

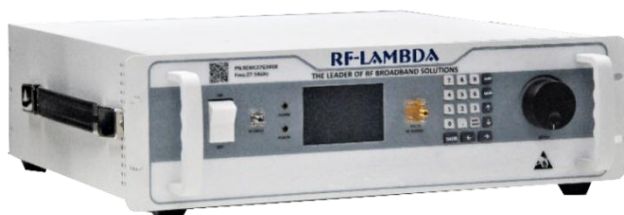


# RF-LAMBDA

The power beyond expectations

REMC18G23GD

## 20W Solid State EMC Benchtop Power Amplifier 18GHz~23GHz



### Features

- Automatic Calibration
- Built in Temperature Compensation
- Adjustable Attenuation:  
31.5dB Range, 0.5dB Step Size
- Supply Voltage: 110V/220V AC

### Typical Applications

- Aerospace and military applications
- Test and Measurement.
- Research and Development.

### Electrical Specifications, $T_A=25^\circ\text{C}$

| Parameter                                       | Min.                                               | Typ. | Max. | Units |
|-------------------------------------------------|----------------------------------------------------|------|------|-------|
| Frequency Range                                 | 18 - 23                                            |      |      | GHz   |
| Gain                                            |                                                    | 48   |      | dB    |
| Gain Variation Over Temperature<br>(-45 ~ +85)  |                                                    | -    |      | dB    |
| Input Return Loss                               |                                                    | -    |      | dB    |
| Output Return Loss                              |                                                    | -    |      | dB    |
| Saturated Output Power (Psat)                   |                                                    | 43   |      | dBm   |
| Output Third Order Intercept (IP <sub>3</sub> ) |                                                    | -    |      | dBm   |
| Isolation S <sub>12</sub>                       |                                                    | -    |      | dB    |
| Input Max Power (No Damage)                     | Psat – Gain                                        |      |      | dBm   |
| Weight                                          | 35                                                 |      |      | lbs   |
| Impedance                                       | 50                                                 |      |      | Ohms  |
| Power Supply Connector                          | D-SUB COMBO 3POS                                   |      |      |       |
| Input / Output Connectors                       | Input: 2.9mm female, Output: 2.92mm female or WR28 |      |      |       |
| Material                                        | Aluminum / Copper                                  |      |      |       |

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| Absolute Maximum Ratings                                      |                  |
|---------------------------------------------------------------|------------------|
| Supply Voltage                                                | 110V 220V ac     |
| RF Input Power (RFIN)<br>$P_{in\ max} = P_{sat} - G_{ainsat}$ | $P_{sat} - Gain$ |
| Storage Temperature (°C)                                      | -50 to +125      |

Note: Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves

| Biasing Up Procedure |                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------|
| Step 1               | Connect input and output with 50 Ohm source/load. ( in band VSWR<1.9:1 or >10dB return loss) |
| Step 2               | Turn on AC power.                                                                            |
| Step 3               | Enable RF output                                                                             |
| Power OFF Procedure  |                                                                                              |
| Step 1               | Turn off RF output power                                                                     |
| Step 2               | Turn Off AC power                                                                            |
| Step 3               | Disconnect input and output                                                                  |

### Environmental Specifications and Test Standards

| Parameter                        | Standard      | Description                                                                                                                                                                                                     |
|----------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operational Temperature          | MIL-STD-39016 | -45°C~+85°C                                                                                                                                                                                                     |
| Storage Temperature              |               | -55°C~+125°C                                                                                                                                                                                                    |
| Thermal Shock                    |               | 1 Hour@ -45°C → 1 Hour @ +85°C (5 Cycles)                                                                                                                                                                       |
| Random Vibration                 |               | Acceleration Spectral Density 6 (m/s)<br>Total 92.6 RMS                                                                                                                                                         |
| Electrical & Temperature Burn In |               | Temperature +85°C for 72 Hours                                                                                                                                                                                  |
| Shock                            |               | 1. Weight >20g, 50g half sine wave for 11ms, Speed variation 3.44m/s<br>2. Weight <=20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s<br>3. Total 18 times (6 directions, 3 repetitions per direction). |
| Altitude                         | MIL-STD-883   | Standard: 30,000 Ft (Epoxy Sealed Controlled Environment)<br>Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min)                                                                                             |
| Hermetically Sealed (Optional)   |               | MIL-STD-883 (For Hermetically Sealed Units)                                                                                                                                                                     |

