



MS Elite Controller

Model: 461959-XXXXB (Basic),
461959-XXXXD (Deluxe)



2813



II 3(2) D. IP64

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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.

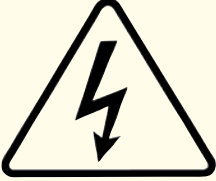
WARNING



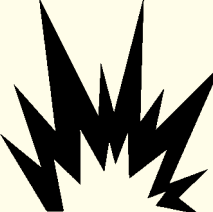
- The hazards shown on the following pages may occur during the normal use of this equipment.

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, 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>

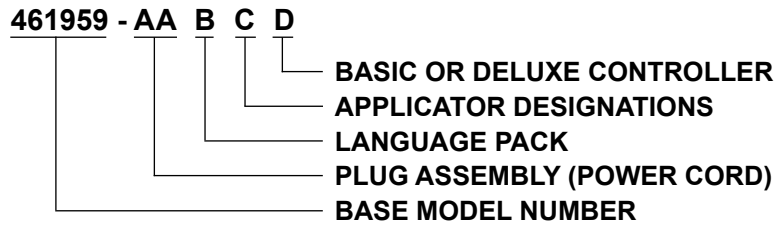
AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
<p>Spray Area</p> 	<p>Explosion Hazard</p> <p>Improper or inadequate operation and maintenance procedures will cause a fire hazard.</p> <p>Protection against inadvertent arcing that is capable 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>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>

APPROVALS (ATEX/FM/UKEX)

MS ELITE CONTROLLER MODEL IDENTIFICATION



POWER CORD SELECTION

“AA”	Description	Part #
00	NONE	NONE
01	EU Plug Assembly	460147
02	NA/Japan Plug Assembly	460149
03	China Plug Assembly	460150
04	Switzerland Plug Assembly	460148
05	UK Plug Assembly	461881

LANGUAGE PACK SELECTION

“B”	Description
Package 1	English, French, Spanish, Portugese, Italian, German, Chinese, Japenese (General Language Pack)
Package 2	English, French, Spanish, Italian, German, Czech, Polish, Russian (Eastern European Language Pack)

APPLICATOR DESIGNATION

"C"	Description
M	Manual Application
A	Automatic Application

CONTROLLER DESIGNATION

"D"	Description
B	Basic
D	Deluxe

Note: This unit is FM/ATEX approved for use inside the hazardous area. Refer to local governing bodies for proper use of this listed controller.

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 Controller 461959-XXXXX ATEX Product Marking Definitions

Ex Certificate Number: FM 19ATEX0004X and FM21UKEX0140X

FM = Notified Body performing EU-type examination

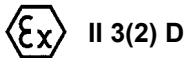
19 = Year of examination

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

3(2) = Equipment Category

D = Type of explosive atmosphere (dust)

Specific Conditions of Use:

1. The equipment must be used in accordance with EN 50050-2 for manual applications.
2. The instructions must be followed in order to avoid possible electrostatic charging hazards.



Rear View of Basic Model



Rear View of Deluxe Model

CARLISLE FLUID TECHNOLOGIES INC.
16430 N. SCOTTSDALE RD, SUITE 450
SCOTTSDALE, AZ 85254, USA

WARNING

FAILURE TO OBSERVE THE FOLLOWING PRECAUTIONS MAY RESULT IN AN ELECTRICAL DISCHARGE CAPABLE OF STARTING A FIRE.

1. THE ARTICLE BEING COATED MUST BE GROUNDED.
2. ALL OTHER ELECTRICALLY CONDUCTING OBJECTS WITHIN THE SPRAY BOOTH WITH THE SPRAY APPLICATOR MUST BE GROUNDED.
3. THIS CONTROL UNIT MUST BE INTERLOCKED WITH THE SPRAY BOOTH VENTILATORS SO AS TO PREVENT OPERATION OF THE POWER SUPPLY UNLESS VENTILATING FANS ARE IN OPERATION.
4. SERVICE WARNING - ENCLOSURE PROTECTS AGAINST SHOCK AND INJURY. SERVICE TRAINING REQUIRED.
5. WARNING - INSTALL SYSTEM PER LOCAL AND NATIONAL AGENCY REQUIREMENTS FOR PROPER GROUNDING
6. DO NOT ATTEMPT OPERATION OR REPAIR BEFORE READING SERVICE MANUAL.
7. FOR ELECTROSTATIC POWDER FINISHING APPLICATIONS.
8. WARNING - USE A CONDUCTIVE POWDER SUPPLY TUBE FOR PROPER GROUNDING. RESISTANCE THRU POWDER TUBE IS LESS THAN 1 MEGA OHM.
9. WARNING - EXPLOSION HAZARD. DO NOT OPEN ENCLOSURE NOR SEPERATE CONNECTIONS WHILE ENERGIZED. AVERTISSEMENT - RISQUE D'EXPLOSION. NE PAS OUVRIR LE BOITIER NI SEPARER LES CONNEXIONS SOUS TENSION.

CONTROL UNIT

FOR ELECTROSTATIC POWDER FINISHING APPLICATIONS
(SERIAL NUMBER INCLUDES DATE OF MANUFACTURE)

PART No.

SERIAL No.

INPUT VOLTAGE	100-240 VAC	0.75 A MAX.
FREQUENCY	50/60 Hz	1
VOLTAMPS	90 VA MAX.	1.5VAC/1W
HUMIDITY	95% NON-CONDENSING	1W
INPUT PRESSURE	6 BAR MAX	10-40°C
		Tamb

INPUT RMS CURRENT PHASES

POWER AC MAX 600 W

POWER DC MAX 60 W

SCCR

LABEL REMOVAL VOIDS WARRANTY

APPROVED FOR ELECTROSTATIC FINISHING APPLICATIONS USING CLASS II SPRAY MATERIALS

APPROVED CONFIGURATIONS:
461942 + 815210 + 805700* + APPROVED ACCESSORIES*

US CERT NO. FM18US0005
CANADIAN CERT NO. FM18CA0001
ATEX CERT NO. FM19ATEX0004X
UK CERT NO. FM21UKEX0140X

THIS SYSTEM IS APPROVED WHEN USING THE LISTED CONFIGURATIONS
*IF NEEDED OR REQUIRED IN THE COATING APPLICATION WITH THIS CONTROLLER

461974

PARTS IDENTIFICATION

This section identifies standard parts included when a MS elite controller system is delivered.



Scope of Delivery

The following items will be delivered as part of an MS controller order.

