

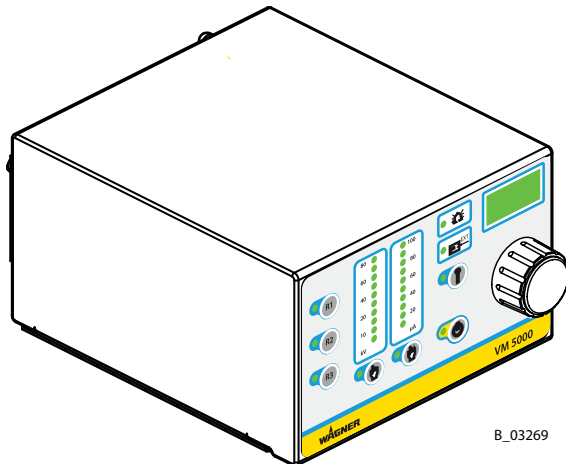


**Translation of the original
Operating manual**

VM 5000


Edition 03/2012

Electrostatic control unit
for electrostatic hand spray guns



B_03269

CE Ex II 3 G

 (in submission)
APPROVED

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1 ABOUT THESE INSTRUCTIONS

This operating manual contains information about the operation, repair and maintenance of the unit.

→ Always follow these instructions when operating the unit.

This equipment can be dangerous if it is not operated in accordance with this manual.

Electrostatic spray guns may be operated only by trained personnel.

Compliance with these instructions constitutes an integral component of the guarantee agreement.

1.1 LANGUAGES

This operating manual is available in the following languages:


Language:	Part No.	Language:	Part No.
German	2310484	English	2318718
French	2318719	Dutch	---
Italian	2318720	Spanish	2318721

1.2 WARNINGS, NOTES AND SYMBOLS IN THESE INSTRUCTIONS


Warning instructions in this manual point out particular dangers to users and equipment and state measures for avoiding the hazard.

These warning instructions fall into the following categories:


Danger - imminent danger. Non-observance will result in death, serious injury and serious material damage.

	⚠ DANGER
	<p>This line warns of the hazard! Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.</p> <p>→ The measures for preventing the hazard and its consequences.</p>

Warning - possible danger. Non-observance can result in death, serious injury and serious material damage.

	⚠ WARNING
	<p>This line warns of the hazard! Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.</p> <p>→ The measures for preventing the hazard and its consequences.</p>

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

	⚠ CAUTION
	<p>This line warns of the hazard! Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.</p> <p>→ The measures for preventing the hazard and its consequences.</p>

Caution - a possibly hazardous situation. Non-observance can cause material damage.

SIHI_0102_GB	CAUTION
<p>This line warns of the hazard! Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.</p> <p>→ The measures for preventing the hazard and its consequences.</p>	

Note - provide information on particular characteristics and how to proceed.

2 GENERAL SAFETY INSTRUCTIONS

2.1 SAFETY INSTRUCTIONS FOR THE OPERATOR

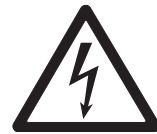
- Keep these operating instructions to hand near the unit at all times.
- Always follow local regulations concerning occupational safety and accident prevention.



2.1.1 ELECTRICAL EQUIPMENT

Electrical plant and unit

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



Control units

- Place the control unit outside the spray booth/zone.
- Place the control unit, if possible, outside the explosion zone (positioning in explosion zone 2 is enables).
- Protect the control unit from extreme temperature and moisture changes.
- Protect the control unit against dirt.
- Lay and fix the connecting cable correctly.
- Guarantee that local mains voltage and tension of the equipment agree.

2.1.2 PERSONNEL QUALIFICATIONS

- Ensure that the unit is operated and repaired only by trained persons.

2.1.3 A SAFE WORK ENVIRONMENT

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



2.2 SAFETY INSTRUCTIONS FOR STAFF

- Always follow the information in these instructions, particularly the general safety instructions and the warning instructions.
- Always follow local regulations concerning occupational safety and accident prevention.

**Control units**

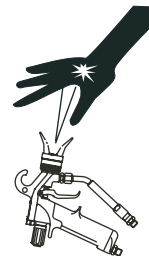
- When putting into operation and for all work, read and follow the operating instructions and safety regulations for the additionally required system components.
- Do not open the control unit.

2.2.1 SAFE HANDLING OF WAGNER SPRAY UNITS

The spray jet is under pressure and can cause dangerous injuries.

Avoid injection of paint or cleaning agents:

- Never point the spray gun at people.
- Never reach into the spray jet.
- Before all work on the unit, in the event of work interruptions and functional faults:
 - Switch off the energy/compressed air supply.
 - Secure the spray gun against actuation.
 - Relieve the pressure from the spray gun and unit.
 - By functional faults: Identify and correct the problem, proceed as described in chapter „Trouble shooting“.



In the event of skin injuries caused by paint or cleaning agents:

- Note down the paint or cleaning agent that you have been using.
- Consult a doctor immediately.

Avoid danger of injury through recoil forces:

- Ensure that you have a firm footing when operating the spray gun.
- Only hold the spray gun briefly in any one position.

2.2.2 EARTH THE UNIT

Depending on the high-voltage of the spray electrode and the flow rate at spray pressures can produce an electrostatic charge in the equipment. These can cause sparks and flames upon discharge.

- Ensure that the unit is always earthed.
- Earth the work pieces to be coated.
- Ensure that all persons inside the working area are earthed, e.g. that they are wearing derivable shoes.
- When spraying, wear derivable gloves to earth yourself via the spray gun handle.

**2.2.3 MATERIAL HOSES**

- Ensure that the hose material is chemically resistant to the sprayed materials.
- Ensure that the material hose is suitable for the pressure generated in the unit.
- Ensure that the following information is visible on the high pressure hose:
 - Manufacturer
 - Permissible operating overpressure
 - Date of manufacture.
- The electrical resistance of the complete high pressure hose must be less than 1 MOhm.



2.2.4 CLEANING

- De-energize the unit electrically.
 - Disconnect the pneumatic supply line.
 - Relieve the pressure from the unit.
 - Ensure that the flash point of the cleaning agent is at least 15K above the ambient temperature. Otherwise, the cleaning works shall be carried out at forced ventilated cleaning place.
 - To clean, use only solvent-soaked cloths and brushes. The cleaning process mustn't damage parts of the spray gun, it mustn't be an abrasive procedure.
 - Parts of spray gun mustn't submerged or soaked into solvent.
 - Non-ignitable cleaning liquids shall be preferred.
 - A suitable solvent for cleaning the spray gun depends on the part of the gun and on the material that needs to be removed. It's recommended to use only non-polar solvents to prevent a conductive residue on critical components. If it's necessary to use polar solvents to clean the spray gun components, all residue must be removed by using a nonconductive non-polar solvent.
 - All electrical components cannot be cleaned or soaked in any solvents.
- An explosive gas/air mixture forms in closed containers.
- When cleaning units with solvents, never spray into a closed container.
 - For cleaning liquids only electrically leading containers may be used.
 - The containers must be earthed.

**2.2.5 HANDLING HAZARDOUS LIQUIDS, VARNISHES AND PAINTS**

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

**2.2.6 TOUCHING HOT SURFACES**

- Touch hot surfaces only if you are wearing protective gloves.
- When operating the unit with a coating material with a temperature of > 43 °C; 109.4 °F:
 - Identify the unit with a warning label that says „Warning - hot surface“.

Order No.

9998910 Information label

9998911 Safety label



2.3 CORRECT USE

WAGNER accepts no liability for any damage arising from incorrect use.

- Use the unit only to work with the materials recommended by WAGNER.
- Operate the unit only as an entire unit.
- Do not deactivate safety equipment.
- Use only WAGNER original spare parts and accessories.



2.4 SAFETY-RELEVANT INFORMATION ABOUT DISCHARGES

The plastic parts of the spray gun are charged electrostatically by the high-voltage field of the spray pistol. Harmless discharges (brush discharges) are possible after contact with plastic parts. They are completely harmless for people.

The corona discharge at the electrode end is visible during darkness at a distance of between 4 and 10 mm; 0.15 and 0.4 inches, between the spray gun and spray object.

Surface spraying of the control unit

- Do not spray unit parts with electrostatic (e.g. electrostatic spray gun).



Cleaning of the control unit

If there are deposits on the surfaces, the unit may form electrostatic charges. Flames or sparks can form if there is a discharge.

- Remove deposits from the surfaces to maintain conductivity.
- Use only a damp cloth to clean the unit.



2.5 USE IN AN EXPLOSION HAZARD AREA

2.5.1 CORRECT USE

The VM 5000 control unit may only be used in combination with the GM 5000EA or GM 5000EAC hand spray guns. If the control unit is operated in combination with devices other than the above-mentioned spray guns, the SIRA and FM authorizations (type approvals) cease to apply. These electrostatic hand spray guns are suitable for spraying liquid materials, in particular coating materials that follow AirCoat or Airspray techniques. Coating materials that contain solvents from the II A explosion group may be used.

2.5.2 EXPLOSION PROTECTION ACCORDING TO CE

The control unit is designed together with the spray gun in accordance with the 94/9/EC (ATEX 95) directive. The spray gun is suitable for use in potentially explosive areas zone 1 and the control unit in the area of zone 2.

Authorization (type approval) by SIRA for zone 1 (spray gun)

CE  0102  II (2) G
SIRA 11 ATEX 5374X



CE	Communautés Européennes
0102	Notified inspection body: PTB
Ex	Symbol for explosion protection
II	Unit class II
(2)	Category 2 (Zone 1) applies only to spray gun
G	Ex-atmosphere gas
SIRA 11 ATEX 5374X	Number of type approval certificate

Authorization for zone 2 (control unit)

CE   II 3 G Ex nR IIA T4 Gc

CE	Communautés Européennes
Ex	Symbol for explosion protection
II	Unit class II
3	Category 3 (Zone 2)
G	Ex-atmosphere gas
Ex nR	Ignite protection class „Restricted breathing“
IIA	Equipment group IIA
T4	Temperature class T4
Gc	Equipment protection type Gc

The „Gas-proof“ type of explosion protection is only guaranteed if all sealed elements in the control unit are available and undamaged. During operation, all electric connections in the control unit and relevant plug connectors or shut-off devices have to be tightly sealed.

