

DE BEERS GROUP

IGNITE™

Automated Melee Screening 2 (AMS2) Device

Operating Manual



PLEASE READ THIS IMPORTANT INFORMATION PRIOR TO USE**DISCLAIMER**

The intended use of this Automated Melee Screening (AMS2) Device (the "AMS2 Device") is expressly limited to that set out in Terms and Conditions for the Supply of AMS2 Devices, Software and Warranty support services (the "Conditions") and this Operating Manual. Changes to this Operating Manual will be effective once they are published on <https://www.iidgr.com>. Continued use of the AMS2 Device signifies acceptance of these changes.

The use of the AMS2 Device signifies acceptance of the above conditions.

DISCLAIMER

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

IMPORTANT NOTICE

**THERE ARE NO USER SERVICEABLE PARTS WITHIN THE INNER AMS2
DEVICE COVERS.**

Contents

1	LIMITATIONS OF USE	7
2	SAFETY INFORMATION	8
2.1	Safety labels used on the AMS2 Device	8
2.2	information Labels used on the AMS2 Device	9
2.3	Position of Labels	9
2.3.1	External Labels	9
2.3.2	Internal Labels.....	10
2.4	Environmental	11
2.4.1	European Union	12
2.5	General Safety	12
2.6	UV & Laser Safety	12
2.7	Service Warning	13
3	INTRODUCTION.....	13
3.1	Typical Performance	13
3.2	AMS2 Device Identification	13
3.3	User Interfaces	13
3.3.1	Front Cover	13
3.3.2	Hopper	14
3.3.3	Application Interface	15
3.3.4	Dispense Bins	15
3.4	Computer Hardware	16
4	EXTERNAL CONNECTIONS	17
4.1	Power Supply.....	17
4.2	Ethernet Port.....	17
4.3	USB Port.....	18
4.4	Debug Port	18
4.5	Accessory Power	18
5	INSTALLATION AND COMMISSIONING	18
5.1	Selection of Location for Installation	18
5.2	Calibration.....	20

6	OPERATING THE AMS2 DEVICE.....	21
6.1	Initialisation Procedure	21
6.2	Screening Stones	22
6.2.1	Weigh the Stones.....	22
6.2.2	Check that the AMS2 Device is Empty and that the Bins are Correctly Located	23
6.2.3	Clean the Disc and Stone Path.....	23
6.2.4	Pour Stones into the Hopper.....	24
6.2.5	Reset the Counts on the AMS2 Program	24
6.2.6	Select Stone Cut	25
6.2.7	Select Stone Size.....	25
6.2.8	Start Screening	26
6.2.9	Handling and Dispensing	27
6.2.10	Interpretation of Results.....	28
6.2.11	'Refer' Re-Test.....	29
6.2.12	'Non-Diamond' Re-Test	29
6.3	After Use	30
6.3.1	Parcel Screening Finished	30
6.3.2	Run a Purge Cycle.....	30
6.3.3	Weigh the Contents of the Screened Bins.....	30
6.3.4	Check that the AMS2 Device for missing stones.....	30
6.3.5	Purging the AMS2 Device.....	34
6.3.6	Switching the AMS2 Device Off	35
6.3.7	Regular Maintenance.....	36
7	ADDITIONAL AMS2 PROGRAM FEATURES.	37
7.1	File Menu Functionality.	37
7.1.1	File->Save.....	37
7.1.2	File->Print and File->Print Preview.	37
7.2	Edit Menu Functionality.....	37
7.2.1	Edit->Copy.	37
7.3	View Menu Functionality.	37
7.3.1	View->Performance	37
7.3.2	View->Stone Counters.....	38
7.3.3	View->Screening Records.....	38
7.3.4	View->Calibration Records.....	38
7.4	Tools Menu Functionality.....	38
7.4.1	Tools->Settings.....	39
7.4.2	Tools->Options.....	39
7.5	Logging Functionality.....	39
8	TROUBLESHOOTING & MAINTENANCE.....	39
8.1	Reduced Feed rate	39
8.1.1	Dirty Machine	39
8.1.2	Dirty Stones.....	39
8.1.3	Poor Feed Rate.....	39
8.1.4	Feed Rate Too Fast	40
8.2	Missing Stones	40

8.3	Replacing the Foam Rollers	41
9	UNPACKING AND PACKING THE AMS2 DEVICE	41
9.1	Unpacking the AMS2 Device	41
9.2	Packing the AMS2 Device	42
9.3	Packing List	43
10	ACCESSORIES	43
10.1	AMS2 Humidifier Accessory	43
10.1.1	Installation of the Humidifier Accessory	43
10.1.2	Conditions of Use of the Humidifier Accessory	44
10.1.3	Cleaning the Humidifier Accessory	44
10.1.4	Removing the Humidifier Module	44
10.1.5	Replacing the Humidifier Module	45
11	SOFTWARE UPDATES	45
11.1	AMS2 Software Updates	45
11.2	Microsoft Windows Updates	45
12	SPECIFICATION	46
13	LEGISLATIVE COMPLIANCE TESTING	46
13.1	Legislative Compliance Directives	46
13.2	Standards to Which Conformity is declared	46
	Safety of laser products. Equipment classification and requirements	46
13.3	CE Declaration of Conformity	47
	Figure 1 - Rear View of AMS2 Device	9
	Figure 2 - Side View of AMS2 Device	10
	Figure 3 – Internal Laser Safety Labels	10
	Figure 4 - Internal UV Safety Labels	11
	Figure 5 - The Hopper	14
	Figure 6 - User Application GUI	15
	Figure 7 - Dispense Bins	15
	Figure 8 - Removing Dispense Bins	16
	Figure 9 - External Socket Locations	17
	Figure 10 - AMS2 Calibration Sample	20
	Figure 11 - The Status Bar	21
	Figure 12 - Ready for Screening	22
	Figure 13 - Removal of Front Cover	23
	Figure 14 - Pour Stones into the Hopper	24
	Figure 15 - Enter Stone and Parcel Details and Optional Parcel Reference	25
	Figure 16 - Stone Size Range	26
	Figure 17 - Start Button	27
	Figure 18 - Fast Start	27

Figure 19 - Bin Totals and the Dispense Bins.....	28
Figure 20 - Resetting the Bin Counts.....	29
Figure 21 - Removing the Hopper.....	31
Figure 22 - Removing Hopper Rollers	31
Figure 23 - Disconnecting the Dispenser Comms Cable.....	32
Figure 24 - Stone Guide Plate Thumb Screws	32
Figure 25 - Lifting the Stone Guide Plate.....	33
Figure 26 - Purge Button.....	34
Figure 27 - Quickly Removing Stones from the Hopper	35
Figure 28 - Cleaning the Stone Guide Plate	36
Figure 29 - Remove the Lower Phosphorescence Cover.....	40
Figure 30 : Humidifier Accessory	43

1 LIMITATIONS OF USE

The second generation Automated Melee Screening (AMS2) Device (the "AMS2 Device"):

- is a compact automated screening device intended for use in all locations where polished diamonds are handled and which meet the environmental conditions specified in section 2.4 on page 11.
- is designed to automatically feed, handle and dispense small polished diamonds to discriminate natural diamond from synthetic diamond and diamond simulants.
- is only intended for use with colourless or near-colourless diamonds.
- will have an extremely high referral rate for natural brown and natural fancy colour diamonds.
- is designed to screen and dispense a maximum parcel size of 500ct.
- is not intended for use in the classification of other precious gems or diamond simulants, nor to detect the treatment of natural diamonds e.g. fracture filling, irradiation or heat-treatments.

The diamonds used with the AMS2 Device:

- must be acid cleaned prior to screening to guarantee efficient rates of processing and to prevent grease or electrostatic charge causing the diamonds to adhere to each other.
 - Diamonds adhering to each other will not be processed correctly.
- must have dimensions between:
 - 0.0033 ct (0.9mm diameter) and 0.20 ct (3.8mm diameter) for round brilliant diamonds; or
 - a smallest linear dimension of 1mm and a largest linear dimension of 4mm for fancy cut diamonds. For the avoidance of doubt, the smallest linear dimension corresponds to the smallest value of diameter, length, width or height of the smallest diamond in a parcel and the largest linear dimension corresponds to the largest value of diameter, length, width or height of the largest diamond in a parcel.
 - Diamonds which are smaller than the lowest size will jam inside the mechanism and those which exceed the largest size will not be automatically handled.
 - In both cases, attempting to process diamonds outside of the stated size range will cause the AMS2 Device to malfunction and may cause damage to the AMS2 Device and/or the diamonds. No guarantee is given or implied that stones outside the stated size limits will be retrievable from the machine.
- Should be sieved to ensure that they are within the stated limitations of use in the AMS2 Device and that no debris or other foreign material is present.
- Should, for a given parcel, have:
 - contain one cut only; for the avoidance of doubt the performance of the machine will be impaired if mixed cuts are screened.
 - for round brilliant diamonds a maximum diameter variation of 0.2mm for diamonds below 2pts and 0.5mm for diamonds above 2pts.
 - for fancy cut diamonds:
 - a maximum variation of the smallest linear dimension of 0.2mm for stones for which the smallest linear dimension is less than 1.5mm; and
 - a maximum variation of the smallest linear dimension of 0.5mm for stones for which the smallest linear dimension is greater than 1.5mm.

Warning



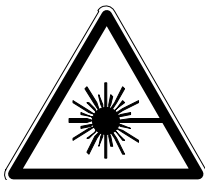
Under no circumstances should diamonds smaller than 0.9mm (round brilliants) or having a smallest linear dimension of less than 1mm (fancy cuts) be screened on the AMS2 Device. These stones will jam the AMS2 Device and may damage the AMS2 Device and/or the diamonds. In such circumstances no guarantee is given or implied that stones outside the stated size limits will be retrievable from the machine. It is also likely that stones below the stated minimum sizes may not be correctly contained within the machine.

2 SAFETY INFORMATION

2.1 SAFETY LABELS USED ON THE AMS2 DEVICE



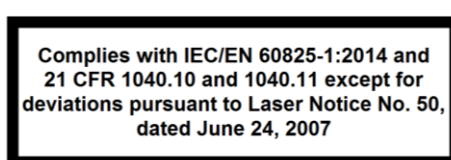
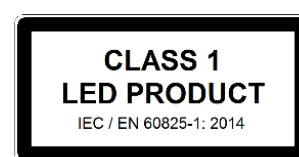
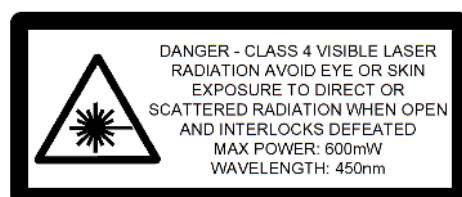
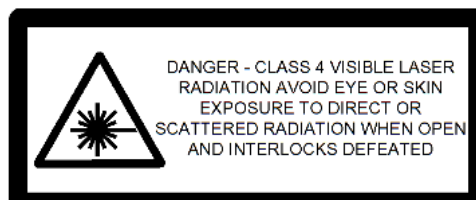
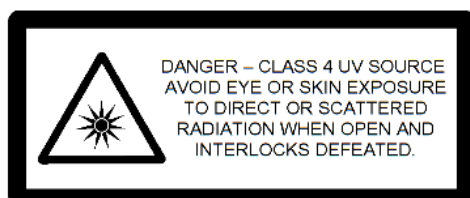
The AMS2 Device operates from a 24V DC power limited power supply unit which is connected to the mains supply using a standard IEC flex.



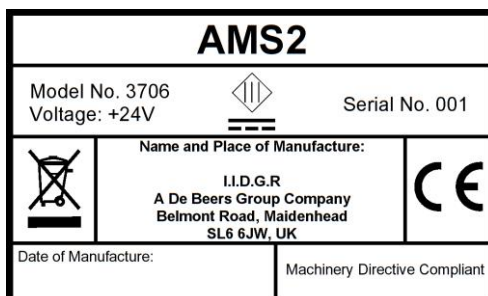
The Laser Starburst - The AMS2 Device contains a Class 4 laser, but a safety interlock is fitted to the Front Cover making the AMS2 Device a Class I laser product.



