Discharging – Static Line

HAUG discharging systems serve to neutralize electrostatic charges. These disruptive electrostatic charges can be found on various material webs, where they interfere with the production process and attract dust particles as well as other quality-reducing substances. Affected are all branches of industry where materials with poor electric conductivity are processed.

HAUG ionizing systems for discharging are alternating voltage systems which basically consist of the following components:

- a power pack with an integrated high-tension transformer and
- one or several connected ionizing devices, supplied by the power pack with a voltage of 7 – 8 kV_{AC}

Power packs

A voltage of approx. 4.2 kV_{AC} (corona inception voltage) is required for the operation of ionizing units. HAUG power packs reach a higher output voltage (7 – 8 kV_{AC}) ensuring an optimum discharging capability.

HAUG power packs are available, for example, with or without monitoring, with internal or external fault signalling contacts for production monitoring, without displays or with analog and/or digital displays.

Most HAUG power packs comply with the specifications of protection type IP 54. All components of the power packs are replaceable.

The equipment levels also include a different number of high-voltage terminals (between 1 and 8 depending on the unit type). This allows the power pack and the connected ionizing units to be utilized to their full capacity. Ionizing units can be connected without needing to open the unit.

The power pack and ionizing units are connected using the high-voltage plug-and-socket connector system X-2000 and the fully shielded cables available in different designs. Depending on the application, cables can be supplied as standard, extension and connection cables with different properties, such as high flexibility or temperature-resistance.

Ionizing units

HAUG ionizing units are available in many designs (round, square, circular). Ionizing units can be supplied as passive and active units and in customized lengths.

Ionizing bars, ring electrodes and special discharge electrodes are absolutely safe to touch (with some clearly identified exceptions). Some of our bars are capacitively or resistance coupled.

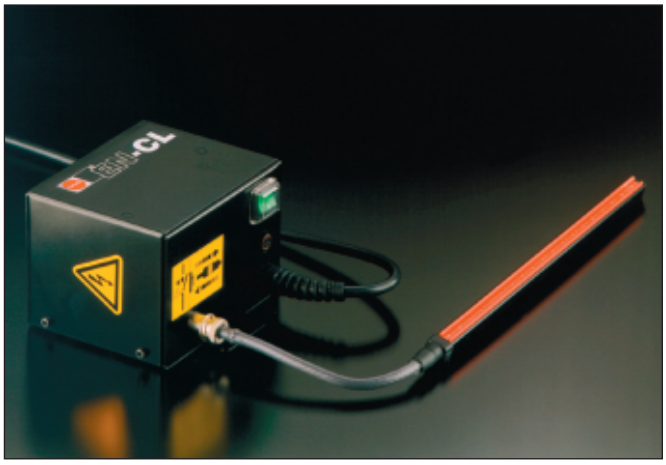
Depending on the application, standard or high-performance bars are used. Special ionizing bars for use in clean rooms and sterile areas as well as heat-resistant ionizing units are also included in our product range. HAUG ionizing units do not have any protruding pins and are therefore easy to clean. The ion generation of the capacitive bars is symmetrical.

The ideal installed distance between the ionizing bar and the material required to achieve optimum discharge is between 10 and 30 mm. A variety of standard mounting fixtures, including plates, bar holders and brackets, are available to ensure the perfect installation position.

Power pack EN CL

Small and easy to handle, the **EN CL** has a modern layout and is highly effective.

The power pack is equipped with one high-voltage terminal (5 m connectable length).



Technical data

Type of protection: IP 41

HV-terminals: 1

Rated frequency: 50 – 60 Hz

Power consumption: max. 20 VA

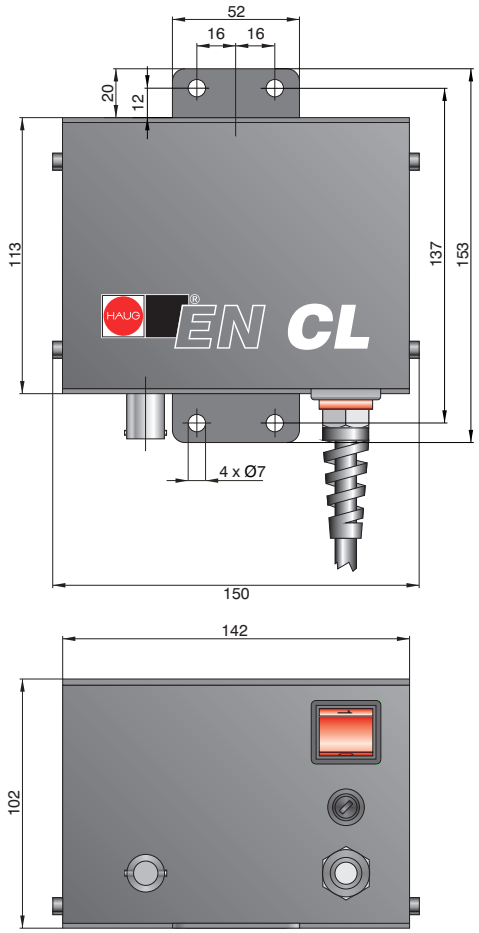
Output short-circuit current: $I_k \leq 3$ mA

Operating temperature +5 °C to +45 °C

Storage/transport temperature: -15 °C to +60 °C

Weight: 4 kg

Mains cable: 2.6 m; fixed to the device



Types	Supply voltage	Connectable length (bars and cabels)	Order-No.
EN CL	230 V_{AC}	max. 5 m	01.7800.120
EN CL	115 V_{AC}	max. 5 m	01.7801.120

Accessories:	Ionizing bar EI PRQ Cabel Bar holder	03.8400.000 06.0240.000 10.0371.000

Power pack EN SL / EN SL LC

Power pack EN SL

The power pack **EN SL** guarantees a service-friendly power supply. It is equipped with two high-voltage terminals.

The main on/off switch, with a built-in display light, always lets the user know that the power pack is ready for operation. With the help of the HAUG vario holder the power pack can easily be mounted horizontally on any flat surface or vertically right to the wall.

Power pack EN SL LC

As **EN SL**, but with integrated full-electronic function monitoring.

This system constantly monitors all functions of the ionizing system without any further measuring or test equipment.

It alerts the operator of any irregularities by causing the LED indicator integrated in the housing to flash.

For dimensions of the powerpacks please have a look at the next page (Power pack EN SL RLC).

Technical data

Type of protection:	IP 54
Rated frequency:	50 – 60 Hz
Power consumption:	max. 40 VA
Rated output current:	ca. 7 – 8 kV_{AC}
HV-terminals:	2
Operating temperature:	+ 5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60°C
Weight:	3.5 kg
Mains cable:	2.6 m; fixed to the device

Types	Supply voltage	Connectable length (bars and cables)	Function monitor. short circuit protection unit	Output short circuit current	Order-No.
EN SL	230 V_{AC}	max. 5 m	–	3 mA	01.7780.220
EN SL	115 V_{AC}	max. 5 m	–	3 mA	01.7781.220
EN SL	230 V_{AC}	max. 10 m	–	3 mA	01.7780.200
EN SL	115 V_{AC}	max. 10 m	–	3 mA	01.7781.200
EN SL	230 V_{AC}	max. 10 m	yes	3 mA	01.7830.000
EN SL	115 V_{AC}	max. 10 m	yes	3 mA	01.7831.000
EN SL II	230 V_{AC}	max. 5 m	with potentiometer adjustable, 4...6 kV (+signalling cable K3)		01.7782.225
EN SL II	115 V_{AC}	max. 5 m			01.7783.225
EN SL LC	230 V_{AC}	max. 10 m	yes	5 mA	01.7833.000
EN SL LC	115 V_{AC}	max. 10 m	yes	5 mA	01.7834.000

Accessories: for EN SL II only	Signalling cable K3, shielded	
	5 m, with plug	06.8960.000
	10 m, with plug	06.8960.001
	20 m, with plug	06.8960.002
	Plug	X-6099

Power pack EN SL RLC

Power pack EN SL RLC

Identical in all technical aspects to the EN SL LC the **EN SL RLC** power pack comes additionally with a signal socket to which a afult message can be connected.

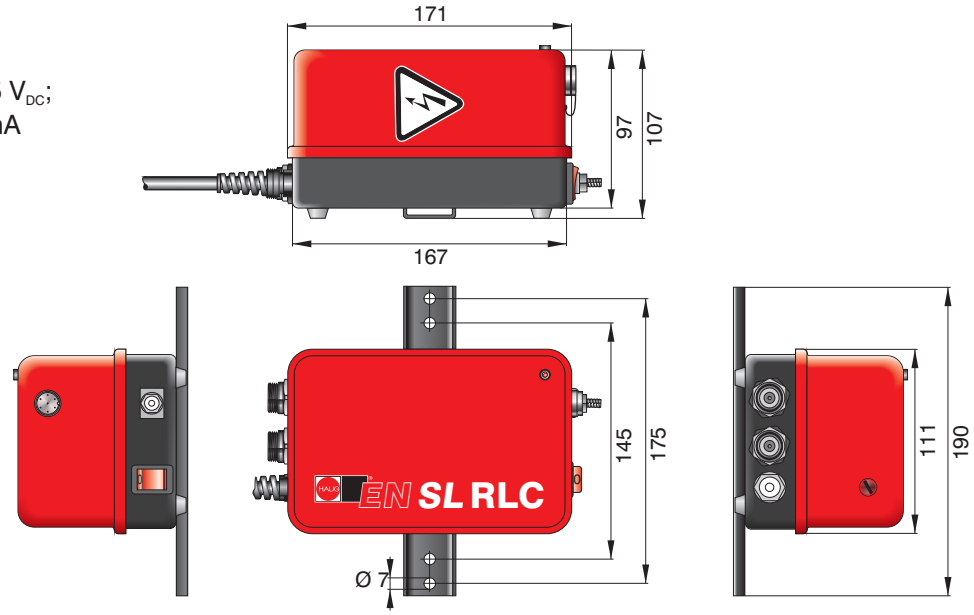
Power pack EN SL SD (spark detect)

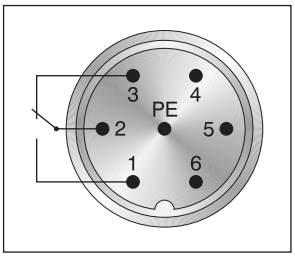
As EN SL RLC, but with additionally monitoring of the following errors: Spark over, short-circuit of high voltage and overtemperature. Via the signalling socket the power pack can be monitored and controlled. Reset is possible on the device as well as via remote control.

Technical data

see EN SL / EN SL LC

Capacity of signallling contacts: 24 V_{AC} / 35 V_{DC}; max. 50 mA





Operation status	Contacts closed
High voltage connected Supply voltage connected	1 and 2
High voltage failure	2 and 3
Supply voltage failure	2 and 3

Types	Supply voltage	Connectable length (bars + cables)	Function monit. short circuit protection unit	Output short circuit current	Order-No.
EN SL RLC	230 V_{AC}	max. 10 m	yes	5 mA	01.7835.100
EN SL RLC	115 V_{AC}	max. 10 m	yes	5 mA	01.7836.100
EN SL SD	230 V_{AC}	max. 10 m	yes, with extended function monitoring for spark overs		01.7843.000
EN SL SD	115 V_{AC}	max. 10 m			01.7844.000

Accessories:	Signalling cable K6, shielded 5 m, with plug 10 m, with plug 20 m, with plug Plug	 06.8976.000 06.8976.001 06.8976.002 X-7807

Power pack EN 8 / EN 8 LC / EN 8 SLC

Power pack EN 8 LC

The **EN 8 LC** power pack comes with an in the secondary area integrated monitoring which indicates that the partial discharge inception voltage (= start of effect of ionizing units) is too low by making the monitoring LED flash. The compact printed circuit board technology ensures reliability and ease of maintenance. The device has four gas-tight high voltage terminals.

