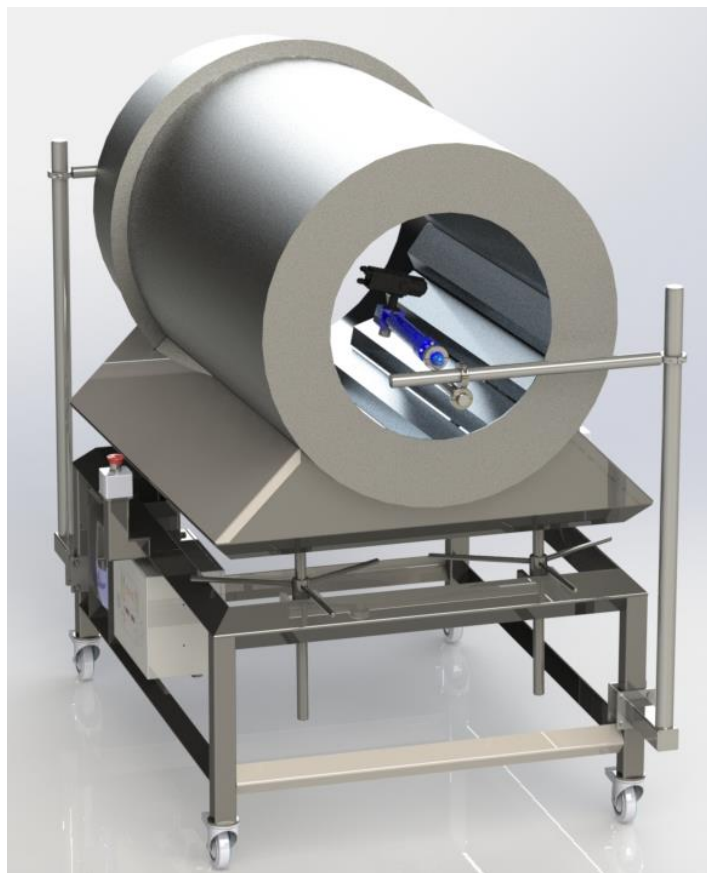




SAS 10/20 – Electrostatic Oil INSTRUCTION MANUAL



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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

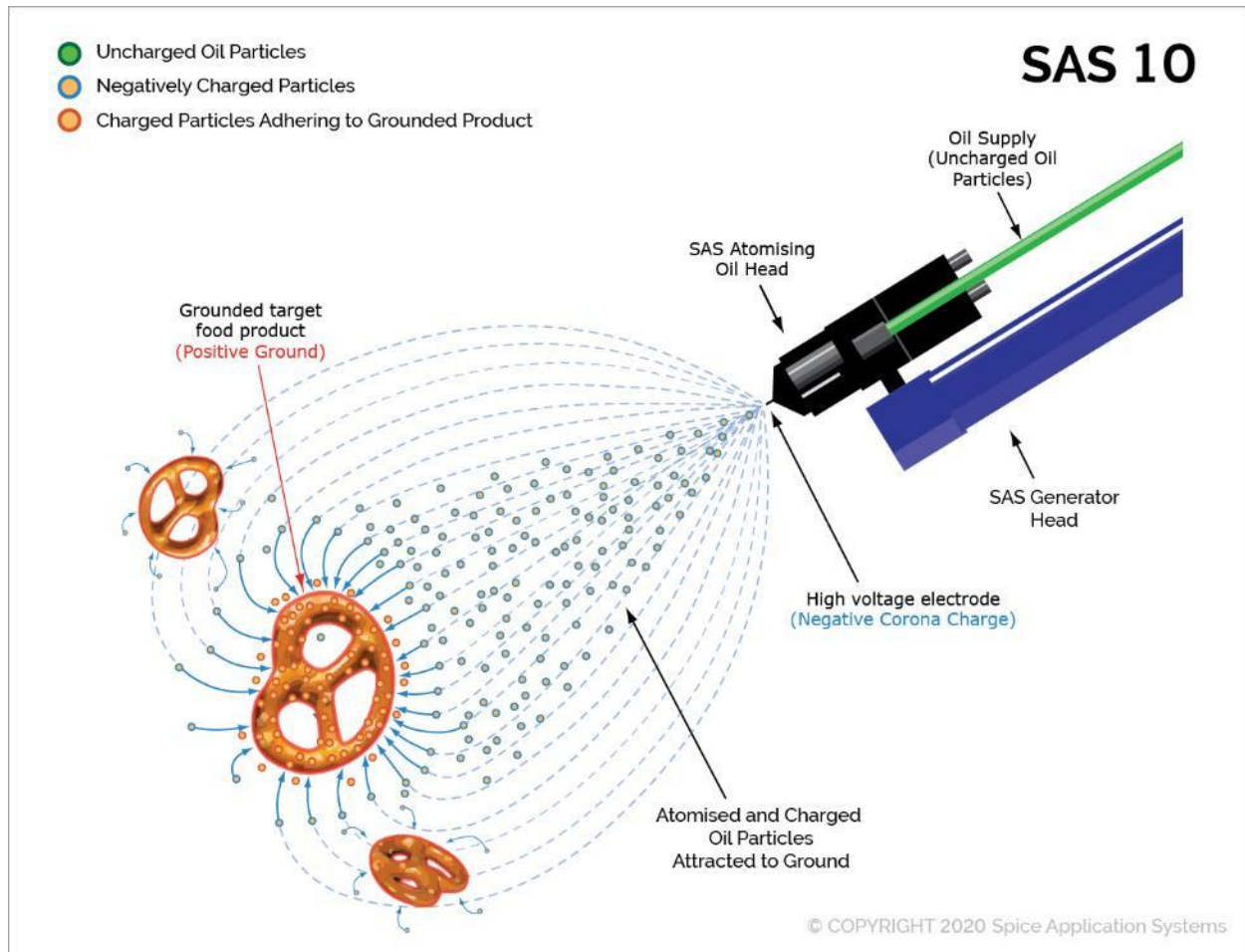


COMMON MARKING TO GUNS	DESCRIPTION
KREMLIN REXSON 93245 STAINS FRANCE	Name and address of the manufacturer
KAP EX & KAV EX	Gun Version
INERIS 04 ATEX 0093 X	Fluid approval N° given by INERIS
EEx 0.24mJ  II 2 G	EEx 0.24mJ : marking corresponding to the projection guns for paints for the non-flammable paints or flock in association with non-flammable adhesive vapours with an energy less than 0.24 mJ (EN 50 050 standard) II : group II 2 : class 2 Surface equipment meant to be in an area where explosive atmospheres due to gas, vapours, mists are liable to appear from time to time in usual operating. G : gas
CE0080	0080 : INERIS code that notifies the Quality Management System
P air : 6 bar / 87 psi	Maximum air pressure
P prod : 10 bar / 145 psi	Maximum fluid pressure
	Environmental indication

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 bely 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

Oil Application Model Type: SAS 10 & SAS 20

This model is designed to atomise mineral based Oils and create an electrostatic charge on the oil as it leaves the atomiser, which is angled and pointing onto the products to be coated.

The SAS Oil Applicator spray unit uses the principal of atomising the oil as it is atomiser by spraying air and electrical charge onto the oil, it is able to obtain the ultimate wrap-around effect, onto grounded product.

Please Note

This system is not suitable for applying highly conductive spray materials, such as water-based minerals. Please consult SAS for such applications.

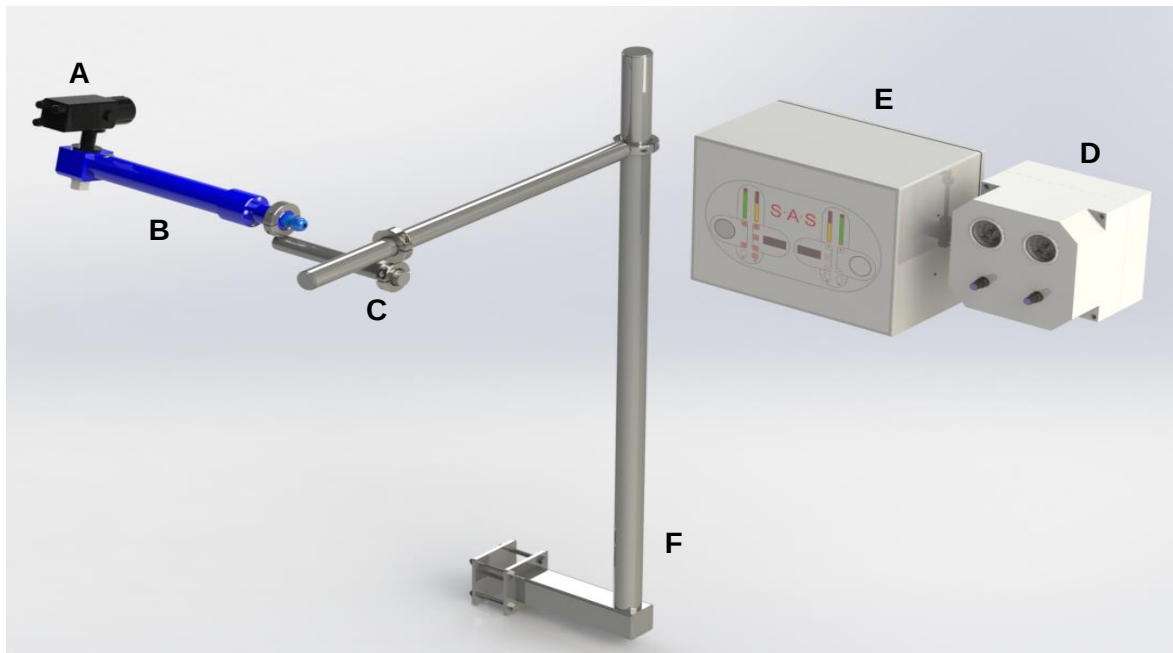


Fig 1

SAS 10 – Oil Applicator overview

Pos.	Description	Assembly Number	Manual Reference
A	Electrostatic Oil Atomiser Head	OH 200-132R	See Page 30 - Fig 16
B	Electrostatic Oil Generator Head	OH 200-161	See Page 28 - Fig 14
C	Support for Oil Generator Head	GH 200-322	See Page 34 - Fig 21
D	Electrostatic Controller	CU 200-124	See Page 27 - Fig 13
E	Pneumatic Control Box	PB 200-133	See Page 33 - Fig 19
F	Frame Mounting Assembly - Oil	GH 200-320	See Page 34 - Fig 22

