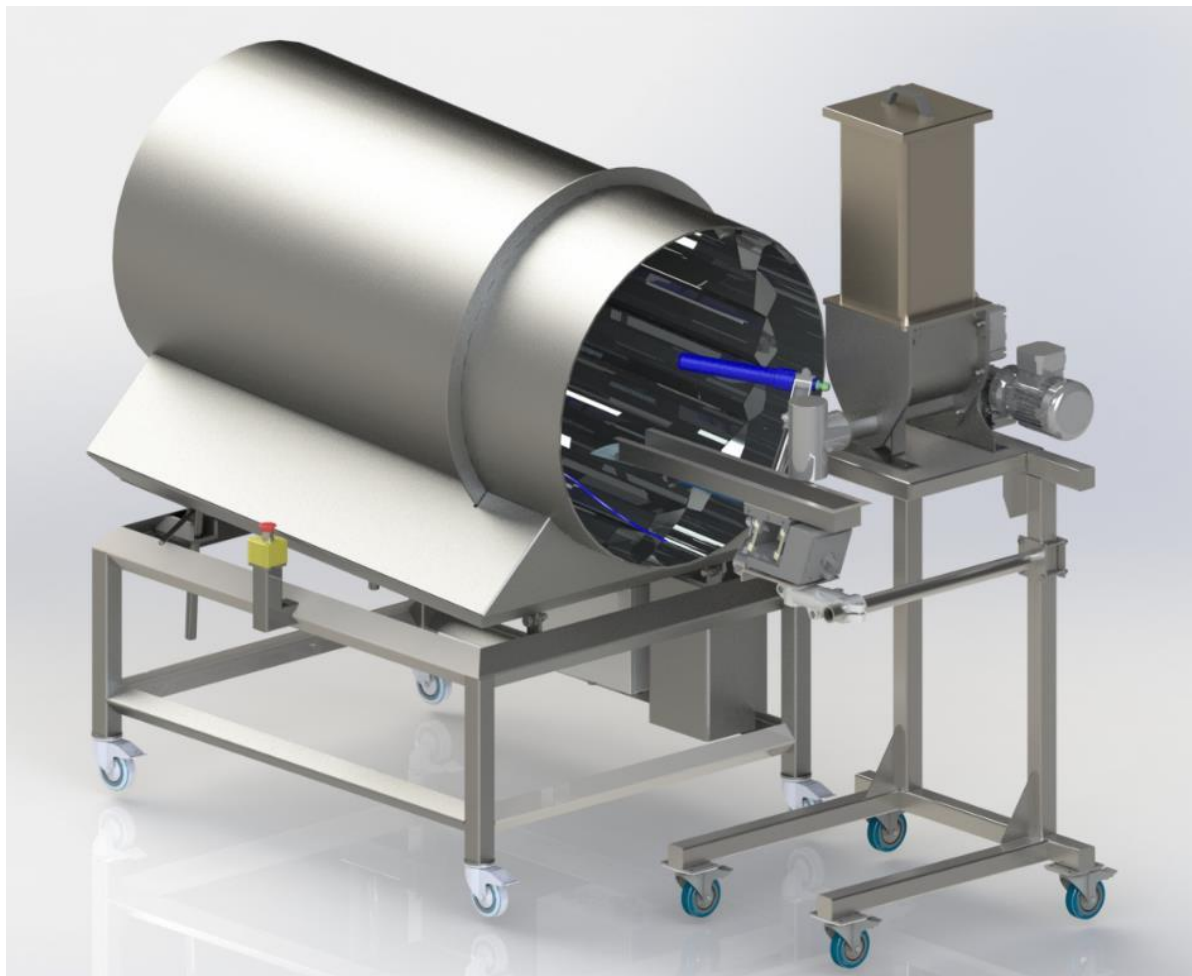




SAS 1DV/2DV – Electrostatic Dry Vibrator

INSTRUCTION MANUAL



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To obtain the best performance and reliability from this equipment it is strongly recommended to read the instruction manual thoroughly before attempting to use the equipment.

WARNINGS OVERVIEW

All controls within the Control Box have been adjusted for optimum performance and safety during manufacturing.

The Electrostatic Generating heads and control box is sealed for IP 65.

Re-adjustments, alterations or substitutions of any component may result in a hazardous operating condition a failure and possible damage to the equipment as well as overriding the built-in safety features.

Any unauthorised modification will invalidate the warranty and could endanger the work force.

Under no circumstances are any alterations allowed to the electrostatic equipment without specific written instructions and consent from Spice Application Systems Ltd.

SAFETY GUIDELINES

-  The person in charge of the manufacturing work area should ensure that personnel are properly trained in the use of this equipment. The safety rules which follow should be fully understood and applied at all times.
-  Never point the spray unit at any person or animal.
-  Spraying certain products can be dangerous, depending on what is being sprayed so full protection for operators in the form of instructions supplied with that product must be adhered to at all times.
-  The normal safety rules and precautions for atomisation must be observed.
-  For more information, consult the local safety rules. In addition, the following precautions must be observed.

WARNING! Failure to observe the safety precautions contained within this manual could result in operational difficulties of the equipment and potential to create unsafe conditions.

ALL personnel who are associated with the coating operation should read and fully understand this manual. It is especially important that the operators and maintenance team of the electrostatic equipment and their supervisory personnel understand the requirements for safe and proper usage of the electrostatic process.

EC DECLARATION OF CONFORMITY FOR MACHINERY



The manufacturer: Spice Application Systems Ltd
Unit 3, Hawksworth
Southmead Industrial Estate,
Didcot
Oxfordshire
OX11 7HR, England, UK
Tel: 00 44 1865 747 634
Fax: 00 44 1235 818 443

Herewith declares that “the Electrostatic Food Spray Unit” is in conformity with the provisions of:

- EU Directive 2014/34/EU – certified as Category 3D 40°C and manufactured in line with Internal Control of Production as outlined in the Directive
- BS EN ISO 12100:1 – Safety of Machinery
- BS EN ISO 12100:2 – Safety of Machinery
- BS EN 60079:0 and BS EN 60079:11 – Equipment for Use in Potentially Explosive Atmospheres
- EN 50177 – Stationary electrostatic spraying equipment for flammable coating powder
- EN 60204 IP – Type protection: contact, foreign bodies and water protection for electrical equipment
- EC Machinery Directive 2006/42/EC
- EC Low Voltage Directive 2006/95/EC
- EC Directive of Electromagnetic Compatibility 2014/30/EU
- BS EN 61000-6-3:2001 – Electromagnetic Compatibility
- BS EN 61000-6-1:2001 – Electromagnetic Compatibility
- BS EN 50050-2:2013 – Electrostatic hand-held spraying equipment. Safety requirements. Hand-held spraying equipment for ignitable coating powder
- Plastic Blue Acetal Copolymer EU Directive 2002/72/EC/FDA Directive 21CFR
- EC No.1935/2004

All as amended, and with national implementing legislation.
Established in Oxford on 1st October 1999.

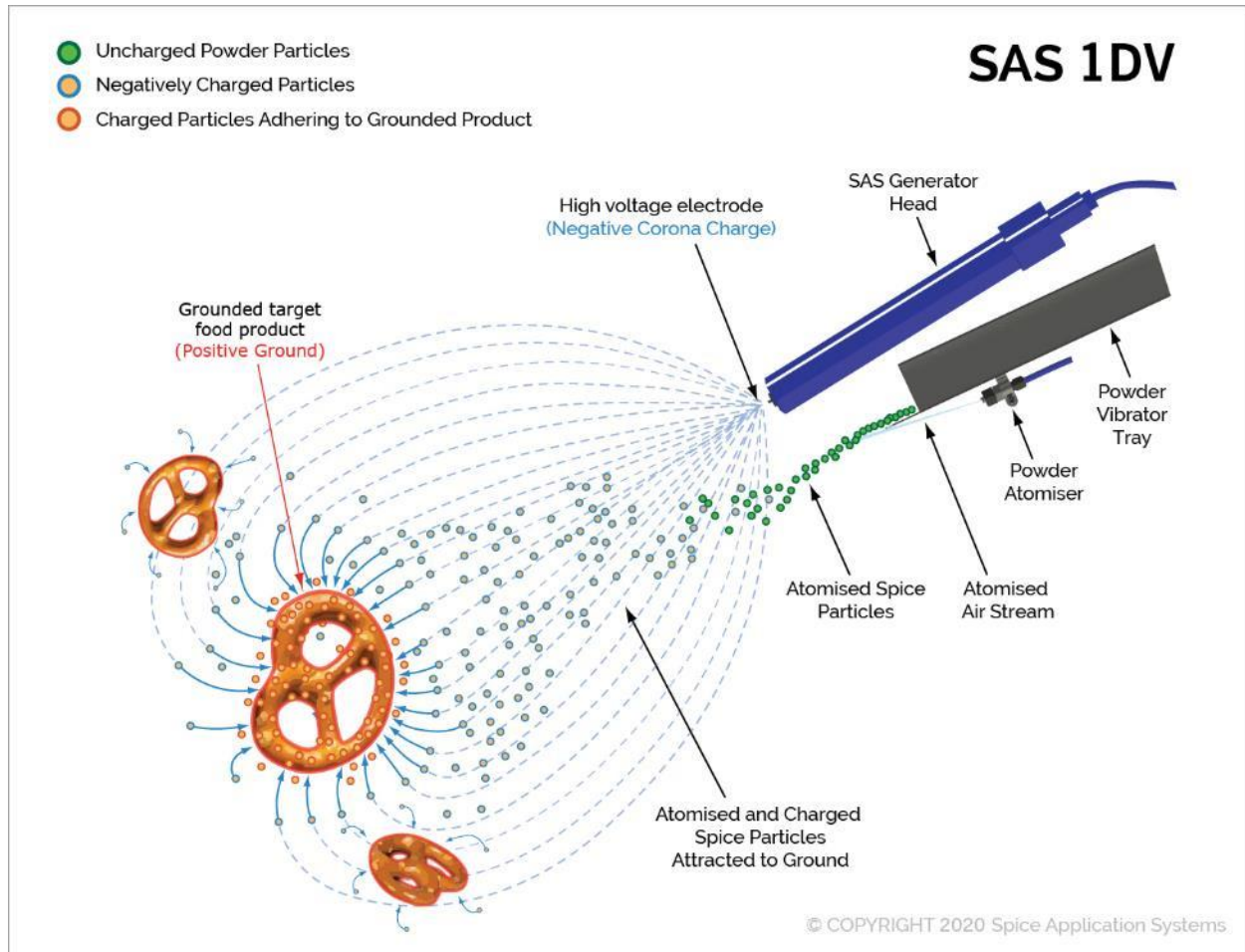
Spice Application Systems Ltd
P.O. Box 1190
Oxford OX4 4GH
England, UK

Peter King
Managing Director

ELECTROSTATIC INTRODUCTION

What is Electrostatics

Electrostatics is an environmentally responsible way to apply coating materials, significantly increasing the quality of the finished product, while substantially decreasing powder/oil costs through more effective use of materials.



How does it work?

The aim is to eliminate wasteful over spray and put as much coating material on the target as possible. This is achieved by negatively charging atomized powder/oil particles so that they are attracted to the grounded work piece, opposites attract.

A charging electrode is located at the tip of the electrostatic generator head or atomizer. The powder/oil is atomized as it moves past the electrode, its particles become ionized - negatively charged. An electrostatic field is created between the charging electrode and the grounded work piece, the spray is concentrated within it.

The product to be coated (chips, tablets, etc.) is Grounded from contact within the rotating drum/wire belt flat chamber. When the coating material is released, it is attracted to the Grounded product. Due to the electrostatic attraction, coating material that would normally be lost ends up on the back and sides of the target product to produce a "wrap-around" effect.

ELECTROSTATIC INTRODUCTION

When to use electrostatics!

When you want to achieve maximum transfer efficiency and minimize coating waste and dusting/misting emissions, while achieving maximum application wrap around effect, high production and high flow rates.

The advantages!

Up to 98% coating of all products, with greatly improved coating over traditional methods, less powder usage, cut down of dusting, cleaner working area and cleaner drum, all resulting in less line contamination.

Increased transfer efficiency and reduced over spray, which results in significant cost savings and reduced dusting/misting emissions. We build our system with safety in mind, with flexible, lightweight low voltage cable going to the generating spray head.

