

RIGOL

Service Guide

DSA800 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

Website: 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 injury or damage 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 for use within the 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 the power cord to the Protective Earth terminal before connecting 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 isobaric electric potential as the 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 the instrument.

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 be exposed to the 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 an increase of temperature or damage to the device. So please keep the instrument 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 the instrument in a humid environment.

Do Not Operate in an Explosive Atmosphere.

In order to avoid damage 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 the air, please keep the surface of the device clean and dry.

Electrostatic Prevention.

Operate the instrument in an electrostatic discharge protective environment to avoid damage induced by static discharges. Always ground both the internal and external conductors of cables to release static before making connections.

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 damage 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 conditions or practices that could result in injury or loss of life.



CAUTION

Caution statements indicate 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 occur.

CAUTION indicates 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:



GefährlicheS
pannung



Sicherheits-
Hinweis



Schutz-erde



Gehäusemasse



Erde

Document Overview

Format conventions in this manual:

1. Key:

The keys at the front panel are usually denoted by the format of "Textbox + Key name (Bold)". For example, **FREQ** denotes the **FREQ** key.

2. Menu:

The menus are usually denoted by the format of "Character shading + Menu word (Bold)". For example, **Center Freq** denotes the center frequency menu item under the **FREQ** function key.

3. Connector:

The connectors at the front or rear panel are usually denoted by the format of "Square brackets (Bold) + Connector name (Bold)", such as **[GEN OUTPUT 50Ω]**.

4. Operation step:

"→" represents the next step of operation. For example, **FREQ** → **Center Freq** indicates pressing **FREQ** at the front panel and then pressing the menu softkey **Center Freq**.

User manuals of this product:

The user manuals of this product include the Quick Guide, User's Guide, Programming Guide, Data sheet etc. For the desired manual, please download it from www.rigol.com.

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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.

Exploded View of the Device

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 correct procedures and avoid scratching the part surface. This manual mainly introduces the disassemble and assemble methods of DSA800 series spectrum analyzer. The exploded view of DSA800 (take DSA832-TG/DSA875-TG as an example) is as shown in Figure 1-1.

