WAGNER

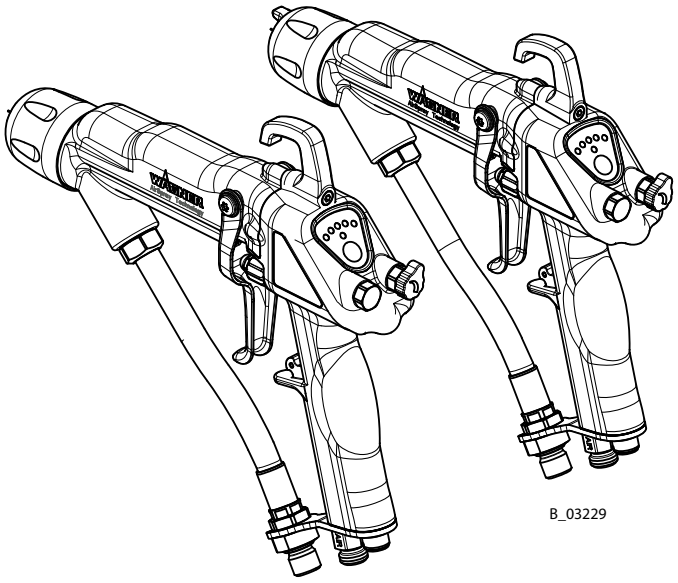
Translation of the Original Operating Manual

GM 5000EA

Version 04/2016

Electrostatic Air Spray Gun

for manual operation
for flat or round jet nozzles



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1 ABOUT THESE INSTRUCTIONS

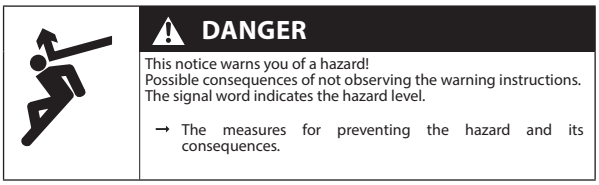
1.1 PREFACE

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 the operating and service personnel.
The device may only be operated by trained personnel and in compliance with this operating manual. Operating and service personnel should be instructed according to the safety instructions.
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.

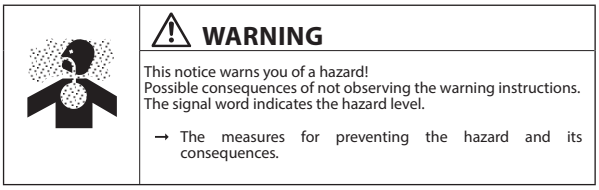
1.2 WARNINGS, NOTICES AND SYMBOLS IN THESE INSTRUCTIONS

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:

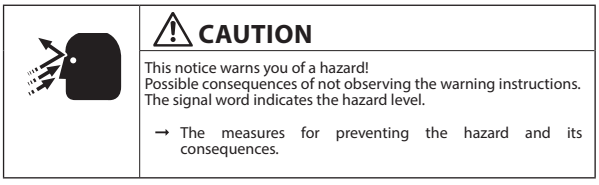
Danger - immediate risk of danger.
Non-observance will result in death or serious injury.



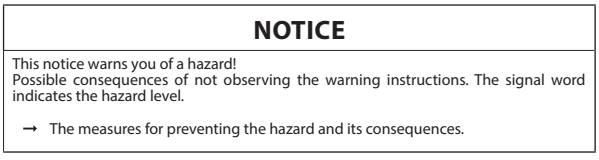
Warning - possible imminent danger.
Non-observance may result in death or serious injury.



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



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



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

1.3 LANGUAGES

The **GM 5000EA** operating manual is available in the following languages:

Language	Order No.	Language	Order No.
German	2356789	English	2344499

Additional languages on request or at: **www.wagner-group.com**

1.4 ABBREVIATIONS

Order No.	Order number
ET	Spare part
K	Marking in the spare parts lists
EA	Electrostatics Air
GM	Manual gun
Low R	Low-resistance
PEEK	Polyether ether ketone (high temperature-resistant thermoplastic plastic)
SSt	Stainless steel
Pos	Position
Stk	Number of pieces
SW	Wrench size

1.5 TERMINOLOGY FOR THE PURPOSE OF THIS MANUAL

Cleaning	Manual cleaning of devices and device parts with cleaning agent
Flushing	Internal flushing of paint-wetted parts with flushing agent
Product pressure generator	Pump or pressure tank

Staff qualifications

Trained person	Is instructed in the tasks assigned to him/her, the potential risks associated with improper behavior as well as the necessary protective devices and measures.
Electrically trained person	Is instructed by an electrician about the tasks assigned to him/her, the potential risks associated with improper behavior as well as the necessary protective devices and measures.
Electrician	Can assess the work assigned to him/her and detect possible hazards based on his/her technical training, knowledge and experience in relevant provisions.
Skilled person in the context of BGI 764	A person who, based on his/her technical training, experience and recent vocational experience, has sufficient technical knowledge in the area of electrostatic coating and is familiar with the relevant and generally accepted rules of technology so that he/she can inspect and assess the status of devices and coating systems based on workplace safety. → Additional requirements for skilled persons can also be referred to in TRBS 1203 (2010): Expert knowledge in the areas of protection against excessive pressure, electrical hazards, and explosion protection (where applicable).

2 CORRECT USE

2.1 DEVICE TYPE

Electrostatic manual spray gun for manual coating of grounded work pieces.

2.2 TYPE OF USE

The GM 5000EA electrostatic manual spray gun is suitable for spraying liquid products, particularly coating products, using the air atomizing method. Coating products which contain ingredients of explosion class IIA and IIB substances (maximum ignition energy 0.24 mJ) may be used.

WAGNER forbids any other use!

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 explosion protection marking in Chapter 3).

2.4 SAFETY PARAMETERS

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.

The device may only be operated under the following conditions:

- → The operating personnel must be trained on the basis of this operating manual.
- → The safety regulations listed in this operating manual must be observed.
- → The operating, maintenance and repair information in this operating manual must be observed.
- → The statutory requirements and accident prevention regulation standards in the country of use must be 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 WORKING MATERIALS

- → Lacquers which contain ingredients of explosion class IIA and IIB substances (maximum ignition energy 0.24 mJ) can be processed with the GM 5000EA spray gun.
- → The spray gun basic version is suitable for processing 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 an accessory), you can also successfully process sprayed substances with an electrical resistance > 50 kΩ (according to the WAGNER scale).
- → The application effectiveness is always dependant on the composition of the product being used, e.g. pigments or resin.

Conversion of Paint Resistance

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

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

Example:

With WAGNER's paint 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 spray product with regard to the charging ability can be read from the actual values for high-voltage (kV) and for the spray current (µA) shown in the illuminated displays 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

- → Please contact your local WAGNER dealer and the lacquer manufacturer if you encounter application problems.

2.6 REASONABLY FORESEEABLE MISUSE

The forms of misuse listed below may result in physical injury or property damage:

- → use with non-authorized control units;
- → coating work pieces which are not grounded;
- → working with an ungrounded lacquer supply system;
- → performing unauthorized conversions or modifications to the device;
- → processing inadmissible coating products;
- → processing dry or similar coating products, e.g., powder;
- → using defective components, spare parts or accessories other than those described in the "Accessories" chapter of this operating manual;
- → continuing work with a defective or kinked product hose;
- → working with incorrectly set values;
- → processing food;
- → use in the pharmaceutical sector.

2.7 RESIDUAL RISKS

Residual risks are risks which cannot be ruled out 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 lacquers and cleaning agents	Handling of lacquers and cleaning agents	Skin irritations, allergies	Wear protective clothing Observe safety data sheets	Operation, maintenance, disassembly
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

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For electrostatic finishing applications using class I, group D, spray product

In accordance with document 2316160

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

Temperature notes

- 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

Cable connections

Only cable assigned to the device may be used (see Chapter 13).

Permissible Device Combinations

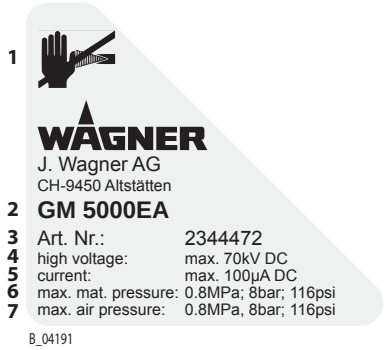
The GM 5000EA manual spray gun may only be connected to the control units listed below:

- VM 500 control unit (USA)
- VM 5000 control unit (USA)

⚠	**⚠ WARNING**
	Incorrect use! Risk of injury and damage to the device. → Connect the GM 5000EA manual spray gun only to original WAGNER control units.

3.2 TYPE PLATE

Type plate left



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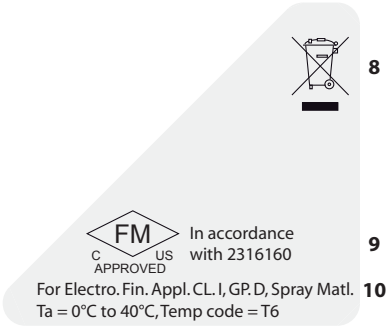
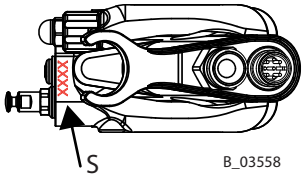
Type plate right



1 Warning: Danger of becoming injured by high-pressure jet
2 Device type
3 Article number
4 Maximum high voltage
5 Maximum current
6 Maximum product pressure
7 Maximum air pressure
8 Do not dispose of used electrical equipment with household refuse.
9 Identification and test centre
10 For Electrostatic Finishing Applications using Class II, Spray Material

Serial number
The serial number (S) on the underside of the handle.



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4 GENERAL SAFETY INSTRUCTIONS

4.1 SAFETY INSTRUCTIONS FOR THE OPERATOR

→ Keep this operating manual at hand near the device 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. With open housings, there is a danger from line voltage.
→ 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 or are damaged.
→ Must be de-energized before work is commenced on active parts. Inform staff about planned work. Observe electrical safety regulations.
→ Connect all devices to a common grounding point.
→ Only operate the device with a properly installed socket with a protective ground wire connection.
→ Keep liquids away from electrical devices.

4.1.2 PERSONNEL QUALIFICATIONS

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

4.1.3 SAFE WORK ENVIRONMENT

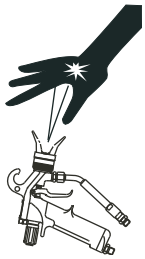
→ Ensure that the floor in the working area is static dissipative in accordance with EN 61340-4-1 (resistance must not exceed 100 megohms).
→ Ensure that all persons within the working area wear static dissipative shoes. Footwear must comply with EN 20344. The measured insulation resistance must not exceed 100 megohms.
→ Ensure that during spraying, persons wear static dissipative gloves. The grounding takes place via the spray gun handle or the trigger guard.
→ If protective clothing is worn, including gloves, it has to comply with EN 1149-5. The measured insulation resistance must not exceed 100 megohms.
→ Paint mist extraction systems/ventilation 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. No smoking.
→ Ensure that the pipe joints, hoses, equipment parts and connections are permanently, technically leak-proof:
  - Periodic preventative maintenance and service (replacing hoses, checking tightness strength and connections etc.).
  - Regular monitoring of leaks and defects via visual inspection and odor testing, e.g., daily before commissioning, at the end of work or weekly.
→ In the event of defects, immediately bring the device or system to a stop and arrange to have repairs carried out immediately.

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.
→ Anyone fitted with a pacemaker must not enter the high-voltage area!

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 flushing 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 with need, at least however every 12 months to examine by experts (e.g., WAGNER Service Technician) in accordance with the guidelines for liquid ejection devices (DGUV regulation 100-500).
  - For shut down devices, the examination can be suspended until the next start-up.
→ Carry out the work steps as described in the "Pressure Relief" 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 flushing agents:
→ Note the paint or flushing agent that you have been using.
→ Consult a doctor immediately.

Avoid risk of injury from 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

Friction, flowing liquids and air or electrostatic coating processes create charges. Flames or sparks can form during discharge. Grounding prevents electrostatic charging.

- → Ensure that the device is grounded. → See chapter "Grounding".
- → 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 static dissipative gloves when spraying. The grounding takes place via the spray gun handle.
- → The spray substance supply (spray substance tank, pump, etc.) must be grounded.

4.2.3 PRODUCT HOSES

- → Ensure that the hose material is chemically resistant to the sprayed products and the used flushing agents.
- → Ensure that the product hose is suitable for the pressure generated.
- → Ensure that the following information can be seen on the high-pressure hose:
  - Manufacturer
  - Permissible operating pressure
  - Date of manufacture
- → Make sure that the hoses are laid only in suitable places. Hoses should not be laid in the following places under any circumstances:
  - in high-traffic areas,
  - on sharp edges,
  - on moving parts or
  - on hot surfaces.
- → Ensure that the hoses are never run over by vehicles (e.g., fork lifts), or that the hoses are never put under pressure from the outside in any other way.
- → Ensure that the hoses are never kinked. Observe maximum bending radii.
- → Make sure that the hoses are never used to pull or move the equipment.
- → Suction hoses may not be subjected to pressure.

Several liquids have a high expansion coefficient. In some cases their volume can rise with consequent damage to pipes, fittings, etc. and cause fluid leakage.
When the pump sucks liquid from a closed tank, ensure that air or a suitable gas can enter the tank. Thus a negative pressure is avoided. The vacuum could implode the tank (squeeze) and can cause it to break. The tank would leak and the liquid would flow out.
The pressure created by the pump is a multiplication of the inlet air pressure.

4.2.4 CLEANING AND FLUSHING

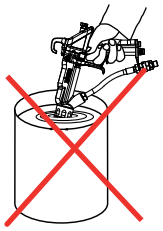
→ Relieve the pressure from the device.
→ De-energize the device electrically.
→ Preference should be given to non-flammable cleaning and flushing agents.
→ Observe the specifications of the lacquer manufacturer.
→ Ensure that the flash point of the cleaning agent is at least 15 K above the ambient temperature or that cleaning is undertaken at a cleaning station with technical ventilation.

→ Take measures for workplace safety (see Chapter 4.1.3).
→ When commissioning or emptying the device, please note that an explosive mixture may temporarily exist inside the lines and components of equipment:
- depending on the coating product used,
- depending on the flushing agent (solvent) used,
explosive mixture inside the lines and items of equipment.

→ Only electrically conductive tanks may be used for cleaning and flushing agents.
→ The tanks must be grounded.

An explosive gas/air mixture forms in closed tanks.
→ Never spray into a closed tank when using solvents for flushing.

External cleaning
When cleaning the exterior of the device or its parts, also observe the following:
→ Disconnect the pneumatic supply line.
→ Use only moistened cloths and brushes. Never use abrasive agents or hard objects and never spray cleaning agents with a gun. Cleaning the device must not damage it in any way.



→ Ensure that no electrical component is cleaned with nor even immersed into solvent.
→ Which cleaning agent is used to clean the spray gun depends on which parts of the spray gun have to be cleaned and which product has to be removed. 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.

4.2.5 HANDLING HAZARDOUS LIQUIDS, VARNISHES AND PAINTS

- → When preparing or working with lacquer and when cleaning the device, 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 skin 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 label

Note: Order the two stickers together.

4.3 PROTECTIVE AND MONITORING EQUIPMENT

- → Protective and monitoring equipment must not be removed, modified or rendered unusable.
- → Regularly check for perfect functioning.
- → If defects are detected on protective and monitoring equipment, the system must not be operated until these defects are remedied.

4.4 USE IN AREAS SUBJECT TO EXPLOSION HAZARDS

The spray gun may be used in potentially explosive areas. The following safety regulations must be observed and followed.

4.4.1 SAFETY REGULATIONS

→ Observe safety instructions in Chapter 3.2.

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 device against steel or rusty iron.
→ Do not drop the spray gun.
→ Use only 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.
→ Use only a damp cloth to clean the device.

4.5 SAFETY-RELEVANT INFORMATION ABOUT DISCHARGES

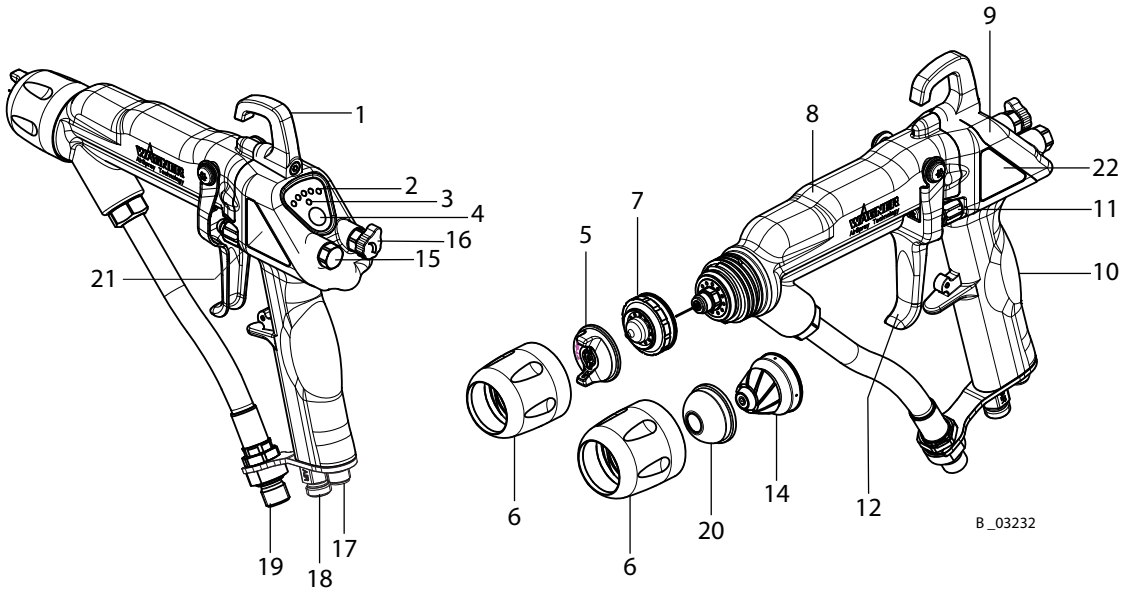
The plastic parts of the spray gun are charged electrostatically by the high-voltage field of the spray gun. Contact with plastic parts harmless discharges (brush discharges) may occur. They are completely non-hazardous for human health.

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 in the dark.

5 DESCRIPTION

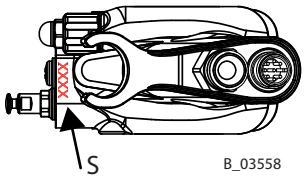
5.1 STRUCTURE (STANDARD VARIANT)

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 13 "Accessories".



Pos	Description
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 13)
6	Union nut
7	Flat spray nozzle AF 5000 x.x (accessories: see Chapter 13)
8	Adapter
9	Cover
10	Handle

Pos	Description
11	Adjusting screw (stop)
12	Trigger lever
14	Nozzle AR 5000 (accessories: see Chapter 13)
15	Sealing plug
16	Air regulation
17	Electric cable connection
18	Atomizing air connection
19	Product connection
20	Air cap AR 5000 (accessories: see Chapter 13)
21	Type plate left
22	Type plate right

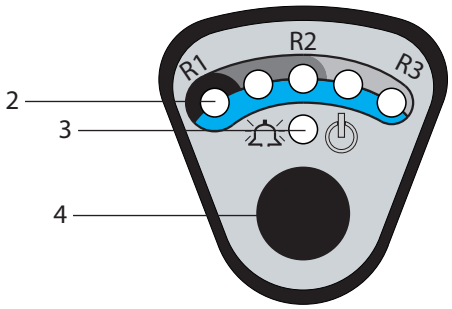


Note:
The gun type (T) is specified on the type plate and the serial number (S) is specified on the underside of the handle.

5.2 MODE OF OPERATION

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 for at least 2 seconds to go forward 1 recipe.



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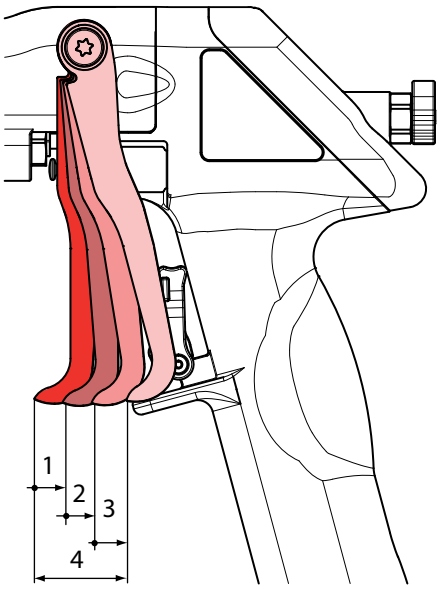
Display (2) → ●●○○○ = Recipe values changed temporarily:
If the operating key (4) is pressed for 2 seconds, the saved recipe values for the previously selected recipes numbers will be reloaded from the memory.

During spraying mode (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 illuminate in 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 - Paint conductivity too high

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

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.



