

# Operating Instructions



F01089y

## **BASE IONIZER** **Series ES60 vario Power Supply** for AC operation

**BA-en-2088-2207**





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## Dear Customer,

The ES60 high voltage power supplies are power supply units for AC operation discharging bars.

The discharging bars and the ES60 power supply are used mainly in cases where disruptive static charges impair production processes and need to be eliminated.

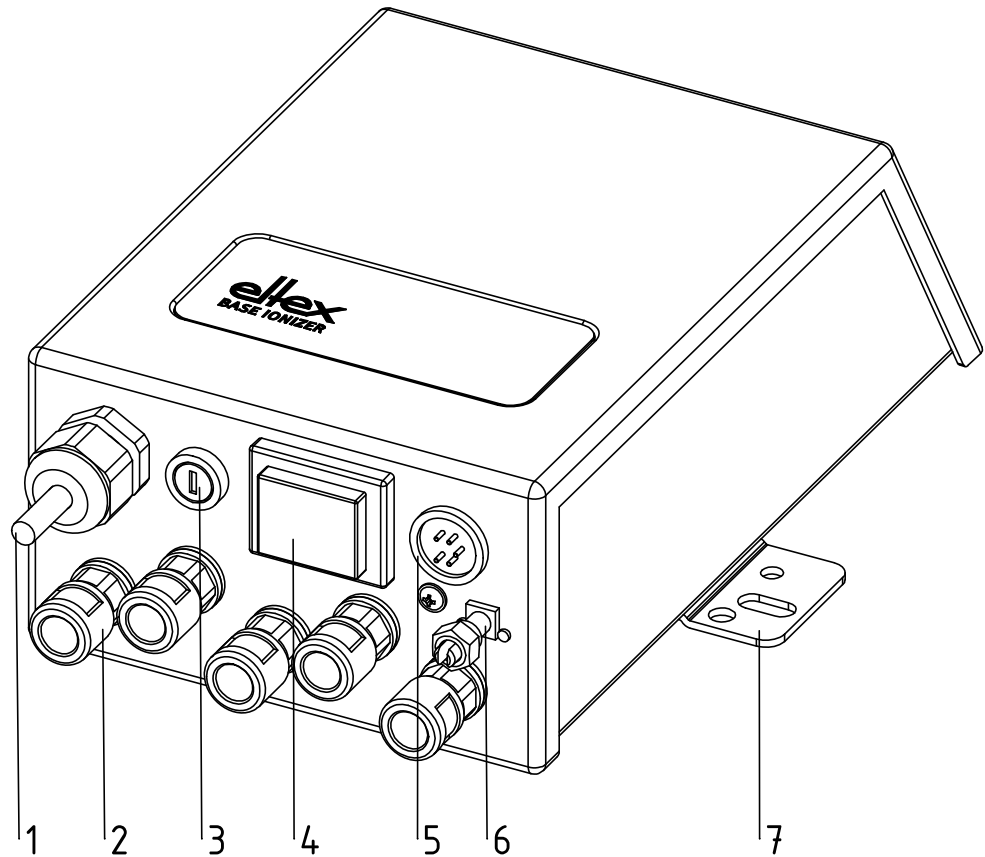
The ES60 power supply features the following characteristics:

- 5 plug-type high voltage outputs
- stable 5 kV AC output voltage
- optional function monitoring
- small dimensions
- easy installation
- protection class IP54 design

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 the feedback from the users of our appliances.

## 1. Outline of appliance



*Fig. 1:  
ES60 high voltage  
power supply for  
AC operation*

- 1 Power supply lead
- 2 High voltage terminals (5 pcs)
- 3 Fuse (type: see name plate)
- 4 ON/OFF switch (ON = illuminated)
- 5 Plug for functional signal (only for functional monitoring, optional)
- 6 Grounding terminal
- 7 Mounting bracket

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## 2. Safety

The ES60 Power Supplies 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.

For warranty conditions, please refer to the General Terms and Conditions (GTC), see [www.eltex.de](http://www.eltex.de).

### 2.1 Proper use

The ES60 Power Supplies may be operated only in connection with the appropriate Eltex discharging bars for AC operation as well as the ion blower nozzles, ion blower pistols and distributors, each with a permanently connected high voltage cable.