Note ! *An SAS 20 Assembly contains one common Electrostatic controller
(see Page 10, Fig 3)*

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 45 cm (8" to 18")
4. Ensure that the distance between the electrode on the oil head and any surrounding metal objects (including the infeed tray and drum) is at least 15cm (6") or greater.
5. The Pneumatic control box must be located outside the flavouring drum at a location which allows the operators to observe the material atomisation in front of the tumbling product.
6. Ensure the Oil Head fluid nozzle and air cap are correctly fitted and hand tightened with the retaining ring onto the Oil head.
7. The Oil delivery system will determine the fluid flow rate to the applicator, which is adjusted by the oil pump controls. (see respective manual for Oil delivery system)
8. Ensure a suitable fluid delivery hose is installed between the Oil applicator and the delivery pump. The fluid hose connected directly to the Oil applicator must be non-conductive. It is recommended to use Food grade Polyethylene or Teflon hose.
9. The fluid delivery hose must be suitable for the materials being applied and the cleaning agents used for flushing. Also, the fluid hose must have a suitable working pressure rating for the system.
10. Depending upon the materials being applied, it may be required to install a fluid filter before and after the Oil pump to prevent the Oil applicator from blockages and protect the oil pump mechanism.
11. All pneumatic hoses connected to the atomiser must be non-conductive. It is recommended to use Polyethylene and not Nylon hose.
12. Never use damaged hoses, cables or connections.
13. 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.
14. 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 12 – Fig 6 on the manual. If not using, make sure the dust caps are fitted and locked into place on the underside of the SAS Controller. (see Page 12 - Fig 5)

INSTALLATION

15. 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.
16. Remove all unnecessary metal components and materials from the application area.
17. Keep the application area clean.
18. The Electrical mains supply must be fitted with an earth wired to the factory mains earthing system.
19. 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.
20. 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)
21. 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.
22. Only personnel Trained and Qualified in the operation and service of Electrostatic equipment are permitted to work upon the Application equipment and installation.
23. Any Personnel working within the application area, must wearing conductive footwear. If personnel are required to wear gloves, these must also be conductive.
24. Ensure any Warning signs provided are prominently posted around the application area so all personnel can read and adhere to the safety instructions.
25. For all Interconnection details of the equipment, please refer to page 9 - Fig 2 or page 10 - Fig 3 for your appropriate application.

