



MS elite M5 Manual Powder Spray Applicator

Model: 615210



2813



II 2D 2mJ

NOTE: This manual has been changed from revision **PA-17-08-R5** to revision **PA-17-08-R6**. 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.

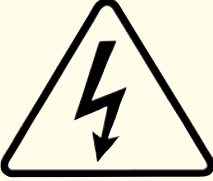
WARNING




- 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.

<p>AREA Tells where hazards may occur.</p>	<p>HAZARD Tells what the hazard is.</p>	<p>SAFEGUARDS Tells how to avoid the hazard.</p>
<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, 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 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>

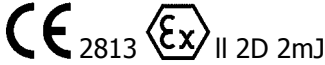
AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p style="text-align: center;">Spray Area</p> 	<p>Explosion Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent 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 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 areas, in accordance with NFPA 33.</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 Meg Ohm. (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 handgun, 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 flushing, cleaning, or working on spray 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 hazardous areas, in accordance with NFPA 33.</p> <p>Avoid installing an applicator into a fluid system where the solvent supply is ungrounded.</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 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>
<p>Spray Area</p> 	<p>Explosion Hazard — Incompatible Materials</p> <p>Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1, - Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.</p>	<p>Spray applicators require that aluminum inlet fittings be replaced with stainless steel.</p> <p>Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your coating supplier. Any other type of solvent may be used with aluminum equipment.</p>

INTENDED USE

1. The MS elite M5 Manual 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 M5 Manual 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 M5 Manual 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 M5 Manual 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 M5 Manual 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 50050-2 FM 7260	IP64	T6 (Zone 21) T4 (Zone 22)
		

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.

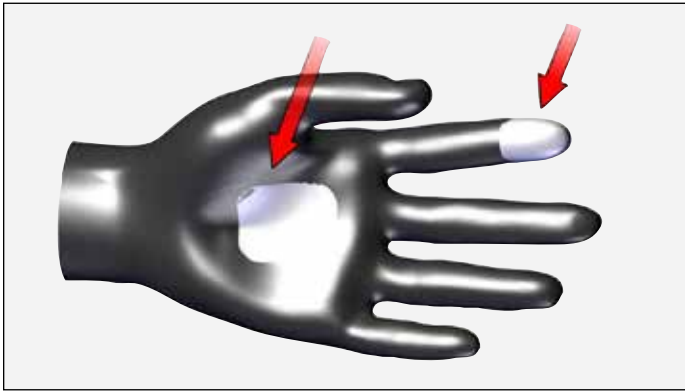
WARNING

- 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

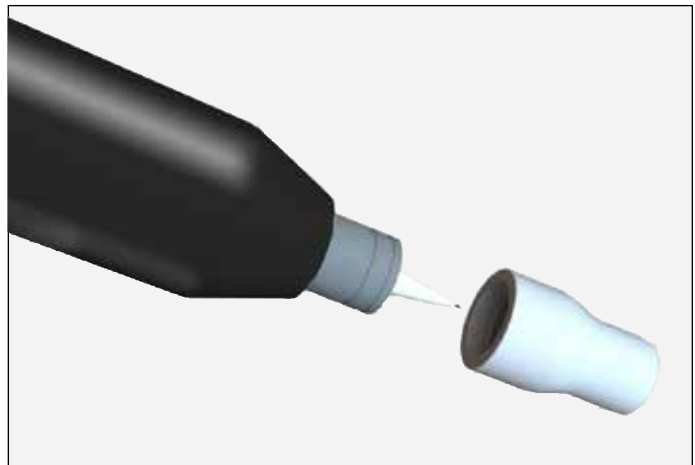
- The operator must ensure that the manual powder coating equipment and accessories are tested as required, this should be done at least annually by an expert on safe working condition.

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. When using the manual powder applicator, the operator's hand must make intimate contact with the handle. If gloves are worn, they must be electrostatically conductive, or the palm must have a suitable cut out to allow direct contact with the conductive black part of the handle. An example of a suitable cut out is shown on the next page. (EN 1149-1, EN 1149-2)



5. 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.
6. The voltage and powder feed lines to the powder applicators must be protected against mechanical, thermal and chemical damage.
7. 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.
8. The booth air must be interlocked with the controller of the powder applicator. If the booth is switched off the controller is off.
9. 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)
10. 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).
11. The powder spraying equipment should be checked annually by the operator for explosion protection.
12. 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).
13. When cleaning the powder applicator and when replacing the nozzles, the controller must be switched off.
14. 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.
15. Powder must be used according to the manufacturer's instructions.
16. When disposing of powder and cleaning agents, manufacturer's instructions and the applicable environmental protection regulations must be observed.
17. In the case of damage (broken parts, cracks, etc), these components should be removed and the powder applicator no longer operated.
18. 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 automatically move 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 and with temperature class T6.
2. 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.
3. Installation shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-14:2014. Power cord must be plugged into power source outside all classified zones.
4. 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.
5. 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.
6. Putting into service, use, assembling, and adjustment of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation. The instructions must be followed in order to avoid possible electrostatic charging hazards.

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

- a. Installation
- b. Operation
- c. Maintenance
- d. Parts Identification

7. 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.

8. 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.

Refer to "Specifications" in the "Introduction" section:

- a. High voltage cascade is encapsulated with a solvent resistant epoxy.
9. A recapitulation of the certification marking is detailed in the "ATEX" section on the next page.
10. 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.

MS elite M5 615210 ATEX/UKEX Product Marking Definitions

Ex Certificate Number: FM 19ATEX0004X and FM21UKEX0140X

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

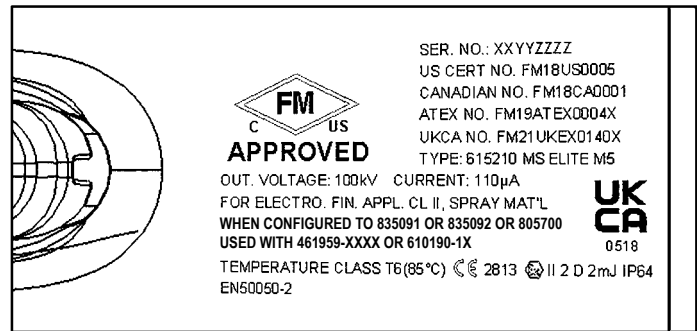
2 = Equipment Category

D = Type of explosive atmosphere (dust)

EEx 2mJ = The MS elite M5 applicator is suitable for use in manual spraying installations complying with EN 50050-2: 2013 as it is a Type A class with a discharge energy limit of 2mJ.

X = Special conditions for safe use

1. This equipment must be used in accordance with EN 50050-2 for manual applications.
2. Approved for safe use when configured to drawing 835091 or 835092, or 805700.
3. The instructions must be followed in order to avoid possible electrostatic charging hazards.



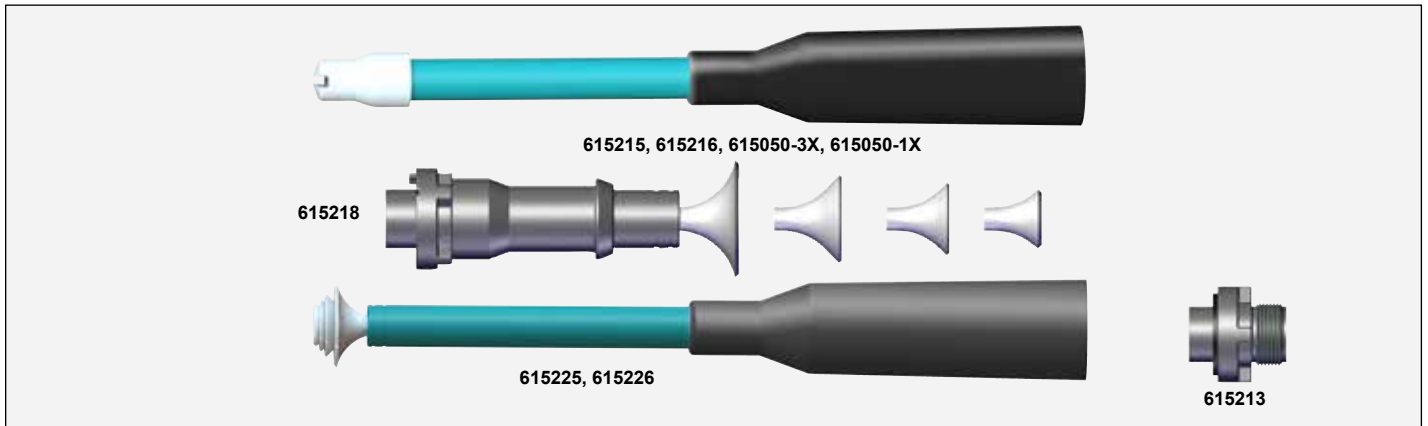
FM Configuration

This application is FM, ATEX, and UKEX approved when the setup is using components shown on page 15.

