
Operating instructions and spare parts list

PG 3-E Enamel manual gun



Translation of the original operating instructions

Documentation PG 3-E Enamel manual gun

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General safety regulations

This chapter specifies the fundamental safety regulations that must be followed by the user and third parties using the PG 3-E Enamel manual gun.

These safety regulations must be read and understood before the PG 3-E Enamel manual gun is used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

**DANGER!**

Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

**WARNING!**

Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

**INFORMATION!**

Useful tips and other information

Conformity of use

1. The PG 3-E Enamel manual gun is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.
2. Any other use is considered as non-conform. The manufacturer is not responsible for damage resulting from improper use of this equipment; the end-user alone is responsible. If the PG 3-E Enamel manual gun is to be used for other purposes or other substances outside of our guidelines then Gema Switzerland GmbH should be consulted.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of

use. The PG 3-E Enamel manual gun should only be used, maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

4. Start-up (i.e. the execution of a particular operation) is forbidden until it has been established that the PG 3-E Enamel manual gun has been set up and wired according to the guidelines for machinery (2006/42 EG). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to the PG 3-E Enamel manual gun exempt the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
7. Furthermore the country-specific safety regulations must be observed.

Explosion protection	Protection type	Temperature class
 	IP64	T6 (zone 21)

Technical safety regulations for stationary electrostatic powder spraying equipment

General information

The powder spraying equipment from Gema is designed with safety in mind and is built according to the latest technological specifications. This equipment can be dangerous if it is not used for its specified purpose. Consequently it should be noted that there exists a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery belonging to the user and a hazard to the efficient operation of the equipment.

1. The powder spraying equipment should only be started up and used once the operating instructions have been carefully studied. Improper use of the controlling device can lead to accidents, malfunction or damage to the control itself.
2. Before every start-up check the equipment for operational safety (regular servicing is essential)!
3. Safety regulations BGI 764 and VDE regulations DIN VDE 0147, part 1, must be observed for safe operation.
4. Safety precautions specified by local legislation must be observed.
5. The plug must be disconnected before the machine is opened for repair.
6. The plug and socket connection between the powder spraying equipment and the mains network should only be taken out when the power is switched off.
7. The connecting cable between the controlling device and the spray gun must be set up so that it cannot be damaged during

operation. Safety precautions specified by local legislation must be observed!

8. Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. Damage caused by other parts is not covered by guarantee.
9. If Gema powder spraying equipment is used in conjunction with machinery from other manufacturers then their safety regulations must also be taken into account.
10. Before starting work familiarize yourself with all installations and operating elements, as well as with their functions! Familiarization during operation is too late!
11. Caution must be exercised when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable! Smoking is forbidden in the entire plant area!
12. As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations!



WARNING!

We emphasize that the customer himself is responsible for the safe operation of equipment. Gema is in no way responsible for any resulting damages!

Safety conscious working

Each person responsible for the assembly, start-up, operation, service and repair of powder spraying equipment must have read and understood the operating instructions and the "Safety regulations"-chapter. The operator must ensure that the user has had the appropriate training for powder spraying equipment and is aware of the possible sources of danger.

The control units for the spray guns must only be set up and used in zone 22. The spray guns are permitted in the zone 21 created by them.

The powder spraying equipment should only be used by trained and authorized personnel. This applies to modifications to the electrical equipment, which should only be carried out by a specialist.

The operating instructions and the necessary closing down procedures must be followed before any work is carried out concerning the set-up, start-up, operation, modification, operating conditions, mode of operation, servicing, inspection or repairs.

The powder spray equipment can be turned off by using the main switch or failing that, the emergency shut-down. Individual components can be turned off during operation by using the appropriate switches.

Individual safety regulations for the operating firm and/or operating personnel

1. Any operating method which will negatively influence the technical safety of the powder spraying equipment is to be avoided.
2. The operator should care about no non-authorized personnel works on the powder spraying equipment (e.g. this also includes using the equipment for non-conform work).

3. For dangerous materials, the employer has to provide an operating instructions manual for specifying the dangers arising for humans and environment by handling dangerous materials, as well as the necessary preventive measures and behavior rules. The operating instructions manual has to be written in an understandable form and in the language of the persons employed, and has to be announced in a suitable place in the working area.
4. The operator is under obligation to check the powder spraying equipment at least once every shift for signs of external damage, defects or changes (including the operating characteristics) which could influence safety and to report them immediately.
5. The operator is obliged to check that the powder spraying equipment is only operated when in satisfactory condition.
6. As far as it is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).
7. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder spraying equipment.
8. No safety devices should be dismantled or put out of operation. If the dismantling of a safety device for set-up, repair or servicing is necessary, reassembly of the safety devices must take place immediately after the maintenance or repair work is finished. The powder spraying device must be turned off while servicing is carried out. The operator must train and commit the responsible personnel to this.
9. Activities such as checking powder fluidization or checking the high voltage spray gun etc. must be carried out with the powder spraying equipment switched on.

Notes on special types of hazard

Power

It is necessary to refer once more to the danger of life from high voltage current if the shut-down procedures are not observed. High voltage equipment must not be opened - the plug must first be taken out - otherwise there is danger of electric shock.

Powder

Powder/air mixtures can be ignited by sparks. There must be sufficient ventilation in the powder coating booth. Powder lying on the floor around the powder spraying device is a potentially dangerous source of slipping.

Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided - see chapter "Grounding/Earthing".

