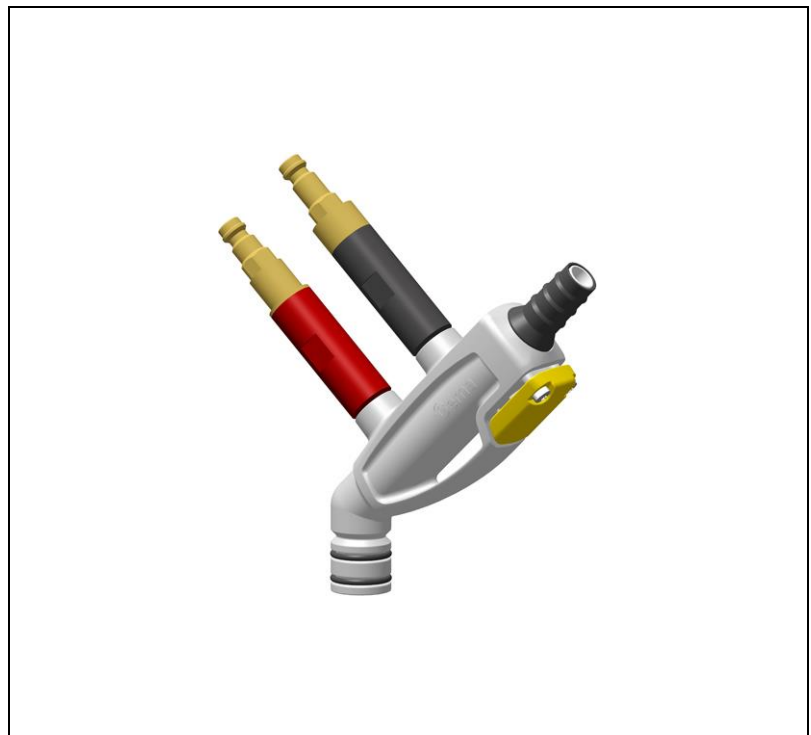


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Operating instructions and Spare parts list

# Powder injector OptiFlow IG07



Translation of the original operating instructions

**Documentation OptiFlow IG07**

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Gema Switzerland GmbH  
Mövenstrasse 17  
9015 St.Gallen  
Switzerland

Phone: +41-71-313 83 00

Fax.: +41-71-313 83 83

E-mail: [info@gema.eu.com](mailto:info@gema.eu.com)

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# About these instructions

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## General information

This operating manual contains all important information which you require for the working with the OptiFlow IG07. It will safely guide you through the start-up process and give you references and tips for the optimal use when working with your powder coating system.

Information about the functional mode of the individual system components should be referenced in the respective enclosed documents.

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## Keeping the Manual

Please keep this Manual ready for later use or if there should be any queries.

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## Safety symbols (pictograms)

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

### DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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### WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

---

### CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

---

### ATTENTION

Indicates a potentially harmful situation. If not avoided, the equipment or something in its surrounding may be damaged.

---

**ENVIRONMENT**

Indicates a potentially harmful situation which, if not avoided, may have harmful consequences for the environment.



**MANDATORY NOTE**

Information which must be observed.



**NOTICE**

Useful information, tips, etc.

**Structure of Safety Notes**

Every note consists of 4 elements:

- Signal word
- Nature and source of the danger
- Possible consequences of the danger
- Prevention of the danger

**⚠ SIGNAL WORD**

**Nature and source of the hazard!**

**Possible consequences of the danger**

- ▶ Prevention of the danger

**Presentation of the contents**

**Figure references in the text**

Figure references are used as cross references in the descriptive text.

**Example:**

"The high voltage (**H**) created in the gun cascade is guided through the center electrode."

# Safety

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## General information

This chapter provides the user and third parties who operate this product with all essential safety regulations, the adherence to which is imperative.

These safety regulations must be read and understood in their entirety before the product is put into operation.

The standards and guidelines applied during the development, manufacture and configuration are described in the EC declaration of conformity and in the manufacturer's declaration.

### **WARNING**

#### **Working without instructions**

**Working without instructions or with individual pages from the instructions may result in damage to property and personal injury if relevant safety information is not observed.**

- ▶ Before working with the device, organize the required documents and read the section "Safety regulations".
  - ▶ Work should only be carried out in accordance with the instructions of the relevant documents.
  - ▶ Always work with the complete original document.
- 

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## Basic safety instructions

- This product is built to the latest specification and conforms to the recognized technical safety regulations and is designed for the normal application of powder coating.
- Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. If this product is to be used for other purposes or other substances outside of our guidelines then Gema Switzerland GmbH should be consulted.
- Start-up (i.e. the execution of intended operational tasks) is forbidden until it has been established that this product has been set up and wired according to the guidelines for machinery. The standard "Machine safety" must also be observed.
- Unauthorized modifications to the product exempt the manufacturer from any liability from resulting damage.