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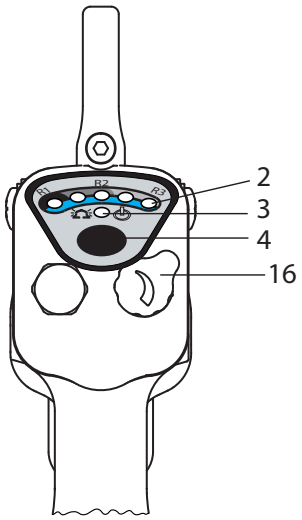
- An increase in the force needed to pull the trigger back will be perceived at the position where the product valve opens.
- For spraying without high voltage, the high voltage can be switched off using the operating button (4). Press the operating button (4) briefly: High voltage is switched off. The standby display (3) illuminates.
- In the event of a malfunction the spray gun switches to "standby" operating mode and the display (3) illuminates.
- The relationship between forming air and atomizing air is set using the **air regulator** (16).



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5.3 SCOPE OF DELIVERY

Order No.	Description
2344471	GM 5000EA spray gun (USA)
2363670	GM 5000EA spray gun spiral hose (USA)*
2367744	GM 5000EA spray gun 4 finger trigger (USA)
	All variants without control unit, product and air hose, electric cable, air cap and nozzle.

* no FM approval, in submission

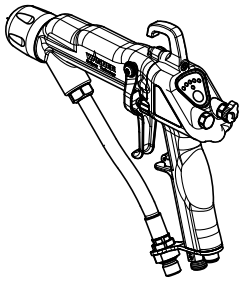
Each spray gun includes the following as standard equipment:

Order No.	Description
2309368	Valve needle assembly tool
2325263	Clamping screw assembly tool
2319653	Protection gloves against spray mist
2316160	FM Control Document
see Chapter 1.3	Operating manual in local language

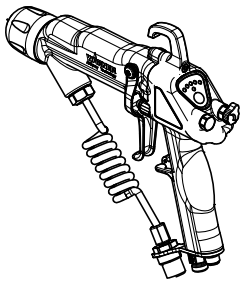
The spray gun basic version can be adapted optimally to any application depending upon the requirements and the desired accessories with the help of spray gun configuration.

The delivery note shows the exact scope of delivery.

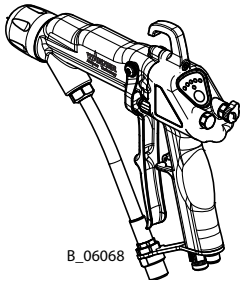
5.3.1 DESIGN VARIANTS



Basic version GM 5000EA (USA)
Order No. 2344471



Spiral hose GM 5000EA (USA)
(no FM approval, in submission)
Order No. 2363670
for processing of metallic lacquers



B_06068

GM 5000EA 4 finger trigger (USA)
Order No. 2367744

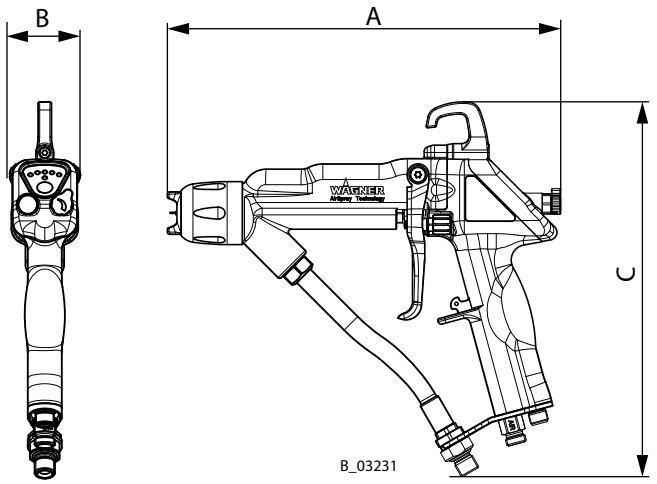
5.4 TECHNICAL DATA

Maximum air pressure	0.8 MPa; 8 bar; 116 psi
Maximum product pressure	0.8 MPa; 8 bar; 116 psi
Fluid inlet	NPSM 3/8"–18
Air connection	NPSM 1/4"–18
Input voltage	maximum 20 Vpp
Input current	maximum 1.0 A AC
Output voltage	maximum 70 kV DC
Output current	maximum 100 µA DC
Ambient temperature	0 °C - 40 °C; 32 °F - 104 °F
Maximum permissible product temperature:	50 °C; 122 °F
Maximum surface temperature	85 °C; 185 °F
Compressed air quality: free from oil and water	Quality standard 6.5.2 according to ISO 8573.1, 2010 6: Particle density ≤ 5 mg/m³ 5: Humidity: pressure dew point ≤ +7 °C 2: Oil content ≤ 0.1 mg/m³
Weight (without hose set)	630 g (incl. union nut, nozzle and air cap)
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)

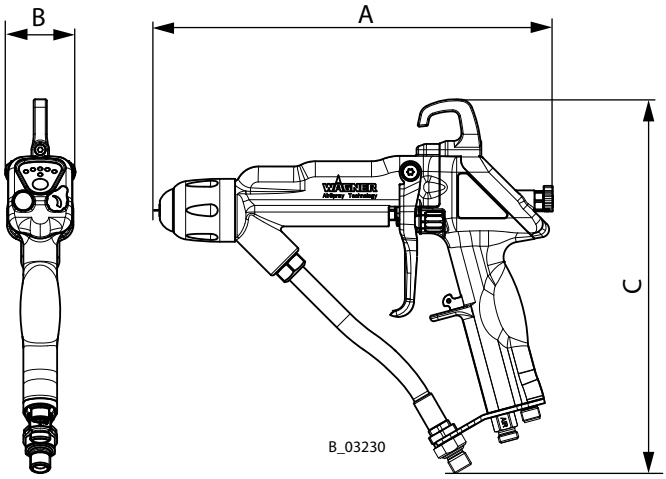
* A-rated sound pressure level measured at 1 m distance, LpA1m, in accordance with DIN EN 14462: 2005.

Dimensions

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



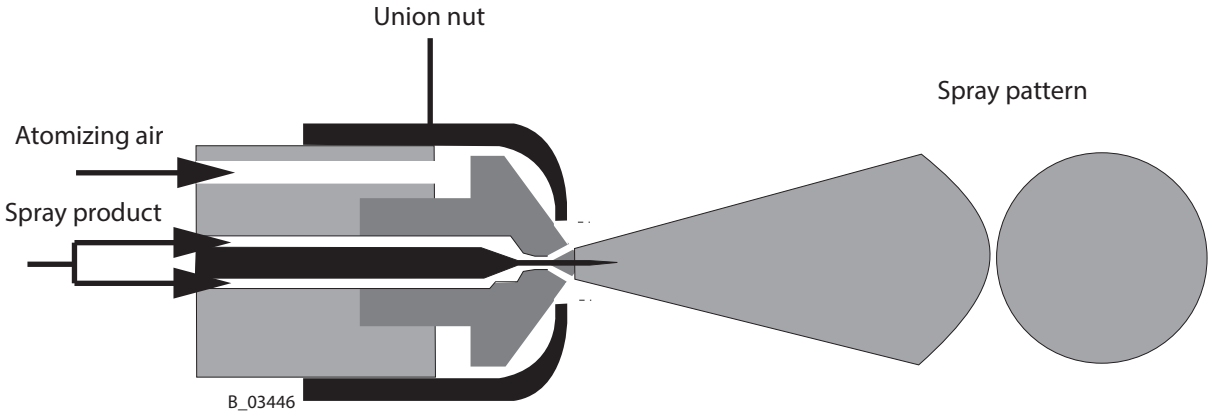
GM 5000EA R with round jet nozzle		
	mm	inch
A	261	10.28
B	46	1.81
C	245	9.65



5.5 SPRAYING PROCEDURE

5.5.1 SPRAYING PROCEDURE FOR ROUND JET AIR ATOMIZING

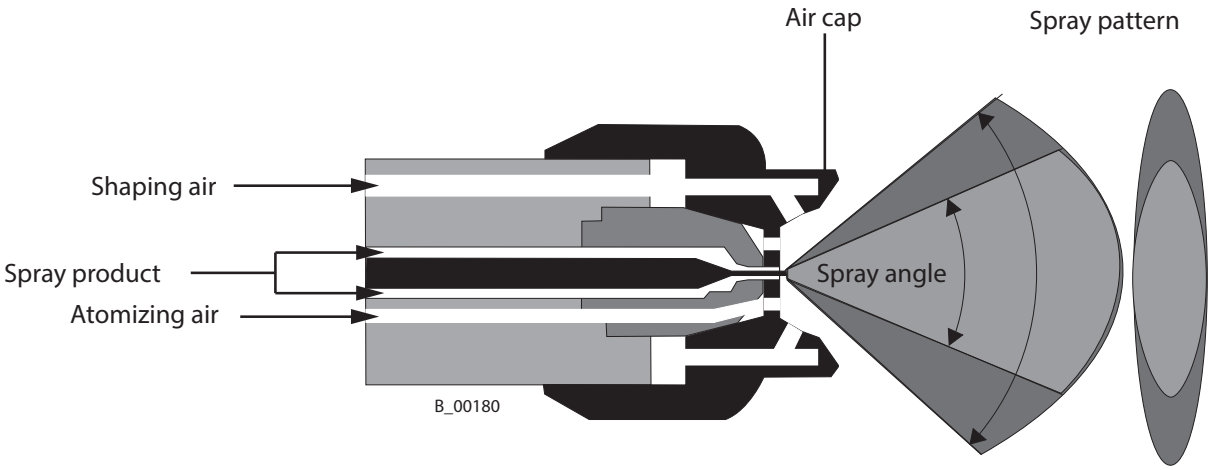
In this process, the spray product is fed to the nozzle with a pressure of approx. 0.05–0.2 MPa; 0.5–2 bar; 7–29 psi. The atomizing air at approx. 0.25 - 0.4 MPa; 0.25 - 4 bar; 36 - 58 psi produces a soft round jet, which largely eliminates the problem of overlapping boundaries. There are various nozzles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



Advantages
- Thin layers
- Uniform coating thickness
- Perfect finish

5.5.2 SPRAYING PROCEDURE FOR FLAT JET AIR ATOMIZING

In this process, the spray product is fed to the nozzle at a pressure of 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 round jet, which largely eliminates the problem of overlapping boundaries. The shaping air allows modification of the spray jet. There are various nozzles and air caps available as accessories for the respective spray product and the discharge quantities.

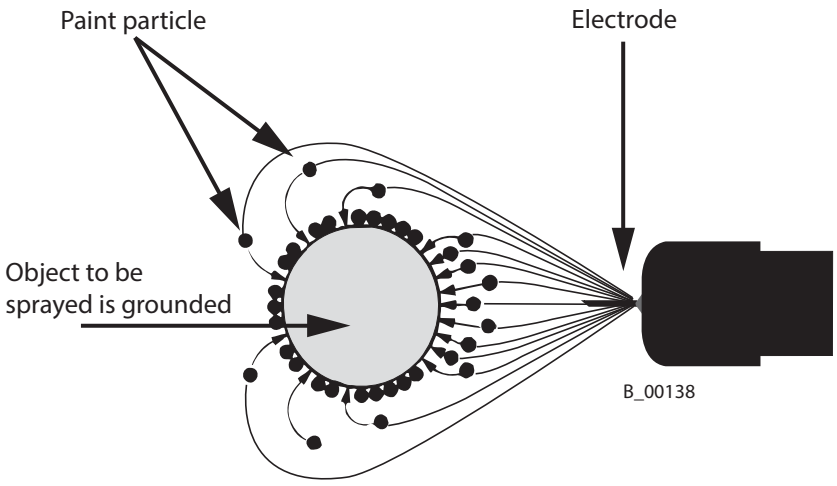


Advantages

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

5.5.3 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
- Savings in working time

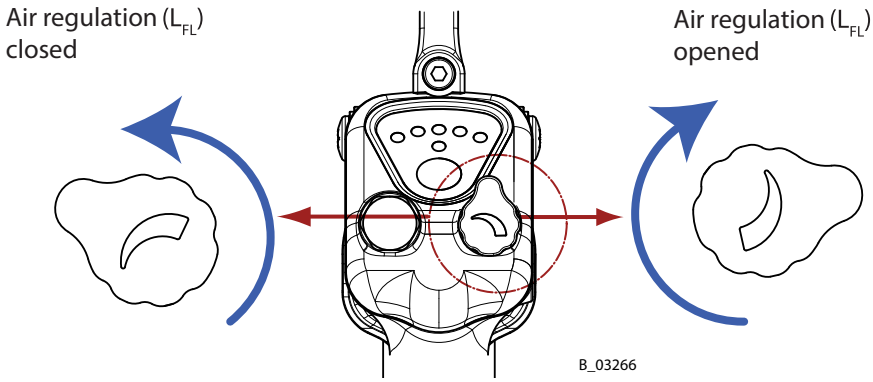
5.6 THE WAGNER ELECTROSTATIC AIR SPRAYING SYSTEM

The nozzle range (chapter 13) provided by WAGNER allows optimum coating results for any application.

General criteria for selection of nozzles
Flat jet → for large-surface parts
Round jet → for smaller delicate parts

Options for influencing the jet spray / spray pattern:

Description		Modification
Product pressure	P_{Mat}	+ or -
Atomizing air pressure	P_{ZL}	+ or -
Air regulation	L_{FL}	from open to closed
Stop screw product valve	A_{MV}	from open to closed
Nozzle sizes	DS	Flow rate
Electrostatics	ES	+ or - or off



5.6.1 PRESSURE SETTINGS FOR ROUND JET NOZZLES

There are 4 nozzle sizes, D8, D12, EARV LV and EARV HV 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 must be in a central position as shown in the photo.

Pressure setting	**Nozzle D8 (small)**	**Nozzle D12 (large) / EARV**
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

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

5.6.2 PRESSURE SETTINGS FOR FLAT JET NOZZLES

There are 8 flat jet nozzle sizes from 0.6 up to 2.0 available. There are 2 air cap types (s = small, w = wide) with 3 different nozzle sizes each. Each air cap can be used in combination with 2 to 3 nozzles sizes. Only matching nozzle components may be used.

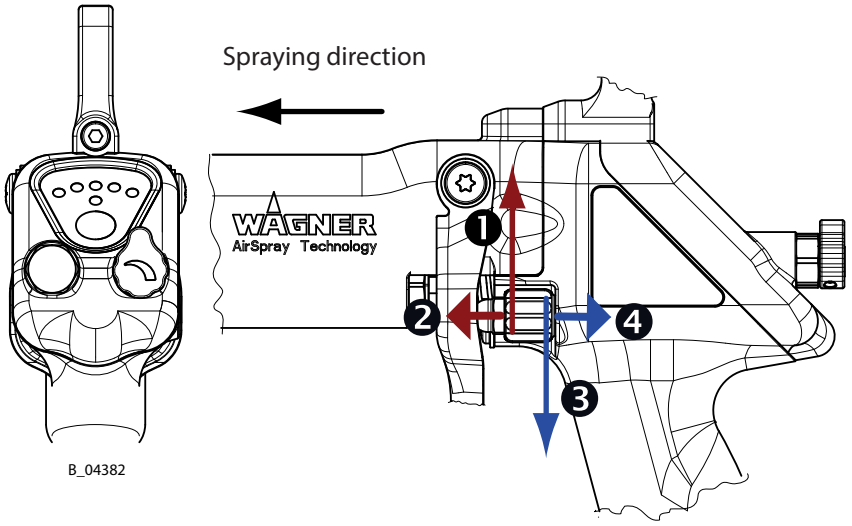
Pressure settings	**Air cap 0.6-0.8**	**Air cap 1.0-1.4**	**Air cap 1.6-2.0**
Product pressure (P_{MAT})	0.5 bar to 1.0 bar	1.0 bar to 2.0 bar	1.0 bar to 3.0 bar
Atomizing air pressure (P_{ZL})	1.0 bar to 3.0 bar	1.5 bar to 4.0 bar	1.5 bar to 5.0 bar

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

Air cap type	**suitable nozzle sizes**
0.4–0.8S / 0.4–0.8W	0.6 / 0.8
1.0–1.4S / 1.0–1.4W	1.0 / 1.2 /1.4
1.6–2.0S / 1.6–2.0W	1.6 / 1.8 /2.0

5.6.3 ADJUSTING SCREW

By turning the lateral adjusting screw (A_{MV}) of the gun, the outlet cross-section can be adjusted on the product valve. This cross-section is minimized by turning the screw upwards. With the same pressure settings, this results in a reduction of the flow rate and finer atomization.
Note: The spray pattern is reduced with this setting.



Rotate upward ❶
→ Stop (A_{MV}) to front ❷
→ Smaller cross-section

Rotate downward ❸
→ Stop (A_{MV}) to back ❹
→ Larger cross-section

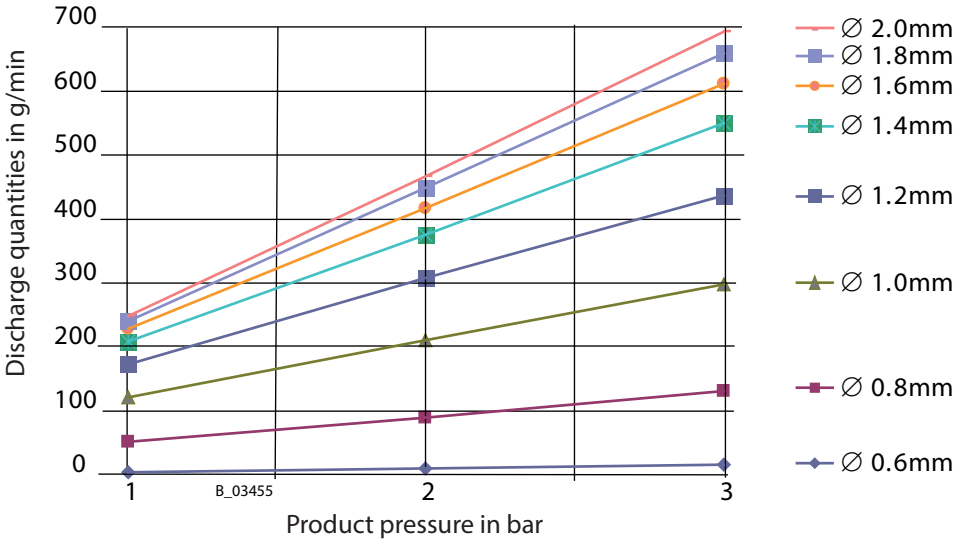
5.6.4 ELECTROSTATIC AND ATOMIZATION

The electrostatic charging of the spray cloud produces a more homogeneous distribution of paint particles on the object. - See also Chapter 5.5.3.

5.6.5 DISCHARGE QUANTITY MEASUREMENTS

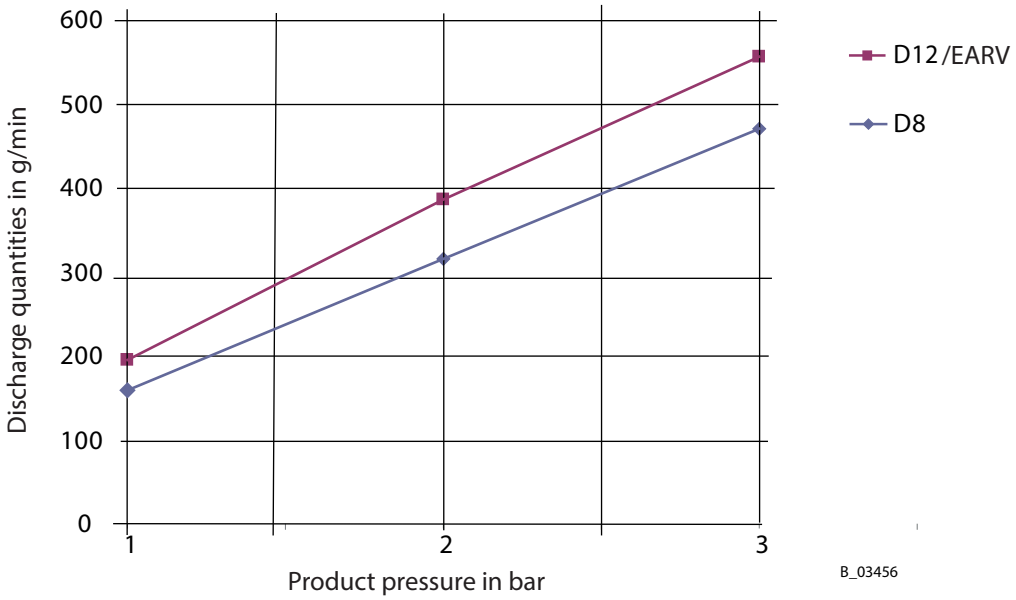
Flat spray nozzles

Device: GM 5000EA / flat jet nozzle
Viscosity: 22 DIN/4 seconds
Product hose: Length 7.5 m; 24.6 ft
Inside diameter 6 mm; 0.24 inches



Round spray nozzles

Device: GM 5000EA / round jet nozzle
Viscosity: 22 DIN/4 seconds
Product hose: Length 7.5 m; 24.6 ft
Inside diameter 6 mm; 0.24 inches



6 ASSEMBLY AND COMMISSIONING

6.1 TRAINING ASSEMBLY/COMMISSIONING STAFF

⚠ WARNING

Incorrect installation/operation!
Risk of injury and damage to the device.

