

RIGOL

Service Guide

DSA1000A/DSA1000 Series Spectrum Analyzer

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RIGOL Technologies, Inc.**

Guaranty and Declaration

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Product Certification

RIGOL guarantees this product conforms to the national and industrial standards in China as well as the ISO9001:2008 standard and the ISO14001:2004 standard. Other international standard conformance certification is in progress.

Contact Us

If you have any problem or requirement when using our products or this manual, please contact **RIGOL**.

E-mail: service@rigol.com

Websites: www.rigol.com

Safety Requirement

General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injuries or damages to the instrument and any product connected to it. To prevent potential hazards, please use the instrument only specified by this manual.

Use Proper Power Cord.

Only the power cord designed for the instrument and authorized by local country could be used.

Ground The Instrument.

The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, it is essential to connect the earth terminal of power cord to the Protective Earth terminal before any inputs or outputs.

Connect the Probe Correctly.

If a probe is used, do not connect the ground lead to high voltage since it has the isobaric electric potential as ground.

Observe All Terminal Ratings.

To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your manual for more information about ratings before connecting.

Use Proper Overvoltage Protection.

Make sure that no overvoltage (such as that caused by a thunderstorm) can reach the product, or else the operator might expose to danger of electrical shock.

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels removed.

Do Not Insert Anything into the Holes of Fan.

Do not insert anything into the holes of the fan to avoid damaging the instrument.

Use Proper Fuse.

Please use the specified fuses.

Avoid Circuit or Wire Exposure.

Do not touch exposed junctions and components when the unit is powered.

Do Not Operate With Suspected Failures.

If you suspect damage occurs to the instrument, have it inspected by qualified service personnel before further operations. Any maintenance, adjustment or replacement

especially to circuits or accessories must be performed by **RIGOL** authorized personnel.

Keep Well Ventilation.

Inadequate ventilation may cause increasing of temperature or damages to the device. So please keep well ventilated and inspect the intake and fan regularly.

Do Not Operate in Wet Conditions.

In order to avoid short circuiting to the interior of the device or electric shock, please do not operate in a humid environment.

Do Not Operate in an Explosive Atmosphere.

In order to avoid damages to the device or personal injuries, it is important to operate the device away from an explosive atmosphere.

Keep Product Surfaces Clean and Dry.

To avoid the influence of dust and/or moisture in air, please keep the surface of device clean and dry.

Electrostatic Prevention.

Operate in an electrostatic discharge protective area environment to avoid damages induced by static discharges. Always ground both the internal and external conductors of the cable to release static before connecting.

Protect the Input Terminals of Instrument

Do not bend or hit the input terminals and the connected devices, (such as filter, attenuator, etc.) as such stress may cause damages to devices and the instrument. Do not mix the use of 50Ω and 75Ω connectors and/or cables.

Do Not Overload the Input

To avoid damaging the instrument, the signals at input terminal must be less than 50V DC voltage components and 30 dBm (1 W) AC (RF) components.

Appropriate Use of Power Meter

If you are not sure of the characteristics of signal under measure, follow these recommendations to ensure safe operations: if a RF power meter is available, use it to measure the power level of this signal first; or add a rated external attenuator between signal cable and input terminal of the instrument. Maximum attenuation, reference level and maximum span frequency should be selected, so as to make the signals displayed within the screen.

Know About the Specification Conditions of the Instrument

For maximum performance of the instrument, use the analyzer under specified conditions.

Proper Use of Battery.

If a battery is supplied, it must not be exposed to high temperature or in contact with fire. Keep it out of the reach of children. Improper change of battery (note: lithium battery) may cause explosion. Use **RIGOL** specified battery only.

Handling Safety

Please handle with care during transportation to avoid damages to buttons, knob interfaces and other parts on the panels.

Safety Terms and Symbols

Terms Used in this Manual. These terms may appear in this manual:



WARNING

Warning statements indicate the conditions or practices that could result in injury or loss of life.



CAUTION

Caution statements indicate the conditions or practices that could result in damage to this product or other property.

Terms Used on the Product. These terms may appear on the Product:

DANGER indicates an injury or hazard may immediately happen.
WARNING indicates an injury or hazard may be accessible potentially.
CAUTION indicates a potential damage to the instrument or other property might occur.

