En

Operating instructions and spare parts list

OptiSpray AP01 Application Pump

Translation of the original operating instructions

Gema

Documentation Application pump OptiSpray AP01

Printed in Switzerland

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
Homepage: www.gemapowdercoating.com

Table of contents

General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the OptiSpray AP01 Application pump.

These safety regulations must be read and understood before the OptiSpray AP01 is put into operation.

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 electrically live 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

Proper use

1. The OptiSpray AP01 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 non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. Gema Switzerland GmbH must be consulted prior to any use of the OptiSpray AP01 for any purposes or substances other than those indicated in our guidelines.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of

conformity of use. The OptiSpray AP01 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 intended operational tasks) is forbidden until it has been established that the OptiSpray AP01 has been set up and wired according to the guidelines for machinery (2006/42 EC). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to the OptiSpray AP01 Application pump 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 also must be observed.

Explosion protection	Protection type	Temperature class
CE Ex II 3 D	IP54	T6

Product-specific safety measures

- Installation work performed by the customer must be carried out according to local regulations.
- All components must be grounded according to the local regulations before start-up.

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

About this manual

General information

This operating manual contains all the important information you require for the working with the OptiSpray AP01 Application pump. 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 functionality of the individual system components - booth, gun control unit, manual gun or automatic gun - should be referenced to their enclosed corresponding documents.

DANGER:

Working without operating instructions.

Working without operating instructions or with individual pages from the operating 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.

Function description

Field of application

OptiSpray AP01 Application pump

The OptiSpray AP01 Application pump is intended for conveying coating powder to the powder gun. 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.

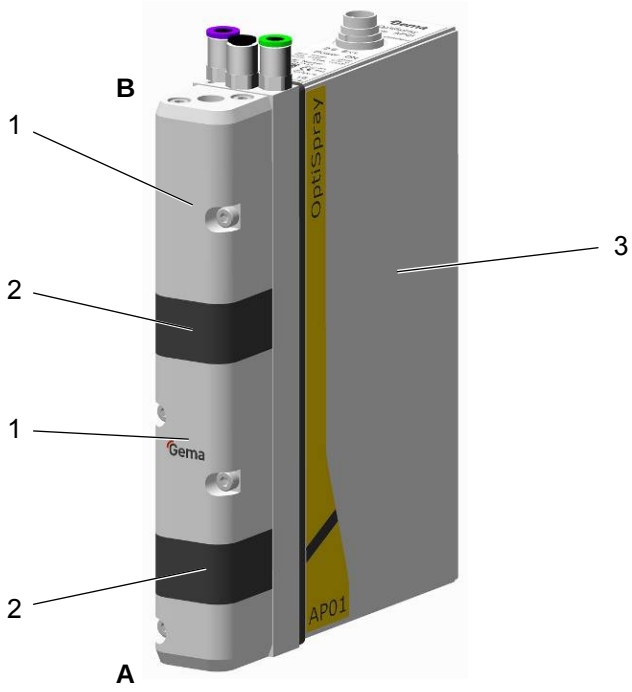
The OptiSpray AP01 Application pump operates only in combination with the OptiStar CG12-CP (automatic equipment) or the OptiStar CG11-P Control unit (manual equipment).

The OptiSpray AP01 application pump will only operate in combination with the OptiGun GA03-P automatic gun or with other Gema models with a suitable diffuser (spraying air adapter). Please contact Gema if you have any further queries.

OptiSpray AP01 Application pump

Design and function

OptiSpray AP01 - structure



OptiSpray AP01 Application pump - structure

A	Suction side	**B**	Transport side
1	Filter element bodies with filter elements	3	Pneumatic system and electronics
2	Pinch valve housing		

Powder hoses

Depending the application, different powder hoses are used for the suction and conveying procedure. The corresponding hose connections with nuts with kink protection must be used!

Field of application	Suction side	Transport side
Automatic equipment	Inside diameter 4.5 mm OptiCenter suction tube hose length max. 1 m	Inside diameter 7 mm
manual equipment OptiFlex FP	Inside diameter 4.5 mm, hose length max. 1 m	Inside diameter 7 mm

NOTE!
Other hose diameters can also be used for certain applications. Only use other hose diameters with the explicit recommendation of Gema!

