



MS Elite A5 Automatic Powder
Spray Applicator
Model: 835020



2813



II 2D 2mJ

NOTE: This manual has been changed from revision **PA-18-01-R4** to revision **PA-18-01-R5**. Reasons for this change are noted under “Manual Change Summary” inside the back cover of this manual.

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SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any electrostatic coating system, read and understand all of the technical and safety literature for your products. This manual contains information that is important for you to know and understand. This information relates to **USER SAFETY** and **PREVENTING EQUIPMENT PROBLEMS**. To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

WARNING

A **WARNING!** states information to alert you to a situation that might cause serious injury if instructions are not followed.

CAUTION

A **CAUTION!** states information that tells how to prevent damage to equipment or how to avoid a situation that might cause minor injury.

NOTE

A **NOTE** is information relevant to the procedure in progress.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and associated equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your equipment, contact your local Carlisle Fluid Technologies representative or Carlisle Fluid Technologies technical support.


WARNING



- The user **MUST** read and be familiar with the Safety Section in this manual and the safety literature therein identified.
- This equipment is intended to be used by trained personnel **ONLY**.
- This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA-33 AND EN 16985 SAFETY STANDARDS, LATEST EDITION**, or applicable country safety standards, prior to installing, operating, and/or servicing this equipment.

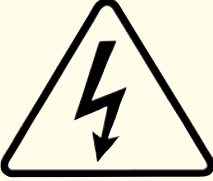
WARNING



- The hazards shown on the following pages may occur during the normal use of this equipment.

Repairs may only be performed by personnel authorized by Carlisle Fluid Technologies.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p>Spray Area</p> 	<p>Fire Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.</p>	<p>Fire extinguishing equipment must be present in the spray area and tested periodically.</p> <p>Spray areas must be kept clean to prevent the accumulation of combustible residues.</p> <p>Smoking must never be allowed in the spray area.</p> <p>The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance.</p> <p>Spray booth ventilation must be kept at the rates required by NFPA-33, EN 16985, OSHA, country, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents.</p> <p>Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch (25mm) for every 10KV of output voltage is required at all times.</p> <p>Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed.</p> <p>Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled.</p> <p>The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, OSHA, local, country, and European Health and Safety Norms.</p>

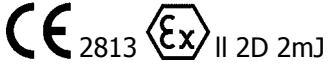
AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p style="text-align: center;">Spray Area</p> 	<p>Explosion Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation.</p> <p>Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.</p>	<p>Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch (25mm) for every 10KV of output voltage is required at all times.</p> <p>Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside Class I or II, Division 1 or 2 hazardous, zone 20, 21 or zone 22 areas.</p> <p>Test only in areas free of flammable or combustible materials.</p> <p>The current overload sensitivity (if equipped) MUST be set as described in the corresponding section of the equipment manual. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if the current overload sensitivity is not properly set. Frequent power supply shutdown indicates a problem in the system which requires correction.</p> <p>Always turn the control panel power off prior to flushing, cleaning, or working on spray system equipment.</p> <p>Before turning high voltage on, make sure no objects are within the safe sparking distance.</p> <p>Ensure that the control panel is interlocked with the ventilation system and conveyor in accordance with NFPA-33, EN 16985.</p> <p>Have fire extinguishing equipment readily available and tested periodically.</p>
<p style="text-align: center;">General Use and Maintenance</p> 	<p>Improper operation or maintenance may create a hazard.</p> <p>Personnel must be properly trained in the use of this equipment.</p>	<p>Personnel must be given training in accordance with the requirements of NFPA-33.</p> <p>Instructions and safety precautions must be read and understood prior to using this equipment.</p> <p>Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, EN Norms and your insurance company requirements.</p>

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p>Spray Area / High Voltage Equipment</p> 	<p>Electrical Discharge</p> <p>There is a high voltage device that can induce an electrical charge on ungrounded objects which is capable of igniting coating materials.</p> <p>Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.</p>	<p>Parts being sprayed and operators in the spray area must be properly grounded.</p> <p>Parts being sprayed must be supported on conveyors or hangers that are properly grounded. The resistance between the part and earth ground must not exceed 1 megohm. (Refer to NFPA-33, EN 16985)</p> <p>Operators must be grounded. Rubber soled insulating shoes should not be worn. Grounding straps on wrists or legs may be used to assure adequate ground contact.</p> <p>Operators must not be wearing or carrying any ungrounded metal objects.</p> <p>When using an electrostatic hand applicator, operators must assure contact with the handle of the applicator via conductive gloves or gloves with the palm section cut out.</p> <p>NOTE: REFER TO NFPA-33, EN 16985 OR SPECIFIC COUNTRY SAFETY CODES REGARDING PROPER OPERATOR GROUNDING.</p> <p>All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Grounded conductive flooring must be provided in the spray area.</p> <p>Always turn off the power supply prior to cleaning, or working on powder system equipment.</p> <p>Unless specifically approved for use in hazardous locations, all electrical equipment must be located outside Class I or II, Division 1 or 2, zone 20, 21 or zone 22 hazardous areas, in accordance with NFPA-33.</p> <p>Do not touch the applicator electrode while it is energized.</p>

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p>Electrical Equipment</p> 	<p>Electrical Discharge</p> <p>High voltage equipment is utilized in the process. Arcing in the vicinity of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance.</p> <p>Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation.</p> <p>Frequent power supply shut-down indicates a problem in the system which requires correction.</p> <p>An electrical arc can ignite coating materials and cause a fire or explosion.</p>	<p>Unless specifically approved for use in hazardous locations, the power supply, control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2, zone 20, 21 or zone 22 hazardous areas in accordance with NFPA-33 and EN 16985.</p> <p>Turn the power supply OFF before working on the equipment.</p> <p>Test only in areas free of flammable or combustible material.</p> <p>Testing may require high voltage to be on, but only as instructed.</p> <p>Production should never be done with the safety circuits disabled.</p> <p>Before turning the high voltage on, make sure no objects are within the sparking distance.</p>
<p>Toxic Substances</p> 	<p>Chemical Hazard</p> <p>Certain materials may be harmful if inhaled, or if there is contact with the skin.</p>	<p>Follow the requirements of the Safety Data Sheet supplied by coating material manufacturer.</p> <p>Adequate exhaust must be provided to keep the air free of accumulations of toxic materials. Reference EN 12215 or applicable code.</p> <p>Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.</p>

INTENDED USE

1. The MS elite A5 Automatic powder applicator is exclusively for use in powder coating. It has been developed according to recognized safety regulations for use in potentially explosive atmospheres according to directive RL 2014/34/EU.
2. Any other use is considered improper. The manufacturer is not liable for any resulting damage. The risk lies by the user alone. If the MS elite A5 Automatic powder applicator or its operating conditions are altered, or materials differing from the manufacturer's specifications are to be used, the written consent of Carlisle Fluid Technologies must be obtained.
3. Intended use also includes compliance with the manufacturer's operating, maintenance and service instructions. The MS elite A5 Automatic powder applicator may be used, maintained and repaired only by persons who are trained on the equipment and its dangers.
4. Commissioning (this means the starting of operation as directed) is prohibited until it is determined that the MS elite A5 Automatic powder applicator is installed and wired in accordance with the Machinery Directive (2006/42/EC). Also to note is the EN 60204-1 (Safety of machinery).
5. Unauthorized modifications to the MS elite A5 Automatic powder applicator exclude the manufacturer from any liability.
6. The relevant accident prevention regulations and other generally recognized safety, occupational health and structural regulations must be observed.
7. Any country-specific safety regulations must also be considered and observed.

Explosion Protection	Protection Class	Max Surface Temperature
EN 50177	IP64	T6 (Zone 21)
		

Safety Regulations for Electrostatic Powder Coating

WARNING

- This equipment can be dangerous if it is not operated according to the information in this manual! In addition, the country-specific safety regulations for fire protection must be observed.

WARNING

- Persons with pacemakers should not remain in the area of electrostatic powder spraying. Strong high voltage and electromagnetic fields can arise in these areas.

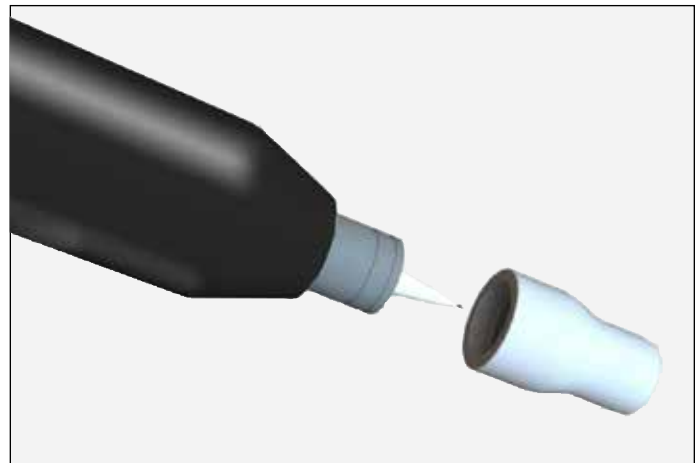
CAUTION

- The operator must ensure that the manual powder coating equipment and accessories are tested as required, this should be done at least annually by an expert on safe working condition.

1. All conductive items in the spray area must be grounded to true earth ground with a resistance of no more than 1 mega ohm measured at 250V minimum.
2. The floor of the coating area must be electrostatically conductive (normal cement is generally conductive). (Measurement according to EN1081)
3. The operator must wear anti-static footwear, for example, leather soles. (According to EN 344-1 shoes).

4. The supplied grounding cable (green / yellow) must be connected to the grounding screw of the electrostatic manual powder coating equipment. The grounding cable must have good metallic connection with the coating enclosure, the recovery unit and the conveyor chain respectively. Any suspended objects must be connected to the true earth ground. The provided powder hose must be used as it provides ground to the applicator.
5. The voltage and powder feed lines to the powder applicators must be protected against mechanical, thermal and chemical damage.
6. The main power connection of the MS powder coating device must be electrically interlocked with the exhaust system of the powder coating enclosure. The powder coating device may only be switched on if the exhaust air is running.
7. The booth air must be interlocked with the controller of the powder applicator. If the booth is switched off the controller is off.
8. The powder spray applicator may only be operated in a powder spray enclosure with industrial ventilation. Operation creates a hazard zone around the powder spray applicator. (Reference EN 16985: 2018 NFPA-33)
9. The operator must ensure that an average concentration of powder in the air does not exceed 50% of the lower explosive limit (UEG=maximum permissible powder/air concentration). If the UEG is not reliably known, the mean UEG must not exceed 10g/m^3 (must meet requirements of EN 12981).
10. The powder spraying equipment should be checked annually by the operator for explosion protection.
11. The grounding of all conductive parts (hooks, chain conveyors, etc.) must be checked at least weekly. The Resistance to earth must be less than $1\text{ M}\Omega$ (Mega Ohm).
12. When cleaning the powder applicator and when replacing the nozzles, the controller must be switched off.
13. When working with cleaning agents that can develop hazardous fumes, the manufacturer's instructions must be observed. Flammable cleaning agents should not be used. Before using flammable cleaners, the powder spraying device must be turned off, separated from the power supply, secured against reconnection and allowed to discharge to true earth ground.
14. Powder must be used according to the manufacturer's instructions.
15. When disposing of powder and cleaning agents, manufacturer's instructions and the applicable environmental protection regulations must be observed.
16. In the case of damage (broken parts, cracks, etc), these components should be removed and the powder applicator no longer operated.
17. Repairs may not under any circumstances be carried out in a hazardous area. Repairs must be performed by authorized service centers from MS Powder. Only original spare and wear parts from MS Powder may be used or warranty and agency approval are voided.

NOTICE ON HARMLESS DISCHARGES



When the high voltage is switched on, a glow or corona discharge occurs at the tip. This is only visible in a dark environment. When the electrode is near the grounded work piece, this physical phenomenon can be observed. This glowing discharge does not cause any ignition and does not affect the functioning of the system. When the electrode approaches the work piece, the controller automatically reduces the high voltage to a safe value or, depending on the setting, switches the high voltage off.

Touching the plastic parts of the manual powder applicator with your finger can cause harmless discharges called brush discharges. These discharges on the plastic parts are caused by the high voltage field of the applicator. However, they do not have enough energy to cause an ignition.

SAFETY CONSIDERATIONS

Any person who is responsible for the installation, commissioning, operation, maintenance and repair of powder spraying device must have read and understood the operating instructions and particularly the "Safety" section. The user company must ensure that the user has the necessary professional knowledge to deal with the powder spraying device and its hazards. The MS elite Controller for the spray applicators can be installed and operated inside of Zone 22. Spray applicators are approved for Zone 21 and Zone 22. The powder spraying device may only be operated by trained and authorized personnel. This applies especially to work on the electrical equipment which may only be performed by appropriate specialists. Before doing any work concerning installation, commissioning, setup, operation, changes in operating conditions and modes of operation, maintenance, inspection or repair, the necessary shutdown procedures specified in the operating instructions must be performed. The powder spraying device is turned off by using the main switch or, if it exists, by emergency switch off. The individual components can be switched on and off during operation by use of the respective switches.

