruments.**

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## Regional contact

Europe, Africa, Middle East

+49 89 4129 12345

[customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)

North America

1-888-TEST-RSA (1-888-837-8772)

[customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)

Latin America

+1-410-910-7988

[customersupport.la@rohde-schwarz.com](mailto:customersupport.la@rohde-schwarz.com)

Asia/Pacific

+65 65 13 04 88

[customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)

China

+86-800-810-8228 /+86-400-650-5896

[customersupport.china@rohde-schwarz.com](mailto:customersupport.china@rohde-schwarz.com)

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**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](http://www.rohde-schwarz.com)