SCHEMATIC LAYOUT - 10

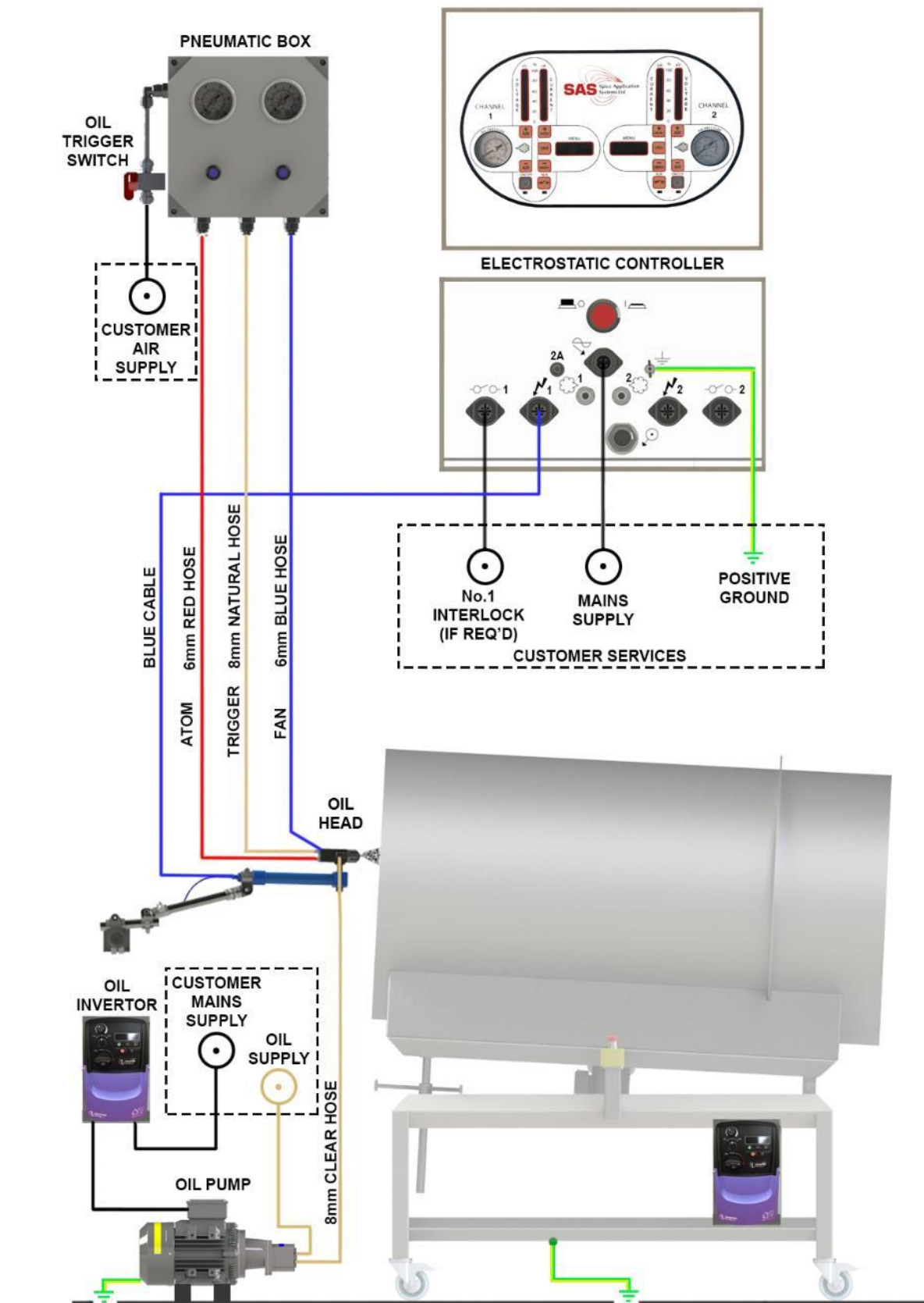


Fig 2

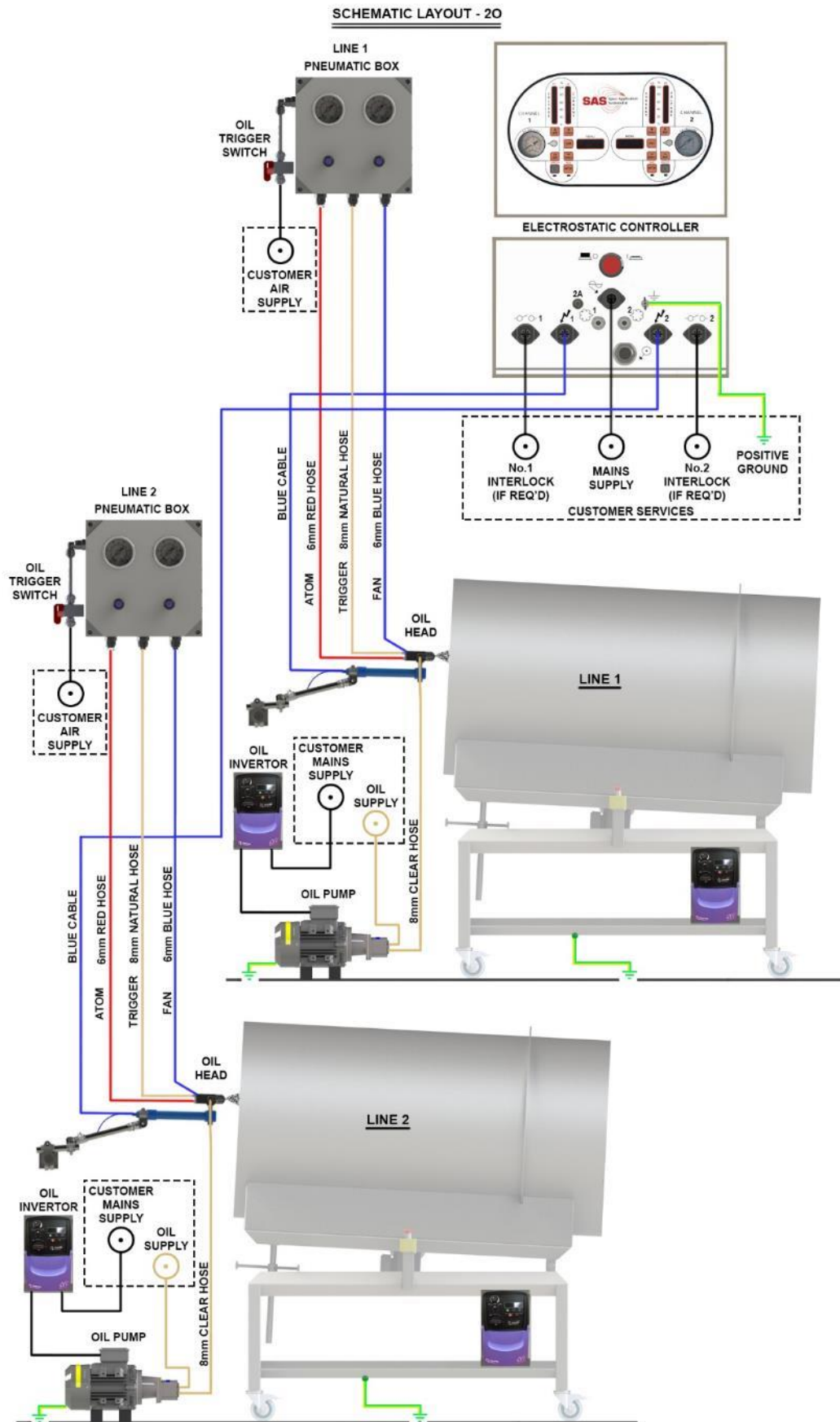


Fig 3

INSTALLATION

CONTROL UNIT – CONNECTION POINTS

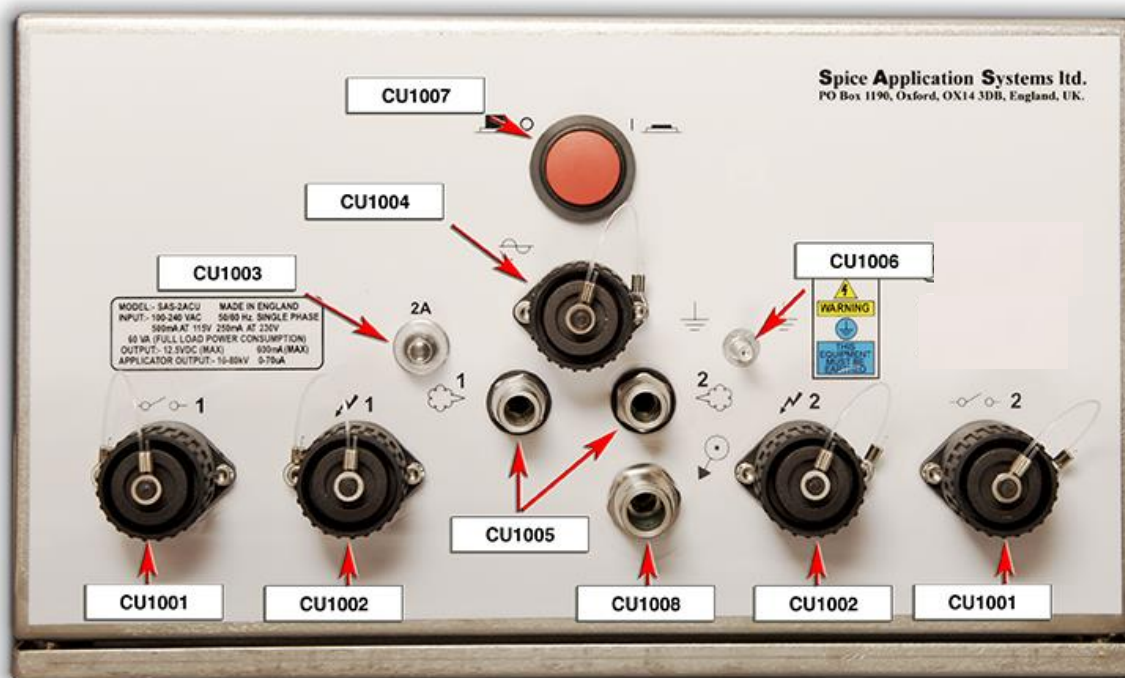


Fig 4

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	Not required for 1O & 2O Applications
CU1006	Terminal, Earth Post (IP65)
CU1007	Mains electric master on/off switch (IP65)
CU1008	Not required for 1O & 2O Applications

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

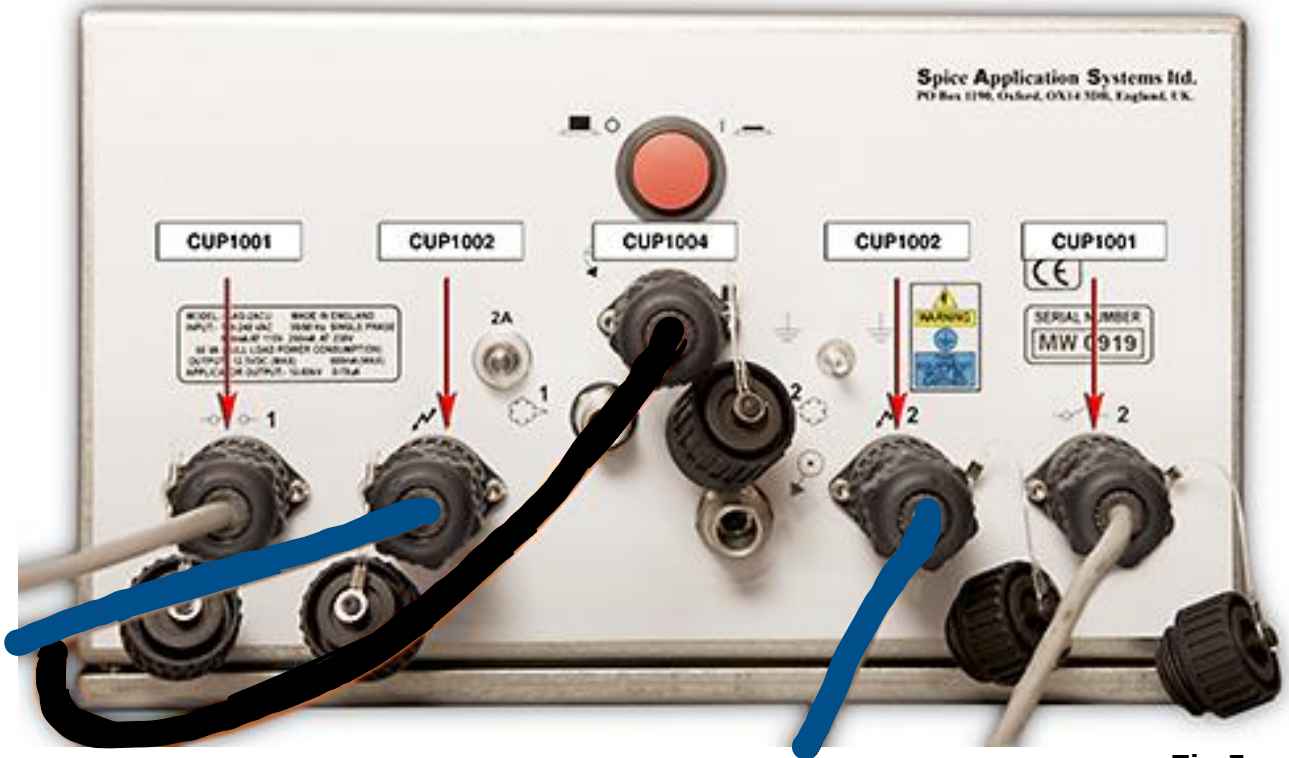
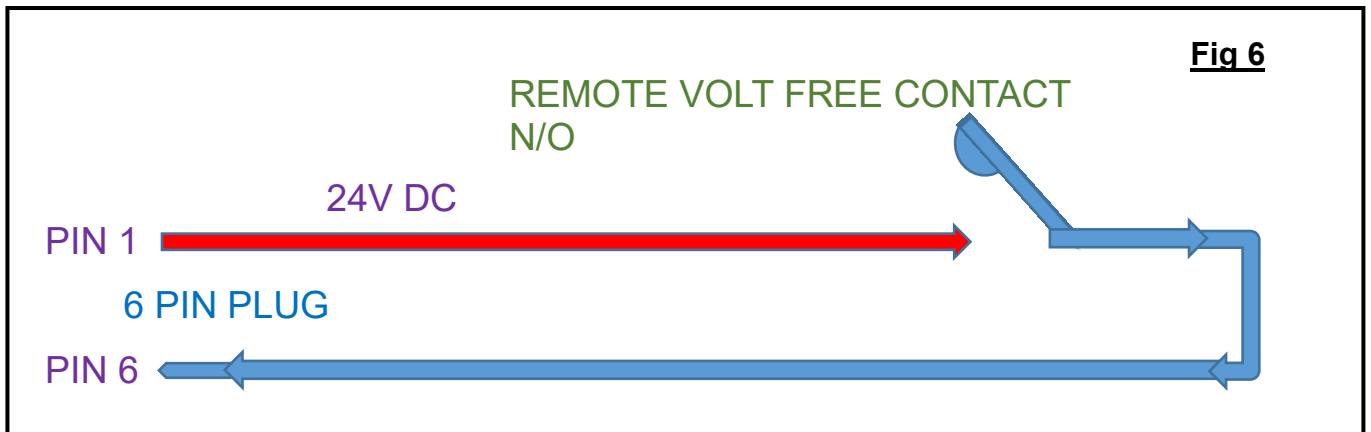


Fig 5

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)



NOTE

For the remote trigger input signal for each channel to operate, the respective Remote trigger on/off switch on the control fascia, must be selected with the Red LED below illuminated (see page 16 - Fig 8, position 7).

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 electrostatic oil head should be positioned towards the tumbling product inside the drum.

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.

