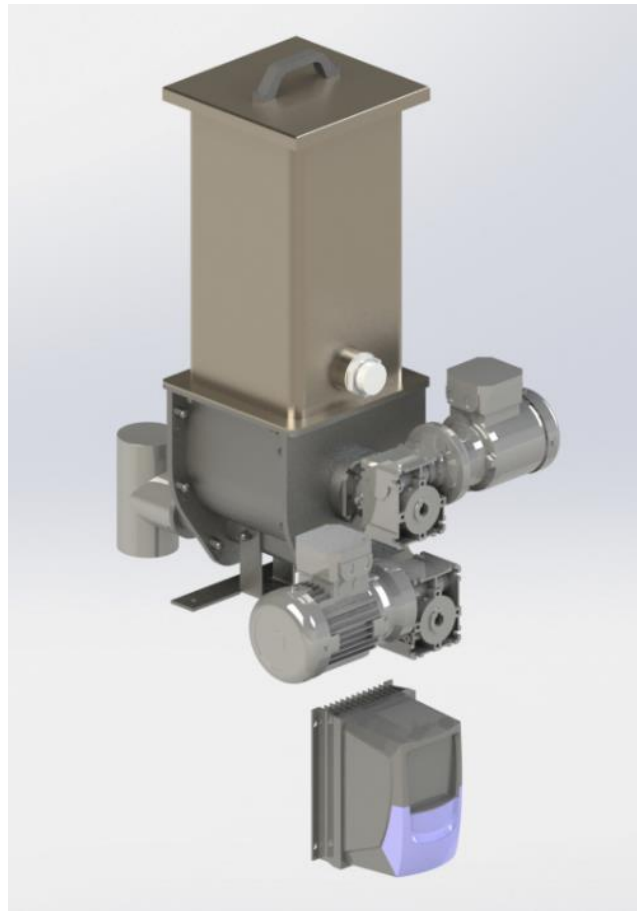




# **SAS 1SF – Twin Screw Feeder INSTRUCTION MANUAL**



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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 this 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 European community Standards.

## WARNINGS OVERVIEW

- Notes for screw feeders assigned at the transport of food, pharmaceutical and zoo-technical products:
  - Periodically clean the screw feeders; the cleaning frequency depends on the type of product processed and on the nature of the system. It must be fixed by the people responsible for the use of the machine.
  - Great attention must be paid to the cleaning of the dispenser body, the dispensing screw, the protections, etc.
  - If it is necessary to clean with other products that are difficult or impossible to list because of their nature, it is necessary that the customer previously informs our technical office.



### **IT IS STRICTLY FORBIDDEN**

the use of the equipment if some anomalies occurs (excessive noise, vibrations, etc).



### **WARNING:**

The failure of the safety standards observance and advices for corrected machine maintenance or the possible tampering of safety standard relieves **Spice Application Systems Ltd** and their suppliers in case of responsibility of fire, damage or plant/line/machine malfunctioning.

## INAPPROPRIATE USE



An inappropriate use of the machine may have serious risks for people and/or the environment as well as causing damages to the equipment itself.

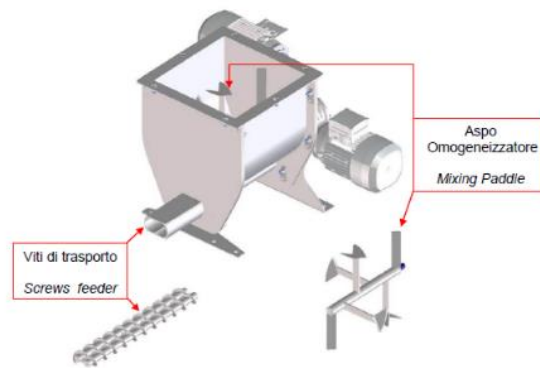
The equipment must be used only for the purposes specifically expected by the manufacturer:

- Do not use the equipment if it's not correctly installed, do not start it up if the engine group is not mechanically fixed to the rest of the machine.
- Do not use the equipment if the rotating part are not intact or perfectly cleaned. In this case the dosing power and the capacity are not guaranteed.
- Do not use the screw feeders with a screw exceeding the length of the exhaust pipe.
- Do not use the equipment as a supporting point even if it is not working. There is the danger to fall or to damage the machine itself.
- Do not work on the electric engine or on any other electric component if the power supply is on, in order to avoid electrocution.
- Do not wash the machine with a water jet. The electric motor is not shielded from dust and water.
- Do not use products that do not have a clear composition, chemically aggressive, flammable or dangerous for the machine or the operator
- Do not operate the machine outside, exposed to weather and sudden changes of temperature.

## WARNINGS OVERVIEW

### IDENTIFICATION OF HAZARDOUS MOVING PARTS

On the machine are present mobile elements potentially harmful. These elements are not reachable during functioning because of their position, because they are behind grids or other system devices. Pay attention to these elements during cleaning and maintenance



(Fig. 2.2.A)

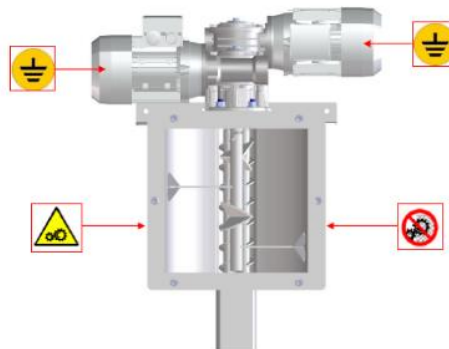
### POSITIONING OF SAFETY SIGNS

During the normal cycle, dangerous mobile elements are not reachable. Operators are trained on possible critical situations and safety sign are positioned on the machine.



#### **WARNING:**

In case that one or more signs are damaged it is necessary to substitute them.



(Fig.2.3.A)

**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



## DICHIARAZIONE CE DI CONFORMITÀ

DICHIARAZIONE DI TIPO A SECONDO L' ALLEGATO II DELLA DIRETTIVA  
MACCHINE 2006/42/CE

CE DECLARATION OF CONFORMITY - CE DECLARATION DE CONFORMITE -  
CE DECLARACION DE CONFORMIDAD - CE KONFORMITÄTSEKTLÄRUNG

### **DEFINITIVE INNOVATION S.R.L.**

DICHIARA CHE LA MACCHINA / DECLARES THAT THE MACHINE / DECLARE QUE LA MACHINE / DECLARA  
QUE LA MAQUINA / FEST, DASS DIE MASCHINE:

|                                                            |                             |
|------------------------------------------------------------|-----------------------------|
| MODELLO / MODEL / MODALE / MODELO / TYP:                   | DRV030D                     |
| DESCRIZIONE / DESCRIPTION / DESCRIPCION /<br>BESCHREIBUNG: | DOSATORE BIVITE VOLUMETRICO |
| MATRICOLA / SERIAL NUMBER                                  |                             |
| NUMERO DE SERIE / MATRÍCULA / KENNUMMER:                   | J126942753                  |

- E' CONFORME ALLE DISPOSIZIONI DELLA DIRETTIVA MACCHINE 2006/42/CE;
- IS IN CONFORMITY TO PROVISIONS OF MACHINES' DIRECTIVE 2006/42/CE;
- EST CONFORME AUX NORMES DE LA DIRECTIVE DES MACHINES 2006/42/CE ;
- ES CONFORME A LAS DISPOSICIONES DE LA DIRECTIVA DE LAS MAQUINAS 2006/42/CE ;
- IST IN ÜBEREINSTIMMUNG MIT DEN NORMEN DER MASCHINEN 2006/42/CE.
- E' CONFORME ALLE DISPOSIZIONI DELLA DIRETTIVA BASSA TENSIONE (DIRETTIVA 2014/35/UE);
- IS IN CONFORMITY TO PROVISIONS OF LOW VOLTAGE DIRECTIVE (DIRECTIVE 2014/35/UE);
- EST CONFORME AUX NORMES DE LA DIRECTIVE BAS VOLTAGE (DIRECTIVE 2014/35/UE) ;
- ES CONFORME A LAS DISPOSICIONES DE LA DIRECTIVA BAJE VOLTAJE (DIRECTIVA 2014/35/UE) ;
- IST IN ÜBEREINSTIMMUNG MIT DEN NORMEN DER RICHTLINIE DER NIEDRIGEN SPANNUNG (RICHTLINIE 2014/35/UE).
- E' CONFORME ALLE DISPOSIZIONI DELLA DIRETTIVA EMC 2014/30/UE;
- IS IN CONFORMITY TO PROVISIONS OF EMC DIRECTIVE 2014/30/UE;
- EST CONFORME AUX NORMES DE LA DIRECTIVE EMC 2014/30/UE;
- ES CONFORME A LAS DISPOSICIONES DE LA DIRECTIVA EMC 2014/30/UE;
- IST IN ÜBEREINSTIMMUNG MIT DEN NORMEN DER RICHTLINIE EMC 2014/30/UE.