Typical Electrostatic Applications

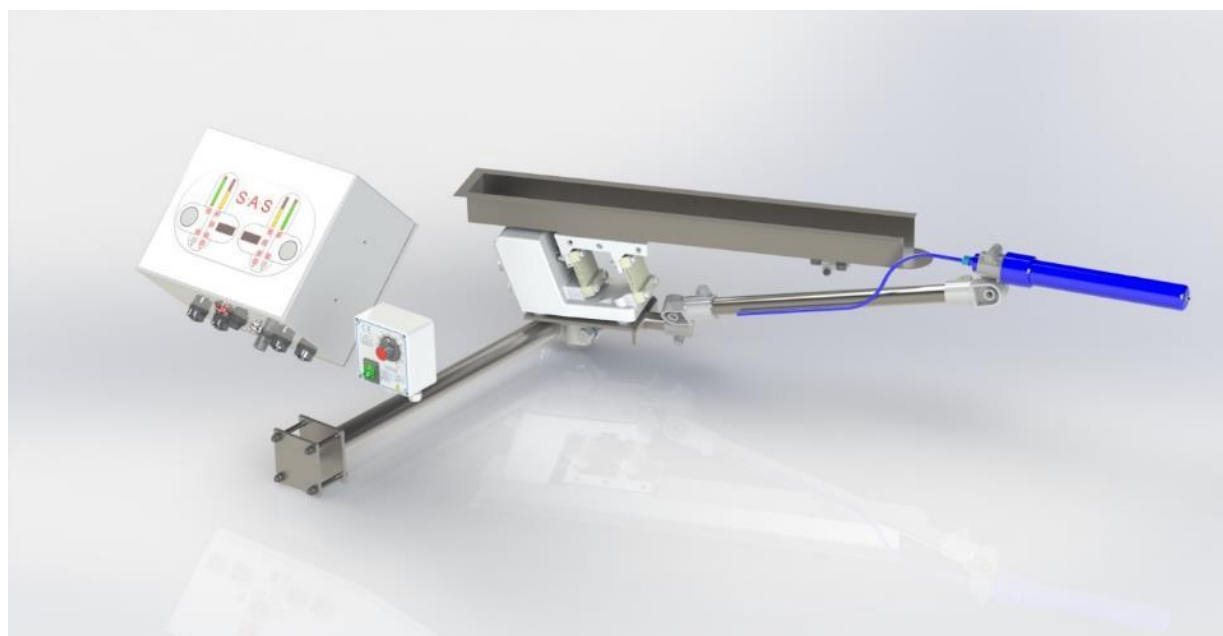
- Pharmaceuticals: coating tablets granule formation
- Horticulture: powder onto seeds
- Agriculture: powder/liquids on potato or cattle feed
- Meat: fresh poultry and processed meats-powder & liquid flavouring
- Fish: oils & powder
- Breakfast Cereals: vitamins & flavouring in powder/liquid form
- Snacks, crisps, nuts, extruded and pasta pellets: powder & liquid spices
- Confectionery: powder onto mints, chewing gum, etc.
- Pet food: powder & liquid enhancers onto kibbles, biscuits & chew bars
- Dairy: starch onto cheese
- Bakery: oil & powder coating onto cakes, burger buns, etc.

PRODUCT INTRODUCTION

Dry Vibrator Model Type: SAS 1 DV & 2DV

This model is designed to atomise dry spices and create an electrostatic charge on the powder as it leaves our patented vibratory tray design, which is positioned and pointing onto the products to be coated.

The SAS DRY VIBRATOR spray unit uses the principal of atomising the spice as it falls off the vibrator by spraying air and electrical charge onto the powder, it is able to obtain the ultimate wrap-around effect, onto grounded product.



SAS Assembly Number – SAS 1DV-XXX-Y

	Description	Assembly Number Ref.
XXX	Powder Tray – 500mm long (Short)	500
	Powder Tray – 760mm long (Standard)	760
	Powder Tray – 1,000mm long (Long)	1000
Y	Powder Atomiser – Plastic tip c/w Plastic body	P
	Powder Atomiser – Plastic tip c/w St/St body	S

Example Assembly Number : **SAS 1DV-760-P**

Electrostatic Dry Vibrator system (760mm/Plastic Body)

PRODUCT INTRODUCTION

Dry Vibrator Applicator overview

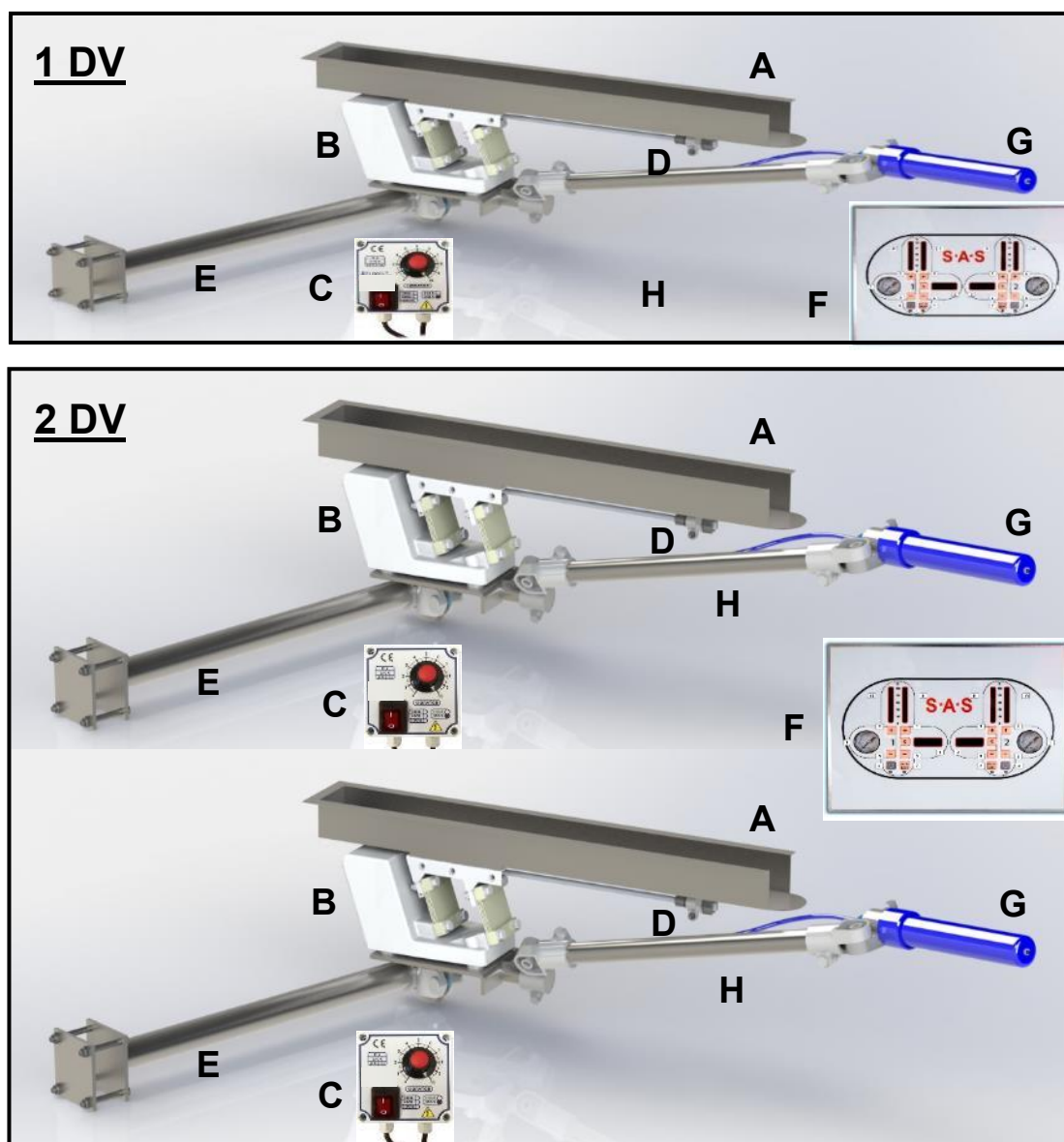


Fig 1

Pos.	Description	Assembly Number	Manual Reference
A	Powder Vibrator Tray Assy	DV 200-09X	See Page 32 - Fig 16
B	Vibrator Motor Assy	DV 200-09X	See Page 32 - Fig 16
C	Vibrator Controller Assy	DV 200-097	See Page 32
D	Powder Atomiser Assy	DV 200-11XX	See Page 31
E	Support for Vibrator Motor/Tray Assy	DV 200-153	See Page 33 - Fig 19
F	Electrostatic Controller Assy	CU 200-124	See Page 28 - Fig 11
G	Generator Head – Powder Assy	GH 200-161	See Page 29 - Fig 12
H	Supports for Generator Head Assy	GH 200-159	See Page 33 - Fig 18

INSTALLATION

1. The Electrostatic control unit must be located outside the flavouring drum in a Non-Hazardous area at a location which allows the operators to observe the material atomisation in front of the tumbling product.
2. To obtain the maximum electrostatic efficiency, the product to be coated must be able to fully tumble and roll in front of the atomiser spray pattern. If it does not do so, this may result in a poor quality finish to the product.
3. The appropriate distance between the atomiser and the product to be coated should be between 20 to 25 cm (8" to 10")
4. The electrode needle on the electrostatic generating head should be positioned approximately 20-25cm (8"-10") in front of the vibratory tray and approximately 20-25cm (8"-10") apart so the Generator head electrode is towards the centre of the drum facing the tumbling product and powder cloud. (see page 21 - Fig 10)
5. Ensure that the distance between the electrode needle on the generating head and any surrounding metal objects (including the Powder tray and Drum) is at least 15cm (6") or greater.
6. The vibratory powder transfer unit needs to be positioned just below the screw feeder outlet and the powder atomiser needs to be positioned inside the drum, facing the tumbling product and running parallel to the drum flights, if possible. (see page 21 - Fig 10)
7. The vibratory system can be adjusted to allow for the correct positioning of the vibratory tray to transport the powder from the Screw feeder outlet to the Tumbling product inside the drum.
8. The vibrator control needs to be fitted close to the vibrator to allow operators to adjust the vibration speed. If the vibrator control has to be moved to a fixing further away than the standard distance of 1.5mtrs (6ft) a junction box must to be fitted to a rating of IP 65. Contact Spice Application Systems in this scenario.
9. All pneumatic hoses connected to the atomise must be non-conductive. It is recommended to use Polyethylene and not Nylon hose.
10. Never use damaged hoses, cables or connections.
11. All compressed air connections must be fitted with a local isolator and pressure regulator, plus fitted with a suitable Filter to ensure a Clean and Dry air supply to the SAS equipment.
12. If the application requires the remote trigger to facilitate the unit to switch on and off with an existing production line, please refer to Page 14 – Fig 7 on the manual.
13. If not using, make sure the dust caps are fitted and locked into place on the underside of the SAS Controller. (see Page 14 - Fig 6)

INSTALLATION

14. Ensure all Earthing cables are connected and all other equipment in the application area is Grounded, including all mobile frames, within 3m (10ft) of the application area.
15. Remove all unnecessary metal components and materials from the application area.
16. Keep the application area clean.
17. The Electrical mains supply must be fitted with an earth wired to the factory mains earthing system.
18. The drum must be earthed in 2 places with the earthing contacts rubbing against the wall of the drum. The outgoing and incoming vibratory conveyors to and from the drum must always be earthed and all metal within 3mtrs of the drum.
19. All ground connections must be regularly checked and confirmed using a megohm meter for a resistance of 1 megohm or less from the structure to a positive ground. (i.e. floor bolt or building steelwork)
20. Any floor coating in the application area must be electrically conductive and grounded. Do not attempt to by-pass or defeat the ground connections as this may result in a hazardous condition.
21. Only personnel Trained and Qualified in the operation and service of Electrostatic equipment are permitted to work upon the Application equipment and installation.
22. Any Personnel working within the application area, must wearing conductive footwear. If personnel are required to wear gloves, these must also be conductive.
23. Ensure any Warning signs provided are prominently posted around the application area so all personnel can read and adhere to the safety instructions.
24. For all Interconnection details of the equipment, please refer to Page 10 - Fig 2 or Page 11 - Fig 3 for your appropriate application.