The appropriate distance between the atomiser and the product to be coated should be between 20 to 45 cm (8" to 18")

OIL HEAD ATOMISER

1. The part to be coated must be connected to the ground continuously.
2. Keep the atomiser clean.
3. Ensure the air nozzle, fluid nozzle and air cap are correctly fitted and the retaining ring is hand tight.
4. Ensure the atomiser is installed and positioned correctly.
5. Do not use the equipment if there is any air or fluid leaks.
6. Ensure that the product being coated does not come closer than 15 cm (6") and no further than 45cm (18") from the atomiser.
7. The manual control trigger switch for the Oil head atomiser is located on the side of the pneumatic box.
8. Atomisation and Fan regulation is set upon the Pneumatic box front regulators.
9. Set the Atomisation and Fan air pressures for the atomiser to provide an even pattern at the minimum air pressure required.
10. Do not used excessive Atom & Fan air pressures as this will result in oil Misting outside of the coating drum.
11. Turn on the control trigger switch to commence operation.

OIL FLOW SYSTEM

1. The Oil flow rate is determined and adjusted by the oil supply system.
2. Turn on the oil Head followed by the oil supply system to prime the fluid delivery hoses with the coating material up to the oil Head.
3. Once the coating material is present at the oil head, turn off the oil supply system and turn off the oil head.
4. Caution If operating a positive displacement oil pump in the oil supply system, this pump supply MUST be turned On & Off in unison with the oil head to prevent over-pressurization of the fluid supply system.

OPERATING PRINCIPLE

OIL HEAD CONNECTIONS

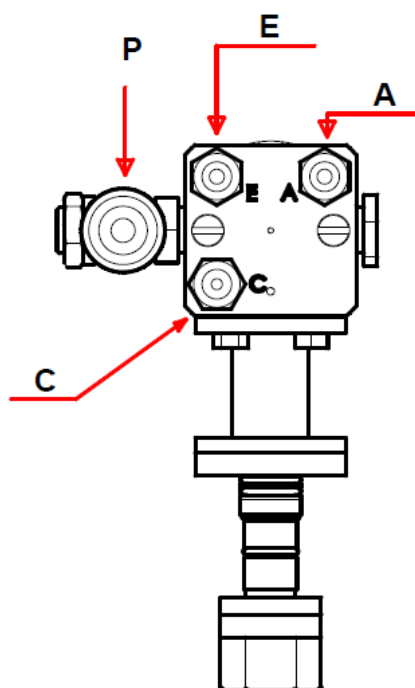


Fig 7

Position	Connection	Function	Pressure Adjustment
C	Control air	Spraying triggered. (Material dispensed from the nozzle.)	P = 4 to 6 bar (58 to 87 psi)
E	Fan air	Fan width : - Narrow - Wide	P = 0 P = 1 to 4 bar (14.5 to 58 psi)
A	Atomizing air (Swirl air)	Fineness of spraying	P = 2 to 5 bar (29 to 72.5 psi)
P	Oil Supply Inlet	Connection of Oil material	P = Fluid Flow adjustment upon Oil supply/pump

NOTE

It is recommended that a Production record is kept by the customer for the different applicator settings and pressure values relating to the production process for specific products and materials being applied.

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	Description
1	0-4 bar Pressure gauge
2	Not required for 1O & 2O Applications
3	Not required for 1O & 2O Applications
4	Not required for 1O & 2O Applications
S	Not required for 1O & 2O Applications
5	Not required for 1O & 2O Applications
6	Local on/off switch
7	Remote trigger on/off switch
8	Program information numbers
9	Microamp dial (orange)
10	Kilovolt dial (green)

START UP

ELECTROSTATIC CONTROLLER

1. Connect the SAS control to its electrical power source.
2. Turn the main power-supply ON/OFF switch to the ON position (see page 11 - Fig 4, CU1007).
3. To turn on the electrostatic effect, press the Local ON/OFF button on the panel facia (see page 16 - 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.
4. The power supply emits a self-regulating 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 applicator electrode.

PNEUMATIC CONTROL BOX

1. Supply the SAS Pneumatic control with clean dry compressed air minimum 6 bar (87 psi).
2. The compressed air connection must be fitted with a local isolator and a pressure regulator, plus fitted with a suitable Filter to ensure a Clean and Dry air supply to the SAS equipment.

OIL APPLICATION ADJUSTMENT

1. Ensure the air nozzle, fluid nozzle and air cap are correctly fitted and the retaining ring is hand tight.
2. Open the oil head by turning the manual Control switch on the Pneumatic control box to the ON position. This will open the Trigger on the Oil head.
3. Turn on the Oil supply system to Prime the fluid lines with coating material up to the Oil head, ensure any trapped air is removed.
4. Adjust the Oil Supply system flow rate to provide the required volume of material. Conduct a flow rate test at the Oil head without any Atom and Fan air pressure. Collect the Oil flow rate into a measuring jug for one minute and record the volume and settings.
5. Adjust the Oil head Atomisation and Fan air pressures on the respective Pneumatic Control box regulators (see page 15 - Fig 7)
 - Adjust the Atomising air pressure (A - Atom air) to atomise the oil
 - Adjust the Fan air pressure (E - Fan air) to increase the Fan pattern.
6. Observe the Oil head is atomising the material inside the Drum using the minimum amount of air pressure required to atomise. Excessive air pressures will result in oil Misting outside the drum.
7. Do not use the equipment if there is any air or fluid leaks.
8. Ensure the atomiser is installed and positioned correctly.
9. Ensure that the product being coated does not come closer than 15 cm (6") and no further than 45cm (18") from the atomiser.
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.
11. The appropriate distance between the atomiser and the product to be coated should be between 20 to 45 cm (8" to 18")

START UP

12. Be sure that the distance between the electrode on the oil head and any surrounding metal objects (including the infeed tray and drum) is at least 15cm (6") or greater.
13. If required, adjust the rotational Speed and angle of the Drum unit to ensure the product is tumbling but without causing damage.
14. 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 also is automatically set depending upon the application conditions.
15. Follow the Static Electricity Test (S.E.T.) as described on page 19, to check the Electrostatic field within the application area.

NOTE

The electrostatic efficiency decreases quickly when 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

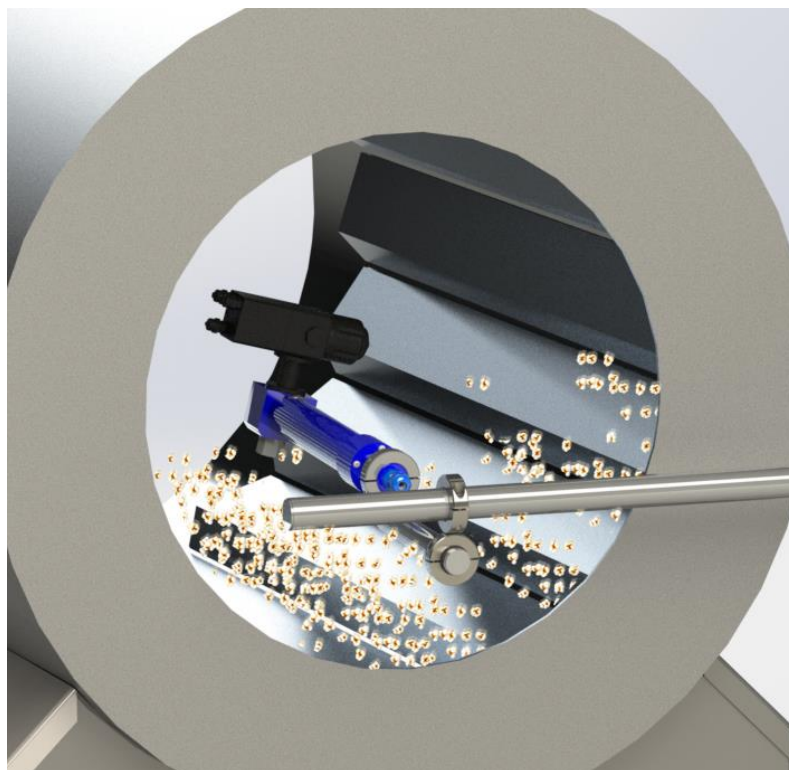


Fig 9

STATIC ELECTRICITY TEST

STATIC ELECTRICITY TESTER

Part No. 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 400-500mm 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 at 2 bar (29psi)
- Wipe dry the atomisers, generator heads, vibratory tray/drive assemblies, plus all hoses 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 hoses 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 Oil Head and electrode.
2. Check the condition, wipe clean and dry the Generator head.
3. Check the condition and operation of the Oil delivery system.
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 Oil delivery system. Please refer to the Oil Supply system Manual for instructions.
2. Check the condition of any Anti-Vibration feet used with the system. Should the Anti-Vibration feet require attention, please refer to the respective service Manual for instructions.
3. Check the Oil Flow Rate at the output from the Oil supply system. Conduct a flow volume test.
4. Check the compressed air supplies to the equipment to ensure the correct input pressures and that the air supply is Clean & Dry.
 - SAS Controller @ 4 bar (58psi)
 - Pneumatic Control box @ 6 bar (87psi)
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 if required, the Oil Head Electrode.
2. Check and replace if required, the Oil Head air cap and fluid Nozzle.

SERVICING APPLICATOR

OIL HEAD - CLEANING

1. Never immerse the oil head in solvent of cleaning fluids.
2. Do not use metal tools to clean the oil head or the air cap holes, as they scratch and distort the spray pattern.
3. Only use soft cloth or soft bristle brushes.
4. Clean the front of the oil head and the fluid nozzle with the oil head tip pointed downwards to prevent dirty cleaning materials entering the air and fluid passages.
5. Make sure that the fluid passages have been released of and fluid pressure from the oil supply system.
6. Remove the Air cap retaining ring and the air cap from the oil head.
7. Clean them with a soft bristle brush and some cleaning solution (do not leave immersed in cleaning solution)
8. Using compressed air, blow through the holes in the air cap from rear (inside) of the air cap & fluid nozzle.
9. **IMPORTANT** Check the electrode condition on the oil head. Never start the oil head in production if the electrode is damaged or broken.
10. After cleaning, store in a dry location or reinstall onto the oil head.
11. Before switching on the electrostatic effect, ensure the fluid nozzle, air cap and electrode are correctly and securely positioned with the retaining ring.