E INOLTRE DICHIARA CHE / AND DECLARE MOREOVER THAT / ET EN PLUS DECLARE QUE / Y DECLARE  
TAMBIEN QUE / UND ERKLÄRT AUCH DASS:

- SONO STATE APPLICATE LE SEGUENTI NORME ARMONIZZATE/ THE FOLLOWING HARMONISED NORMS HAVE  
BEEN APPLIED:
- LES SUIVANTES NORMES UNIFIES ONT ETES APPLIQUEES/ LAS SIGUENTES NORMAS UNIFORMADAS HAN  
ESTADOS PONIDOS EN PRACTICA / DIE FOLGENDEN VEREINTEN NORMEN SIND ANGEWENDET:  
EN ISO 12100:2010 - EN 60204 -1 - EN 61439-1 - EN 61439-2
- NOTA: IL SISTEMA COME SOPRA DESCRITTO NON E' COSTITUITO DAL CABLAGGIO DELLE  
UTENZE ELETTRICHE E PNEUMATICHE E DALL' INSTALLAZIONE IN CAMPO DELLE SUDETTE  
APPARECCHIATURE.
- NOTE: IN THE SYSTEM AS ABOVE DESCRIBED CABLING OF ELECTRICAL AND PNEUMATICAL  
SUPPLY AS WELL AS INSTALLATION ON SITE, OF ABOVE-MENTIONED DEVICES, ARE EXCLUDED

PERSONA (FISICA O GIURIDICA) AUTORIZZATA A SOSTITUIRE IL FASCIOLLO TECNICO:  
DEFINITIVE INNOVATION S.R.L.

COGNOME E NOME: FIANDRI STEFANO  
INDIRIZZO: VIA ALLENDE 47  
CITTÀ:

TITOLO: RESPONSABILE LEGALE  
NAZIONE: ITALIA  
CAP: 41122 PROVINCIA: (MO)

FIRMA:

DATA: 10/01/2019 LUOGO: MODENA

## PRODUCT INTRODUCTION

### Twin Screw Feeder Type: SAS 1SF

The SAS 1SF twin screw feeders are designed for the dosing of powder materials.

Equipped with a double extracting screw, they provide a homogeneous material flow, high precision and dosing control together with integrated material agitation provided by an internal paddle.



### SAS Part Number – SAS 1SF-**BBL-CC**

|           | <u>Description</u>                 | <u>Part Number Reference</u> |
|-----------|------------------------------------|------------------------------|
| <b>BB</b> | Product Hopper – 20 Litre          | <b>20L</b>                   |
|           | Product Hopper – 50 Litre          | <b>50L</b>                   |
| <b>CC</b> | Gearbox Ratio (main drive) – 14:1  | <b>14</b>                    |
|           | Gearbox Ratio (main drive) – 21:1  | <b>21</b>                    |
|           | Gearbox Ratio (main drive) – 28:1  | <b>28</b>                    |
|           | Gearbox Ratio (main drive) – 60:1  | <b>60</b>                    |
|           | Gearbox Ratio (main drive) – 100:1 | <b>100</b>                   |

Example Part Number :     **SAS 1SF-20L-60**  
Twin Screw Feeder c/w 20L hopper & 60:1 Gearbox

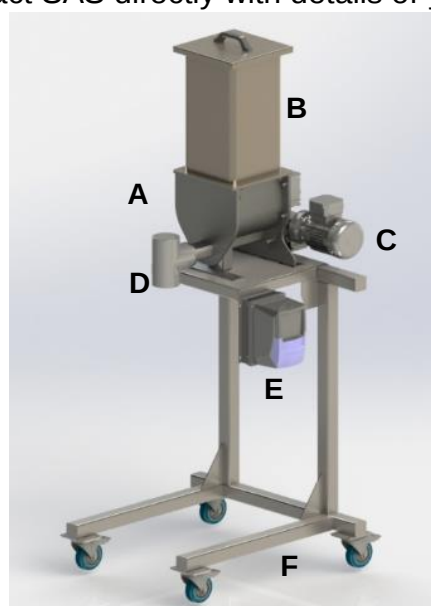
# PRODUCT INTRODUCTION

## TYPICAL POWDER OUTPUT RANGE

| SAS 1SF<br>Twin Screw Feeder |                        | <u>Litres/Hour</u> |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|------------------------------|------------------------|--------------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| Gearbox<br>Ratio             | Twin Screw Set<br>Type | 2                  | 4 | 8 | 10 | 12 | 14 | 16 | 20 | 23 | 28 | 40 | 44 | 48 | 70 | 92 | 140 | 172 | 225 | 255 |
| 100:1                        | EX Single Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC                     |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| 60:1                         | EX Single Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC                     |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| 28:1                         | EX Single Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC                     |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| 21:1                         | EX Single Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC                     |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| 14:1                         | EX Single Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch        |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC                     |                    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |

### Please Note

The above table is for reference only and provides an approximate indication of Powder Throughputs. Please contact SAS directly with details of your powder materials.



**Fig 1**

### SAS 1SF – Twin Screw Feeder Assy overview

| Pos.     | Description                   | Assembly Number | Manual Reference             |
|----------|-------------------------------|-----------------|------------------------------|
| <b>A</b> | Twin Screw Feeder Main Body   | SF 200-138-XXX  | See page 28 – Fig 8          |
| <b>B</b> | Product Hopper Size (2 sizes) | SF 100-1XX      | See page 30 - Fig 10         |
| <b>C</b> | Motor/Gearbox Ratio (4 sizes) | ---             | See Table above on page 7    |
| <b>D</b> | Twin Screw Set (3 sizes)      | SF 100-14X      | See page 29 - Fig 9          |
| <b>E</b> | Invertor Control – E3         | 100-177         | See separate Invertor Manual |
| <b>F</b> | Mounting Stand - Mobile       | SF 200-292      | See page 30 – Fig 11         |

# INSTALLATION

During the installation there are combined actions of several operators, thus is necessary work with great caution.

Verify the integrity of the machine, particularly of the fan covers over the electric motors that can be damaged during transport.

If the fan covers are dented blocking the fan rotation, restore or replace them before commissioning the machine.

When the screw feeder is provided without vertical unload and endless screw, with length of the screw exceeding the one of the exhaust pipe because of a customer request for installation needs, the customer is in charge of performing a risk analysis and of mounting proper protections and/or repairs.

The operations performing the installation must have a technical grounding and proper knowledge to operate with adequate expertise.

The user must have an installation area that satisfies the current regulations on health and safety on production environments.

Set up an area where install the machine verifying that the floor is flattened and without obstacles.

Make room around the machine sufficiently to permit safety and ergonomics to the operators and to the fitters. Safety distances from other machines or production areas must be observed according to the current regulations.

The installation and working area must be correctly lit up, defined and signalled. It must respect the law parameters concerning working areas.

The working area must be forbidden to personnel not involved in the machine operation. If this is not possible, barriers or similar means not hindering the production must be installed



**WARNING:** The set-up of the machine is usually performed by the manufacturer who knows the right methods to do it. In case that the set up cannot be performed by the manufacturer, the customer has to ask the manufacturer all the information in order to perform it correctly by himself.

# INSTALLATION

## ACCIDENT PREVENTION WARNINGS

- Wear the suitable prevention equipment for the operation that has to be carried on. The clothing must be tight fitting to the body. Avoid wearing ties, necklaces or belts that could go in the movement parts.
- Do not remove the safety devices or the accident prevention protections.
- Do not turn on or misadjust the control points or the tools on the equipment without authorization or without knowing the functioning.
- Every technical change that can have repercussion on the functioning or the safety of the equipment must be performed only by technicians of the manufacturer or by technicians authorized by him.



