

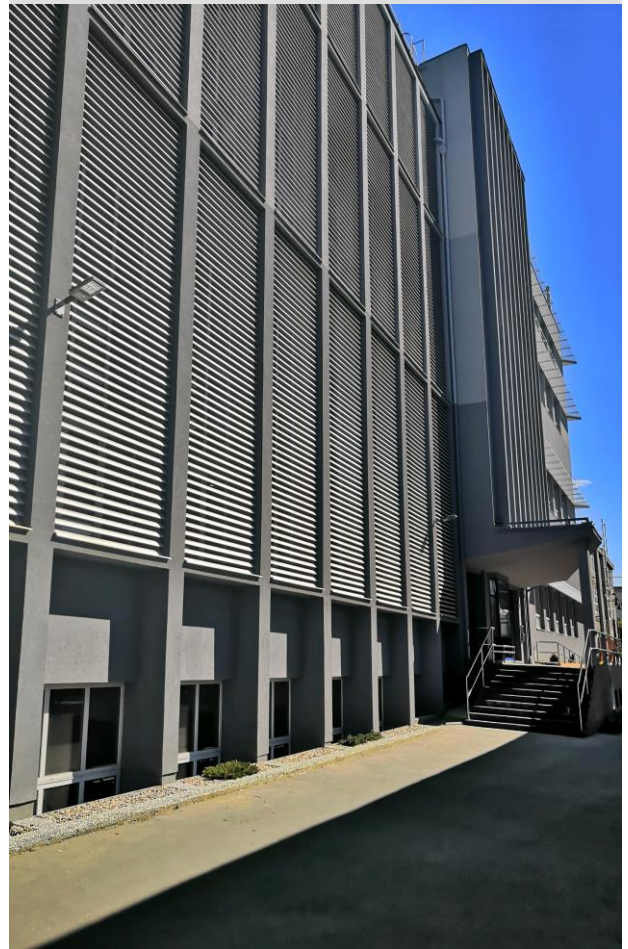


ELEKTROTECHNIKA

**Extra high voltage  
source  
ZEOB line  
for electrostatic  
precipitators**

**ELEKTROTECHNIKA**, a.s. was established in 1999.

ELEKTROTECHNIKA, a.s. is operating on domestic and foreign markets in the segments of electrotechnical equipment, especially semiconductor applications with focus to equipment and services with a high added value rate. This all involves promoting internal Research & Development, design, production, testing, and taking care of the customers requiring particular approach at their needs. Focusing to special and unit production creates a competitive advantage over large and strong multinationals in those areas where the customers search for specific and optimal made-to-measure design enabling minimizing the investment costs and especially the expenses of reconstructions and up-grading the existing equipment. Customer approach involves also enhancing further supplementary services – especially advisory services (for example feasibility studies or energetic audits before starting tenders), further on, bids of financing mainly quick-capital-return projects, as well as providing fast and effective service and inspections. Since its foundation ELEKTROTECHNIKA, a.s. has acquired a range of significant references nearly throughout the entire scope of its operation both at home and on the foreign markets.



## CONTACT

Kolbenova 936/5e  
190 00 Prague 9  
Czech Republic

phone: +420 226 544 200  
fax: +420 226 544 300  
e-mail: [info@elektrotechnika.cz](mailto:info@elektrotechnika.cz)  
e-mail: [marketing@elektrotechnika.cz](mailto:marketing@elektrotechnika.cz)

## The Electrostatic Precipitators

Are the most effective devices for removing solid particles contained in the industrial exhaust gases of power-plant and heating-plant boilers, cement-mill ovens and other metallurgical and chemical plants. For feeling such electrostatic precipitators ELEKTROTECHNIKA, a.s., developer and manufactured the ZEOB line of HV Sources with Microprocessor Controller EMADYN, which present quality progress with comparison former ZEO line.

The ZEOB line of HV sources are designed to deed negative potential o the emitting electrode. The precipotators of this type achieve the highest operational efficiency (at least 98% of solid particles removed), a perfect HV source being the condition for maintaining the stability of this efficiency. The source fulfills autonomous function derived from operation of a section of an electrostatic precipilator and can be used even in a complex control system of elektrostatic separation proces. The source is especially suitable for those types of plants where several electrostatic precipitators are installed in a cascade and therefore i tis necessary to ensure their synchronous function together with the minimum content of solid particles in industrial exhaust gases.