Symbols Used on the Product. These symbols may appear on the product:



**Hazardous
Voltage**



**Safety
Warning**



**Protective
Earth
Terminal**



**Chassis
Ground**



**Test
Ground**

Allgemeine Sicherheits Informationen

Überprüfen Sie die folgenden Sicherheitshinweise sorgfältig, um Personenschäden oder Schäden am Gerät und an damit verbundenen weiteren Geräten zu vermeiden. Zur Vermeidung von Gefahren, nutzen Sie bitte das Gerät nur so, wie in diesem Handbuch angegeben.

Um Feuer oder Verletzungen zu vermeiden, verwenden Sie ein ordnungsgemäßes Netzkabel.

Verwenden Sie für dieses Gerät nur das für ihr Land zugelassene und genehmigte Netzkabel.

Erden des Gerätes.

Das Gerät ist durch den Schutzleiter im Netzkabel geerdet. Um Gefahren durch elektrischen Schlag zu vermeiden, ist es unerlässlich, die Erdung durchzuführen. Erst dann dürfen weitere Ein- oder Ausgänge verbunden werden.

Anschluss eines Tastkopfes.

Die Erdungsklemmen der Sonden sind auf dem gleichen Spannungspegel des Instruments geerdet. Schließen Sie die Erdungsklemmen an keine hohe Spannung an.

Beachten Sie alle Anschlüsse.

Zur Vermeidung von Feuer oder Stromschlag, beachten Sie alle Bemerkungen und Markierungen auf dem Instrument. Befolgen Sie die Bedienungsanleitung für weitere Informationen, bevor Sie weitere Anschlüsse an das Instrument legen.

Verwenden Sie einen geeigneten Überspannungsschutz.

Stellen Sie sicher, daß keinerlei Überspannung (wie z.B. durch Gewitter verursacht) das Gerät erreichen kann. Andernfalls besteht für den Anwender die Gefahr eines Stromschlages.

Nicht ohne Abdeckung einschalten.

Betreiben Sie das Gerät nicht mit entfernten Gehäuse-Abdeckungen.

Betreiben Sie das Gerät nicht geöffnet.

Der Betrieb mit offenen oder entfernten Gehäuseteilen ist nicht zulässig. Nichts in entsprechende Öffnungen stecken (Lüfter z.B.)

Passende Sicherung verwenden.

Setzen Sie nur die spezifikationsgemäßen Sicherungen ein.

Vermeiden Sie ungeschützte Verbindungen.

Berühren Sie keine unisolierten Verbindungen oder Baugruppen, während das Gerät in Betrieb ist.

Betreiben Sie das Gerät nicht im Fehlerfall.

Wenn Sie am Gerät einen Defekt vermuten, sorgen Sie dafür, bevor Sie das Gerät wieder betreiben, dass eine Untersuchung durch qualifiziertes Kundendienstpersonal durchgeführt wird. Jedwede Wartung, Einstellarbeiten oder Austausch von Teilen am Gerät, sowie am Zubehör dürfen nur von **RIGOL** autorisiertem Personal durchgeführt werden.

Belüftung sicherstellen.

Unzureichende Belüftung kann zu Temperaturanstiegen und somit zu thermischen Schäden am Gerät führen. Stellen Sie deswegen die Belüftung sicher und kontrollieren regelmäßig Lüfter und Belüftungsöffnungen.

Nicht in feuchter Umgebung betreiben.

Zur Vermeidung von Kurzschluß im Geräteinneren und Stromschlag betreiben Sie das Gerät bitte niemals in feuchter Umgebung.

Nicht in explosiver Atmosphäre betreiben.

Zur Vermeidung von Personen- und Sachschäden ist es unumgänglich, das Gerät ausschließlich fernab jedweder explosiven Atmosphäre zu betreiben.

Geräteoberflächen sauber und trocken halten.

Um den Einfluß von Staub und Feuchtigkeit aus der Luft auszuschließen, halten Sie bitte die Geräteoberflächen sauber und trocken.

Schutz gegen elektrostatische Entladung (ESD).

Sorgen Sie für eine elektrostatisch geschützte Umgebung, um somit Schäden und Funktionsstörungen durch ESD zu vermeiden. Erden Sie vor dem Anschluß immer Innen- und Außenleiter der Verbindungsleitung, um statische Aufladung zu entladen.

Die richtige Verwendung des Akku.