Note: The operating temperature for the unit is specified at the package base. It is the user's responsibility to ensure the part is in an environment capable of maintaining the temperature within the specified limits

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## REMC18G23GD

20W Wide Band Solid State EMC-Benchtop Power Amplifier 18-23GHz

| Ordering Information |                                |
|----------------------|--------------------------------|
| Part No.             | Description                    |
| REMC18G23GD          | 18GHz~23GHz<br>Power Amplifier |

### Amplifier Use

Ensure that the amplifier input and output ports are safely terminated into a proper 50 ohm load before turning on the power. Never operate the amplifier without a load. A proper 50 ohm load is defined as a load with impedance less than 1.9:1 or return loss larger than 10dB relative to 50 Ohm within the specified operating band width.

#### Power Supply Requirements

Power supply must be able to provide adequate current for the amplifier. Power supply should be able to provide 1.5 times the typical current or 1.2 times the maximum current (whichever is greater).

In most cases, RF - Lambda amplifiers will withstand severe mismatches without damage. However, operation with poor loads is discouraged. If prolonged operation with poor or unknown loads is expected, an external device such as an isolator or circulator should be used to protect the amplifier.

Ensure that the power is off when connecting or disconnecting the input or output of the amp.

Prevent overdriving the amplifier. Do not exceed the recommended input power level.

Adequate heat-sinking required for RF amplifier modules. Please inquire.

Amplifiers do not contain Thermal protection, Reverse DC polarity or Over voltage protection with the exception of a few models. Please inquire.

Proper electrostatic discharge (ESD) precautions are recommended to avoid performance degradation or loss of functionality.

What is not covered with warranty?

Each RF - Lambda amplifier will go through power and temperature stress testing.

Since the die, ICs or MMICs are fragile, these are not covered by warranty. Any damage to these will NOT be free to repair.