Newest knowledge from the physical theory of the electrostatic precipitators (semi-pulse operation, measurement of current-voltage characteristic, back corona evaluation, integration of output current and voltage, etc.) as well as leading word manufactures opinion have been taken into consideration during the development of the source.

The combined use of the regulator ZEODYN and of visualization software on an industrial PC enables you to create an assembly of standard control boxes of EVERT D series where one of the boxes is equipped with the above PC. As for visualization, this box is called EVERT DM (MASTER) and the other boxes EVERT DS (SLAVE).

You can control power supply units and set parametrs both locally from the PC MASTER box and remotely through the RS485 communication line.



*Components source ZEOB - HV part type VDB with block of HV isolator for cable connect and box control EVERT IV. generation (D) in version „MASTER“ with industry PC (left) and „SLAVE“ (right)*



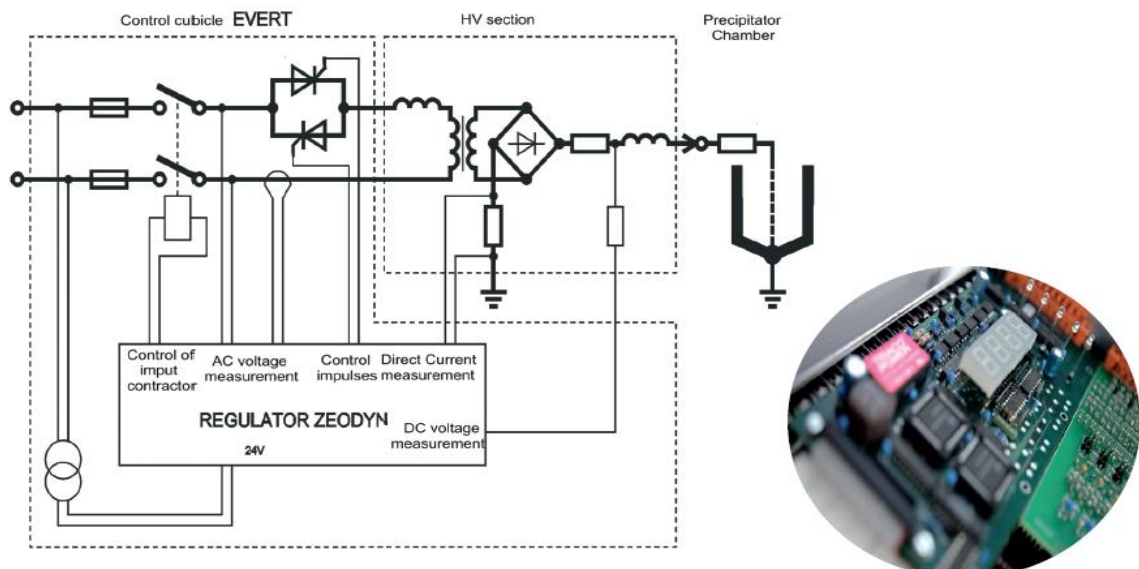
## ZEOB Source Set

The power supply unit of EHV ZEOB series consists of an EVERT D control box that regulates the input voltage from the network for a HV transformer & rectifier placed in the EHV VDB part. The extra high voltage part represents a closed vessel with transformer oil, in which there is a primary choke, a conversion transformer with a one-phase bridge rectifier, auxiliary elements to suppress undesirable oscillations on EHV line and a temperature sensor. There are an isolator of rectified EHV negative potential, a manual short-circuit unit and position switches on the top cover. Input and output terminals and a temperature sensor are placed in the box that is resistant to all climatic influences. All parts of the extra high voltage part are attached to a removable cover. The extra high voltage part is equipped with a travel wheels to handle.

There are power thyristors controlled by the regulator ZEOBYN and auxiliary power supply and control circuits in the box EVERT D of the standard size 640x435x2070mm (w x d x h). There are measurement instruments and control elements or possibly an industrial visualization PC of the „MASTER“ box on the box door. The thyristor cooling is natural; however for bigger powers, it is forced with fans. The thyristor control and communication with the operator is provided by the ZEOBYN mikroprocessor regulator.