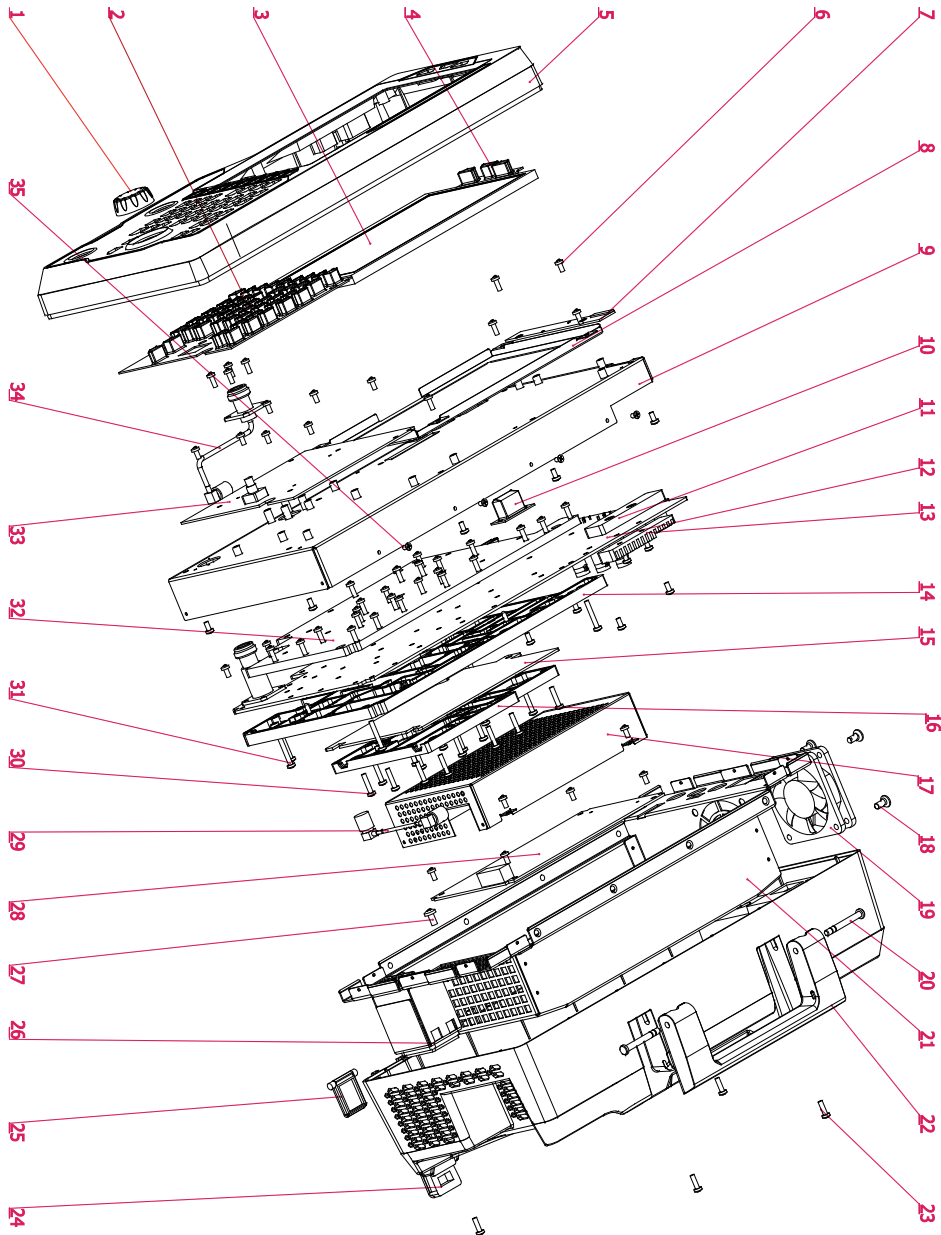


Figure 1-1 Exploded View of DSA800

Table 1-1 Part Explanation of DSA800 Exploded View

No.	Part Name	No.	Part Name
1	Knob	19	Fan 60*60*15
2	Main Keys	20	Handle Rotating Shaft
3	LCD	21	Rear Metal Cover
4	Side Keys	22	Handle
5	Front Panel	23	Screw M3*10
6	Screw M3*6	24	Non-slip Pad
7	Side Keyboard	25	Front Supporting Leg
8	Screen Fixing Frame	26	Power Socket Jumper
9	Front Metal Panel	27	Screw M4*8
10	Power Key	28	Power Board
11	Radiator (Bottom)	29	RF-TG Cable
12	Main Board	30	Screw M3*14
13	Radiator (Top)	31	Screw M3*20
14	Body Seat	32	RF Body (Bottom)
15	TG Board	33	Main Keyboard
16	TG Body (Top)	34	N Cable
17	Power Shield	35	Pan Head Screw M3*4
18	Screw ST5*10	--	--

The recommended disassemble procedures are as follows.

To Disassemble the Rear Cover → To Disassemble the Rear Metal Cover → To Disassemble the Main Board → To Disassemble the Power Key → To Disassemble the Front Metal Panel