→ The assembly and commissioning staff must have the technical skills to safely commission the device.
→ When assembling, commissioning and carrying out all work, read and follow the operating manuals and safety regulations for the additionally required system components.

A skilled person must check to ensure that the device is in a reliable state after it is installed and commissioned.

6.2 STORAGE CONDITIONS

Until the point of assembly, the device must be stored in a dry location, free from vibrations and with a minimum of dust. The device must be stored in closed rooms.

The air temperature at the storage location must be between -20 °C and +60 °C (-4 °F and +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 in a range between 0 °C and 40 °C; 32 °F and 132 °F.

The relative air humidity at the installation site must be between 10 and 95% (without condensation).

6.4 TRANSPORTATION

Protect valve needle with protection cap (Order No. 2315709).

6.5 ASSEMBLY AND INSTALLATION

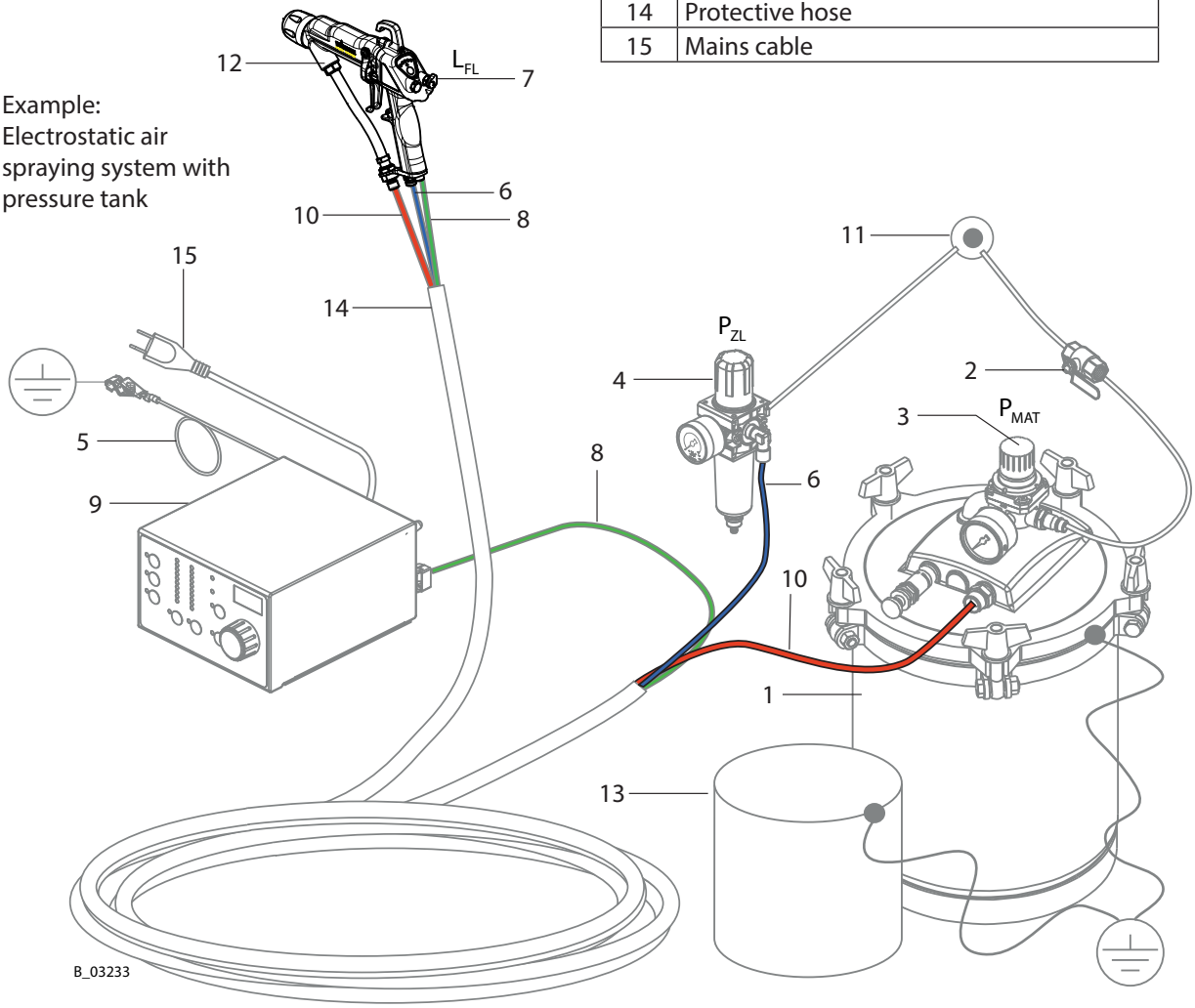
Check the delivery package against the delivery note. Become familiar with the function of the spray gun and all the other components used. Carefully read the accompanying operating manual. Note the special requirements of the designated electrostatic air spray procedure.

6.5.1 TYPICAL ELECTROSTATIC AIR SPRAYING SYSTEM

Pos	Description
1	Pressure tank
2	Stop valve
3	Air pressure regulator tank
4	Air pressure regulator with air filter
5	Grounding cable
6	Air hose

Pos	Description
7	Air regulation
8	Gun cable
9	VM 5000 control unit
10	Product hose
11	Compressed air main
12	GM 5000EA R spray gun
13	Tank for return flow
14	Protective hose
15	Mains cable

Example:
Electrostatic air spraying system with pressure tank



The GM 5000 EA spray gun must be combined with various components to make up a spraying system (spray pack). The system shown in the figure 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 manuals and the safety regulations of all additional system components before starting commissioning.

⚠ WARNING

Incorrect installation/operation!
Risk of injury and damage to the device.

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

6.5.2 VENTILATION OF THE SPRAY BOOTH

The electrostatic spraying equipment may only be operated in defined spraying areas and in accordance with the EN 12215 standard or under comparable ventilation conditions.
The electrostatic spraying equipment must 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 materials.
-or-
→ Operate the device on an appropriate spraying wall with the ventilation (extraction) switched on.
→ Observe national and local regulations for the exhaust air speed.

6.5.3 AIR SUPPLY

The use of an air filter with 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.

⚠ WARNING

Hose connections!
Risk of injury and damage to the device.

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

6.5.4 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 flushing agent.

⚠ 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.

6.5.5 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

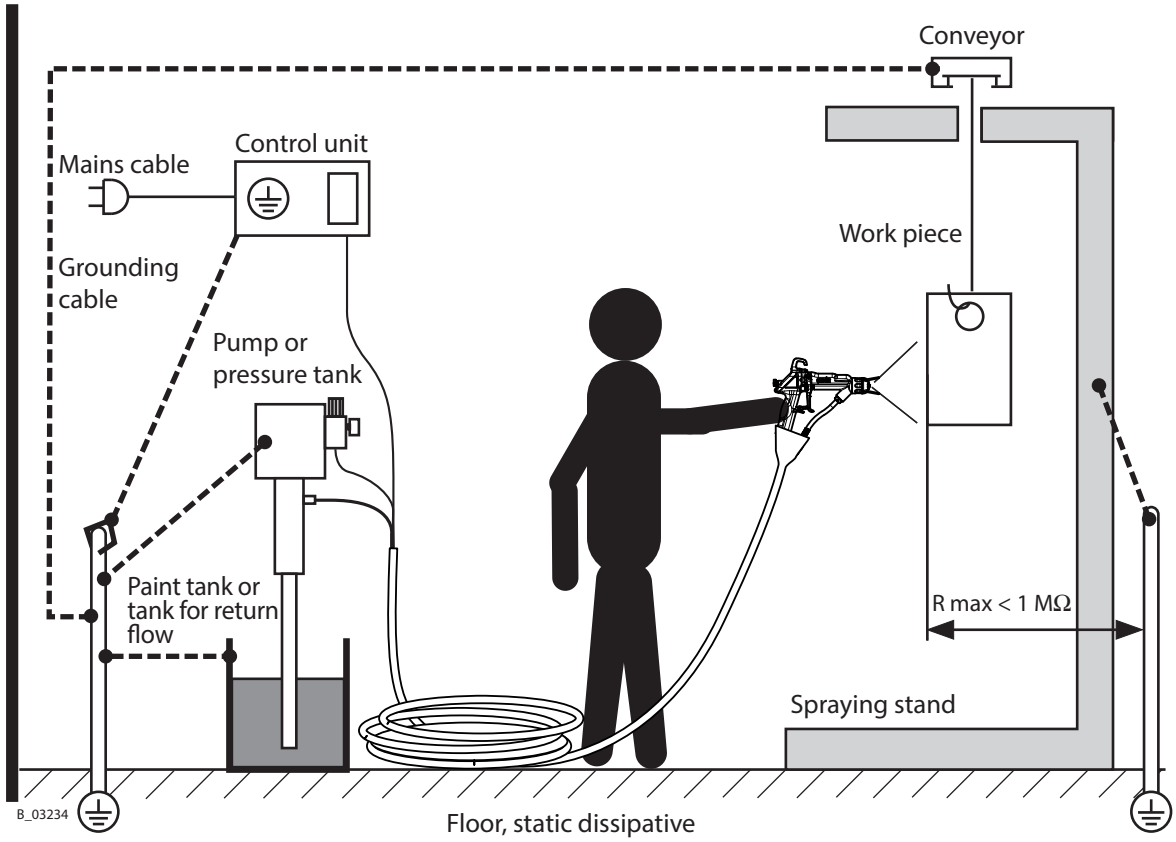
Heavy paint mist if grounding is insufficient!
Danger of poisoning.
Insufficient paint application quality.

→ 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 (contamination) and coater.

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 manuals 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 (megohm). (Ground leakage resistance measured at 500 V or 1000 V)
- Connect the control unit to the signal ground.
- Connect all ground cables using a short and direct route.
- Safety shoes and gloves, if used, must be static dissipative.

Grounding scheme (example)



Minimum cable cross-section

Control unit	4 mm² / AWG 12
Product supply	
Paint tank	
Conveyor	16 mm² / AWG 6
Booth	
Spraying stand	

Grounding of spray gun

The spray gun is grounded via the spray gun cable.

→ The GM 5000EA spray gun must be connected by the gun cable with the VM 500 or VM 5000 control unit.

Note for the sprayer

Safety shoes and gloves, if used, must be static dissipative.

6.6 PREPARATION OF LACQUER

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

In the case of application problems contact the lacquer manufacturer.

6.6.1 VISCOSITY CONVERSION TABLE

mPa s	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		

6.7 COMMISSIONING

6.7.1 SAFETY INSTRUCTIONS

→ Observe the safety instructions in Chapter 4 and Chapter 7.2.
→ Observe the general rules for making adjustments to the spray gun. → Chapter 7.2.2

6.7.2 PREPARATION FOR COMMISSIONING

NOTICE

Impurities in the spraying system!
Clogging of the spray gun

→ Flush the spray gun and paint supply with a suitable flushing agent before commissioning.

6.7.3 COMMISSIONING

The following points must be noted:

→ Make sure that all other conductive parts within the work area are grounded (see Chapter 6.5.5).
→ 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. For compressed air quality see Chapter 5.4.
→ 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. → See Chapter 6.7.3.1
→ 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 flow.
→ 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.

6.7.3.1 GUN CABLES AND GUN CABLE EXTENSIONS

⚠ WARNING

Sparks form when the plug is removed!
Explosion hazard.

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

The following points must be noted:

→ The cable connection to the gun and the connection to a cable extension may not be disconnected or connected in a potentially explosive area.

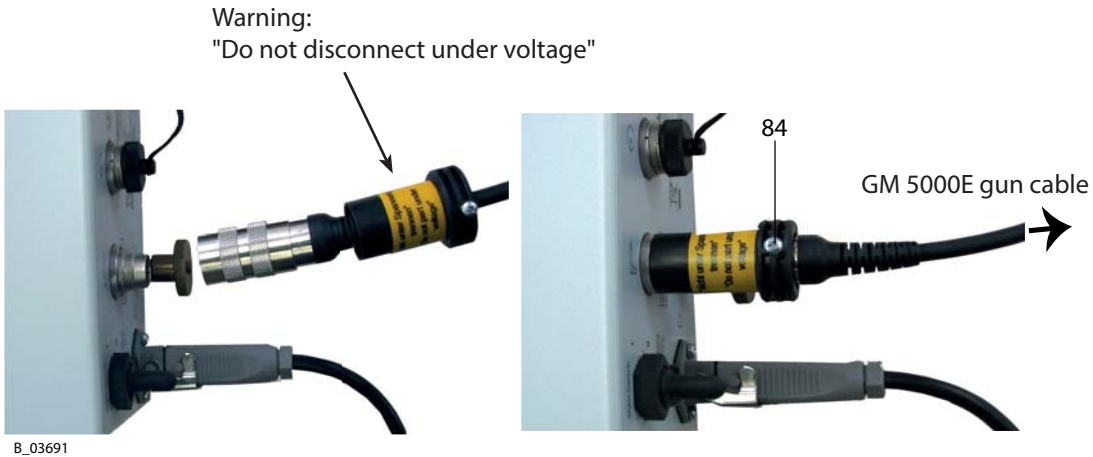
→ Only disconnect or connect all cable extensions from the gun cable and the cable extension when the control unit is switched off.

→ In order that the GM 5000EA spray gun is grounded, it must be connected via the gun cable with the VM 500 or VM 5000 control unit.

Gun cable is available in various lengths. Order No., see Chapter 13.5.3.

Attention: gun cable to control unit

Secure the cover sleeve with the warning sign by means of the screw (84) on the connector.



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Attention: guns with electric extension cable

Secure the cover sleeves with the warning sign by means of the screws (84) on the connectors.

Power loss
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.

6.7.4 VERIFYING A SAFE OPERATIONAL CONDITION

A skilled person must check to ensure that the device and the spraying system are in a safe state after they are installed and commissioned.

This includes:
- Carry out a safety checks in accordance with Chapter 8.2.3.
- Function test in accordance with Chapter 11.

7 OPERATION

7.1 TRAINING THE OPERATING STAFF

⚠ WARNING

Incorrect operation!
Risk of injury and damage to the device.

- → The operating staff must be qualified to operate the entire system.
- → The operating staff must be familiar with the potential risks associated with improper behavior as well as the necessary protective devices and measures.
- → Before work commences, the operating staff must receive appropriate system training.

7.2 SAFETY INSTRUCTIONS

→ Observe safety instructions in Chapter 4.

⚠ WARNING

Incorrect operation!
Risk of injury and damage to the device.

- →If contact with lacquers 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 megohms.
- → The protective clothing, including gloves, must comply with EN ISO 1149-5. The measured insulation resistance must not exceed 100 megohms.

⚠ 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.

⚠ 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.

7.2.1 EMERGENCY DEACTIVATION

In the case of unforeseen occurrences, proceed as follows:

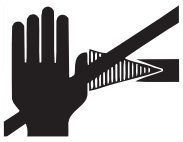
1. Switch off control unit.
2. Close the compressed air supply.
3. Relieve pressure according to the operating manual of the product pressure generator.
4. Point the spray gun toward the grounded collecting tray.
5. Pull the trigger of the spray gun until no further pressure is present.

7.2.2 GENERAL RULES FOR MAKING ADJUSTMENTS TO THE SPRAY GUN

⚠ DANGER

High-voltage field!
Danger to life from malfunction of heart pacemaker

Make sure that persons with pacemakers:
→ Do not work with the electrostatic spray gun.
→ Do not enter the high-voltage area.



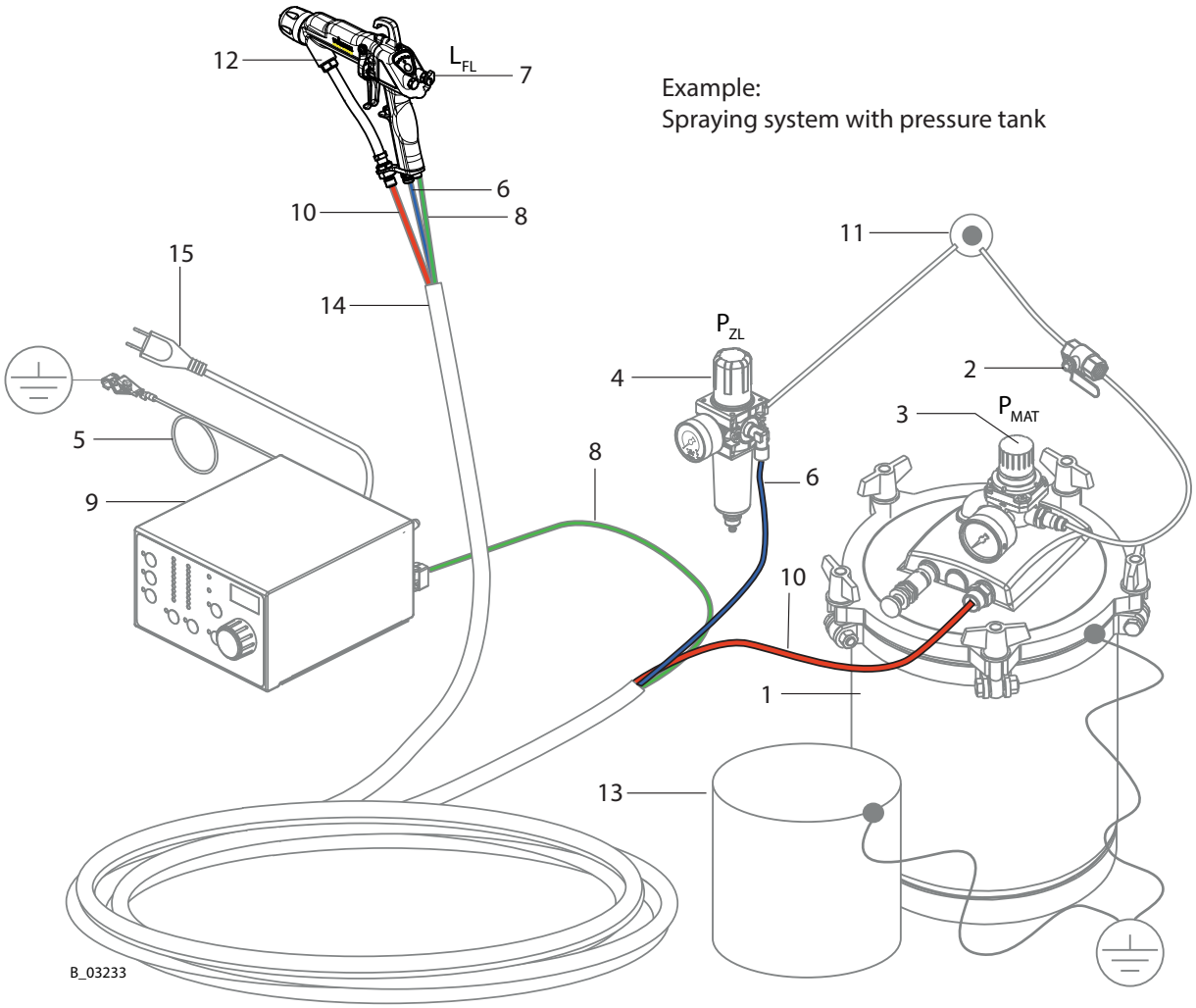
⚠ WARNING

High-pressure spray jet!
Danger to life from injecting paint or solvent.

→ Never reach into the spray jet.
→ Never point the spray gun at people.
→ Consult a doctor immediately in the event of skin injuries caused by paint or solvent. Inform the doctor about the paint or solvent used.
→ Never seal defective high-pressure parts; instead relieve the pressure from them and replace them immediately.
→ Wear the appropriate protective clothing, gloves, eyewear and respiratory protection.

7.3 WORKING

Ensure that:
→ the regular safety checks are carried out in accordance with Chapter 8.2.3,
→ commissioning is carried out in accordance with Chapter 6.7.



