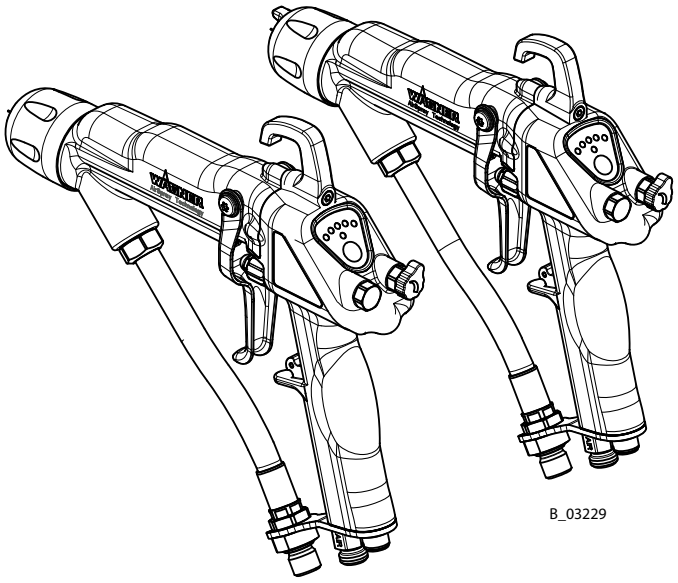
WAGNER

Translation of the Original Operating Manual

GM 5000EA

Version 07/2014

Electrostatic Airspray Gun for Manual Operation with Flat or Round Jet Nozzles



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Contents

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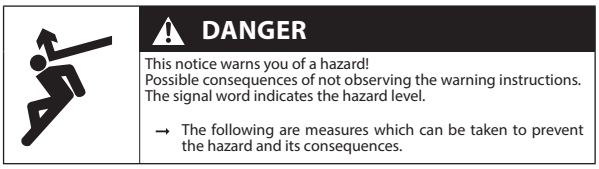
1 GENERAL

The operating manual contains information about safely operating, maintaining, cleaning and repairing the device.
The operating manual is part of the device and must be available to operating and service staff.
Operating and service staff should be instructed according to the safety instructions.
The device may only be operated in compliance with this operating manual.
This equipment can be dangerous if it is not operated according to the instructions in this operating manual.
Electrostatic spray guns may only be operated by trained personnel.

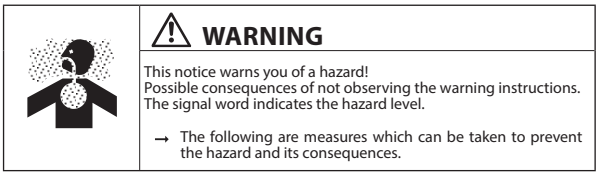
1.2 WARNINGS, NOTICES, AND SYMBOLS IN THIS OPERATING MANUAL

Warning instructions in this operating manual highlight particular dangers to users and to the device and state measures for avoiding the hazard. These warning instructions fall into the following categories:

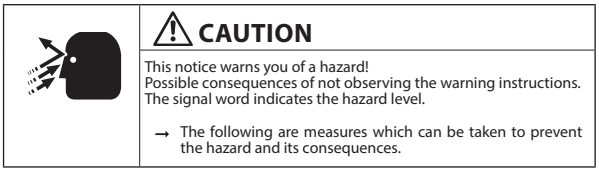
Danger - immediate risk of danger.
Non-observance will result in death or serious injury.



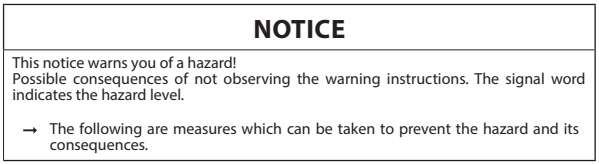
Warning - possible imminent danger.
Non-observance may result in death or serious injury.



Caution - a possibly hazardous situation.
Non-observance may result in minor injury.



Notice - a possibly hazardous situation.
Non-observance may result in material damage.



Note - provides information about particular characteristics and how to proceed.

1.3 LANGUAGES

The operating manual is available in the following languages:

German	English	2344499

1.4 ABBREVIATIONS

Order No.	Order number
ET	Spare part
K	Marking in the spare parts lists
Low R	Low-resistance
Pos	Position
Stk	Number of pieces
SW	Width across flats

2 CORRECT USE

2.1 DEVICE TYPE

Electrostatic manual spray gun for manual coating of grounded work pieces

2.2 CORRECT USE

The GM 5000EA electrostatic manual spray gun is suitable for spraying liquid products, particularly coating products, using the air atomizing method. Coating products containing solvents of explosion class II A may be used.

2.3 USE IN AN EXPLOSION HAZARD AREA

The GM 5000EA electrostatic manual spray gun is suitable for coating electrically conductive objects with liquid coating products and can be used in potentially explosive areas. (See Chapter 3 "Identification")

2.4 SAFETY PARAMETERS

The GM 5000EA electrostatic manual spray gun is only suitable for spraying liquid products, particularly coating products.
J. Wagner AG forbids any other use!
The electrostatic manual spray gun may only be operated under the following conditions:

- the operating staff have previously been trained on the basis of this operating manual,
- the safety regulations listed in this operating manual are observed,
- the operating, maintenance and repair information in this operating manual is observed,
- and the statutory requirements and accident prevention regulations standards in the country of use are observed.

The electrostatic manual spray gun may only be operated if all parameters are set and all measurements/safety checks are carried out correctly.

2.5 PROCESSIBLE PRODUCTS

- → With the GM 5000EA spray gun, lacquers can be processed which contain solvents of explosion class II A.
- → The spray gun basic version is suitable for processing of sprayed substances with an electrical resistance of > 150 kΩ (according to the WAGNER scale).
  Equipped with a special product hose for low-resistance sprayed substances (available as accessory) you can also process sprayed substances with an electrical resistance > 50 kΩ (according to the WAGNER scale) successfully.
- → The transfer efficiency is always dependant on the composition of the product being used, e.g. pigmentation or resin.

Conversion of Lacquer Resistance

There are lacquer resistance measuring devices available on the market that do not directly measure the specific lacquer resistance.

Multiplying the result of measurement with the device-specific cell constant (K), we obtain the specific resistance value of the product.

Example:

With Wagner lacquer resistance measuring device the cell constant is K =123.

Measured value according to the WAGNER scale R = 500 kΩ

Specific resistance (RS) RS = R x K = 500 kΩ x 123 = 61.5 MΩ.cm

Notice

Using sprayed substances with too low an electrical resistance the application of electrostatics does not show any effect, i.e. there is no "paint wrap around" on the object to be sprayed.

The suitability of the sprayed product with regard to the charging ability can be read from the indicators showing the actual values for the high-voltage (kV) and for the spray current (µA) the actual values are shown either on the VM 5000 control unit or on the spray gun.

high kV value, low µA value	= ok.
low kV value, high µA value	= excessive conductivity of the paint -> no wrap-around

In the event of application problems, please contact your local WAGNER office and the lacquer manufacturer.

2.6 REASONABLY FORESEEABLE MISUSE

- Processing inadmissible coating products
- Use of defective spare parts
- Use for foodstuffs
- Use in the pharmaceutical sector

2.7 RESIDUAL RISKS

Residual risks are risks which cannot be excluded even in the event of correct use.
If necessary, warning and prohibition signs at the relevant points of risk indicate residual risks.

Residual risk	Source	Consequences	Specific measures	Lifecycle phase
Skin contact with solvent-based paints and cleaning agents	Handling of solvent-based paints and cleaning agents	Skin irritations, allergies	Wear protective clothing, observe safety data sheets	Operation, maintenance, disassembly
Solvent-based lacquer in air outside the defined working area	Lacquering outside the defined working area	Inhalation of substances hazardous to health	Observe work and operation instructions	Operation, maintenance

3 IDENTIFICATION

3.1 EXPLOSION PROTECTION IDENTIFICATION FM

For Electrostatic Finishing Applications
using Class I, Group D, Spray Material

In accordance with 2316160

This device has been manufactured according to the FM (Factory Mutual) standard "Class number 7260" (Approval Standard for Electrostatic Finishing Equipment) and tested by FM. All tested combinations of devices including accessories are given in the FM Control Document with part number 2316160.

3.2 INFORMATION FOR SAFE AND CORRECT OPERATION

Maximum surface temperature

- Maximum surface temperature: 85 °C; 185 °F
- Maximum permissible product temperature: 50 °C; 122 °F
- Permissible ambient temperature: 0 to +40 °C; +32 to +104 °F

Safety instructions

Safe handling of WAGNER spray devices
Mechanical sparks can form if the device comes into contact with metal.
In an explosive atmosphere:
→ Do not knock or push the unit against steel or rusty iron.
→ Do not drop the spray gun.
→ Only use tools that are made of a permitted material.

Ignition temperature of the coating product
→ Ensure that the ignition temperature of the coating product is above the maximum surface temperature.

Surface spraying, electrostatics

→ Never spray device parts using electrostatic equipment (electrostatic spray gun!).

Medium supporting atomizing

→ To atomize the product, use only weakly oxidizing gases, e.g. air.

Cleaning

If there are deposits on the surfaces, the device may form electrostatic charges. Flames or sparks can form during discharge.

→ Remove deposits from the surfaces to maintain conductivity.

→ Only use a damp cloth to clean the device.

3.3 PERMISSIBLE DEVICE COMBINATIONS

⚠ WARNING

Incorrect use!

Risk of injury and equipment damage.

→ Connect the GM 5000EA manual spray gun only to original Wagner control units.

The GM 5000EA manual spray gun may only be connected to the control units listed below:

- VM 500 controller
- VM 5000 controller

4 GENERAL SAFETY INSTRUCTIONS

4.1 SAFETY INSTRUCTIONS FOR THE OPERATOR

→ Keep this operating manual at hand near the unit at all times.
→ Always follow local regulations concerning occupational safety and accident prevention.

4.1.1 ELECTRICAL EQUIPMENT

Electrical devices and equipment
→ To be provided in accordance with the local safety requirements with regard to the operating mode and ambient influences.
→ May only be maintained by skilled electricians or under their supervision.
→ Must be operated in accordance with the safety regulations and electrotechnical regulations.
→ Must be repaired immediately in the event of problems.
→ Must be decommissioned if they pose a hazard.
→ Must be de-energized before work is commenced on active parts. Inform staff about planned work. Observe electrical safety regulations.

4.1.2 STAFF QUALIFICATIONS

→ Ensure that the device is operated and repaired only by trained persons.

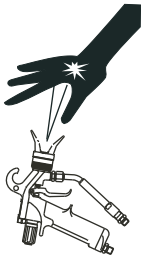
4.1.3 SAFE WORK ENVIRONMENT

→ Ensure that the floor in the working area is static dissipative in accordance with EN 61340-4-1 (resistance must not exceed 100 Mohm).
→ Ensure that all persons within the working area wear static dissipative shoes. Footwear must comply with EN 20344. The measured insulation resistance must not exceed 100 Mohm.
→ Ensure that during spraying, persons wear static dissipative gloves. The grounding takes place via the spray gun handle.
→ If protective clothing is worn, including gloves, it has to comply with EN 1149-5. The measured insulation resistance may not exceed 100 Mohm.
→ Paint mist extraction systems must be fitted on site according to local regulations.
→ Ensure that the following components of a safe working environment are available:
– Product/air hoses adapted to the working pressure.
– Personal safety equipment (breathing and skin protection).
→ Ensure that there are no ignition sources such as naked flames, sparks, glowing wires, or hot surfaces in the vicinity. Do not smoke.

4.2 SAFETY INSTRUCTIONS FOR STAFF

→ Always follow the information in this manual, particularly the general safety instructions and the warning instructions.
→ Always follow local regulations concerning occupational safety and accident prevention.

4.2.1 SAFE HANDLING OF WAGNER SPRAY DEVICES



The spray jet is under pressure and can cause dangerous injuries.
Avoid injection of paint or cleaning agents:
- → Never point the spray gun at people.
- → Never reach into the spray jet.
- → Before all work on the device, in the event of work interruptions and functional faults:
  - – Switch off the energy/compressed air supply.
  - – Relieve the pressure from the spray gun and device.
  - – Secure the spray gun against actuation.
  - – In the event of functional faults: remedy the fault as described in the "Troubleshooting" chapter.
- → The liquid ejection devices are to be checked for safe working conditions by an expert (e.g. Wagner Service Technician) as often as necessary or at least every 12 months, in accordance with the guidelines for liquid ejection devices (ZH 1/406 and BGR 500 Part 2 Chapter 2.36).
  - – For shut down devices, the examination can be suspended until the next commissioning.
- → Carry out the work steps as described in the "Pressure Relief/Work Interruptions" chapter:
  - – if pressure relief is required.
  - – if the spraying work is interrupted or stopped.
  - – before the device is cleaned on the outside, checked, or serviced.
  - – before the spray nozzle is installed or cleaned.

In the event of skin injuries caused by paint or cleaning agents:
- → Note down the paint or cleaning agent that you have been using.
- → Consult a doctor immediately.

Avoid danger of injury through recoil forces:
- → Ensure that you have firm footing when operating the spray gun.
- → Only hold the spray gun briefly in a position.

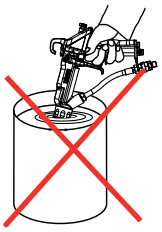
4.2.2 GROUNDING THE DEVICE

In order to avoid electrostatic charging of the device, the device must be grounded.
Friction, flowing liquids, and air or electrostatic coating processes create charges. Flames or sparks can form during discharge.
- → Ensure that the device is grounded at all times.
- → Ground the work pieces to be coated.
- → Ensure that all persons inside the working area are grounded, e.g. that they are wearing static dissipative shoes.
- → Wear dissipative gloves when spraying. The grounding takes place via the spray gun handle.
- → Grounding of the coating product supply (coating product tank, pump, etc.) is mandatory.

4.2.3 MATERIAL HOSES

- → Ensure that the hose material is chemically resistant to the sprayed products.
- → Ensure that the product hose is suitable for the pressure generated in the device.
- → Ensure that the following information can be seen on the high-pressure hose:
  - Manufacturer
  - Permissible operating overpressure
  - Date of manufacture.
- → Make sure that the hoses are laid only in suitable places. In no case, should hoses be laid in the following places:
  – in high-traffic areas,
  – on sharp edges,
  – on moving parts, or
  – on hot surfaces
- → Make sure that the hoses are never used to pull or move the equipment.
- → The electrical resistance of the complete high-pressure hose must be less than 1 Mohm.

4.2.4 CLEANING



- → De-energize the device electrically.
- → Disconnect the pneumatic supply line.
- → Relieve the pressure from the device.
- → Ensure that the flash point of the cleaning agent is at least 15 K above the ambient temperature or that cleaning is undertaken at a cleaning station with technical ventilation.
- → To clean, use cloths and brushes moistened with solvent. Abrasive agents or objects must not be used. Ensure that the spray gun is not damaged in any way while cleaning.
- → Parts of the spray gun must not be sprayed with or immersed into cleaning agent.
- → Preferably, non-combustible cleaning agents should be used.
- → The choice of the appropriate cleaning agent for cleaning purposes of the spray gun depends on which parts of the spray gun have to be cleaned and which product has to be detached. When cleaning the spray gun only use non-polar cleaning agents to prevent conductive residues on the surface of the spray gun. Should it, however, be necessary to use a polar cleaning agent, all residues of this cleaning agent have to be removed by using a non-conductive and non-polar cleaning agent, once the cleaning is finished.
- → Ensure that no electrical component is cleaned with nor even immersed into solvent.

An explosive gas/air mixture forms in closed tanks.
→ When cleaning devices with solvents, never spray into a closed tank.
→ Only use electrically conductive tanks for cleaning liquids.
→ The tanks must be grounded.

4.2.5 HANDLING HAZARDOUS LIQUIDS, LACQUERS AND PAINTS

→ When preparing or working with lacque and when cleaning the unit, follow the working instructions of the manufacturer of the lacquers, solvents and cleaning agents being used.
→ Take the specified protective measures. In particular wear safety goggles, protective clothing and gloves, as well as hand protection cream if necessary.
→ Use a mask or breathing apparatus if necessary.
→ For sufficient health and environmental safety: operate the device in a spray booth or on a spraying wall with the ventilation (extraction) switched on.
→ Wear suitable protective clothing when working with hot products.

4.2.6 TOUCHING HOT SURFACES

→ Only touch hot surfaces if you are wearing protective gloves.
→ When operating the device with a coating product with a temperature of > 43 °C; 109 °F:
- Identify the device with a warning label "Warning - hot surface".

Order No.	
9998910	Instruction label
9998911	Protection sticker

Note: Order the two stickers together.

4.3 CORRECT USE

WAGNER accepts no liability for any damage arising from incorrect use.
→ Use the device only to work with the products recommended by WAGNER.
→ Only operate the device as a whole.
→ Do not deactivate safety fixtures.
→ Use only WAGNER original spare parts and accessories.

4.4 SAFETY INFORMATION ON DISCHARGES

The plastic parts of the spray gun are charged electrostatically by the high-voltage field of the spray gun. In case of contact with plastic parts harmless discharges (brush discharges) may occur. They are completely non-hazardous for human health.
When keeping a distance of 4 to 10 mm; 0.15 to 0.4 inch between spray gun and object to be sprayed, the corona discharge at the end of the electrode is visible during darkness.

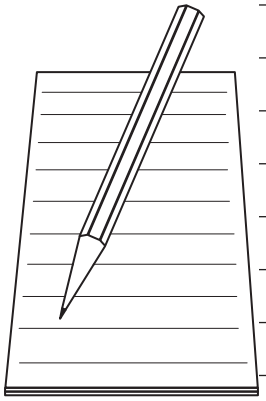
4.5 USE IN AN EXPLOSION HAZARD AREA

In explosion hazard areas only use approved explosion-proof electrical devices.

4.6 NOTES TO GERMAN REGULATIONS AND GUIDELINES

a)	BGV A3	Electrical devices and equipment
b)	BGR 500	Part 2, Chapter 2.36 Working with Liquid Ejection Devices
c)	BGR 500	Part 2, Chapter 2.29 Working with Coating Products
d)	BGR 104	Explosion protection rules
e)	TRBS 2153	Avoiding ignition risks
f)	BGR 180	Equipment for cleaning work pieces with solvents
g)	ZH 1/406	Guidelines for liquid ejection devices
h)	BGI 740	Painting rooms and equipment
i)	BGI 764	Electrostatic coating
j)	Betr.Sich.V.	Plant Safety Ordinance

Note: All titles can be ordered from Heymanns Publishing House in Cologne, or they can be found on the Internet.

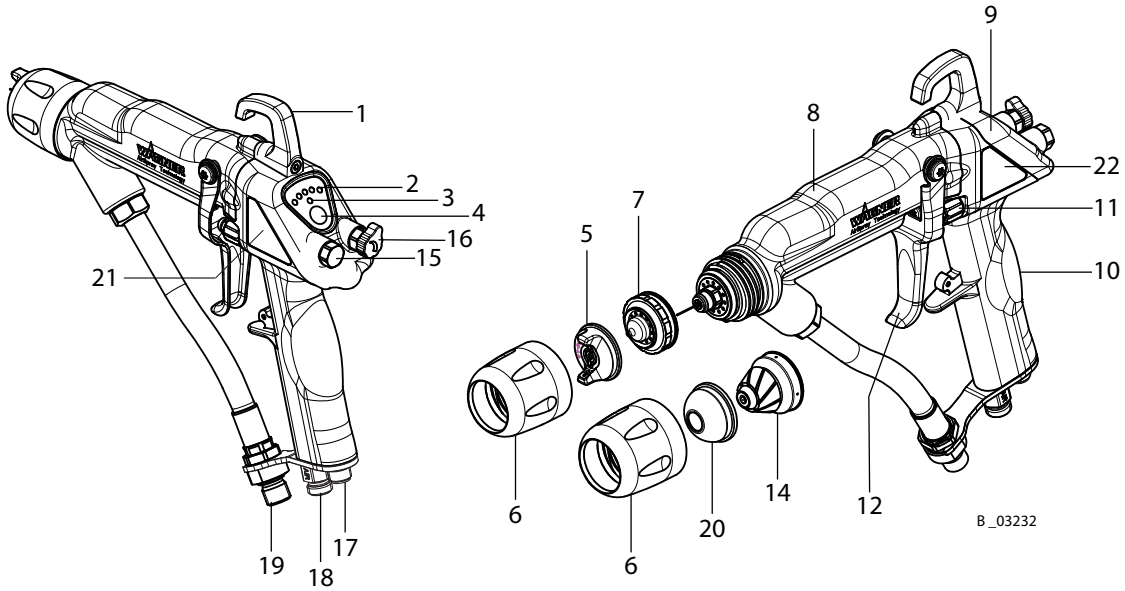


5 DESCRIPTION

5.1 FUNCTIONAL DESCRIPTION

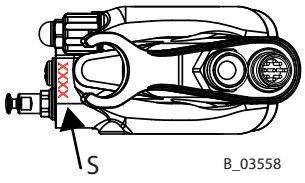
5.1.1 DESIGN OF THE SPRAY GUN (BASIC VERSION)

Note:
The nozzle parts (pos 5; 7; 14 and 20) do not belong to the basic equipment of the spray gun. The different versions can be found in Chapter 12 "Accessories".