SCHEMATIC LAYOUT - 1DV

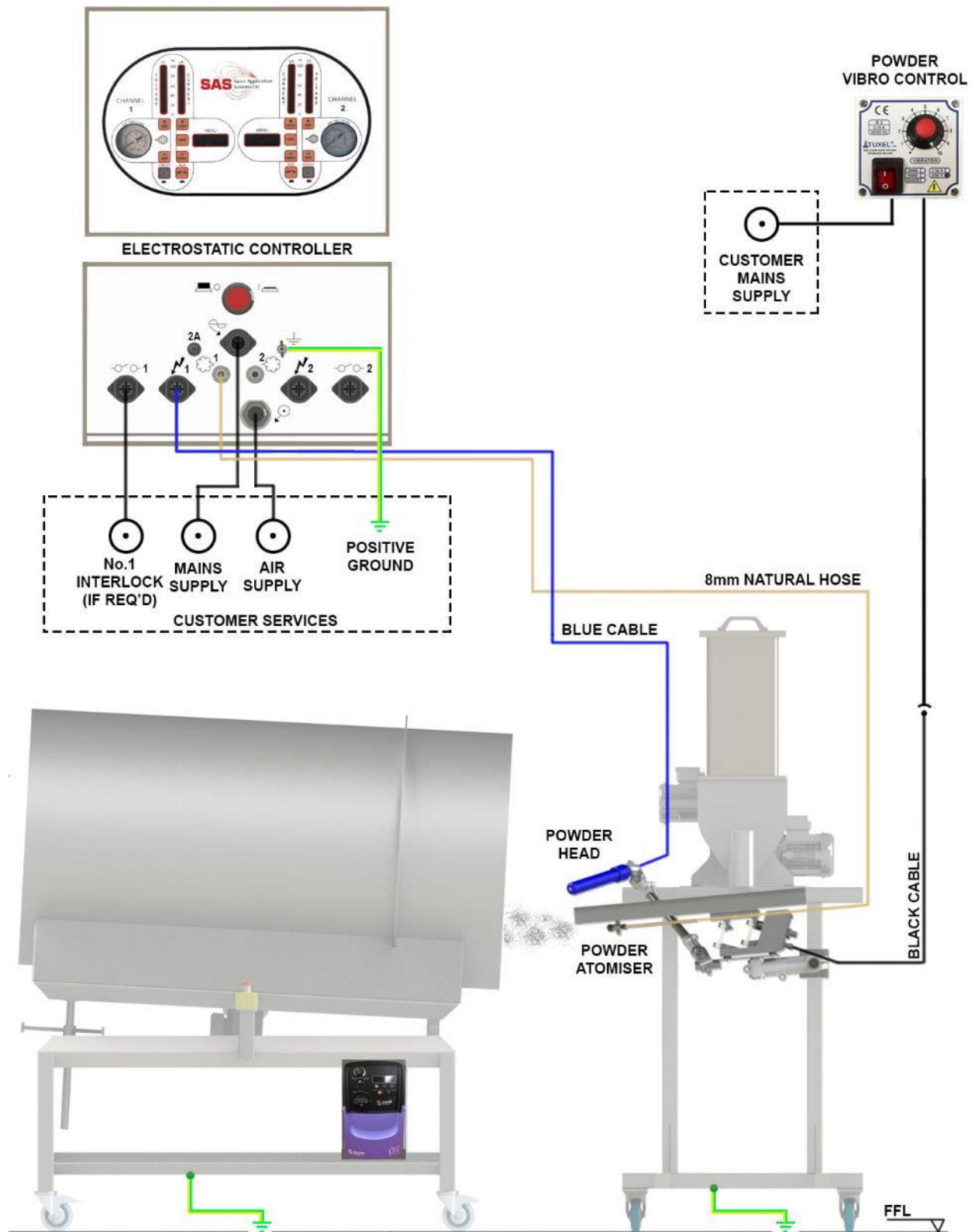


Fig 2

SCHEMATIC LAYOUT - 2DV

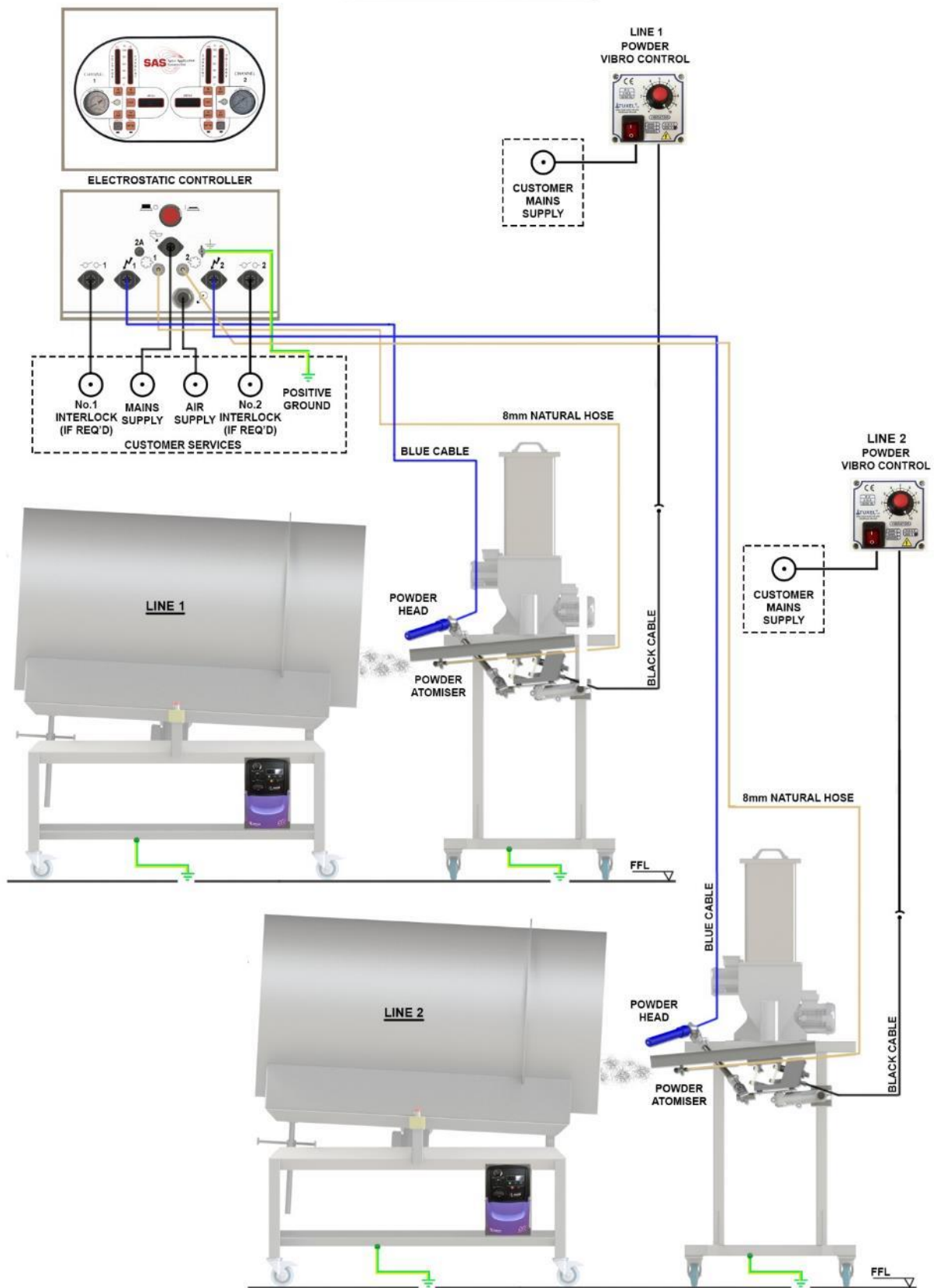


Fig 3

INSTALLATION

POWDER VIBRATOR TRAY MOUNTING

Assembly Number: DV 200-173

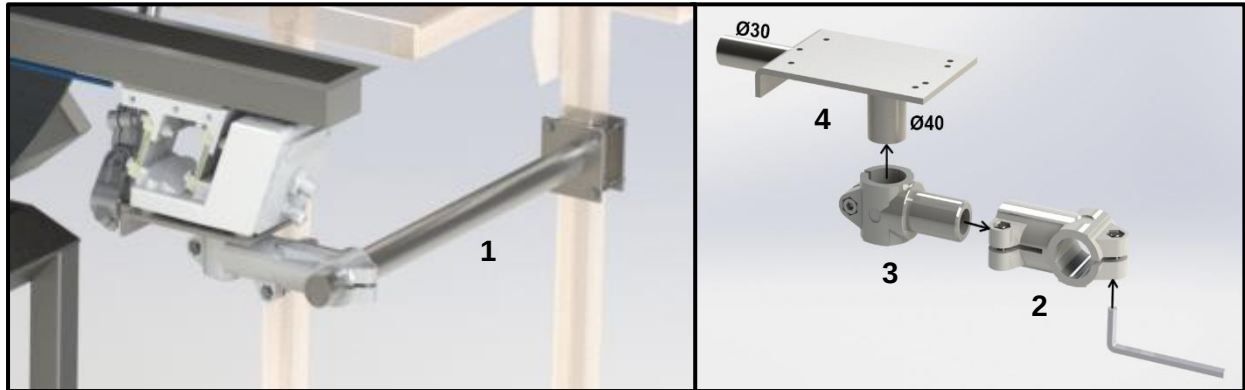


Fig 4

Position	Description	Part Number
1	Main Support bar c/w Clamp plate	DV 100-153
2	40mm Vibro Clamp (Female)	DV 100-152
3	40mm Vibro Clamp (Male)	DV 100-151
4	Vibro Plate	DV 100-173

INSTALLATION

CONTROL UNIT – CONNECTION POINTS

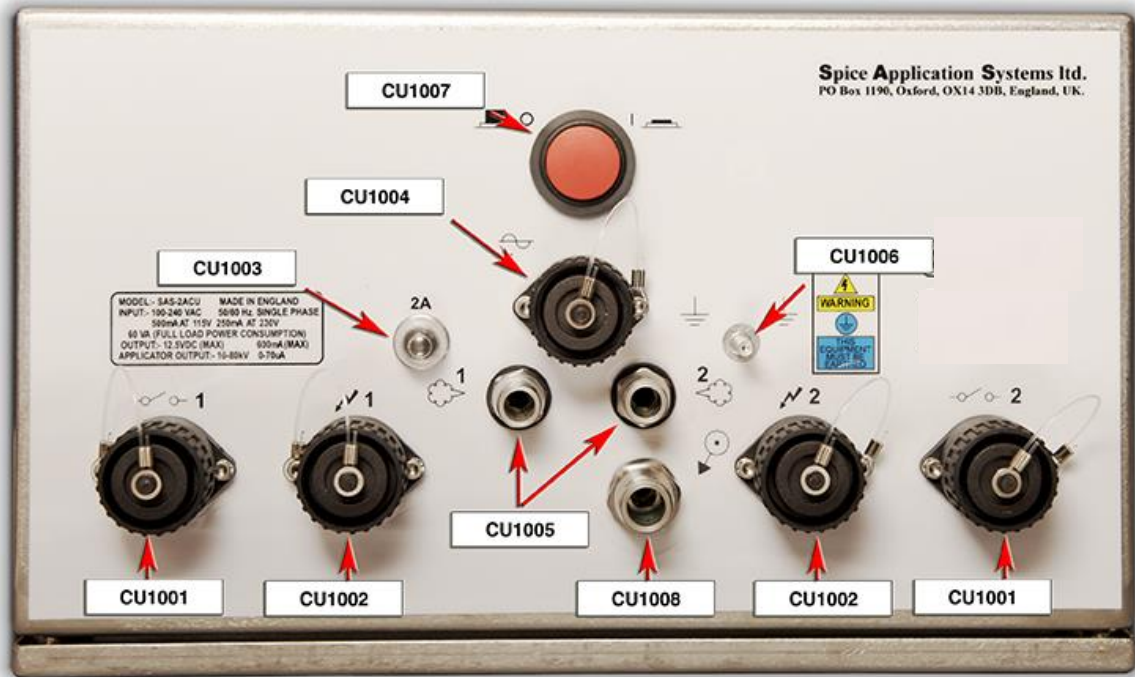


Fig 5

Position	Description
CU1001	Remote trigger cabinet plug 6 pin Female (IP65)
CU1002	Electrostatic generating head cabinet plug 4 pin Female (IP65)
CU1003	Circuit Breaker (IP65)
CU1004	Mains electric input cabinet plug 4 pin Male (IP65)
CU1005	Pneumatic Air output quick release 8mm (IP65)
CU1006	Terminal, Earth Post (IP65)
CU1007	Mains electric master on/off switch (IP65)
CU1008	Pneumatic Air input quick release 10mm (IP65)

NOTE

The terminals used in the mains connector on the control panel of the unit are:-

<u>POLE</u>	<u>PIN No.</u>
Live	Pin 1
Neutral	Pin 3
Earth / Ground	Pin E

The method of disconnection from the mains electrical supply is by removal of the mains lead plug from its respective supply socket.