Example:
Spraying system with pressure tank

7.3.1 FILLING WITH WORKING MATERIAL

1. Provide an empty tank for return (13).
2. Put the tank with working material into the pressure tank (1) and close the pressure tank.
3. Open stop valve (2).
4. Adjust to 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 material 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 CHECKING THE SPRAY PATTERN (WITHOUT ELECTROSTATICS)

Start air-spraying (without electrostatics)

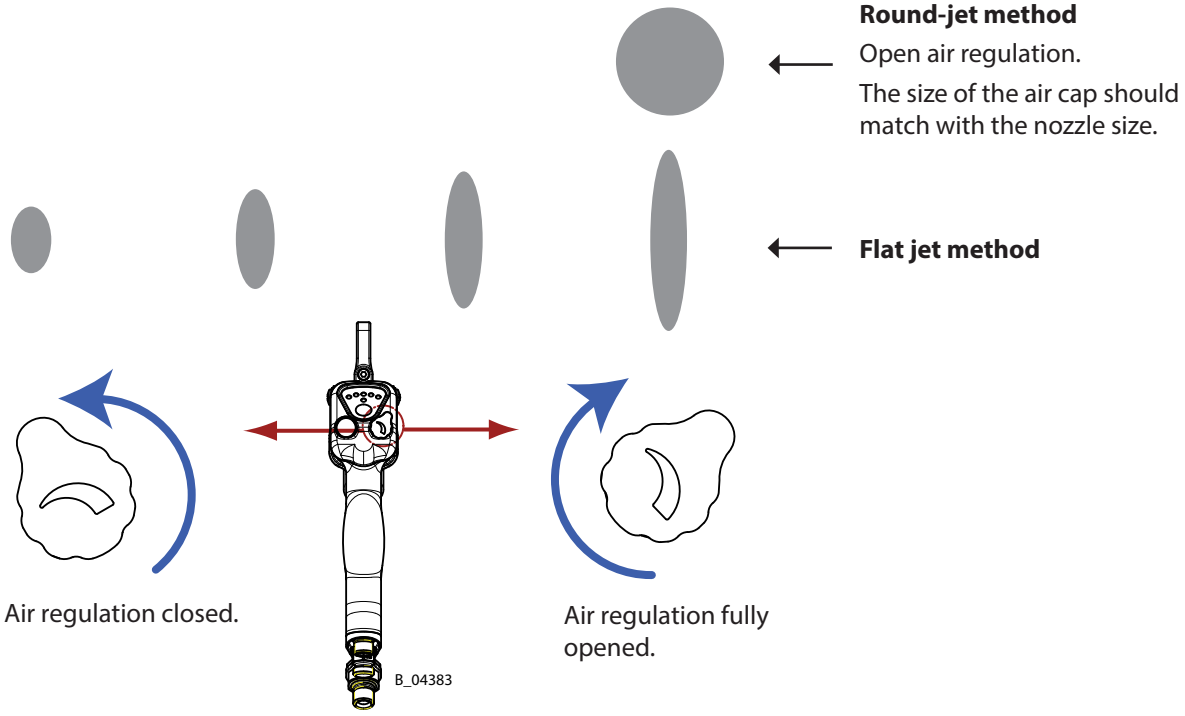
1. Switch off control unit (the grounding of the spray gun via the gun cable is maintained).
2. Start up with product supply generator set to approx. 0.05 to 0.15 MPa; 0.5 to 1.5 bar; 7 to 22 psi operating pressure. → See corresponding operating manual.
3. Set atomizing air regulator (4) to approx. 1–4 bar.
4. Open air regulator at the rear of the gun.
5. Spray (actuate trigger) and check the atomization.
6. Set the fluid pressure on the product pressure generator until good product atomization is achieved.
7. Adjust the atomizing air regulator (4) until optimal atomization is achieved.
8. Flat jet process: with the air adjustment on the gun, set the ratio of shaping air/ atomizing air so as to achieve an optimum spray pattern.

Changing the Flow Rate

→ Adapt product pressure.
→ Use a different nozzle (see Chapter 13).
→ Limit the valve needle stroke with the adjustment screw on the side of the gun.

Spray pattern and air regulation

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



7.3.3 SPRAYING

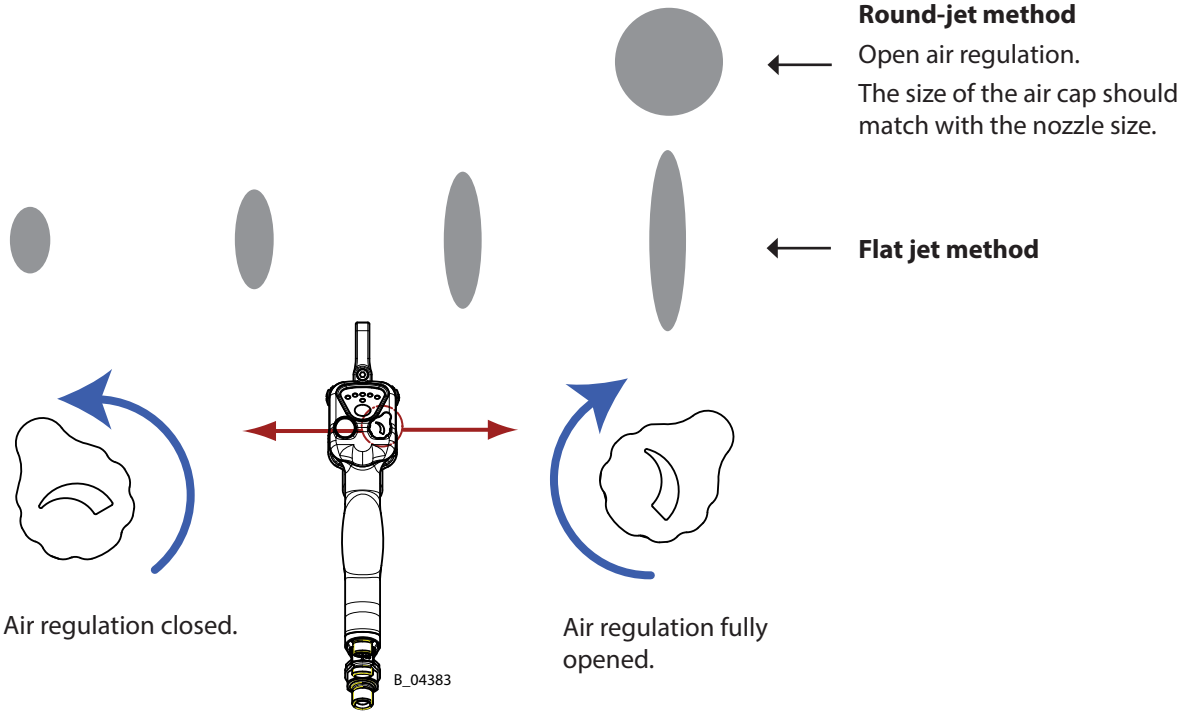
1. Insert the desired nozzle into the spray gun.
2. Turn on the control unit. → See corresponding operating manual.
3. Start up with product supply generator set to approx. 0.05 to 0.15 MPa; 0.5 to 1.5 bar; 7 to 22 psi operating pressure. → See corresponding operating manual.
4. Set atomizing air regulator (4) to approx. 1–4 bar.
5. Open air regulator at the rear of the gun.
6. Spray on a test object (pull trigger).
   → Pressing the trigger on the spray gun switches the high-voltage supply on.
7. Adjust the product pressure and atomizing air in accordance with the nozzle and object.
   Rule of thumb: Set atomizing air pressure approx. three times higher than the product pressure.

Flat-jet method: Changing the spray jet width

8. Change the width of the spray jet by turning the air regulator (at the rear of the spray gun, see photo) or by appropriate selection of the nozzle.

Flow rate

9. Product quantity may be able to be reduced by:
   - Minimizing the product pressure.
   - Use a different nozzle size. → See Chapter 13.
   - Limit the valve needle stroke with the adjustment screw on the side of the gun.

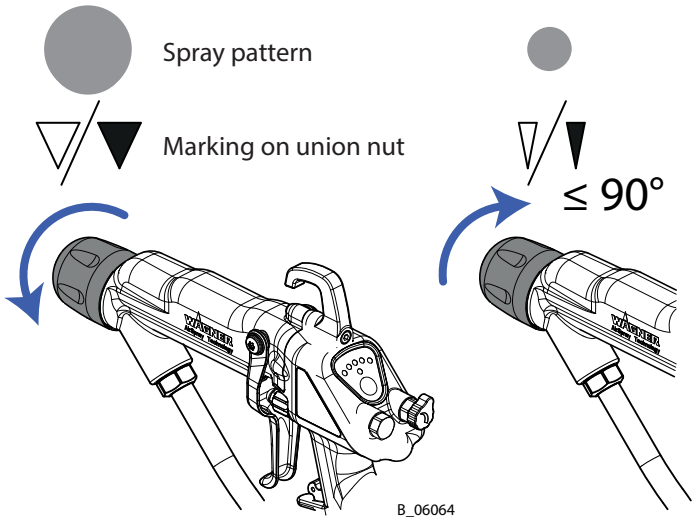


Adjustable EARV 5000 round jet nozzle

By turning the union nut the spray pattern can be adjusted to suit the object being sprayed. The illustration shows the influence of the turning on the spraying pattern.

1. Set the union nut as far as the stop.
2. Open maximum 1/4 turn. The atomizing is good in this area.
   → The union nut should not protrude beyond the nozzle body.

→ Always fully open the air regulation.



Low viskosity, diameter big

Low viskosity, diameter small

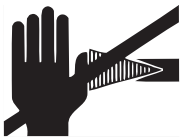
High viskosity, diameter big

High viskosity, diameter small

7.3.4 PRESSURE RELIEF/WORK INTERRUPTION

The pressure must always be relieved when:
- The spraying tasks are finished.
- The spraying system is maintained.
- Cleaning tasks are carried out on the spraying system.
- The spraying system is moved to another location.
- Something must be checked on the spraying system.
- The nozzle is removed from the gun.

→ Observe general safety instructions in Chapter 4.



⚠ WARNING

High-pressure spray jet!
Danger to life from injecting paint or solvent.

→ Never reach into the spray jet.
→ Never point the spray gun at people.
→ Consult a doctor immediately in the event of skin injuries caused by paint or solvent. Inform the doctor about the paint or solvent used.
→ Never seal defective high-pressure parts; instead relieve the pressure from them and replace them.
→ Wear the appropriate protective clothing, gloves, eyewear and respiratory protection.

Process for relieving pressure

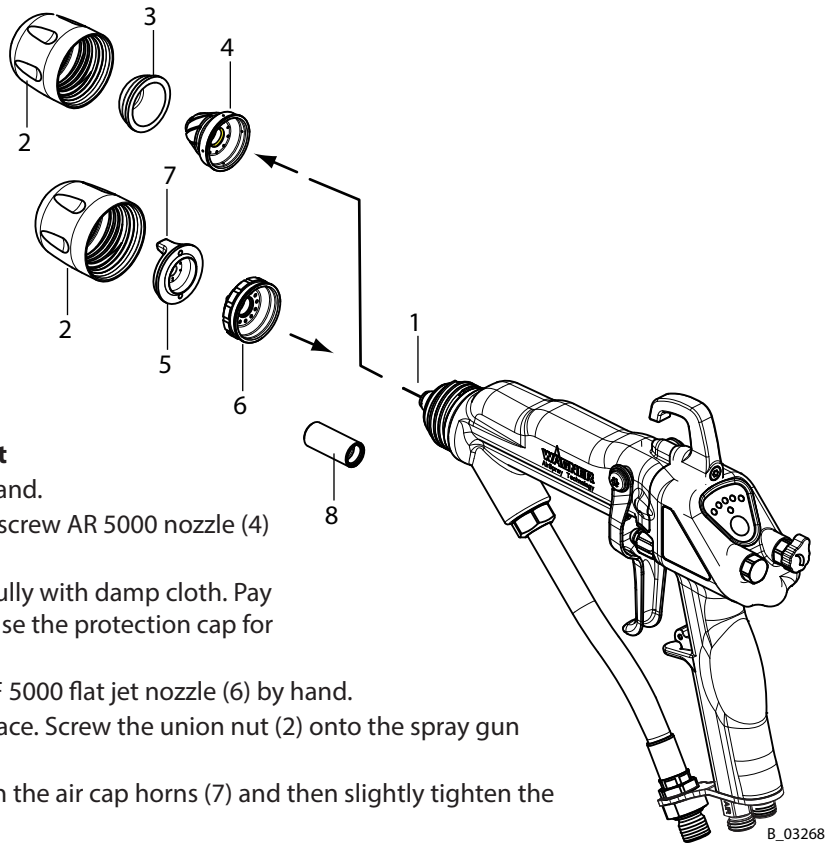
1. Switch off control unit.
2. Close the compressed air supply.
3. Relieve pressure according to the operating manual of the product pressure generator.
4. Point the spray gun toward the grounded collecting tray.
5. Pull the trigger of the spray gun until no further pressure is present.

7.3.5 CHANGING FROM AIR ROUND JET TO AIR FLAT JET

NOTICE

Defective electrode!
Material damage due to functional faults.

→ Do not damage the electrode.



Flush spray gun

1. Switch off control unit.
2. Relieve pressure.
   → Chapter 7.3.4
3. Connect the system to the flushing agent supply.
4. Set product pressure. Close atomizing air regulator.
5. Thoroughly flush out the spray gun.
6. Relieve pressure.
   → Chapter 7.3.4

Changing from round jet to flat jet

7. Unscrew the union 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.

Changing from flat jet to round jet

7. Unscrew the union nut (2) by hand.
8. Remove AF 5000 air cap (5).
9. Unscrew and remove AF 5000 flat jet nozzle (6) by hand.
10. Clean the spray gun front carefully with damp cloth. Pay attention to the electrode (1). Use the protection cap for the valve needle (8).
11. Screw on and slightly tighten AR 5000 nozzle (4) by hand.
12. Position AR 5000 air cap (3). Screw the union nut (2) onto the spray gun body and slightly tighten by hand.

7.3.6 CLEANING OF THE NOZZLE PARTS

The nozzle parts (2, 3, 4, 5 and 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.

7.3.7 CHANGING THE VALVE HOUSING

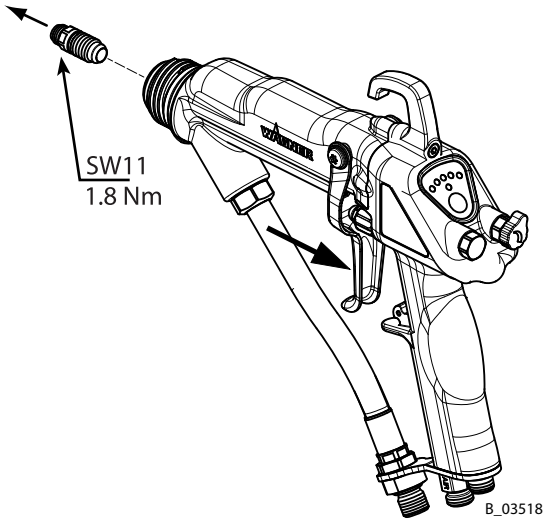
NOTICE

Changing the valve housing!
Damage to the device.

→ 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.

Use a socket or ring spanner (not a wrench) to tighten the valve housing.



Valve housing and valve tip are available in various materials:

	Valve housing	Valve tip
	Material of the valve seat	Product
Standard version	Steel	PEEK
Special accessories	PEEK	Steel

When wear-related problems occur, the valve housing and/or valve tip can be exchanged.
→ Order No., see Chapter 13.

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

→ Observe safety instructions in Chapter 4.

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 unit.
→ Before all work on the device and in the event of work interruptions:
- Switch off the energy supply and the compressed air supply.
- Relieve the pressure from the spray gun and device.
- Secure the spray gun against actuation.
→ Observe the operating and service manual for all work.

DANGER

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

- → Before starting cleaning, rinsing, 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!
- → Only electrically conductive tanks may be used for cleaning and flushing agents. Ground the tank.
- → Which cleaning agent is used to clean the spray gun depends on which parts of the spray gun have to be cleaned and which product has to be removed. 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.
- → Preference should be given to non-flammable cleaning and flushing agents.
- → Only cleaning and flushing agents, which contain ingredients of explosion class IIA and IIB may be used (maximum ignition energy 0.24 mJ).
- → The cleaning and flushing 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 FLUSHING THE DEVICE

The spraying system and the spray gun must be cleaned and flushed daily. The cleaning and flushing agents used must be compatible with the working material.

⚠ WARNING

Incompatibility of cleaning/flushing agent and working medium!
Risk of explosion and danger of poisoning by toxic gases

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

NOTICE

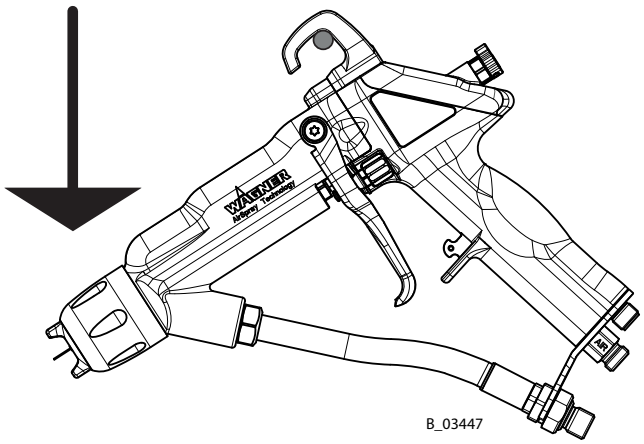
Damage to electrical devices!

→ Never immerse the spray gun in cleaning agent.

NOTICE

Liquid in air tube!
Functional faults caused by swollen seals.
Discharge current to ground → No high voltage

→ Always point the spray gun down when cleaning.
→ Ensure that neither lacquers nor cleaning or flushing 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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DANGER

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

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

Clean nozzle

1. Switch off control unit.
2. Relieve pressure. → Chapter 7.3.4
3. Close air pressure regulator.
4. Dismount nozzle and clean separately. → Chapter 7.3.6

Flush spraying system and spray gun

5. Connect spraying system to flushing agent supply in accordance with operating manual for the product pressure generator.
6. Point the spray gun toward the collecting tray and actuate the trigger. Flush the gun thoroughly as soon as clean flushing agent emerges.
7. Remove flushing agent supply.

Blowing out the air passages of the spray gun

8. Close pump pressure regulator. Switch on compressed air supply and open air pressure regulator.
9. Actuate the trigger of the spray gun and thoroughly blow out the air passages.
10. Switch off the compressed air supply.

Clean the outside of the spray gun

11. Clean the spray gun body and other components of the spraying system with a cleaning agent recommended by the lacquer manufacturer and dry with a cloth or blow gun.

Cleaning the nozzle parts → See Chapter 7.3.6

8.2 MAINTENANCE

8.2.1 MAINTENANCE STAFF

Maintenance 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 maintenance work:

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

An authorized person must ensure that the device is checked for being in a reliable state after maintenance work is completed.

8.2.2 SAFETY INSTRUCTIONS

→ Observe the safety instructions in Chapter 4 and Chapter 8.1.2.

Prior to maintenance

- Flush and clean the system. → Chapter 8.1.3.

After maintenance

- Carry out a safety checks in accordance with Chapter 8.2.3.
- Put the system into operation (Chapter 6.7) and check for leaks (Chapter 11.3).
- Carry out a function test, if required, in accordance with Chapter 11.

→ In accordance with the guideline for liquid ejection devices (DGUV regulation 100-500):
  - 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.
  - For shut down devices, the examination can be suspended until the next start-up.

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.

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 unit.
- → Before all work on the device and in the event of work interruptions:
  - Switch off the energy supply and the compressed air supply.
  - Relieve the pressure from the spray gun and device.
  - Secure the spray gun against actuation.
- → Observe the operating and service manual for all work.

8.2.3 SAFETY CHECKS

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 8.2.4
Grounding	weekly	Chapter 4.2.2, Chapter 6.5.5
Inspection for damage	weekly	Chapter 8.1.3, 8.2, 10
Locking of the technical ventilation with the electrostatic manual spraying unit	annually	Chapter 6.5.2

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.

8.2.4 PRODUCT HOSES, TUBES AND COUPLINGS

DANGER

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

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

The service life of the complete hoses between product pressure generator and application device is reduced due to environmental influences even when handled correctly.

→ Check hoses, pipes, and couplings every day and replace if necessary.
→ Before every commissioning, check all connections for leaks.
→ Additionally, the operator must regularly check the complete hoses for wear and tear as well as for damage at intervals that he/she has set. Records of these checks must be kept.
→ Undamaged complete hoses are to be replaced when one of the two following intervals has been exceeded:
  – 6 years from the date of the hose crimping (see fitting embossing).
  – 10 years from the date of the hose imprinting.

