

PRESIDIUM[®]

Synthetic Diamond Screener II

USER HANDBOOK

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I. DISCLAIMERS, EXCLUSIONS AND LIMITATIONS OF LIABILITY

PLEASE READ AND NOTE PRESIDIUM WARRANTY TERMS AND CONDITIONS as stated in the warranty card. Presidium warranty for its devices are subject to proper use by its users in accordance with all the terms and conditions as stated in the relevant user handbook and shall cover only manufacturing defects.

Due to continuous product improvement, Presidium reserves the right to revise all documents including the right to make changes to the handbook without notice and without obligation to notify any person of such revisions or changes. Users are advised to check Presidium's website from time to time <http://www.presidium.com.sg/>

Presidium shall not be responsible for any damage or loss resulting from the use of this product or handbook.

Under no circumstances shall Presidium, its manufacturer or any of its subsidiaries, licensors, distributors, reseller, servant and/or agent be liable for any direct or indirect damages, resulting from the use of this device.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, under no circumstances shall Presidium, its manufacturer or any of its subsidiaries, licensors, distributors, reseller, servant and/or agent be responsible for any special, incidental, consequential or indirect damages howsoever caused.

The Synthetic Diamond Screener II ("SDS II") by Presidium in this handbook is provided and/or sold on an "as is" basis. Except as required by applicable law, no warranties of any kind expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

II. ABOUT THIS BOOK

Thank you for purchasing the Synthetic Diamond Screener II by Presidium (“SDS II” or “Device”).

This handbook is designed to help you set up your device and describes all you need to know about how to use your diamond screening device accurately and take care of it, in line with its requirements. Please read these instructions carefully and keep them handy for future reference.

This book also contains the terms and conditions in relation to the use of the device including the Disclaimer, EXCLUSION and Limitation of Liability clauses stated above in Section I.

III. ABOUT PRESIDIUM SYNTHETIC DIAMOND SCREENER II (SDS II)

The Synthetic Diamond Screener II (SDS II) is developed to help screen out the Type IIa colorless diamond, which could possibly be synthetic, from the natural Type Ia colorless diamond.

Diamonds can be classified into two Types.

Typically, Type I diamonds contain nitrogen atoms as the main impurity and these diamonds make up almost 98% of all natural diamonds. The usual color of Type I diamond is colorless, brown, yellow or orange but can also be virtually any color other than blue.

Type II diamonds, however, contain few or undetectable nitrogen atoms and they make up the remaining 2% of natural diamonds.¹ Within the Type II category of diamonds, they can be further classified as Type IIa and Type IIb. Type IIa diamonds are usually the purest of color ranging from colorless to near colorless, although they can also be of yellow, brown, orange, pink, red or purple colour. Type IIb are typically not colorless and are usually blue, brown or gray and contain boron atoms as well.

¹ Diamond Grading ABC The Manual. 9th edition, 2007, Verena Pagel-Theisen G.G. F.G.A

Currently, known synthetic colorless diamonds are generally Type IIa diamonds i.e. colorless diamonds without any detectable presence of nitrogen atoms. Type IIa colorless synthetic diamonds can be grown either using chemical vapor deposition (CVD) synthesis or High Pressure High Temperature (HPHT) synthesis, or can be HPHT-treated CVD diamond.

This device helps to identify the Type IIa colorless diamond, which may be a synthetic diamond, but does not distinguish between the various processes through which the synthetic diamond may be grown or treated.

When subjected to deep UV irradiation, Type Ia and Type IIa diamonds absorb different amounts of UV light and this difference in the light absorption is significant enough to aid in differentiating between Type Ia and Type IIa colorless diamonds.

The SDS II is developed and designed based on this principle. Type IIa diamonds allow more deep UV light to pass through and thus its UV light absorption ability is lower.

This device, meant only for use on colorless diamonds (Color D to J), features a safe, user-activated, deep-wave UV light source that passes through the tested stone towards the photo-detector on the base platform inside the product. Bars of colored lights on the front of the lid will provide an easy reading to indicate if the UV light absorption ability of the tested stone is low (i.e. indicative of a Type IIa diamond) or high (indicative of a natural diamond).

