

Operating Instructions



F00042y

Ion Blower Pistol EXPR50

for AC Operation



BA-en-2063-1105



**electrostatic
innovations**

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Dear Customer,

Electrostatic charges in production processes often cause disruptions and reduce both the process speed and the product quality.

The powerful EXPR50 Ion Blower Pistol can now be used for active discharging, also in the hazardous area. The long discharging range supported by a powerful blast of air creates a special depth effect - discharging and blowing off static dust at the same time.

The pistol is most effective in zones where charged surfaces attract and bind dust particle and where surfaces need to be discharged as well cleaned effectively at the same time. The bars are operated with an alternating voltage of 5 kV at 50...60 Hz and are approved for use in explosive atmosphere of the group IIG and IID and comply with the device category 2 (zone 1 resp. zone 22 operating material)

Features of the Ion Blower Pistol EXPR50:

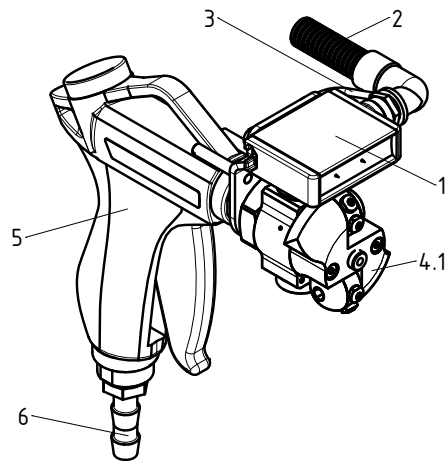
- use in hazardous area
- ultimate safety through passive discharging when the power supplies are off
- high active discharging power through patented insulated ground conductors
- safety through function and pollution monitoring in connection with the ES53 power supply
- no electric shock risk when touching the tips

The optimum discharge effect is guaranteed in conjunction with the ES53/G... bzw. ES53/H... bzw. ES53/I... Eltex high voltage power supplies.

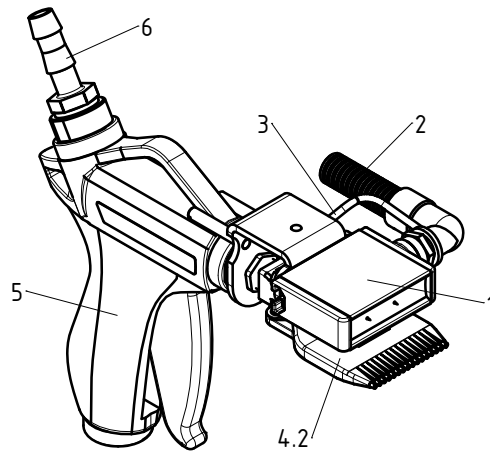
Please read the operating instructions carefully before starting the instrument. This will help you prevent personal injuries and damage to property.

Please give us a call if you have any suggestions, proposals or ideas for improvements. We greatly appreciate feedback from the users of our appliances.

1. Outline of appliance EXPR50



*Fig. 1:
EXPR50/NC
Ion Blower Pistol
with rotating
nozzle*



*Fig. 2:
EXPR50/OF
Ion Blower Pistol
with fishtail nozzle*

- 1 Discharging bar
- 2 High voltage cable
- 3 Grounding cable (earth)
- 4.1 Rotating nozzle
- 4.2 Fishtail nozzle
- 5 Blower pistol with metallic coating (without filter)
- 6 Air connection NW10 (top or bottom)