Fitting embossing (if present)	**Meaning**
xxx bar	Pressure
yymm	Crimping date (year/month)
XX	Internal code

Hose imprinting	**Meaning**
WAGNER	Name / Manufacturer
yymm	Date of manufacture (year/ month)
xxx bar (xx MPa) e.g., 270 bar (27MPa)	Pressure
XX	Internal code
DNxx (e.g., DN10)	Nominal diameter

9 TROUBLE SHOOTING AND RECTIFICATION

Functional fault	Cause	Remedy
Insufficient product output	Nozzle too small	Select larger nozzle (see Accessories).
	Product pressure too low	Increase product pressure.
	Product pressure generator blocked	Clean or replace filter.
	Nozzle is clogged	Clean or replace nozzle.
	Product valve travel set too small	Increase product valve travel by turning the adjusting screw.
Poor spray pattern	Wrongly adjusted atomizing air	Readjust the atomizing air.
	Unfavorable nozzle size	Select a different nozzle (see Accessories).
	Product pressure too high/too low	Adapt product pressure.
	Spray product viscosity too high	Thin product in accordance with the manufacturer's instructions.
	Damaged nozzle	Attach new nozzle.
Poor wrap-around	Poor grounding at object	Check grounding of object or hanger with ohmmeter.
	Lacquer resistance too high/too low	Check lacquer resistance, see Chapter 2.5
	Spraying pressure too high	Readjust spraying pressure.
No wrap-around	No high voltage	Switch on high voltage at the control unit. / Repair malfunction as explained in the control unit operating manuals.
		Connect gun and gun cable/check for defect.
		Check lacquer resistance, see Chapter 2.5
	Seal in end piece defective	Repair by WAGNER Service Department.
	Air-passages damp	Clean and dry air passages.
Back-spray	Poor grounding at object	Check grounding.
	Distance between spray gun and object too large	Reduce distance between spray gun and work piece.
	High voltage set wrongly (too high)	Adapt high voltage to product.
	Loosen the nozzle union nut for round jet method	Slightly tighten union nut by hand.
Valve rod leaks	Seals at the valve rod are damaged	Replace the seals (see Chapter 10).
	Loose packing	Tighten.

10 REPAIR WORK

10.1 REPAIR STAFF

Repair work should be undertaken carefully by qualified and trained personnel. They should be informed of specific hazards during their training.

The following hazards may arise during repair work:

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

A skilled person must check to ensure that the device is in a reliable state after it is repaired. Carry out function test in accordance with Chapter 11.

10.2 SAFETY INSTRUCTIONS

→ Observe the safety instructions in Chapter 4 and Chapter 8.1.2.

Before a Repair

- Flush and clean the system. → Chapter 8.1.3.

After a Repair

- Carry out a safety checks in accordance with Chapter 8.2.3.
- Put the system into operation (Chapter 6.7) and check for leaks (Chapter 11.3).
- Function test in accordance with Chapter 11.

→ In accordance with the guideline for liquid ejection devices (DGUV regulation 100-500):
  - 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.
  - For shut down devices, 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 unit.
→ Before all work on the device and in the event of work interruptions:
  - Switch off the energy supply and the compressed air supply.
  - Relieve the pressure from the spray gun and device.
  - Secure the spray gun against actuation.
→ Observe the operating and service manual for all work.

10.3 DISMANTLING OF THE GUN

Plastic parts
Gently handle all plastic parts.

10.3.1 TOOLS

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

- Allen wrench SW 2
- Allen wrench SW 3
- Allen wrench SW 5
- Wrench size 5
- Wrench size 6
- Wrench size 8
- Wrench size 11
- Wrench size 12
- Wrench size 14
- Wrench size 19
- Ring spanner SW9
- Ring spanner SW11
- Torx® wrench 20
- Torx® wrench 25
- Slide gauge
- Valve needle assembly tool, Order No. 2309368
- Clamping screw assembly tool, Order No. 2325263

Only as required:

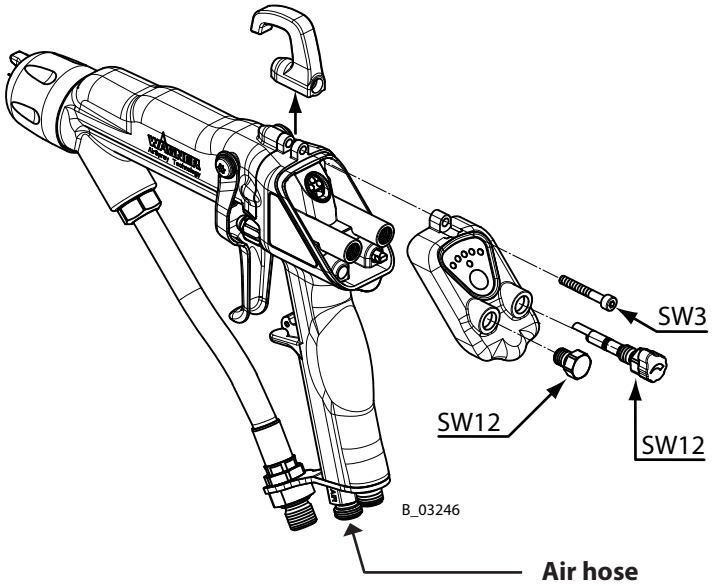
- Handle seal assembly tool (Order No. 2342334, not included in scope of delivery)

Brand notice:

The brands specified in this document are property of the respective owners. Loctite®, for example, is a registered brand of Henkel.

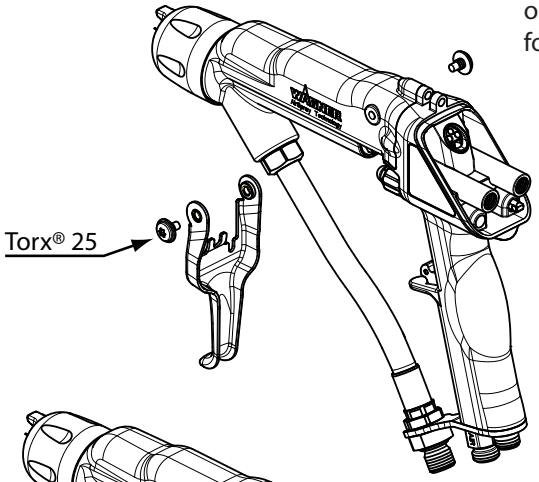
10.3.2 DISMANTLING OF THE SPRAY GUN

1



Air hose
When unscrewing the air hose, a second open-ended/box wrench must be used for bracing.

2



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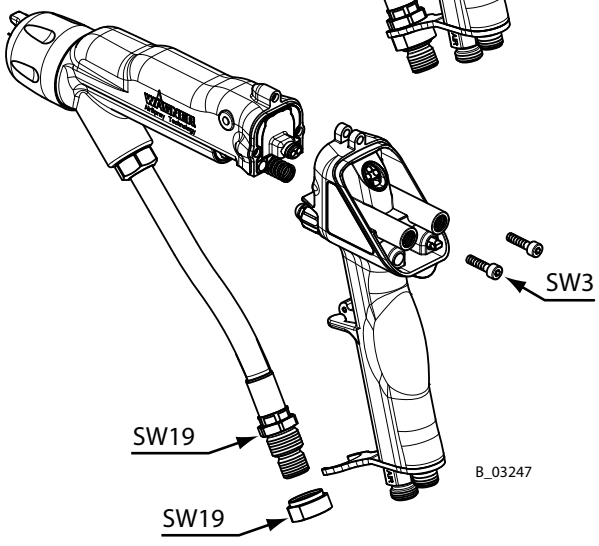
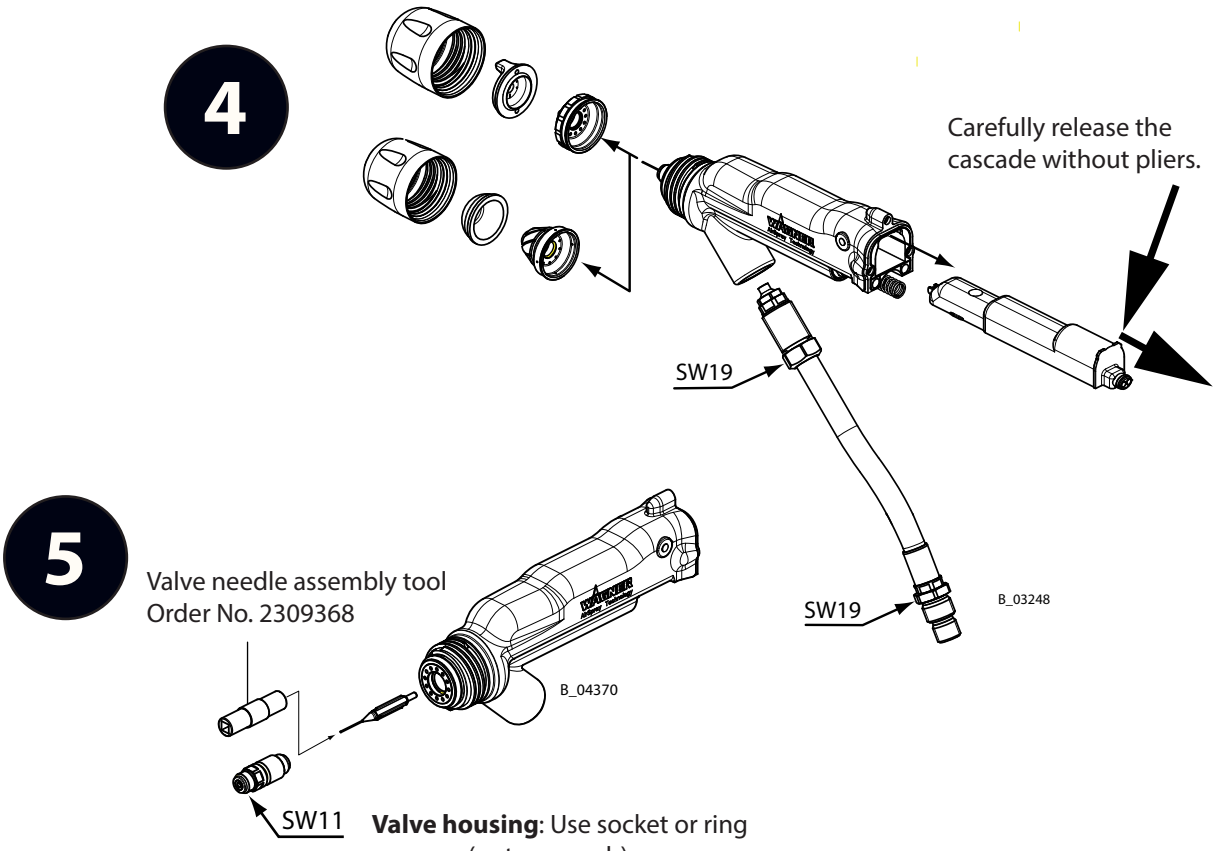
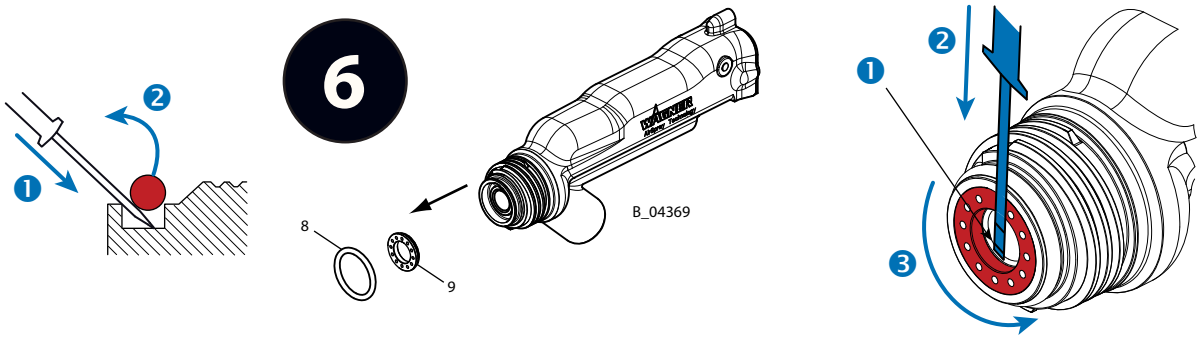


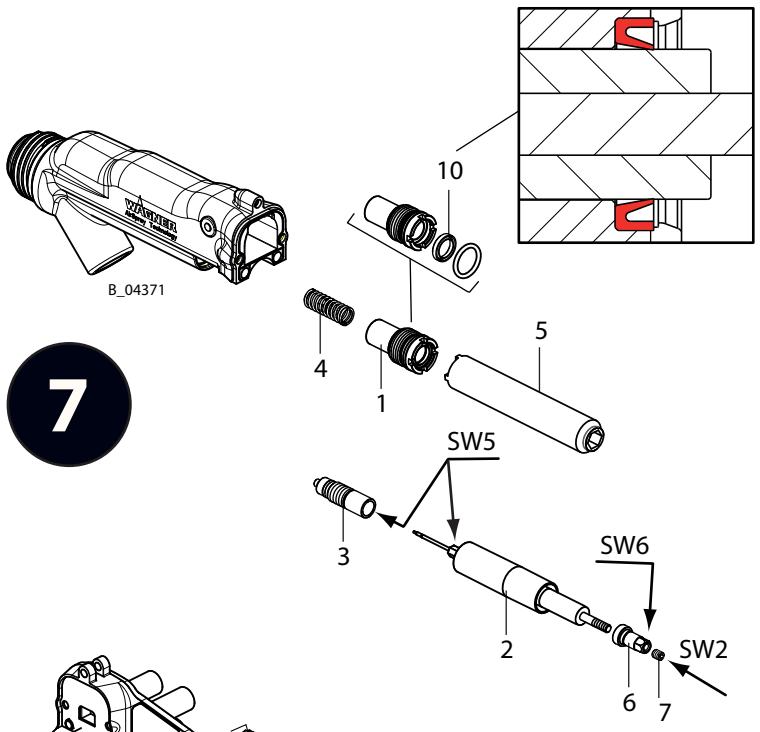


Valve needle Air
Loosen valve tip by hand using the valve needle assembly tool (Order No. 2309368).



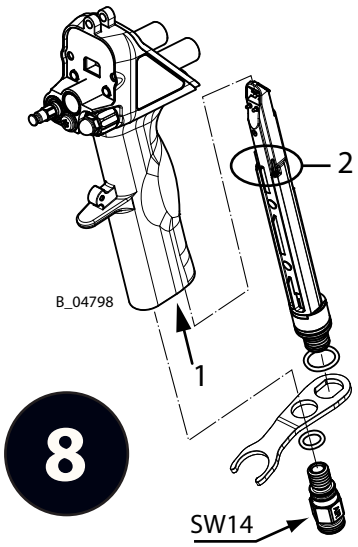
O-ring (8): 1. Use screwdriver no. 1 to press under the O-ring.
2. Lever up the O-ring and remove it.

Air distribution (9): 1. Locate the start of the thread for recessed internal threading.
2. Lever under the air distribution ring directly in front of the start of the thread using screwdriver no. 1.
3. As soon as the ring disengages, carefully undo it on all sides.



7

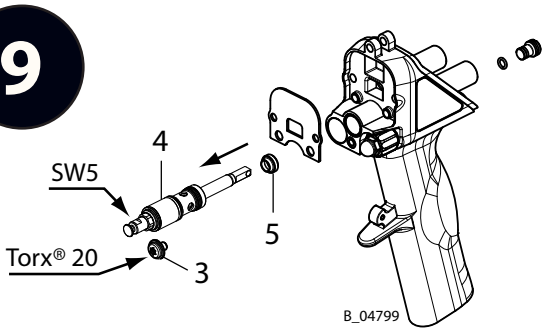
1. Remove pressure spring (4).
2. Loosen clamping screw (1) with assembly tool (5).
3. Unscrew valve rod unit (2, 6, 7). The packing (3) is also unscrewed and removed.
4. **Only as required:**
   Remove rod seal (10). Do not damage the housing in the process.



8

Two gold contact sleeves either remain in the handle (1) or are seated on the two gold pins (2). Do not lose!

9



1. Loosen the oval head screw (3).
2. Pull the air valve (4) out off the drilled hole. Do not turn! Do not damage the cylindrical surfaces. Ideally press on the tappet from behind using a transversely held screwdriver, for example.
3. **Only as required:**
   Press out seal (5) using a handle seal assembly tool (Order No. 2342334, not included in scope of delivery).

10.3.3 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, inside handle and all dismantled parts 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). Clean and mount wearing gloves.
→ Spare parts may have safety-relevant properties.
Only repair and replace parts that are listed in the "Spare parts" chapter and that are assigned to the unit.
→ 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 gases.

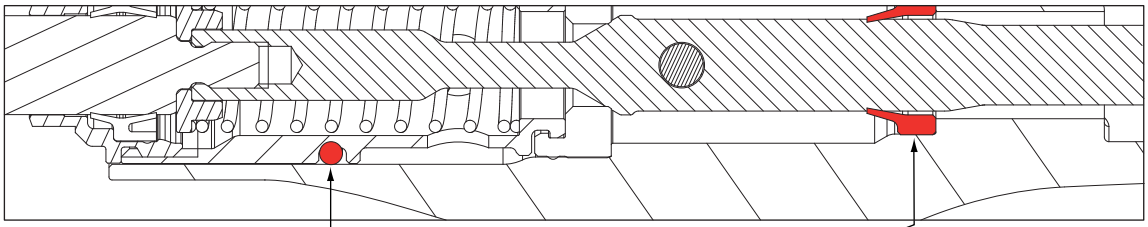
→ Examine the compatibility of the cleaning agents and working media on the basis of the safety data sheets.

In Chapter 14 the part numbers for gun spare parts can be found as well as for wearing parts such as seals.

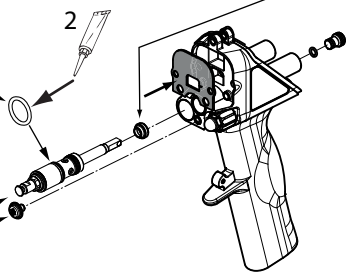
10.3.4 ASSEMBLING THE SPRAY GUN

Assembly aids:		
Pos	**Order No.**	**Description**
2 *	9992698	Vaseline white PHHV II
4	9992511	Loctite® 243

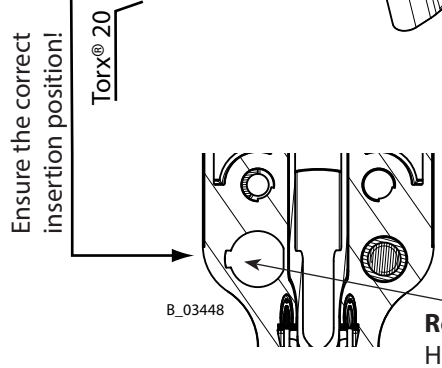
* Use Vaseline sparingly



1

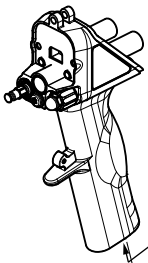


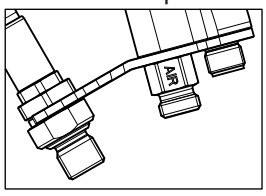
Only as required (if the seal was removed): press in using handle seal assembly tool (Order No. 2342334, not included in scope of delivery)

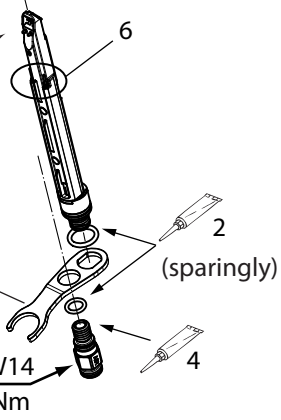


Recess for pin
Hold the air valve so that the pin points to the left.

2



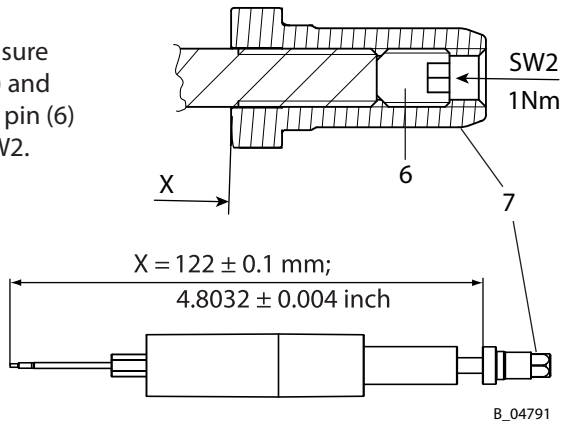


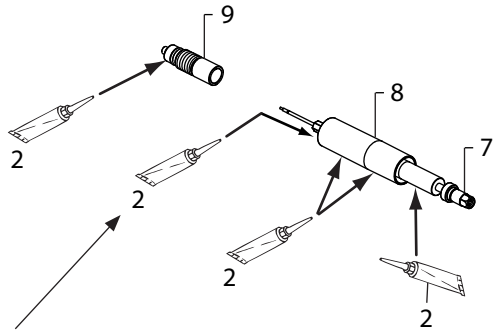


Gold contact sleeves
Check whether the two gold contact sleeves are in the handle (5). Otherwise, insert the sleeves onto the two gold pins of the plug (6). Slide plug into handle.

3

Valve rod unit
Set length adjusting measure X with withdrawal nut (7) and then fasten the threaded pin (6) using an Allen wrench SW2.





Coat the hollow section with a brush. Note: avoid the pin and hexagon.

(sparingly)

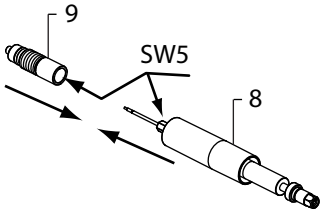
Wear gloves!

