

FS 567245

# KI-DISCUS<sup>TM</sup> MK 3 USER MANUAL

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*KI-DISCUS<sup>TM</sup> is a product designed and manufactured by CTS Europe Ltd.  
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***Keep this instruction manual with the machine. If this documentation is lost or damaged, obtain a replacement from the manufacturer.***

## Introduction

Thank you for purchasing a KI-DISCUS<sup>TM</sup> product.

### FUNCTIONAL DESCRIPTION

The KI-DISCUS<sup>TM</sup> system has been designed to enable aperture/operator protection factors (and where appropriate, product protection and cross contamination factors) to be measured for Class I and Class II open-fronted microbiological safety cabinets in accordance with EN12469:2000. *(It can also be used for special hybrid facilities such as carcinogen and radio-pharmaceutical cabinets and for general purpose laboratory fume cupboards).*

Unlike test methods employing a micro-biological aerosol challenge this technique enables cabinets to be evaluated without risk of microbial contamination, of either the containment facility or the laboratory. Another advantage is that the results of the tests are available within a few minutes and can be permanently retained.

**KI-DISCUS<sup>TM</sup> MK 3 is a safety measuring device which must be used in accordance with the instructions in order to provide the indicated level of protection.**

*KI-DISCUS<sup>TM</sup> MK 3 is manufactured by CTS Europe Ltd. CTS Europe Ltd accept no liability for any injury or damage caused by improper use.*

## Safety

### WARNINGS WITH THIS GUIDE

You will find in this manual various warning and safety instructions. The type of hazard is identified by a symbol and a title. This safety information must be observed.



#### ***Warning***

This symbol indicates a hazardous situation in which there is an immediate danger of death, serious injury or damage to health if instructions are not followed.



#### ***Attention***

This symbol indicates a hazardous situation in which there may be a risk of minor injury or damage to health if instructions are not followed.



#### ***Information***

This symbol indicates important details on the proper use of the system.



#### ***Useful Information***

This symbol indicates useful information.



H225 Highly flammable liquid and vapour



H302 Harmful if swallowed



## GENERAL SAFETY INSTRUCTIONS

Please note the following general safety precautions



### ***Information***

For your own safety please note the following:

- Working safely always takes priority at all times.
- Staff must be trained before working with active, hazardous / or toxic substances.
- Please read these instructions carefully before use.
- Keep the manual close by the equipment so that it is easy to refer to.
- The information in this guide will help you to work safely and without exposure to contaminants.
- For all questions concerning the application or correct use of this system please contact [info@kidiscus.com](mailto:info@kidiscus.com)
- This document assumes that the user is familiar with all relevant guidelines and safety protocols for working in a laboratory environment and is competent in the use of the device.



### ***Warning – Spray Generator LED lamp***

The spray generator LED lamp is of a high brightness type & is used to illuminate the aerosol produced by the generator. This assists the user in confirming aerosol generation. The user is protected from viewing the LED lamp directly by the spray generator arm assembly. Never use optical instruments to view the lamp directly. If the arm should become damaged and the LED lamp becomes directly visible as a result, the equipment must not be used.

## SAFETY INSTRUCTIONS FOR OPERATING AND SERVICING



### **Information – Operating Conditions**

#### **Avoid failure due to condensation or heat.**

Operate the system at a room temperature of 15°-25°C and 5-80% RH to avoid damage caused by condensation or by overheating.

- This equipment is intended for indoor use only.
- Use only on a stable, level surface. Do not tilt.



### **Warning – Electrical Safety**

**Follow the power supply requirements listed below, failure to do so may result in fire, electric shock or incorrect operation.**

- The system must only be operated on the voltage and frequency shown below.

POWER SUPPLY VOLTAGE	POWER CONSUMPTION	FREQUENCY
100V-120VAC and 220V-240VAC	220w typ.	50-60Hz

- The power supply should be stable and the current capacity sufficient to operate the machine. If the power supply fluctuates, the system could operate incorrectly.

**A modified or damaged mains cable may result in fire, electrical shock or malfunction. Do not modify. If the cable becomes damaged, contact the manufacturer for a replacement.**

- Keep the mains cable away from hot items.
- Do not place heavy objects on the mains cable.
- Do not place the mains cable where it may present a trip hazard or cause an obstruction.
- Do not excessively bend or pull on the mains cable.

### **Warning – Maintenance**

- Unplug the machine before inspection, maintenance or part replacement.
- Repairs requiring removal of the internal cover or top panel should be performed by an engineer appointed by the manufacturer. Never remove any covers or panels. There are no user serviceable parts inside.



### **Attention – Maintenance**

**Improper maintenance, repair or upgrade work can cause considerable damage.**

Cleaning, maintenance and repairs should be performed only by persons who are trained for the activities and understand the possible dangers. For safety reasons, unauthorised alterations or changes to the device are not permitted. Genuine parts and accessories are designed specifically for this equipment. No liability is accepted for damage that is caused by use of non-original parts or accessories.

### **Attention – Operation**

Keep equipment dry. Spillages should be cleaned up immediately.



### **Useful Information**

In an emergency situation, press the “O” Side of the green power switch on the top panel to turn off the machine.



## **Principle of Operation**

A fine aerosol of potassium iodide droplets, produced by a spray generator, is used as a challenge aerosol to measure the containment of a cabinet (*or fume cupboard*). Four Centripetal sensor heads sample the air outside (or inside the cabinet- depending on the nature of the test) and deposit any potassium iodide particles that are entrained in the sampled air on to filter membranes. At the end of the sampling period the filter membranes are placed in a solution of palladium chloride whereupon the potassium iodide “develops” to form clearly visible and easily identified brown dots of Palladium Iodide.

Knowledge of a number of the droplets in the challenge produced by the spray generator and of the number collected in the sensor heads enables the protection factor for the cabinet to be evaluated. A satisfactory protection factor is the criterion by which open-fronted micro-biological safety cabinets are assessed and this test method is described in EN12469:2000.

When this performance is confirmed at commissioning or during routine maintenance there should be no more than 62 brown dots on any of the KI-DISCUS™ filter membranes after development in palladium chloride. The figure of 62 results from evaluating the equation in the above section for an operator protection requirement of  $10^5$ .

## Equipment Overview

KI-DISCUS™ is designed for one person operation and comprises of two parts, cabinet and tool box, which can be separated for ease of transportation.

The cabinet and tool box house all the apparatus and equipment required for the test.

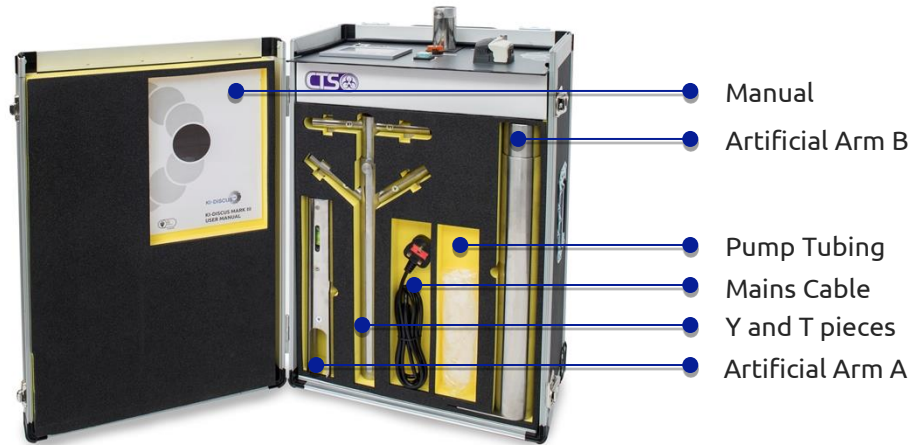


### *Useful Information*

**Note that the cabinet and tool box are separate items. The lids of both cabinet and tool box may be lifted off.**



## CABINET



User Manual

Instruction user guide.

Artificial Arm

Used to simulate disturbances to the air flow, caused by an operator's arm in the aperture of an open-fronted cabinet.

Y and T Pieces

Sensor head mounting assembly.