The UV Starburst - The AMS2 Device contains a Class 4 UV source, but a safety interlock is fitted to the Front Cover making the AMS2 Device a Class I UV product.



2.2 INFORMATION LABELS USED ON THE AMS2 DEVICE



Rating Label – This label defines information about the AMS2 Device

2.3 POSITION OF LABELS

2.3.1 External Labels

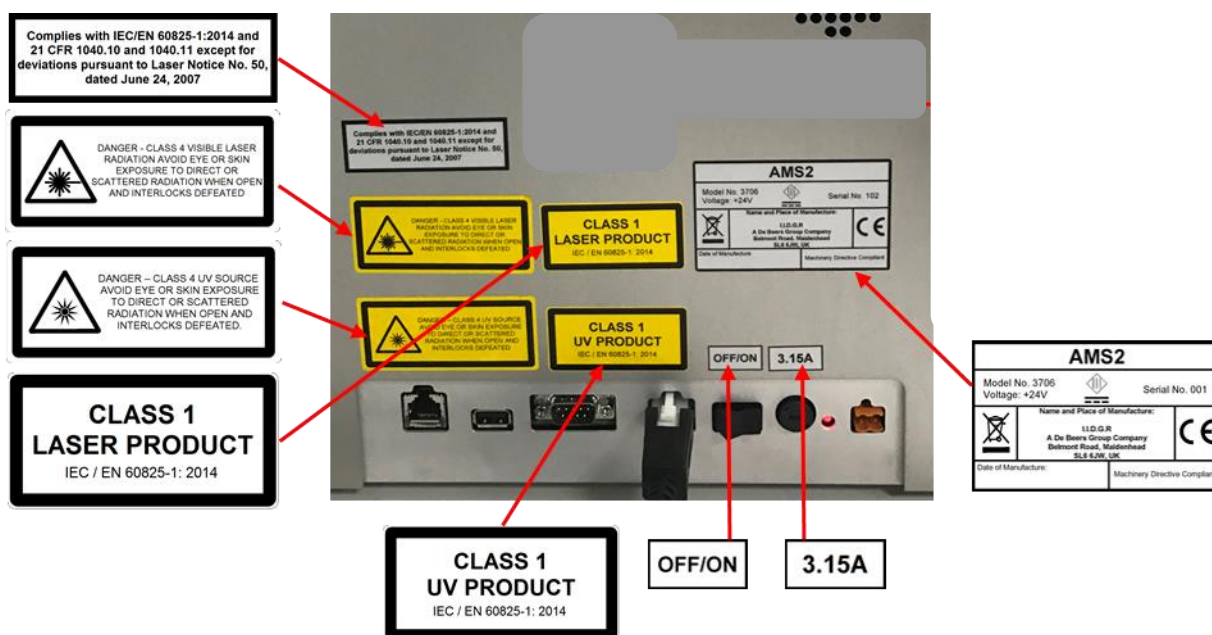


Figure 1 - Rear View of AMS2 Device



Figure 2 - Side View of AMS2 Device

2.3.2 Internal Labels

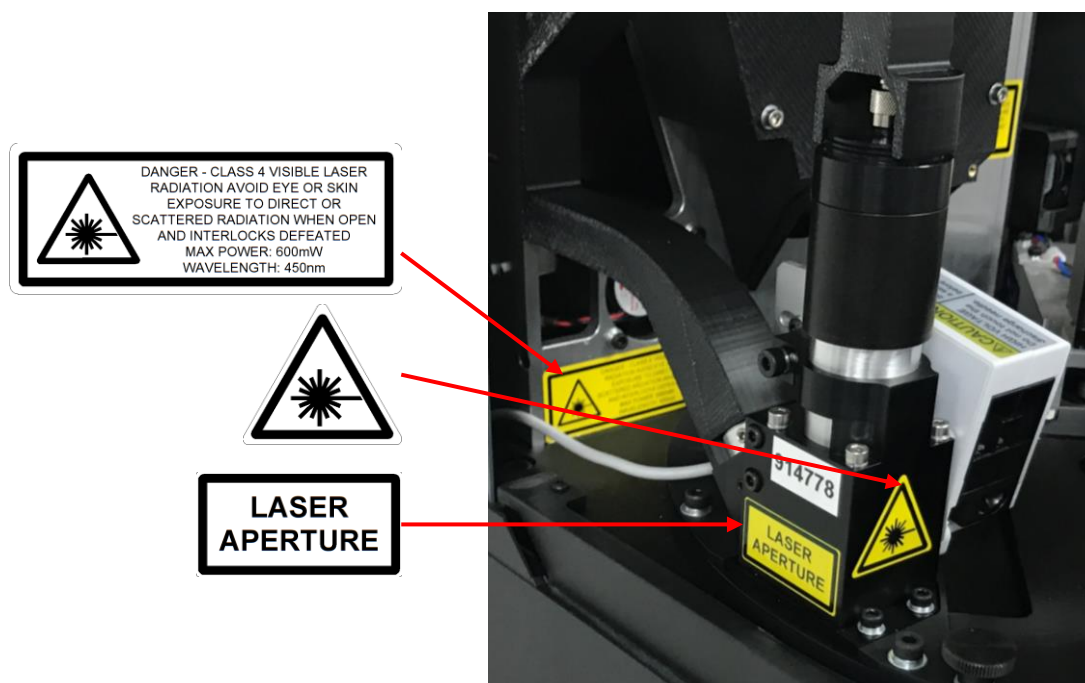


Figure 3 - Internal Laser Safety Labels

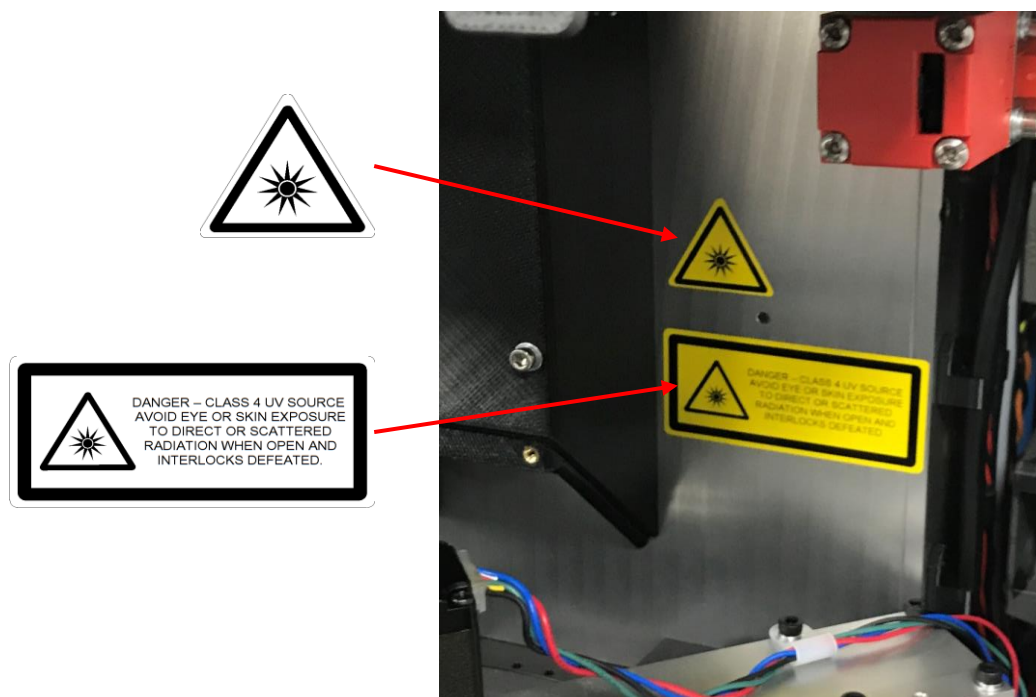


Figure 4 - Internal UV Safety Labels

2.4 ENVIRONMENTAL

The AMS2 Device is designed for indoor use only.

It should be used in the temperature range 15 °C to 28 °C and with an operating humidity of between 45% to 65% non-condensing.

The maximum operating altitude is 2000 metres.

The AMS2 Device measures the environmental conditions and will inform the user if these are outside of the operating range. If the conditions are outside of the specified range the performance of the machine will become impaired and cannot be guaranteed. It is not possible to calibrate the machine if the operating environment is outside the stated limits.

Tip / Information



If overnight running of the AMS2 Device is to take place it is important to ensure that the environmental conditions are maintained throughout the screening run.

2.4.1 European Union



EUROPEAN UNION ONLY

This equipment is marked in compliance with EU directives 2202/96/EC and EN50419.

It is marked with the recycling symbol as shown. It means that at the end of the life of the equipment it must not be placed in the normal domestic unsorted waste stream. Please return it to the manufacturer at the address below for appropriate recycling and disposal:

De Beers Technologies UK Ltd
Belmont Road
Maidenhead
Berkshire
SL6 6JW
United Kingdom

2.5 GENERAL SAFETY

The AMS2 Device should only be used in accordance with the instructions given in this Operating Manual. **Failure to follow these instructions could impair the safety protection that is provided.**

The AMS2 Device is a Class 1 laser product and a Class 1 Ultraviolet (UV) product. The safety aspects of these potential hazards are discussed in section 2.6.

Warning



Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure to laser and/or ultraviolet radiation.

2.6 UV & LASER SAFETY

The outer front cover forms part of an interlock system designed to ensure that the user is not exposed to laser or UV radiation. Prior to using the AMS2 Device the condition of the front cover should be inspected. **In the event that the cover or the metal interlock key attached to it become damaged the user should immediately isolate the AMS2 Device from the mains and return it to the supplier for servicing.**

The AMS2 Device contains a Class 4 optical fibre coupled laser diode operating at a wavelength of 450nm +/- 10nm with a maximum average power of 600mW. The typical pulse length is 150ms with a typical frequency of 1Hz.

2.7 SERVICE WARNING

Warning



There are no user serviceable parts within the inner AMS2 Device enclosures. The interlocked black front cover can be removed to allow user access to service hopper rollers and for diamond recovery purposes. A single inner cover may also be removed to allow a calibration sample to be temporarily installed.

Service personnel should be aware that both the laser and UV source are Class 4 but interlocked such that the complete AMS2 Device is laser and UV Class 1. Over-riding the interlock can expose personnel to laser Class 4 radiation and is not recommended. Warning labels for Class 4 radiation are fitted inside the AMS2 Device.

3 INTRODUCTION

This Operating Manual describes the operation of the AMS2 Device. The AMS2 Device is designed to automatically feed, handle and dispense small polished diamonds to discriminate natural diamond from synthetic diamond and diamond simulants.

The AMS2 is designed to screen diamonds conforming to the requirements of the Limitations of Use section on Page 7.

3.1 TYPICAL PERFORMANCE

With a typical parcel of round, natural diamonds conforming to the Limitations of Use section on Page 7 and a correctly maintained and cleaned AMS2 device a referral rate of approximately 0.25% may be expected with a feed rate of up to 3600 stones per hour.

3.2 AMS2 DEVICE IDENTIFICATION

The AMS2 Device identification label is located at the back of the AMS2 Device on the rear cover plate above the external connector outputs. The model number and serial number should be quoted in all correspondence relating to servicing.

3.3 USER INTERFACES

This section describes the controls available to the user of the AMS2 Device.

3.3.1 Front Cover

The front cover of the AMS2 Device is design to be user removable. This allows the user access to the hopper and stone path when checking for lost stones. The cover is also part of a safety system to prevent the user becoming exposed to UV and/or laser radiation. The cover is safety interlocked; removing the cover will prevent the laser and UV strobe from operating.

Warning

Removing the cover during a screening run will prevent the laser and UV strobe from operating but will not stop the sort. All stones sorted whilst the cover is removed will not be measured correctly and will be dispensed as non-diamond.

Removing the cover whilst the machine is screening will expose the user to motorised moving parts within the AMS2 Device. Although this presents no hazard (as all moving parts operate at low torque - less than 75Nm) any interaction with these moving parts should be avoided.

Warning

Removing the cover whilst the machine is sorting will expose the user to motorised moving parts within the AMS2 Device. Interaction with these moving parts should be avoided.

