Operating Instructions

F01063y

VARIO

COMPACT IONIZER

ES24 Series Power Supply
for supplying AC discharging bars

BA-en-2062-2505

electrostatic innovations

List of contents

Dear Customer,

The COMPACT IONIZER high-voltage power supply units of the ES24 series are power supply units for the AC-operated ion blower nozzles, ion blower heads, distributors and discharging bars of the R47, R5x and R6x series, each with a permanently connected high-voltage cable.

The discharging bars and the ES24 power supply are used mainly in cases where disruptive static charges on fast-moving material webs impair production processes and need to be eliminated.

The ES24 power supply features the following characteristics:

- stable 5 kV AC output voltage
- output current monitoring
- short-circuit proof
- independent from different national line voltages
- connecting options for several consumer units (bars, blowing nozzles) via ESVY61 or ESV61 high voltage distributor (optional)
- protection class IP54
- compact design, small dimensions
- adaptable and easy to install
- low weight compared with conventional transformers

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 ES24 power supply

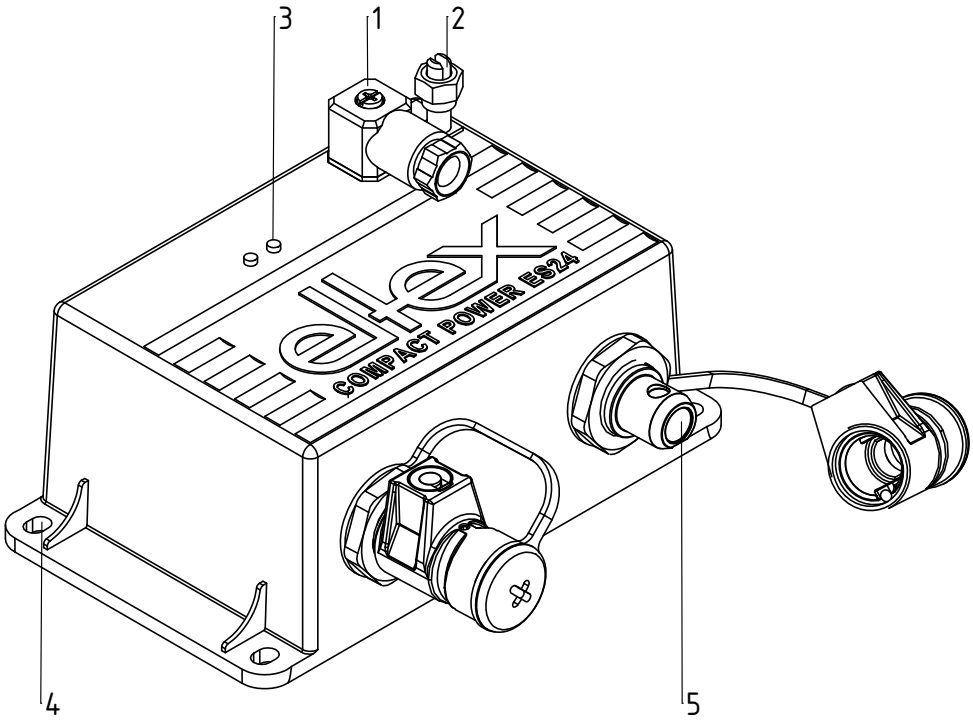

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Fig. 1:
ES24/O high voltage power supply for AC operation

1 Universal plug: supply voltage and potential-free contact
  Pin 1: potential-free fault signal contact
  Pin 2: 24 V DC
  Pin 3: GND
  Pin 4: potential-free fault signal contact;
  trouble-free state - contact closed

2 Operational grounding connection

3 LED status; function and error messages display

4 Fixing holes for scews M5

5 2 high voltage outputs: connection of the consumer units (discharging bars, high voltage distributor ESVY61 / ESV61)

2. Safety

The ES24 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.

