



SAS 1DR – Flavouring Drum

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

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.



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 the associated manual could result in operational difficulties of the equipment and potential to create unsafe conditions.



The removing of the protective equipment and/ or modifying the machine without previous authorization by the manufacturer is strictly forbidden.

- Use only spare parts, accessories or materials that are original or instead item and materials provided by the manufacturer.
- Do not put or approach the hands and/or other objects near the movement blocks in order to avoid crushing risks.
- The installation and even the partial use of the equipment are forbidden to the unauthorized operators.
- It is compulsory the grounding of the metallic box.
- Any use of the equipment different from the intended one is strictly forbidden.
- Read carefully the warning and danger plates on the equipment.
- It is forbidden to remove the warning and danger plates on the equipment.
- It is forbidden to start up the equipment before the installation is declared compliant to the directive 2004/108/EC.
- The installer has to provide the suitable devices for the products that are dangerous and harmful by contact and/or by inhalation, flammable, explosive and dangerous from a bacterial and/or viral point of view. Concerning this part the installer has to set up all the protections in order to avoid damages to things or people if breakings with consequent fall of pieces from the equipment occurs.
- Do not start the machine without having the complete knowledge about the functioning.
- Do not clean, make maintenance, substitute or adjust machine components if the voltage is on.
- The people responsible for the use of the machine have to check and provide the correct use of the equipment according to the requests, the regulations, the laws and the UK & European community Standards.

EC DECLARATION OF CONFORMITY FOR MACHINERY



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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
Unit 3 Hawksworth
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Peter King
Founder

PRODUCT INTRODUCTION

Flavouring Drum Type: SAS 1DR

This coating drum is specifically designed to SAS specifications to provide a superior flavouring system which is both kind to the product and the coating application.

The Non-Breakage design provides a soft tumble action of the raw materials whilst presenting the product for coating of oil and powder, whilst contained within the drum construction.

The highly polished interior surface eliminates any product contamination as experienced with polymer drums and provides an easy clean design. Adjustable rotation speed and tilt allows the customer to control the coating process and production volumes as desired.

We standardise upon four sizes of Flavouring drum dependent upon the product volume and density. Custom made sizes can also be accommodated, please contact the SAS head office for information.



SAS Assembly Number – SAS 1DR-XX-XXX

Description	Flavouring Drum Drum Size	SAS Assembly Number
SAS 1DR-50-100	500 dia x 1000 lg	DR 100-289
SAS 1DR-80-150	800 dia x 1500 lg	DR 100-291
SAS 1DR-80-200	800 dia x 2000 lg	DR 100-286
SAS 1DR-100-200	1000 dia x 2000 lg	DR 100-296

Example : **SAS 1DR-80-150**
Flavouring Drum – 800mm dia. x 1500mm long.
SAS Assembly Number DR 100-291

PRODUCT INTRODUCTION



Fig 1

SAS 1DR – Flavouring Drum overview

Pos.	Description	Assembly Number	Manual Reference
A	Flavouring Drum Assembly	DR 100-XXX	See Page 14 – Fig 4
B	E3 Invertor Drive	E3 100-282	See SAS E3 Manual
C	Earthing Wheel	DR 100-299	See Page 15 – Fig 5

INSTALLATION

1. The SAS flavouring drum comes completely assembled and ready for installation on to the customer's site.
2. Occasionally the drum maybe removed for transportation but is simply reinstalled by hand with the drum guide flange positioned into the guide rollers, where upon it will make contact with the main drive mechanism.
3. Designed with lockable mobile castors, the drum can be positioned within the production line, where upon it is connected to the customers electrical and grounding services.
4. If it is the intension of the customer to remove the drum from the production line for cleaning, then consideration must be given to the electrical and grounding connections so that they are safely and easily disconnected and reconnected between cleaning and maintenance duties.
5. Either side of the drum assembly there are "Drum Stop" button fitted. These are pre-wired into the SAS E3 Invertor control system to stop the drum in the event being activated. Please refer to the SAS E3 Invertor manual for further details.
6. The drum rotation is controlled via the SAS E3 Invertor. Upon the Invertor facia, it is possible to select the rotational speed and direction to suit the application.
7. It is extremely important that the Drum Frame is positively grounded to the customers main building structure (i.e. grounding rod, floor bolt and building steelwork). All ground connections must be regularly checked and confirmed using a megohm meter for a resistance of 1 megohm or less
8. The Electrical mains supply must be fitted with an earth wired to the factory mains earthing system. Never use damaged cables or connectors.
9. 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.
10. Only personnel Trained and Qualified in the operation and service of Electrostatic equipment are permitted to work upon the Application equipment and installation.
11. Any Personnel working within the application area, must wearing conductive footwear. If personnel are required to wear gloves, these must also be conductive.
12. Ensure any Warning signs provided are prominently posted around the application area so all personnel can read and adhere to the safety instructions.



