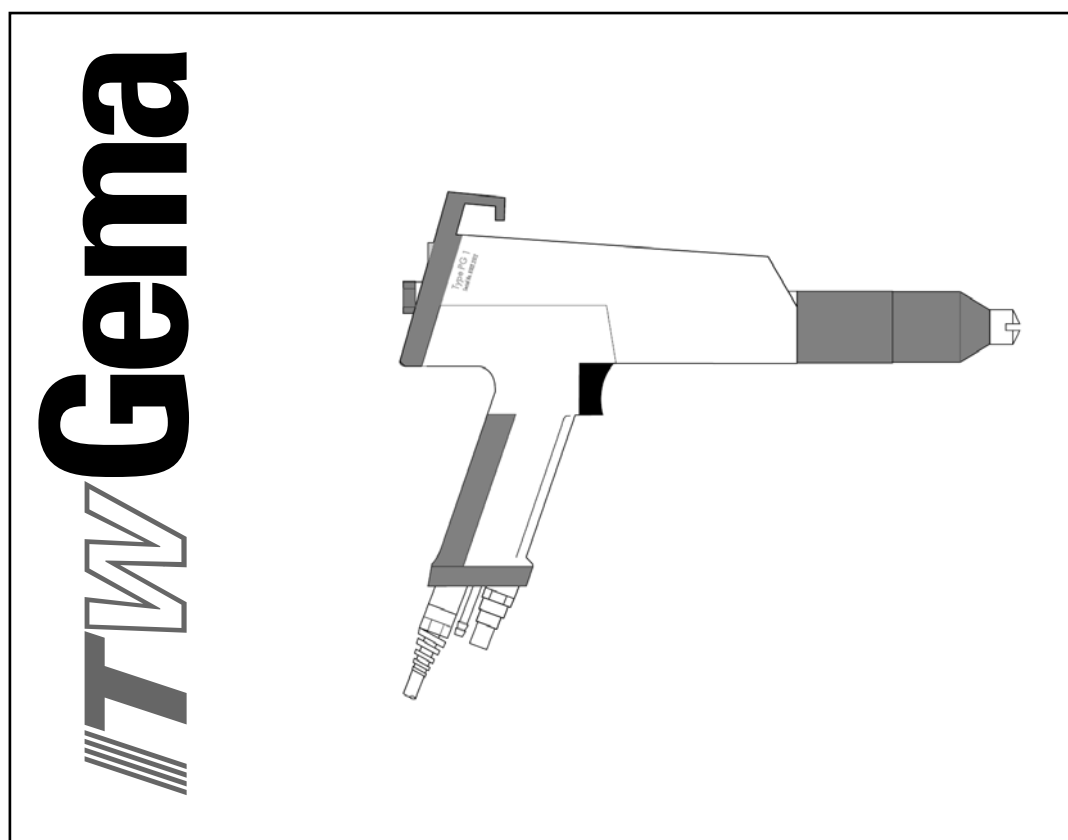


---

Operating instructions and spare parts list

# PG 3-E

# Manual Enamel Gun



**Dokumentation PG 3-E Manual Enamel Gun**

© Copyright 2000 ITW Gema AG

All rights reserved.

This publication is protected by copyright. Unauthorized copying is prohibited by law. No part of this publication may be reproduced, photocopied, translated, stored on a retrieval system or transmitted in any form or by any means for any purpose, neither as a whole nor partially, without the express written consent of ITW Gema AG.

OptiTronic, OptiGun, EasyTronic, EasySelect, OptiFlow and SuperCorona are registered trademarks of ITW Gema AG.

OptiMatic, OptiMove, OptiMaster, OptiPlus, MultiTronic and Gematic are trademarks of ITW Gema AG.

All other product names are trademarks or registered trademarks of their respective holders.

Reference is made in this manual to different trademarks or registered trademarks. Such references do not mean that the manufacturers concerned approve of or are bound in any form by this manual. We have endeavored to retain the preferred spelling of the trademarks, and registered trademarks of the copyright holders.

To the best of our knowledge and belief, the information contained in this publication was correct and valid on the date of issue. ITW Gema AG makes no representations or warranties with respect to the contents or use of this publication, and reserves the right to revise this publication and make changes to its content without prior notice.

**Printed in Switzerland**

ITW Gema AG  
Mövenstrasse 17  
9015 St.Gallen  
Switzerland

Phone: +41-71-313 83 00

Fax.: +41-71-313 83 83

E-Mail: [info@itwgema.ch](mailto:info@itwgema.ch)

Homepage: [www.itwgema.ch](http://www.itwgema.ch)