Modifications or changes made to the power supplies are not permitted.

Use only original Eltex spare parts and equipment.

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

### 2.2 Identification of risks and hazards

Possible risks and hazards resulting from the use of the power supplies 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.

### 2.3 Work and operational safety



#### Warning!

Carefully observe the following notes and the complete [chapter 2 "Safety", page 6!](#)

Always observe the rules and regulations applying in your country with reference to electrical appliances.

- Before carrying out repairs, cleaning or maintenance work involving the power supplies and the discharging bars, switch off the power supply and disconnect the mains power supply (see [chapter 5 "Maintenance", page 14](#), [chapter 6 "Trouble-shooting", page 15](#)).

- If electrically conductive substrates or substrates coated with conductive material (e.g. metal foil or metal composites) are used, the mains supply must be interrupted (see [chapter 4.2 "Operating mode with conductive substrats", page 13](#)).
- Before carrying out any work involving the units, the machine which has the units fitted must not be in operation (see [chapter 5 "Maintenance", page 14](#), [chapter 6 "Trouble-shooting", page 15](#)).
- Any work involving the units must be carried out by qualified electricians (see [chapter 5 "Maintenance", page 14](#), [chapter 6 "Trouble-shooting", page 15](#)).
- Before starting the unit make sure that the appliance is permanently grounded via the grounding terminal (5, Fig. 1). The ground cable should have a minimum cross section of 1.5 mm<sup>2</sup> (see [chapter 3.2 "Ground connection", page 10](#)).
- Check the power supplies and the discharging bars at regular intervals for any damage to the electrical wiring and the high voltage cables. Any damaged components must be repaired or replaced before continuing to operate the units.
- If the housing cover is removed and the supply voltage is switched on at the same time, contact protection is no longer effective. Always disconnect the power before opening the power supply units.
- The protection class IP54 only applies if the housing cover is closed and the cable connections are shrouded.
- Connect/disconnect the discharging bars only if the power supply unit is switched off (see [chapter 3.4 "Connecting the high voltage cable", page 10](#)).
- In applications involving moving bars, the high voltage cable must be attached such that there is no cable movement near the connection zone of the power supply unit (see [chapter 3.4 "Connecting the high voltage cable", page 10](#)).
- Both the lengths of the high voltage cable and of the active bars are limited, observe maximum lengths (see [chapter 3.5 "Maximum active bar length and length of the high voltage cable", page 11](#)).
- To ensure that no voltage is supplied to the bars when the material web is at rest, enabling the supply voltage to the power supply via machine contact is recommended. If the material web is at rest, or if the machine is not in operation, no high voltage is supplied to the bars in this case (see [chapter 3.6 "Connecting the supply voltage", page 12](#)).
- Before starting up the power supply the user must make sure that the power supply and the bars have been installed and assembled correctly. The supply voltage can then be switched on (see [chapter 4.1 "Startup", page 13](#)).

- The power supply must be checked regularly to ensure its proper functioning. The connections of the high voltage cables must be free of dirt and other foreign matter (see [chapter 5.1 "Power supply", page 14](#)).
- Make sure that the bars are clean at all times. Dirt results in malfunctions and in premature wear of the units.
- When cleaning do not soak the bars and the high voltage cable in solvent and do not damage the emission tips; allow the solvent to evaporate completely before restarting the unit (see [chapter 5 "Maintenance", page 14](#), [chapter 6 "Trouble-shooting", page 15](#)).
- Potential risk for wearers of cardiac pacemakers:  
Moving the chest closer than 3.5 cm to the emission tips of the discharging bars 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 discharging bar, or if several emission tips are touched at the same time, the appropriate warning notices must be displayed.
- The operation of the bars can generate ozone. The ozone concentration levels developing near the bars depend on many different factors such as site of installation, bar current and voltage, air circulation, etc., and can therefore not be specified in general terms. If the maximum allowable concentration of ozone must be observed at the site of installation of the bar, the concentration must be measured on site.  
The AGW value (maximum admissible concentration) serves to assess the ozone concentration at the workplace. The user must make sure that the appropriate national AGW value is at no times exceeded, e.g. in Germany the ozone concentration occurring during the operation of the system must not exceed the recommended value based on international limits of 0.06 ml/m<sup>3</sup> (0.12 mg/m<sup>3</sup>).