If the UV light absorption measurement is low, a single red light bar will light up alerting the tested stone is a Type IIa diamond, which could be synthetic and therefore should be subjected to other supporting tests.

If the UV light absorption measurement is high, a single blue light bar will light up, indicating that the UV light absorption of the tested stone corresponds to the usual absorption range characteristic of a Type I colorless natural diamond.

Created with the user in mind, the Synthetic Diamond Screener II is designed to be a lightweight, portable, sturdy and non-slip unit that can be powered by 4 AAA batteries or through its USB port that connects to either an external power source or to the Presidium Universal Power Adaptor.

The device was designed with the following objectives:

- Aid to alert to the possibility of Type IIa synthetic diamond
- Help in quickly screening out natural Type I colorless (From D to J color) diamond (the most common type of natural diamond) from Type IIa colorless diamond which is usually synthetic diamond
- Provide consistent and reliable test results under proper use and understanding of its functions
- Feature user-safe materials and user-friendly ergonomics that gives clear visibility of results, maximum sturdiness and grip, ease of use and portability

The capabilities of the Synthetic Diamond Screener II are as follows:

- Test on diamonds within a range of dimension from 1.5 mm in width and up to 5 mm in height. (approx. 0.02 to 10 carat size)
- Test on polished stones of common shapes such as round cut, oval cut, princess cut, brilliant round cut, emerald cut, baguette cut, square brilliant cut, step cut and mixed cut
- Can be used on both loose stones and mounted stones jewellery with open-back setting
- Fast testing time of 2 seconds

The user is cautioned against using the Synthetic Diamond Screener II on the following as it may affect the accuracy of the readings:

- × Stones that are more than 5 mm in height as the specific UV wavelength has limited ray reach
- × Diamond of colors other than colorless (D to J)
- × Testing to identify other forms of diamond simulants i.e., moissanite, cubic zirconia, etc are not possible

The SDS II features the following:

- 2 color coded (blue/red) indicator light bars to give clear results of Natural Type I Diamond and Type IIa Diamond
- Test button will blink in red to alert if the device is unable to detect any stone on the photo-detector
- Exterior base rubber padding to ensure non-slip sturdiness and prevent scratches to surfaces
- Streamlined ergonomic design that enhances portability and stability
- Exterior USB port at back of unit for connecting to external power source
- International voltage compatibility
- Low battery indicator
- USB power

The interior testing area of SDS II features:

- UV light source pre-set at a safe and optimum wavelength to accurately measure the UV absorption ability of stones
- Crosshair marking on the probe as guide for positioning rings
- Blue light to illuminate the testing pad
- Light-sensitive photo detector in the center of base platform to detect the amount of light that is able to pass through the stone
- Anti-slip platform to hold the stone in place
- A 5mm metal bar to conveniently raise the test probe for successive testing on loose stones

Included in your package:

- Presidium Synthetic Diamond Screener II unit
- Protective carrying case with interior pouch for gemstones and accessories
- 5mm metal bar
- USB cable
- Presidium Universal Power Adaptor
- User handbook
- Warranty card

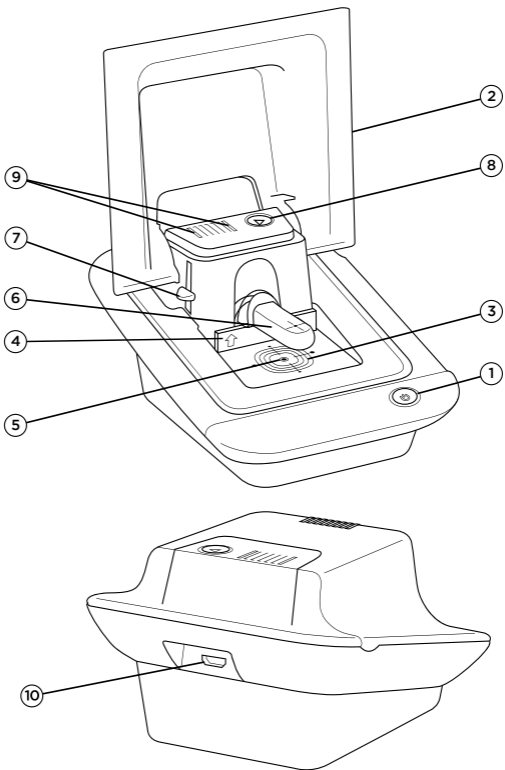


Fig.A Synthetic Diamond Screener II Unit

Features/Functions (Fig.A)