To Disassemble the Rear Cover

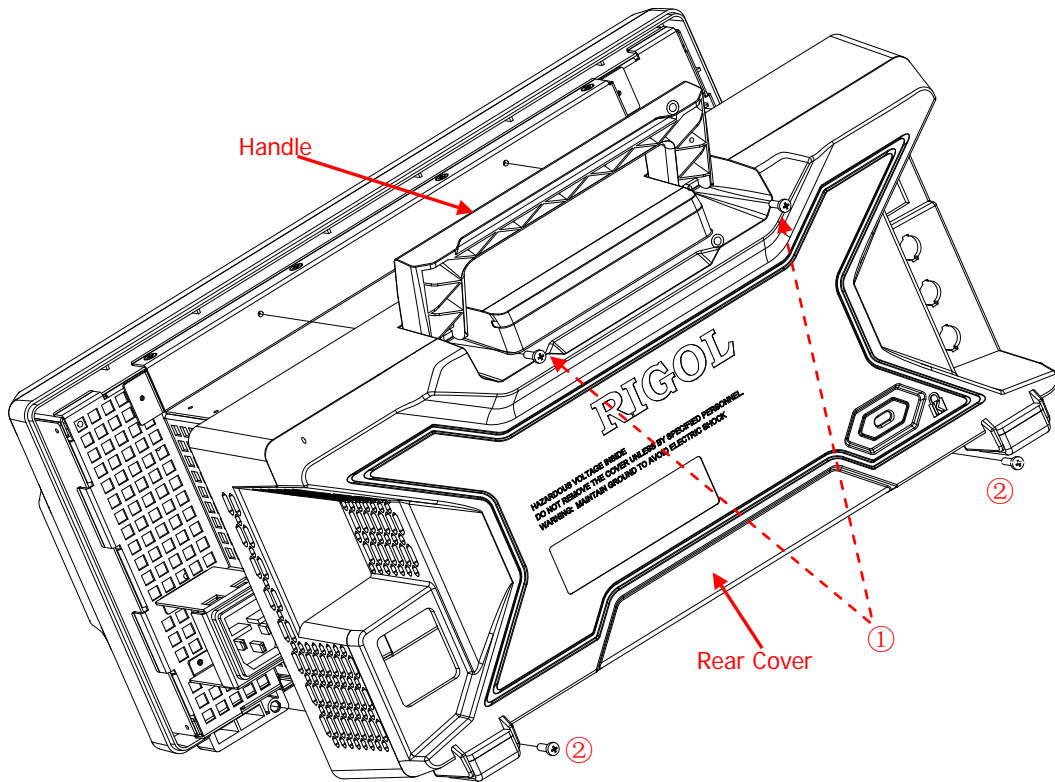


Figure 1-2 To Disassemble the Rear Cover

Part Explanations:

- ① 2 screws (M3*10 torx pan head screw) at the handle groove.
- ② 2 screws (M3*8 torx pan head screw assembly) at the bottom of the cover.

Disassemble Steps:

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

To Disassemble the Rear Metal Cover

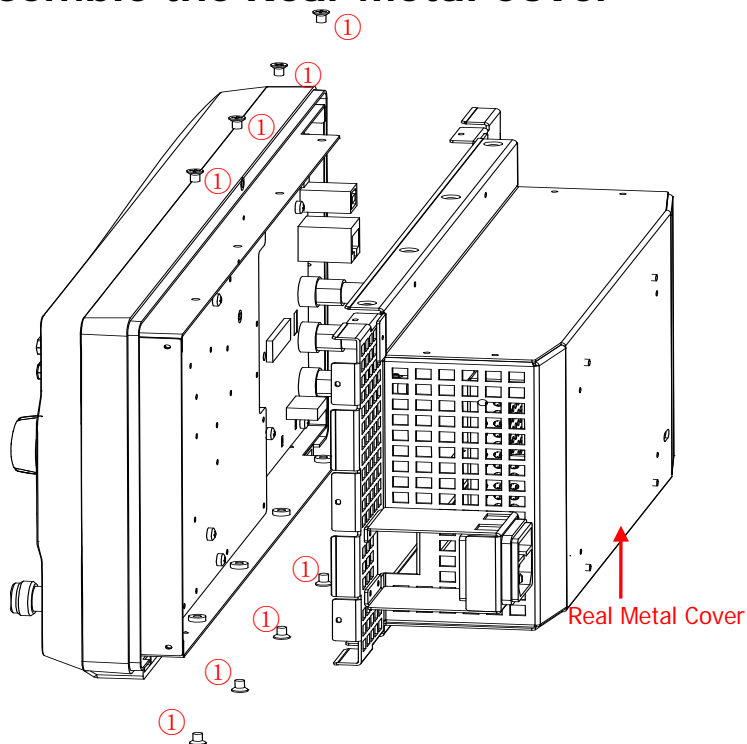


Figure 1-3 To Disassemble the Rear Metal Cover (DSA815/DSA815-TG)