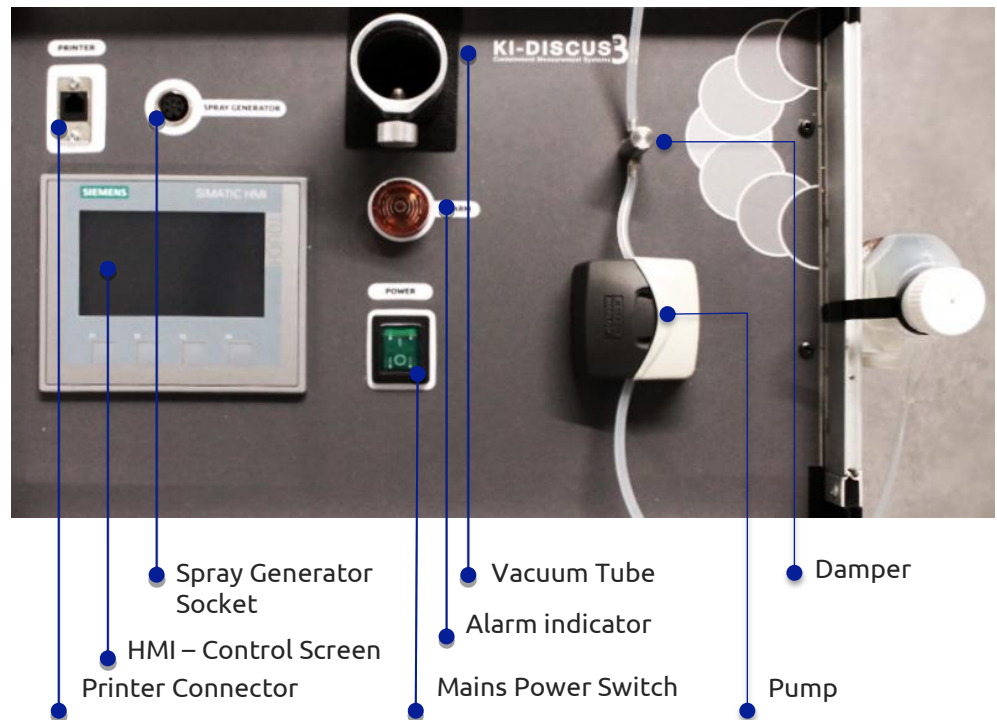
Mains Cable

Used to connect mains power to the AC inlet at the rear of the machine.

Pump Tubing

Used to supply Potassium Iodide solution from the reservoir bottle to the spray generator, via the Peristaltic Pump

## CABINET CONTROL PANEL



### Mains Power Switch

Used to turn the machine on and off. Illuminated when switched on.

### Alarm Indicator

Illuminates and sounds if a test error occurs or performance falls outside specifications during cycle.

### Vacuum Tube and Locking Screw

Y piece insert connection point.

### Damper

Fluid flow regulator.

### Peristaltic Pump

Used to deliver Potassium iodide solution to the spinning disc. The pump speed is factory set.

## TOOL BOX



The tool box holds the equipment, consumables and tools to set up KI-DISCUS™ and carry out tests.

## Consumables

### Potassium Iodide

Used to produce the challenge aerosol.

Potassium Iodide solution is pumped to the nebuliser, where it is dispensed onto the Spray Generator spinning disc. The disc rotates at high speed, creating an aerosol.

*Current MSDS are available on request.*



### **Warning – Caution**

The Potassium Iodide solution used for the test is flammable and corrosive to un-treated steel. Potassium Iodide oxidises rapidly in the atmosphere and leaves a yellow stain.

- It is recommended to place a protective sheet or paper on the floor in front of the cabinet being tested.
- Wipe clean the cabinet thoroughly after testing.
- Use a cloth dampened in water for cleaning, or contact the cabinet manufacturer for suitable cleaning advice.
- Wipe up any spillages immediately using water with a small concentration of detergent.



## Information

*When the KI-DISCUS™ system is used to measure the operator protection factor in facilities used for microelectronics research or production it is generally not possible to use potassium iodide as the challenge aerosol, as this would provide a containment which is incompatible with the work.*

*In such containment circumstances it may be possible to substitute a solution of ammonium iodide in the aerosol generator and carry out tests in the same way as described earlier for Class I and Class II cabinets. The ammonium iodide solution should again be 1.31% dissolved in alcohol or industrial methylated spirits. The filters are developed as usual in the palladium chloride solution. Seek advice from the manufacturer and the laboratory equipment owner in case of any doubt.*

## Palladium Chloride

At the end of the test the filter membranes are placed in a palladium chloride solution. This 'develops' the filter membrane so that any escaping particles become visible as brown dots.

*Current MSDS are available on request.*



## De-ionised Water

De-ionised (or distilled) water is used to rinse the filter membrane. This concludes the development process.



## Sensor head filters

3µm pore size, white, 25mm diameter, hydrophilic, mixed cellulose esters (MCE) discs.

Recommended Merck/Millipore filters, reference SSWP02500, are available from CTS.



*Current MSDS are available on request.*

*The individual filters are separated by blue sleeves. Make sure these are discarded before placing the filter into the sensor head.*



## Tools

### ***Tweezers x 3***

- A. Millipore tweezers – used when loading fresh filters to sensor heads.
- B. Fine point tweezers – used when removing sampled air filter from sensor heads and ‘floating’ filter on palladium chloride filled petri dish.
- C. Spade end tweezers – used when removing filter from palladium chloride solution, then used for rinsing in de-ionised water and placing.



### ***Measuring Cylinder***

Used to confirm quantity of potassium iodide solution delivered to Spray Generator.

20ml to be delivered in 9 minutes  $\pm$  30 seconds.

### ***Petri Dish x 2***

- 1. Dish 1 - One half filled with Palladium Chloride solution - used when floating sampled filters.
- 2. Dish 2 - One half filled with de-ionised water for filter rinsing.



### ***Vacuum gauge***

Used to confirm\* individual sensor head vacuum reading of 8 inches wg / -20mbar.

*\*Vacuum is set and monitored automatically by the machine.*



#### ***Useful Information***

*NB. Some fluctuation in vacuum generation may be observed. This is normal but should not exceed  $\pm$  1.5mbar.*

### ***Reservoir Bottle & Clip***

Filled with potassium iodide solution – silicone tubing connects the reservoir bottle to the spray generator via the peristaltic pump and damper.



### ***Magnifier & Graticule***

Used to view and determine the number of brown dots found on the filters.



### ***Distance Piece Gauge***

Used when measuring set distances –divided into 50mm x 4



### ***Tools & Spares***

- A. Feeler gauge - used to determine and set distance of 0.1mm between the spinning disc and the nebuliser nozzle.
- B. Allen key - used to release/tighten the nebuliser nozzle securing screw, if adjustments need to be made to achieve a 0.1mm gap between end of nebuliser nozzle & top surface of spinning disc.
- C. Tommy bar - used in replacing the spinning disc and hub assembly.
- D. Spare "O" rings for sensor heads.
  - Large size - used in sensor heads (Sensor cap seal).
  - Medium size - used in rising arm.
  - Small size - used in sensor heads (Sensor connector seal).



### ***Printer & Cable***

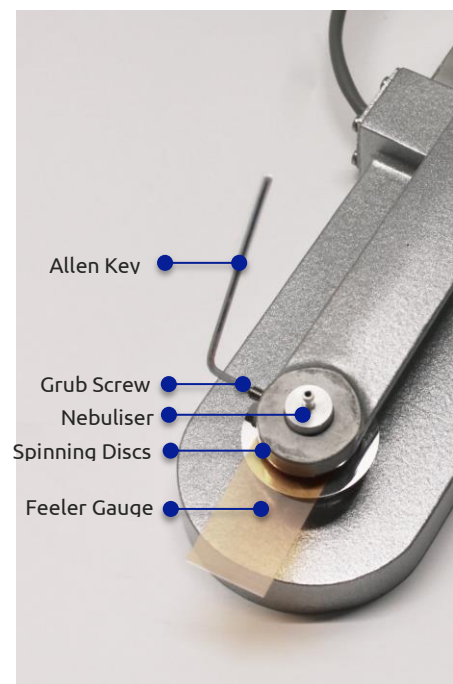
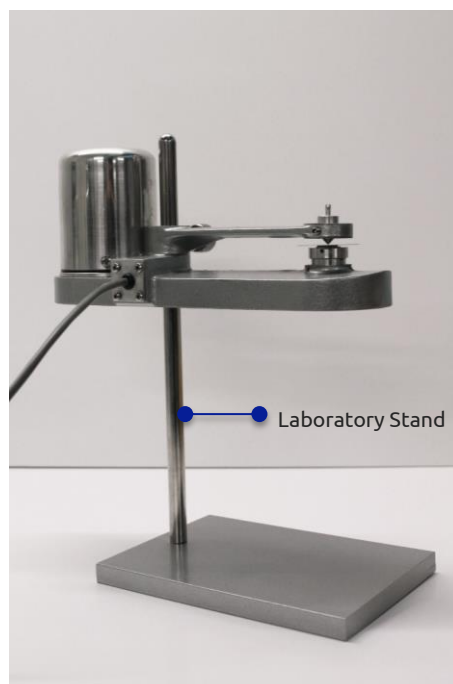
Connected to the KI-DISCUS™ control panel, enabling the user to obtain a paper report of the KI-DISCUS™ test performance.