1. Power button (On/Off and Low Battery Indicator)
2. Lid
3. Anti-slip platform with concentric markings to ensure correct placement of stone
4. A 5mm metal bar to conveniently raise the test probe for successive testing on loose stones
5. Photo-detector
6. UV light source with crosshair marking as ring guide embossed on top and light pointer
7. Lever to adjust the light source
8. "Start Test" button
9. Two indicator lights labelled "Natural" and "Type IIa Diamond"
10. Micro USB port

IV. IMPORTANT NOTICE

- Before testing, ensure that your gemstone is a diamond and not a diamond simulant (moissanite, cubic zirconia or other colorless stones).
- Keep the device dry. Precipitation and all types of liquids or moisture can contain minerals that will corrode electronic circuits. If your device gets wet, remove the battery and allow the device to dry completely before replacing it.
- Do not use, store or expose the device in dusty, dirty areas. Its moving parts and electronic component may get damaged.
- Do not use, store or expose the device in hot areas. High temperatures can damage or shorten the life of the device, damage batteries, and warp or melt certain plastics.
- Do not use, store or expose the device in cold areas. When the device returns to its normal temperature, moisture can form inside the device and damage electronic circuit boards.
- Do not attempt to open the device other than as instructed in this handbook.
- Do not drop, knock, or shake the device. Rough handling may break internal circuit boards and fine mechanics.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the device.
- Do not paint the device. Paint can clog the moving parts and prevent proper operation.

If the device is not working properly, kindly contact Presidium Customer Service at **service@presidium.com.sg** or:

Presidium Instruments Pte Ltd
Unit 7
207 Henderson Road
Singapore 159550
Attn: Customer Service Executive

1. GETTING STARTED WITH YOUR SYNTHETIC DIAMOND SCREENER II

1.1 POWERING UP YOUR DEVICE

The Synthetic Diamond Screener II can be powered by batteries or an external power source through the USB cable connected to the Presidium Universal Power Adaptor (both are included in the packaging)

If batteries are used, you can locate the battery compartment at the bottom of the unit. Release the two catches on the battery cover and remove the battery cover to reveal the battery compartment. (Fig 1.1)

4 AAA batteries are needed to power the device. Do take note of the positive (+) and negative (-) directions of the batteries when inserting them into device. The use of alkaline batteries is recommended as it should generally allow for approximately 2400 tests.

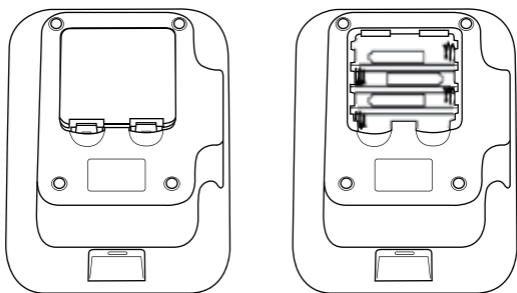


Fig.1.1 Removing the battery covers to reveal the battery well

If an external power source is used, insert the provided micro USB cable to the port located at the back of the device (Fig 1.2) and the other end to the provided Presidium Universal Power Adaptor for connection to an external power socket.

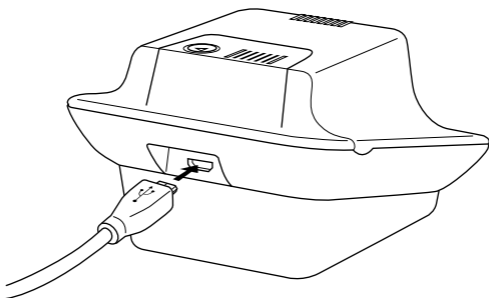


Fig.1.2 Plug the micro USB into the port located at the back of the device

You may also connect the other end of the USB cable directly to an external power source (e.g. computer, laptop, etc).