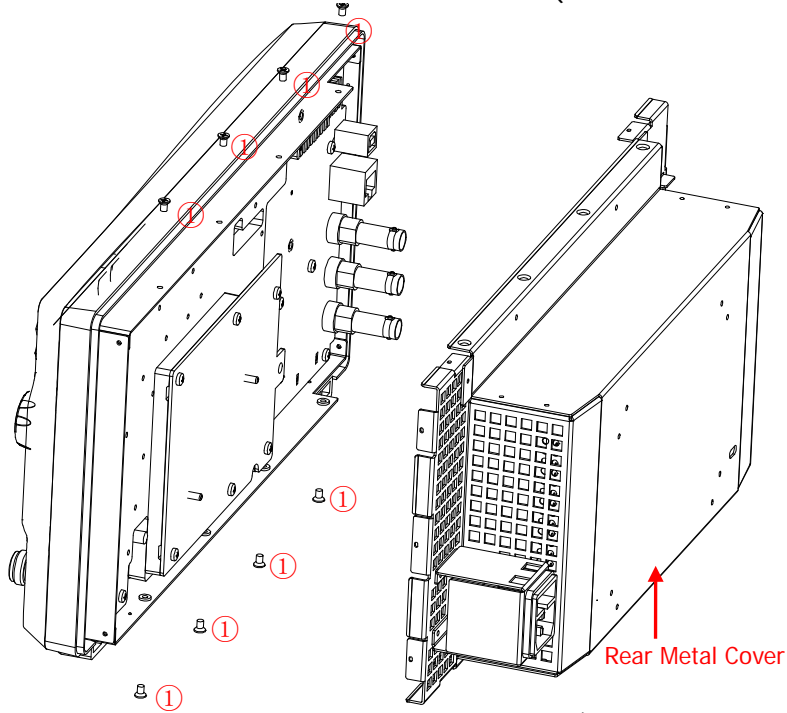


Figure 1-4 To Disassemble the Rear Metal Cover (DSA832/DSA875)

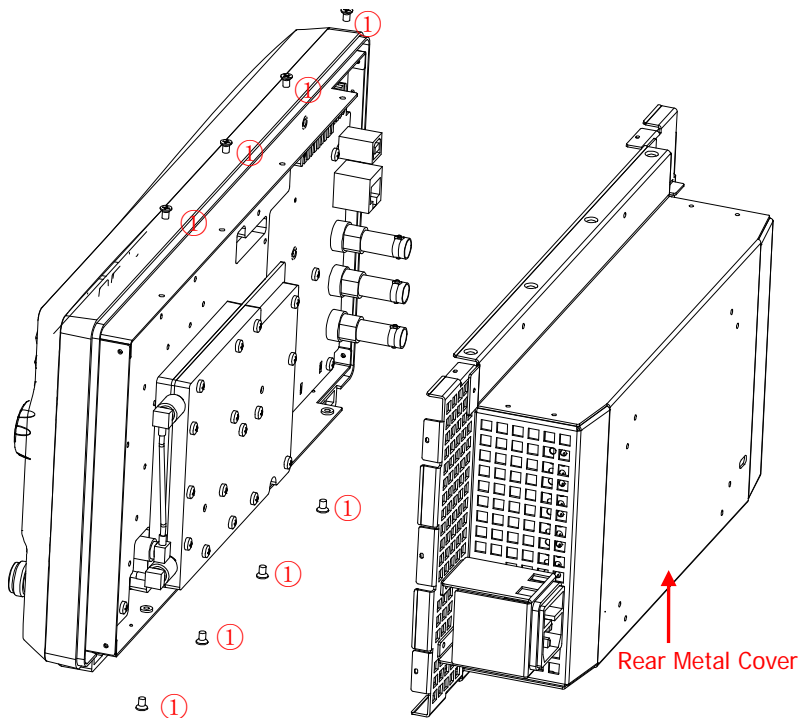


Figure 1-5 To Disassemble the Rear Metal Cover (DSA832-TG/DSA875-TG)

Part Explanation:

- ① 8 screws (M3*4 torx pan head screw) fixing the front metal panel and rear metal cover.

Disassemble Steps:

1. Remove the 3 nuts and washers at the BNC port of the rear metal cover using the BNC socket.
2. Remove the 8 screws (①) fixing the front metal panel and rear metal cover using the screw driver (T10).
3. Remove the power cord connecting the main board and take off the rear metal cover gently.

Tip:

1. Pay attention to the connecting position of the power cord before removing it to avoid incorrect connection or incomplete connection when assembling the instrument.
2. Check whether the screen line and the keyboard cable on the main board are correctly installed before assembling the rear metal cover.