3.3.2 Hopper

The AMS2 hopper is the receptacle into which a parcel of stones is loaded for screening. Access is located on the top cover towards the front of the AMS2 Device. The hopper features a cover to prevent the ingress of dust into the system via the hopper (see Figure 5 below). The hopper cover should be left closed at all times except when melee is being loaded into the machine.



Figure 5 - The Hopper

3.3.3 Application Interface

The application graphical user interface is the medium through which the user operates the AMS2 Device via the provided computer.

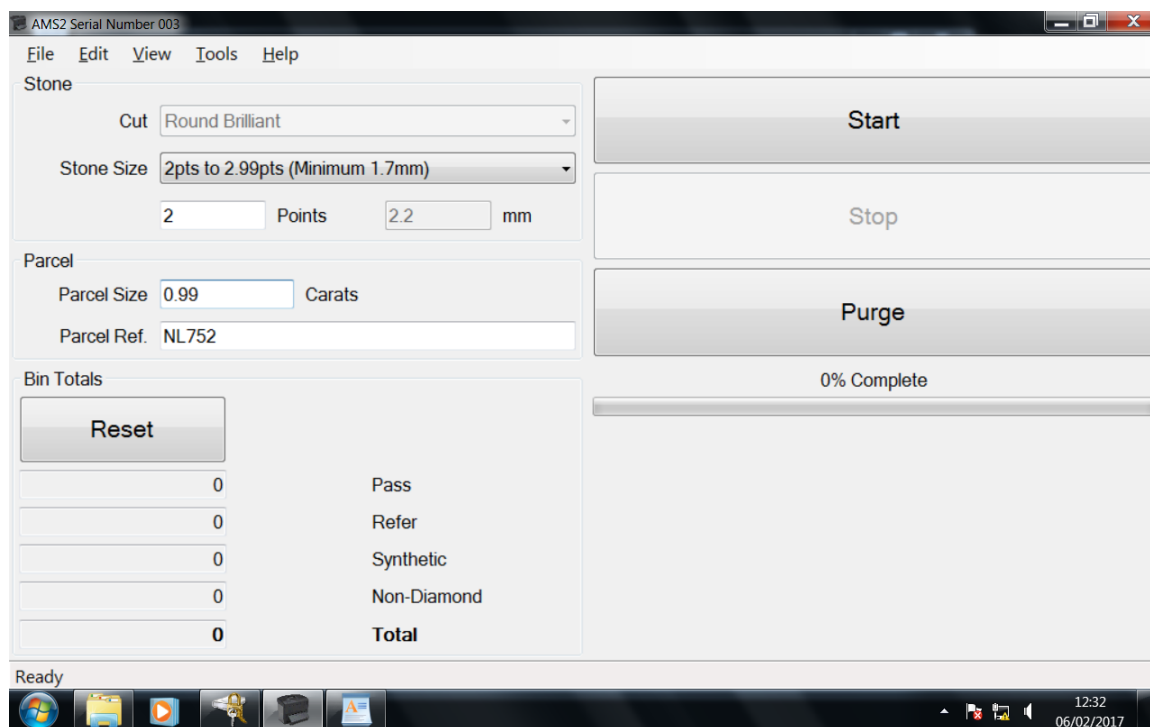


Figure 6 - User Application GUI

3.3.4 Dispense Bins

The AMS2 Device automatically screens melee into one of five dispense bins located at the front of the machine. The dispense bins are termed: Pass, Refer, Synthetic, Non-Diamond and Purge. A diagonal line is printed on the bins to allow the user to check that the bins have been correctly positioned. See Figure 7 below.



Figure 7 - Dispense Bins

If any of the dispense bins are removed from the AMS2 Device whilst it is operating the AMS2 Device will stop immediately. This may cause stones to be left inside the machine.

The dispense bins are inserted and removed from the machine by pressing the lower section of the front of the bin. Each dispense bin is marked with 'Press here to remove' to indicate where they should be pressed see Figure 8 below.

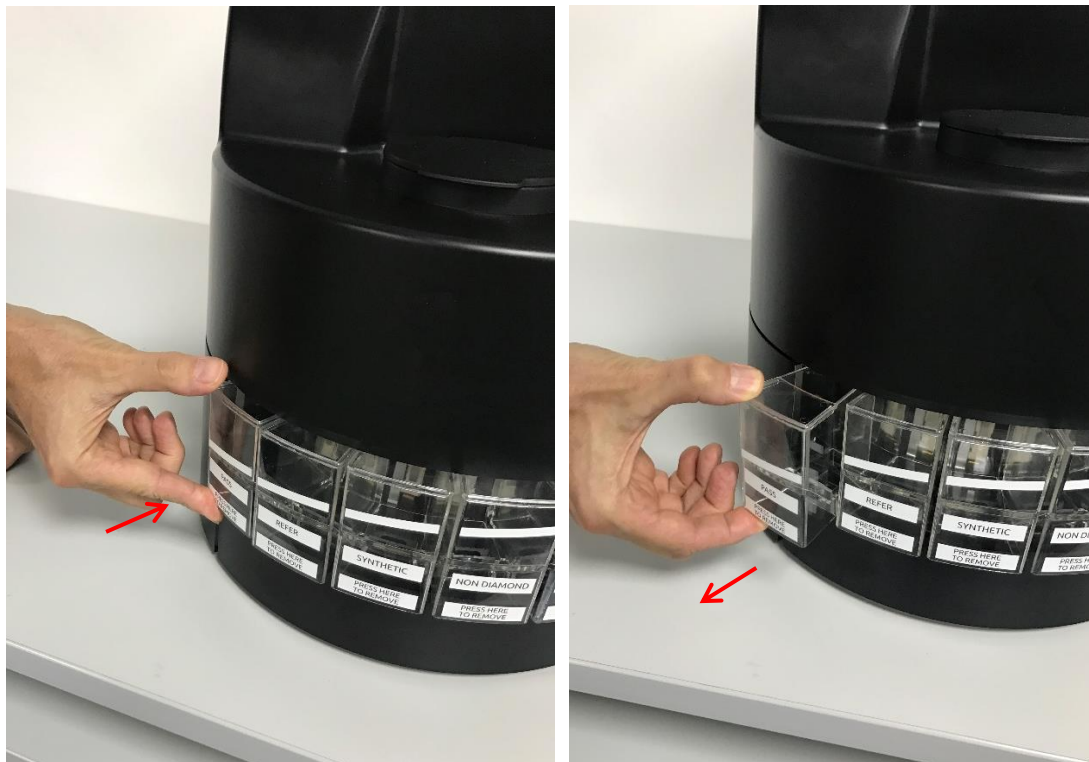


Figure 8 - Removing Dispense Bins

3.4 COMPUTER HARDWARE

The AMS2 Device contains an embedded PC which is controlled by the built-in touch screen display. Additional devices may optionally be connected to the AMS2 Device through a user-supplied USB hub attached to the USB port on the rear of the machine (see Figure 9 below and section 4.3 on page 18):

- A USB mouse.
- A USB keyboard.

A USB hub, keyboard and mouse are not supplied with the AMS2 Device. If required these should be supplied by the customer.

On the touch-screen 'double-clicking' is achieved by a quick double tap of the screen. 'Right-clicking' is achieved by touching the screen for a second or two until a context menu appears. The options within this may be selected as normal by a single touch.

The AMS2 Device must be connected to an internet connection of not less than 2Mbps/s through the Ethernet port on the rear of the machine (see Figure 9 below and section 17 on page 17). This connection will ensure that the operating software of the AMS2 Device and its operating system receive relevant operational and security updates. (See Section 11 on page 45).

4 EXTERNAL CONNECTIONS

4.1 POWER SUPPLY

The AMS2 Device is powered from the mains supply. An external power supply is used to convert the mains supply voltage to that required by AMS2 Device.

The mains supply wall socket must be easily accessible.

The external power supply provided with the AMS2 Device is designed for use throughout the world and does not require adjustment for use in different countries. It is connected to the mains supply by a standard IEC flex terminated with a plug suitable for use in the country of operation. The power supply is connected to the AMS2 Device by means of a power socket located at the rear of the AMS2 Device (see Figure 9 below).

If the mains power supply shows signs of damage or malfunction the user should immediately stop using the machine, disconnect the power supply from the mains supply and contact the supplier for a replacement.

Warning



The AMS2 Device must be used only with the power supply provided by the manufacturer of the AMS2 Device.

The AMS2 Device has a power switch at the rear. When not in use the AMS2 Device should first be shut down via its operating system and then once this is complete turned off using this switch. The power supply should then be disconnected from the mains supply. When power is applied to the AMS2 Device power lights are illuminated on the rear panel (red) and front panel (green) to indicate this.

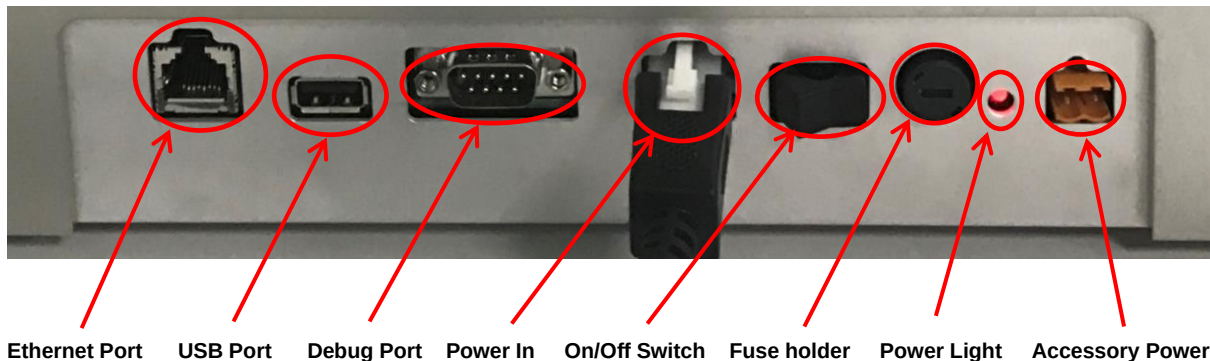


Figure 9 - External Socket Locations

4.2 ETHERNET PORT

This allows the AMS2 Device to be connected to a computer network for the purposes of connecting to the internet to allow software upgrades to be automatically downloaded and to allow remote support to be provided when required. It is recommended the AMS2 is not permanently connected to a network but is connected on a weekly basis to allow software updates to be installed.

Tip / Information

The AMS2 Device does not offer a WiFi connection. If this is required a user supplied wireless interface may be connected via the USB port.

4.3 USB PORT

A single USB port allows additional user supplied peripheral devices such as a mouse, keyboard or printer to be connected to the AMS2 Device.

Tip / Information

The USB port of the AMS2 Device can supply only limited power to a connected device. External USB hard disks and similar higher power peripherals may not operate correctly and could cause the embedded PC within the AMS2 Device to behave erratically.

If higher power or multiple devices are to be used it is strongly advised that a user supplied externally powered USB hub be employed.

4.4 DEBUG PORT

This port is used during manufacture and test of the AMS2 Device. Users should not make any connection to this port.

4.5 ACCESSORY POWER

This port is used only to power optional external peripherals supplied by IIDGR which are specifically designed to operate with the AMS2 Device. This port should not be used to power any other device.

5 INSTALLATION AND COMMISSIONING

The AMS2 Device is installed by the customer who must ensure that it is operating correctly at the point of installation.

5.1 SELECTION OF LOCATION FOR INSTALLATION

The AMS2 Device is designed for use on a desk. The desk on which the machine is to be located should be capable of supporting the weight of the machine (>23 kgs). The desk should be at least 30cm deeper than the AMS2 to allow space for the cables at the rear and to allow the stone bins to be withdrawn whilst still over the desk. If a user supplied mouse and/or user supplied keyboard are to be used there should be sufficient space for them to be used comfortably. (A user-supplied USB hub will be required if more than one USB device is to be connected).

Care should be taken in choosing a location to ensure that the operator does not adopt a posture which could give rise to discomfort.

It is advisable to position the unit such that bright lights or sunlight cannot affect the visibility of the screen.

The AMS2 Device should be positioned away from the edge of the desk to ensure that it cannot fall.