*EVERT DM and EVERT DS line (opened)*



## ZEODYN Microprocessor regulator

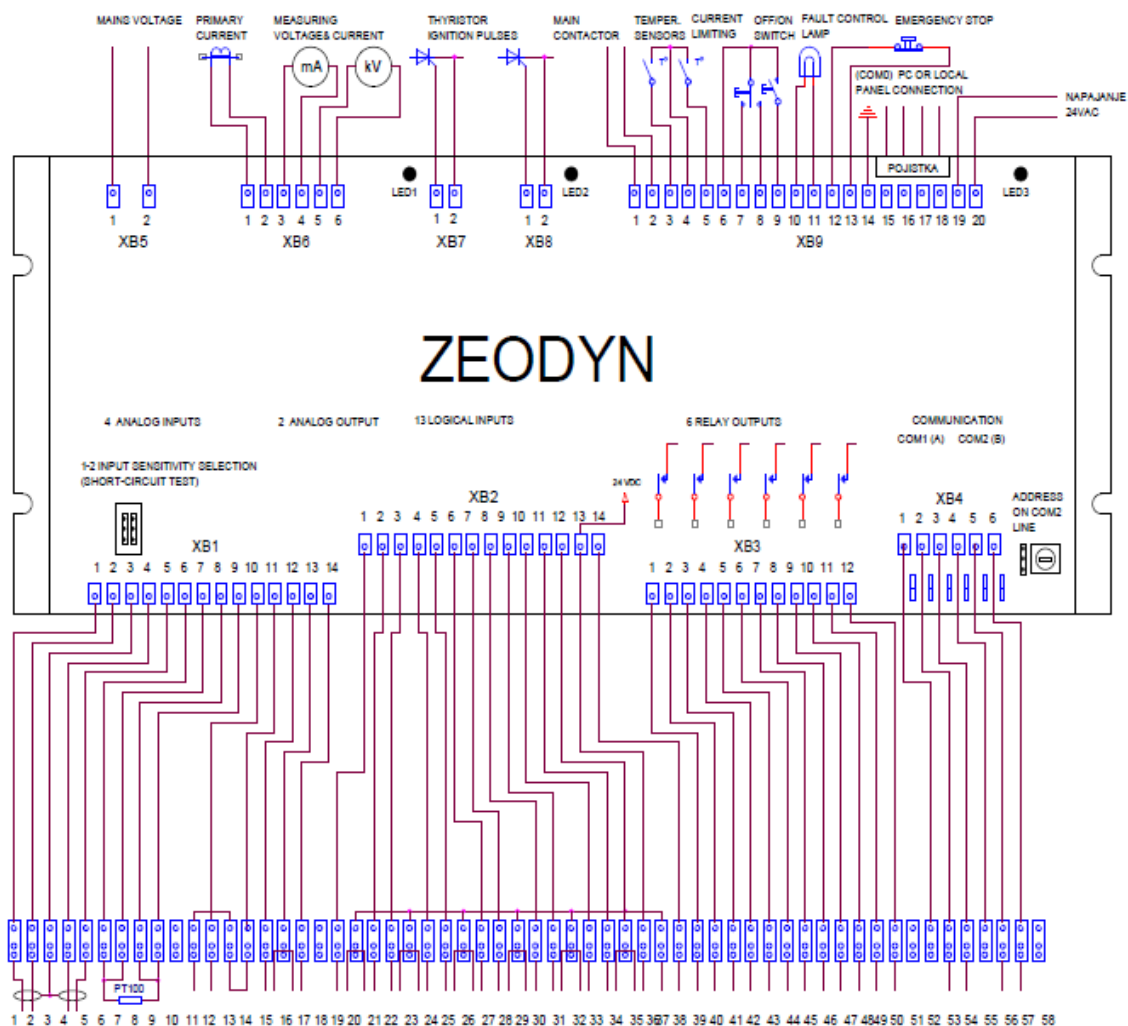
The required properties of the whole power supply unit are provided by the ZEODYN microprocessor regulator. The regulator of our own production is placed in a metal housing and consists of a oneboard computer RCP-1 and an interface unit RIZ-1 with connection bus bars. The individual bus bars XB1 ÷ XB9 are placed according to the type of connected signals. There are separate bus bars of external signals for analog inputs and outputs XB1, bus bars of logic inputs XB2, of logic outputs XB3 and communication bus bars XB4 placed at the bottom.

There are bus bars of internal signals of the box – of synchronization voltage XB5, current and voltage measurement XB6, pulses for thyristors XB7 and XB8 and bus bars of logic inputs XB9 placed up.

- See the following picture. The bus bar XB9 includes also a communication line and a power supply to connect an alphanumeric display MPA-2.

The power supply status and parameter changes can be monitored locally from an industrial PC in the door of the box EVERT DM („MASTER“) or from a four-place display on the regulator ZEODYN, or remotely through the protocol MODBUS (RTU).