INSTALLATION

CONTROL UNIT - PLUG IN CABLES

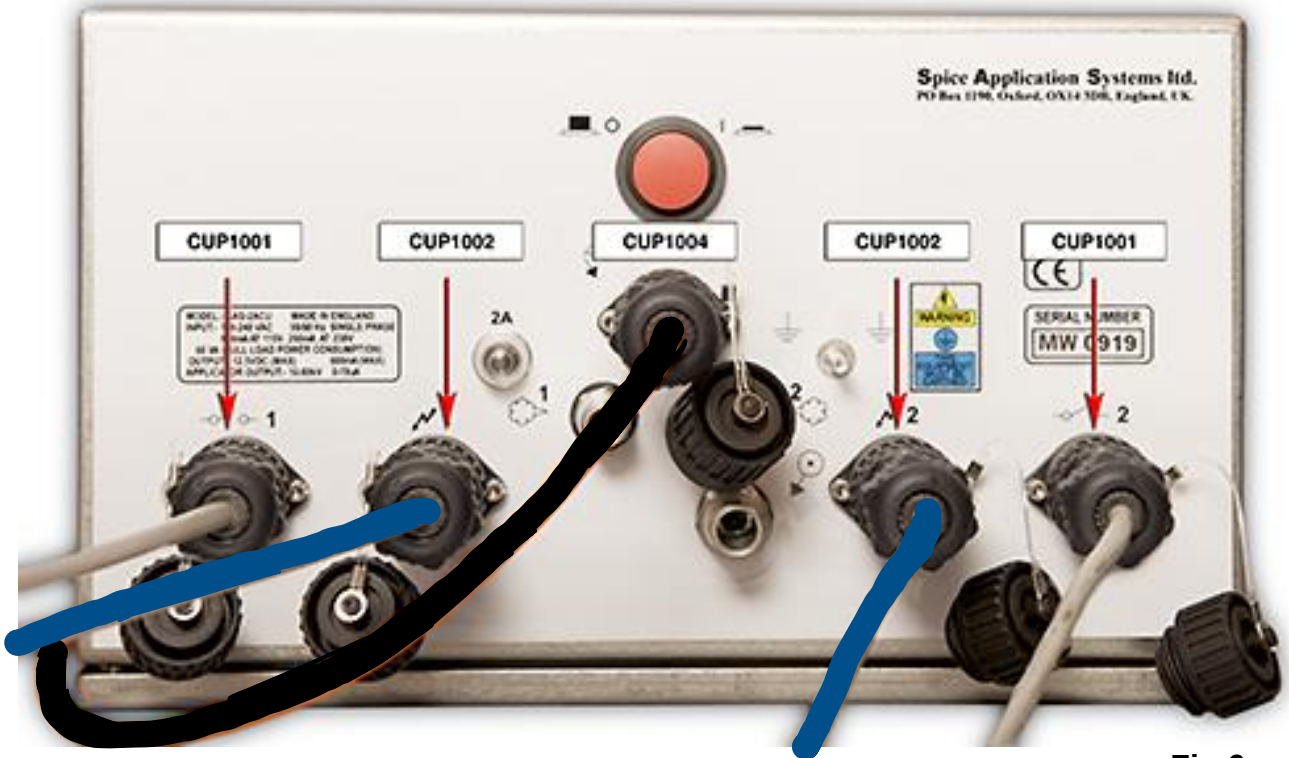


Fig 6

Position	Description
CUP1001	Remote Trigger plug 6 pin Male (IP65)
CUP1002	Electrostatic generating head plug 4 pin Male (IP65)
CUP1004	Mains electric input plug 4 pin Female (IP65)

REMOTE TRIGGER WIRING (CUP1001)

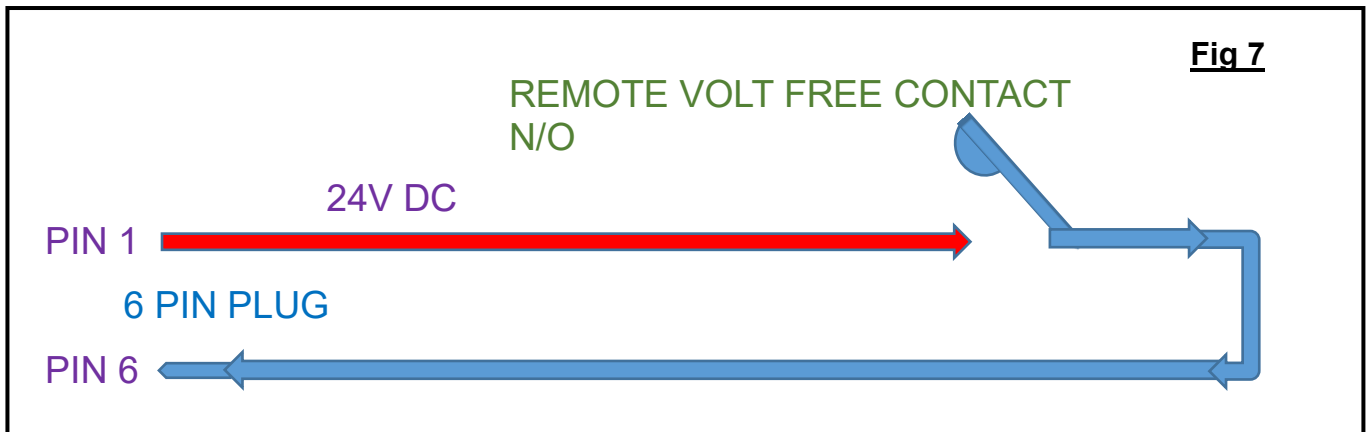


Fig 7

NOTE

Please refer to the instructions on page 18 for the correct programming of the remote trigger input signal for each channel.

INSTALLATION

CABLE COLOUR CODING FOR CONTROL UNIT

The cable colour coding used for the Control Unit and its supplied mains cable is as follows:-

<u>Pole</u>	<u>Designation</u>	<u>US/JAPAN</u>	<u>U.K.</u>
Live	<i>L</i>	Black	Brown
Neutral	<i>N</i>	White	Blue
Earth / Ground	<i>E</i>	Green	Green/Yellow

For U.K. Equipment

The wire which is coloured **GREEN** and **YELLOW** must be connected to the terminal in the plug which is marked with the letter *E* or by the earth symbol, or coloured green or green and yellow.

The wire which is coloured **BLUE** must be connected to the terminal which is marked with the letter *N* or coloured black.

The wire which is coloured **BROWN** must be connected to the terminal which is marked with the letter *L* or coloured red.



IMPORTANT

When fitting a plug to the mains lead it is essential that it contains an earthing/grounding contact and that this is connected. Under no circumstances should this equipment be connected to a mains supply which does not include an earthing/grounding wire and contacts. For example, wire extension leads, as used for some domestic equipment, **MUST NOT BE USED.**

OPERATING PRINCIPLE

ELECTROSTATIC

The SAS control power supply transforms the 110/220 Vac into an adjustable voltage operating from 3.5 to 13 Vdc.

The generator head converts the 3.5 to 13 Vdc into a negative charge up to 85kV, which is transferred onto the material being applied which is then drawn towards the grounded product being coated.

The electrode needle on the electrostatic generating head should be positioned approximately 20-25cm (8"-10") in front of the vibratory tray and approximately 20-25cm (8"-10") apart so the Generator head electrode is towards the centre of the drum facing the tumbling product and powder cloud. (see page 21 - Fig 10)

To obtain the maximum electrostatic efficiency, the product to be coated must be able to fully tumble and roll in front of the atomiser spray pattern. If it does not do so, this may result in a poor quality finish to the product.

POWDER FLOW SYSTEM

1. The Powder flow rate is determined and adjusted by a Screw Feeder output.
2. The vibratory powder transfer unit needs to be positioned just below the screw feeder outlet and the powder atomiser needs to be positioned inside the drum facing the tumbling product and running parallel to the drum flights, if possible. (see page 21 - Fig 10)
3. The Powder Tray should be slightly inclined to assist the transportation of the powder from the screw feeder and towards the product in the drum. Start at an approximate declined angle of 2° to 3° towards the Powder atomiser end.
4. The system must be set up to freely transport the powder throughput from the screw feeder at the required line rate. This requires the following settings to be adjusted to suit the Flow rate required and the type of Powder being applied :-
 - Set the Screw Feeder output speed to provide the required volume of powder.
 - Set the Powder transfer unit Vibrator control to the lowest settings which transports the powder along the length of the tray without backing up. (Please refer to our LE manual for details regarding the Vibration control & drive unit)
 - Set the Minimum air pressure for the Powder atomiser to provide an even curtain off the tray end to suit the type of powder being applied and save into the Atomisation control memory. (See following instructions in section "Atomisation Control Memory")

OPERATING PRINCIPLE

ATOMISATION CONTROL MEMORY

The SAS Control unit can hold in memory 100 different Menu numbers for air pressure and remote operation settings, this is so you can easily change the pressure for different applications and production rates.

The powder pressure needs to be stored in the memory by a competent operator who will be working with the unit and responsible for production quality.

The operator will only need to press one button when changing to another type of spice or production rate, once the unit has been programmed.

Programming of Menu for Air Pressure settings

(see Page 19 - Fig 8 for reference)

1. Turn on mains power to the unit.
2. Select which Channel is required for air pressure setting adjustment and switch on the local on/off button **6**. The LED light below the button will turn from Red to Green.
3. Select the Menu program number to be programmed for that Channel.
Press button **4** or button **5** to scroll between the Menu numbers.
4. To adjust air pressure in the selected Menu number for that Channel, press button **2** or button **3**, until you have the desired atomisation of powder.
NOTE ! Always use the minimum amount of air pressure required to atomise the powder, as excessive air can cause dusting into the atmosphere.
5. Once any menu settings are adjusted, the menu display will "Flash" until the new settings are Saved.
To save the required air setting to the memory, press the **SAVE** button (**11**) twice to store the value into the selected Menu number memory.
6. To now use the programmed Menus, press buttons **4** & **5** to scroll through the Menu settings.
7. To review the air pressure setting in each Menu, press once on either button **2** or button **3** to display the programmed value for air pressure.

If the adjustments are not saved correctly within the memory, the unit will default to the previous settings for the Menu number selected.

OPERATING PRINCIPLE

REMOTE OPERATION MEMORY

Within the SAS Control unit memory, you can also select within each Menu number, to operate the Electrostatics from a remote volt-free signal (see page 14, Fig 7)

This allows for each Channel on the unit to be independently switched On or Off from a remote source, providing the selected Menu number is pre-programmed for this function.

Programming of Menu for Remote Operation settings

(see Page 19 - Fig 8 for reference)

1. Turn on mains power to the unit.
2. Select the Channel and the Menu program number to be programmed for Remote operation.
Press button **4** or button **5** to scroll between the Menu numbers.
3. To program Remote operation for the selected Menu number/Channel, press button **Aux** button (**7**). The LED light below will turn Green.
4. Once the Remote operation is selected, the menu display will "Flash" until the new setting is Saved.
To save the Remote operation to the memory, press the **SAVE** button (**11**) twice to store into the selected Menu number memory.
5. Once a Menu number is programmed for Remote operation, the unit will await the signal from the remote source. Once the remote signal is received, the LED light below the **AUX** button (**7**) will turn Red and the Electrostatics will be turned on. Once the remote signal is removed, the LED light below the **AUX** button (**7**) will turn back to Green.
6. To now use the programmed Menus, press buttons **4** & **5** to scroll through the Menu settings.
7. To review the Remote operation setting in each Menu, scroll through the Menus by pressing either button **4** or button **5** and observe the LED light status below the **Aux** button (**7**) for each Menu number.