The installation location should be chosen for its suitability for handling small diamonds; the floor should be tiled rather than carpeted and both floor and the desk on which the AMS2 Device is sited should be free from crevices or similar stone traps. The desk should be free from clutter.

The environmental conditions of the chosen location should fall within the limits set out in the Environmental section on page 11.

A single mains outlet is required for the AMS2 Device and should be located close to the desk on which the AMS2 Device is sited such that the mains lead to the power supply and the power lead from the power supply to the AMS2 Device do not create a trip or similar hazard and are not subject to potential damage. It should be possible for the operator to easily isolate the power supply of the AMS2 Device from the mains supply. If a user supplied powered USB hub or printer is required (see section 4.3 on page 18 then one or more additional mains supply outlets will be required).

Warning



The AMS2 Device weighs more than 25KG and should only be lifted by two people.

1. Follow the steps detailed in section 9.1 below which describes how to unpack and lift the AMS2 Device.
2. Position the machine in the centre of the desk ensuring there is clear desk in front of the machine. Ensure the AMS2 Device is placed in an acceptable position as once the installation is complete the AMS2 Device should not be moved.

Warning



Once installation of the AMS2 Device is complete it should not be moved.

3. Ensure the power switch on the AMS2 Device is in the off position. See Figure 9 - External Socket Locations.
4. Ensure the switch on the mains supply is in the off position.
5. Perform a visual check of the AMS2 power supply, its lead and the supplied IEC mains lead to ensure they have not been damaged in transit.
6. Plug the AMS2 Device power supply into the 'power in' socket on the rear of the machine.
7. Connect the IEC mains lead first to the AMS2 Device power supply and then to the mains supply.
8. Turn on the mains supply.
9. Turn on the AMS2 Device using the switch on the rear panel. The red light on the rear panel and the green light on the front panel will illuminate.
10. The AMS2 machine will boot up.

It is advised the following installation a calibration is performed (See section 5.2 below).

Following calibration it is advised that a small parcel of large known natural goods should be run through the machine to verify the AMS2 Device is functioning correctly as defined in section 3.1.

5.2 CALIBRATION

The AMS2 Device requires periodic user calibration to ensure continued high performance. The AMS2 Device will monitor its calibration and inform the user when calibration is due. The AMS2 Device will require periodic recalibration. To check the time before the next calibration is required, select View->Calibration Records. The validity of the current calibration and (if valid) the time before next calibration is due are indicated on the displayed form.

Tip / Information



If the current calibration has expired it will not be possible to start a screening run until the AMS2 Device has been recalibrated.

Each AMS2 Device is supplied with a calibration sample which is inscribed with the serial number of the AMS2 Device with which it is associated. The calibration sample must be kept securely and must be kept clean.

Warning



The calibration sample supplied with each AMS2 Device is designed for use only with that instrument. Particular care should be taken if more than one AMS2 Device is used in a given location. If an incorrect calibration sample is used an AMS2 Device the performance of that AMS2 Device will be impaired.



Figure 10 - AMS2 Calibration Sample

1. Locate the calibration sample and ensure the serial number inscribed on the tool matches the serial number of the machine being calibrated. The serial number of the machine is displayed in the title bar top of the main application window when the Automated Melee Screening program (the "AMS2 Program") is running.
2. Start the AMS2 Program by either double-clicking the desktop icon or by selecting *Start->All Programs->Automated Melee Screening->Automated Melee Screening*.

3. Allow a few seconds for the AMS2 Device to initialise. The status of the initialisation process is shown first in a splash screen and then at the bottom left hand side of the main application window.
4. Start the calibration wizard by selecting Tools->Options->Calibration Wizard.
5. Follow the onscreen instructions to complete the calibration.
6. Once the machine is calibrated ensure the calibration sample is removed from the machine and all covers removed during the calibration process are re-fitted..

6 OPERATING THE AMS2 DEVICE

It is strongly advised that when first using the AMS2 Device small parcels of larger goods are run first to allow the user to gain some familiarity with the operation of the machine.

6.1 INITIALISATION PROCEDURE

1. Start the Automated Melee Screening program (the "AMS2 Program") by either double-clicking the desktop icon or by selecting *Start->All Programs->Automated Melee Screening->Automated Melee Screening*.
2. Allow a few seconds for the AMS2 Device to initialise. The status of the initialisation process is shown first in a splash screen¹ and then at the bottom left hand side of the main application window. During this process the following take place:
 - The internal motors are initialised.
 - The internal spectrometer is initialised.
 - The camera is initialised.
 - Internal system checks are performed.

The status bar at the bottom of the AMS2 Program window indicates the current activity and progress through the initialisation sequence (Figure 11 below).

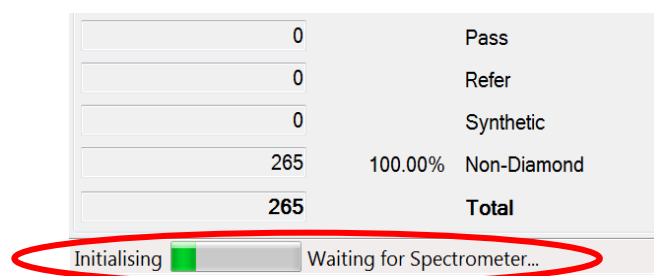


Figure 11 - The Status Bar

On completion the status bar will indicate that the AMS2 Device is 'Ready' to screen melee (Figure 12 below).

¹ A **splash screen** is a small window which appears while a program is launching to indicate activity.

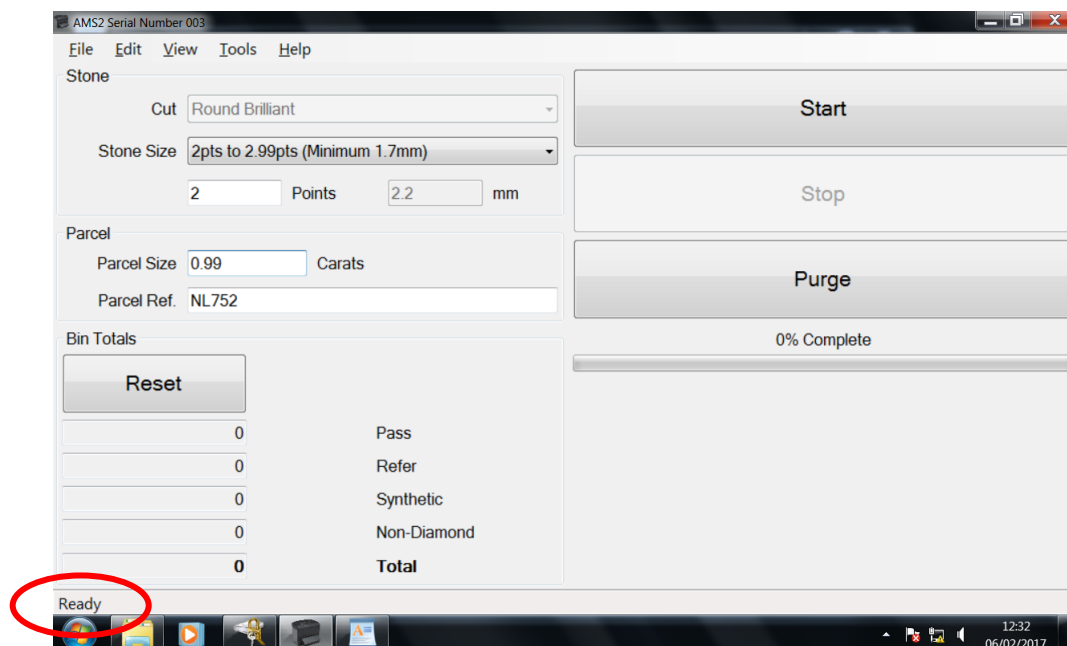


Figure 12 - Ready for Screening

6.2 SCREENING STONES

Warning



Diamonds used with the AMS2 Device must meet the requirements set out in the Limitations of Use section on page 7. In particular the diamonds should be clean and dry with no evidence of grease or fingerprints. No debris should be present in the parcel. If the maximum size variation of the diamonds being screened exceeds the limits set out on the Limitations of Use section then the feed performance of the AMS2 Device will be impaired.

Screening goods which are not clean will cause grease from the stones to be transferred from the stones to the internal surfaces and measurement area of the machine leading to impaired operation and high referral rates.

A build-up of electrostatic charge on stones, particularly smaller stones will impair the operation of the AMS2 Device. Stones with a strong electrostatic charge may cling to the internal surfaces of the AMS2 Device and will be difficult to locate.

Acidising is an excellent way to eliminate both grease and electrostatic charge on stones.

6.2.1 Weigh the Stones

It is important to weigh the parcel of diamonds prior to loading it into the AMS2 Device. When these diamonds are later removed from the AMS2 Device reweighing will allow any stone losses to be readily identified with little risk of mixing of stones with subsequent parcels.

It is important that the balance which is used to weigh the parcel of diamonds has appropriate resolution and accuracy to allow the loss of a single diamond to be identified.

6.2.2 Check that the AMS2 Device is Empty and that the Bins are Correctly Located

It is important to verify that the AMS2 Device is empty prior to loading stones. Several areas must be checked:

6.2.2.1 Hopper

Lift the hopper dust cover and look inside; no stones should be visible.

6.2.2.2 Diamond Handling Area

Remove the black AMS2 Device upper front cover by pulling it forward. Inspect the stone path on the disc from the hopper, through the semi-circular orientation mechanism and sizing assembly through to the measurement area; no stones should be visible.



Figure 13 - Removal of Front Cover

Replace the front cover after the inspection has been completed. A click will be heard when the cover is positioned correctly.

6.2.2.3 Dispense Bins

A careful check should be made to ensure that no stones from a previous run remain in the dispense bins. Particular care should be taken if the machine was previously used to screen stones less than 3 pts since electrostatic charge means that these may cling to the inner surfaces of the dispense bins. Each bin should be carefully removed and inspected; it is not sufficient to simply glance at the bin whilst it is in the AMS2 Device.

Finally, check that the dispense bins have been correctly positioned in the machine; the diagonal line which is printed on the front face of the bins should run continuously upwards from left to right when the bins are inserted in the following left to right order Pass, Refer, Synthetic, Non-Diamond and Purge.

6.2.3 Clean the Disc and Stone Path

Follow the steps in section 6.3.7.1 prior to each screening run to ensure the machine is clean.

Warning

The AMS2 machine must be kept clean. If the machine is not cleaned before each screening run an optimal feed environment may not be achieved and a reduction in feed rate may occur.

6.2.4 Pour Stones into the Hopper**Tip / Information**

It is advisable to place only as many stones into the hopper as the AMS2 Device is capable of screening under the local working practices. (For example, if overnight running with melee is not permitted by local working practices there is little point tipping more melee into the AMS2 Device than can be screened during a working day). A good solution is to tip the melee into the AMS2 Device in smaller batches, topping the machine up as necessary during a run. If the AMS2 Device stops it may be restarted without resetting the counts. This is better than putting more melee into the AMS2 Device and then purging as this can increase the electrostatic charge on the stones.

As a rough guide the AMS2 Device measures up to sixty stones every minute.

Lift the hopper dust cover and pour the diamonds gently into the side of the hopper.

The diamonds will slide down to the throat of the hopper ready for screening.

Lower the hopper dust cover to prevent dust entering the AMS2 Device.



Figure 14 - Pour Stones into the Hopper

6.2.5 Reset the Counts on the AMS2 Program

The count of each stone category (Pass, Refer etc.) which is displayed on the AMS2 Program is retained through power cycles of the AMS2 system. This means that when the AMS2 system is powered up the counts may not be zero. This is provided to avoid loss of data should there be a power failure during a screening run.

It is therefore important to ensure that when a new parcel of diamonds is loaded into the AMS2 Device the 'Reset' button is clicked to reset the counts to zero.

6.2.6 Select Stone Cut

The cut of the diamonds in the parcel should first be selected.

6.2.7 Select Stone Size

It is important that the correct stone size is entered to ensure optimal settings are used during the screening process.

For round stones the minimum individual stone size in points within the parcel, and the parcel size in carats should be entered (Figure 16 below).