# Table of contents

<b>General safety regulations</b>	<b>3</b>
Safety symbols (pictograms).....	3
Conformity of use.....	3
Technical safety regulations for stationary electrostatic powder spraying equipment .....	4
General information .....	4
Safety conscious working .....	5
Individual safety regulations for the operating firm and/or operating personnel .....	5
Notes on special types of hazard.....	6
Safety requirements for electrostatic powder coating.....	7
A summary of the rules and regulations .....	9
Product specific security measures .....	10
<b>About this manual</b>	<b>11</b>
General information .....	11
<b>Function description</b>	<b>13</b>
Field of application .....	13
Scope of delivery .....	14
PG 3-E Manual Enamel gun .....	14
Structure.....	14
High voltage generation .....	15
Circuitry .....	15
Powder flow and rinsing air.....	16
Spray nozzles.....	16
Standard-Set.....	16
Flat jet nozzle with vented central electrode.....	16
<b>Technical data</b>	<b>17</b>
PG 3-E Manual Enamel gun .....	17
Electrical data .....	17
<b>Start-up and operation</b>	<b>19</b>
Connecting guide .....	19
Function check.....	20
Start-up .....	21
Adjusting powder output and powder cloud.....	21
Switch on the control unit - Powder coating.....	21
Switch off the control unit.....	21
Clean the powder hose .....	21
<b>Maintenance and cleaning</b>	<b>23</b>
Daily maintenance .....	23
Weekly maintenance.....	23

Cleaning.....	23
Cleaning the PG 3-E Manual Enamel gun .....	23
Cleaning the spray nozzles .....	24
Important notes for assembling the nozzles.....	25
Flat jet nozzle: .....	25
Dismantling the gun.....	26
Assembling the gun.....	27
Replacing parts.....	28
Replacing the trigger (17) or the spring (18) .....	28
Replacing the gun connector (13) .....	28
<b>Troubleshooting</b>	<b>29</b>
General information .....	29
<b>Spare parts list</b>	<b>31</b>
Ordering spare parts.....	31
PG 3-E Manual Enamel gun - Spare Parts List.....	32
Remarks .....	32
Flat jet nozzle set for PG 3-E Manual Enamel gun .....	34

# General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the PG 3-E Manual Enamel Gun.

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

---

## Safety symbols (pictograms)

The following warnings with their meanings can be found in the ITW 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 Manual Enamel Gun is built to the latest specification and conforms to the recognized technical safety regulations and is designed for the normal application of powder coating.
2. 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! If the PG 3-E Manual Enamel Gun is to be used for other purposes or other substances outside of our guidelines then ITW Gema AG should be consulted.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of the

conformity of use. The PG 3-E Manual Enamel 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 Manual Enamel Gun has been set up and wired according to the guidelines for machinery (98/37 EG). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to powder spraying equipment exempts 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
CE <sub>0102</sub> Ex II 2 D		T6 (Pistole)
CE <sub>0102</sub> Ex II 2 D	IP54	T4 (Pistolensteuerung)

## Technical safety regulations for stationary electrostatic powder spraying equipment

### General information

The powder spraying equipment of ITW 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. Incorrect operation of the control unit can lead to accidents, malfunctions or damage to the control itself or to the plant.
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. Please observe the local safety regulations!
5. The plug must be disconnected before the machine is opened for repair.
6. The plug and socket connections between the powder spraying equipment and the mains network should only be removed when the power supply 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. Please observe the local safety regulations!
8. Only original ITW-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 ITW-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 alert that the customer himself is responsible for the safe operation of equipment. ITW Gema AG 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 devices for the spray guns must only be set up and used in zone 22. Spray guns are admitted in zone 21.

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 shutdown. 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 has to ensure that no non-authorized persons work 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 operating enterprise has to ensure that GEMA electrostatic spraying equipment is only operated in perfect 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. All maintenance activities must be executed when the powder spraying mechanism is switched off. 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/tension***

It is necessary to refer once more to the danger of life from high voltage current if the shutdown 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 "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 M $\Omega$ . The resistance must be tested regularly. The condition of the work piece attachments as well as the hangers must guarantee that the work pieces remain grounded. If the grounding of the work pieces takes place by their attachments, 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 standstill 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 user enterprise has to ensure due to the local conditions, that when repairs at the electrical part or restarting operation activities are done, additional measures such as providing with gates against the admission of unauthorized persons are absolutely executed.

### ***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, and the faulty part must be immediately replaced or repaired. Only original ITW Gema spare parts may be used! Damage caused by other parts is not covered by guarantee.

Repairs must only be carried out by specialists or in ITW-Gema workshops. Arbitrary, unauthorized repairs can lead to injuries and damages to the equipment! The ITW Gema AG guarantee would no longer be valid.