On the transport side, a powder hose with conductive strip must be used (electrically conductive)!

Spraying air function / diffusers

The coating guns to be used must be equipped with the appropriate spraying air function or with an appropriate diffuser.

The diffuser function is built into the rear piece of the OptiGun GA03-P automatic gun.

The OptiGun GA02 automatic gun and the OptiSelect GM03 manual gun must be equipped with an appropriate diffuser.

The diffuser is grounded through the powder transport hose with conductive strips!

Powder quantity control

The OptiSpray AP01 Application pump operates always with the same frequency. The powder quantity is controlled by the opening time of the pinch valves on the inlet of the Application pump. The longer the pinch valves on the inlet of the Application pump remain open during the suction procedure, the more powder will be aspirated into the powder chamber and then will be transported in conveying direction.

Main functions

- Conveying coating powder from or a fluidized container to the powder gun
- Processing signals from the superordinated OptiStar CG12-CP or CG11-P Control unit

Secondary functions

- Powder hose rinsing and cleaning of the filter elements

Technical data

OptiSpray AP01 Application pump

Powder output (guide values)

OptiSpray AP01	
Conveying hose till 20 m - internal Ø 7 mm Suction hose or tube till 30 cm - internal Ø 4,5 mm	80-300 g/min

Electrical data

OptiSpray AP01	
Nominal input voltage	24 VDC
Performance	10 VA
Protection type	IP54
Temperature range	15 °C – 40 °C (+59 °F - +104 °F)
Temperature class	T6
Approval	CE Ex II 3D

Pneumatic data

OptiSpray AP01	
Compressed air main connection	Quick release connection - 8 mm
Input pressure	6 bar
Max. compressed air consumption	approx. 2 Nm³/h
Max. water vapor content of the compressed air	1.3 g/m³
Max. oil vapor content of the compressed air	0.1 mg/m³

Dimensions

OptiSpray AP01	
Height (basic module, without connections)	264 mm
Width	40 mm
Depth	183 mm
Weight (basic module, without connections)	3.1 kg

Start-up and operation

Preparation for start-up

Basic conditions

By the start-up of the OptiSpray AP01 Application pump, the following basic conditions, which have an influence on the powder transport, must be considered:

- Characteristic of hose layout
- Length and height difference of the suction distance - max. 30 cm
- Length of the conveying distance - min. 10 m
- Powder preparation and powder quality
- Spatial arrangement of the OptiSpray AP01 Application pump (layout, length and internal diameter of the suction hose)

Basic information

The adherence of the following principles leads to a successful start-up of the OptiSpray AP01 Application pump:

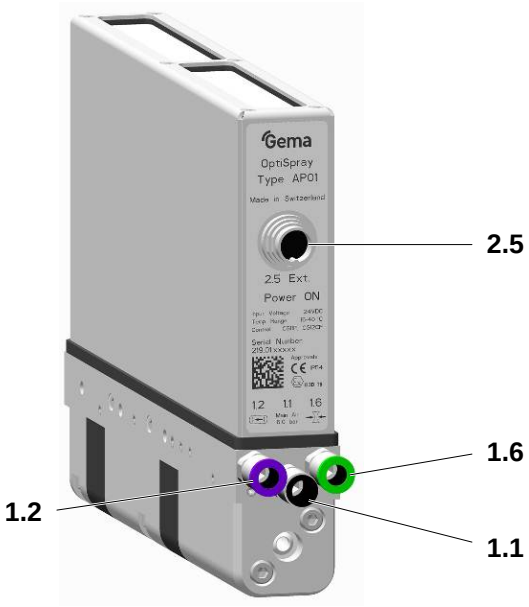
- The OptiSpray AP01 Application pump can be installed either vertically or horizontally
- The suction distance is to be kept as short as possible
- Basically, the powder transport with the OptiSpray AP01 Application pump works with every powder type, which can be fluidized. If the powder is for example humid or contaminated with other materials, then the conveying can be negatively influenced or does not work at all
- The OptiSpray AP01 Application pump is not intended for use with enamel powders
- At the suction area, a homogeneous fluidization must be ensured, so that no air ducts (craters) can be formed

OptiSpray AP01 - connections

The OptiSpray AP01 Application pump is supplied ready for use by the manufacturer. Just a few cables and hoses must be connected.

