



INSTRUCTION MANUAL

**AUTOMATIC ELECTROSTATIC GUN
SERIE KA* Ex**

Manual : 1406 573.181.112

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TRANSLATION FROM THE ORIGINAL MANUAL

IMPORTANT : Before assembly and start-up, please read and clearly understand all the documents relating to this equipment (professional use only).

THE PICTURES AND DRAWINGS ARE NON CONTRACTUAL. WE RESERVE THE RIGHT TO MAKE CHANGES WITHOUT PRIOR NOTICE.

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INSTRUCTION MANUAL
ELECTROSTATIC AUTOMATIC GUN
MODEL KA* Ex

TABLE OF CONTENTS

1. GENERAL SAFETY INSTRUCTIONS2

2. OPERATING PRINCIPLE.....4

3. SPECIFICATIONS5

4. INSTALLATION.....9

5. STARTING UP.....14

6. DAILY CARE AND CLEANING15

7. INSTALLATION SHUTDOWN.....17

8. MAINTENANCE.....17

9. TROUBLESHOOTING AND ELECTRICAL TESTS17

10. DISASSEMBLY - REASSEMBLY19

11. ASSEMBLY INSTRUCTIONS (Example : KAX Ex GUN).....24

12. OPTION25

ADDITIONAL DOCUMENTATIONS :

EC Declaration of Conformity	578.018.130-UK
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Parts Identification List	
KA* Ex Electrostatic guns	573.350.050
KAP Ex Electrostatic gun	573.338.050
KAV Ex Electrostatic gun	573.340.050
KAC Ex Electrostatic gun	573.341.050
KAX Ex Electrostatic gun	573.339.050
Generator barrel	573.348.050

Dear Customer,

We would like to take this opportunity to thank you for buying a new **electrostatic automatic gun**. We are confident that you have made the right choice.

We have taken every care, from original design to final manufacture, to ensure that this product gives you complete satisfaction.

To obtain the best performance and reliability from this equipment, we would strongly advise you to read this instruction manual attentively before attempting to use the equipment.

1. GENERAL SAFETY INSTRUCTIONS

1 - The non-compliance with the safety requirements and precautions stated in this manual could result in unsafe conditions.

2 - The personnel involved in operating and servicing the electrostatic coating equipment must be fully aware of all the safety requirements stated in this manual.

3 - The workshop supervisor must be certain that the personnel has perfectly understood the safety instructions and complies with them. These instructions cover the precautions required for solvent-based paint spraying and the specific precautions in connection with the use of equipment requiring high voltage.

The electrostatic coating system shall be used by qualified personnel only. The personnel must also be familiar with the local safety standards which can be in force in certain countries.

WARNING : failure to observe the safety precautions contained herein could result in operating troubles and create unsafe conditions (body injury, explosion fire or electric shock).

■ INSTALLATION

➔ **The EN 50 176 standard covers the select, installation and use requirements of the automatic electrostatic projection equipments for ignitable materials. That standard defines 3 classes of electrostatic projection systems. The class A covers the systems in conformity with the EN 50050 standard with an energy limit of 0,24mJ. The KA* Ex gun is a gun designed **only** for the application of paint and varnishes.**

4 - Spraying, cleaning and servicing must be made in a ventilated area so that solvent vapours are properly drained.

5 - **The power supply unit must be installed in a non-hazardous area. Ground the earth terminal.**

6 - All metallic parts located within 3 meters (10 ft) around the gun (such as pumps, drums, conveyor, etc...) must be correctly grounded.

7 - Storage of paint and solvent drums near or inside the spraying area is prohibited. Keep all fluid containers properly closed in a non-hazardous area.

➔ **Use cleaning solvents with the highest flash point - if possible, higher than the ambient temperature.**

8 - Remove the useless parts from the spraying area and keep this area clean. Part holders and conveyor hooks must be removed and frequently cleaned.

9 - The floor must be electrically conductive and grounded (maximum resistivity of the floor : 1 MΩ as per EN 50 053-7-2).

10 - The warning sign supplied in the case must be hung up in the spraybooth so that it can be easily seen and read by all operators.

■ SPRAYING

- 11 - Never point the spray gun to anyone or at any part of the body.
- 12 - Never throw or drop the gun-generator barrel assembly. Any misuse of the spray gun equipment or accessories can damage them and result in serious body injury, fire or explosion.
- 13 - The part to be painted must be properly grounded. Any incorrect electrical continuity might result in stock hazard.
- 14 - Never operate the electrostatic spray gun if air leaks are detected on the gun. Never use air hoses on which air can occur.
- 15 - Be sure that the distance between the parts hanging on the conveyor and the gun air cap is at least of 15 cm / 5.9".
- 16 - Be sure that tip and air cap are in position and hand tightened with the retaining ring onto the gun before turning on the power supply.
- 17 - Verify that any person entering the spray area is correctly grounded with conductive sole shoes (in accordance with EN 344 standard).

The operator must not wear gloves which insulate the hand from the conductive gun handle. If using gloves, check that they are conductive (in accordance with EN 50 053) or that a square has been cut- out in the glove palm.

■ SERVICING

- 18 - The electrical supply must be shut off before any cleaning (box switch O).
- 19 - When shutting off high voltage and before any action on the gun, wait a moment to leave the electrostatic charge flow out freely to earth.
- 20 - Never immerse the gun or plastic parts of the gun in solvent.
This could seriously damage the gun and cause fire, explosion or body injury. To clean the gun use soft cloth or bristle brush with a moderate amount of non-conductive solvent, wipe the front of the gun at fluid nozzle with the gun pointed down to prevent from flowing back into the air passages.
- 21 - Before disconnecting the hoses, check that they are no more under pressure and that the power supply is off.
- 22 - The personnel involved in the electrostatic coating system servicing must be trained and qualified. If you face any trouble which cannot be repaired, do not try to start up the equipment. Consult immediately your local authorized KREMLIN distributor for assistance.
- 23 - After any servicing or cleaning, never switch on the power supply tip and air cap are in position and secured with the retaining ring onto the gun.

■ ENVIRONMENT



The equipment consists of a label plate with the name of the manufacturer, the equipment part number, the interesting informations to use correctly the equipment (pressure, voltage...) and the above pictogram.

The equipment is designed with and consists of high quality materials and components which can be re-used.

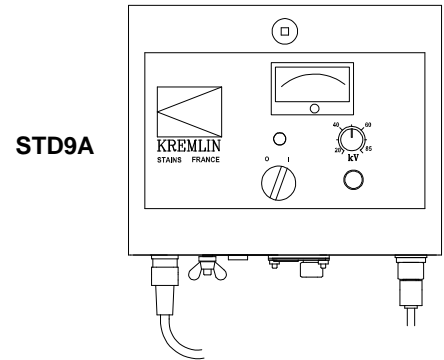
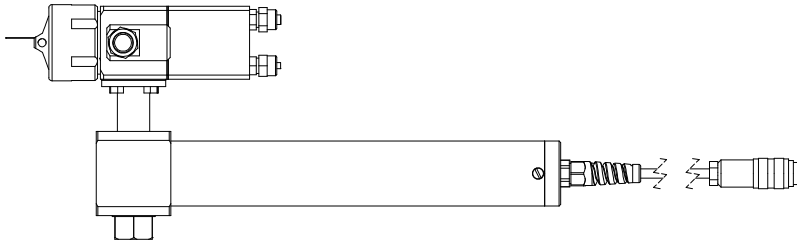
The 2002/96/EC European Directive covers all equipments with a crossed-out bin pictogram. Please inform yourself about the collection systems for electric and electronic equipments.

Please act according to local rules and **do not throw the old equipments with household wastes**. A correct disposal of the old equipment will help prevent negative consequences for the environment and health.

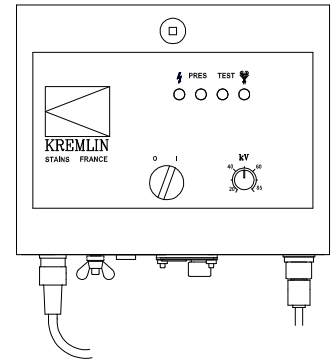
2. OPERATING PRINCIPLE

KA* Ex gun assembly with BG Ex barrel

STD 9 A or STD 9 power supply unit



STD9A



STD9

The electrostatic coating system consists of an automatic spraying gun with its generator barrel and of an electronic control box.

■ STD 9 A OR STD 9 POWER SUPPLY

The power supply transforms the 100/220 Vac into an adjustable continuous low voltage which can be set from the electronic regulator.

The electronic regulator built into the power supply unit automatically reduces the intensity and voltage when the electrode on the spray gun is close to a grounded object (less than 100 mm or 4 inches) thereby preventing any electric discharge.

➔ **The power supply unit includes a 3-pin plug and cable assembly so as guarantee a safe grounded AC input power system. Failure to ground the power supply may result in an electric shock hazard.**

Interconnect the STD 9 A or STD 9 power supply unit with the air pressure network (maximum pressure 6 bar / 87 psi).