APPROVALS (ATEX/FM/UKEX)

615210

Base Model No.
(Ordering information only)



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:	458 g (Without cable and hose assembly) (15.1 oz.)
Length:	350 mm (Flat spray nozzle) (13.7 inches)

Electrical Data:

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

Pneumatic Data:

Input air pressure (Main Supply):	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
Residual oil in the compressed air:	max. 0.01 mg/m ³
Air throughput:	5-20 Nm ³ /h

Ambient Condition:

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

Usable Powder:

Plastic Powder, Metallic Powder

Certificate Numbers:

FM 18US0005, FM 18CA0001, FM 19ATEX0004X, FM21UKEX0140X

Environmental Degree of Protection:	IP 64
Temperature range:	Without vibration motor 10° C - 85 °C (50 °F - 185 °F) With vibration motor 10C - 135C (50F - 185F)

Ignition Protection:

2mJ according to EN 50050-2013

INTRODUCTION

PRODUCT DESCRIPTION

Application

The MS elite M5 manual 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 manual 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
615210	MS elite M5
	Flat spray nozzle set (615214 included in 615210)
PA-17-08	This service manual in electronic form on a USB memory stick

The elite M5 manual 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 M5 manual 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.



MS elite M5 MANUAL PARTS BREAKDOWN

Item #	Description
1	Body of the applicator
2	Operator panel
3	Nozzle nut
4	Flat spray nozzle
5	Trigger
6	Applicator cable connector
7	Powder hose connector
8	Applicator air inlet barb



FUNCTION

Upon actuation of the trigger (1) (controller is turned on), the cascade is activated in the spray applicator. Simultaneously, the powder supply (2) as well as the air supply (3) is activated and sent to the spray applicator. The powder moves along the applicator and comes into contact with the high voltage.

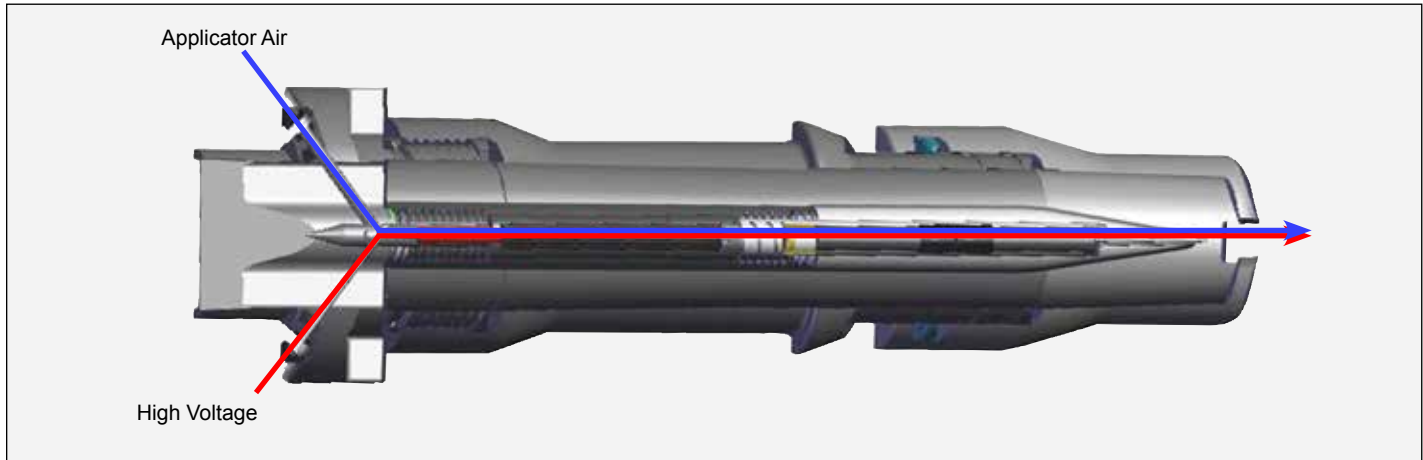
The high voltage differential between the grounded work piece and the electrode of the coating applicator generates an electric field, which transmits a negative charge on the individual powder particles.

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 FUNCTIONS

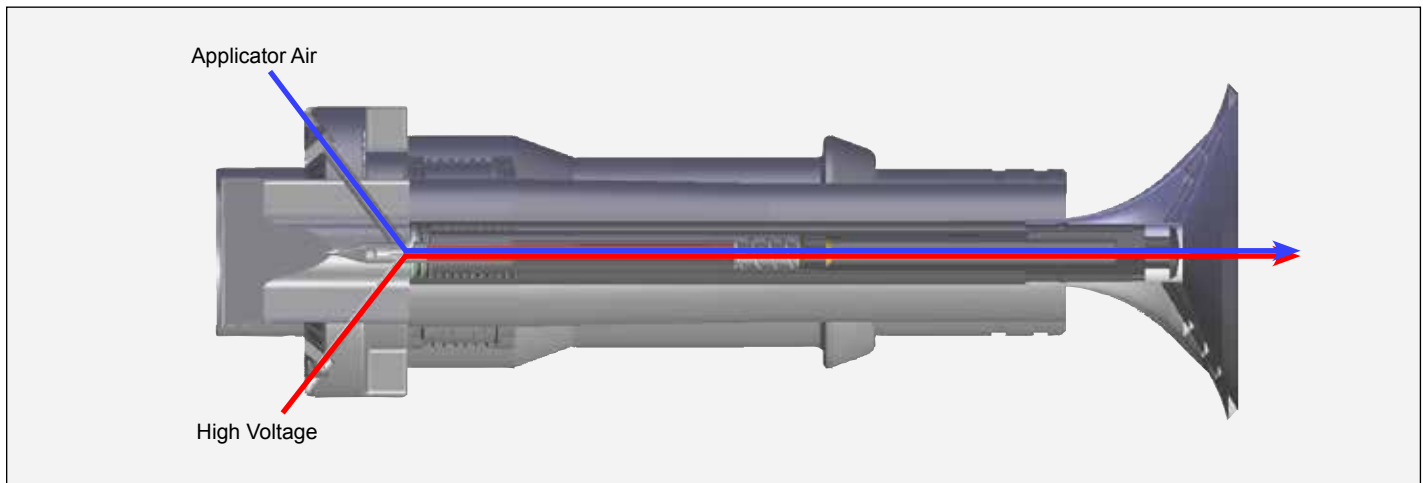
Flat fan nozzle

The applicator air is used to cool the electrode in the flat spray nozzle during operation to deter impact fusion.



Round spray nozzle

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



INSTALLATION

COMMISSIONING AND OPERATION OF MS elite M5 MANUAL 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 MANUAL 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 present here.
3. In case of an issue, solve the issue as described in the section Maintenance: 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.