It is recommended you use only the USB cable and the Presidium Universal Power Adaptor provided with your product.

1.2 SWITCHING ON YOUR DEVICE

To switch on your Synthetic Diamond Screener II, press and hold the Power button located at the front of the unit. A blue light will blink for approximately 4 seconds to allow the product to warm up. (Fig 1.3)

Once the blue light stops blinking and remains stable, the device is ready for use.

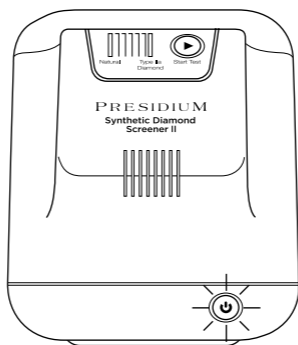


Fig.1.3 Switch on Synthetic Diamond Screener II with the Power button

1.3 SWITCHING OFF YOUR DEVICE AND POWER-SAVING AUTO-OFF

To switch off your Synthetic Diamond Screener II, press and hold the Power button for approximately 2 seconds until the light goes off.

To ensure that your Synthetic Diamond Screener II conserves power, the unit will automatically switch off 10 minutes after the last activity.

1.4 LOW BATTERY INDICATOR

When the battery is too low for the device to function, the Power button light will blink red. (Fig 1.4)

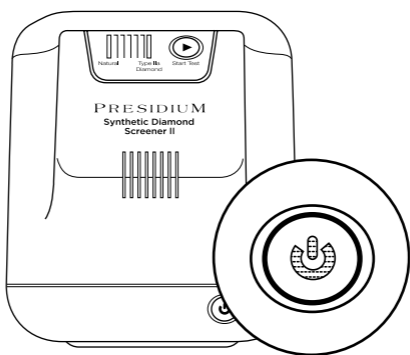


Fig.1.4 Low Battery Indicator in Red Light shown on Power Button

When the Low Battery Indicator turns red, the device is not able to conduct any more tests and the UV light source inside the device will not be able to switch on.

Replace the batteries or switch power source when it is necessary.

Battery Information

Do not leave worn out batteries in the battery compartment as the batteries may corrode or leak, and damage the circuitry of the device. It is recommended that batteries should be removed when the device is expected to be stored for an extended period of time.

Batteries do not have to be removed from the unit when the Presidium Power Universal Adaptor is used through the USB cable.

2. PERFORMING A TEST WITH YOUR SYNTHETIC DIAMOND SCREENER II

The Synthetic Diamond Screener II works accurately with known colorless diamonds of color D to J. You should ascertain if your stone is a diamond first, before using this device.

Use the finger grips on the front of the lid to lift the lid and access the interior testing area. (Fig 2.1)

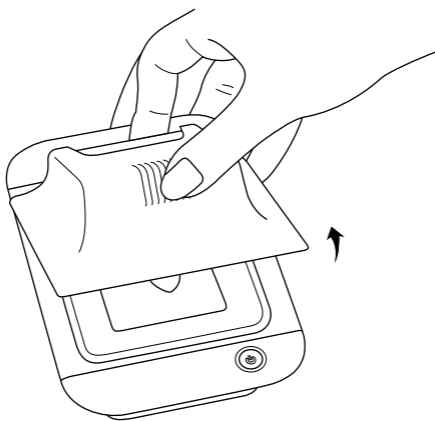


Fig.2.1 Lift the lid of the device using the finger grips on the front

Testing is performed under the lid of the Synthetic Diamond Screener II where a testing area is marked by a hole in the center and a protruding overhead UV light source (Fig 2.2). The stone is placed covering this hole and testing begins when the lid is closed and the "Start Test" button is pressed. Results will be displayed from the adjacent light bars within 2 seconds upon testing.