Grounding/Earthing

All electricity conducting parts and machinery found in the workplace (according to DIN VDE 0745, part 102) must be earthed 1.5 meters either side and 2.5 meters around each booth opening. The earthing resistance must amount to maximally 1 MOhm. The resistance must be tested on a regular basis. The condition of the machinery surroundings as well as the

suspension gear must ensure that the machinery remains earthed. If the earthing of the machinery includes the suspension arrangements, then these must constantly be kept clean in order to guarantee the necessary conductivity. The appropriate measuring devices must be kept ready in the workplace in order to check the earthing.

Compressed air

When there are longer pauses or stand-still times between working, the powder spraying equipment should be drained of compressed air. There is a danger of injury when pneumatic hoses are damaged and from the uncontrolled release and improper use of compressed air.

Crushing and cutting

During operation, moving parts may automatically start to move in the operating area. It must be ensured that only instructed and trained personnel go near these parts. The operator should ensure that barriers comply with the local security regulations.

Access under exceptional circumstances

The operating firm must ensure that local conditions are met when repairs are made to the electronic parts or when the equipment is restarted so that there are additional measures such as barriers to prevent unauthorized access.

Prohibition of unauthorized conversions and modifications to machines

All unauthorized conversions and modifications to electrostatic spraying equipment are forbidden for safety reasons.

The powder spraying equipment should not be used if damaged, the faulty part must be immediately replaced or repaired. Only original Gema replacement parts should be used. Damage caused by other parts is not covered by guarantee.

Repairs must only be carried out by specialists or in Gema workshops. Unauthorized conversions and modifications may lead to injury or damage to machinery. The Gema Switzerland GmbH guarantee would no longer be valid.

Safety requirements for electrostatic powder coating

1. This equipment is dangerous if the instructions in this operating manual are not followed.
2. All electrostatic conductive parts, in particular the machinery within 5 meters of the coating equipment, must be earthed.
3. The floor of the coating area must conduct electricity (normal concrete is generally conductive).
4. The operating personnel must wear electricity conducting footwear (e.g. leather soles).
5. The operating personnel should hold the gun with bare hands. If gloves are worn, these must also conduct electricity.
6. The supplied earthing cable (green/yellow) must be connected to the earthing screw of the electrostatic powder spraying hand appliance. The earthing cable must have a good metallic connec-

tion with the coating booth, the recovery unit and the conveyor chain and with the suspension arrangement of the objects.

7. The electricity and powder supply to the hand guns must be set up so that they are fully protected against heat and chemical damage.
8. The powder coating device may only be switched on once the booth has been started up. If the booth cuts out then the powder coating device must be switched off.
9. The earthing of all electricity conducting devices (e.g. hooks, conveyor chains) must be checked on a weekly basis. The earthing resistance must amount to maximally 1 MOhm.
10. The control device must be switched off if the hand gun is cleaned or the nozzle is changed.
11. When working with cleaning agents there may be a risk of hazardous fumes. The manufacturer's instructions must be observed when using such cleaning agents.
12. The manufacturers instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.
13. If any part of the spray gun is damaged (broken parts, tears) or missing then it should not be used.
14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original Gema replacement parts should be used.
15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The former protection must not be reduced.
16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of more than 50% of the lower explosion limit (UEG) (UEG = max. permissible powder/air concentration). If the UEG is not known then a value of 10 g/m³ should be used.

A summary of the rules and regulations

The following is a list of relevant rules and regulations which are to be observed:

Guidelines and regulations, German professional association

BGV A1	Prevention principles
BGV A2	Electrical equipment and material
BGR 132	Guidelines for the avoidance of the dangers of ignition due to electrostatic charging

EN European standards

RL94/9/EC	The approximation of the laws of the Member States relating to apparatus and safety systems for their intended use in potentially explosive atmospheres
EN 292-1 EN 292-2	Machine safety ²⁾
EN 50014 until EN 50020, identical: DIN VDE 0170/0171	Electrical equipment for locations where there is danger of explosion ³⁾
EN 60529, identical: DIN 40050	IP-Type protection: contact, foreign bodies and water protection for electrical equipment ²⁾
EN 60204 identical: DIN VDE 0113	VDE regulations for the setting up of high voltage electrical machine tools and processing machines with mains voltages up to 1000 V ³⁾

VDE (Association of German Engineers) Regulations

DIN VDE 0100	Regulations for setting-up high voltage equipment with mains voltages up to 1000 V ⁴⁾
DIN VDE 0105, part 1	VDE regulations for the operation of high voltage equipment ⁴⁾ General regulations
DIN VDE 0147, part 1	Setting up stationary electrostatic spraying equipment ⁴⁾
DIN VDE 0165	Setting up electrical equipment in locations in areas with danger of explosion ⁴⁾

Sources:

¹⁾ Carl Heymanns Verlag KG, Luxemburger Strasse 449, 5000 Köln 41, or from the appropriate employers association

²⁾ Beuth Verlag GmbH, Burggrafenstrasse 4, 1000 Berlin 30

³⁾ General secretariat, Rue Bréderode 2, B-1000 Bruxelles, or the appropriate national committee

⁴⁾ VDE Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12

Product specific security measures

- The installation work, to be done by the customer, must be carried out according to local regulations
- Before starting up the plant a check must be made that no foreign objects are in the booth or in the ducting (input and exhaust air)
- It must be observed, that all components are grounded according to the local regulations, before start-up

About this manual

General information

This operating manual contains all the important information which you require for the working with the PG 3-E Enamel manual gun. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components - reciprocators, booths, powder gun control units, powder guns etc. - should be referenced to their corresponding documents.

Function description

Field of application

The PG 3-E Enamel manual gun is built exclusively for electrostatic coating with inorganic, non-flammable enamel powders. Any other use is considered as non-conform. The manufacturer is not responsible for any damage resulting from this - the risk for this is assumed by the user alone!