OIL HEAD – REPLACEMENT

Disassemble oil head from the generator head.

1. Unscrew shaft nut (2) and remove the oil head (1)
2. Replace O ring (5)
3. Apply dielectric grease on the shaft of the new oil head (3) and O Ring (5)
4. Insert new oil head shaft into the generator head (4) ensuring the O ring (5) is correctly located in groove.
5. Re install the screw shaft nut (2) and tighten when the gun is in the correct location.



Fig 10

SERVICING APPLICATOR

OIL HEAD – DISASSEMBLY

ELECTRODE (56) : ACCESS BY THE FRONT OF THE OIL HEAD

Change the electrode (56) or the needle end (57)
Without changing the complete needle.
Remove the air cap (43) & nozzle (44) and the
tip of the oil head, then remove the end to change
the electrode.

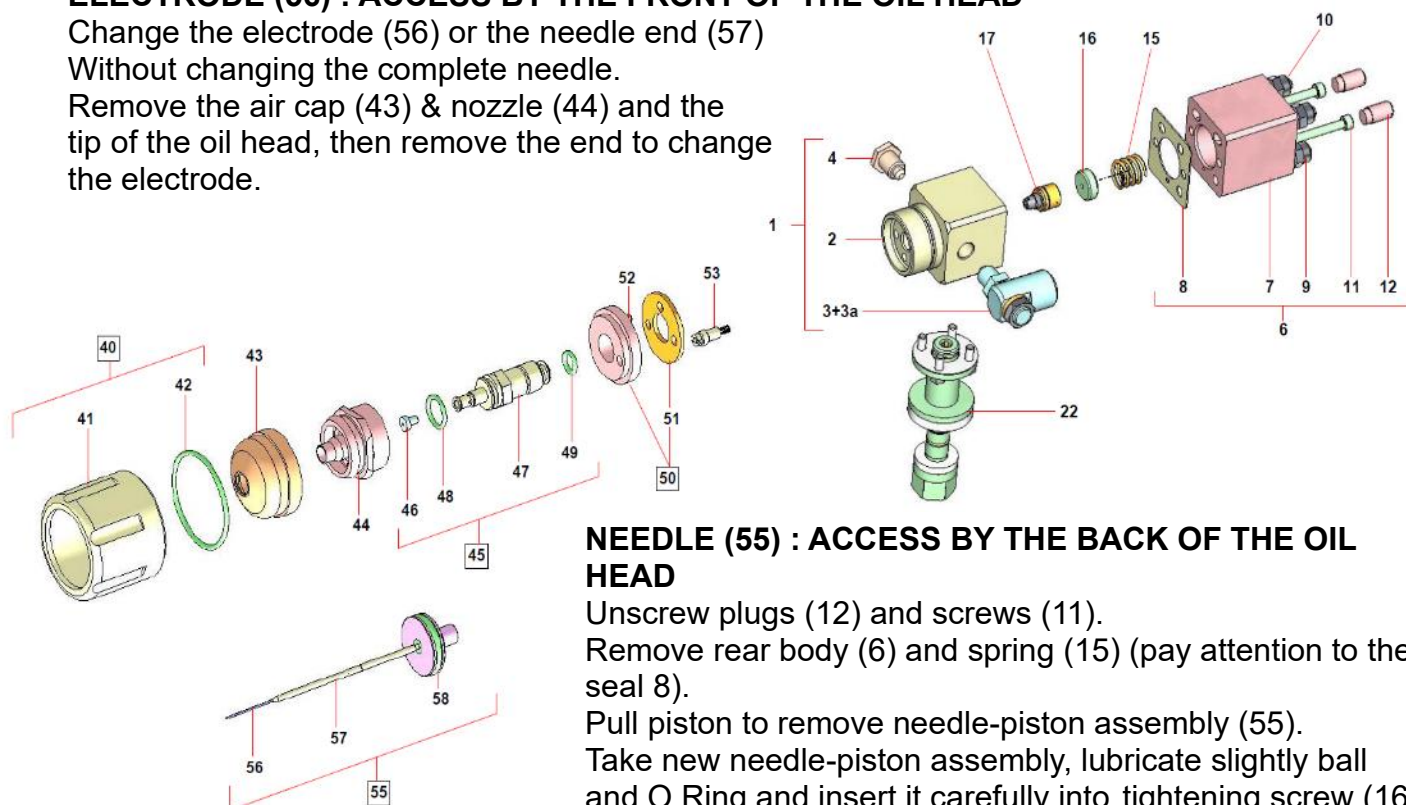


Fig 11

NEEDLE (55) : ACCESS BY THE BACK OF THE OIL HEAD

Unscrew plugs (12) and screws (11).
Remove rear body (6) and spring (15) (pay attention to the seal 8).
Pull piston to remove needle-piston assembly (55).
Take new needle-piston assembly, lubricate slightly ball and O Ring and insert it carefully into tightening screw (16), cartridge (17).
Change seals if necessary.
Reinstall spring, rear body, screws and plugs.
Make sure plugs (12) are installed. They contribute to the security.

TIGHTNESS CARTRIDGE (17) : ACCESS BY THE BACK PART OF THE OIL HEAD

Unscrew the plugs (12), the screws (11)
Remove rear body (6) and spring (15) (pay attention to the seal 8).
Pull piston to remove needle-piston assembly (55).
Unscrew screwing screw (16).
With a long-nose pliers, pull the cartridge (17).
After the lubrication of the O Ring seal (19), replace it. Comply with installation order.

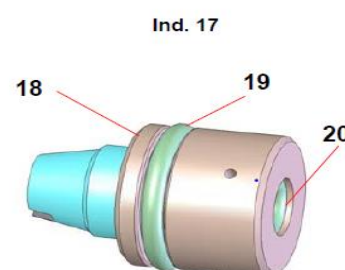


Fig 12

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Unit will not operate	Mains connector not fitted to control panel	Connect to rear of control panel (see page 12 - Fig 5, CUP1004)
	Not connected to a suitable mains electrical supply	Engineer to check supply (see page 13)
	Not switched "ON"	Turn the switch "ON" at the control panel (see page 11 - Fig 4, CU1007)
	Circuit breakers tripped at the rear of the control panel	Press circuit breakers inwards (see page 11 - Fig 4, CU1003) If they trip out again after turning on the unit call for an engineer.
Jerking or spitting spray.	Air is being sucked into material stream.	Check pump suction hose for leaks and tighten fittings.
	Insufficient fluid pressure.	Increase pump fluid pressure and/or clean fluid filter.
	Dirt in the fluid line.	Clean the fluid line and filter.
	Not enough fluid in the container.	Fill the fluid container.
No fluid flow rate.	Nozzle blocked. Dirt in the fluid being applied.	Clean air cap and nozzle (see page 23) Use a finer fluid filter or replace a damaged filter.
	Insufficient air pressure to trigger the oil spray head.	Pressure = minimum 4 bar/58 psi. (see page 15 – Fig 7)
	Fluid filter clogged. Low fluid pressure.	Clean it. Increases pump air pressure/check the fluid filter.
Fluid continuously leaking from oil spray nozzle.	Needle worn.	Replace it (see page 24 – Fig 11)
	Nozzle-seat worn.	Replace it (see page 24 – Fig 12)
Fluid leaks through holes in air cap.	Nozzle badly screwed into the body.	Clean the air cap and nozzle (see page 24 – Fig 11) Check for fluid flow back into the air passages.
Poor atomization.	Nozzle obstructed or worn out. Low fluid pressure.	Clean nozzle or replace it (see page 23) Increase pumps fluid pressure.
	Fluid viscosity too high.	Reduce viscosity by adding compatible solvent or heating material where appropriate
	Atomizing air pressure too low.	Increase atomizing air pressure (see page 15 – Fig 7)

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Excessive delivery in middle of spray (spray fan is not uniform)	Excessive fluid flow rate	Reduce fluid flow rate. Increase atomizing air pressure (see page 15 – Fig 7)
	Nozzle too large.	Install a smaller nozzle.
	Fluid viscosity too high.	Reduce fluid viscosity
	Air holes in air cap obstructed.	Clean air cap, blow air holes, clean with compressed air (see page 23)
Oil spraying, poor adhesion to product	Voltage output too low	Adjust the Applicator further away from the product (see page 17) Conduct SET test (see page 19)
	Earthing not correct	Reset the earth wiring and contacts
	Oil not suitable for electrostatic application	Contact Oil supplier
Partial or missed coating of product	Applicator incorrectly positioned in the drum	Set to correct position facing the tumbling product. In excess of 20cm (8") away from ground (see pages 7 & 8)
	Insufficient Oil output	Increase oil pump output. Refill Oil tank.
	Flavouring drum speed/angle	Increase or decrease drum speed. Raise or lower drum angle.
Overspray in the Factory (dusting)	Electrostatics are not turned on	Turn on at the control (see page 17) Conduct SET test (see page 19)
	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.
	Atomisation very fine (misting)	Reduce Atomisation air pressure (see pages 7 & 8)
	Air pressure too high	Turn down Atomisation air & Fan air pressures. (see page 15 – Fig 7)
Operators are getting static electricity shocks	Earthing not connected	Reset the earth wiring and contacts to all equipment.
	Operator not wearing conductive clothing	Purchase conductive foot gear, or conductive operator earthing straps.