Pos	Designation
1	Suspension hook
2	Display (spray current and recipe)
3	Display standby and fault
4	Operating button (standby and recipe change)
5	Air cap (Accessories: see Chapter 12)
6	Union nut
7	AF 5000 x.x flat spray nozzle (Accessories: see Chapter 12)
8	Adapter
9	Cover
10	Handle

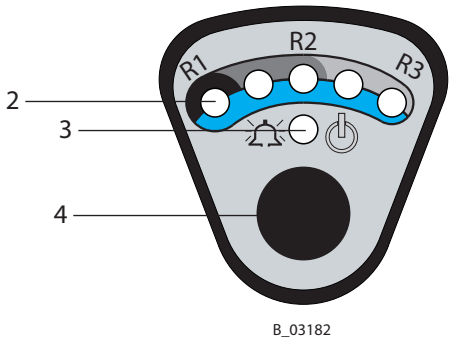
Pos	Designation
11	Adjusting screw (stop)
12	Trigger lever
14	AR 5000 nozzle (Accessories: see Chapter 12)
15	Sealing plug
16	Air adjustment
17	Electric cable connection
18	Atomizing air connection
19	Product connection
20	AR 5000 air cap (Accessories Chapter 12)
21	Type plate left
22	Type plate right



Note:
The gun type (T) can be found on the type plate (21) and the serial number (S) on the underside of the handle.

5.1.2 FUNCTIONING OF THE SPRAY GUN

When the spray gun is connected to the control unit and the control unit is switched on, the pre-defined recipe (R1, R2 or R3) is shown on the gun display (2) as follows.
Recipe 1 -> ●❍❍❍❍ R1
Recipe 2 -> ●●●❍❍ R2
Recipe 3 -> ●●●●● R3



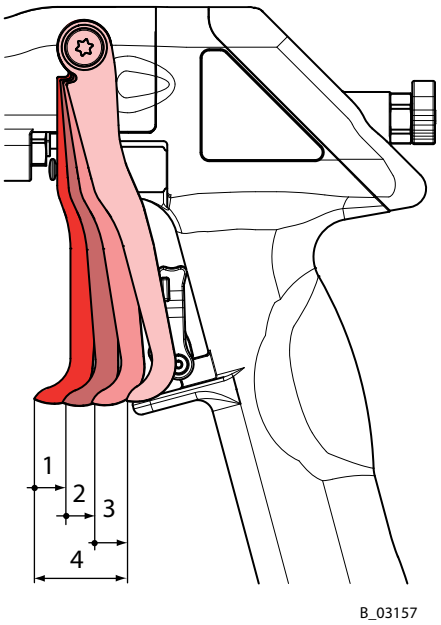
Recipe change R1 -> R2 -> R3 -> R1.
Press the operating button (4) and hold the button pressed of at least 2 seconds, then it is advanced by 1 recipe.

Display (2) -> ●●❍❍❍ = recipe values changed temporarily:
The stored recipe values of the previously selected recipe number are re-loaded from memory by pressing the operating button (4) for 2 seconds.

During spraying (trigger lever pressed), the status is shown in the display (2) by LEDs.

LED display	**Description**
LEDs 1 - 3 light up green	The spray gun is working in an optimal high-voltage spray current range
one or both right-hand LEDs light up orange (Warning display: You can continue working without any limitations.)	spray current too high Possible causes: ● Spray gun too close to the work piece ● Contamination of the spray gun ● Lacquer conductivity too high

The trigger can be used to activate, one after the other, the various functions of the spray gun.



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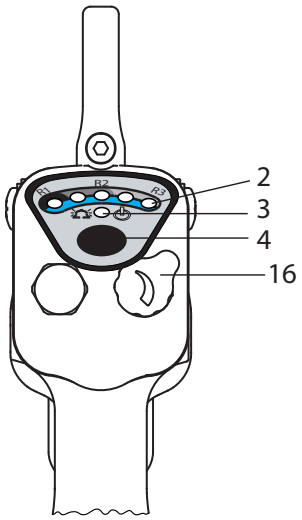
Distance	Description
1	Atomizing air open
2	Atomizing air open and electrostatically (high-voltage) activated.
	Display (2) for "spray current" on the spray gun ●○○○○○ to ●●●●● activated
3	Atomizing air open, electrostatically (high-voltage) activated and product valve open.
4	Overall way of trigger

- An increase in the force needed to pull the trigger back will be perceived at the position where the product valve opens.
- For spraying without high-voltage, the high-voltage can be switched off using the operating button (4). Press the operating button (4) briefly: High-voltage is switched off. The standby display (3) illuminates.
- In the event of a malfunction the spray gun switches to "standby" operating mode and the display (3) illuminates.
- The width of the spray jet can be adjusted using the air adjustment (16) (only for flat-jet method).



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5.2 SCOPE OF DELIVERY

Stk	Order No.	Designation
1	2344471	GM 5000EA spray gun Without control unit, product and air hose, electric cable, air cap and nozzle.

Each gun includes as standard equipment:

	Order No.	Designation
1	2309368	Assembly tool valve needle
1	2325263	Assembly tool clamping screw
1	2319653	Protection gloves against spray mist
1	2316160	FM Control Document GM 5000E
1	see Chapter 1.3	Operating manual in local language

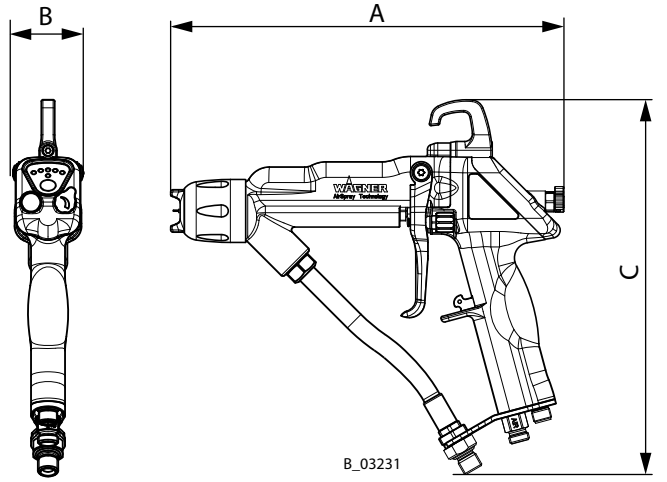
The spray gun basic version can be set according to requirement and the desired accessories by means of the spray gun configuration.

The delivery note shows the exact scope of delivery.

5.3 TECHNICAL DATA

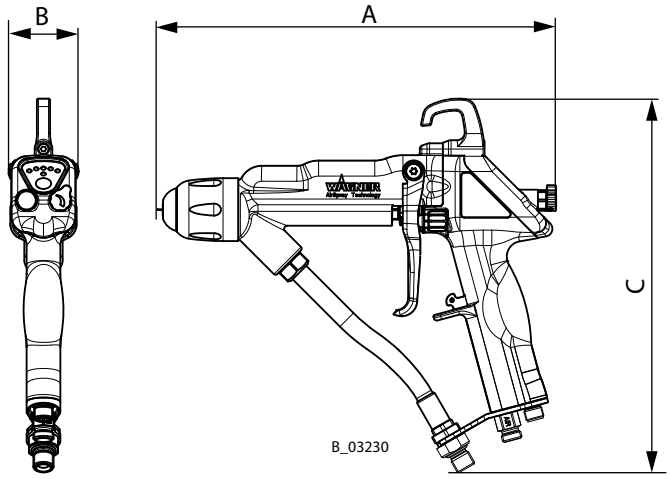
Maximum air pressure	0.8 MPa; 8 bar; 116 psi
Maximum product pressure	0.8 MPa; 8 bar; 116 psi
Fluid inlet	G 1/4" A
Air connection	G 1/4" A
Input voltage	maximum 20 Vpp
Input current	maximum 1.0 A AC
Output voltage	maximum 70 kV DC
Output current	maximum 100 µA DC
Polarity	negative
Weight (without hose set)	630g incl. union nut, nozzle and air cap
Operating temperature range	0 °C to 40 °C 32 °F to 104 °F
Maximum product temperature	50°C 122 °F
Sound level at 0.3 MPa; 3 bar; 43.5 psi air pressure and 0.3 MPa; 3 bar; 43.5 psi product pressure	73 dB(A) *

* A-rated sound pressure level measured at 1 m distance, LpA1m, in accordance with DIN EN 14462: 2005.



Dimensions

GM 5000EA F with flat jet nozzle		
	mm	inch
A	261	10.28
B	46	1.81
C	245	9.65

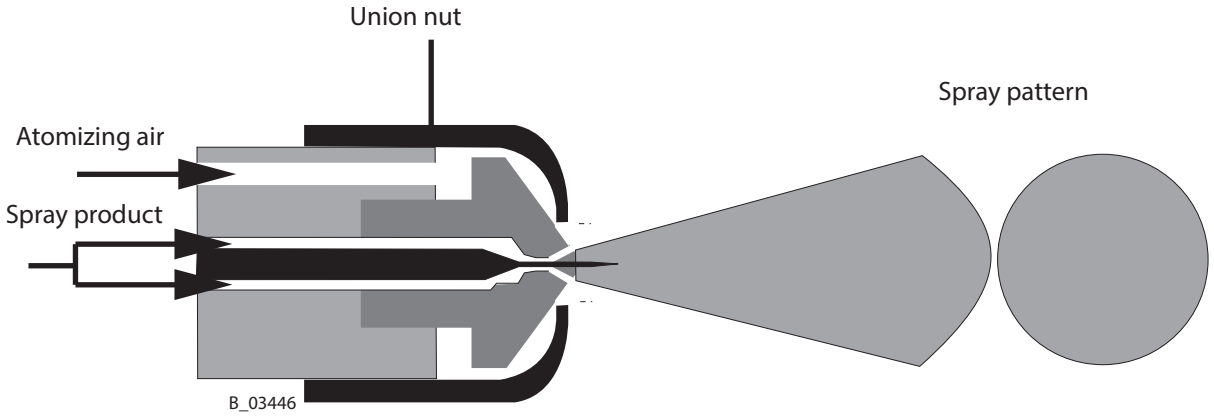


GM 5000EA R with round jet nozzle		
	mm	inch
A	261	10.28
B	46	1.81
C	245	9.65

5.4 SPRAY PROCESS

5.4.1 AIR ATOMIZING SPRAY PROCESS - ROUND JET

In this process, the paint is fed to the nozzle with a pressure of appprox. 0.05-0.2 MPa; 0.5-2 bar; 7-29 psi.The atomizing air at approx. 0.25-0.4 MPa; 2.5-4 bar; 36-58 psi produces a soft jet, which largely eliminates the problem of overlapping boundaries. There are various nozzles and air caps available as accessories for the respective spray product and the output amounts.

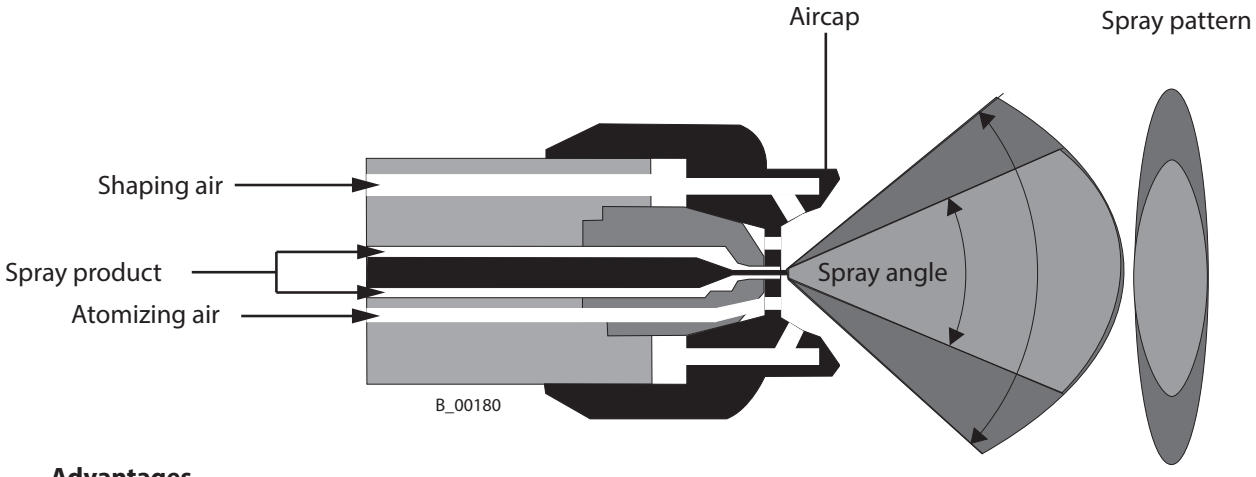


Advantages

- Thin layers
- Uniform coating thickness
- Perfect finish

5.4.2 AIR ATOMIZING SPRAY PROCESS - FLAT JET

In this process, the paint is fed to the nozzle with a pressure of 0.05 to 0.2 MPa; 0.5 to 2 bar; 7 to 29 psi). The atomizing air at approx. 0.25-0.4 MPa; 2.5-4 bar; 36-58 psi produces a soft jet, which largely eliminates the problem of overlapping boundaries. The shaping air allows to modify the spray jet. There are various nozzles and air caps available as accessories for the respective spray product and the output amounts.

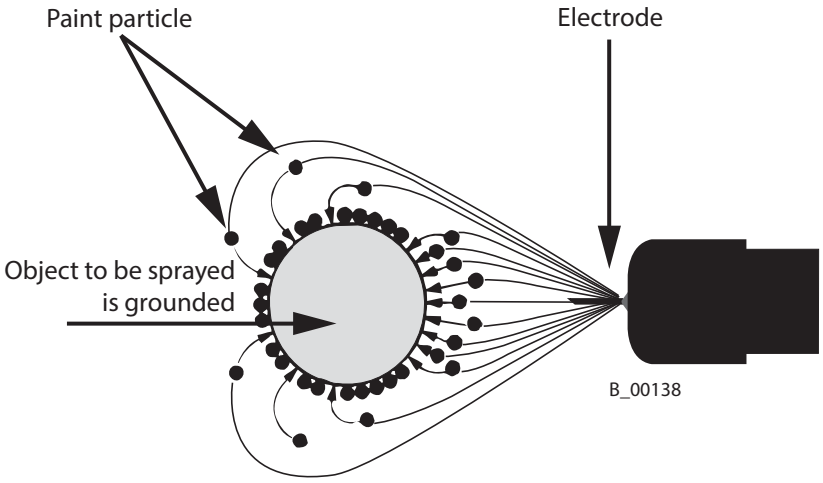


Advantages

- Large range of adjustment of the spray jet
- Thin layers
- Uniform coating thickness
- Perfect finish

5.4.3 ELECTROSTATIC EFFECT

The spray gun produces an electrostatic field by means of the high-voltage electrode. As a result, the paint particles atomized by the spray gun are carried to the grounded work piece by kinetic and electrostatic energy where they adhere finely dispersed to the object to be sprayed.



Advantages

- Very high application effectiveness
- Low over spray
- Coating of entire circumferences due to the electrostatic effect
- Saving in working time

6 COMMISSIONING AND OPERATION

6.1 TRAINING ASSEMBLY/COMMISSIONING STAFF

⚠ WARNING

Incorrect installation/operation!
Risk of injury and equipment damage.

→ The commissioning staff must have the technical skills to safely undertake commissioning.
→ When putting into commissioning and for all work, read and follow the operating manual and safety regulations for the additionally required system components.

6.2 STORAGE CONDITIONS

Until the point of assembly, the manual spray gun must be stored in a dry location, free from vibrations and with a minimum of dust. The manual spray gun must be stored in closed rooms.
The air temperature at the storage location must be between -20 - +60 °C; -4 - +140 °F.
The relative air humidity at the storage location must be between 10 and 95 % (without condensation).

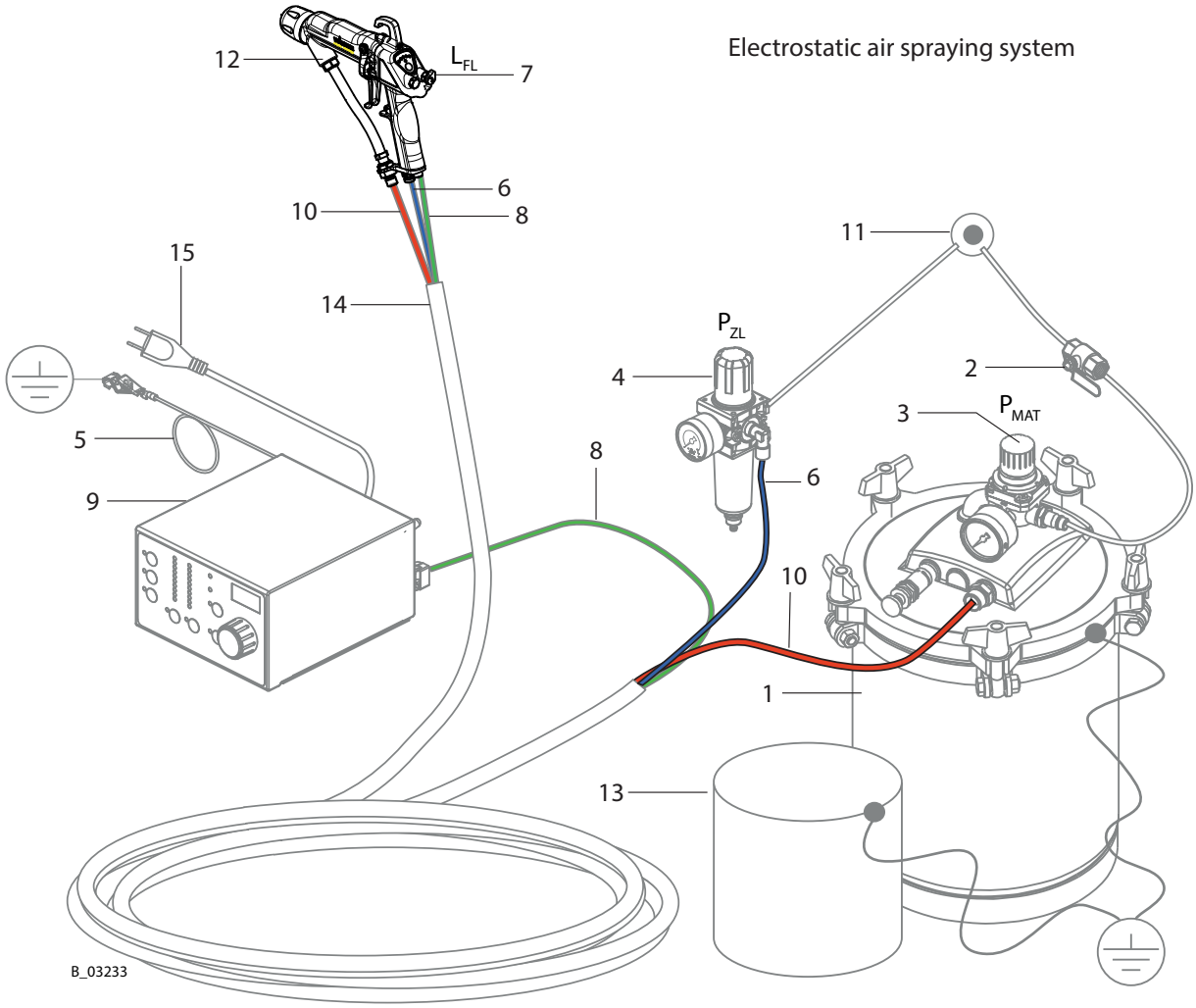
6.3 INSTALLATION CONDITIONS

The air temperature at the installation site must be between 0 - 40 °C; 32 - 132 °F.
The relative air humidity at the installation site must be between 10 and 95 % (without condensation).