The screenshot shows the AMS2 Serial Number 003 software interface. The 'Stone' section has 'Cut' set to 'Round Brilliant' and 'Stone Size' set to '2pts to 2.99pts (Minimum 1.7mm)'. The 'Parcel' section has 'Parcel Size' set to '0.99 Carats' and 'Parcel Ref.' set to 'NL752'. The 'Bin Totals' section shows a 'Reset' button and a table with counts for Pass, Refer, Synthetic, Non-Diamond, and Total, all currently at 0. The right side of the interface has buttons for 'Start', 'Stop', and 'Purge', and a progress bar showing '0% Complete'.

Figure 15 - Enter Stone and Parcel Details and Optional Parcel Reference

For fancy cut stones the smallest linear dimension (in millimetres) of the smallest diamond in the parcel should be entered.

Optionally for both round and fancy cuts:

- A parcel reference may be entered. This will appear in results files or when the Edit->Copy function is used to transfer data and is helpful in recording screening results.
- The stone size may be selected from the drop down list (Figure 16 below) but better performance will be obtained if the actual stone size is entered in the field provided.
- An estimated count of stones may be entered.

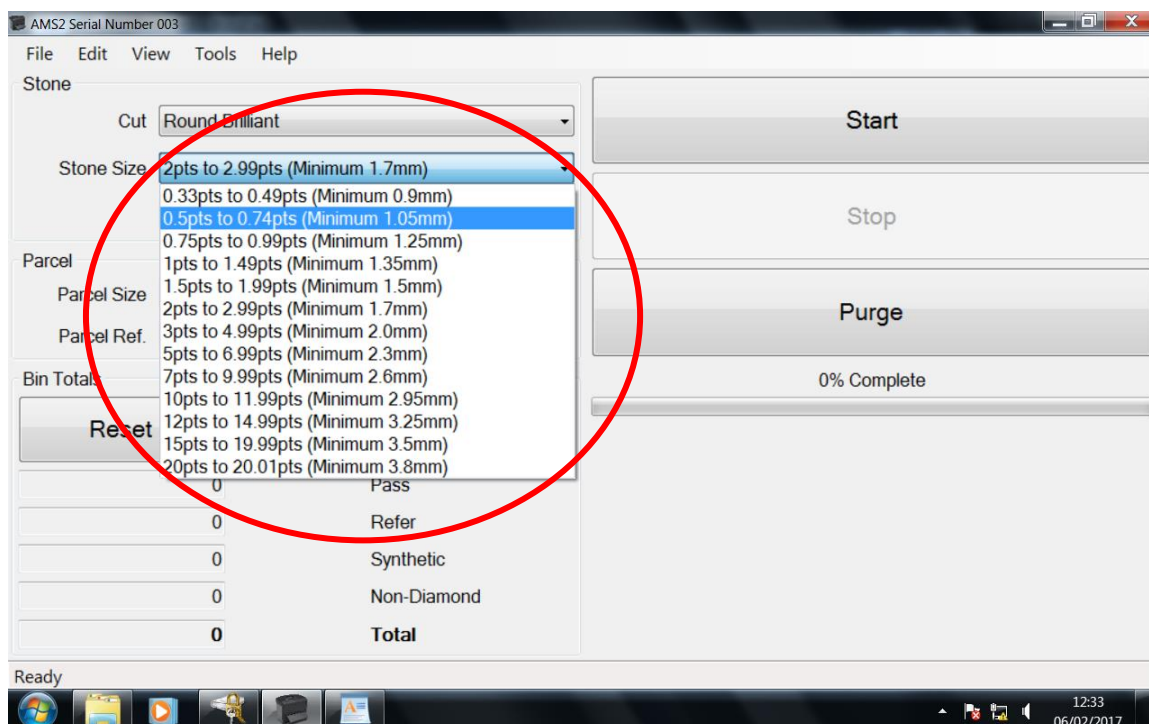


Figure 16 - Stone Size Range

6.2.8 Start Screening

Click the 'Start' button (Figure 17 below). The AMS2 Device will begin the screening process using optimal settings for the chosen parcel size.

A 'Fast' start is optional. This will cause the first stone to be screened more quickly than if a normal start had been selected. When using the touch-screen pressing the 'Start' button for a second or two will then present a menu giving the user the option of a 'Normal' or 'Fast' start (Figure 18 below). If an external user-supplied mouse is being used the same effect may be achieved by right-clicking on the 'Start' button.

Warning



The 'Fast' start option should not be selected unless the machine is known to be empty. If more than one 'Fast' start is made for a parcel of goods in the hopper the AMS2 Device is likely to become flooded with goods.

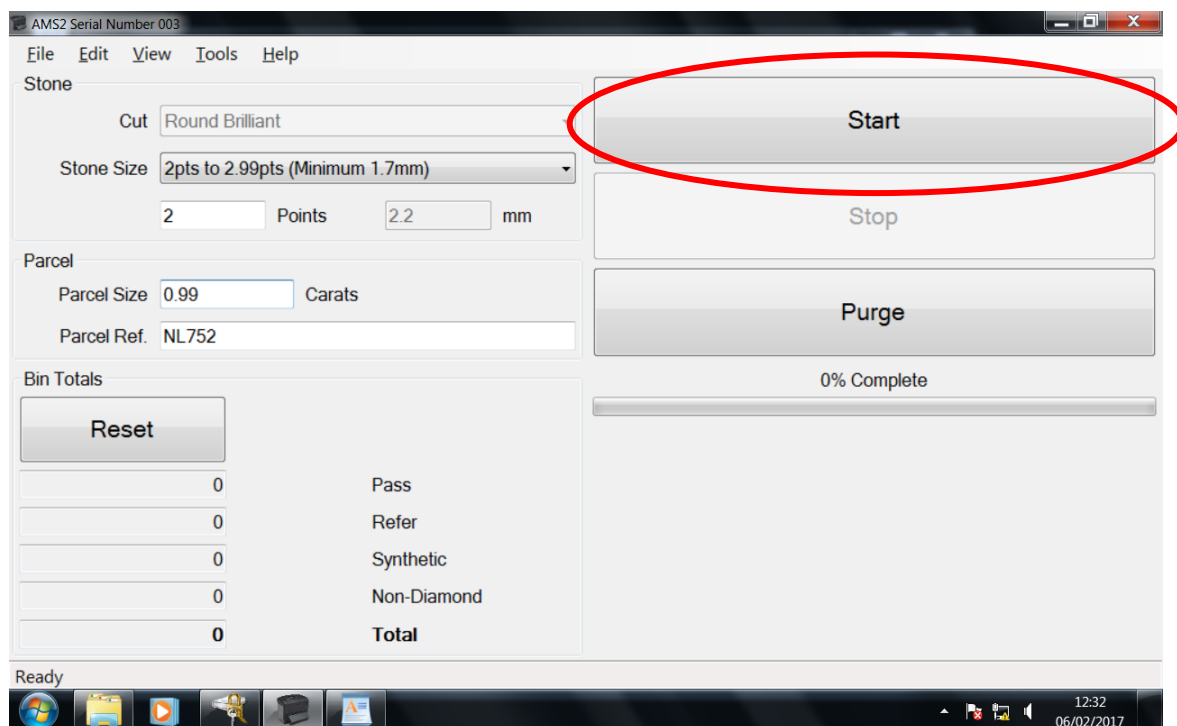


Figure 17 - Start Button

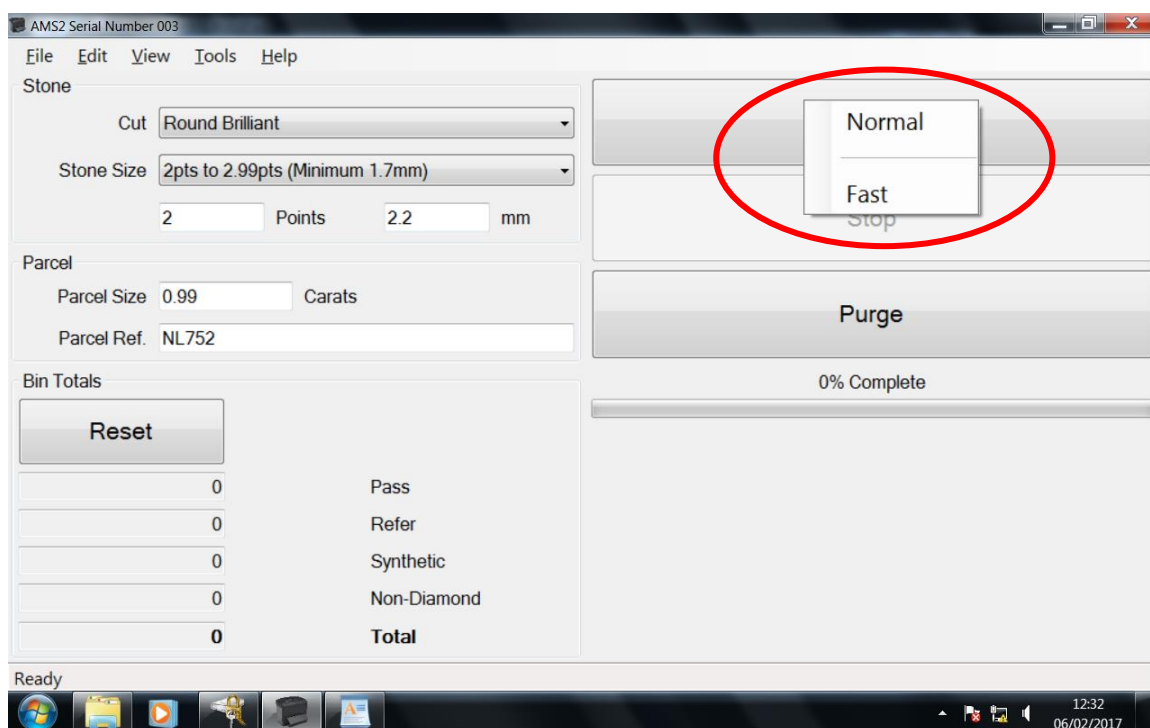


Figure 18 - Fast Start

6.2.9 Handling and Dispensing

During the screening run the diamonds will be automatically fed into the machine, measured and then dispensed into an appropriate bin. It is advisable to check that the first few stones are being measured correctly before leaving the machine.

6.2.10 Interpretation of Results

When each measurement is successfully completed and the stone has been dispensed into the correct bin the display is incremented to show the number of stones screened in each result category.

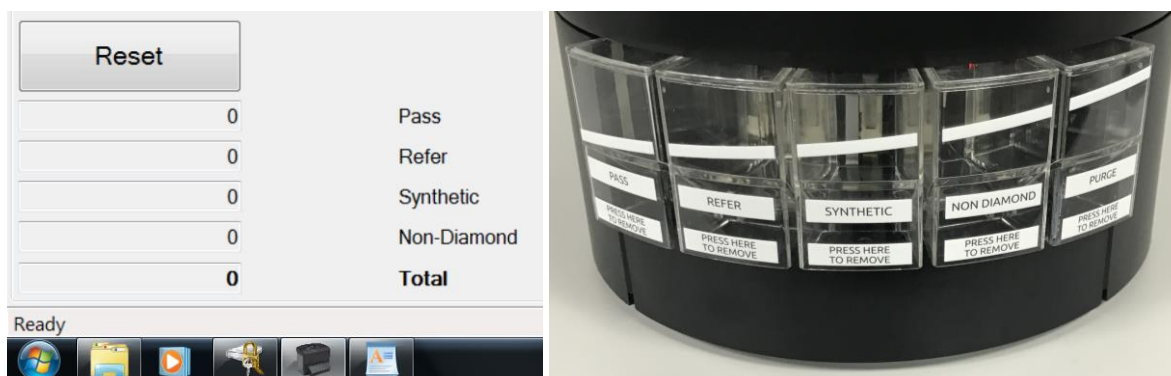


Figure 19 - Bin Totals and the Dispense Bins

The possible results are as follows:-

- **PASS**
- **REFER**
- **SYNTHETIC**
- **NON-DIAMOND**

Note: a 'refer' result does not necessarily indicate that the stone is synthetic since the stone may be a member of a rare group of natural diamonds which will also be referred by the AMS2 Device.