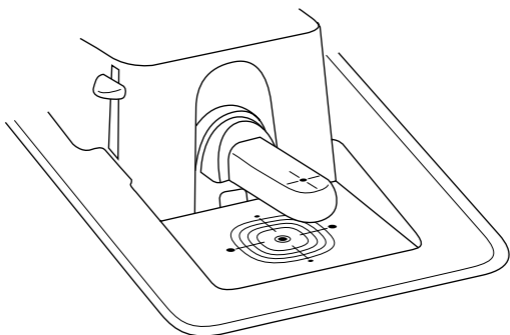


Fig.2.2 The interior testing area inside the device

The following instructions will guide you through testing loose diamond and mounted diamond.

2.1 FOR TESTING ON LOOSE DIAMOND

Ensure your loose diamond stone is wide enough to cover the testing area. It should be approximately 1.5 mm in width. Your diamond should also not exceed 5 mm in height to ensure that the UV wavelength transmitted by the UV light source can be accurately measured.

Place the diamond stone over the testing area (Fig 2.3). The table of the stone should be placed face-down on the testing area. Ensure that the testing area is completely covered by the diamond so that the emitted wavelength will pass through the stone material and not erroneously through other material which can then give an inaccurate reading of the UV light absorption ability of the diamond.

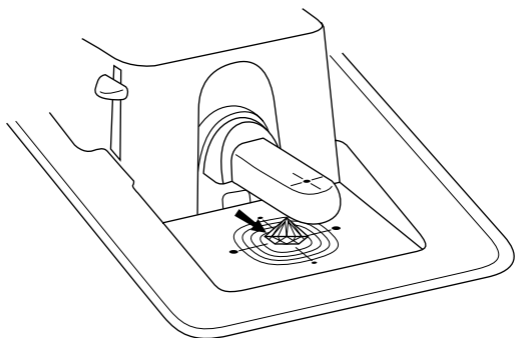


Fig.2.3 Location of the loose diamond over the testing area

Release the lever to lower the UV light source and secure the diamond in place for testing. (Fig 2.4)

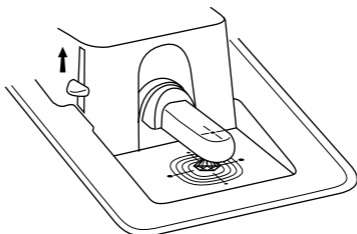


Fig.2.4 Adjust the UV light source with lever to secure the diamond in place

If you are testing multiple loose stones, use the metal bar provided to hold the light source in place so that you do not need to keep adjusting the lever in order to position the loose stones (Fig 2.5). It is not necessary for the light source to touch the stone for the testing to be carried out. (Fig 2.6)

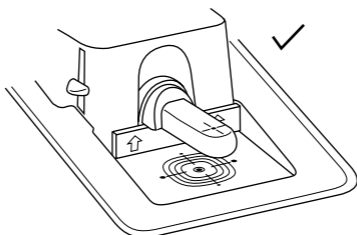


Fig.2.5 Correct position

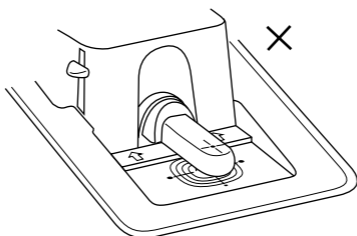


Fig.2.6 Wrong position

2.2 FOR MOUNTED DIAMONDS

Ensure that the stone is set with an open-back setting, meaning you can still see a clear view and colour of the stone when you view the back of it and it is not obscured by the jewelry metal or other stones. (Fig 2.7).

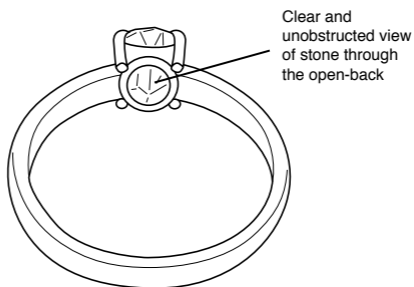


Fig.2.7 An example of jewelry with open-back setting

If your mounted open-back diamond is in a ring, place the ring in the centre of the cross-hair marking Ring Guide that is embossed on the UV light source. The table of the mounted diamond should be directly facing down on the testing area.