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

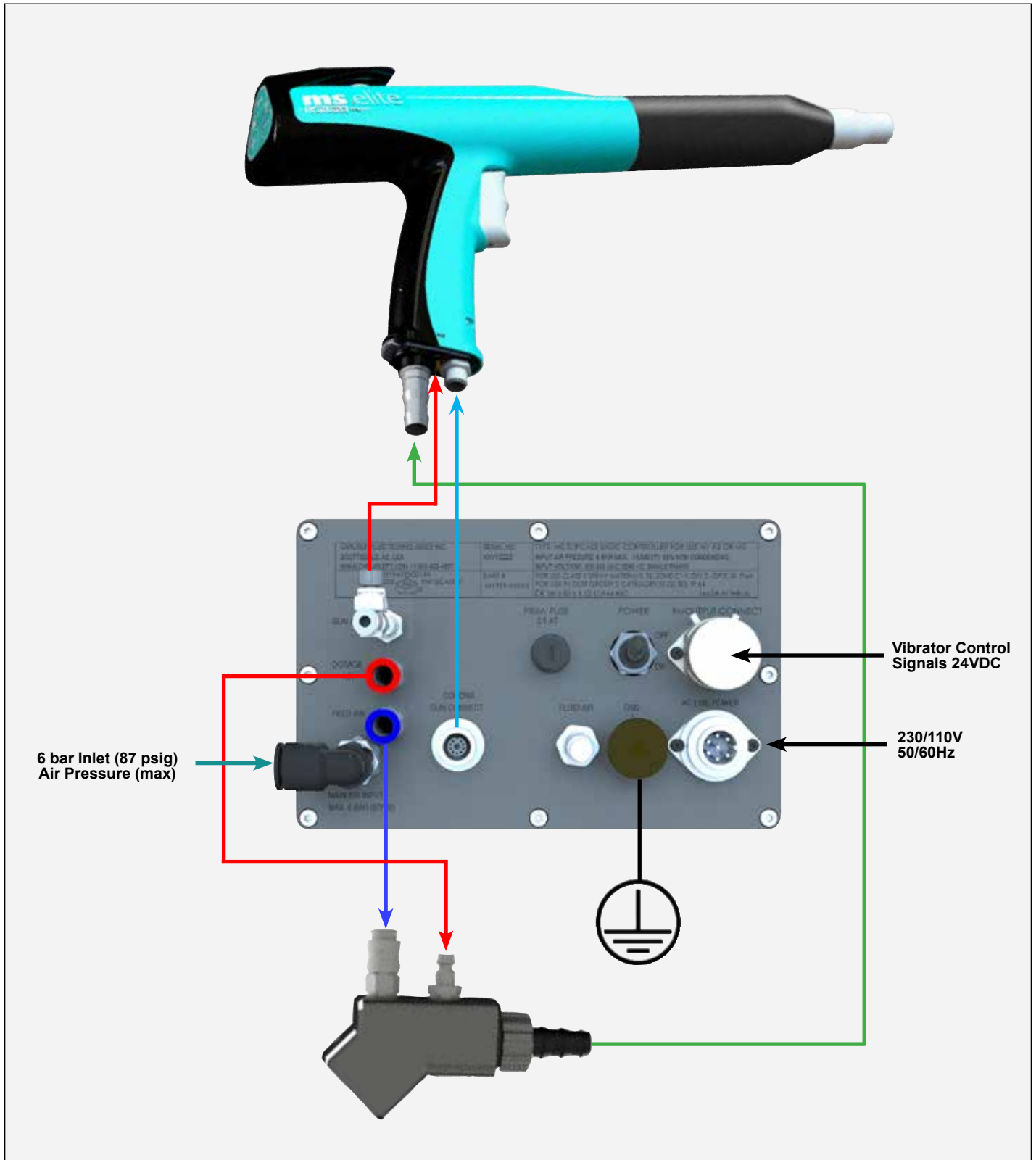
Feed Air Hose	Feed Air (Blue)	Controller	Feed Air Connection on injector
Dosage Air Hose	Dosage Air (Red)	Controller	Dosage Air Connection on injector
Powder Hose		Powder Injector Output	Powder Applicator



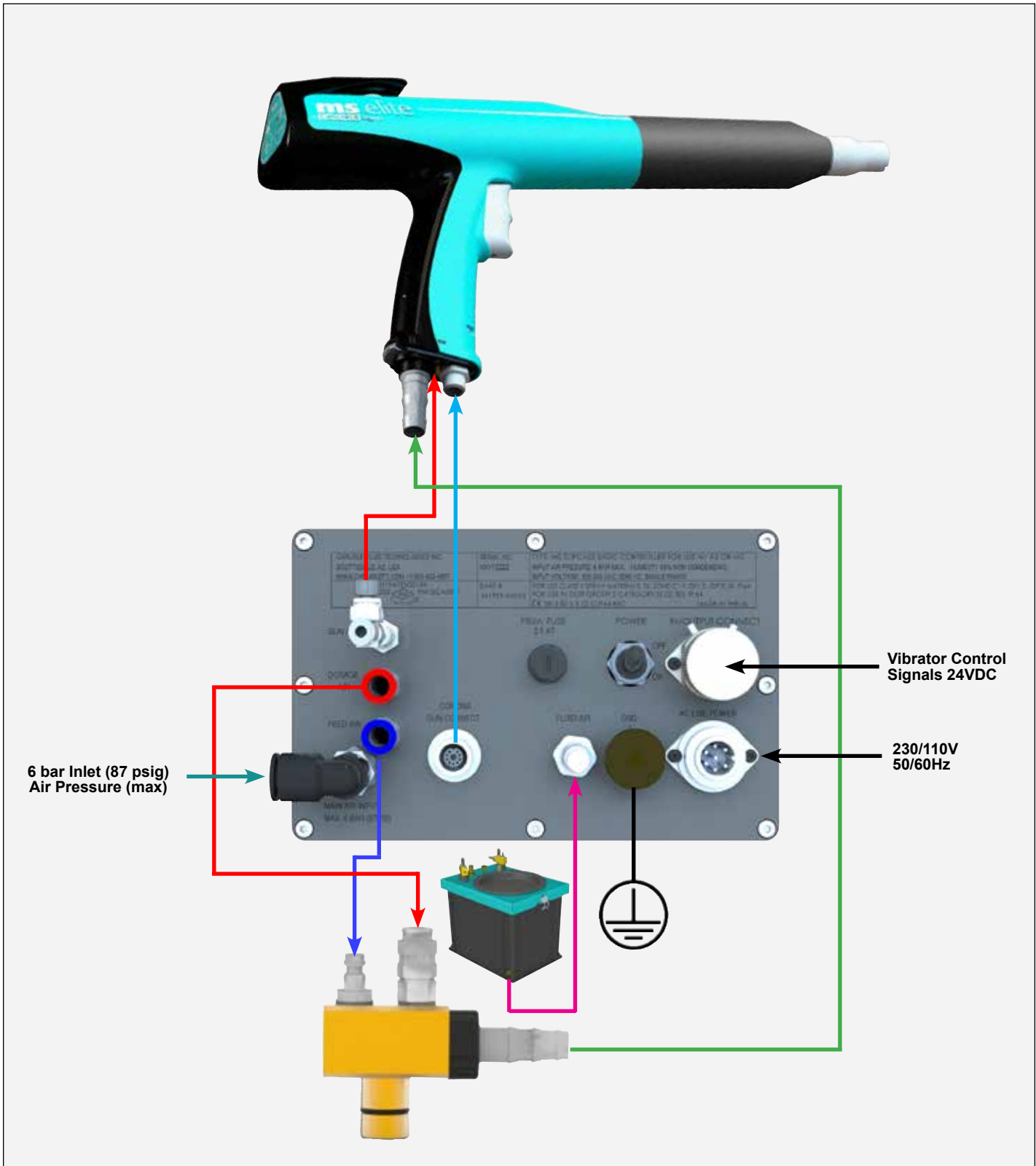
WARNING

- 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 FOR VIBRATORY CART



WIRING DIAGRAM OF MS elite CONTROL MODULE FOR FLUIDIZED HOPPER

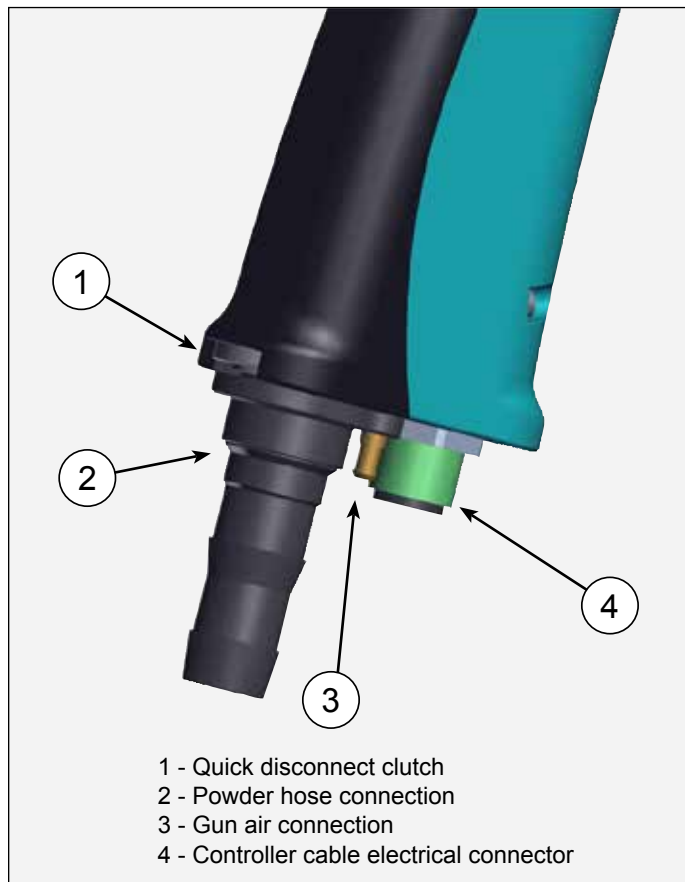


CONNECTING MANUAL POWDER APPLICATOR

The powder hose is connected via a quick disconnect. This enables a rapid plugging and unplugging of the powder hose. The powder hose is locked into the applicator. The powder hose can be connected by pushing item 1 below to open the locking connection. After the tube is fully inserted remove the pressure on item 1 which will lock the tube in place.

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 MANUAL POWDER APPLICATOR

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

- MS Topcase Deluxe Unit 461959-XXXXD
- MS Topcase Basic Unit 461959-XXXXB
- MS Topcase Elite Cart Unit (805700-XXXX)
- 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 manual applicator.
3. Connect the controller cable to the bottom 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 back of the applicator.