Each result will now be considered in turn:

6.2.10.1 PASS

A natural diamond has been detected.

6.2.10.2 REFER

The occasional natural diamond, typically less than 0.25% of natural diamond, will be dispensed into this category. These are easily identified by standard gemmological tests that are typically carried out in grading laboratories. See also section 6.2.11 on page 29.

High purity CVD synthetics and some types of HPHT synthetics will be dispensed into this category.

6.2.10.3 SYNTHETIC

HPHT synthetics and standard purity CVD synthetics will be dispensed into this category.

It is possible that natural diamond may also be dispensed into this category. These natural diamonds can be identified using standard gemological techniques.

6.2.10.4 NON-DIAMOND

Simulants or diamond imitations will be dispensed into this category.

It is possible that natural diamond may also be dispensed into this category. These natural diamonds can be identified using standard gemological techniques. See also section 6.2.12 on page 29.

6.2.10.5 PURGE

Any stones which are dispensed into this bin have not been measured. In general stones will arrive here by means of a purge cycle (see section 6.3.2 below). If stones are found in the purge bin at the end of a screening run they should be returned to the hopper and the screening run restarted.

6.2.11 'Refer' Re-Test

Natural stones dispensed into the Refer category are generally due to a marginal result. Re-running these stones through the machine may result in a Pass result. It is recommended all refer stones are re-tested following the initial screening. The following procedure should be followed:

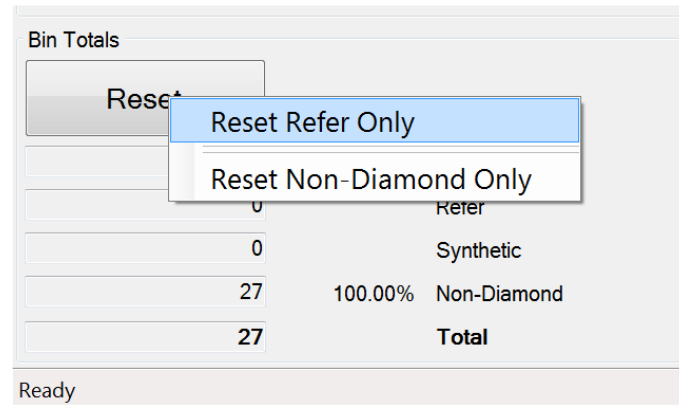


Figure 20 - Resetting the Bin Counts

1. Remove the 'Refer' dispense bin and load the stones within the bin into the hopper.
2. Replace the 'Refer' bin.
3. Press and hold the 'Reset' button (or if using a mouse, right-click the 'Reset' button) until the context menu appears select 'Reset Refer Only'. This will reset only the refer stone count to zero.
4. Press and hold the 'Start' button and select 'Fast Start'. The stones will then be automatically fed, measured and dispensed.
5. Allow the machine to complete the sort. Potentially a number of 'Refer' stones will now give a 'Pass' result.

6.2.12 'Non-Diamond' Re-Test

As with the refer stones, it is possible that natural diamond may be dispensed into the 'Non-Diamond' bin. Re-running these stones through the machine should result in one of the three diamond results. It is recommended all non-diamond stones are re-tested after initial screening.

The following procedure should be followed:

1. Remove the 'Non Diamond' dispense bin and load the stones within the bin into the hopper.
2. Replace the 'Non Diamond' bin.
3. Press and hold the 'Reset' button (or if using a mouse, right-click the 'Reset' button) until the context menu appears and select 'Reset Non-Diamond Only'. This will reset only the non-diamond stone count to zero.
4. Press and hold the 'Start' button and select 'Fast Start'. The stones will then be automatically fed, measured and dispensed.
5. Allow the machine to complete the screening run. Stones given an initial non diamond result may now be dispensed as diamond. Any stones remaining in the 'Non-Diamond' dispense bin are likely to be simulants. Further tests should however be carried out to confirm this.

Re-screening the Refer and Non-diamond stones may be completed at the same time. Ensure that both the Refer and Non-Diamond stone counts are reset before re-screening.

6.3 AFTER USE

6.3.1 Parcel Screening Finished

When the screening of the parcel is completed, the AMS2 Device will stop automatically after a diamond has not been dispensed for 4 minutes unless the operator selects the 'Stop' button.

If unmeasurable stones remain within the AMS2 Device a message will be displayed which indicates this. In this case the stones should be removed from the machine by running a purge cycle.

6.3.2 Run a Purge Cycle

A purge cycle should be run to ensure that no goods remain in the feed mechanisms. Refer to section 6.3.5 for further details.

6.3.3 Weigh the Contents of the Screened Bins

Each of the screened categories should be weighed.

The total weight of each category should equal that of the initial parcel weight before screening.

It is possible that some stones may remain within the machine once a screening run has been completed.

6.3.4 Check that the AMS2 Device for missing stones

If any stones are missing when the stones are reweighed the steps outlined in sections 6.3.4.1 & 6.3.4.2 should be completed.

If stones are still missing then section 6.3.4.3

6.3.4.1 Check the stone path is clear

1. Remove the black front cover and check the stone path on the disc from the hopper, through the semi-circular orientation mechanism, across separation blades and through the sizing assembly to the measurement area; no stones should be visible.
2. Remove each dispense bin in turn and check it is empty.

6.3.4.2 Check the hopper is empty

Warning



Do not attempt to remove stones from the hopper using tweezers. These will damage the delicate foam rollers.

When running very small stones it is possible that a very small number of stones may remain in the hopper. The AMS2 hopper is easily removable allowing the operator to check for stones.



Figure 21 - Removing the Hopper

1. Remove the black AMS2 front cover as shown in Figure 13 on page 23.
2. Grip the hopper as shown in Figure 21.
3. Slide the hopper in the direction of the red arrow shown in Figure 21. Care should be taken when handling the removed hopper as it will still be connected to the AMS2 and therefore the movement of the hopper is restricted.



Figure 22 - Removing Hopper Rollers

4. The hopper may now be inspected to ensure no stones remain. The transparent hopper cover can be removed by loosening the thumbwheel on the LH side of the hopper as shown in Figure 22. Slide the cover slightly to the left, lift the left hand side and slide the cover out from under the right hand fixing. The cover can now be fully removed. It is not necessary to fully remove the thumbwheel.
5. The rollers can now be removed from the hopper. It is recommended that a receptacle, such as a weigh pan, is placed below the hopper to catch any stones that may fall out of the hopper as the rollers are removed.
6. Once it is confirmed that the hopper is empty of stones the hopper should be reassembled and replaced by sliding it back into its restraints.

6.3.4.3 Remove the stone guide plate

In the unlikely event that all missing stones cannot be recovered from the machine by following sections 6.3.2, 6.3.4.1 & 6.3.4.2 then the main stone guide plate may be removed to verify that the disc is clear of stones.

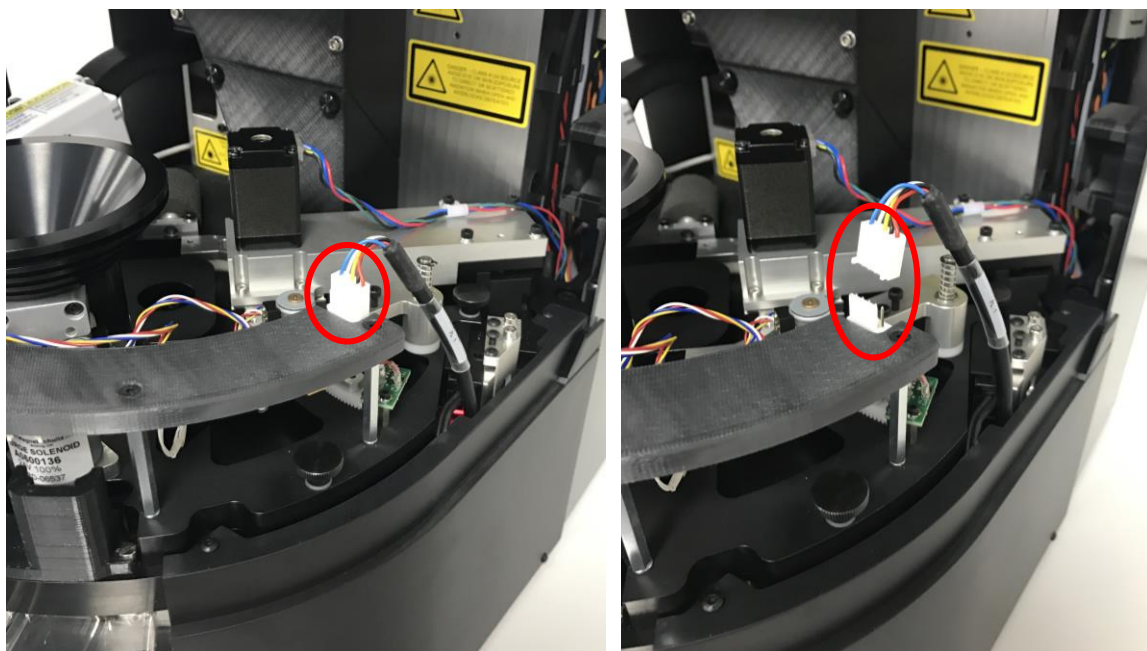


Figure 23 - Disconnecting the Dispenser Comms Cable

1. Switch off the AMS2 Device as detailed in section 6.3.6.
2. Remove the front cover from the AMS2 Device.
3. Carefully disconnect the Dispenser Comms Cable as shown in Figure 23. The tip of the plastic tongue on the connector should be moved slightly forward to release the latch on the connector.



Figure 24 - Stone Guide Plate Thumb Screws

4. Unscrew and remove the three thumb screws detailed in Figure 24



Figure 25 - Lifting the Stone Guide Plate

5. Carefully lift the Stone Guide Plate as shown in Figure 25.
6. Inspect the Stone Guide Plate to ensure no stones are stuck to any of the surfaces of the plate. Once it is confirmed the plate is clear of stones the plate can be carefully placed on the desk next to the machine.
7. The disc may be manually rotated to check for missing stones.
8. The area around the semi-circular orientation mechanism should be checked for missing stones.
9. Once all stones are recovered the stone guide plate can be replaced. Ensure that the plate sits flat on the lower plate with no gaps, that the three thumb screws are replaced and that the Dispenser Comms cable is re-connected.

Caution



The Dispenser Comms cable must never be disconnected or reconnected whilst the machine is switched on.

6.3.4.4 Unscreened Melee

Melee may not be screened for the following reasons:

- Melee outside the capability of the AMS2 Device may have been fed into the machine. Refer to the Limitations of Use section on page 7.
- The stones do not give the correct information during measurement to provide a definitive result.

In the unlikely event that a stone remains unmeasured it will either be dispensed into the purge dispense bin or may remain on the disc once the machine has finished the screening. In the latter case a dialog box will inform the operator that unscreened stones remain within the machine.

These stones should be referred for further tests.

6.3.5 Purging the AMS2 Device

Warning



Do not attempt to remove stones from the hopper using tweezers. These will damage the delicate foam rollers.

The AMS2 Device features a special mode called 'purging' which is a method of rapidly removing goods from the feed mechanism without measuring them. This may be used for three purposes:

1. To remove goods which have been placed in the hopper but for which measurements are no longer required.
2. To clear a flooded measurement disc.
3. To ensure that the feed mechanism is empty.