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

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

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

2.1 Proper use

The ES24 power supply units may only be operated with the associated Eltex discharging bars for AC operation and 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.

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 7!

- Before carrying out repairs, cleaning or maintenance work and before resetting after malfunctions, switch off the power supply and disconnect the mains supply voltage (see chapter 5 "Maintenance", page 17, chapter 6 "Troubleshooting", page 18).
- Any work involving the units must be carried out by qualified electricians (see chapter 5 "Maintenance", page 17, chapter 6 "Troubleshooting", page 18).
- 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 17, chapter 6 "Troubleshooting", page 18).
- The ES24 high voltage power supply must be operated only with a 24 V DC line voltage (see chapter 4 "Operation", page 16).
- 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 "Operation", page 16).
- Before starting the unit make sure that the appliance is permanently grounded via the grounding terminal (2, Fig. 1). The ground cable should have a minimum cross section of 1.5 mm^2 (see chapter 3.2 "Ground connection", page 12).
- Check the units, the electrical wiring and the hight voltage cable at regular intervals and before startup for any damage. Any damaged components must be repaired profesionally or replaced before continuing to operate the units, or the bar or cable must be disabled.
- In applications involving moving bar, the high voltage cable must be attached such that there is no cable movement near the connection zones of the divices (power supply, distributer or discharging bar); see chapter 3.3 "Connecting the high voltage cable", page 12).
- Seal unused connections with blanking plugs (see chapter 3.3 "Connecting the high voltage cable", page 12).
- 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 14).
- When connecting several consumer units (power supply, bars, ion blower nozzles and heads) using an ESVY61 / ESV61 high voltage distributor, the entire active bar and cable length must be within the permissible range of the loading capacity diagram (see chapter 3.5 "Maximum active bar length and length of the high voltage cable", page 14).

- Operating the ES24 power supply requires a 24 V DC line voltage designed for a maximum current of 1.4 A (see chapter 3.6 "Connecting supply voltage and fault signal contact", page 15).
- The supply voltage 24 V DC at the universal plug must be connected to Contact 2 (24 V) and Contact 3 (Ground), or plugged into the power supply available as accessory.
  Contact 3 (Ground) must be connected to the ground (see chapter 3.6 "Connecting supply voltage and fault signal contact", page 15).
- Make sure that the units are clean at all times.
  Dirt results in malfunctions and in premature wear of the units.
- 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. Check for correct ground connection (see chapter 5 "Maintenance", page 17).