With the ring hung within the Ring Guide area, use the lever to lower the UV light source to secure the stone over the testing area (Fig 2.8)

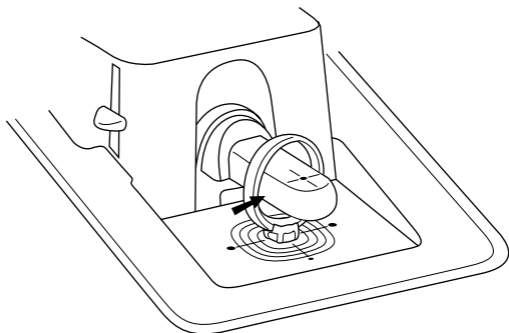


Fig.2.8 Using the Ring Guide on the UV light source and securing the stone in place

2.3 START TEST

The “Start Test” button located at the top right corner of the device serves as an indication when the device is ready for testing and the interior UV light source is activated to begin the identification procedure.

You should only begin to use the device for testing when the “Start Test” button is lit in a steady blue. (Fig 2.9)

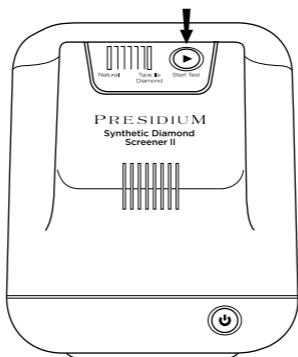


Fig.2.9 Press “Start Test” button to perform a test

When testing is being conducted, the “Start Test” button will blink in blue and when testing is done, the light will hold steady as a white light.

You can then read the result from the light bar indicators.

To start a new test, press the “Start Test” button again to return it to ready mode. The button light should revert to be steady blue.

To understand your test results, refer to Section 3 in this book – “Reading test results on your SDS”.

2.4 IMPORTANT NOTES ABOUT PERFORMING A TEST

- Ensure your tested gemstone does not exceed 5 mm in height and its width covers the Photo-detector completely. The carat equivalent of this is approximately 0.02 to 10 carats.
- Conduct prior supporting tests to ascertain the stone for testing is a diamond.
- Only open-back mounted jewelry can be tested.
- To ensure accuracy, it is recommended to place the gemstone in at least four different positions on the testing area and to check if the readings are consistent.
- Ensure the testing platform and photo-detector are free of dirt and dust for a reliable testing result.
- To prevent inaccurate results, no test can be conducted when the Power button turns red, indicating low battery.
- You can only conduct a test when the “Start Test” button is lit in blue.
- A test is completed when the “Start Test” button stops blinking and is lit in white.
- To reset and start a new test, press the “Start Test” button so that the button light reverts to blue light.

3. READING TEST RESULTS WITH YOUR SYNTHETIC DIAMOND SCREENER II

The SDS measures the UV absorption ability of the diamond and this measurement is communicated as 'Natural' or 'Type IIa Diamond'.

After the "Start Test" button is pressed, the button will start to blink in blue as testing is underway. Within 2 seconds, the Indicator light bar will be lit. A lit blue bar will indicate the reading is 'Natural' and a lit red bar will indicate 'Type IIa Diamond'. (Fig 3.1)

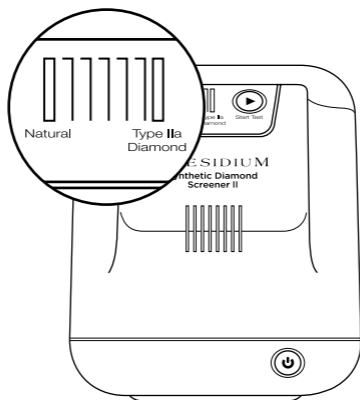


Fig.3.1 Results are to be read from the Indicator Lights

When the test is complete, the "Start Test" button will stop blinking and be lit in white.

Blue Bar of light/Natural

The first bar on the left will indicate the 'Natural' reading and will be lit in blue (Fig 3.2).