2.5.3 EXPLOSION PROTECTION ACCORDING TO FM

Authorization (type approval) by FM for class 1, div. 1 (spray gun)



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

In accordance with 2316160 (the device is in submission)

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

2.6 GERMAN REGULATIONS AND GUIDELINES

- a) BGV A3 Electrical units and equipment
- b) BGR 500 Part 2, Chap. 2.36 Working with liquid ejection devices
- c) BGR 500 Part 2, Chap. 2.29 Using coating materials
- d) BGR 104 Explosion protection rules
- e) TRBS 2153 Avoiding ignition risks
- f) BGR 180 Setting up for cleaning with solvents for cleaning workpieces with solvents
- g) ZH 1/406 Guidelines for liquid ejection devices
- h) BGI 740 Painting rooms and equipment
- j) BGI 764 Electrostatic coating
- j) Betr.Sich.V. Plant Safety Ordinance

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

3 GUARANTEE AND CONFORMITY DECLARATIONS

3.1 IMPORTANT NOTES ON PRODUCT LIABILITY

As a result of an EC regulation, effective as from January 1, 1990, the manufacturer shall only be liable for his product if all parts come from him or are approved by him, and if the devices are properly fitted, operated and maintained.

If other makes of accessory and spare parts are used, the manufacturer's liability could be fully or partially null and void.

The usage of original WAGNER accessories and spare parts guarantees that all safety regulations are observed.

3.2 GUARANTEE CLAIM

Full guarantee 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 guarantee provided is such that the device or individual components of the device are either replaced or repaired as we think 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 unit to a location other than the address of the purchaser.

We do not provide guarantee for damage that has been caused or contributed to for the following reasons:

Unsuitable or improper use, faulty installation or commissioning by the purchaser or a third party, normal wear, negligent handling, defective maintenance, unsuitable coating products, substitute materials and the action of chemical, electro chemical 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 similar reduce the service life of valves, packings, spray guns, tips, cylinders, pistons etc. Signs of wear and tear due to such causes are not covered by this guarantee.

Components that have not been manufactured by WAGNER are subject to the original guarantee of the manufacturer.

Replacement of a component does not extend the period of guarantee of the device.

The unit should be inspected immediately upon receipt. To avoid losing the guarantee, 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 guarantee compliance met by a contracting company.

The services provided by this guarantee depend on evidence being provided in the form of an invoice or delivery note. If an examination discovers that no guarantee claim exists, the costs of repairs are charged to the purchaser.

It is clearly stipulated that this guarantee claim does not represent any constraint to statutory regulations or regulations agreed contractually in our general terms and conditions.

J. Wagner AG

3.3 CE-CONFORMITY

EC declaration of conformity as defined by Atex-directive 94/9/EC.

Herewith we declare that the supplied version of:

Electrostatic hand spraying system			
VM 500	VM 5000	GM 5000EA	GM5000EAC

Complies with the following guidelines:

94/9/EG	2004/108/EG	2002/96/EG
2006/42/EG	2002/95/EG	

Applied standards, in particular:

DIN EN 50050:2007	DIN EN 61000-6-2:2006	DIN EN ISO 12100:2011
DIN EN 1953:2010	DIN EN 61000-6-4:2011	DIN EN 60079-0:2010
DIN EN 60079-15:2011	DIN EN 60204-1:2007	

Applied national technical standards and specifications, in particular:

BGI 764

EC type approval certificate:

SIRA 11 ATEX 5374X issued by SIRA Certification, CH4 9JN, Chester, England, notified body no. 0518

Identification:

Control unit:   II (2) G
SIRA 11 ATEX 5374X

  II 3 G Ex nR IIA T4 Gc

Spray gun:   II 2 G EEx 0.24mJ
SIRA 11 ATEX 5374X

CE Certificate of Conformity

The certificate is enclosed with this product. The certificate of conformity can be reordered from your WAGNER representative, quoting the product and serial number.

Part number:

2310487



4 DESCRIPTION

4.1 FIELDS OF APPLICATION, USING IN ACCORDANCE WITH THE INSTRUCTIONS

WAGNER's electrostatic control unit VM 5000 controls the high voltage supply to the spray guns used to apply liquid coating media GM 5000EAC and GM 5000EA.

The VM 5000 may only be operated together with the above-mentioned hand spray guns. If the control unit is operated in combination with devices other than the above-mentioned spray guns, the SIRA and FM authorizations (type approvals) cease to apply.

As a result of the „Gas-proof“ type of explosion protection, the control unit is suitable for use in ex-zone 2. This is guaranteed providing all sealed elements in the control unit are available and undamaged. During operation, all electric connections in the control unit and relevant plug connectors or shut-off devices have to be tightly sealed.

4.2 SCOPE OF DELIVERY

Quantity	Part No.	Description
1	2310477	VM 5000 control unit

The standard equipment includes:

Quantity	Part No.	Description
1	241270	Mains cable with Stak200; 3 m; 9.8 ft
1	130215	Earthing cable 10 m; 32.8 ft
2	9951117	Delay-action fuses 1.0 AT
1	2310487	ES 5000 manual Declaration of conformity
1	2310484	VM 5000 Operating manual German
1	see 1.1	Operating manual in the local language

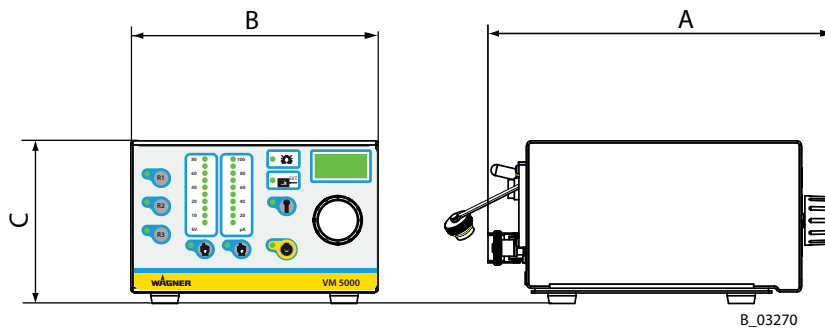
The delivery note shows the exact scope of delivery.

4.3 TECHNICAL DATA

Input voltage	115 VAC - 230 VAC, 50 Hz / 60 Hz
Input power	max. 40 W
Input current	max. 0.5 A
Output voltage	max. 20 Vpp
Output current	max. 1.0 A AC
High-voltage limit	80 kV DC
Spraying current limit	100 µA DC
Polarity	for negative high-voltage generator
Protection class	IP 54 *
Weight (without cables)	2.3 kg; 5.07 lb
Working temperature range	0-40 °C; 32-104 °F

* Splash-proof protection is only guaranteed when the gun cable socket is screwed to the device plug and the mains cable plug is fixed to the control unit plug with the safety clip.

Measurements:



B_03270

VM 5000		
	mm	inches
A	250	9.84
B	180	7.09
C	120	4.72

4.4 FUNCTIONAL DESCRIPTION

The VM 5000 control unit together with the suitable GM 5000EA or GM 5000EAC spray gun and other components form an electro-static hand spray system. The VM 5000 supplies the control voltage for the spray gun, in which high-voltage is subsequently produced. The targeted high-voltage and the current limiting in the spray gun is adjusted at the control unit and can be saved in three different recipes. The high-voltage supply is switched on and off with the trigger of the spray gun.

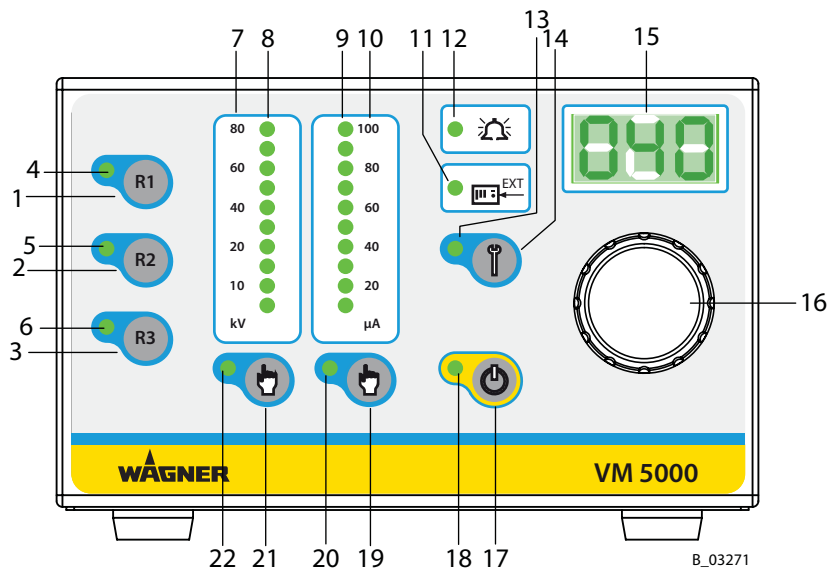
The special linear characteristic for high-voltage ensures that if the spray gun is brought too close to the work piece (or to earth) the high-voltage is reduced automatically to prevent an accidental spark discharge.

In addition, the VM 5000 control unit has a wide range of other functions, such as an operating hours counter, service interval display, external approval, fault display and an easy-to-use interface.

4.5 OPERATING ELEMENTS AND CONNECTIONS

4.5.1 OPERATING ELEMENTS FRONT SIDE

- 1 Push button: Recipe 1**
- 2 Push button: Recipe 2**
- 3 Push button: Recipe 3**
- 4 Luminous display: R1**
Lights up if recipe 1 is used.
- 5 Luminous display: R2**
Lights up if recipe 2 is used.
- 6 Luminous display: R3**
Lights up if recipe 3 is used.
- 7 Declaration of values for high-voltage in kV**
- 8 Illuminated display: High-voltage**
 - Lights up green.
 - Display range: 0-80 kV.
 - Single display: Preset value of high-voltage.
 - Bar display: Set voltage.
- 9 Illuminated display: Spraying current**
 - Lights up green.
 - Display range: 0-100 μ A.
 - Single display: Spraying current limit.
 - Bar display: Actual spraying current.
- 10 Declaration of values for spray voltage in μ A**



11 Illuminated display: External release

12 Illuminated display: Fault

13 Illuminated display: Service

14 Push button: Service

15 Display LED, 7 segments, three-digit number

- Indicates the target and actual values of high-voltage and spray voltage.
- Displaying error number about warnings and malfunctions.

16 Universal rotary controller

- Dynamic digital rotary controller with 32 positions per revolution.
- Adjustment speed is proportional to rotational speed.
- Used to adjust high-voltage and spray voltage.
- For setting parameter values in configuration mode.

17 Push button: Standby mode

18 Illuminated display: Standby

19 Push button: Spraying current

- To activate the function, the current limiting is set with the rotary controller 16 and is indicated in the LED display 9.
- Adjusting range: 5-100 μA .
- Resolution: 1 μA .