Z-111735_1y

Z-111735_2y

Fig. 3:
EXPR50/FF
Ion Blower Pistol
with fishtail nozzle
and filter

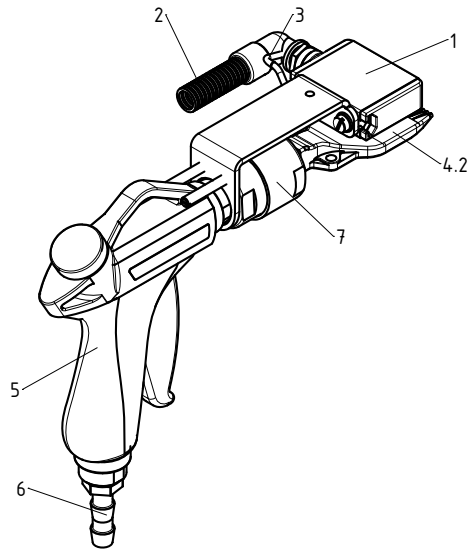
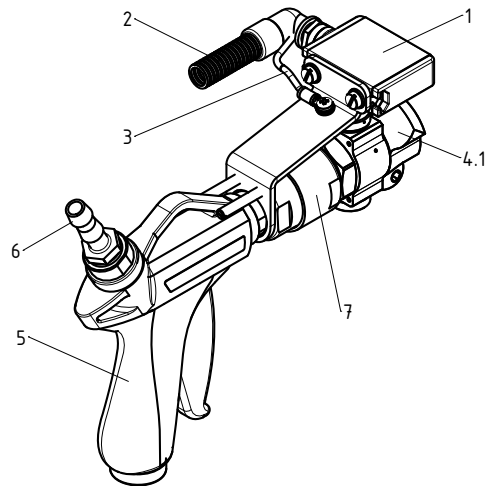


Fig. 4:
EXPR50/GC
Ion Blower Pistol
with rotating nozzle
and filter



- 1 Discharging bar
- 2 High voltage cable
- 3 Grounding cable (earth)
- 4.1 Rotating nozzle
- 4.2 Fishtail nozzle
- 5 Blower pistol with metallic coating (with filter)
- 6 Air connection NW10 (top or bottom)
- 7 Filter

The high voltage cable leads in radial direction out of the discharging bar and is encapsulated with the bar. The grounding cable leading out of the connection zone ensures the safe ground link of the bar holder.

Variants

EXPR50 Ion Blower Pistol:

Two ion blower pistols (with and without filter; with top or bottom air connection) and two different nozzles are available:

- fishtail nozzle,
without filter, top air connection: EXPR50/OF
without filter, bottom air connection: EXPR50/NF,
with filter, top air connection: EXPR50/GF
with filter, bottom air connection: EXPR50/FF
- Rotating nozzle,
without filter, top air connection: EXPR50/OC,
without filter, bottom air connection: EXPR50/NC,
with filter, top air connection: EXPR50/GC
with filter, bottom air connection: EXPR50/FC

To prevent damaging the nozzles, we advice the use of a balancer together with the ion blower pistol EXPR50. Available as optional equipment under article no. 111792.

The grese filter solely serves to eliminate grease and fat particles from the blower pistol. Cleaned apparatuses air must be used as blowing air.

2. Safety

The units have been designed, built and tested using state-of-the-art engineering, and have left the factory in a technically and operationally safe condition. If used improperly, the units may nevertheless be hazardous to personnel and may cause injury or damage. Read the operating instructions carefully and observe the safety instructions.

Always observe the rules and regulations applying in your country with reference to opening and repairing electrical appliances in explosion hazard area.

2.1 Identification of risks and hazards

Possible risks and hazards resulting from the use of the units are referred to in these operating instructions by the following symbols:



Warning!

This symbol appearing in the operating instructions refers to operations which, if carried out improperly, may result in serious personal injuries.



Caution!

This symbol appearing in the operating instructions refers to operations which, if carried out improperly, may result in damage to property.



Ex Warning!

This symbol denotes the special conditions which must be observed when operating the system in explosion hazard areas as specified in the EX approvals.

2.2 Inspection



2.2.1 Inspecting the emission tips

The emission tips must be checked for any damage or deformation before the ion blower pistol is operated. The ion blower pistol must not be operated with damaged emission tips.



2.2.2 Checking the ground link

Ground conductor and bar holder must be checked before the blower pistol is operated. The ground link must be intact.



2.2.3 Checking the conductive coating of the ion blower pistol

The pistol must not be operated if more than 30% of the metallic coated surface has worn off.

2.2.4 Inspection of the protective resistors

The protective resistors must be inspected at regular intervals. The inspection intervals are specified in the accident prevention regulations, as amended (e.g. in Germany BGV A3). Eltex recommend inspection intervals of 6 months.

Use an resistance meter to check the insulation resistance between the high-voltage connection and ionization tip(s). The resistance must not fall below 120MΩ. The test voltage must be 1,000V.

2.3 Technical advance

The manufacturer reserves the right to make changes to the technical specifications without prior notice in order to adapt the units to state-of-the-art engineering. Eltex will provide the latest information on any changes or modifications in the operating instructions on request.