## 2.4 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.



### 3. Installation and assembly

#### 3.1 Assembling the power supply

The power supply is designed for wall mounting. Attach using the brackets provided (installation dimensions, see Fig. 2). The operating elements of the power supply and the terminals must be freely accessible at all times and the display LEDs must be visible.

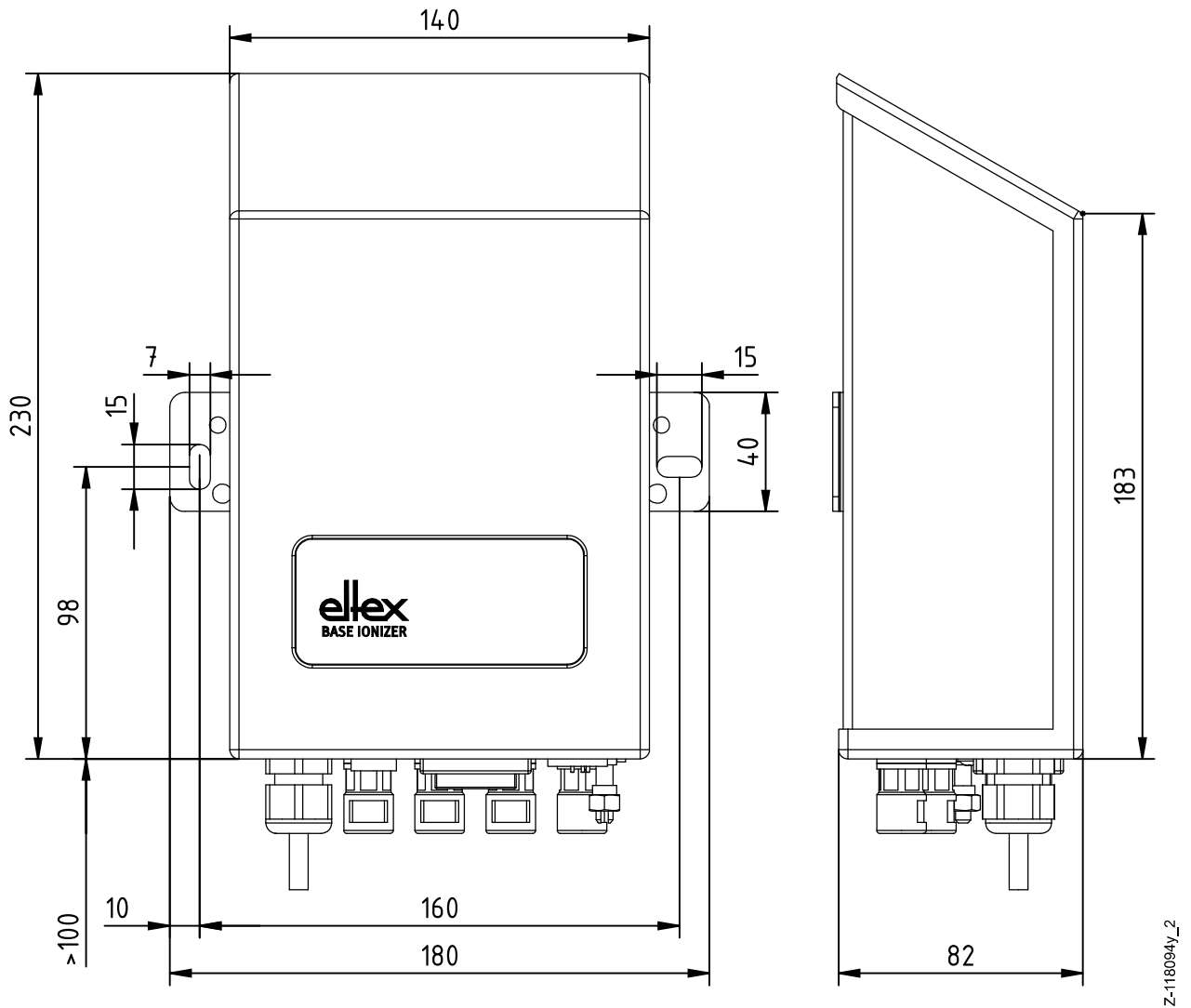


Fig. 2:  
Dimensions, ES60 Power Supply



### 3.2 Ground connection

A permanent ground connection must be made via the grounding terminal (5, Fig. 1). The ground cable should have a minimum cross section of 1.5 mm<sup>2</sup>.