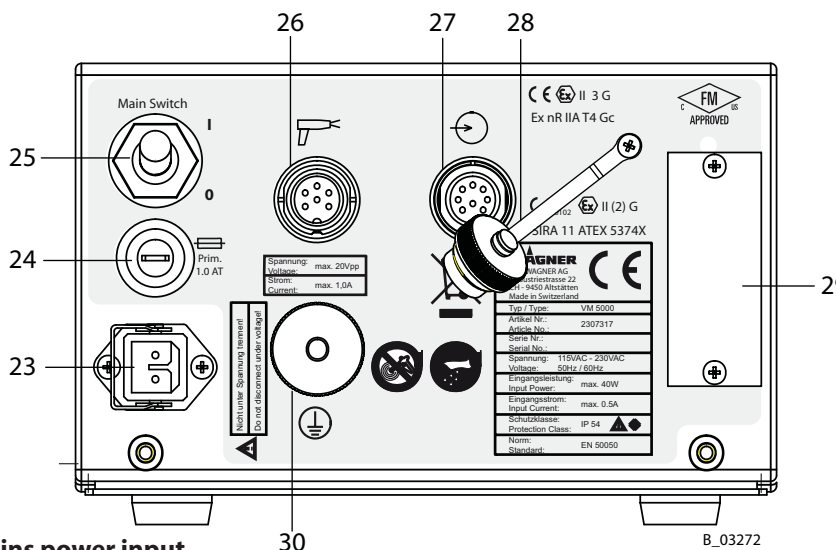
20 Illuminated display: Spraying current

21 Push button: High-voltage

- To activate the function, the high-voltage is set with the rotary controller 16 and is indicated in the LED display 8.
- Adjusting range: 5-80 kV.
- Resolution: 1 kV.

22 Illuminated display: High-voltage

4.5.2 CONNECTIONS ON THE REAR SIDE



23 Mains power input

Connection for mains cable with securing clip.
Warning - Do not disconnect under voltage.

24 Primary fuse

1.0 Ampere slow-acting.

25 Mains switch

0 = The control unit is deactivated.
I = The control unit is activated.

26 Gun connection

To connect a GM 5000EA or GM 5000EAC gun.
Warning - Do not disconnect under voltage.

27 Interface

Warning - Do not disconnect under voltage.

28 Cover of the interface connections

29 Cover of the service connections

For Wagner service personnel only!

30 Knurled nut earthing

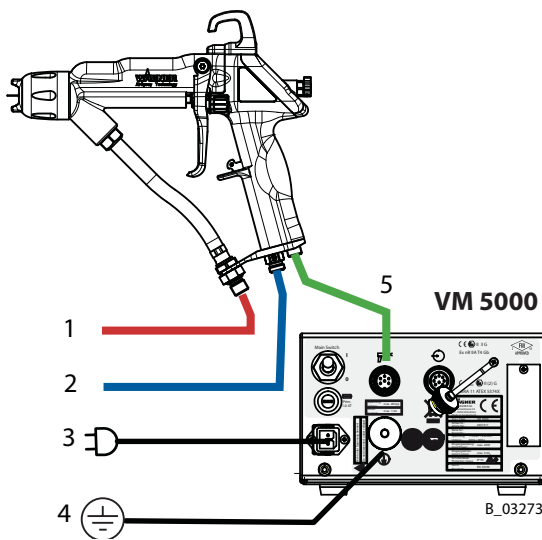
Earthing cable connection to the system earth.

5 PREPARATION BEFORE STARTING WORK

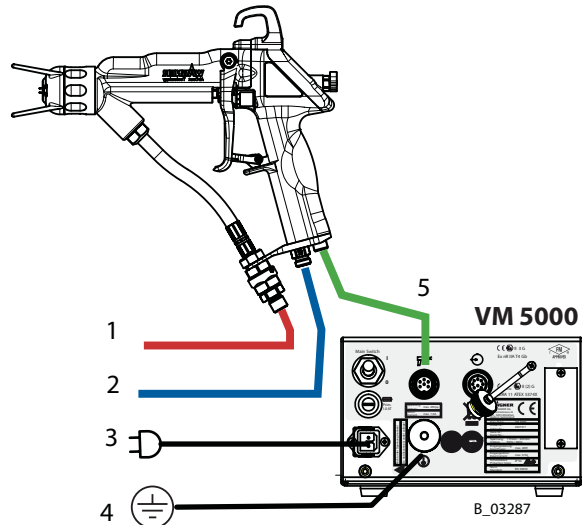
5.1 ADDITIONAL COMPONENTS

This control unit can be used to complete an electro-static hand spraying system. If this is the objective, only a suitable spray gun and the relevant components for the selected spray technique are required (see WAGNER accessories).
 Spray guns that are compatible with the VM 5000:

Air-Spray GM 5000EAR or GM 5000EAF



AirCoat-Spray GM 5000EACR or GM 5000EACF



1	for the material supply system	3	Mains cable	5	Spray gun cable
2	for the compressed air supply	4	Earthing cable to system earth		



	<h3>! WARNING</h3>
	<p>Incorrect installation/operation! Risk of injury and damage to equipment</p> <p>→ When putting into operation and for all work, read and follow the operating instructions and safety regulations for the additionally required system components.</p>

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<h3>CAUTION</h3>
<p>Impurities in the spraying system! Spray gun blockage, materials harden in the spraying system</p> <p>→ Flush the spray gun and paint supply with a suitable cleaning agent.</p>



SIHL_0001_GB

5.2 POSITIONING OF THE UNIT

	 DANGER
	<p>Incorrect installation of the unit! Risk of explosion and equipment damage</p> <ul style="list-style-type: none"> → Place the unit outside the spray booth/zone. → Place the unit, if possible, outside the explosion zone (Positioning in explosion zone 2 is enables). → Protect the unit from extreme temperature and moisture changes. → Protect the unit against dirt. → Lay and fix the connecting cable correctly.

SIHL_0143_GB



All sealed elements in the control device must be available and undamaged. During operation, all electric connections in the control unit and relevant plug connectors or shut-off devices have to be tightly sealed. When under voltage, neither plug connectors nor any shut-off devices may be separated or opened.

	 WARNING
	<p>Sparking by separation and joining of live construction units! Danger of explosion by electrical sparks</p> <ul style="list-style-type: none"> → Disconnect connectors not under tension. → Fuse holders under tension do not open. → Remove the service plug cover not under tension.

SIHL_0144_GB

5.3 EARTHING

Perfect earthing of all system components (work pieces, conveyor, paint supply system, control unit, spray booth or spraying stand, see illustration) is a prerequisite for optimum coating efficiency and safety.

	 WARNING
	<p>Discharge of electrostatically charged components in atmospheres containing solvents! Explosion hazard from electrostatic sparks or flames</p> <ul style="list-style-type: none"> → Earth all unit components. → Earth the workpieces being painted.

SIHL_0027_GB

	<h2>! WARNING</h2>
	<p>Heavy paint mist if earthing is insufficient! Risk of poisoning Insufficient paint application quality</p> <p>→ Earth all unit components. → Earth the workpieces being painted.</p>

SIHL_0003_GB

The imperfect earthing of a work piece will result in:

- Very poor wrap-around.
- Uneven coating thickness.
- Back spraying to the spray gun (contamination) and coater.

The prerequisites for perfect earthing and coating are:

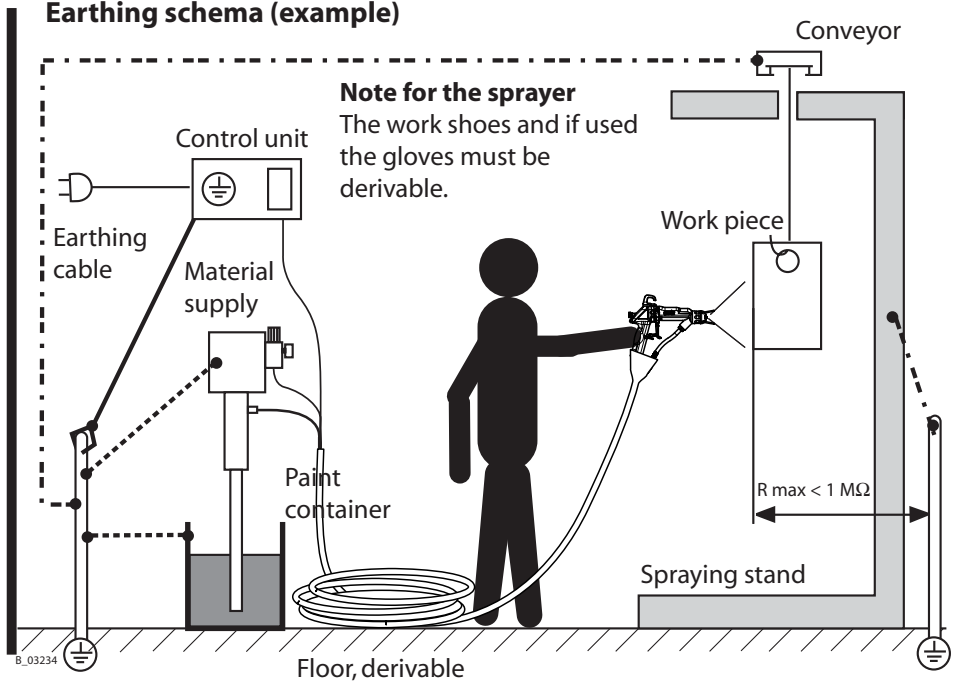
- Clean work piece suspension.
- Earthing of spray booth, conveyor system and suspension on the building side in accordance with the operating instruction or the manufacturer's information.
- Earthing of all conductive parts within the working area.
- The earthing resistance of the work piece may not exceed 1 MΩ (Mega Ohm).

Note:

Resistance to earth measured with 500 V or 1000 V.

- Connect the control unit to the mains system earth.