The connection of the OptiSpray AP01 Application pump takes place according to following instructions:

1. Connect the control signal cable to the connection **2.5**
2. Connect the compressed air supply to the connection **1.1**
3. Connect the transport air to the connection **1.2**
4. Connect the pinch valve air to the connection **1.6**
5. Connect the powder hoses to the Application pump input and output



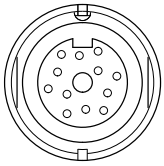
OptiSpray AP01 Application pump - connections

1.1	Compressed air (Air Supply IN)	**1.6**	Pinch valve air
1.2	Transport air (Conveying Air IN)	**2.5**	Ext. Signal

NOTE!
The further start-up procedure for the OptiSpray AP01 Application pump is explicitly described in the OptiStar CG12-CP/CG11-P Gun control unit operating instructions (chapter "Initial start-up" and "Daily start-up")!

OptiSpray AP01 - connections

Pin assignment



Control IN socket, 12 pins

A-J	Control signal
K	IDENT / Recognition
L	REQUEST / Request
M	GND
	Enclosure - shield

OptiSpray AP01 - Start-up

Configuration

The start-up of the OptiSpray AP01 Application pump takes place according to following instructions:

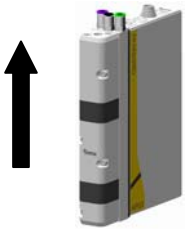
1. Connect the compressed air supply to the connection **1.1** (6 bar)
2. Connect the transport air hose to the connection **1.2**
3. Connect the pinch valve air hose to the connection **1.6**
4. Connect the external signals cable to the connection **2.5**
5. Adapt the adjusting parameters for total air and powder output (see also the OptiStar CG12-CP or CG11-P operating instructions)
6. Ensure the fluidization
7. Start the pumping procedure

Fluidized powder hopper

The powder is fluidized in the powder container by fluidizing air forced through a porous plastic plate from below. Thereby, the powder becomes loose and acquires fluid-like characteristics.

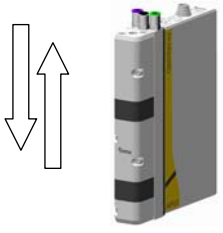
NOTE!
For a better understanding of the interrelationships in powder coating, it is recommended to read completely the operating instructions of the control unit and the powder gun, so as to be familiar with their functions too!

OptiSpray AP01 - characteristics



Conveying direction

The OptiSpray AP01 Application pump conveying direction is defined by the direction of arrow, that means, the suction side is on the bottom, the transport side on the top (see picture).



Powder hose rinsing

The powder hose rinsing enables the cleaning of the powder hoses and the filter elements in the Application pump. If color changes take place, rinsing must be done in conveying and in suction direction.

Cleaning programs

The OptiStar CG12-CP and CG11-P Gun control units feature three cleaning programs:

- Cleaning the hose to the gun only
- Cleaning the hose on the suction side only
- Cleaning the hose in both directions, combined

(For details, see the operating instructions of the corresponding gun control unit)

WARNING:

Large dust formation possible!

► The conveying hose and the powder gun must be kept in the booth during the rinsing procedure!

The Ultra sonic sieve can be damaged during cleaning when being used with an OptiCenter.

► Only the original lid (without any sieve insert) must be assembled and closed on the OptiSpeeder!

The pump is to be cleaned as a component of the entire system.

Maintenance interval monitoring

This function is provided by the OptiStar CG12-CP or the CG11-P Control unit.

OptiSpray AP01 - functional check and operation

NOTE!
By the assembly or the first start-up, it is recommended to carry out the functional check without powder!

Switching on and off the conveying procedure

The conveying procedure is switched on and off by the OptiStar CG12-CP or the CG11-P Control unit (see the corresponding operating manual).

Switching on and off the rinsing procedure

The rinsing procedure is switched on and off by the OptiStar CG12-CP or the CG11-P Control unit (see the corresponding operating manual).

OptiSpray AP01 - shutdown

The OptiSpray AP01 Application pump is switched off by the CG12-CP or the CG11-P control unit.

The compressed air supply to the Application pump must also be interrupted!