Wenn eine Batterie verwendet wird, vermeiden Sie hohe Temperaturen bzw. Feuer ausgesetzt werden. Bewahren Sie es außerhalb der Reichweite von Kindern auf. Unsachgemäße Änderung der Batterie (Anmerkung: Lithium-Batterie) kann zu einer Explosion führen. Verwenden Sie nur von RIGOL angegebene Akkus.

Sicherer Transport.

Transportieren Sie das Gerät sorgfältig (Verpackung!), um Schäden an Bedienelementen, Anschlüssen und anderen Teilen zu vermeiden.

Sicherheits Begriffe und Symbole

Begriffe in diesem Guide. Diese Begriffe können in diesem Handbuch auftauchen:



WARNING

Die Kennzeichnung WARNING beschreibt Gefahrenquellen die leibliche Schäden oder den Tod von Personen zur Folge haben können.



CAUTION

Die Kennzeichnung Caution (Vorsicht) beschreibt Gefahrenquellen die Schäden am Gerät hervorrufen können.

Begriffe auf dem Produkt. Diese Bedingungen können auf dem Produkt erscheinen:

DANGER weist auf eine Verletzung oder Gefährdung hin, die sofort geschehen kann.

WARNING weist auf eine Verletzung oder Gefährdung hin, die möglicherweise nicht sofort geschehen.

CAUTION bedeutet, dass eine mögliche Beschädigung des Instruments oder anderer Gegenstände auftreten kann.

Symbole auf dem Produkt. Diese Symbole können auf dem Produkt erscheinen:



Gefährliche Spannung



Sicherheits-Hinweis



Schutz-erde



Gehäusemasse



Erde

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Chapter 1 Disassemble and Assemble

Disassemble and Assemble Notices

Notices:

- Do not disassemble the instrument unless for working requirement.
- Only authorized personnel can disassemble the instrument.
- Cut off the power supply before disassembling the instrument.
- Please wear anti-static wrist strap or make other anti-static precaution when disassembling the instrument.
- Please use proper tools and follow the correct steps.
- Take care not to deform the metal structure and be scuffed when disassembling the metal structures.

Tools Required:

- Phillips screw driver T10
- BNC socket



WARNING

Make sure that the power supply is cut off before disassembling the instrument. Only personnel with relative training or relative qualification certification can disassemble the instrument.

Outside View Drawing of the Instrument

You need to get a basic understanding of the main parts of the instrument before disassembling and assembling the instrument. When disassembling or assembling the instrument, please follow the procedures and take care not to scratch the surfaces of the parts. In this manual, DSA1030A is taken as an example to illustrate the disassemble and assemble methods of the DSA1000A/DSA1000 series spectrum analyzer. The figure below is the outside view drawing of DSA1030A (with TG; the order number is DSA1030A-TG).

The recommended disassemble procedures are as follows.

Disassemble the Rear Cover → Disassemble the Rear Metal Cover → Disassemble the Digital Board and RF Board → Disassemble the Metal Chassis → Disassemble the Power Supply → Disassemble the Fan