Individual safety instructions for the user company and / or operating personnel.

1. The user is to refrain from any work which compromises the technical safety of the powder spraying device.

2. The operator must help to ensure that no unauthorized persons work on the powder spraying device (e.g. by installing devices to protect against unauthorized use).
3. The employer must create an operating instruction for the use of hazardous substances. These instructions must detail what must occur during handling of hazardous materials, threats to people and the environment and the necessary protective measures and rules of conduct to be followed. These operating instructions must be written in the language of the workforce in an understandable form and placed in an appropriate location known to the workforce.
4. The operator is obliged to check the entire powder spraying system at least once per shift for apparent damages and to immediately report any changes (including in performance) affecting safety.
5. The company must ensure that the spray powder unit is only operated in perfect condition.
6. Where necessary, the company will provide the operator with personal protective equipment (e.g. face mask).
7. The user must ensure cleanliness and clarity of the workspace at and around the powder spraying device.
8. No safety equipment may be disconnected or removed from service. If the disconnection of safety devices is required for equipping, repairing or maintaining the equipment, the safety devices must be reassembled immediately after the completion of maintenance. All maintenance activities may only be carried out on a disconnected powder spraying device.
9. Activities such as controlling powder fluidization, adjusting high voltage or similar may not be carried out on an actively powered spray device.

NOTES OF SAFETY HAZARD

Current/Voltage

It is important to reiterate there is an imminent danger to health and safety if high voltage shutdown procedures are not followed correctly.

Energized equipment must not be service while power is on. The power must be disconnected prior to servicing.

Powder

Unfavorable powder concentrations in air may ignite in the presence of sparks. It is the user's responsibility to ensure sufficient air in the coating enclosure. Powder lying on the floor around the powder spraying device constitutes an imminent risk of slipping.

Static charge

Some possible consequences of static charge are charging of persons, electric shock or sparks. Charging of objects and persons must be avoided.

Grounding

All electrically conductive parts in the spray area and the work pieces must be grounded. The resistance to earth of each work piece must not exceed 1 Mohm. This resistance must be checked regularly. Any holders or hangers for the work piece must ensure the work pieces remain grounded. If the work piece is suspended, the hanger must be kept clean so that the necessary conductivity can be retained. To check the grounding, suitable instruments should be ready at the workplace.

Pneumatic

For longer work interruptions or downtime, the powder spraying device must be depressurized. Damage to the pneumatic hose with uncontrolled leakage and improper use of compressed air may result in injury.

Crushing and shearing points

During operation, moving parts may move automatically in the workspace. Only trained and authorized persons may approach this equipment. Barriers must be carried out on site in accordance with local safety regulations.

Access restrictions for a specific reason

The user must ensure that local "Safety" conditions are met when repairs are conducted on electrical parts. Additional measures, such as barriers, shall be taken to prevent unauthorized access.

Prohibition of unauthorized conversions and modifications to the machine

Any unauthorized modifications or changes to the powder spraying device are not permitted for safety reasons. The powder spraying device may not be used if damaged, and the defective part must be immediately replaced or repaired. Only original MS Powder spare parts may be used. Damage due to use of other parts invalidates the warranty. Repairs may only be carried out by a specialist or authorized repair center. Unauthorized modifications can lead to personal injury and property damage. The warranty provided by MS Powder and the agency approvals are voided.

ATEX/FM/UKEX

EUROPEAN ATEX DIRECTIVE 2014/34/EU, ANNEX II, UKSI 2016: 1107 (AS AMENDED)

The following instructions apply to equipment covered by certificate number FM 19ATEX0004X and FM21UKEX0140X:

1. The equipment may be used with ignitable powders with apparatus groups II. Equipment shall be used only in spray areas according to EN-12981 or under equivalent ventilation conditions
2. The minimum exhaust volume flow is the minimum air flow which dilutes the concentration of ignitable coating powders to a maximum of 50% of LEL of the coating powders in air. Here, all air performance losses have to be considered. It shall be ensured that excess of coating material (overspray) will be collected reliably.
3. The equipment is only certified for use in ambient temperatures in the range +10°C to +40°C and should not be used outside this range.
4. Installation shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-14:2014. Electrostatic equipment shall be interlocked with forced ventilation. Power cord must be plugged into power source outside all classified zones.
5. Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-17, EN 50050-2, EN 50177.
6. Repair of this equipment shall be carried out by suitable trained personnel in accordance with the applicable code of practice e.g. EN 60079-19. See "Parts Identification" page for use of spare parts. Before starting maintenance works:
 - The high voltage supply shall be cut off and safeguarded against restart.
 - The applicator shall be disconnected from energy sources like high voltage, low voltage, and compressed air.
7. Putting into service, use, assembling, and adjustment of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.

Refer to the "Table of Contents" of this service manual:

 - a. Installation
 - b. Operation
 - c. Maintenance
 - d. Parts Identification
8. All protective gloves used shall comply with requirements from EN50050-2 section 6.2.4. The instructions must be followed in order to avoid possible electrostatic charging hazards.
 - Footware to be worn by the operator shall comply with EN ISO 20344. The measured insulation resistance shall not exceed 100 MΩ.
 - Protective clothing to be worn, including gloves, shall comply with EN 1149-5. The measured insulation resistance shall not exceed 100 MΩ.
9. Components to be incorporated into or used as replacement parts of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.
10. The certification of this equipment relies upon the following materials used in its construction:

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.

Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheets that it is resistant to specific chemicals.

11. A recapitulation of the certification marking is detailed in the “ATEX” section on the next page.
12. The characteristics of the equipment shall be detailed e.g. electrical, pressure, and voltage parameters.

The manufacturer should note that, on being put into service, the equipment must be accompanied by a translation of the instructions in the language or languages of the country in which the equipment is to be used and by the instructions in the original language.

13. This instruction manual was written according to EN ISO 12100.
14. Electrostatic spraying equipment shall only be operated by competent persons. Electrostatic spraying equipment shall only be operated in a safe and sound state. Damaged equipment shall be put out of operation immediately and shall be repaired. Spare parts can have safety relevant properties. Worn parts shall be replaced immediately.
15. **Earthing of containers for cleaning liquids**
Only electrically conducting containers shall be used for cleaning liquids. The container shall be earth grounded.
16. **Characteristics of the cleaning liquids**
The cleaning works shall be carried out at forced ventilated cleaning places.

Non-ignitable cleaning agents are preferred.

Ignitable cleaning solvent:

Use Iso Propanal Alcohol to wipe down and clean the applicator.

17. **Earthing of the jigs for workpieces**

Appropriate measures shall ensure that the resistance to earth of the jig shall not exceed 1 MΩ, measured with a measurement voltage from 500 V to 1000 V.

All conductive components of the system, like for instance floors, walls, ceilings, protective gratings, transport devices, workpieces, powder hoppers, reciprocators or constructional parts, etc. within the spraying area, except for parts which are at high voltage for operational reasons, shall be connected to the earthing system. Parts of the booth shall be earthed in accordance with EN 12981.

Floor assemblies in potentially explosives areas shall be dissipative according to EN 61340-4-1.

18. **Test intervals of repeated tests**

For a safe operation of electrostatic spraying equipment the intervals for repeated tests shall be determined by the manufacturer. The intervals depend on the operational and local conditions. The following test intervals listed are recommended.

TEST INTERVALS		
	Reference	Test Intervals
A	Earthing measures	Weekly
B	Interlocking of forced ventilation and electrostatic spraying equipment	Yearly
C	Check of electrostatic spraying equipment for damage	Weekly

MS Powder A5 elite 835020 ATEX Product Marking Definitions

Ex Certificate Number: FM19ATEX0004X

FM = Notified Body performing EU-type examination

19 = Year of examination

ATEX = Reference to ATEX Directive

0004 = Document serial number

X = Special conditions for safe use apply

Product Marking



Ex = Specific marking of explosive protection

II = Equipment Group hazardous area characteristics

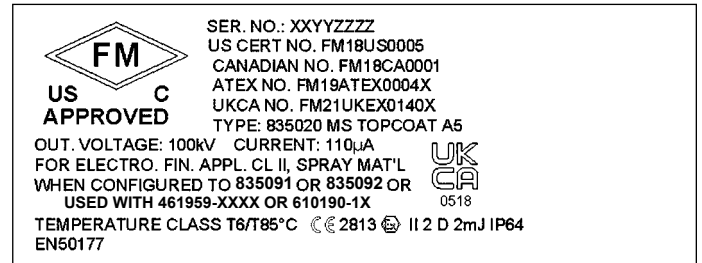
2 = Equipment Category

D = Type of explosive atmosphere (dust)

EEx 2mJ = The MS Powder A5 elite applicator is suitable for use in automatic spraying installations complying with EN 50177 as it is a Type A class with a discharge energy limit of 2mJ.

X = Special conditions for safe use

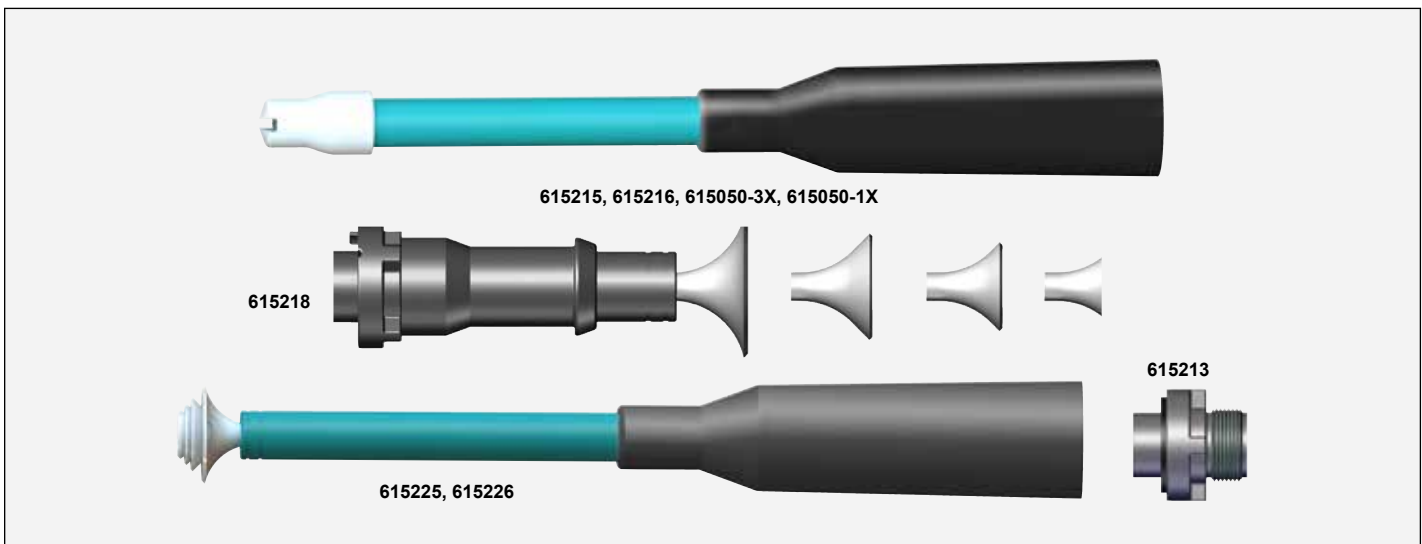
1. The equipment must be used in accordance with EN 50177 for automatic applications.
2. Approved for safe use when configured to drawing 835091 or 835092.
3. The instructions must be followed in order to avoid possible electrostatic charging hazards.



FM Configuration

These applications are FM approved when the setup is configured per the label information.

MS ELITE A5 AUTOMATIC POWDER SPRAY APPLICATOR MODEL 835020



AVAILABLE ACCESSORIES

Part #	Description
615215	Extension Flat Spray F150
615216	Extension Flat Spray F300
615218	Round Spray Nozzle Set R1
615225	Extension Round Spray Nozzle Set R150
615226	Extension Round Spray Nozzle Set R300
615258	Assembly Flat Spray Nozzle 3mm (Included)
615130-X	Assembly Flat Jet Nozzle 3, 4, 5 (Parallel Sides)
615050-1X	Flat Jet Extension (150mm)
615050-3X	Flat Jet Extension (300mm)

For a full listing of usage configurations, please see 835091, 835092, 805700.