Power pack EN 8

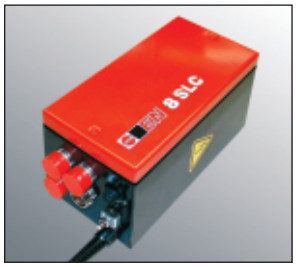
Identical in all technical aspects to the EN 8 LC, the **EN 8** comes without the integrated operation-control system.

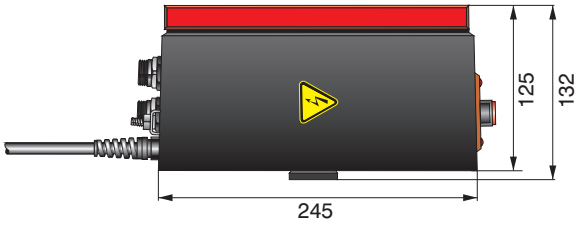
Power pack EN 8 SLC

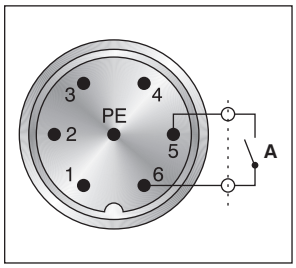
As EN SL LC, but additionally clockable via an externally potential free contact.

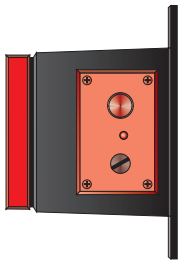
Techical data

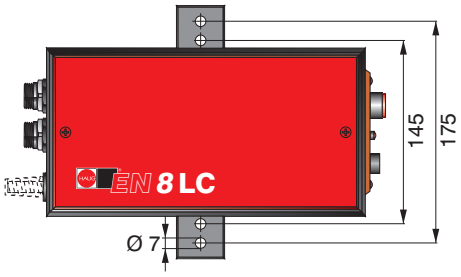
Type of protection:	IP 54
Protection class:	I
Rated frequency:	50 – 60 Hz
Power consumption:	max. 80 VA
Rated output voltage:	approx. 7 – 8 kV_{AC}
Output short-circuit current:	$I_k \leq 5$ mA
HV-terminals:	4
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	5 kg
Mains cable:	2.6 m; fixed to the device

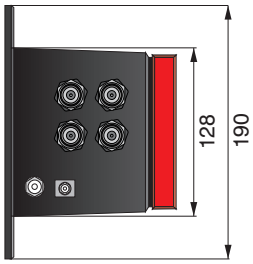












Types	Supply voltage	Connectable length (bars + cables)	Clockable	Order-No.
EN 8	230 V_{AC}	max. 18 m	–	01.7757.000
EN 8	115 V_{AC}	max. 18 m	–	01.7756.000
EN 8 LC	230 V_{AC}	max. 18 m	–	01.7757.100
EN 8 LC	115 V_{AC}	max. 18 m	–	01.7756.100
EN 8 SLC	230 V_{AC}	max. 18 m	yes	01.7854.000
EN 8 SLC	115 V_{AC}	max. 18 m	yes	01.7855.000

Accessories: for EN 8 SLC only	Signalling cable K1, shielded	
	5 m, with round plug (mounted)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with round plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

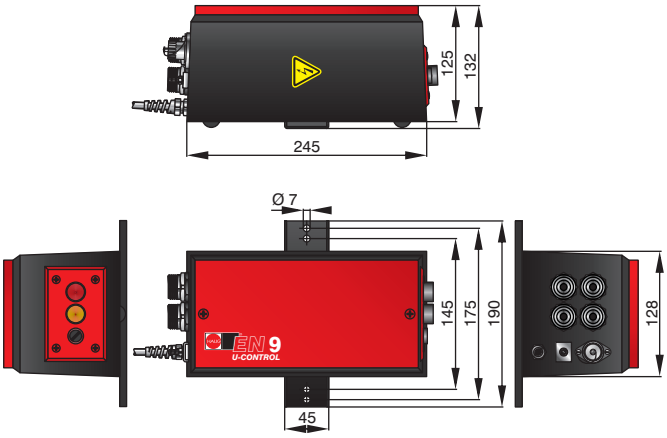
Power Pack EN 9 U-control

The power pack **EN 9 U-control** is used exclusively for the power supply of needle ionizers and discharging spikes. Needle ionizers and discharging spikes are used for electrostatic discharge of the interior space of filling vessel. This discharge supports a subsequent cleaning by blowing out with compressed air.

The **EN 9 U-control** supplies a monitoring for the high voltage output. Thus, a continuous process monitoring is possible - for example, in the pharmaceutical industry.

The power pack **EN 9 U-control** is clockable. Using the monitor voltage allows the logging of the high voltage output. The integrated overload monitoring protects the device in the case of failure by switching off the high voltage output.

The **EN 9 U-control** is used in the packaging and filling areas of Pharmaceutical and Medical Technology as well as in the Food and Cosmetic Industries.



Technical data

Type of protection:	IP 54
Protection class:	I
Rated frequency:	50 – 60 Hz
Power consumption:	max. 80 VA
Rated output voltage:	approx. 4 – 6 kV_{AC}
Output short-circuit current:	$I_k \leq 5$ mA
HV-terminals:	4
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	5 kg
Mains cable:	2.6 m; fixed to the device

Types	Supply voltage	Connectable length (bars and cabels)	Order-No.
EN 9 U-control	115 V_{AC}	min. 2 m up to max 15 m	01.7867.000
EN 9 U-control	230 V_{AC}	„	01.7866.000

Accessories:	Signalling cable K1, shielded	
	5 m, with round plug (mounted)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with roung plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

Power Pack EN 9 Sine

The discharging power pack **EN 9 Sine** supplies energy to HAUG ionizing units. A functional monitoring facility reports impermissible operating states in the ionizing system, such as short circuit and spark formation or thermal overload.

The **EN 9 Sine** can be pulsed and supplies a monitoring signal of the output high voltage.

The function monitoring facility of the **EN 9 Sine** permanently monitors the output high voltage in the components of the ionization system – from the discharging power pack via the high voltage lines through to the connected ionizing units.

In the case of thermal overload of the discharging power pack, the high voltage output is switched off. Thus protects the product, the ionizing system and machine components from consequential damage.

The discharging power pack **EN 9 Sine** has been manufactured to conform to protection type IP 54.

Properties

- 4 HV outputs for up to 18 m connected length
- Permanent function monitoring
- Signalling of impermissible operating conditions
- Integration in machine control unit or control desk
- Pulsing of output high voltage
- Monitoring signal of output high voltage

Technical data

Type of protection:	IP 54
Protection class:	I
Rated frequency:	50 – 60 Hz
Power consumption:	max. 80 VA
Rated output voltage:	approx. 7 – 8 kV_{AC}
Output short-circuit current:	$I_k \leq 5$ mA
Capacity of signalling contacts:	24 V_{AC} / 35 V_{DC}, max. 50 mA
HV-terminals:	4
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	5 kg
Mains cable:	2.6 m; fixed to the device

Types	Supply voltage	Connectable length (bars and cabels)	Order-No.
EN 9 Sine	115 V_{AC}	max. 18 m	01.7872.000
EN 9 Sine	230 V_{AC}	max. 18 m	01.7873.000

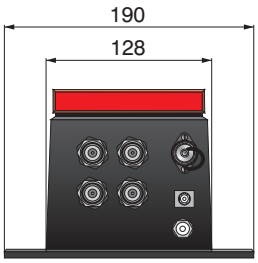
Accessories:	Signalling cable K1, shielded	
	5 m, with round plug (mounted)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with roung plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

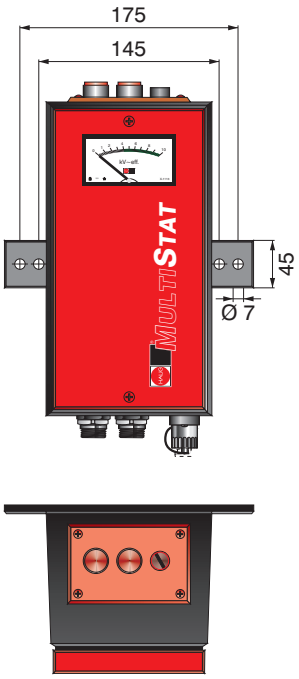
Power pack Multistat

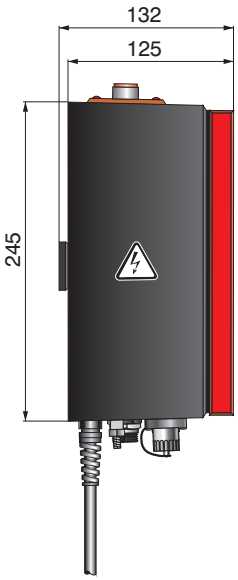
The power pack **Multistat** has a self-balancing high tension; no adjustments or settings on the **Multistat** are required. The indication of the output high tension is shown by means of an analogue indicating instrument.

In case of insufficient output voltage an optical signal (light-emitting diode - LED) is shown and a floating change-over contact is activated. The floating change-over contact allow both a status check and an error check to be performed.

The Multistat included four high voltage terminals.

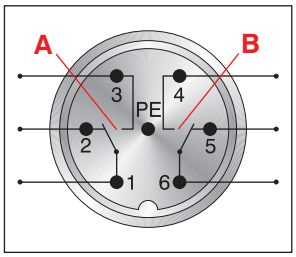






Technical data

Type of protection:	IP 54
Protection class:	I
Rated frequency:	50 – 60 Hz
Power consumption:	max. 80 VA
Rated output voltage:	approx. 7 – 8 kV_{AC}
Output short-circuit current:	$I_k \leq 5$ mA
Capacity of signalling contacts:	24 V_{AC} / 35 V_{DC}, max. 50 mA
HV-terminals:	4
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	5 kg
Mains cable:	2.6 m; fixed to the device



A Relay contact
Mains power failure

B Relay contact
High tension failure

Types	Supply voltage	Connectable length (bars + cables)	CUL approved (UL and CSA conformal	Order-No.
Multistat	230 V_{AC}	max. 18 m	–	01.7760.000
Multistat	115 V_{AC}	max. 18 m	–	01.7759.000
Multistat	230 V_{AC}	max. 18 m	test no.:	01.7760.040
Multistat	115 V_{AC}	max. 18 m	E 189 151	01.7759.040

Accessories:	Signalling cable K1, shielded	
	5 m, with round plug (mounted)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with roung plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

Power pack Multistat S

The discharge power pack **Multistat S** is based on the successful Multistat and additionaly offers a function monitoring for the whole ionizing system. It permanently monitors the high voltage output in the components of the ionizing system - from the power supply via the high voltage cables up to the connected ionizing units.

In case of short circuit or sparks in the ionizing system, for example by defective insulation, the high voltage output is switched off.

Faulty operating conditions are signaled without delay - the ionizing process is under your controll permanently.