Note! Grounding of the Flavouring Drum is critical to the application efficiency and safety of the operating process.

INSTALLATION

ELECTRICAL CONNECTIONS

(Please refer to the SAS E3 Manual)



The electric connection of the equipment must be performed only by qualified personnel, according to the current directives.



Before connecting the power, please check with a voltmeter that the phase of the line correspond to the one of the equipment. The power needed is written on the identification plate and on the motor plate.

- Check the presence and the functioning of the grounding system in power supply.
- Check that the main switch at the beginning of the equipment power line is in “0” position.
- Check the rotation direction of the motor.
- Always pay attention to the safety requirements.

CONNECTION LOCATION

Single phase supply

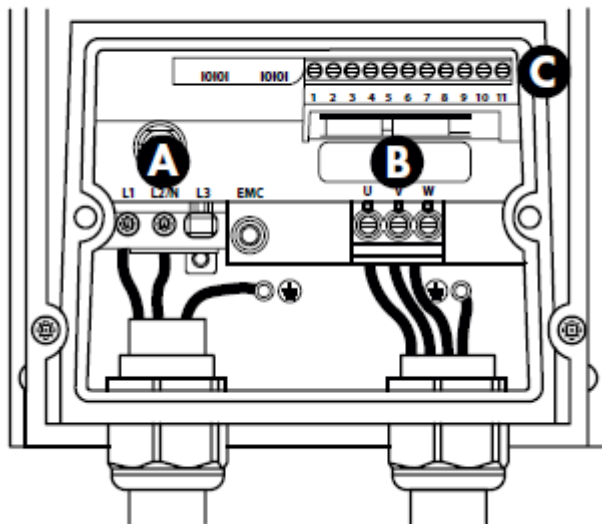


Fig 2

Position	Description	Manual Reference
A	Incoming Power	See E3 Manual Pages 8-9, Fig 5
B	Motor Connections	See E3 Manual Pages 10-13, Fig 6 to Fig 9
C	Control Terminal Connections	See E3 Manual Page 14, Fig 10