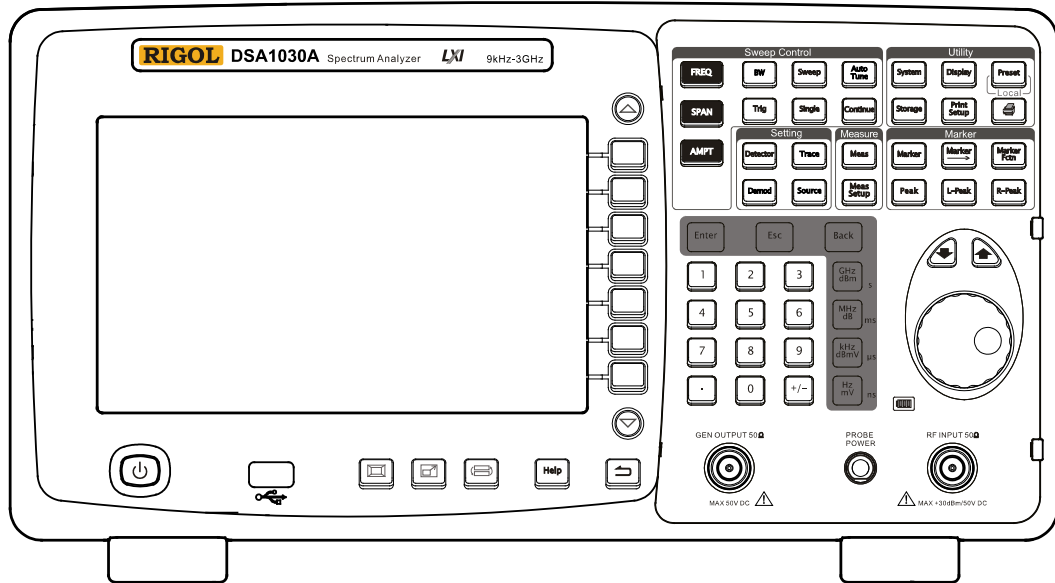


Figure 1-1 Outside View Drawing of DSA1000A

Disassemble the Rear Cover

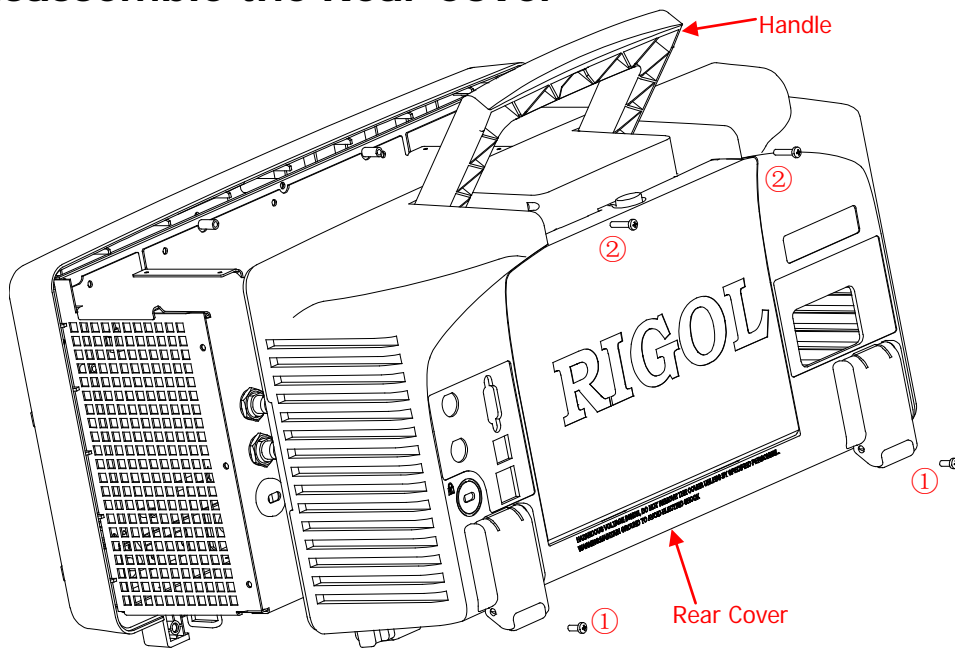


Figure 1-2 Disassemble the Rear Cover

Part Explanations:

- ① 2 screws (M3*8 pan head torx bi-metal flat spring machine) at the bottom of the cover.
- ② 2 screws (M3*14 pan head torx machine) at the handle groove.

Disassemble Steps:

1. Remove the 2 screws (①) at the bottom using the screw driver (T10).
2. Remove the 2 screws (②) at the handle groove using the screw driver (T10).
3. Take off the rear cover gently.