WHEN only one or two control boxes are delivered, it is possible to select a more economic solution and to supplement the boxes with the above alphanumeric display instead of the industrial PC.



## BASIC CHARACTERISTIC OF THE CONTROLLER

- Precise setting of voltages and currents in real time with calculation of values derived: mean, peak and minimum voltage, mean and pulse current rms value of alternating voltage and current, active and apparent power etc.
- Quick and exact regulation of individual current pulses (pulse current regulation) depending on current limitation or sparks between electrodes.
- Manual, automatic or remote selection of the mean current limiting.
- Semi-pulse power supply with adjustable auxiliary pulses.
- Manual, automatic or remote option of semi-pulse power supply.
- Optimisation of semi-pulse power supply period depending on current limitation.
- Detection of back corona and optimisation of average current.
- Optimized control of the HV source at sparks between electrodes: quick voltage recovery after a spark, reduction of spark rate at steady operation of the ESP section connected, optimizing of pulse current reduction after a spark, voltage regulation at suppressed intensity of the corona.
- Controlled reduction of average current value for rapping of passive electrodes.
- Automatic transfer to reduced rapping period in case of EHV power supply failure.
- Possibility to connect a sensor to measure dust concentration.
- Minimizing of power consumption of the HV source according to the extinction sensor data.
- Minimizing of total power consumption of a group of HV sources feeding one ESP.
- Possibility to activate groups of selected parameters when operating conditions change due to cyclically running technological process.
- Mutual synchronization of electrode rapping of individual EO sections with elimination of simultaneous rapping.
- Adjustable protections and warning including heat protection of EHV part equipped with resistance thermometer.
- History record of EHV power supply operation.
- Industrial PC boxes of „MASTER“ type with visualisation of operation of 8 control boxes max.
- Communication with central control and display panel of PC (communication protocol Modbus).
- Communication with superior system (communication protocol Modbus).



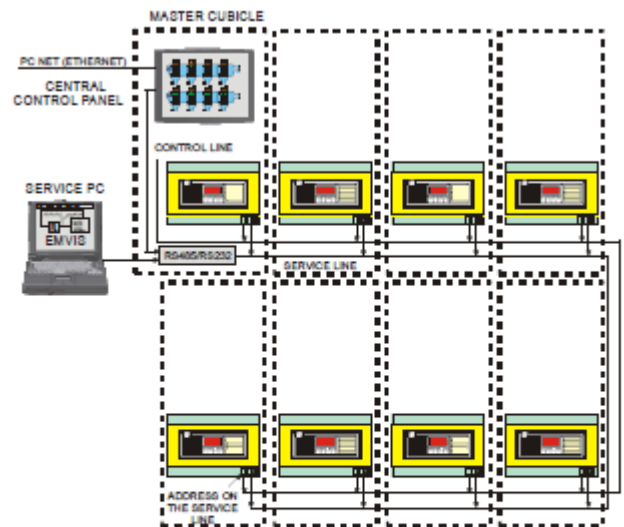
ZEODYN regulator with 4 positions display and 4 keys for software input