Properties

- Permanent monitoring function
- Indication of faulty operating conditions
- Integration into machine control unit or a control console
- 4 HV-outputs provide 18 m connection length

Technical data

Type of protection:	IP 54
Protection class:	I
Nominal frequency:	50 – 60 Hz
Power consumption:	max. 80 VA
Rated output voltage:	approx. 7 – 8 kV_{AC}
HV output current:	$I_A \leq 5$ mA
Capacity of signalling contacts:	24 V_{AC} / 35 V_{DC}, max. 50 mA
HV-terminals:	4
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	approx. 5kg
Mains cable:	2.6 m; fixed to the device

Types	Supply voltage	Connectable length (bars + cables)	CUL approved (UL and CSA conformal	Order-No.
Multistat S	115 V_{AC}	max. 18 m	–	01.7870.000
Multistat S	230 V_{AC}	max. 18 m	–	01.7871.000
Multistat S	115 V_{AC}	max. 18 m	Prüf.-Nr.	01.7920.000
Multistat S	230 V_{AC}	max. 18 m	E 189 151	01.7921.000

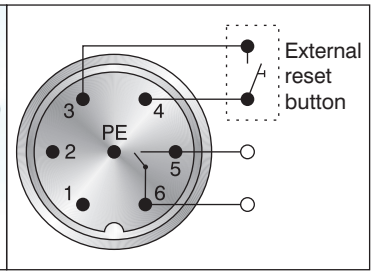
Accessories:	Signalling cable K1, shielded	
	5 m, with round plug (mounted)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with round plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

Power pack Multistat Plus

The high-voltage power pack **Multistat Plus** with its long permissible connected length and extended monitoring facilities os a high-performance unit. The **Multistat Plus** is particularly suited to systems with multiple ionizing bars.

The extended functions of the **Multistat Plus** allow improved monitoring of the ionizing system set-up withthis unit. The unit has six individually monitored high-voltage terminals. Any overload is indicated by means of a warning lamp and a signal at the signalling socket.

An Overload lamp indicates an overload at the high-voltage terminals. In the event of failure, the unit will switch off – restart using Reset. The display indicates the high-voltage or currents at the six high-voltage terminals. The currents are output one after another in a fixed sequence. This allows good monitoring of the ionizing units connected to the HV-terminals.



Contact assignement signalling socket

Pin 1: Signal output overload. In the event of oerload, a signal (approx. 12 V) is output.

Pin 2: Signal output, voltage values for current monitoring of HV-terminals.

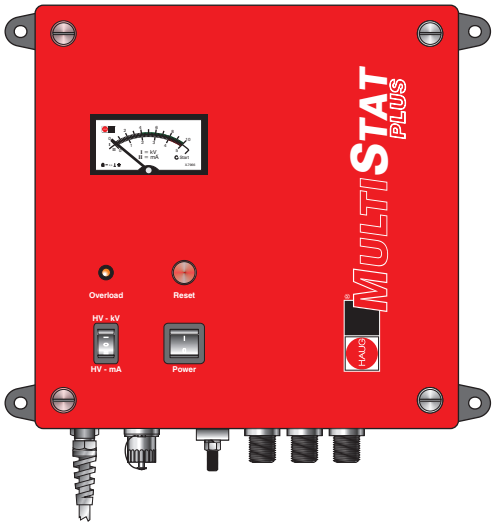
Pin 3: Input reset signal. After the unit has switched off ollowing an overload, it can be restarted by means of this input.

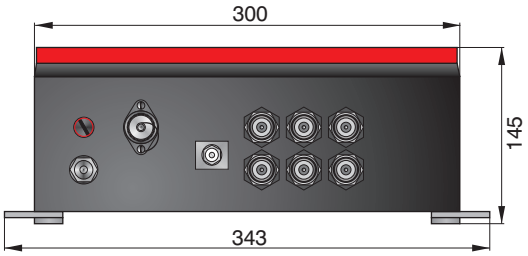
Pin 4: Signal ground GND

Pin 5: Floating contact. Contact closed when high voltage is correct.

Pin 6: Floating contact. Contact closed when high voltage is correct.

Pin PE: Ground





Technical data

Type of protection:	IP 54
Protection class:	I
Nominal frequency:	50 – 60 Hz
Power consumption:	max. 200 VA
Rated output voltage:	approx. 6 – 8 kV_{AC}
HV output current: per HV-terminal	$I_A \leq 4$ mA (permissible operating range)
Capacity of signalling contacts:	24 V_{AC} / 35 V_{DC}, max. 50 mA
HV-terminals:	6
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	approx. 11 kg
Mains cable:	2.6 m; fixed to the device

Types	Supply voltage	Connectable length (bars and cables)	Order-No.
Multistat Plus	230 V_{AC}	max. 6 × 10 m	01.7862.000
Multistat Plus	115 V_{AC}	max. 6 × 10 m	01.7863.000

Accessories:	Signalling cable K1, shielded 5 m, with round plug (mounted) 10 m, with round plug (mounted) 20 m, with round plug (mounted)	 06.8941.000 06.8941.001 06.8941.002
	Round plug Angle plug	X-0616 X-5718

Power pack EN 70 / EN 70 LC

Power pack EN 70 / EN 70 RLC

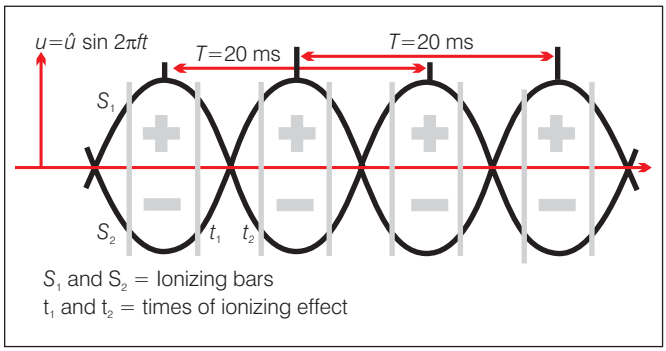
The power pack **EN 70 LC** / **EN 70 RLC** is used in fast running machines in combination with tandem ionizing bars. It is equipped with two transformers which operate by 180° out of phase and four high-voltage terminals each.

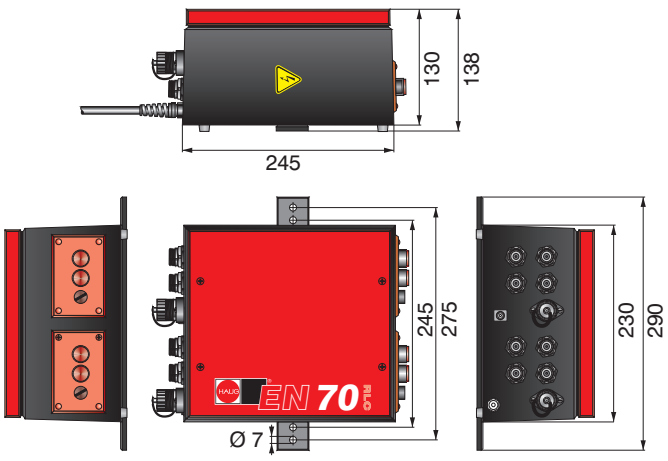
The power pack **EN 70 RLC** has two additionally relay contacts for fault signals.

Power pack EN 70

Identical to power pack EN 70 LC, but without integrated watchdog function.

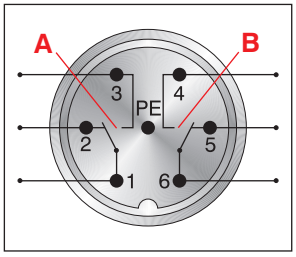
We recommend the utilisation of tandem ionizing bars (round version): EI RD / EI VD and EI HRD.





Technical data

Type of protection:	IP 54
Rated frequency:	50 – 60 Hz
Power consumption:	max. 160 VA
Rated output voltage:	approx. 7 – 8 kV_{AC}
Output short-circuit current:	$I_k \leq 5$ mA
Capacity of signalling contacts (RLC only):	max. 24 V_{AC} / 35 V_{DC} max. 50 mA
HV-terminals:	2 x 4
Operating temperature:	+5 °C bis +45 °C
Storage/transport temperature:	-15 °C bis +60 °C
Weight:	8.5 kg
Mains cable:	2.6 m; fixed to the device



A Relay contact
Mains power failure

B Relay contact
High voltage failure

Types	Supply voltage	Connectable length (bars + cables)	Fault signal relay contacts	Order-No.
EN 70	230 V_{AC}	max. 2 × 18 m	–	01.7701.000
EN 70	115 V_{AC}	max. 2 × 18 m	–	01.7700.000
EN 70 LC	230 V_{AC}	max. 2 × 18 m	yes	01.7701.100
EN 70 LC	115 V_{AC}	max. 2 × 18 m	yes	01.7700.100
EN 70 RLC	230 V_{AC}	max. 2 × 18 m	yes, with	01.7701.400
EN 70 RLC	115 V_{AC}	max. 2 × 18 m	signalling contact	01.7700.400

Accessories: EN 70 RLC	Signalling cable K1, shielded	
	5 m, with round plug (mounted)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with round plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

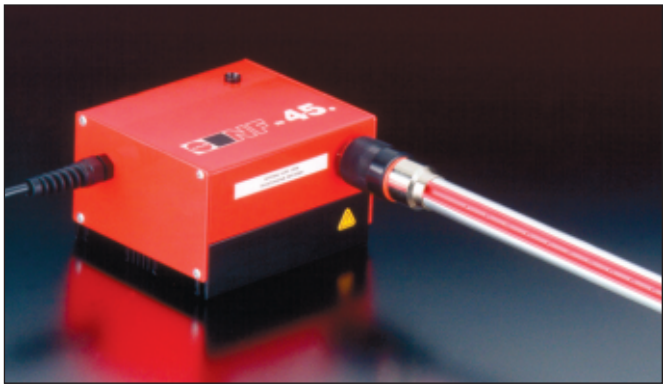
Power pack NF 45 / NF 45 RLC

Power pack NF 45

This power pack is only suited for utilization with ionizing bar **NFA** (see ionizing bars)!

The **NF 45** was developed specifically for use on fast running machines. The **NF 45** automatically adjusts the discharging frequency (400 – 800 Hz) to the connected bar length. The higher frequency of the power pack **NF 45** gensures a high decoupled current and therefore fast, even discharge of the material. The power pack is supplied with a low voltage of $24V_{AC}$ / 30_{DC}. A series transformer with connection facility for up to five power packs is available as accessory for all customary mains voltages (230 V_{AC} / 115 V_{AC}).

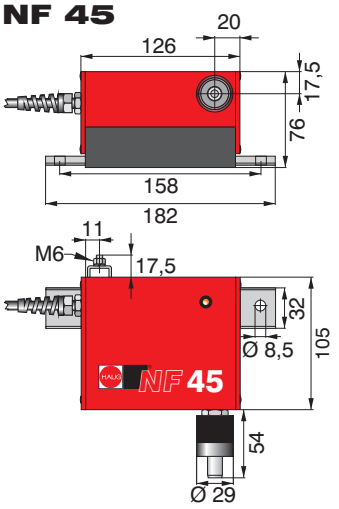
Due to the compact aluminium housing the power pack **NF 45** is suitable even where space is at a premium. By means of the included hold plate it can be mounted easily on movable machine parts, e.g. on swivel or robot arms.



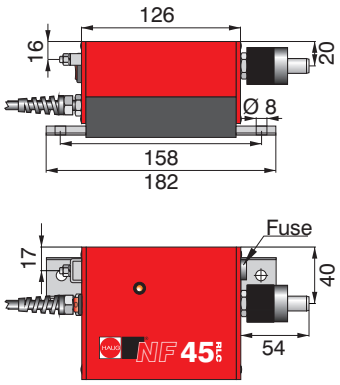
Power pack NF 45 RLC

The functions of power pack **NF 45 RLC** are fidentical of those of power pack **NF45**, but the **NF 45 RLC** is characterized by a different arrangement of external ports. In addition to the signalling socket, an error message can be output. Following an overload (switch-off of hgh voltage), the **NF 45 RLC** automatically performs an adjustment. (green = bar has been adjusted to maximum power / orange = bar is adjusting itself to optimum power).