SPECIFICATIONS

Dimension:

Weight:	470g (16.6 oz.)
Length:	395 mm (Standard Flat Spray Nozzle) (15.5 inches)

Electrical Data:

Frequency:	40 kHz
Output voltage:	100 kV DC Maximum
Output current:	0 – 110 μ A
Polarity:	Negative

Pneumatic Data:

Input air pressure (Sprayed air):	6 bar max (87 psig)
Powder flow rate:	Variable up to 450 g/min

Compressed Air Quality According ISO 8573.1:

Residual water content in compressed air:	max. 1.3 g/m ³ with a dew point of 7 °C
Air throughput:	5-20 m ³ /h

Ambient Condition:

10°C to 40°C
When using low temperature powders, an ambient temperature below 30°C may be necessary.

Usable Powder:

Plastic powder, Metallic-powder

Certificate Numbers:

FM18US0005, FM18CA0001, FM19ATEX0004X, FM21UKEX0140X

Environmental degree of protection:	IP 64
Surface temperature range:	+10° C - 85 °C (50 °F - 185 °F)
Ignition Protection:	2 mJ According to EN 50177

INTRODUCTION

PRODUCT DESCRIPTION

Application

The MS elite A5 Automatic powder applicator is designed exclusively for electrostatic coating with organic powders. Any other use is considered improper. The manufacturer is not liable for any resulting damage, the risk lies with the user alone!

The MS elite M5 Automatic powder applicator is suitable for electrostatic coating of objects of all shapes and geometries, which can be grounded.



Foreseeable misuse

- Coating of ungrounded objects
- Use of enamel powder
- Incorrectly set values of the powder feed air
- Incorrectly set values of the electrode rinsing air (gun air)
- Using moist powder

SCOPE OF DELIVERY

Article #	Description
835020	MS elite A5
	Flat spray nozzle set (615214 included in 835020)
PA-18-01	This service manual in electronic form on a USB memory stick

The elite A5 Automatic applicator receives power from a controller which powers a cascade that generates a high voltage DC charge to the electrode, creating an electrostatic field between the nozzle and the target.

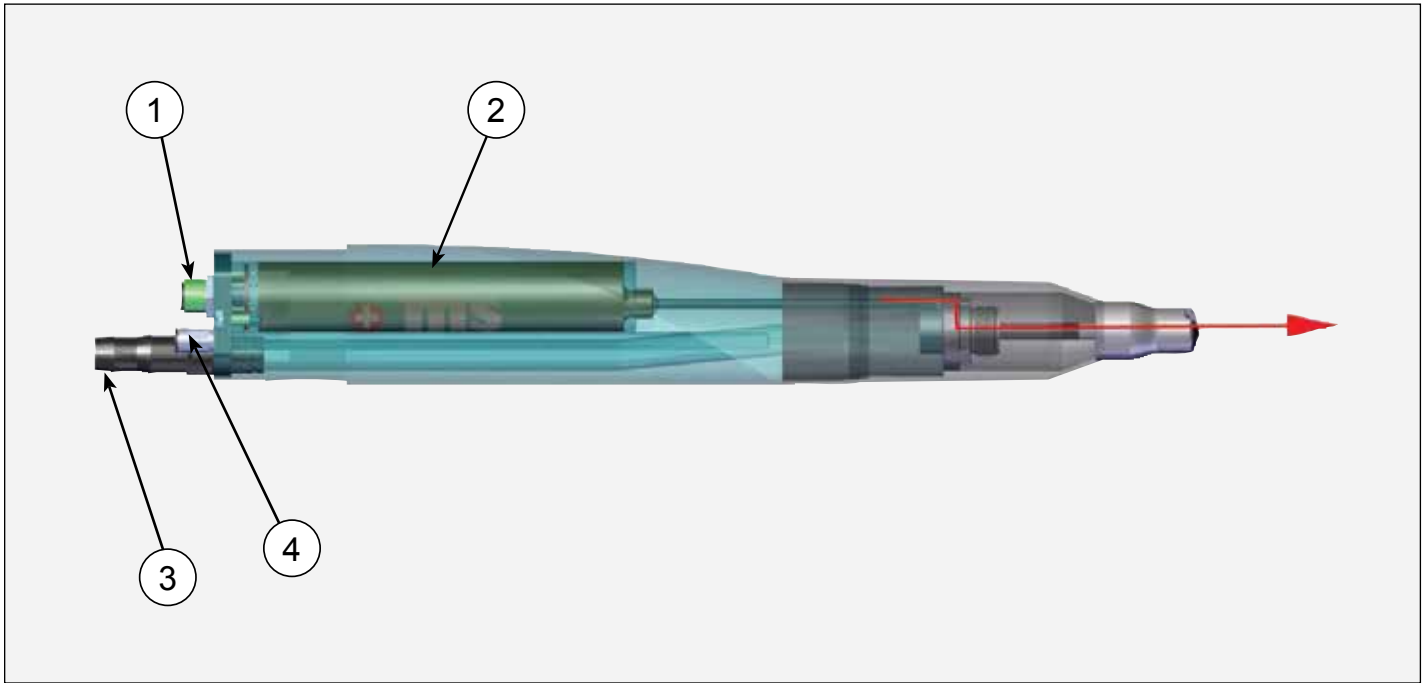
One of the many features of the MS elite A5 Automatic powder applicator is that the electrical energy, which is available from the resistive charging electrode, is limited to the optimum level of safety and efficiency. The system is incapable of releasing sufficient electrical or thermal energy during normal operating conditions to cause ignition of specific hazardous materials in their most easily ignited concentrations in air.

As the applicator electrode approaches ground, applicator circuitry causes the high voltage to approach zero while the current approaches its maximum value.



Figure 1: MS elite A5 Automatic Powder Applicator 835020

MS ELITE A5 AUTOMATIC POWDER APPLICATOR	
Item #	Description
1	Housing, A5 elite
2	Cap, End, A5
3	Nut, Nozzle
4	Flat spray nozzle
5	Clip, Body
6	5 Pin Applicator Cable Connector
7	4mm ODT Fitting
8	Powder Hose Connector
9	Screw, M4 x 6
10	Screw, M4 x 10
11	4mm OD x 2.5mm ID Tube
12	Push To Lock Straight Reducer 4mm to 6mm
13	Short Corona



FUNCTION

When the automatic powder spray applicator is turned on at the controller, and the cable is connected at (1), the cascade (2) is activated and provides high voltage to the electrode. When the applicator is activated, the powder supply, connected at (3), and the air supply, connected at (4), are also activated. The powder migrates through the passages of the applicator and comes in contact with the high voltage created by the cascade.

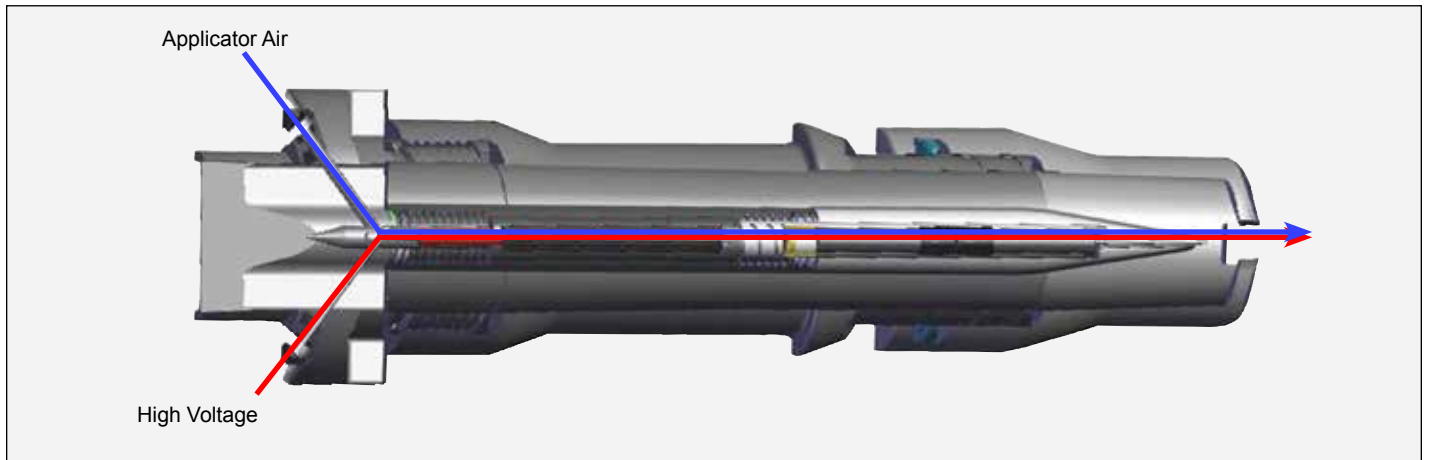
The high voltage differential between the grounded work piece and the electrode of the coating applicator generates an electric field, which transmits a negative charge on the individual powder particles.

Since these particles have the same charge as the spray applicator, they are repelled, distributed in a fine cloud and deposited evenly on the grounded work piece. Powder that does not initially make contact with the work piece is caught in the electrical field and wraps around to the backside of the work piece. This powder coating technology provides more effective material utilization, time savings, greatly improved coating quality, minimal cleaning effort and a healthy working environment.

NOZZLE FUNCTION

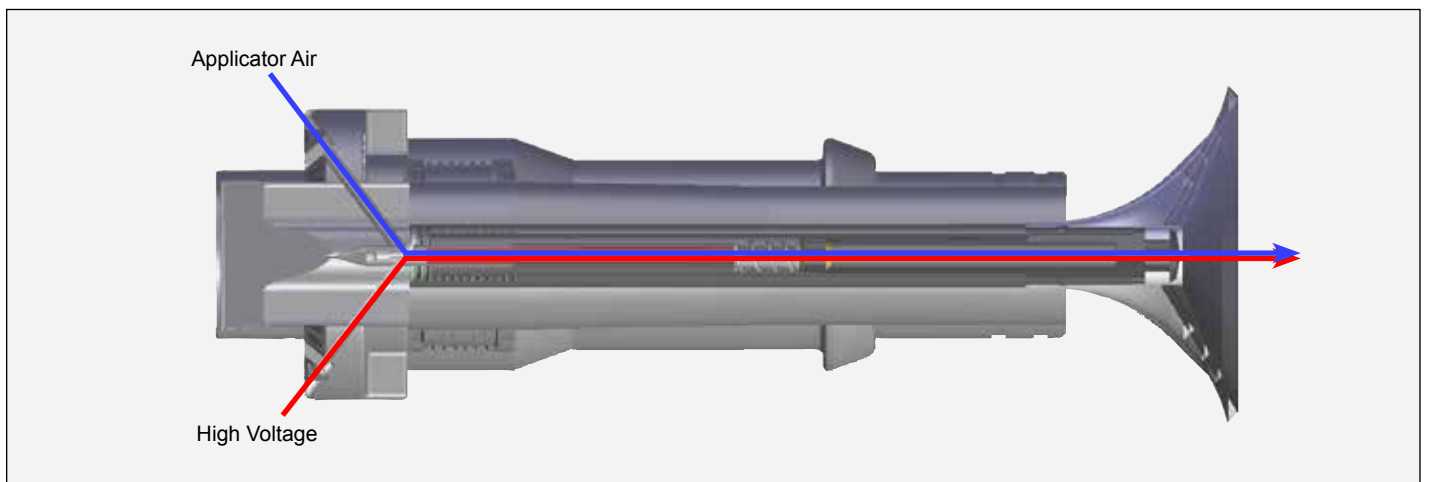
Flat fan nozzle

The applicator air is used to cool the electrode during operation to prevent impact fusion.



Round spray nozzle

The applicator air is used to cool the electrode during operation to prevent impact fusion.



INSTALLATION

COMMISSIONING AND OPERATION OF MS ELITE A5 AUTOMATIC POWDER APPLICATOR

NOTE

- Before you begin the installation and commissioning, take a moment to familiarize yourself with the relevant manuals.
- Check that all components for mounting are provided.
- A high quality of compressed air is necessary for operation of the powder coating system.

⚠ CAUTION

- When connecting the powder spray applicator, the control unit and the accessories, the controller must be switched off by using the main switch.

⚠ CAUTION

- You must be familiar with the operation of this device before switching it on.
- DO NOT touch the applicator nozzle when high voltage is switched on.
- Do not stand in front of the spray applicator.

SAFE HANDLING OF THE AUTOMATIC POWDER APPLICATOR

1. Never point powder applicator at any person for any reason.
2. Persons with pacemakers may not at any time stand in the area between the spray applicator and the coated work piece. A high voltage field is presented here.