6.4 INSTALLATION AND CONNECTION

6.4.1 TYPICAL ELECTROSTATIC AIR SPRAYING SYSTEM

Electrostatic air spraying system



Pos	Designation
1	Pressure tank
2	Stop valve
3	Air pressure regulator tank
4	Air pressure regulator with air filter
5	Grounding cable
6	Air hose
7	Air adjustment
8	Gun cable

Pos	Designation
9	VM 5000 controller
10	Product hose
11	Compressed air main
12	GM 5000EAR spray gun
13	Tank for return flow
14	Protective hose
15	Power cable

The GM 5000 EA spray gun must be combined with various components to make up a spraying system (spray pack). The system shown in figure B_03233 is only one example of an electrostatic air spraying system. Your Wagner distributor would be happy to assist you in creating a spraying system solution that meets your individual needs. You must familiarize yourself with the operating instructions and the safety regulations of all additional system components before starting commissioning.

⚠ WARNING

Incorrect installation/operation!
Risk of injury and equipment damage.

→ When putting into commissioning and for all work, read and follow the operating manual and safety regulations for the additionally required system components.

6.4.2 VENTILATION OF THE SPRAY BOOTH

The electrostatic hand spraying equipment is for use only in spray areas which correspond with standard EN 12215.
The electrostatic hand spraying equipment has to be locked to the technical ventilation so that the coating product supply and the high-voltage are not effective as long as the technical ventilation is not operated with the minimum exhaust air volume flow or a larger exhaust air volume flow.
Ensure that the excess coating product (overspray) will be collected up safely.

⚠ WARNING

Toxic and/or flammable vapor mixtures!
Risk of poisoning and burns.

→ Operate the device in a spray booth approved for the working products.
-or-
→ Operate the device on an appropriate spraying wall with the ventilation (extraction) switched on.
→ Observe national and local regulations for the outgoing air speed.

6.4.3 AIR SUPPLY

The use of an air filter with the air regulator (4) ensures that only dry, clean atomizing air gets into the spray gun. Dirt and moisture in the atomizing air worsens the spraying quality and spraying pattern.

6.4.4 PRODUCT SUPPLY

NOTICE

Impurities in the spraying system!
Spray gun blockage, products harden in the spraying system.

→ Flush the spray gun and paint supply with a suitable cleaning agent.

DANGER

Bursting hose, bursting threaded joints!
Danger to life from injection of product.

→ Ensure that the hose product is chemically resistant to the sprayed products.
→ Ensure that the spray gun, threaded joints, and product hose between the device and the spray gun are suitable for the pressure generated in the device.
→ Ensure that the following information can be seen on the high-pressure hose:
- Manufacturer
- Permissible operating pressure
- Date of manufacture

WARNING

Hose connections
Risk of injury and equipment damage.

→ Do not exchange hose connections of product hose and air hose.

6.4.5 GROUNDING

Perfect grounding of all conductive parts such as floors, walls, roofs is important for optimum coating and safety. Barriers, work pieces, transport devices, coating product tank, coating product supply or construction parts in the spray area with exception of the high-voltage parts during normal operation.
Parts of the booth must be grounded in accordance with EN 12215.

⚠ WARNING

Discharge of electrostatically charged components in atmospheres containing solvents!
Explosion hazard from electrostatic sparks or flames.

→ Ground all device components.
→ Ground the work pieces to be coated.

⚠ WARNING

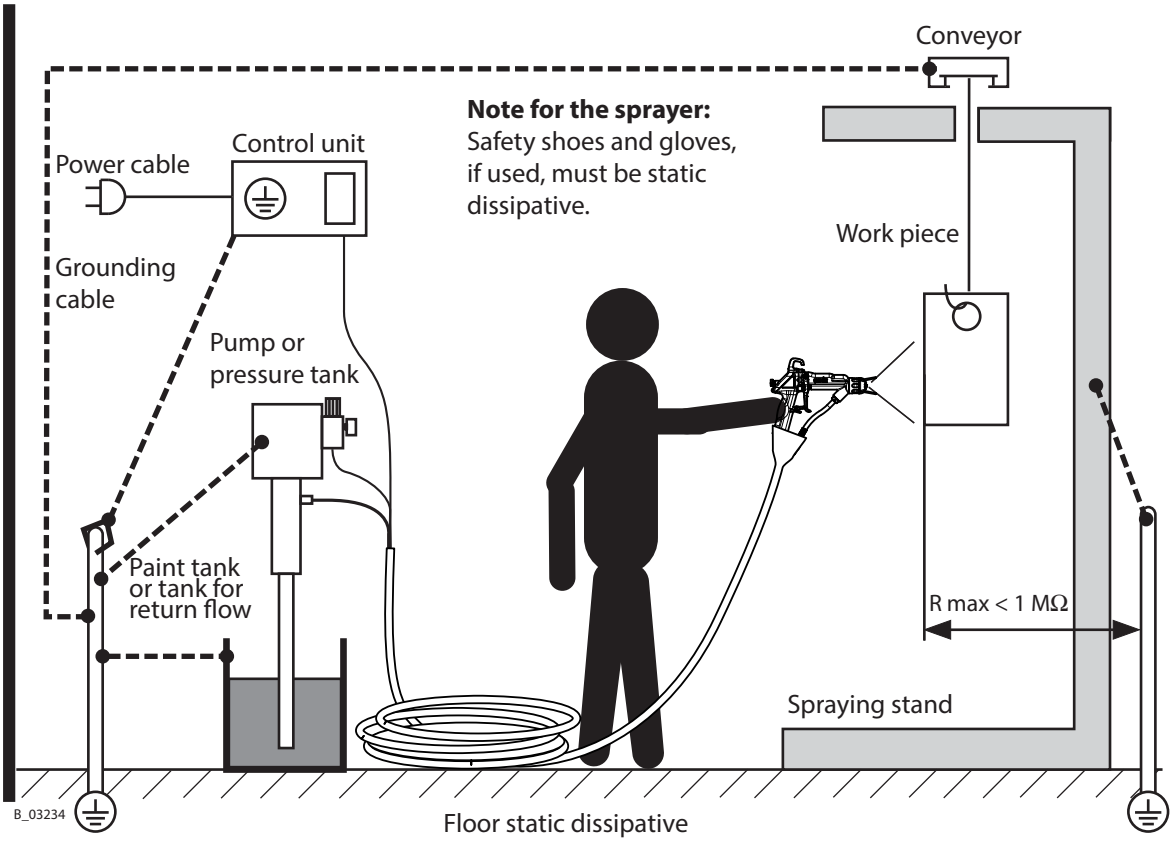
Heavy paint mist if grounding is insufficient!
Danger of poisoning.
Insufficient paint application quality.

→ Ground all device components.
→ Ground the work pieces to be coated.

A poorly grounded work piece causes:
- very bad wrap around.
- uneven coating.
- Back spraying to the spray gun, i.e. contamination.

Prerequisites for perfect grounding and coating are:
- Clean work piece suspension.
- Grounding of spray booth, conveyor system and suspension on the building side in accordance with the operating instruction or the manufacturer's information.
- Grounding of all conductive parts within the working area.
- The grounding resistance of the work piece may not exceed 1 MΩ (Mega Ohm).
  Note:
  Resistance to ground measured at 500 V or 1000 V.
- Connect the control unit to the system ground.

Grounding schema (example)



Minimum cable cross-section	
Control unit	4 mm² (AWG 12)
Pump	4 mm² (AWG 12)
Paint tank	4 mm² (AWG 12)
Conveyor	16 mm² (AWG 6)
Booth	16 mm² (AWG 6)
Spraying stand	16 mm² (AWG 6)

6.5 PREPARATION OF LACQUER

The viscosity of the lacquers is of great importance. The best spraying results are obtained with values between 15 and 30 DIN-s (measured in immersion flow cup DIN 4 mm; 0.16 inches).

In the case of application problems contact the lacquer manufacturer.

6.5.1 VISCOSITY CONVERSION TABLE

milli Pascal x x Sec mPas	Centipoise	Poise	DIN Cup 4 mm 0.16 inch	Ford Cup 4	Zahn 2
10	10	0.1		5	16
15	15	0.15		8	17
20	20	0.2		10	18
25	25	0.25	14	12	19
30	30	0.3	15	14	20
40	40	0.4	17	18	22
50	50	0.5	19	22	24
60	60	0.6	21	26	27
70	70	0.7	23	28	30
80	80	0.8	25	31	34
90	90	0.9	28	32	37
100	100	1	30	34	41
120	120	1.2	33	41	49
140	140	1.4	37	45	58
160	160	1.6	43	50	66
180	180	1.8	46	54	74
200	200	2	49	58	82
220	220	2.2	52	62	
240	240	2.4	56	65	
260	260	2.6	62	68	
280	280	2.8	65	70	
300	300	3	70	74	
320	320	3.2			
340	340	3.4			
360	360	3.6	80		
380	380	3.8			
400	400	4	90		

6.6 WAGNER ELECTROSTATIC AIR SPRAYING SYSTEM

The nozzle range (chapter 12), provided by Wagner, allows optimum coating results for each application.

General criteria for the selection of nozzles:
flat jet -> for large-surface parts
round jet -> for small delicate parts

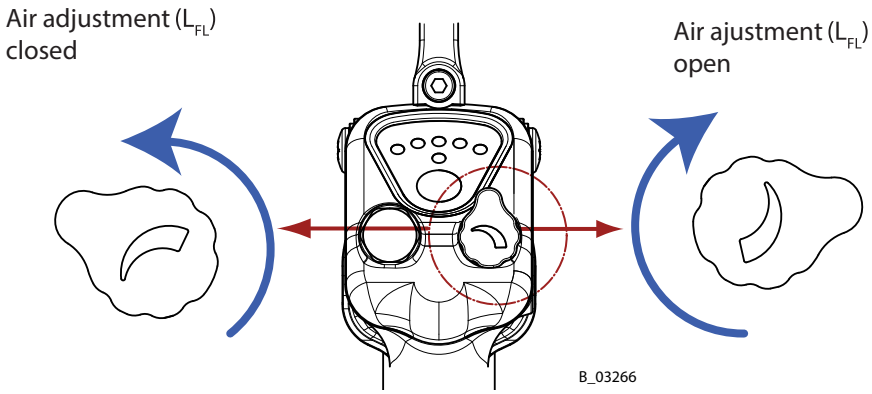
Influences on the jet spray - the spray pattern:		
Description		Modification
Product pressure	P_{Mat}	+ or -
Atomizing air pressure	P_{ZL}	+ or -
Air adjustment	L_{FL}	from open to closed
Stop screw product valve	A_{MV}	from open to closed
Nozzle sizes	DS	delivery rate
Electrostatics	ES	+ or - or off

6.6.1 PRESSURE SETTINGS FOR ROUND JET NOZZLES

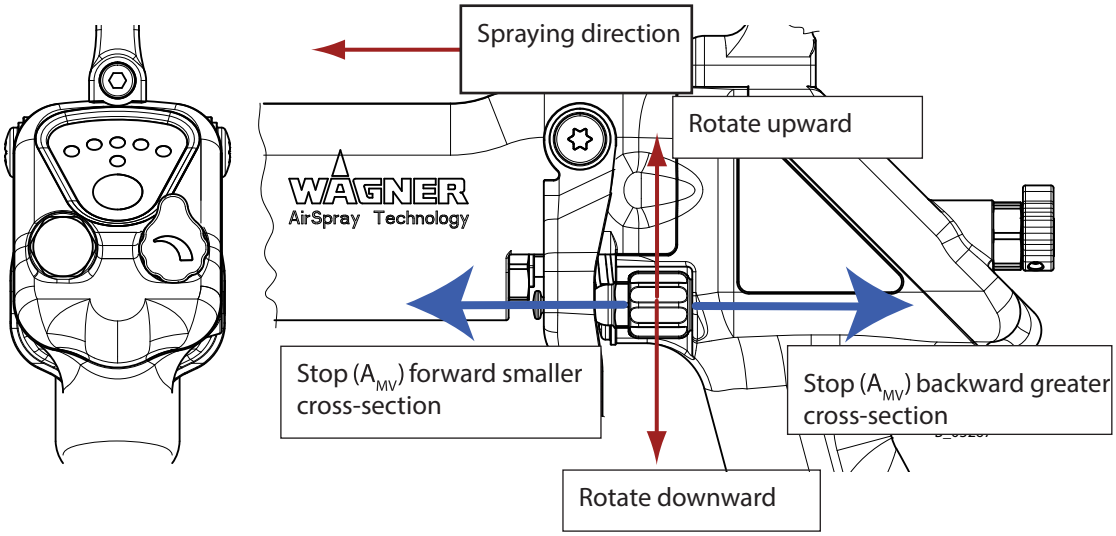
There are 2 nozzle sizes, D8 and D12, available. The air cap and nozzle are adjusted according to size to each other and may not be exchanged. During the calibration of the product pressure (P_{MAT}) and the atomizing air pressure (P_{ZL}) the air control lever shown in figure B_03266 must be in a central position.

pressure setting	**Nozzle D8 (small)**	**Nozzle D12 (large)**
Product pressure (P_{MAT})	0.8 bar to 1.2 bar	0.8 bar to 1.6 bar
Atomizing air pressure (P_{ZL})	2.0 bar to 2.3 bar	2.3 bar to 3.0 bar

Note:
The table contains default values. Depending on the product, conditions and the desired result different values are possible or necessary.



By turning the lateral adjusting screw (AMV) of the gun, the outlet cross-section can be adjusted on the product valve. By reducing this cross-section under the same pressure settings you can create a further refinement of the atomization, i.e. turning the adjustment screw upwards.



6.6.2 PRESSURE SETTINGS FOR FLAT JET NOZZLES

There are 8 flat jet nozzle sizes from 0.6 up to 2.0 available. There are 3 air cap types. Each air cap can be used in combination with 2 or 3 nozzles sizes. Only matching nozzle components may be used. During the calibration of the product pressure (P_{MAT}) and the atomizing air pressure (P_{ZL}) the air control lever shown in figure B_03266 must be in a central position. These presettings are based on a lacquer viscosity of 22 DIN 4 sec.

Pressure settings	Air cap 0.4-0.8	Air cap 1.0-1.4	Air cap 1.6-2.0
Product pressure (P_{MAT})	0.5 bar to 1.0 bar	1.0 bar to 2.0 bar	1.0 bar to 3.0 bar
Atomizing air pressure (P_{ZL})	1.0 bar to 2.5 bar	1.5 bar to 2.5 bar	1.5 bar to 3.0 bar

Note:
The table contains default values. Depending on the product, conditions and the desired result different values are possible or necessary.

By turning the lateral adjusting screw (A_{MV}) of the gun, the outlet cross-section can be adjusted on the product valve. By reducing this cross-section under the same pressure settings you can create a further refinement of the atomization, i.e. turning the adjustment screw upwards.

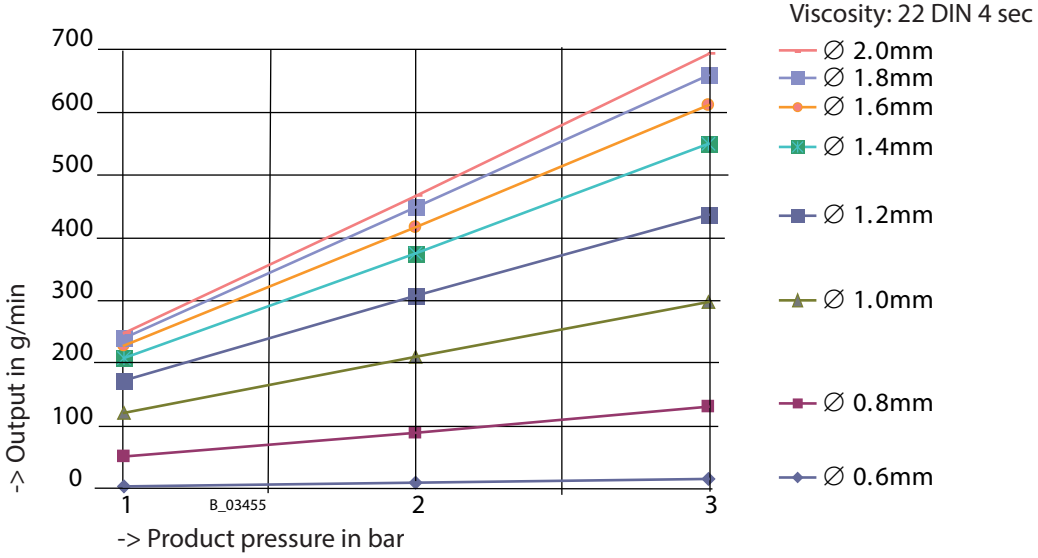
Note:
With this setting the spray pattern is reduced.

6.6.3 ELECTROSTATIC AND ATOMIZATION

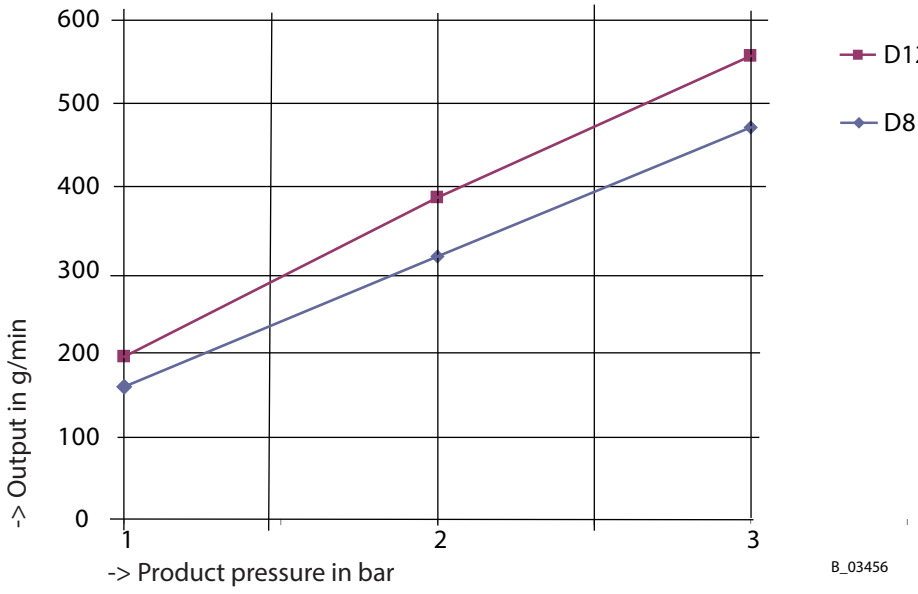
The electrostatic charging of the spray cloud produces a more homogeneous distribution of paint particles on the object.
See also Chapter 5.4.3.

6.6.4 OUTPUT MEASURING

Flat spray nozzles



Round spray nozzles



6.7 COMMISSIONING

6.7.1 GENERAL RULES FOR MANIPULATION OF THE SPRAY GUN

→ Observe safety instructions in Chapter 4.

DANGER

High voltage field!
Danger to life from malfunction of heart pacemakers.