NF 45



NF 45 RLC



Technical data

Type of protection:	IP 54
Protection class:	I
Rated frequency:	50 – 60 Hz
Power consumption:	approx. 20 VA
Output voltage:	approx. 5.5 kV at 400 – 800 Hz
Output short-circuit current:	I_k < 1.5 mA
HV-terminals:	1
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	1.5 kg

Types	Supply voltage	Connectable length (bars + cables)	Mains cable	Order-No.
NF 45	24 V_{AC} / 30 V_{DC} ± 10%	0.5 – 2.5 m	10 m	01.9700.001
NF 45 RLC	24 V_{AC} / 30 V_{DC} ± 10%	0 – 2.5 m (bar max. 2 m)	2.6 m	01.9701.000

Accessories:	Ionizing bar NFA	03.8042.000
	Series transformer VG NF (115 V)	12.0011.000
	Series transformer VG NF (230 V)	12.0010.000
	Connecting cable (axial)	02.8563.035
	Bar holder "Klick-Zack"	10.0004.000
NF 45 RLC	Signalling cable K1, shielded	
	5 m, with round plug (mountedt)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with round plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

Power pack EN Ion Fan

The discarge power pack **EN Ion Fan** is the energy source for the ionizing bars and the fans of the Ion Fan modules.

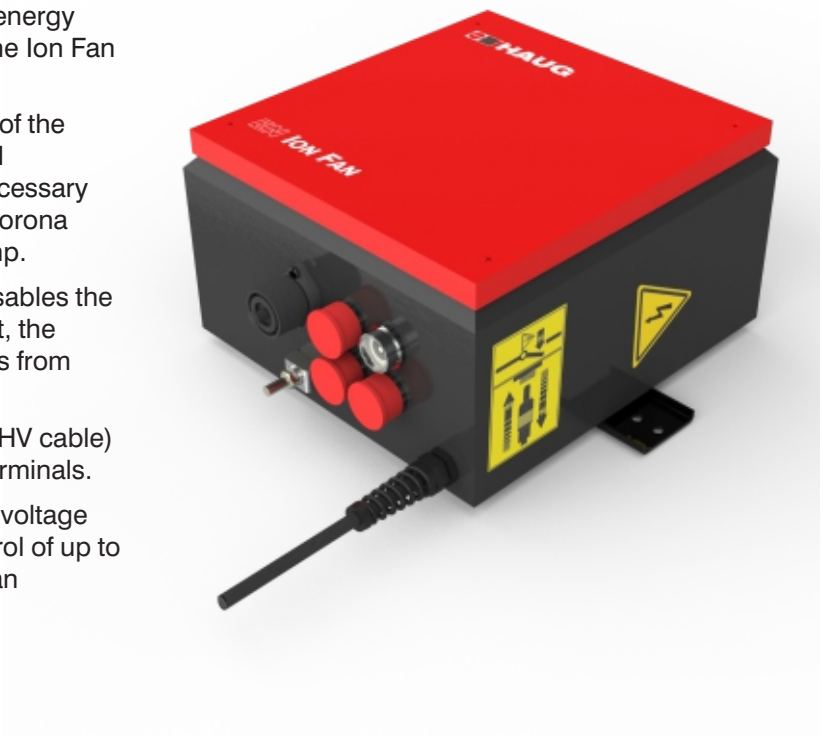
A surveillance function allows the monitoring of the ionizing system without additional testing and measuring instruments. A value below the necessary amount of 4.2 kV for the propper operation (corona inception voltage) is indicated by a signal lamp.

A thermal overload of the power pack also disables the high voltage output - this protects the product, the ionizing system and the machine components from consequential damages.

Ionizing bars with a total length of 18 m (incl. HV cable) can be connected via the four high-voltage terminals.

The adjustable output voltage allows the speed control of up to eight fans in the Ion Fan modules.

Fig. 2: Control elements



The discharging power pack **EN Ion Fan** has been manufactured to conform to protection type IP 54.

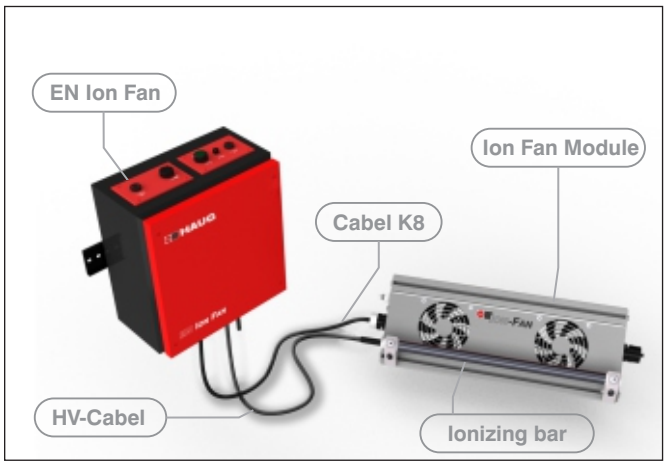


Fig. 2: Application example

Technical data

Type of protection:	IP 54
Protection class:	I
Supply voltage:	230 V_{AC} (50 - 60 Hz)
Power consumption:	90 VA
Output voltage:	7 — 8 kV_{AC}
Output short-circuit current:	I_k < 5 mA
HV-terminals:	4
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Weight:	11 kg
Mains cable:	2.6 m; fixed to the device

Types	Supply voltage	Connectable length (bars + cables)	Order-No.
EN Ion Fan	230 V_{AC}	max. 18 m	01.7802.000

Accessories:	Signalling cable K8, shielded 5 m, with round plug (mountedt) 10 m, with round plug (mounted) 20 m, with round plug (mounted)	 06.8978.000 06.8978.001 06.8978.002

Ionizing bar EI SL

The reasonable priced ionizing bar **EI SL** is suitable for utilization with power packs **EN SL** / **EN SL LC** and **EN SL RLC**.

The ionizing bar **EI SL** is approprite for machine speeds ≤ 100 m/min.

The ionizing bar is available in standard bar lengths only including 2 m high-voltage cable. Bar and cable are not detachable.

Technical data

Diameter: 20 mm

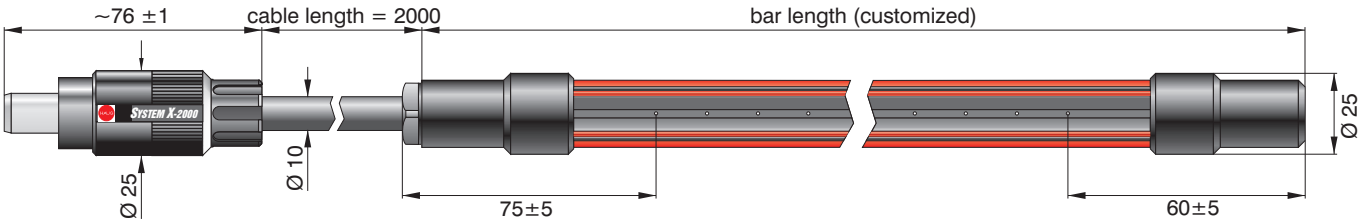
Length: available from 150 to 2.500 mm (total length).
Standard bar lengths incl. 2 m high-voltage cable available ex stock

Operating temperature: +5 °C to +45 °C

Storage/transport temperature: -15 °C to +60 °C

Optimum effective distance: 20 – 30 mm

Smallest bending radius (cable): R 50



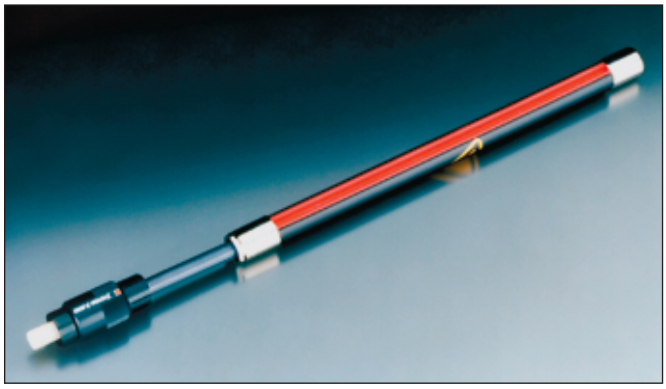
Types	Length	Effective length	Order-No.
EN SL	200 mm	bar length -140 mm	03.8025.002
EN SL	300 mm	bar length -140 mm	03.8025.003
EN SL	400 mm	bar length -140 mm	03.8025.004
EN SL	500 mm	bar length -140 mm	03.8025.005
EN SL	600 mm	bar length -140 mm	03.8025.006
EN SL	800 mm	bar length -140 mm	03.8025.008
EN SL	1000 mm	bar length -140 mm	03.8025.010
EN SL	1200 mm	bar length -140 mm	03.8025.012
EN SL	1400 mm	bar length -140 mm	03.8025.014
EN SL	1500 mm	bar length -140 mm	03.8025.015
EN SL	1600 mm	bar length -140 mm	03.8025.016
EN SL	1700 mm	bar length -140 mm	03.8025.017
EN SL	1800 mm	bar length -140 mm	03.8025.018
EN SL	1900 mm	bar length -140 mm	03.8025.019
EN SL	2000 mm	bar length -140 mm	03.8025.020

Accessories:	Passive Ionizer CI SL	12.0002.000
	Passiv Ionizer CI SL with 100 mΩ / 2 W	12.0002.007
	Additional blow strip "Jet Streamer" JS SL	11.0000.000
	Bar holder	see access line

Ionizing bar EI RN

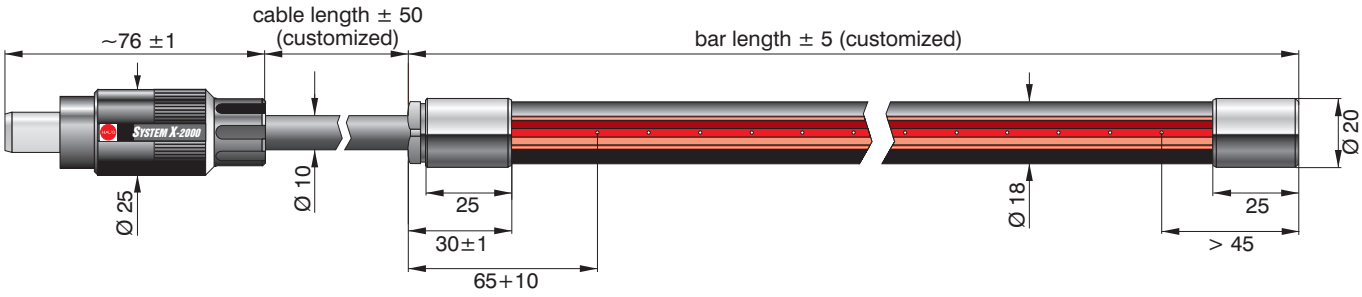
The standard ionizing bar **EI RN** isa powerful and rugged piece of equipment. The bar is suitable for machine speeds ≤ 100 m/min.

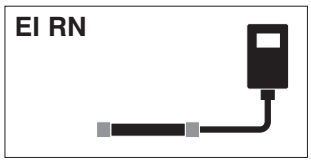
- **EI RNE**: as EI RN, but with HV-connection on end of bar for series connection of ionizing units.
- **EI RN OF**: as EI RN, additionally optical function signal on end of bar for function monitoring from a distance.
- **EI RA**: without HV-cable, suitable for connection of a highly-flexible detachable HV-connection cable (VK-Norm, VK-ATL a.o.).
- **EI RAE**: as EI RA, but with HV-connection on end of bar for series connection of ionizing units.
- **EI RA OF**: as EI RA, additionally optical function signal on end of bar for function monitoring from a distance.