**WARNING:** A good installation gives more steadiness to the machine and avoids vibrations and noise.



**WARNING:** Spice Application Systems Ltd declines every responsibility coming from the not fulfilment of the above mentioned instructions.

## TRANSPORTATION AND RECEIPT OF GOODS

- Check that during the transport any damage to the structure or internal parts of the equipment has not occurred.
- Any damage must be immediately signalled on the packing note. The driver must accept the complaint and leave one copy for you.
- For any contact with our technical assistance please always quote the part number and the manufacturing year.
- Damages verified after unpacking must be notified within 7 working days.

## ELECTRICAL CONNECTIONS

**(Please refer to separate Invertor Manual)**



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

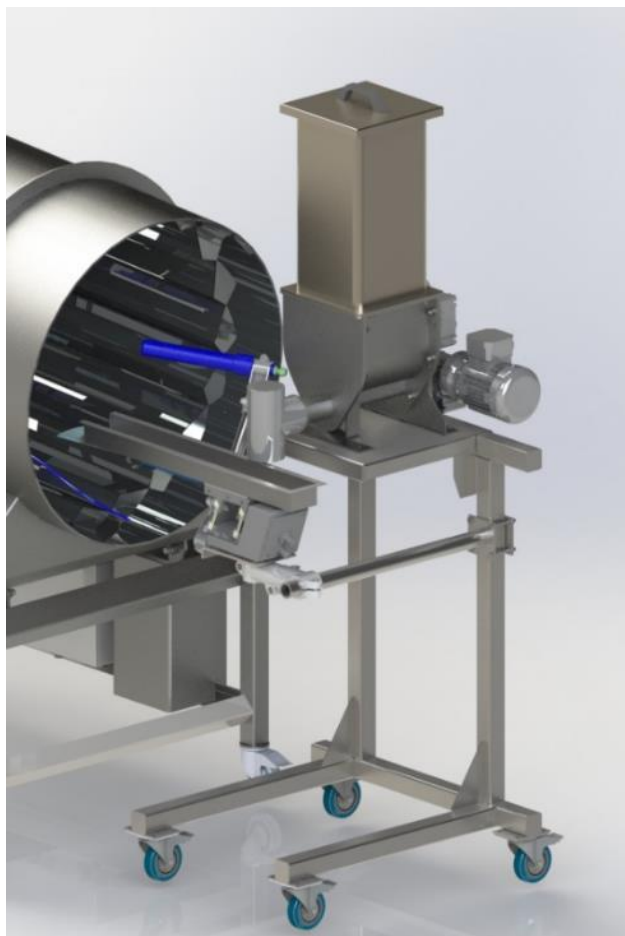


Before connecting the power, please check with a voltmeter that the phase of the line correspond to the one of the equipment. The power needed is written on the identification plate and on the engine plate.

- 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 engine.
- Always pay attention to the safety requirements.

## INSTALLATION

Typical Installation with SAS 1DV system & SAS Coating Drum



**Fig 2**

# OPERATING PRINCIPLE

## TWIN SCREW FEEDER

The D series screw feeders are equipped with a double extracting screw, they guarantee a homogeneous material flow, high precision and dosing regularity thanks also to the screws that are machine made for a perfect coupling.

The D series twin screw feeders are designed for the dosing of powdered material and synthetic fibres. They are available both on volumetric and gravimetric version with an electronic loading cell weighting system that guarantees high precision and reliability. They are used in their different configurations in all industrial fields, from concrete to chemistry, from food to pharmaceutical industry.

The different configurations make them suitable for the use of materials that have very different granulometry and fluency.

They are available also in configuration for ATEX areas.

A screw feeder makes the function to unload a theoretically constant material quantity on each turn. This behaviour allows to make a specific load both on the granulometric and volumetric version. It is expressed in  $\text{dm}^3/\text{h}$  and the value is determined by the following factors:

- Dosing screw rotating speed.
- Dosing screw pitch and diameter length.
- Used product specific weight.

The machine is given with dosage members suitable to guarantee the required capacities in connection with the material characteristic, as written in the specifications transmitted by the manufacturer.

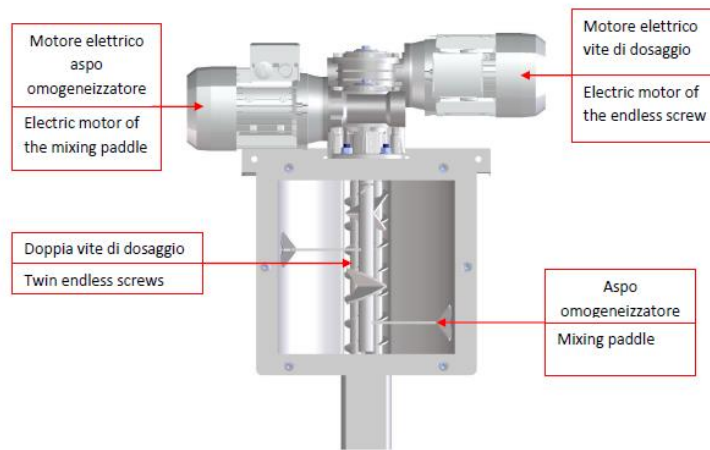
The machine dimensions are based on tables obtained by the manufacturer expertise. For this reason, potential differences of behaviour due to the specific material to be processed and due to the specific environment cannot be discovered before the test.

In any case, if it is necessary to change some part of the system to change the capacity or to process different materials from the ones foreseen, consult the manufacturer.

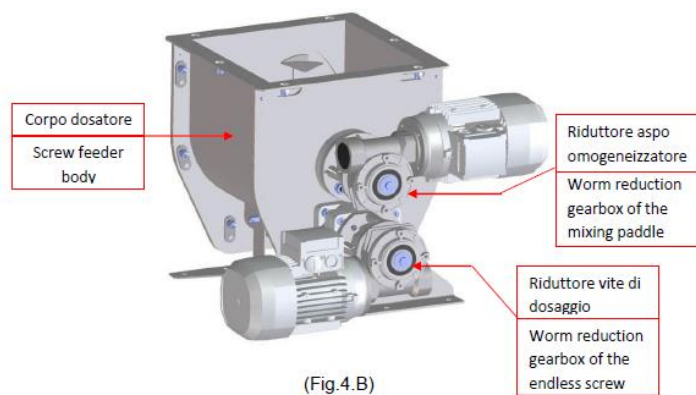
The D-series twin screw feeder is provided completely assembled in one piece with different dimensions composed by:

- Hopper
- 2 three-phase induction motors; (Fig.4.A)
- 2 worm reduction gearboxes; (Fig.4.B)
- A screw feeder body made of stainless steel for containing the material; (Fig.4.B)
- A mixing paddle chosen between different models to mix the material inside the screw feeder body (Fig.4.B)
- Two endless screws for the transport of the material (Fig.4.B)

## OPERATING PRINCIPLE



(Fig.4.A)



(Fig.4.B)

# START UP

## TWIN SCREW FEEDER

- Check that during the transport any damage to the structure or internal parts of the equipment has not occurred.
- Check that the power supplied is compliant to the machine one.
- Check the presence and integrity of the danger and warning signs.
- Check if water or external substances have entered the screw conveyor. If so take away the cover, clean the equipment and reassemble.
- Strictly avoid every flexion of the screw feeder, controlling the perfect alignment between inlet and outlet ports, or the endless screw can be damaged.
- Check the rotation direction of the screw. If it is not correct invert the connection on the engine.
- Check the right level of the oil in the motor gear.
- Check that the warning signs on the machine is in good conditions.
- Check the correct machine fastening and its stability.
- Check the correct functioning of the auxiliary equipment.
- Check the integrity and correct functioning of all guards and protective devices. The transport or the installation might damage or misadjust them.
- Check the working temperature of the different components: they do not have to overheat.
- The first start up test must be done with the empty screw conveyor for about thirty minutes, if any noise, vibrations or other things that may suggest a bad functioning don't occur then the loading with other material can be done.
- After the first 12 hours of the working cycle check the tightness of the bolts.



It is absolutely forbidden to work inside the feeder while it is functioning. It is absolutely forbidden to open the inlet and outlet ports and the covers with the electrical power On.



**WARNING:** It is absolutely forbidden to take off the safety guards during the equipment functioning.

Remove the safety guards only after switching off the power supply. This operation is allowed only to technical qualified personnel.