SPARE PARTS

ELECTROSTATIC CONTROLLER

Assembly Number : CU 200-124

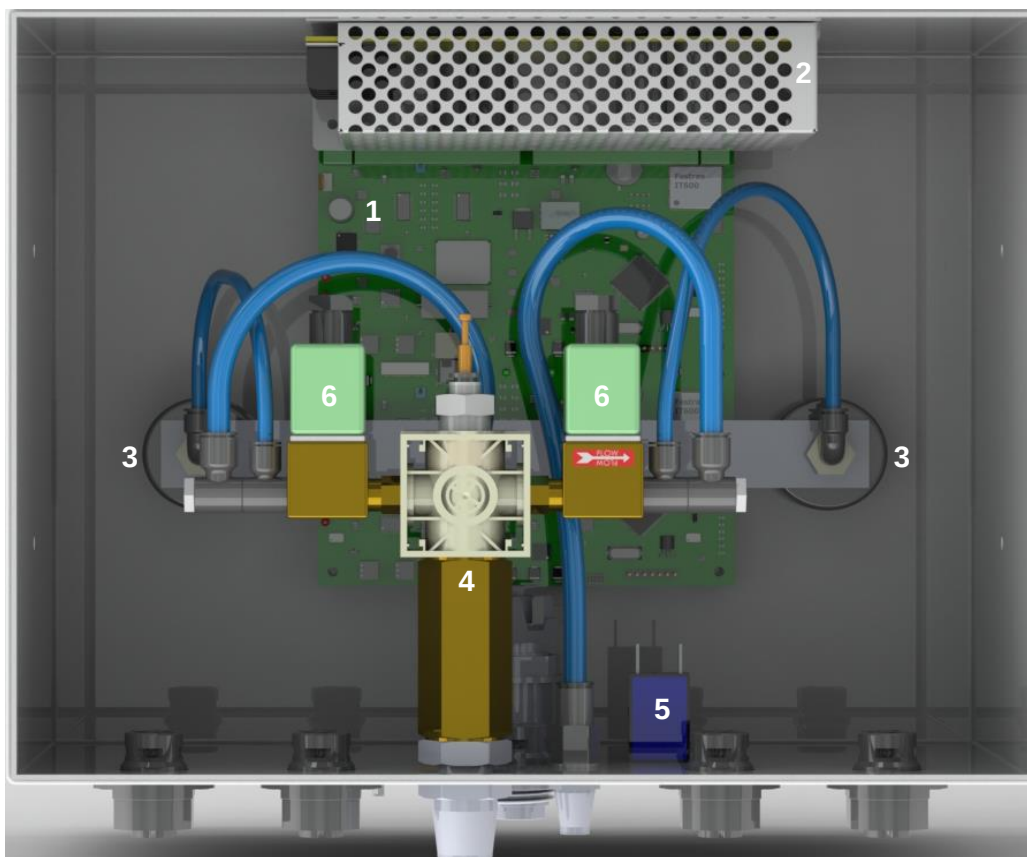


Fig 13

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 – OIL

Assembly Number : OH 200-161

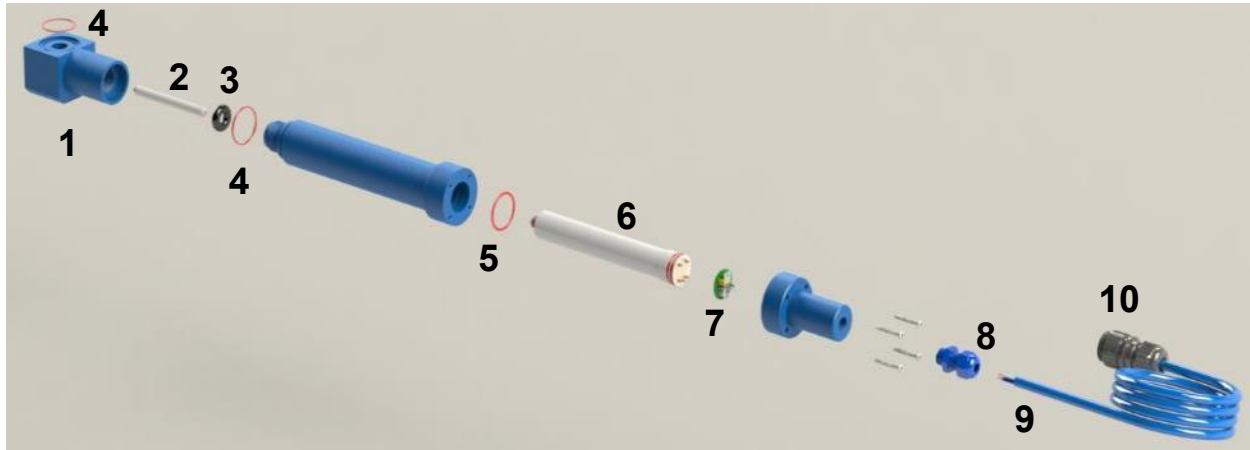


Fig 14

Position	Part Number	Description
1	GH 100-068	Oil Cap
2	GH 100-169	Oil Electrode assy
3	GH 100-074	Black Electrode “O” Ring
4	GH 100-080F	Red Seal “O” Ring (Front) – 2 places
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 – OIL)

Assembly Number : OH 200-128



Fig 15

<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 Oil)	GH 100-169	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

ELECTROSTATIC OIL HEAD – Round Spray (Standard)

Assembly Number : OH 200-132R

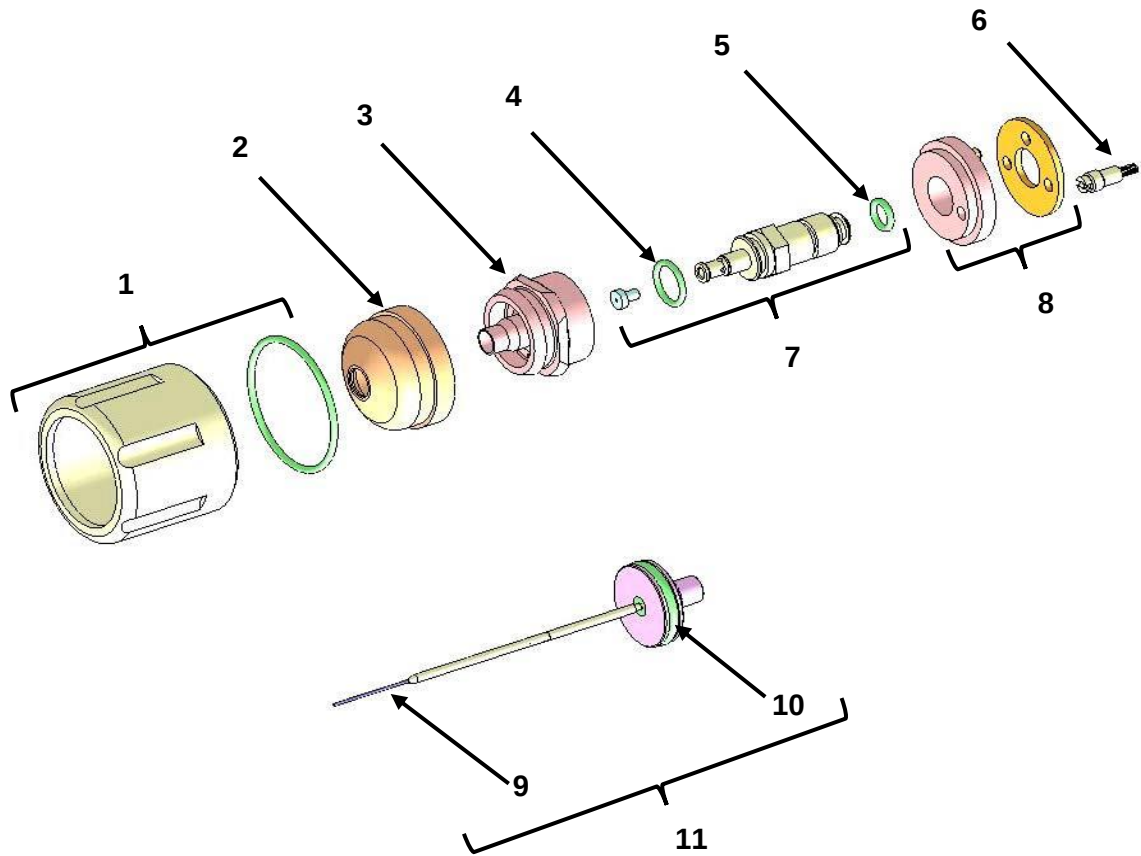


Fig 16

Position	Part Number	Description
1	OH 100-380-K1	Air Cap ring with Seal
2	OH 100-381	Round Spray Air Cap
3	OH 100-382	Round Spray Air Nozzle
4	OH 100-383	O Ring, Front Nozzle
5	OH 100-384	O Ring, Rear Nozzle
6	OH 100-385	Contact Assembly
7	OH 100-386-K1	Round Spray Fluid nozzle c/w seals
8	OH 100-387-K1	Air Cap adaptor
9	OH 100-389-K10	Electrode (pack of 10)
10	OH 100-390-K10	O Ring, Piston (pack of 10)
11	OH 100-391-K1	Complete Needle piston assembly

SPARE PARTS

ELECTROSTATIC OIL HEAD – Body common parts (Standard) Assembly Number : OH 200-132