2.4 Proper use

The EXPR50 ion blower pistol must be used only for discharging static surfaces and for cleaning workpieces and tools. The pistol has been designed for industrial use only.

The EXPR50 ion blower pistol must be operated only together with the ES53/G... or ES53/H... or ES53/I... 5kV AC Eltex power units. In case of noncompliances the Ex approval of the EXPR50 will expire. Please note the instructions for the site of assembly of the power unit.

The recommended distance from the substrate to be discharged and cleaned is between 50 and 100 mm.

Please make sure that the EXPR50 ion blower pistol does not drop on the ground during operation. We recommend using a balancer which must also have the appropriate EX approval rating.

Other uses are not permitted. The manufacturers will not assume any liability and warranty if the units are used improperly or used outside the intended purpose.

Modifications or changes to the units are not permitted.
Use only original Eltex spare parts and equipment.

2.5 Work and operational safety



Warning!

Carefully observe the following notes!



- Before carrying out repairs, connection, cleaning or maintenance work, switch off the power supply and disconnect the mains supply voltage.
- The units must be installed, repaired, serviced and tested by qualified personnel only.



- A conductive compressed air hose must be used for the air supply.
- Cleaned apparatuses air must be used as blowing air.
- Sufficient air extraction must be ensured during operation.
- Check the blower pistol, the discharging bar and the high voltage cable at regular intervals for any damage. Any damaged components must be repaired or replaced before continuing to operate the unit, or the ion blower pistol must be disabled.
- Mechanical or electrical modifications of the ion blower pistol are not permitted. Use only original Eltex spare parts and equipment
- To guarantee the proper function of the EXPR50 ion blower pistol, the discharging bar must be cleaned at least once every week. It must be cleaned at shorter intervals if dirt and grime deposits are severe.
- Do not touch the emission tips - risk of injury.
If the high voltage supply is connected, reflex responses to electrical irritation can lead to secondary accidents.
High risk in the vicinity of unguarded rotating assemblies!



- The discharging bar and the emission tips must be checked for any damage or deformation before the ion blower pistol is operated. The ion blower pistol must not be operated with damaged discharging bar / emission tips.
- Never point the pistol at persons.
- The air flow must not be directed at ears and eyes.



- Potential risk for wearers of cardiac pacemakers:
Moving the chest closer than 3.5 cm to the emission tips of the discharge electrode or making surface contact with several emission tips (touching a single tip is not critical) can result in a temporary switchover of the cardiac pacemaker into the fault mode. Permanent proximity or contact can therefore cause severe problems. If it is likely that the chest of such a person comes closer than 3.5 cm to the emission tips of the discharge electrode, or if several emission tips are touched at the same time, the appropriate warning notices must be displayed.
- To prevent static charges from building up, work gloves worn during operation of the pistol must be antistatic.
- Use the grounding cable of the discharging bar to make a permanent ground link; the ion blower pistol must not be operated without being grounded.
- The pistol must not be operated if more than 30% of the metallic coated surface has worn off.
- To prevent static charges from building up, an antistatic cloth must be used for cleaning the ion blower pistol.
- The ion blower pistol must not be put down in an explosion hazard area. The unit must be always taken out of the explosion hazard area before putting down. Putting the unit down in the explosion hazard area is permitted if a suitable depositing device is used which by its design ensures that the unit does not suffer mechanical damage when putting it down, picking it up or storing it. Eltex recommend the use of a balancer (with ATEX approval for zones 1, 22), available as optional equipment under article No. 111792.
- The operation of the units can generate ozone. The ozone concentration levels developing near the electrodes depend on many different factors such as site of installation, electrode stream and voltage, air circulation, etc., and can therefore not be specified in general terms. If the maximum allowable concentration (MAC) of ozone must be observed at the site of installation of the electrode, the concentration must be measured on site.
- Depending on use, the permitted sound level may be exceeded which may result in warning signals sent by other units not being heard. If necessary, sound level measurements must be made.

3. Installation and assembly

The EXPR50 ion blower pistol is supplied ready for operation. Check to make sure that the unit is undamaged.

When operating the ion blower pistol, we strongly recommend using a balancer to prevent damage to the pistol. The balancer is available as optional equipment under article No. 111792.