SCOPE OF DELIVERY	
Part #	Description
461959-XXXXB OR 461959-XXXXD	MS (Basic) Controller OR MS (Deluxe) Controller
460147 OR 460148 OR 460149 OR 460150 OR 461881	Controller Power Cable for EU OR Controller Power Cable for Switzerland OR Controller Power Cable for USA/Japan OR Controller Power Cable for China OR Controller Power Cable for UK
460146	Grounding cable with clamp
PA-19-06	This Service Manual in electronic form on a USB memory stick






MS elite Controller Options

Depending on the order, one of the following MS elite control systems will be delivered.

MS CONTROLLER OPTIONS		
Part #	Description	Picture
461959-XXXXB	Basic	
461959-XXXXD	Deluxe	

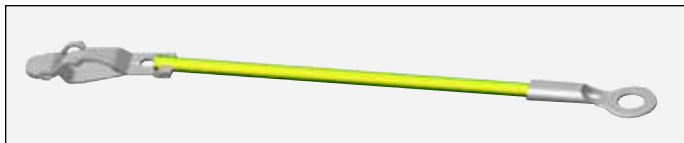
POWER CORD OPTIONS

Depending on the optional designator used when the MS controller system was ordered, the customer may receive one power cord. The following table lists the power cord associated with each optional designator number. The power cord must be connected to a power source outside the classified zone.

POWER CORD OPTIONS			
"AA"	461959-AA-B-C-D	Power Cord Item #	Picture
	Description		
00	No Power Cord Included	N/A	
01	Controller Power Cable for EU	460147	
02	Controller Power Cable for Switzerland	460148	
03	Controller Power Cable for USA/Japan	460149	
04	Controller Power Cable for China	460150	
05	Controller Power Cable for UK	460881	

Grounding Cable

Each MS Controller order will include one grounding cable with a clamp, part number 460146.



LANGUAGE PACK SELECTION	
"B"	461959-AA-B-C-D
	Description
1	General Language Pack
2	Eastern European Language Pack

See languages in detail on page 9

INTRODUCTION

PRODUCT DESCRIPTION

The MS Controller is designed exclusively for the control of MS Powder applicators.

It controls and regulates the electrostatics and the air supply for powder application. Any other use is considered improper. The manufacturer is not liable for any damage resulting from improper use.

PRODUCT FEATURES

The MS Controller can be operated with the following applicators:

MS ELITE CONTROLLER AND MS POWDER APPLICATOR COMPATIBILITES

MS elite Controller Part Number	Compatible elite Powder Applicators
461959-XXXXB (Basic)	M5 (#615210)
461959-XXXXD (Deluxe)	M5 (#615210)

*Use of the MS elite with the MS elite M4 and A4 applicators is not FM/ATEX approved.

Features of the elite controller include:

- Powder Program storage allows one-touch selection of Powder Program parameters such as feed air, dosage air, gun air, kV, and μ A settings.
- Two standard Powder Programs are provided to simplify initial usage.
- 94 additional user-customizable Powder Programs are available.
- Air regulation is precisely controlled by electronic proportional air valves.
- MS Controller units have processor-controlled regulation of voltage (kV) and current (μ A) output.
- MS Controller 461959-XXXXD supports remote control via the Ethernet interface using the Modbus protocol. See separate manual for details on the MODBUS programming interface.

SPECIFICATIONS

Dimension

Weight:	6.4 kg (14.2 pounds)
Depth:	332.0 mm (13.06 inches)
Width:	200.6 mm (7.89 inches)
Height:	128.6 mm (5.06 inches)

Electrical data

Main:	100 - 240 VAC
Frequency:	50 - 60 Hz
Input power:	70 W (With vibrator 550W)
External voltage to applicator:	max. 10 Veff
External current to applicator:	max. 1.4 A
External frequency to applicator:	40 kHz.
Output to vibrator:	100 - 240 VAC / max. 70 W
Fuse:	2.5A

Permission

Environmental Degree of Protection:	
461959-XXXXX (Basic and Deluxe)	IP64 (FM/ATEX)
Interference suppression:	FN
Temperature range:	10° to 40°C (50 to 104 °F) Ambient
Certificates:	
461959-XXXXX (Basic and Deluxe)	FM19ATEX0004X, FM18US0005, FM18CA0001, FM21UKEX0140X

Pneumatic data

Input air pressure:	Maximum 6 bar, (87 PSI)
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Compressed air quality according ISO 8573.1

Residual water content in compressed air:	Maximum 1.3 g/m ³ with a dew point of 7 °C (Maximum 0.035 oz/yd ³ with a dew point of 44.6 °F)
Residual oil in the compressed air:	max. 0.1 mg/m ³
Air throughput:	5-20 Nm ³ /h (176 - 706 cuft/hr)
Regulated output air pressure:	0 – 5 bar (0–73 PSI)

INSTALLATION

This section discusses how to install the MS controller.

⚠ WARNING

- The user **MUST** read and be familiar with the “Safety” section of this manual.
- 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 requirements of operating and servicing safely are followed. The user should be aware of and adhere to ALL local building and fire codes and ordinances as well as NFPA-33, OSHA, and all related country safety codes prior to installing, operating, and/or servicing this equipment.
- Only approved applicators should be used with the MS elite controller.

⚠ CAUTION

- Observe safety regulations.

LOCATION OF THE MS ELITE CONTROLLER

⚠ CAUTION

- 461959 controller can be located in ATEX zone 21 and zone 22.

⚠ CAUTION

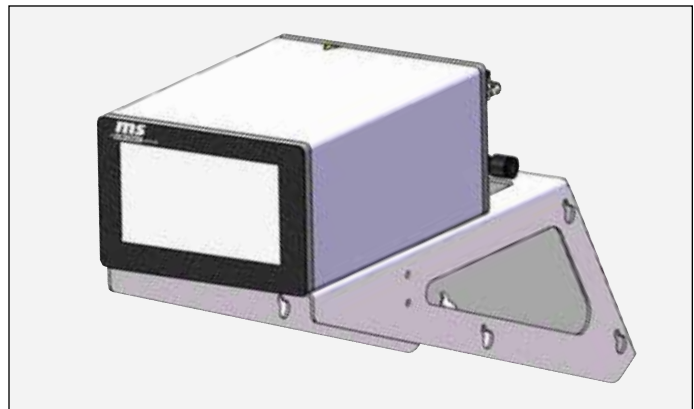
- Elite 461959 is rated IP64 and therefore is resistant to environmental intrusion, such as dust or moisture.

⚠ CAUTION

- **DO NOT** locate the controller near or adjacent to heat producing equipment such as ovens, high wattage lamps, etc.

Install the 461959 elite controller can be installed in ATEX Zone 21 or Zone 22 in accordance with federal, state, and local codes. The area should protect the controller from the possibility of environmental intrusion (such as dust or moisture), have ambient temperatures that do not exceed 40°C (104°F), and be as close to the applicator as possible to minimize the applicator cable length. (See note below for location of 461959 elite controller).