## **Safety requirements for electrostatic powder coating**

1. This equipment can be 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 grounding cable (green/yellow) must be connected to the grounding screw of the manual electrostatic powder spraying equipment. The grounding cable must have a good metal to metal connection with the coating booth, the recovery unit and the work piece conveyor system, especially with the work piece suspension.
7. The electricity and powder supply to the hand guns must be set up in such a way that they are fully protected against heat and chemical damage.
8. The powder coating equipment may be able to be switched on only if the booth is in operation. 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 unit 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 manufacturers 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 ITW-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/m<sup>3</sup> 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	General regulations
BGV A2	Electrical equipment and material
BGI 764	Electrostatic coating
BGR 132	Guidelines for the avoidance of the dangers of ignition due to electrostatic charging (Guideline "Static Electricity")
VDMA 24371	Guidelines for electrostatic coating with synthetic powder <sup>1)</sup> - Part 1 General requirements - Part 2 Examples of use

### ***Leaflets***

ZH 1/310	Leaflet for the use of tools in locations where there is danger of explosion <sup>1)</sup>
----------	--

### ***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 <sup>2)</sup>
EN 50 014 to EN 50 020, identical: DIN VDE 0170/0171	Electrical equipment for locations where there is danger of explosion <sup>3)</sup>
EN 50 050	Electrical apparatus for potentially explosive atmospheres - Electrostatic hand-held spraying equipment <sup>2)</sup>
EN 50 053, part 2	Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials - Hand-held electrostatic powder spray guns <sup>2)</sup>
EN 50 177	Stationary electrostatic spraying equipment for flammable coating powder <sup>2)</sup>
PR EN 12981	Coating plants - Spray booths for application of organic powder coating material - Safety requirements
EN 60 529, identical: DIN 40050	IP-Type protection; contact, foreign bodies and water protection for electrical equipment <sup>2)</sup>
EN 60 204 identical: DIN VDE 0113	VDE regulations for setting-up high voltage electrical machine tools and processing machines with mains voltages up to 1000 V <sup>3)</sup>

### **VDE (Association of German Engineers) Regulations**

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

**\*Sources:**

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

<sup>2)</sup> Beuth Verlag GmbH, Burggrafenstrasse 4, 1000 Berlin 30

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

<sup>4)</sup> 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 Manual Enamel 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 - booth, gun control unit or powder injector - should be referenced to their enclosed corresponding documents.



# Function description

---

## Field of application

The PG 3-E Manual Enamel 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!

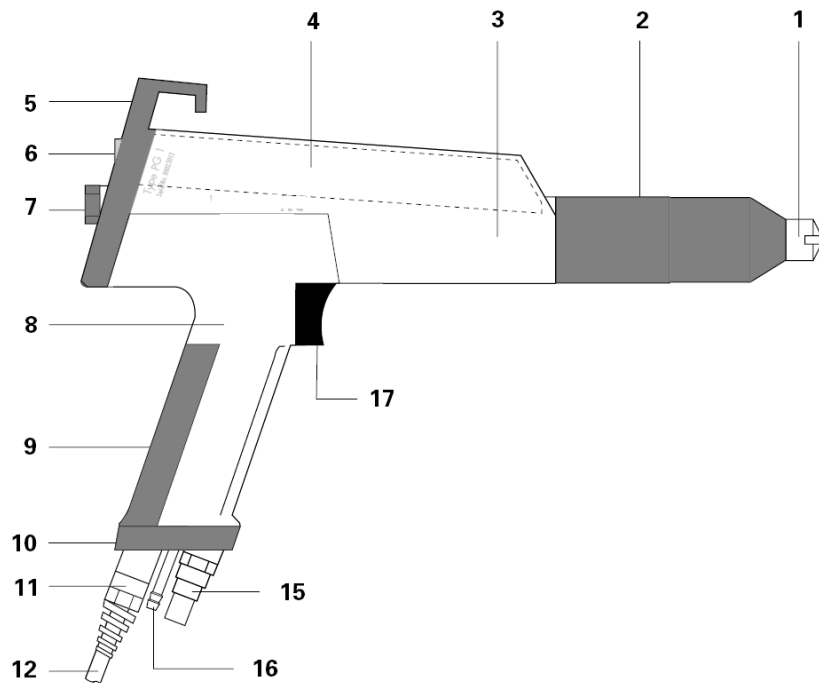
The PG 3-E Manual Enamel gun with integrated high voltage generation can produce optimum penetration and high charging efficiency. The gun is detachable, therefore easy for maintenance and repair.

## Scope of delivery

- A complete PG 3-E Manual Enamel gun with gun cable
- Rinsing air hose
- FSD Flat jet nozzle with electrode holder
- Cable fixation with velcro fastener
- Gun cleaning brush
- Spare parts kit