3.1 Installation



The power supplies ES53/G... or ES53/H... or ES53/I... have to be installed outside the explosion hazard area.



Warning!

For safe operation, please note the following:

- Installation work must be carried out by qualified personnel.
- Please note the installation and safety instructions for the power supply.
- Connect the EXPR50 ion blower pistol to the ES53/G... or ES53/H... or ES53/I... power supply.
- Connect or disconnect the high voltage cables only with the power supply switched off!
- A **conductive compressed air hose** must be used.



Caution!

To avoid severe damage, keep other objects from hitting against the nozzle!

3.2 Routing the high voltage cable

The high voltage cable must be routed to make sure that it does not make contact with moving machine parts. Avoid mechanical deformations and bending radii smaller than 60 mm. Do not route the high voltage cable along the floor because the cable could be trodden on.

3.3 Ground link

Use the grounding cable of the discharging bar to make a permanent ground connection.

3.4 Connecting compressed air

The ion blower pistol EXPR50 is delivered with an air nipple NW10. Attach the hose for the air supply to the air nipple (Fig. 1, 6). Secure the air hose with a hose clip or a cable binder.

3.5 Routing the conductive compressed air hose

The conductive compressed air hose must be routed to make sure that it does not make contact with moving machine parts. Avoid mechanical deformation and excessively small bending radii (see manufacturer's specifications).

3.6 Compressed air properties

The compressed air must be free from oil, water and dust. If the air supply hoses are very long, a water separator must be fitted immediately upstream from the ion blower pistol. Maximum rated air pressure depends on the used nozzle type (see chap. 9 Technical specifications).

3.7 Impact of heat radiation

To ensure that the permissible operating temperature is not exceeded, the blower pistol must not be exposed to direct heat radiation.

3.8 Balancer (optional)

Suspend the balancer from a suitable attachment point. You may also use an appropriate tripod or stand.

Adjust the desired spring force.

To avoid unnecessary wear and tear, make sure that the balancer moves freely.

Adjusting the spring force

+	To increase the spring force, turn the rotary button anticlockwise.
-	To decrease the spring force, turn the rotary button clockwise.

- Make sure that the ropes moves freely over its entire length.
- Hang the ion blower pistol onto the lower hook and secure it against inadvertently falling off.
- Check the condition of the rope at regular intervals. If damaged, the balancer must be replaced at once for safety reasons.
- Do not use the balancer above its maximum load of 1.0 kg.

**Warning!**

- The balancer must be approved for Zone 1 and 22 (Atex approval).
- Do not open the balancer! It holds a set of springs which may result in personal injury if used improperly.

The balancer requires no further maintenance.

4. Operation



- **Warning!**

For safe operation, please observe the following:



- Sufficient air extraction must be ensured when operating the EXPR50 ion blower pistol.
- The ion blower pistols must be operated only with the ES53/G... or ES53/H... or ES53/I... Eltex power supplies with 5 kV AC output. Only these power supplies meet the requirements of the Ex approval.
- To prevent static charges from building up, work gloves worn during operation of the pistol must be antistatic.
- If the EXPR50 ion blower pistol is operated with a balancer, the balancer must be Ex approved for Zone 1 and Zone 22.

4.1 Startup

Once all the connections have been made correctly, the system is operational and the supply voltage at the power supply and the compressed air lines can be switched on. The ion blower pistol EXPR50 ist operational now.

:

4.2 Function control



Ex Warning!

The following function checks must be carried out outside the Ex zone!
Note the result of the cleaning.

4.2.1 Function control of the nozzles

Check to ensure that the rotary nozzle rotates evenly / to ensure that air exits from the fishtail nozzle.



Warning!

To avoid severe damage, keep other objects from hitting against the nozzle!

4.2.2 Function control of the discharging bar

Touch the top (active) emission tip with a metallic object (e.g. a screw driver with plastic handle) which is firmly connected to ground potential. A small spark must be visible at the emission tip. The proper function can also be checked using a glow lamp voltage tester.



Warning!

Electrical irritation!

The object which is used to touch the bar must have a firm connection with ground potential.

5. Maintenance



Warning!

- Before carrying out any maintenance and repair work on all units, switch off the power supply and disconnect the compressed air supply.
- Repair and maintenance work must be carried out by qualified personnel.
- To ensure the proper function of the units, the compressed air supply must be checked for proper function at regular intervals.
- The pistol must not be operated if more than 30% of the metallic coated surface has worn off.