### **Spray Generator Assembly**

The spray generator incorporates a spinning disc rotating at 28,000 rpm  $\pm$  500 rpm.

Potassium iodide solution, contained in the reservoir bottle, is delivered to the spinning disc through silicone tubing, via a peristaltic pump & damper mounted on the control panel. The solution is dispensed on the centre of the spinning disc via the nebuliser. The gap between the end of the nebuliser nozzle and the spinning disc is set to 0.1mm by means of the feeler gauge provided, to ensure an even aerosol. The spray generator assembly also comprises a laboratory stand which is used to hold the spray generator at different heights when required.



### **Sensor Heads x 4**

Air enters the sensor head through the orifice in the cap and is directed to the filter. Potassium iodide particles escaping from the Microbiological Safety Cabinet (MSC) cabinet are deposited on the filter.

*Air flow through the sensor heads is controlled automatically. Suction is provided by a centrifugal fan housed within the cabinet.*



# KI-DISCUS™ Tests

## CONTEXT

### Test Requirements

EN12469:2000 Specifies replicate testing in annex C.1.2 that a type test for aperture/operator protection should be made on production example of a safety cabinet, and that five replicated tests should produce operator protection factors of  $10^5$  or above. When this performance is confirmed at commissioning or during routine maintenance there should be no more than 62 brown dots on any of the KI-DISCUS™ filter membranes after development in palladium chloride. The figure of 62 results from evaluating the equation in the above section for an operator protection requirement of  $10^5$ .

If the operator protection factor is to be consistent with the values specified in EN12469:2000 at least 5 consecutive tests at specified distances should be performed, each of which results in a protection factor of not less than  $10^5$  evaluated for each sensor head.

Practical experience has shown that well set-up cabinets in good environmental conditions will have approx. 5-30 dots per filter.

### Regular Testing of Cabinets

It is recommended that maintenance and testing of all classes of micro-biological safety cabinets be carried out as a regular routine. The Control of Substances Hazardous to Health Regulations (COSHH) requires that any control measure such as safety cabinets are maintained in an efficient state. Safety cabinets should be thoroughly examined and tested at least once every 14 months (more frequently in special circumstances, e.g. at least every 6 months for work at containment levels 3 and 4) and records of the examination and tests, and of any repairs carried out should be kept for at least 5 years.

## Preparations for Test

### POSITIONING THE KI-DISCUS™ CABINET

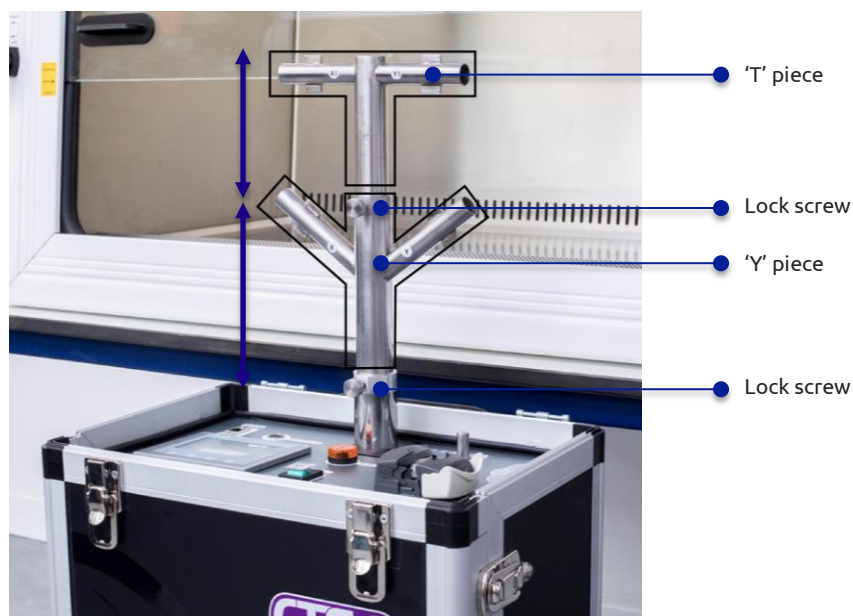


#### Useful Information

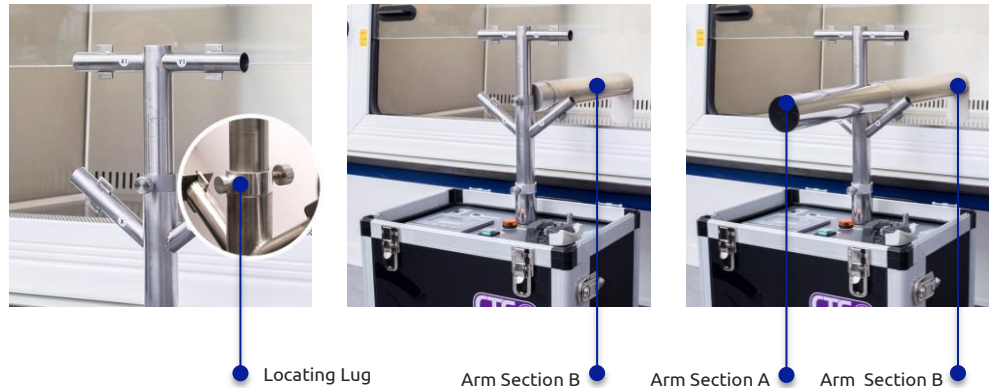
Potassium Iodide oxidises rapidly in the atmosphere and can leave a yellow stain. It is recommended to place a protective sheet or paper on the floor in front of the cabinet being tested.

1. The KI-DISCUS™ cabinet is placed upright at the front centre of the safety cabinet aperture with the control panel facing the user.
2. Connect one end of the mains cable to a suitable electrical supply and the other to the rear inlet socket on the KI-DISCUS™ cabinet. Ensure the cable is placed so that it does not present a hazard.
3. Do not switch on KI-DISCUS™ at this stage. If KI-DISCUS™ powers up, switch off using the green power switch on the cabinet control panel.

### 'Y' PIECE, 'T' PIECE & ARTIFICIAL ARM ASSEMBLY



1. Remove the 'Y' piece and 'T' piece from the KI-DISCUS™ cabinet. Loosen the lock screw on the 'Y' piece and gently insert the 'T' piece. Do not tighten the lock screw at this stage.
2. Loosen the lock screw on the vacuum tube. Take the 'Y' piece (now connected to the 'T' piece) and insert the lower tube of the 'Y' piece gently into the vacuum tube. *If there is much resistance when attempting to insert tubes, a little silicone grease may be placed on the 'O' ring seals located towards the top of the tubes.*



3. Remove artificial arm sections 'A' and 'B' from the KI-DISCUS™ cabinet. Place arm section 'B' in the cabinet under test, so that the 'foot' plate is facing the wall of the cabinet under test. The 'key' hole at the opposite end of arm section 'B' must be hooked onto the locating lug at the top of the 'Y' piece.
4. Install arm section 'A' onto the end of arm section 'B'. The complete arm section, comprising section 'A' and section 'B', should now rest on the 'Y' piece. The artificial arm should protrude a minimum of 250 mm into the laboratory from the plane of the aperture.
5. Adjust the height of the 'Y' piece, so that the complete arm section is horizontal. Use the spirit level in arm section 'A' for this purpose. Tighten the lock screw on the vacuum tube.
6. Ensuring the 'T' piece is located securely in the 'Y' piece, install sensor heads onto the 'X1' and 'Y1' sections of the 'T' piece. The sensor heads air inlet hole must face the cabinet aperture. Adjust the height of the 'T' piece, so that the centre of the sensor heads' air inlet holes are level with the top of the aperture of the cabinet under test. Tighten the lock screw on the 'Y' piece. It will be necessary to temporarily remove section 'A' of the artificial arm when making this adjustment.
7. Install sensor heads onto the 'X' and 'Y' sections of the 'Y' piece.
8. Carefully manoeuvre the KI-DISCUS™ cabinet, so that the air inlet holes of all sensor heads are 150mm – 160mm from the cabinet aperture plane.

## SPRAY GENERATOR INSTALLATION

The spray generator positioning changes according to the microbiological cabinet type, the following information describes the positioning for Class I and Class II Safety Cabinets.