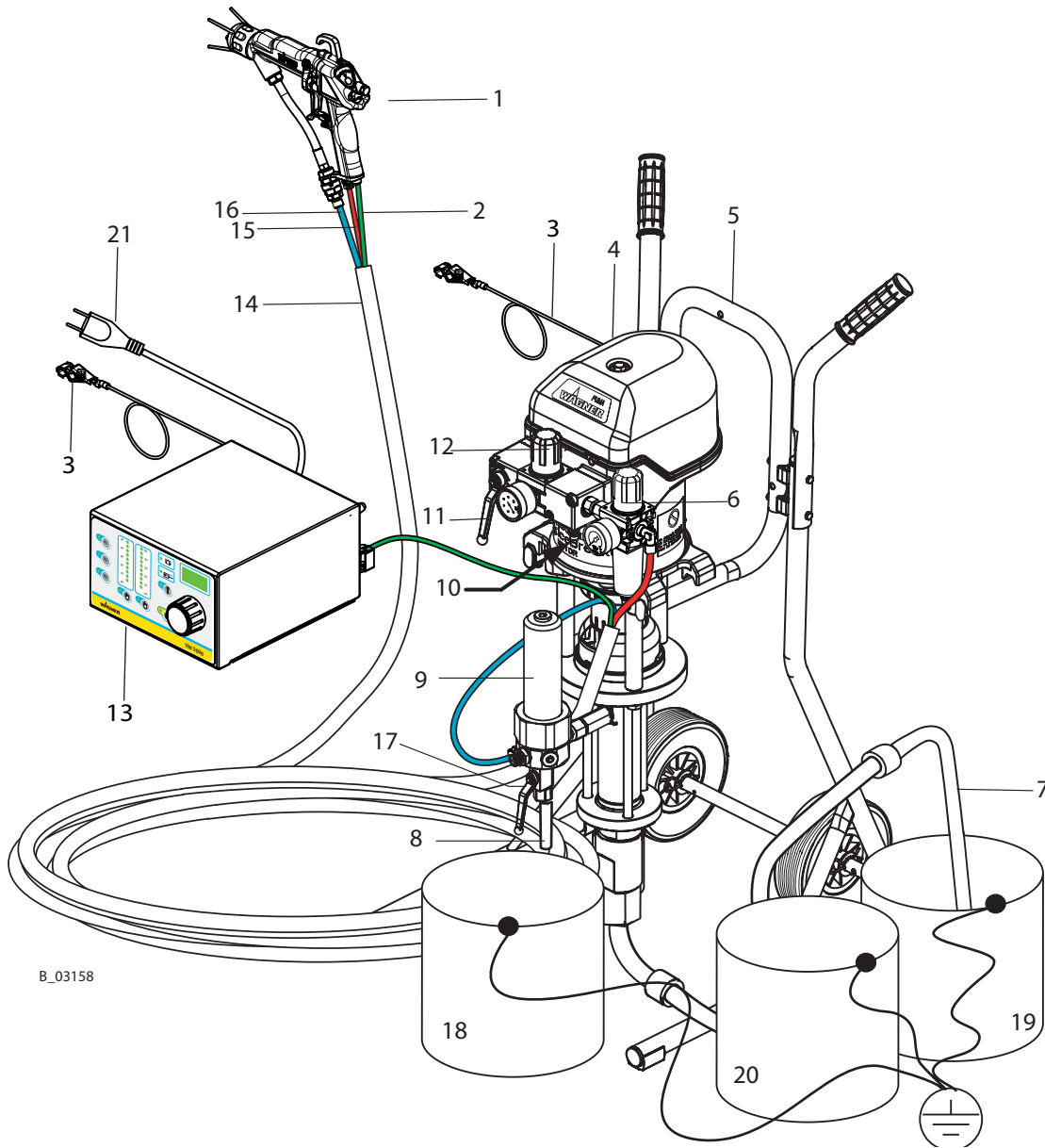
Earthing schema (example)



Minimum cable cross-section

Control unit	4 mm ² (AWG 12)	Conveyor	16 mm ² (AWG 6)
Material supply	4 mm ² (AWG 12)	Booth	16 mm ² (AWG 6)
Paint container	4 mm ² (AWG 12)	Spraying stand	16 mm ² (AWG 6)

5.4 EXAMPLE FOR AIRCOAT SPRAYING SYSTEM



B_03158

Item	Description
1	GM 5000EACF spray gun
2	Gun cable
3	Earthing cable
4	Pneumatic pump
5	Carriage
6	Pressure regulator + air filter
7	Material suction system

Item	Description
8	Return hose
9	High pressure filter
10	Compressed air connection
11	Stop valve
12	Air pressure regulator
13	VM 5000 control unit
14	Protective hose

Item	Description
15	Air hose
16	Material hose
17	Return valve
18	Container for return flow
19	Paint container
20	Container, cleaning agent
21	Mains cable

The following points should be noted before commissioning:

- Lay earthing cable from the earthing screw on the device to the signal ground and ensure that all other conductive parts within the area of work are earthed.
- Connect the VM 5000 electrostatic control unit via the mains cable to the socket interlocked with the extraction system.
- Connect the gun cable to the connector socket and screw into place.
- Connect the gun to the adjustable, clean air supply.
Compressed air quality class 3.5.2 according to ISO 8573.1.
- Connect the GM 5000EA or GM 5000EAC to the paint supply as described in the relevant operating manual.
- Check that all material-conveying connections are correctly connected.
- Check that all air supply connections are connected properly.
- Visually check the permissible pressures for all the system components.
- Check the level of the separating agent in the pump and add more in necessary.
- Prepare a material container, a container for the cleaning agent and an empty container for the return flow.
- The interface on the back of the control unit has to be protected by the cover.
- Connect the system to the air supply.
- When starting the unit for the first time -> Clean the system in accordance with the operating manuals for the other components.

5.5 DEVICE CONFIGURATION

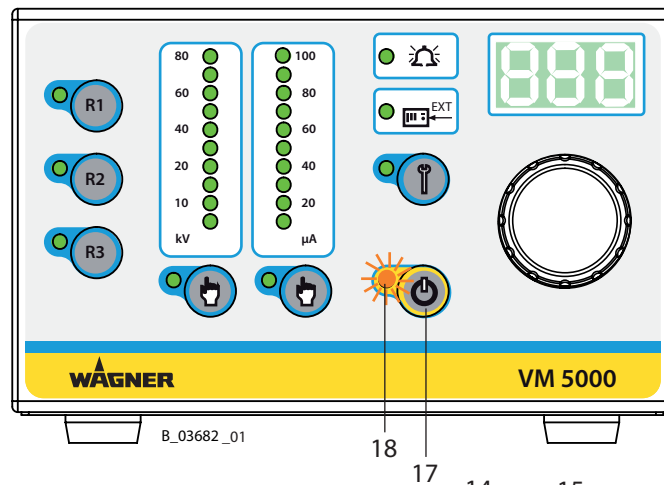
5.5.1 OVERVIEW OF PARAMETERS

	Parameters	Values	Description
C11	Remote-release	off (factory setting)	The device functions as a standalone device. External approval by interface does not have to be defined. The bypass is activated.
		on	External approval by interface must be issued. If the trigger is pulled despite the fact that no approval has been issued, the LED display „external approval“ starts to flash quickly. Approval is given when input is connected to ground.
C12	External set point value	off (factory setting)	The target values for high-voltage in kV and current limiting in μ A are adjusted at the front control panel.
		on	The target values for high-voltage in kV and current limiting in μ A are predetermined by two analog power inputs on the interface. Example of application: Target value specification from high-ranking control (PLC). Target values can no longer be adjusted at the front control panel. All recipe functions (save, call up recipe, etc.) are locked.
C13	Lock	off (factory setting)	User lock is switched off.
		on	User lock is switched on: no target values (kV and μ A) can be adjusted; you can only select the recipe and the control functions.
		pro	User lock Pro (program) You can select recipes and control functions. The target values (kV and μ A) can be adjusted but cannot be saved in the recipes.
C19	Reset recipes	no (factory setting)	No reaction.
		res	All programs are set to delivery status when „res“ is saved by the Service key.
C20	Reset configuration	no (factory setting)	No reaction.
		res	All configuration parameters are set to delivery status when „res“ is saved by the Service key.

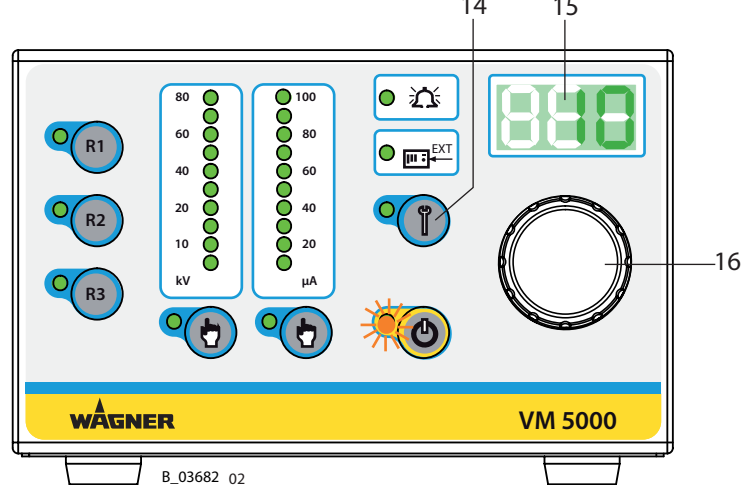
5.5.2 ACCESS TO THE DEVICE CONFIGURATION MODE

Works procedure:

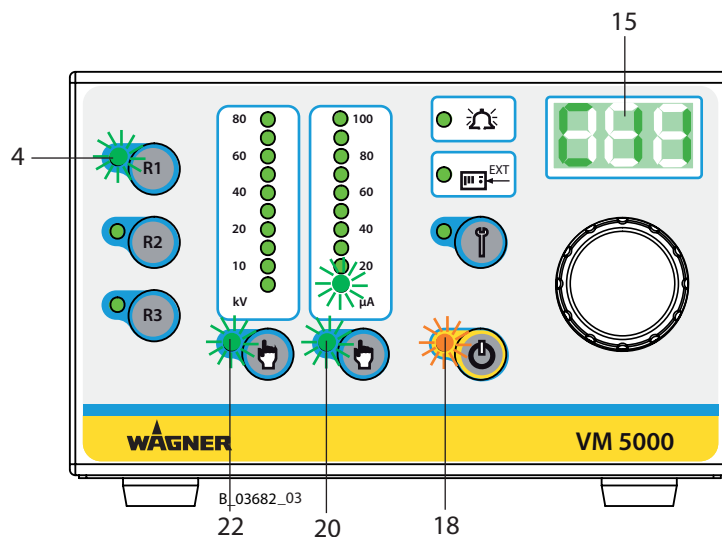
1. Switch to „Standby“ by pressing the „Standby“ key (17). The orange LED „Standby“ (18) lights up.