Cleaning and maintenance

NOTE!
Regular and conscientious maintenance increases the service life of the OptiSpray AP01 Application pump and ensures a longer, more constant coating quality!
The parts, which are to be replaced during maintenance work, are available as spare parts. These parts will be found in the corresponding spare parts list!

Cleaning the Application pump (color change)

For the preparation of a color change, the pump has to be rinsed.

NOTE!
The rinsing procedure can be started and stopped only externally via control unit or plant control.

Maintenance of the OptiSpray AP01 Application pump

The OptiSpray AP01 Application pump is designed in such a way, that only a minimum maintenance is required.

Daily maintenance

Clean the Application pump with a dry cloth and check the connection points of the powder hoses. Replace the powder hoses, if necessary.

Rinse the Application pump by using the rinsing program. Therewith, the filter elements are cleaned and possible, unintended powder deposits in the Application pump and in the powder hoses are avoided.

OptiSpray AP01 - maintenance plan

The following components or modules are subject to a maintenance plan:

- Pinch valves
- Filter elements

The service life of the filter elements and pinch valves depends on the service duration, the powder quality and the quality of the air supply.

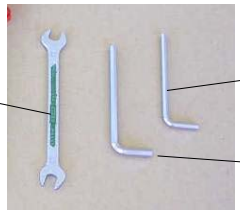
Wearing parts

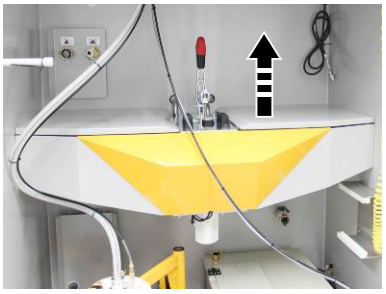
The wearing parts to be replaced during the OptiSpray AP01 Application pump maintenance are available separately (see the spare parts list).

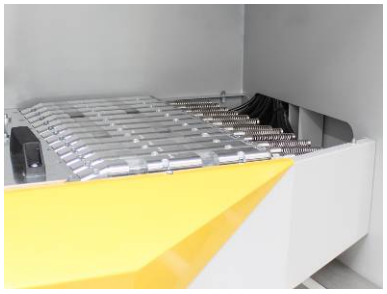
Replacing the filter elements

WARNING!
Before dismantling/changing the filter elements, it is necessary to clean the Application pump in both directions by using the rinsing program!

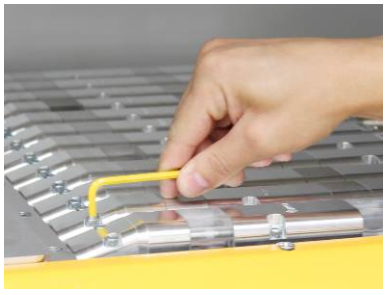
Required spare parts - 2 filter elements



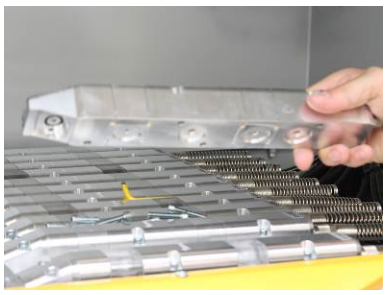
1. 

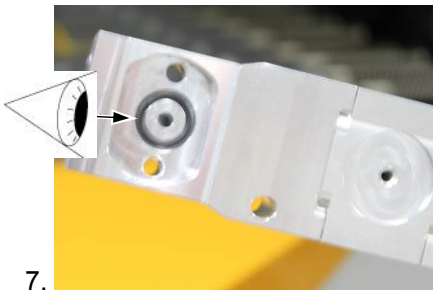
2. 

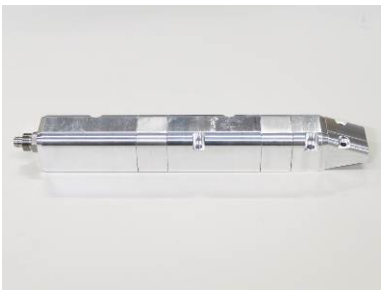
3. 

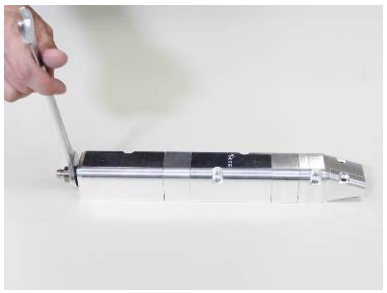
4. 