### *For Class I Safety Cabinets*

Place the aerosol generator centrally in the cabinet below the artificial arm and use the measuring gauge provided so that the leading edge of the spinning disc is 100 mm behind the plane of the aperture (Figure 3)

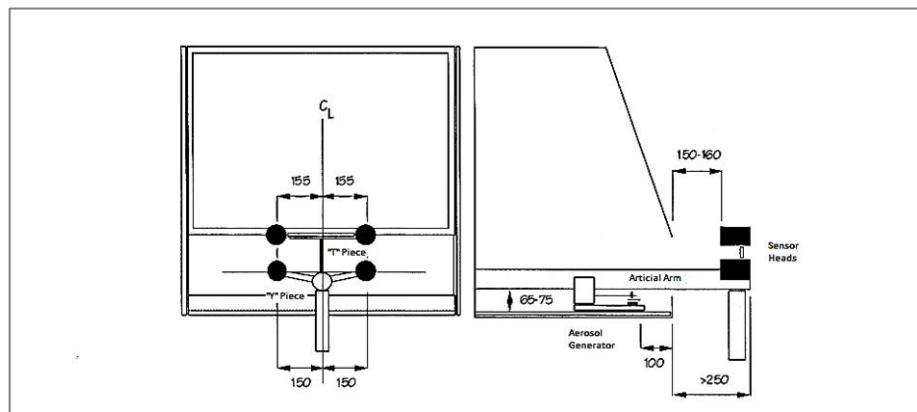


Fig. 3

### *For Class II Safety Cabinets*

Place the aerosol generator on the laboratory stand centrally in the cabinet so that the centre of the spinning disc is directly above the centre of the artificial arm and the leading edge of the disc is 100 mm behind the plane of the aperture. Adjust the height of the spray generator so that the spinning disc is level with the upper edge of the aperture (Figure 4).

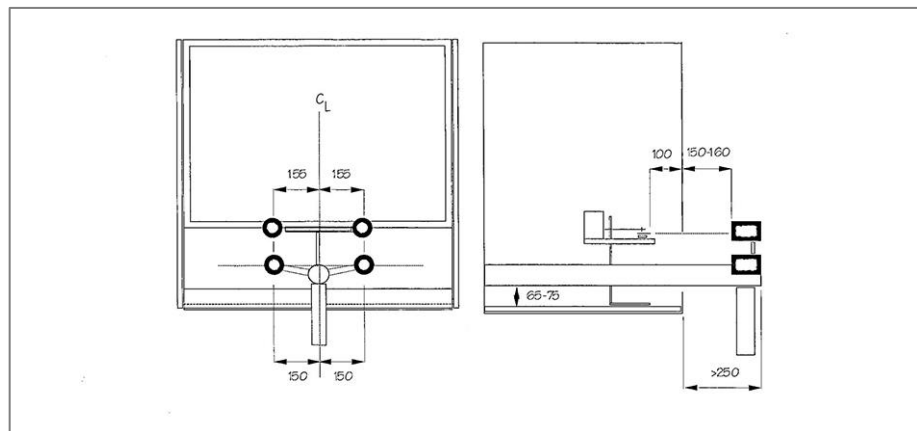


Fig. 4

### **Spray Generator Connection**

Connect the spray generator cable plug to the spray generator connector socket on the cabinet control panel, paying attention to the orientation of the plug. A locking ring on the plug is rotated clockwise to secure the plug to the socket and rotated anti-clockwise to release. *Never pull the cable at the plug or spray generator end. Never connect or disconnect the spray generator while running an automatic test. Doing so may cause erratic operation or possible damage to the spray generator motor drive system.*



## **Pre-Test Checks**

These pre-test checks verify fluid delivery, fluid quantity & nebuliser to spinning disc distance.



### ***Information – Testing***

Ensure these pre-test checks are carried out before performing tests. Failure to do so may cause the system to operate incorrectly.

### ***Information – User commands***

- User commands, except emergency stop, are input through the touch-sensitive screen and the membrane panel.
- Press 'O' on the 'POWER' rocker switch for an Emergency Stop.
- Finger pressure when using the screen & panel should be light to moderate. Use of other implements may damage the screen.



## FLUID DELIVERY PRE-TEST CHECK. TUBING INSTALLATION.



### *Information – Test Accuracy*

Perform the fluid delivery pre-test check at the start of every day the system is in use and when tubing is replaced. Failure to perform this check may affect the accuracy of test results.

### *Information – Tubing*

NB! KI-DISCUS™ is calibrated to use the following silicone tubing only (1.25 mm wall - 2.00mm bore). Use of other tubing types may result in unreliable potassium iodide solution delivery.

**Do not use old, worn or damaged tubing.**

Tubing may be obtained from CTS under part number: 3/440008

1. Carefully fill the reservoir bottle with potassium iodide solution and place the filled bottle on a nearby stable surface. The nearby surface should ideally be at the same height or slightly higher than the peristaltic pump. If no nearby surface is available, securely clip the bottle to the side of KI-DISCUS™ using the supplied reservoir bottle clip.
2. Using the supplied allen key, loosen the nebuliser securing screw located towards the end of the arm on the spray generator. Remove the nebuliser from the spray generator arm.
3. Connect a 1.2 metre length of tubing from the spray generator nebuliser to the damper on the cabinet control panel. Use of lengths less than 1.2 metres are not recommended and may adversely affect pump dosing accuracy. Ensure there are no sharp bends in the tubing.
4. Place the nebuliser in the supplied measuring cylinder. The nebuliser should be above the 20ml graduation. It may be necessary to place the measuring cylinder in a stand to prevent it from tipping.
5. Open the peristaltic pump lid. Connect a 80 – 100 cm length of tubing to the opposite damper connector. Use of lengths less than 80 cm or greater than 100 cm are not recommended and may affect pump dosing accuracy. Place the tubing in between the pump rollers and inside wall. The tubing must not be twisted or stretched. Close the lid.

a.



b.



c.



d.



6. Connect the other end of the tubing to the reservoir bottle nozzle.
7. Press the 'POWER' rocker switch. The 'POWER' switch will illuminate.
8. When prompted by the following screen, touch "Enter System".



9. The Main Menu will appear.



10. Proceed with the priming of the fluid delivery system.

## PRIMING THE FLUID DELIVERY SYSTEM



### *Information – Priming the fluid delivery system*

When performing a fluid delivery pre-test check, ensure the nebuliser is placed in the measuring cylinder, above the 20ml graduation mark.

### *Information – Tests*

Priming the fluid delivery system is necessary before:

- Performing a fluid quantity test.
- Performing the first full automatic test.

### Priming

1. Touch “Prime Dose Pump”. The Dose Pump Priming screen appears.



Three pump functions are available and each toggles between two modes. The functions are selected by touching the related grey 'button'.

FUNCTION	Direction	Speed	Start/Stop
MODES	Forward/ Reverse	Slow / Fast	Start / Stop

2. Ensure reservoir bottle is filled with potassium iodide solution.
3. Set Direction to 'Forward'.
4. Set Speed to 'Slow'.
5. Set Start/Stop to 'Start'.
6. Pay attention to the fluid travelling along the tubing.

The fluid will now be drawn from the reservoir bottle, through the pump and damper, up to the nebuliser. The leading edge of the fluid can be seen through the translucent tubing. Once the fluid enters the nebuliser, it will exit the nozzle into the measuring cylinder.

7. Inspect the tubing for air bubbles. If air bubbles can be seen in the tubing, continue running the pump until they have been removed.  
If air bubbles continue to develop, check the delivery system for leaks. Leaks may occur if the reservoir bottle spout is not securely attached to the reservoir bottle outlet.
8. Once fluid enters the measuring cylinder and no air bubbles are present in the tubing, set Start/Stop to 'Stop'. Fluid delivery will cease. Remove the nebuliser from the measuring cylinder. The tubing has now been primed with fluid, i.e. the tubing is completely filled with fluid. When the pump is re-started, fluid will exit the nebuliser immediately.
9. Empty the contents of the measuring cylinder.
10. Replace the nebuliser into the measuring cylinder, ensuring the nebuliser is placed above the 20ml graduation.
11. It will now be necessary to check the quantity of fluid delivered in 9 minutes. Please follow the Quantity Test detailed in the next session.

#### Quantity Test

Pump rotation speed is set at calibration to deliver a nominal 20ml of potassium iodide solution from the reservoir bottle to the spinning disc in 9 minutes. Note that a variation of +/- 30 seconds is permitted to deliver the required 20ml of solution. The actual quantity of fluid delivered may vary due to normal manufacturing tolerances of the tubing, tubing performance over time and the duration tubing is held within the peristaltic pump. Other factors, such as temperature, may also affect delivery.