- The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
- Furthermore, the country-specific safety regulations also must be observed.

---

## Product specific security regulations

- This product is a constituent part of the equipment and is therefore integrated in the system's safety concept.
- If it is to be used in a manner outside the scope of the safety concept, then corresponding measures must be taken.
- The installation work to be done by the customer must be carried out according to local regulations.
- It must be ensured, that all components are earthed according to the local regulations before start-up.



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**For further security information, see the more detailed Gema safety regulations!**

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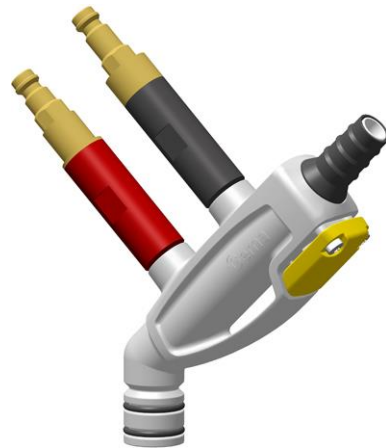


# Product description

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## Intended use



The OptiFlow injector is used to convey normal organic powders between the powder hopper and the powder gun.



*fig. 1: Powder injector with coded quick release connections*



The injector is certified for using in the following zone, if powder hoses with conductive strips are used, and the grounding resistance is less than 1 MOhm!

Explosion protection	Zone
 	22

Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. This product should only be used, maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

Any other use is considered non-compliant. The manufacturer is not responsible for any incorrect use and the risks associated with such actions are assumed by the user alone!

### Reasonably foreseeable misuse

- Use of enameled powder
- Use with insufficient compressed air quality
- Use of moist powder
- Incorrectly assembled individual parts

## Typical characteristics – properties of the functions

The OptiFlow Injector is a plug-in type and permits easy handling and quick cleaning. All connections are plug-in types and not interchangeable. The injector can be disassembled without special tools.

The injector is supplied with a PTFE / ETFE cartridge as standard.

## Structure

### Overall view

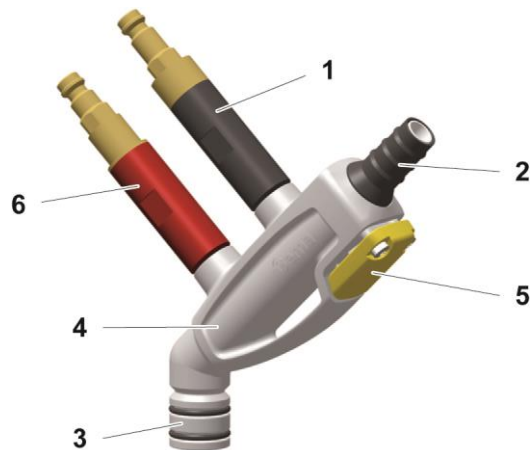


Fig. 2

- |   |                                         |   |                                     |
|---|-----------------------------------------|---|-------------------------------------|
| 1 | Check valve unit<br>(supplementary air) | 4 | Injector housing                    |
| 2 | Powder hose quick release<br>connection | 5 | Release trigger                     |
| 3 | Powder hopper connection                | 6 | Check valve unit<br>(conveying air) |

## Principle of the injector

When air flows through a nozzle into a cavity, a vacuum will be created in the cavity (see figure below). This effect is used now for aspirating powder through a suction opening - a powder-air mixture will be created.