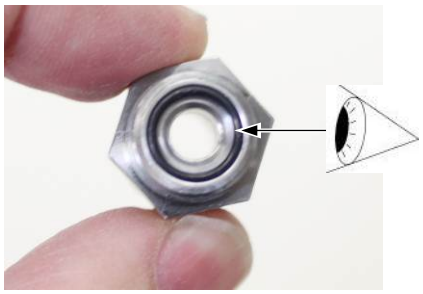
5. 

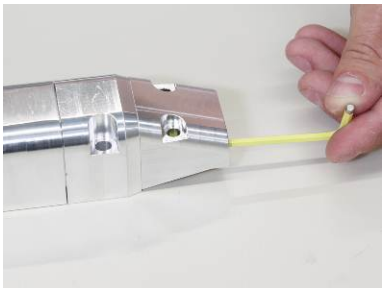
6. 

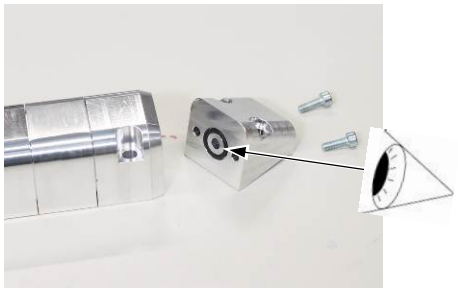
7. 

.8. 

9. 

10. 

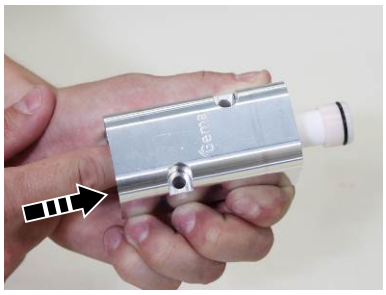
11. 

12. 

13. 

14. 

15. 

16. 

17. 

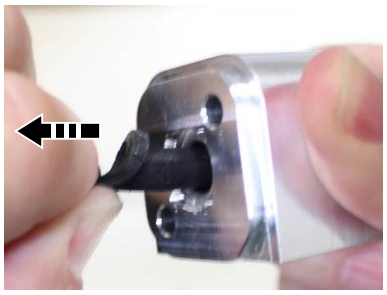
Replacing the pinch valves

Required spare parts - 2 pinch valve hoses NW5

WARNING!
When cleaning the plastic pinch valve bodies, do not use alcohol, acetone, benzol or other solvents!
For cleaning, use benzine, light lye or acid or a cleaning agent!

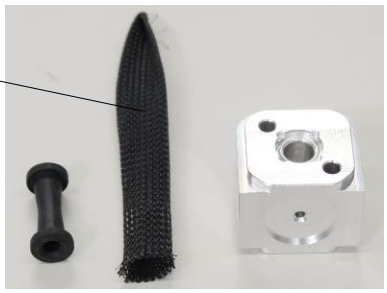
17.

18.



Braided sleeve

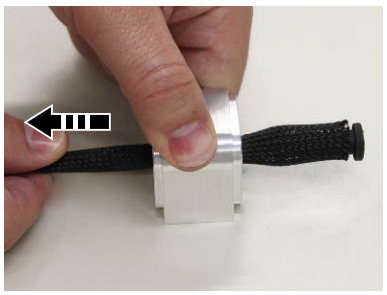
19.



20.

21.

22.

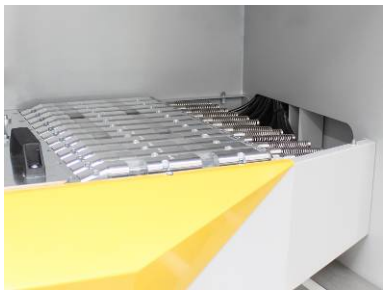


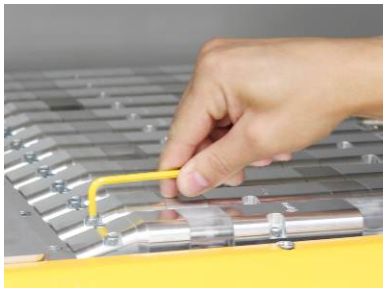
NOTE!
The assembly takes place in reverse order!
By assembling, do not tighten the screws too strong!