Disassemble the Rear Metal Cover

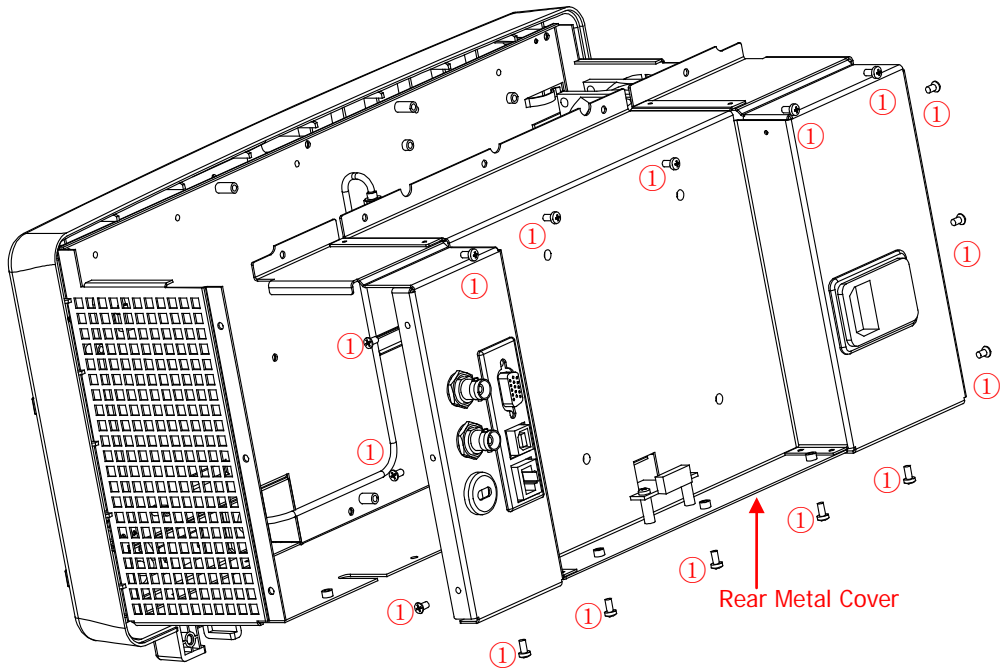


Figure 1-3 Disassemble the Rear Metal Cover

Part Explanation:

- ① 16 screws (M3*6 flush head torx machine) fixing the rear metal cover and metal chassis.

Disassemble Steps:

1. Remove the 16 screws (①) fixing the rear metal cover and metal chassis using the screw driver (T10).
2. Take off the rear metal cover gently and remove the corresponding cables on the main board (pay attention to the connections of the cables to avoid incorrect connection or incomplete connection when assembling).

Tip:

Check whether all the cables on the main board are correctly installed before assembling the rear metal cover.

Disassemble the Digital Board and RF Board

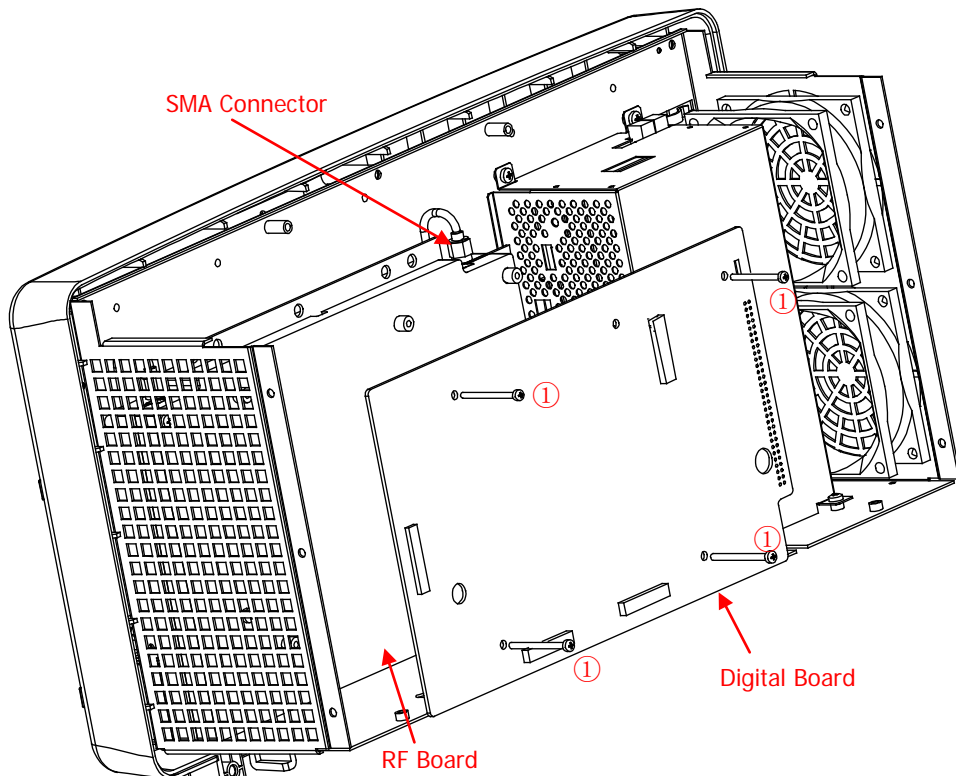


Figure 1-4 Disassemble the Digital Board and RF Board

Part Explanation:

① 4 screws (M3*35 pan head torx bi-metal flat spring machine) fixing the digital board and RF board.