### 3.3 Discharging bars, ion blower nozzles, ion blower pistols and distributors suitable for connection

Eltex discharging bars for AC operation as well as the ion blower nozzles, ion blower pistols and distributors can be connected to the ES60 power supplies, each with a permanently connected high voltage cable.

### 3.4 Connecting the high voltage cable



#### Warning!

Connect or disconnect the high voltage cables only with the power supply switched off!

Connect the discharging bars to the power supply using the prefabricated high voltage cable. Push the high voltage cables into the sockets up to the stop. Then secure the adapter in the socket with the clip provided (see Fig. 3).

Cables without flexible tube and cables with plug-type adapters are plugged in flush and secured with the clip.

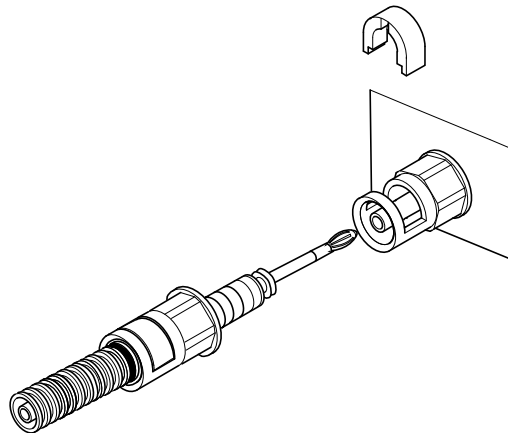


Fig. 3:  
Connecting the  
high voltage cable



#### Warning!

In applications involving moving bars, the high voltage cable must be attached such that there is no cable movement near the connection zone of the power supply unit.

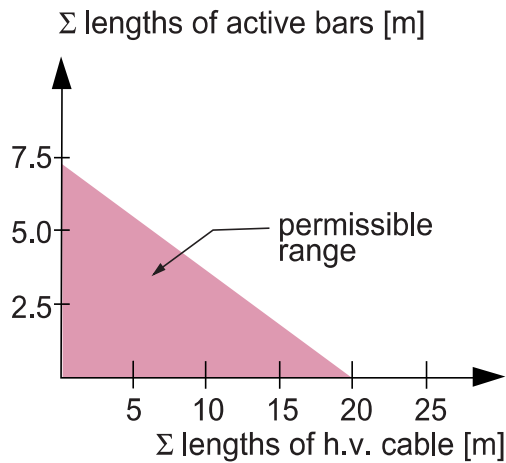
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### 3.5 Maximum active bar length and length of the high voltage cable



Both the lengths of the high voltage cable and of the active bars are limited. The shielded high voltage cables cause a capacitive load on the transformer inside the power supply. The maximum loading capacity is a result of the function of the total active bar length and the total length of all high voltage cables. Fig. 4 demonstrates this principle for R5x bars, ion blower nozzles R36E, ion blower heads R55E and ion blower pistols PR36 and PR55.

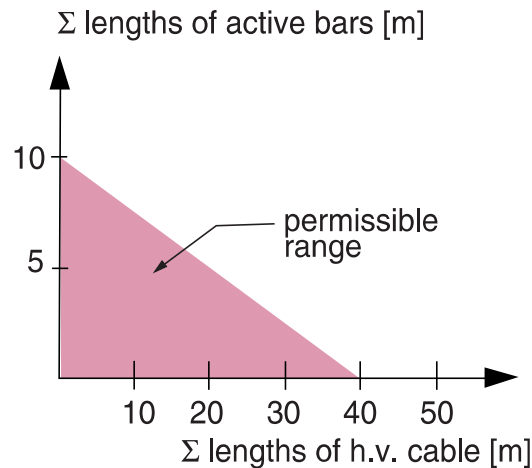
**Fig. 4:**  
Loading capacity of the Power Supply as factor of bar length and length of high voltage cable of R5x bars, R36E, R55E, PR36, PR55



*Example: The maximum permissible total cable length with a 3 meter active bar length is 32 meters.*

Fig. 5 demonstrates this principle for R47 and R6x bars.