Make sure that persons with pace makers:
→ do not work with the electrostatic spray gun.
→stay outside the area of the electrostatic spray gun/work piece

WARNING

Unintentional putting into operation!
Risk of injury.

Before any work on the device, in the event of work interruptions and malfunctions:
→ Switch off the energy/compressed air supply.
→ Relieve the pressure from the spray gun and unit.
→ Secure the spray gun against actuation.
→ In the event of functional faults: remedy the fault as described in the "Troubleshooting" chapter.

6.7.2 PREPARATION FOR STARTING UP

The following points should be noted before commissioning

→ Make sure that all other conductive parts within the work area are grounded (see Chapter 6.4.5).
→ Connect the product hose to the spray gun and the product pump or the pressure tank.
→ Check that all product-conveying connections are correctly connected.
→ Connect air hose to spray gun and to supply of oil-free dry air, approx. 0.25 MPa; 2.5 bar; 36 psi. Compressed air quality class 3.5.2 according to ISO 8573.1.
→ Check that all air-conveying connections are correctly connected.
→ Connect the electric cable to the spray gun and to the VM 5000 or VM 500 control unit.
→ Visually check the permissible pressures for all the system components.
→ When using a Wagner pneumatic pump:
Check the level of the separating agent and fill the separating agent up if necessary.

→ Provide product tank, tanks for flushing agent and an empty tank for return.
→ Connect the system to the air and power supply.
→ A basic flushing of system must be carried out before commissioning. Make sure that no nozzle is inserted into the gun.

⚠ WARNING

Sparks form when the plug is removed!
Explosion hazard.

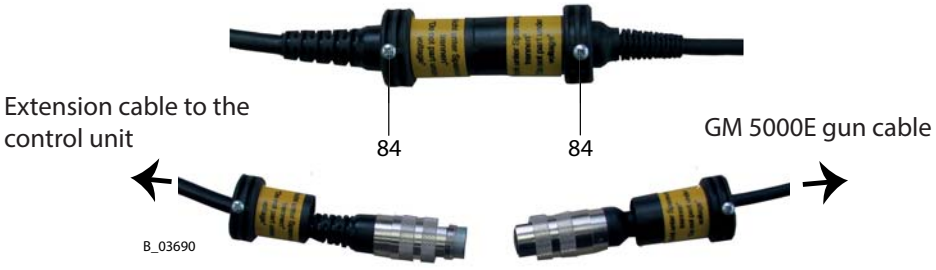
When using the spray gun in explosion hazard areas:
→ The cable connection on the gun and the connection to any cable extensions may not be disconnected or connected in this area.

Attention: gun cable to control unit
Secure the cover sleeve with the warning sign by means of the screw (84) on the connector.

B_03691

Attention: guns with electric extension cable
Secure the cover sleeves with the warning sign by means of the screws (84) on the connectors.

Note:
In order to prevent power losses keep the cable length as short as possible. The maximum power is available with the standard cable length of 10 m.
An extension to a total length of up to 40 m will cause a power loss of up to 10%. The gun cable can be extended to a total length of 80 m, however, a power loss of up to 30 % will be caused.



7 OPERATION

7.1 TRAINING THE OPERATING STAFF

⚠ WARNING

Incorrect operation!
Risk of injury and equipment damage.

→ The operating staff must be qualified to operate the entire system.
→ Before work commences, the operating staff must receive appropriate training.

7.2 SAFETY INSTRUCTIONS

⚠ WARNING

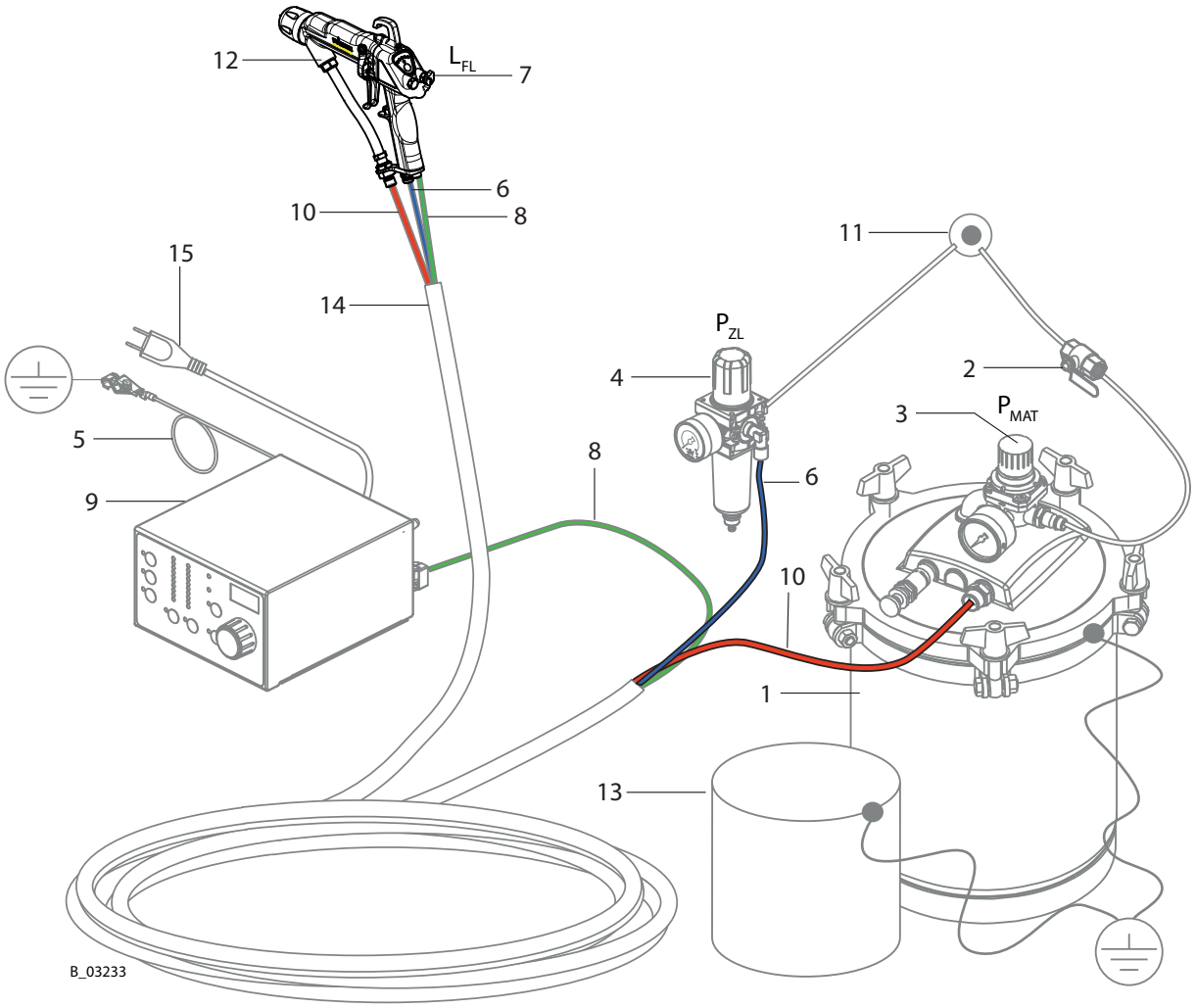
Incorrect operation!
Risk of injury and equipment damage.

→ If contact with solvent-based paints or cleaning agents causes skin irritation, appropriate precautionary measures must be taken, e.g. wearing protective clothing.
→ The footwear worn by operating staff must comply with EN ISO 20344. The measured insulation resistance must not exceed 100 MΩ.
→ The protective clothing, including gloves, must comply with EN ISO 1149-5. The measured insulation resistance must not exceed 100 MΩ.

⚠ WARNING

Discharge of electrostatically charged components in atmospheres containing solvents!
Explosion hazard from electrostatic spark-over.

→ Use gun only with fitted nozzle, air cap and union nut.



7.3 WORK

7.3.1 FILLING WITH WORKING PRODUCT

1. Provide an empty tank for return (13). See picture B_03233.
2. Put the tank with work product into the pressure tank (1) and close the pressure tank.
3. Open stop valve (2).
4. Adjust approx. 0.05 to 0.15 MPa; 0.5 to 1.5 bar; 7 to 22 psi on the pressure regulator (3).
5. Point the gun, without nozzle, into tank (13) and open it.
6. Close stop valve (2) as soon as pure working product without any air inclusions starts coming from the gun.
7. Close the spray gun if the pressure tank is depressurised.
8. Dispose of the contents of the tank (13) according to the local regulations.

7.3.2 START-UP SPRAYING

1. Insert the desired nozzle into the gun.
2. Open stop valve (2).
3. Turn on the control unit (9).
4. Set the product supply to operating pressure P_{MAT}.
5. Spray on a test object (pull trigger).
6. Adjust the spray pressure at the paint pump and/or pressure tank (1) according to the nozzle and object being sprayed.
7. Set air adjustment at the back of the gun to the center position and open now atomizing air (4) and adjust to an optimum, according to the nozzle and the object being sprayed .

For round-jet method:

8. By turning the air adjustment or the stop screw on the side of the gun, the the atomizing air jet is influenced additionally.

Notice

The size of the air cap should match with the nozzle size.

For flat-jet method:

9. Change the width of the spray jet by turning the air adjustment on the back of the spray gun or by appropriate selection of the nozzle.

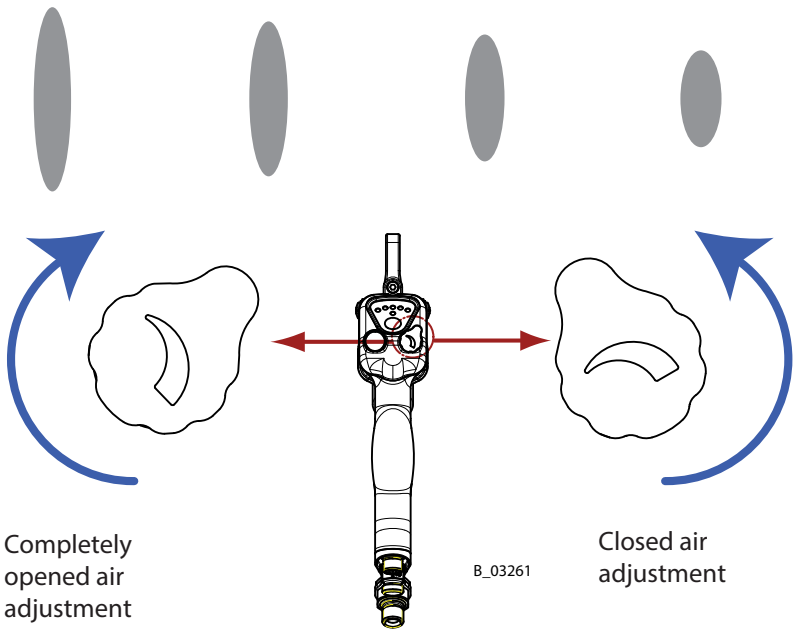
Notice

A change in the product quantity is achieved by:

- Changing the product pressure

or

- Use a different nozzle size (see Accessories)



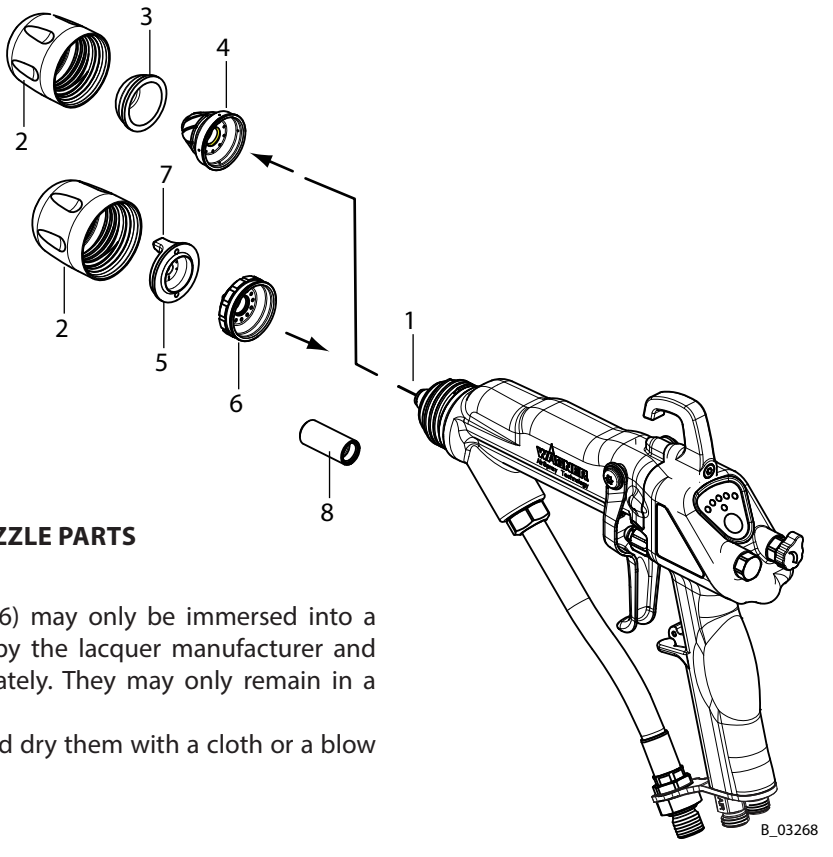
7.3.3 CHANGING FROM AIR ROUND JET TO AIR FLAT JET

NOTICE

Defective electrode!
Material damage due to functional faults.

→ Do not damage the electrode.

1. Switch off control unit.
2. Relieve spray gun and device pressure!
3. Replace paint with cleaning solvent.
4. Set product pressure control. Switch off the atomizing air.
5. Flush the gun through thoroughly.
6. Relieve the product pressure on the spray gun and the device!
7. Unscrew nozzle nut (2) by hand.
8. Remove AR 5000 air cap (3). Unscrew AR 5000 nozzle (4) by hand and remove it.
9. Clean the spray gun front carefully with damp cloth. Pay attention to the electrode (1). Use the protection cap for the valve needle (8).
10. Screw in and slightly tighten AF 5000 flat jet nozzle (6) by hand.
11. Put the AF 5000 air cap (5) in place. Screw the union nut (2) onto the spray gun body.
12. Set the desired flat jet level with the air cap horns (7) and then slightly tighten the union nut by hand.



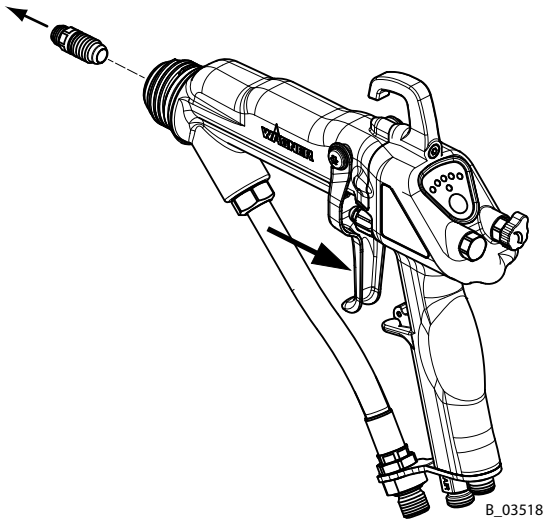
7.3.4 CLEANING OF THE NOZZLE PARTS

The nozzle parts (2, 3, 4, 5 und 6) may only be immersed into a cleaning solvent recommended by the lacquer manufacturer and must be removed again immediately. They may only remain in a cleaning solvent for a short time.
Clean these parts with a brush and dry them with a cloth or a blow gun.

7.3.5 CHANGING THE VALVE HOUSING

NOTICE
Changing the valve housing! Equipment damage. → Activate the spray gun trigger when changing the valve housing.

To prevent damage to the gun (valve seat rubs on the valve needle, valve needle may loosen), activate the spray gun trigger when changing the valve housing.



8 CLEANING AND MAINTENANCE

8.1 CLEANING

8.1.1 CLEANING STAFF

Cleaning work should be undertaken regularly and carefully by qualified and trained staff. They should be informed of specific hazards during their training.

The following hazards may arise during cleaning work:

- Health hazard from inhaling solvent vapors
- Use of unsuitable cleaning tools and aids

8.1.2 SAFETY INSTRUCTIONS

⚠ DANGER

Explosive powder/air mixes!
Danger to life and equipment damage.

→ Before starting cleaning or other manual work, the high-voltage must be shut down and locked to prevent it from being switched back on!
→ The spray gun must be separated from the high-voltage supply before any cleaning work is started!
→ Use only electrically conductive tanks for cleaning liquids! Ground the tank.
→ Preference should be given to non-flammable cleaning fluids.
→ Only cleaning agents of explosion class IIA should be used (maximum ignition energy 0.24 mJ).
→ The cleaning agent's flash point must be at least 15 K above the ambient temperature.
→ Ensure that no electric component is cleaned with or immersed into solvent.

8.1.3 CLEANING AND DECOMMISSIONING

The spray gun and the unit must be cleaned daily. The cleaning agents used for cleaning must correspond with the working product.

Cleaning of the nozzle parts -> Chapter 7.3.4

NOTICE

Flushing agent in the air duct!
Functional faults caused by swollen seals.

→ Never immerse the spray gun in cleaning agent.

⚠ WARNING

Incorrect maintenance/repair!
Risk of injury and equipment damage.

→ Have repairs and part replacements be carried out only by specially trained staff or a WAGNER service center.
→ Before all work on the device and in the event of work interruptions:
- Switch off the energy/compressed air supply.
- Relieve the pressure from the spray gun and device.
- Secure the spray gun against actuation.
→ Observe the operating instructions for any work.

DANGER

Exploding gas / air mixture!
Danger to life from flying parts and burns.

→ Never spray into a closed tank.
→ Ground the tank.

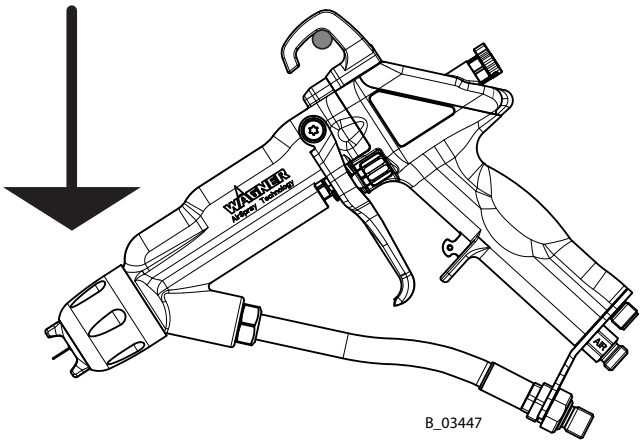
Gun flushing

1. Switch off control unit.
2. Ensure that the product pressure is relieved and shut off the atomizing air supply to the gun.
3. Connect the cleaning agent supply.
4. Set product pressure.
5. Actuate the trigger. Flush the gun through thoroughly.
6. Relieve the pressure from gun and unit!
7. Remove nozzle and clean separately.
8. Clean the spray gun body with a cleaning agent recommended by the lacquer manufacturer and dry with a cloth or blow gun.

NOTICE

Flushing agent in the air duct!
Functional faults caused by swollen seals.
Discharge current to ground -> no high-voltage

→ Always point the spray gun down when cleaning.
→ Ensure that neither paint nor cleaning agent enters the air duct.
→ When taking a break from work or when stored for a longer period, the spray gun should be positioned with the adapter pointing downwards.



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8.2 MAINTENANCE

8.2.1 MAINTENANCE STAFF

Maintenance work should be undertaken regularly and carefully by qualified and trained staff.

The following hazards may arise during maintenance work:

- Health hazard from inhaling solvent vapors
- Use of unsuitable tools and aids

Once the maintenance work is complete, the device must be checked by a qualified person to ensure a reliable condition.

8.2.2 SAFETY INSTRUCTIONS

DANGER

Incorrect maintenance/repair!
Danger to life and equipment damage.

→ Repair or replacement of devices or parts of devices are only allowed to be performed outside the hazard area by qualified personnel.

Check hoses, pipes, and couplings every day and replace if necessary.