If the adjustments are not saved correctly within the memory, the unit will default to the previous settings for the Menu number selected.

NOTE

It is recommended that a record is kept by the customer for the different production settings relating to the application process for specific products and materials being coated.

It is also recommended that a simple chart of these settings is printed and posted local to the SAS controller for your Operator's reference.

OPERATING PRINCIPLE

CONTROL UNIT - FRONT PANEL

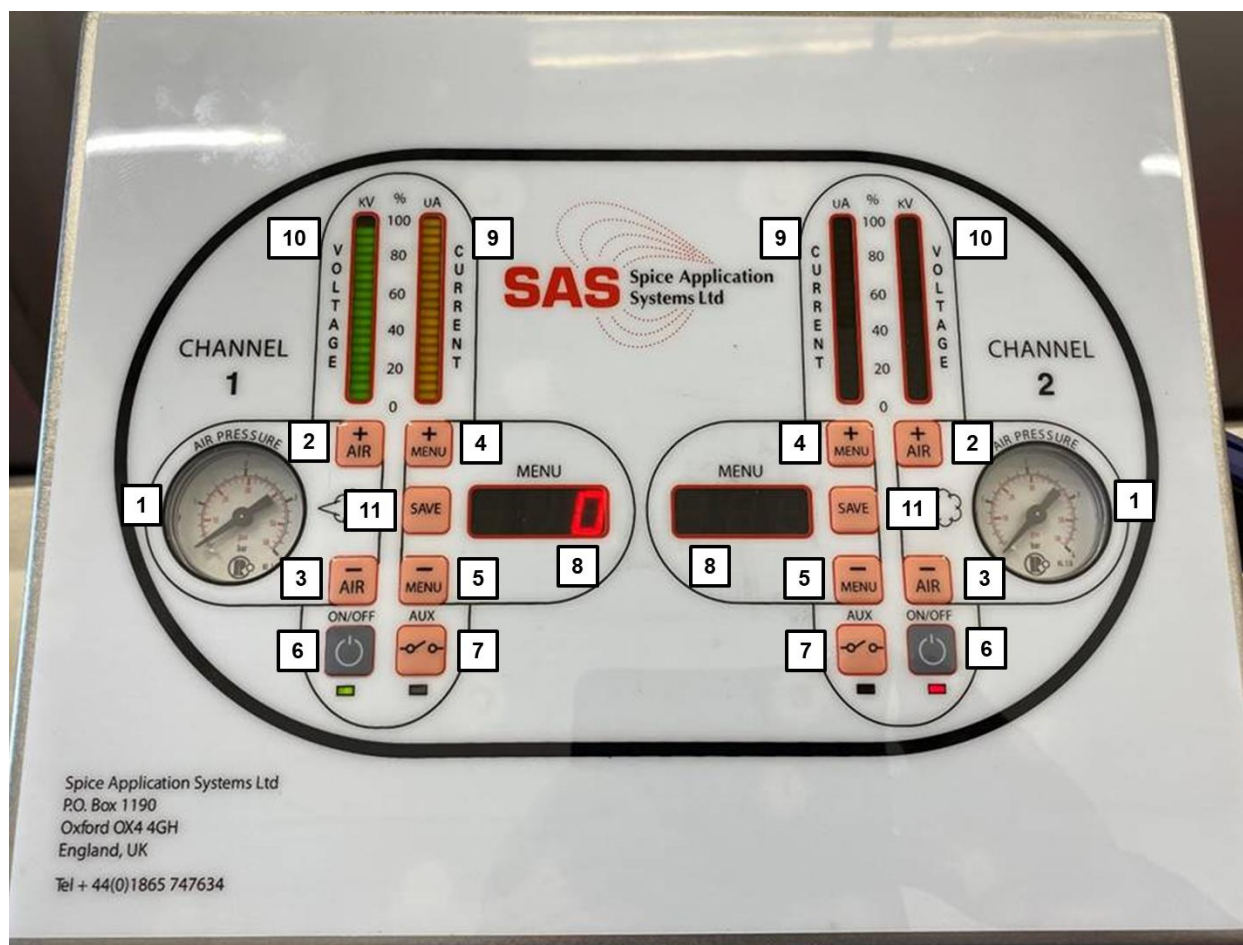


Fig 8

Position	Title	Description
1	Air Pressure	0-4 bar Pressure gauge
2	+ Air	Pressure regulator adjustment + (increase air pressure)
3	- Air	Pressure regulator adjustment - (decrease air pressure)
4	+ Menu	Menu number selection (up +)
5	- Menu	Menu number selection (down -)
6	On/Off	Local on/off switch
7	Aux	Remote trigger on/off switch
8	Menu	Menu Number display
9	uA	Microamp meter (orange)
10	kV	Kilovolt meter (green)
11	Save	Lock selection button

START UP

ELECTROSTATIC CONTROLLER

1. Connect the SAS control to its electrical power source.
2. Supply the SAS control with clean dry compressed air maximum 4 bar (58 psi).
3. The compressed air connection must be fitted with a local isolator and pressure regulator adjusted to 3.4 to 4.0 bar (50-58psi), plus fitted with a suitable Filter to ensure a Clean and Dry air supply to the SAS equipment.
4. Turn the main power-supply ON/OFF switch to the ON position (see page 13 - Fig 5, CU1007).
5. To turn on the electrostatic effect, press the Local ON/OFF button on the panel facia (see page 19 - Fig 8, position 6). The LED light below the button will turn from Red to Green and the Kilovolt and Microamp dials will be illuminated.
6. The power supply emits a self-regulated voltage to the generator head from 3.5 to 13 Vdc. This regulated voltage is transformed into high voltage by the cascade within the generator head and transported to the application electrode.

POWDER APPLICATION ADJUSTMENT

1. Turn the powder transfer unit vibrator control to ON position
2. Adjust the Screw feeder speed to provide the desired Powder flow rate at the Screw Feeder outlet.
Conduct a flow rate test at the Screw feeder outlet. Collect the powder flow rate into a measuring jug for one minute and record the volume and settings.
3. Adjust the Powder vibration speed to when the powder is coating the bed of the vibratory tray. This will give an even curtain drop in front of the Powder atomiser.
4. Powder atomisation air pressure is adjusted by selecting the required value from your Menu for the relevant production application. If adjustment is required, then pressing + for more air and - for less air and follow the instructions cover with the earlier paragraph on "Atomisation Control Memory" and save the value into a new memory number.
5. The powder tray and atomiser needs to be positioned inside the drum facing the tumbling product and parallel to the drum flights, if possible (see page 21 - Fig 10)
5. If required, adjust the rotational Speed of the Drum unit to ensure the product is tumbling sufficiently but without causing damage to the raw product.
6. The electrode needle on the electrostatic generating head should be positioned approximately 20-25cm (8"-10") in front of the vibratory tray and approximately 20-25cm (8"-10") apart so the Generator head electrode is towards the centre of the drum facing the tumbling product and powder cloud. (see page 21 - Fig 10)
7. To obtain the maximum electrostatic efficiency, the product to be coated must be able to fully tumble and roll in front of the atomiser spray pattern. If it does not do so, this may result in a poor quality finish to the product.
8. Electrostatic effect.
The high voltage is shown in Green and will automatically adjust to the maximum allowed for the application conditions.
The microamps is shown in Yellow is also automatically set depending upon the application conditions.
9. Follow the Static Electricity Test (S.E.T.) as described on page 22, to check the Electrostatic field within the application area.

START UP

POWDER ATOMISER

1. The part to be coated must be connected to the ground continuously.
2. Keep the atomiser clean.
3. Do not use the equipment if there is an air leak in the hoses.
4. Ensure that the product being coated does not come closer than 15cm (6") and no further than 45cm (18") from the atomiser.
5. Ensure the atomiser is installed and positioned correctly. The atomiser flat air jet has to be horizontal across the tray face and pointing to interface with the underside the vibratory tray.

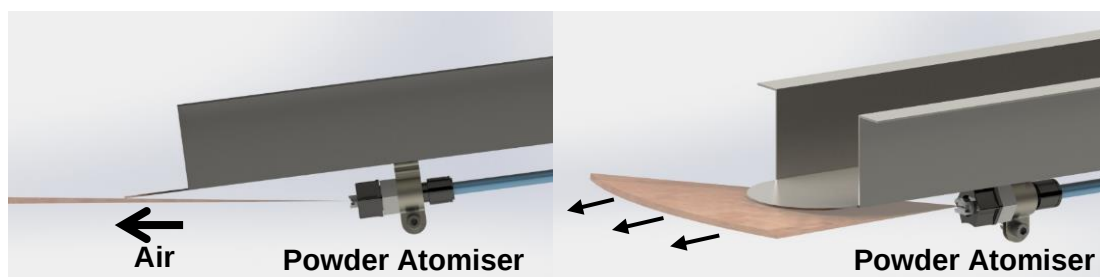


Fig 9

NOTE

The electrostatic efficiency decreases quickly when the application head or hoses are dirty or damp. This will lead to poor quality finished product. Please ensure the Applicator, Generating head and all supply hoses and cables remain dry.

Typical set-up image

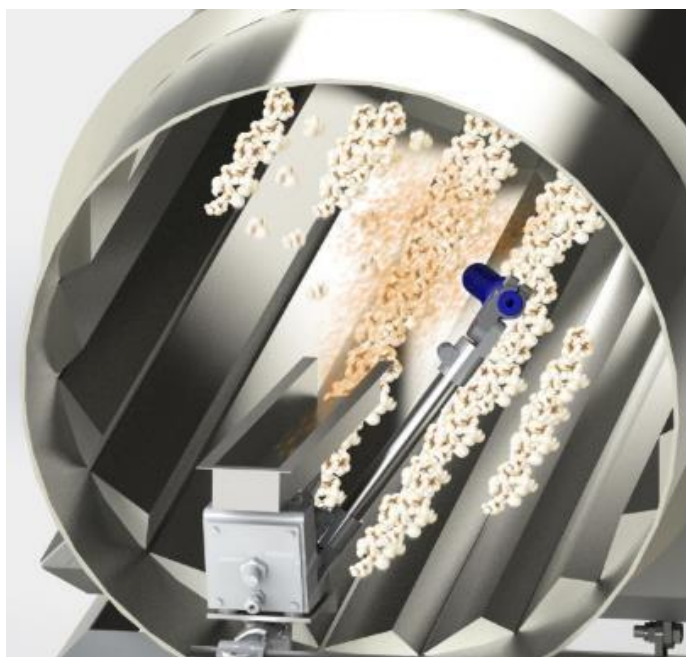


Fig 10

STATIC ELECTRICITY TEST

STATIC ELECTRICITY TESTER

Part Number: 100-166



INSTRUCTIONS

Always “self-test” the tester (S.E.T) before you start.

Do this by touching both ends simultaneously.

A bright Red light should illuminate indicating that the S.E.T. is functioning correctly.

ELECTROSTATIC TEST

1. Turn on the electrostatic generating head.
2. **Always make sure you are holding onto an earthing point when doing this test, and you are wearing conductive shoes.**
3. Hold the S.E.T. with the screwdriver tip between the fingers. With the handle end pointing towards the generating head, about 1m away, move towards the electrode at the end of the electrostatic generator and you should see a strong red light illuminate, being at it strongest when you are within 40-50cm (16"-20") from the electrode.
4. If no red light appears then no static field is detected, refer to the Troubleshooting section of this manual.

CLEANING METHOD

WARNING



Never switch ON the electric power supply unit during the washing and cleaning operation.



All metallic parts located within and around the applicator head must be correctly connected to the ground. Any floor coating must be electrically conductive and grounded.



Do not stand upon wooden pallets or a non-grounded structure while cleaning.



DO NOT USE HIGH PRESSURE CLEANING SYSTEMS ON THE APPLICATION EQUIPMENT AND CONTROLS.

CLEANING PROCEDURE

- The ON/OFF switches on the power supply and to the applicator head must be OFF position before starting cleaning operation.
- Wait for 10 seconds before entering the spray area.
- Only apply a moderate amount of cleaning solution onto a clean soft cloth, or bristle brush, to clean the applicator, generator head and hoses.
- Hose down the complete system in place (CIP). There is no need to remove the system for cleaning.
- Wash thoroughly and dry completely with low pressure compressed air @ 2bar (29psi)
- Wipe dry the atomisers, generator heads, vibratory tray/drive assemblies, plus all hose and cables carefully and thoroughly before commencing production.