WARNING

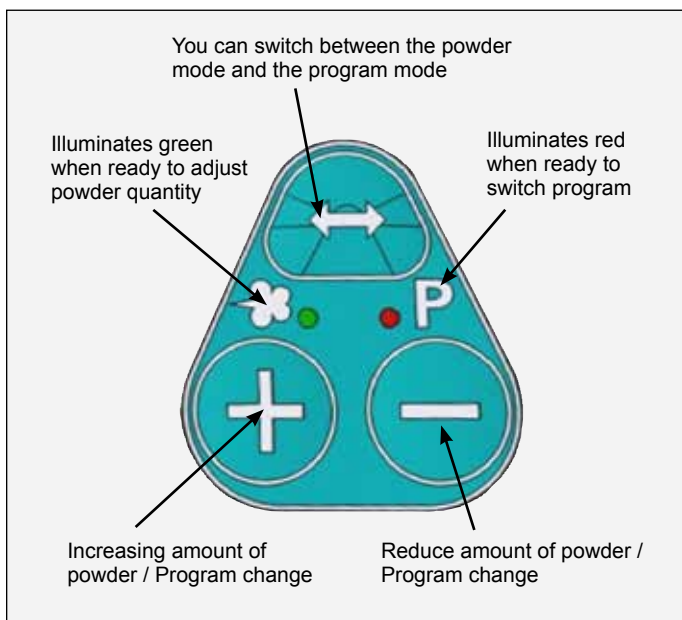
- Powder tube resistance is less than 1 megaohm for the entire length.
7. Turn on the powder applicator using the controller and check for leaks in the powder connections.

For more detailed instructions of hooking up a powder system, see PA-18-03 Elite Cart System manual.

OPERATION

OPERATION

On the back of the manual powder spray applicator is a control panel. With this, the programs can be changed and the amount of powder can be adjusted. By pressing the arrow keys you can switch between program changes and powder quantity settings.



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 grounding cable must be connected to the control unit.

WARNING

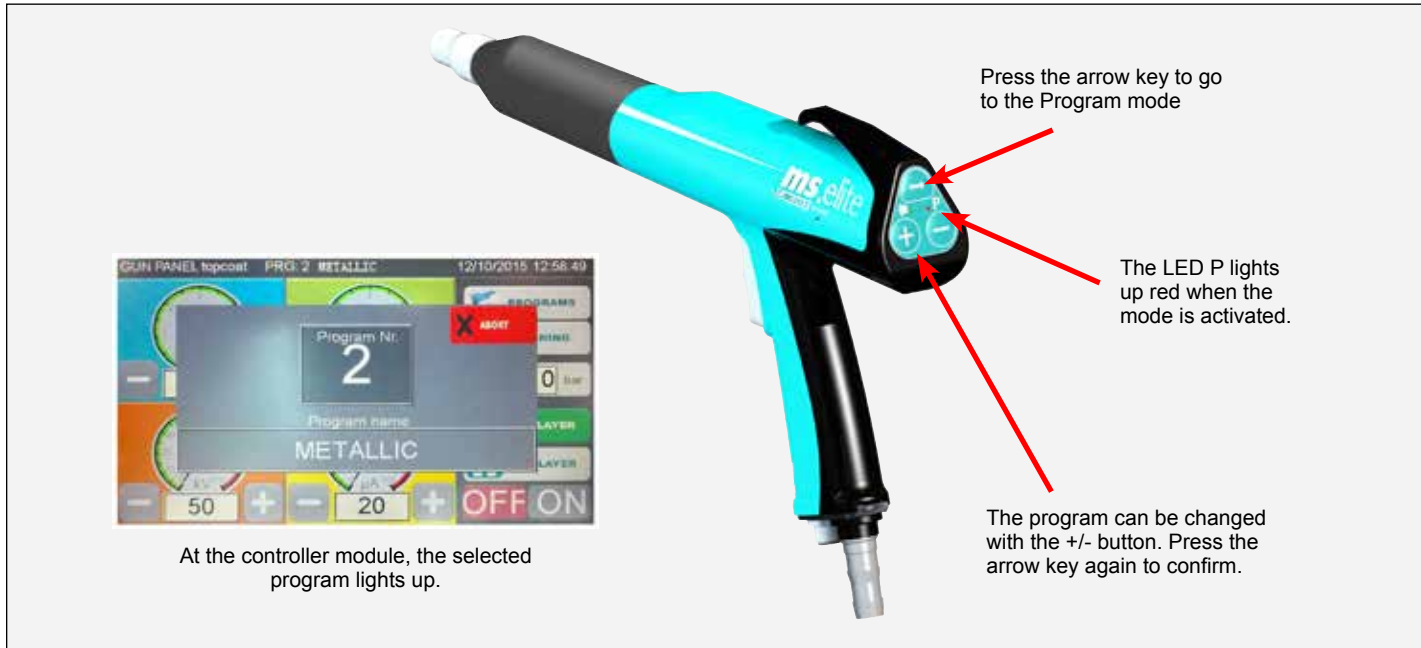
- The grounding of all conductive parts (for example, hooks, chain conveyors, etc.) must be checked at least weekly.
- The Resistance to earth must be $<1 \text{ M}\Omega$ (Mega Ohm).

WARNING

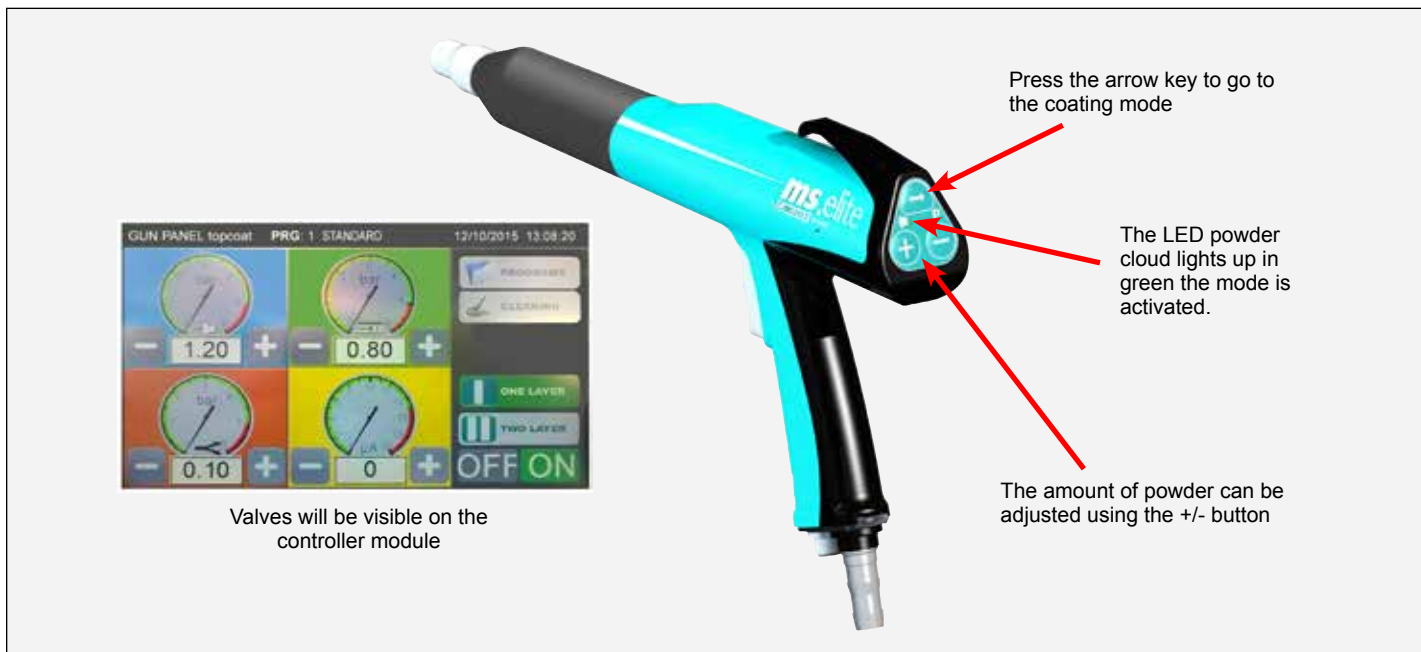
- All electrical supply lines must be equipped with grounding conductor and connected. Use only power cord with ground wire.

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.

CHANGING PROGRAM ON THE MANUAL POWDER APPLICATOR



CHANGING POWDER QUANTITY ON THE MANUAL POWDER APPLICATOR



WARNING

- For the operation of the installation follow the operating instructions of the corresponding Control Units. ref. PA-19-06.