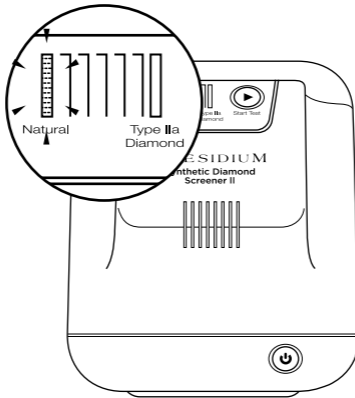


Fig.3.2 'Natural' Reading

The blue light labelled 'Natural' indicates the UV light absorption ability of the tested diamond stone is high as there are trace elements within the stone that has absorbed the UV light, thus allowing very little UV light through to the photo-detector. This is characteristic of a natural Type I colorless diamond.

Red Bar of light/Type IIa Diamond

The first light bar on the right will indicate 'Type IIa Diamond' and will be lit in red (Fig 3.3).

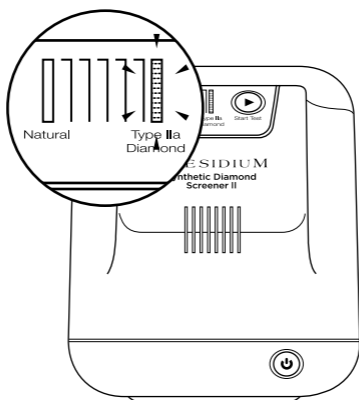


Fig.3.3 'Type IIa' Reading

A 'Type IIa Diamond' reading means the UV light absorption ability of the tested diamond stone is low and this is due to the lack of trace elements such as nitrogen within the colorless diamond, allowing the light to pass through the diamond with little obstruction. The red light in the 'Type IIa Diamond' reading will alert you that the tested stone could be a synthetic laboratory grown diamond.

Should you get this result, it is recommended for you to conduct further testing via other means on this stone as this indicates the diamond is most likely a synthetic Type IIa diamond or a natural Type IIa diamond.

4. OVERVIEW OF BUTTONS & INDICATORS ON YOUR SYNTHETIC DIAMOND SCREENER II

The table below summarizes the functions and representations of the buttons and lights on the Synthetic Diamond Screener II device.

Power Button

Description	Light	Function
Press and hold the power button to switch on the device	No light	Device is being switched on and will start warming up.
Device warms up for approximately 4 seconds	Blinking blue then steady blue	Device is starting up.
Device is powered and ready for use	Steady blue light	Device has power and is ready to begin testing.
Low battery indicator	Blinking red light	Device cannot operate with low battery.
Loose connection/ Non-working interior UV light	Blinking red light	Device's UV light is not connected/working properly.
Press and hold the power button for 2 seconds to turn off the device.	No lights	Device is being switched off.

Start Test Button

Description	Light	Function
No stone on the photo-detector is detected	Blinking red	Device is unable to detect any stones on the photo-detector.
Ready for testing	Steady blue	Device lid is closed and ready for testing with the interior UV light source switched off.
Testing is underway	Blinking blue	Device is conducting the test with the interior UV light source switched on.
Test is complete	Steady white	Device has completed the test and a result will be displayed.
Testing is prohibited	No light	Device lid is opened and testing is prohibited. Close the lid to proceed with testing.

Indicator Lights Display

Description	Light	Function
Blue Light Bar indicator light above the label marked 'Natural'	Steady Blue	The test is completed and the tested diamond has recorded high UV absorption ability, indicating that it is a Type Ia diamond likely to be a natural diamond.
Red Light Bar indicator light above the label marked 'Type IIa Diamond'	Steady Red	The test is complete and the tested diamond has recorded low UV absorption ability, indicating that it is a Type IIa diamond which could be synthetic and it is recommended to do further testing via other means.

5. TAKING CARE OF YOUR SYNTHETIC DIAMOND SCREENER II

The Synthetic Diamond Screener II should be handled with care. Always cover it or place it securely in its custom carrying case when the device is not in use. Caution should be taken so as not to damage the device.

Do not leave worn out batteries in the battery compartment as the batteries may corrode or leak, and damage the circuitry of the device. It is recommended that batteries should be removed when the device is expected to be stored for an extended period of time.

Your tester is a product of extensive design and craftsmanship, please treat it with care.

Thank you for taking time to go through the user handbook, which helps you to understand your recent purchase better.

Presidium also recommends that you register your warranty by sending the provided warranty registration card to us or by registering online at <http://www.presidium.com.sg/>.

www.presidium.com.sg