## Central control panel (industrial PC) with ZEOVis program

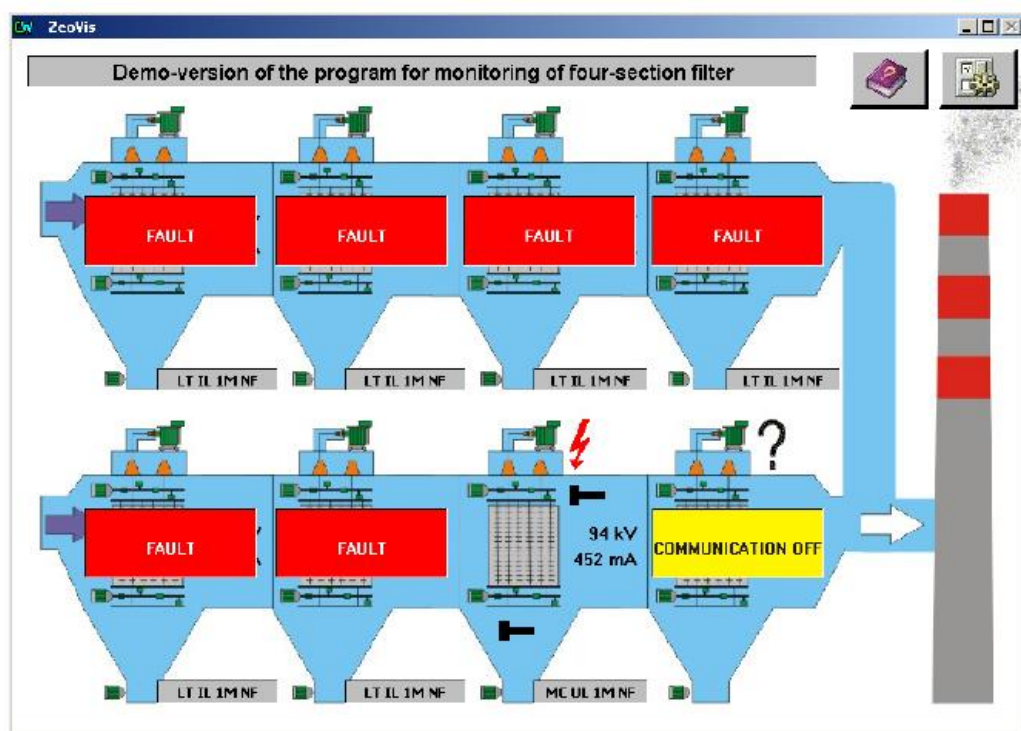
The panel enables you to monitor 8 power supply units max. divides into 2 groups. One group commonly supplies L.H. and the other group R.H. EO side. After the panel is turned on, the program starts automatically and opens an overview window of all of the power supply units, in which basic data about operation of the power supply units are displayed. Then you can display a more detailed window with information about operation of one selected power supply unit and the corresponding supplied EO section.

The separate windows serve to display operation history of each of the power supply units in text form, measure and display volt-ampere characteristic of the connected EO section, display momentary courses of the power supply voltage and current and change the program configuration.

The overview window of the power supply units opens automatically when the panel is turned on. There is basic information of the power supply unit displayed in this window: average voltage, average current, spark indication, back coronas, electrode rapping, operation status of the power supply unit (ON, OFF, warning, breakdown) and communication status. Then it is also displayed a text field with power supply unit status that includes information about behaviours of the power supply and of the connected EO section.



Overview window





## Window with more detailed information of one power supply unit

Open the window with detailed information of one power supply unit by touching the EO section supplied by the corresponding power supply unit in the power supply overview window; the window is shown in the following picture. The text field placed in the upper part of the window displays a text (power supply name) that you can change in the program configuration window. The power supply symbol line placed at the bottom of the window serves to inform you about operation of the other power supplies and enable you to directly switch over into the window with detailed information of another power supply unit.

There are selected quantities displayed in the text field informing about operation of the power supply. The icon placed to the left of the power supply box shows a momentary position of the switch on the box door. Using the button placed to the right from the box door. Using the button placed to the right from the box, you can open the window to set current limitation.

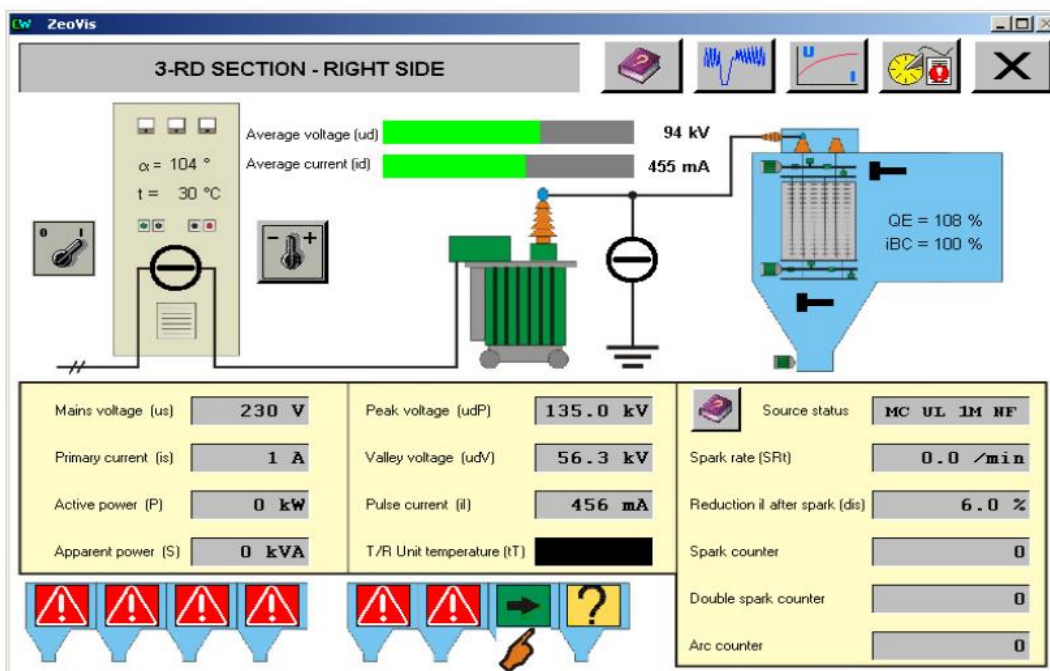
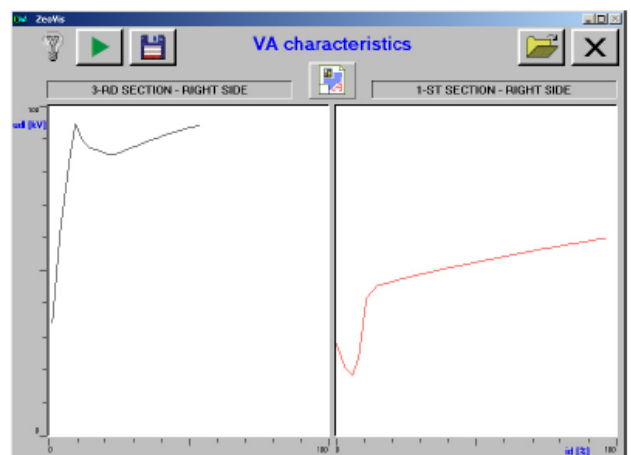
By touching the first button from the left you display the help window with explaining description of the individual symbols.