NOTE

- When changing program or powder quantity, perform the entire operation using only one method (back of applicator or Topcase controls). For more information, please see the appropriate Topcase manual.

MAINTENANCE

MS elite M5 MANUAL POWDER APPLICATOR

⚠ CAUTION

► Maintenance, repair or replacement of parts may only be performed by trained personnel of Carlisle Fluid Technologies.

⚠ WARNING

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

Cleaning and Changing Nozzles Interruption of Work

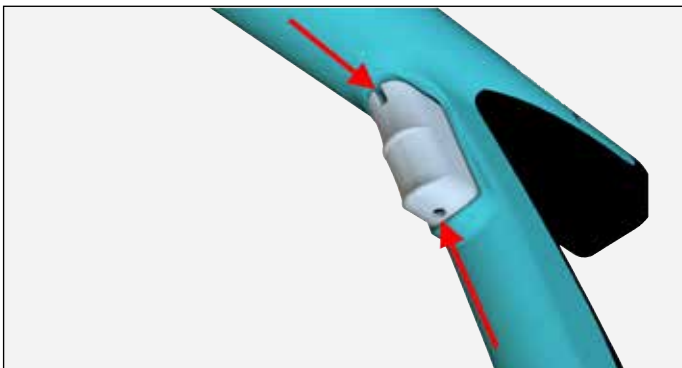
⚠ CAUTION

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

If work is interrupted, the powder applicator should be blown through and cleaned of residual powder.

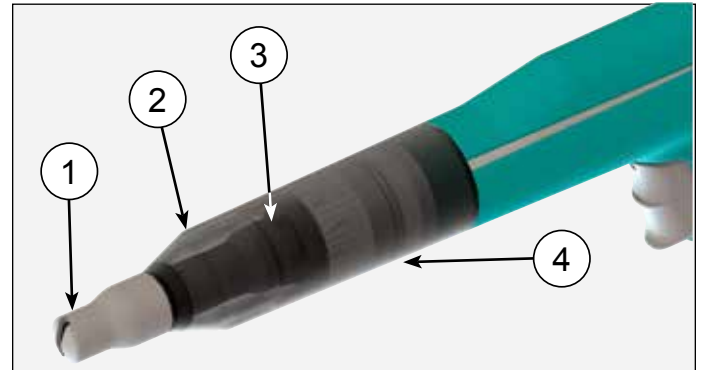
Pre Cleaning:

1. Turn off controller.
2. Pull out the powder injector from injector connection, so that no more powder can be conveyed.
3. Hold the powder applicator in the spray enclosure and clean with compressed air the powder applicator of powder.
4. Clean trigger and switch components using compressed air directed into the top and bottom air pathways on the trigger. Air is introduced where the arrows are pointing.

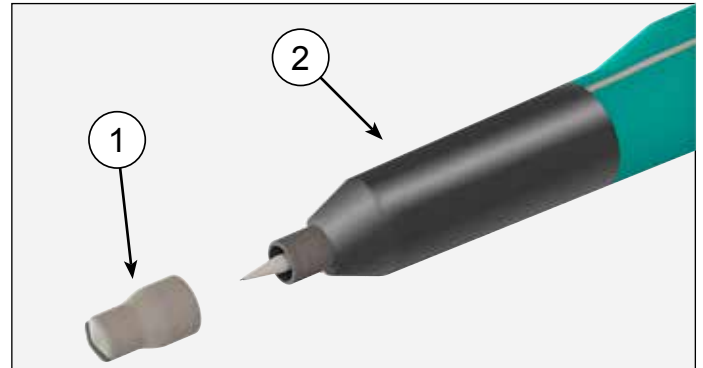


NOZZLE CHANGE

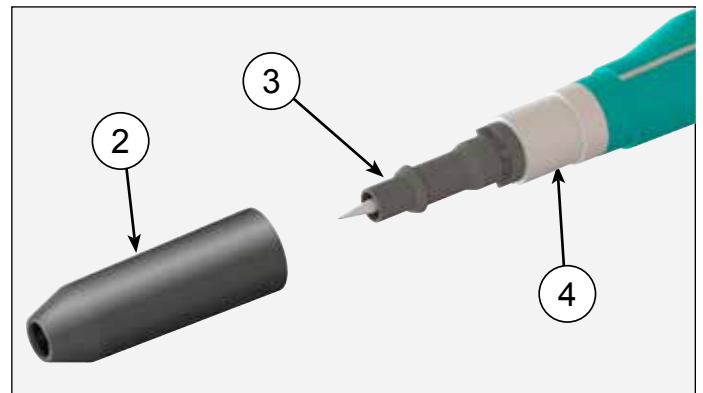
Removing the Nozzle



1. Clean the powder applicator as described in the Pre-Cleaning and Disassembly.

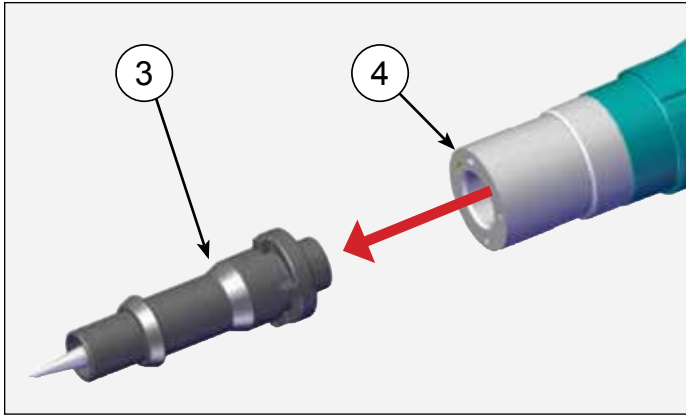


2. Remove nozzle (1) from the nozzle tube (3).

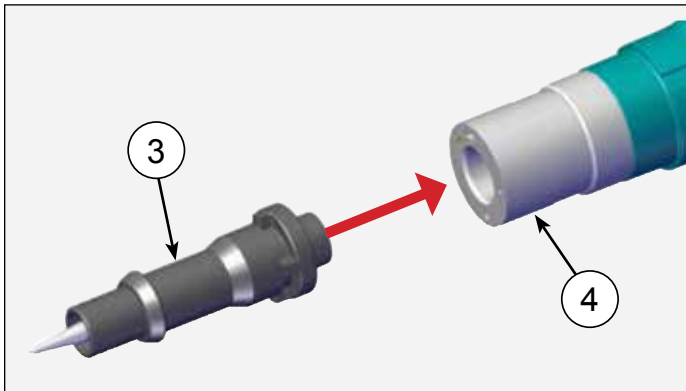


3. Unscrew the nozzle nut (2) from the applicator body (4).

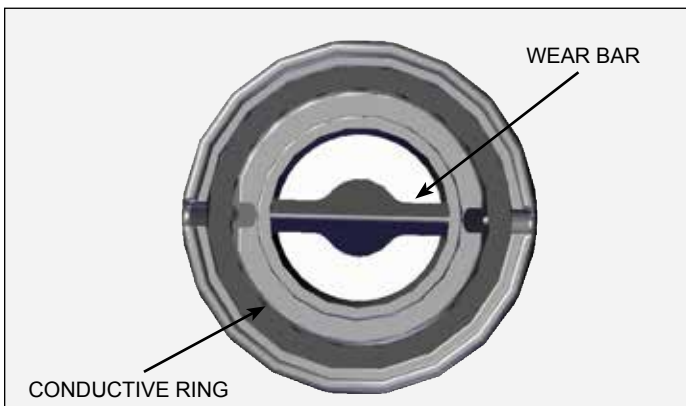
4. Carefully pull out the nozzle tube (3) without twisting the applicator body (4).
5. Clean the removed nozzle and powder applicator with compressed air.



Replacing the Nozzle

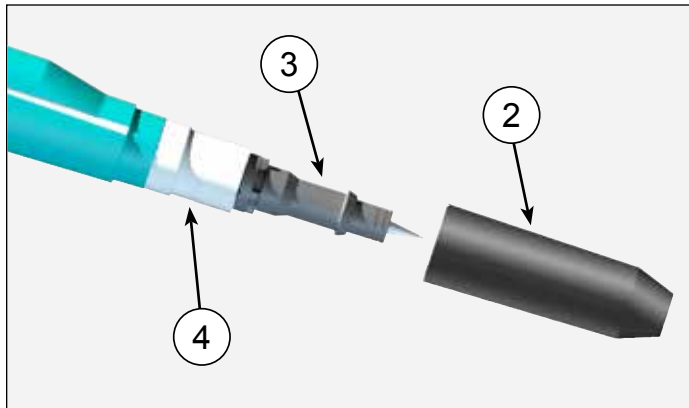


1. Insert the nozzle tube (3) into the applicator body (4), making sure the area is clear and the contacts are lined up. Make sure the wear bar and flat spray nozzle opening are horizontal to the floor when inserted (See image).