INSTALLATION

SAS 1DR - MOTOR CONNECTIONS

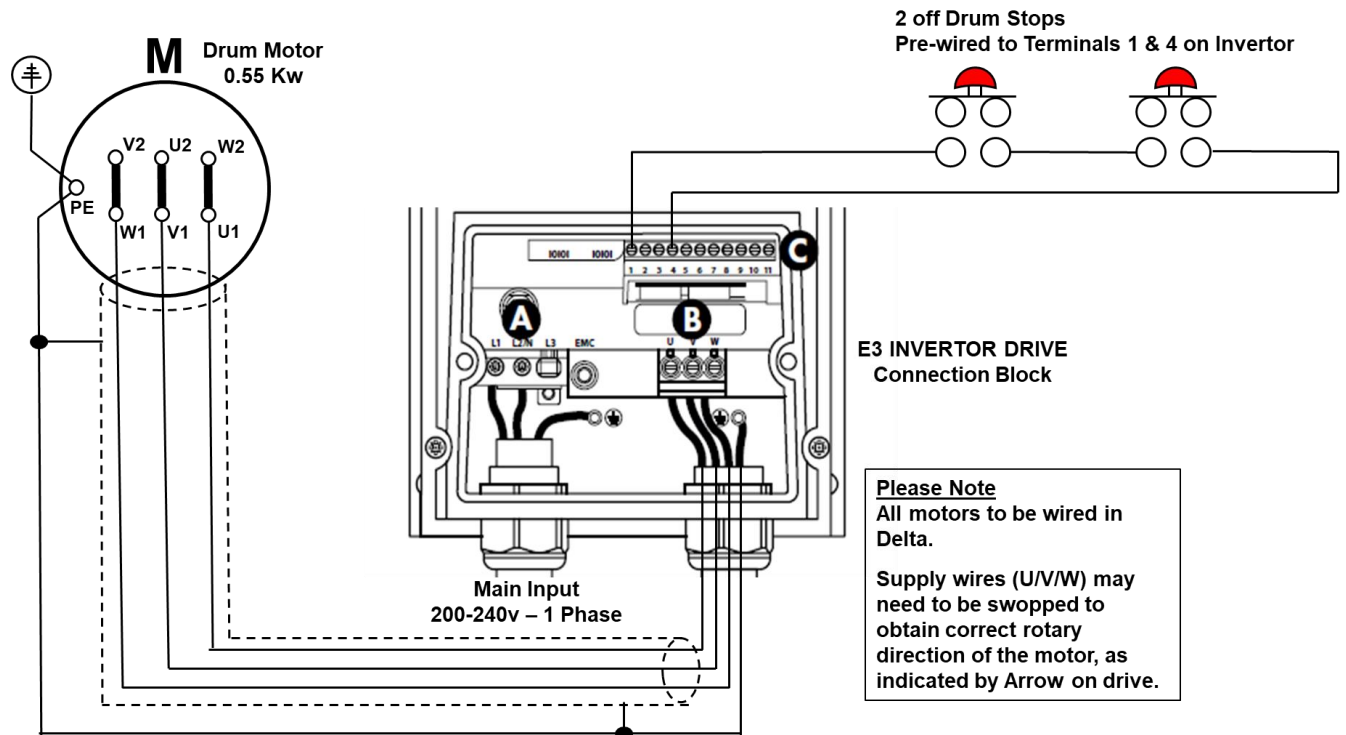


Fig 3

PARAMETER SETTINGS – COATING DRUM

Terminal Mode

- P 12 = 0 (Responds to commands applied directly to the control terminals)
- P 15 = 6 (Allows Forward & Reverse of Drum rotation)



Please Note

If Drum Stop CCT is engaged, the following reset procedure must be followed :-

- Ensure both Drum Stop CCT buttons are reset.
- Select the “OFF” position on the E3 Invertor switch.
- Then select the desired direction of rotation (Forward or Reverse).

OPERATING PRINCIPLE

FLAVOURING DRUM

The 1DR Flavouring Drum had been specifically designed by Spice Application Systems for the food flavouring market.

Utilising our expertise across all types of coating materials and products, our design in combination with our SAS application equipment, provides superior quality coatings which are both efficient and kind to the raw materials being processed.

The specific SAS non-breakage design angled flights within the drum help to disperse and present the product to the application equipment in a soft tumbling action.

Our variable drum rotational speed provides the optimal soft tumble action, and together with the drum Tilt adjustment, the customer has the ability to adapt the process for his specific production requirements.

The Twin skin stainless steel construction of the drum and highly polished interior surface, eliminates any product contamination as often experienced with polymer drums.

The seamless construction and mobile design provides the customer with easy cleaning of the drum either In Situ or off line as required.