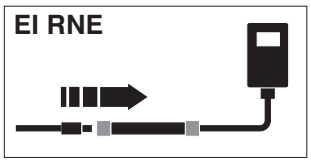


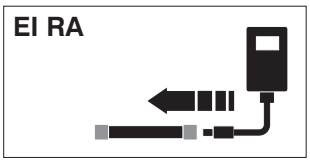
Technical data

Diameter:	18 mm / 20 mm
Length:	available from 150 to 4.500 mm. Other lengths on request.
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Optimum effective distance:	20 – 30 mm
Effective length:	bar length - 100 mm
Smallest bending radius (cable):	R 50









Types	Specification	Order-No.
EI RN	inseparable high-voltage cable; cable permanently attached to bar	03.8005.000
EI RNE	detachable high-voltage cable on end of bar for series connection of ionizing units	03.8007.000
EI RN OF	as EI RN, additionally optical function signal	03.7009.000
EI RA	for connection of a highly-flexible detachable HV connection cable	03.8006.000
EI RAE	as EI RA, for series connection of ionizing units	03.8008.000
EI RA OF	as EI RA, additonally optical function signal	03.7010.000

Accessories:	HV-cable	06.0210.000
	VK-Norm 21, highly-flexible detachable connection cable	03.8006.000
	VK-Norm 22, highly-flexible detachable connection cable	03.8517.000
	VK-Norm 23, highly-flexible detachable connection cable	05.8519.000
	VK-Norm 24, highly-flexible detachable connection cable	05.8518.000

Ionizing bar EI VC

The high-performance ionizing bar **EI VC** reliably eliminates electrostatic charges in clean rooms. It can be used both directly for the discharge of objects or for enriching laminar air flows with positive and negative ions. Existing or generated charges are thus eliminated and the build up of charges is prevented.

As a result of the minimum particle emission, the EI VC is suitable for use in rooms with "ISO Class 4" in accordance with DIN EN ISO 14 644-1. This corresponds to the withdrawn US Federal Standard 209E "Class 10".

The ionizing bar **EI VC** exerts a load on the power pack of 3x the capacity of the standard version. The ionizing bar length must therefore be multiplied by 3 and the added to the length of the high-voltage cable.

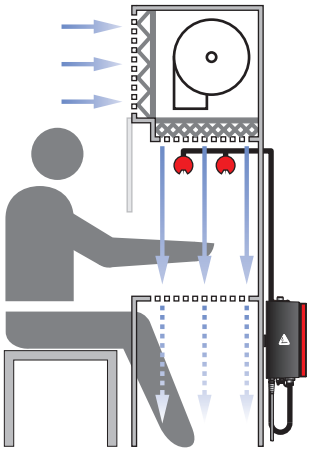
Example of a system

consisting of 2 ionizing bars **EI VC** each 1.5 m long with 2 m high-voltage cable.

Calculation

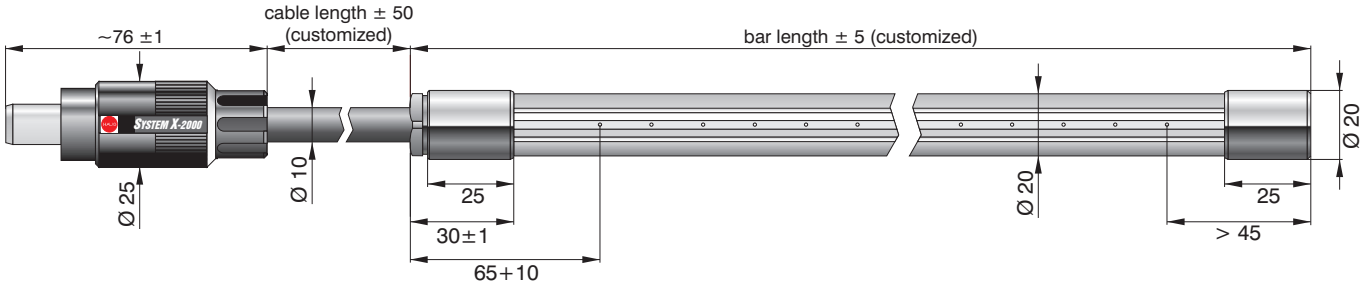
[2 × (3 × 1.5 m)] + (2 × 2 m) =13 m total connected length

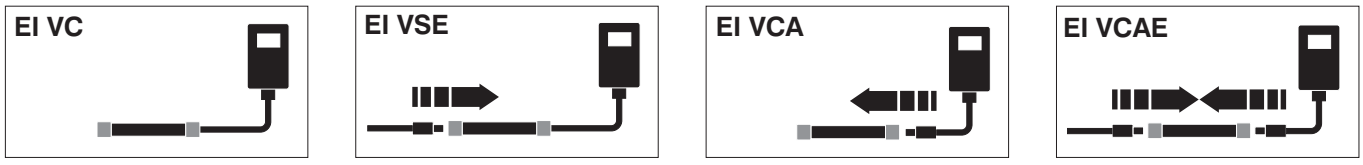
Fraunhofer IPA TESTED® DEVICE



Technical data

Diameter:	20 mm
Length:	150 mm – 2500 mm
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15°C to +60°C
Optimum effective distance:	20 – 30 mm
Effective length:	bar length - 120 mm
Smallest bending radius (cable):	R 50





Types	Specification	Order-No.
EI VC	inseparable high-voltage cable; cable permanently attached to bar	03.8410.000
EI VCA	detachable high-voltage cable	03.8411.000
EI VCE	as EI VC, detachable high-voltage cable on end of bar for series connection of ionizing units	03.8412.000
EI VCAE	as EI VCA, for series connection of ionizing units	03.8413.000

Accessories:	HV-cable (only TPE cable)	06.0210.000
	VK-Norm 21, highly-flexible detachable connection cable	05.8006.000
	VK-Norm 22, highly-flexible detachable connection cable	05.8517.000
	VK-Norm 23, highly-flexible detachable connection cable	05.8519.000
	VK-Norm 24, highly-flexible detachable connection cable	05.8518.000

Ionizing bar EI VS

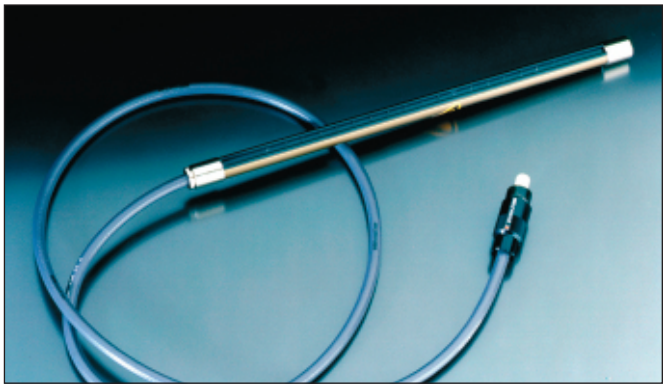
The performance of ionizing bar **EI VS** when compared to the standard version, is considerably enhanced. Therefor it is specially designed for high charges on high-speed machines.

The electrical capacity is three times as great as the standard version, it is necessary to base any power pack load calculations on a bar length three times as long.

Example:

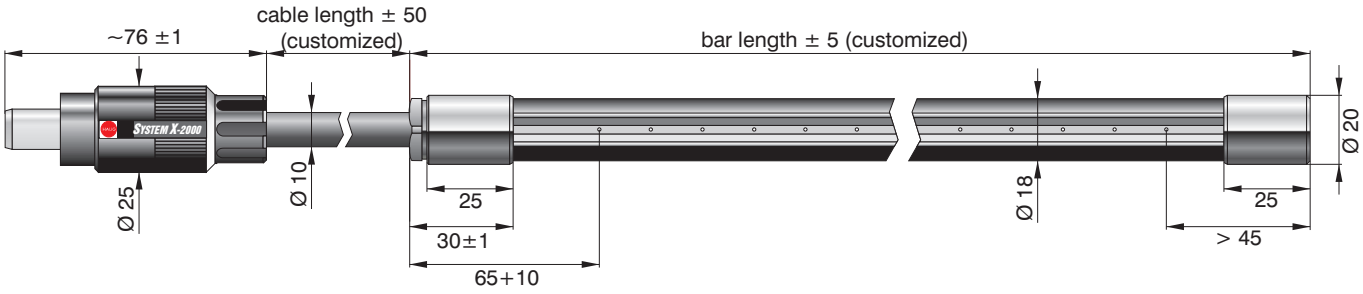
EI VS 50 cm with 200 cm cable

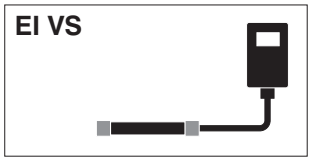
Power pack load: 3 × 50 cm + 200 cm = 350 cm

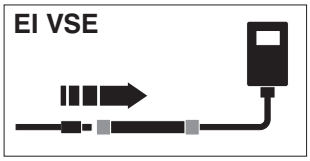


Technical data

Diameter:	18 mm / 20 mm
Length:	150 mm – 2500 mm
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Optimum effective distance:	20 – 30 mm
Effective length:	bar length - 120 mm
Smallest bending radius (cable):	R 50







Types	Specification	Order-No.
EI VS	Special design for high charges on high-speed machines, bar and cable inseparable	03.8020.000
EI VSE	as EI VS, detachable high-voltage cable on end of bar, for series connection of ionizing units	03.8022.000
EI VSA	for connection of a highly-flexible detachable high-voltage cable	03.8021.000
EI VSAE	as EI VSA, for series connection of ionizing units	03.8023.000
EI VS OF	as EI VS, additionally optical function signal	03.7011.000
EI VSA OF	as EI VSA, additionally optical function signal	03.7012.000

Accessories:	HV-cable	06.0210.000
	VK-Norm 21, highly-flexible detachable connection cable	03.8006.000
	VK-Norm 22, highly-flexible detachable connection cable	03.8517.000
	VK-Norm 23, highly-flexible detachable connection cable	05.8519.000
	VK-Norm 24, highly-flexible detachable connection cable	05.8518.000

Ionizing bar EI VS Nut

The ionizing bar **EI VS** includes all the features that characterize HAUG ionizing bars, especially the reliable and removable contact system, the shielded high voltage cable, the absolute contact security and special electrodes made of stainless steel.

In variant **EI VS Nut**, the bar has an integrated T-groove at its top. This enables mounting without additional brackets (see Figure 2 and 3) with minimal installation effort and maximum flexibility in the choice of fixing points.