STD 9 A power supply unit : The pressure switch incorporated into the power supply unit provides the 12 Vdc to the generator barrel only when independent air pressure is activated (minimum air pressure : 4 bar / 58 psi).

STD 9 power supply unit : The atomizing air of the electrostatic spray gun flows through the power supply - via the power supply unit - via the flow switch - and then exhausts through the gun air cap. The flow switch provides the low voltage supply to generator barrel.

■ **KA* Ex GUN-BARREL ASSEMBLY**

The generator barrel transforms the low voltage supply supplied by the power supply unit into a high voltage.

The KA* Ex electrostatic gun, on its generator barrel, is designed to negatively charge the material being sprayed.

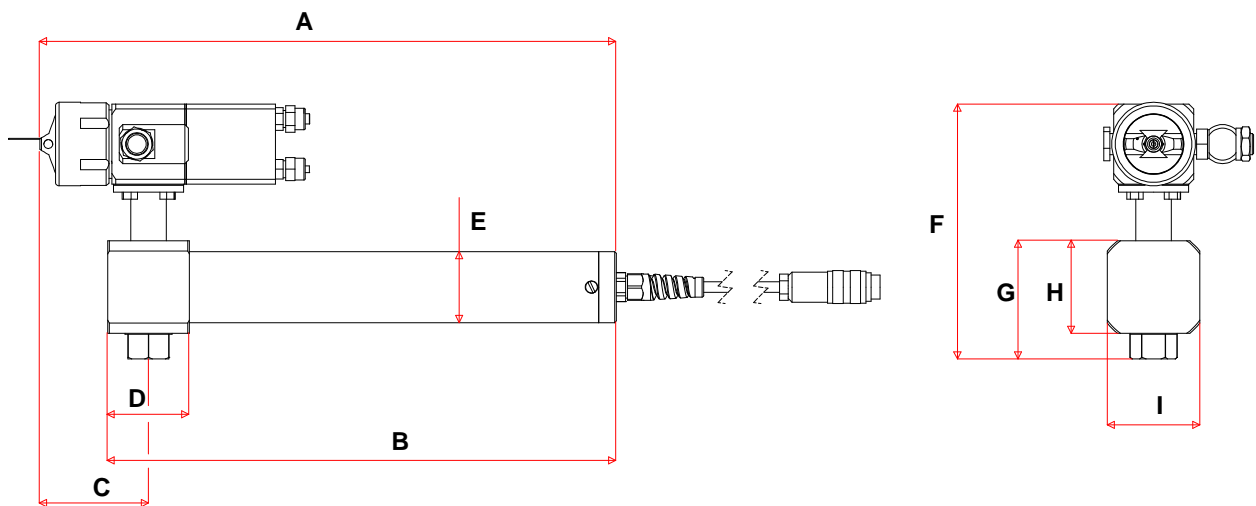
As a result of the electrostatic charge of the paint particules, a more efficient and uniform application of the coating material is applied to the front but also on the sides, edges and back of the grounded work pieces.

3. SPECIFICATIONS

■ **COMMON FEATURES TO ALL KA* Ex GUNS**

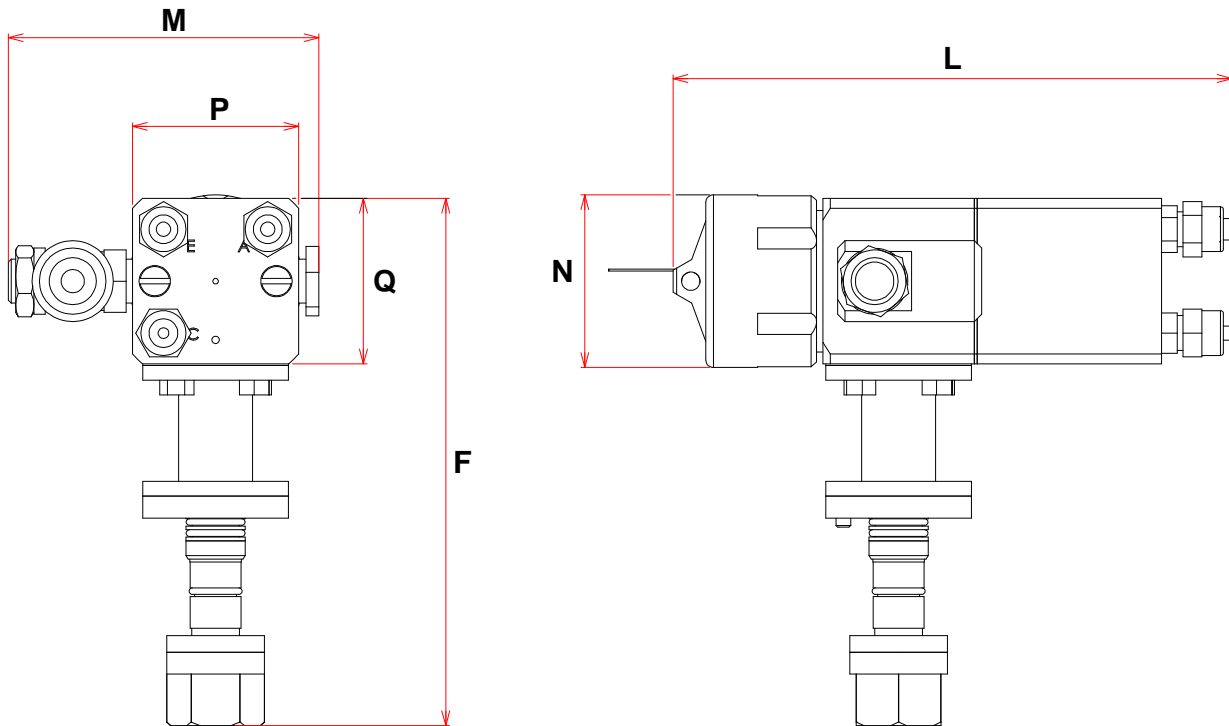
Dimensions

<i>Gun + BG</i>	Ind.	A	B	C	D	E	F	G	H	I
	mm	325	285	60	46	40	145	64	52	52
	"	12.8	11.2	2.36	1.81	1.57	5.7	2.52	2.04	2.04



KA* Ex gun

Ind.	L	M	N	P	Q
mm	160	85	50	45	45
"	6.3	3.35	1.97	1.77	1.77





Electric specifications

Type	integrated generator (in the BG Ex barrel)
Number of electrodes	1
Operating voltage (electrode)	negative, adjustable between 20 kV to 80 kV.
Current	100 µA.
Low voltage	adjustable from 3 V to 12 Vdc (refer to the STD9 instruction manual)
Low voltage display	by a galvanometer on the STD 9 A supply unit by a LED on the STD 9 supply unit
Maximum current consumption.....	0,65 A at 12 V.
BT electric cable length.....	12 m for assembly with KA. Ex gun 6 m for assembly with iso bubble

Fluid specifications

Fluid fitting (gun).....	fitting F 12x125
Fluid fitting (hose).....	fitting F 1/2 JIC
Maximum viscosity	40 s CA 4 - For higher viscosity, consult your local authorized KREMLIN distributor.
Maximum temperature	60° C / 140 ° F
Fluid hose	Specific hose (fitting M 12 x 125 - fitting F 1/2 JIC)
Fluid viscosity	>5 MΩ (assembly with a specific hose, 1 or 5 m long + an AIRMIX hose)
Fluid hose	from 0 to 5 MΩ (solvent paint or water-based paint) assembly with an insulated specific hose , 10 or 15 m long)

Nota : For water based materials, use an ISO BUBBLE (to isolate the pump, the paint container). Consult your local authorized KREMLIN REXSON distributor.

COMMON MARKING TO GUNS	DESCRIPTION
KREMLIN REXSON 93245 STAINS FRANCE	Name and address of the manufacturer
KAX Ex (or KAP Ex or KAV Ex or KAC Ex)	Gun version
PATENT PENDING	Registered patent
INERIS 04 ATEX 0093 X	Fluid approval N° given by INERIS
EEx 0.24mJ  II 2 G	EEx 0.24mJ : marking corresponding to the projection guns for paints for the non-flammable paints or flock in association with non-flammable adhesive vapours with an energy less than 0.24 mJ (EN 50 050 standard) II : group II 2 : class 2 Surface equipment meant to be in an area where explosive atmospheres due to gas, vapours, mists are liable to appear from time to time in usual operating. G : gas
CE0080	0080 : INERIS code that notifies the Quality Management System
P air : 6 bar / 87 psi	Maximum air pressure
P prod : 120 bar / 1741 psi	Maximum fluid temperature (depending on gun version : 120 bar / 1741 psi for the KAX Ex and KAC Ex 10 bar / 145 psi for the KAP Ex and KAV Ex)
	Environment indication (refer to § 2 - Environment)
N° Serie /Serial Nb <i>(engraved on the side of the gun body and at the foot for the generator barrel)</i>	Number given by KREMLIN REXSON. The two first numbers indicate the manufacturing year.