→ In accordance with the guideline for liquid ejection devices (ZH 1/406 and BGR 500 Part 2 Chapter 2.36):
- The liquid ejection devices should be checked by an expert (e.g. Wagner service technician) for their safe working conditions as required and at least every 12 months.
- If devices have been decommissioned, the examination can be suspended until the next start-up.

DANGER

Incorrect maintenance/repair!
Danger to life and equipment damage.

- → Only a WAGNER service center or a suitably trained person may carry out repairs and replace parts.
- → Only repair and replace parts that are listed in the "Spare Parts" chapter and that are assigned to the device.
- → Before all work on the device and in the event of work interruptions:
  - Disconnect the control unit from the mains.
  - Relieve the pressure from the spray gun and device.
  - Secure the spray gun against actuation.
- → Observe the operating manual and service instructions at all times when carrying out work.

8.3 DISASSEMBLY OF THE SPRAY GUN

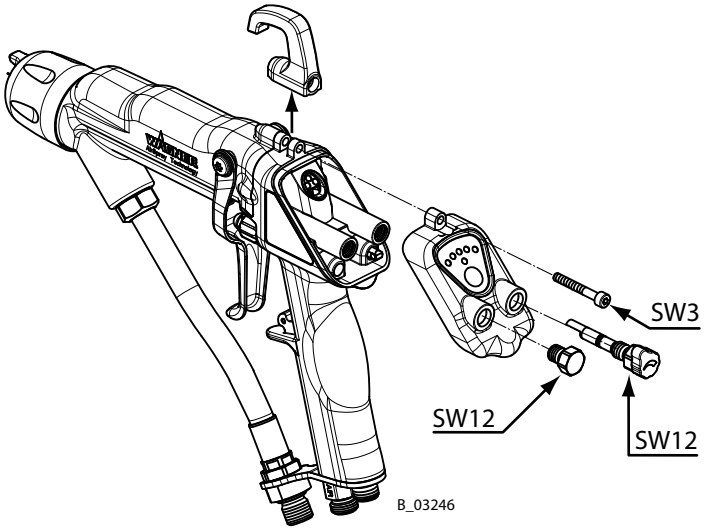
8.3.1 TOOLS

For disassembling and assembling the gun the following tools are required:

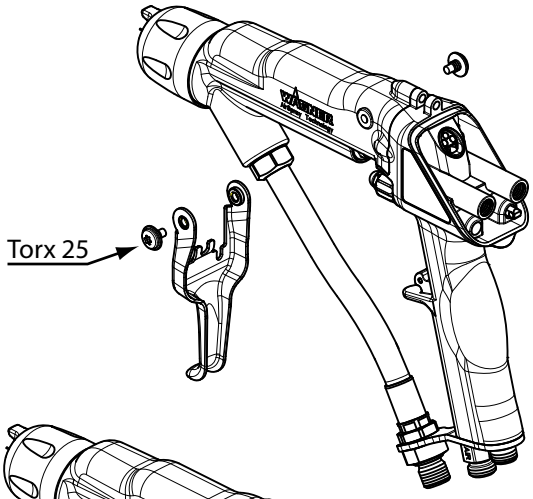
●	Allen wrench SW 2
●	Allen wrench SW 3
●	Allen wrench SW 5
●	Open-end wrench SW 5
●	Open-end wrench SW 6
●	Open-end wrench SW 8
●	Open-end wrench SW 11
●	Open-end wrench SW 12
●	Open-end wrench SW 14
●	Open-end wrench SW 19
●	Ring spanner SW 9
●	Ring spanner SW 11
●	Torx wrench 20
●	Torx wrench 25
●	Assembly tool valve needle Order No. 2309368
●	Assembly tool clamping screw Order No. 2325263

8.3.2 DISASSEMBLY OF THE SPRAY GUN

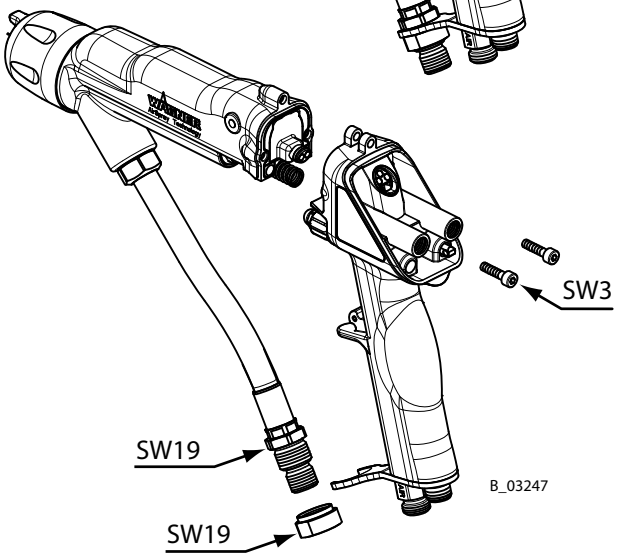
1



2



3



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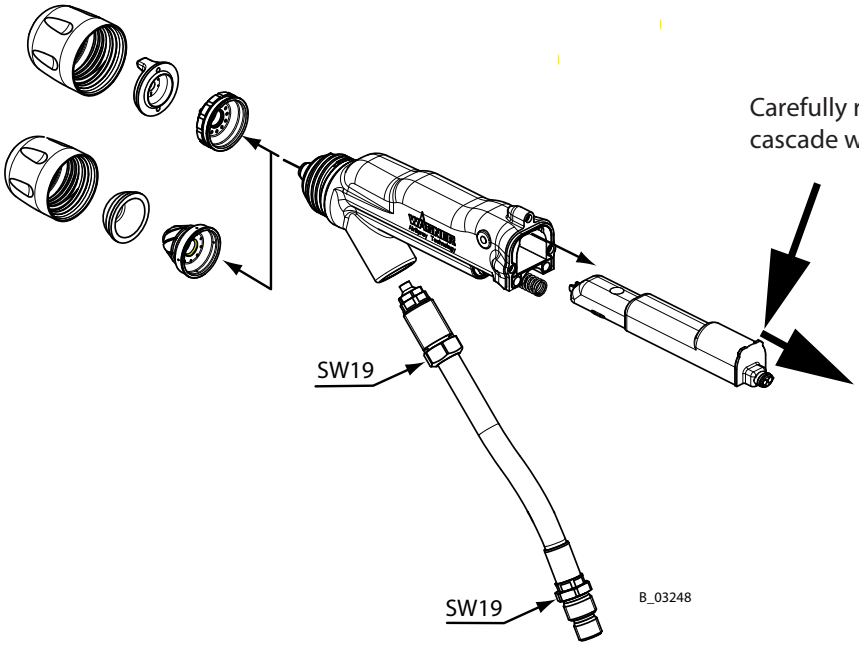
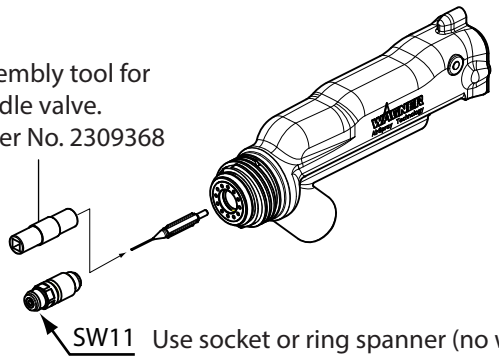


Carefully release the cascade without pliers.

5

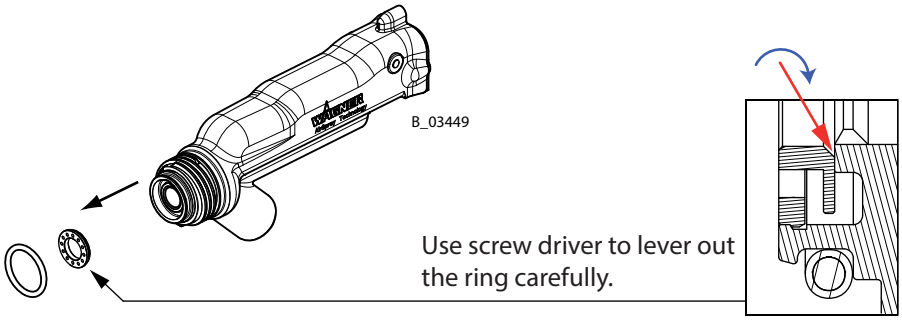
Assembly tool for needle valve.
Order No. 2309368



Use socket or ring spanner (no wrench).

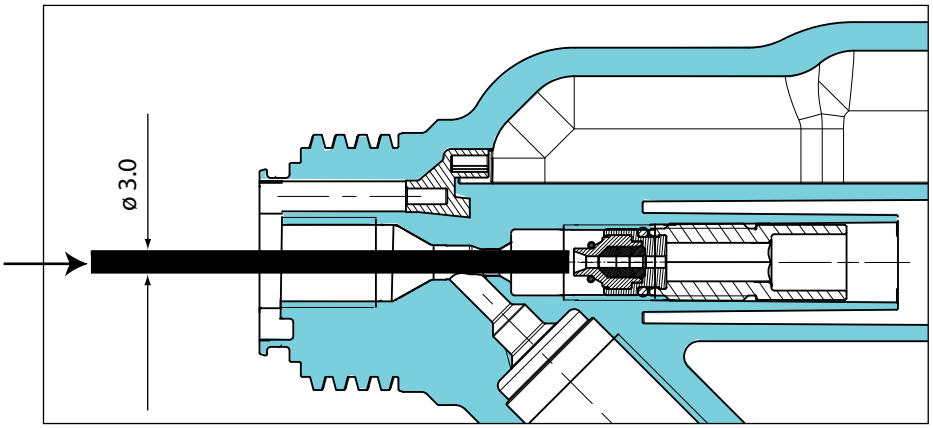
Note:
Loosen valve tip Air by hand using an assembly tool.

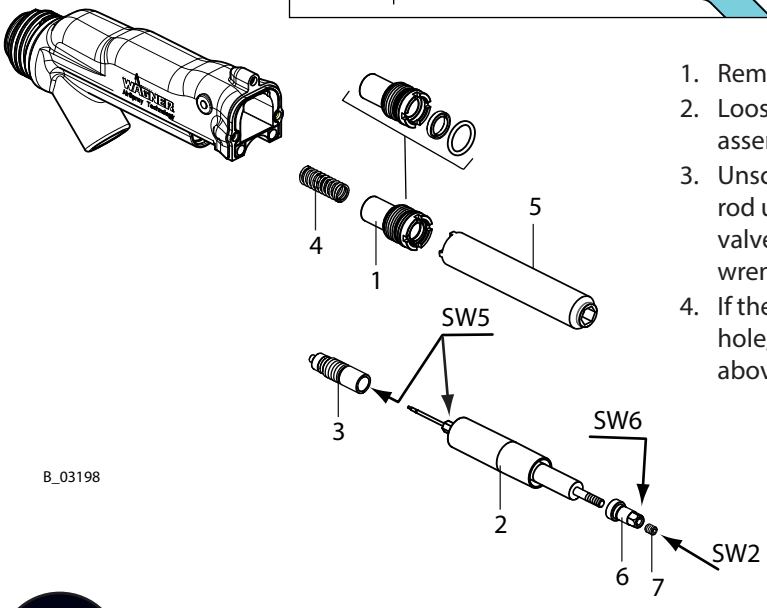
6



Use screw driver to lever out the ring carefully.

7

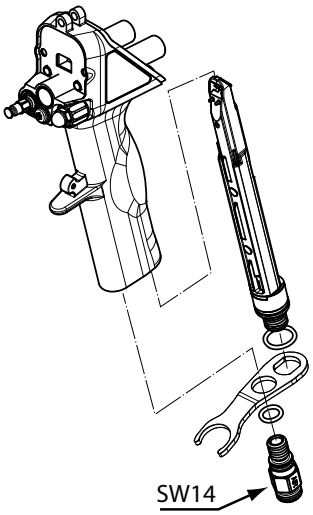




B_03198

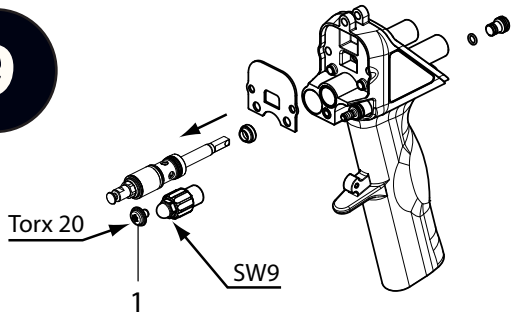
1. Remove pressure spring (4).
2. Loosen clamping screw compl. (1) with assembly tool (5).
3. Unscrew the complete package (3) via valve rod unit complete (2, 6 and 7) or pull out the valve rod unit and unscrew it using an Allen wrench SW5.
4. If the loosened package (3) is jammed in the hole, push from the front. (see illustration above)

8



B_03250

9



1. Loosen the oval head screw (1).
2. Pull the air valve out off the hole.

8.4 CLEANING THE PARTS AFTER DISASSEMBLY

ATTENTION

Please note:

- → All reusable parts (except for the parts conducting high-voltage such as cascade, adapter, plug compl. etc.) should be cleaned thoroughly using a suitable cleaning agent.
- → The adapter, plug compl. and the handle inside must be clean and dry after cleaning. Care should be taken that these parts remain free of solvents, grease or sweat from the hands (salt water).
- → Spare parts may have safety-relevant properties.
- → Use only WAGNER original spare parts and accessories.
- → Defective parts, O-rings and seal sets must always be re-placed.

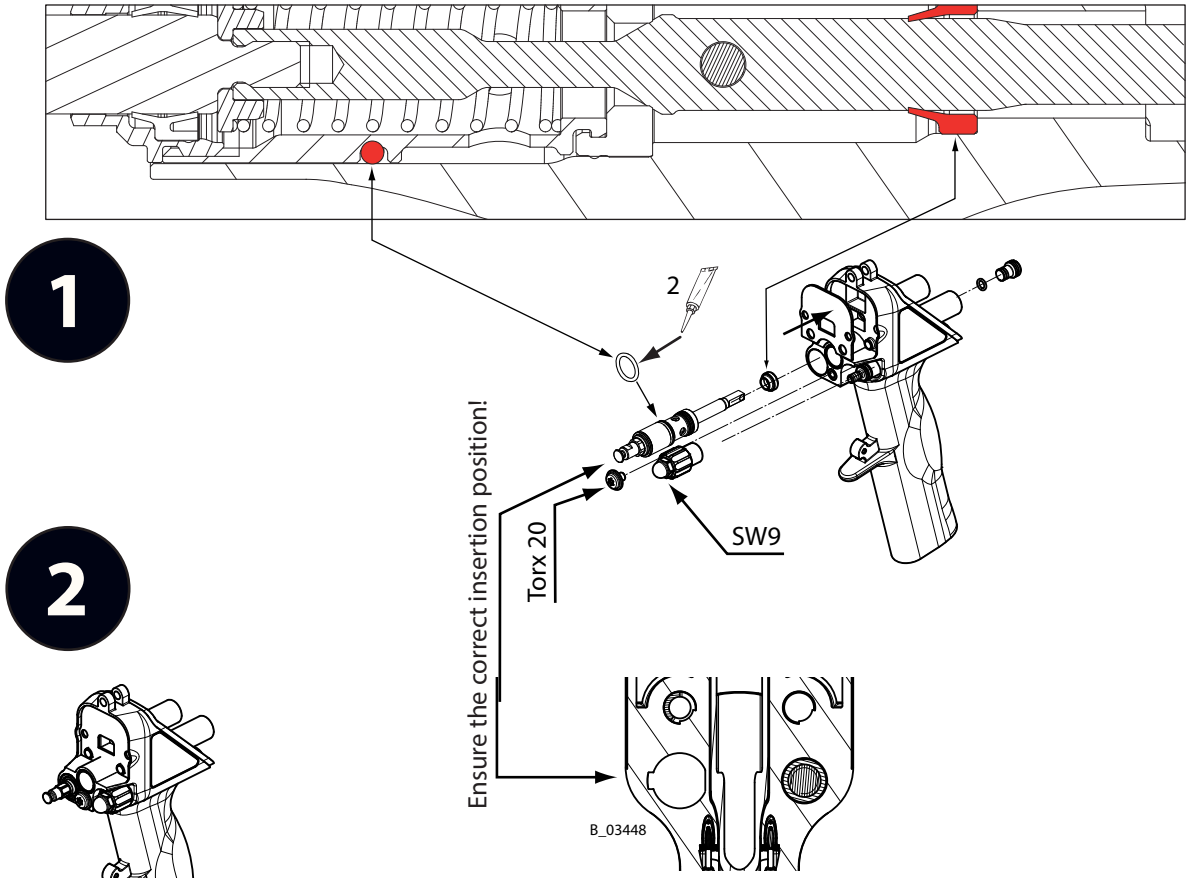
⚠ WARNING

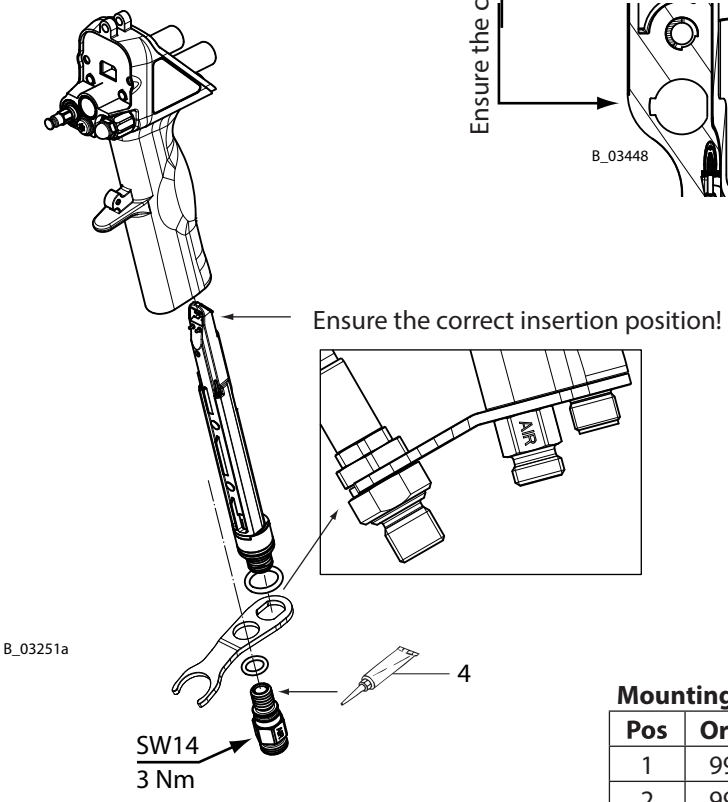
Incompatibility of cleaning agent and working medium!
Risk of explosion and danger of poisoning by toxic gasses.

- → Examine the compatibility of the cleaning agents and working media on the basis of the safety data sheets.

In chapter 13 the part numbers for gun spare parts can be found as well as for wearing parts such as seals.