## PG 3-E Manual Enamel gun

### Structure



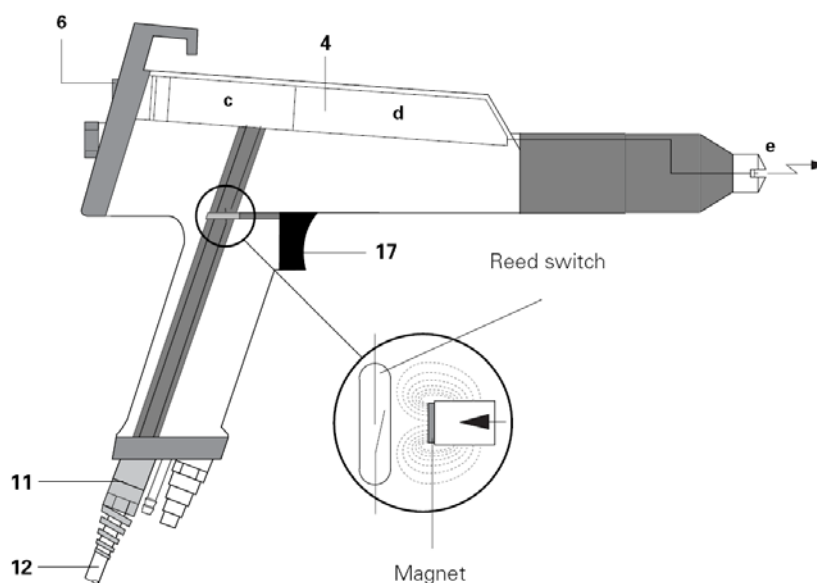
- |   |                     |    |                                      |
|---|---------------------|----|--------------------------------------|
| 1 | Atomizing system    | 9  | Grounding plate                      |
| 2 | Threaded sleeve     | 10 | Locking screw                        |
| 3 | Shaft               | 11 | Gun cable connection (bayonet catch) |
| 4 | HV 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 signal of approximately 10 V eff. This voltage is fed through the gun cable (11) to the high voltage cascade (4) in the gun body.

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 high voltage cascade in a second step (d), until the required high voltage is obtained at the end (approx. 100 kV). The high voltage is now fed to the electrode within the spray nozzle (e).

When the high-voltage is adjusted on the control unit, the intensity of the LED (6) also changes. The user has the assurance that high-voltage is present and can control this function.



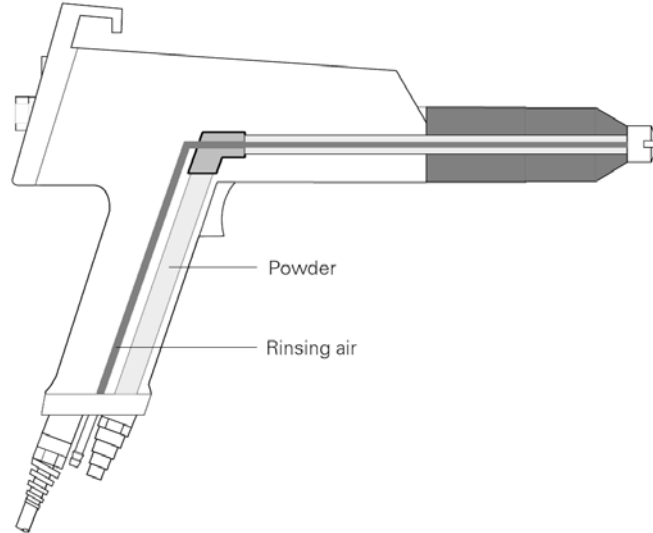
PG 3-E Manual Enamel gun - High voltage generation

## Circuitry

In addition to the low-voltage a switching voltage is taken to the gun. When the gun switch (17) is actuated, a reed switch closes the circuit. The control module switches the low voltage, the powder feed, and the gun air (supplementary air) on. This reed satisfies the safety regulations of most major standards.

## Powder flow and rinsing air

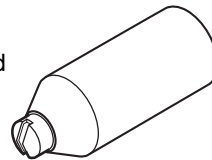
The rinsing air, used by the vented spray nozzle, is connected with its designated connection on the rear of the gun control unit (see the operating manual of the gun control unit). The functions of the spray nozzles are described in the corresponding section of this manual.



## Spray nozzles

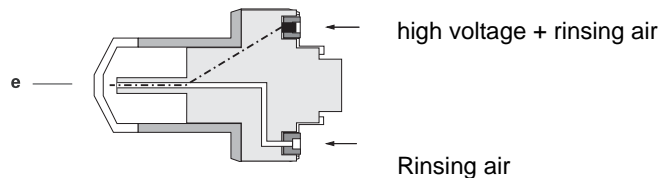
### Standard-Set

Flat jet nozzle with vented central electrode



### Flat jet nozzle with vented central electrode

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



In order to prevent powder from sintering on the electrode, compressed air is used during the spray process. The compressed air (called 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 Manual Enamel gun

### Electrical data

PG 3-E Manual Enamel gun	
Nominal input voltage	10 V eff.
Operating frequency	ca. 18 kHz
Nominal output voltage	98 kV
Polarity	negative (optional positive)
Max. output current	100 $\mu$ A
High voltage display	with LED
Ignition protection	Ex 2 mJ T6
Approvals	EN 50050 and PTB test no. Ex-91.C.9102. PTB Ex 03-53018 FM Nr. J.I. OW 7 A 6.AE(7264). Date tested 10/1993