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 Assembly the power supply

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

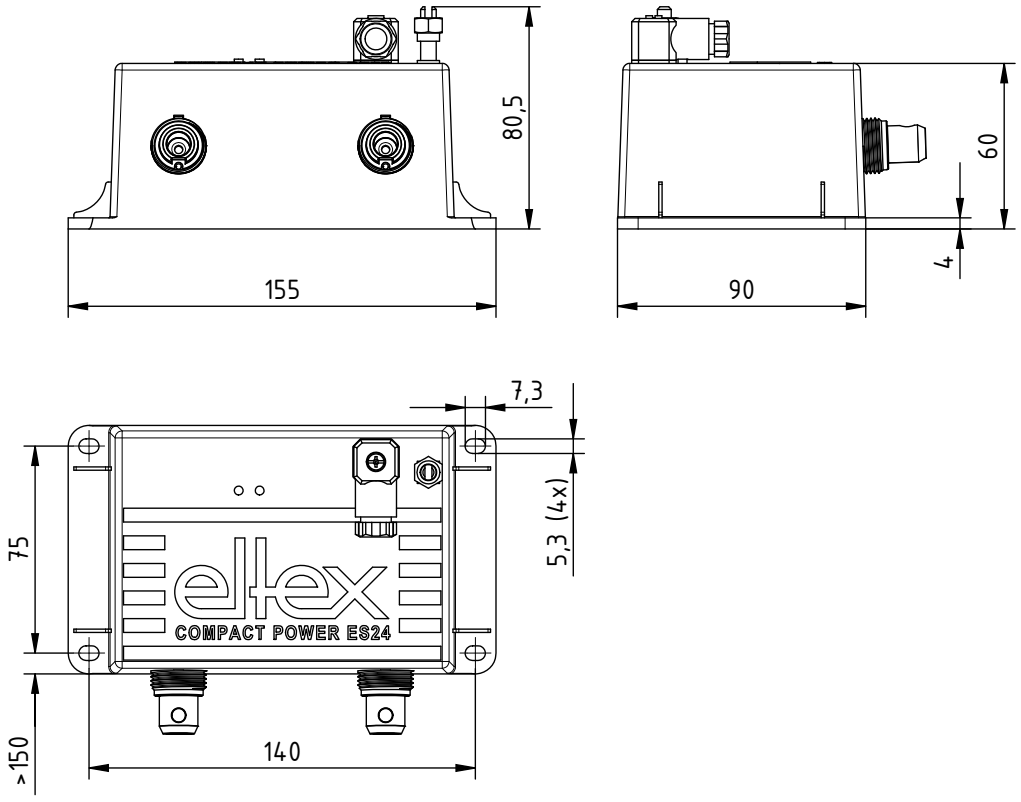

Fig. 2: Installation dimensions, ES24/O Power Supply

Installation examples

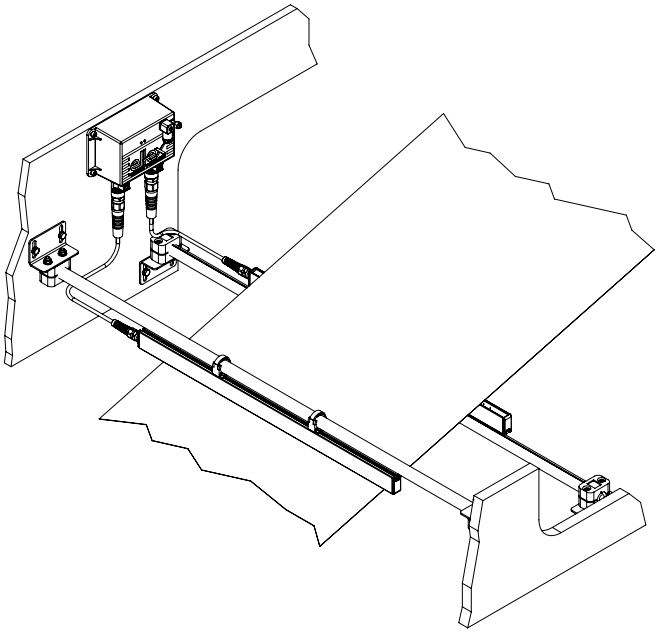

Fig. 3: Installation examples

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Example: connection of several consumer units via a high voltage distributor