The controller may be free standing on any flat surface or placed on a shelf with optional wall mount brackets.

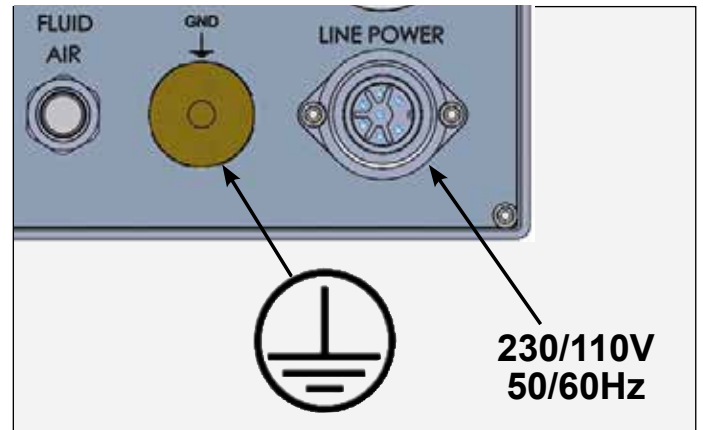
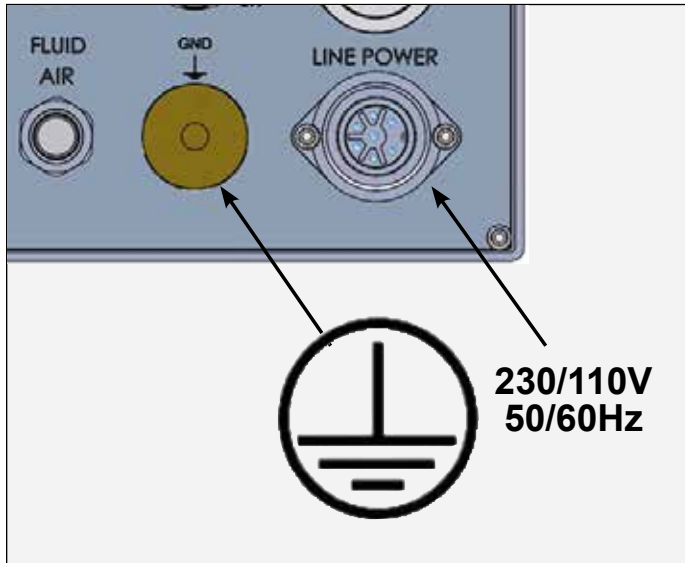


GROUNDING

⚠ CAUTION

- The supplied grounding cable (green/yellow) must be connected to the grounding screw of the electrostatic manual powder coating equipment. The grounding cable also must have a good metallic connection with the the spray booth, the powder recovery unit and the conveyor chain and must be connected to true earth ground.

In order to achieve a good powder coating and for safety reasons (see safety regulations), the powder coating system must be properly grounded to true earth ground (copper rod driven into the ground). A ground cable is included with the controller. The following picture shows the connecting point on the back of the controller.



MS ELITE CONTROLLER CONNECTIONS - MODEL 461959-XXXXB

⚠ CAUTION

➤ Unused connectors on the back panel of the MS elite controller module must be protected by the supplied covers.

⚠ CAUTION

➤ When assembling any system involving the MS elite controller, the control module must be disconnected from the electrical power cord.

⚠ WARNING

➤ Only approved applicators should be used with the MS elite controller. (Refer to applicator compatibility table.)

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

1. Very bad wrap-around, poor efficiency.
2. Uneven coating thickness.
3. Back spray onto spray applicator and user.
4. Dangerous electric charging of the work piece.

MAIN SUPPLY LINE POWER

⚠ CAUTION

➤ The main supply line power connection of the MS elite controller must be electrically interlocked with the exhaust system of the powder spray booth. The MS elite controller must be switched on only when the booth exhaust is running. If air flow is off, the MS elite controller must also be switched off.

Power cord must be plugged into power source outside all classified zones. The following picture indicates the location on the back of the controller to attach this cable.



461959-XXXXB Backplate

CONNECTING HARDWARE - MS ELITE BASIC CONTROLLER

Connect What	Controller Connector Name	From —————> To	Notice	
Control Module Connecting				
Ground Cable	GND	Controller	True Earth Ground	Safety Regulations
Power Cable	Line Power	Main Supply	Controller	Safety Regulations
Main Air	Main Air Input	Main Air	Controller	6 Bar (Free From Oil and Water)
Control Signals Cable	In/Output Connect	Controller	Vibrator Motor	Safety Regulations
Fuse	Prim. Fuse			2.5A (Pre Installed)
Manual Powder Applicator Connections				
Applicator Air Hose	Gun Air (Back)	Manual Powder Applicator	Controller	
Powder Motor Air Hose	Fluid Air	Powder Motor	Controller	
Manual Powder Applicator Cable, Corona	Corona Gun Connect	Manual Powder Applicator	Controller	Verify Correct Cable Part Number Using Applicator Manual
Powder Injector Connections				
Air Hose Feed Air	Feed Air (Blue)	Controller	Feed Air Connection on injector	
Air Hose Dosage Air	Dosage Air (Red)	Controller	Dosage Air Connection on injector	

*For more information on how to connect associated hardware to your controller, see your cart or applicator manual.

MS DELUXE CONTROLER CONNECTIONS - MODEL 461959-XXXXD

⚠ CAUTION

- Unused connectors on the back panel of the MS elite controller module must be protected by the supplied covers.

⚠ CAUTION

- When assembling any system involving the elite controller, the control module must be disconnected from the electrical power cord.

⚠ WARNING

- Only approved applicators should be used with the MS elite controller. (Refer to applicator compatibility table.)



461959-XXXXD Backplate

CONNECTING HARDWARE - MS ELITE DELUXE CONTROLLER

Connect What	Controller Connector Name	From —————▶ To	Notice	
Control Module Connecting				
Connect Ground Cable	GND (Yellow/Green)	Controller	True Earth Ground	Safety Regulations
Power Cable	Line Power	Main Supply	Controller	Safety Regulations
Main Air	Main Air Input	Main Air	Controller	6 Bar (Free From Oil and Water)
Connect Control Signals	In/Output Connect	Controller	Vibrator Motor	Safety Regulations
Fuse	Prim. Fuse			2.5A (Pre Installed)
Ethernet Communications	Ethernet	Controller	Ethernet Switch or PLC	Modbus Protocol (*2)
Automatic Powder Applicator Connections				
Applicator Air Hose	Gun Air (Back)	Automatic Powder Applicator	Controller	
Powder Motor Air Hose	Fluid Air	Powder Motor	Controller	
Automatic Powder Applicator Cable, Corona (*3)	Corona Gun Connect	Automatic Powder Applicator	Controller	Verify Correct Cable Part Number Using Applicator Manual
Automatic Powder Applicator Cable, Tribo (*3, 4)	Tribo Gun Connect	Automatic Powder Applicator	Controller	Verify Correct Cable Part Number Using Applicator Manual.
Powder Injector Connections				
Air Hose Feed Air	Feed Air (Blue)	Controller	Feed Air Connection On Injector	
Air Hose Dosage Air	Dosage Air (Red)	Controller	Dosage Air Connection On Injector	