Disassemble Steps:

1. Remove the 4 screws (①) fixing the digital board and RF board using the screw driver (T10).
2. Remove the SMA connector to disassemble the digital board and RF board.

Tip:

Remove the cables on the digital board before disassembling the digital board and pay attention to the connection positions of the cables to avoid incorrect connection or incomplete connection when assembling.

Disassemble the Metal Chassis

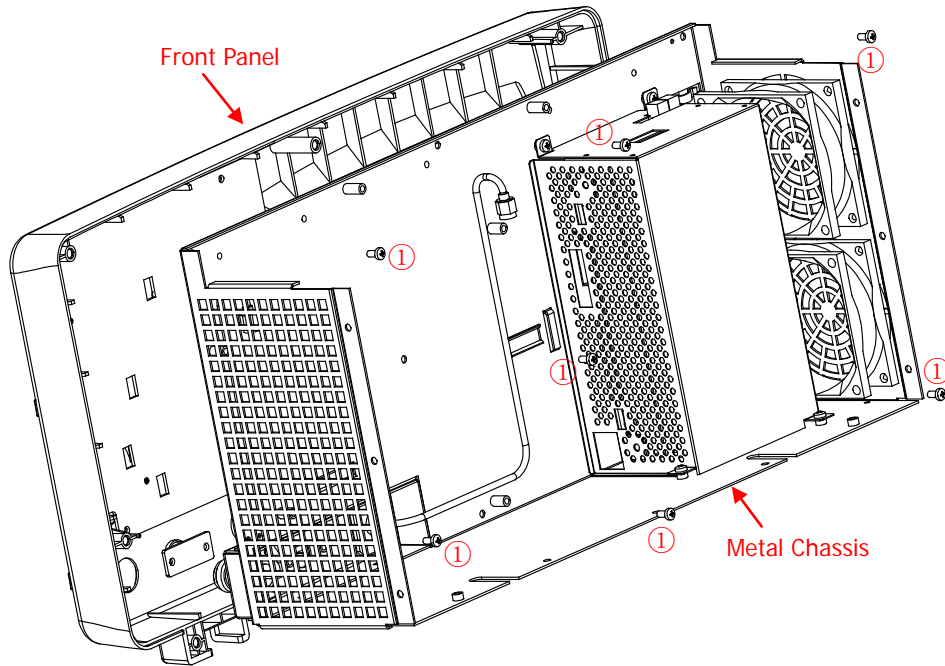


Figure 1-5 Disassemble the Metal Chassis

Part Explanation:

① 7 screws (M3*6 pan head torx bi-metal flat spring machine) fixing the metal chassis and front panel.

Disassemble Step:

1. Remove the 7 screws (①) fixing the metal chassis and front panel using the screw driver (T10).

Disassemble the Power Supply

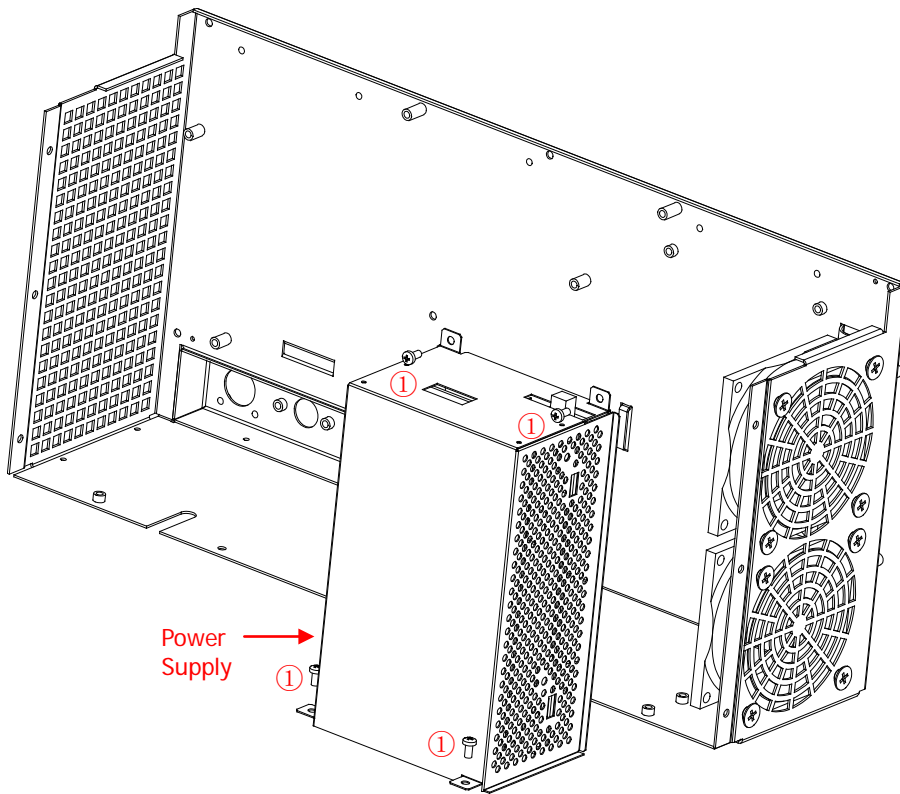


Figure 1-6 Disassemble the Power Supply

Part Explanation:

① 4 screws (M3*6 pan head torx bi-metal flat spring machine) fixing the power supply.

Disassemble Step:

1. Remove the 4 screws (①) fixing the power supply using the screw driver (T10).

Disassemble the Fan

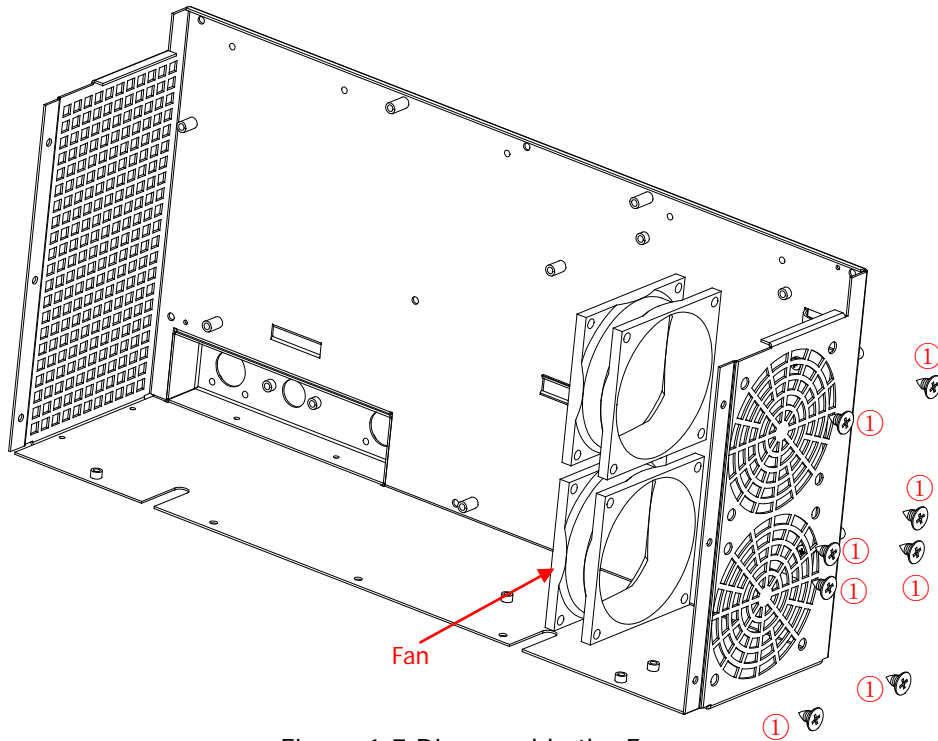


Figure 1-7 Disassemble the Fan

Part Explanation:

- ① 8 screws (M5*10 flush head torx thread cutting self tapping machine) fixing the fan.

Disassemble Step:

1. Remove the 8 screws (①) fixing the fan using the screw driver (T10).

Tip:

Pay attention to the installation direction of the fan and the fan direction when disassembling the fan to avoid incorrect connection when assembling.

Assemble Procedures

The assemble procedures are the reverse of the disassemble procedures. Check whether the cables are correctly connected and whether all the screws are installed after each step of assemble.

You are recommended to follow the order and method introduced above when disassembling and assembling the instrument to avoid damage to the instrument due to improper operation and to save your time.

Chapter 2 Troubleshooting&Maintenance

Troubleshooting

The commonly encountered failures and their solutions are listed below. When you encounter those problems, please solve them following the corresponding steps. If the problem remains still, please contact **RIGOL** and provide your device information (acquisition method: **System** → **Information** → **System Info**).