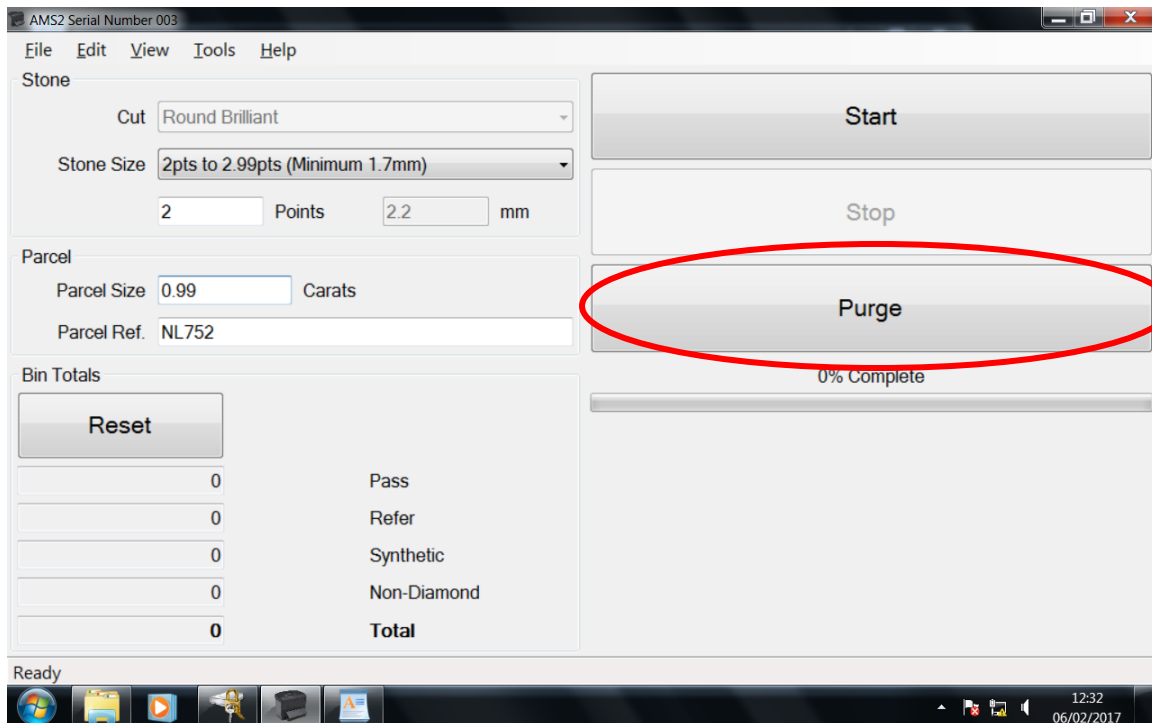


Figure 26 - Purge Button

The AMS2 Device has two purge options:

Clicking the 'Purge' button will purge only the stones that have already passed out of the hopper and are currently within the stone path (on the 'disc'). In this case the AMS2 Device will run the disc at an increased speed in order to purge the stone path of diamonds. The purge action will either stop automatically once a stone has not been detected on the disc for 4 minutes or the operator may choose to end the purge operation by clicking the 'Stop' button. This procedure can be carried out with the black AMS2 front cover removed to allow the operator to observe progress.

To purge the whole AMS2 Device including the hopper the operator can press and hold the 'Purge' button on the touchscreen interface (or if using a user-supplied mouse by right-clicking the 'Purge' button) and then select the option to purge 'Disc & Hopper'. This will run both the disc and hopper at an increased speed.



Figure 27 - Quickly Removing Stones from the Hopper

If a large number of stones remain in the hopper and require purging this would potentially take a long time using the above method. An alternative is to carefully follow the instructions in section 6.3.4.2 to remove the hopper from the machine. The stones remaining in the hopper can then be carefully poured out of the hopper. Once the hopper has been replaced the 'Purge disc & hopper' operation described above can be selected to purge any remaining stones.

Tip / Information



When removing a hopper which contains stones a catch tray should be placed underneath the hopper as quickly as possible to prevent partially fed stones from falling from the bottom of the foam rollers.

6.3.6 Switching the AMS2 Device Off

After screening has been completed and the machine purged select '*File->Close*' or click the white cross in the red box at the top right hand side of the AMS2 Program window.

Note that it may take several seconds for the AMS2 Program to close down the various subsystems in the AMS2 Device. Progress is indicated in the status bar at the bottom of the AMS2 Program window.

Shut down the embedded computer by selecting '*Start->Shutdown*'

Once the computer has shut down the AMS2 Device can be switched off using the On/Off button located on the rear of the machine. Ensure the embedded PC has completely shutdown before switching the AMS2 off.

The external power supply should be disconnected from the mains when not in use.

6.3.7 Regular Maintenance

The condition of the foam rollers in the hopper should be inspected every few weeks (depending on AMS2 Device usage) for any damage. Note that only damaged rollers should be replaced. The most frequent cause of damage to the foam rollers occurs when tweezers are used in an attempt to remove stones from the hopper. Refer to section 8.3 below for details on how the foam rollers may be removed.

6.3.7.1 Cleaning the Disc and Stone Guide Assembly

Before each screening run the disc should be inspected and cleaned. Any debris on the disc will reduce the efficiency of the feed system and should be removed. The following procedure should be followed:

1. Follow the steps within section 6.3.4.3 to remove the stone guide plate.
2. Using a lint free cloth clean the disc using high grade acetone. Carefully rotate the disc to ensure the whole disc is cleaned.



Figure 28 - Cleaning the Stone Guide Plate

3. Again using a lint free cloth and high grade acetone clean the blade of the sizing assembly as detailed in Figure 28. The rest of the stone path² of the stone guide plate should be cleaned in the same manner. Particular attention should be paid to the lower edges of the stone guide plate which the girdles of the stones will come into contact with.
4. Once the disc and stone guide plate have been cleaned replace the stone guide plate as detailed in section 6.3.4.3.

² The stone path is the channel in which the stones are guided when the disc rotates.

7 ADDITIONAL AMS2 PROGRAM FEATURES.

This section outlines some of the additional built-in features of the AMS2 Program.

7.1 FILE MENU FUNCTIONALITY.

7.1.1 File->Save.

Choosing File->Save allows the results of a screening run to be saved. By default the file extension is '.ams'. This file may be imported into Microsoft Excel (not supplied) or Libre Office. Data is tab delimited.

Prior to the file being saved the user is prompted to enter some descriptive text for the parcel which is included in the saved file.

7.1.2 File->Print and File->Print Preview.

The results of a sort may be printed in the conventional way using the File->Print or File->Print Preview options.

Prior to the file being saved the user is prompted to enter some descriptive text for the parcel which is included in the printed output.

If required an electronic PDF file may be created by printing to the 'CutePDF' printer which is installed on the machine.

7.2 EDIT MENU FUNCTIONALITY.

7.2.1 Edit->Copy.

This allow the results of the current screening run to be copied to the Windows clipboard for pasting into another application. The results may be copied with or without a descriptive header as required.

7.3 VIEW MENU FUNCTIONALITY.

7.3.1 View->Performance

This presents a summary of a number of performance metrics for the AMS2 Device. Some of these are useful only to servicing personnel but others may be of interest to users and are detailed below.

Note that owing to memory requirements this form will display only a small number of data values acquired prior to it being opened. (For example, if a screening run was running for an hour before the form was opened only the last few data values would be shown initially). All subsequent data points are captured however. If the performance across a screening run is required this form should remain open for the duration of the run.

It is possible to 'Clear' the counters displayed using the button on the form. This does not affect any other machine logging functions.

Metric	Description
Feed Rate	This presents graphically the feed rate of the machine. It is normal to see a lower feed rate at the start and end of a screening run.
Stones Fed	This gives a count of the number of stones fed just prior to and since the form was opened.
Stones Dispensed	This gives a count of the number of stones dispensed just prior to and since the form was opened.
Stones Too Close	An increasing value on this metric suggests that stones are being fed too quickly.
Stones Recycled	A stone may be recycled by the measurement system for several reasons, including a failure to complete a satisfactory measurement and double feed stones. Recycling will cause the stone to be remeasured.
Measurement Efficiency	This is expressed as Stones Dispensed divided by Stones Fed and expressed as a percentage. Note that owing to the lag between feed and dispense this will be only become useful at the end of a screening run.
Average Feed Rate	The average feed rate for the current screening run.
Average Dispense Rate	The average dispense rate for the current screening run.
Double Feeds	The number of double-feed stones detected by the measurement system. These will be included in the 'Stones Recycled' metric.

Table 1 - Performance Metrics

7.3.2 View->Stone Counters.

This presents a summary of the performance of any AMS2 Device broken down by stone size. Individual screening results are not captured but this is nevertheless a good method by which the general performance of the AMS2 Device may be assessed. A grand total of all stones screened is presented at the bottom of the dialog.

7.3.3 View->Screening Records.

This presents a summary of the last 200 screening runs. When the dialog is first opened the results are presented in percentage terms but a checkbox is provided on the dialog to allow the stone counts to also be displayed. Owing to the large amount of data which is present it is advisable to enlarge the window by resizing it. Hovering the mouse over any of the header columns will cause the title of the column to be displayed in a tooltip.

Screening results may be copied to the Windows clipboard as required by selecting the desired record or records, right clicking and then choosing whether to copy the results with or without the descriptive header text. The entire table of results may be quickly selected by clicking in the box at the top left hand corner of the table.

A 'Save' button is provided to allow the results to be saved to a filename selected by the user. It is not possible to select individual records to be saved; all displayed results are saved to the selected file.

7.3.4 View->Calibration Records.

This presents a summary of the calibration records for the machine. In addition it provides an indication of when the current user calibration will expire.

7.4 TOOLS MENU FUNCTIONALITY.

The Tools Menu features several options which may be useful to both the user and servicing technician:

7.4.1 Tools->Settings.

This features some settings which may be used for service and diagnostic purposes only.

7.4.2 Tools->Options.

7.4.2.1 Tools->Options->Re-Initialise.

This causes the entire initialisation cycle to be repeated. There is a risk that goods may be left on the disc of the AMS2 Device or in the measurement areas when this is selected and a warning dialog to this effect is presented. Care should be exercised when using this option.

7.5 LOGGING FUNCTIONALITY.

All events on the AMS2 Device are logged. When requesting service support for a fault it is likely that the service technician will ask the user to email the log file for the day on which the fault was noticed.

The log files are located in C:\AMS2\Log.

Each file is named dd-mm-yyyy.log where:

dd is the day of the month

mm is the month number

yyyy is the year

The relevant file or files may be emailed as required.

8 TROUBLESHOOTING & MAINTENANCE

This section deals with the most common issues which the user is likely to experience with the AMS2 Device.

8.1 REDUCED FEED RATE

If a large reduction in average feed rate is experienced the following points should be considered:

8.1.1 Dirty Machine

Were the disc and stone guide plate cleaned before the start of the screening run? See section 6.3.7.1 above.

8.1.2 Dirty Stones

Were the stones cleaned before they were loaded into the AMS2 Device? See Limitations of Use section on page 7.

8.1.3 Poor Feed Rate

Were the correct cut and stone size selected? Selecting a smaller stone size than is necessary will result in a reduction in the feed rate.

Note also that if a larger stone size than is actually required is selected this can feed stones too quickly which are then recycled by the measurement processes within the machine. The result is that the apparent rate at which stones are dispensed is low even though the feed rate appears high. The Performance form (section 7.3.1 on page 37) is helpful in diagnosing these problems.

8.1.4 Feed Rate Too Fast

Was the correct cut and stone size selected? Selecting a larger stone size than is necessary will cause stones to be fed too quickly leading to increased recycling of stones or even flooding of the disc. The Performance form (section 7.3.1 on page 37) is helpful in diagnosing these problems.

8.2 MISSING STONES

This section provides a step-by-step guide to locating any stones which are unaccounted for.

1. Ensure that the balance on which the stones are being weighed is:
 - a. Correctly tared with the relevant weigh-pan in place.
 - b. The same balance as was used to weigh the stones prior to loading them into the machine.
 - c. Of sufficient accuracy to allow reasonable conclusions to be drawn. (For example a two decimal place carat balance is of limited use when 0.5 point stones are being handled).
2. Using the weight difference and average weight of the stones, establish the likely quantity of lost stones.
3. Ensure that the AMS2 Device has been purged as in section 6.3.2 above and that a thorough inspection of the diamond path has been completed.
4. Check that the dispense bins have been fully emptied and that in particular small stones are not clinging to the sides of the bins.
5. Check the work area around the AMS2 Device for dropped stones.
6. Following the directions detailed in section 6.3.4 to look for missing stones that might still be inside the AMS2 Device.



Figure 29 - Remove the Lower Phosphorescence Cover

7. Remove the lower phosphorescence cover by removing the two thumb screws as indicated in Figure 29.
8. Check the area of the disc directly under the cover to ensure no stones are present.
9. Replace the lower phosphorescence cover and thumb screws.
10. Remove the Stone Guide Plate as detailed in section 6.3.4.3 and check for missing stones.