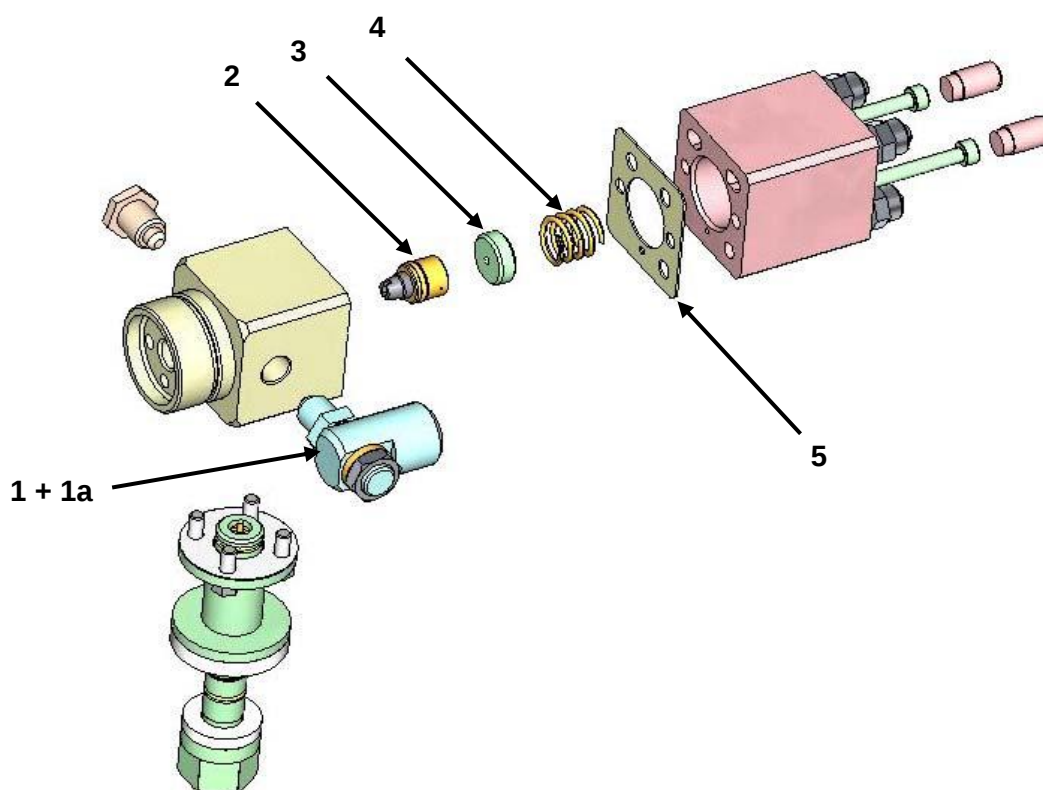


Fig 17

Position	Part Number	Description
1	OH 100-395	Fluid Connector
1a	OH 100-396-K4	Seal (pack of 4)
2	OH 100-397	Cartridge assembly
3	OH 100-398	Screw, locking
4	OH 100-399	Spring, piston
5	OH 100-400-K10	Body gasket (pack of 10)

SPARE PARTS

ELECTROSTATIC OIL HEAD – Flat Spray (Optional set-up)

Assembly Number : OH 200-132F

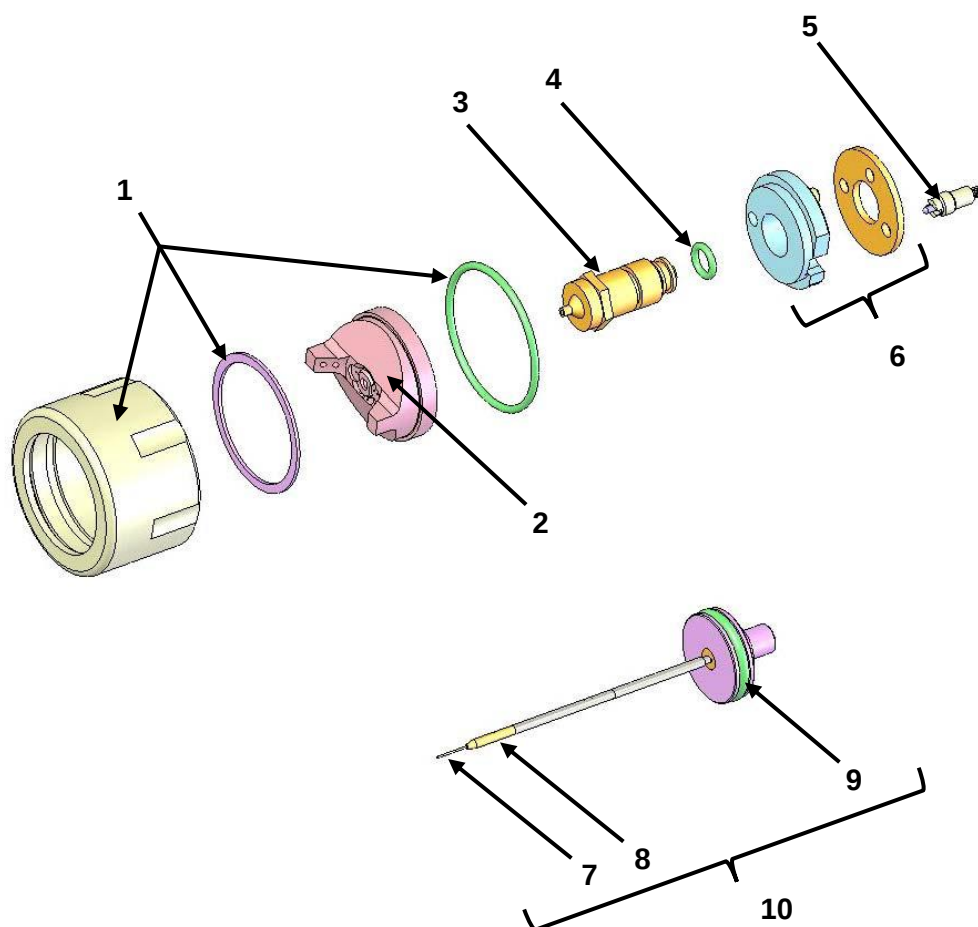


Fig 18

Position	Part Number	Description
1	OH 100-410-K1	Air Cap ring with Seals
2	OH 100-411	Flat Spray Air Cap
3	OH 100-412	Fluid Nozzle (#12) without seal
4	OH 100-413	Seal, nozzle
5	OH 100-414	Contact Assembly
6	OH 100-415-K1	Air Cap adaptor
7	OH 100-416-K10	Electrode (pack of 10)
8	OH 100-417-K10	Needle end (pack of 10)
9	OH 100-418-K10	O Ring, Piston (pack of 10)
10	OH 100-419-K1	Complete Needle piston assembly

SPARE PARTS

PNEUMATIC CONTROL BOX Assembly Number : PB 200 133



Fig 19

Position	Part Number	Description
1	PB 100-341	Flow Regulators
2	PB 100-343	Pressure Gauges
3	PB 100-342	Control Air ON/OFF switch

PNEUMATIC CONTROL BOX - 10mm
PART No. 100-133-10

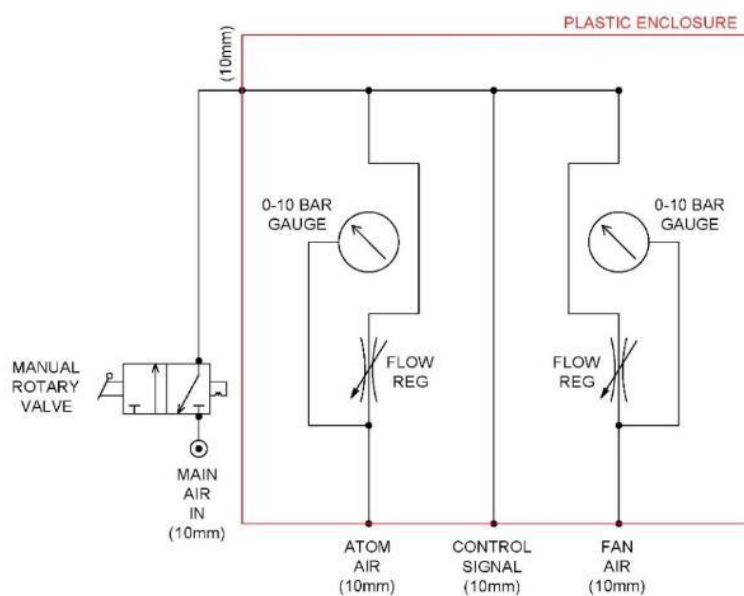


Fig 20

SPARE PARTS

SUPPORT BARS - OIL GENERATOR HEAD

Assembly Number : GH 200-322



Fig 21

Position	Description	Part Number
1	25mm to 30mm Cross Clamp	GH 100-323
2	30mm Head Clamp & Bar Assy (25 x 200)	GH 100-322

Oil Applicator & Generator head not included

FRAME MOUNTING BARS – GENERATOR HEAD

Assembly Number : GH 200-320

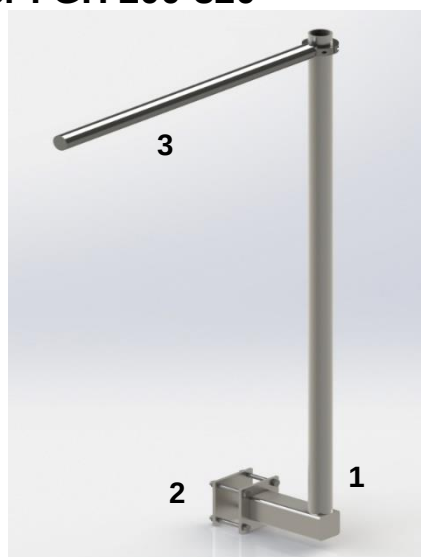


Fig 22

Position	Description	Part Number
1	Main Upright Support bar c/w Clamp plate	GH 100-320
2	Back Plate	GH 100-148
3	Horizontal Cross bar – 30mm x 600mm	GH 100-321