START UP

FIRST COMMISSIONING

1. It is advisable to flush the drum with a suitable cleaning fluid following the Cleaning Method advised on page 11.
2. Make sure that the speed and direction of drum rotation is suitable to provide a soft “Tumble” of the product in front of the oil and powder application. It is recommended to keep the rotational speed to a minimum but that which is suitable for the application.
3. The SAS Flavouring drum has two modes of drum rotation. The special SAS designed angled flutes, help to disperse product a wide variation of product shapes with minimal breakage.
 - Forward is considered the optimal direction to provide a soft random tumble of the majority of snack and confectionary products.
 - Reverse is an alternative direction typically used with uniform products which can build or stack upon each other during rotation.
4. The raw material production rate through the drum is set prior to the oil or powder application is switched on.
5. Once the correct tumble of product is achieved with minimal rotation speed, then the drum Tilt angle can be set for the raw material production rate required.
6. Start the drum rotation as instructed in points 2 & 3 above. Introduce a consistent flow of raw product material into the drum at the desired production line speed.
7. Observe the flow of raw material through the drum to ensure product is flowing towards the exit end and not backing up at the entry end or spilling out of the entry aperture.
8. Once there is a full bed of raw material flowing through the drum, collect the raw material being discharged into a container and measure the weight of raw material collected in one minute of production flow. This will provide you with the drum output raw material production rate in kg/min.
9. To adjust the raw material production rate at the drum outlet, increase or decrease the Tilt height adjustment on the two hand wheels at the drum entry end.
10. Now the SAS application equipment can be adjusted to provide the correct quality of oil and powder required for the process.

CLEANING METHOD

WARNING



Switch off and isolate the electrostatic power supply.



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 USE HIGH PRESSURE CLEANING SYSTEMS ON THE APPLICATION EQUIPMENT AND CONTROLS.

CLEANING PROCEDURE

- All application equipment must be turned OFF and any compressed air or fluid delivery systems depressurized.
- It is recommended that the mobile SAS 1SF Screw feeder stand complete with the SAS 1DV Electrostatic Powder applicator be removed from the Drum, where possible. Please refer to the SAS 1DV and SAS 1O applicator manuals for their correct cleaning procedures.
- Firstly, manually empty the drum using a soft brush and/or soft blade non-metal scrapers to remove the bulk of any residue product and coating material.
- Switch the drum ON and set at a low rotation speed. Then spray the internal drum surface with a light grease cutting detergent and apply some hot soapy water into the drum, whilst collecting the outlet spillage in a container at the exit.
- Ensure to clean thoroughly around the internal entry end holding guard where it meets the internal drum flights.
- Hose down the complete system, wash thoroughly and dry completely with low pressure compressed air at 2 bar (29psi)
- Blow dry with compressed air the Drum surfaces, 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 electric 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

ELECTROSTATIC EQUIPMENT FITTED TO DRUM

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 electrical capacity has time to reach ground.
3. **Before disconnecting any equipment hoses, ensure that the system is no longer pressurized, the air is turned off and that the electric supply is also switched off.**
4. Do not soak or immerse the applicator, generator head or any electrical or plastic parts in a solvent. This could result in damage and impair the safety circuits. If necessary, clean any parts with a soft brush soaked in a soapy water solution and then wipe dry immediately.
5. Never leave components of the electrical components immersed in cleaning solution.
6. Always store equipment in a dry place.
7. After any repair and prior to turning on the power supply:
 - a. Ensure the equipment is correctly reinstalled and positioned onto the production line.
 - b. Ensure all Earth wires are in place, positively connected to ground, checked and verified for safe operation. (1 megohm or less to ground)

SERVICE

This Flavouring drum design is generally maintenance free, however periodic checks and maintenance will be required.