**Fig. 5:**  
Loading capacity of the Power Supply as factor of bar length and length of high voltage cable of R47 and R6x bars





### 3.6 Connecting the supply voltage

Connect the supply voltage via the power supply lead (1, Fig. 1) using an earthing pin plug (depending on cable version).

To ensure that no voltage is supplied to the bars when the material web is at rest, enabling the supply voltage to the power supply via machine contact is recommended. If the material web is at rest, or if the machine is not in operation, no high voltage is supplied to the bars in this case.

For external security of the power supply the following circuit breaker is recommended: Tripping Characteristic 2A/K according to DIN EN 60947-2.

### 3.7 Connecting the function signal

The 5-pin connecting plug (Fig. 6) is only provided in units equipped with function monitoring. The following signals can be picked up at this plug:

- Output voltage active: contact 1, 2, 5 (contact 1 and 5 closed)

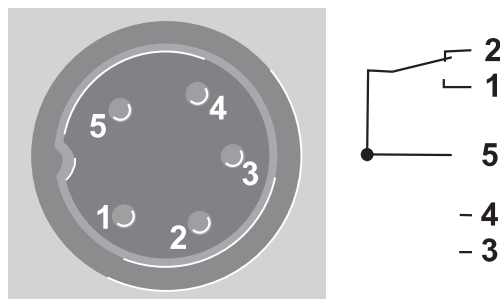


Fig. 6:  
Assignment of the  
plug for function  
signals  
(contacts at rest)

Cables prefabricated at one end are available for connection to this plug (see spare parts).

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## 4. Operation

### 4.1 Startup



Before starting up the power supply the user must make sure that the power supply and the bars have been installed and assembled correctly. The supply voltage can then be switched on.

Use the toggle switch (4, Fig. 1) to switch on the power supply. In the ON position the switch lights up green. High voltage is now supplied to the discharging bars.

The output voltage is now a constant 5 kV AC.

If the fuse is defective, the switch will not light up.

### 4.2 Operating mode with conductive substrats

If electrically conductive substrates or substrates coated with conductive material (e.g. metal foil or metal composites) are used, the mains supply must be interrupted. The connected bars discharge the substrates like this in passive operating mode.

Check for correct ground connection!

## 5. Maintenance



### Warning!

Electric shock hazard!

- Switch the power supply off and disconnect the supply voltage before carrying out any maintenance or repair work.
- The machine which has the units fitted must not be in operation.
- Any work involving the units must be carried out by qualified electricians.

### 5.1 Power supply



The power supply must be checked regularly to ensure its proper functioning. The connections of the high voltage cables must be free of dirt and other foreign matter. The intervals for the check depend on the application and must hence be defined by the user according to the operating conditions. The power supply itself does not require any maintenance. Check for correct ground connection!

### 5.2 Discharging bars

To ensure the trouble-free function of the discharging bars, clean the bars at least once a week with compressed air free of oil and water (max.  $6 \times 10^5$  Pa and standard compressed air pistol) and a brush with soft plastic bristles (article RBR22, see [chapter 9 "Spare parts and accessories", page 18](#)). Refer to the operating instructions for the bar used.

Dirt deposits settling on the bars (e.g. grease) must be cleaned off using a suitable solvent (benzine). Do not soak the bars and the high voltage cable in solvent!



### Caution!

Risk of deflagration!

Allow the solvent to evaporate completely before restarting the unit. Do not damage the emission tips of the bars.

## 6. Trouble-shooting



### Warning!

Electric shock hazard!

- Switch the power supply off and disconnect the supply voltage before carrying out any maintenance or repair work.
- Any work involving the units must be carried out by qualified electricians.