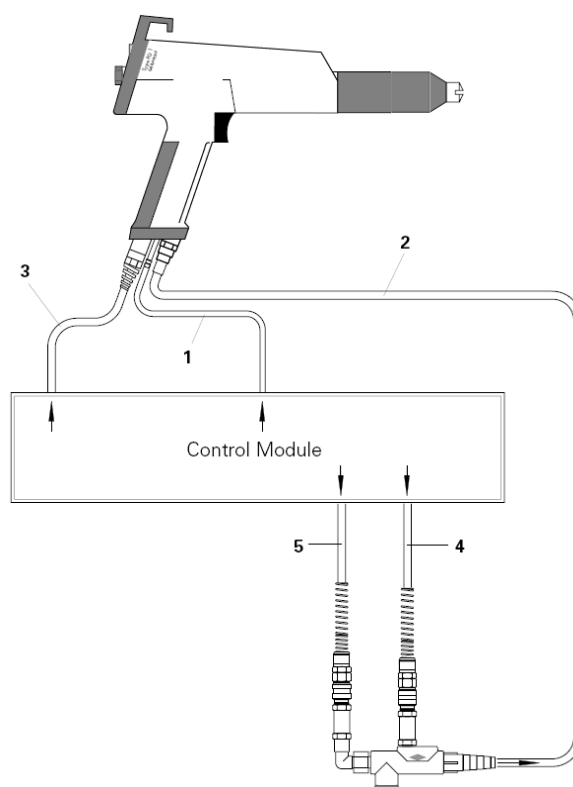
# Start-up and operation

## Connecting guide

1. Connect the gun cable plug to the control unit (see "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 corresponding injector



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



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

*Connecting guide - overview*

---

## Function check

1. Turn on the gun control unit
2. Pick up the gun and point it toward a **grounded** workpiece, distance approx. 20 cm.
3. Press the gun trigger
4. Adjust the high voltage at the control unit  
The high voltage LED (kV) lights up. The high voltage in the PG 3-E Manual Enamel 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 gun cascade increases as the voltage rises.
6. Adjust conveying air, supplementary air and electrode rinsing air depending on the application
7. The maximal nominal output current can be monitored on the gun control unit (please read the "Gun control unit" operation manual).

When all the checks are positive, the gun is ready for operation.



---

**Note:**

**When a malfunction occurs, see the "Troubleshooting Guide" as well as the gun control Operating instructions!**

---

## Start-up

### Adjusting powder output and powder cloud

The powder output is depending on the powder type, the powder hose length, the number of hose curvatures, the 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 corresponding injector operating instructions.

1. Switch on the control unit
2. Direct the gun into the booth and press the gun switch
3. Adjust the conveying air
4. Adjust the supplementary air according to the instructions of the control module.
5. Adjust the rinsing air quantity, so that the desired form of the powder cloud is not impaired

### Switch on the control unit - Powder coating



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

1. Switch on the control unit
2. Adjust the high voltage Check by observing the LED (6).

### Switch off the control unit

1. Switch off the 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 etc. the main compressed air supply is to be interrupted

### Clean the powder hose

If lengthy downtimes take place, the powder hose must be cleaned. Proceed as follows:

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



# Maintenance and cleaning




---

**Note:**

Regular and conscientious maintenance increases the operating 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 Manual Enamel gun

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




---

**Note:**

Before cleaning the powder gun, switch off its control unit. The compressed air used for cleaning must be free from 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 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 Manual Enamel gun with the following solvents is not allowed:**

**Ethylene chloride, acetone, ethyl acetate, methyl ethyl ketone, methylene chloride, premium gasoline, turpentine, tetrachloromethane, 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 every shift*

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



**Check the seating of the spray nozzles**

**Make sure that the threaded sleeve is always tightened well. If the spray nozzle is fitted loosely, there is danger of 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 sintering should have formed, then this is to be removed.

### *Monthly:*

- Check the spray nozzles for wear

The flat jet nozzle is to be replaced, if:

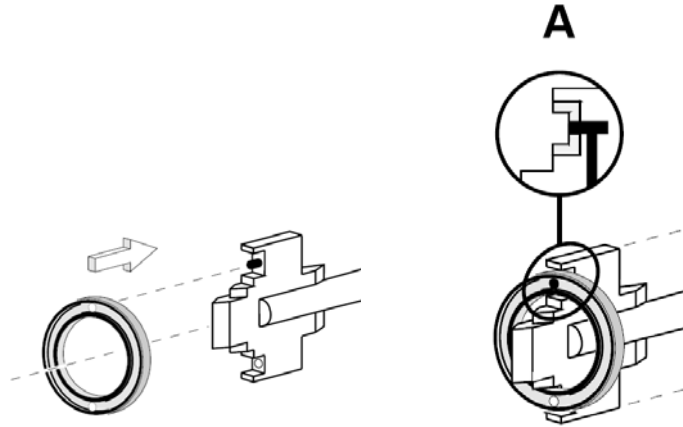
- The spray pattern is no longer a regular oval
- deeper grooves in the nozzle slot or even the wall thickness is no longer visible
- The wedge of the electrode holder is worn