**WARNING:** it is compulsory to isolate any energy supply of the line anytime the maintenance and adjusting operations are performed.

Before starting the equipment, by turning the main switch on the ON position, it is necessary to:



Nobody is nearby the equipment.

- The safety devices are present and functioning.
- The safety guards are completely closed.

# CLEANING METHOD

## CLEANING OF THE SCREW FEEDER

With the machine turned off and disconnected from the power line, use a dry and clean cloth to clean the exterior of the machine, if necessary soaked with a suitable non-toxic and non-abrasive detergent.



**Do not wash the machine with a high pressure water jet around the electric motor.**

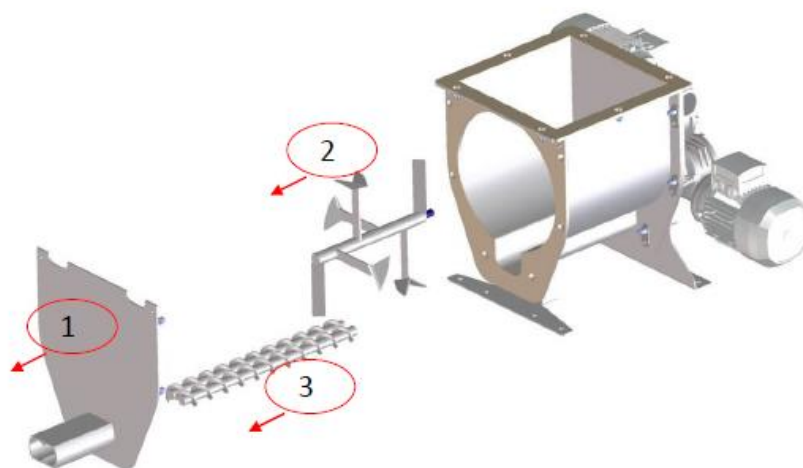
For the body cleaning, once it has been disassembled, it is possible to use water because no electric components exposed are present and the materials allow this method.

The modular assembling of the machine permits an easy disassembling, easing the cleaning and sanitizing procedures during a change of processed product.

Particularly, the motor group has no connection with the gears present on the screw feeder body.

Disassemble the machine following the operations listed below:

1. Unwire the machine from the power line
2. Release the hopper from the screw feeder body loosening the nuts positioned under the flange and rotating toward the outside the fixing hooks
3. Take the frontal of the screw feeder body off after loosening the locks (knobs or nuts) using the suitable tools and, if they are present, loosening the grub screws of the guide bearing present in the mixing paddle (Fig. 7.2.1.A).
4. Loosen the break-bridge agitating paddle always clockwise and take it off from the screw feeder body (Fig. 7.2.1.A)
5. Loosen the endless screws always clockwise and take them off from the screw feeder body (Fig. 7.2.1.A).

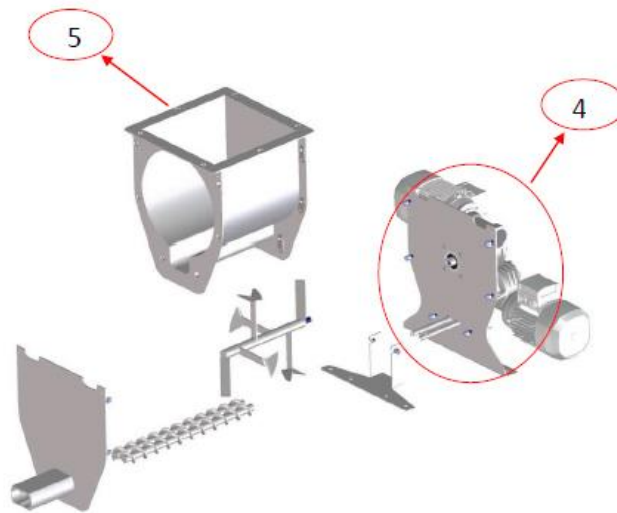


(Fig. 7.2.1.A)

## CLEANING METHOD

6. Loosen the locks (knobs or nuts) from the back plate of the motors using proper tools (Fig. 7.2.1.B).
7. Take the screw feeder body off from the motors and from the frontal holding (Fig. 7.2.1.B)

To re-assemble the components follows the procedure listed above in reverse order. Not following this procedure can cause problems and void the warranty on the machine and on the components.



(Fig. 7.2.1.B)

### 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 equipment must be OFF position before starting cleaning operation.
- Wait for 10 seconds before entering the spray area.
- Wash thoroughly and dry completely with low pressure compressed air at 2 bar (29psi)
- Wipe dry the equipment, plus all hoses and cables carefully and thoroughly, before commencing production.



**THIS IS VERY IMPORTANT.**

**IF NOT DRY IT CAN LEAD TO MATERIAL BUILD UP ON THE EQUIPMENT.**

### **Before switching the electrostatic back ON, please check:**

1. Check that the equipment 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.

- Maintenance procedures have to be well understood before the machine start up in order to avoid accidents.
- Unauthorized personnel is not allowed in the working area.
- People who are not trained for the use or the maintenance are not allowed to use the machine.
- Keep the working area, clean, dry and clear from materials.
- Do not perform any operation while the machine is working.
- Before performing any operation on the machine, put the sign “machine in maintenance” on the control panel.
- During maintenance or repairing operations the unauthorized personnel must keep out of the area.
- The deactivation of the protection and safety devices must be performed only by authorized operators and only for maintenance reasons. The operator will guarantee the safety of the personnel and will avoid any damage to the equipment as well as turning on again the safety and protection devices after the maintenance has been completed.
- The maintenance operations need a suitable equipped workshop.
- The spare parts must always correspond to the technical requests of the manufacturer, this can be guaranteed by using original spare parts.
- It is forbidden to turn on or misadjust the checking parts or tools on the machine without authorization or without knowing the exact functioning.
- Keep all the components in good conditions and installed in the right way.
- Immediately repair any breakdown/failure.
- Repair and substitute all the damaged or torn components.
- Take note of any anomaly and report them to the maintenance supervisor.
- Use working tools with double insulation and low safety voltage (SELV) or external power (battery).
- Do not impede the transit with power cables.
- Do not touch warm or sharp parts on the machine.
- Put one fire extinguisher near the working area.
- The maintenance technicians who work on the electric panel must have a proper training in order to have the acknowledgement of expert person (PES) or informed person (PAV) according to law CEI EN 50110 and CEI 11-27. The law CEI 11-27 is about the training of technicians who work on electric panel with voltage not above 1000 volt in AC and 1500 in DC and it identifies the involved people and their training.
- The electric maintenance cannot be performed by untrained personnel.

## SERVICING OVERVIEW

- Before beginning the maintenance operations clean the working area and take away all the objects that can be dangerous.
- Light adequately the working area with portable safety lamps.
- The maintenance technicians have to be adequately trained and well skilled about the maintenance process.
- The machine user is responsible for the training level of the maintenance technicians according to the requirements of this manual.
- Wear the suitable protection devices for the operations that have to be performed. The clothes must be tight to the body and resistant to the cleaning products. Avoid wearing ties, necklaces, belts or anything else that can entangle into the moving parts of the machine.
- Operators under alcohol or drugs effects cannot be authorized to use the machine or to perform any maintenance operation.
- Every maintenance or repairing operation must be carried out by trained operators or personnel that have the necessary physical and intellectual requirements.
- Maintenance and repairing operations must be carried out under the supervision of only one person.
- At the end of the maintenance/repairing operations the machine must be started up only after the OK of the supervisor who has to check that:
  - the work has been performed correctly.
  - the machine works perfectly.
  - the safety systems are working.
  - nobody is working on the machine.
- The manufacturer is not responsible if the maintenance is not performed following the directions on this manual. The manufacturer is not responsible for any damage to people/things that come from a wrong or incomplete maintenance.
- If the user requires it the manufacturer can provide qualified personnel for the machine maintenance according to the current conditions.
- Before starting the machine, make sure that there are not any external things (keys, screw, screwdrivers etc.) on the machine and that the adjusted or replaced parts are firmly fixed.
- Check that on the floor there is no oil, grease or anything else that can make operators fall or slip in the working area.
- If there is more than one operator working on the maintenance ,it is necessary to warn them all before turning on the machine.