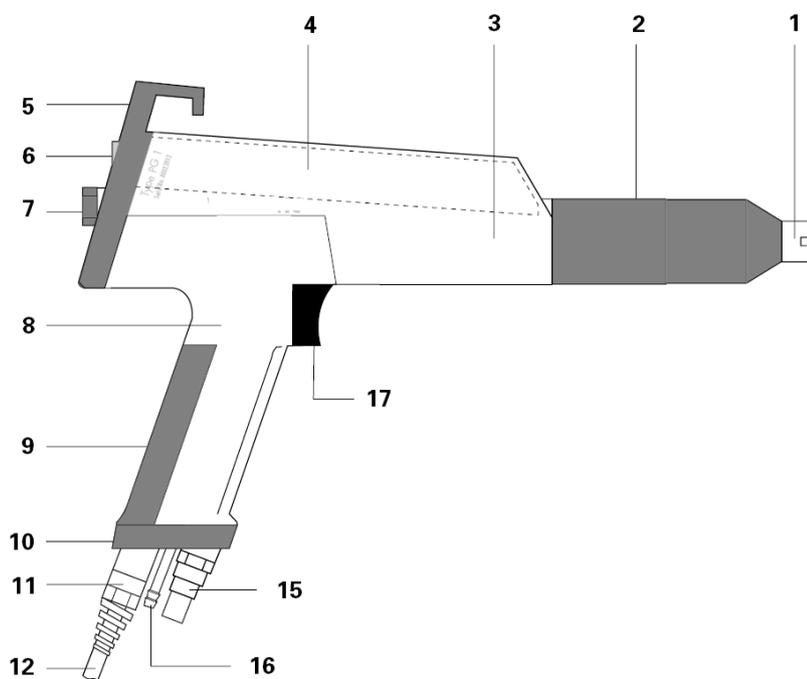
The PG 3-E Enamel manual gun with integrated high voltage generation can produce an optimum penetration and a high and constant transfer efficiency. The gun is detachable, therefore easy for maintenance and repair.

Scope of delivery

- PG 3-E Enamel manual gun complete, with gun cable
- Rinsing air hose
- Flat jet nozzle with electrode holder
- Cable tie with Velcro closure
- Gun cleaning brush
- Spare parts kit

PG 3-E Enamel manual gun

Structure



PG 3-E Enamel manual gun - structure

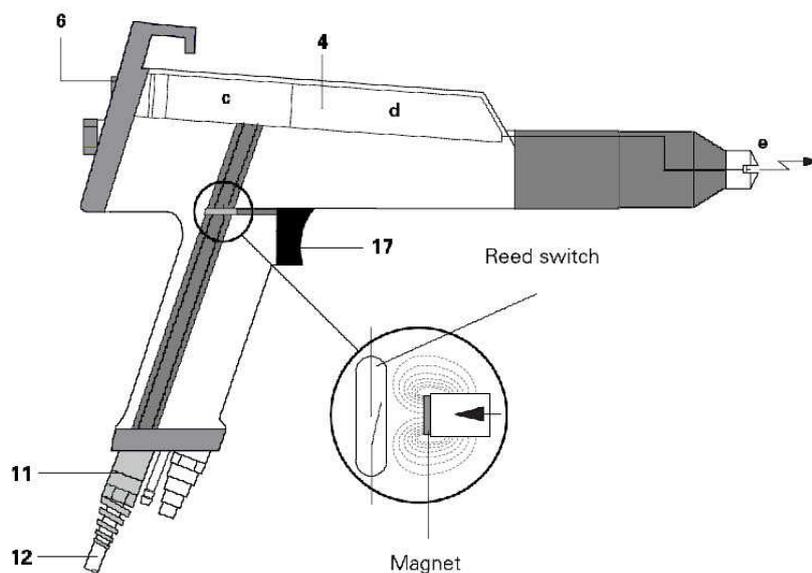
- | | | | |
|---|----------------------|----|------------------------|
| 1 | Spray nozzle system | 9 | Grounding plate |
| 2 | Threaded sleeve | 10 | Safety screw |
| 3 | Shaft | 11 | Gun cable connection |
| 4 | High voltage cascade | 12 | Gun cable |
| 5 | End plate with hook | 15 | Powder hose connection |
| 6 | LED window | 16 | Rinsing air connection |
| 7 | Plastic screw | 17 | Trigger |
| 8 | Grip | | |

High voltage generation

The control unit supplies a high frequency low-voltage. This voltage is fed to the high voltage cascade (4) by the gun cable (12) and the gun connection (11) in the handhold of the gun.

In the high voltage cascade (4), the low voltage is high-transformed in a first step (c). This primary high voltage is subsequently rectified and multiplied in the cascade in a second step (d), until the required high voltage will be obtained at the end. The high voltage is now fed to the electrode (e) within the spray nozzle.

By adjusting the high voltage on the gun control unit, the intensity of the LED (6) also will change. Thereby, the user has the assurance that the high voltage is present and can control this function.