Fault	Cause	Measure
No high voltage	<ul style="list-style-type: none"><li>• Lamp in mains power switch lit: transformer defective.</li><li>• Lamp in mains power switch fails to light: supply voltage not enabled or not connected.</li><li>• Defective fuse.</li></ul>	<ul style="list-style-type: none"><li>• Inform Eltex Service.</li><li>• Check supply voltage and connections. Check connected cables, cable connections and bars.</li><li>• Replace fuse.</li></ul>

## 7. Technical specifications ES60

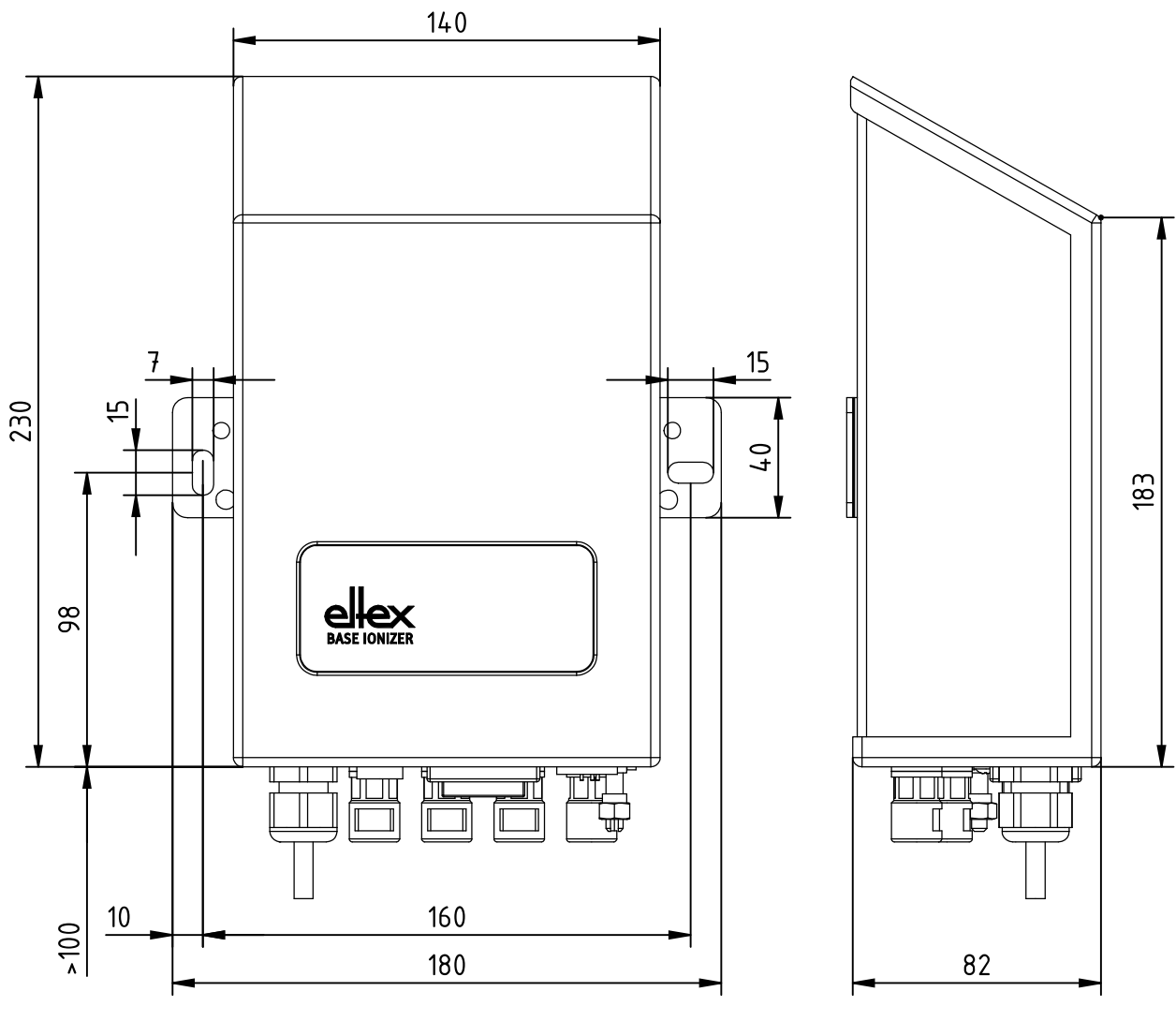
<b>Input</b>	
Supply voltage	115 or 230 V AC 50/60 Hz
Power input	max. 80 VA
Fuse (primary circuit)	see name plate
Recommended protection	Tripping Characteristic 2A/K according to DIN EN 60947-2
Mains power cable	depending on the unit variant, either with grounding contact plug (approx. 2.5 m) or with free end (cable length max. 99 m)
<b>Connectivity</b>	
Operation	illuminated ON / OFF switch
Interfaces	optional
<b>Output</b>	
Voltage	5 kV AC
Current	max. 6,2 mA
Frequency	50/60 Hz
pluggable connections	5
Load capacity	depending on bar type and length and high voltage cable length (see chapter 3.5)
<b>Features</b>	
Ion balance	with and without parameter diode
Function monitoring	optional
passive operating mode	with the power supply unit switched off
<b>Key date</b>	
Housing type	sheet metal steel with wall bracket
Ground link	grounding terminal on housing
Operating ambient temperature	0...+60 °C (+32... +140 °F)
Storage temperature	-20...+80 °C (-4... +176 °F)
Ambient humidity	max. 80 % r.h., non-dewing
Protection class	IP54 according to EN 60529
Housing dimensions	230 x 180 x 82 mm [LxBxH]
Weight	approx. 4 kg