**WARNING:** Do not move by hands the mechanic parts of the machine. If the Power is on, there can be dangerous movements for the operator safety.

## SERVICING OVERVIEW



It is absolutely forbidden to work inside the feeder while it is functioning.  
It is absolutely forbidden to open the inlet and outlet ports and the covers with the general power switch of the machine in “I” closed position.



**WARNING:** It is absolutely forbidden to take off the safety guards during the equipment functioning.

Remove the safety guards only after switching off the power supply.  
This operation is allowed only to technical qualified personnel.



**WARNING:** it is compulsory to isolate any energy supply of the line anytime the maintenance and adjusting operations are performed.



It is absolutely forbidden to work inside the feeder while it is functioning.  
It is absolutely forbidden to open the inlet and outlet ports and the covers with the electrical power On.



**WARNING:** It is absolutely forbidden to take off the safety guards during the equipment functioning.

Remove the safety guards only after switching off the power supply.  
This operation is allowed only to technical qualified personnel.



**WARNING:** it is compulsory to isolate any energy supply of the line anytime the maintenance and adjusting operations are performed.

Before starting the equipment, by turning the main switch on the ON position, it is necessary to:



Nobody is nearby the equipment.

- The safety devices are present and functioning.
- The safety guards are completely closed.

Every operation has its own potential risks and dangers. Before starting any operation carefully read the manual.



The above mentioned maintenance operations have to be performed by qualified personnel.



To assure a perfect functioning of the machine it is necessary to perform a general check every 24 hours.

## SERVICING OVERVIEW



**WARNING:** check periodically all the components that wear with the time.



**WARNING:** check regularly the electrical, electronic devices.

Following, the deadlines of the periodic maintenance operations will be indicated.  
Every 2 years:

- Replace every component subject to wear.

The frequency of the above mentioned operations depends on the equipment type of use and the working conditions (transported material, working environment etc..).

For onerous environments and/or transported material that are dusty or sandy (for this reason highly wearing) it is suggested to increase the frequency of the operations.

For any questions about specific use of the machine please contact our technical office.

Extraordinary maintenance refers to repair and replacement operations of one or more machine Key components that are necessary only after a long time, and it doesn't change the technical characteristics of the machine. The extraordinary maintenance must be performed by the manufacturer or by qualified personnel.



**WARNING:** in any case all changes and updates must be discussed and agreed with the original manufacturer, and every project that modifies the original one dispense the manufacturer from any responsibilities about damages to people or things.



**WARNING: Spice Application Systems Ltd** declines every responsibility coming from the non-fulfilment of the above mentioned instructions

All the operations that have to be performed that are indispensable for keeping the optimal efficiency of the machine.

## SERVICE ROUTINE

### DAILY CHECKS (start of every shift)

Every day before starting and stopping the machine:

- Verify the presence and the integrity of the protections
- Visually check mechanical moving parts of the unit are moving freely and no signs of damage.
- Listen for any unusual noise from the mechanical moving parts of the unit.
- Clean the machine (refer to section in manual on Cleaning Procedure)

Should any damage and unusual noises be observed, switch off the operation of the unit and report to the Maintenance department immediately.



Use always the proper protective devices for the machine cleaning.



It is not allowed the use of acids, solvents, detergents, corrosive liquids and abrasive materials for the machine cleaning.



It is not allowed the use of water jets directly on terminals, electric panels or junction boxes.

### WEEKLY CHECKS (every 7 days)

- Check all mechanical and electrical components of the machine for correct operation.
- Ensure the complete unit is stripped down and thoroughly cleaned in line with the Cleaning Procedure of this manual (refer to section in manual on Cleaning Procedure)
- Check the Powder Flow Rate at the output from the Twin Screw feeder. Conduct a flow volume test.
- 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)

- Check and replace if required, all Key components of the Screw feeder.

## KEY COMPONENT REPLACEMENT

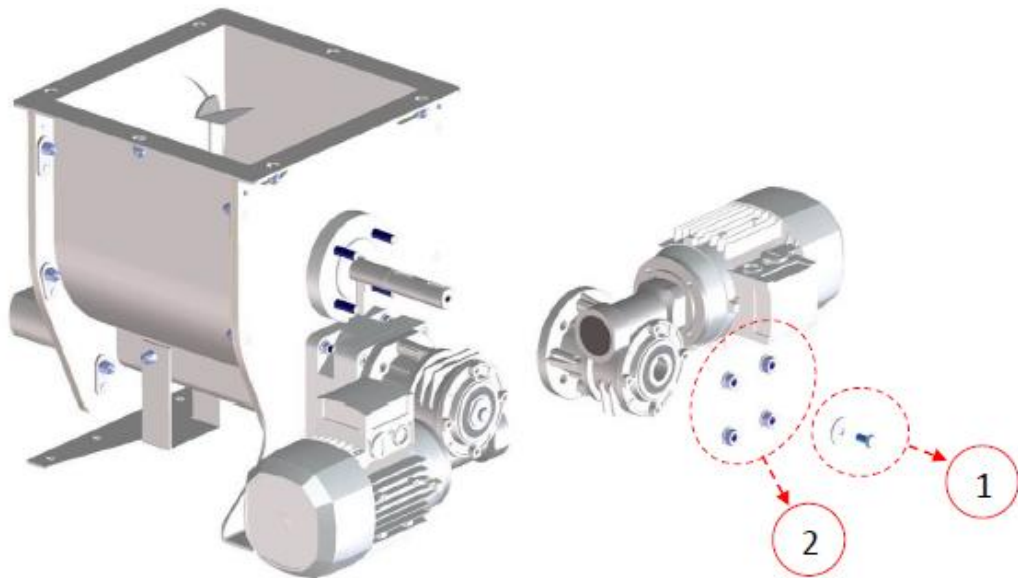
### GEAR REDUCER REPLACEMENT

To replace the gear reducer perform the following actions:

1. Loosen the central fastening screw (Fig. 7.4.1.A)
2. Loosen the shaft screws of the gear reducer from the housing (Fig. 7.4.1.A)
3. Take the gear reducer off and replace it with the new one.

Follow the procedure in reverse order to assemble the new gear reducer

1. Screw in the shaft screws of the gear reducer in the housing (Fig. 7.4.1.A)
2. Locate and screw in the fastening screw (Fig. 7.4.1.A)



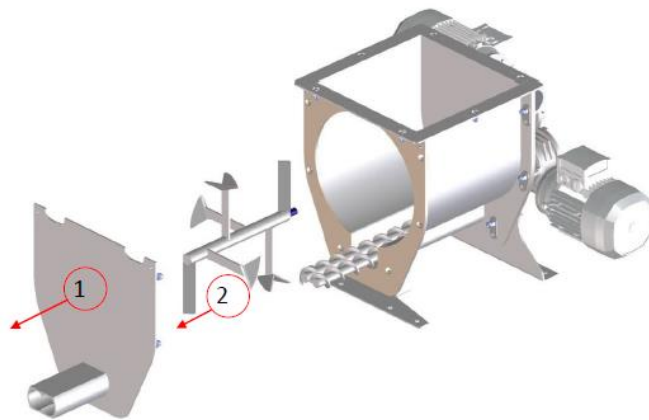
(Fig. 7.4.1.A)

# KEY COMPONENT REPLACEMENT

## MIXING PADDLE REPLACEMENT

To replace the mixing paddle perform the following actions:

1. Take the frontal part of the screw feeder body off after loosening the locks (knobs or nuts), using proper tools. If they are present, loosen the grub screws of the guide bearing present in the mixing paddle (Fig. 7.4.2.A)
2. Loosen the break-bridge agitating paddle always clockwise (Fig. 7.4.2.A)

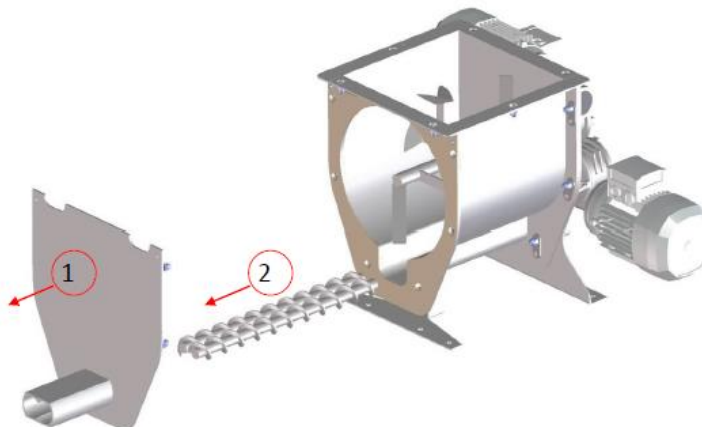


(Fig. 7.4.2.A)