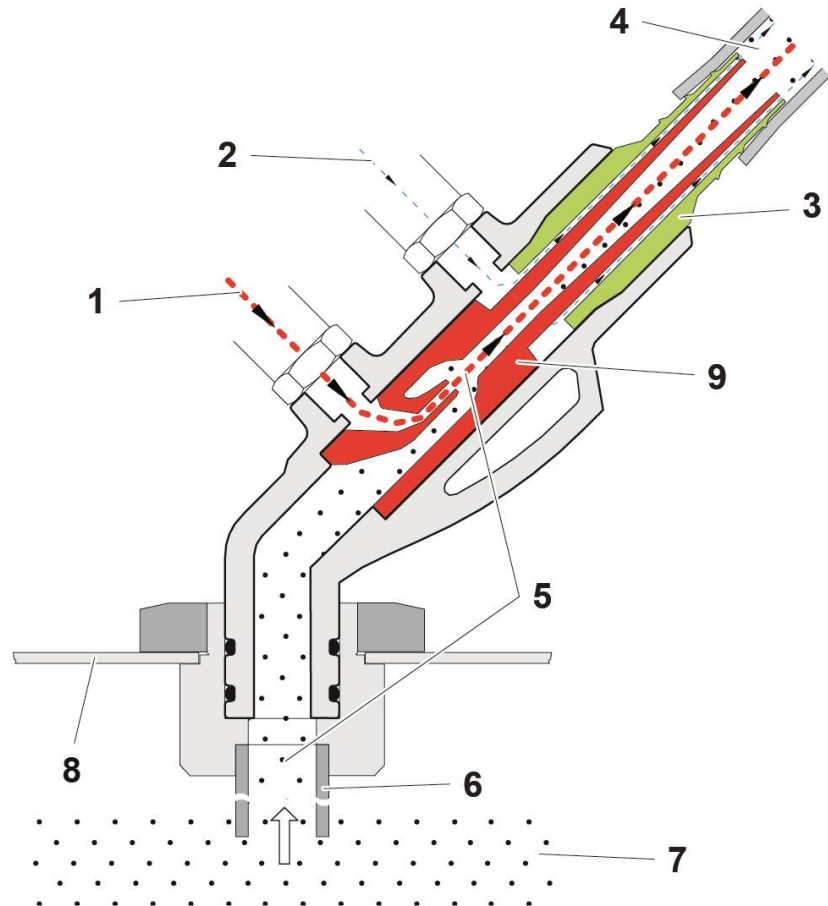


fig. 3

- |   |                    |   |                  |
|---|--------------------|---|------------------|
| 1 | Conveying air      | 6 | Suction tube     |
| 2 | Supplementary air  | 7 | fluidized powder |
| 3 | Insert sleeve      | 8 | Powder container |
| 4 | Powder/air mixture | 9 | Nozzle           |
| 5 | Vacuum             |   |                  |

This passes through the nozzle into the insert sleeve and through the powder hose into the gun.

The powder output volume depends on the ratio between the conveying and additional air:

- The conveying air creates the intake depression.
- The additional air influences the flow velocity.
- The total air is the sum of the conveying and additional air.

The transport of fine solids such as powder requires a certain air volume per time unit to facilitate airborne conveyance. If a hose diameter of 11 mm is used, the value is approx. 4 Nm<sup>3</sup>/h.

If the powder transport becomes irregular, the so-called "pumping" takes place.

In order to prevent this from happening, supplementary air is added until the volume of the air in the powder hose is sufficient available once more.

The conveying quality depends on the quality of the powder, the powder hose length, the hose diameter and the number of hose curvatures. Place great importance on the insert sleeve condition, because clogging or sintering causes the powder output to reduce drastically.

## Powder volume setting for OptiFlow Injector

In order to set the ideal powder volume on the OptiStar gun control unit, it is recommended to select the firmness of the powder cloud or the total air first. As guide values for different powder hoses, the following can be assumed:

- Powder hose 74 type, Ø 10 mm, **3-5 m³/h**
- Powder hose 66 type, Ø 11 mm, **4-5 m³/h**

According to the prevailing conditions (powder, powder hose layout, the parts to be coated) a low to lowest total air can also be set with the standard hose 74 type, Ø 10 mm.

If a very large powder output is required, it is recommended to select a larger powder hose internal diameter (Ø 12 mm).



**It should be noted, that if irregular or pumping conveying occurs, as a rule, the total air is set too low!**



## Powder output (reference values)

### *General conditions for the OptiFlow Injector*

Powder type	Epoxy/polyester
Powder hose Ø (mm)	11
Type of powder hose	POE with guide strips
Input pressure (bar)	5.5
Correction value C0	Powder output zeroing adjustment

### Guide values for OptiStar with OptiFlow Injector

All values in these tables are guide values for new nozzle inserts. Differing environmental conditions, wear and different powder types can affect the table values.