■ **SPECIFIC FEATURES OF THE KA EX GUNS**

	AIRMIX [®] GUNS		PNEUMATIC GUNS	
	KAX EX	KAC EX	KAP EX	KAV EX
Gun assembly with air cap and nozzle	<i>KX 16 air cap</i> <i>09/135 nozzle</i>	<i>KXC 5 air cap</i> <i>K 30 nozzle</i>	<i>KP 3 air cap</i> <i>Ø 1,2 nozzle</i>	<i>KMV air cap</i> <i>Swirling fan nozzle</i>
Fluid specifications				
Fan pattern	Airmix [®] - Adjustable flat pattern	Airmix [®] - Round hollow spray	Pneumatic - Flat pattern	Pneumatic - round pattern
Maximum fluid pressure	120 bar / 1740 psi	120 bar / 1740 psi	10 bar / 145 psi	10 bar / 145 psi
Fluid flow rate and fan width	Adjustable by air flow rate variation on the air cap - Refer to AIRMIX [®] nozzle chart - ('KAX Ex Spare parts' list' Doc)	Refer to AIRMIX [®] nozzle chart - ('KAC Ex Spare parts' list' Doc)	Maxi 1 litre/minute Fan width at 25 cm : 30 cm	Maxi 1 litre/minute Fan width at 25 cm : 20 cm
Air specification	KX 16 air cap flow rate: 8 Nm ³ /h.	KXC 5 air cap flow rate: 8 Nm ³ /h.	KP 3 air cap flow rate : maxi 20 Nm ³ /h at 4 bar (58 psi)	KMV air cap flow rate: 16 Nm ³ /h at 4 bar (58 psi)

4. INSTALLATION

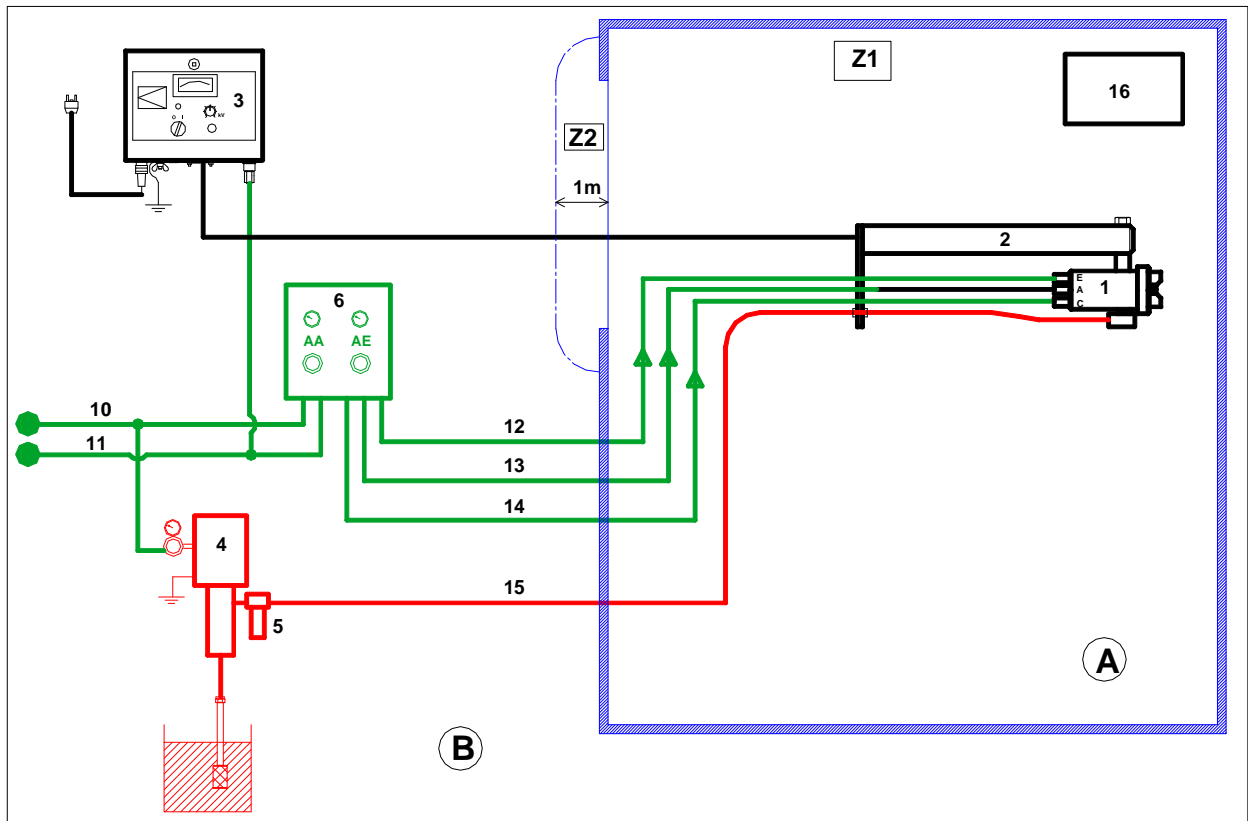
➡ REFER TO GENERAL SAFETY INSTRUCTIONS

That equipment requires compliance with all applicable safety standards and requirements outlined in this manual. Any improper installation or misuse of the electrostatic coating system can cause serious body injury, fire, explosion or electric shock hazard (refer to general safety instructions).

The European safety standard EN 50 053 and EN 50 176 cover installation and operation regulations of electrostatic coating system.

■ INSTALLATION DIAGRAM

Installation diagram with a STD 9 A power supply unit



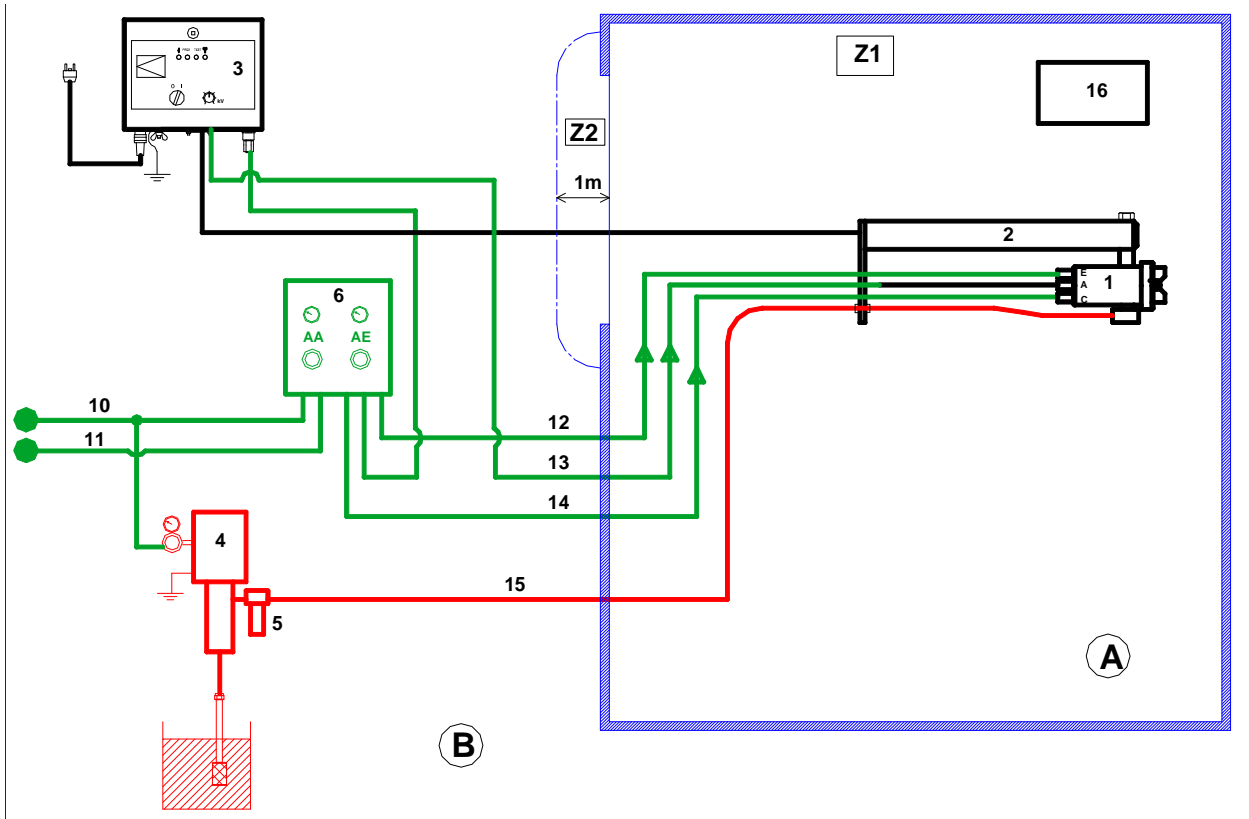
Ind.	Description
A	Explosive area (area 1 and area 2) spray booth
B	Non explosive area
1	KA* Ex gun (depending on the model)
2	HV generator barrel
3	STD 9 A control supply unit
4	Fluid pump (pneumatic or AIRMIX® depending on the model)
5	Fluid filter
6	Air control box (option)

Ind.	Description
10	Main air supply line (P = max 6 bar / 87 psi)
11	Robot control air (P = mini 4 bar / 58 psi)
12	Air hose, Ø 6x8 (fan air)
13	Air hose, Ø 6x8 (central air)
14	Air hose, Ø 4x6 (control air)
15	Fluid hose (depending hose) For water-based paint → insulating specific hose (10 or 15 m long) For solvent paint → specific hose + AIRMIX® hose
16	Warning sign

The **typical installation** shown above is only a guide for selecting and installing an electrostatic coating system.