#### **Information**

**Check and, if necessary, calibrate the fluid delivery system using the quantity test before starting a full automatic test.**

#### Set Up

Ensure the nebuliser is placed within the measuring cylinder.

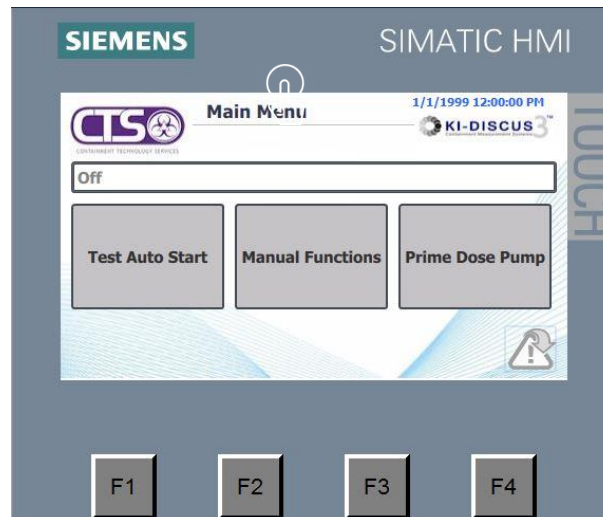
1. Set Direction to 'Forward'.
2. Set Speed to 'Slow'.
3. Set Start/Stop to 'Start'.
4. Start a timer/stopwatch etc. to measure how much fluid is delivered in to the measuring cylinder in 9 minutes.
5. When 9 minutes is up, set Start/Stop to 'Stop'. Observe the quantity of fluid in the measuring cylinder.
  - Delivery of 20ml +/- 1ml is permissible.
  - If the fluid delivered is outside this range, the standard automatic test time of 9 minutes can be increased or reduced up to a maximum of 30 seconds, allowing an automatic test time of between 8 minutes 30 seconds to 9 minutes 30 seconds.
  - To adjust the automatic test time, proceed as follows.
6. Press 'F4' on the control panel.



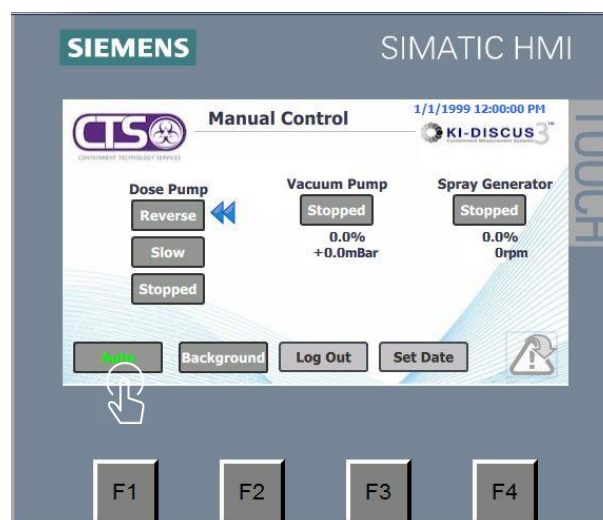
## Useful Information

'F4' returns the user to the previous operation screen. It always performs the same function.

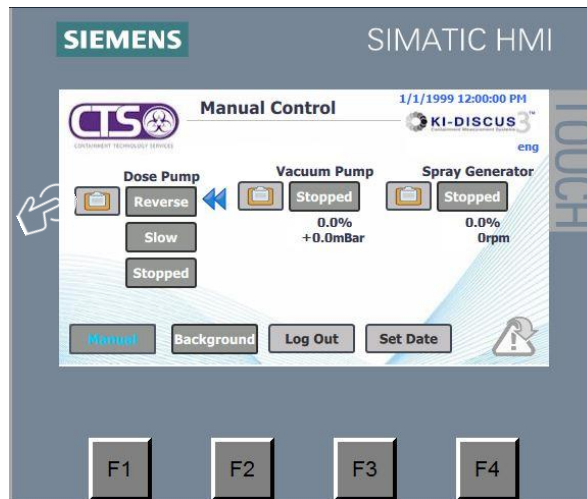
7. Touch 'Manual Functions'.



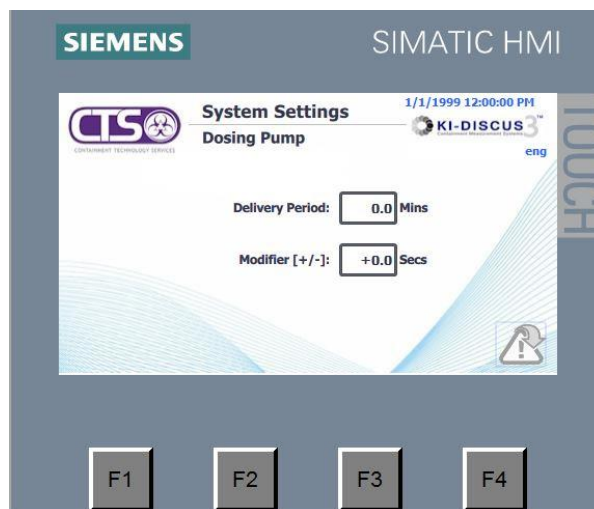
8. Touch the 'Auto' button. The indicator will now show 'Manual'. KI-DISCUS™ is now in manual mode. No automatic test is possible in manual mode.



9. Touch the adjustment button  in the Dose Pump section.



The following screen will appear.



10. Touch the 'Modifier' box. A keyboard will appear. It will now be possible to enter a numerical figure to vary the time of the automatic test e.g. '+15' will extend the test time by 15 seconds, '-15' will reduce the test time by 15 seconds. Increasing the time will allow a greater quantity of fluid to be delivered. Reducing the time will allow less fluid to be delivered. Adjust the time accordingly. It may be necessary to run a few delivery tests at different time settings to obtain satisfactory fluid delivery. Once set, the modifier retains the value set until KI-DISCUS™ is turned off or power is removed. *The Delivery Period is pre-set and not user adjustable. NB! Do not release/re-clamp the tubing in the pump whilst performing a Quantity Test or after completion of the Quantity Test. Doing so will void the Quantity Test calibration.*

11. Press 'F4' to return to the previous screen. Touch the 'Manual' button, so that 'Auto' is shown.

KI-DISCUS™ is now in 'Auto' mode. *Remember to return the machine to 'Auto' mode. No automatic tests are possible in 'Manual' mode.*

Remove the nebuliser from the measuring cylinder & install it into the spray generator arm. Ensure a gap of 0.1mm exists between the end of the nebuliser nozzle and the surface of the spinning disc. (Use the feeler gauge for this purpose). Tighten the securing screw using the supplied allen key to lock the nebuliser in place. Position the spray generator back in the correct position within the cabinet under test.



12. Press 'F4' to return to the Main Menu.



### Useful Information



The adjustment button is only available in 'Manual Control' mode.

Its function is limited to Dose (Peristaltic) Pump operation only.

It performs an engineering/service function in other modes – these modes are not available to user.

Attempting to use this function in any other mode than Dose Pump operation will prompt the user for a password.

Press 'Cancel' to return to the previous screen.

## SETTING TIME & DATE

*The 'Set Date' button is used to set the internal clock time and date. This information is primarily used for report data. KI Discus will still perform tests if the correct time and date have not been set.*

- Press the 'Manual Functions' button in the Main Menu.
- The 'Manual Control' screen will appear.
- The time & date are shown in the top right hand corner of the screen.



- Press the 'Set Date' button.
- Follow the on screen instructions for entering time and date.
- Use the on screen keyboard to enter data.
- The setting format is shown in orange to the right of the 'Set Time' and 'Set Date' buttons.
- Make sure the correct setting format is used. Failure to do so may result in the wrong time and/or date being displayed, or failure to accept time or date information.
- Press 'F4' to return to the previous screen.



## OTHER MANUAL CONTROL FUNCTIONS

The Vacuum Pump motor & Spray Generator may be turned on and off independently in the Manual Control mode.

*This facility is intended for basic system checks and not for cabinet testing.*



### Information

*'Manual' mode must be selected when using this facility. Ensure 'Manual' is displayed in the bottom left corner of the Manual Control screen. Touch the 'Auto/Manual' button so that 'Manual' is displayed. This facility is not available in 'Auto' mode.*

#### Vacuum Pump

The Vacuum Pump motor may be started or stopped by pressing the grey button. The button text will indicate motor status ('running' or 'stopped').