3. In case of a problem with the equipment, the issue must be solved as described in the maintenance section under troubleshooting.
4. Comply with local regulations for occupational safety and accident prevention regulations at all times.
5. Follow the information in this manual at all times, particularly the general safety instructions and warnings.

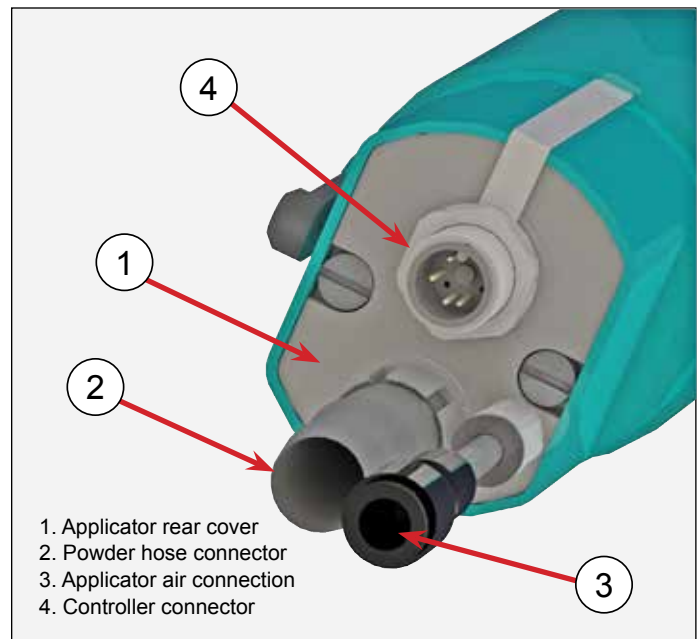
Connecting Automatic Powder Applicator

The powder hose connects via a quick disconnect. This enables a rapid plugging and unplugging of the powder hose by a spring.

The controller connector is permanently assembled in the rear cover.

⚠ WARNING

- Turn off the power at the control unit before disconnecting cables at either applicator or controller end.



CABLE AND HOSE CONNECTIONS

CONNECTING			
	Connect	From —————>	To

Connecting to Controller

Manual Powder Applicator Cable	Applicator Connect	Powder Applicator	Controller
Dosage Air Hose	Doseage Air Red	Controller	Injector Dosage Air
Feed Air Hose	Feed Air Blue	Controller	Injector Feed Air
Gun Air Hose	Rinse Air Black	Controller	Applicator Gun Rinse Air
Fluidization Air Hose	Deluxe Controller Only	Controller	Fluidization Hopper

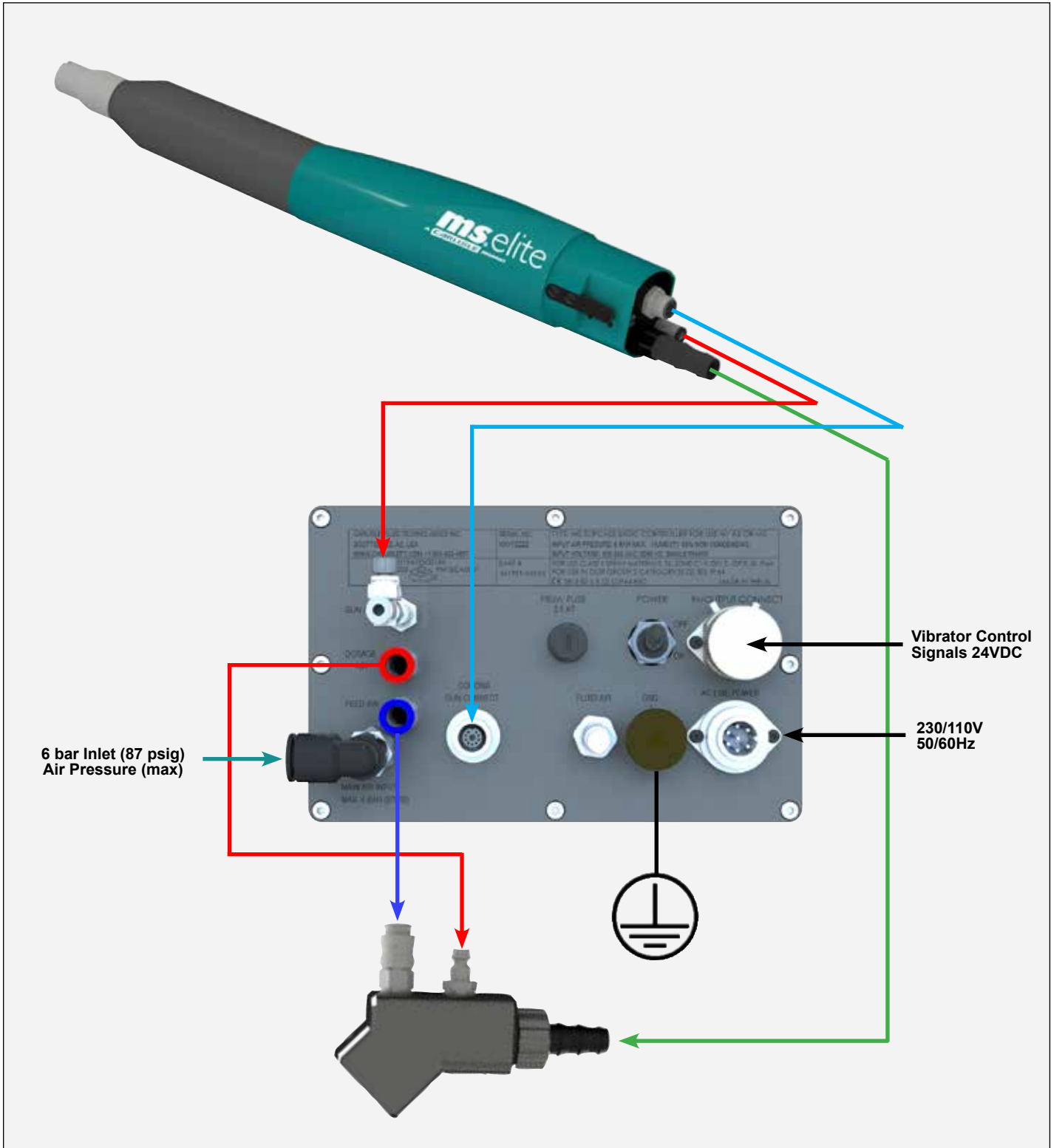
Connect Powder Injector

Feed Air Hose	Feed Air (Blue)	Controller	Feed Air Connection on injector
Dosage Air Hose	Dosage Air (Red)	Controller	Dosage Air Connection on injector
Powder Hose		Powder Injector Output	Powder Applicator

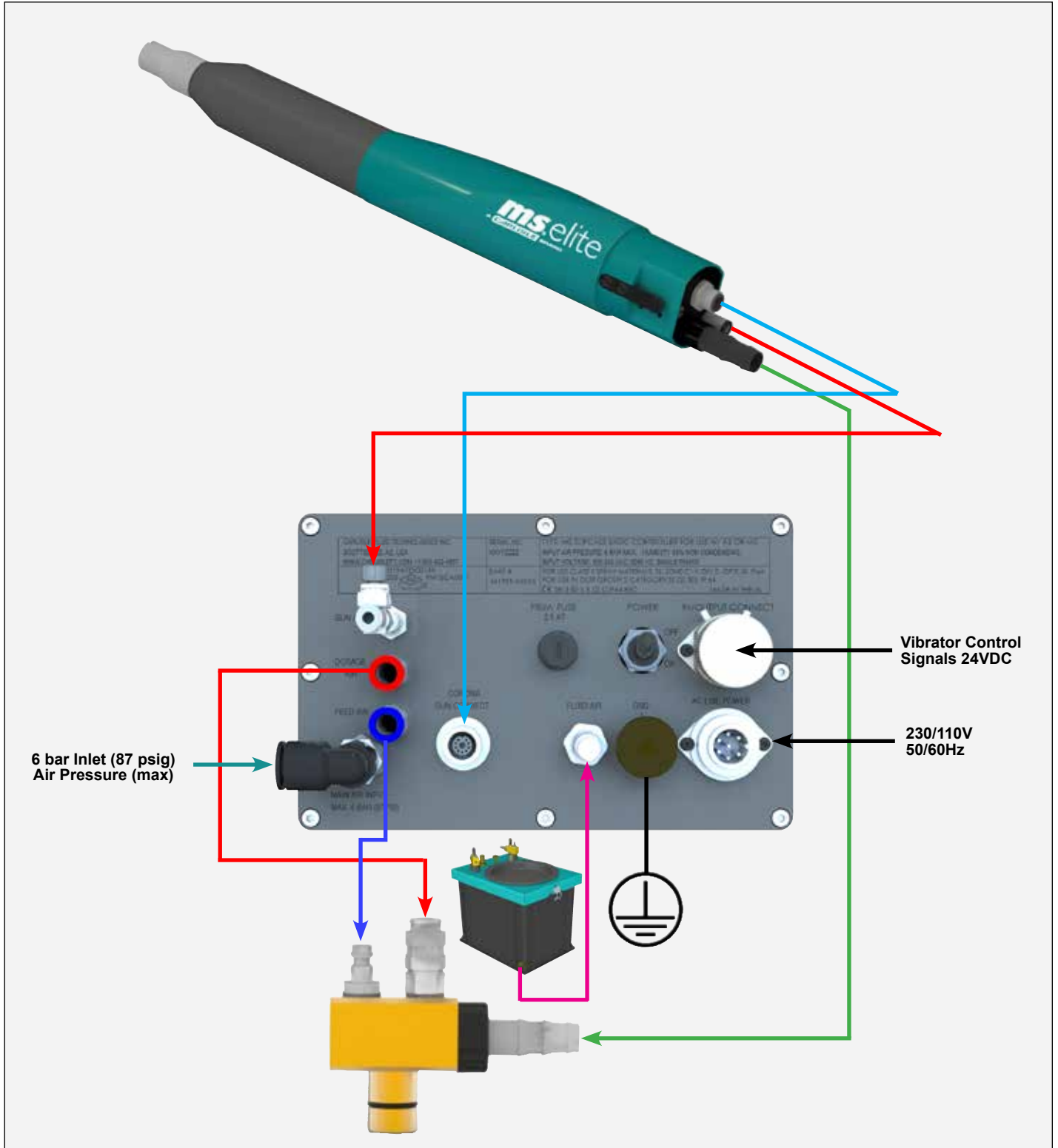
WARNING

- The applicator cable connector is keyed to ensure proper connection of the applicator cable to the applicator. The connector should be tightened to 0.6Nm.

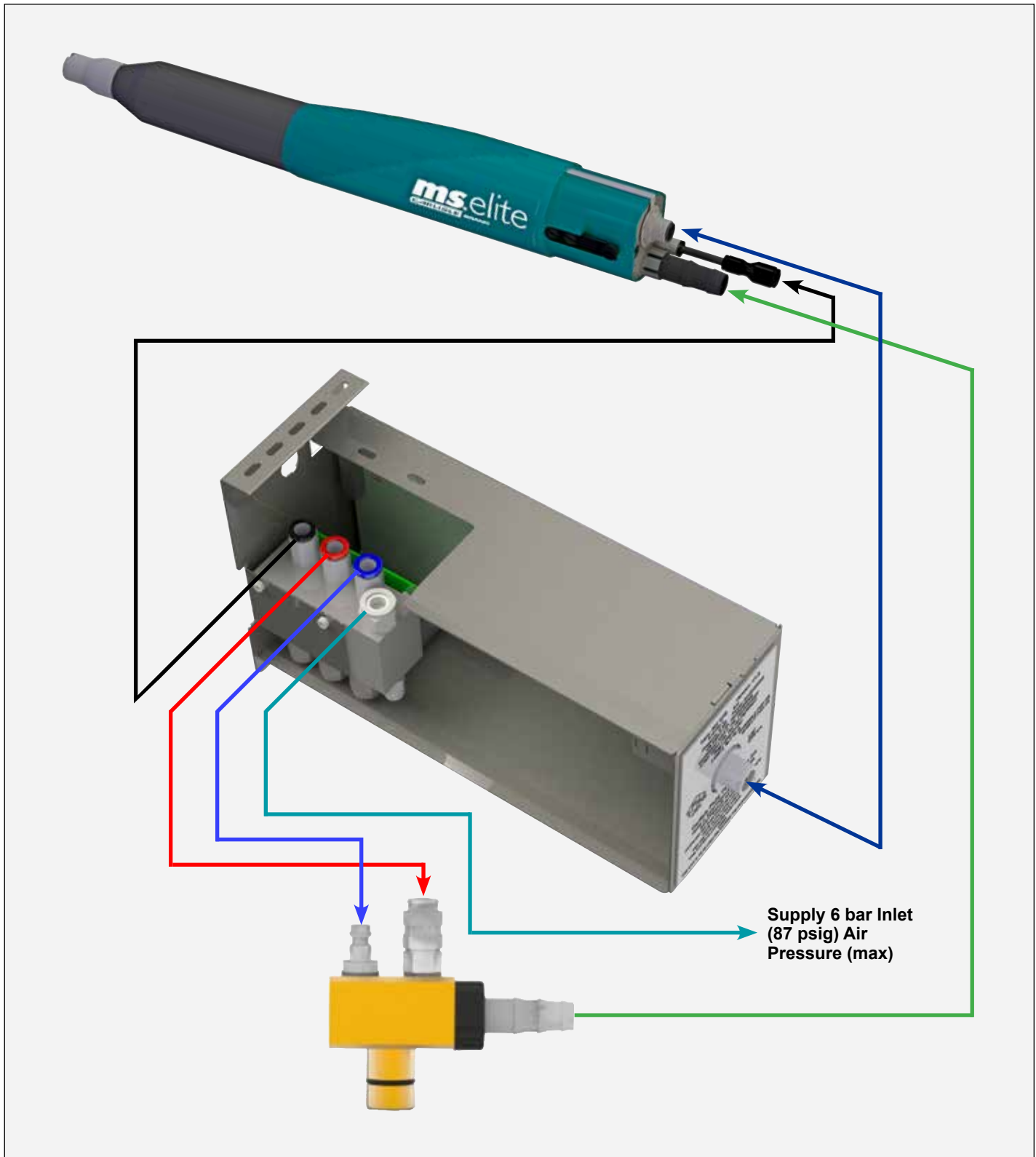
WIRING DIAGRAM OF MS ELITE CONTROL MODULE (BASIC MODEL)