---

## Important notes for assembling the nozzles

### Flat jet nozzle:

1. Hold the electrode holder.
2. Push the black contact ring with the hole on to the back of the electrode holder.



---

**Attention! The slot in the contact ring must be visible from the rear - see Detail A !**

---

3. Push the electrode holder with the contact ring into the slot of the nozzle and press home.

## Dismantling the gun

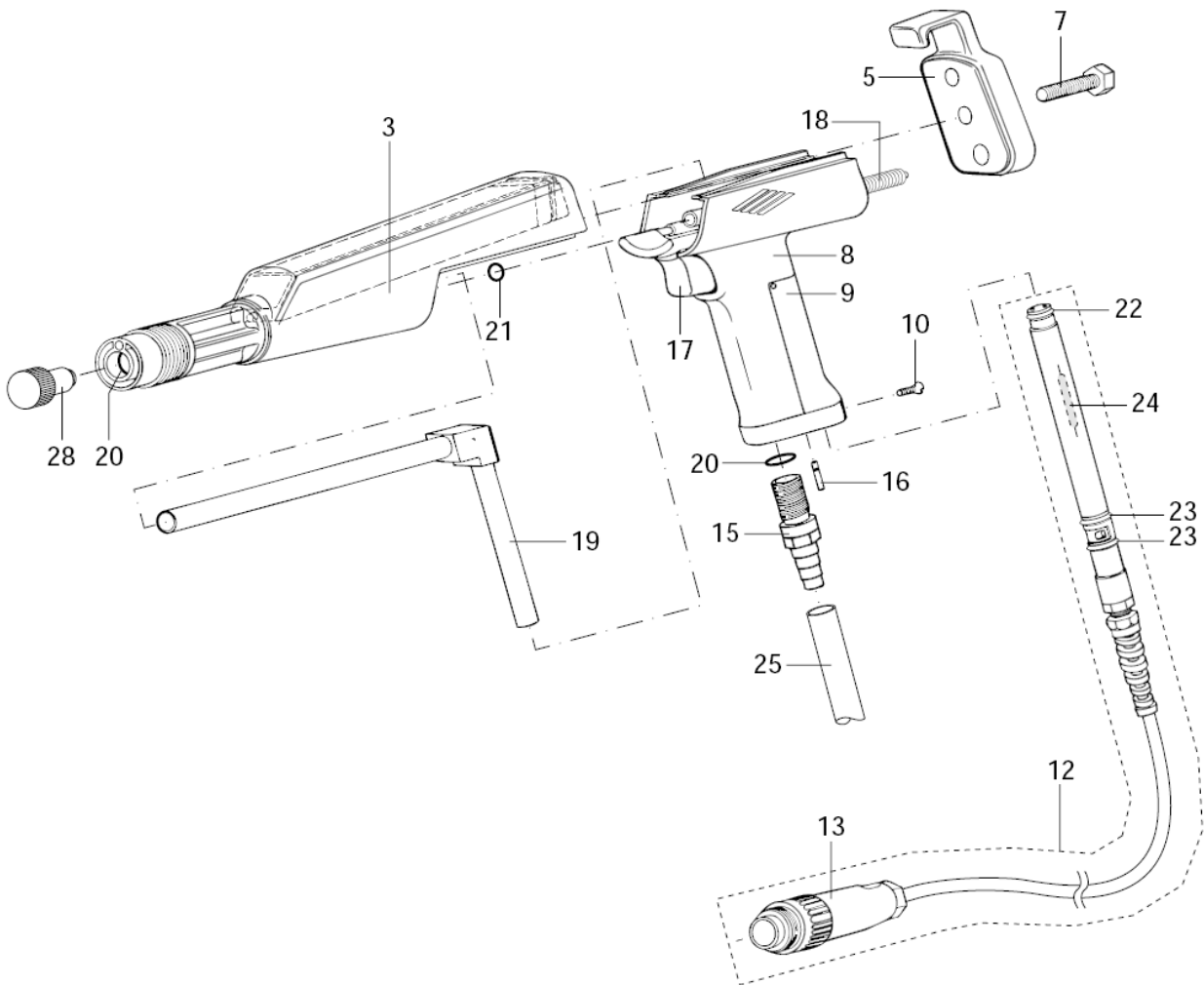


**Attention:**

The control unit must be switched off and the gun plug detached, before dismantling the gun!

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 it should be defective or the shaft broken, the complete shaft (3) is to be sent to an authorized ITW Gema service center!



1. Detach the powder hose at corresponding connection
2. Detach the rinsing air hose at corresponding connection
3. Remove the nozzle
4. Unscrew the lock screw (10 - Fig. 8)
5. Give the cable connector (11 - Fig. 8) a 1/4 turn counter-clockwise (align the marks) and pull out in a straight line.
6. Screw in the lock screw provisionally so that it cannot get lost.
7. Unfasten the plastic bolt (7 - Fig. 8) and remove the connecting plate (5 - Fig. 8).
8. Separate the grip (8 - Fig. 8) from the shaft (3 - Fig. 8).
9. Pull the powder tube (19 - Fig. 8) out of the grip (8 - Fig. 8).
10. Check the O-ring (21) for damages and replace it, if necessary.
11. Pull out the powder tube (19) from the support (8)

The connections for the powder hose and the 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.