## ENDLESS SCREW REPLACEMENT

To replace the endless screws perform the following actions:

1. Take the frontal part of the screw feeder body off after loosening the locks (knobs or nuts), using proper tools. If they are present, loosen the grub screws of the guide bearing present in the mixing paddle (Fig. 7.4.3.A)
2. Loosen the endless screws always clockwise (Fig. 7.4.3.A)



(Fig. 7.4.3.A)

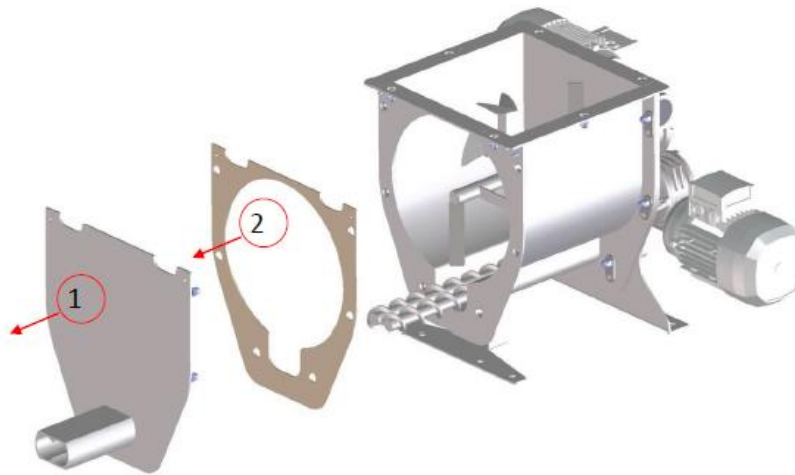
# KEY COMPONENT REPLACEMENT

## GASKET REPLACEMENT

Gaskets made of NBR are placed between the screw feeder body and the hopper on top, between the screw feeder body and the frontal part and between the screw feeder body and the motors plate on the back.

To replace the gaskets perform the following actions:

1. Take the frontal part of the screw feeder body off after loosening the locks (knobs or nuts), using proper tools. If they are present, loosen the grub screws of the guide bearing present in the mixing paddle (Fig. 7.4.4.A)
2. Take the gaskets off and replace them (Fig. 7.4.4.A)



(Fig. 7.4.4.A)

## TROUBLESHOOTING

| PROBLEM                                                      | PROBABLE CAUSE                                            | SOLUTION                                                        |
|--------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------|
| <b>Unit will not operate</b>                                 | 1) No electrical Mains supply                             | 1) Check connection of control panel                            |
|                                                              | 2) Fuses or Circuit breakers tripped on the control panel | 2) Check fuses and circuit breakers                             |
| <b>Unit starts but then stops</b>                            | 1) Wrong rotation of the screw feeder                     | 1) Change the polarity                                          |
|                                                              | 2) Screws are obstructed                                  | 2) Clean the screw feeder internally                            |
|                                                              | 3) The capacity is too high                               | 3) Check the amperage and the capacity                          |
|                                                              | 4) Motor fault                                            | 4) Check the cause (see point 3) and after that repair          |
|                                                              | 5) Faulty Motor or gear reducer                           | 5) Check the cause (see point 2) and then replace the component |
|                                                              | 6) The outlet is blocked                                  | 6) Unblock the Outlet port                                      |
| <b>Unit starts but the screws do not convey the material</b> | 1) The gear reducer outlet shaft is faulty                | 1) Check the cause and then replace component                   |
|                                                              | 2) Wrong rotation direction                               | 2) Change polarity                                              |

### 1) General checks

- Check that the screw conveyor starts without any problems even after long stops.
- Check that the environmental conditions do not interfere with machine functioning.

### 2) Electrical part checks

- Check that there are no voltage problems due to the contemporary start-up of different equipment.
- Check that there is a power generator.
- Check that the engine is properly connected and that the wires are well fixed.
- Check that the regulation of the thermal sensor of the engine in the general panel is compliant to the data written in the engine plate.
- Check that the engine rotates in the correct way.
- Check the power consumption of the engine when the screw conveyor is empty, at the beginning and when the screw feeder is working.
- Check that the diameter of the wire is suitable for the power used.

# TROUBLESHOOTING

## 3) Mechanical part checks

- Check that the air valve of the motor gear is working.
- Check that the outlet port is free of possible deposits that might reduce the diameter of the port.
- Check the tank loaded in the screw conveyor.

## 4) Checks of the machine status

- Verify that the screw feeder components are assembled correctly.
- Verify that the screw feeder do not flex.
- Check the machine while it is empty and while it's working. In order to perform this empty the screw conveyor, open the inspections doors and check that the material flow is normal. Then start the screw conveyor and measure the power absorption, the power voltage and the frequency directly from the terminal board of the electric engine. Measure the rotation speed of the empty screw conveyor and compare the data with the one written on the engine plate. While the screw conveyor is working begin to gradually load it and keep on checking the power absorption, the power voltage and the frequency directly on the terminal board of the engine.
- Perform various start-ups of the loaded screw conveyor and measure the power absorption, the power voltage and the frequency.

## 5) Final product checks

- Perform the below mentioned checks on the material that have to be processed in order to know the product characteristics and the impact that it will have on the machine:
  - Product name
  - Bulk Density (Kg weight per Litre volume)
  - Particle size (Range in microns - min to max)
  - Humidity Percentage
  - Smoothness
  - Compressibility factor
  - Abrasiveness

## DE-COMMISSIONING

In case of whole or partial machine decommissioning the below reported prescriptions have to be followed depending if it is temporary or definitive.

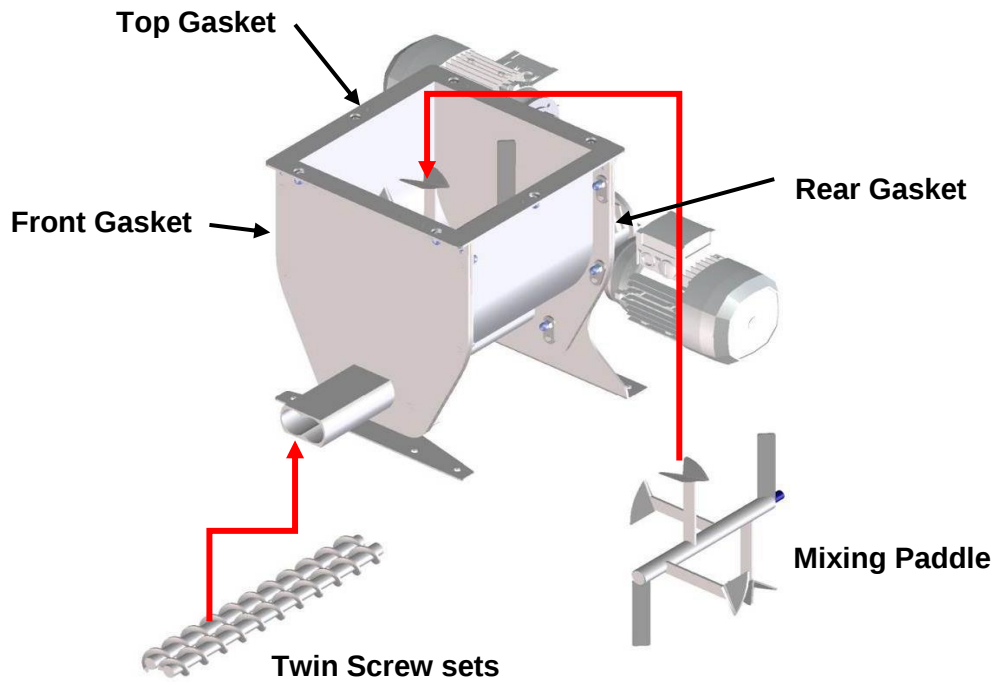
Decommission means that the whole line or part of its equipment are not used for a defined period of time.

If the inactivity period is more or less long, for example one month, we suggest the following storage operations might be performed.