To Disassemble the Main Board

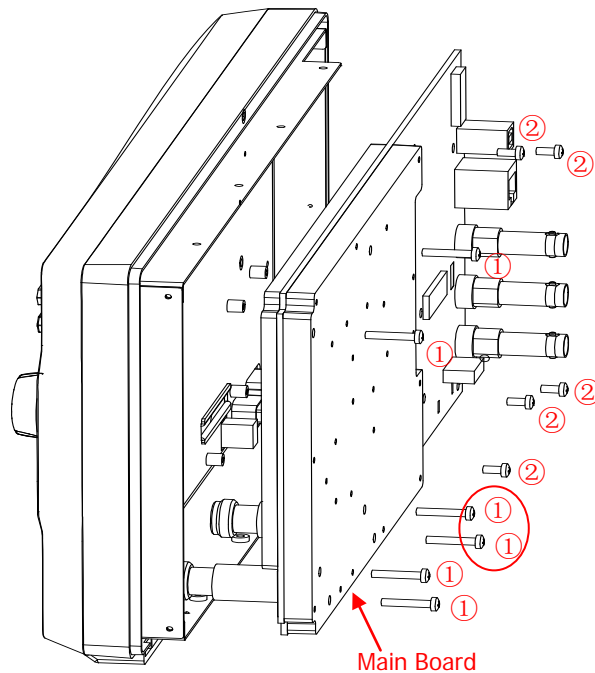


Figure 1-6 To Disassemble the Main Board (DSA815/DSA815-TG)

Part Explanations:

- ① 6 screws (M3*20 torx pan head screw assembly) fixing the main board.
- ② 7 screws (M3*6 torx pan head screw assembly) fixing the main board (the positions of some screws are not marked out in the figure above and please remove them according to their actual positions).

Disassemble Steps:

1. Remove the 13 screws (① and ②) fixing the main board using the screw driver (T10).
2. Remove the keyboard cable and screen line on the main board.
3. Take off the main board gently.

Tip:

1. Pay attention to the connecting position of each cable before disassembling the keyboard cable and screen line on the main board to avoid incorrect connection or incomplete connection when assembling the instrument.
2. For DSA815 (does not include the tracking generator), the two screws (①) in the red circle in the figure above do not exist.

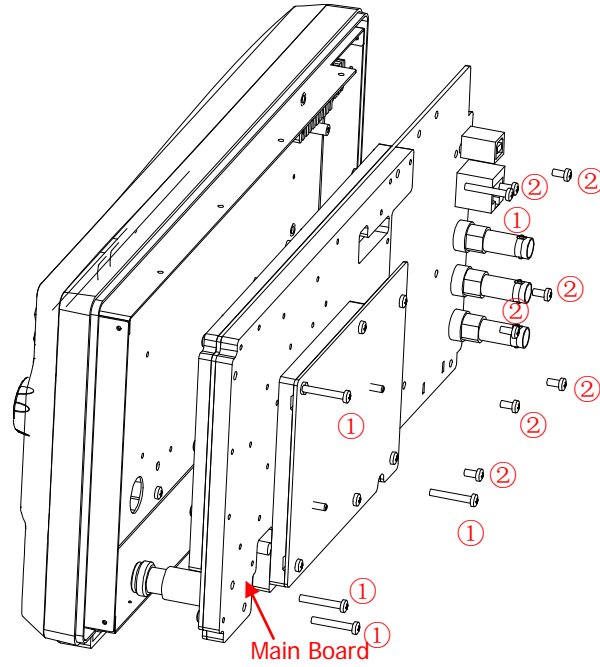


Figure 1-7 To Disassemble the Main Board (DSA832/DSA875)

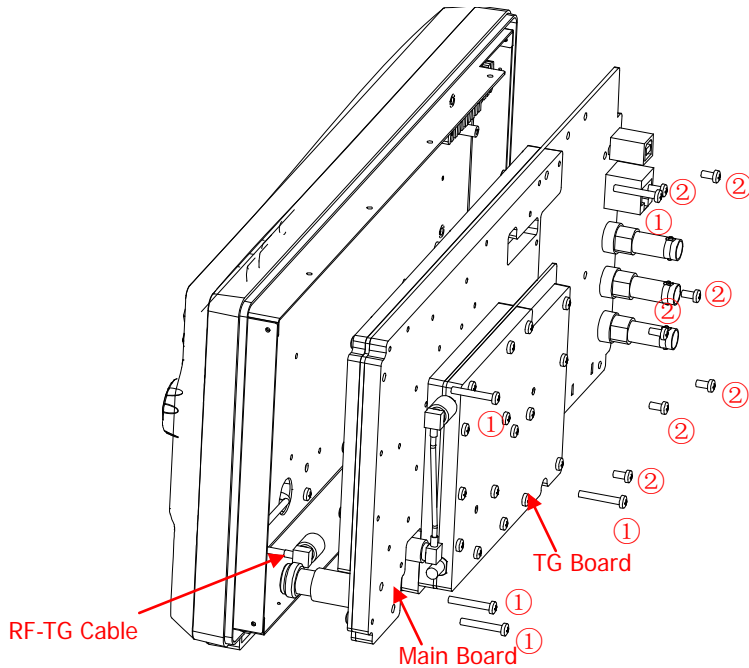


Figure 1-8 To Disassemble the Main Board (DSA832-TG/DSA875-TG)

Part Explanations:

- ① 5 screws (M3*20 torx pan head screw assembly) fixing the main board.
- ② 7 screws (M3*6 torx pan head screw assembly) fixing the main board.