*NB.: The vacuum motor will run at a pre-set speed when operated manually. Vacuum motor power is displayed arbitrarily as a % figure. Vacuum generated is displayed in mBar below vacuum motor power. Although vacuum level is monitored, the vacuum motor speed remains fixed, regardless of vacuum generation. The vacuum motor speed is pre-set by the manufacturer to provide an approximation of correct vacuum when the vacuum system is in good order. The vacuum generated in manual mode may not be exactly -20 mBar. This is not a fault. Motor speed is not user adjustable.*

#### Spray Generator

The spray generator may be started or stopped by pressing the grey button. The button text will indicate motor status ('running' or 'stopped').

*NB.: The spray generator disc drive motor will start up and accelerate until the correct speed is reached (28,000 RPM +/- 500 RPM). Due to the high running speed and normal tolerances of the components used, some speed variation, within +/- 500 RPM, is likely. This is not a fault. Disc drive motor power is displayed arbitrarily as a % figure. Disc speed is displayed in RPM below disc motor power. If the disc fails to rotate at the correct speed, there may be a problem with the spray generator or disc drive system. In this event, the manufacturer should be contacted. Motor speed is not user adjustable.*

*The spray generator LED lamp remains illuminated whenever power is connected and KI Discus is switched on, regardless of operating condition.*



### Information

*NB.: After using this facility, ensure the system is returned to 'Auto' mode. Touch the 'Auto/Manual' button so that 'Auto' is displayed. No automatic functions are available in 'Manual' mode.*

## SPRAY GENERATOR PRE-TEST CHECK

The spray generator is a precision instrument. The following check is vital for its correct functioning.

1. Remove the spray generator from the Tool Box.
2. Take the orange feeler gauge and carefully slide it between the silver disc and nozzle of the nebuliser. There should be a *very* slight resistance felt. This indicates the gap is set correctly (0.1mm).
3. If no resistance is felt and a gap is visible between the feeler gauge and nebuliser nozzle and/or silver disc, the distance between the silver disc and nebuliser is too great. If significant resistance is felt when using the feeler gauge, the distance between the silver disc and nebuliser is too small. It will be necessary to adjust the gap between the silver disc.
4. Using the Allen key supplied, loosen the nebuliser securing screw at the end of the arm on the spray generator. Move the nebuliser so that the feeler gauge can be inserted easily between the nebuliser nozzle and silver disc. Now position the nebuliser so that *very* slight resistance is felt when sliding the feeler gauge between the nebuliser nozzle and silver disc. Tighten the nebuliser securing screw. Re-check the gap between the nebuliser nozzle and silver disc with the feeler gauge. Re-adjust if necessary.

This concludes pre-test checks.

## Preparation for Tests

Remove the petri dishes, tweezers, large filter paper and filter membrane box from the tool kit. Set out the petri dishes on a bench away from the cabinet under test. Half fill one dish with Palladium Chloride solution & half fill the other with de-ionised water. Replace the covers on each.

Set out four large filter papers for drying the filter membranes.

## Loading Sensor Heads

Remove each individual sensor head from the arms of the Y & T piece.

Remove the top cap from each sensor head. Unscrew and remove the brass cone from each filter holder.

Using the Millipore tweezers, carefully separate and remove a filter membrane from the pack. Ensure the blue interleaved material, used to separate each filter membrane, is removed and discarded.

Place one filter membrane in each filter holder.

Screw the brass cone back on to the filter holder and replace the sensor head cap.

Install the sensor heads on to the Y & T piece.

*NB.: The filter membranes are fragile and must be treated with care. Similarly, the brass cones are machined to fine tolerances in order to ensure an appropriate air flow; damaged or distorted cones must be replaced.*

**The system is ready to start tests.**

## Background Test

### OPERATION



#### *Information*

NB.: Perform this test first, before running a full automatic test.

The background test detects KI particles already present in the environment, prior to any full automatic test. If KI particles are detected after a background test has been performed, this may affect the accuracy of any full automatic test. Seek advice from the laboratory regarding ventilation of the area.

Filter membranes must be inserted into each of the sensor heads before carrying out a background test. The machine will run the background test for 10 minutes. The spray generator and peristaltic pump will not function during the background test.



#### *Information – This procedure is important.*

The background test must be performed before any testing is undertaken, prior to using KI-DISCUS™ in a specified laboratory.

Moving to a different laboratory would require the background test to be undertaken again, before commencing testing.

1. Place KI-DISCUS™ so that the four sensor heads, loaded with filter membranes, are in front of the safety cabinet 150mm to either side of the front aperture centre line and 100mm from the plane of the front aperture.
2. Touch the 'Manual Functions' button to select the Manual Control screen. Touch the 'Background' button on the Manual Control screen. The button text will turn orange. Ensure 'Auto' is selected on the Manual Control screen. Press 'F4'.
3. 'Background Check' will now be displayed in orange. Touch the 'Test Auto Start' button. The Test Control screen will now be displayed.



4. Touch the 'Auto Start' button. The background test will begin.

The 'Vacuum' status indicator will flash green until correct vacuum is reached and maintained. This should take less than 1 minute.

The vacuum status indicator will then be a steady green colour.

This test will run for 10 minutes. A green horizontal bar, calibrated from 0 to 100 provides an indication of test progress. The bar is underneath the status indicators. Test time remaining is shown in the right hand corner of the display.

- The status indicators and test progress bar will turn grey on completion of the test. The vacuum motor will turn off.
- The filter membranes are removed from the sensor heads and developed in Palladium Chloride solution. Instructions are provided in the following section.



### ***Useful Information***

*N.B. On background test completion, the machine will automatically switch back to standard mode.*



### ***Information – Contamination Risk***

*N.B. In order to avoid contamination, care should be taken to ensure that the tweezers used for placing the membrane in palladium chloride solution are not used for loading the sensor heads.*

- a. On completion of the test, individually remove the sensor heads from the arms of the 'Y' & 'T' pieces. Prepare two petri dishes, one containing Palladium Chloride solution, the other containing de-ionised water.
- b. Remove the sensor head cap. Unscrew & remove the brass cone. Using the fine point tweezers, remove the filter and float the filter into the petri-dish containing the palladium chloride solution, with the surface that has been exposed to the air flow facing upwards.

*The sensor head from which a particular membrane was removed should be noted.*

Within 30-45 seconds the membrane will become saturated with palladium chloride and any Palladium Iodide will become visible as brown dots.

- c. The filter is then removed with the spade tweezers and immersed in de-ionised water for 3-4 seconds before being placed on a clean filter paper to dry.
- d. Repeat this procedure with the filter membrane from the other sensor heads.
- e. Place covers over the petri-dishes.

### **Examination of the Filter Membranes**

Examine each filter with the x10 magnifier provided and count the number of developed dots.

On completion of the background tests in laboratories where NO previous tests have taken place within 24 hours, the developed membranes should not show any Brown spots.

In laboratories where Operator/Aperture tests have recently taken place (or where they have resulted in considerable leakage of the Aerosol challenge) it is particularly advisable to perform background tests before making any further tests on the cabinets.

A count of more than five spots on any of the four filter membranes following a 10 minute test should be regarded as unsatisfactory and further tests postponed until the background is no longer contaminated.



### ***Useful Information***

If required, a report may be printed on completion of the background test. Please refer to the report printing section on page 34.

**Background Test End.**

## Running a Full Automatic Test



### Information

The silicone tubing running from the reservoir bottle, through the pump and damper and then to the nebuliser nozzle on the spray generator must first be primed with KI fluid. If this is the first full automatic test of the day, ensure pre-test checks have been carried out.

### AUTOMATIC TEST START

This is achieved via the 'Test Control' screen.

1. Select the Main Menu.
  2. Touch 'Test Auto Start'.
  3. Touch 'Auto Start'.
- The automatic test will begin.
  - The vacuum motor will run and the spray generator disc will start to spin.
  - The 'Vacuum' and 'Disc' status indicators will flash green until their correct parameters are reached and maintained. This should take no longer than 45 seconds. The Vacuum and Disc status indicators should then remain green.



- The peristaltic pump will start shortly afterwards. The 'Pump' status indicator will turn green. KI fluid is now delivered to the spray generator.
- The run up procedure should take no longer than 75 seconds.
- Once the run up procedure is complete, the test begins. The test will run for a nominal 9 minutes. *This may be extended or reduced by 30 seconds as required to deliver the correct amount of fluid.*
- A green horizontal bar, calibrated from 0 to 100 provides an indication of test progress. The bar is underneath the status indicators. Test time remaining is shown in the right hand corner of the display.
- Following test completion, the peristaltic pump will switch off, shortly followed by the spray generator disc and vacuum motor.
- The 3 status indicators will turn grey. This indicates the end of the test.