The air control box (ind. 6) is optional. It enables air to be not exhausted through the gun air cap (no bleeder type gun). It checks the air pressures (spraying air and fan air)

Installation diagram with a STD 9 power supply unit



Ind.	Description
A	Explosive area (area 1 and area 2) spray booth
B	Non explosive area
1	KA* Ex gun (depending on model)
2	HV generator barrel
3	STD 9 control supply unit
4	Fluid pump (pneumatic or AIRMIX® depending on model)
5	Fluid filter
6	Air control box

Ind.	Description
10	Main air supply line (P = max 6 bar / 87 psi)
11	Robot control air (P = mini 4 bar / 58 psi)
12	Air hose, Ø 6x8 (fan air)
13	Air hose, Ø 6x8 (central air)
14	Air hose, Ø 4x6 (control air)
15	Fluid hose (suivant modèle) For water-based paint → insulating specific hose (10 or 15 m long) For solvent paint → specific hose + AIRMIX® hose
16	Warning sign

The **typical installation** shown above is only a guide for selecting and installing an electrostatic coating system.

As the STD 9 power supply unit is fitted out with a flow switch (the STD 9 A power supply unit consists of a pressure switch), **it is compulsory to mount an air control box** or any other material (electrovalves, automaton, robot...) that can shut off the atomizing air (fan air and central air) of the guns.

For assistance in designing other system, contact your local authorized KREMLIN distributor.

■ GUN ASSEMBLY

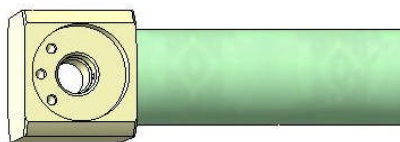
Mount the BG generator barrel as indicated. For a correct assembly, use only KREMLIN hook up systems.

- ➔ The stand used to support the parts to be painted must imperatively be grounded (be careful with hooks covered with dry paint!).
- ➔ The appropriate spraying distance must be of about 20 to 30 cm / 8" to 12" between the gun air cap and the part to be painted (the minimum distance must be of 15 cm / 6").

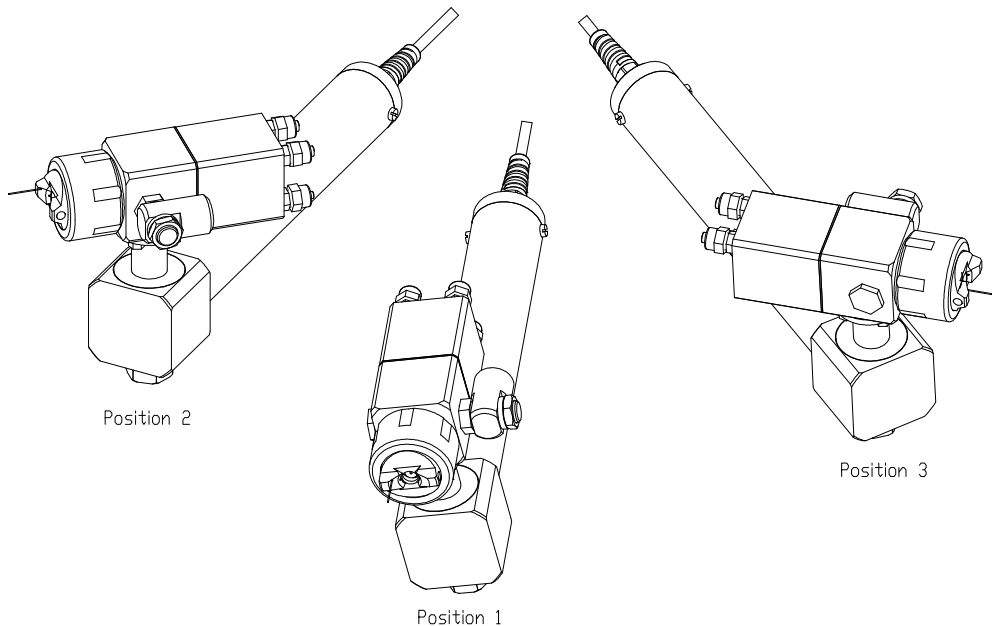
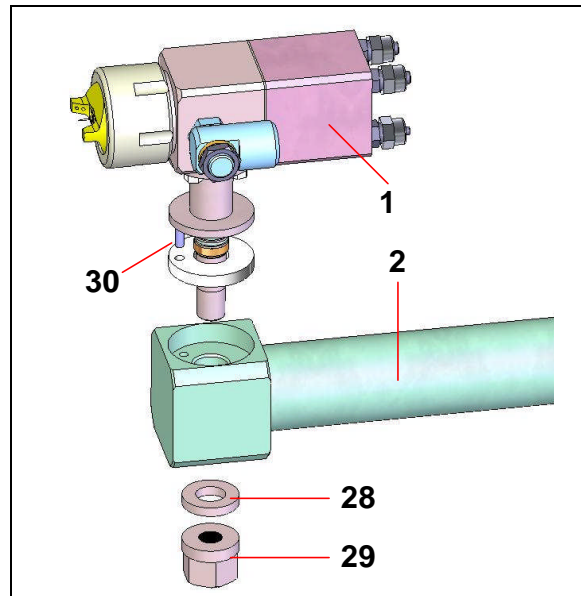
Mount the KA* Ex gun (1) on the BG barrel (2) :

- Take off the nut (29) and the lower washer (28).
- Insert the gun axle into the barrel according to the position chosen. First, position the washer (28) and then screw the axle nut (29).

Three positions are possible depending on the position of the pin (30) in one of the holes of the generator barrel.



↑ 3 holes at 45°



➔ According to the installation, you can mount the gun either above or below the barrel.

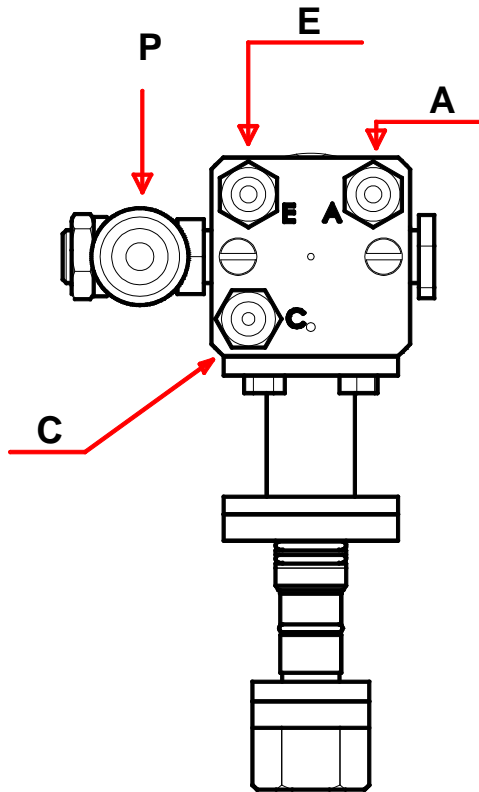
■ COMPRESSED AIR SUPPLY CONNECTION

Compressed air supply to the electrostatic coating system must be dry and clean. Dirt or moisture can ruin the quality of your finished work piece and can cause the gun to malfunction.

For correct operation of the electrostatic coating system, supply air to the pressure switch located in the power supply unit.

If necessary, install an air line lubricator at the pump inlet.

Check that the compressed air network has a minimum pressure of 4 bar / 58 psi (clean air).