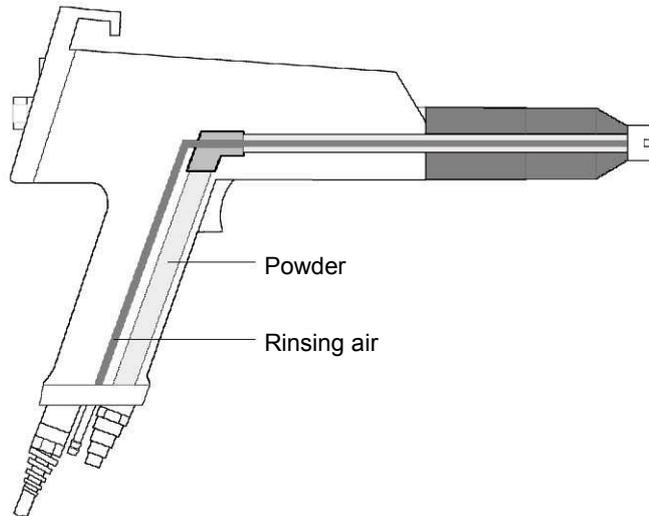
PG 3-E Enamel manual gun - high voltage generation

Circuit

In addition to the low voltage, a switching current is fed through the gun cable into the gun. If the trigger (17) is pressed, a reed switch closes the current circuit. The gun control unit switches on the low voltage, the powder transport and the rinsing air. The reed switch complies with the safety regulations of all recognized standards.

Powder flow and rinsing air

The rinsing air, used by vented spray nozzles, is connected with its designated connection on the rear side of the gun control unit (see the operating manual of the gun control unit). The functions of the spray nozzles are described in the corresponding sections.

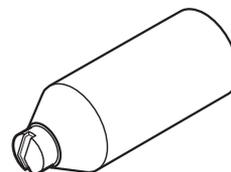


PG 3-E Enamel manual gun - powder flow and rinsing air

Spray nozzles

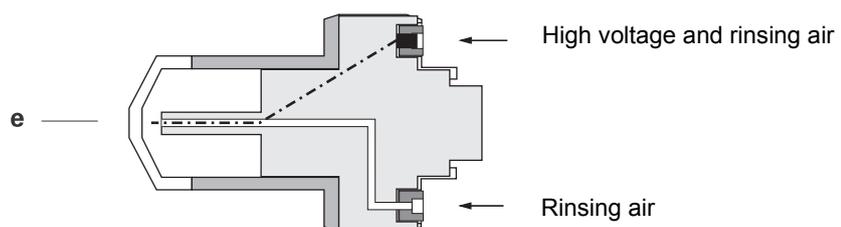
Standard set

Flat jet nozzle with vented central electrode



Flat jet nozzle with vented central electrode

The vented flat jet nozzle serves for the spraying and the charging of the powder. The powder cloud obtains an oval spray pattern by the slot-shaped opening. The powder will be charged by the central electrode. The high voltage, which is created in the gun, is conducted through the black contact ring of the nozzle holder to the central electrode.



In order to prevent a powder sintering on the electrode, it will be rinsed with compressed air during spraying. Therefore, the rinsing air is fed

through the small hole in the black contact ring of the nozzle holder, and into the electrode holder.

The rinsing air adjustment on the gun control unit is explained in the corresponding operating manual.

Technical data

PG 3-E Enamel manual gun

Electrical data

PG 3-E Enamel manual gun	
Nominal input voltage	10 V eff.
Frequency	approx. 18 kHz
Nominal output voltage	98 kV
Polarity	negative (optional positive)
Max. output current	100 μ A
High voltage display	LED
Ignition protection	Ex 2 mJ T6
Approval	EN 50050 und PTB Test Nr. Ex-91.C.9102 PTB Ex 03-53018 FM Nr. J.I. OW 7 A 6.AE(7264) Testing year 10/1993

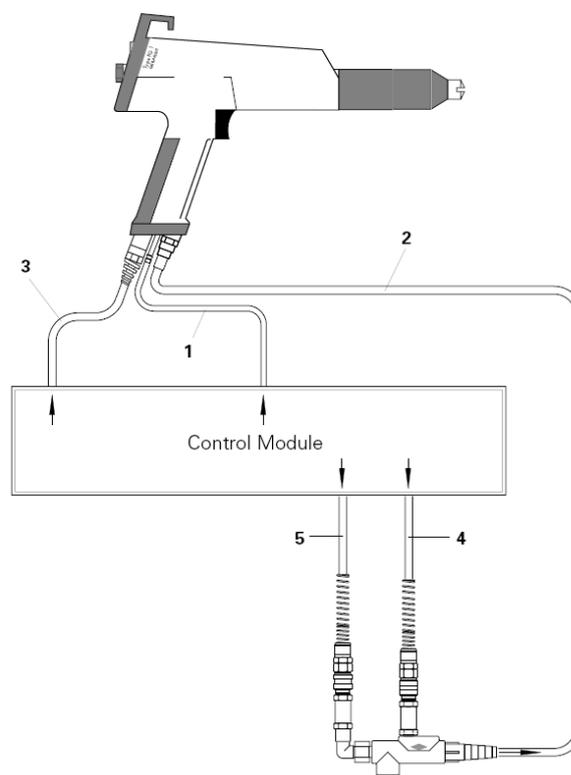
Start-up and operation

PG 3-E Enamel manual gun - connecting guide

1. Connect the gun plug to the control unit (see the gun control unit operating instructions)
2. Connect the rinsing air hose from the control unit to the gun.
3. Connect the powder hose from the gun to the injector



Note:
The compressed air must be free of oil and water!



PG 3-E Enamel manual gun - connecting guide

- | | | | |
|---|------------------|---|------------------------|
| 1 | Rinsing air hose | 4 | Supplementary air hose |
| 2 | Powder hose | 5 | Conveying air hose |
| 3 | Gun cable | | |

Functional check

1. Switch on the gun control unit
2. Pick up the gun and point it to a **grounded** object, from a distance of approx. 20 cm
3. Press the powder gun trigger
4. Adjust the high voltage on the gun control unit.
The high voltage display LED (kV) illuminates. The high voltage in the PG 3-E Enamel manual gun is present
5. Slowly increase the high voltage. The value on the high voltage display should increase slowly. The intensity of the LED on the cascade increases as the voltage rises
6. Adjust the conveying air, supplementary air and electrode rinsing air according to the application
7. The maximal nominal output current can be monitored on the gun control unit (please note the gun control unit operating manual)

If all the checks were positive, the gun is ready for operation.