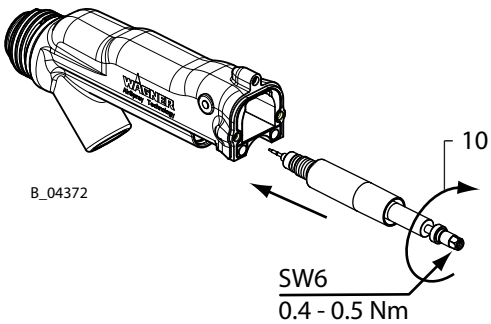
The outside thread of the packing (9) must be free of lacquer.

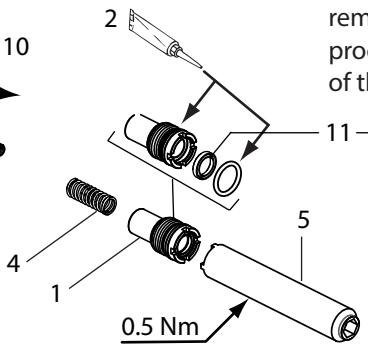
Valve rod unit (8) and packing (9):
- grease,
- slide together,
- screw together (10).

Grease clamping screw (1) and mount using assembly tool (5).

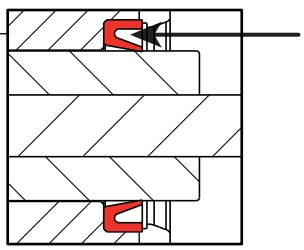
Insert spring (4).



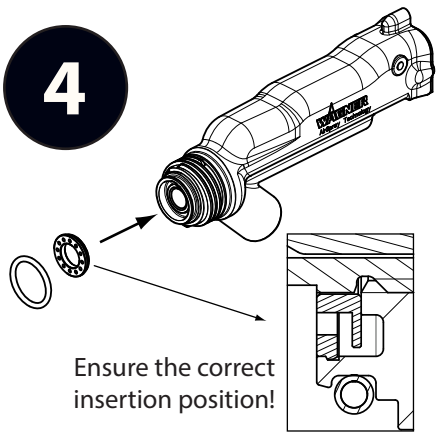




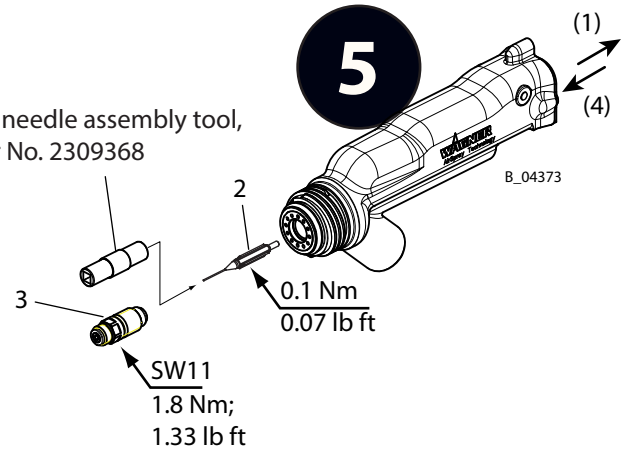
Only as required (if the rod seal was removed): Press in rod seal (11). In the process, press only on the lowest area of the rod seal.



4



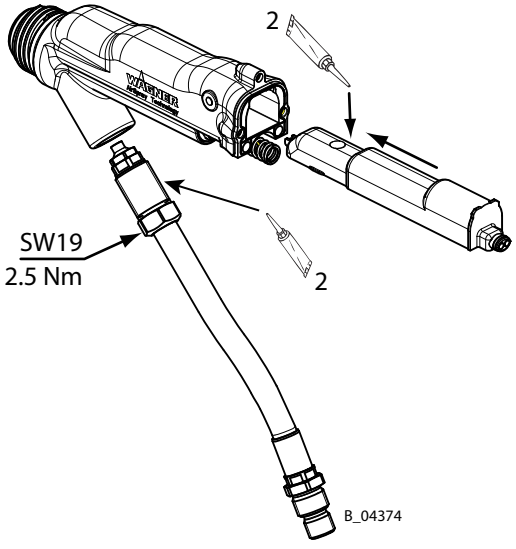
5



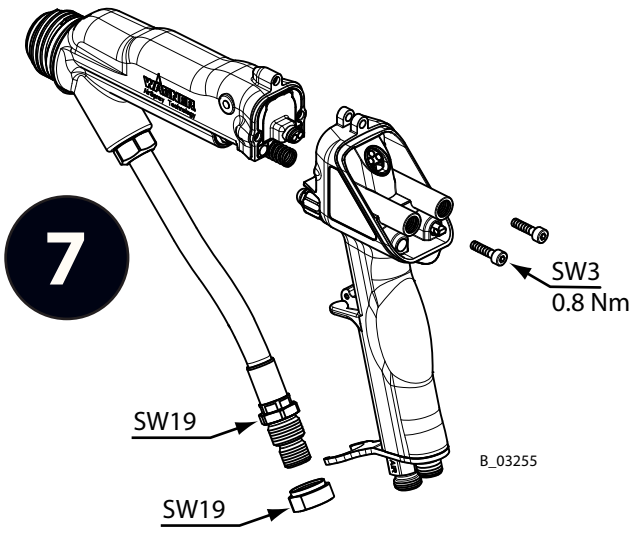
1. Move the valve rod to the rear position so that the sealing area does not become scratched (1).
2. Very slightly tighten valve tip (2) using an assembly tool with three fingers.
3. Use socket or ring spanner (no wrench) to tighten the valve housing (3).
4. Slide the valve rod to the forward position (at the valve seat) (4).

6

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



7

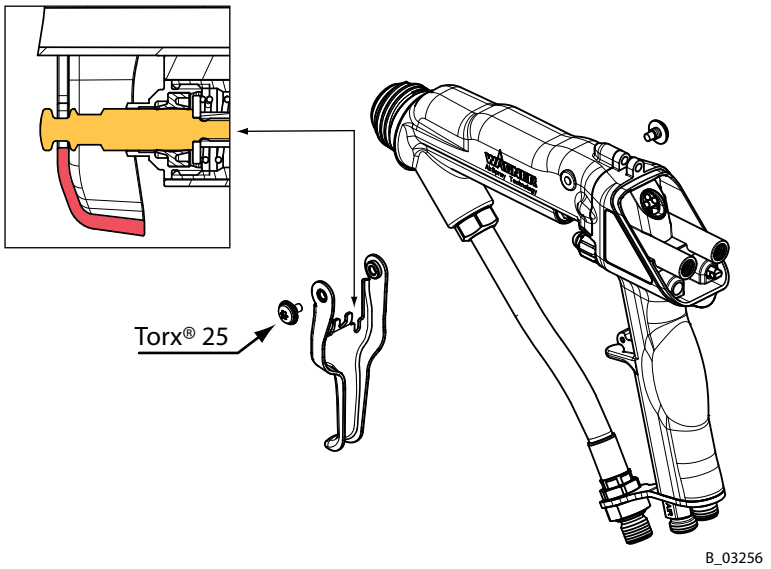


Ensure that the spring is inserted in the adapter.

Ensure that the flat gasket is inserted in the handle.

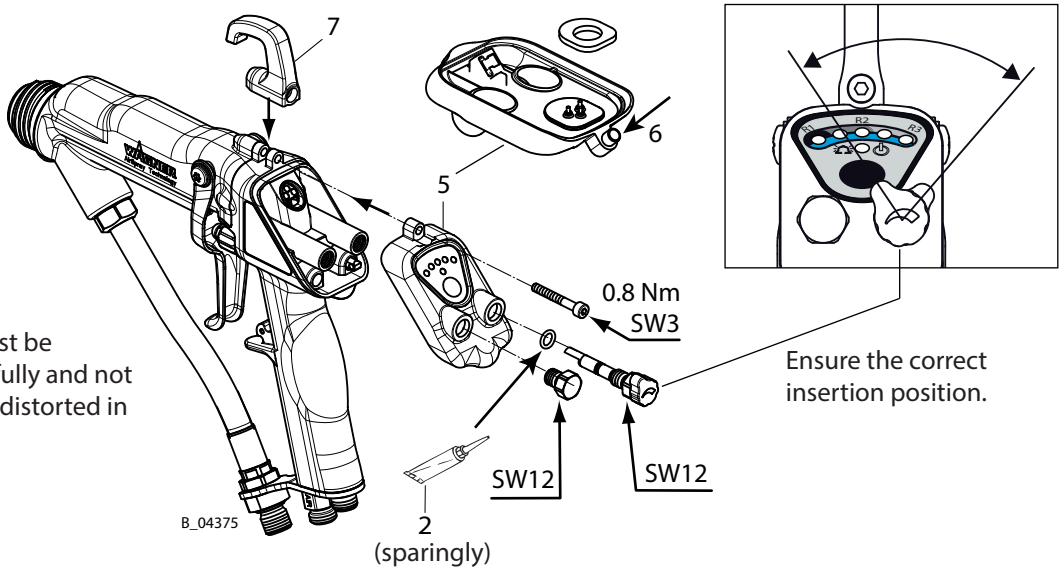
8

Push the trigger upward into the air valve piston. The recess in the trigger must engage correctly in the indentation of the piston.



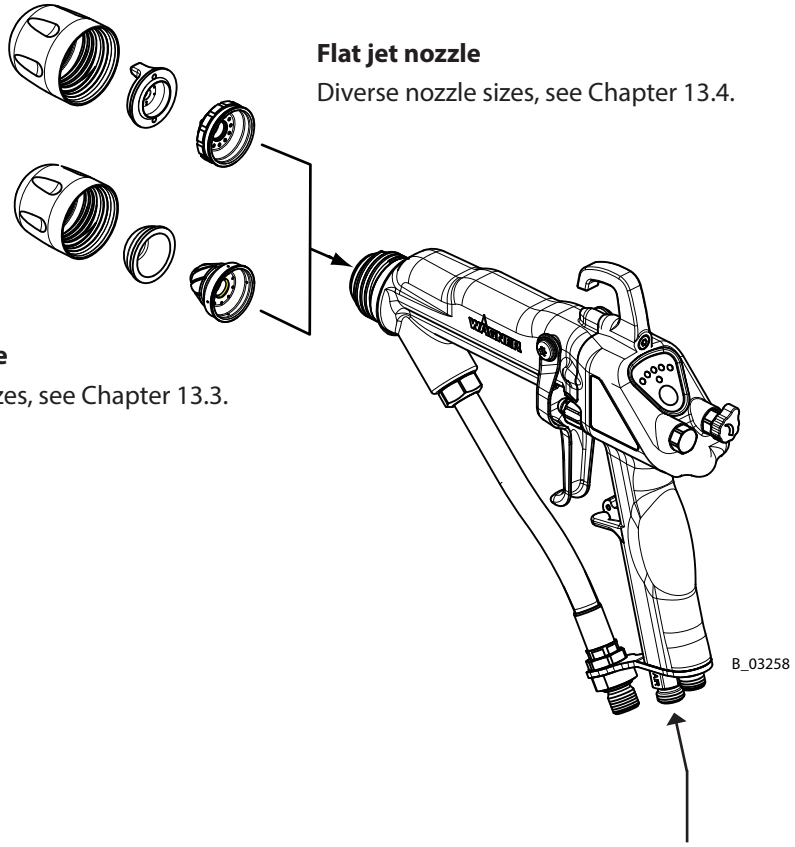
9

Cover (5)
The cover must be handled carefully and not be twisted or distorted in any way.



1. Press metal sleeve (6) back in cover (5) (e.g., press on table). In the process, only exert counter pressure on the sleeve bracket and not on the entire cover.
2. Position cover straight and level, and carefully press in. Use only minimal force, gently rocking from side to side if necessary.
3. Ensure that the cover is flush mounted on all sides.
4. Press back on metal sleeve for a flush fit (e.g., press on table).
5. Position bracket (7).
6. Mount screw, plug, and air regulation.

10



Flat jet nozzle

Diverse nozzle sizes, see Chapter 13.4.

Round jet nozzle

Diverse nozzle sizes, see Chapter 13.3.

Air hose

When screwing on the air hose, a second open-ended/ring spanner must be used for bracing.

11 FUNCTION TEST AFTER THE REPAIR

After all repairs, the device must be checked for safe condition before recommissioning. The necessary scope of inspection and testing depends on the repair carried out and must be documented by the repair staff.

11.1 CHECKING THE HIGH VOLTAGE

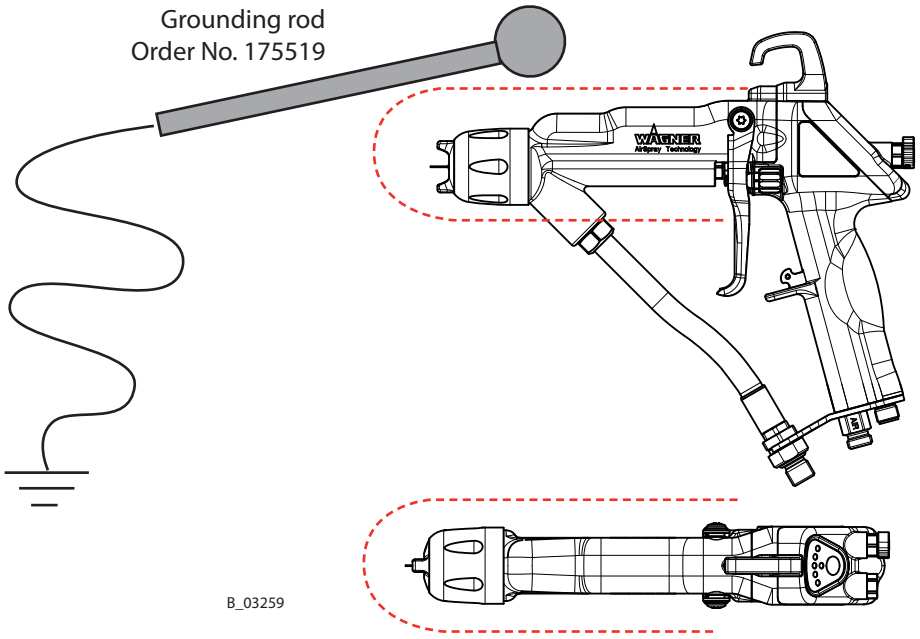
Necessary test equipment:
VM 500 or VM 5000 control unit and HV200 high-voltage tester.

High-voltage measurement on spraying gun.
Connect gun cable to control unit. Take the spray gun in your hand and hold it in open space. Switch on control unit and actuate trigger guard.
The high voltage should be 60 to 65 kV in dry ambient air. The value can be checked with the display on the control unit (VM 5000).
Note:
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 50 to 55 kV.

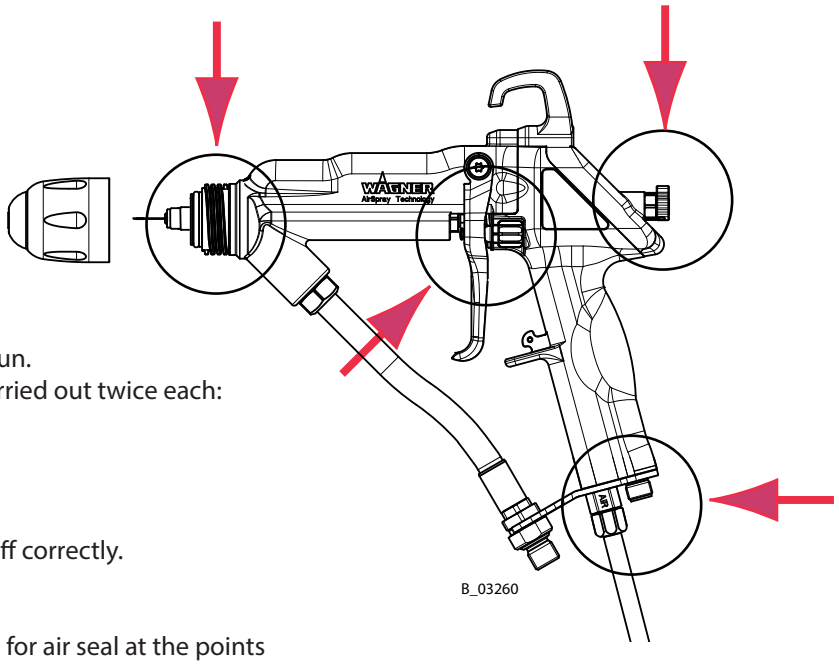
High-voltage measurement with high-voltage tester
Place the ball of the high-voltage tester on the gun electrode and turn on the high voltage.
The measured value should be 70 to 80 kV.
Notes

- 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.



11.2 AIR TEST



Connect test or air hose to spray gun.
The following air tests are to be carried out twice each:
- at 0.1 MPa; 1 bar; 14.5 psi
- at 0.8 MPa; 8 bar; 116 psi

Checking the air valve
The air valve must switch on and off correctly.

Air seal
Without activating the trigger, test for air seal at the points marked in the illustration.

11.3 PRODUCT PRESSURE TEST

Connect low-pressure hose to the spray gun.
Spray gun with suitable medium (e.g., flushing agent or Marcol 52) and a maximum pressure of 0.8 MPa; 8 bar; 116 psi. Increase the pressure gradually while doing so.
Observe the following gun components:
Product connection, nozzle body, product valve (no post-spraying).

⚠ DANGER

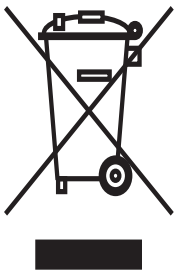
Exploding gas / air mixture!
Danger to life from flying parts and burns.

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

11.4 TEST OF SPRAY PATTERN

Check spray pattern in accordance with Chapter 7.3.2.

12 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.

Consumable products
Consumable products (lacquers, adhesives, flushing and cleaning agents) must be disposed of in accordance with all applicable legal requirements.

13 ACCESSORIES

13.1 VALVE HOUSING

Order No.	Designation
2312179	Valve housing Air, complete (steel) (standard version)
2312176	Valve housing Air, complete (PEEK)


B_03697


B_03697

13.2 VALVE TIPS

Order No.	Designation
2312184	Valve tip Air, complete (PEEK) (standard version)
2312185	Valve tip Air, complete (steel)


B_03698


B_03698

13.3 ROUND SPRAY NOZZLES

13.3.1 AR 5000 AIR CAPS

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


B_03239


B_03239

13.3.2 AR 5000 NOZZLES

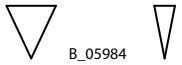
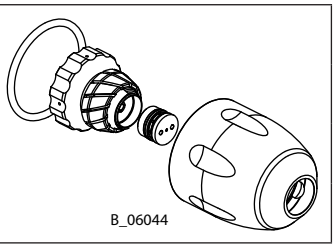
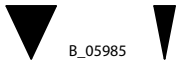
Order No.	Designation
2310558	Nozzle, AR 5000 (D8)
2315050	Nozzle, AR 5000 (D12)


B_03238


B_03238

Discharge quantity measurements: see Chapter 5.6.5

13.3.3 NOZZLE SET EARV

Order No.	Designation	Markings on union nut	
2361290	Nozzle set EARV 5000 LV suitable for low viscosity products	 B_05984	 B_06044
2365979	Nozzle set EARV 5000 HV suitable for high viscosity products	 B_05985	

Mounting tool

353210	Air nozzle spanner	 B_00117

Spare parts see Chapter 14.4.3.