Ex Warning!

Maintenance work must be carried out outside the Ex area!

5.1 Cleaning the ion blower pistol EXPR50

To prevent static charges from building up, an antistatic cloth must always be used when cleaning the ion blower pistol.

5.2 Cleaning the fishtail nozzle

To ensure the trouble-free function of the ion blower pistol used with the fishtail nozzle, the surface from which the emission tip and the blown air exit must be clean and dry at all times. Dirty blower nozzles must be cleaned with a suitable solvent (benzine) and a plastic brush. To prevent the air exit holes from clogging up with dirt during cleaning, the compressed air (0.3...0.5 bar) must be switched on during cleaning.



Warning!

Risk of deflagration!

Allow the solvent to evaporate completely before restarting the unit.



Caution!

Do not damage the emission tips when cleaning.

5.3 Exchanging the nozzle inserts of the rotary nozzle



Ex Warning!

The nozzle inserts must be exchanged outside the Ex zone!

- Remove the nozzle insert by a slight turn with a 6 mm fixed spanner.
- Take out the nozzle insert.
- Insert and fix a new nozzle insert, making sure not to overtighten to avoid damaging the thread.

5.4 Cleaning the discharging bar EXR5N



Ex Warning!

Always clean the discharging bar outside the Ex zone!

To ensure the trouble-free function of the ion blower pistol EXPR50, clean the bar at least once a week with compressed air free of oil and water (6 bar and standard compressed air pistol) and a brush with plastic or soft copper bristles.



In explosion hazard areas Group II Gas subdivision B it must be ensured that the possibility of the discharge pins being effectively connected together, e.g. by dirt or contamination, is avoided.

Clean grease, ink, glue, paper dust, etc. off the discharge bar using a suitable solvent (Cleaning gasoline). Do not soak the bars and the high voltage cable in solvent!



Warning!

Risk of deflagration!

Allow the solvent to evaporate before restarting the unit.



Caution!

Do not damage the emission tips when cleaning. Brush only in longitudinal direction.

5.5 Filter



Ex Warning!

Maintenance work must be carried out outside the Ex area!

Inspect and, if necessary, exchange the filter for dirt deposits at regular intervals.

5.6 High voltage cable

The high voltage cable of the EXPR50 ion blower pistol is encapsulated and cannot be exchanged.

The high voltage cable must be connected and disconnected only with the power supply switched off.



Warning!

The ion blower pistol must not be operated with a damaged high voltage cable.

6. Troubleshooting



Ex Warning!

All work must be carried out outside the Ex zone!

Warnung!

Electric shock hazard!

- Before carrying out any maintenance and repair work, switch off the power supply and disconnect the supply voltage and the compressed air supply on all units. The ion blower pistol must not be in operation.
- Repairs and maintenance work must be carried out by qualified personnel.

Fault	Cause	Measure
Efficiency of the application declines.	<ul style="list-style-type: none"> • Insufficient compressed air pressure / pressure has dropped . • The power supply is disabled or defective. • Dirt on the fishtail nozzle. • Short circuit in the high voltage cable. • If a filter is used: filter dirty. • Dirt on bar. 	<ul style="list-style-type: none"> • Check the compressed air system / compressed air supply for insufficient pressure. • Switch on the power supply. • Clean ion blower pistol / discharge bar with compressed air and a plastic brush. Grease, oil, inks, etc. on the blower nozzle / pistol must be cleaned off using a suitable solvent (benzine). Warning! Allow the solvent to evaporate completely before restarting the unit. Caution! Do not soak the blower nozzle / bar in solvent. • The ion blower pistol does not function; exchange the discharging bar or return the unit. • Change filter. Clean the bar.

Fault	Cause	Measure
Rotating nozzle does not move or rotates irregularly.	<ul style="list-style-type: none"> Compressed air line network not operational. Insufficient speed / worn bearings. 	<ul style="list-style-type: none"> Check if the compressed air line network is operational; activate the compressed air line network. Under normal operation, the easy movement bearing may show signs of wear after a certain running time. This may result in the speed dropping off or the rotating nozzle stopping. The bearing cannot be exchanged on site. Please return the unit, after the bearing has been replaced and the full function has been checked, the unit will be returned to you as quickly as possible.