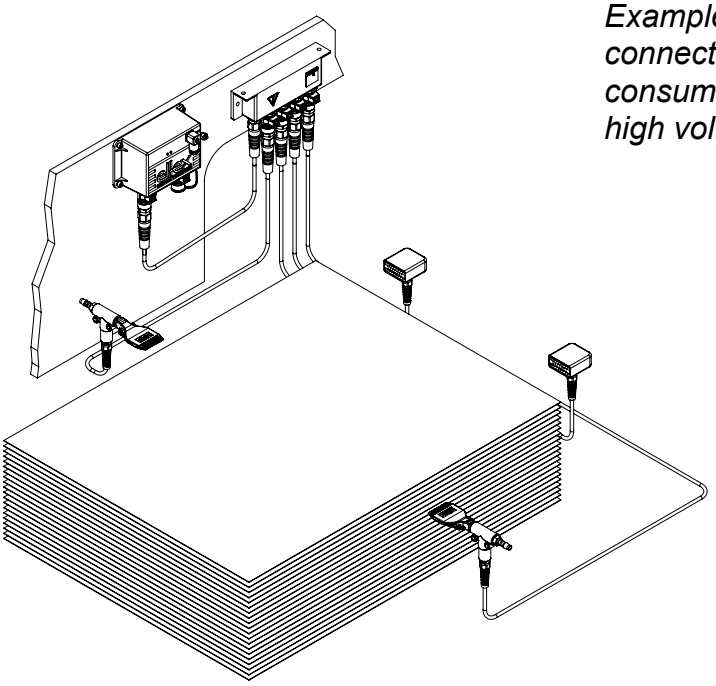

Fig. 4: Installation examples

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3.2 Ground connection

A permanent grounding connection must be made and checked via the ground terminal (2, Fig. 1) and routed with the shortest possible distance to the machine frame. The ground cable should have a minimum cross section of 1.5 mm^2.

3.3 Connecting the high voltage cable

The connection of the high-voltage cable of the discharging bars to the devices is described in the operating instructions of the corresponding devices.

Warning!
Electric shock hazard!
Work may be carried out only if:

- the supply voltage to the power supply / generator has been disconnected,
- the machine is at standstill because the bars pick up charges if the substrat web is running.

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. Make sure that the locking pin is fully engaged.

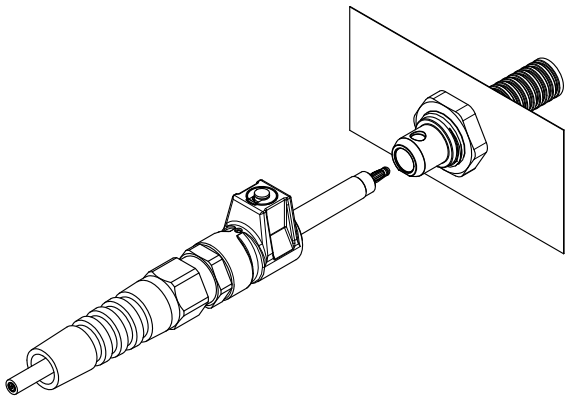

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Fig. 5: Connecting the high voltage cable

To pull out the high voltage plug, use a flat screwdriver to lift the locking pin.

Warning!
In applications involving moving bar, the high voltage cable must be attached such that there is no cable movement near the connection zone of the devices (power supply, distributer or discharging bar).

Seal unused connections with blanking plugs.

3.4 Dismantling / Assembling the plug housing

To route the cable through a wall or a grommet, the plug housing and the threaded anti-kink joint can be dismantled and removed.

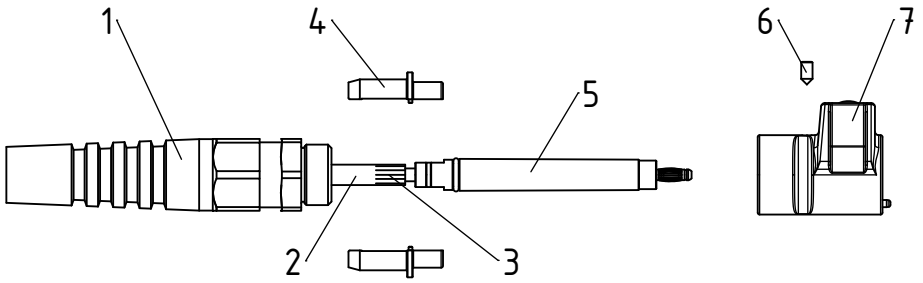

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Fig. 6: Dismantling / Assembling the plug housing

- First loosen the union nut of the threaded anti-kink joint (1).
- Turn the threaded anti-kink joint (1) out of the plug housing (7).
- Loosen the grub screw (6) located immediately behind the locking pin.
- Fix both semi-shells (4) of the shield carrier in place and pull the plug housing (7) off to the front. Then remove the two semi-shells (4).
- The jack (5) with the split-pin plug is encapsulated with the high-voltage cable (2) and cannot be dismantled.
- If required, widen the sealing rubber of the threaded anti-kink joint and pull the threaded ant-kink joint (1) off over the jack.
- To assemble, proceed in reverse order. When replacing the semi-shells (4), make sure that the shield (3) is properly tucked over and that the whole unit is properly and correctly assembled.