CAUTION: Synesthetic resins used in the fabrication of the electrostatic Atomiser can react with certain cleaning agents. Check with Spice Application Systems.



CAUTION: avoid using the most toxic cleaning agents. Do not use chlorinates.



THIS IS VERY IMPORTANT.

**IF NOT DRY IT CAN LEAD TO MATERIAL BUILD UP ON THE EQUIPMENT.
NEVER SWITCH ON THE ELECTROSTATICS WITH ANY CLEANING
MATERIALS REMAINING IN THE SYSTEM.**

Before switching the electrostatic back ON, please check :

1. Check that the atomisers, generator heads, vibratory tray/drive assemblies, plus all hose and cables are completely dry.
2. Check that all equipment within the application area is correctly installed and positioned.

SERVICING OVERVIEW

WARNING



The personnel involved in the electrostatic coating system servicing must be trained and qualified. If you face any troubles which cannot be repaired after consulting the Troubleshooting and Maintenance guides, do not try to start the equipment. Consult your local authorised SAS distributor or SAS directly for assistance.

1. The electric power supply must be disconnected before any servicing operation **(power supply unit switched off and isolated)**.
2. When turning off the Voltage, wait for 10 seconds before commencing work, so that any electrostatic charge has time to reach ground.
3. **Before disconnecting hoses, ensure that the system is no longer pressurized, the air is turned off and that the electric current is also switched off.**
4. Do not soak or immerse the applicator, generator head or any plastic parts in a solvent. This could result in damage and impair the safety circuits. If necessary, clean any plastic parts with a soft brush soaked in a soapy water solution, after hosing down and then wipe dry immediately.
5. Never leave components of the applicator and generator head immersed in cleaning solution.
6. Never use metal tools to clean the applicator and generator head.
7. Always store in a dry place.
8. After any repair and prior to turning on the power supply:
 - a. Ensure the atomiser and generator head is correctly installed and positioned onto the application unit.
 - b. Ensure all Earth wires are in place and positively connected to ground.

SERVICING ROUTINE

DAILY CHECKS (start of every shift)

1. Check the condition, wipe clean and dry the powder atomiser.
2. Check the condition, wipe clean and dry the Generator head and electrode.
3. Check the condition and operation of the Powder Vibrating Tray & Drive, ensuring correct operation, wipe clean and dry.
4. Check All hoses are in good condition (not worn or crimped) ensuring there are no leaks and connections are tight.
5. Check All electrical cables are in good condition (not worn or crimped) ensuring they are not broken, twisted or knotted and connections are tight.
6. Check All earthing wires are connected to the equipment and support frames including the Vibratory trays and Drum are connected correctly.
7. Check the SAS Controller for correct operation of the Voltage & Microamp meters.
8. Conduct an S.E.T. test to check the electrostatic effect.

WEEKLY CHECKS (every 7 days)

1. Check the working condition of the Powder Vibrator Unit. Ensure all connections are tight and there is no "Knocking" from the Vibrator drive. Should the Vibrator drive require adjustment, please refer to the SAS LE Manual for instructions.
2. Check the condition of the Anti-Vibration feet of the Powder Vibrator drive. Should the Anti-Vibration feet require attention, please refer to the SAS LE Manual for instructions.
3. Check the Powder Flow Rate at the output from the Screw Feeder. Conduct a Flow volume test.
4. Check the compressed air supplies to the equipment to ensure the correct input pressure (3.5 to 4 bar) and that the air supply is Clean & Dry.
5. Check the electrical resistance to ground of All earthing wires are connections within 3 meters of the application area. This should be checked with a Megaohm Meter and the resistance to ground should measure 1 megohm or less.

BI-ANNUAL CHECKS (every 6 months)

1. Check and replace the Electrode on the Powder Generating Head.
2. Check and replace if required, All Anti-Vibration feet of the Powder Vibrator drive. Please refer to the SAS LE Manual for instructions.
3. Check and replace if required, the Powder atomiser Nozzle.

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Unit will not operate	Mains connector not fitted to control panel	Connect to rear of control panel (see page 14 - Fig 6, CUP1004)
	Not connected to a suitable mains electrical supply	Engineer to check supply (see page 15)
	Not switched "ON"	Turn the switch "ON" at the control panel (see page 13 - Fig 5, CU1007)
	Circuit breakers tripped at the rear of the control panel	Press circuit breakers inwards (see page 13 - Fig 5, CU1003) If they trip out again after turning on the unit call for an engineer.
Spitting Spray	Insufficient air pressure	Turn up the air pressure (see page 17) Check hoses for leaks and tighten fittings.
	Empty powder hopper in the screw feeder	Fill the hopper
No powder delivery	Screw feeder blocked:	Empty screw feeder, remove screws and clean thoroughly. Reassemble and refill hopper.
	Insufficient air pressure to the air spray head:	Increase air pressure at the control (see page 17)
	Pinched or restricted airlines	Check and replace if necessary
	No powder in the screw feeder	Fill the screw feeder hopper
	Vibratory tray not working	Turn on vibrator at the vibrator control Consult SAS LE Manual
Poor atomisation of powder	Powder atomiser obstructed or worn down	Clean nozzle or replace with new Ensure nozzle is fitted correctly
	Low air pressure	Increase air pressure (see page 17)

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Powder spraying, poor adhesion to product	Voltage output too low	Adjust the vibratory tray further away from the product (see page 16) Conduct SET test (see page 22)
	Earthing not correct	Reset the earth wiring and contacts
	Spice not suitable for electrostatic application	Contact spice supplier
	Spice particles too large	Contact spice supplier.
Partial or missed coating of product	Vibratory tray incorrectly positioned in the drum	Set to correct position and angled facing the tumbling product (see page 16)
	Insufficient powder output	Increase screw feeder output. Refill powder hopper.
	Flavouring drum speed/angle	Increase or decrease drum speed. Raise or lower drum angle.
Dust in the air (dusting)	Electrostatics are not turned on	Turn on at the control (see page 16) Conduct SET test (see page 22)
	The low voltage cable not connected or is damaged	Replace cable if needed. (This cable must be supplied by SAS).
	Earthing not correct	Reset the earth wiring and contacts.
	Powder very fine (under 15 microns)	Powder supplier to reformulate the powder.
	Air pressure too high	Turn down the pressure at the control (see page 17)
Operators are getting static electric shocks	Earthing not connected	Reset the earth wiring and contacts.
	Operator not wearing conductive clothing	Purchase conductive foot gear, or conductive operator earthing straps.
Static Electric shocks from the intake and exit vibratory conveyors:	No earthing on the vibratory trays	Fit earthing straps to both conveyors.

SPARE PARTS

ELECTROSTATIC CONTROLLER

Assembly Number : CU 200-124

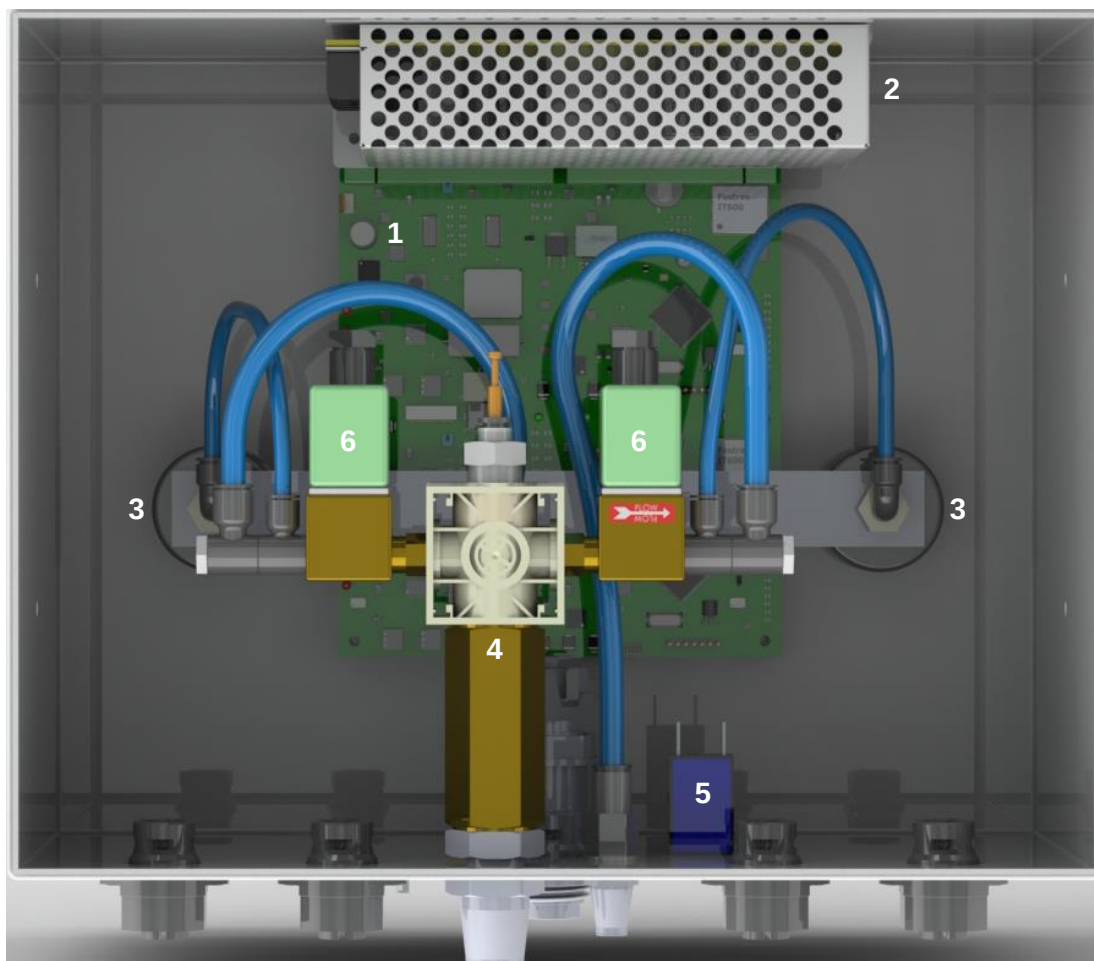


Fig 11

Position	Description	Part Number
1	Main Control PCB	CU 100-003
2	Power Supply	CU 100-004
3	Air Gauges	CU 100-055B
4	Mains Pressure Regulator	CU 100-002
5	Mains Fuse	CU 100-018
6	Regulating Solenoid Valves	CU 100-005

SPARE PARTS

ELECTROSTATIC GENERATING HEAD – POWDER

Assembly Number: GH 200-161 (GH3001)