- The assembly of the gun is carried out in the reverse order to that shown above.
- Careful handling must be observed!
- If the gun cable connection can not be inserted properly without applying force, disassemble the gun again and reassemble it correctly.
- The powder hose connection should always be screwed in up to the stop.

After assembly check that:

- the gun cable connection sits correctly




---

**The locking grub screw must be possible to be screwed in completely.**

---

- there are no gaps at the joins
- the gun trigger can be smoothly actuated and that it returns to the neutral 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 ITW Gema repair center! Contact your ITW Gema representative for details!

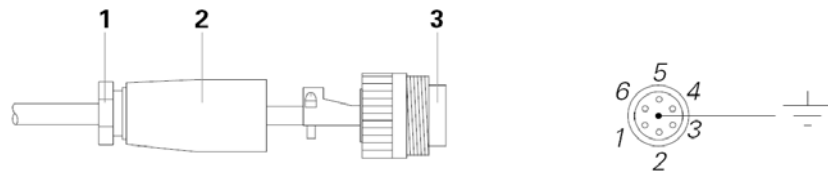
### Replacing the trigger (17) or the spring (18)

1. Disassemble the gun
2. Remove the spring (Pulling the yoke with forefinger)
3. Insert the (new) trigger into the grip (8 - Fig. 8)
4. Fit the (new) spring on the guide ribs of the trigger and push to the stop
5. Reassemble the gun

### Replacing the gun connector (13)

A soldering iron is required

View of soldering pins



1. Open the connector :
  - Unfasten the sealing gland (1)
  - Unscrew the sleeve (2)

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

Pin assignment:

1	black wire	4	white wire
2	vacant	5	vacant
3	blue wire	6	brown wire
centre	screening (ground)		

7. Tighten the 2 screws of the cable clamp
8. Screw on the sleeve (2) and tighten
9. Tighten the sealing gland (1)

# Troubleshooting

## General information

Fault	Causes	Troubleshooting
High voltage display shows no value, although the control unit is switched on and gun switch is pressed	Gun not connected Gun plug or gun cable defective High voltage part defective	Connect the gun Replace corresponding part or send in for repair Replace, send in for repair
During coating, air flows out of the gun body	O-ring (21) defective or missing	Replace or insert
LED at the rear of the gun is not lit, although the gun sprays powder; powder does not adhere on the work piece.	High voltage adjustment is set too low Gun plug or gun cable defective High voltage cascade is defective Control circuit board (PCB) defective	Increase high voltage Replace corresponding part or send in for repair Send in the gun body for repair Send for repair
Powder does not adhere to object, although the high voltage is available, and the gun sprays powder	High voltage and current deactivated High voltage cascade defective 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>Too little conveying air</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>Nozzle in the injector is clogged</p> <p>Fluidizing not running</p> <p>No conveying air:</p> <p>Reducing valve 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 output and/or total air volume on the control unit</p> <p>Clean corresponding part</p> <p>Replace or insert</p> <p>Replace</p> <p>(see above)</p> <p>Replace the reducing valve</p> <p>Replace the solenoid valve</p> <p>Send 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 Manual Enamel 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 given. 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!**