GUN BACK VIEW

- A Air hose, 6x8 (Polyamide)
- E Air hose, 6x8 (Polyamide)
- C Air hose, 4x6 (Polyamide)
- P Specific fluid hose

	Fitting	Air supply	Atomizing	Pressure adjustment (bar/psi)
KA* Ex	C	Control air	Gun opening → fluid	P = from 4 to 6 bar / from 58 to 87 psi
KAX Ex	E	Fan air	Even fan → elimination of tails	P = from 1 to 3 bar / from 14.5 psi to 43.5 psi
	A	Central air	Fan width : - wide fan - narrow fan	P = 0 P = from 1 to 3 bar / from 14.5 psi to 43.5 psi
KAC Ex	E	Central air	Fan width : - wide fan - narrow fan	P = 0 P = from 1 to 3 bar / from 14.5 to 43.5 psi
	A	Swirling air	Fineness of spraying	P = from 1 to 3 bar / from 14.5 to 43.5 psi
KAP Ex	E	Fan air	Fan width : - round fan - flat fan	P = 0 P = from 1 to 4 bar / from 14.5 to 58 psi
	A	Central air	Fineness of spraying	P = from 2 to 5 bar / from 29 to 72.5 psi
KAV Ex	E	Central air	Fan width : - narrow fan - wide fan	P = 0 P = from 1 to 4 bar / from 14.5 to 58 psi
	A	Swirling air	Fineness of spraying	P = from 2 to 5 bar / from 29 to 72.5 psi

An air control box enables a separate air connections and manages a separate adjustment of the fan air and central air (hose 6 x 8).

In this way, the air does not exhaust through the gun air cap (no bleeder type gun). The box control air will enable the air to be provided in 2 phases : atomizing air at first, then gun triggering air.

■ PRODUCT SUPPLY CONNECTION

Before connecting the fluid hose (15), check that the hose is suited to the pump working pressure and to the kind of paint sprayed (water-based paint or solvented paint).

Nota : for easier assembly of the insulating specific hose, remove the gun fluid fitting, interconnect the hose to the fitting and mount the whole on the gun.

Never use damaged fluid hoses. Use only KREMLIN fluid hose designed for the resistivity range of the fluid to be sprayed.

Connect the fluid filter (5) onto the pump fluid outlet (4).

Interconnect the fluid supply hose (15) between the filter (5) and the gun (1).

■ VENTILATE THE SPRAY BOOTH

To prevent hazardous concentrations of toxic and / or flammable vapors, spray only in a correctly ventilated spray booth.

Never operate the spray gun when the ventilation system is stopped.

High velocity air exhaust will decrease the operating efficiency of the electrostatic system (air exhaust velocity of 30 meters (98.5 ft)/minute should be sufficient).

Nevertheless, before operating the electrostatic coating system, make sure that the air velocity of the spray booth complies with the local regulations.

■ ELECTRICAL CHECKS

Install the power supply unit (STD 9 A or STD 9) outside of the coating application area.

Before connecting the power supply unit (3) on the main power source, be sure is compatible with the local voltage source.

Connect the three pin plug and cable assembly to the power source.

Connect the ground wire to the earth connection of the spray booth and conveyor.

With a megohmmeter, check the electrical grounding continuity between the ground connection of the power supply (3) and the grounded AC input power source (real earth connection).

Do not attempt to by-pass or defeat the ground interconnections : it may result in an electric shock hazard, fire or explosion.

Interconnect the generator barrel (2) electric cable to the power supply unit (3).

5. STARTING UP

➡ REFER TO GENERAL SAFETY INSTRUCTIONS

■ SAFETY REQUIREMENTS

Before using the electrostatic coating system :

Check that the operators have fully understood the safety instructions stated in this manual.

The operators must not wear gloves which could insulate the hand from the conductive gun handle. If using gloves, check that they are conductive in accordance with EN 50 053 or that a square has been cut out in the glove palm.

Be sure that the personnel entering the spraying area has read and understood the safety requirements stated in this manual.

Verify that any person entering the spray area is correctly grounded with conductive sole shoes or personal grounding straps.

Check that fans are in good operating condition.

Remove any useless parts from the spraying area and keep this area clean. Part holders and conveyor hooks must be cleaned frequently. All conductive objects must be electrically grounded as well.

■ FAN PATTERN ADJUSTMENT

Install the air nozzle and the air cap on the gun.

Screw retaining ring and air cap firmly onto the spray gun positioning the air cap to obtain the desired pattern orientation. Pattern orientation will be 90° from the orientation of the air horns on the air cap.

Prime the pump.

Trigger the gun with a minimum pressure of 4 bar / 58 psi.

Adjust the material pressure (pump air regulator) for the desired flow rate.

Adjust fan air pressure (E) and central air pressure (A).

Nota : If more or less material are required, select another spray tip.

■ ELECTROSTATIC CIRCUIT

Connect the STD 9 A or STD 9 power supply unit to its 115 V / 230 Vac power source.

Turn the power supply O-I switch to the I position.

Supply the power supply unit with compressed air (P = 4 bar / 58 psi).

→ The red indicator light turns on denoting electrostatic effect presence.

Turn the voltage adjustment knob (potentiometer "kV" fully clockwise :

→ The power supply emits a constant voltage at any given setting. This regulated voltage is transformed into high voltage within the generator barrel before being delivered to the gun.

■ FINISHING ADJUSTMENT

Adjust the spraying parameters :

- Fluid flow rate (pump air pressure).
- Atomizing air
- Fan width
- Electrostatic effect (high voltage is adjusted by the front potentiometer).

The fluid and air hoses as well as the gun remain clean.

The electrostatic wrap effect efficiency decreases quickly when gun and hoses are dirty.

6. DAILY CARE AND CLEANING

➡ REFER TO GENERAL SAFETY INSTRUCTIONS

The fluid and air hoses as well as the gun remain clean.

The electrostatic wrap effect efficiency decreases quickly when gun and hoses are dirty.

■ FLUID NETWORK CLEANING

Important recommendations

Cleaning and flushing of the electrostatic coating system must be carried out in a ventilated area.

The ON / OFF switches on the power supply and gun must be OFF before starting cleaning operation.

All metallic parts located within 4 m (13 ft) around the gun must be correctly connected to the ground. The floor must be conductive and grounded.

Use cleaning solvents with the highest flash point - if possible, higher than the ambient temperature.

Only apply a moderate amount of solvent onto a clean soft cloth or bristle brush to clean the gun and hoses.

Synthetic resins used in the fabrication of the electrostatic manual guns can react with certain solvents.

Avoid using the most toxic solvents. Do not use chlorinated solvents.

Clean all parts with a non-conductive (1) solvent, compatible with the fluid being sprayed (conductive (1) solvent can cause the gun to malfunction). If cleaning requires the use of a conductive (1) solvent, never leave this solvent inside the fluid network. Flush it with a non-conductive (1) solvent, blow the fluid hose out with air and dry the gun carefully.

(1) non-conductive solvents are also called non polar solvents; conductive solvents are also called polar solvents.

Before switching ON the electrostatic effect :

- Install the air cap assembly over the needle seat or tip and secure in position with retaining ring on to the gun.
- After applying solvent onto the gun and hoses check they are completely dried.
- Check the cleaning solvent vapors due to the cleaning operation are totally evacuated.

Procedure

Turn the ON / OFF switch on the power supply and gun to OFF "O" (All indicator lights switch off).

Depressurize air hoses.

Empty all material from the container, then fill the material container with a solvent compatible with the material just emptied.

Decrease the air pressure on the pump air motor (KAX Ex and KAC Ex guns).

Send the control air to trigger the gun.

Warning : Never switch on the power supply unit during this flushing operation. Otherwise it may result in ignition or explosion of the air / solvent mixture.

When clear solvent flows from the gun, stop the pump and depressurize fluid hoses.

Blow up the fluid hose with compressed air.

Reassemble the air cap and tip onto the spray gun and clean them with the appropriate solvent.

Before switching ON the electrostatic effect :

- *Install the air cap assembly over the needle seat or tip and secure in position with retaining ring on to the gun.*
- *After applying solvent onto the gun and hoses check they are completely dried.*
- *Check the cleaning solvent vapors due to the cleaning operation are totally evacuated.*

■ **GUN CLEANING**

Never immerse the gun in solvent.

Do not use metal tools to clean the gun or the air cap holes, as they scratch them and create a distortion of the spray pattern.

Only use soft cloth or bristle brush.

Clean the front of the gun and the fluid nozzle with the gun pointed down, to prevent dirty solvent from flowing back into the air passages.

■ **AIR CAP CLEANING**

Make sure that the fluid pressure has been released in fluid hose.

Remove air cap ring and air cap from the spray gun.

Clean them with a soft brush and some solvent (do not leave these items immersed in solvent). Blow up the air cap and air cap ring with compressed air.

After cleaning, store the air cap, tip, nozzle and needle seat or reinstall them onto the gun.

On KAX Ex and KAC Ex guns, check the electrode wire. Never start up a gun whose electrode wire is damaged or broken.

7. INSTALLATION SHUTDOWN

■ SHORT DURATION SHUTDOWN

You can leave paint inside hoses and gun, except paint with a high percentage of hardener (for example, polyurethane paint).

■ LONG DURATION SHUTDOWN

➔ **Shut off the electrical supply.**

Flush the installation with solvent. Clean the gun carefully with a soft cloth or bristle brush.

Blow up with compressed air. Make sure the tip is not clogged.

Install the tip onto the gun after cleaning.