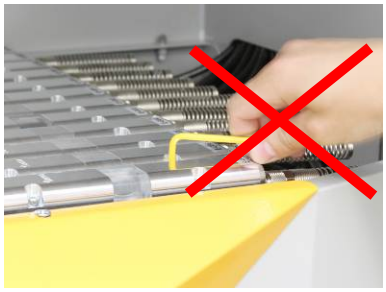
Replacing the Application pump

1. Remove the powder from the system
2. Start the cleaning program, rinse in both directions
3. Depressurize/vent OptiCenter

4. 

5. 

6. 

7. 

8. 

9. 

Fault remedying

General information

Fault	Causes	Fault remedying
Application pump does not convey	No control signal	Check the control cable
	Compressed air supply failed or pressure too low	Check the compressed air source (ensure an air pressure of 7-10 bar), check the pressure gauge of the local pressure regulator
	No transport air present	Check the hose connection of the control unit to the Application pump Check the compressed air supply
	No fluidization in the suction zone	Ensure the fluidization
	Service life of the pinch valve runs off (defective)	Change the pinch valve, check the pneumatic system for defects and replace, if necessary
	Service life of the filter element runs off (clogged)	Replace the filter element
Application pump conveys irregularly or too little powder	Scratch development in the powder container, powder will not be fluidized well	Adjust the fluidization correctly
	Backpressure is larger than 1.2 bar (Hot Coating: 1,8 bar)	Powder hose is too long Powder hose is clogged (clean or replace it) Filter elements are clogged (clean or replace them)
	Filter elements tend to clogging	Run the rinsing program, replace the filter elements
	Powder hoses tend to clogging due to sintering	Clean or replace the powder hoses
	Oil or water in the system	Ensure that oil or water will be separated before entering into the Application pump

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** OptiSpray AP01
  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)

WARNING:
Only original 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 Gema guarantee conditions!

OptiSpray AP01 – spare parts list

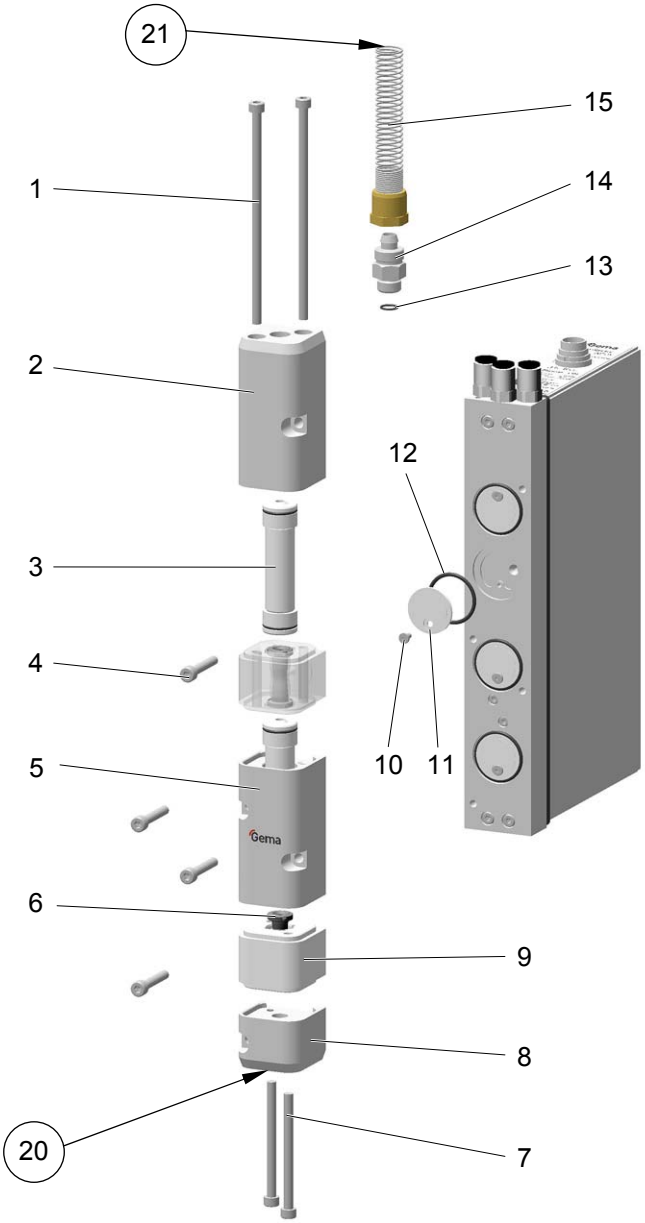
OptiSpray AP01 Application pump – complete, boxed