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 bars length and the total length of all high voltage cables.

Fig. 7 demonstrates this relationship for R50 bars, R36E ion blower nozzles, R55E ion blower heads and PR36 / PR55 ion blower pistols.

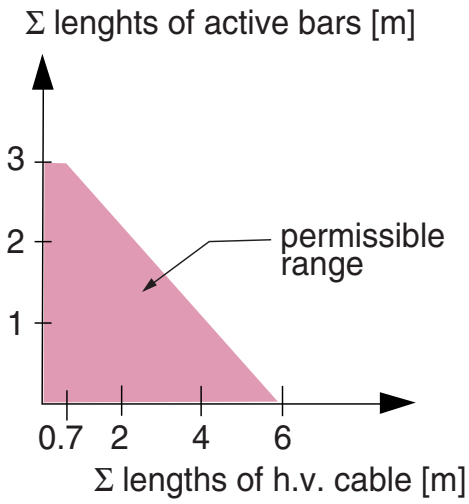

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Fig. 7: Loading capacity of the power supply as factor of bar length and length of high voltage cable of R50 bars, R36E, R55E§, PR36, PR55

Example:
The maximum permissible total cable length with a 1 meter active bar length is 4,1 meters.

Fig. 8 demonstrates this relationship for R47 and R6x bars values.

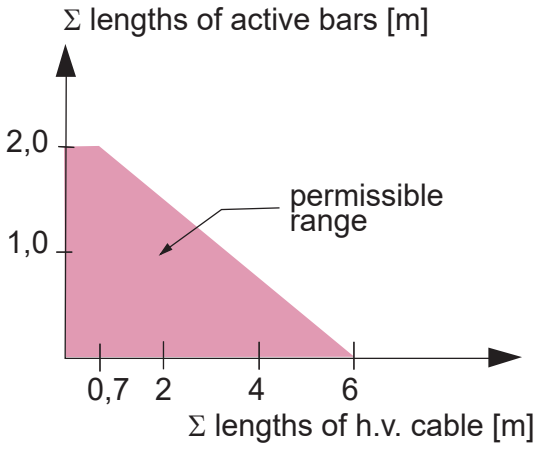

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Fig. 8: Loading capacity of the power supply as factor of active bar length and length of high voltage cable of R47 / R6x bars

When connecting several devices (bars, ion blower nozzles and ion blower heads) using an ESVY61 / ESV61 high voltage distributor, the entire active bar and cable length must be within the permissible range of the loading capacity diagram (Fig. 7 / Fig. 8).

3.6 Connecting supply voltage and fault signal contact

Operating the ES24 power supply requires a 24 V DC line voltage designed for a maximum current of 1.4 A.

The supply voltage is provided by the customer and is connected via the connector supplied. The power supply available as accessory may be used as an alternative.

To ensure that no high voltage applies at the bars when the web is at rest, we recommend to switch off the supply voltage of the units. If the web is at rest or if the machine is not in operation, no high voltage applies at the bars.

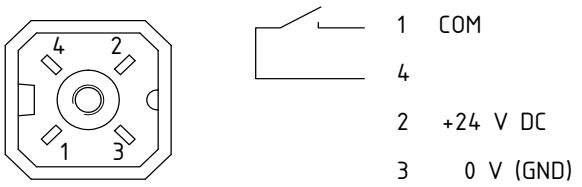

Fig. 9: Universal plug

Caution!
The supply voltage 24 V DC at the universal plug must be connected to Contact 2 (24 V) and Contact 3 (Ground), or plugged into the power supply available as accessory.
Contact 3 (Ground) must be connected to the ground.