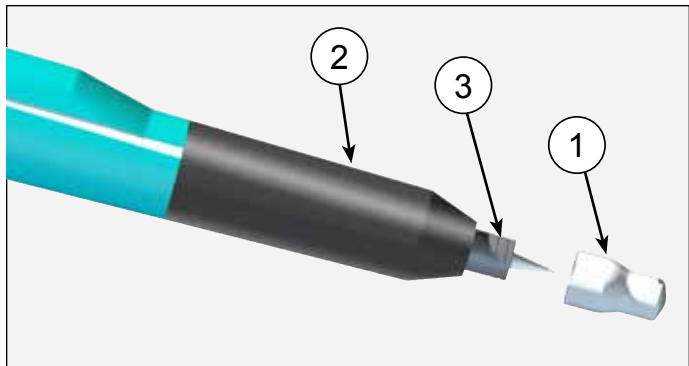


NOTE

- At this stage, check to make sure conductive ring 461706 is intact.



2. Place the nozzle nut (2) over the nozzle tube (3) and carefully thread on to applicator body (4) until secure.



3. Insert the nozzle (1) over the nozzle tube (3). Insert up to stop.

⚠ WARNING

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

⚠ CAUTION

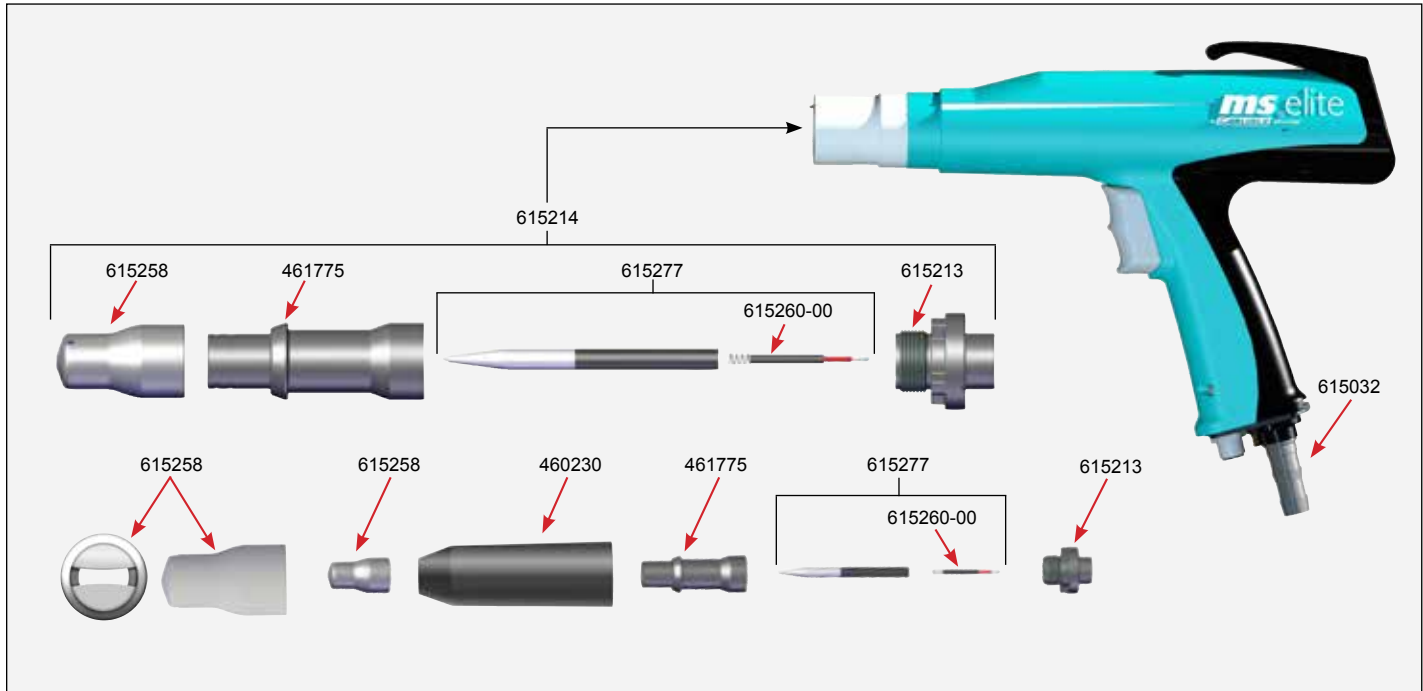
- Under all circumstances the manual powder applicators must be dismantled for cleaning. (Connection cable etc.).
- There can be no guarantee for the safety of the user.



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. Defective fuse on controller.	Check continuity of cable and replace as needed. 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 powder 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.

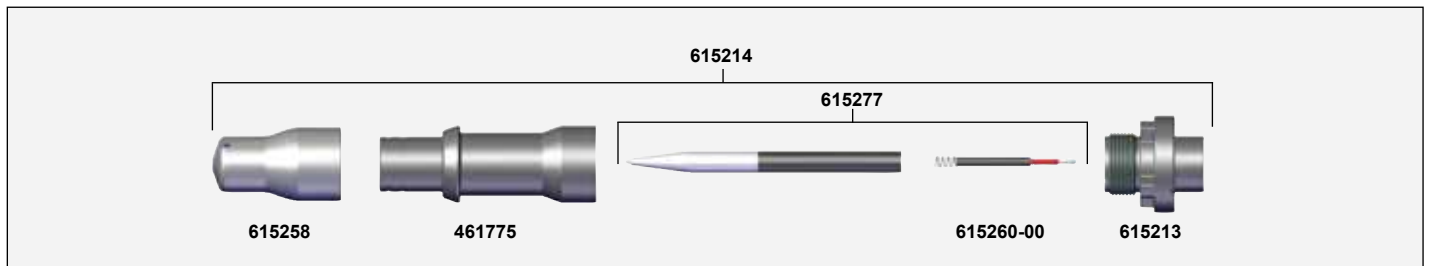
PARTS IDENTIFICATION



M5 MANUAL APPLICATOR SPARE PARTS LIST

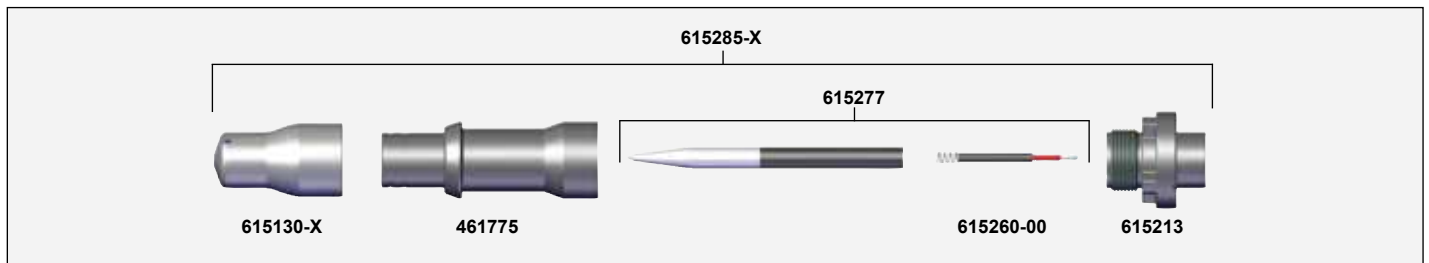
Item #	Description	Wear Part
460230	Nozzle Nut MS elite	
461775	Nozzle Tube	
615213	Nozzle Holder	W
615032	Ass'y Powder Connector (Includes 460110)	W
460110-K5, -K25	O-Ring, Powder Connector Kit	W
615277, -K5	Electrode Replacement Kit	W
615260-00, -K5	Wire Assembly Kit	W
615214	Flat Spray Nozzle and Electrode Assembly	W
615258	Flat Spray Nozzle C3 MS elite (Includes O-Ring 460105)	W
460105-K5, K25, -K50	O-Ring, Nozzle Kit	W