8.5 ASSEMBLY OF THE SPRAY GUN

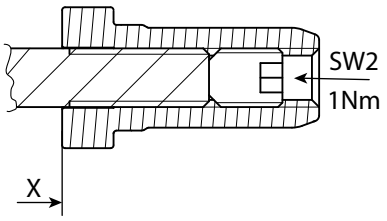




Mounting aids:

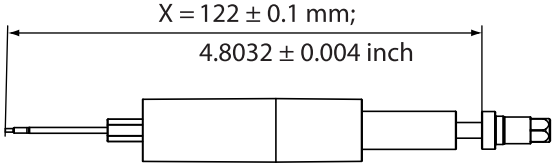
Pos	Order No.	Designation
1	9992590	Loctite 222
2	9992698	Vaseline white PHHV II
3	9992831	Loctite 542
4	9992511	Loctite 243

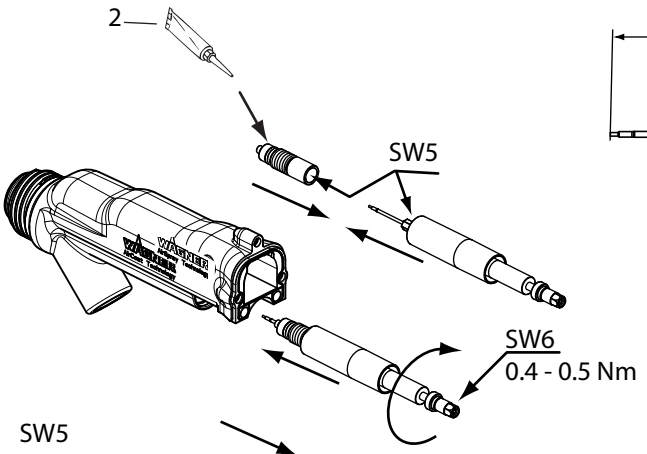
3



Valve rod unit Length adjusting measure

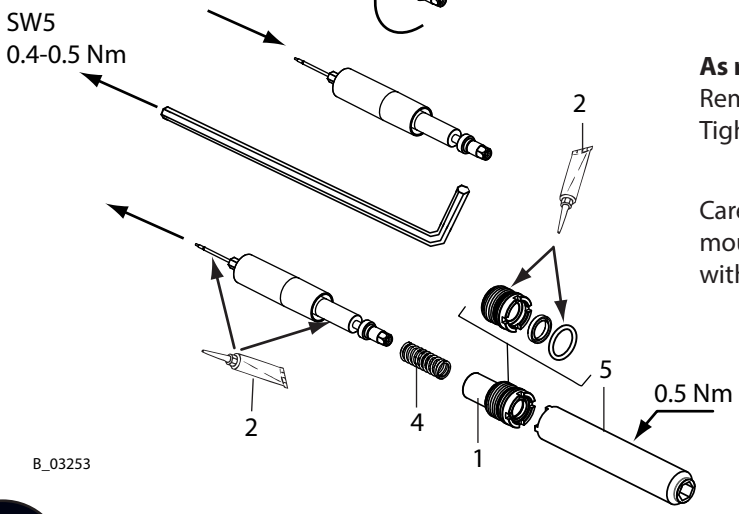
X = 122 ± 0.1 mm;
4.8032 ± 0.004 inch





Push together the valve rod unit and the complete package.

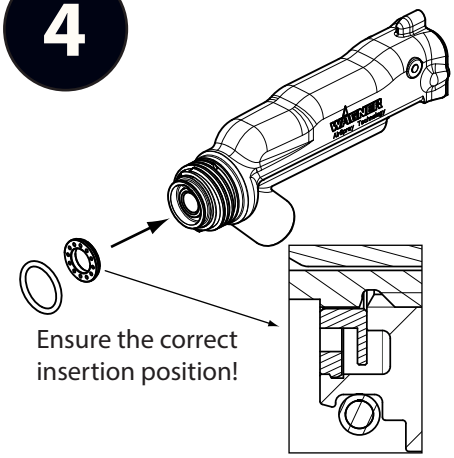
Screw in together the valve rod unit and the complete package.



As required only
Remove the valve rod unit.
Tighten the complete package.

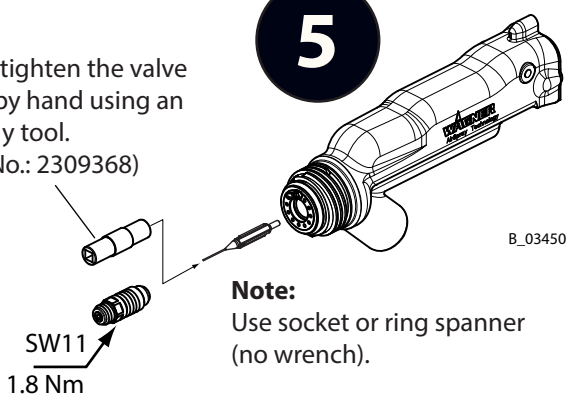
Carefully insert the valve rod unit and mount the complete clamping screw (1) with assembly tool (5).

4



5

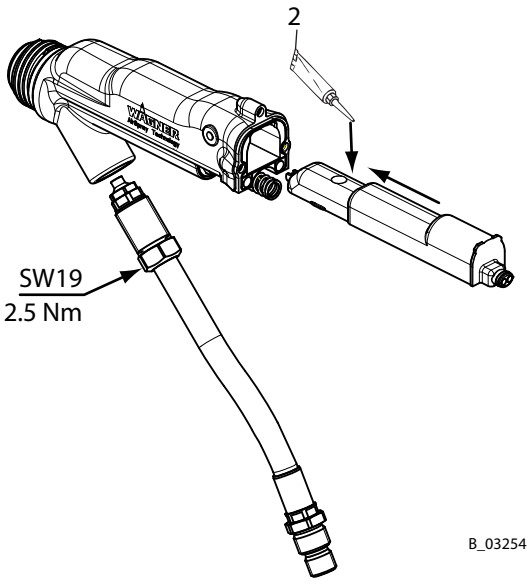
Slightly tighten the valve needle by hand using an assembly tool.
(Order No.: 2309368)



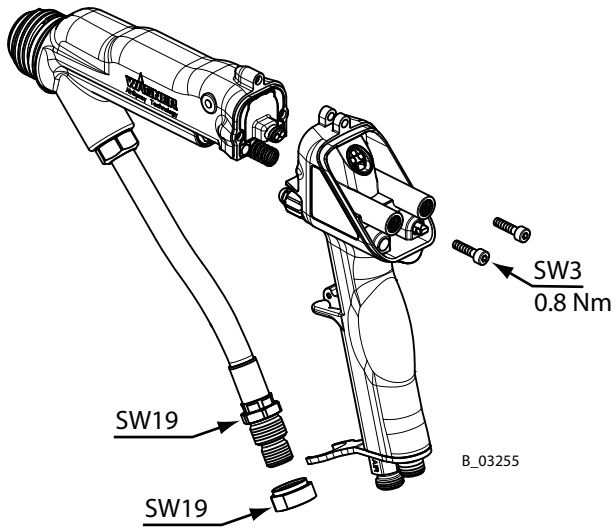
Note:
Use socket or ring spanner (no wrench).

6

Clean and degrease the inside of the adapter and the cascade, then grease the cascade surface with Vaseline.

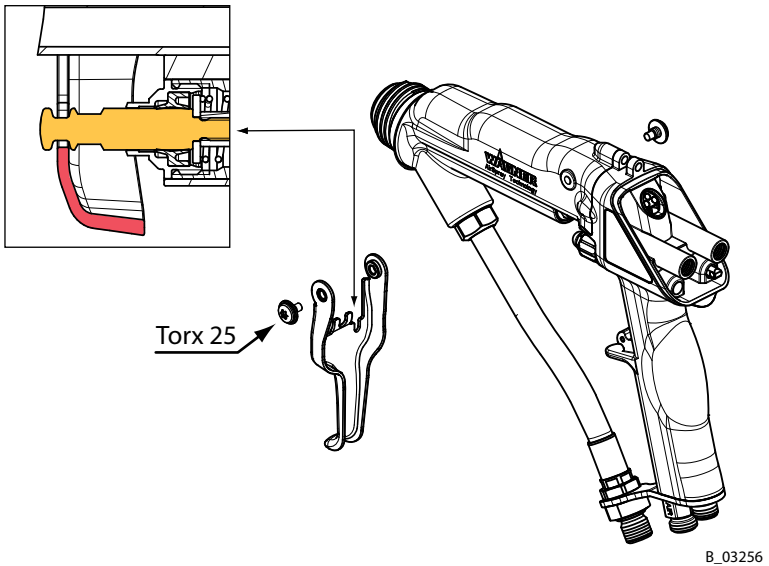


7

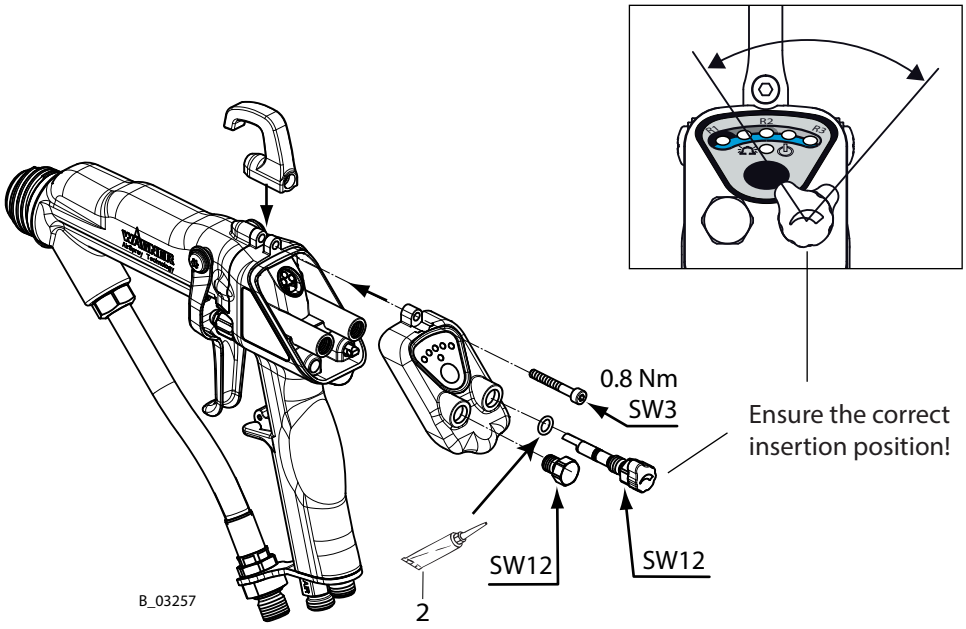


8

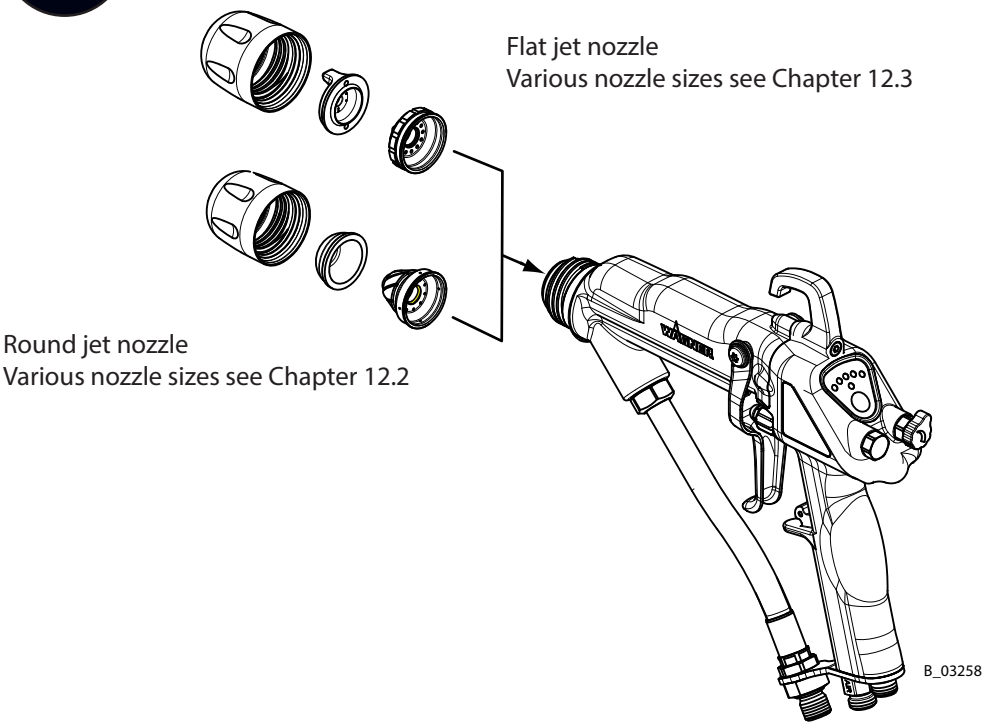
Push the trigger upward into the air valve piston.



9


0.8 Nm
SW3
Ensure the correct insertion position!
SW12
SW12
2
B_03257

10


Flat jet nozzle
Various nozzle sizes see Chapter 12.3
Round jet nozzle
Various nozzle sizes see Chapter 12.2
B_03258

8.6 FUNCTION TEST AFTER ASSEMBLY OF THE GUN

8.6.1 TEST OF THE HIGH-VOLTAGE

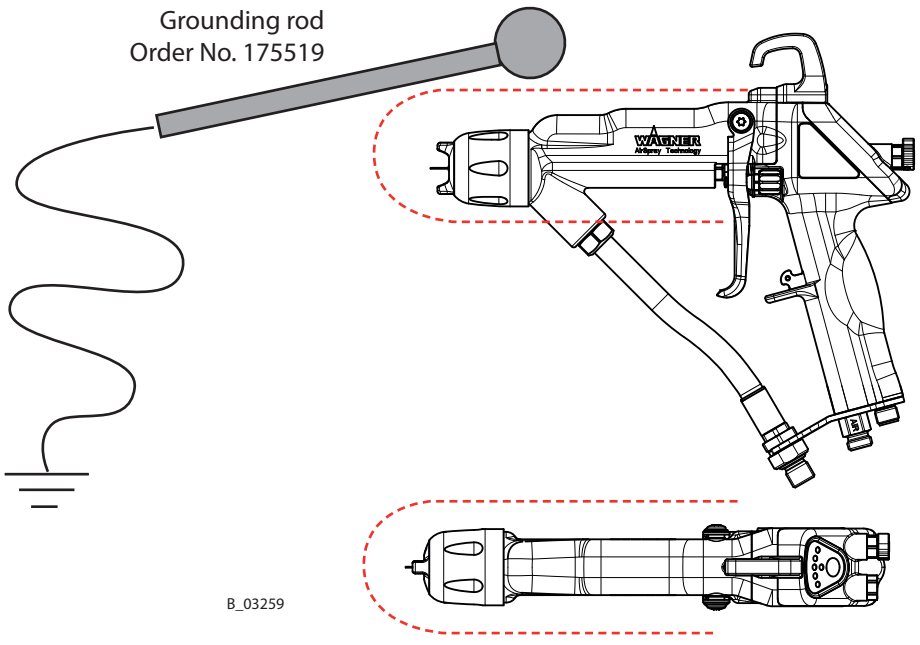
Necessary test equipment:
VM 500 or VM 5000 control unit and HV200 high-voltage tester.

High-voltage measurement on spraying gun.
Connect gun cable to control unit. Take the spray gun in your hand and hold into open space. Switch on control unit and actuate trigger guard.
The high-voltage should be 50 to 60 kV in dry ambient air. The value can be checked with the display on the control unit (VM 5000).
Notice
The gun must be clean and dry and must not have any paint or cleaning agent residues.
In the case of ambient air with a high air humidity, the measured value can reduce to 40 to 50 kV.

High-voltage measurement with high-voltage tester
Place the ball of the high-voltage tester on the gun electrode and turn on the high-voltage. The measured value should be 60 to 70 kV.
Notice

- When measuring the high-voltage the gun and the measuring device should be held at arms length as far from the body as possible.
- There should be no chargeable objects within a radius of 1 m; 3.28 ft of the place where the measurements are taken.
- The placing of the measuring ball of the high-voltage measuring device reduces the spraying of the high-voltage electrode. As a result the high-voltage value increases compared to the spraying in the free space.

Disruptive discharge test
Check the gun against ground with the grounding rod. No sparks should be formed.
Note: in the vicinity of the electrode harmless corona discharges can occur.

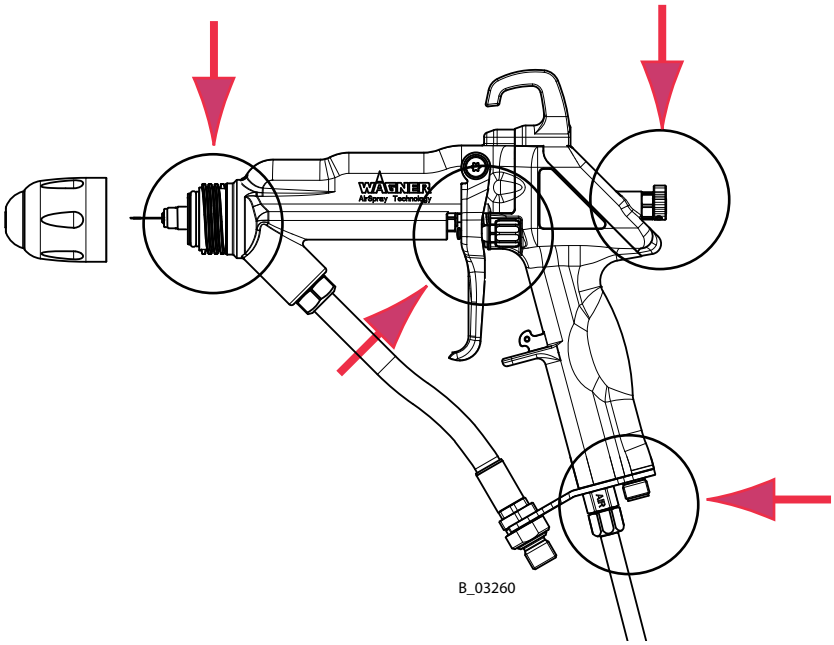


8.6.2 AIR TEST

Connect test or air hose to the spray gun and switch on mains pressure 0.8 MPa; 8 bar; 116 psi maximum.

Checking the air valve
The air valve must switch on and off correctly.
Test up to approx. 0.8 MPa; 8 bar; 116 psi.

Air tightness
With the trigger unactuated, test for air tightness at the points marked in the illustration:



8.6.3 PRODUCT PRESSURE TEST

Connect low pressure hose to the spray gun.
Test the spray gun for tightness with solvent or spray oil (e.g. Macrol 52) and a maximum pressure of 0.8 MPa; 8 bar; 166 psi.
Observe the following gun components:
Product connection, nozzle body, product valve (no after-spraying).

DANGER

Exploding gas / air mixture!
Danger to life from flying parts and burns.

→ Never spray into a closed tank.
→ Ground the tank.

8.6.4 TEST OF SPRAY PATTERN

Start air-spraying (without electrostatics)

1. Start up with product supply set to approx. 0.05 to 0.15 MPa; 0.5 to 1.5 bar; 7 to 22 psi operating pressure.
2. Spray (actuate trigger) and check the atomization.
3. Set the product pressure on the product supply to the point where a good product atomization is achieved.
4. Open air pressure regulator for the atomizing air and adjust so as to achieve optimal atomization.
5. With the air adjustment on the gun, set the ratio shaping air / atomizing air so as to achieve an optimum spray pattern.

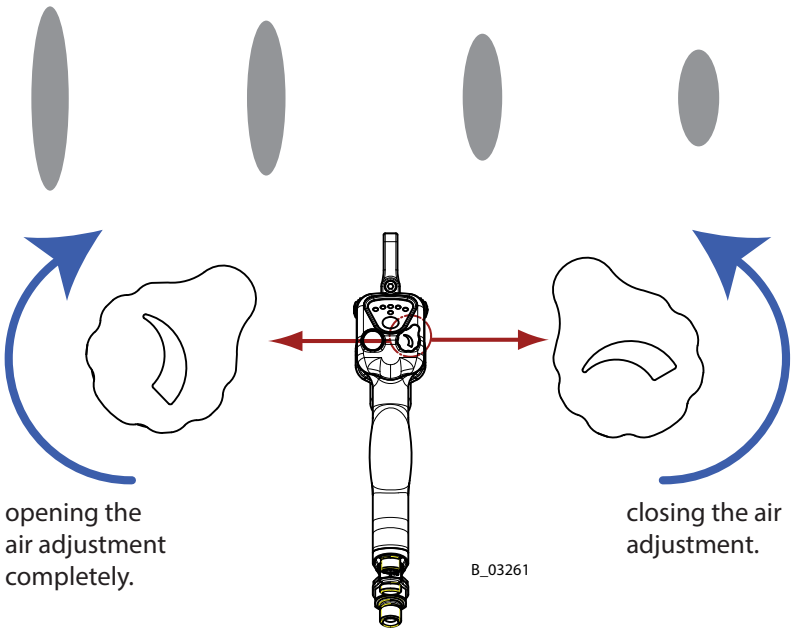
Notice

The paint output can be changed by:

- changing the product pressure or
- using a different flat jet nozzle (see Chapter 12).
- reducing the product valve stroke.