Hose internal diameter (mm)	Ø 11						
Hose length (m)	6		12		18		
Total air volume  (Nm <sup>3</sup> /h)	3.5	5.5	3.5	5.5	3.5	5.5	
<b>Powder output (g/min)</b>							
Powder output  (%)	20	90	105	65	75	45	60
	40	170	205	135	150	100	120
	60	235	280	185	215	145	170
	80	290	350	235	270	185	220
	100	340	405	280	320	220	260

## Available accessories

- Multi-Tool / Plug gauge for checking wear (order no. 1017 201)



# Maintenance / Repairs

---

## Cleaning

### ATTENTION

**Any unauthorized modifications and alterations to the product are not permitted for safety reasons and exclude the manufacturer's liability for any resulting damage!**



**Regular and conscientious cleaning and maintenance increase the service life of the product and ensure consistent high coating quality!**

- The parts to be replaced during maintenance work are available as spare parts. These parts can be found in the appropriate spare parts list!

---

## Cleaning the injector

### ATTENTION

**Injector parts may be damaged during the cleaning process.**

- ▶ Clean the component parts with compressed air and, if necessary, dissolve sintered deposits with nitro-thinner.
- ▶ Do not use acetone, do not scrape!

Cleaning intensity depends of the powder used. For optimal cleaning results, we recommend dismantling the entire injector into its dismantable components.

1. Remove the injector
2. Remove the powder hose from the hose connection
3. Clean the hose connection with compressed air which is free of oil and water, and check for wear
4. Clean the injector body with compressed air which is free of oil and water.
  - Any contamination can be seen through the opening of the hopper fitting
5. If the injector is severely fouled, it must be dismantled

**ATTENTION**

**Individual parts may be damaged during the cleaning process.**

- ▶ Please dismantle carefully to avoid damages!
- ▶ Remove the check valve units (1 and 6) with the correct sized spanner.

6. Reinsert the injector and fix it

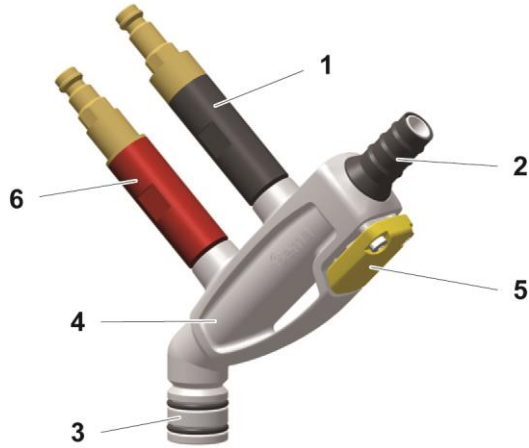


fig. 4

- |                                           |                                       |
|-------------------------------------------|---------------------------------------|
| 1 Check valve unit<br>(supplementary air) | 4 Injector housing                    |
| 2 Powder hose quick release<br>connection | 5 Release trigger                     |
| 3 Powder hopper connection                | 6 Check valve unit<br>(conveying air) |



## Cleaning the check valve units

### ATTENTION

**Damage or loss of function!**

**Parts of the check valve unit may be damaged during the dismantling process.**

- ▶ Blow off the filter elements from the inside to the outside!
- ▶ Do not immerse the filter elements in fluidities or solvents!
- ▶ Never remove the supporting ring!