➔ **Never immerse the air cap, the tip or the gun in solvent. Keep them in a dry area.**

➔ **Do not use metal tools to clean the gun or the air cap holes, as they scratch them and create a distortion of the spray pattern.**

8. MAINTENANCE

During the day, make sure :

- make sure the gun is clean,
- coating material is not present in the air hoses,
- all hoses are not worn or crimped and all air and coating material connections are tight.
- the safety circuit is functioning properly by moving a grounded object toward the front of the gun.

9. TROUBLESHOOTING AND ELECTRICAL TESTS

■ GUN OPERATION TROUBLESHOOTING CHART

TROUBLE	PROBABLE CAUSE	SOLUTION
Jerking or spitting spray.	Air is being suctioned into material stream.	Check pump suction hose for leaks and tighten fittings. If necessary, use thread sealant or male thread.
	Uninsufficient fluid pressure.	Increase pump air pressure and / or clean fluid filter.
	Dirt in the fluid line.	Clean the fluid line, clean the fluid filter.
	Not enough fluid in the fluid container.	Fill the fluid container.
No fluid output	Tip blocked	Clean it
	Insufficient air pressure to trigger the gun.	Minimum pressure = 4 bar / 58 psi
	Fluid filter clogged	Clean it.
	No pressure on the pump	Check it
Fluid continuously leaking from gun tip	Needle tip worn	Replace it
	Seat worn	Replace it

TROUBLE	PROBABLE CAUSE	SOLUTION
Fluid leaks through holes in air cap	Loose air cap. Improper position of tip over the needle seat (KAX Ex, KAC Ex). O Ring on seat worn or damaged	Tighten air cap retaining ring; do not overtighten. Clean the air cap and tip. Check that fluid did not flow back in the air passages. Replace it.
Poor atomization	Tip obstructed / tip clogged (KAX Ex - KAC Ex). Low fluid pressure (KAX Ex - KAC Ex). Fluid viscosity too high Atomizing air pressure low. Fluid flow rate too high (KAV Ex - KAP Ex).	Clean it. Increase pressure. Reduce viscosity adding compatible solvent (or heating material where appropriate). Increase atomized air pressure. Decrease the fluid flow rate (decrease pump air pressure).
"Orange peel" finish	Evaporation of solvent too fast. Improper thinner of fluid being sprayed.	Use slower evaporation solvent. Dilute fluid with solvent - Increase the air pressure (KAX Ex - KAC Ex). Increase fluid pressure - Use smaller tip size.
Fluid runs	Evaporation of solvent too slow. Excessive delivery	Use faster evaporating solvent. Spray at a greater distance. Reduce fluid flow rate - Increase air atomization pressure - Reduce electrostatic system.
Excessive delivery in middle of spray	Excessive fluid flow rate (KAP Ex - KAV Ex). Improper tip size (KAX Ex). Improper fluid thinner. Air holes in air cap obstructed.	Reduce fluid flow rate. Increase air atomization pressure. Use a smaller tip Dilute fluid with solvent or heating fluid where appropriate. Clean air cap.

■ ELECTRICAL TROUBLESHOOTING CHART

TROUBLE	PROBABLE CAUSE	SOLUTION
No electrostatic effect	No high voltage	Check for low voltage from power supply, check power supply manual troubleshooting. Check the electrical interconnection.
	Improper distance between gun and work part.	Adjust spraying distance between 200 and 300 mm (8" to 12").
	Poorly grounded parts.	Check these parts, holder and conveyors are correctly grounded. Clean where necessary.
	High exhaust velocity in booth	Reduce exhaust velocity (within standard limit).
	Atomizing air pressure too high.	Reduce it.
	Excessive fluid pressure (KAP Ex - KAV Ex).	Reduce it.
	Improper fluid viscosity	Check with supplier for proper fluid for electrostatic spraying.
Low or high fluid resistivity.	Check with resistivity meter.	

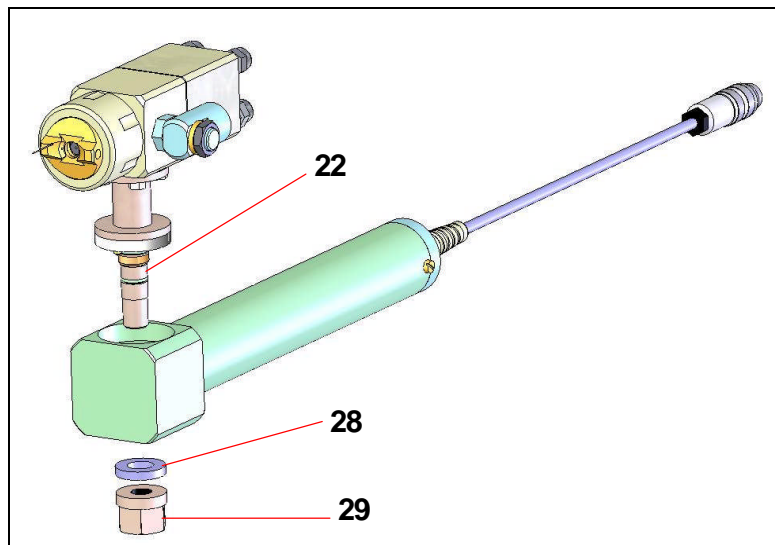
10. DISASSEMBLY - REASSEMBLY



WARNING : Before any action on the gun, shut off the electrical supply, the compressed air supply and depressurize the systems. (refer to § 2 "GENERAL SAFETY INSTRUCTIONS").

■ GUN REPLACEMENT

Disassemble gun from generator barrel.
 Unscrew nut (29) and remove washer (28).
 Take off the gun.
 Put grease on the axle washers of the new gun (22).
 Insert gun axle onto barrel.
 Place washer (28), then screw axle nut (29).



■ **SEAT (49) : ACCESS BY THE FRONT PART OF THE GUN**

Unscrew ring (40), put aside air cap (43) and tip (44).

Unscrew seat (49) and replace it. Make sure you install the seat seal (50).

■ **NEEDLE (55) : ACCESS BY THE BACK PART OF THE GUN**

Unscrew plugs (12) and screws (11).

Remove rear body (6) and spring (15) (pay attention to the seal 8).

Pull piston to remove needle-piston assembly (55).

Take new needle-piston assembly, lubricate slightly ball and O Ring and insert it carefully into tightening screw (16), cartridge (17).

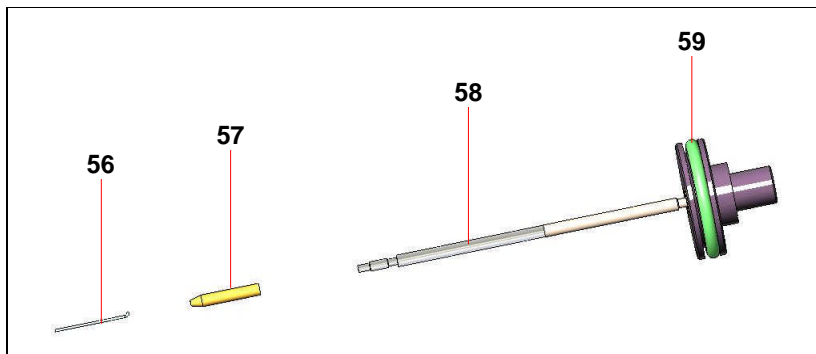
Change seals if necessary.

Reinstall spring, rear body, screws and plugs.

➡ **Make sure plugs (12) are installed. They contribute to the security.**

Nota : For the KAP Ex needle, you can change the electrode (56) or the needle end (57) without changing the complete needle.

Remove the air cap and the tip of the gun, then remove the end to change the electrode.



■ **TIGHTNESS CARTRIDGE (17) : ACCESS BY THE BACK PART OF THE GUN**

Unscrew the plugs (12), the screws (11)

Remove rear body (6) and spring (15) (pay attention to the seal 8).

Pull piston to remove needle-piston assembly (55).

Unscrew screwing screw (16).

With a long-nose pliers, pull the cartridge (17).

After the lubrication of the O Ring seal (19), replace it. Comply with installation order.

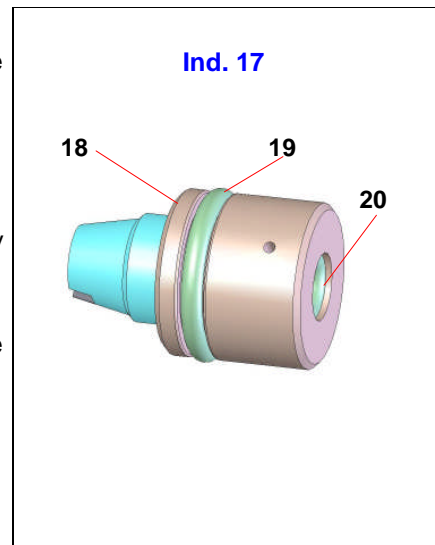
Screw tighten screw (16).

Lubricate slightly end ball and seal (58), then insert needle piston assembly (55).