Disassemble Steps:

1. Remove the 12 screws (① and ②) fixing the main board using the screw driver (T10).
2. Remove the RF-TG cable on the TG board (Note: This step is only required when disassembling DSA832-TG or DSA875-TG).
3. Remove the keyboard cable and screen line on the main board.
4. Take off the main board gently.

Tip:

Pay attention to the connecting position of each cable before disassembling the keyboard cable and screen line on the main board as well as the RF-TG cable on the TG board to avoid incorrect connection or incomplete connection when assembling the instrument.

To Disassemble the Power Key

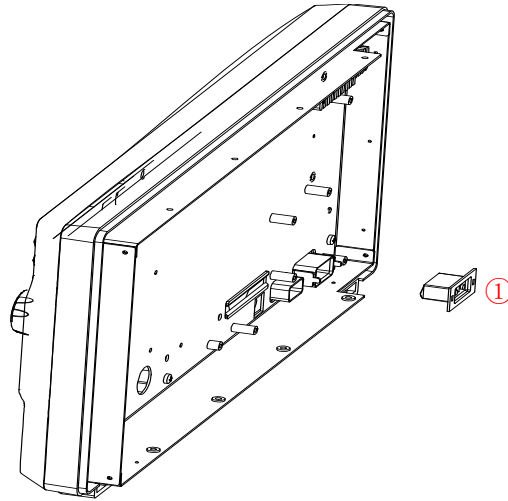


Figure 1-9 To Disassemble the Power Key (DSA815/DSA815-TG/DSA832/DSA875)

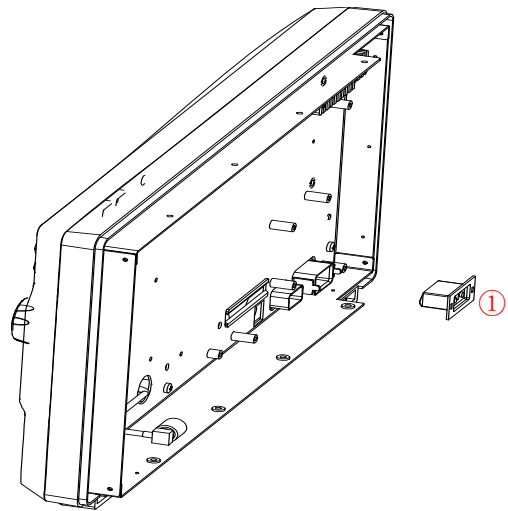


Figure 1-10 To Disassemble the Power Key (DSA832-TG/DSA875-TG)

Part Explanation:

- ① A power key

Disassemble Step:

Take off the power key on the front metal panel gently.