## REPORT PRINTING

A report may be printed on completion of the background or full automatic test. The report includes information concerning the operational parameters of the machine during the test. This information is useful in confirming the satisfactory operation of the machine whilst performing the test.

- Connect the printer to the printer terminal on the top control panel.
- Touch 'View Report'. Report parameters will then be displayed.
- Touch 'Print'. The report parameters will be printed.

*Printer power is automatically turned on when a print command is received and turned off shortly after printing has finished.*



### Useful Information

*NB.: This function will not be available if the test was unsuccessful (i.e. stopped either manually by the user or automatically by the machine). No report is generated.*



- Press 'F4' to return to the Test Control screen.



### Information – Contamination Risk

*N.B. In order to avoid contamination, care should be taken to ensure that the tweezers used for placing the membrane in palladium chloride solution are not used for loading the sensor heads.*

## RESULTS ANALYSIS

- a. On completion of the test, individually remove the sensor heads from the arms of the 'Y' & 'T' pieces. Prepare two petri dishes, one containing Palladium Chloride solution, the other containing de-ionised water.
- b. Remove the sensor head cap. Unscrew & remove the brass cone. Using the fine point tweezers, remove the filter and float the filter into the petri-dish containing the palladium chloride solution, with the surface that has been exposed to the air flow facing upwards.

*The sensor head from which a particular membrane was removed should be noted.*

Within 30-45 seconds the membrane will become saturated with palladium chloride and any Palladium Iodide will become visible as brown dots.

- c. The filter is then removed with the spade tweezers and immersed in de-ionised water for 3-4 seconds before being placed on a clean filter paper to dry.
- d. Repeat this procedure with the filter membrane from the other sensor heads.
- e. Place covers over the petri-dishes.

### Examination of the Filter Membranes

1. Examine each filter with the x10 magnifier provided and count the number of developed dots.
2. If the number exceeds 50-100, it will be necessary to attach the graticule provided with the magnifier and then count the dots within a square or convenient circle.

The following table gives the multiplication factors to be applied to the count of dots within an appropriate circle on the graticule and within the squares on the grid:

Graticule Circles Dia. (mm)	2.5	2.0	1.0	0.9	0.8	0.7	0.5
Multiplication Factor	77	121	483	597	756	988	1935

Graticule Grid	1sq cm	Small Squares
Multiplication Factor	3.8	1520

These factors take into account the percentage of total surface area of the membrane on which particles may be deposited.



## INTERPRETING RESULTS

For a microbiological safety cabinet to pass the EN standard for aperture/operator protection, there **must be no more than 62 developed dots on any one filter paper**.



Dots on any one filter paper and guide to cabinet performance.

A count of more than 62 dots on any one filter paper= FAIL.

?= Marginal Pass

### KI-DISCUS™ OPERATOR PROTECTION FACTOR

$$\frac{62 \times 10^5}{n}$$

Where  $n$  = number of droplets counted

Multiplied by Graticule Multiplication factor (if appropriate)

	$n$	
EXCELLENT	0	$>6.20 \times 10^6$
	1	$6.20 \times 10^6$
	2	$3.10 \times 10^6$
	3	$2.07 \times 10^6$
	4	$1.55 \times 10^6$
	5	$1.24 \times 10^6$
	6	$1.03 \times 10^6$
GOOD	7	$8.86 \times 10^5$
	8	$7.75 \times 10^5$
	9	$6.89 \times 10^5$
	10	$6.20 \times 10^5$
	11	$5.64 \times 10^5$
	12	$5.17 \times 10^5$
	13	$4.77 \times 10^5$
	14	$4.43 \times 10^5$
	15	$4.13 \times 10^5$
	16	$3.88 \times 10^5$
	17	$3.65 \times 10^5$
	18	$3.44 \times 10^5$
	19	$3.26 \times 10^5$
	20	$3.10 \times 10^5$
	21	$2.95 \times 10^5$

	$n$	
GOOD	22	$2.82 \times 10^5$
	23	$2.70 \times 10^5$
	24	$2.58 \times 10^5$
	25	$2.48 \times 10^5$
	26	$2.39 \times 10^5$
	27	$2.30 \times 10^5$
	28	$2.21 \times 10^5$
	29	$2.14 \times 10^5$
	30	$2.07 \times 10^5$
	31	$2.00 \times 10^5$
	32	$1.94 \times 10^5$
	33	$1.88 \times 10^5$
FAIR	34	$1.82 \times 10^5$
	35	$1.77 \times 10^5$
	36	$1.72 \times 10^5$
	37	$1.68 \times 10^5$
	38	$1.63 \times 10^5$
	39	$1.59 \times 10^5$
	40	$1.55 \times 10^5$
	41	$1.51 \times 10^5$
	42	$1.47 \times 10^5$
	43	$1.44 \times 10^5$

	$n$	
FAIR	44	$1.41 \times 10^5$
	45	$1.38 \times 10^5$
	46	$1.35 \times 10^5$
	47	$1.32 \times 10^5$
	48	$1.29 \times 10^5$
	49	$1.27 \times 10^5$
	50	$1.24 \times 10^5$
	51	$1.22 \times 10^5$
	52	$1.19 \times 10^5$
	53	$1.17 \times 10^5$
MARGINAL PASS	54	$1.15 \times 10^5$
	55	$1.13 \times 10^5$
	56	$1.11 \times 10^5$
	57	$1.09 \times 10^5$
	58	$1.07 \times 10^5$
	59	$1.05 \times 10^5$
	60	$1.03 \times 10^5$
	61	$1.02 \times 10^5$
	62	$1.00 \times 10^5$



### Useful Information – Marginal Pass

A marginal pass, although not technically considered a 'fail' result, does not generally indicate satisfactory operation of the cabinet under test. Only a small margin exists between a 'pass' and 'fail' result. Further tests or different environmental conditions etc. may produce a 'fail' result. The laboratory owner must be advised of marginal results.

### Useful Information – Operation Protection Factor

The Operator Protection Factor is defined as the ratio of exposure to airborne contamination generated on the open bench to the exposure resulting from the same dispersal within the containment facility (cabinet) under test.

## Alarms

- Functional parameters (vacuum generation, disc speed and pump rotation) are continuously monitored throughout the test. The status indicators should remain permanently green throughout the test.
- Abnormalities in any of these parameters will be detected and an alarm beacon will activate.

**The alarm system operates on 2 levels:**

### Level One - Low Level Error

- Low level error detected. Alarm beacon activated. Test allowed to run.
- The detected error is of a low level and was successfully rectified within a reasonable period.
- The error is unlikely to have adversely affected the quality of the test. The alarm may be reset manually and the test allowed to continue at the discretion of the operator.

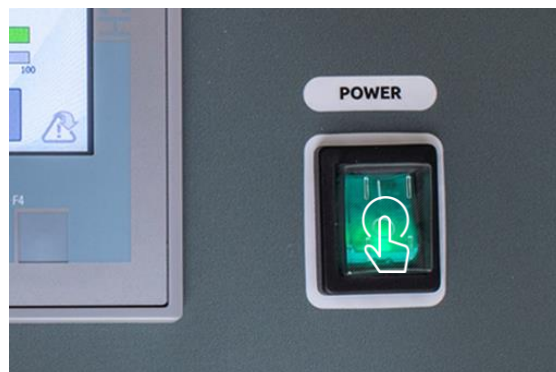


### **Useful Information**

*NB.: If a level one error occurs more than once during the test procedure, it is recommended to stop the test and re-start the test. Multiple level one errors may have a cumulative affect which may affect the accuracy of a test.*

### Level Two - High level error

- High level error detected. Alarm beacon activated. Test automatically stopped.
- The detected error is of a high level and could not be rectified within a reasonable period.
- The error is possibly of a magnitude sufficient to adversely affect the quality of the test. The test is automatically stopped. The alarm may be reset following the test shut down. The test is not allowed to continue. A new test must be performed.
- Please see the 'Troubleshooting Guide' for assistance, should the alarm beacon activate.
- The test may be stopped at any time by touching the 'Abort' button.
- An 'emergency stop' may also be performed by switching off the power using the illuminated green rocker switch on the top panel.



## TROUBLE SHOOTING AND ALARM FUNCTIONS

- The machine has a comprehensive error detection and diagnosis system.
- The alarm sounds when an error is detected. The 'alarm' symbol will flash on the screen. The beacon will flash on the top panel.