13.4 FLAT JET NOZZLES

13.4.1 AF 5000 AIR CAPS

Order No.	Designation	
2310506	Air cap, AF 5000–0.4-0.8S	 B_03240
2310507	Air cap, AF 5000–1.0-1.4S	 B_03240
2310508	Air cap, AF 5000–1.6-2.0S	 B_03240
2314255	Air cap, AF 5000–0.4-0.8W (wide)	 B_03240
2314256	Air cap, AF 5000-1.0-1.4W (wide)	 B_03240
2314258	Air cap, AF 5000–1.6-2.0W (wide)	 B_03240

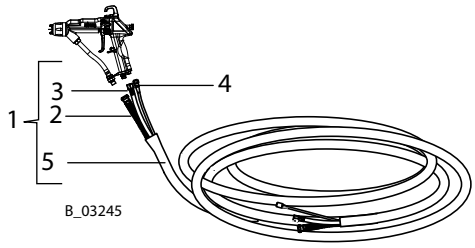
13.4.2 AF 5000 NOZZLES

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

Discharge quantity measurements: see Chapter 5.6.5

13.5 HOSES AND ELECTRIC CABLES

13.5.1 STANDARD HOSE SETS AND COMPONENTS



Pos	Stk	Order No.	Designation
1	1	2356991	Hose set GM 5000EA USA (7.5 m)
Consists of:			
2	1	2356965	Low pressure hose DN6-PN20-NPSM 3/8"-7.5 m-PA
3	1	2356978	Air hose, complete DN8 USA (8.0 m)
4	1	2339157	Gun cable GM 5000E (10.0 m)
5	8 m	3676437	Protection hose fabric PP30 (8.0 m)

Pos	Stk	Order No.	Designation
1	1	2356992	Hose set GM 5000EA USA (10 m)
Consists of:			
2	1	2356966	Low pressure hose DN6-PN20-NPSM 3/8"-10 m-PA
3	1	2356979	Air hose, complete DN8 USA (10.5 m)
4	1	2339158	Gun cable GM 5000E (15.0 m)
5	10.5 m	3676437	Protection hose fabric PP30 (10.5 m)

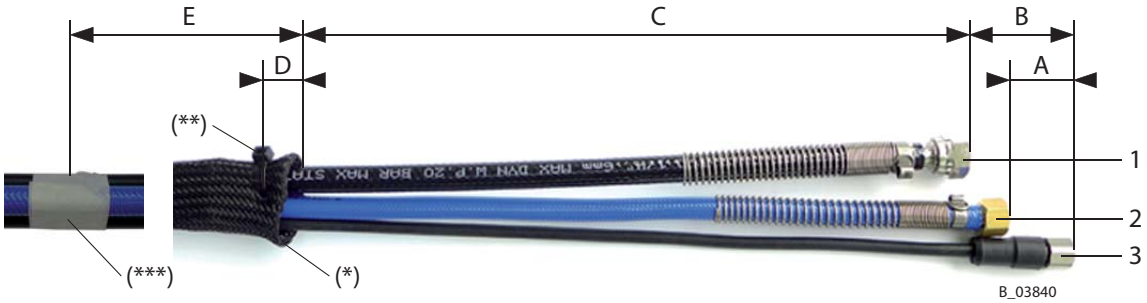
Pos	Stk	Order No.	Designation
1	1	2356993	Hose set GM 5000EA USA (15 m)
Consists of:			
2	1	2356967	Low pressure hose DN8-PN17-NPSM 3/8"-15 m-PA
3	1	2356980	Air hose, complete DN8 USA (15.5 m)
4	1	2339159	Gun cable GM 5000E (20.0 m)
5	15.5 m	3676437	Protection hose fabric PP30 (15.5 m)

Pos	Stk	Order No.	Designation
1	1	2356994	Hose set GM 5000EA USA (20 m)
Consists of:			
2	1	2356968	Low pressure hose DN8-PN17-NPSM 3/8"-20 m-PA
3	1	2356981	Air hose, complete DN8 USA (20.5 m)
4	1	2339160	Gun cable GM 5000E (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 8 mm; 0.32 inch
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



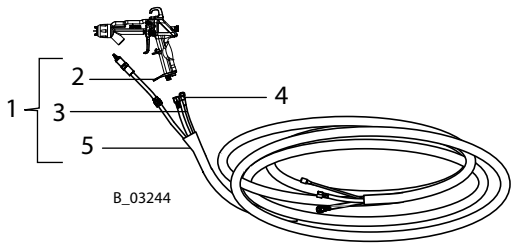
1 Product hose
2 Air hose
3 Electrical cable

Order No.	Description	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
2356991	Hose set GM 5000EA USA (7.5 m)	29±2	47±2	300±10	20±10	1500^{+100}
2356992	Hose set GM 5000EA USA (10 m)	29±2	47±2	300±10	20±10	1500^{+100}
2356993	Hose set GM 5000EA USA (15 m)	29±2	47±2	300±10	20±10	1500^{+100}
2356994	Hose set GM 5000EA USA (20 m)	29±2	47±2	300±10	20±10	1500^{+100}

Notes:

(*) Melt the hose ends at both sides (gun/pump) and turn approx. 5 cm of each hose end to the inside.
(**) 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 **)!

13.5.2 HOSE SETS FOR LOW-RESISTANCE PRODUCTS



Pos	Stk	Order No.	Designation
1	1	2357021	Hose set GM 5000EA USA (7.5 m), Low R
Consists of:			
2	1	2310464	Product hose EA, complete (7.5 m) Low R
3	1	2345340	Air hose, complete (8.0 m)
4	1	2339157	Gun cable GM 5000E (10.0 m)
5	8 m	3676437	Protection hose fabric PP30 (8.0 m)
	1	2307288	Nipple
	1	9971025	O-ring

Pos	Stk	Order No.	Designation
1	1	2357022	Hose set GM 5000EA USA (10.0 m), Low R
Consists of:			
2	1	2310465	Product hose EA, complete (10.0 m) Low R
3	1	2345341	Air hose, complete (10.5 m)
4	1	2339158	Gun cable GM 5000E (15.0 m)
5	10.5 m	3676437	Protection hose fabric PP30 (10.5 m)
	1	2307288	Nipple
	1	9971025	O-ring

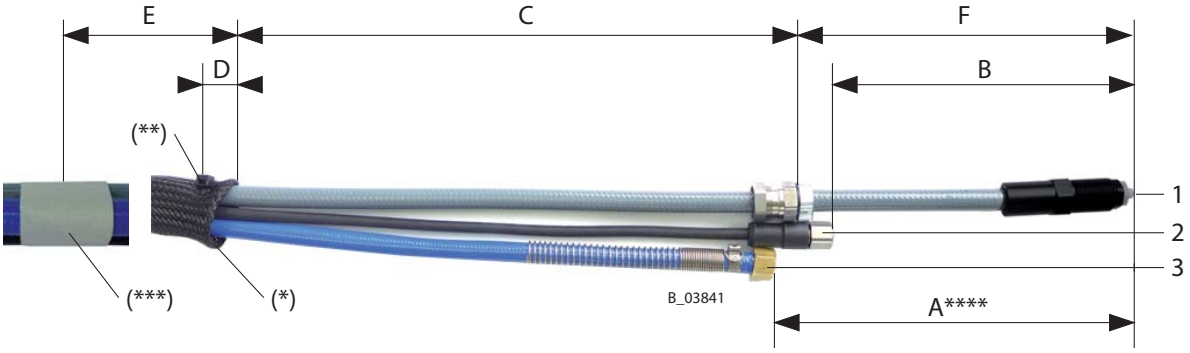
Pos	Stk	Order No.	Designation
1	1	2357023	Hose set GM 5000EA USA (15.0 m), Low R
Consists of:			
2	1	2310466	Product hose EA, complete (15.0 m) Low R
3	1	2345342	Air hose, complete (15.5 m)
4	1	2339159	Gun cable GM 5000E (20.0 m)
5	15.5 m	3676437	Protection hose fabric PP30 (15.5 m)
	1	2307288	Nipple
	1	9971025	O-ring

Pos	Stk	Order No.	Designation
1	1	2357024	Hose set GM 5000EA USA (20.0 m), Low R
Consists of:			
2	1	2310467	Product hose EA, complete (20.0 m) Low R
3	1	2345343	Air hose, complete (20.5 m)
4	1	2339160	Gun cable GM 5000E (25.0 m)
5	20.5 m	3676437	Protection hose fabric PP30 (20.5 m)
	1	2307288	Nipple
	1	9971025	O-ring

Hose colors:
Product hose grey
Air hose blue

Dimensions:
Air hose: inside diameter 8 mm; 0.32 inch
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 Electrical cable
3 Air hose

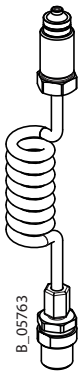
Order No.	Description	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
2357021	Hose set GM 5000EA (7.5m) Low R	200±2	171±2	300±10	20±10	1500^{+100}	182±1
2357022	Hose set GM 5000EA (10 m), Low R	200±2	171±2	300±10	20±10	1500^{+100}	182±1
2357023	Hose set GM 5000EA (15 m), Low R	200±2	171±2	300±10	20±10	1500^{+100}	182±1
2357024	Hose set GM 5000EA (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 turn approx. 5 cm of each hose end to the inside.
(**) 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 accordingly.
Dimension A becomes 231±2 mm!

13.5.3 SPIRAL HOSE (NO FM APPROVAL)

Pos	Stk	Order No.	Designation
1	1	2355047	Spiral hose, complete (USA)



The spiral hose can only be used along with standard hose set.

Application:
This hose is used primarily for processing of metallic lacquers.
Due to the spiral the conductive bridges will be interrupted by sedimentation of the metallic particles.

For details of spiral hose assembly, refer to the supplied assembly manual.

13.5.4 GUN CABLES AND GUN CABLE EXTENSIONS

GM 5000E gun cable

Length	10 m; 32.8 ft	15 m; 49.2 ft	20 m; 65.6 ft	25 m; 82.0 ft	32 m; 105 ft	62 m; 203 ft
Order No.	2339157	2339158	2339159	2339160	2344995	2344996

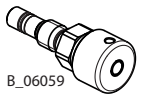
GM 5000E extension cable

Length	10 m; 32.8 ft	20 m; 65.6 ft
Order No.	2339161	2339162

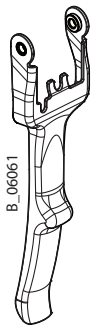
Max. total length of 80 m; 262 ft (see Chapter 6.7.3.1)

13.5.5 AIR REGULATION

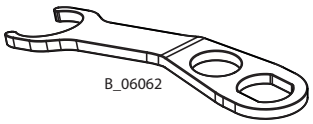
Order No.	Designation
2357053	Air regulation PB, complete



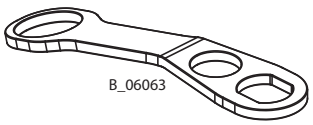
13.5.6 4 FINGER TRIGGER



Order No.	Designation
2367641	4 finger trigger



Order No.	Designation
2367508	Hose holder 4 finger trigger open



Order No.	Designation
2367381	Hose holder 4 finger trigger closed

13.6 MISCELLANEOUS

Order No.	Designation
2319653	Protective gun coating
259010	High-voltage tester, HV 200 N
2326041	Paint resistance meter
999080	Wet film thickness gauge
50342	Viscosity cup DIN 4 mm; 0.16 inch
2309368	Valve needle assembly tool
2325263	Clamping screw assembly tool
2326485	Wall mount, GM 5000E (left/right)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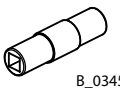
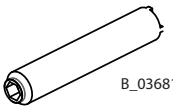
P_00265

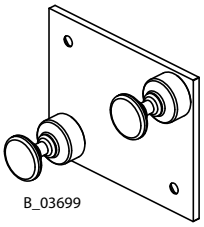

B_03692


B_03225


B_03224


B_03451


B_03681


B_03699

14 SPARE PARTS

14.1 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 list. 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:
- Address for the invoice
- Address for delivery
- 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 parts
Note: These parts are not covered by warranty terms.

● Not part of standard equipment, available, however, as additional extra.

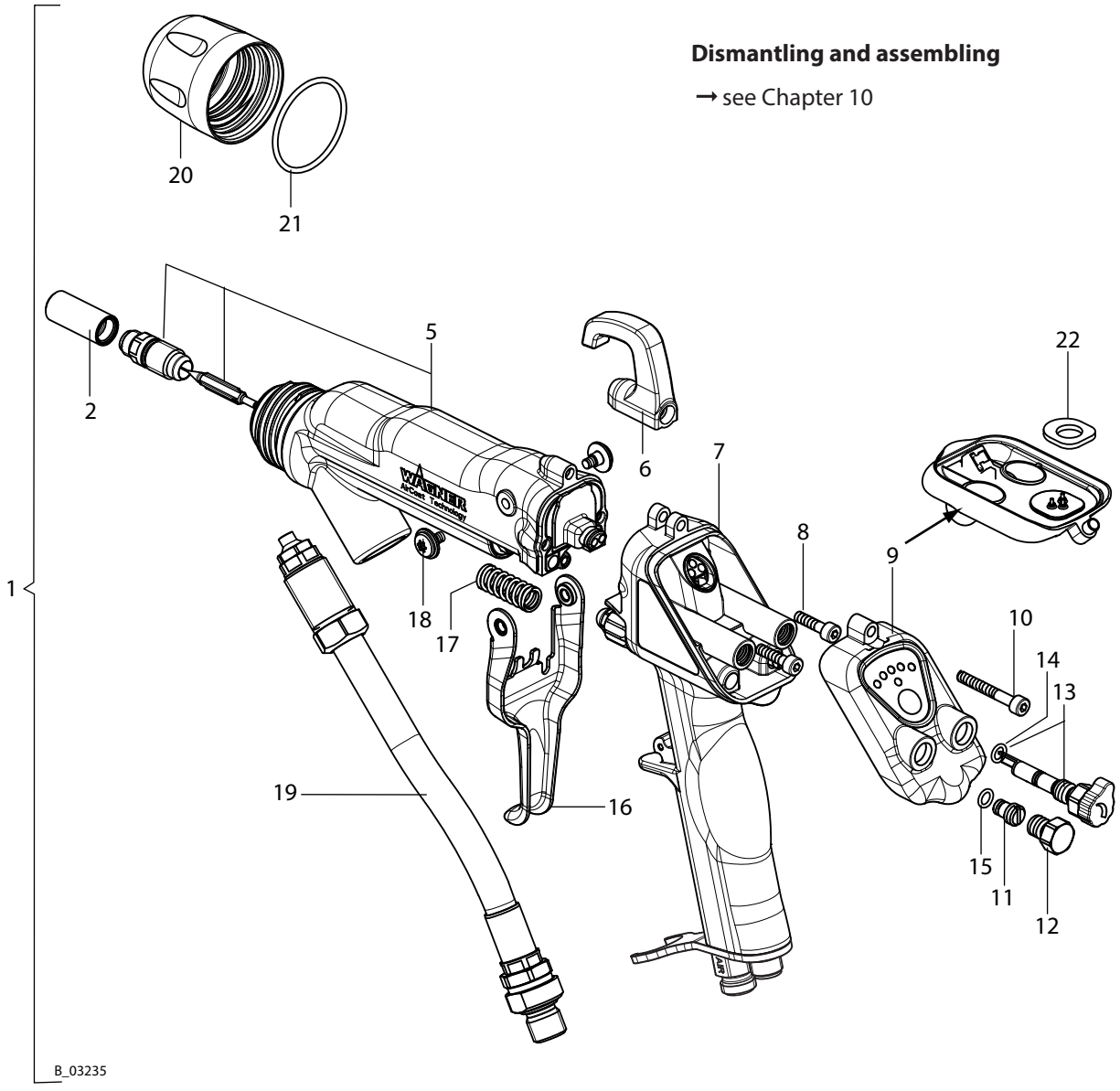
DANGER

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 unit.
→ Before all work on the device and in the event of work interruptions:
- Switch off the energy supply and the compressed air supply.
- Relieve the pressure from the spray gun and device.
- Secure the spray gun against actuation.
→ Observe the operating and service manual for all work.

14.2 GM 5000EA SPRAY GUN

14.2.1 BASIC VERSION GM 5000EA



GM 5000EA spare parts list

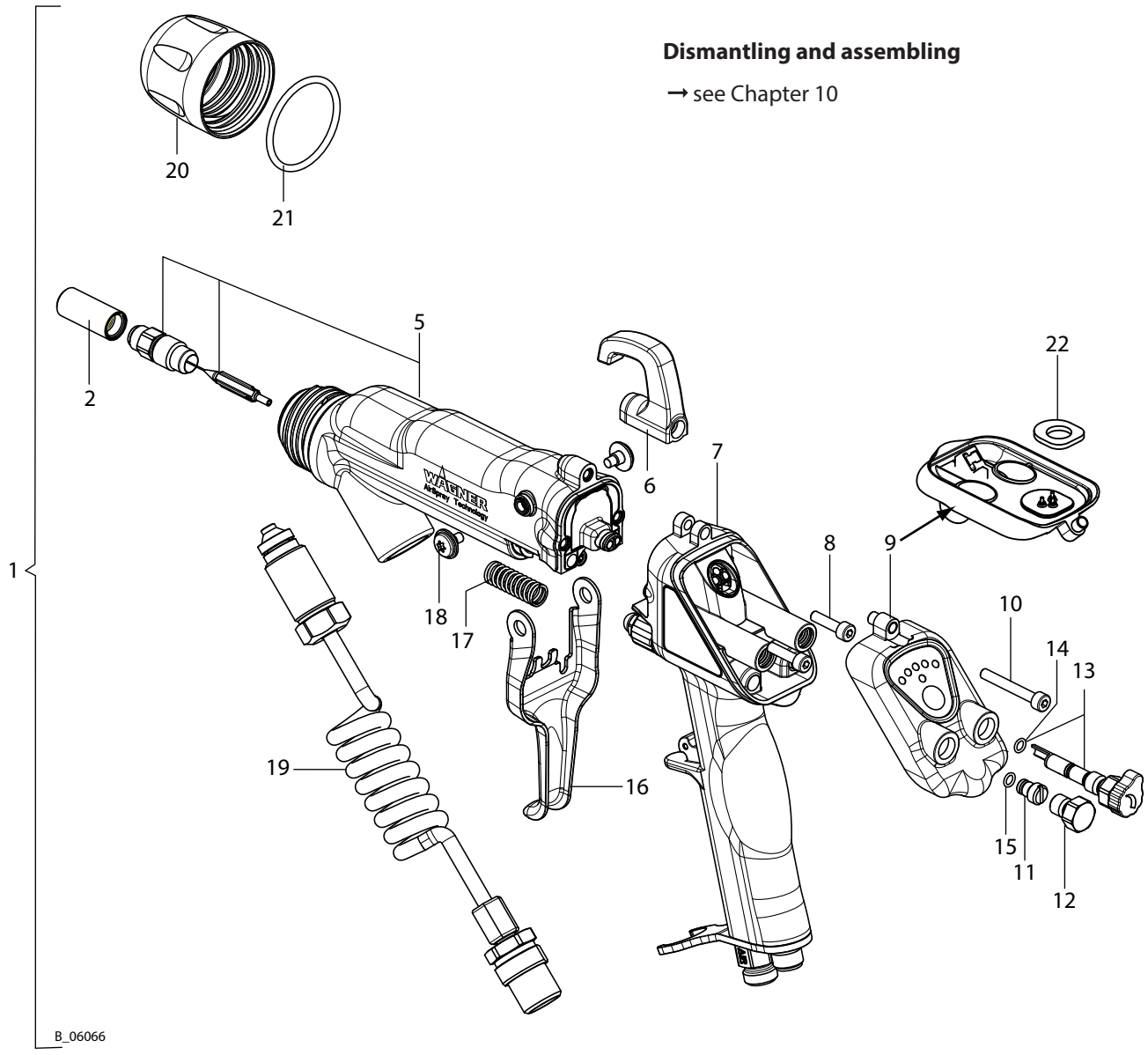
Pos	K	Stk	Order No.	Designation
1		1	2344471	Basic version GM 5000EA
2		1	2315709	Protection cap valve needle
5		1	-	Adapter GM 5000EA, complete For details, see Chapter 14.2.4
6	◆	1	2314361	Hook
7		1	-	Handle ES 5000 Air (USA), complete For details, see Chapter 14.2.5
8		2	9900308	Hexagon socket cylinder head screw
9		1	2312183	Lid, complete (including item 22)
10		1	9900386	Hexagon socket cylinder head screw
11		1	2311970	Sealing plug
12		1	2307104	Screw plug
13		1	2312180	Air regulation, complete (including item 14)
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 socket
19	◆	1	2352728	Product hose Air (USA), complete
20		1	2307039	Union nut
21	◆★	1	2311217	O-ring
22	◆★	1	2308699	Cover seal

	1	2326335	Service set GA 5000EA

◆ = Wearing part

★ = Included in service set

14.2.2 SPIRAL HOSE FOR GM 5000EA



GM 5000EA spare parts list

Pos	K	Stk	Order No.	Designation
1		1	2363670	Spiral hose for GM 5000EA*
2		1	2315709	Protection cap valve needle
5		1	-	Adapter GM 5000EA, complete For details, see Chapter 14.2.4
6	◆	1	2314361	Hook
7		1	-	Handle ES 5000 Air (USA), complete For details, see Chapter 14.2.5
8		2	9900308	Hexagon socket cylinder head screw
9		1	2312183	Lid, complete (including item 22)
10		1	9900386	Hexagon socket cylinder head screw
11		1	2311970	Sealing plug
12		1	2307104	Screw plug
13		1	2312180	Air regulation, complete (including item 14)
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 socket
19	◆	1	2355047	Spiral hose, complete (USA)*
20		1	2307039	Union nut
21	◆★	1	2311217	O-ring
22	◆★	1	2308699	Cover seal