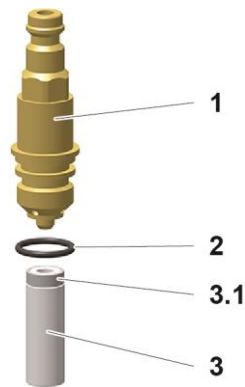


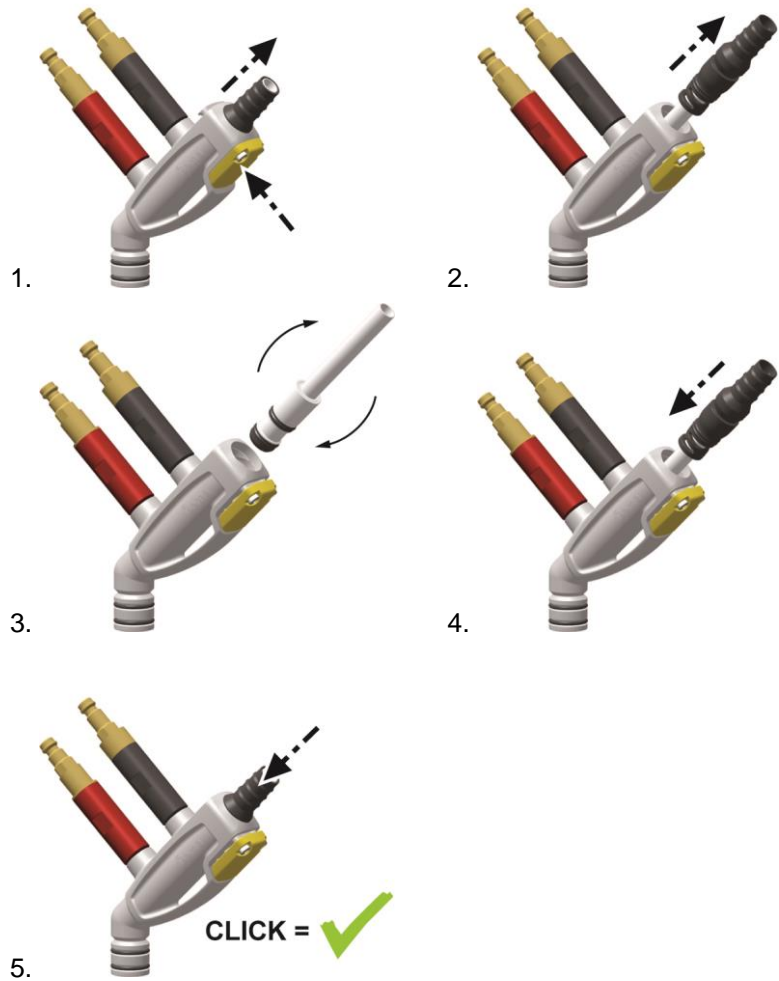
fig. 5

- 1 Connection/plug
- 2 O-ring

- 3 Filter element
- 3.1 Supporting ring

---

## Changing the cartridge



# Fault clearance

---

## Faults

The following lists possible faults during operation and their clearance.

Fault	Cause	Corrective action
<b>The gun does not spray powder although the control unit is switched on</b>	Injector nozzle, check valve unit, powder hose or powder gun are clogged	Clean the corresponding parts and if necessary, replace them
<b>Gun achieving only poor spray profile</b>	Conveying vacuum too low	Increase the powder quantity and/or total air volume on the control unit
	Cartridge worn, clogged or not inserted	Replace or install the cartridge.



# Disposal

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## Introduction

### Requirements on personnel carrying out the work

The disposal of the product is to be carried out by the owner or operator. When disposing of components that are not manufactured by Gema, the instructions in the respective manufacturer's documentation must be observed.

### Disposal regulations



---

**The product must be disassembled and disposed of properly at the end of its service life.**

- ▶ When disposing of the product, the applicable local and regional laws, directives and environmental regulations must be complied with!
- 

### Materials

The materials must be sorted according to material groups and taken to the appropriate collection points.



# 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** OptiGun GA03 automatic powder 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 bulk stock is always marked with an \*.

Wearing 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)

### ATTENTION

**Use of non-original Gema spare parts**

**When using the spare parts from other manufacturers the explosion protection is no longer guaranteed. If any damage is caused by this use all guarantee claims become invalid!**

- ▶ Only original Gema spare parts should be used!
-

## OptiFlow IG07 – Spare parts list

	OptiFlow IG07 Powder injector – complete (pos. 1-15)	1015 100
<b>A</b>	Conveying air check valve unit (red marking) – complete (incl. pos. 6, 8, 9 and 10)	1015 830
<b>B</b>	Supplementary air check valve unit (black marking) – complete (incl. pos. 7, 8, 9 and 11)	1015 831
1	Injector body – without pos. 14 and 15	1015 102
2	Slide gate	1015 104
3	Release trigger	1014 810
4	Screw – M3x6 mm	1014 812
5	Compression spring	1014 813
6	Connector (conveying air) – NW 5.5	1004 366
7	Connector (supplementary air) – NW 5.5	1004 367
8	O-ring – Ø 11x1.5 mm	1000 532
9	Filter element	1015 832
10	Body (red)	1015 835
11	Body (black)	1015 836
12	Cartridge – complete	1016 561#
13	Hose connection – complete	1014 806
14	O-ring – Ø 16x2 mm	1007 794#
15	Axial gasket – complete	1014 814
21	Conveying air hose – Ø 8/6 mm (red)	103 500*
22	Supplementary air hose – Ø 8/6 mm (black)	1008 038*
23	Quick release coupling for conveying air hose – NW5-Ø 8 mm	261 645
24	Quick release coupling for supplementary air hose – NW5-Ø 8 mm	261 637
25	Kink protection	1008 844
	Powder hose – 66 type, POE, Ø 16/11 mm, with conductive strip (standard)	105 139*#
	Powder hose – 74 type, POE, Ø 15/10 mm, with conductive strip	1001 673*#
	Powder hose – 75 type, POE, Ø 18/12 mm, with conductive strip	1001 674*#