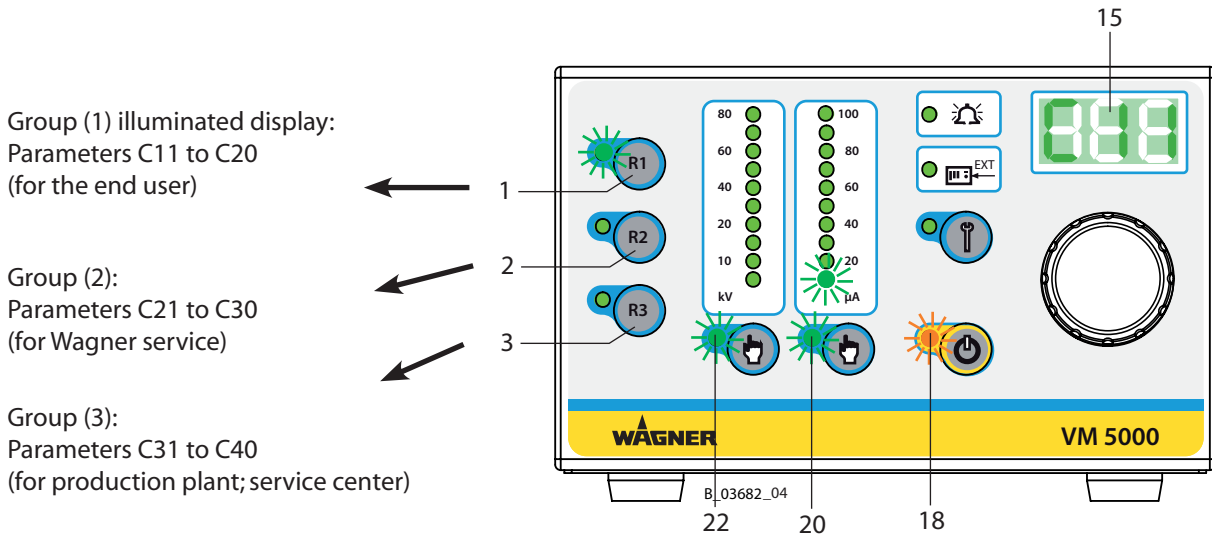


2. Press push button „Service“ (14) and hold it down.
3. Turn the universal control dial (16) with the other hand until the display (15) shows the number „10“. Then release button „Service“ (14). The scrolling text „Configuration“ is displayed. The device is now in configuration mode.



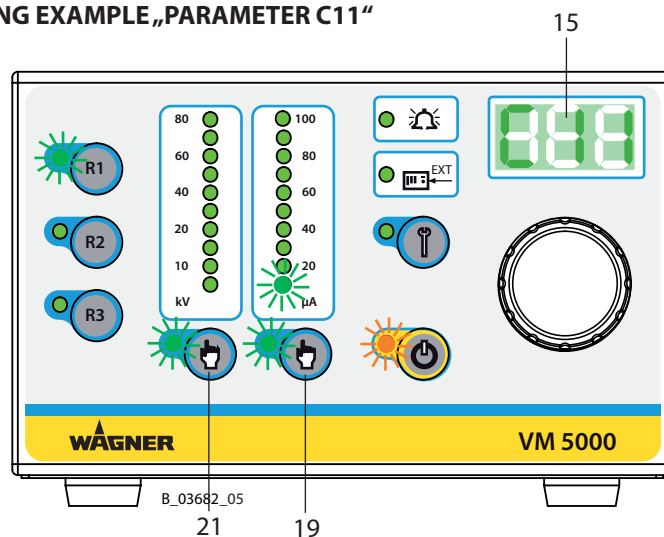
4. The LED display (15) now shows the first configuration setting C11. At the same time, the two LED displays „High-voltage“ (22) and „Spraying current limit“ (20) will flash. „Standby“ indicator (18) flashes quickly.





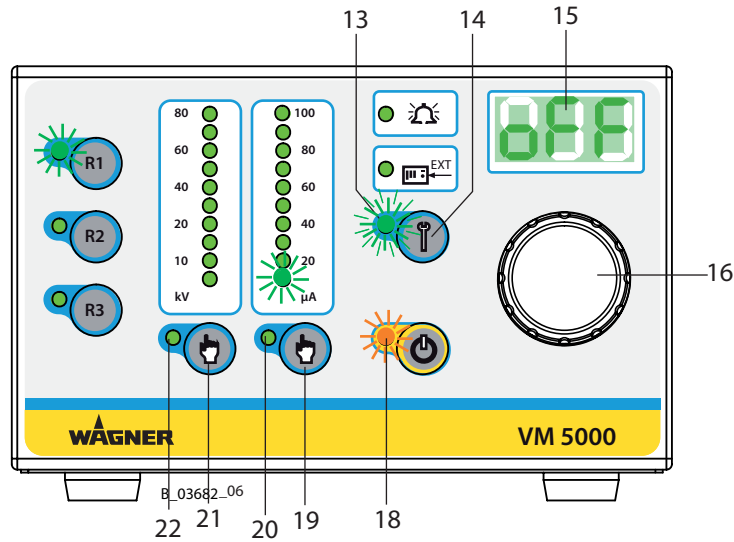
For ease of operation the configuration settings are divided into three groups. The first group is for the end user, the other both groups, protected by a password, are reserved for Wagner Service and the Wagner production sites or the Wagner Service Center, which have the necessary infrastructure.

5.5.3 SETTING EXAMPLE „PARAMETER C11“

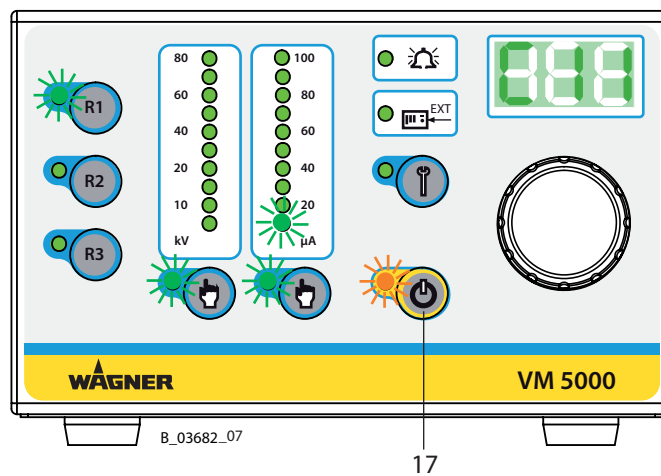


After getting started in configuration mode, the display (15) shows the parameter „C11“ by default.

Press one of the Push keys (21) or (19) to select all kinds of parameters for the end user. To change a selected parameter value (e.g. C11), press Push key (14). The content of C11 is displayed (15).



The flashing LED display (13) indicates that the parameter value „OFF“ in the display (15) can be changed by the universal control dial (16). Possible values in C11 are „on“ or „OFF“. Keep the Push button (14) held down to have the set value saved to C11. As soon as storage took place, except the Standby all other LEDs delete LED.



Go back to the operating mode from configuration mode:
Press „Standby“ button (17).

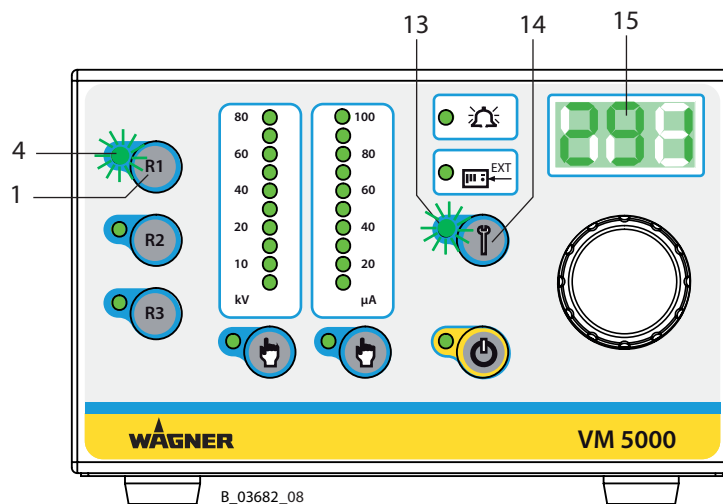
5.6 OPERATING HOURS COUNTER/WARNING DISPLAY

2 hour counters are integrated into the control unit. The absolute counter measures the ongoing hours of operation of the spray gun and with the service hours counter, service intervals can be determined and monitored for the spray gun.

From the standby setting on the control unit you access the screen for the service menu via the push button (14).

Service menu structure (LED display (13) is activated).

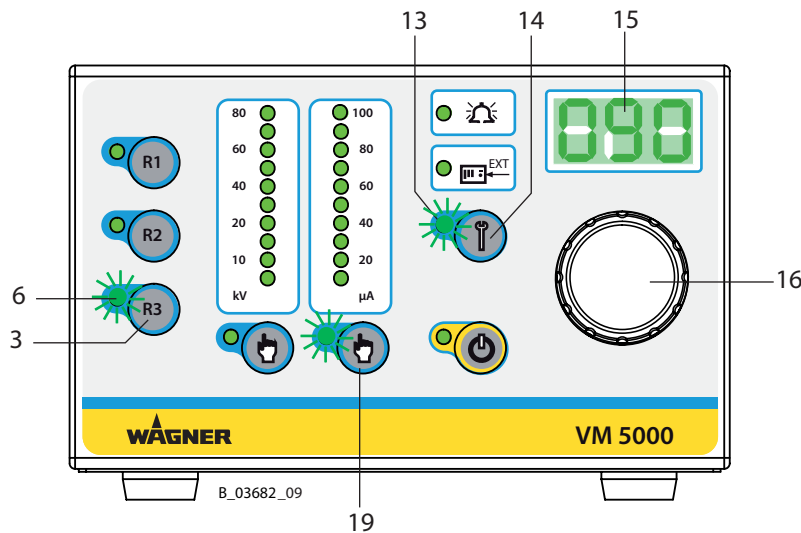
Push button	Description of display
R1	Display of absolute accrued operating hours of the spray gun. Display format: Counter status < 999 hours: 001 = 1 hour; 291 = 291 hours Counter status > 1000 hours: 1.23 = 1230 hours; 45.2 = 45200 hours. Maximum display value = 99.9 = 99900 hours Afterwards it shows flashing lines.
R2	Display of temporary service counter and how to reset this counter.
R3	Set service interval in hours or lock this function.



5.6.1 SET UP AND QUERY SERVICE COUNTER

When using the device for the first time, the function for the service interval counter is deactivated. This function can be activated via the R3 push button (3). The service interval limit can be set within a range of 0 to 999 hours.