Main Drive Assembly and Guide wheels

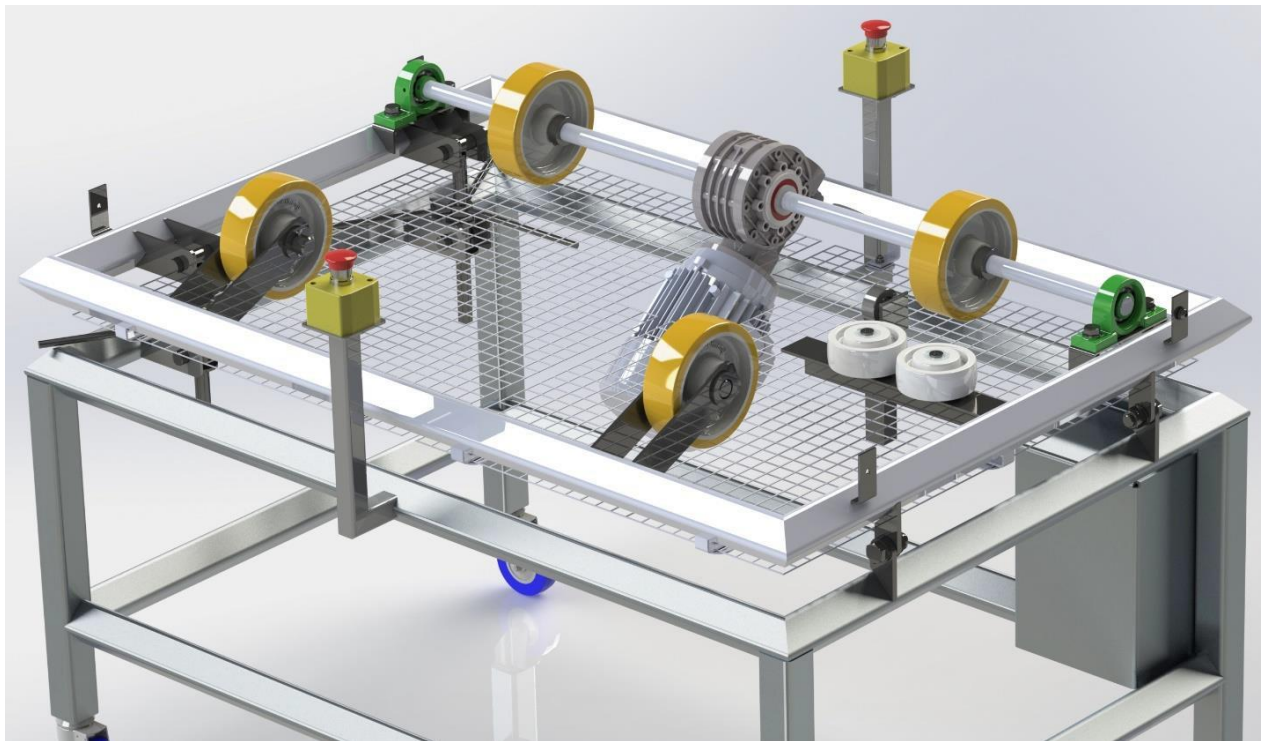


Fig 4

SERVICE

Earthing Wheel

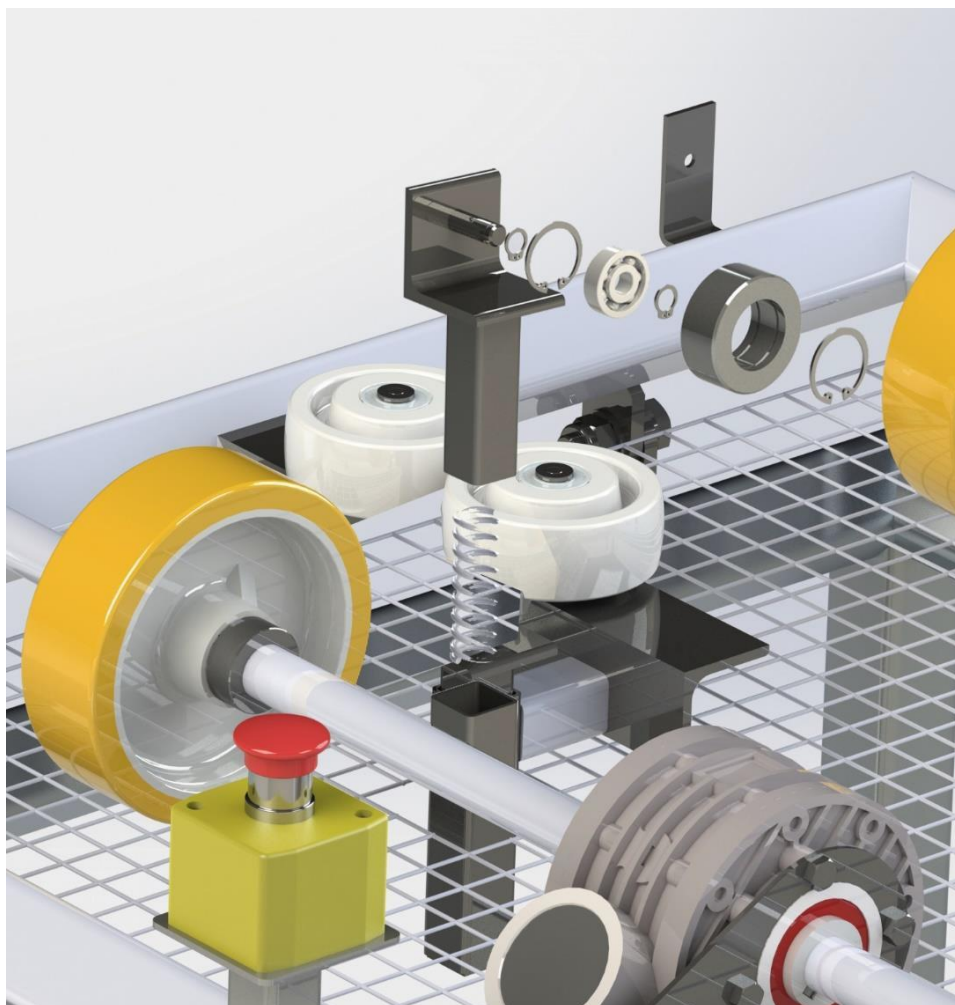


Fig 5

SERVICING ROUTINE

DAILY CHECKS (start of every shift)

1. Check the condition and operation of the Flavouring drum.
2. Check that the drum is rotating correctly and there are no signs of wear on the drive system.
3. Ensure that no parts, hoses or cables of the application equipment are in contact with the rotation surface of the drum which could cause damage to the equipment.
4. Check All electrical cables are in good condition (not worn or crimped) ensuring they are not broken, twisted or knotted and connections are tight.
5. Check All grounding wires are connected to the equipment and support frames including the Vibratory trays and the application systems are connected correctly.

WEEKLY CHECKS (every 7 days)

1. Check the overall working condition of the Flavouring drum system and application equipment.
2. Check the correct resistance to ground of the Coating drum surface to the customers positive ground building connection. This should be checked with a Megaohm Meter and the resistance to ground should measure 1 megohm or less.
3. Check the electrical resistance to ground of All equipment 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 maintain if required, the Drive assembly, Drive and Guide rollers and Earthing wheel assembly for correct operation.

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Drum does not operate	Check electrical mains supply to the E3 Invertor	Check mains supply fuse and connection to the drum controller.