Technical data

Diameter:	18 mm / 20 mm 18 mm / 20,5 mm / 26,5 mm
Length:	150 mm – 2500 mm
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Optimum effective distance:	20 – 30 mm
Effective length:	bar length - 120 mm
Smallest bending radius (cable):	R 50

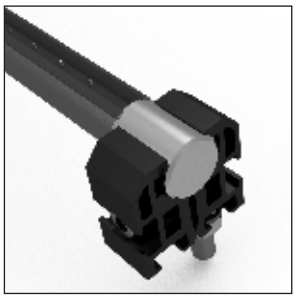


Fig. 2: Mounting EI VS

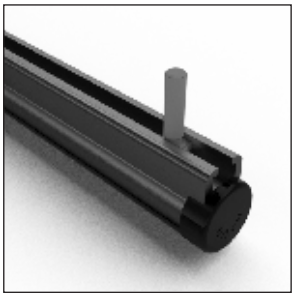


Fig. 3: Mounting EI VS Nut

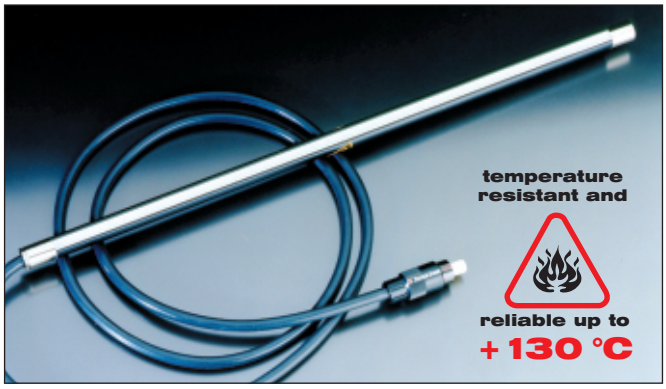
Types	Specification	Order-No.
EI VS Nut	Special design for high charges on high-speed machines, bar and cable inseparable	03.8530.xxx
EI VSE Nut	as EI VS, detachable high-voltage cable on end of bar, for series connection of ionizing units	on request
EI VSA Nut	for connection of a highly-flexible detachable high-voltage cable	on request
EI VSAE Nut	as EI VSA, for series connection of ionizing units	on request

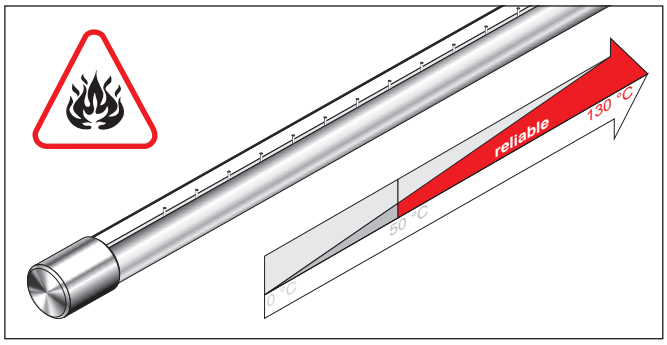
Ionizing bar EI HRN

The ionizing bar **EI HRN** is intended for applications in temperatures up to +130°C. It is a powerful ionizer symmetrically generating positive and negative ions by means of alternating voltage. This process ensures that the area around the pins of the bar is ionized. Its design fulfills any conceivable mechanical engineering requirements. Even under high temperatures and high feed speeds, ionizing systems reliably and effectively eliminate surface charges that interfere with production.

The ionizing bars **EI HRN** / **EI HRA** are suitable for machine speeds of ≤ 100 m/min.

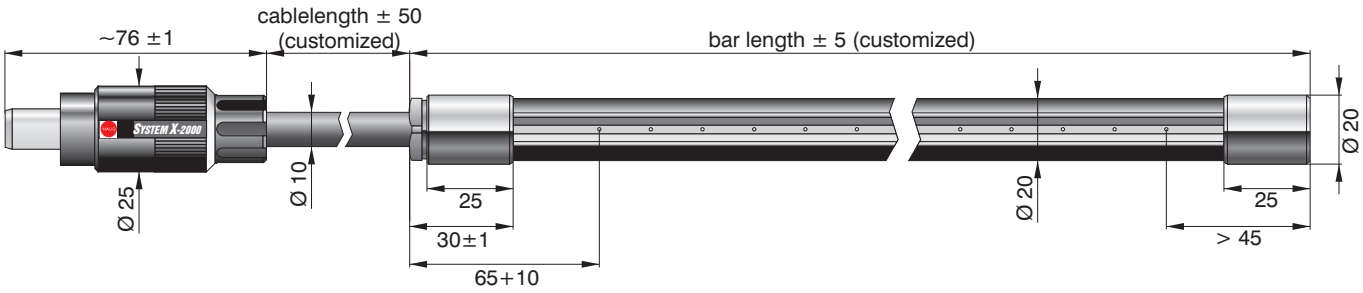
The tandem version **EI HRD** is suitable for machine speeds ≥ 100 m/min.

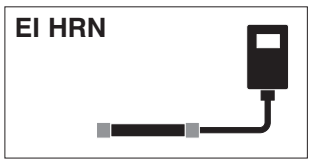




Technical data

Diameter:	20 mm
Operating temperature:	+5 °C to +130 °C
Storage/transport temperature:	-15 °C to +60 °C
Optimum effective distance:	20 – 30 mm
Effective length:	bar length - 100 mm
Smallest bending radius (cable):	R 50





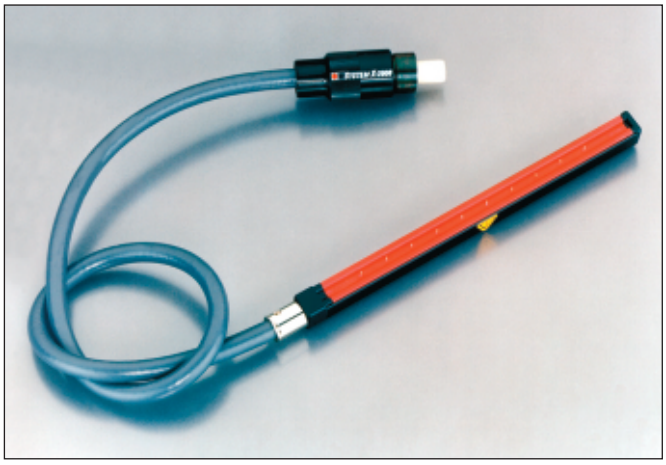
Types	Specification	Order-No.
EI HRN	inseparable high-voltage cable; cable and bar attached permanently	03.7019.000
EI HRA	zum Anschluss eines hochflexiblen, lösbaren Hochspannungskabels	03.8016.000
EI HRD	tandem version (2 bars) inseparable high-voltage cable, cable and bar attached permanently	on request

Accessories:	HV-cable	06.0211.000
	VK-Flex 21, highly-flexible detachable connection cable	03.8006.000
	VK-Flex 22, highly-flexible detachable connection cable	03.8517.000
	VK-Flex 23, highly-flexible detachable connection cable	05.8519.000
	VK-Flex 24, highly-flexible detachable connection cable	05.8518.000

Ionizing bar EI PS

The ionizing bar **EI PS** is a mini high-performance ionizer. Thanks to his tight dimensions it is specially used in areas where space is at a premium. The EI PS is available in two different versions with radial or axial cable outgoing.

Thanks to the integrated T-groove the bar can easily be mounted with the supplied attachment screws wherever its needed.



Technical data

Dimensions: 14 × 16.5 mm

Length: available from 60 mm

Operating temperature: +5 °C to +45 °C

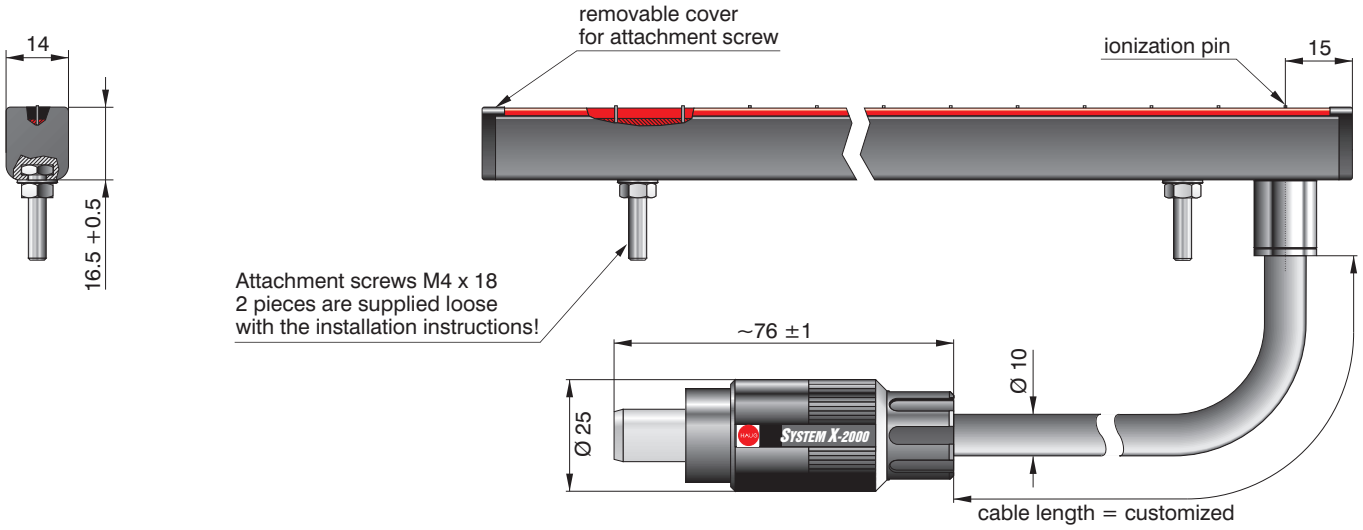
Storage/transport temperature: -15 °C to +60 °C

Optimum effective distance: 20 – 30 mm

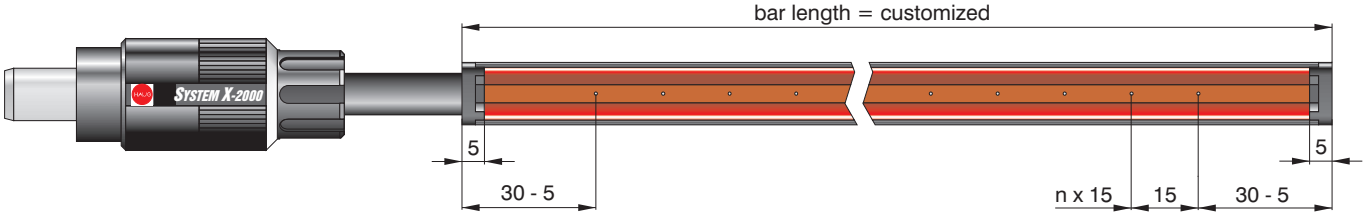
Effective length: bar length - 20 mm

Smallest bending radius (cable): R 50

Radial cable outgoing



Axialer cable outgoing



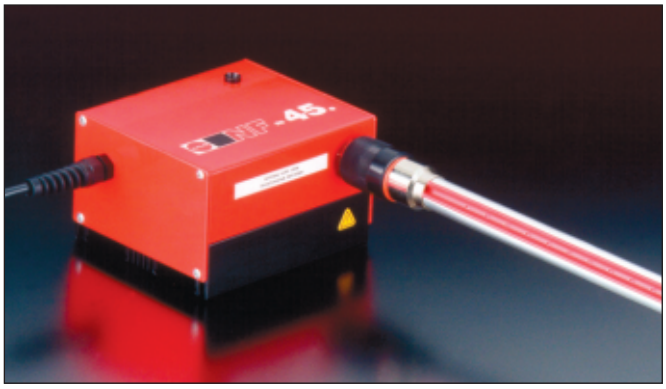
Types	Specification	Order-No.
EI PS	cable outgoing radial	03.8097.000
EI PS	cable outgoing axial, optional	03.8098.000
EI PS	cable outgoing radial, for TPE-cable	03.8601.000

Ionizing bar NFA

The ionizing bar **NFA** is a special version for the use with power packs **NF 45** / **NF 45 RLC** (see power packs)!