Influence of the air adjustment on the spray pattern shape

The spray pattern can be adjusted to suit the object to be sprayed using the air adjustment. The illustration shows the influence of the shaping air regulator on the spraying pattern. Other nozzle sizes can be used to obtain larger or smaller spraying patterns.



8.7 HIGH PRESSURE HOSES

The service life of the fluid hoses is reduced due to environmental influences even when handled correctly.

→ Check hoses, pipes, and couplings every day and replace if necessary.
→ As a precaution, fluid hoses should be replaced after a period specified by the operator.

DANGER

Bursting hose, bursting threaded joints!
Danger to life from injection of product.

→ Ensure that the hose material is chemically resistant to the sprayed products.
→ Ensure that the spray gun, threaded joints, and product hose between the device and the spray gun are suitable for the pressure generated in the device.
→ Ensure that the following information can be seen on the high-pressure hose:
- Manufacturer
- Permissible operating pressure
- Date of manufacture

9 INSPECTIONS

→ Observe safety instructions in Chapter 4.

9.1 PERIODICAL INSPECTIONS

For the safe operation of electrostatic manual coating systems for flammable liquid coating products, intervals for periodical inspections are defined as follows:

Inspection point	Inspection interval	Remarks
Gun cleaning, gun flushing	daily	Chapter 4.2.4, Chapter 8.1
Hoses, tubes, couplings	daily	Chapter 8.7
Grounding	weekly	Chapter 4.2.2, Chapter 6.4.5
Inspection for damage	weekly	Chapter 8.1.3, 8.2, 8.3, 8.4 und 8.5
Locking of the technical ventilation with the electrostatic manual coating system	annually	Chapter 6.4.2

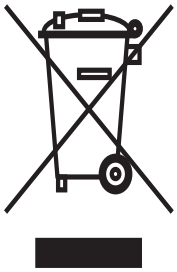
The above recommended intervals are maximum values and may be modified by the operator depending on the local and operational conditions and the contamination.

Damaged devices must be decommissioned and repaired immediately.

10 TROUBLESHOOTING AND RECTIFICATION

Functional fault	Cause	Remedy
Insufficient product output	Nozzle too small.	Select larger nozzle (see nozzle table 12.2 und 12.3).
	Product pressure too low.	Increase product pressure.
	Filter of pump blocked.	Clean or replace filter.
	Nozzle is clogged.	Nozzle cleaning
Poor spray pattern	Atomizing air incorrectly adjusted.	Readjust the atomizing air.
	Nozzle is too large.	Select smaller nozzle (see nozzle table).
	Product pressure too low.	Increase product pressure at the product supply.
	The product viscosity is too high.	Thin product in accordance with the lacquer manufacturer's instructions.
Valve rod leaks	Seals at the valve rod are damaged.	Replace the seals (see Chapter 8).
Poor wrap-around	Insufficient grounding.	Check grounding.
	Inadequate electric resistance of the lacquer.	Check lacquer resistance (see Chapter 2.5).
	Spraying pressure too high.	Readjust spraying pressure.
Back-spray	Insufficient grounding.	Check grounding.
	Distance between spray gun and work piece too large.	Reduce distance between spray gun and work piece.
No wrap-around	High-voltage switched off.	Switch on high-voltage.
	No electrostatics.	Repair malfunction as laid down in the control unit operating instructions.

11 PRODUCT DISPOSAL



NOTICE

Do not dispose of used electrical equipment with household refuse!
In accordance with European Directive 2002/96/EC on the disposal of used electrical equipment and its implementation in national law, this product may not be disposed of with the household refuse, but must be recycled in an environmentally correct manner.
Wagner or one of our dealers will take back your used Wagner electric or electronic equipment and will dispose of it for you in an environmentally-friendly way. Please contact one of our service points, one of our representatives or us directly to arrange this.

12 ACCESSORIES

12.1 VALVE SEATS / VALVE TIPS

12.1.1 VALVE SEATS

Order No.	Designation	
2312179	Valve seat Air complete (steel) (Standard version)	 B_03697
2312176	Valve seat Air complete (PEEK)	 B_03697

12.1.2 VALVE TIPS

Order No.	Designation	
2312184	Valve tip Air complete (PEEK) (Standard version)	 B_03698
2312185	Valve tip Air complete (steel)	 B_03698

12.2 ROUND JET NOZZLES

12.2.1 AR 5000 AIR CAPS

Order No.	Designation
2310557	AR 5000 air cap (D8)
2315049	AR 5000 air cap (D12)


B_03239


B_03239

12.2.2 AR 5000 NOZZLES

Order No.	Designation
2310558	AR 5000 nozzle (D8)
2315050	AR 5000 nozzle (D12)


B_03238


B_03238

12.3 FLAT JET NOZZLES

12.3.1 AF 5000 AIR CAPS

Order No.	Designation
2310506	AF 5000 air cap - 0.4-0.8S
2310507	AF 5000 air cap - 1.0-1.4S
2310508	AF 5000 air cap - 1.6-2.0S
2314255	AF 5000 air cap - 0.4-0.8W (breit)
2314256	AF 5000 air cap - 1.0-1.4W (wide)
2314258	AF 5000 air cap - 1.6-2.0W (wide)


B_03240


B_03240


B_03240


B_03240


B_03240

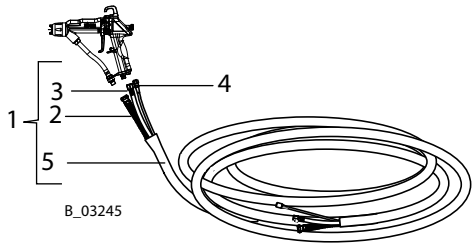

B_03240

12.3.2 AF 5000 NOZZLES

Order No.	Designation	
2310539	AF 5000 nozzle - 0.6 mm (black)	 B_03241
2310540	5000 nozzle - 0.8 mm (yellow)	 B_03241
2310541	AF 5000 nozzle - 1.0 mm (red)	 B_03241
2310542	AF 5000 nozzle - 1.2 mm (green)	 B_03241
2310543	AF 5000 nozzle - 1.4 mm (brown)	 B_03241
2310544	AF 5000 nozzle - 1.6 mm (white)	 B_03241
2310545	AF 5000 nozzle - 1.8 mm (blue)	 B_03241
2310546	AF 5000 nozzle - 2.0 mm (black)	 B_03241

12.4 HOSES AND ELECTRIC CABLES

12.4.1 STANDARD HOSE SETS AND COMPONENTS



Pos	Stk	Order No.	Designation
1	1	2339167	GM 5000EA hose set (7.5 m)
Consists of:			
2	1	2339130	Low pressure hose DN6-PN20-G¼"-7.5 m-PA
3	1	2339152	Air hose complete (8.0 m)
4	1	2339157	GM 5000E gun cable (10.0 m)
5	8 m	3676437	Protection hose fabric PP30 (8.0 m)

Pos	Stk	Order No.	Designation
1	1	2339168	GM 5000EA hose set (10m)
Consists of:			
2	1	2339131	Low pressure hose DN6-PN20-G¼"-10 m-PA
3	1	2339153	Air hose complete (10.5 m)
4	1	2339158	GM 5000E gun cable (15.0 m)
5	10.5 m	3676437	Protection hose fabric PP30 (10.5 m)

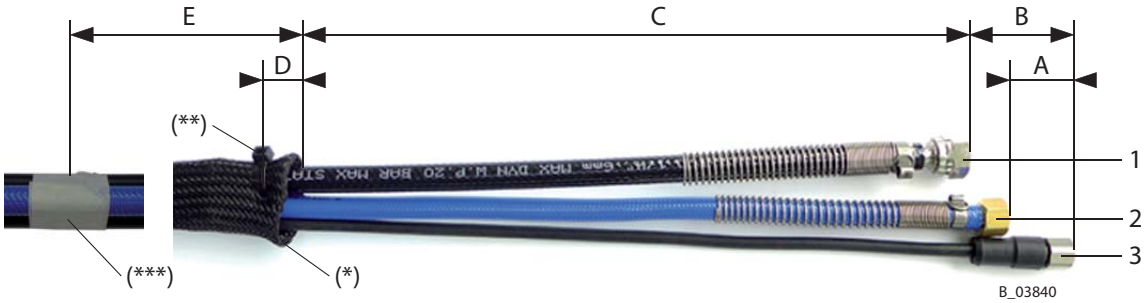
Pos	Stk	Order No.	Designation
1	1	2339169	GM 5000EA hose set (15 m)
Consists of:			
2	1	2339132	Low pressure hose DN8-PN17-G¼"-15 m-PA
3	1	2339154	Air hose complete (15.5 m)
4	1	2339159	GM 5000E gun cable (20.0 m)
5	15.5 m	3676437	Protection hose fabric PP30 (15.5 m)

Pos	Stk	Order No.	Designation
1	1	2339170	GM 5000EA hose set (20m)
Consists of:			
2	1	2339133	Low pressure hose D8-PN17-G¼"-20 m-PA
3	1	2339155	Air hose complete (20.5 m)
4	1	2339160	GM 5000E gun cable (25.0 m)
5	20.5 m	3676437	Protection hose fabric PP30 (20.5 m)

Hose colors:
Product hose black
Air hose blue

Dimensions:
Air hose: inside diameter 6.5 mm; 0.26 inches
Product hose 7.5 m and 10 m: inside diameter 6 mm; 0.24 inch, nominal pressure 2 MPa; 20 bar; 290.07 psi
Product hose 15 m and 20 m: inside diameter 8 mm; 0.32 inch, nominal pressure 1.7 MPa; 17 bar; 246.56 psi

Material of product hose: PA



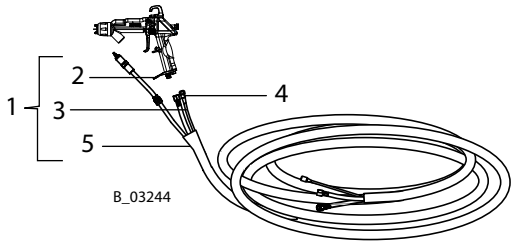
1 Product hose
2 Air hose
3 Electric cable

Order No.	Description	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
2339167	GM 5000EA hose set (7.5 m)	29±2	47±2	300±10	20±10	1500^{+100}
2339168	GM 5000EA hose set (10m)	29±2	47±2	300±10	20±10	1500^{+100}
2339169	GM 5000EA hose set (15 m)	29±2	47±2	300±10	20±10	1500^{+100}
2339170	GM 5000EA hose set (20m)	29±2	47±2	300±10	20±10	1500^{+100}

Notes:

(*) Melt the hose ends at both sides (gun/pump) and revert them to the interior by approx. 5 cm.
(**) Fix the protective hose with cable ties on both sides only once at the product hose (internally)
(***) Fix the hose set within the protective hose approx. once per meter by means of adhesive tape, starting at distance E.
Cable ties are only permitted at the ends of the protective hose (see **)!
(****) If the air swivel joint (order no. 2324766) is used, the hose set has to be adapted.
Dimension A becomes 60±2!

12.4.2 HOSE SETS FOR LOW-RESISTANCE PRODUCTS



Pos	Stk	Order No.	Designation
1	1	2339175	GM 5000EA hose set (7.5m), Low R
Consists of:			
2	1	2310464	EA product hose complete (7.5 m) Low R
3	1	2339152	Air hose complete (8.0 m)
4	1	2339157	GM 5000E gun cable (10.0 m)
5	8 m	3676437	Protection hose fabric PP30 (8.0 m)

Pos	Stk	Order No.	Designation
1	1	2339176	GM 5000EA hose set (10.0m), Low R
Consists of:			
2	1	2310465	EA product hose complete (10.0 m) Low R
3	1	2339153	Air hose complete (10.5 m)
4	1	2339158	GM 5000E gun cable (15.0 m)
5	10.5 m	3676437	Protection hose fabric PP30 (10.5 m)

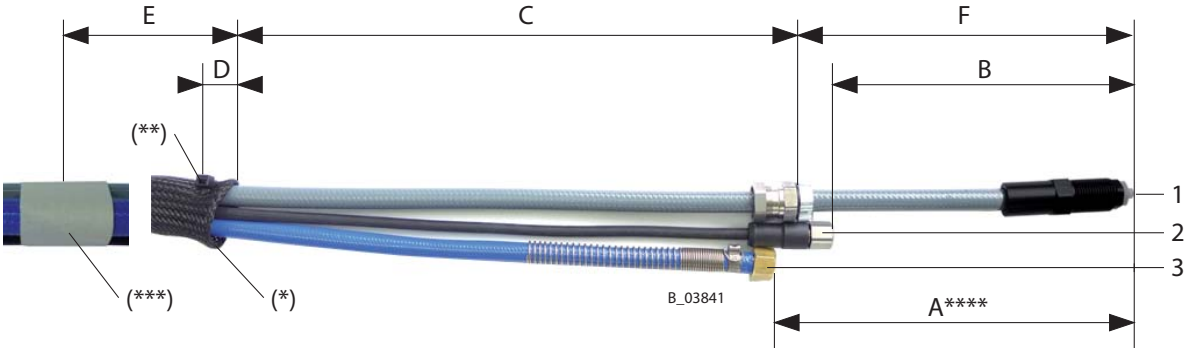
Pos	Stk	Order No.	Designation
1	1	2339177	GM 5000EA hose set (15.0 m), Low R
Consists of:			
2	1	2310466	EA product hose complete (15.0 m) Low R
3	1	2339154	Air hose complete (15.5 m)
4	1	2339159	GM 5000E gun cable (20.0 m)
5	15.5 m	3676437	Protection hose fabric PP30 (15.5 m)

Pos	Stk	Order No.	Designation
1	1	2339178	GM 5000EA hose set (20.0 m), Low R
Consists of:			
2	1	2310467	EA product hose complete (20.0 m) Low R
3	1	2339155	Air hose complete (20.5 m)
4	1	2339160	GM 5000E gun cable (25.0 m)
5	20.5 m	3676437	Protection hose fabric PP30 (20.5 m)

Hose colors:
Product hose grey
Air hose blue

Dimensions:
Air hose: inside diameter 6.5 mm; 0.26 inches
Product hose: inside diameter 6 mm; 0.24 inch, nominal pressure 2 MPa; 20 bar; 290.07 psi

Material of product hose: FEP



1 Product hose
2 Electric cable
3 Air hose

Order No.	Description	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
2339175	GM 5000EA hose set (7.5m) Low R	200±2	171±2	300±10	20±10	1500^{+100}	182±1
2339176	GM 5000EA hose set (10m) Low R	200±2	171±2	300±10	20±10	1500^{+100}	182±1
2339177	GM 5000EA hose set (15 m), Low R	200±2	171±2	300±10	20±10	1500^{+100}	182±1
2339178	GM 5000EA hose set (20 m) Low R	200±2	171±2	300±10	20±10	1500^{+100}	182±1

Notes:

(*) Melt the hose ends at both sides (gun/pump) and revert them to the interior by approx. 5 cm.
(**) Fix the protective hose with cable ties on both sides only once at the product hose (internally).
(***) Fix the hose set within the protective hose approx. once per meter by means of adhesive tape, starting at distance E.
Cable ties are only permitted at the ends of the protective hose (see **)!
(****) If the air swivel joint (order no. 2324766) is used, the hose set has to be adapted.
Dimension A becomes 231±2 mm!

12.4.3 GUN CABLES AND GUN CABLE EXTENSIONS

Order No.	Designation
2307295	GM 5000E extension cable 10m; 32.81 ft
2307296	GM 5000E extension cable 20 m; 65.62 ft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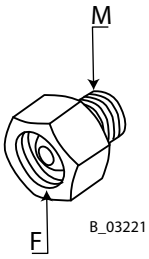
12.5 REDUCTION FITTINGS FOR HIGH-PRESSURE HOSES

The classification of WAGNER fittings is consistent with the following classification, each separated by high-pressure and low pressure fittings.

DF	Double fitting - male / male thread
RF	Reduction fitting - female / male thread
SF	Adjustable screw - female / male thread: allows precise angle adjustment (swivel)
EF	90° elbow - adjustable or male / male thread (elbow fitting)
BF	Bulkhead fastener - male / male thread with pressure-resistant feed-through
PF	Stopper - male thread for closing (plug fitting)
HF	Hose fitting with union nut and sealing cone (hose fitting)
The short description of the fittings are as follows:	

DF-	MM-	G3/4“-	1/4“NPS-	PN270-	SSt
					Materials, SSt = Stainless steel
				Nominal pressure (in bar)	
			1st thread, e.g. G1/4", 1/4"NPS		
		2nd thread, e.g. G1/4", 1/4"NPS, M16x1.5			
	M: male (outer thread) F: female (interior thread)				
Short description see list above, e.g. RF = Reduction Fitting					

Order No.	Designation
384555	Reduction fitting RF-FM-M16x1,5-1/4"NPS-PN530-SSt
384559	Reduction fitting RF-FM-M16x1,5-G1/4"-PN530-SSt
384556	Reduction fitting RF-FM-M16x1,5-3/8"NPSM-PN530-SSt
34041	Reduction fitting RF-FM-1/4"NPS-M16x1,5--PN270-SSt
179732	Reduction fitting RF-FM-1/4"NPS-3/8"NPS--PN270-SSt
179247	Reduction fitting RF-FM-1/4"NPS-G1/4"--PN270-SSt



In the large Wagner Accessories Catalogue for wet coating you will also find other material fittings.

12.6 MISCELLANEOUS

Order No.	Designation
2319653	Protective gun coating
259010	HV200 N high-voltage tester
2326041	Lacquer resistance meter
999080	Wet film thickness gauge
50342	Viscosity cup DIN 4 mm; 0.16 inch
2309368	Assembly tool valve needle
2325263	Assembly tool clamping screw
2326485	GM 5000E wall mount (left/right)
2324766	Swivel joint air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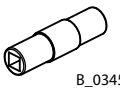
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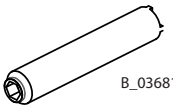
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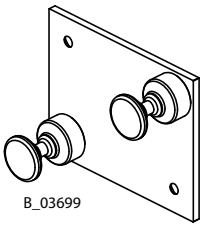
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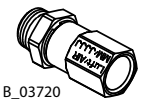
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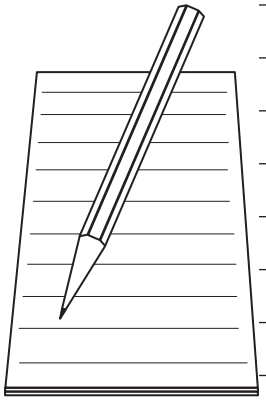


13 SPARE PARTS

13.1 HOW CAN SPARE PARTS BE ORDERED?

Always supply the following information to ensure delivery of the right spare part:

Order number, designation and quantity
The quantity need not be the same as the number given in the quantity column "**Stk**" on the lists. This number merely indicates how many of the respective parts are used in each component.

The following information is also required to ensure smooth processing of your order:
- Billing address
- Delivery address
- Name of the person to be contacted in the event of any queries
- Type of delivery (normal mail, express delivery, air freight, courier, etc.)

Identification in spare parts lists

Explanation of column "**K**" (labeling) in the following spare parts lists:

◆ Wearing part
Note: No liability is assumed for wearing parts.