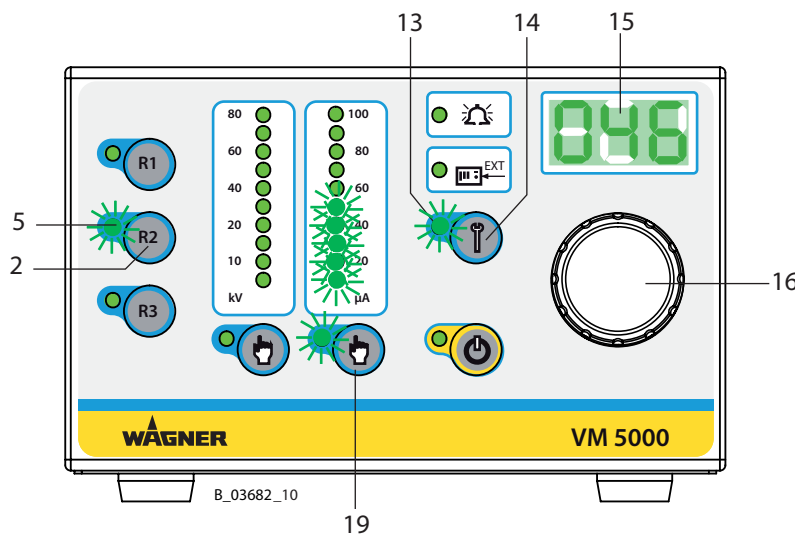
Set and save the service interval limit in hours.



Works procedure:

1. Actuate the push button (3) for a short time. Illuminated display (6) lights up.
2. Use the dial (16) to set the service interval limit you want (e.g. 90 hours).
3. Check setting on display (15).
4. The value is saved by pressing and keeping the push button R3 (3) until the display shown (15) starts flashing.

Review counter status since last service carried out on gun.

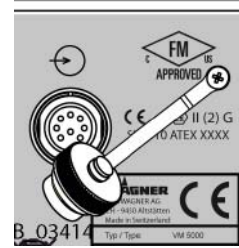


Works procedure:

1. Actuate the push button (2) for a short time. Illuminated display (5) lights up.
2. Read display (15). In the example 46 hours have passed since the last spray gun service. The bar graph on the left indicates that 50% of the set interval time has passed.
3. By pressing and keeping the push button (19) held down, you can reset the display (15) to 0 (reset upon expiry of set interval limit).

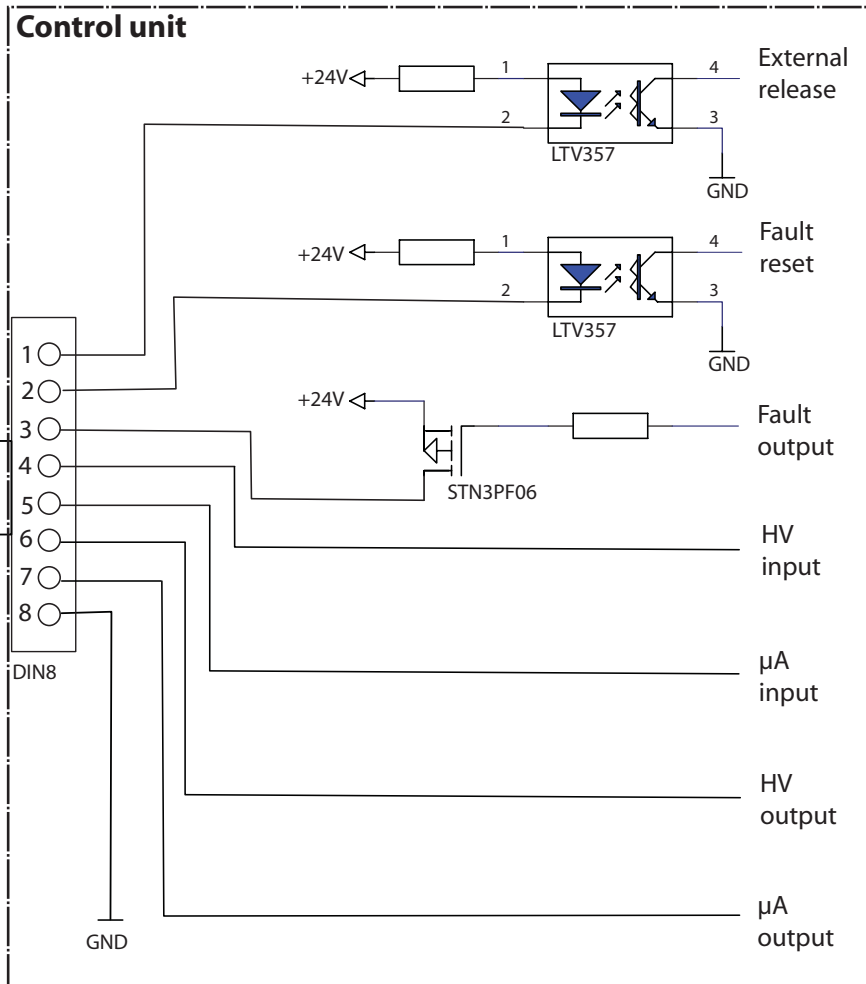
5.7 EXTERNAL SIGNAL

The control unit includes with an interface.
 Before using it, you have to select the respective parameters in the device configuration.



- External release
GND >> Release
 white
- Fault reset
neg. side >> Reset
 brown
- Fault output
24 VDC >> Fault
 green
- HV input
8 V >> 80 kV
 yellow
- μ A input
10 V >> 100 μ A
 grey
- HV output
8V >> 80 kV
 pink
- μ A output
10 V >> 100 μ A
 blue
- Ground
 red


Interface cable



Pin no.	Designation	Description
1 in	External release	Potential-free contact between pin 1 and pin 8 (ground) - closed → Approval issued - open → Approval not issued
2 in	Fault reset	Potential-free contact (button) between pin 2 and pin 8 (ground) - If there is a fault, it can be acknowledged by pressing a button. - Acknowledgement is only given via the negative side.
3 out	Fault output	If there is a fault, +24 VDC is issued at pin 3 in reference to pin 8 (ground). - Maximum current 0.5 A
4 in	DC kV in	Set point value for high-voltage Analog d.c. current input between pin 4 in reference to pin 8 (ground) - 0.1 V corresponds to 1 kV - 8.0 V is a maximum specification and corresponds to 80 kV
5 in	DC μ A in	Set point value for spraying current limit Analog d.c. current input between pin 5 in reference to pin 8 (ground) - 0.1 V corresponds to 1 μ A - 10.0 V is a maximum specification and corresponds to 100 μ A
6 out	DC kV out	Output of current actual voltage Analog d.c. current output between pin 6 in reference to pin 8 (ground) - 0.1 V corresponds to 1 kV - 8.0 V is a maximum specification and corresponds to 80 kV
7 out	DC μ A out	Output of current actual spray current Analog d.c. current output between pin 7 in reference to pin 8 (ground) - 0.1 V corresponds to 1 μ A - 10.0 V is a maximum specification and corresponds to 100 μ A

6 START-UP AND OPERATION

→ Observe safety instructions in chapter 2.



⚠ DANGER

High voltage field!
Danger to life from malfunctioning heart pacemakers

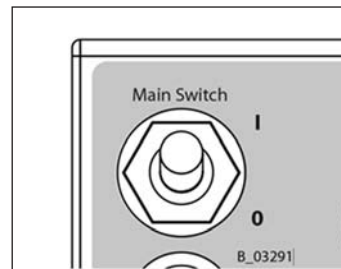
Ensure that persons with heart pacemakers:

- Do not work with the electrostatic spray gun.
- Remain outside the area of the electrostatic spray gun/work-piece.

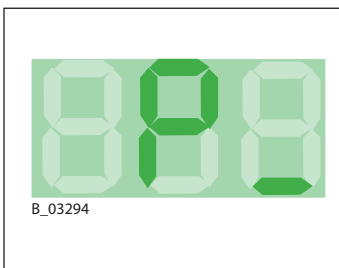
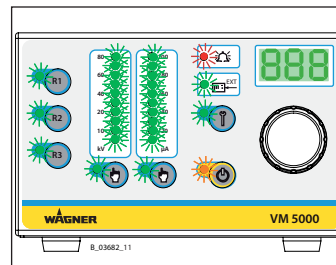
SIHL_0049_GB

6.1 START-UP THE CONTROL UNIT

1. Set toggle switch to position I.



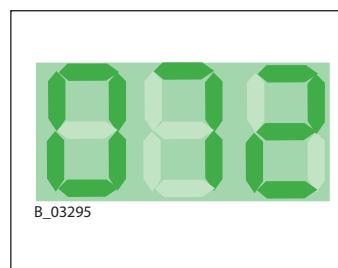
2. All the LEDs -> display test light up for about 1 second.



B_03294

3. The hardware release and version of the software are shown

← briefly in succession in the display. →

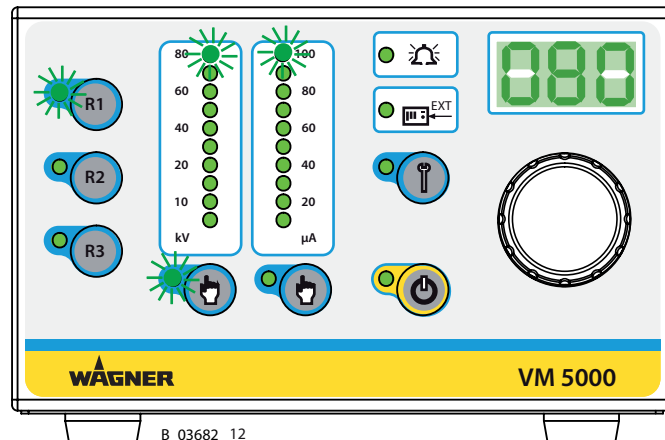


B_03295

4. The control unit is ready for use.

Note:

Each start process is concluded by allocating the saved target data in the recipe „R1“.



6.2 SET AND SAVE RECIPES

Target values are saved in kV for high-voltage and in μA for spray current limit in the recipe. By standard, the following values are saved ex works in the 3 storage places available for recipes:

Recipe no.	Target - high-voltage in kV	Target - spray current limit in μA
R1	80	100
R2	60	100
R3	40	80

Recipes 1-3 can be selected and saved directly using program buttons R1, R2 and R3. Once the recipe required has been called up, the individual coating parameters can be called up and changed using the corresponding selection buttons (see chapter 6.2.1 and 6.2.2). When a parameter is changed, the LED on the left of the program button flashes to indicate that a parameter value has been changed.