Note:

If a malfunction occurs, see the troubleshooting guide, as well as the gun control unit operating manual!

Start-up

Setting powder output and powder cloud

The powder output is depending on the powder type, the powder hose length, the powder hose diameter, the conveying air pressure and the supplementary air. The operation mode of the injector and the effect of the supplementary air are described in the injector operating instructions.

1. Switch on the gun control unit
2. Point the gun into the coating booth and press the gun trigger
3. Adjust the conveying air
4. Adjust the supplementary air according to the control unit operating instructions
5. Adjust the rinsing air pressure, until the powder cloud achieves the desired form

Powder coating



Attention:

Make sure first, that all electrically conductive parts within 5 m of the coating booth are grounded!

1. Switch on the gun control unit
2. Adjust the high voltage, check the high voltage on the LED

Shut-down

1. Switch off the gun control unit
The adjustments for high voltage, rinsing air and powder output can be left as they are
2. If working interruptions take place, such as lunch time, night time etc. disconnect the main compressed air supply

Rinsing the powder hose

If longer downtimes take place, the powder hose has to be cleaned. Proceed as follows:

1. Disconnect the powder hose from the hose connection on the injector
2. Blow through the hose manually with a compressed air gun
3. Connect the powder hose again to the hose connection on the injector

Maintenance and cleaning



Note:

Regular and conscientious maintenance increases the service life of the unit and ensures a longer, more constant coating quality!

Daily maintenance

1. Clean the gun, see chapter "Cleaning"

Weekly maintenance

1. Clean the gun, see chapter "Cleaning"
2. Check the grounding connections of the coating booth, the suspension devices of the work pieces, or the conveyor chain

Cleaning

Cleaning the PG 3-E Enamel manual gun

Frequent cleaning of the gun helps to guarantee the coating quality.



Note:

Before cleaning the powder gun, switch off the control unit. The compressed air used for cleaning must be free of oil and water!

Daily:

1. Blow off the outside of the gun and wipe, clean etc.

Weekly:

2. Remove the powder hose from the connection
3. Remove the spray nozzle from the gun and clean it with compressed air
4. Blow through the gun with compressed air, beginning from the connection in flow direction
5. Clean the integrated gun tube with the brush supplied, if necessary

6. Blow through the gun with compressed air again
7. Clean the powder hose
8. Reassemble the gun and connect it



Attention:

Cleaning the PG 3-E Enamel manual gun with the following solvents is not allowed:

Ethylene chloride, acetone, ethyl acetate, methyl ethyl ketone, methylene chloride, premium gasoline, turpentine, tetrachloro-methane, toluene, trichloroethylene, xylene!



Note:

Only cleaning agents with a flash point of a least 5 Kelvin above the ambient temperature, or cleaning places with technical ventilation are allowed!

Cleaning the spray nozzles

Daily or after each shift

- Clean the inside and outside of the spray nozzle with compressed air.
Never immerse the parts in solvents!



Attention:

Check the seating of the spray nozzles. Make sure that the threaded sleeve is always tightened well. If the spray nozzle is just fitted loosely, there is danger of a flash-over of the gun high voltage, which leads inevitably to damaging the gun!

Weekly:

- Remove the spray nozzles and clean inside with compressed air. If sinterings should have formed, they have to be removed!

Monthly

- Check the spray nozzles for wear

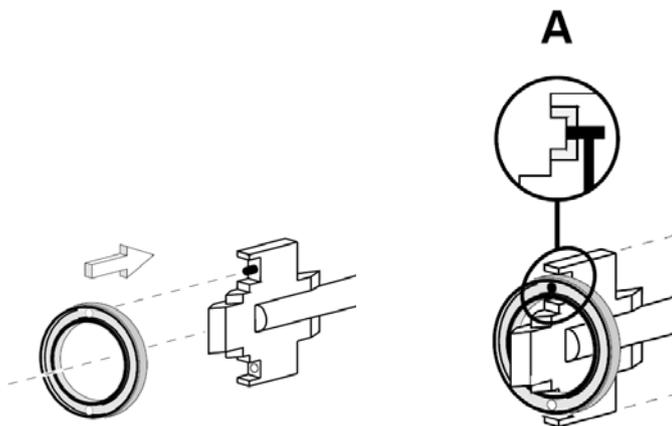
The flat jet nozzle is to be replaced, if:

- the spray pattern is no longer a regular oval
- deeper grooves are in the nozzle slot, or even the wall thickness is no longer recognizable
- the wedge of the electrode holder is worn

Important instructions for nozzle assembly

Flat jet nozzle

1. Hold the electrode holder ready
2. Insert from behind the black contact ring with the hole onto the electrode holder pin



Attention!

The groove on the contact ring must be visible from outside - see detail A!