as shown on  
appliance  
marking:





## 8. Dimensions



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Fig. 7:  
Dimensions ES60 Power Supply

## 9. Spare parts and accessories

Article	Article No.
High voltage distributor discharging , 5 terminals (1 high voltage cable, 4 outputs) specify plug and cable length	ESV61/_ _
High voltage distributor discharging, 2 terminals (1 high voltage cable, 2 outputs) (specify plug and cable length)	ESVY61/_ _
Extention cable	KE/LB
Plug "L" Set for prefabricating the high voltage cable with flexible tube for power supply ES60	103289
Plug "S" Set for prefabricating the high voltage cable without flexible tube for power supply ES60	101366
Flexible tube for high voltage cable (specify length)	MCH02438
Blanking plug for high voltage connection	102742
Mains cable gland	MCH02176
Grounding terminal	ELM00202
ES60: Fuse F1 (115 V) 1,25 A T (IEC 60127-2/5)	113522
Fuse F1 (230 V) 0,63 A T (IEC 60127-2/5)	113211
Round plug connector 5-pole for function signal	ELM01144
Blanking plug for function plug	ELM01115
Signal cable assembled (specify cable length)	KS/C _ _ _ _
Cleaning brush with handle	RBR22
Operating Instructions (specify language)	BA-xx-2088

Please specify the article number when ordering.

# EU-Declaration of Conformity

CE-2088-en-2205

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



declares in its sole responsibility that the product

**Power Supply Type ES50 / ES51 / ES53 / ES60** (according to Eltex reference code)

complies with the following directives and standards.

Relevant EU-Directive:

**2014/35/EU**

Low Voltage Directive

Harmonized standard applied:

EN 60204-1:2018

Safety of machinery – Electrical equipment of machines –  
General requirements

Relevant EU-Directive:

**2014/30/EU**

EMC Directive

Harmonized standards applied:

EN 55011:2016 + A1:2017  
+ A11:2020 + A2:2021

Industrial, scientific and medical equipment –  
Radio-frequency disturbance characteristics – Limits and methods  
of measurement

EN IEC 61000-3-2:2019

Electromagnetic compatibility (EMC) – Limits – Limit for harmonic  
current emissions (equipment input current  $\leq 16$  A per phase)

EN 61000-3-3:2013 + A1:2019

Electromagnetic compatibility (EMC) – Limits – Limitation of voltage  
changes, voltage fluctuations and flicker in public low-voltage supply  
systems, for equipment with rated current  $\leq 16$  A per phase and not  
subject to conditional connection

EN IEC 61000-6-2:2019

Electromagnetic compatibility (EMC) – Generic standards –  
Immunity for industrial environments

Relevant EU-Directive:

**2011/65/EU**

RoHS Directive

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

Weil am Rhein, 16.05.2022  
Place/Date



Lukas Hahne, Managing Director

# Eltex offices and agencies

The addresses of all  
Eltex agencies can be  
found on our website at  
[www.eltex.de](http://www.eltex.de)



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