For other malfunctions, please also consult the operating instructions of the power supply.



7. Warranty

The units are warranted for a period of 12 months provided that the operating conditions have been maintained, that the units have not been tampered with and that the units show no mechanical damage.

The warranty applies only if the operating and assembly instructions specified by Eltex have been observed. The warranty period begins on the date of delivery.

In the event of defects occurring during the warranty period, the units or defective components will be repaired at Eltex. Defective components will be replaced and installed free of charge.

If repairs are required at the customer's premises, the costs for sending a technician (travel, travel time, expenses) will be charged to the customer.

8. Disposal

The unit must be disposed in compliance with local regulations.

9. Technical specifications EXPR50

Effective distance	approx. 50 - 100 mm
Blower pistol and bracket	plastic and metall
Bar element	glass-fibre-reinforced plastic GRP
Encapsulation material	polyurethane UI-94 V-0
Emission tips	special alloy
Operating voltage	5 kV, 50/60 Hz
Short-circuit current/ emission tip/ground	max. 42 μ A at 5 kV AC
Operating ambient temperature	min. + 10°C...+40°C (+50°F...+104°F) with blowing air; blowing air temperature max. 30°C
Ambient humidity	min. 10% r.F., max. 70% r.F. non-dewing
High voltage supply	via ES53/G... or ES53/H... or ES53/I...Eltex power supply; operating voltage max. 5 kV AC
High voltage connection	high voltage cable encapsulated
Air connection	NW10 mm hose / G3/8"
Air pressure	rotating nozzle: min. 5 bar, max. 10 bar; recommended: 6-8 bar fishtail nouule: max. 6 bar
Rotating nozzle	Standard speed: approx. 750 1/min (not dependent on pressure)
Contact protection	contact protected according EN 61140:2003, paragraph 5.1.6
Dimensions	see figres chap. 10 Dimensions
Weight	EXPR50 with filter: with rotating nozzle: approx. 600 g, with fishtail nozzle: approx. 380 g EXPR50 without filter: with rotating nozzle: approx. 680 g, with fishtail nozzle: approx. 460 g
Balancer (optional)	capacity: 0,4 kg - 1,0 kg travel: 1,6 m weight: 0,6 kg



Air consumption [m³/h]	Typical values												
Air pressure [bar]	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0	
Air consumption EXPR50/_F	3	7	9	12	15	17	20	23	26	29	32	34	
Nozzle inserts Ø	0,6	0,8	1,0	1,2	1,4	1,6	1,8	2,0					
Air consumption PR36/_C*	9,0	13,8	17,4	25,8	37,8	47,4	59,4	72,6					
* with 2 nozzle inserts per side (with 6 bar)													
Ex Approval	TÜV 10 ATEX 7873 X <div> <div>Ex</div>II 2 G c IIA T6 oder <div>Ex</div>II 3 D c T100°C </div>												



Ex Warning!

The EXPR50 ion blower pistol must be operated only together with the ES53/G... or ES53/H... or ES53/I... 5kV AC Eltex power units. In case of noncompliances the Ex approval of the EXPR50 will expire.