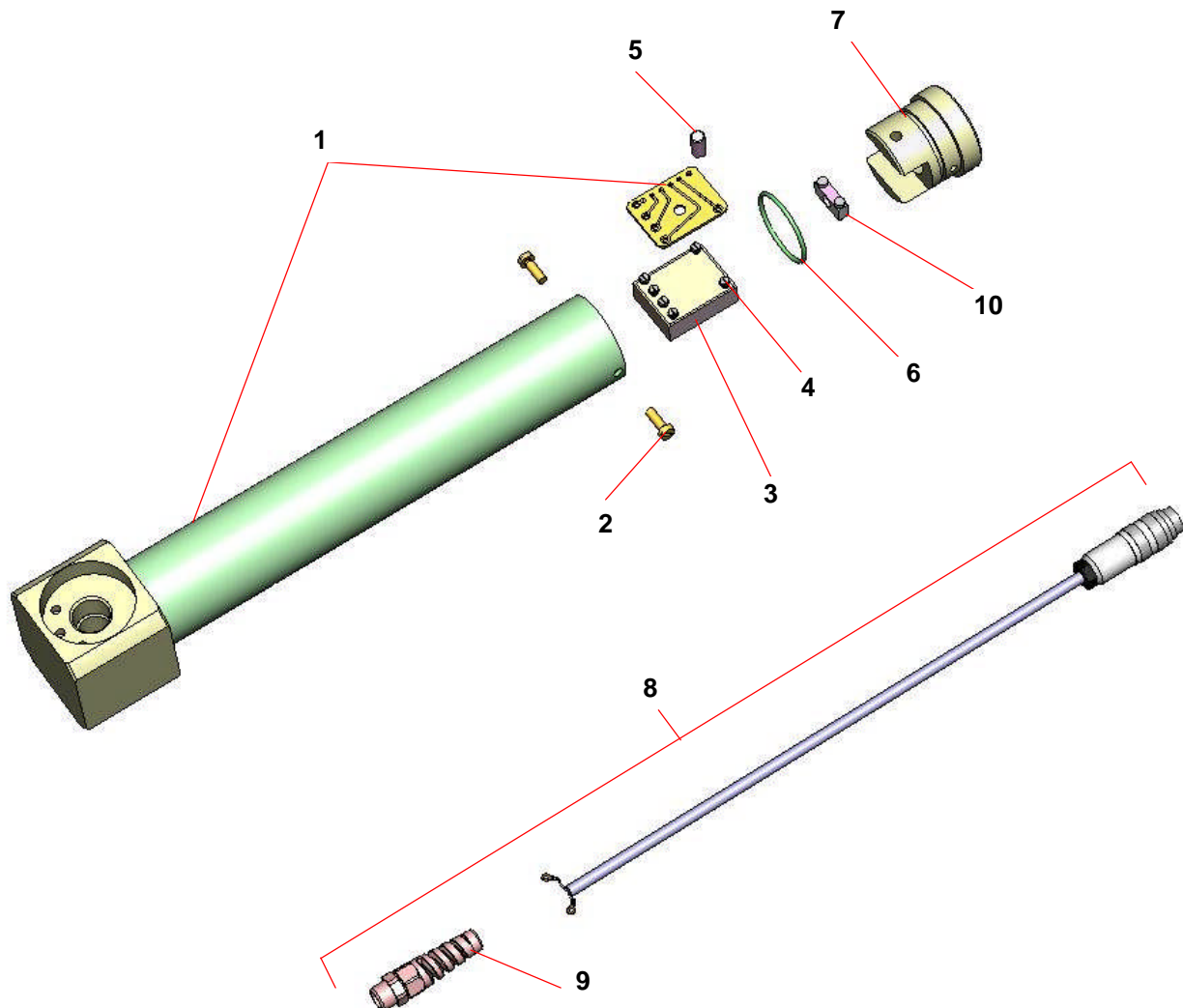
Change seals if necessary.

Remount spring, rear body, screws and plugs.

➡ **Make sure plugs (12) are installed. They contribute to the security.**



■ OSCILLATOR REPLACEMENT (IND. 3)



Removal

- 1 - Separate the barrel from its support (wrench # 3).
- 2 - Unscrew the 2 screws (2)
- 3 - Pull the end (7) **carefully** to take off the oscillator.
- 4 - Unscrew the screw (5).
- 5 - Unscrew the stuffing-box (9) holding the lock nut (wrench # 15) to make the cable slide.
- 6 - Take off the oscillator and its circuit from the end (7).
- 7 - Unscrew the 6 screws (4 and 98) carefully and separate the oscillator (3) from its circuit.
- 8 - Change the oscillator (3).

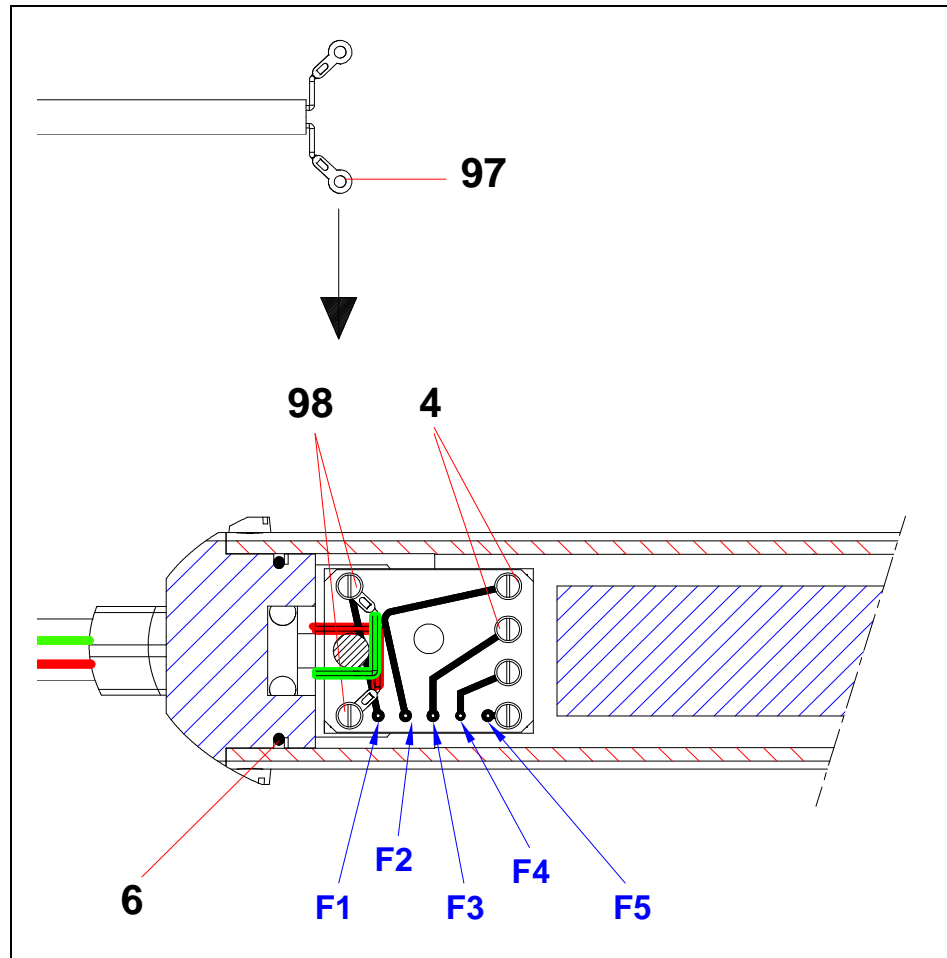
Installation

IMPORTANT : prior to reinstalling, change the O-ring (6).

- 1 - Fix the circuit on the oscillator with 4 screws (4) and 4 washers (screws and washers are supplied with the spare oscillator).
- 2 - Fix the 2 thimbles (97) of the cable on the oscillator with 2 washers and 2 screws (98).

Do not forget to install the washers.

Comply with the position and the orientation of the thimbles.



- 3 - Insert the oscillator (3) inside the end (7) and fix it with the screw (5).
- 4 - Tighten the stuffing-box (9).
- 5 - Fix the end (7) at the end of the barrel tightening the 2 screws (2).

COMPLY WITH INSTALLATION ORDER - CORRECT TIGHTENING IS REQUIRED.