- *1. For more information on how to connect associated hardware to your controller, see your cart or applicator manual.
- *2. For details on how to use Modbus to communicate with the MS elite controller, please refer to the "Modbus Protocol for elite Controllers" service literature.
- *3. Only one applicator can be connected at a time.
- *4. Future feature

OPERATION

⚠ CAUTION

- Familiarize yourself with its operation before switching on the device.
- Use caution when the high voltage is switched on! Do not touch the applicator nozzle.
- Do not stand in front of the spray applicator!
- Never point the applicator towards people!
- Observe safety regulations.

⚠ WARNING

- The user **MUST** read and be familiar with the “Safety” section of this manual.
- 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 requirements of operating and servicing safely are followed. The user should be aware of and adhere to ALL local building and fire codes and ordinances as well as NFPA-33, OSHA, and all related country safety codes prior to installing, operating, and/or servicing this equipment.
- Only approved applicators should be used with the elite controller.

BASIC OPERATIONS

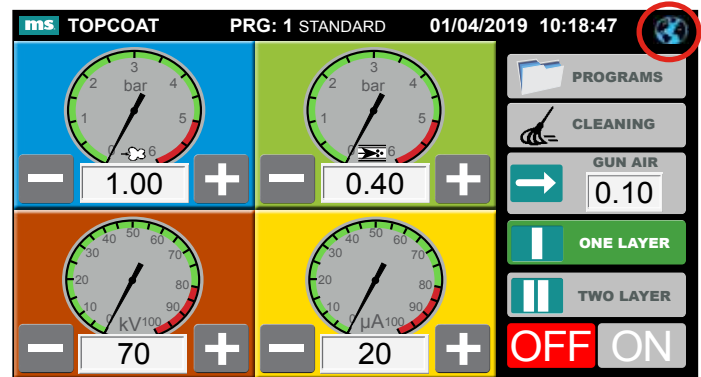
Turn Controller ON

Turn on the MS elite controller using the lever switch at the back. The system will boot up.



Select Display Language

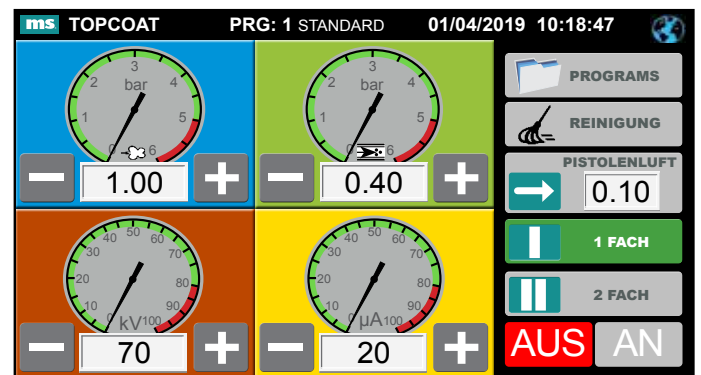
Change the displayed language by pressing the globe button in the top right corner of the “WORK” screen.



Press the flag that represents the preferred language. (Refer to separate sales brochure for most recent list of languages supported.)



Once this selection has been made, press the “EXIT” button to return to the “WORK” screen. The “WORK” screen and all subsequent screens will now appear in the selected language.



Example of “WORK” screen with German display language selected.

NOTE

- For questions about languages currently available, please contact CFT customer service.

Select a Powder Program

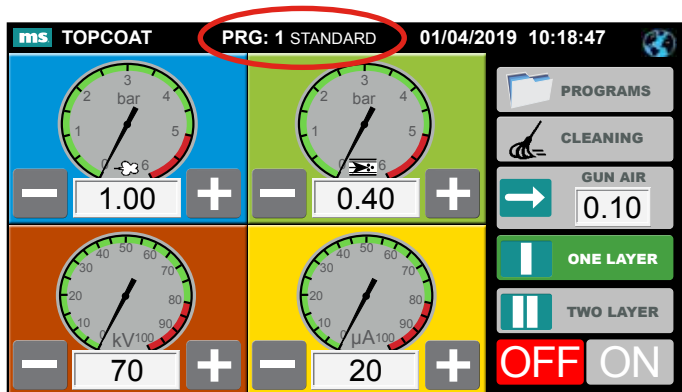
There are two pre-defined Powder Programs already loaded on the MS elite controller. These Powder Programs have basic air, kV, and μA values set for a powder coating session using either standard or metallic powder. Select one of these Powder Programs by pressing the “PROGRAMS” button on the “WORK” screen.



This will take you to the “PROGRAMS” screen.



From here, press the number or name of either the “STANDARD” program or the “METALLIC” program to select that Powder Program and return to the “WORK” screen. All the corresponding Powder Program parameter settings will automatically be loaded. The top of the “WORK” screen will display the selected Powder Program is now active.



Activating the Powder Applicator

Depending on the specific MS elite controller, either a Manual or an Automatic applicator may be attached. The method to enable and trigger the applicator is slightly different. Manual powder applicators are enabled at the MS elite controller screen, and have a trigger on the applicator the user must pull to begin powder coating. Automatic powder applicators are activated from the MS elite controller screen or via a Modbus protocol command. Refer to the “Modbus Protocol MS for elite Controllers” service literature for details of operating automatic applicators via Ethernet using Modbus.

Powder Coating Using Manual Powder Applicators (M5)

On the “WORK” screen, press the “ON” button. This will enable the manual powder applicator, but powder coating will not begin.



Once the manual powder applicator has been enabled, and with the powder cart set up correctly (consult the user manual for your cart for more details), you can start powder coating. Point the manual powder applicator toward the work piece and pull the trigger to start the powder flow.

When work piece coating is complete, stop powder flow by releasing the manual powder applicator trigger.

To disable the manual powder applicator press the “OFF” button on the “WORK” screen. Now powder will not flow even if the manual powder applicator is triggered.



Powder Coating Using Automatic Powder Applicators

Automatic powder applicators must be enabled on the MS elite controller “WORK” screen before powder coating can begin. The default appearance of the automatic powder applicator control buttons displays the current status of “OFF” and “STOP”.



Button appearance reflects the current state of the automatic powder applicator. To change that state of the button, press the button to toggle it. For example, to enable the automatic powder applicator, press the “OFF” button. The button will change its appearance to “ON”. The automatic powder applicator is now enabled, but powder coating will not begin until the “START” button appears on the “WORK” screen.