3. Insert the electrode holder with the contact ring into the nozzle groove and fix it firmly

Dismantling the gun

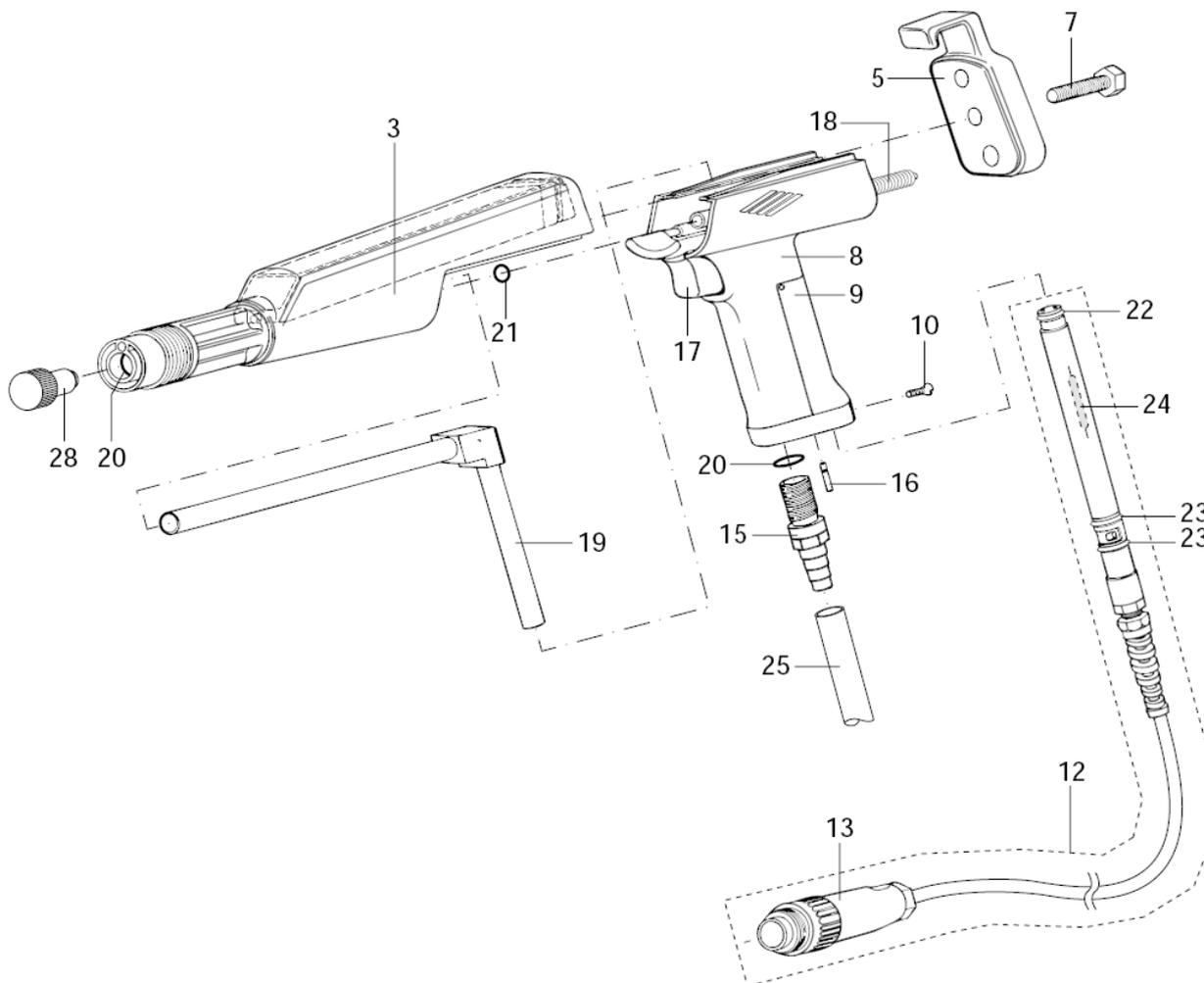


Attention:

Before cleaning the gun, switch off the control unit and disconnect the gun plug!

The gun should only be dismantled when this is made necessary by a defect or contamination. It is only to be dismantled so far, as the desired part is accessible!

The high voltage cascade should not be removed, since it was installed in a special procedure. If the cascade is defective or the shaft is broken, send the complete shaft to an authorized Gema service center!



PG 3-E Enamel manual gun - dismantling the gun

Dismantling the gun

1. Remove the powder hose from the powder hose connection
2. Remove the rinsing air hose from the corresponding connection
3. Remove the spray nozzle
4. Unscrew the safety screw (10)
5. Turn the gun cable connection (11) by 1/4 turn to the left (marking on marking) and remove it
6. Screw in the safety screw provisionally. This screw can easily be lost
7. Unscrew plastic screw (7) and remove the end plate (5)
8. Separate the grip (8) from the shaft (3)
9. Remove the powder tube (19) from the grip (8)
10. Check the O-ring (21) for damages and replace it, if necessary

The connections for powder hose and rinsing air should not be unscrewed if they are not defective.

Assembling the gun

The assembly of the gun is carried out in the reverse order to that shown above.

- Careful handling is recommended!
- If the gun cable connection can not be inserted properly without applying force, dismantle the gun again and re-assemble it correctly
- Screw in the powder hose connection up to the stop
- After the gun has been reassembled, check that the gun cable connection is properly seated



Note:

It should be possible to turn the safety screw all the way into the countersink!

- No gaps may be between the joints!
- The gun trigger must be smoothly to actuate and has to return to the initial position on its own!

Replacing parts

Except for the replacement of possible defective parts, there are very few repairs to be made.

The replacement of the cascade and the repair of the powder gun cable connection is only permitted by an authorized Gema Service center! Contact your Gema representative for details!

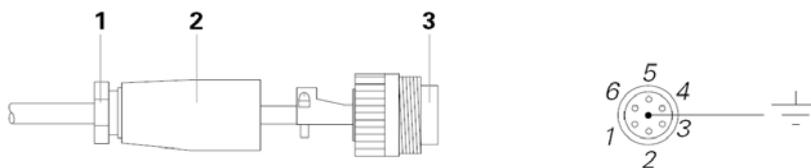
Replacing the trigger/the return spring

1. Dismantle the gun
2. Remove the return spring (by pulling the yoke with forefinger)
3. Insert the (new) trigger into the grip (8)
4. Insert the (new) return spring on the guide ribs of the trigger and push it to the stop
5. Reassemble the gun

Replacing the gun plug

Therefore, a soldering iron is required!