1. The screen is still dark (no display) after power on:

- (1) Check whether the fan is running:
If yes, the connection of the screen cable may be loose.
If not, the instrument has failed to power up and please refer to step (2).
- (2) Check the power:
Check whether the power supply has been connected correctly and the power switch has been turned on.
Check whether the power fuse is burned. If a new fuse is needed, use the specified fuse (5 mm×20 mm, 250V AC, T2A).

2. The key is unresponsive or gives a wrong response:

- (1) Press all the keys at the front panel to whether all the keys are normal after power on.
- (2) Press **System** → **Self-Test** → **Key Test** to check whether all the keys are working properly.
- (3) If a key is not working, the keyboard connection might be loose or the keyboard might be damaged. If the instrument is still with the warranty time period, please do not disassemble the instrument by yourself and contact **RIGOL**.

3. The spectrum lines on the screen do not update for long periods of time:

- (1) Check whether the screen is locked, if so, press **Esc** to unlock.
- (2) Check whether the instrument is in remote control.
- (3) Check whether all the trigger conditions have been met, check the trigger settings and check whether there is a trigger signal.
- (4) Check whether the analyzer is in single sweep.
- (5) Check whether the current sweep time is too long.

4. Wrong measurement results or poor precisions:

To calculate the system errors and check the measurement result and precision, refer to the relative specifications in the User's Guide. To reach these specifications, you need to:

- (1) Check whether all the external devices have been successfully connected and are working normally.
- (2) Get some knowledge of the signal under measurement and set appropriate

instrument parameters.

- (3) Make measurements under proper conditions, for example, warm up the instrument appropriately and operate under the specified environment temperature.
- (4) Calibrate the instrument regularly to reduce or avoid errors that can occur over time.
 - a) A complete calibration was performed when the instrument left the factory. Please make sure whether the instrument needs to be calibrated according to the purchasing time of your instrument (the recommended calibration interval is one year). If a calibration is required, please contact **RIGOL** or get paid service from authorized measurement agency.
 - b) The analyzer provides the self-calibration function. If required, press **System** → **Calibrate** → **Self-Cal**, and the instrument will perform self-calibration automatically once the operating temperature changes.
 - c) Press **System** → **Calibrate** → **Cal Now** to make a self-calibration immediately.

5. Pop-up Message:

The instrument may display prompt messages, error messages or state messages according to the current working status. These messages are displayed to help you to use the instrument correctly and are not instrument failures. For information of the pop-up messages, please refer to the User's Guide.

Maintenance

System Maintenance

In order to ensure the performance and prolong the service life of the instrument, please follow the recommendations below.

1. Get a full understanding of the performance and basic operating method of the instrument before using it.
2. In order to ensure the measurement accuracy and the service life of the instrument, the instrument should be used and stored in places away from dust, shock, moisture, magnetic field and static; besides, the instrument should be placed in places where it will not be exposed to sunlight for long periods of time.
3. Do not operate the instrument when failure occurs. In this situation, you need to first solve the failure. Besides, regular test and calibration should be performed to ensure the accuracy of the performance.
4. Arrange the instrument properly after you finish the operation of the instrument.
5. Keep the relative accessories of the instrument properly for future use.

Warranty

RIGOL warrants that its products mainframe and accessories will be free from defects in materials and workmanship within the warranty period.

If a product is proven to be defective within the respective period, **RIGOL** guarantees the free replacement or repair of products which are approved defective. To get repair service, please contact with your nearest **RIGOL** sales and service office.

RIGOL does not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hint guarantee items related to tradable characteristic and any particular purpose. **RIGOL** will not take any responsibility in cases regarding to indirect, particular and ensuing damage.

General Care and Cleaning

General Care:

Do not store or leave the instrument in where the instrument will be exposed to direct sunlight for long periods of time.

Cleaning:

Clean the instrument regularly according to its operating conditions. To clean the exterior surface, perform the following steps:

1. Disconnect the instrument from all power sources.
2. Clean the loose dust on the outside of the instrument with a lint- free cloth (with a mild detergent or water). When cleaning the LCD, take care to avoid scarifying it.



CAUTION

To avoid damages to the instrument, do not expose them to liquids which have causticity.



WARNING

To avoid injury resulting from short circuit, make sure the instrument is completely dry before reconnecting to a power source.