WIRING DIAGRAM OF MS ELITE CONTROL MODULE (DELUXE MODEL)



TUBING DIAGRAM FOR USE WITH 610190-10

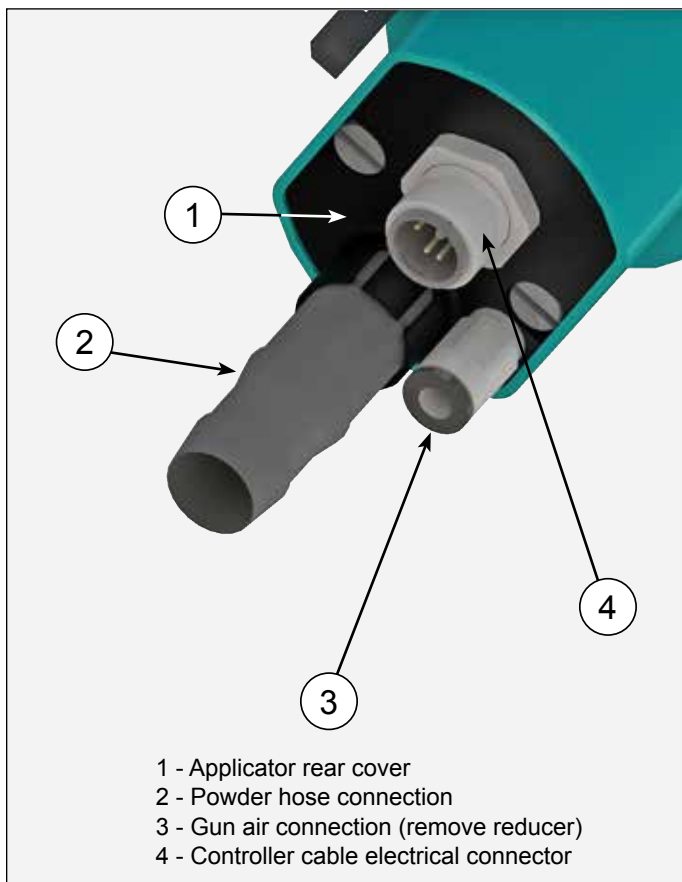


CONNECTING AUTOMATIC POWDER APPLICATOR

The powder hose is connected via a quick disconnect. There is a gun air fitting and the controller cable connection.

WARNING

- Do not unplug or plug in the applicator cable while applicator is powered on. The power must be turned off at the control unit before performing this task.



CONNECTABLE CONTROLLERS MS elite AUTOMATIC POWDER APPLICATOR

The MS elite Automatic powder spray applicator may only be operated with one of the following controllers:

- MS elite Deluxe Unit 461959-XXXXD
- MS elite Basic Unit 461959-XXXXB
- CP2 Module Assy 610190-XX

WARNING

- These devices may be used only for the application described above.

Installation Instructions

1. Ensure there is a true earth ground connection available. Connect the powder source and air hose ground to this connection.
2. Connect the air hose to the automatic applicator.
3. Connect the controller cable to the rear of the applicator and the controller. Make sure the controller is switched off.
4. Using controller, turn on and actuate air without powder. Check for air leaks in the connectors.
5. Turn off the power to the powder applicator using the controller.
6. Attach the powder hose to the rear of the applicator.

CAUTION

- Powder tube resistance is less than 1 megaohm for the entire length.

7. Turn on the powder applicator using the controller and check for leaks in the powder connections.

OPERATION

GROUNDING

Ground the powder coating system properly.

In order to achieve a good powder coating and for safety reasons (see safety regulations) the powder coating system must be properly grounded.

Good grounding of the work piece is a prerequisite for optimum powder coating. A poorly grounded work piece causes:

1. Poor wrap-around
2. Uneven coating thickness
3. Back spray onto spray applicator and user
4. Dangerous electric charging from the work piece

Requirements for good grounding are:

- Any hangers used to suspend work pieces must be electrically conductive and connected to earth ground. The ground of these hangers should be checked at least weekly. If the resistance regularly tests above 1 MOhm, the hangers should be cleaned more frequently than one week.
- The powder hose must have a resistance of less than 1 MOhm and should be regularly checked.

Important:

1. Powder residues must be regularly cleaned from hangers.
2. The earth grounding cable must be connected to the control unit.



WARNING

- The grounding of all conductive parts (for example, hooks, chain conveyors, etc.) must be checked at least weekly.
- The Resistance to earth must be <math><1\text{ M}\Omega</math> (Mega Ohm).



WARNING

- All electrical supply lines must be equipped with grounding conductor and connected. Use only power cord with ground wire.

Earth grounding is required with a minimum 11mm² copper connector to the system ground. The grounding cable must have a good metallic connection with the coating enclosure, the recovery unit and the conveyor chain. Any suspended objects must be connected to true earth ground.

Other operation instructions:

- Refer to the following manuals:
 - PA-19-07 MS Module Assembly
 - PA-19-06 MS elite Controller

MAINTENANCE

⚠ WARNING

- Inspection and maintenance of this equipment shall be carried out by suitably trained personnel.

⚠ WARNING

- Wear parts in the powder applicator, marked with a W in the spare parts list, must be checked regularly and replaced if necessary.

SCHEDULE

Daily (or at start of each shift)

- Verify all containers in hazardous area and spray area are grounded to true earth ground.
- Check within 6m (20ft) of the point of operation (of the applicator) and remove or ground ALL loose or ungrounded objects.
- Inspect all work holders for accumulated coating materials (and remove such accumulations).

Weekly

- Check resistance to ground of the work holders. Resistance must be less than 1MΩ to true earth ground measured at 500 to 1000V.
- Check applicator and associated equipment for any damage. Any damaged device must be removed from the system at once and repaired.

Annually

- Ensure interlocks between high voltage, booth ventilation and the applicator are properly functioning. If not, repair at once.

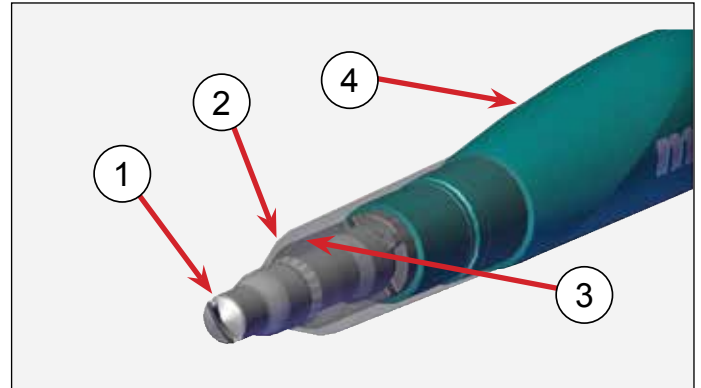
Cleaning and changing nozzles

⚠ CAUTION

- For maintenance and cleaning work the controller must be switched off at the main switch.

NOZZLE CHANGE

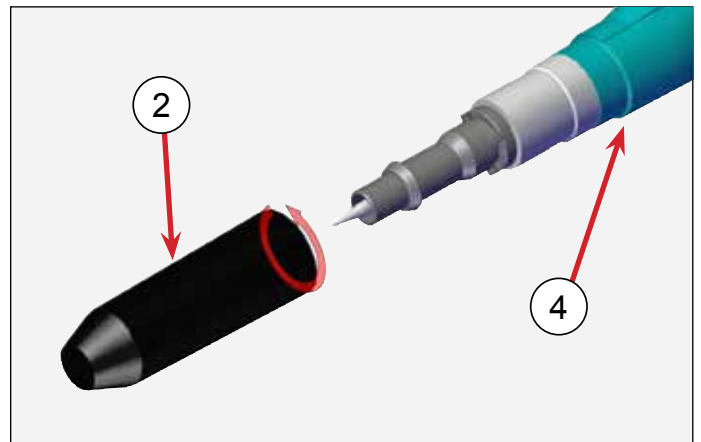
Removing the nozzle



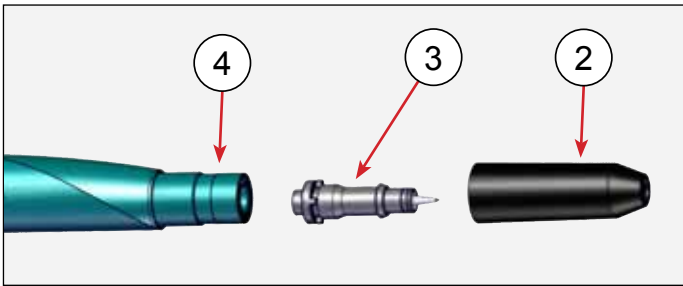
1. Clean the powder applicator.



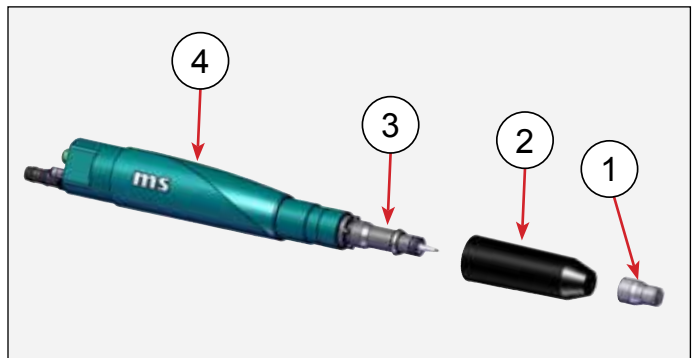
2. Pull off nozzle (1) from the nozzle tube (3).



3. Unscrew the nozzle nut (2) from the applicator body (4).



- Carefully pull out the nozzle tube (3) without twisting the applicator body (4).
- Clean the removed nozzle and powder applicator with compressed air.



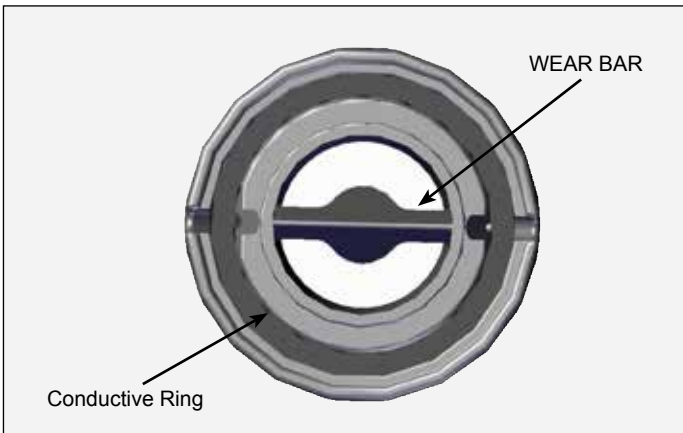
- Screw the nozzle nut (2) over the nozzle tube (3). Replace the flat spray nozzle (1). Check the nozzle slot is aligned to meet application needs.

NOTE

- At this stage, check to make sure conductive ring 461706 is intact and no excessive erosion on the wear bar and no excessive corrosion on the wear bar.