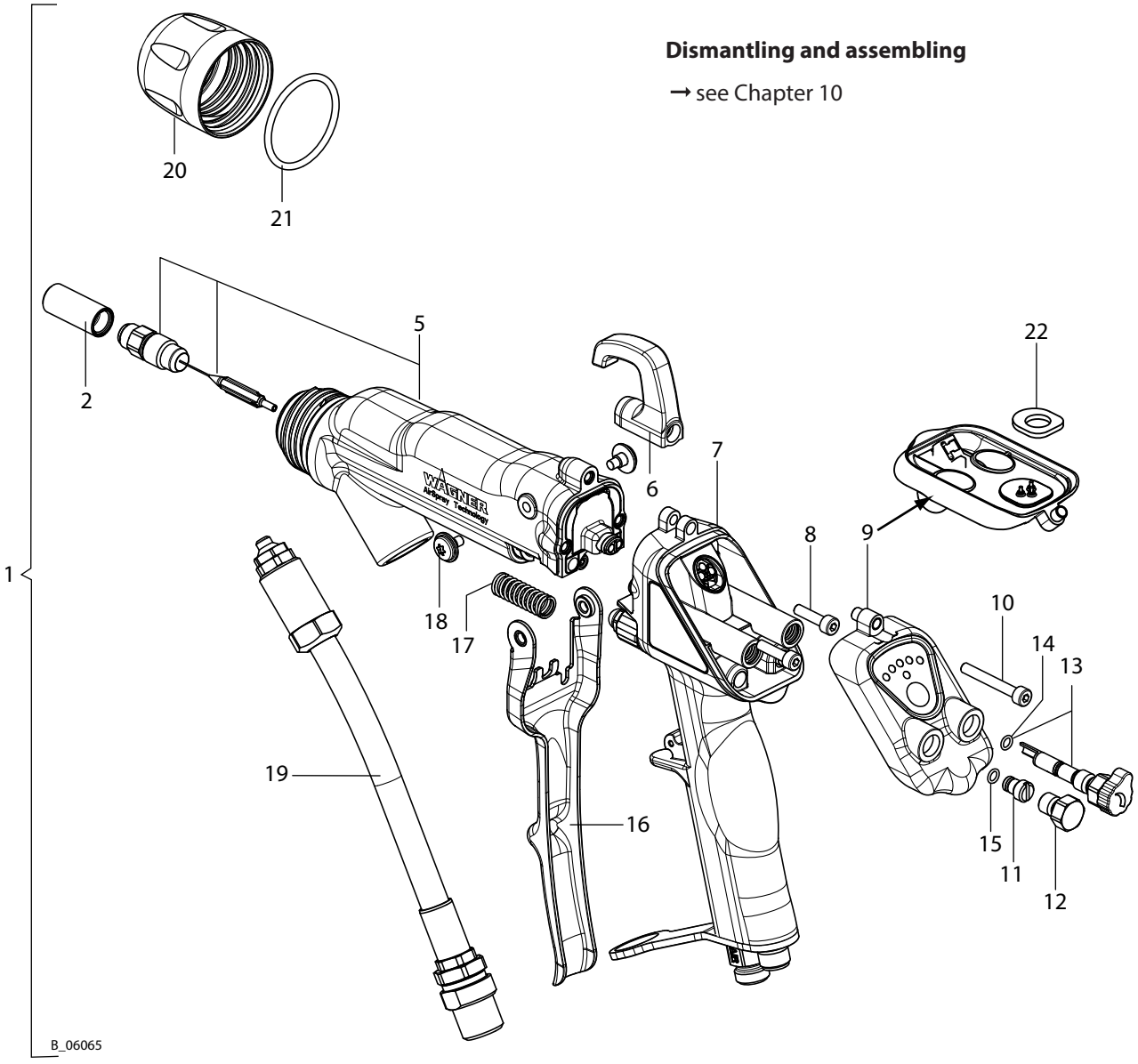
	1	2326335	Service set GA 5000EA

* no FM approval, in submission

◆ = Wearing part

★ = Included in service set

14.2.3 4 FINGER TRIGGER FOR GM 5000EA



GM 5000EA spare parts list

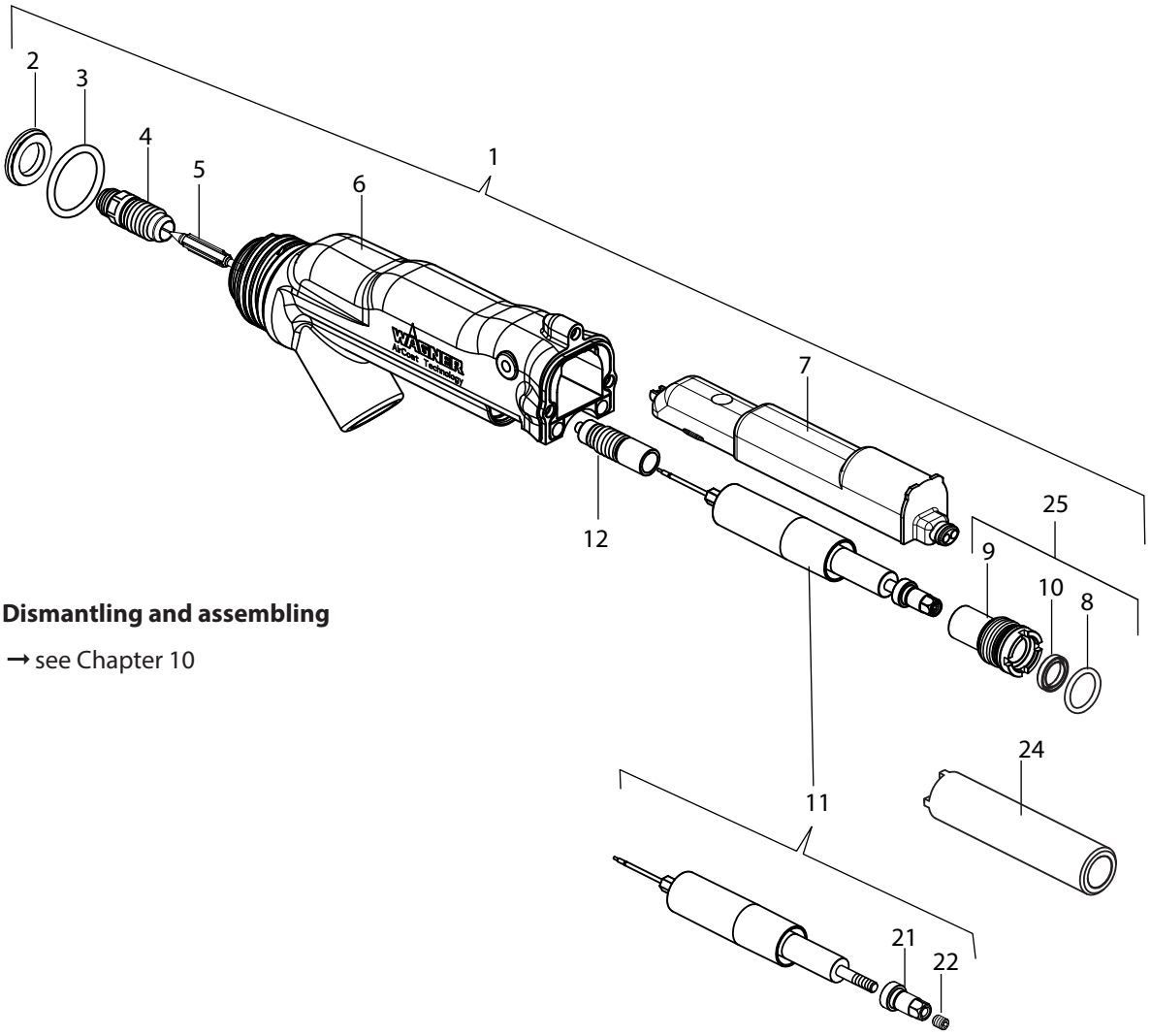
Pos	K	Stk	Order No.	Designation
1		1	2367744	4 finger trigger for GM 5000EA
2		1	2315709	Protection cap valve needle
5		1	-	Adapter GM 5000EA, complete For details, see Chapter 14.2.4
6	◆	1	2314361	Hook
7		1	-	Handle ES 5000 Air (USA), complete For details, see Chapter 14.5.
8		2	9900308	Hexagon socket cylinder head screw
9		1	2312183	Lid, complete (including item 22)
10		1	9900386	Hexagon socket cylinder head screw
11		1	2311970	Sealing plug
12		1	2307104	Screw plug
13		1	2312180	Air regulation, complete (including item 14)
14	◆★	1	9971182	O-ring
15	◆★	1	9971182	O-ring
16	◆	1	2367641	4 finger trigger
17		1	2311849	Cylindrical helical spring
18		2	2310617	Oval head screw with hexagon socket
19	◆	1	2352728	Product hose Air (USA), complete
20		1	2307039	Union nut
21	◆★	1	2311217	O-ring
22	◆★	1	2308699	Cover seal

	1	2326335	Service set GA 5000EA

◆ = Wearing part

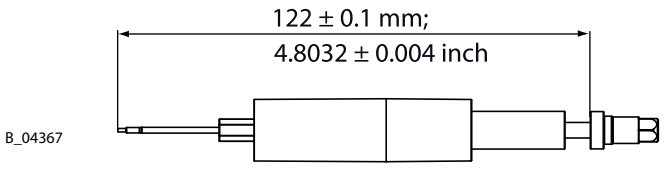
★ = Included in service set

14.2.4 GM 5000EA ADAPTER



Dismantling and assembling

→ see Chapter 10



B_04367

Spare parts list adapter

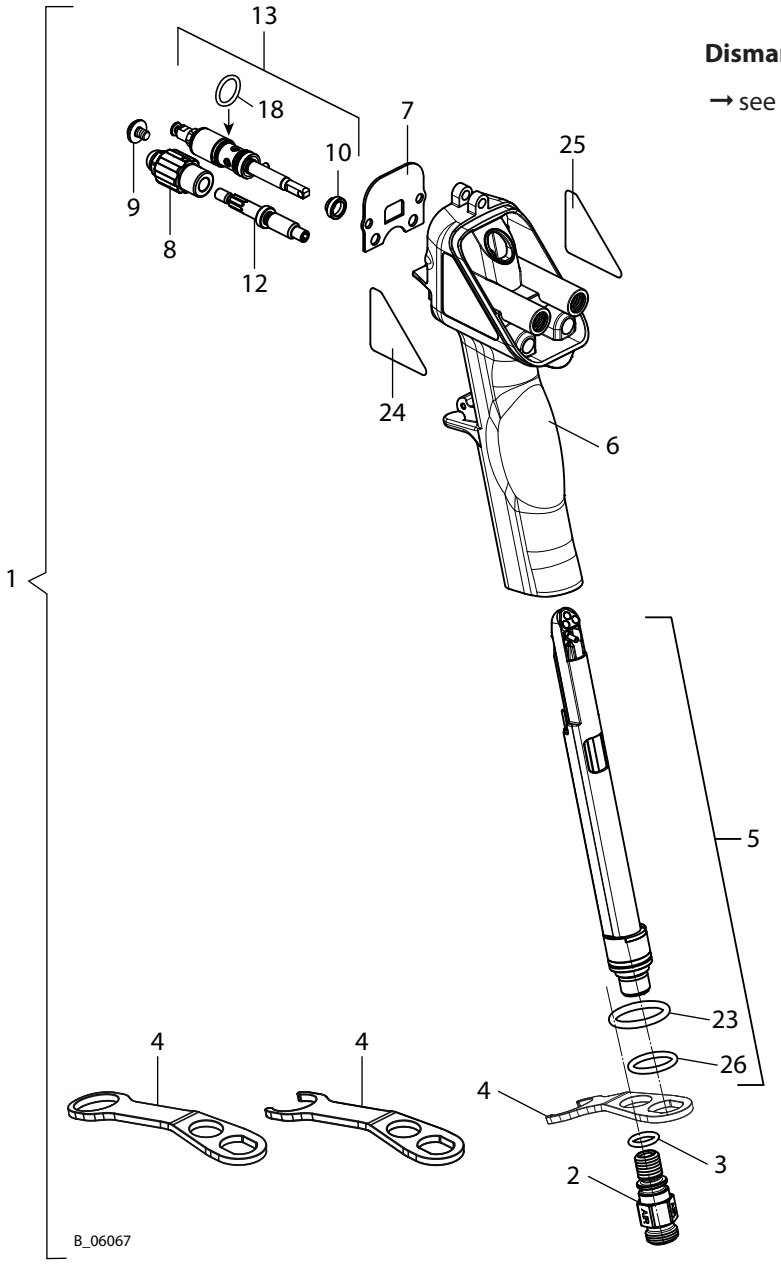
Pos	K	Stk	Order No.	Designation
1		1	-	Adapter GM 5000EA, complete
2	★	1	2309391	Air manifold ring, Air
3	◆★	1	2307180	O-ring, sheathed
4	◆★	1	2312179	Valve housing Air, complete (steel)
	◆ ●	1	2312176	Valve housing Air, complete (PEEK)
5	◆★	1	2312184	Valve tip Air, complete (PEEK)
	◆ ●	1	2312185	Valve tip Air, complete (steel)
6		1	2314271	Adapter GM 5000EA
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	2357106	Packing, complete
21		1	2307059	Withdrawal nut
22		1	9901411	Threaded pin with hexagon socket
24		1	2325263	Clamping screw assembly tool
25		1	2357665	Clamping screw valve rod, complete
		1	2326335	Service set GA 5000EA

◆ = Wearing part

★ = Included in service set

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

14.2.5 GM 5000EA HANDLE



Dismantling and assembling

→ see Chapter 10

Handle spare parts list

Pos	K	Stk	Order No.	Designation
1		1	-	Handle GM 5000EA (USA), complete
2		1	2354402	Fitting (USA)
3	◆★	1	9971025	O-ring
4		1	2307290	Hose holder
4			2367508	Hose holder 4 finger trigger open
4		1	2367381	Hose holder 4 finger trigger closed
5		1	2312182	Plug, complete (including item 23)
6		1	2314270	Handle, complete
7	★	1	2307232	Adapter seal
8		1	2325789	Adjusting screw complete
9		1	2309825	Oval head screw with hexagon socket
10	◆★	1	2310692	Seal
12		1	2307281	Threaded bolt
13		1	2312189	Air valve
18	◆★	1	9974218	O-ring
23	◆★	1	9974166	O-ring
24		1	2344489	Type plate left, GM5000EA - FM*
25		1	2344490	Type plate right, GM5000E - FM*
26		1	9971364	O-ring
		1	2326335	Service set GA 5000EA

◆ = Wearing part

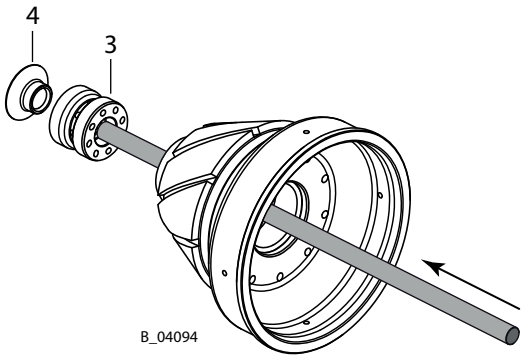
★ = Included in service set

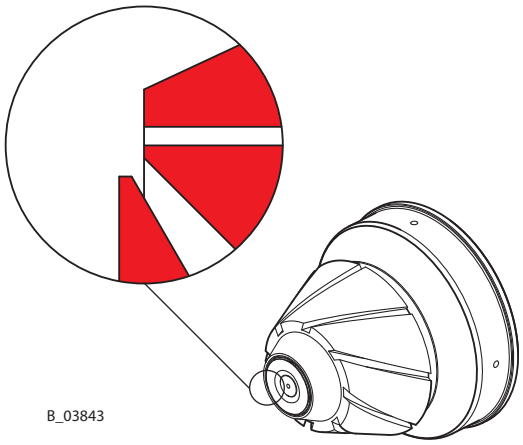
Note:

* Type plates may only from WAGNER staff or a skilled person be replaced!

14.3 ACCESSORIES SPARE PARTS LISTS

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



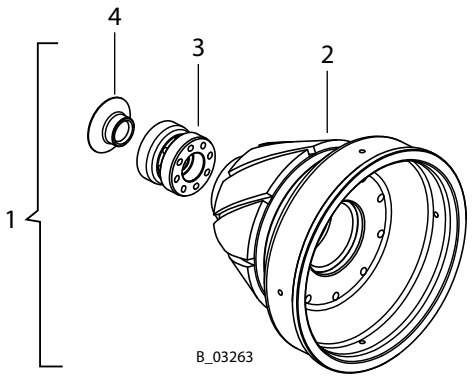


NOTICE

Incorrect assembly!
Damage to the parts or device.

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

14.3.1 AR 5000 NOZZLE (D8)

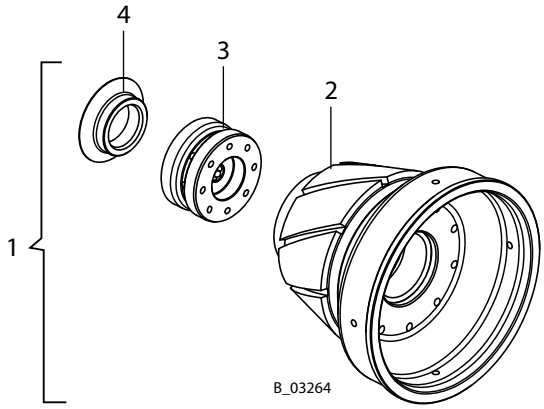


AR 5000 nozzle (D8) spare parts list

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

◆ = Wearing part

14.3.2 AR 5000 NOZZLE (D12)



AR 5000 nozzle (D12) spare parts list

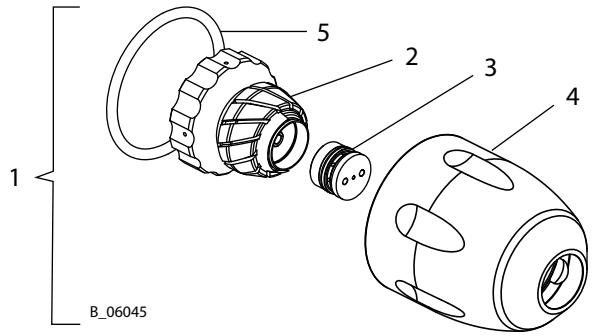
Pos	K	Stk	Order No.	Designation
1		1	2315050	Nozzle AR 5000, complete (D12)
2	◆	1	2327661	Nozzle, AR (D12)
3	◆	1	2327662	Nozzle attachment, AR (D12)
4	◆	1	2327663	Air diffuser, AR (D12)

◆ = Wearing part

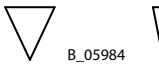
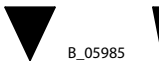
14.3.3 NOZZLE SET EARV 5000

EAWRV 5000 spare parts list				LV Low-viscosity (LV) products	HV High-viscosity (HV) products
Pos	**K**	**Stk**	**Designation**	**Order No.**	**Order No.**
1		1	Nozzle set EARV 5000	2361290	2365979
2	◆	1	Nozzle, EARV	2361273	
3	◆	1	Nozzle insert EARV	2361274	
4		1	Union nut, EARV	2361272	2365978
5	◆ ★	1	O-ring, sheathed	2311217	

◆ = Wearing part



Markings on union nut

LV Low-viscosity (LV) products	HV High-viscosity (HV) products
 B_05984	 B_05985

Mounting tool

353210	Air nozzle spanner	 B_00117

15 WARRANTY

15.1 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.

15.2 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 material 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. Signs of wear traced back to these products 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

15.3 FM APPROVAL

The electrostatic manual gun GM 5000EA is approved in the USA and Canada using configuration drawing no. 2316160.

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: **781 762 4300** F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

HAZARDOUS LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

The GM 5000EA Air Spray and GM 5000EAC Air Coat Spray Manual Applicators for use in Electrostatic Finishing Applications using Class I, Group D, Spray Material when configured with VM 500 or VM 5000 Low Voltage Control Units in accordance with FM Control Document 2316160. The VM 500 and VM 5000 Low Voltage Control Units are for use in unclassified locations with an indoor environmental rating of IP54.

Equipment Ratings:

The GM 5000EA Air Spray and GM 5000EAC Air Coat Spray Manual Applicators for use with VM 500 and VM 5000 Control units for use in Electrostatic Finishing Applications using Class I Group D Spray Materials when configured in accordance with drawing 2316160. The GM 5000EA applicators are rated for a fluid pressure of 0-116psi (0-8bar) and air pressure of 0-116psi (0-8bar) and a maximum ambient temperature of +40 °C. The GM 5000EAC applicators are rated for a fluid pressure of 0-3626psi (0-250bar) and air pressure of 0-116psi (0-8bar) and a maximum ambient temperature of +40 °C. Both applicators have a high voltage electrostatic output of 70kv at 100µA maximum. The Control Units VM 500 and VM 5000 are rated for use in unclassified locations with an indoor environmental rating of IP54 and an input voltage of 115-240Vac 50/60Hz.

Order No. 2344499
Edition 04/2016

Germany
J. WAGNER GmbH
Otto-Lilienthal-Str. 18
Postfach 1120
D- 88677 Markdorf
Phone +49/ (0)7544 / 5050
Telefax +49/ (0)7544 / 505200
E-mail service.standard@wagner-group.com

Switzerland
J. WAGNER AG
Industriestrasse 22
Postfach 663
CH- 9450 Altstätten
Phone +41/ (0)71 / 757 2211
Telefax +41/ (0)71 / 757 2222

More contact addresses on the internet at:
www.wagner-group.com
Company/Locations/WAGNER worldwide

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Document No. 11163741
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