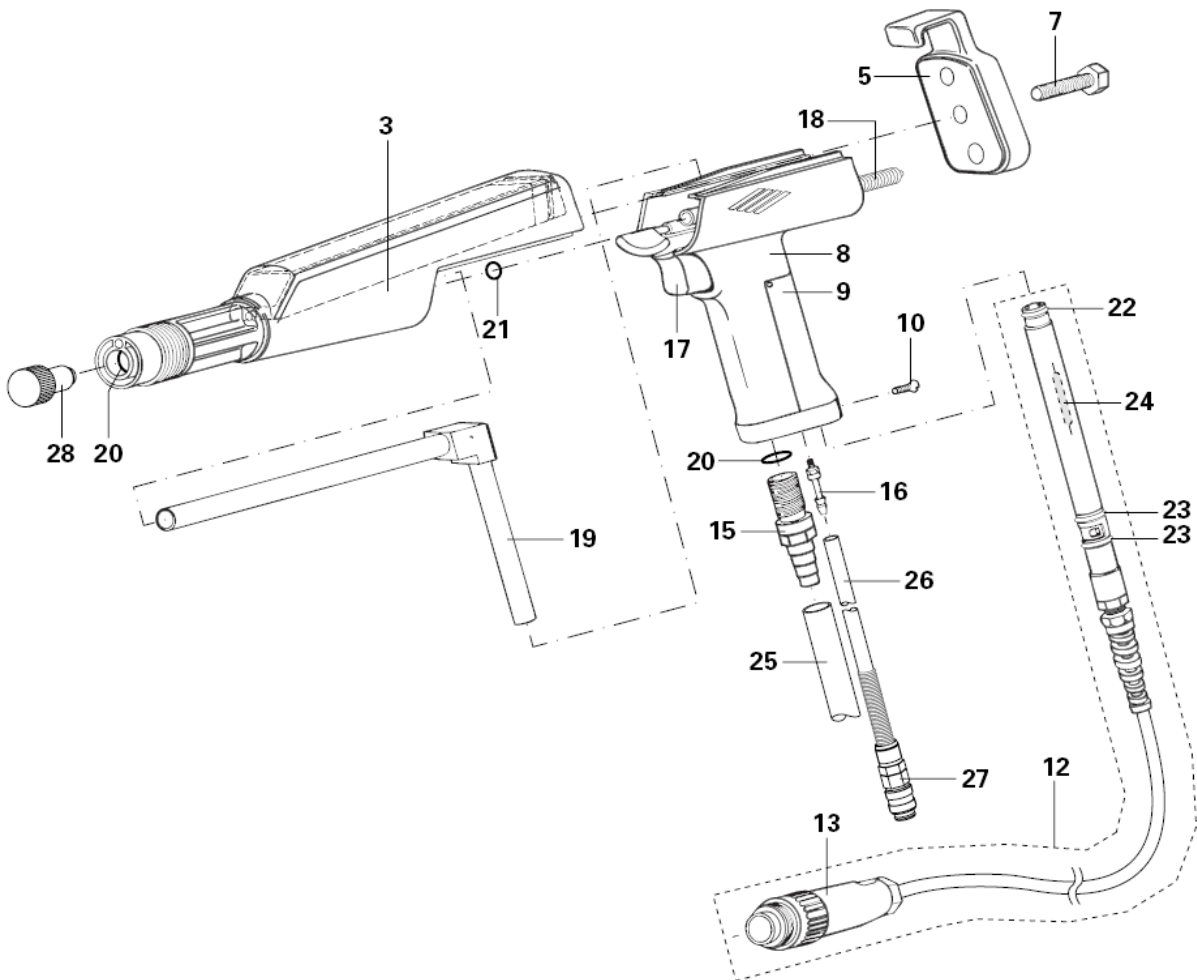
**Only original ITW-Gema spare parts should be used, because the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the ITW Gema guarantee conditions!**

---

## PG 3-E Manual Enamel gun - Spare Parts List

### 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 is 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 Manual Enamel 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 Manual Powder gun body - complete	406 740
5	Cover with hook	330 043
7	Plastic bolt - M8 x 35 mm	328 847
8	Hand grip	330 035
9	Grounding plate	328 863
10	Lock screw - M4 x 10 mm	232 637
12	Gun cable, complete with 6 m cable	328 740
	Gun cable, complete with 11 m cable	336 025
12.1	Extension cable for gun cable (Item 12)	334 464
12.2	Cable only (for Item 12)	102 911*
13	7 pin plug	200 085
15	Powder hose connector (with O-ring - Item 20)	333 727
16	Rinsing air connector	328 820
17	Trigger with switching magnet	333 662
18	Spring	331 651
19	Powder tube	403 725#
20	O-ring - $\varnothing$ 13.1 x 1.6 mm	232 670
21	O-ring - $\varnothing$ 6.1 x 1.6 mm	233 099
22	O-ring - $\varnothing$ 7.65 x 1.78 mm	232 564
23	O-ring - $\varnothing$ 10.82 x 1.78 mm	232 556
24	Reed contact	328 910
25	Powder hose - $\varnothing$ 16 / 11 mm	103 128#*
26	Rinsing air hose - $\varnothing$ 6 / 4 mm	339 954
27	Quick-release connection - $\varnothing$ 6 / 4 mm	200 840
28	Special extractor tool (for Item 19)	340 839
	Spiral brush (for Item 19) - not shown	389 765
	FSD Flat jet nozzle - see next page	404 225#
	Threaded sleeve - see also next page	404 101
	Parts set (not shown), consisting of:	341 754
	Cable binder with Velcro closure (8x)	303 070
	Items 7, 10, 20, 21 and 28	

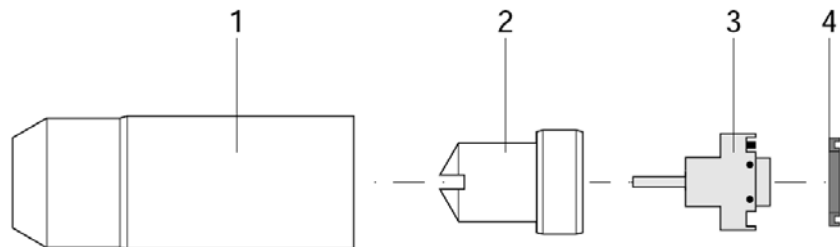
\* Please indicate length

# Wearing part

## Flat jet nozzle set for PG 3-E Manual Enamel gun

	Flat jet nozzle set (incl. Items 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



*Flat jet nozzle set for PG 3-E Manual Enamel gun*