### ALARM RESET

An alarm screen is shown below:



Touch the flashing alarm symbol to access the Alarm Status screen.



Touch 'Reset Alarm' to silence the alarm and extinguish the alarm lamp. It may be necessary to do this more than once for particular faults. Press 'F4' to return to the previous screen.

## TROUBLESHOOTING

- Vacuum pressure fault: Check all sensor heads are securely fitted and filter membranes loaded in each head.
- Spray generator fault: Check spray generator cable is securely connected. Check drive belt.
- PM001 Clamp fault: Ensure peristaltic pump lid is closed.
- No operation. Power switch Illuminated. No screen display. The internal temperature may be too high. If possible, move machine to a cool, dry, ventilated area. Leave cabinet front door open. Re-attempt use after 30 minutes. If problem persists, contact CTS.
- No automatic test function. The machine may be in 'Manual' mode. Enter 'Manual Control' screen. The indication mode is shown in the bottom left corner. This must display 'Auto'. If it displays 'Manual', the machine will not perform an automatic test. Touch the button so that 'Auto' is displayed.
- Press 'F4' to return to the main screen.

**Contact CTS for further fault assistance.**



## Maintenance of KI-DISCUS™ System

No regular maintenance is required other than scrupulous attention to keeping all components clean. As soon as the day's session of tests is completed, the following procedure should be followed:

1. Clean the laboratory stand, the aerosol generator, artificial arm sections and the sensor heads using a tissue or cloth lightly moistened with water. **Do not use abrasive materials or aggressive cleaning chemicals on any part of KI-DISCUS™. Use of these materials may damage KI-DISCUS™ and will not be covered by the warranty.**
2. Remove the sensor head covers and the brass cones, clean the insides of the covers, the brass cones and the filter membrane holders with a lightly moistened tissue. Replace the cones and the covers.
3. Thoroughly wash, rinse and dry the Petri-dishes and the tweezers.
4. Gentle foam cleansers may be used to clean the cabinet.
5. Clean the touchscreen and keyboard membrane.  
Use a cleaning cloth dampened with a cleaning agent. Only use water with little liquid soap or a reputable screen cleaning foam. Never use compress air, steam jet air ejectors, aggressive chemicals or scouring agents.
6. It is recommended to flush the silicone tubing through with water at the end of a day's testing. This should prevent the formation of Potassium Iodide crystals within the tubing.



### *Useful Information*

Potassium Iodide crystal formation, within tubing may impede the flow of the solution during tests. This may affect the accuracy of results.



### *Information - Cleaning*

In addition to cleaning the KI-DISCUS™ system after use, the walls and base of the Cabinet that has been tested should be cleaned.

## Calibration

- KI-DISCUS™ is calibrated to the manufacturer specifications prior to shipping.
- The calibration period is valid for one year.
- Annual calibration is required to ensure optimum performance.
- KIDISCUS™ system should be only calibrated by engineers appointed by CTS Europe Ltd.

For further information contact CTS or email [info@kidiscus.com](mailto:info@kidiscus.com)

## Technical Specification

Model Ref	KI-DISCUS TM MK 3
Manufacturer	CTS Europe Ltd - <a href="http://containment-technology.co.uk">containment-technology.co.uk</a>
Weight	39.5 Kg
<b>POWER REQUIREMENTS</b>	
Voltage	100v – 120v AC / 220v-240v AC 50-60Hz
<b>ENVIRONMENTAL OPERATING RANGE</b>	
Temperature	15°C to 25° C
Humidity	5%-80% RH

## Spares List

REF	DESCRIPTION
4248805	Millipore Filter Membrane 1" Dia (Box of 100)
4253813	Liquid 500ml bottle Palladium Chloride L.D.P.E.
4253812	Liquid 500ml bottle Potassium Iodide L.D.P.E.
4253814	Liquid 500ml bottle Distilled water L.D.P.E.
4253811	Liquid 5L bottle Potassium Iodide L.D.P.E.
3/730001	Reservoir Bottle Integral 250 ml
3/730002	Reservoir Bottle Holder Snap Hook Clip-On
3/730006	Reservoir Bottle Tip
3/730003	RS232 printer
3/730004	Printer plug cable
3/730005	Printer Paper Roll
3263802	Tool 4 thou gauge
3268107	Bar tommy
4263819	Tool Alan key
3/730006	Tool distance piece - Complete
4263810	Millipore Tweezers
4263817	Tool stainless extra fine curved tweezers
4263820	Tool precision tweezers flat rounded point
4263811	MAG6 Pocket Magnifier Tool
4263813	Tool - Graticule
4263814	25ml Measuring Cylinder
4263812	Petri Dish with Cover
4266803	O Ring 1 5/8" O/D (020) - VacuumTube
4266804	O Ring 1" O/D (036) Sensor head Female
4266806	O Ring 2 1/2" O/D (029) Sensor head Male
3/731000	Vacuum Gauge Assembly - Complete
3/731001	Vacuum Gauge Rubber Cover
3/731002	Vacuum Gauge 50 mm
3/733000	Aerosol Generator - Complete
3/733100	Bearing Assembly - Complete
3/733200	Generator Hub and Disc Assembly - Complete
3/733201	Spinning Disc
3/733202	Generator Hub
3/733306	Nozzle Nebuliser
3/733308	Aerosol Generator Belt drive
3/733425	Locking Screw Assembly Long - Complete
3/432000	Locking Screw Assembly Short - Complete
3/734000	Sensor Head - Complete
3/734214	Sensor Cone Nozzle Mounting Plate Assembly-Complete
3/734215	Sensor Cone - Brass
3/450001	Elec/Con right angle socket Mains lead
3/440006	KI-DISCUS™ Bag
3/450000	KI-DISCUS™ MK 3 Handbook
3/440007	Cabinet Shipment Packaging
3/720001	Tool Box Shipment Packaging

Please contact [info@kidiscus.com](mailto:info@kidiscus.com) for all KI-DISCUS™ MK3 parts availability and Pricing

Health & Safety Data Sheets – Current MSDS are available on request.



## Product Decommissioning and Disposal

In accordance to the WEEE directive 2012/19/EU (waste electrical and electronic equipment)

At the end of the useful life of your KI-DISCUS™ MK 3, we as the manufacturer will accept the applicable electronic modules back to our facility and will dispose of these in accordance to the above directive.

## Product Warranty Statement

Thank you for purchasing from CTS Europe Ltd.

This Limited warranty applies to physical goods, and only for physical goods purchased from CTS Europe Ltd.

The Limited warranty covers any defects in function, material or workmanship under normal use during warranty period which is 6 months from the date of commissioning by CTS approved engineer

CTS warrants to the original purchaser, with proof of purchase, that its delivered products shall be free from defects in material and workmanship under normal use for a period of 6 months, from date of

During the warranty period, we will repair or replace, at no charge, products or parts of a product that prove defective due to because of improper material workmanship or electrical component failure.

This assumes a system under normal use and maintained with manufacturers recommended spares.

A CTS product that is repaired under warranty will receive a new 6 month warranty commencing on the date of repair.

This limited warranty does not cover any problem that is caused by:

- Conditions, malfunctions or damage which is not a result of defects in material or workmanship.
- Engineer travel costs to customer site to carry out an on – site repair

If you have any concerns regarding this product, Please contact us on [info@kidicus.com](mailto:info@kidicus.com)



# Declaration of Conformity

## **Manufacture**

CTS Europe Ltd, 14 Ordnance Court, Ackworth Road,  
Portsmouth, PO3 5RZ



## **Product**

MK3 KI-DISCUS TM Test Equipment

*The above named product conforms to the requirements of the following European Directives:*

*2006/42/EC Machinery Directive*

*LVD 2014/35/EU Low Voltage Directive*

*2014/30/EU EMC Directive*

*Conformity with the requirements of the directives is testified by adherence to the relevant parts of the following harmonised standards:*

**BS EN 61010-1:2010**

*Safety requirements for electrical equipment*

**BS EN ISO 12100:2010**

*Safety of machinery- General principles*

**BS EN 61326-1:2013**

*General EMC requirements for measurement, control & laboratory use equipment- Emissions and Immunity requirements.*

**BS EN 61000-3-2:2014**

*Limits for mains harmonics*

**BS EN 61000-3-3:2013**

*Limits for mains voltage fluctuations & flicker*



Sean Codling

For and on behalf of: CTS Europe Ltd

Date: 1<sup>st</sup> Dec 2018







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