To begin powder coating using the automatic applicator, press the “STOP” button. The button will change appearance to read “START”. Powder will begin to flow from the applicator.



To stop the flow of powder from the automatic powder applicator, press the “START” button on the elite “WORK” screen. It will change appearance to read, “STOP”. This will stop the flow of powder. However, the applicator will still be enabled.

To disable the automatic powder applicator, press the “ON” button on the elite controller. The button will change appearance to read “OFF”. The automatic powder applicator is now disabled; powder will not flow from it again until both the “OFF / ON” and “STOP / START” buttons are toggled again.

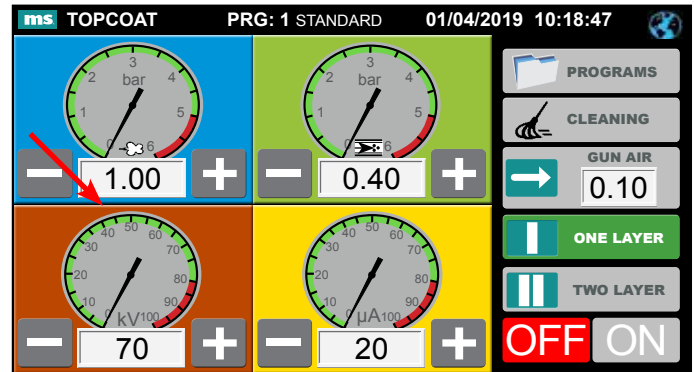


NOTE

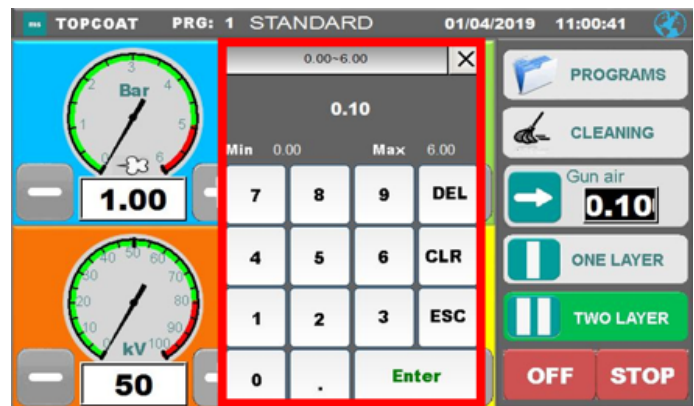
➤ If the “ON” button is pressed when the screen is also showing “START”, both buttons will be toggled and the result will be “OFF” and “STOP”.

Adjusting Powder Program Parameters

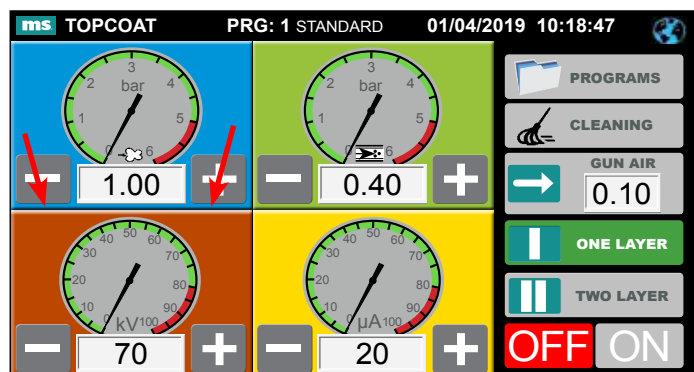
Adjust Powder Program parameters by pressing the number within the gauge textbox and a numeric entry pad will appear. Then, you can enter any value you wish within the specified range for that particular operating parameter.



The possible range for each air, kV and μA setting is listed in the top bar of the numeric entry pad when it appears. For example, if you press the text box under the KV dial, a numeric entry keypad will appear with the possible kV settings range (0 to 100) listed in its title bar.



Alternatively, you can press the plus or minus buttons next to the gauge text boxes. The program parameter will either increment (+ button) or decrement (- button). If you press and hold the “+” or “-” button, it will change in larger increments.



NOTE

► The amount of adjustment (step size) that the “+” and “-” buttons apply to a parameter differs depending on which “WORK” screen **Measurement Unit** configuration setting is being used (Bar, Nm³/h, or PSI). See notes in appendix for additional details on **Measurement Unit** selection and step sizes.

NOTE

► Any setting changes made will not automatically be saved to the current **Powder Program** and will be lost unless the **Powder Program** is saved.

Adjusting Gun Air

The “WORK” screen displays the current setting for Gun Air pressure. Similar to the gauge numeric displays, pressing the number will bring up a keypad pop-up display and permit the user to change the setting. This setting is always in “Bar” and may range from 0.00 to 6.00.

ADVANCED OPERATIONS

This section introduces advanced features available for operation.

ONE LAYER / TWO LAYER Operation

The MS elite controller supports 2-pass (layer) painting processes. The MS elite controller is able to apply different control settings (kV and μ A only) for each painting layer.

On the “WORK” screen, there are buttons for selecting which layer’s settings will be actively used. Which button is green indicates which LAYER and settings are active.



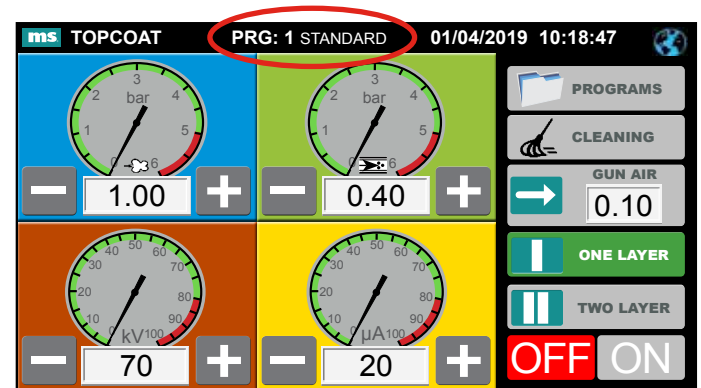
See the Configuration screens topic for how to adjust the settings for “TWO LAYER”.

NOTE

► “TWO LAYER” settings are always re-read from the selected Powder Program, so any adjustments that may have been made via the “WORK” screen gauges prior to re-selecting “ONE LAYER” will be lost when “TWO LAYER” is selected again.

POWDER PROGRAM CREATION, ADJUSTMENT AND DELETION**How to Adjust and Save Powder Program Parameters**

1. Check to see if the Powder Program you wish to adjust is already the active Powder Program listed on the “WORK” screen



2. If the Powder Program you would like to adjust is active, skip to step 4. If the Powder Program you wish to adjust is not active, navigate to the “PROGRAMS” screen by pressing the “PROGRAMS” button.