	Check Drum Stop buttons on each side of drum are released (turn anti-clockwise to release)	Inspect the Drum Stop buttons to ensure they have not been depressed. Turn anti-clockwise to release and then turn off the E3 Invertor to reset the system.
	Reset the E3 Invertor drive and inspect for any Error code displayed	To reset the E3 Invertor, switch off at the facia and restart the system. Please refer to the SAS E3 Invertor manual for further instructions.
	Ensure the Drum rotation is selected and the required speed is set on the E3 facia.	Upon the E3 Invertor facia, select the rotation direction (forward or reverse) and increase the speed selection potentiometer.
Not insufficient product flow through the drum system.	Product is not flowing through the drum quick enough.	Set the drum rotation speed to provide sufficient "Tumble" in front of the Oil and Powder applicators, but without causing excessive damage to the product.
	Product is backing up in the drum and spilling out of the Entry aperture	Increase the tilt angle of the drum by manual adjustment of the two height adjustment hand wheels at the entry end of the drum. Conduct a Raw Product weight check at drum outlet (i.e. kg/min of Raw product discharged)
Electrostatic discharge observed from the Drum	Ground connection faulty	Check and verify correct Grounding connection to Drum Assembly (1 megohm or less)
	Earthing Wheel faulty	Inspect Earthing Wheel is in constant contact with the outer drum surface during operation. Maintain roller and spring assembly if required.
Strong or abnormal noise	Faulty drive or guide assembly	Strong or abnormal noise, inspect and repair faulty or worn drive components.