1	Allen cylinder screw - M5x120 mm	1010 369
2	Upper end piece	1010 049
3	Filter element – 3 µm, 10 mm, complete (incl. pos. 3.1)	1009 312#
3.1	O-ring - Ø 16x1.5 mm	205 141#
4	Allen cylinder screw - M5x30 mm	216 372
5	Filter element body	1010 046
6	Pinch valve hose – DN5	1009 311#
7	Allen cylinder screw – M5x65 mm	244 759
8	Lower end piece	1010 050
9	Pinch valve housing	1010 047
10	Allen cylinder screw – M3x6 mm	1010 359
11	Fluid blocking ring	1010 354#
12	O-ring - Ø 24x2 mm	230 480#
13	O-ring - Ø 8x1 mm	1007 793#
14	Hose connection – Ø 11,5/7 mm	1010 371
15	Nut with kink protection – M16x1-Ø 12 mm	1005 443
20	Powder hose suction side - Ø 4.5 mm (not shown)	1005 454*****
21	Powder hose transport side - Ø 11.5/7 mm (not shown)	1005 097*****

***** Please indicate length

Wearing part

OptiSpray AP01 – spare parts

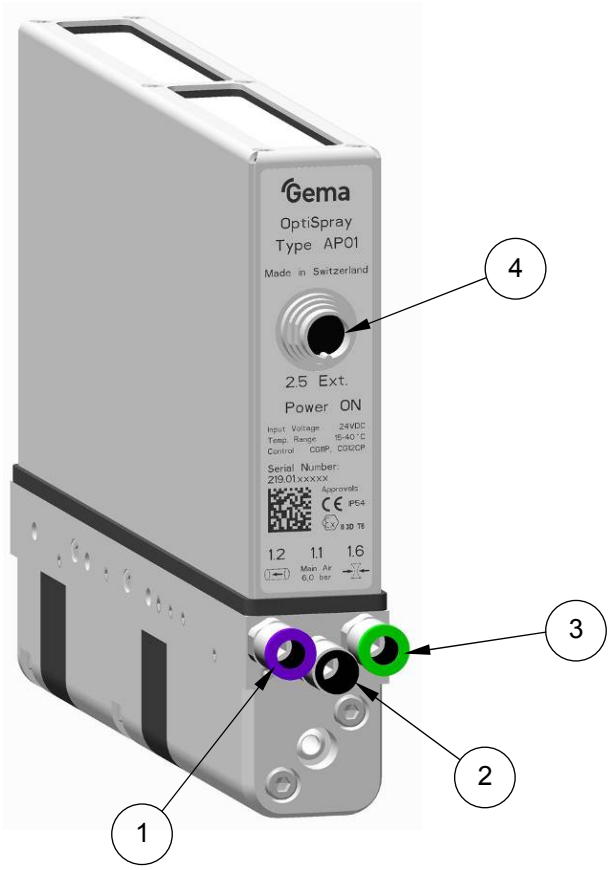


OptiSpray AP01 Application pump – spare parts

OptiSpray AP01 - connections

1	Plastic tube - Ø 8/6 mm, blue	103 497*
2	Plastic tube - Ø 8/6 mm, black	103 152*
3	Plastic tube - Ø 8/6 mm, green	103 519*
4	Connecting cable - 12 pins, 1.5 m	1000 991
	Connecting cable - 12 pins, 2.2 m	393 398
	Connecting cable - 12 pins, 5 m	1000 975
	Connecting cable - 12 pins, 10 m	1000 976
	Connecting cable - 12 pins, 15 m	1000 977
	Connecting cable - 12 pins, 20 m	1000 978

***** Please indicate length



OptiSpray AP01 - connections