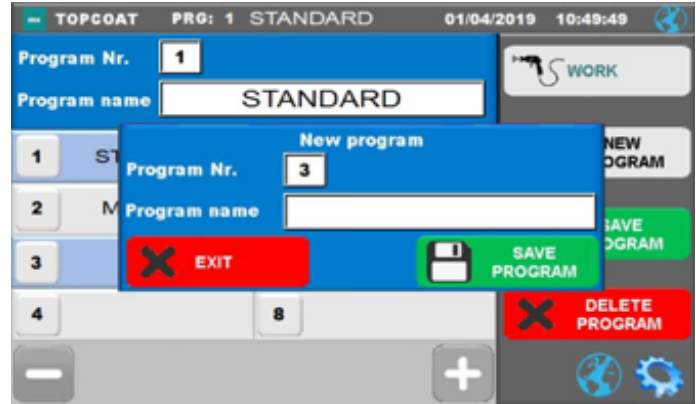


3. Select the Powder Program you would like to adjust from the program list. You will automatically be redirected to the “WORK” screen. The program will now be active.
4. Adjust the program parameters on the “WORK” screen (gun air, feed air, dosage air, kV, and/or μ A).

- Navigate back to the "PROGRAMS" screen by pressing the "PROGRAMS" button.
- Store the Powder Program, with its new parameter settings, by pressing the "SAVE PROGRAM" button.



- Now when you select that program from the "PROGRAMS" screen, it will appear in the "WORK" screen with the newly entered Powder Program parameters.



How to Create a New Powder Program

NOTE

➤ Ensure no programs are accidentally overwritten by first checking the programs list on the "PROGRAMS" screen for unused numbers before entering a number for the new program.

NOTE

➤ The elite will not permit selecting Powder Program #1 or #2 for a new program.

To create a new Powder Program:

- Press the "PROGRAMS" button to enter the "PROGRAMS" screen.



- Once in the "PROGRAMS" screen, examine the programs list to find a number that is not presently holding any program information. When you have found and memorized this number, press the "NEW PROGRAM" button.



- A "NEW PROGRAM" pop-up screen will appear. Enter the program number you just memorized into this "NEW PROGRAM" screen. Also enter a name for the new program. (Pressing the text fields will open keyboards that will allow you to enter this information).

- Press the "SAVE PROGRAM" button within the "NEW PROGRAM" pop-up window. Then, you will automatically be returned to the "WORK" screen.
- Press the "PROGRAMS" button again to enter the PROGRAMS screen, you will find that the program with the parameters you just adjusted is still active. This means that you can now save this program with the latest parameters you just set in the workscreen. Do so by pressing the "SAVE PROGRAM" button and lock in the settings you just specified for your new program.



How to Delete a Powder Program

Powder Programs can also be deleted at any time. To delete a Powder Program:

- Navigate to the "PROGRAMS" screen from the "WORK" screen by pressing the "PROGRAMS" button.



2. Check to see if the Powder Program you want to delete is the active Powder Program by looking at the dark blue bar at the top of the “PROGRAMS” screen.
 - If the active Powder Program is not the Powder Program you wish to delete, first perform the following steps:
 - Select the Powder Program you wish to delete from the programs list.
 - If you had to choose your Powder Program from the programs list, you will automatically be sent to the “WORK” screen again. The Powder Program just selected will now be “active.”
 - From the “WORK” screen, press the “PROGRAMS” button one more time. This time when you return to the “PROGRAMS” screen, your selected Powder Program will still be the active one.



3. When the active Powder Program is the Powder Program you wish to delete, press the “DELETE PROGRAM” button.



NOTE

- The MS elite controller will not permit deleting either Powder Program #1 or #2.

4. When the pop up deletion confirmation window appears, press the “DELETE PROGRAM” button again.



5. The system will then erase the selected Powder Program, select and load Powder Program #1 (STANDARD) and return to the “WORK” screen.

Activating the Cleaning Cycle Function

If you press the “CLEANING” button from the “WORK” screen, a pop up menu will appear. Press the “START CLEANING” button to start air flowing through the feed, dosage and applicator air lines for a pre-defined amount of time to purge powder from the system. This will leave the system ready for the next powder coating job.



Default configuration settings for wash pressure and wash cycle time are set at the factory. The user can adjust these values on the configuration screens. For information on color change procedures, see your cart manual.

CONFIGURATION SETTINGS SCREENS

NOTE

- A user may only make changes when the applicator trigger is not pressed..

How To Access the Configuration Screens

To access the configuration menu, do the following:

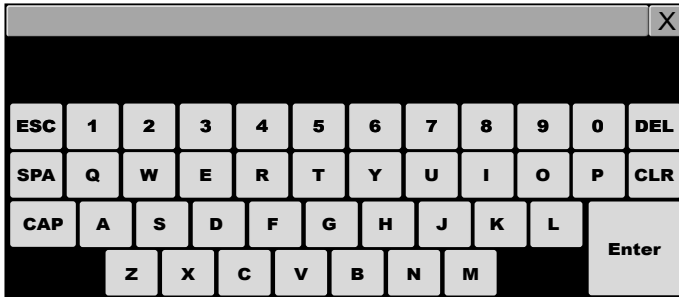
1. Starting at the “WORK” screen, press the “PROGRAMS” button.



2. In the bottom, right corner of the “PROGRAMS” screen, press the gear icon



- Enter the password MS100 (Note: “CAP” is not highlighted) onto the keyboard and then press the “Enter” button.



You will now be viewing the first of the configuration setting screens. Use the arrow buttons at the bottom of each configuration screen to navigate between the four configuration screens. The right arrow moves forward a screen, while the left arrow moves back a screen. Buttons that are green indicate currently selected choices. Pressing the “PROGRAMS” button will return the “PROGRAMS” screen. Pressing “WORK” will return to the “WORK” screen.



CONFIGURATION SETTINGS - SCREEN #1

This section discusses the configuration settings on the first configuration screen.



Measurement Unit (of “WORK” Screen Display Dials)

The first panel of buttons entitled “Measurement Unit” will allow switching between “WORK” screen configurations. Press a button to select that as the choice for gauges displayed on the “WORK” screen. See the Appendix for additional details related to the display Measurement Unit settings.

Gun Mode Buttons (Tribo vs. Corona)

The Tribo gun option functionality is reserved for future use. Corona gun must always be selected.

Two Layer Mode

By pressing the text boxes for kV and μA , you can manually set the parameters used by the “TWO LAYER” program that can be selected on the “WORK” screen. To change these settings, press on the box containing the number next to the kV or μA labels. You will be able to enter the numerical settings you wish using the numerical keypad that pops up.