10. Dimensions

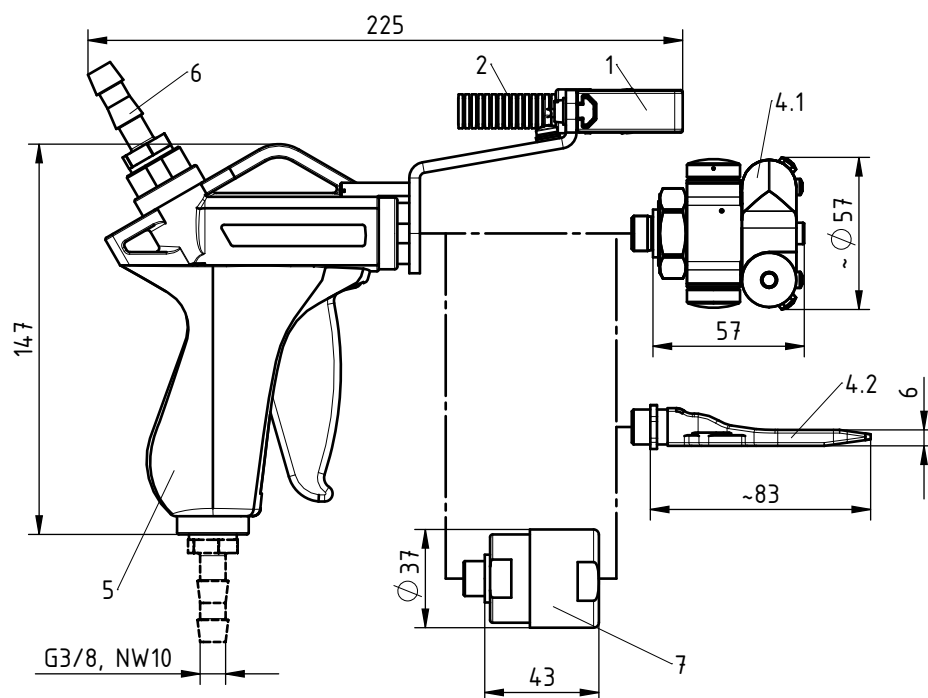
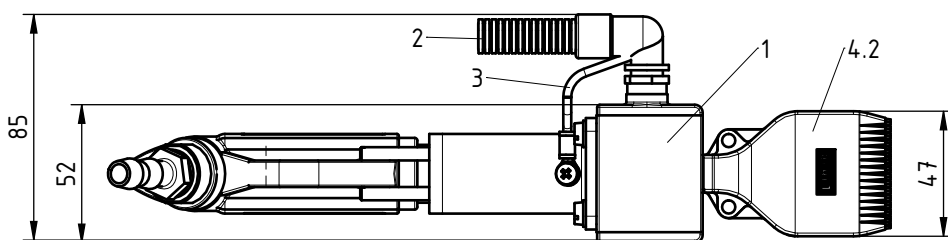


Fig. 5:
Dimensions of the
EXPR50 ion
blower pistol and
the EXPR50/_F
und EXPR50/_G
ion blower nozzles



- 1 Discharge bar
- 2 High voltage cable
- 3 Grounding cable (earth)
- 4.1 Rotating nozzle
- 4.2 Fishtail nozzle
- 5 metallisch beschichtete Blaspistole with filter
- 6 NW10 air connection (bottom / top)
- 7 Filter

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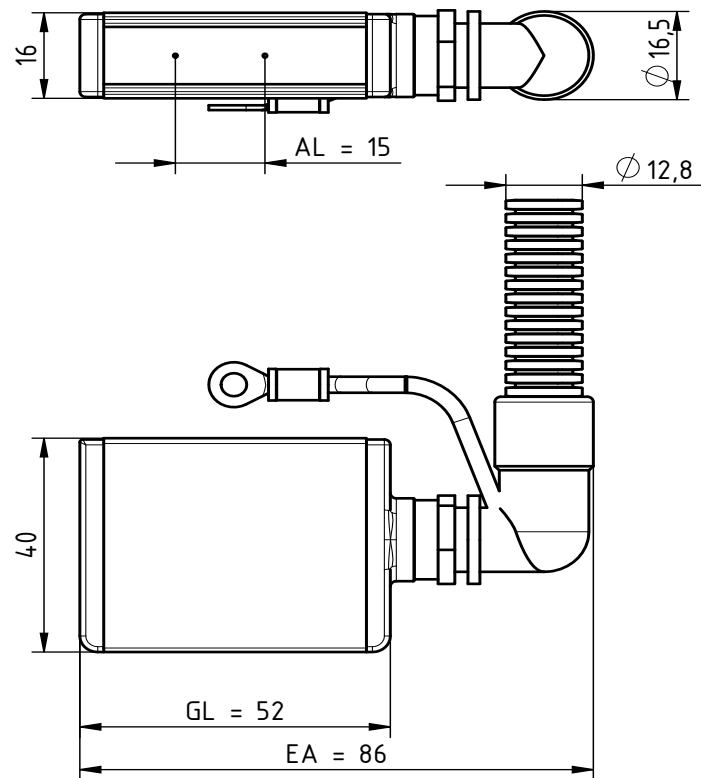
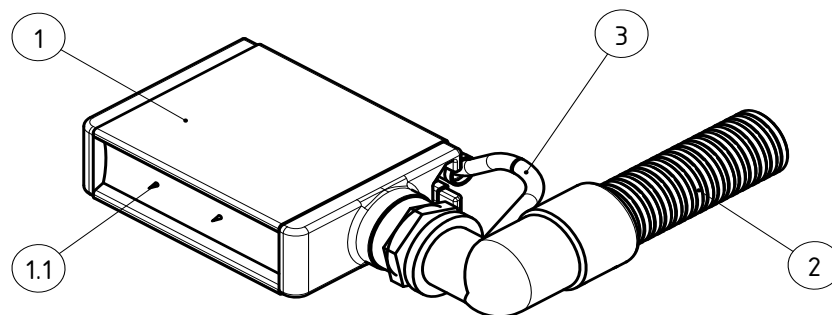