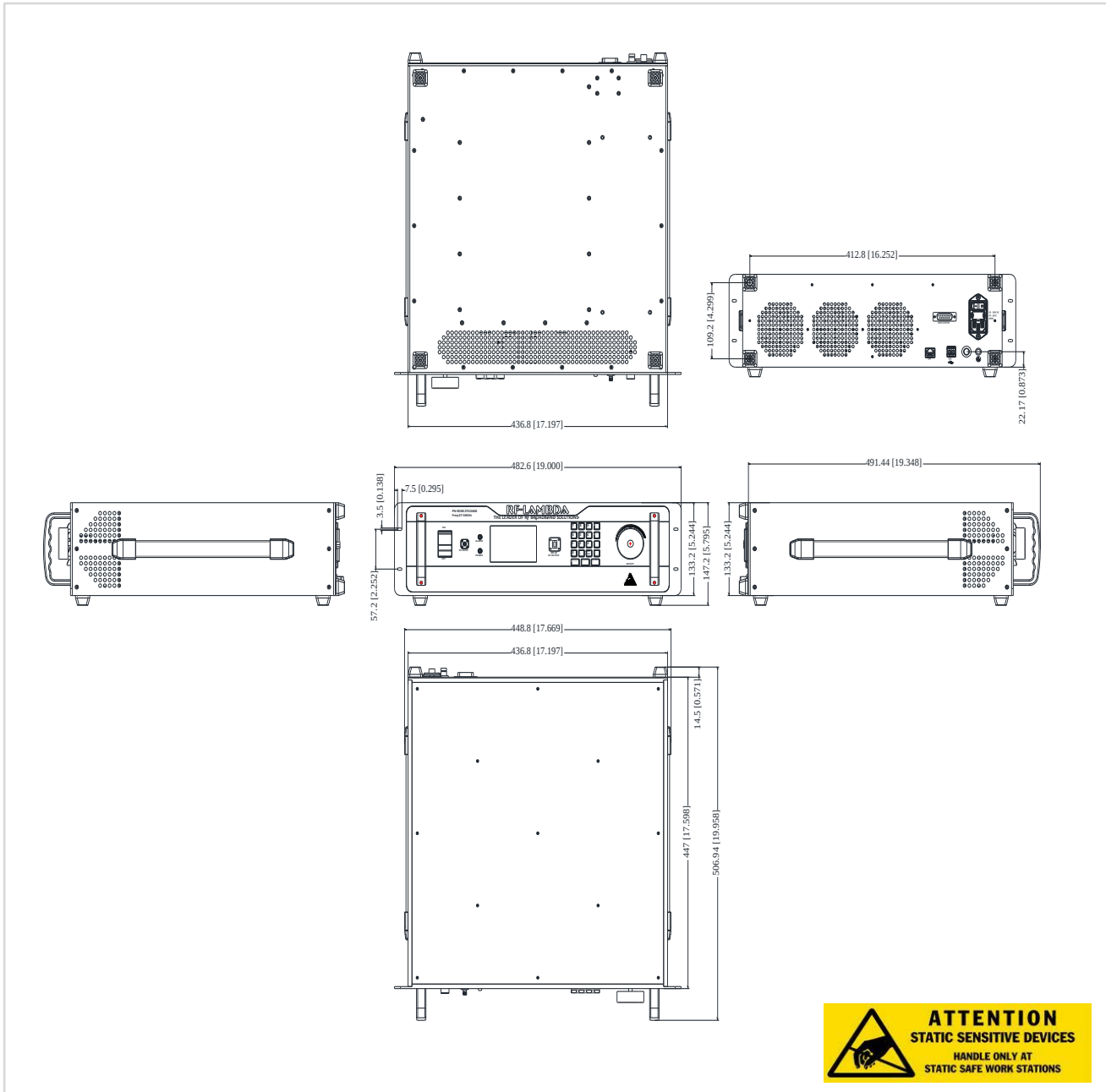
# RF-LAMBDA

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### Outline Drawing:

All Dimensions in mm [inches]



20W Wide Band Solid State EMC-Benchtop Power Amplifier 18-23GHz

### Important Notice

The information contained herein is believed to be reliable. RF-Lambda makes no warranties regarding the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for any of the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for RF-Lambda products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.

RF-Lambda products are not warranted or authorized for use as critical components in medical, life-saving, or life sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.



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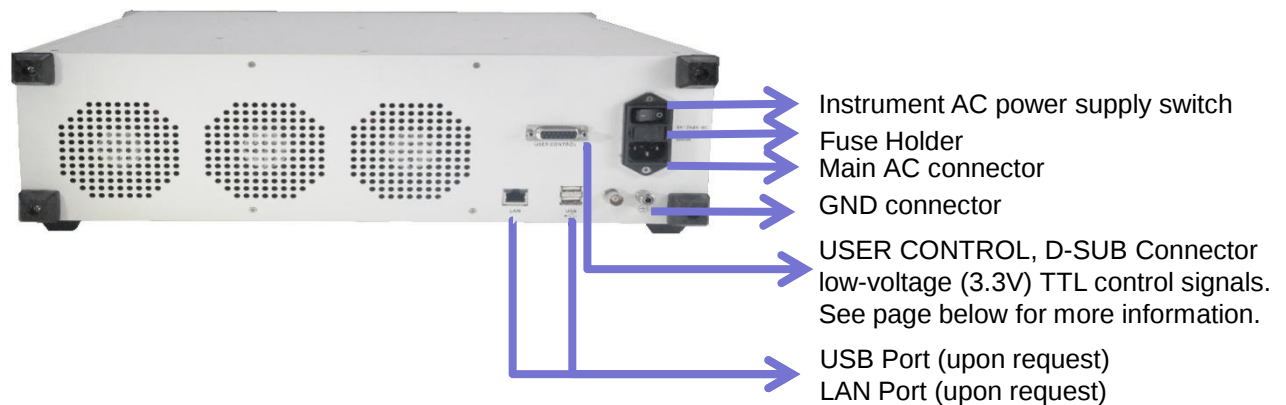
**REMC18G23GD**