Production Counter

The production counter is a tool for keeping track of the amount of time the applicator has been actively operating since the time accumulation production counter was last reset. This counter can be reset to zero from the configuration screen at any time.

CONFIGURATION SETTINGS - SCREEN #2



Fluid Air

This button is only applicable if you are using a fluidized bed or hopper for your powder.

Injector Type

Vibratory box fed hand carts 805700-XVBXXX-XXXX will always use the Elite Powder injector. The T9 injector is used with automatic applicators and fluidized hopper carts 805700-XFHXXX-XXXX.

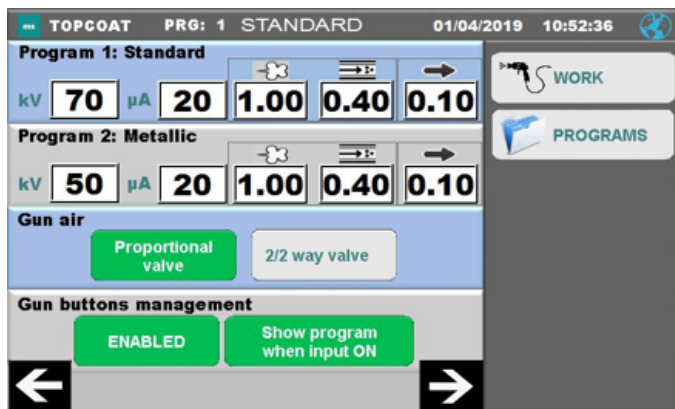
Wash Pressures

Set the air pressures you wish the feed, dosage and gun air lines to maintain during a powder system wash cycle.

Wash Cycle Timeout

This value is the number of seconds for the wash cycle to last. Make this value large enough to ensure the purging airflow will be active long enough to clean the powder system.

CONFIGURATION SETTINGS - SCREEN #3



Program 1: Standard and Program 2: Metallic

These two sections allow adjusting the program parameter settings for the two default Powder Programs on the MS elite unit. These values are originally set at the factory, but are accessible here for alteration.

NOTE

- The labels and settings of these parameters will change depending on the display Measurements Unit selection on configuration screen #1.

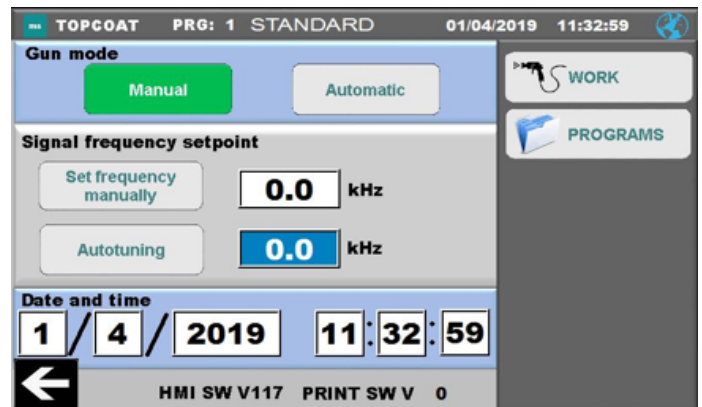
Gun Air

For Deluxe MS elite Controller units, gun air should always be set with the “Proportional Valve” button selected and green.

Gun Buttons Management

Both of these buttons are set at the factory and cannot be changed.

CONFIGURATION SETTINGS - SCREEN #4



Gun Mode

This setting is set at the factory and cannot be adjusted by the user. When the MS elite Controller is delivered, it should be set for the type of powder applicator ordered: either automatic or manual.

Signal Frequency Setpoint

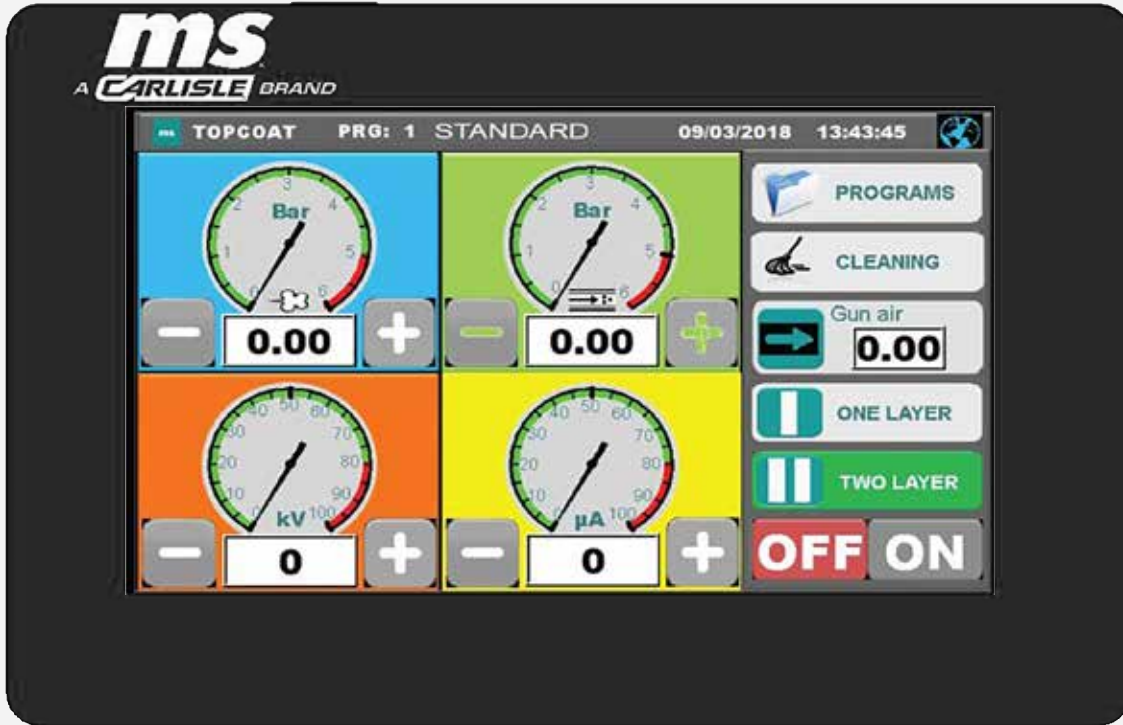
These settings are selected, calibrated and set at the factory and cannot be adjusted by the user.

Date and Time

Set the date and time by pressing on the text boxes and entering numbers on the numerical entry keypads. Note: the date format is in Day / Month / Year format. The hour field expects a 24-hour-per-day setting (e.g. 1 PM should be entered as “13”).

Software Version Numbers

The bottom of the screen displays information about the versions of the software running in the elite.