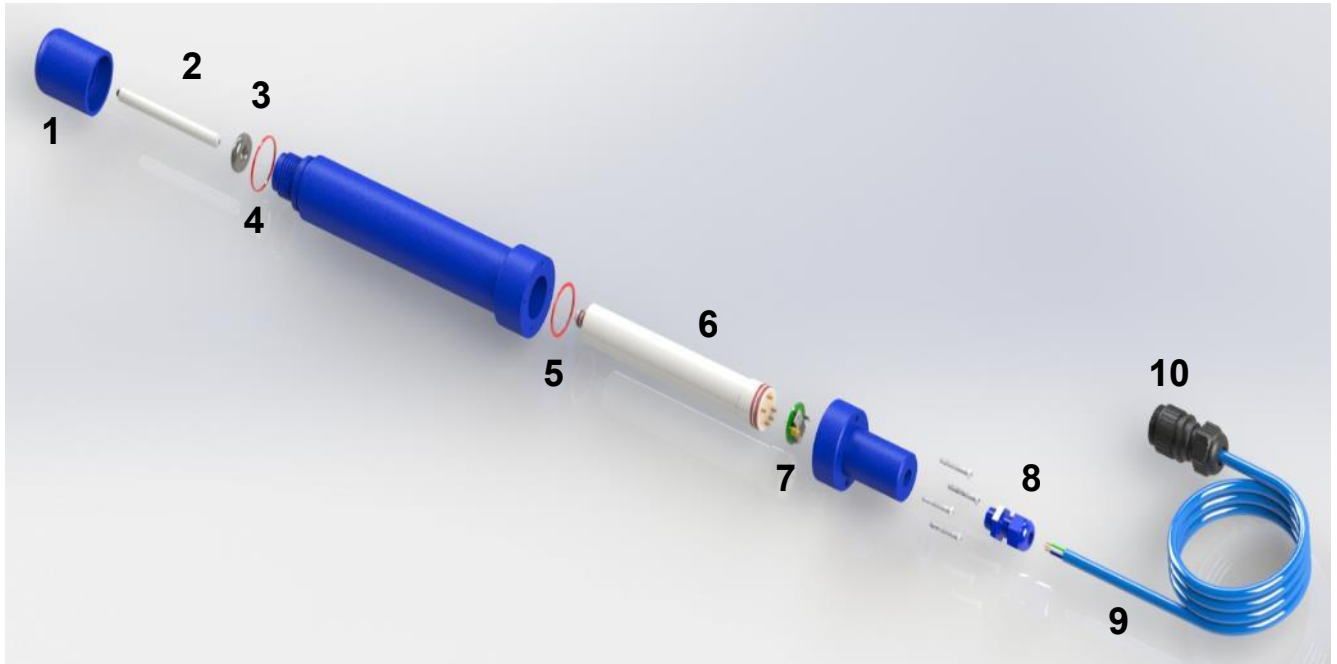


Fig 12

Position	Part Number	Description
1	GH 100-067	Powder Cap
2	GH 100-168	Powder Electrode assy
3	GH 100-074	Black Electrode "O" Ring
4	GH 100-080F	Red Seal "O" Ring (Front)
5	GH 100-080R	Red Seal "O" Ring (Rear)
6	GH 100-076	Cascade MK3
7	GH 100-077	Oscillator board MK3
8	GH 100-075	Cable Gland
9	GH 100-072	Cable MK3
10	GH 100-073	Electrostatic generating head plug 4 pin Male (IP65)

SPARE PARTS

SPARES KIT GENERATING HEAD – POWDER

Assembly Number: GH 200-127 (SK3001)



Fig 13

<u>Position</u>	<u>Description</u>	<u>Part Number</u>	<u>Quantity</u>
1	Security Screwdriver	GH 100-115	1
2	Red Seal 'O' Ring (Front)	GH 100-080F	1
3	Red Seal 'O' Ring (Rear)	GH 100-080R	1
4	Black Electrode 'O' Ring	GH 100-074	1
5	Cable Gland	GH 100-075	1
6	Oscillating Board MK3	GH 100-077	1
7	Electrostatic Electrode (Std Powder)	GH 100-168	1
8	Electrostatic Cascade MK3	GH 100-076	1

On the oscillating board (GH 100-077) there are two free holes to solder wires to, P6 and P7 (they are marked on the board).

The cable from SAS has 2 cores, colours **RED** and **BLACK**, along with an outer sheath. The outer sheath can be removed.

Core colour **RED** goes to P6 and core colour **BLACK** goes to P7

SPARE PARTS

POWDER ATOMISER – PLASTIC TIP & PLASTIC BODY (Standard) Assembly number: DV 200-112P

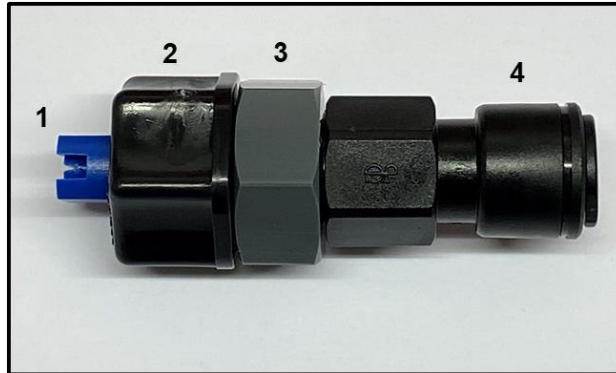


Fig 14

Position	Description	Part Number
1	Atomiser Nozzle (Plastic)	DV 100-112
2	Atomiser Cap (Plastic)	DV 100-110
3	Atomiser Body (Plastic)	DV 100-109
4	Atomiser air connection (Plastic)	DV 100-246

POWDER ATOMISER – PLASTIC TIP & ST/ST BODY (Optional) Assembly number: DV 200-112S

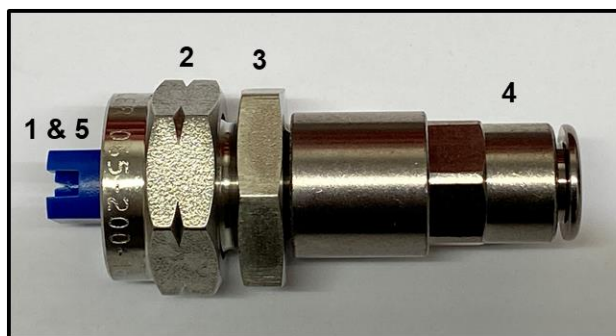


Fig 15

Position	Description	Part Number
1	Atomiser Nozzle (Plastic)	DV 100-112
2	Atomiser Cap (St/St)	DV 100-108
3	Atomiser Body (St/St)	DV 100-107
4	Atomiser air connection (St/St)	DV 100-123
5	Nozzle Seal Washer	DV 100-106

SPARE PARTS

POWDER VIBRATOR UNIT

Assembly Number: DV 200-**XXX-Y**

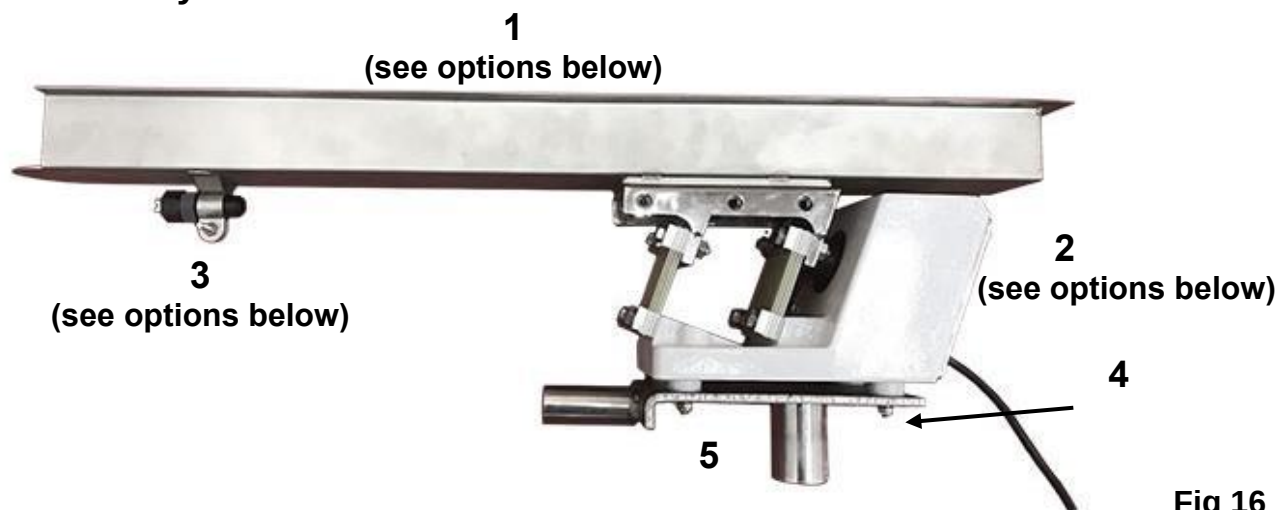


Fig 16

Assembly No. DV 200- XXX-Y	Description	1 Powder Tray Assy	2 Vibrator Drive Assy	3 Powder Atomiser	4 Anti-Vib Feet (set of 4)	5 Vibro Plate
DV 200- 760-P	Powder Vibrator Unit - 760 (Standard)	DV 200-093	DV 200-090	DV 200-112P	DV 100-301	DV 100-173
DV 200- 500-P	Powder Vibrator Unit - 500 (Small)	DV 200-095	DV 200-092			
DV 200- 1000-P	Powder Vibrator Unit - 1000 (Large)	DV 200-096	DV 200-090			
DV 200- 760-S	Powder Vibrator Unit - 760 (St/St Tip)	DV 200-093	DV 200-090	DV 200-112S	DV 100-301	DV 100-173
DV 200- 500-S	Powder Vibrator Unit - 500 (St/St Tip)	DV 200-095	DV 200-092			
DV 200- 1000-S	Powder Vibrator Unit - 1000 (St/St Tip)	DV 200-096	DV 200-090			

VIBRATOR CONTROL

Assembly Number: DV 200-097



Fig 17

NOTE

For further information on the Vibrator Drive and Vibrator Control, please refer to the SAS LE Instruction Manual

SPARE PARTS

SUPPORT BAR - GENERATOR HEAD POWDER

Assembly Number: GH 200-159

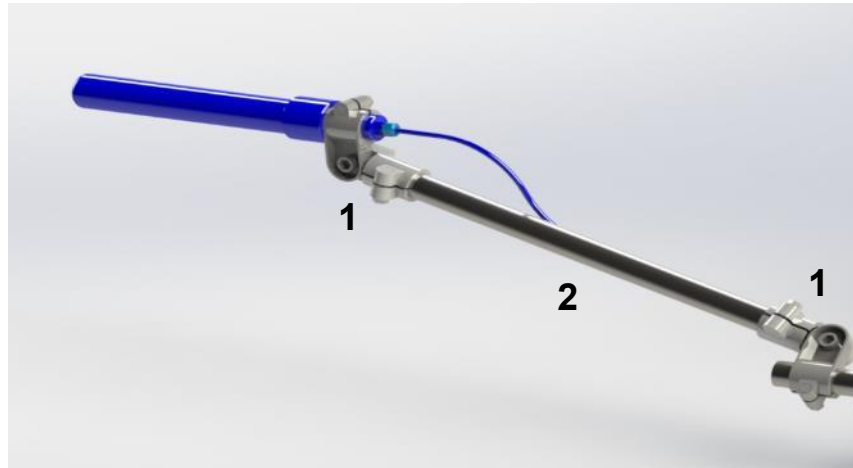


FIG 18

Position	Description	Part Number
1	30mm Head Clamp	GH 100-159
2	30mm Bar (approx. 500mm long)	GH 100-146

Generator head not included (see page 29)

SUPPORT BAR - POWDER VIBRATOR TRAY

Assembly Number: DV 200-153

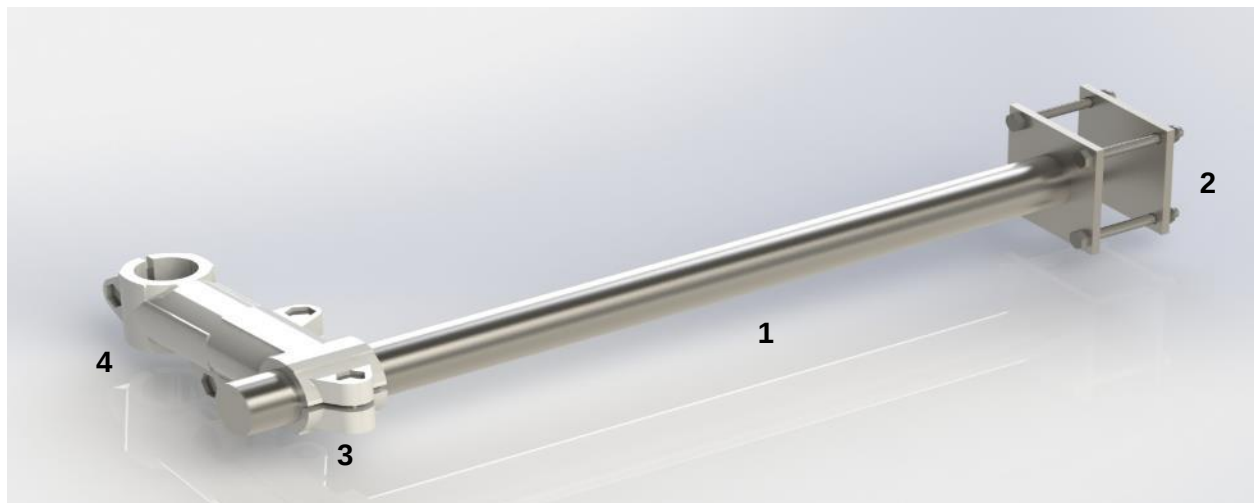


Fig 19

Position	Description	Part Number
1	Main Support bar	DV 100-153
2	Base Plate	DV 100-148
3	40mm Vibro Clamp (Female)	DV 100-152
4	40mm Vibro Clamp (Male)	DV 100-151