- Unplug all the utilities: electric and pneumatic.
- Clean all the parts of the machine as described in the ordinary maintenance paragraph.
- Use covers on the ports so that nothing can go inside the equipment.
- Use a waterproof cover to protect the machine from the humidity.
- Place the equipment parts in a dry and covered place in an environment at normal working temperature.
- Empty the auxiliary circuits if present.
- Fill completely the reducer with oil.

## SPARE PARTS

### TWIN SCREW FEEDER MAIN BODY Assembly Number : SF 200-138-~~XXX~~



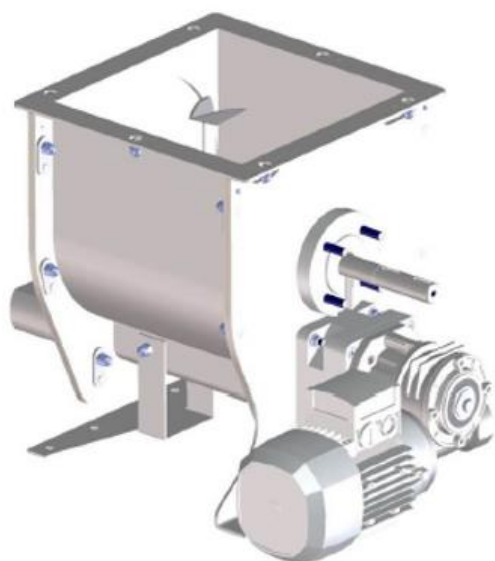
**Fig 8**

| Description       | Part Number         |
|-------------------|---------------------|
| Top Gasket Seal   | SF 100-144T         |
| Front Gasket Seal | SF 100-144F         |
| Rear Gasket Seal  | SF 100-144R         |
| Mixing Paddle     | SF 100-145          |
| Twin Screw sets   | See page 29 - Fig 9 |

## SPARE PARTS

### TWIN SCREW FEEDER MAIN BODY

Assembly Number : SF 200-138-**XXX**



Twin Screw Motor & Gearbox Complete  
SF 100-366-XXX

(See table below for Gearbox ratio)



Stirrer Motor & Gearbox Complete  
SF 100-360-XXX

(See table below for gearbox ratio)

### Stirrer Motor & Gearbox Assembly – SF 100-360-XXX

| Description                             | Part Number   |
|-----------------------------------------|---------------|
| Stirrer Motor & Gearbox Complete (60:1) | SF 100-360-60 |
| Stirrer Motor Only (0.33HP/0.25KW)      | SF 100-361    |
| Stirrer Gearbox (60:1)                  | SF 100-362-60 |

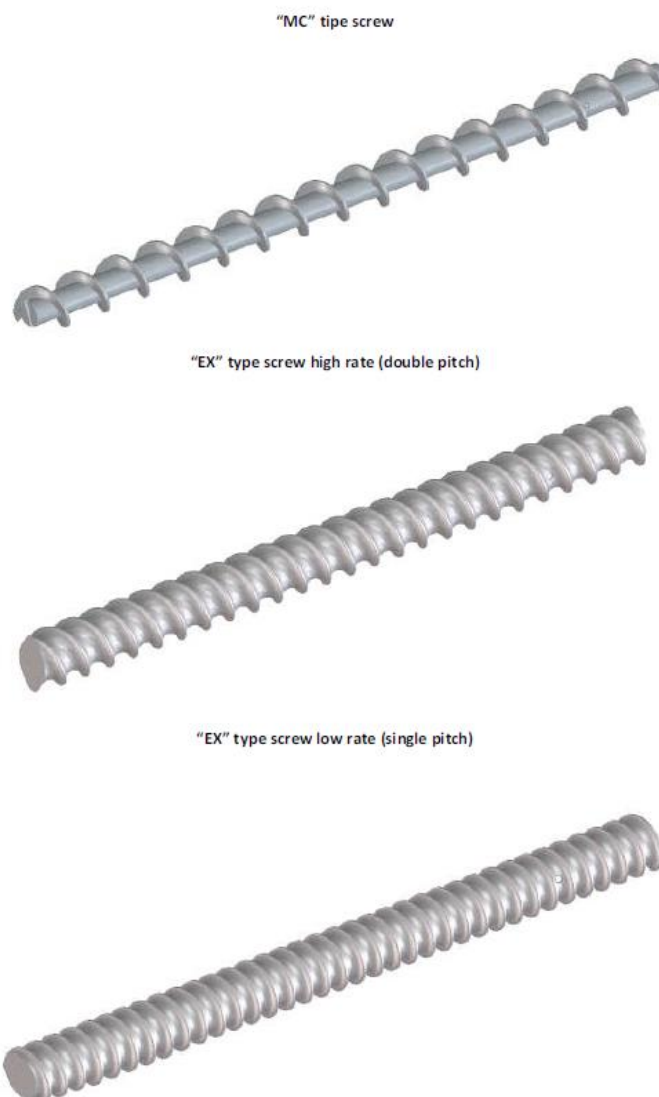
### Twin Screw Motor & Gearbox Assembly – SF 100-366-XXX

| Description                                 | Part Number    |
|---------------------------------------------|----------------|
| Twin Screw Motor & Gearbox Complete (14:1)  | SF 100-366-14  |
| Twin Screw Motor & Gearbox Complete (21:1)  | SF 100-366-21  |
| Twin Screw Motor & Gearbox Complete (28:1)  | SF 100-366-28  |
| Twin Screw Motor & Gearbox Complete (60:1)  | SF 100-366-60  |
| Twin Screw Motor & Gearbox Complete (100:1) | SF 100-366-100 |
| Twin Screw Motor Only (0.5HP/0.37KW)        | SF 100-367     |
| Twin Screw Gearbox (14:1)                   | SF 100-368-14  |
| Twin Screw Gearbox (21:1)                   | SF 100-368-21  |
| Twin Screw Gearbox (28:1)                   | SF 100-368-28  |
| Twin Screw Gearbox (60:1)                   | SF 100-368-60  |
| Twin Screw Gearbox (100:1)                  | SF 100-368-100 |

## SPARE PARTS

### TWIN SCREW SETS

Part Number : SF 100-14X



**Fig 9**

| Position        | Part Number | Description                           |
|-----------------|-------------|---------------------------------------|
| MC              | SF 100-142  | High Flow Capacity – Twin Screw Set   |
| EX Double pitch | SF 100-141  | Medium Flow Capacity – Twin Screw set |
| EX Single Pitch | SF 100-140  | Low Flow Capacity – Twin Screw set    |