■ HV CABLE REPLACEMENT (IND. 8)

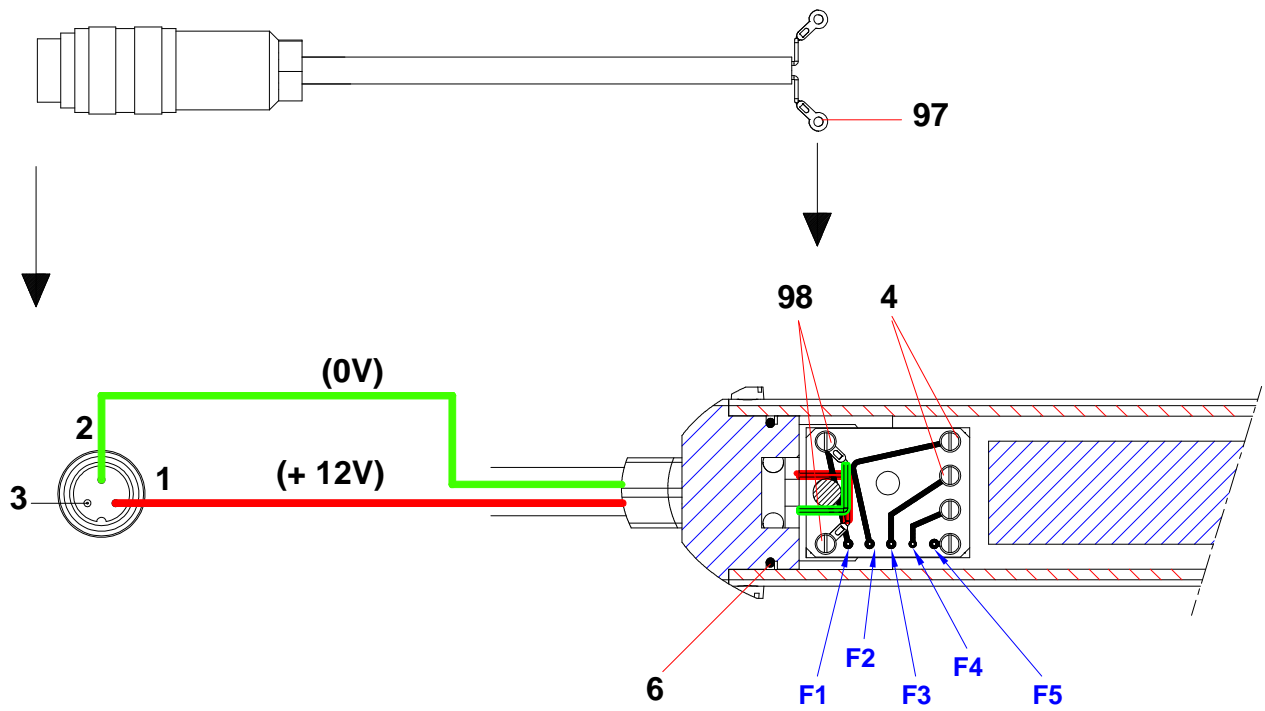
Removal

- 1 - Carry out operations **1 to 6** of oscillator removal.
- 7 - Unscrew the screws cable grip.
- 8 - Unscrew the 2 screws (98) to separate cable from the oscillator.
- 9 - Change the cable.

Installation

- 1 - Change the seal (6)
- 2 - insert the cable into end (7).
- 3 - Install the cable grip without tightening the screws.
- 4 - Fix the 2 thimbles (97) of the cable on the oscillator with 2 washers and 2 screws (98).
- 5 - Tighten the screws of the cable grip.
- 6 - Pull the cable to install the cable grip inside the end.
- 7 - Insert the oscillator inside the end (7) and fix it with the screw (5).
- 8 - Install the end (7) at the end of the barrel.
- 9 - Screw the lock-nut of the stuffing-box.
- 10 - Tighten the 2 screws (2).

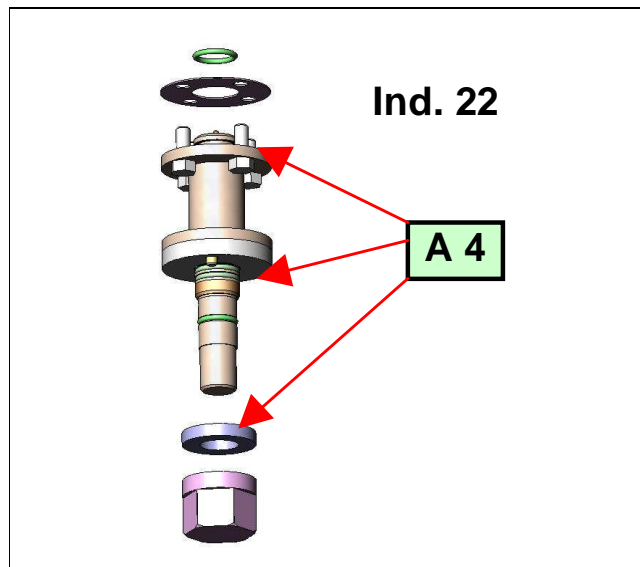
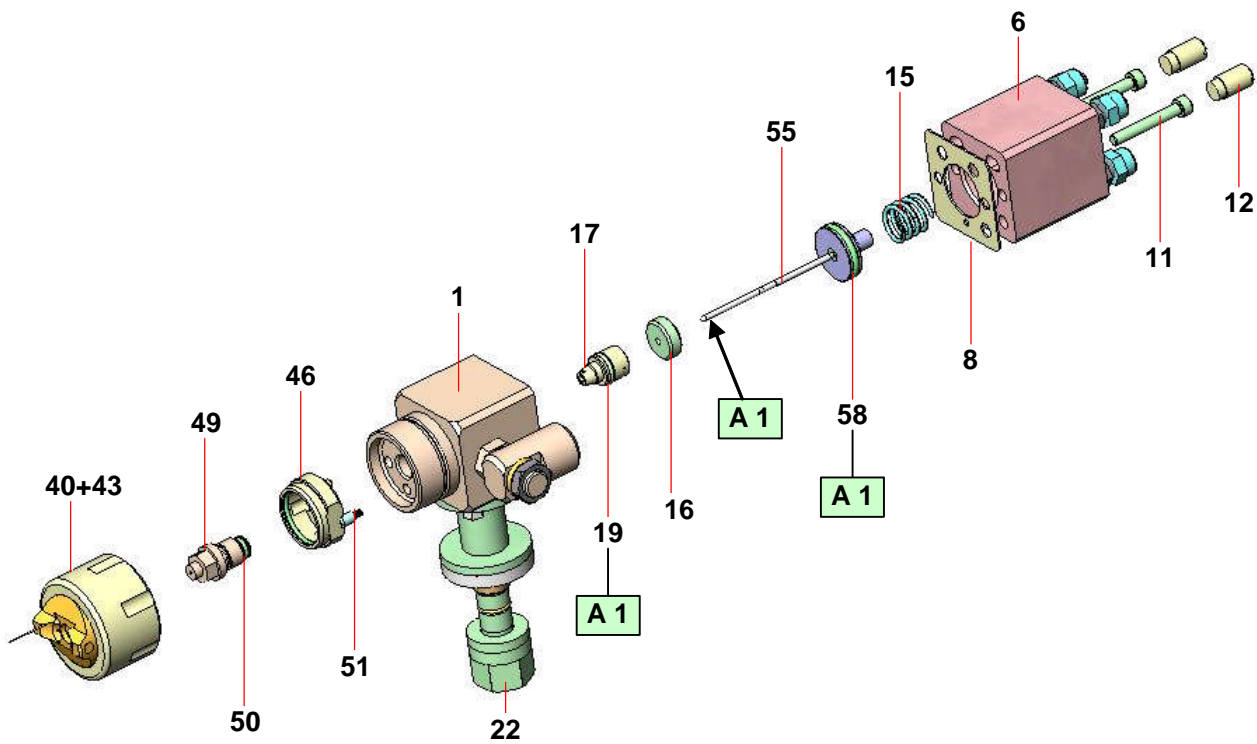
Connection of the cable



1	Red wire (+12V)
2	Green wire (0V)

F1	White wire
F2	Yellow wire
F3	Green wire
F4	Red wire
F5	Blue wire

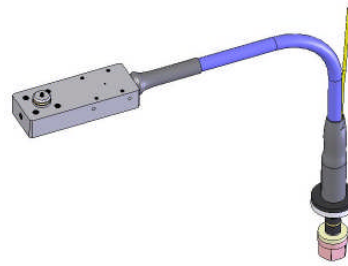
11. ASSEMBLY INSTRUCTIONS (Example : KAX Ex GUN)



Index	Instructions	Description	Part number
A 1	PTFE grease	"TECHNILUB" grease tube (10 ml)	560.440.101
A 4	Isolating grease		


12. OPTION

SPECIAL HIGH VOLTAGE CABLE



The high voltage cable, 1.5 m / 5 ft long, is designed to separate an electrostatic automatic gun (models KAP Ex, KAV Ex, KAX Ex or KAC Ex) from its generator barrel.

Disassembly :
(drawing A)

 Shut off the voltage at the supply box level.


Separate the gun (1) from the generator barrel (2) removing the nut (29) and the washer (28).

Unscrew the 4 screws (24) to remove the axis (23).

Assembly :
(drawing B)

Install the gun on the base of the HV cable (60). Fix it by means of the 4 screws (61).

Remove the nut (63) and the washer (62) located at the end of the cable. Locate the axis on the GB (2). Fix the whole reinstalling the washer and the nut.

 Ground the earth cable (64) to a safe earth.