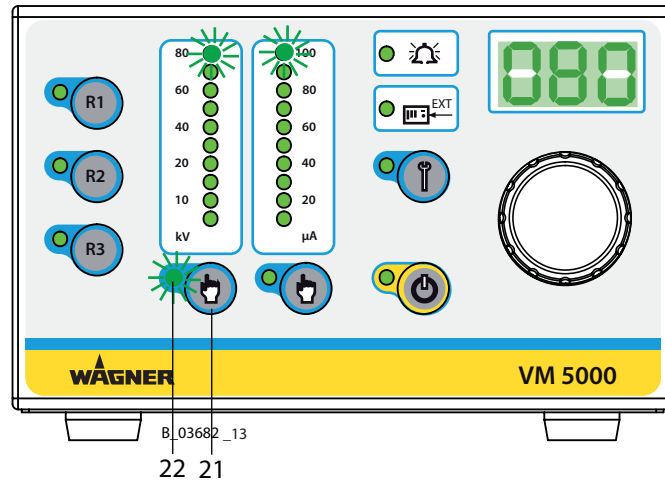
The process for saving parameters is described below.

- To reuse the originally set values, press the program button briefly. The modified values are not taken over.
- To save the modified values, press the appropriate program button and hold for approx. 2 seconds until the LED beside the button flashes quickly. The modified values are then saved.

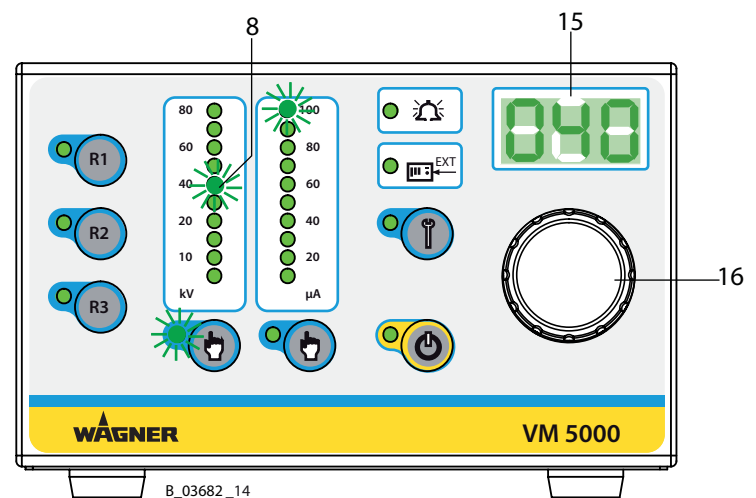
6.2.1 SETTING THE HIGH-VOLTAGE

Works procedure:

1. Press the „High-voltage“ button (21) to adjust the high-voltage. The LED (22) indicates that high-voltage is selected.



2. The high-voltage can now be adjusted using the universal rotary controller (16) between 5 to 80 kV with a resolution of 1 kV. The value is shown in the LED display (15).



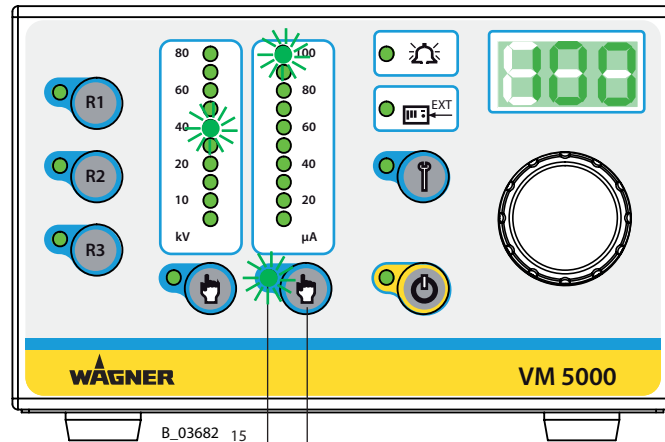
Above the „High-voltage“ button (21) is the „High-voltage“ bar graph display (8). When the control unit is in the ready position, this display shows the set point as a dot.

6.2.2 SETTING THE CURRENT LIMITING

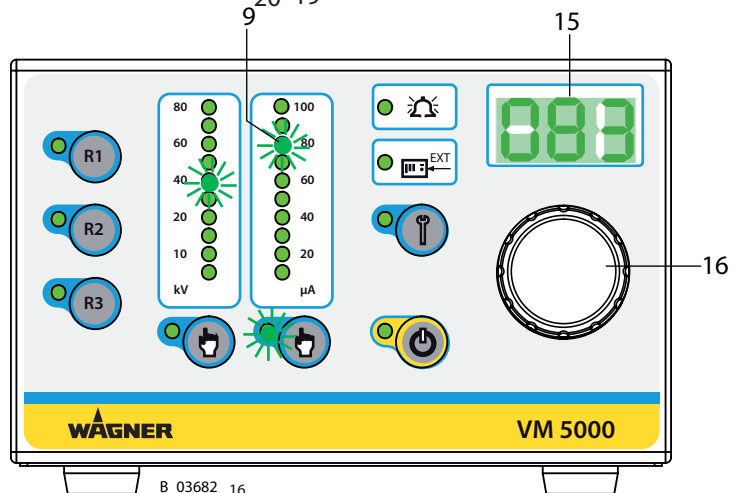
15

Works procedure:

1. Press the „Current limiting“ button (19) to adjust the limitation of the spray current. The LED (20) indicates that current limiting is selected.



2. The current limiting can now be adjusted using the universal rotary controller (16) between 10 - 100 μA with a resolution of 1 μA . The value is shown in the LED display (15).



Above the „Current limiting“ button (19) is the „Current limiting“ bar graph display (9). When the control unit is in the ready position, this display shows the set point as a dot. The current limiting is an adjustable threshold. If this threshold is exceeded, for example by approach of the spray gun to the spraying object, the high-voltage is adjusted downwards until the threshold is no longer exceeded.

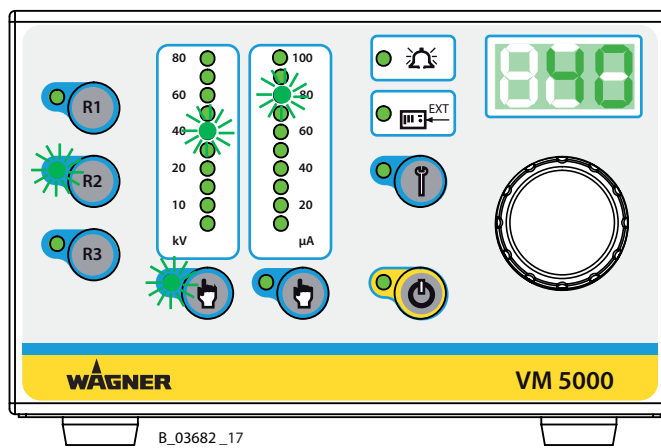
The values set in the examples for target-high-voltage = 40 kV and 83 μA for spray current limit are saved by keeping the recipe push button, R2, kept held down (for < 2 seconds).

6.2.3 SPRAY DISPLAY

Ready to spray using R2 recipe. See picture below.

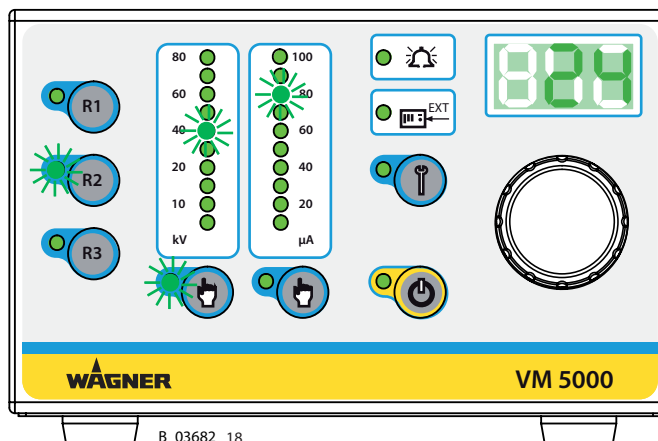
Control unit is ready.

The LEDs for the target values light up in a dot arrangement and the value for high-voltage is displayed in digits. If you press the push button for current limiting, the set target value for the spray current limit is displayed in digits.



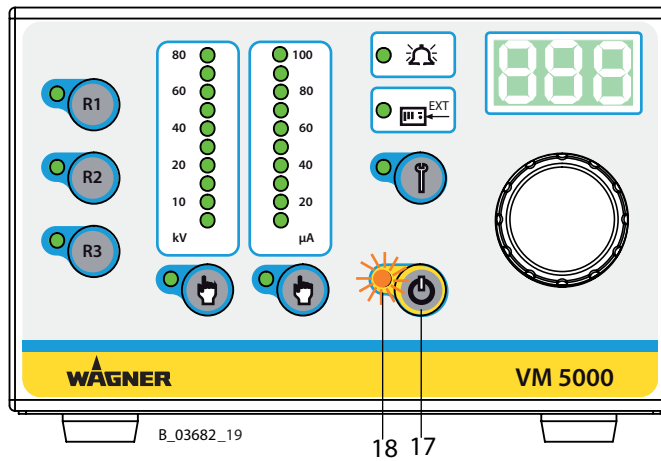
Spray using recipe R2.

High-voltage is created by pressing the trigger on the spray gun. The LEDs light up in a bar and display the actual values. The current actual value for the activated push button for high-voltage (kV) is displayed in digits. If the push button for the spray current limit is pressed, the respective LED lights up and the respective actual value appears in μA .



6.3 STANDBY MODE

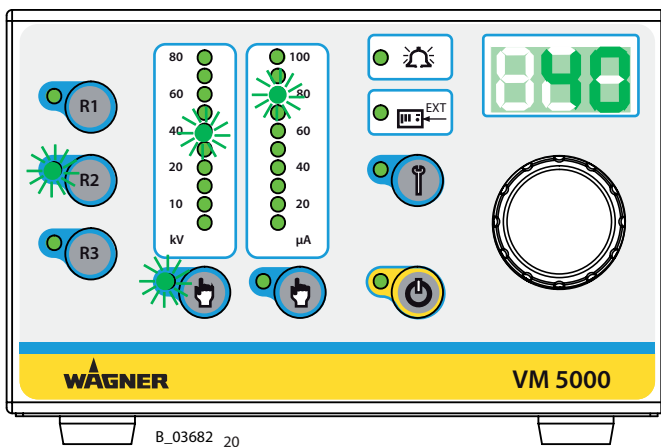
If you want to spray without high-voltage, select standby mode. Press push button (17) briefly and the standby (18) LED display lights up. All the other LEDs go out.