Deluxe Unit Shown

MS CONTROLLER - PARTS LIST

Part #	Description
461959-XXXXB	MS elite Controller (Basic)
461959-XXXXD	MS elite Controller (Deluxe)
460146	Grounding Cable With Clamp
460147	Controller Power Cable (EU)
460148	Controller Power Cable (Switzerland)
460149	Controller Power Cable (USA/Japan)
460150	Controller Power Cable (CN)
460881	Controller Power Cable (UK)
PA-19-06	This Service Manual in electronic form on a USB memory stick
418735	Miniature Fuse 5X20mm, 250 VAC, 2.5W, 10A

MAINTENANCE

⚠ CAUTION

➤ All components inside the MS elite controller are not accessible for servicing by the end-user.

Replacing Fuse

1. To replace the fuse, insert a screwdriver into the fuse holder. Rotate the screwdriver counterclockwise until the fuse holder becomes loose. Then, pull the fuse holder away from the back of the elite.



2. Replace the burnt out fuse with a new one.
3. Place the fuse and holder back in the appropriate opening in the back of the elite. Use a screwdriver to secure the fuse and holder by rotating in the clockwise direction.



APPENDIX

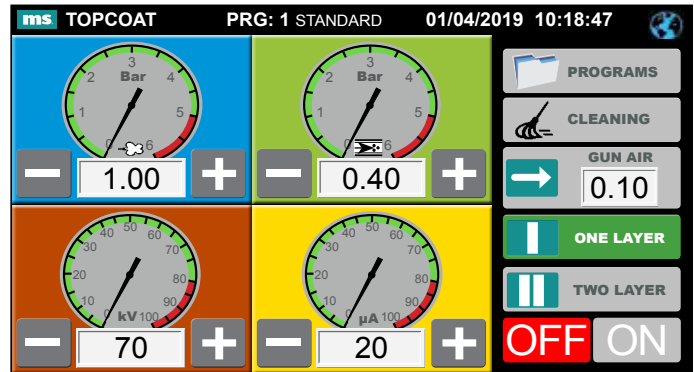
APPENDIX A: ADDITIONAL NOTES ON WORK SCREEN MEASUREMENT UNIT (BAR, PSI, Nm³/h)

Changing Configuration for WORK Screen Measurement Unit (Bar, PSI, Nm³/h)

There are three configuration options for display units of the gauges on the “WORK” screen. Each “WORK” screen configuration is characterized by the type of measurement unit the Powder Program parameters are measured and displayed in: Bar, PSI, or Nm³/h. The differences between these three configurations are explained below.

Work Screen Display Configuration - Bar:

When the elite “WORK” screen Measurement Unit is configured for “Bar”, it appears as shown below.

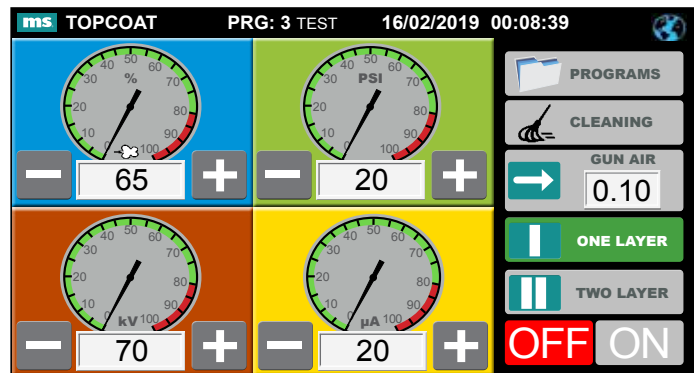


WORK SCREEN DISPLAY CONFIGURATIONS - BAR

Dial Location	Dial Meaning	Notes
Upper right	Dosage Air Pressure, measured in Bar	This is a direct sensor reading.
Upper left	Feed Air Pressure, measured in Bar	This is a direct sensor reading.
Lower left	kV coming out of the end of the applicator	
Lower right	μA coming out of the end of the applicator	

Work Screen Display Configuration - PSI:

When the elite “WORK” screen Measurement Unit is configured for “PSI”, it appears as shown below.

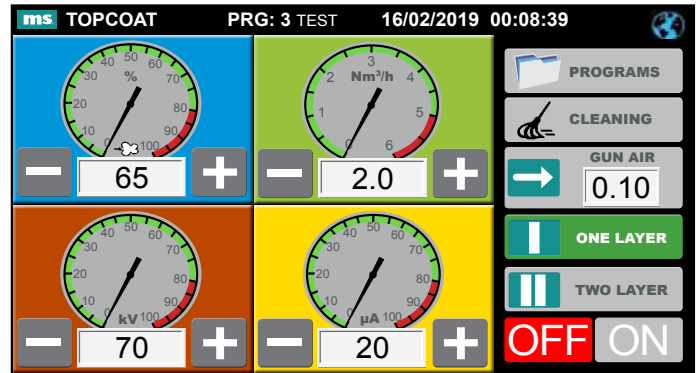


WORK SCREEN DISPLAY CONFIGURATIONS - PSI

Dial Location	Dial Meaning	Notes
Upper right	Feed Air Pressure + Dosage Air Pressure measured in PSI	This can be set for values between 0 and 80 PSI.
Upper left	Percentage of (Feed Air Pressure + Dosage Air Pressure) that is composed of feed air	
Lower left	kV coming out of the end of the applicator	
Lower right	μA coming out of the end of the applicator	

Work Screen Display Configuration - Nm³/h:

When the elite “WORK” screen Measurement Unit is configured for “Nm³/h”, it appears as shown below.



WORK SCREEN DISPLAY CONFIGURATIONS - Nm ³ /h		
Dial Location	Dial Meaning	Notes
Upper right	Feed Air Flow + Dosage Air Flow measured in Nm ³ /h	This can be set to values ranging from 0 to 6 Nm ³ /h.
Upper left	Percentage of (Feed Air Flow + Dosage Air Flow) that is composed of feed air	
Lower left	kV coming out of the end of the applicator	
Lower right	µA coming out of the end of the applicator	

For user-created Powder Programs (3-96), the configured Measurement Unit will be saved as part of the Powder Program. When the Powder Program is selected and made active, the system will return to using the Measurement Units that were in use when the Powder Program was saved.

NOTE

➤ Display Measurement Unit configuration and saving/selecting Powder Programs

When one of the factory default Powder Programs (1-2) are selected and made active, the configured Measurement Units will remain as it was with the last active Powder Program.

WORK SCREEN STEP SIZE OF +/- CHANGES		
Unit of Measurement	Top Left Gauge (Step size for single press of +/-)	Top Right Gauge (Step size for single press of +/-)
BAR	0.05 Bar	0.05 Bar
PSI	5%	1 (Feed + Dosage air pressure)
Nm ³ /h	5%	0.1 (Feed Air + Dosage air flow)

NOTE

➤ Step Size of +/- changes on Work Screen Gauges

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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