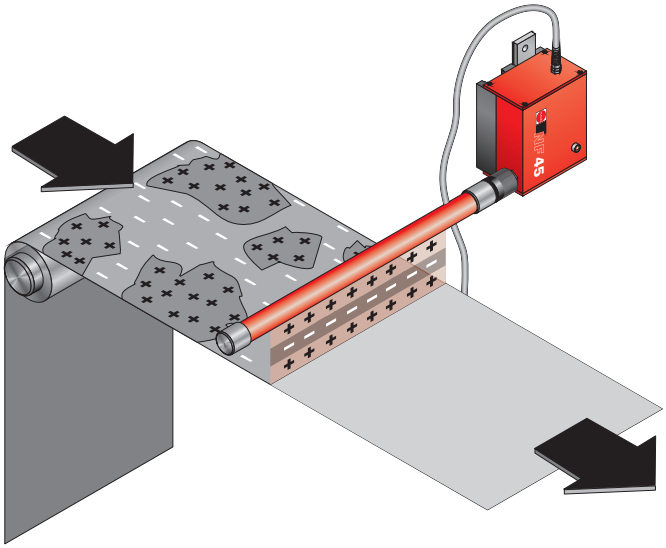
The combination of power packs **NF 45** / **NF 45 RLC** and ionizing bar **NFA** was created especially for the use in high-speed machines. The ionizing bar **NFA** which is adapted tp the **NF 45** / **NF 45 RLC** can be connected directly or using a connection cable. Only ionzing bar **NFA** can be connected to any one **NF 45** / **NF 45 RLC**.

The ionizing bar can be assembled without the need for tools. The operating status of the power pack is indicated by an LED (green = bar has adjusted to the maximum power / orange = bar is adjusting itself to optimum power).



Technical data

Diameter:	20 mm
Connectable length NF 45:	0.5 – 2.5 m (NFA incl. HV-cable)
Connectable length NF 45 RLC:	0 – 2.5 m (NFA incl. HV-cable)
Max. bar length NF 45 RLC:	2 m
Operating temperature:	+5 °C to +130 °C
Storage/transport temperature:	-15 °C to +60 °C
Optimum effective distance:	20 – 30 mm
Effective length:	bar length - 100 mm
Smallest bending radius (cable):	R 50



Type	Specification	Order-No.
NFA	Ionizing bar without high-voltage cable	03.8042.000

Accessories:	Power pack NF 45	03.9700.001
	Power pack NF 45 RLC	01.9701.000
	Connection cable (axial)	02.8563.035
	Series transformer VG NF (115 V)	12.0011.000
	Series transformer VG NF (230 V)	12.0010.000
	Bar holder "Klick-Zack"	10.0004.000
	Signalling cable K1, shielded	
	5 m, with round plug (mounted)	06.8941.000
	10 m, with round plug (mounted)	06.8941.001
	20 m, with round plug (mounted)	06.8941.002
	Round plug	X-0616
	Angle plug	X-5718

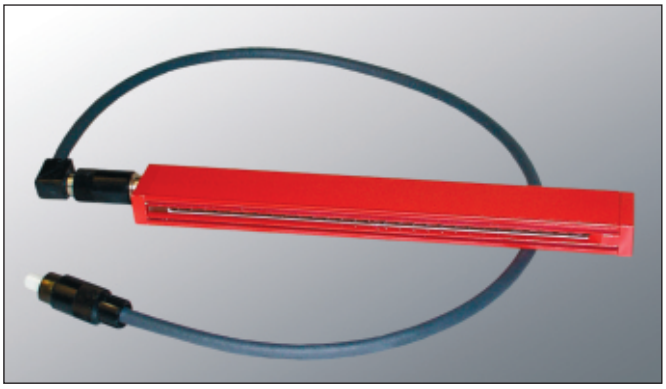
Ionizing bar EI W

The resistance coupled ionizing bar **EI W** is a new development combining the highest output with excellent mechanical stability.

The **EI W** eliminates disturbing electrostatic charges at twice the rate of the previously most powerful ionizing bar. This ensures a high level of effectiveness and reliability even with fast-running machines and high electrostatic charges as well as a mounting with a larger distance to the material to be discharged.

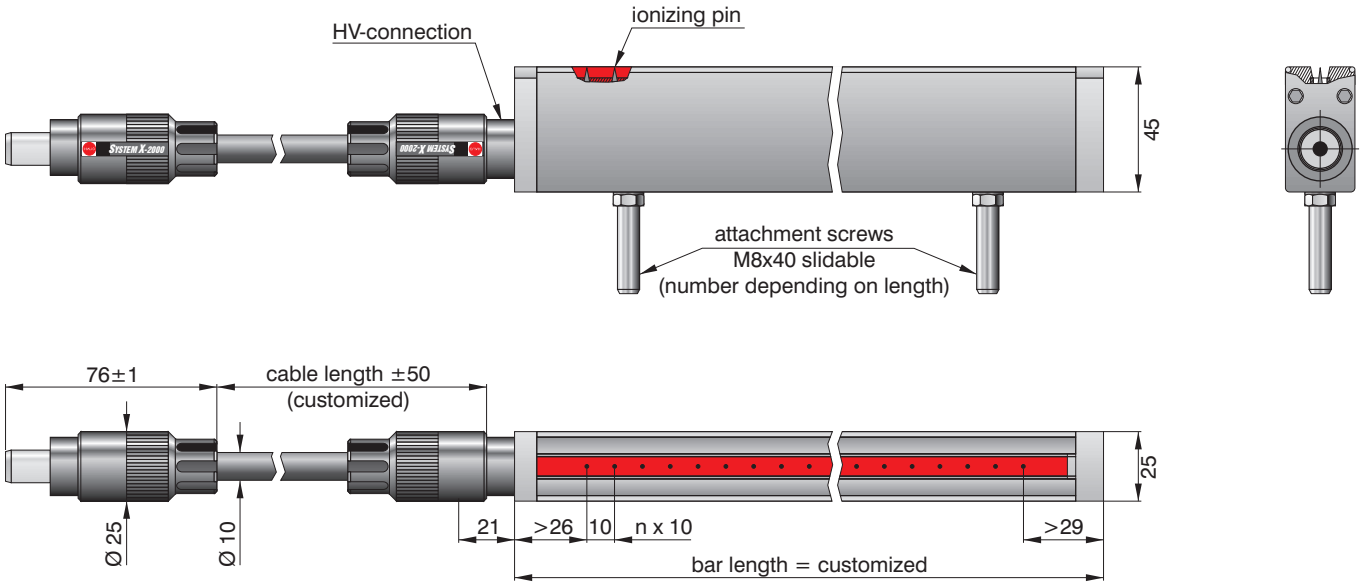
The ionizing bar **EI W** consist of several components of which each is exchangeable by the manufacturer. The high-voltage cable can be extended, shortened or replaced. Also the simple and fast exchange of the ionizing pins is possible.

Stainless steel pins are used as standard, for special applications such as the use of the **EI W** in semi-conductor manufacturing, ionizing pins made of silicon are also available.



Technical data

Dimensions:	25 × 45 mm (W×H)
Length:	80 mm – 2000 mm
Operating temperature:	+5 °C to +45 °C
Storag/transport temperature:	-15 °C to +60 °C
Optimum effective distance:	20 – 30 mm
Effective length:	bar length - 60 mm
Smallest bending radius (cable):	R 50



Types	Specification	Order-No.
EI W	resistance-coupled ionizing bar with axial cable outgoing and stainless steel ionization pins	03.9011.000
EI W	resistance-coupled ionizing bar with axial cable outgoing and silicium ionization pins	03.9013.000

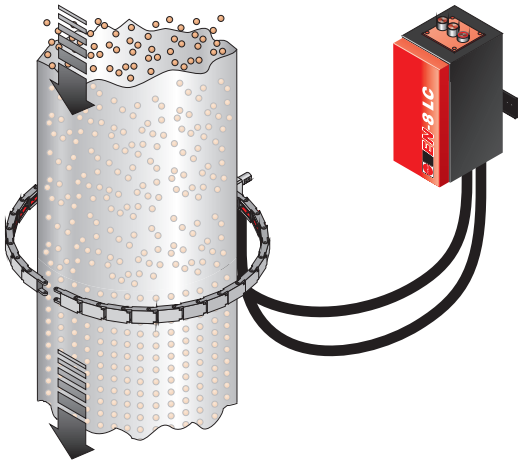
Accessories:	HV-cable	02.8522.000
	Bar holder	X-0423

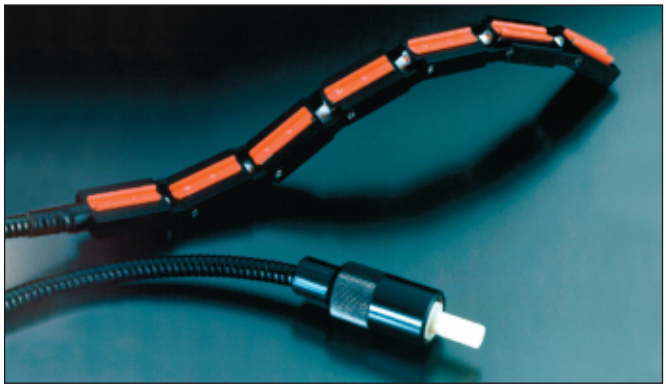
Segmental ionizer EI Form

The segmental ionizer **EI Form** is an ionizing unit which can be adapted to convex and concave shaped surfaces. Even a circular positioning is possible.

This unit is available with up to a maximum of 20 segments with a smallest bending radius of 135 mm.

Its flexible construction offers a wide range of applications.

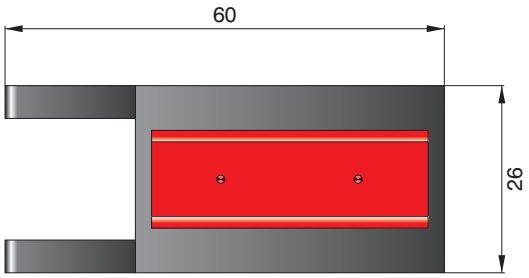


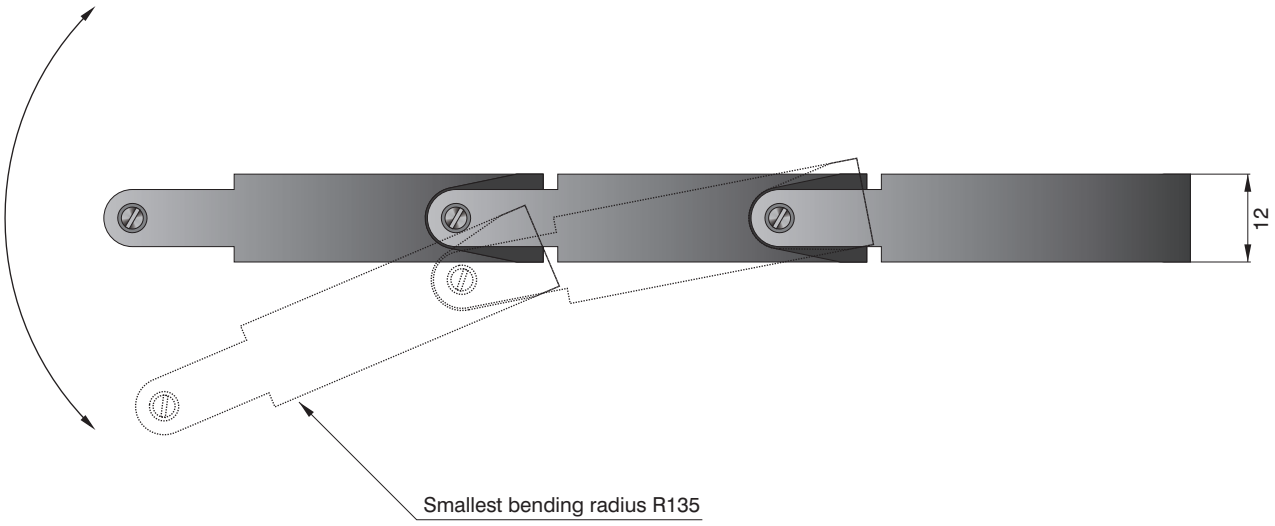


Technical data

Dimension per segment: 12 × 26 × 60 mm (H×W×D)