*Please refer to information and Table on Page 33 for output capacities.*

## SPARE PARTS

### POWDER HOPPERS

Part Numbers : SF 100-136 & SF 100-143

50 Litre Hopper  
Part No. SF 100-143

20 Litre Hopper  
Part No. SF 100-136



**Fig 10**

### MOBILE STAND – SCREW FEEDER

Assembly Number : SF 200-292

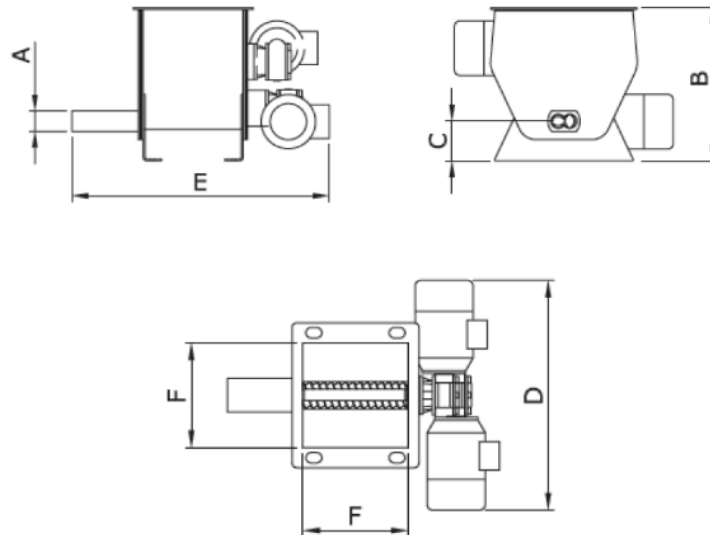


**Fig 11**

## DIMENSIONS

### TWIN SCREW FEEDER MAIN BODY

Assembly Number : SF 200-138-**XXX**



**Fig 12**

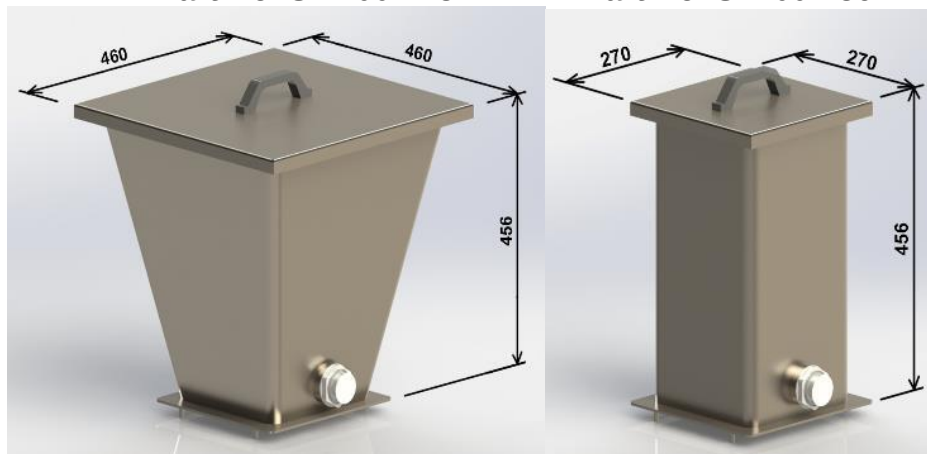
| Model   | A     | B   | C  | D   | E   | F   | Weight (Kg) |
|---------|-------|-----|----|-----|-----|-----|-------------|
| SAS-1SF | 45x70 | 350 | 90 | 500 | 690 | 220 | 34          |

### POWDER HOPPERS

Part Numbers : 100-136 & 100-143

**50 Litre Hopper**  
Part No. SF 100-143

**20 Litre Hopper**  
Part No. SF100-136



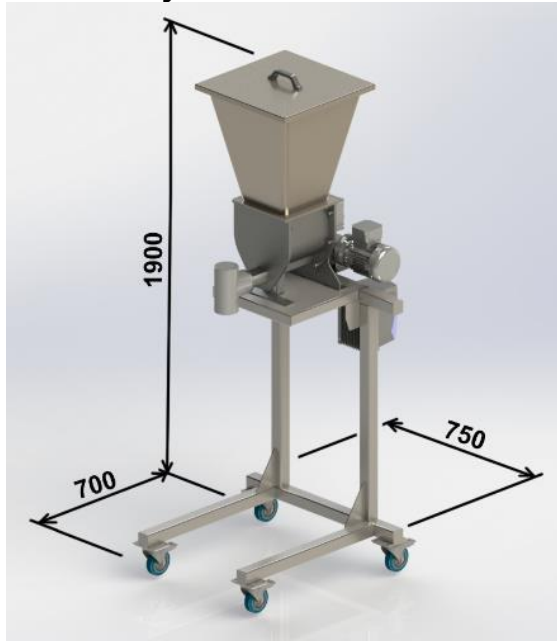
**Fig 13**

## DIMENSIONS

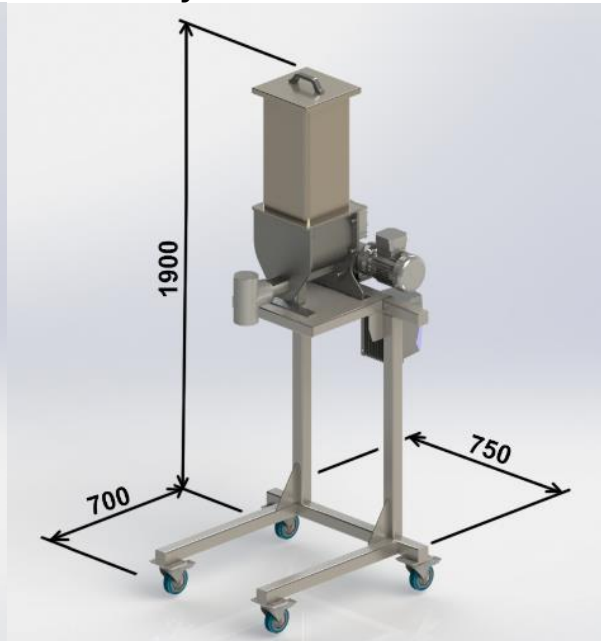
### TWIN SCREW FEEDER ASSEMBLIES

Assembly Number : SAS 1SF-~~XX~~L

SAS-1SF with 50L hopper  
Assy No. SAS 1SF-~~50~~L



SAS-1SF with 20L hopper  
Assy No. SAS 1SF-~~20~~L



**Fig 14**

## TECHNICAL SPECIFICATIONS

The D series screw feeders are equipped with a double extracting screw, they guarantee a homogeneous material flow, high precision and dosing regularity thanks also to the screws that are machine made for a perfect coupling.

The D series twin screw feeders are designed for the dosing of powdered material and synthetic fibres. They are available both on volumetric and gravimetric version with an electronic loading cell weighting system that guarantees high precision and reliability.

They are used in their different configurations in all industrial fields, from concrete to chemistry, from food to pharmaceutical industry.

The different configurations make them suitable for the use of materials that have very different granulometry and fluency.

They are available also in configuration for ATEX areas.

A screw feeder makes the function to unload a theoretically constant material quantity on each turn. This behaviour allows to make a specific load both on the granulometric and volumetric version. It is expressed in dm<sup>3</sup>/h and the value is determined by the following factors:

- Dosing screw rotating speed.
- Dosing screw pitch and diameter length.
- Used product specific weight.

| SAS 1SF<br>Twin Screw Feeder |                 | Litres/Hour |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|------------------------------|-----------------|-------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| Ratio                        | Screw Sets      | 2           | 4 | 8 | 10 | 12 | 14 | 16 | 20 | 23 | 28 | 40 | 44 | 48 | 70 | 92 | 140 | 172 | 225 | 280 |
| 100:1                        | EX Single Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC              |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| 60:1                         | EX Single Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC              |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| 21:1                         | EX Single Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC              |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| 14:1                         | EX Single Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | EX Double Pitch |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
|                              | MC              |             |   |   |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |

### Please Note

The above table is for reference only and provides an approximate indication of Powder Throughputs. Please contact SAS directly with details of your powder materials.

## TECHNICAL SPECIFICATIONS

### TWIN SCREW FEEDER

|                                   |                                                                                                                                 |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Mains Electrical Supply           | <ul style="list-style-type: none"> <li>3 phase, N + E, supply via Invertor (see separate SAS E3 manual for Invertor)</li> </ul> |
| Supply Voltage                    | <ul style="list-style-type: none"> <li>230-480VAC @ 50/60Hz</li> </ul>                                                          |
| Connected Load                    | <ul style="list-style-type: none"> <li>2.8 up to 6.0 Amp – Ratio dependant</li> </ul>                                           |
| No. of Drive Motors               | <ul style="list-style-type: none"> <li>2 x Motor/Gearbox assemblies</li> </ul>                                                  |
| - 1 x Twin Screw Motor/Gearbox    | <ul style="list-style-type: none"> <li>0.25Kw up to 0.50Kw – Ratio dependant</li> </ul>                                         |
| - 1 x Mixing Paddle Motor/Gearbox | <ul style="list-style-type: none"> <li>0.25Kw</li> </ul>                                                                        |
| Protection Category               | <ul style="list-style-type: none"> <li>IP 55</li> </ul>                                                                         |
| Operating Temperature             | <ul style="list-style-type: none"> <li>-10°C to +50°C</li> </ul>                                                                |
| Construction                      | <ul style="list-style-type: none"> <li>Stainless Steel 304</li> </ul>                                                           |
| Gaskets                           | <ul style="list-style-type: none"> <li>NBR Food grade</li> </ul>                                                                |
| Total Weight                      | <ul style="list-style-type: none"> <li>34kg without Hopper</li> </ul>                                                           |

### SUPPORT STAND

|              |                                                                                          |
|--------------|------------------------------------------------------------------------------------------|
| Construction | Stainless Steel 304                                                                      |
| Total Weight | <ul style="list-style-type: none"> <li>50Kg without Screw Feeder &amp; Hopper</li> </ul> |

## 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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