## EMC Equipment User Manual

### Front Panel



### Rear Panel



**20W Wide Band Solid State EMC-Benchtop Power Amplifier 18-23GHz**



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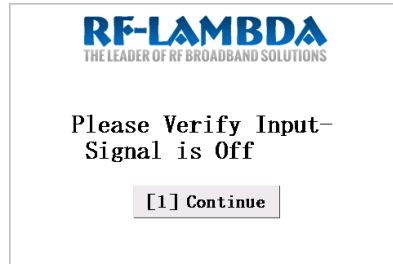
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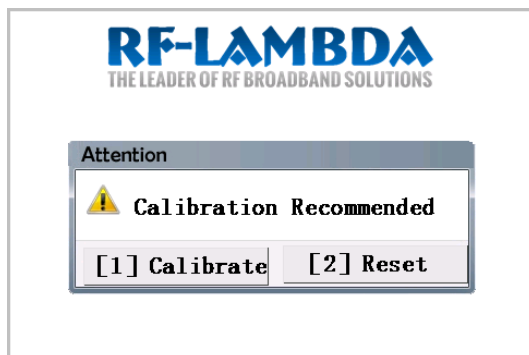
## Front Panel LCD Screen Display

### Switching On Instrument



Please follow the instructions on the front panel LCD screen after switching on the power.  
Press "1" on keypad to continue.

### Self Calibration Screen

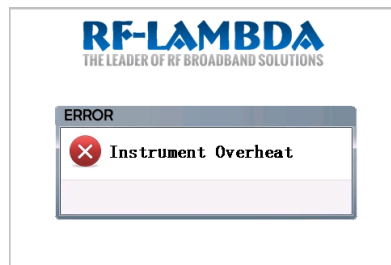
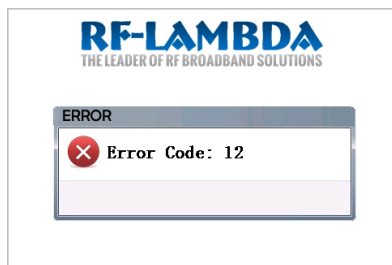


Calibration is may be recommended  
"[1] Calibrate" to execute instrument self calibration process.

"[2] Reset" to reboot the instrument.

\*Please turn OFF RF input power, and terminate the RF output port while applying calibration function

### Instrument Protection Alarms



The front panel LCD screen will display the error code or error message when instrument self protection is triggered. Front panel alarm indicator will light up.

To eliminate the error code, press "RESET" on front panel keypad to reboot the instrument and clear the alarms.

If error code can not be eliminated after reboot, please contact [support@rflambda.com](mailto:support@rflambda.com)



### Instrument Status Display Page

The screenshot shows the RF-LAMBDA logo at the top, followed by a 'Caution:' label and a blue bar. Below this, the following status information is displayed: Temperature: 85 / 29.4 F/C, Attenuation: 15 dB, Frequency: 27 GHz, and Output Power: 50 dBm. At the bottom, there are two buttons: '[1] RF ON/OFF' and '[2] Gain Lock'. A small note '\*press menu for more options' is located below the buttons.