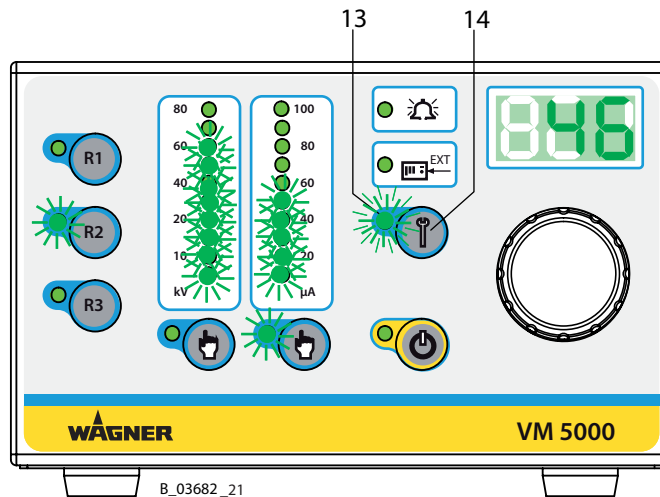
From the standby mode (17) you access the previously saved standby mode by pressing the push button (17) again. See figure below.

Note:

This function can be activated and used from the gun.



6.4 „CONDUCT SERVICE“ DISPLAY



Prerequisite:

The function „Service interval limit“ is activated.

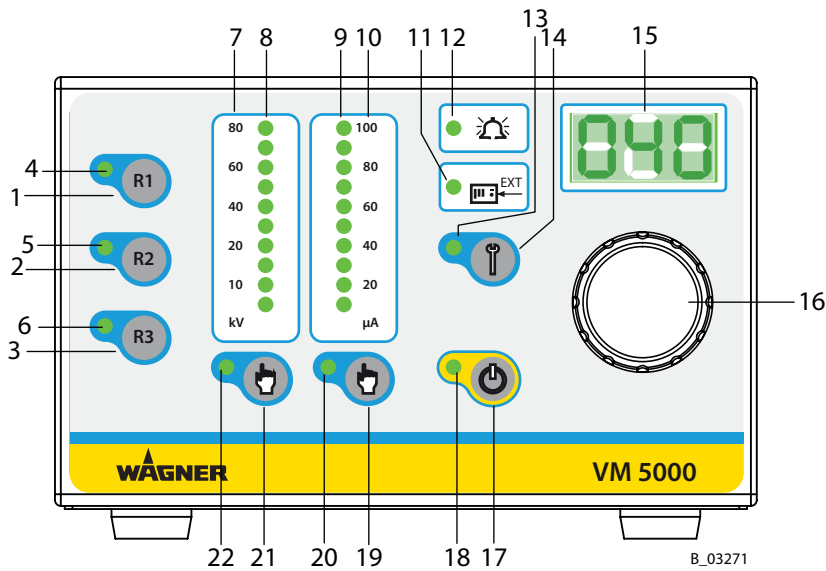
„Conduct service on spray gun“

Once the time for the defined service interval has expired, the LED display (13) starts to flash.

The flashing service display merely acts as a warning. You can continue working without any limitations.

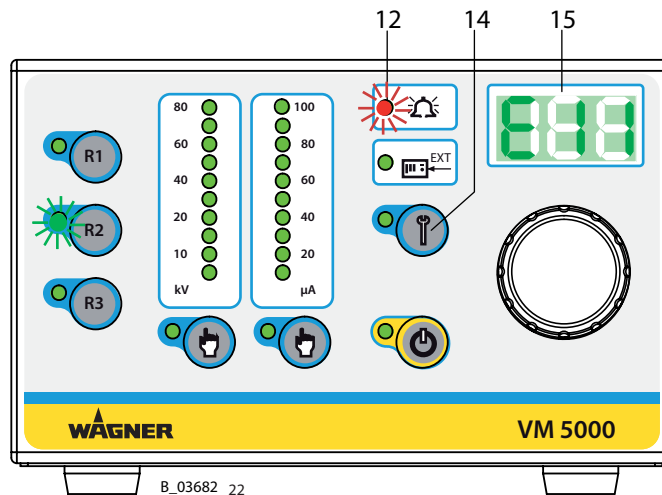
7 TROUBLE SHOOTING AND SOLUTION

Functional fault	Cause	Remedy
No illuminated display lights up	<ul style="list-style-type: none"> • Mains not switched on. • Fuses defective. 	<ul style="list-style-type: none"> • Switch on mains power supply. • Replace fuse. • WAGNER Service.
No high-voltage	<ul style="list-style-type: none"> • Spray gun cable not connected or defective. • Spray gun not connected or defective. • Excessive conductivity of the paint. 	<ul style="list-style-type: none"> • Connect spray gun cable. • WAGNER Service. • See spray gun operating manual.
Fault LED (12) lights up Fault message in display (15)	• See the following table.	• See the following table.



B_03271

The fault LED (12) indicates faults. In addition, the error number is shown in the 7-segment display (15). If a fault occurs, high-voltage is immediately switched off. The user can only continue to work once the fault has been remedied and acknowledged with push button for service (14).



Code Display	Fault	Cause	Remedy
E11	Earth monitoring	<ul style="list-style-type: none"> ● Grounding cable is interrupted. ● The gun is not connected. 	<ul style="list-style-type: none"> ● Check/replace gun cable. ● Check or replace spray gun. ● Connect the spray gun.
E12	No coil current/ Cascade interrupt	<ul style="list-style-type: none"> ● The gun is not connected. ● Gun cable is interrupted. ● Cascade in gun is interrupted --> defective. 	<ul style="list-style-type: none"> ● Connect the spray gun. ● Check/replace gun cable. ● Check or replace spray gun.
E13	Coil current too big	<ul style="list-style-type: none"> ● Cascade of the connected gun is defective. 	<ul style="list-style-type: none"> ● Check or replace spray gun.
E21-E25	Exception error	<ul style="list-style-type: none"> ● Hardware defect has occurred. 	<ul style="list-style-type: none"> ● If problem persists, contact Wagner Service Team.

8 MAINTENANCE AND REPAIR

8.1 MAINTENANCE



The functionality and completeness of the control unit have to be checked regularly. All sealed elements in the control unit must be available and undamaged. During operation, all electric connections in the control unit and relevant plug connectors or shut-off devices have to be tightly sealed.

The leak tightness of the unit has to be checked every 3 years at least. The „Gas-proof“ requirements according to DIN EN 60079-15:2011 have to be fulfilled. This inspection may only be carried out by an authorized person or by trained Wagner Service personnel. The mains input terminal shall serve as the test port in the leak-tightness check.

8.2 REPAIR

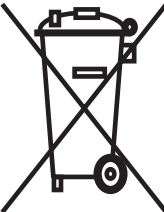
Repairs to the control unit may only be carried out by trained Wagner Service personnel. This also includes opening the control unit.

After a successful repair, the seal tightness of the control unit has to be checked. The „Gas-proof“ requirements according to DIN EN 60079-15:2011 have to be fulfilled. The mains input terminal shall serve as the test port in the leak-tightness check.

	 WARNING
	<p>Sparking by separation and joining of live construction units! Danger of explosion by electrical sparks</p> <ul style="list-style-type: none"> → Disconnect connectors not under tension. → Fuse holders under tension do not open. → Remove the service plug cover not under tension.

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9 PRODUCT DISPOSAL

	<h3>Note</h3>
	<p>Do not dispose of waste electrical equipment with the household refuse!</p> <p>In accordance with European Directive 2002/96/EC on the disposal of waste electrical equipment and its implementation in national law, this product may not be disposed of with the household refuse, but must rather be recycled in an environmentally correct manner. Your waste Wagner electrical device will be taken back by us or our representatives and disposed of environmentally correctly. Please contact one of our service points or one of our representatives or us directly to this purpose.</p>

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10 ACCESSORIES

Part No.	Description	
241270	Mains cable Europe 3 m; 9.8 ft	 B_01065
241271	Mains cable Switzerland 3 m; 9.8 ft	
264626	Mains cable USA 2 m; 6.6 ft	
264625	Mains cable Japan 3 m; 9.8 ft	
2317600	Interface cable VM 5000 10 m; 32.8 ft	 B_03471
130215	Earthing cable 10 m; 32.8 ft	 B_01063
264332	Earthing cable assy. 0.75 m; 2.5 ft	 B_01064
2327509	Mounting control unit compl.	 B_03735

Note:

Hose sets and spray gun cable -> see operating manuals for spray guns.

11 SPARE PARTS

11.1 HOW TO ORDER SPARE PARTS?

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

Part Number, description and quantity

The quantity need not be the same as the number given in the „Quantity“ column. This number merely indicates how many of the respective parts are used in each sub assembly.



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 required (air freight or mail, sea route or overland route, etc.)

Marks in spare parts lists

Note to column „K“ in the following spare parts lists.

- ◆ = Wearing parts
Note: No liability is assumed for wearing parts
- = Not part of standard equipment, available, however, as additional extra.

	 WARNING
	<p>Incorrect maintenance/repair! Risk of injury and damage to the equipment</p> <ul style="list-style-type: none"> → Repairs and part replacement may only be carried out by specially trained staff or a WAGNER service center. → Before all work on the unit and in the event of work interruptions: <ul style="list-style-type: none"> - Switch off the energy/compressed air supply. - Relieve the pressure from the spray gun and unit. - Secure the spray gun against actuation. → Observe the operating instructions when carrying out all work.

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Item	Qty	Part No.	Description
1	1	2310477	VM 5000 control unit
2	1	9903312	Oval head screw, Phillips screwdriver, form H
3	1	9952593	Protection cap Equipment connector
4	1	9950330	Safety catch for connector sockets
5	2	9903306	Oval head screw, Phillips screwdriver, form H
6	1	9910102	Hexagon nut
7	1	9910522	High knurled nut
8	1	9920118	Washer
9	1	9922017	Lock washer outside toothed
10	2	9903311	Oval head screw, Phillips screwdriver, form H
11	1	241323	Cover, white
12	1	2317538	Print compl. VM 5000 control
13	3	263400	Distance bush
14	3	9922011	Lock washer outside toothed
15	3	9910103	Hexagon nut
16	5	2312348	Hexagon lock nut
17	4	9922011	Lock washer outside toothed
18	4	9903312	Oval head screw, phillips screwdriver, form H
19	8	2306405	Countersunk screw, phillips screwdriver, form Z
20	1	2307315	Seal
21	1	2307309	Cover
22	4	9990839	Buffer
23	1	9955176	Power pack
24	5	2309112	Spacer
25	1	2311875	Incremental encoder
26	1	2317539	Print compl. VM 5000 display (with pos. 25)
27	1	2304462	Cover
28	1	2304461	Rotary knob
29	1	9953536	2-pin rocker switch
30	1	9952587	Equipment plug
31	1	9955021	Fuse holder
32	2	9951117	Delay-action fuses 1.0 AT
33	1	9971519	Rubber seal
34	1	9955601	Speedily fuse 2.5 A
35	1	2325264	Seal

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