View of soldering pins



1. Open the connector
 - Unfasten the lead-through (1)
 - Unscrew the sleeve (2)

If the sleeve cannot be unscrewed, put the gun plug into the gun connection and try again!
2. Unfasten the both screws of the cable clamp
3. Unsolder the connector wires (3)
4. Pull the cable out of the connector and the sleeve (2)
5. Insert the cable into the new sleeve and the connector
6. Solder the wires

Pin allocation

1	black wire	4	white wire
2	empty	5	empty
3	blue wire	6	brown wire
Center	Shield (grounding)		

7. Tighten the both screws of the cable clamp
8. Fasten the sleeve (2) and the lead-through (1)

Troubleshooting

General information

Fault	Causes	Troubleshooting
High voltage display shows no value, although the control unit is switched on and the gun trigger is pressed	Gun not connected Gun plug or gun cable defective High voltage part defective	Connect the gun Replace the corresponding part, or send in for repair Replace the corresponding part, or send in for repair
During coating, air flows out of the gun body	O-ring defective or missing	Replace or insert it
Powder gun sprays powder, LED on the rear side of the cascade does not illuminate, powder does not adhere to the object	High voltage is set too low Gun plug or gun cable defective High voltage cascade defective Control circuit board (PCB) defective	Increase high voltage Replace defective part or send in for repair Send in the gun body for repair Send for repair
Powder gun sprays powder, high voltage is present, but the powder does not adhere to the object	High voltage and current deactivated High voltage cascade defective The objects are not properly grounded	Check the high voltage and current setting Send in the gun for repair Check the grounding

Fault	Causes	Troubleshooting
<p>The gun does not spray powder, although the control unit is switched on and the gun is triggered</p>	<p>Compressed air not present</p> <p>Conveying vacuum too low</p> <p>Injector or nozzle on the injector, powder hose or powder gun clogged</p> <p>Insert sleeve in the injector worn or not inserted</p> <p>Insert sleeve in the injector is clogged</p> <p>Fluidization not running</p> <p>No conveying air:</p> <p>Throttle motor defective</p> <p>Solenoid valve defective</p> <p>Front plate defective</p>	<p>Connect the equipment to the compressed air</p> <p>Increase the powder quantity and/or total air volume on the control unit</p> <p>Clean the corresponding part</p> <p>Replace or insert it</p> <p>Replace</p> <p>(see above)</p> <p>Replace throttle motor</p> <p>Replace the solenoid valve</p> <p>Send in for repair</p>

Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

Example:

- **Type** PG 3-E Enamel manual gun
Serial number 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be indicated. The spare part numbers of this yard/meter ware is always marked with an *.

The wear parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)



WARNING!

Only original Gema spare parts should be used, because the hazardous location approval will be preserved that way! The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!

PG 3-E Enamel manual gun - spare parts

Remarks

1. Only parts were included in the spare parts list, which can be replaced by the user himself without problems
2. If a part of the gun body should be broken, or the high voltage cascade in the gun body should be defective, then the whole gun body has to be sent in for repair and check! The high voltage cascade was installed according to a special procedure and should be never removed therefore by the user!
3. If the powder gun cable is defective, it is to be completely sent in for repair!