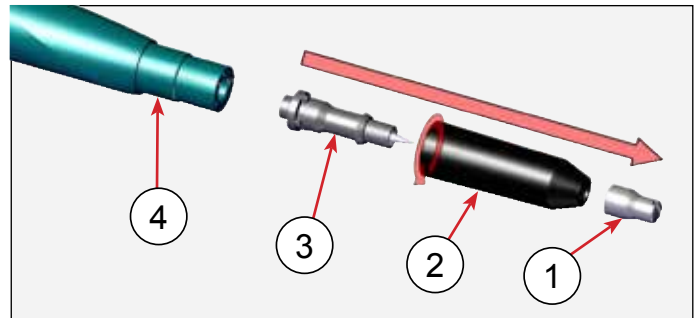
WARNING

- When pulling out and inserting the nozzle holder, always make sure the contact points are clean and undamaged.
- Do not clean the nozzle with solvent.

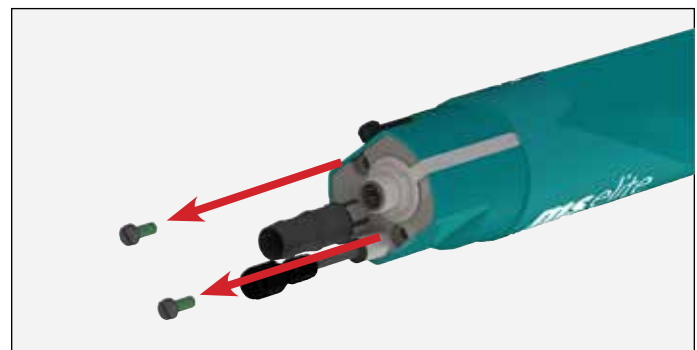


CLEANING POWDER PASSAGE

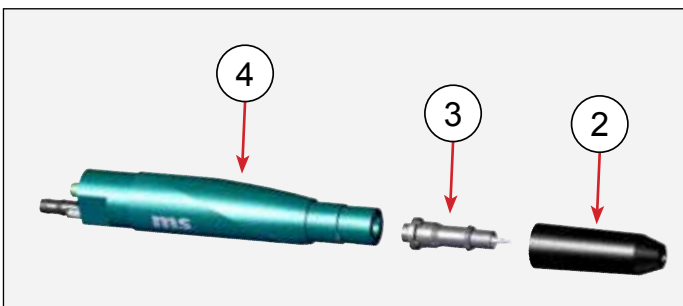
- Remove nozzle nut (2) and flat spray nozzle assembly (1, 3) as in "Changing Nozzles" section.



- Remove rear cover screws.



Installing the Nozzle

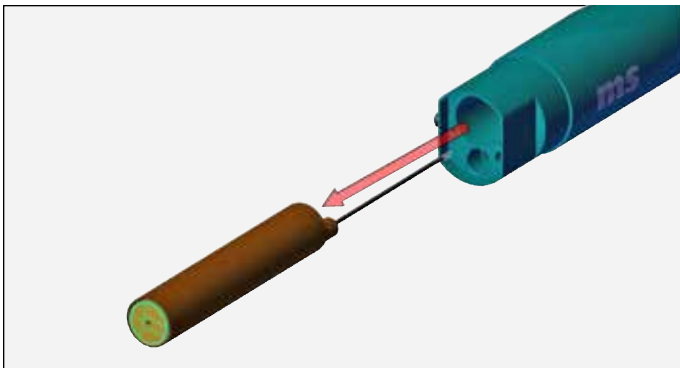


- Insert the nozzle tube (3), making sure to insert the nozzle holder correctly. Make sure the wear bar and flat spray nozzle opening are horizontal to the floor (see image).

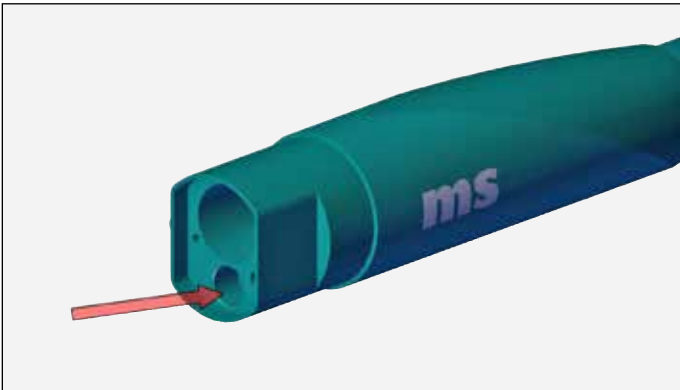
3. Remove cover and powder connector assembly.



4. Remove cascade assembly.



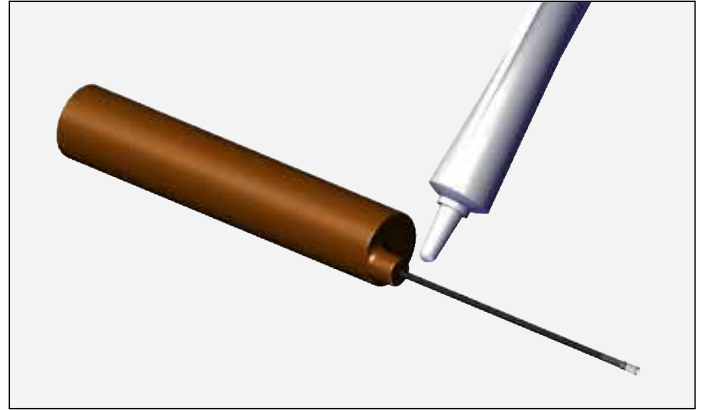
5. Use compressed air to clean powder passage, or place applicator body in an ultrasonic cleaner. Use only nonpolar solvents for cleaning.



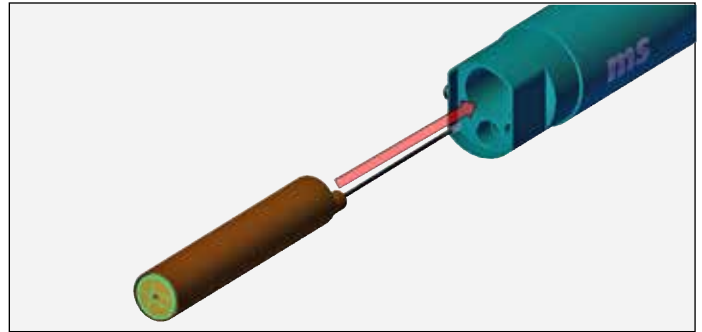
NOTE

➤ Before assembly, ensure the applicator body is clean and dry.

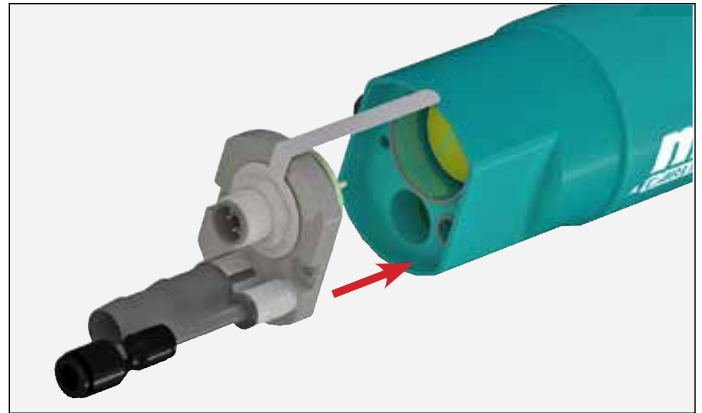
6. Apply dielectric grease along the cascade wire and body.



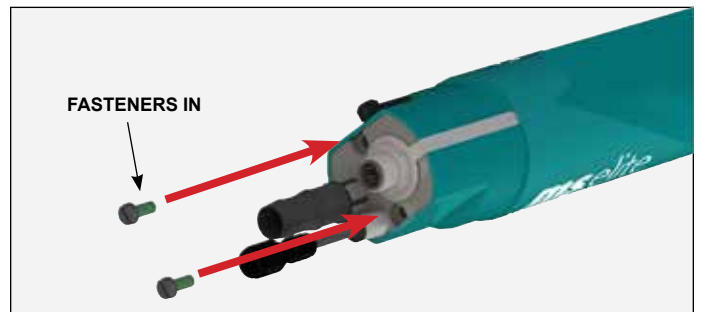
7. Reinsert cascade, taking care to orient wire correctly.



8. Replace rear cover and powder tube assembly.



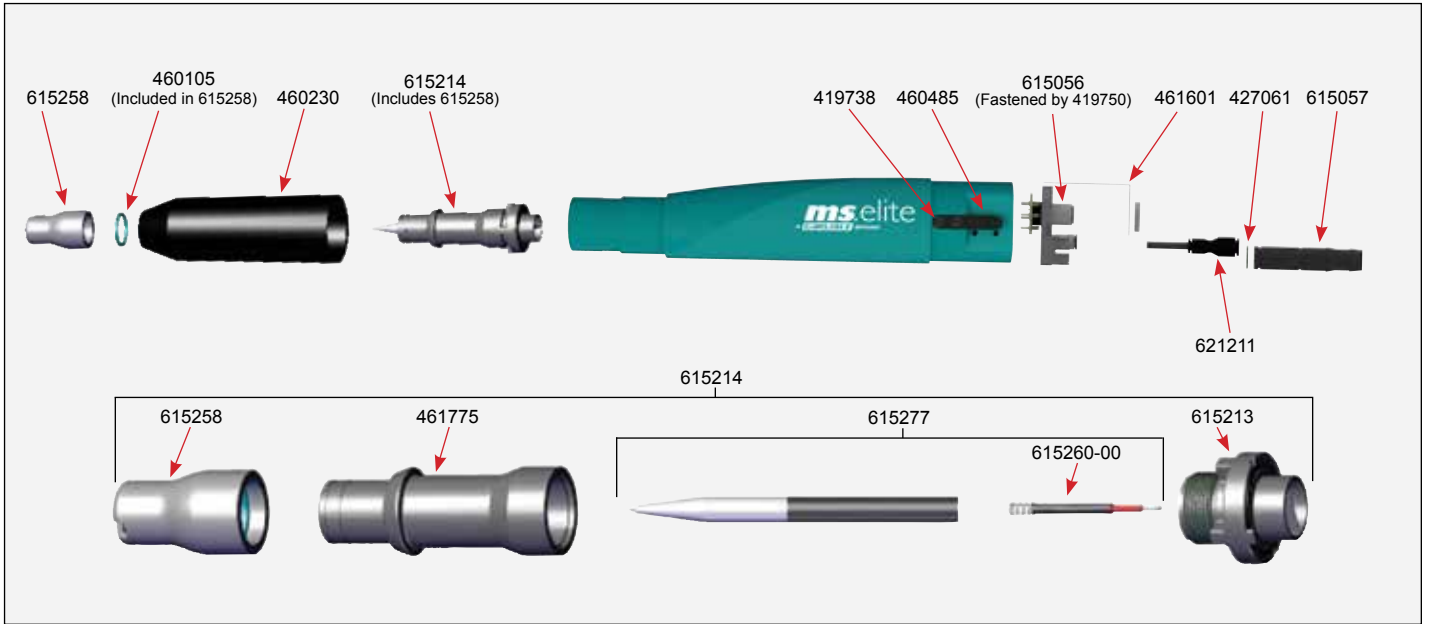
9. Replace rear cover screws.



TROUBLESHOOTING GUIDE

General Problem	Possible Cause	Solution
<i>Inconsistent Powder Cloud</i>	Wear bar or flat spray nozzle are improperly oriented	See “Installing the Nozzle” section.
<i>No Power or Air Delivery</i>	Improper power cord connection.	Check plug connections.
	Improper controller/applicator cable connection.	Check cable connections.
	Insufficient air supply	Check main air supply.
	Defective fuse on controller.	Replace fuse.
<i>No Electrostatics/ Poor Coverage (e.g. no wrap around, little or no powder adhesion)</i>	Improper grounding.	Check proper part and hanger grounding.
	Check high voltage settings.	Adjust high voltage settings.
	Powder deliver rate too excessive.	Decrease powder feed air to reduce excess powder volume and velocity.
	Excessive humidity within powder booth air.	Check humidity level, powder particles dissipate charge in humid environments.
	Applicator/controller cable.	Check continuity of cable and replace as needed.
	Defective fuse on controller.	Replace fuse.
<i>Poor wrap around Back spray</i>	Improper Grounding.	Check part and hanger grounding.
	Applicator too far from part.	Ensure proper distance between applicator and part. Too far from part will cause applicator and operator to be coated (particles seek closest ground).
<i>Powder Flow Insufficient</i>	Hoses kinked.	Check hoses.
	Air leaks in powder delivery system.	Check for leaks.
	Low powder level.	Check power level.
	Insufficient main air supply.	Check main air supply.
	Improper powder feed and dosage air settings.	Check settings.
	Powder accumulation within powder injector.	Inspect and clean/replace.
<i>Spray Cloud No Longer Correct</i>	Insufficient main air supply.	Check main air supply.
	Improper powder feed and dosage air settings.	Check settings.
	Worn nozzle system.	Replace nozzle system.