Fig. 6:
Dimensions of the
EXR5N discharge
bar



- 1 Discharge bar
- 1.1 Emission tips
- 2 High voltage cable
- 3 Grounding cable (earth)

AL = active length = 15 mm
GL = total length = 52 mm

Z-EXR5NW0015y

11. Spare parts and accessories

Article	Article No.
Blower pistol, bottom air connection	111745
Blower pistol, top air connection	111746
Power supply 5 kV	ES53/G... or ES53/H... or ES53/I...
Discharge bar (specify high voltage cable length)	EXR5N/W0015B____
Rotating nozzle	110331
Sealing ring for rotating nozzle	MCH00361
Fishtail nozzle	102954
Locknut for fishtail nozzle	102953
Filter cartridge	107830
Balancer (optional)	111792
Operating instructions	BA-xx-2063

Declaration of Conformity

C-2063-en-1104





Eltex-Elektrostatik-Gesellschaft mbH
Blauenstraße 67 - 69
D-79576 Weil am Rhein



declares in its sole responsibility that the product

Ion Blower Pistol EXPR50 (according to Eltex reference code)

Identification:  II 2 G c IIA or  II 3 D c T100°C
Certification-no.: TÜV 10 ATEX 7873 X dated 04.03.2011
Notified body: TÜV Rheinland Industrie Service GmbH, 51105 Köln

to which this declaration refers, conforms with the following norms or standards:

Relevant EC-Directives:

2006/95/EG	Low Voltage Directive
94/9/EG	Directive: Equipment or Protective System intended for use in potentially explosive Atmospheres
2004/108/EG	EMC Directive
2003/10/EG	Noise Directive

Harmonized standards applied:

EN 12100-1:2003	Safety of machinery – Basic concepts, general principles for design – Basic terminology, methodology
EN 12100-2:2003	Safety of machinery – Basic concepts, general principles for design – Technical principles
EN 60204-1:2006	Safety of machinery – Electrical equipment of machines – General requirements
EN 14121-1:2007	Safety of machinery – Risk assessment – Principles
EN ISO 13849-1:2008	Safety of machinery – Safety-related parts of control systems – General principles for design
EN 60079-0:2006	Electrical apparatus for explosive gas atmospheres – General requirements
EN 60079-18:2004	Electrical apparatus for explosive gas atmospheres – Construction, test and marking of type of protection encapsulation "m" electrical apparatus
EN 13463-1:2001	Non-electrical equipment for potentially explosive atmospheres – Basic method and requirements
EN 13463-5:2003	Non-electrical equipment intended for use in potentially explosive atmospheres – Protection by constructional safety "c"
EN 55011:2007	Industrial scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – limits and methods of measurement
EN 61000-6-3:2007	Electromagnetic compatibility (EMC) – Generic standards – Emission standard for residential, commercial and light-industrial environments

Declaration of Conformity

C-2063-en-1104



EN 61241-0:2006	Electrical apparatus for use in the presence of combustible dust – General requirements
EN61241-18:2004	Electrical apparatus for use in the presence of combustible dust – Protection by encapsulation "mD"
EN ISO 11688-1:2009	Acoustics – Recommended practice for the design of low-noise machinery and equipment – Planning

in the version effective at the time of delivery.

Eltex-Elektrostatik-Gesellschaft mbH keep the following documents for inspection:

- proper operating instructions
- plans
- other technical documentation

Mandatory for documentation:

Jens Froehlich, Blauenstraße 67-69, 79576 Weil am Rhein

Weil am Rhein, 05.04.2011
Place/Date


Managing Director

Eltex offices and agencies

The addresses of all
Eltex agencies can be
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