ACCESSORIES



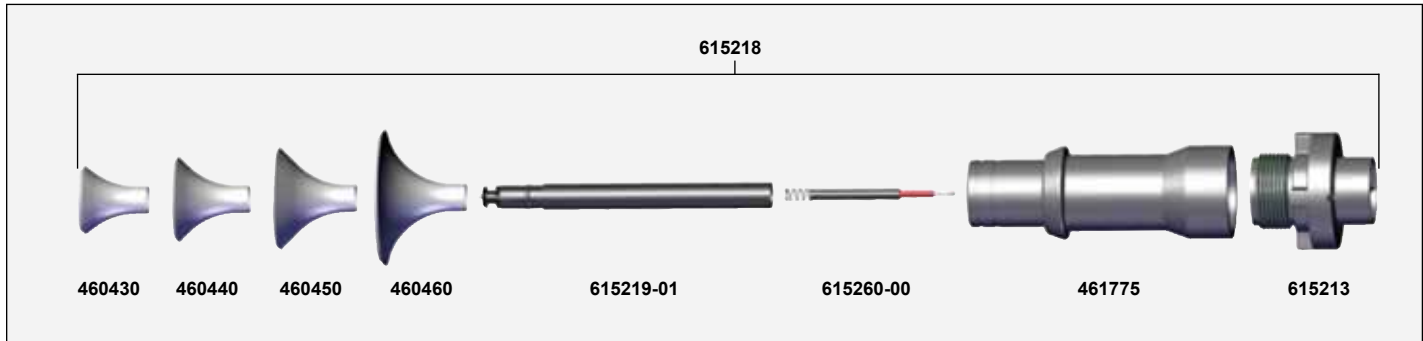
FLAT SPRAY NOZZLES "C3"

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	Nozzle Holder
461775	Nozzle Tube



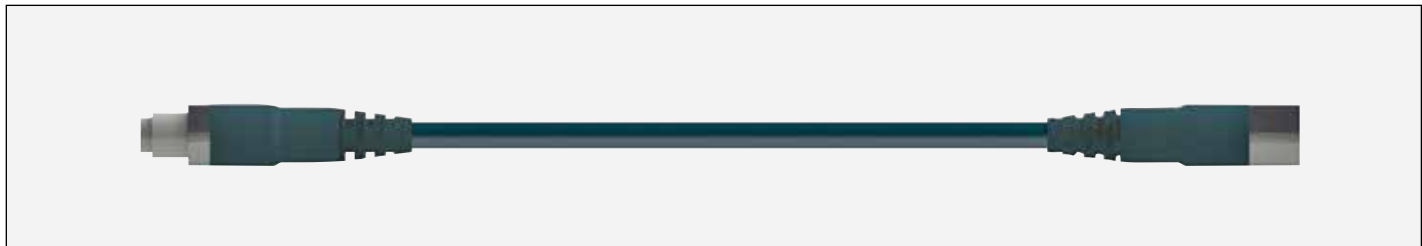
FLAT JET SPRAY NOZZLES "G"

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	Nozzle Holder
461775	Nozzle Tube



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
461775	Needle Tube
615213	Nozzle Holder



HAND APPLICATOR CABLE, elite, 9 PIN

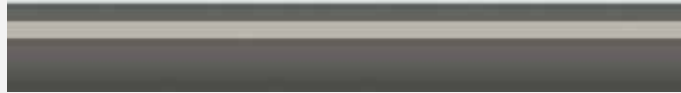
Part #	Description
461942-06	Manual Applicator Cable 6m elite
461942-10	Manual Applicator Cable 10m elite
461942-16	Manual Applicator Cable 16m elite
461942-20	Manual Applicator Cable 20m elite

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



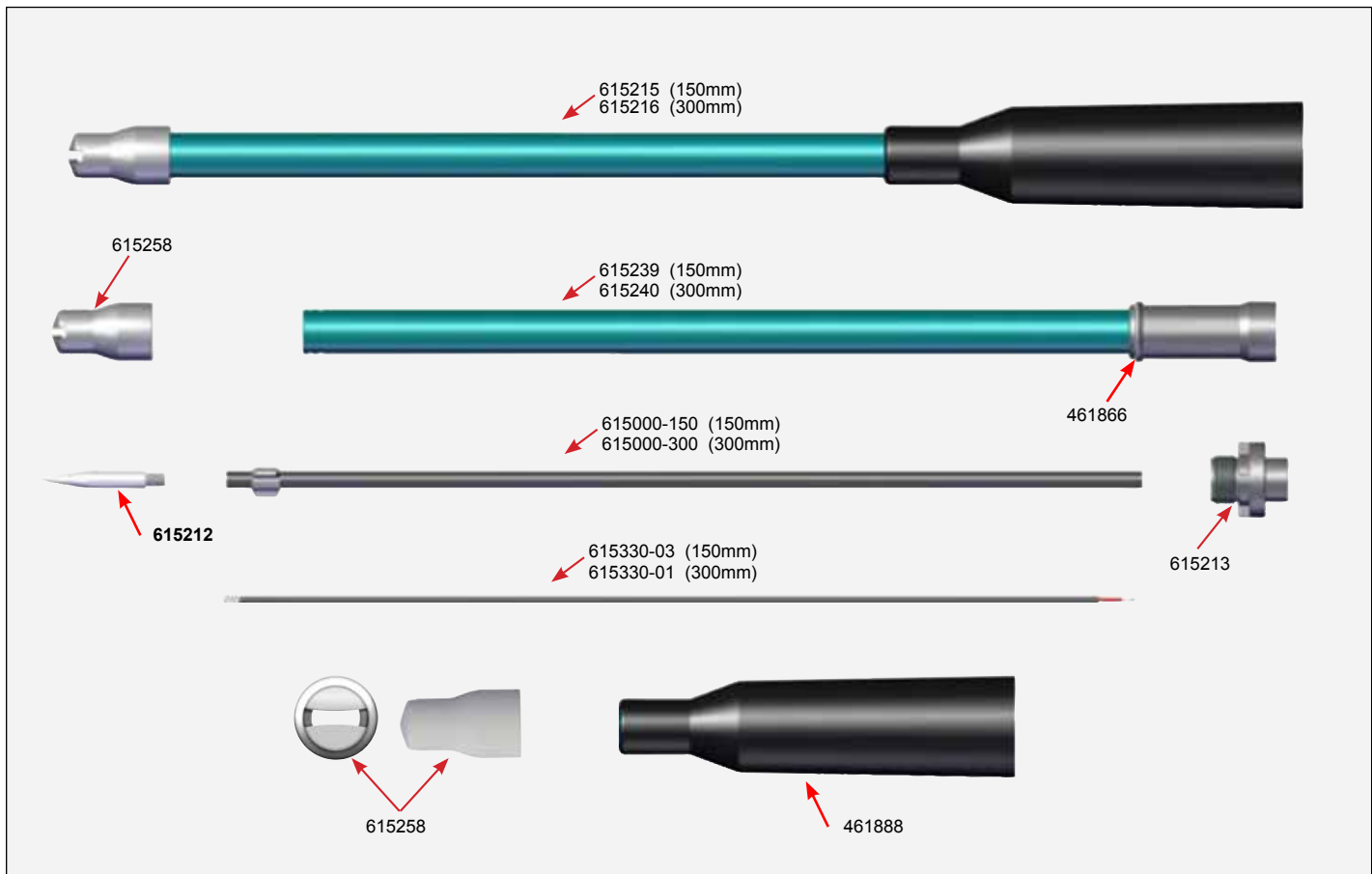
POWDER HOSE

Part #	Description
810195-06	Powder Hose 6m, (10mm ID) Length = 4.8
810195-08	Powder Hose 8m, (10mm ID) Length = 6.8
810195-10	Powder Hose 10m, (10mm ID) Length = 8.8
810195-16	Powder Hose 16m, (10mm ID) Length = 14.8
810195-100	Powder Hose 100m, Bulk (10mm ID) Length = 100
810190-100	Powder Hose 100m, Bulk (11mm ID) Length = 100