8.3 REPLACING THE FOAM ROLLERS

The foam rollers in the hopper may become degraded after significant use. If it is found that debris from the rollers is being observed on the disc then it is likely that the foam rollers will require replacement.

Remove the foam rollers as detailed in section 6.3.4.2 and replace the rollers with a new set. A spare set of foam rollers is provided in the spares kit which is supplied with the AMS2 Device. Additional foam rollers may be ordered from IIDGR.

9 UNPACKING AND PACKING THE AMS2 DEVICE

9.1 UNPACKING THE AMS2 DEVICE

Warning



Appropriate manual handling procedures should always be followed whilst moving the AMS2 Device.

1. A wheeled trolley should be used to move the AMS2 to its desired position whilst it is in its transit case.
2. Remove the top section of the AMS2 transit case by releasing the four catches. Carefully lift the top section until it is clear of the AMS2 Device.
3. Remove the blue bag which covers the AMS2 Device.
4. Tilt the AMS2 Device towards the rear and remove the five dispense bins. See section 3.3.4 for directions on how to remove the bins. Gently allow the machine to return to its original position once the dispense bins are removed.

Warning



Take care not to allow fingers to become trapped whilst removing the dispense bins.

5. Ensure the desk surface where the machine is to be placed is clear and the path between the machine and the desk is unobstructed.

Warning



The AMS2 Device weighs more than 25KG and should only be lifted by two people. Ensure that when lifting the AMS2 Device that personnel do not have to twist or rotate whilst lifting the AMS2 Device.

6. One person should stand on each side of the AMS2 machine. Each person should place one hand in the top of the aperture from which the bins were removed and the other hand at the top of the rear panel. Working together, lift the machine clear of the AMS2 transit case base and gently place it on the desk.
7. The transit case and blue bag should be retained in case it is necessary to return the AMS2 to the supplier for servicing or repair work. It is sensible to leave the blue bag in the transit case.

9.2 PACKING THE AMS2 DEVICE

Warning



Appropriate manual handling procedures should always be followed whilst moving the AMS2 Device.

If the AMS2 Device is not returned to the supplier in the correct transit case then damage in transit is highly likely. Remedial work to correct such damage will be at the expense of the customer.

1. Position the AMS2 transit case suitably close to the AMS2 Device to avoid having to carry the AMS2 Device too far.
2. Remove the top section of the AMS2 transit case by releasing the four turnbuckle catches and lift the top section off.
3. Disconnect the AMS2 Device from its power supply and cables. If these are to be returned they may be placed in the recess in the lower section of the transit case. Ensure that they are not likely to be crushed when the machine lowered into the box.
4. Remove the five dispense bins from the AMS2 Device. See section 3.3.4 for directions on how to remove the bins.

Warning



The AMS2 Device weighs more than 25KG and should be lifted by two people. Ensure when lifting the AMS2 Device that personnel do not have to twist or rotate whilst lifting the AMS2 Device.

5. One person should stand on each side of the AMS2 machine. Each person should place one hand in the top of the aperture from which the bins were removed and the other hand at the top of the rear panel. Working together, lift the machine and lower it into the transit case base.
6. Tilt the AMS2 Device towards the rear and replace the five dispense bins. See section 3.3.4 for directions on how to replace the bins. Gently allow the machine to return to its original position once the dispense bins have been replaced.

Warning



Take care not to allow fingers to become trapped whilst replacing the dispense bins.

7. Cover the AMS Device with the blue bag. This should be tucked in and not allowed to protrude from the gap between the top and bottom sections of the transit case.
8. Fit the top section of the AMS2 transit case (note that this will fit only one way). Secure this with the four turnbuckle catches.
9. It is advisable to use ty-wraps or similar to secure the lid of the transit case. Holes are provided for this purpose.
10. A wheeled trolley should be used to move the AMS2 Device when it is in its transit case.

9.3 PACKING LIST

1. AMS2 Device
2. External power supply
3. Mains lead for AMS power supply
4. Spares kit comprising
 - a. 1 Hex key set
 - b. Flat blade screw driver
 - c. 1 Pair foam rollers
5. 3706-4980 Operating manual
6. AMS2 Device calibration sample
7. Transit case

10 ACCESSORIES

10.1 AMS2 HUMIDIFIER ACCESSORY



Figure 30 : Humidifier Accessory

The AMS2 Humidifier Accessory is designed for use only with an AMS2 machine. The accessory is controlled by the AMS2 machine to maintain the humidity level inside the machine within specified limits.

10.1.1 Installation of the Humidifier Accessory

The humidifier accessory requires self-installation. **An installation video may be found on the AMS2 page of the IIDGR website.** All safety steps defined in the video must be observed when carrying out the installation.

Warning

During the installation of the humidifier accessory the rear sheet metal cover of the AMS2 machine must be replaced. **Under no circumstances should the AMS2 machine be used without either the current or the replacement rear sheet metal cover fitted and secured with all ten fixings screws.**

10.1.2 Conditions of Use of the Humidifier Accessory

The humidifier accessory must only be used for its intended purpose. The following points must also be observed:

1. Only deionised water should be used with the humidifier accessory. ***Under no circumstances should tap water be used with the accessory.***
2. Only the labelled bottle supplied with the humidifier accessory is to be used. ***The humidifier accessory must never be used with a bottle larger than 0.5 litre.***
3. Ensure that the bottle contains sufficient deionised water prior to commencing a screening run.
4. The humidifier accessory and water bottle should be removed from the machine on a weekly basis to be cleaned and sterilized.
5. The water bottle should always be removed prior to fitting or removing the humidifier accessory from the AMS2 machine.
6. Water additives such as essential oils, fragrances or water conditioners must not be used.
7. Do not connect or disconnect the humidifier power cables with wet hands.

10.1.3 Cleaning the Humidifier Accessory

The humidifier module and bottle require cleaning and sterilizing on a weekly basis, regardless of usage. The humidifier module has been designed to be easily and replaced to facilitate this, see sections 10.1.4 and 10.1.5. **A video which shows the removal and replacement of the humidifier module may be found on the AMS2 page of the IIDGR website** Supplied with the humidifier accessory are a number of bottle brushes which can be used to clean inside the pipework. The fixed pipework that remains attached to the machine should also be cleaned and sterilized when the accessory is cleaned. Caution should be taken when cleaning the fixed pipework not to get any cleaning agent inside the AMS2 machine.

10.1.4 Removing the Humidifier Module

1. The humidifier accessory must never be disconnected or removed whilst the machine is screening.
2. Disconnect the power connector from the rear of the humidifier module prior to removing the humidifier accessory.
3. Remove the water bottle from the humidifier accessory. A few drops of water may fall from the bottle as it is removed.
4. Whilst support the humidifier accessory with the right hand, remove the two thumb-screws with the left hand.
5. While still supporting the humidifier accessory with the right hand, use the left hand to grip the pipework of the humidifier and slide the humidifier down away from the machine in the direction of the pipework. Once the two halves of the pipe work have separated the humidifier module is then free from the machine.

10.1.5 Replacing the Humidifier Module

1. To re-assemble the humidifier, hold the humidifier module in the right hand and use the left hand to align and then engage the two parts of the pipework. Slide the pipework together whilst holding the humidifier level. The humidifier mounting will engage as the pipework fully engages.
2. Whilst continuing to support the humidifier with the right hand, use the left hand to fit the two thumb-screws ensuring they are tightened.
3. Reconnect the power connector to the rear of the humidifier module.
4. Refit the water bottle to the humidifier module.

11 SOFTWARE UPDATES

Updates to both the AMS2 Software and the Microsoft Windows operating system are controlled using Microsoft Intune. The AMS2 machine should be connected to a suitable external network on a weekly basis to allow any required updates to be downloaded.

When connected to a suitable external network the AMS2 machine will periodically notify the operator that updates are available to be installed. The operator should then accept the prompt to install these updates. It is recommended the machine is left connected to the network connection overnight to allow updates to be downloaded.

Warning



The AMS2 machine must not be used for screening whilst updates are being downloaded or installed.

11.1 AMS2 SOFTWARE UPDATES

Updates to the AMS2 software will be deployed automatically to each AMS2 machine by Microsoft Intune. If an update is available the operator will be prompted to install the update. This should be completed promptly to ensure the AMS2 is running the latest software release. The AMS2 program must be closed before an update may be installed.

11.2 MICROSOFT WINDOWS UPDATES

Microsoft Windows updates will be deployed automatically to each AMS2 machine by Microsoft Intune. If an update is available the operator will be prompted to install the update. It is recommended Windows Updates are installed on a weekly basis to ensure that the operating system, and more importantly Windows Defender remain up-to-date.

Some Windows Updates are very large and for this reason the AMS2 machine should not be used for screening whilst updates are being downloaded. Moreover, some updates may take a long time to download and it is therefore advised that the AMS2 machine be left connected to a network connection overnight whilst the updates download. The AMS2 machine should not be used for screening during this time.

Once any required updates have been downloaded the operator will be prompted to approve their installation. While the installation takes place the AMS2 machine should not be used for screening. It is possible that the operator will be prompted to restart the operating system as part of the update installation process.

12 SPECIFICATION

The following sections of this operating manual constitute the specification of the AMS2 Device:

Section	Section Number	Page
Limitations of Use	1	7
General Safety	2	8
Environmental	2.4	11
Typical Performance	3.1	13
External Connections	4	17
Legislative Compliance Testing	13	46

Any subsections of the section numbers referenced above are included in the specification.

13 LEGISLATIVE COMPLIANCE TESTING

13.1 LEGISLATIVE COMPLIANCE DIRECTIVES

The AMS2 Device is compliant with the following directives:

Machinery Directive	(MD)	2006/42/EU
Electromagnetic Compatibility Directive	(EMC)	2014/30/EU
Restriction of use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive	(RoHS)	2011/65/EU
Waste of Electronic and Electrical Equipment Directive	(WEEE)	2012/19/EU

13.2 STANDARDS TO WHICH CONFORMITY IS DECLARED

The AMS2 Device has been successfully tested to the following standards:

EN 61326-1:2013

Electrical equipment for measurement, control and laboratory use. EMC requirements.

IEC 61010-1:2010, EN 61010-1:2010, UL 61010-1:2012, CAN/CSA C22.2 61010-1:2012

Safety requirements for electrical equipment for measurement, control, and laboratory use

IEC 60825-1:2014

SAFETY OF LASER PRODUCTS. EQUIPMENT CLASSIFICATION AND REQUIREMENTS

13.3 CE DECLARATION OF CONFORMITY

Declaration of Conformity

Directives to which conformity is declared:

Machinery Directive	(MD)	2006/42/EC
Electromagnetic Compatibility Directive	(EMC)	2014/30/EU
Restriction of use of certain Hazardous Substances in electrical and electronic equipment Directive	(RoHS)	2011/65/EU
Waste of Electronic and Electrical Equipment Directive	(WEEE)	2012/19/EU

Standards to which conformity is declared:

EN 61326-1:2013

Electrical equipment for measurement, control and laboratory use – EMC requirements.

IEC 61010-1:2010, EN 61010-1:2010

Safety requirements for electrical equipment for measurement, control, and laboratory use

IEC 60825-1:2014

Safety of laser products. Equipment classification and requirements

Manufacturers Name: De Beers Group Ignite

Manufacturers Address: De Beers Group Ignite,
De Beers UK Ltd,
Belmont Road,
Maidenhead,
Berkshire,
SL6 6JW
UK

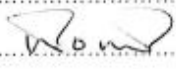
Type of Equipment: AMS2

Model Number: 3706

I, the undersigned, hereby declare that the equipment specified above conforms to the above directives and standards.

Place: Maidenhead, Berkshire

Date: 30 SEPT 2021

Signature: 

Full Name: TREVOR POULTER

Position: PRODUCT GROUP MANAGER

3706-4980 AMS2 Operating Manual - Revision 3

De Beers Ignite (UK) Limited reserves the right to amend this Operating Manual and/or the AMS2 Device without prior notice

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