By touching the second button from the left you display the oscilloscope window that server to display time courses of voltage and

current. The oscilloscope is useful for quick and easy check of transition processes as for sparks between EO electrodes.

By touching the third button from the left you display the volt-ampere characteristic window. The VA characteristic window server you to quickly and easily display volt-ampere characteristics of all the EO sections and to compare them manually. The window enables both graphic and text display of volt-ampere characteristics measured or saved for comparison.

By touching the fourth button from the left you display the history window that serves to display history of operation of each of the power supply units in text form.





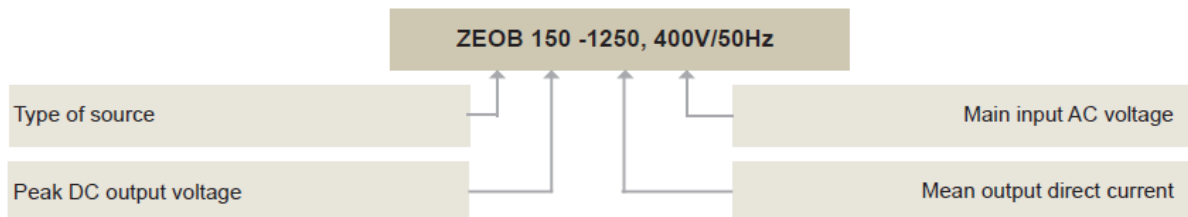
## Parameters and marking of the ZEOB Sources

ZEOB sources be delivered also with another parameters.

### Optional equipment

- Pressure sensor inside HV Section
- Cover of HV bushing (with the grounding switch) for direct connecting to the precipitator
- Cover of HV bushing (with the grounding switch) for cable connecting

<b>Main input voltage</b>	220V + 500V, 50 + 60Hz
<b>Peak output no-load voltage <math>U_{do}</math></b>	92kV, 111kV nebo 150kV
<b>Mean output direct current <math>I_{dn}</math></b>	150mA, 200mA, 500mA, 800mA, 1250mA, 1800mA, 200mA



Separator chamber

## CONTACT

### **ELEKTROTECHNIKA, a.s.**

Kolbenova 936/5e

190 00 Prague 9

Czech Republic

Fax: +420 226 544 300

e-mail: [info@elektrotechnika.cz](mailto:info@elektrotechnika.cz)

[www.elektrotechnika.cz](http://www.elektrotechnika.cz)



### **Ukraine**

ČKD ELEKTROMAŠ

Bulvar Družby Narodov 13, 01042 Kiev, Ukraine

Phone: +38 (067) 665 75 29

e-mail: [info@ckde.cz](mailto:info@ckde.cz)

### **Russian federation**

ČKD ELEKTROPROM

Pervomajskaja 15, 620075 Yekaterinburg, Russian federation

Phone: +7 343 283 08 84