APPLICATOR AIR TUBING

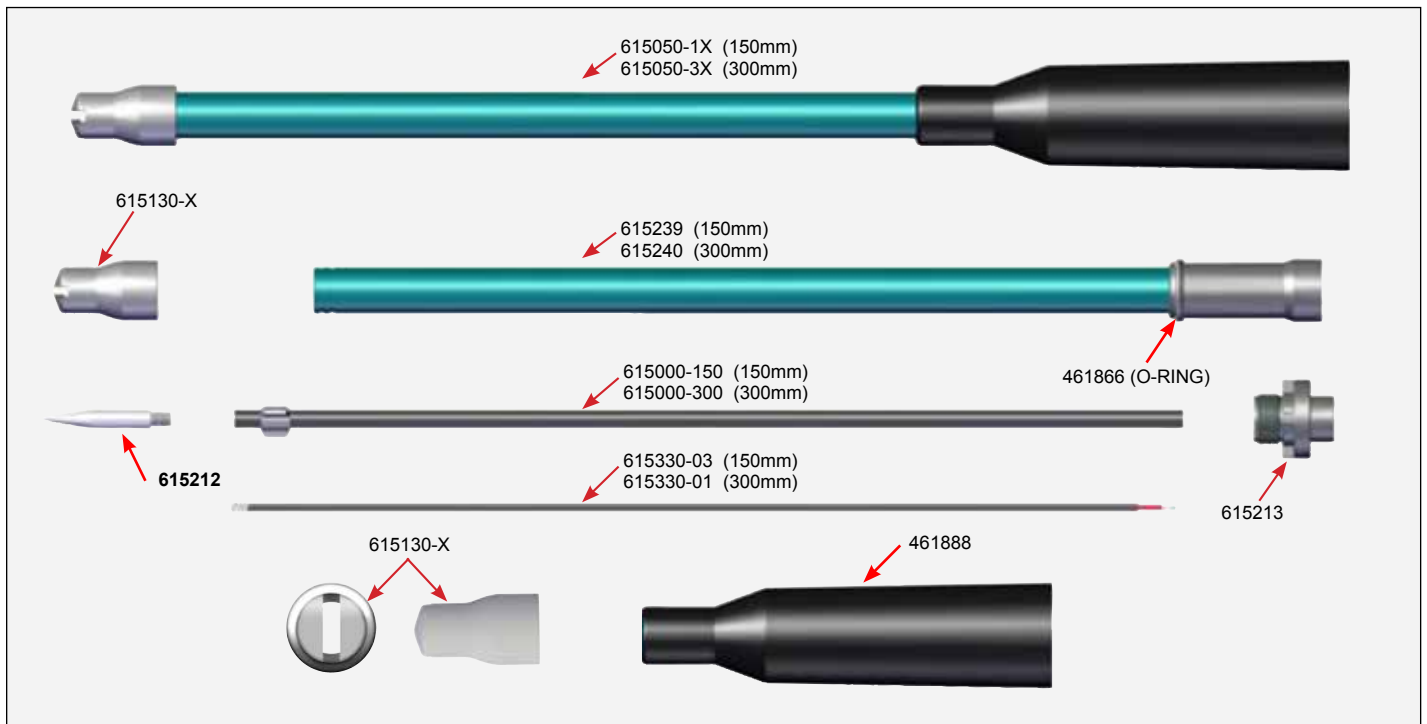
Part #	Description
421370-06	Tube, 6m, (4mm OD, 2.5mm ID) Length = 6.05m
421370-08	Tube, 8m, (4mm OD, 2.5mm ID) Length = 8.05m
421370-10	Tube, 10m, (4mm OD, 2.5mm ID) Length = 10.05m
421370-16	Tube, 16m, (4mm OD, 2.5mm ID) Length = 16.05m
421370-20	Tube, 20m, (4mm OD, 2.5mm ID) Length = 20.05m
421370-100	Tube, 100m, Bulk (4mm OD, 2.5mm ID) Length = 100m



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)

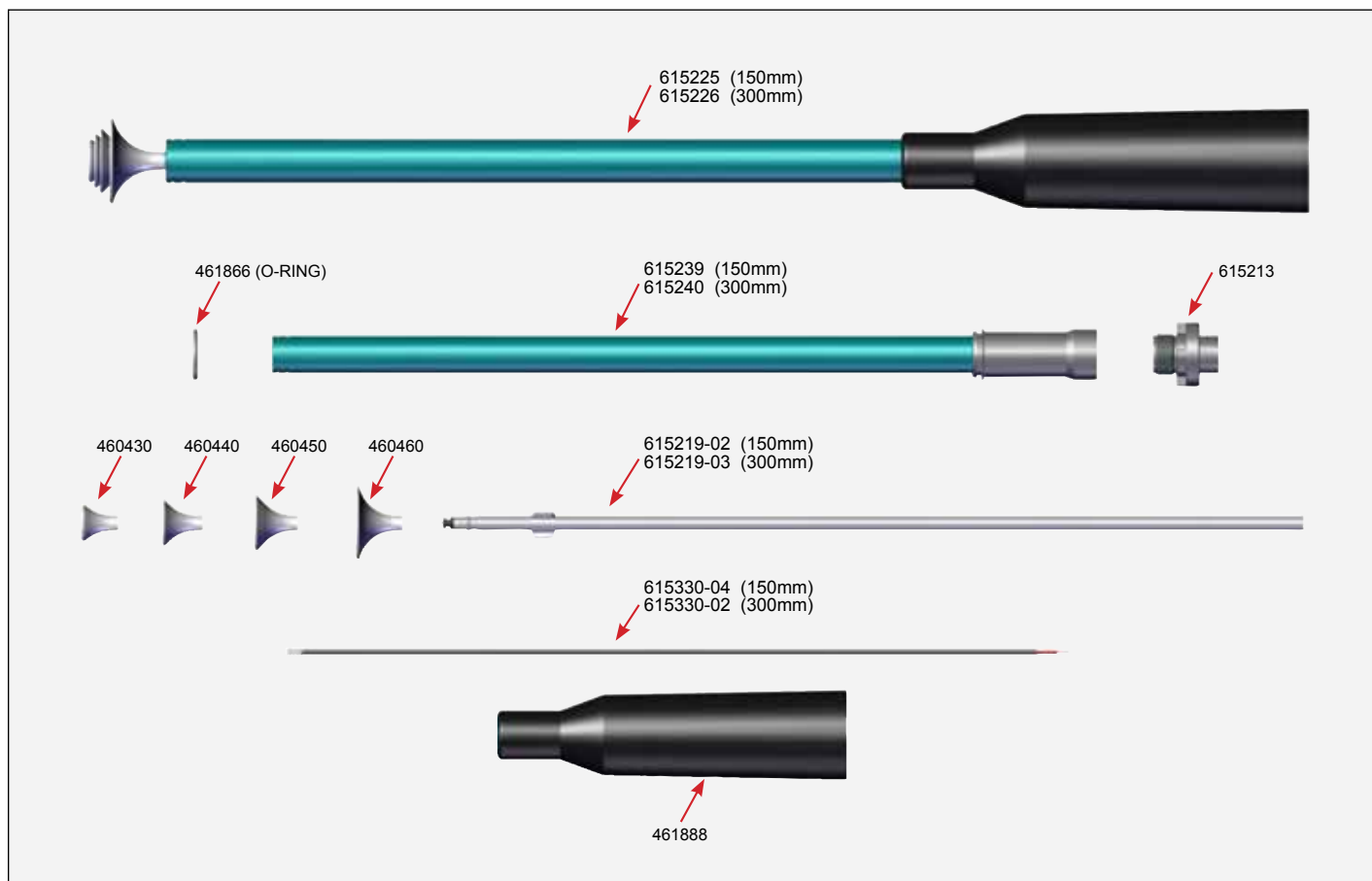
NOTE: Nozzle nut 461888 must be used with all extensions. The standard nozzle nut 460230 will not fit and is not approved for this use.



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-17-08-R6 - Replaces PA-17-08-R5 with the following changes:

No.	Change Description	Page(s)
1.	New cover image and add UKCA logo	1
2.	Add CE EX logo to table	9
3.	Text updates to items 5, 9, 14 and 17	10
4.	Update text in "SAFETY CONSIDERATIONS", bullet points 6 and 9, last paragraph	11
5.	Correct first sentence	12
6.	New label, remove bullet points 1 and 2, update text in FM Configurations	14
7.	New images and update table text	15
8.	Correct specifications text and add "Ignition Protection"	16
9.	New image and update SCOPE OF DELIVERY	17
10.	New image	18
11.	New image and update text in paragraph 1	19
12.	Update text in WARNING, add "Feed Air Connection and Dosage Aie Connection" to table	22
13.	New gun image	23
14.	New gun image and fluid container	24
15.	Add new page "TUBING DIAGRAM FOR USE WITH 610190-11"	25
16.	Correct bullet text, remove first WARNING and add new WARNING between 6 and 7	26
17.	New gun image	28
18.	Add Disassembly text in column 1 and update text in bullet point 1 in column 2, add 3 new images	29
19.	Two new images in column 2	30
20.	New gun image, add nozzles, update callouts and table text	32
21.	Update table	33
22.	Remove nozzle holders and update table	34
23.	Add nozzles, update callouts and table text	35
24.	Add nozzles, update callouts and table text	36
25.	Add O-Ring to callouts	37
26.	Update text in table	38
27.	Update back page contact information	40

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.

Region

North America	marketing@carlisleleft.com	+1-800-992-4657
Central America	CustServMX@carlisleleft.com	+52-55-5321-2339
Europe, Africa Middle East, India	cs-eu@carlisleleft.com	+44-(0)1202-571111
China	mkt_cn@carlisleleft.com	+86-21-337-30308
Japan	devi@carlisleleft.com	+81 045-785-6371
Australia	sales@carlisleleft.com	+61 (0) 28525-7555
Switzerland	csms@carlisleleft.com	+41 71 727 13 70

Technical Support

North America	marketing@carlisleleft.com	+1-800-992-4657
Europe	techsupportEU@carlisleleft.com	+44-(0)1202-571111

For the latest information about our products, visit www.carlisleleft.com.

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