DIMENSIONS

ELECTROSTATIC CONTROLLER

Assembly Number : CU 200-124

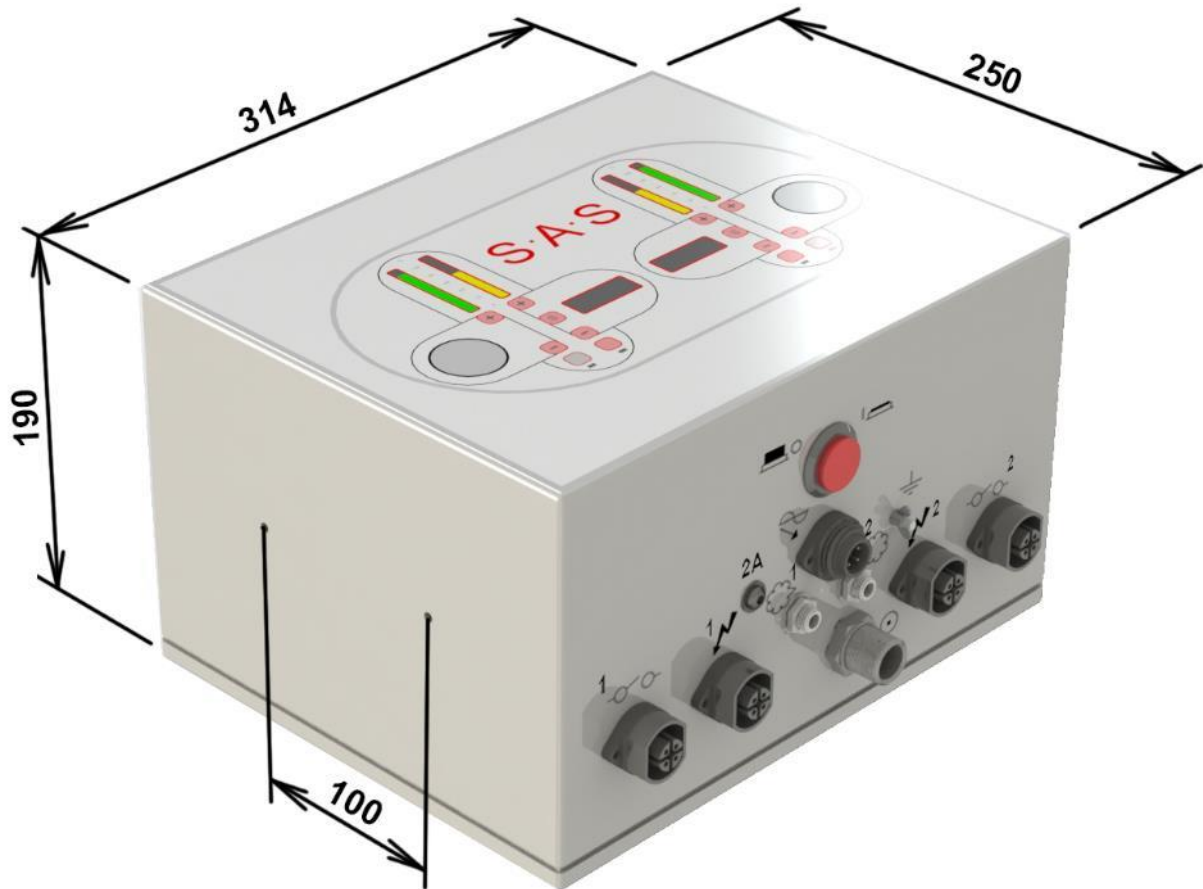


Fig 23

PNEUMATIC SPRAY CONTROL BOX

Assembly Number : PB 200-133

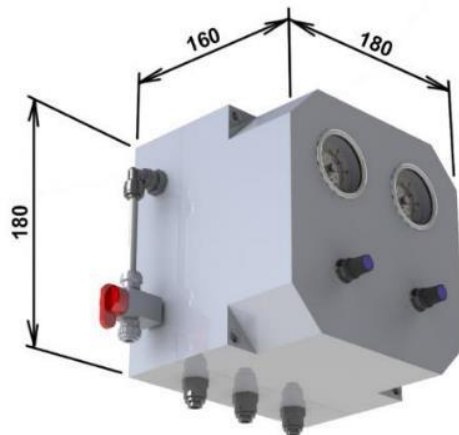


Fig 24

DIMENSIONS

OIL APPLICATOR & GENERATOR HEAD

Assembly Number : OH 200-161 & 132

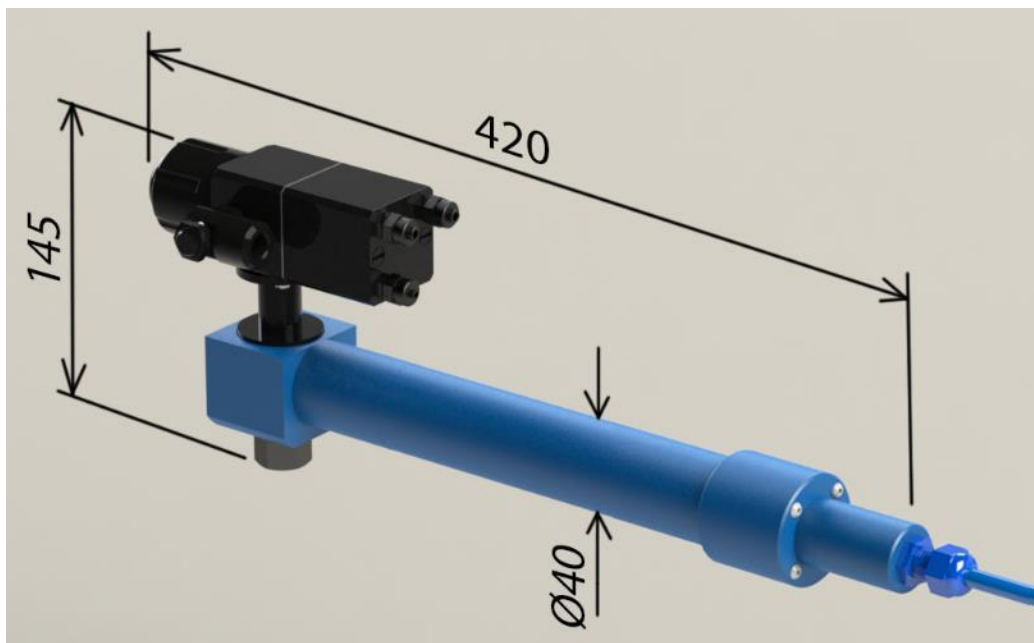


Fig 25

TECHNICAL SPECIFICATIONS

The SAS oil spray uses the principal of a conventional spray which enables it to obtain an excellent coating quality spraying with a flat/cone fan of adjustable width.

An electronic safety device, incorporated into the SAS MK III power supply unit, automatically detects the presence of a grounded object in the vicinity of the OIL spray head. Once this ground approaches within less than 10 cm / 4" this device reduces the high voltage.

ELECTROSTATIC CONTROL UNIT – OIL APPLICATION

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	• Not used for Oil Application... See Pneumatic Spray Control Box
Compressed Air Input connection	
Compressed Air Input Consumption	
Max No. of Applicators	
Atomising Air Output pressure to Atomiser	
Atomising Air Outlet connection to Atomiser	
Regulated Air Output to Atomiser	• 6.80kg
Total Weight	

ELECTROSTATIC GENERATING HEAD

Supply Voltage from Controller	• 3.5 – 13V dc
Supply Current from Controller	• 400mA Max
Output Voltage	• 20-80Kv 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

TECHNICAL SPECIFICATIONS

ELECTROSTATIC OIL APPLICATOR

Atomisation Type	• Pneumatic – Round Swirl nozzle
Spray Pattern size	• 20cm dia @ 25cm target distance
Operating Voltage	• Negative, 20 kV to 80 Kv at gun tip
Number of Electrodes	• 1
Fluid Flow rate	• Max 1 Litre/min. (dependant on viscosity)
Fluid Pressure	• Max 10 bar / 145 psi
Fluid Connection	• 8x6 Clear Poly hose (Food Grade)
Fluid Temperature	• Max 60°C
Air consumption	• 20Nm ³ /h (12 c.f.m.) @ 4 bar (58 psi)
Air Pressure – Atomising Air (A)	• Max 6 bar / 87 psi
Air Pressure – Trigger Air (C)	• Min 4 bar / 58 psi
Connection – Fan Air (E)	• 6x4 Polyurethane
Connection – Atomising Air (A)	• 6x4 Polyurethane
Connection – Trigger Air (C)	• 8x6 Polyurethane
Operating Temperature	• 0°C to 40°C
Gun Construction	• Polyamide, Polyacétal & Stainless steel (Wetted Parts)
Total Weight	• 460g (Gun Only)

PNEUMATIC SPRAY CONTROL BOX

Compressed Air Input Supply	• 8 Bar (114psi) Max / 5 Bar (75 psi) Min
Compressed Air Input connection	• 10mm o/dia. push-in
Compressed Air Consumption	• 20m ³ /hr (12 c.f.m.) per Atomiser
Max No. of Applicators	• 1 Atomiser
Regulated Air Outlets	• Maximum pressure 4 bar (58psi) per Outlet
Regulated Air Outlet connection	• 10mm o/dia. push-in connection (2 Outlet)
Unregulated Air Outlet connection	• 8mm o/dia. push-in connection (1 outlet)
Total Weight	• 1.5Kg

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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