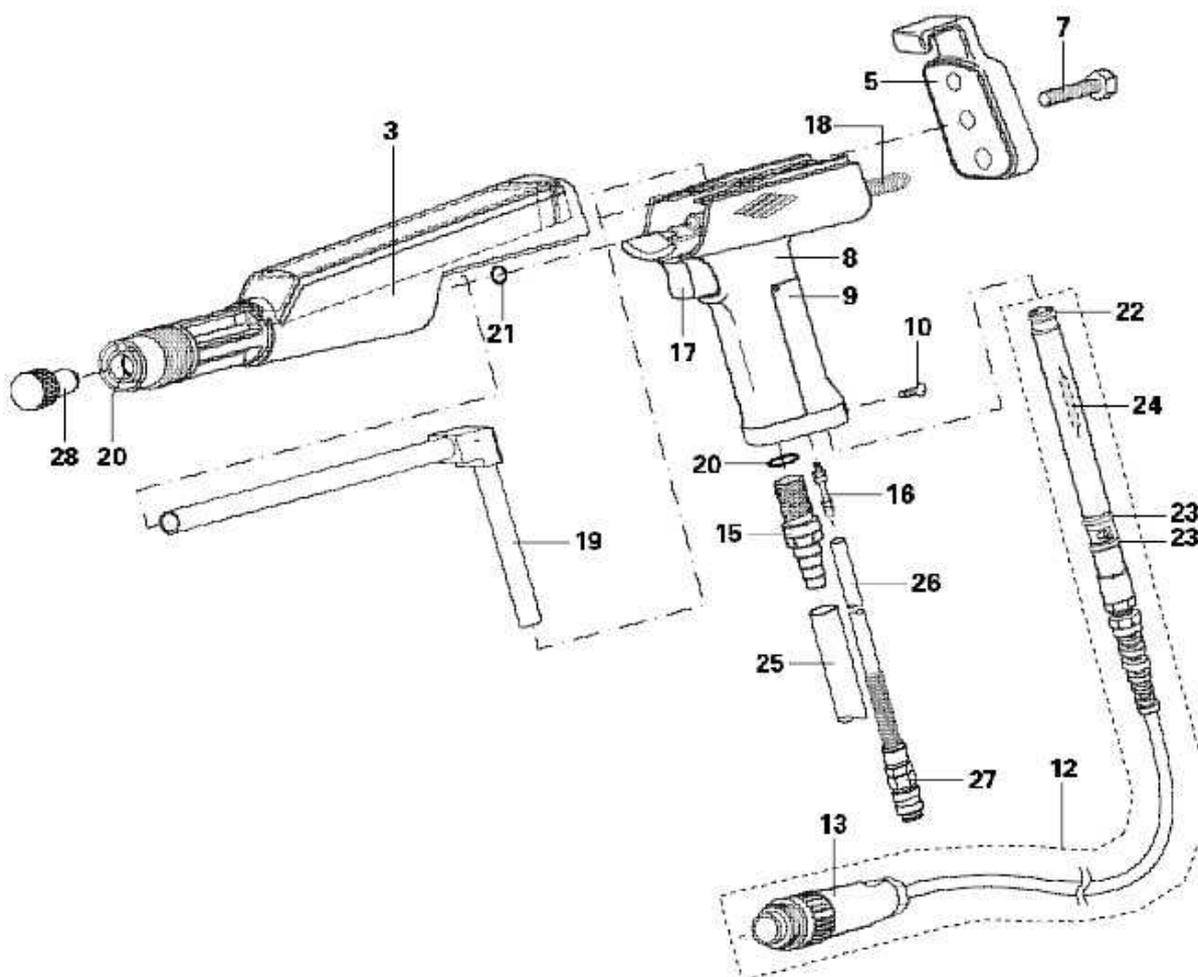
	PG 3-E Enamel manual gun - complete negative polarity , incl. gun cable, rinsing air hose, flat jet nozzle, brush and parts kit, without powder hose	406 759
	PG 3-E Enamel manual gun - gun body, complete (pos. 3-10, 15-21)	406 740
3	Shaft - complete (incl. cascade and pos. 20, 21)	406 805
5	Cover with hook	330 043
7	Plastic screw - M8x35 mm	328 847
8	Grip	396 915
9	Grounding plate	328 863
10	Safety screw - M4x10 mm	232 637
12	Gun cable - complete, 6 m	328 740
	Gun cable - complete, 11 m	336 025
12.1	Extension cable for gun cable (pos. 12)	334 464
12.2	Cable (for pos. 12)	102 911*
13	Connector - 7 pins	200 085
15	Powder hose connection (with O-ring, pos. 20)	333 727
16	Rinsing air connection	328 820
17	Trigger with magnet	333 662
18	Return spring	331 651
19	Powder tube	403 725#
20	O-ring - Ø 13.1x1.6 mm	232 670
21	O-ring - Ø 6.1x1.6 mm	233 099
22	O-ring - Ø 7.65x1.78 mm	232 564
23	O-ring - Ø 10.82x1.78 mm	232 556
24	Reed contact	328 910

* Please indicate length

Wearing part

PG 3-E Enamel manual gun - spare parts

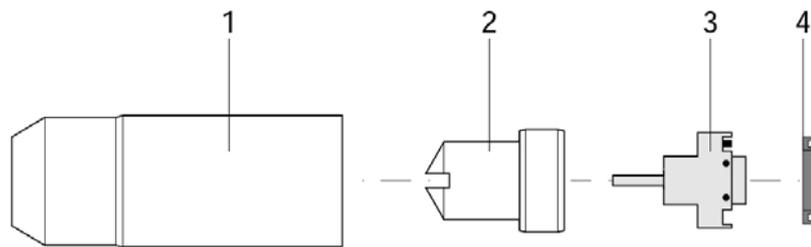
25	Powder hose - Ø 16/11 mm	103 128#*
26	Rinsing air hose - Ø 6/4 mm (incl. pos. 27)	339 954
27	Quick coupling - Ø 6/4 mm	200 840
28	Special extractor tool (for pos. 19)	340 839
	Cleaning brush (for pos. 19), not shown	389 765
	FSD Flat jet nozzle - see next page	404 225#
	Threaded sleeve - see next page	404 101
	Parts set (not shown), consisting of:	341 754
	- Cable tie with Velcro closure (8 pieces)	303 070
	- Pos. 7, 10, 20, 21 and 28	



PG 3-E Enamel manual gun - spare parts

PG 3-E Enamel manual gun - flat jet nozzle set

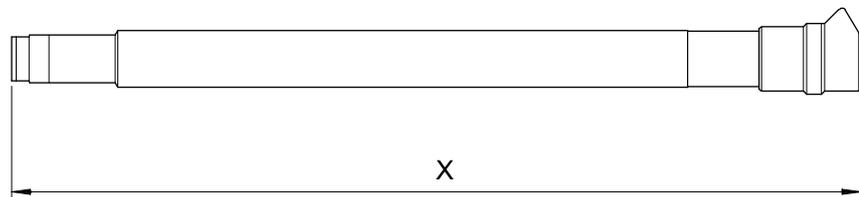
	Flat jet nozzle set (incl. pos. 2, 3, 4)	404 225
1	Threaded sleeve	404 101
2	Flat jet nozzle	404 128#
3	Electrode holder	404 209#
4	Contact ring	318 760#
	# Wearing part	



PG 3-E Enamel manual gun - flat jet nozzle set

PG 3-E Enamel manual gun – Extensions

	Extension 300 - complete, X = 359 mm	404 853#
	Extension 500 - complete, X = 559 mm	404 888#
	# Wearing part	



PG 3-E Enamel manual gun – Extensions