If required, a potential-free fault signal contact (max. contact load 24 A / 0.5 A DC) may be tapped from Contact 1 (COM) and Contact 4:

- trouble-free state: contact closed
- Fault: contact open
- No line voltage: contact open

If the optional power supply is used, the use of the fault signal contact is not envisaged.

4. Operation

The ES24 high voltage power supply must be operated only with a 24 VDC line voltage.

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.

4.2 Function monitoring

Two LEDs in the connection zone signal the proper function of the unit.

- The device version ES24/O hast two LEDs (green, red) and device version ES24/C has three LEDs (green, yellow, red).
- If none of the two LEDs is lit, the supply voltage is not switched on.
- When the bar starts, all two (green, red) must light up briefly.

	Green LED *Operations status of the output voltage*	**Red LED** *Error status*
LED on	High voltage in ON.	Internal error
LED off	High voltage is OFF.	No error
LED flashes	The ES24 power supply operates at its capacity limit.	High voltage error

Note!
Faults will not be saved. A disruption of the supply voltage automatically results in the fault message being acknowledged.

5. Maintenance

Warning!
Electric shock hazard!

- Switch off the power supply unit 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.
- Repairs and maintenance work must be carried out by qualified electricians.

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!

6. Troubleshooting

Warning!
Electric shock hazard!

- Switch off the power supply unit 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.
- Repairs and maintenance work must be carried out by qualified electricians.

Failure	**Cause**	**Measure**
No LED lights up.	No supply voltage.	Check supply voltage and connections. Inform Eltex Service.
Green LED flashes.	The power supply operates at the limit of its capacity.	Check the maximum permissible bar and/or cable length. Clean the discharging bars. Check the high voltage cable or the discharging bars for any damage.
Red LED lights up.	Internal error.	To acknowledge the fault, switch the supply voltage off and back on. If the fault persists, notify Eltex Service.
Red LED flashes.	• Short circuit at the high voltage output. • No output voltage.	• Check the maximum permissible bar / cable length. Clean the discharging bars. Check the high voltage cable / the discharging bars for any damage. • Inform Eltex Service.

7. Technical specifications ES24

Supply voltage	24 V DC +/- 10 %
Power input	15 VA max.
Output voltage	5 kV AC / 100 Hz
Loading capacity	depending on bar length and length of high voltage cable (see chapter 3.5)
Output current	max. 2.0 mA at 5 kV
Ambient operating temperature	0 ... +40 °C (+32 ... +104 °F)
Storage temperature	0 ... +70 °C (+32 ... +158 °F)
Ambient humidity	max. 80 % r.h., non-dewing
Optical indicator	LED on housing: green: high voltage active red: malfunction
Mains power	socket contact with plug, power supply as optional accessory
Ground link	grounding terminal on housing
High voltage connection	2 plug-type high voltage connection
High voltage distributor ESVY61 (optional)	2 plug-type high voltage connections (1 high voltage cable, 2 outputs)
High voltage distributor ESV61 (optional)	4 plug-type high voltage connections (1 high voltage cable, 4 outputs)
Enclosure	plastic with wall-mounted bracket
Protection class	IP54 according to EN 60529
Dimensions	60 x 155 x 90 mm (H x W x D) see Fig. 10
Weight	approx. 1.1 kg
UL Approval	File No. E227156

as shown on appliance marking:

8. Dimensions

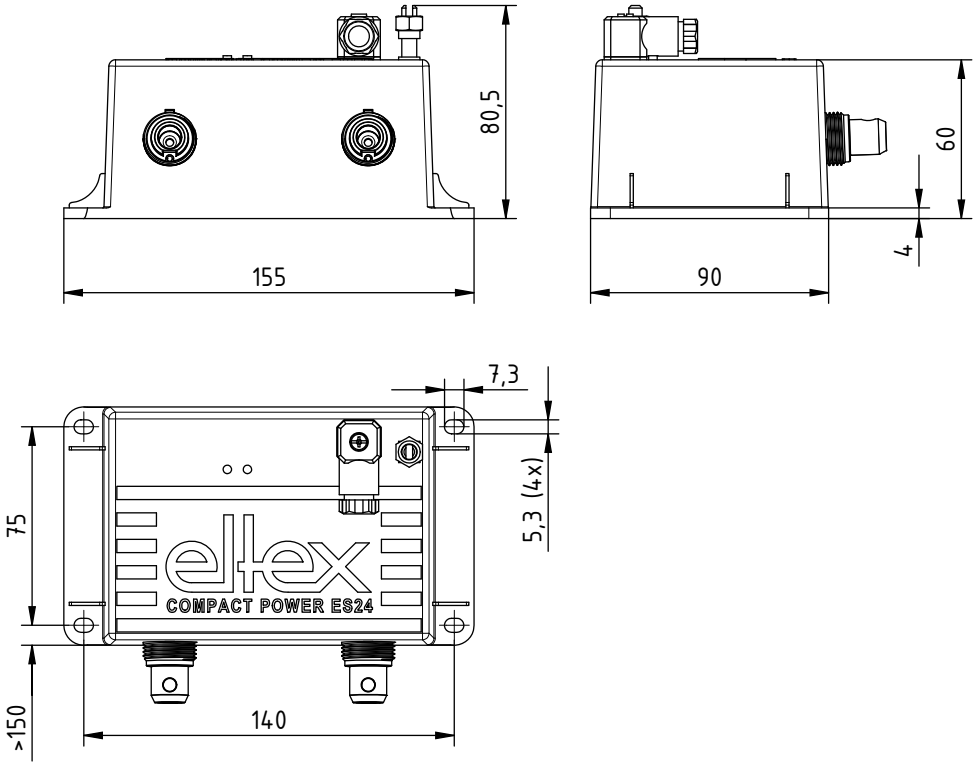

Fig. 10: Dimensions ES24/O power supply

9. Spare parts and accessories

Article	Article No.
High voltage distributor discharging 4 terminals (1 high voltage cable, 4 outputs) Specify plug and socket types as well as cable length	ESV61/_
High voltage distributor discharging 2 terminals (1 high voltage cable, 2 outputs) Specify plug and socket types as well as cable length	ESVY61_
High voltage cable without flexible tube from power supply ES24 or distributer ESV61 resp. ESVY61/Z_ to blower nozzle R36 / R55 (specify cable length)	KE/ZY_
High voltage cable with flexible tube from power supply ES24 or distributer ESV61 resp. ESVY61/Z_ to blower nozzle R36 / R55 (specify cable length)	KE/YW_
Mains Cable (connection on customer side, specify cable length)	KN/FD_
Power pack and connecting cable	111888
Universal plug for line voltage and fault signal contact	109536
Blanking plug for high voltage connection	111937
Volt Stick	109136
Cleaning brush with handle	RBR22
Operating Instructions (specify language)	BA-xx-2062

Please specify the article number when ordering.

10. Decommissioning / Waste disposal

The ES24 power supply unit can be disposed of using the general waste disposal methods (electronic waste).

EU-Declaration of Conformity

CE-2062-en-2411

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

declares in its sole responsibility that the product

Power Supply Type ES24 (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 61000-6-2:2019	Electromagnetic compatibility (EMC) Generic standards – Immunity for industrial environments
EN IEC 61000-6-3:2021	Electromagnetic compatibility (EMC) Generic standards – Emission standard for residential, commercial and light-industrial environments
Relevant EU-Directives:	
2011/65/EU	RoHS Directive
(EU) 2015/863	RoHS Delegated 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 documentations

Weil am Rhein, 05.11.2024
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

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