PARTS IDENTIFICATION



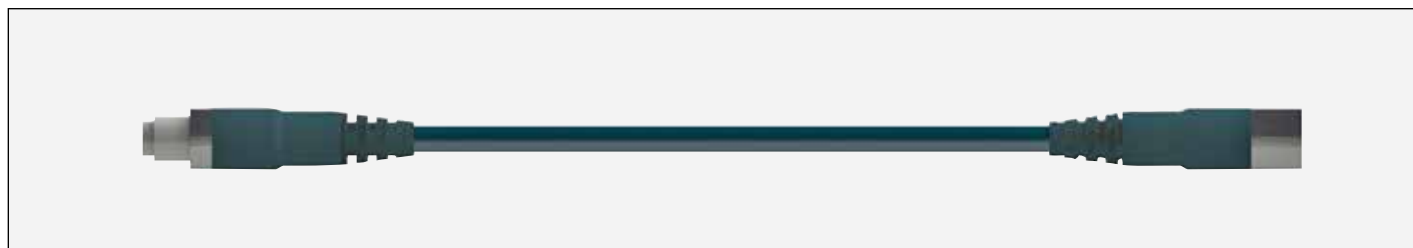
MS TOPCOAT A5 AUTOMATIC APPLICATOR SPARE PARTS

Part #	Description	Wear Part
460230	Nut, Nozzle	
461775	Nozzle Tube	W
615213	Assembly, Nozzle Holder	W
615056	Ass'y, Rear Plate (Retained with (2) 419750 Screws)	
615057	Ass'y, Powder Connector (Includes O-Ring 427061)	W
427061-K5, -K25, -K50	O-Ring, Powder Connector Kit	W
460485	Clip, Body	
460105-K5, -K25, -K50	O-Ring, Nozzle Kit	
419738	Screws (2) Required for Body Clip	
419750	Screws (2) Required for Rear Plate Ass'y	
615277, -K5	Electrode Replacement Kit	W
615260-00, -K5	Electrode Wire Assembly, Flat Spray Kit	
615214	Assembly, Flat Spray Nozzle and Electrode	W
615258	Flat Spray Nozzle, 3mm (Includes O-Ring 460105)	W
461601	Short Corona	
621211	Hose Adaptor	



ROUND SPRAY NOZZLES "R"

Part #	Description
615218	Round Spray Nozzle Set R1
460430	Round Spray Nozzle D16 (Included in 615218)
460440	Round Spray Nozzle D20 (Included in 615218)
460450	Round Spray Nozzle D24 (Included in 615218)
460460	Round Spray Nozzle D30 (Included in 615218)
615260-00, -K5	Wire Assembly Kit
615213	Assembly, Nozzle Holder
461775	Nozzle Tube

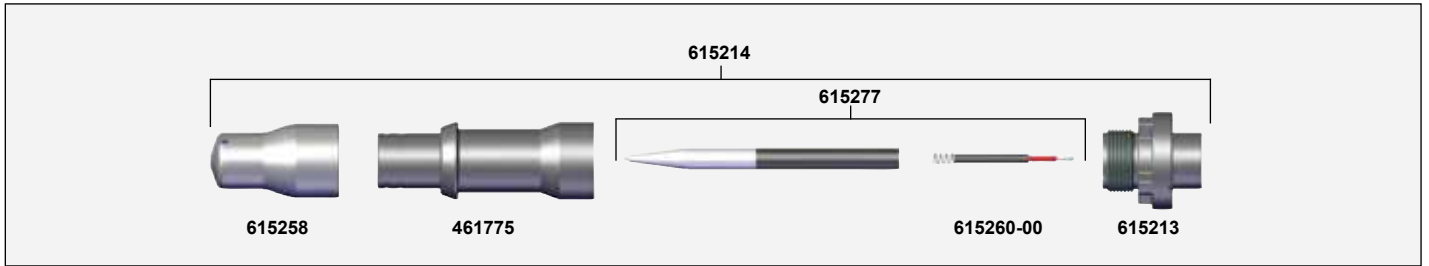


HAND APPLICATOR CABLE, elite, 9 PIN

Part #	Description
461973-12	Automatic Applicator Cable 12m elite
461973-16	Automatic Applicator Cable 16m elite
461973-20	Automatic Applicator Cable 20m elite
461973-25	Automatic Applicator Cable 25m elite

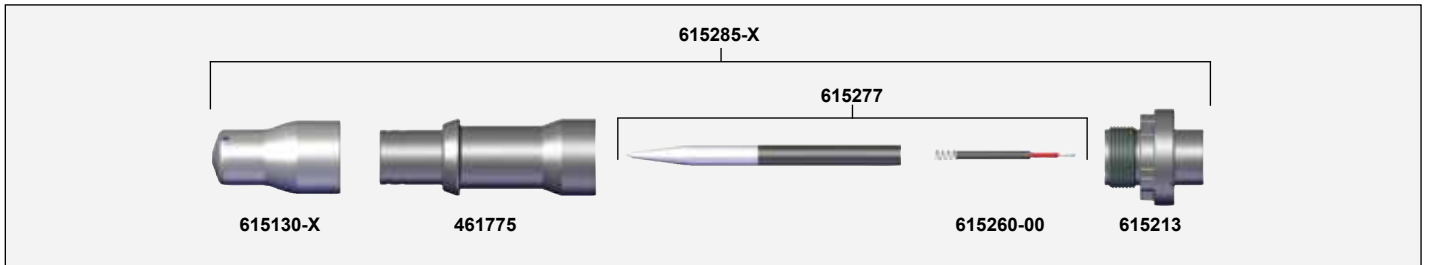
Note: New cable 461942-XX has replaced legacy cable P/N 461742-XX. For more information, please contact your customer service representative.

ACCESSORIES



FLAT SPRAY NOZZLES "C3"

Part #	Description
615214	Assembly, Flat Spray Nozzle & Electrode
615258	Assembly, Flat Spray Nozzle (Included in 615214)
460105-K5, -K25, -K50	O-Ring Nozzle Kit
615260-00, -K5	Wire Assembly Kit
615277, -K5	Electrode Replacement Kit
615213	Assembly, Nozzle Holder
461775	Nozzle Tube



FLAT JET SPRAY NOZZLES "G"

Part #	Description
615285-3	3mm Wide Flat Jet Spray Nozzle Electrode Assembly
615285-4	4mm Wide Flat Jet Spray Nozzle Electrode Assembly
615285-5	5mm Wide Flat Jet Spray Nozzle Electrode Assembly
615130-3	3mm Wide Flat Jet Spray Nozzle Assembly (nozzle and o-ring only, included in 615285-3)
615130-4	4mm Wide Flat Jet Spray Nozzle Assembly (nozzle and o-ring only, included in 615285-4)
615130-5	5mm Wide Flat Jet Spray Nozzle Assembly (nozzle and o-ring only, included in 615285-5)
460105-K5, -K25, -K50	O-Ring Nozzle Kit
615260-00, -K5	Wire Assembly Kit
615277, -K5	Electrode Replacement Kit
615213	Assembly, Nozzle Holder
461775	Nozzle Tube



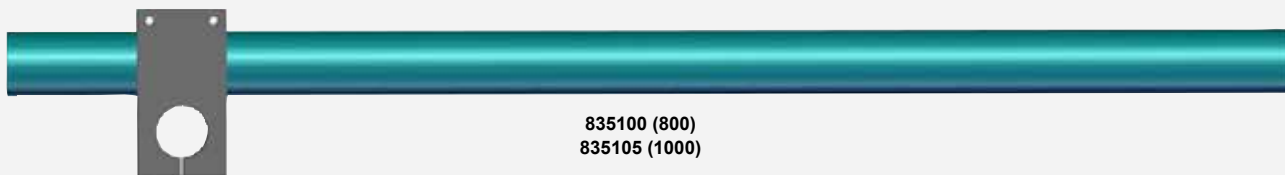
POWDER HOSE

Part #	Description
810195-06	Powder Hose 6m, (10mm ID)
810195-08	Powder Hose 8m, (10mm ID)
810195-10	Powder Hose 10m, (10mm ID)
810195-16	Powder Hose 16m, (10mm ID)
810190-20	Powder Hose 20m, (11mm ID)
810195-100	Powder Hose 100m, Bulk (10mm ID)
810190-100	Powder Hose 100m, Bulk (11mm ID)
810185-100	Powder Hose 100m, Bulk (12mm ID)



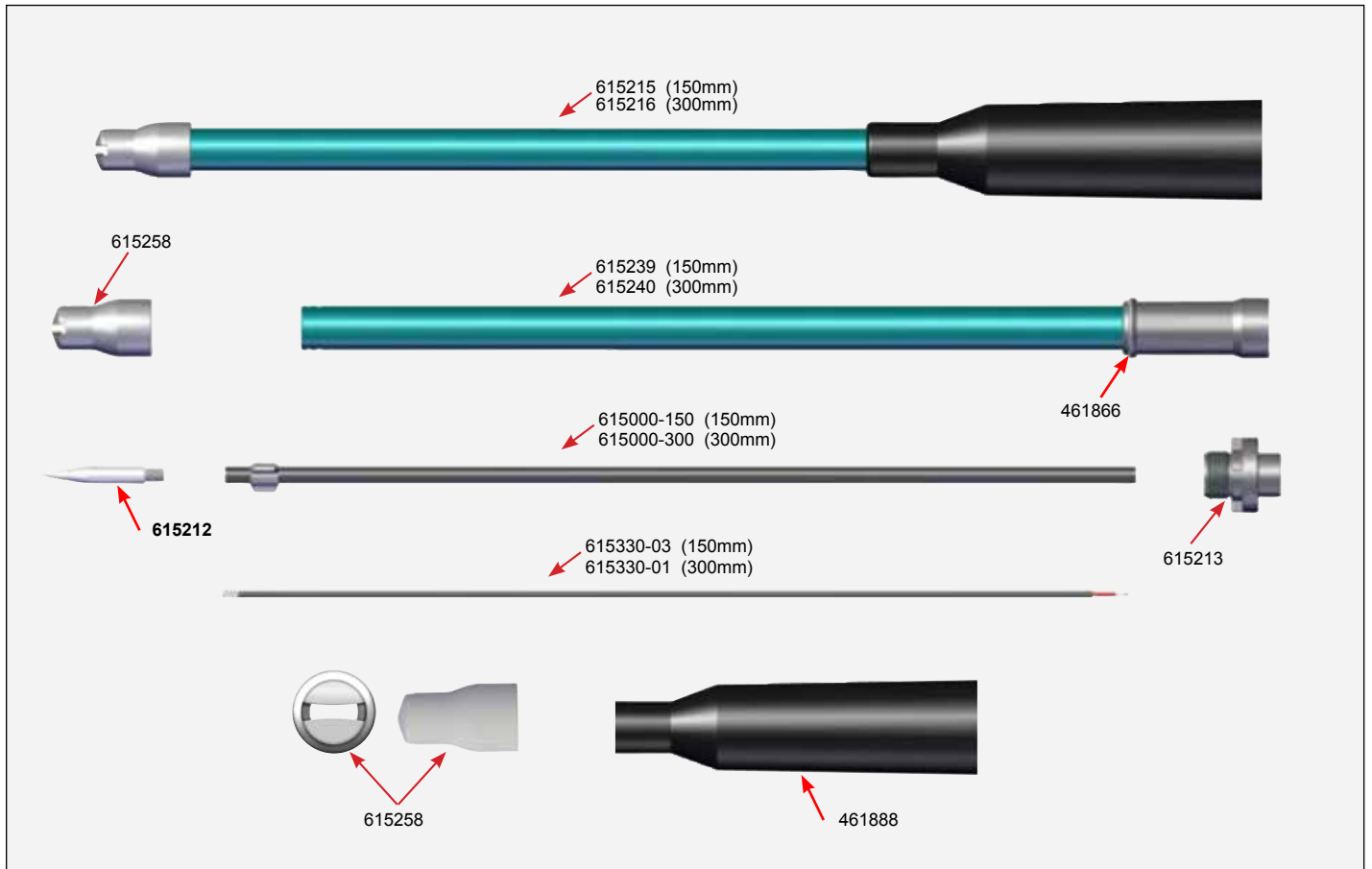
APPLICATOR AIR TUBING

Part #	Description
421370-06	Tube, 6m, (4mm OD, 2.5mm ID)
421370-08	Tube, 8m, (4mm OD, 2.5mm ID)
421370-10	Tube, 10m, (4mm OD, 2.5mm ID)
421370-16	Tube, 16m, (4mm OD, 2.5mm ID)
421370-20	Tube, 20m, (4mm OD, 2.5mm ID)
421370-100	Tube, 100m, Bulk (4mm OD, 2.5mm ID)