Bar length:	Number of segments x 48 mm max. 20 segments
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Optimum effectice distance:	20 – 30 mm
Mains cable:	approx. 2.6 m; fixed to the device
Smallest bending radius:	R 135





Type	Specification	Order-No.
EI Form	inseparable high-voltage cable; cable fixed to the ionizer	03.8200.000

Accessories:	HV-cable AK-Flex	06.2002.000

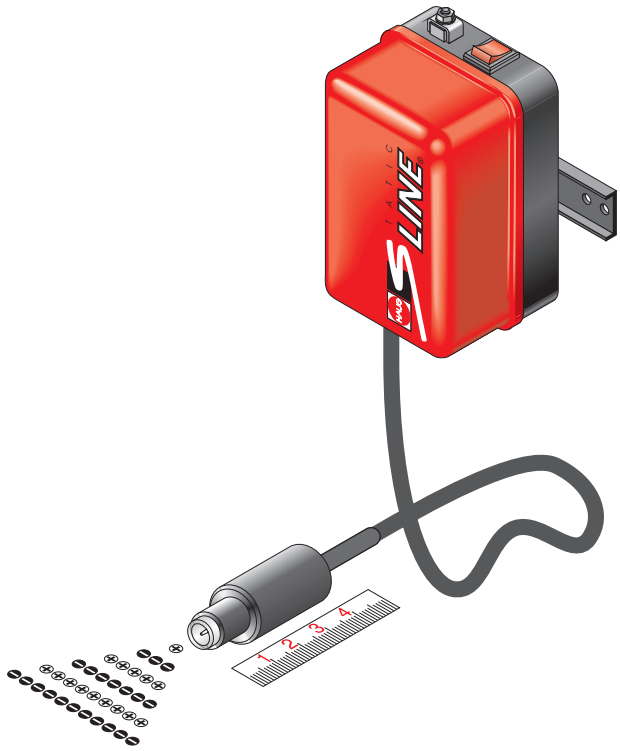
One-Point-Ionizer OPI

The **One-Point-Ionizer OPI** has been developed in order to discharge extremely small parts. It neutralizes electrostatic spot charges by emitting positive and negative ions.

This unit is particularly suitable for installation in areas where space is at a premium. Simply screw-connect the plug of the electrode to the high-voltage transformer, and the ionization system is ready to use without the need for any tools.

The **One-Point-Ionizer** has proven itself over and over again and again in daily use. The unit can also be additionally equipped with compressed air.

Warning: The pin carries high voltage and must not be touched while the unit is switched on.



Technical data

Diameter: 16 mm

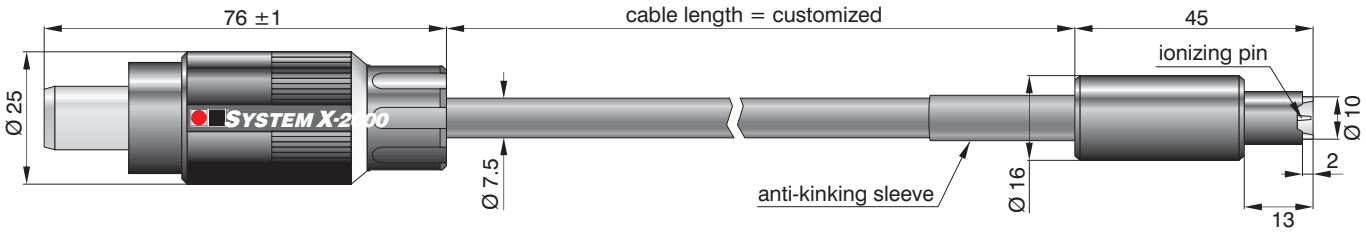
Length: 45 mm

Operating temperature: +5 °C to +50 °C

Storage/transport temperature: -15 °C to +60 °C

Optimum effective distance: 30 mm

Smallest bending radius (cable): R 50



Typen	Specification	Order-No.
OPI	Point electrode, inseparable high-voltage cable (TPE), cable fixed to the bar	03.8510.000

Accessories:	HV-cable TPE VK 21	02.8591.000
	HV-cable TPE VK 22	02.8592.000
	HV-cable TPE VK 23	02.8593.000
	HV-cable TPE VK 24	02.8594.000
	Holder with plate	10.7207.002

Ring electrode EI RE

The radial and central alignment of the electrode as well as a symmetrical choice of ions, together with a large spacious punch-through guarantee maximum efficiency and permormance.

The ring electrodes are available as one-part (one high-voltage cable) and two-part version (two hgh-voltage cables). The ring relectrode **EI RE** can be opened for a short period of time during machine setting up. During production, for instance, this enables quick and uncomplicated changing of the film.

Minimal dimension guarantee a wide field of application with the most diverse types of machines.

The ring electrode **EI RE**, with air support, can also be supplied as ring ionizer (see Air Line - EI RIF).

Technical data

Cross-section: approx. 18 × 20 mm

Operating temperature: + 5 °C to +45 °C

Storage/transport temperature: -15 °C to +60 °C

Smallest bending radius (cable): R 50

Range:

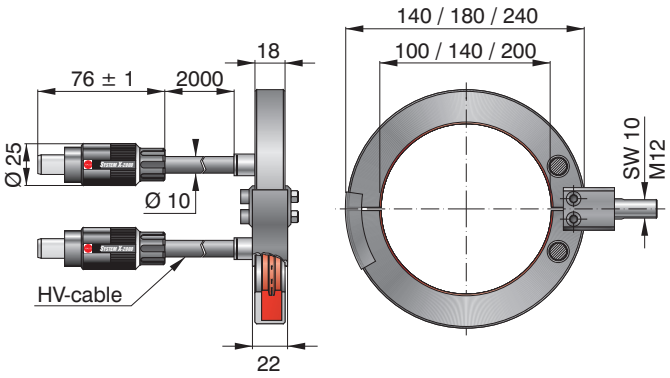
EI RE 014 200	approx. 80 mm – 20 mm
EI RE 018 200	approx. 120 mm – 60 mm
EI RE 024 200	approx. 180 mm – 120 mm

Opening dimension L1:

EI RE 014 200	opened approx. 140 mm
EI RE 018 200	opened approx. 180 mm
EI RE 024 200	opened approx. 240 mm

Special dimensions on request

Two-part version



Types	Specification	Order-No.
EI RE	two-part ring electrode, pins towards centre, 014 Ø 100 mm internal	03.8114.000
EI RE	two-part ring electrode, pins towards centre, 018 Ø 140 mm internal	03.8114.001
EI RE	two-part ring electrode, pins towards centre, 024 Ø 200 mm internal	03.8114.002
EI RE	one-part ring electrode, pins towards centre, 014 Ø 100 mm innen	03.8110.000
EI RE	one-part ring electrode, pins towards centre, 018 Ø 140 mm innen	03.8110.001
EI RE	one-part ring electrode, pins towards centre, 024 Ø 200 mm innen	03.8110.002
EI RE	one-part ring electrode, pins axial, 014 Ø 105 mm internal	03.8101.000
EI RE	one-part ring electrode, pins axial, 018 Ø 145 mm internal	03.8101.001
EI RE	one-part ring electrode, pins axial, 024 Ø 205 mm internal	03.8101.002
EI REF	for delivery pipes, pins towards centre, max. Ø 100 mm internal	on request
EI REF	for delivery pipes, pins towards centre, max. Ø 200 mm internal	on request
EI REF	for delivery pipes, pins towards centre, max. Ø 300 mm internal	on request

Accessories:	HV-cable	06.0210.000
	Flange pair for delivery pipes for EI REF	X-0778
	Flange pair for delivery pipes for EI REF	X-0784
	Flange pair for delivery pipes for EI REF	X-0790
	Diameters customized	

Combi-Ionizer CI SL

Passive ionizers are used to reduce the extremely high field strengths. They are, depends on the load, to be mounted at a distance of 10-30 mm from the surface to be unloaded.

Principle

The discharge of the surface is performed by the flexible tips of the **Combi-Ionizer CI SL**. Passive ionizers must be grounded using the supplied cable.

In order to ensure optimal discharge, it is advisable to use the passive ionizers in conjunction with active ionizing units.

Passive ionizing units are used primarily as a supplement to active ionizers. In this application, the passive ionizers are located upstream of the active ionizers.

For mounting the passive ionizers at HAUG ionizing bars are suitable holders are available.

Techncal data

Diameter:	ca. 16 x 45 mm
Bar length:	on customer demand
Operatin temperature:	+5 °C bis +45 °C
Storage-/transport temperature:	-15 °C bis +60 °C
Optimum effective distance:	10 - 30 mm

Types	Specification	Order-No.
CI SL	Combi-Ionizer, passive additional ionizer for ionizing bars (round version)	12.0002.00

Accessories:	Holder	10.0005.000
	Angle bracket	X-0171
	Standard holding block	10.0007.000
	Combination holder	10.0114.000

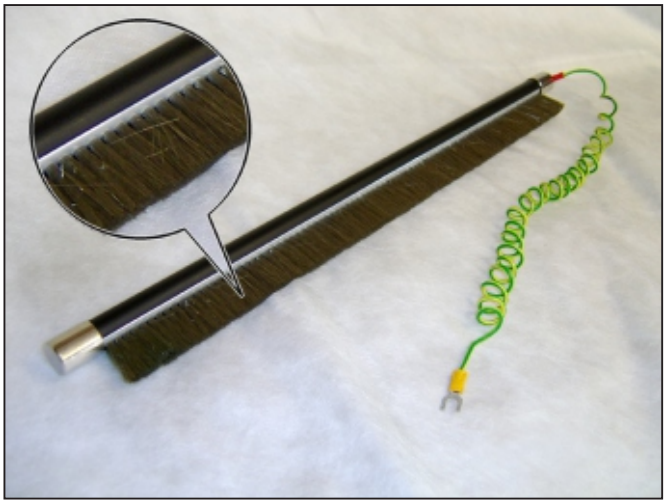
Brush-Ionizer BI

The B**rush-Ionizer BI** reduces static charges with very high field strengths on material webs – preferably case in combination with an active ionization system.

Principle

The partial discharge of a material web is effected (contact free) via the fibre brush of the brush ionizer. The charge equalization of the high field strengths is possible due to the grounding of the brush ionizer.

The brush ionizer is mounted at a distance of a few millimetres from the material web. If the brush ionizer (inadvertently) comes into contact with the material web during operation, the web will not be damaged due to the flexible brush fibres.



Technical data

Diameter:	20 mm
Length:	from 100 mm
Operating temperature:	+5 °C to +45 °C
Storage/transport temperature:	-15 °C to +60 °C
Optimum effective distance:	2 – 3 mm
Effective length:	bar length - 50 mm

Types	Specification	Order-No.
BI	Brush-Ionizer, passive additional ionizer, for ionizing bars (round version)	12.0006.00

Accessories:	"click-zag" special holder	10.0004.000
	Holder, closed	10.0227.000
	Block, half open	10.0301.000
	Clamping holder, 2 parts	10.0268.000
	Angle, large	X-0404