To Disassemble the Front Metal Panel

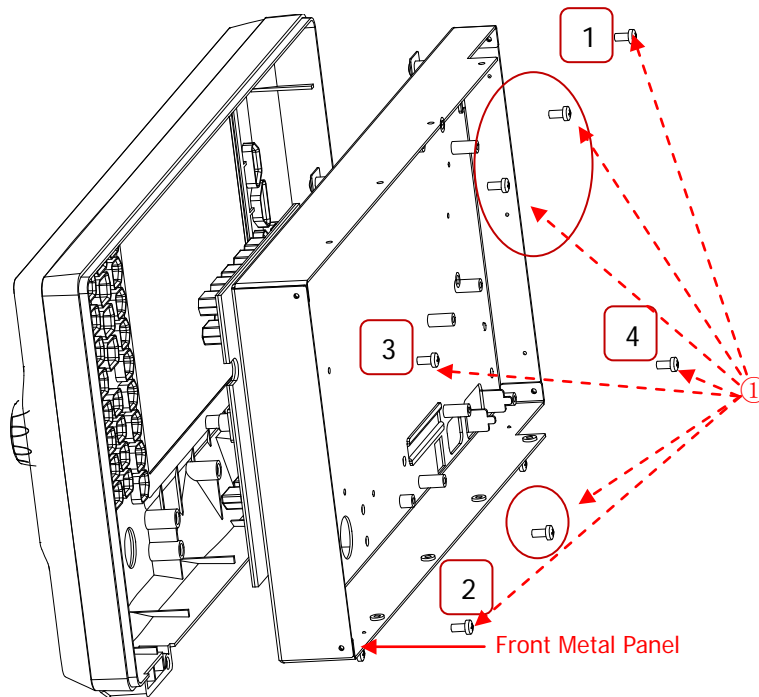


Figure 1-11 To Disassemble the Front Metal Panel (DSA815/DSA815-TG/DSA832/DSA875)

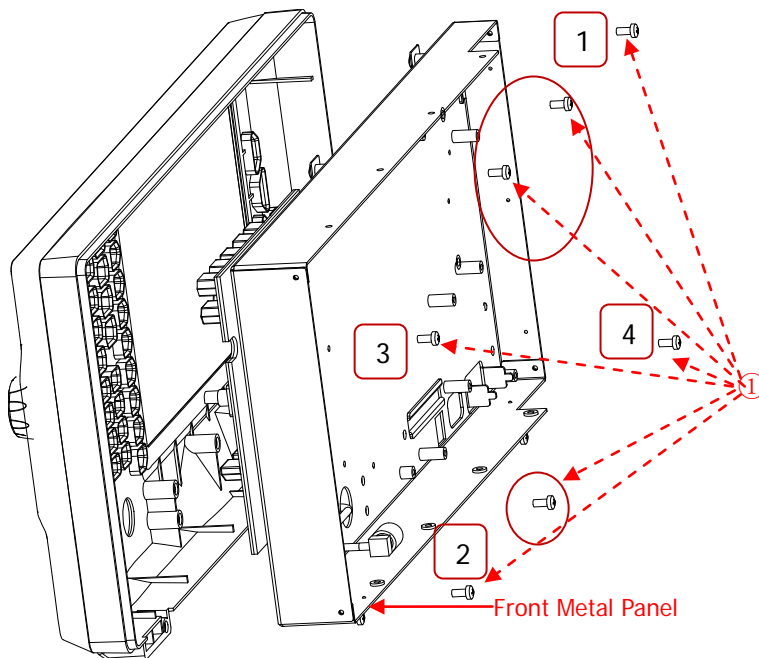


Figure 1-12 To Disassemble the Front Metal Panel (DSA832-TG/DSA875-TG)

Part Explanation:

① 7 screws (M3*6 torx pan head screw assembly) fixing the front metal panel.

Disassemble Steps:

1. Remove the 7 screws (①) fixing the front metal panel using the screw driver (T10).
2. Take off the front metal panel gently.

Tip:

When assembling the front metal panel, the screws 1 to 4 in the figure above should be installed according to the sequence in which they are marked out. To install the other 3 screws, you need to place the panel against the front metal panel.

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 methods 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 pressing the power key:

- (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 start 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 needs to be installed, please use a 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 check whether all of them 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 is broken. Do not disassemble the instrument by yourself and contact **RIGOL**.

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

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

4. Wrong measurement results or poor precision:

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

- (1) Check whether all the external devices are successfully connected and are working normally.
- (2) Have 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 the instrument under the specified environment temperature.

- (4) Calibrate the instrument regularly to compensate for measurement errors that might occur over time.
 - If you need a specific calibration after the stated calibration period, contact **RIGOL** or get paid service from authorized measurement agencies.
 - The analyzer provides self-calibration function. If required, press **System** → **Calibrate** → **Self-Cal** and select "On". The instrument will execute self-calibration regularly. Within half an hour after power-on, the analyzer executes a self-calibration every 10 minutes and per hour after being powered on for more than half an hour.
 - Press **System** → **Calibrate** → **Cal Now** to make a self-calibration immediately.

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 where it may 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 damage to the instrument, do not expose it to caustic liquids.



WARNING

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

Environmental Considerations

The following symbol indicates that this product complies with the WEEE Directives 2002/96/EC.



Product End-of-Life Handling

The equipment may contain substances that could be harmful to the environment or human health. In order to avoid the release of such substances into the environment and harm to human health, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately. Please contact your local authorities for disposal or recycling information.