DIMENSIONS

ELECTROSTATIC CONTROLLER

Assembly Number: CU 200-124

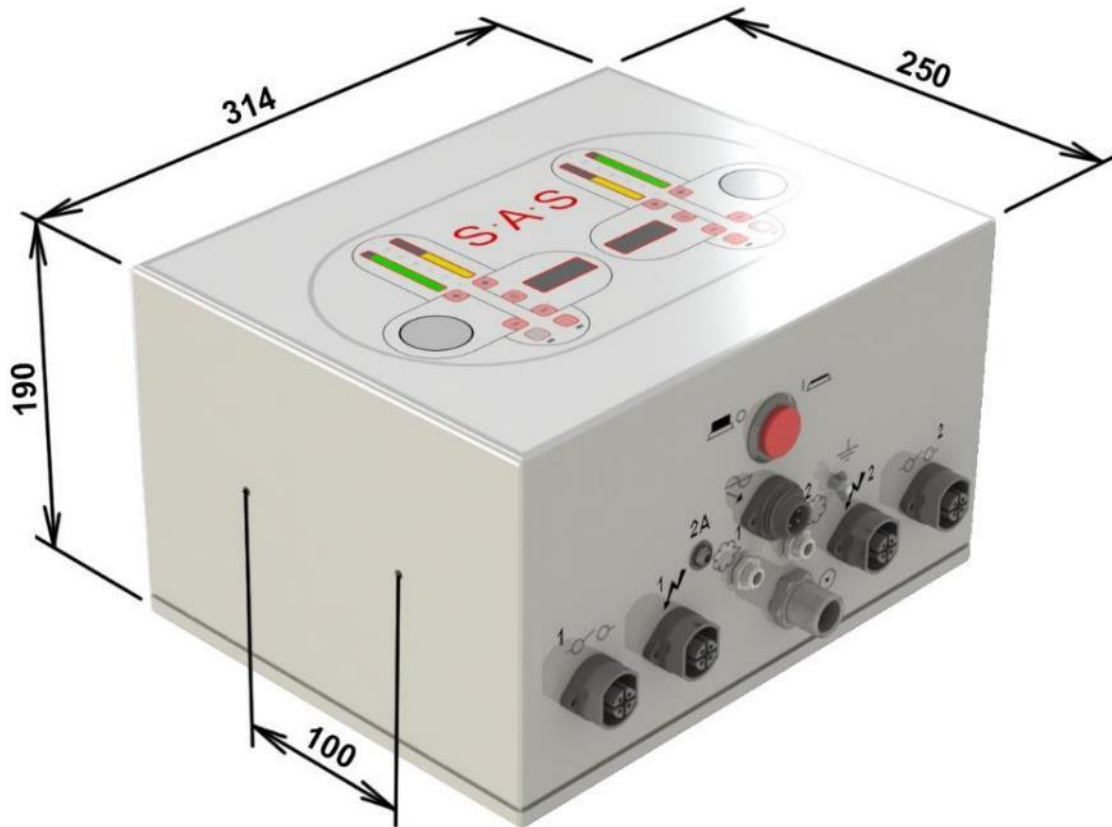


Fig 20

VIBRATOR CONTROLLER

Assembly number: DV 200-097

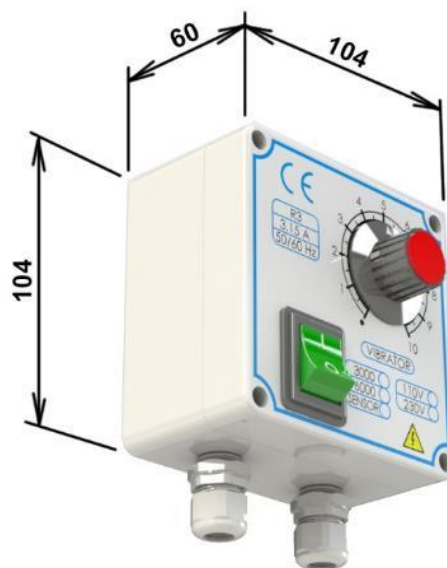


Fig 21

DIMENSIONS

GENERATOR HEAD - POWDER

Assembly Number: GH 200-161

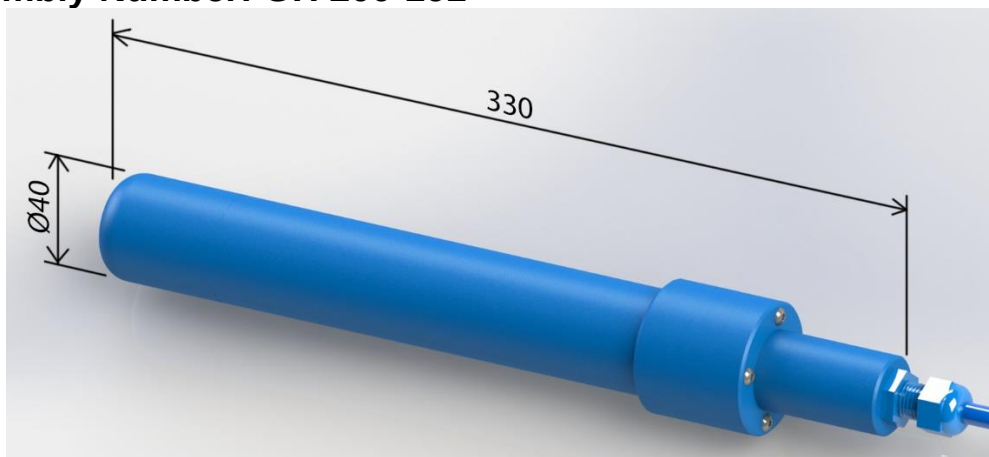


Fig 22

POWDER VIBRATOR ASSY

Assembly Number: DV 200-**XXX-Y**

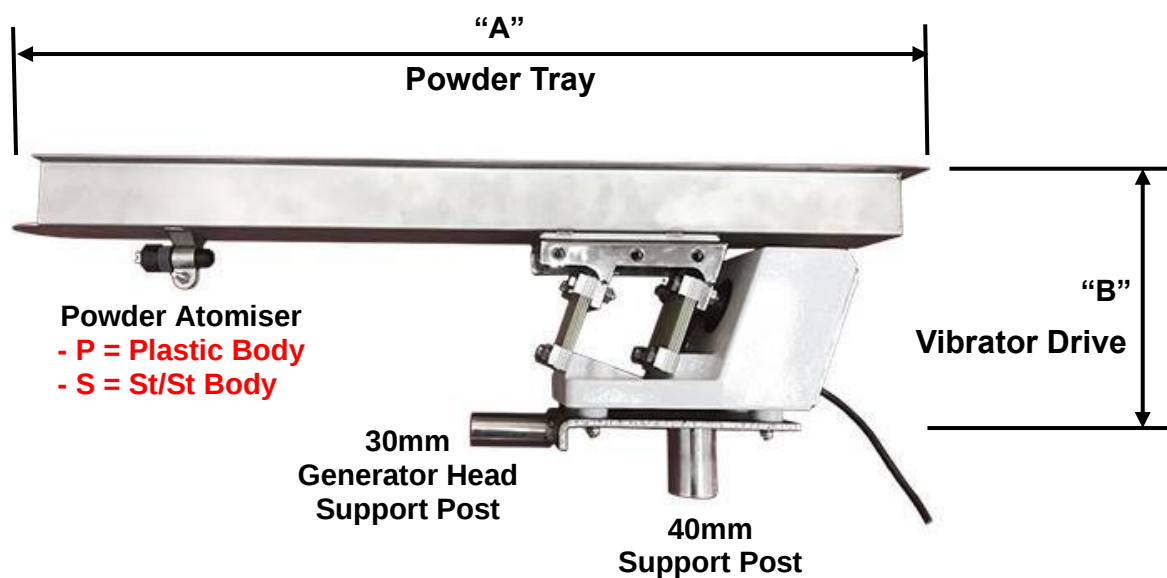


FIG 23

Assembly Number DV 200- XXX-Y	Description	"A"	"B"
DV 200-760- P/S	Powder Tray - 760mm (Standard) c/w LEX2 Drive	780mm	201mm
DV 200-500- P/S	Powder Tray – 500mm (Small) c/w LEX1 Drive	520mm	156mm
DV 200-1000- P/S	Powder Tray – 1,000mm (Large) c/w LEX2 Drive	1,020mm	201mm

TECHNICAL SPECIFICATIONS

With our modular design, Spice Application Systems has been the leader in the electrostatics food industry for many years. With proven components and circuitry built to IP 65, it is a combination that will be hard to beat.

The Control Unit has the added benefit of putting total control at your fingertips. With its unique design, it provides the ability to monitor current flow and control the pneumatics, in addition to providing the controls to operate your electrostatic spray heads.

An electronic safety device, incorporated into the SAS power supply unit, automatically detects the presence of a grounded object in the vicinity of the spray head. Once a ground approaches within 10cm (4"), this device reduces the output voltage.

ELECTROSTATIC CONTROL UNIT

Mains Electrical Supply	• Single Phase 3 Wire (Live-Neutral-Earth)
Supply Voltage	• 90 – 264V a.c.
Supply Frequency	• 47 – 64 Hz
Connected Load	• 40 VA
Circuit Protection	• 0.6 A SP Miniature Circuit Breakers – Live
Max No. of Electrostatic Outputs	• Up to 2 Electrostatic Generator Heads
Supply Voltage to Generator Head	• 3.5 – 13V d.c.
Supply Current to Generator Head	• 400mA Max
Protection Category	• IP 65
Operating Temperature	• -10°C/+60°C
Control Box construction	• Stainless Steel Food Quality 316/304
Mains Cable construction	• Polyurethane - Black
Compressed Air Input Supply	• 4 Bar (58psi) Max / 3 Bar (44 psi) Min
Compressed Air Input connection	• 10mm o/dia. push-in
Compressed Air Input Consumption	• 10m ³ /hr (6 c.f.m.) per Atomiser
Max No. of Atomisers	• Up to 2 Atomisers
Atomising Air Output pressure	• Maximum pressure 2 bar / 29psi
Atomising Air Outlet connection	• 8mm o/dia. push-in connection
Regulated Air Output to Atomiser	0-4 Bar
Total Weight	• 6.80kg

ELECTROSTATIC GENERATING HEAD

Supply Voltage from Controller	• 3.5 – 13V dc
Supply Current from Controller	• 400mA Max
Output Voltage	• 20-85Kv negative charge
Output Current	• 50uA Max
Protection Category	• IP 65
Operating Temperatures	• -10°C/+80°C
Generator Head construction	• Polypropylene/Acetal co Polymer - Blue
Generator Cable construction	• Polyurethane – Blue
Total Weight	• 0.90kg

WARRANTY

Dear Customer,

Thank you for buying a SAS products and systems. Every care has been taken, from design to manufacture, to ensure that this product gives you complete satisfaction.

Spice Application Systems Ltd guarantees that all equipment manufactured by them will be free from defective workmanship or materials for a period of 12 months or 3000 working hours, from the date of delivery of the equipment, whichever comes first.

We will rectify any manufacturing or material defects by means of suitable repair or supplying a replacement part.

Always providing that:

- Any such defect(s) is reported in writing, within the 12-month period.
- All equipment is installed, operated and maintained in accordance with specific recommendations of Spice Application Systems Ltd and good industry practice.
- Spice Application Systems Ltd supplies all spare parts and consumable items.
- Consumable spares are inspected frequently and replaced as necessary. The life of these varies with the application and they are not guaranteed for any specific period.
- Maintenance spares are inspected and replaced if necessary every 12 months or 3000 operated hours, whichever is sooner.
- Any consequential loss, however caused is expressly excluded from this guarantee

Spice Application Systems Ltd will not be liable for any repairs or replacements (including labour costs) without our written approval.

Spice Application Systems Ltd gives no performance guarantees, unless specifically indicated in our proposal. The effects erosion, corrosion and general wear and tear are specifically excluded.

Spice Application Systems Ltd reserves the right to amend or change specifications, as part of their continuous development policy.

We make no other guarantee or representation whatsoever, expressed or implied.

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