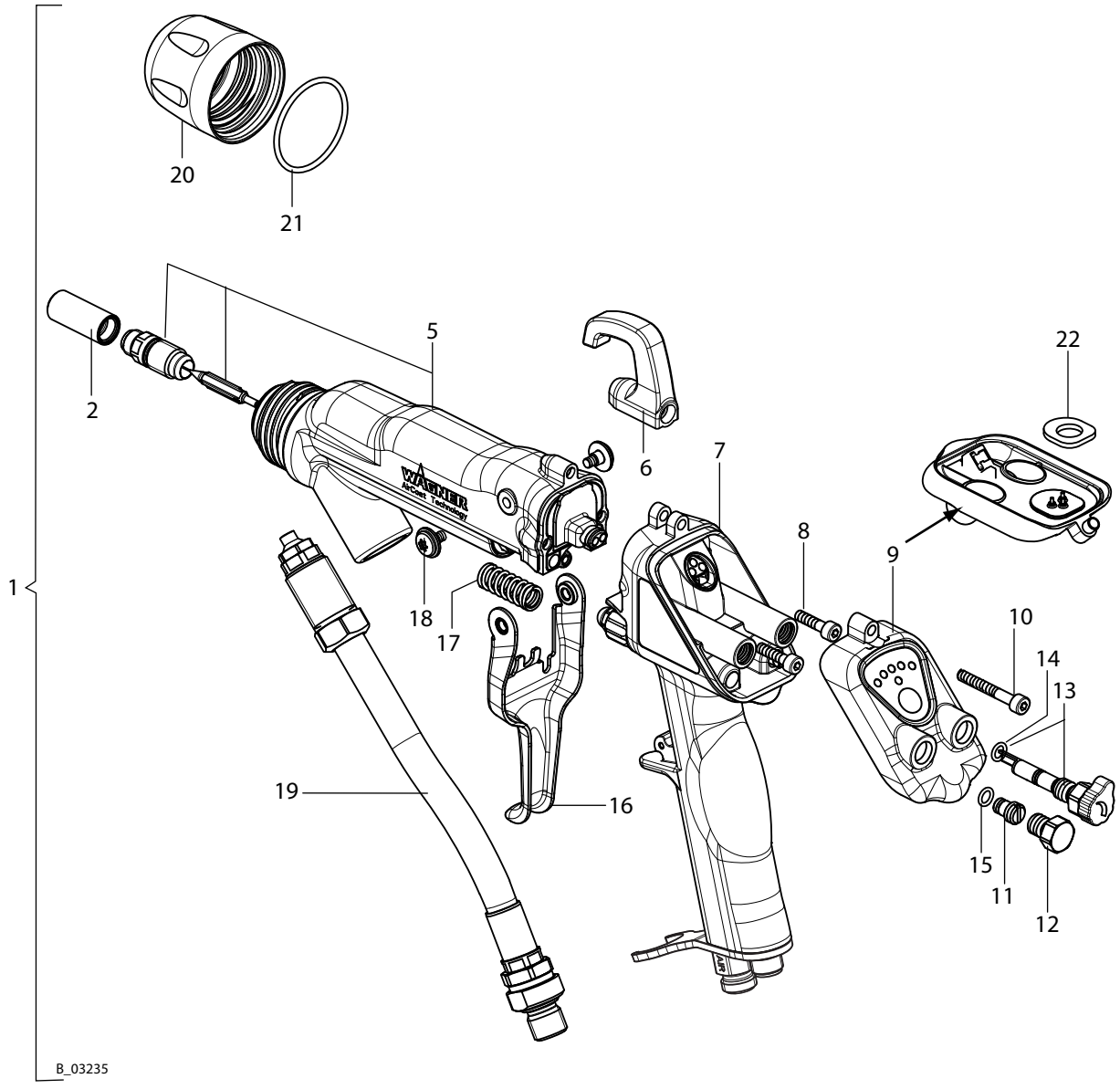
● Not part of the standard equipment but available as a special accessory.

⚠ WARNING

Incorrect maintenance/repair!
Risk of injury and equipment damage.

→ Have repairs and part replacements be carried out only by specially trained staff or a WAGNER service center.
→ Before all work on the device and in the event of work interruptions:
- Switch off the energy/compressed air supply.
- Relieve the pressure from the spray gun and device.
- Secure the spray gun against actuation.
→ Observe the operating instructions for any work.

13.2 SPARE PARTS LIST GM 5000EA



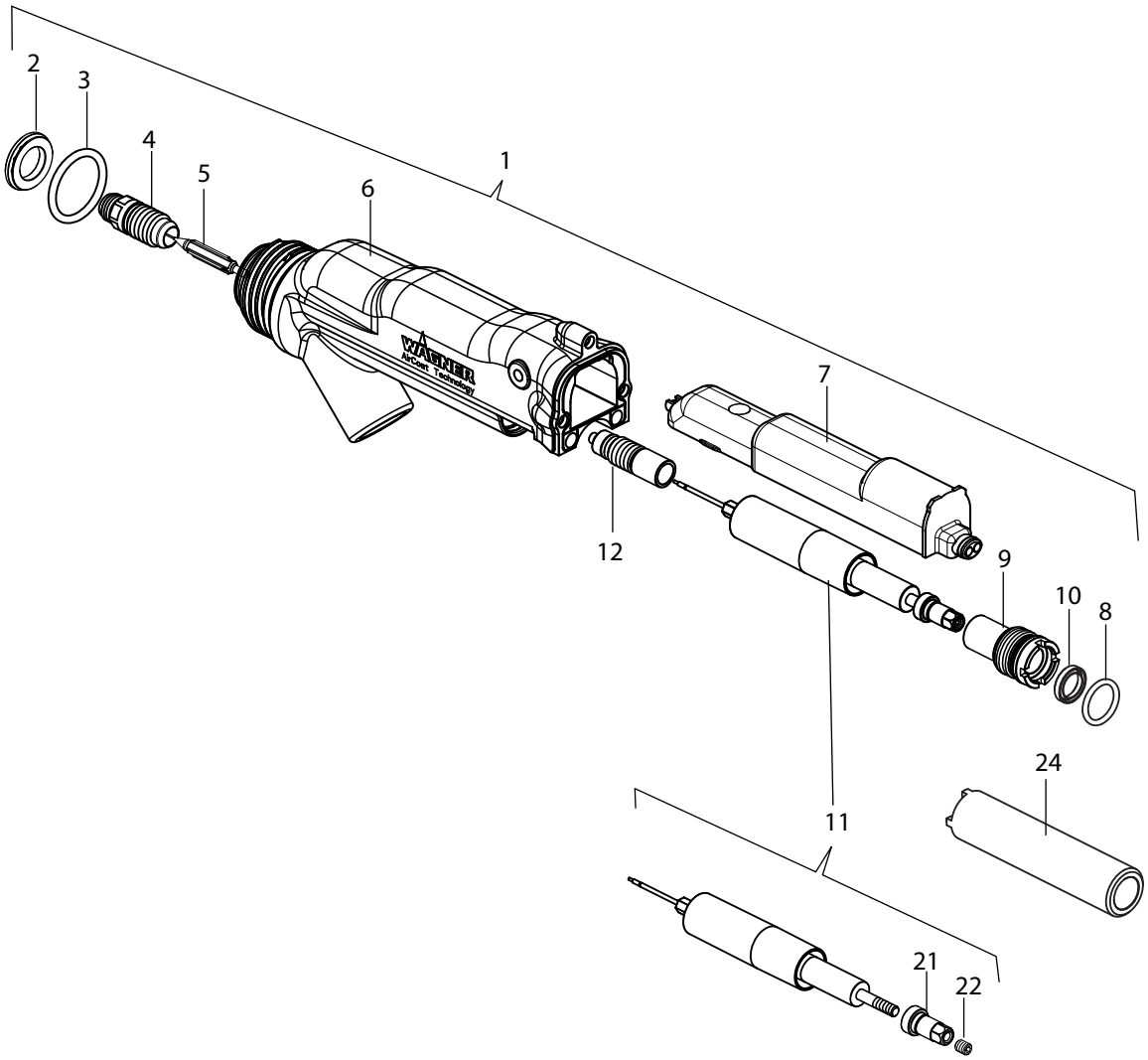
Spare parts list GM 5000EA

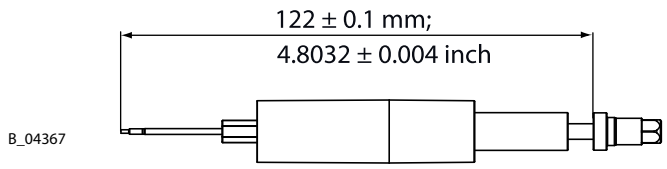
Pos	K	Stk	Order No.	Designation
1		1	2344471	GM 5000EA basic version
2		1	2315709	Protection cap valve needle
5		1	-	GM 5000EA adapter complete Details see Chapter 13.2.1
6	◆	1	2314361	Hook
7		1	-	ES 5000 Air handle complete Details see Chapter 13.2.2
8		2	9900308	Hexagon socket head cap screw
9		1	2312183	Lid complete
10		1	9900386	Hexagon socket head cap screw
11		1	2311970	Sealing plug
12		1	2307104	Screw plug
13		1	2312180	Air regulation complete
14	◆★	1	9971182	O-ring
15	◆★	1	9971182	O-ring
16	◆	1	2314360	Trigger
17		1	2311849	Cylindrical helical spring
18		2	2310617	Oval head screw with hexagon
19	◆	1	2314358	Product hose Air complete
20		1	2307039	Union nut
21	◆★	1	2311217	O-ring
22	◆★	1	2308699	Cover seal
		1	2326335	GA 5000EA service set

◆ = Wearing part

★ = Included in service set

13.2.1 SPARE PARTS LIST GM 5000EA - ADAPTER





Spare parts list Adapter

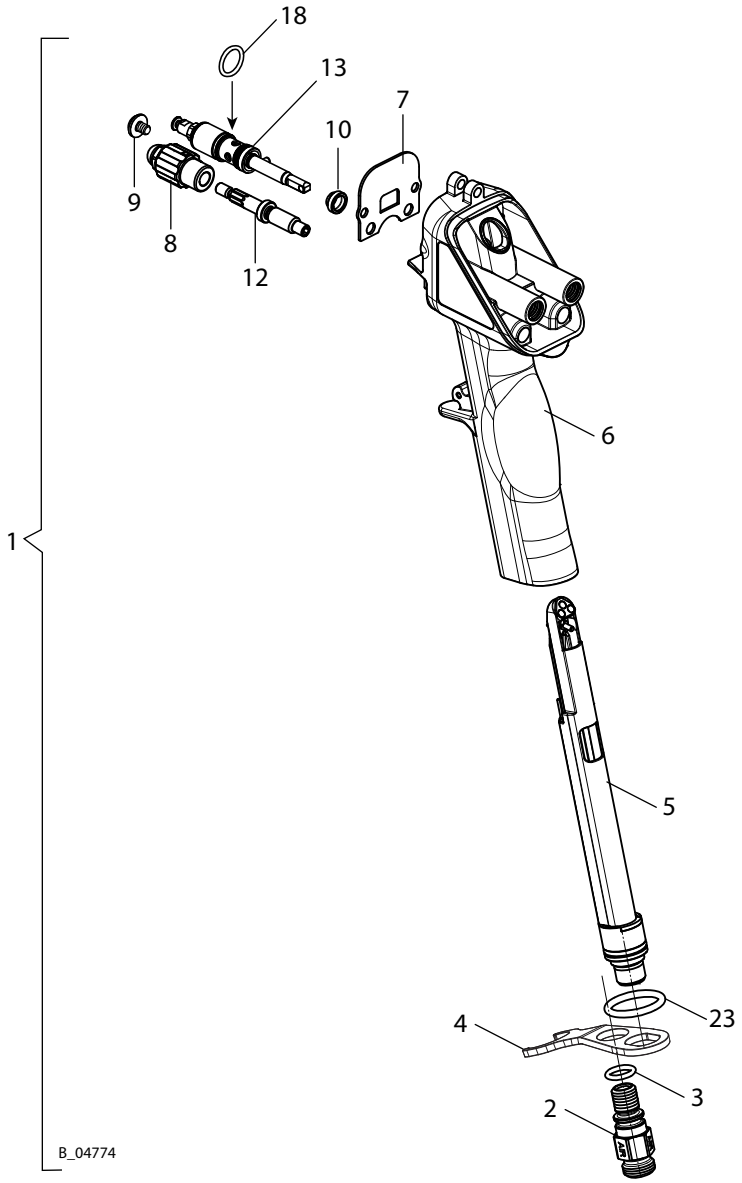
Pos	K	Stk	Order No.	Designation
1		1	-	GM 5000EA adapter complete
2	★	1	2309391	Air manifold ring Air
3	◆★	1	2307180	O-ring, sheathed
4	◆★	1	2312179	Valve seat Air complete (steel)
	◆ ●	1	2312176	Valve seat Air complete (PEEK)
5	◆★	1	2312184	Valve tip Air complete (PEEK)
	◆ ●	1	2312185	Valve tip Air complete (steel)
6		1	2314271	GM 5000EA adapter
7		1	2312181	Cascade complete
8	◆★	1	9974166	O-ring
9		1	2307062	Clamping screw valve rod
10	◆★	1	2311562	Rod seal
11	◆	1	2312177	Valve rod unit Air
12	◆★	1	2340023	Packing complete
21		1	2307059	Withdrawal nut
22		1	9901411	Threaded pin with hexagon socket
24		1	2325263	Assembly tool clamping screw
		1	2326335	GA 5000EA service set

◆ = Wearing part

★ = Included in service set

● = Not part of the standard equipment but available as a special accessory.

13.2.2 SPARE PARTS LIST GM 5000EA - HANDLE



Spare parts list Handle

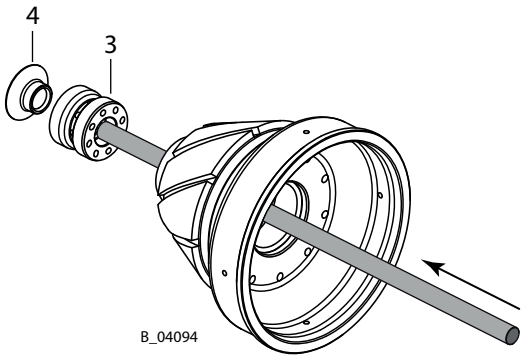
Pos	K	Stk	Order No.	Designation
1		1	-	GM 5000EA handle complete
2		1	2307288	Nipple
3	◆★	1	9971025	O-ring
4		1	2307290	Hose holder
5		1	2312182	Plug complete
6		1	2314270	Handle complete
7	★	1	2307232	Adapter seal
8		1	2325789	Adjusting screw complete
9		1	2309825	Oval head screw with hexagon
10	◆★	1	2310692	Seal
12		1	2307281	Threaded bolt
13		1	2312189	Air valve
18	◆★	1	9974218	O-ring
23	◆★	1	9974166	O-ring
		1	2326335	GA 5000EA service set

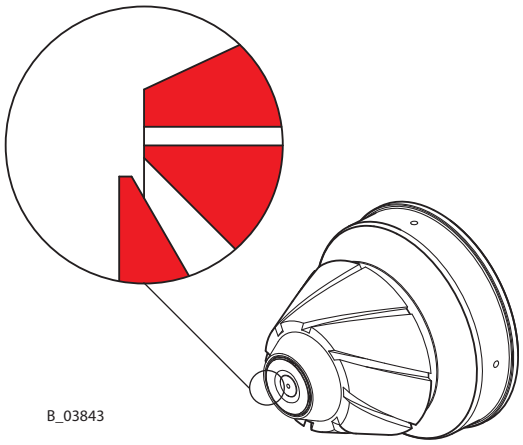
◆ = Wearing part

★ = Included in service set

13.3 ACCESSORIES SPARE PARTS LISTS

Notes concerning AR5000 D8 nd D12 nozzles:
Parts 3 and 4 can be pushed out of the nozzle by means of a suitable pin (∅ 2.0-2.3 mm; 0.08-0.09 inch).



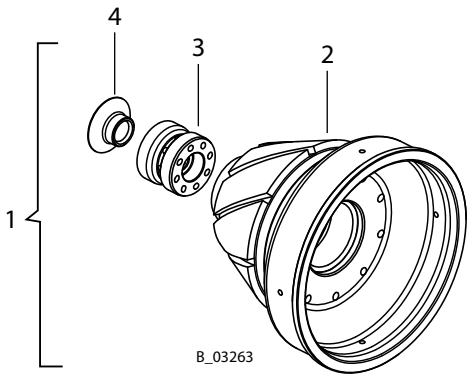


NOTICE

Incorrect assembly
Equipment or parts damage.

→ Do not deteriorate the edges of the parts (see detail) during assembly (press parts carefully on stop).

13.3.1 SPARE PARTS LIST AR 5000 NOZZLE (D8)

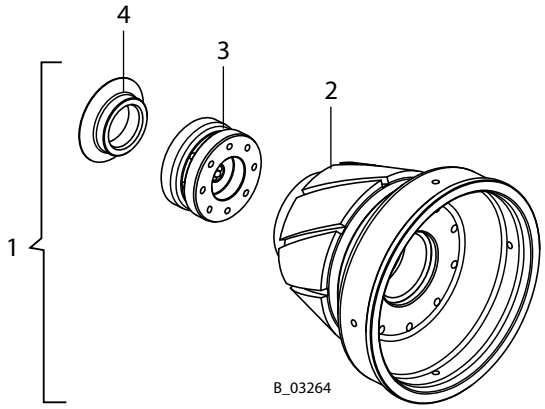


Spare parts list AR 5000 nozzle (D8)

Pos	K	Stk	Order No.	Designation
1		1	2310558	AR 5000 nozzle complete (D8)
2	◆	1	2327658	AR nozzle (D8)
3	◆	1	2327659	AR nozzle attachment (D8)
4	◆	1	2327660	Air diffuser AR (D8)

◆ = Wearing part

13.3.2 SPARE PARTS LIST AR 5000 NOZZLE (D12)



Spare parts list AR 5000 nozzle (D12)

Pos	K	Stk	Order No.	Designation
1		1	2315050	AR 5000 nozzle complete (D12)
2	◆	1	2327661	AR 5000 nozzle (D12)
3	◆	1	2327662	AR nozzle attachment (D12)
4	◆	1	2327663	AR air diffuser (D12)

◆ = Wearing part

14 WARRANTY

14.1 IMPORTANT NOTES REGARDING PRODUCT LIABILITY

As a result of an EC regulation effective from January 1, 1990, the manufacturer shall only be liable for his product if all parts originate from him or are approved by him, and if the devices are properly mounted, operated and maintained.
The manufacturer will not be held liable or will only be held partially liable if third-party accessories or spare parts have been used.
With genuine WAGNER accessories and spare parts, you have the guarantee that all safety regulations are complied with.

14.2 WARRANTY CLAIM

Full warranty is provided for this device:
We will at our discretion repair or replace free of charge all parts which within 24 months in single-shift, 12 months in 2-shift or 6 months in 3-shift operation from date of receipt by the purchaser are found to be wholly or substantially unusable due to causes prior to the sale, in particular faulty design, defective materials or poor workmanship.
The type of warranty provided is such that the device or individual components of the device are either replaced or repaired as we see fit. The resulting costs, in particular shipping charges, road tolls, labour and product costs will be borne by us except where these costs are increased due to the subsequent shipment of the device to a location other than the address of the purchaser.
We do not provide warranty for damage that has been caused or contributed to for the following reasons:
Unsuitable or improper use, faulty assembly or commissioning by the purchaser or a third party, normal wear, negligent handling, defective maintenance, unsuitable coating products, substitute products and the influence of chemical, electrochemical or electrical agents, except when the damage is attributable to us.
Abrasive coating products such as red lead, emulsions, glazes, liquid abrasives, zinc dust paints and so forth reduce the service life of valves, packings, spray guns, nozzles, cylinders, pistons etc. Wear and tear due to such causes are not covered by this warranty.
Components that have not been manufactured by WAGNER are subject to the original warranty of the manufacturer.
Replacement of a component does not extend the period of warranty of the device.
The device should be inspected immediately upon receipt. To avoid losing the warranty, we or the supplier company are to be informed in writing about obvious faults within 14 days upon receipt of the device.
We reserve the right to have the warranty compliance met by a contracting company.
The services provided by this warranty are dependent on evidence being provided in the form of an invoice or delivery note. If the examination discovers that no warranty claim exists, the costs of repairs are charged to the purchaser.
It is clearly stipulated that this warranty claim does not represent any constraint on statutory regulations or regulations agreed to contractually in our general terms and conditions.

J. Wagner AG

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