DIMENSIONS

1DR – Flavouring Drum Assembly

SAS Assembly Number: DR 100-**XXX**

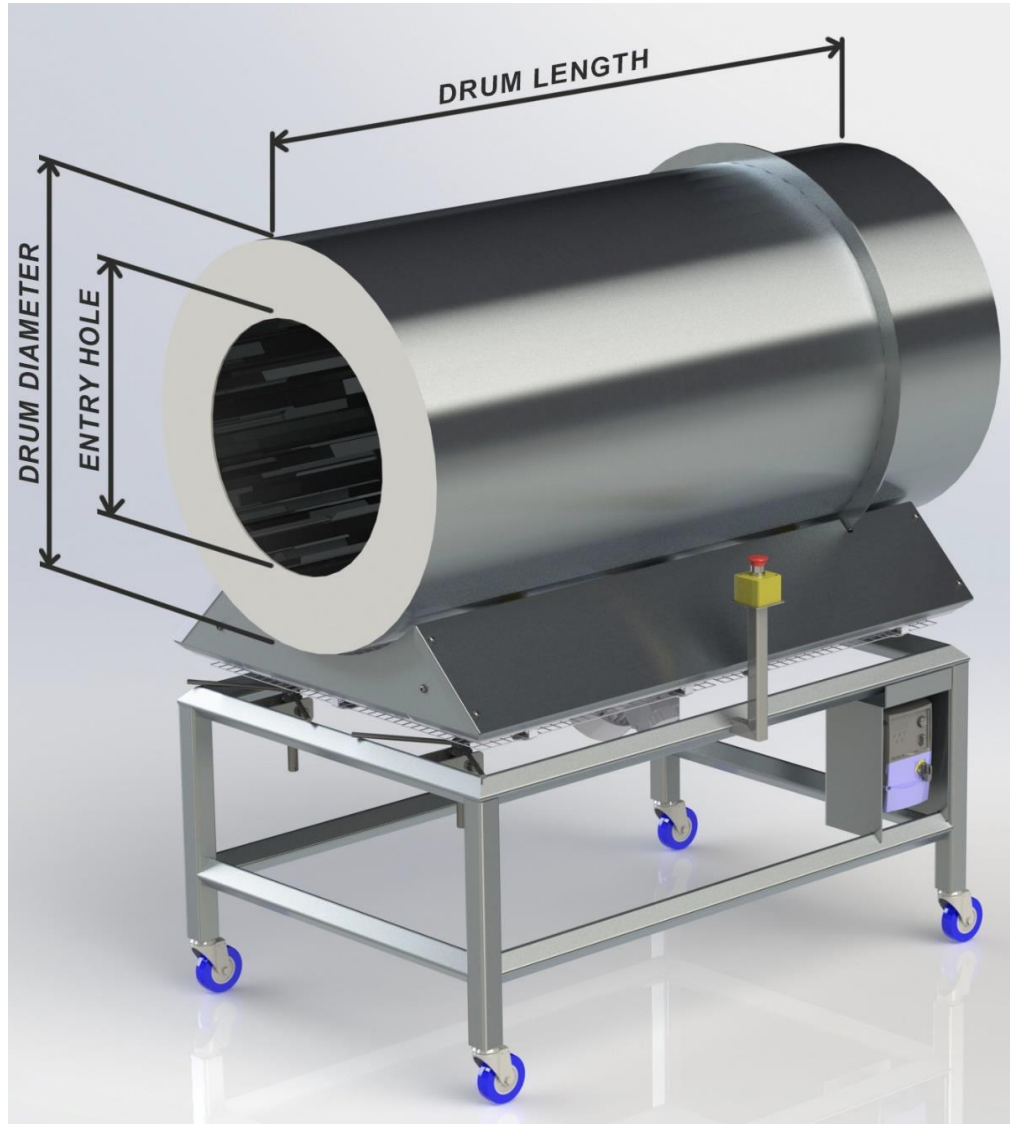


Fig 6

SAS Assy Number		
	Length (mm)	Diameter (mm)
DR 100-286	2000	800
DR 100-289	1000	500
DR 100-290	2000	700
DR 100-291	1500	800
DR 100-295	1500	700
DR 100-296	2000	1000

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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