\* Please indicate length

# Wearing part



# OptiFlow IG07 – spare parts

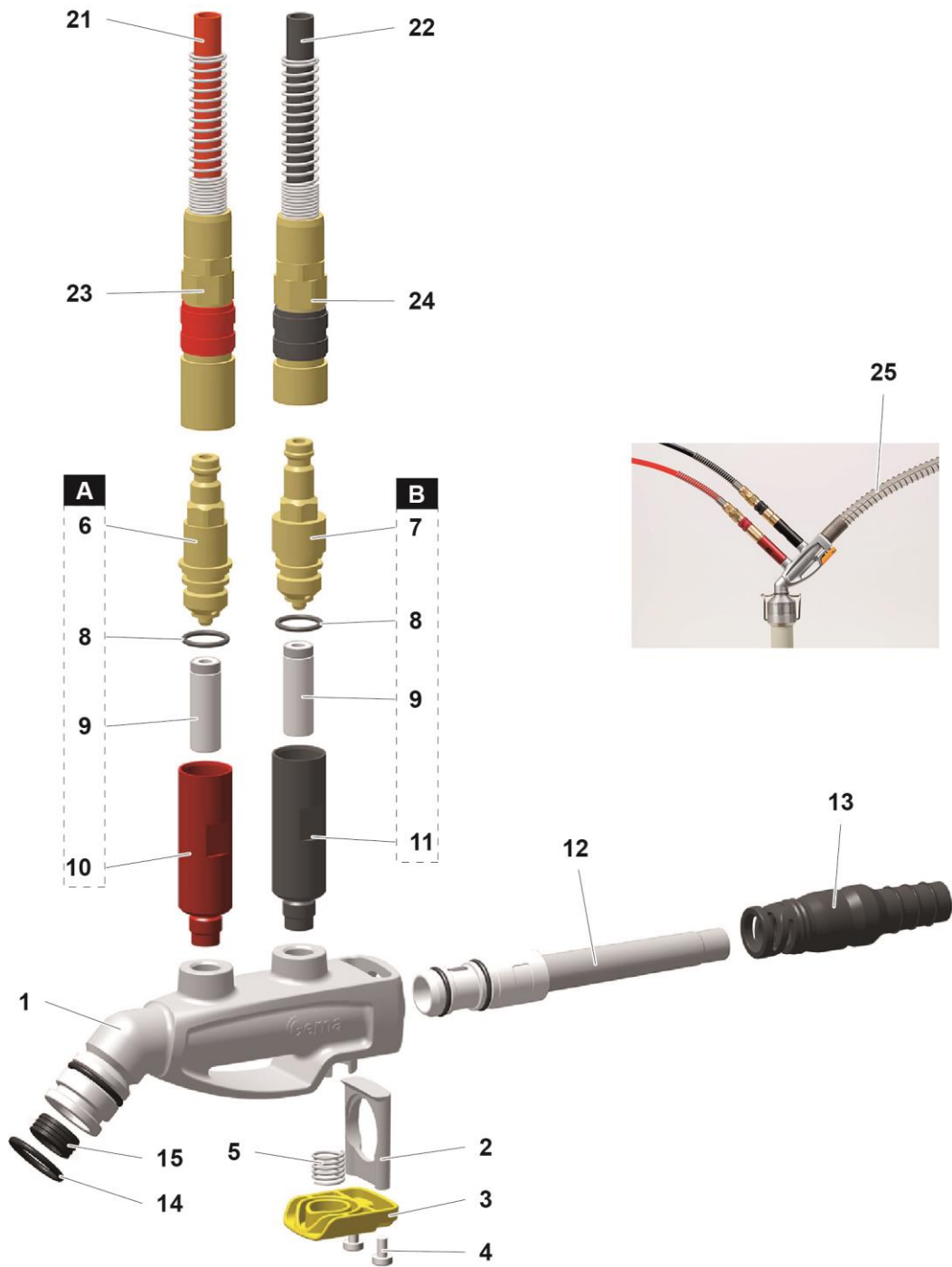


fig. 6



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