TUBE EXTENSIONS

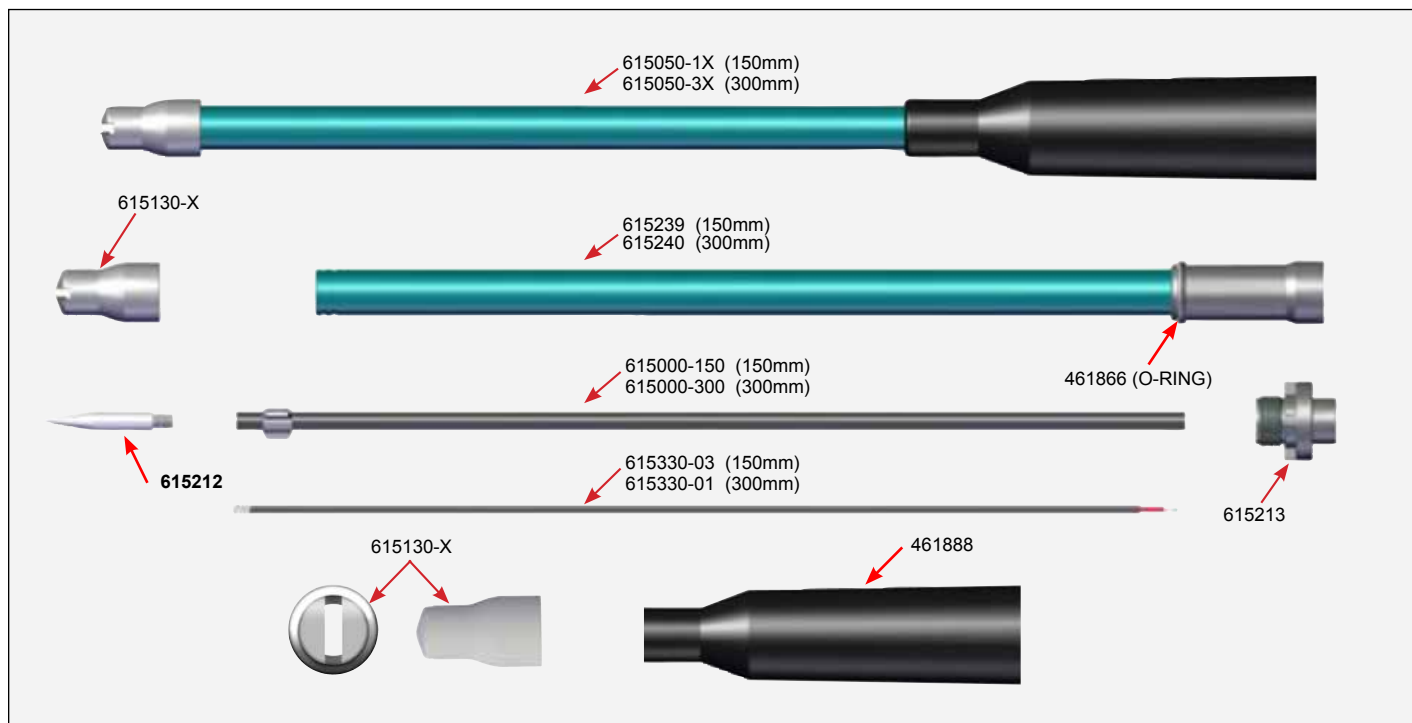
Part #	Description
612112	Cross Clamp Piece with Screws
461075-08	Tube, Extension A5 elite L=800mm
461075-10	Tube, Extension A5 elite L=1000mm



FLAT SPRAY NOZZLE EXTENSIONS “C3”

Part #	Description
615215	Assembly, Nozzle Extension Flat Spray Set, 150mm
615239	Assembly, Extension Tube 150mm
615000-150	Electrode Sleeve, 150mm
615330-03, -K5	Assembly, Wire 150mm Flat Spray Kit
615216	Assembly, Nozzle Extension Flat Spray Set, 300mm
615240	Assembly, Extension Tube 300mm
615000-300	Electrode Sleeve, 300mm
615330-01, -K5	Assembly, Wire 300mm Flat Spray Kit
615258	Assembly, Flat Spray Nozzle 3mm (Included with all lengths)
615212	Assembly, Electrode (Included with all lengths)
615213	Assembly, Nozzle Holder (Included with all lengths)
461866-K5	O-Ring, PTFE 18mm x 2mm Kit (Included with all lengths)
461888	Nozzle Nut, Extensions (Included with all lengths)

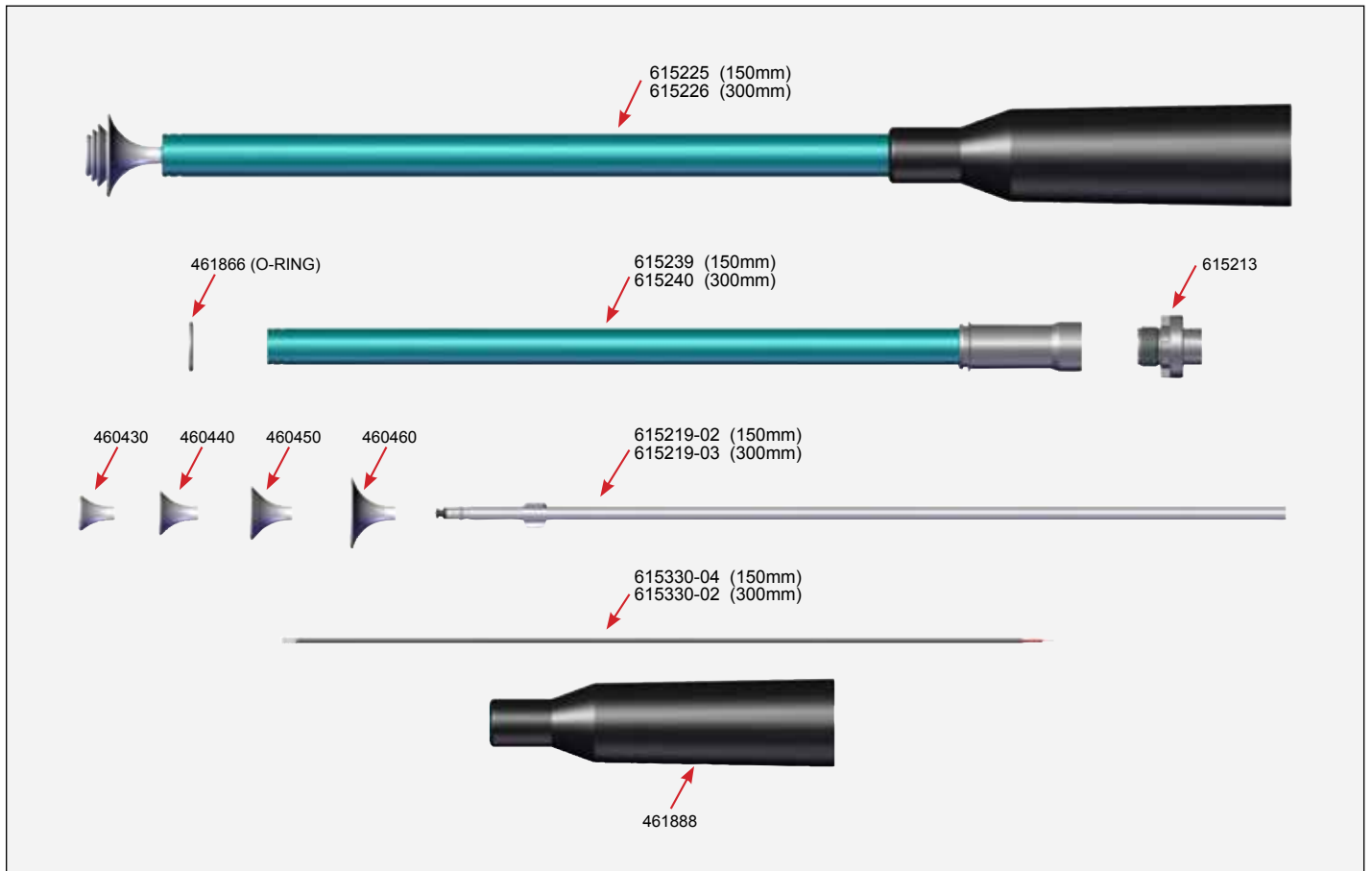
NOTE: Nozzle nut 461888 must be used with all extensions. The standard nozzle nut 460230 will not fit and is not approved for this use.



FLAT SPRAY NOZZLE EXTENSIONS “G”

Part #	Description
Assembly, Nozzle Extension Flat Jet Set, 150mm	
615050-13	Nozzle Extension Flat Jet Set, 150mm (3mm wide)
615050-14	Nozzle Extension Flat Jet Set, 150mm (4mm wide)
615050-15	Nozzle Extension Flat Jet Set, 150mm (5mm wide)
Assembly, Nozzle Extension Flat Jet Set, 300mm	
615050-33	Nozzle Extension Flat Jet Set, 300mm (3mm wide)
615050-34	Nozzle Extension Flat Jet Set, 300mm (4mm wide)
615050-35	Nozzle Extension Flat Jet Set, 300mm (5mm wide)
615239	Assembly, Extension Tube 150mm
615000-150	Electrode Sleeve, 150mm
615330-03, -K5	Assembly, Wire 150mm Flat Spray Kit
615240	Assembly, Extension Tube 300mm
615000-300	Electrode Sleeve, 300mm
615330-01, -K5	Assembly, Wire 300mm Flat Spray Kit
615212	Assembly, Electrode (Included with all lengths)
615213	Assembly, Nozzle Holder (Included with all lengths)
461866-K5	O-Ring, PTFE 18mm x 2mm Kit (Included with all lengths)
461888	Nozzle Nut, Extensions (Included with all lengths)
615130-3	Assembly, Flat Jet Nozzle, 3mm (Parallel and with O-Ring)
615130-4	Assembly, Flat Jet Nozzle, 4mm (Parallel and with O-Ring)
615130-5	Assembly, Flat Jet Nozzle, 5mm (Parallel and with O-Ring)

NOTE: Nozzle nut 461888 must be used with all extensions. The standard nozzle nut 460230 will not fit and is not approved for this use.



ROUND SPRAY NOZZLE EXTENSIONS “R”	
Part #	Description
615225	Assembly, Nozzle Extension Round Spray Set, 150mm
615239	Assembly, Extension Tube 150mm
615330-04, -K5	Assembly, Wire 150mm Round Spray Kit
615219-02	Pressure Bar, 150mm
615226	Assembly, Nozzle Extension Round Spray Set, 300mm
615240	Assembly, Extension Tube 300mm
615330-02, -K5	Assembly, Wire 300mm Round Spray Kit
615219-03	Pressure Bar, 300mm
615213	Assembly, Nozzle Holder (Included with all lengths)
461866-K5	O-Ring, PTFE 18mm x 2mm Kit (Included with all lengths)
460430	Round Spray Nozzle D16 (Included with all lengths)
460440	Round Spray Nozzle D20 (Included with all lengths)
460450	Round Spray Nozzle D24 (Included with all lengths)
460460	Round Spray Nozzle D30 (Included with all lengths)
461888	Nozzle Nut, Extensions (Included with all lengths)

NOTE: Nozzle nut 461888 must be used with all extensions. The standard nozzle nut 460230 will not fit and is not approved for this use.

MANUAL CHANGE SUMMARY

PA-18-01-R5 - Replaces PA-18-01-R4 with the following changes:

No.	Change Description	Page(s)
1.	Update SAFETY section	4-8
2.	Make multiple changes to ATEX/FM/UKEX section	13-17
3.	Text change to bullet point 3	22
4.	Change MANUAL to AUTOMATIC, redirect arrows in the image and change last WARNING to a CAUTION	26
5.	New text for the first WARNING and update SCHEDULE text	28
6.	Update both the NOTE and CAUTION	29

WARRANTY POLICY

This product is covered by Carlisle Fluid Technologies' materials and workmanship limited warranty. The use of any parts or accessories, from a source other than Carlisle Fluid Technologies, will void all warranties. Failure to reasonably follow any maintenance guidance provided, may invalidate any warranty.

For specific warranty information please contact Carlisle Fluid Technologies.

For technical assistance or to locate an authorized distributor, contact one of our international sales and customer support locations.

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