Indicates instrument RF output status. It will display:  
Output is Ready to Turn on or RF Output is ON

Instrument temperature

RF output attenuation (change with adjustment knob)

RF input signal center frequency

Instrument RF output power

Press "Menu" on keypad to enter instrument functions selection menu

User can set a constant gain for the unit. Equipment will automatically adjust the gain at certain frequency

Switches On or Off for instrument RF output port

### Instrument Function Selection Page

The screenshot shows the RF-LAMBDA logo at the top, followed by a 'Caution:' label and a blue bar. Below this, there are six buttons arranged in a 3x2 grid: [1] Calibrate, [2] Frequency, [3] RF ON/OFF, [4] Reset, [5] Status, and [6] Product Info.

To enter this function selection page, press "Menu" on front panel keypad while the instrument is showing the status page. Press the corresponding number on front panel keypad to select:

"[1] Calibrate" calibrates the instruments.

"[2] Frequency" enters RF input signal center frequency.

"[3] RF ON/OFF" switches the RF output port on or off.

"[4] Reset" Restarts the instrument (Turns RF output off)

"[5] Status" enters instrument status display page.

"[6] Product Info" displays product part number and serial number

The dialog box has a title bar 'Attention' and a yellow warning icon. The text inside says 'Excute Calibration?'. At the bottom, there are two buttons: [1] YES and [2] NO.

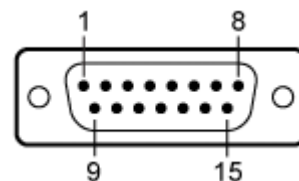
The dialog box has a title bar 'Attention' and a yellow warning icon. The text inside says 'Excute Reset?'. At the bottom, there are two buttons: [1] YES and [2] NO.

The dialog box has a title bar 'Attention' and a yellow warning icon. The text inside says 'Turn Off RF Output?'. At the bottom, there are two buttons: [1] YES and [2] NO.

All action functions will ask for confirming execution when selected from function selection menu.



### User Control Connector on Rear Panel



| Pin # | Name                       | Function     | Initial State | Description                                                                                                      | Applied |
|-------|----------------------------|--------------|---------------|------------------------------------------------------------------------------------------------------------------|---------|
| 1     | Reset                      | Control      |               | Resets PA when logic <u>LOW</u> is applied and released                                                          | Yes     |
| 2     | Driver Disable             | Control      | LOW           | Applying logic <u>HIGH</u> disables driver of amplifiers                                                         | Yes     |
| 3     | Drain Disable              | Control      | LOW           | Applying logic <u>HIGH</u> disables drain of amplifiers                                                          | Yes     |
| 4     | RF IN Over                 | Indicator    | LOW           | Pin will be latched to logic <u>HIGH</u> when input signal is over limit                                         | No      |
| 5     | Temp Over                  | Indicator    | LOW           | Pin will be latched to logic <u>HIGH</u> when amplifier is driven over temperature                               | Yes     |
| 6     | Current Over               | Indicator    | LOW           | Pin will be latched to logic <u>HIGH</u> when drain current limit is reached                                     | Yes     |
| 7     | ID Imbalance               | Indicator    | LOW           | Pin will be latched to logic <u>HIGH</u> when an imbalance in the drain current of the combining branches occurs | Yes     |
| 8     | PA input power             | Indicator    |               | PA input power is represented by voltage                                                                         | No      |
| 9     | PA output power            | Indicator    |               | PA output power is represented by voltage                                                                        | No      |
| 10    | PA output reflection power | Indicator    |               | PA output reflection power is represented by voltage                                                             | No      |
| 11    | VSWR                       | Indicator    | LOW           | Pin will be latched to logic <u>HIGH</u> when output reflection is over limit                                    | No      |
| 13    | +5V                        | Power Supply | +5V           | +5V DC is supplied for reference                                                                                 | Yes     |
| 14    | GND                        | Ground       | GND           | Ground                                                                                                           | Yes     |
| 15    | GND                        | Ground       | GND           | Ground                                                                                                           | Yes     |

HIGH/LOW voltages are standard TTL signals:  
0.0V-0.8V = LOW  
2V-5V = HIGH