

THE EXPLOSION-PROOF SOFT STARTER DEVICE OF УППВ TYPE



GENERAL INFORMATION

The explosion-proof soft starter device of УППВ type (hereinafter "device") is designed to start and stop asynchronous squirrel-cage electric motor by adjusting the stator supply voltage. The device provides an optimal starting/stoppage curve with minimal overcurrent for the electric motor and the mains supply, as well as the mechanical loads limitation of the processing equipment.

The device is intended for conveyors and other machines being operated at the mining enterprises and mines, including those hazardous of gas (methane) and/or coal dust. The device is designed to work in electrical networks of three-phase AC voltage with the isolated and grounded neutral.

The devices have a level of protection «Explosion-proof»; types of protection «flameproof enclosure» and «intrinsically safe electrical circuit»; explosion protection marking is Ex d ia I according to ATEX. Environment protection degree is IP54 according to IEC 60529.

The devices are manufactured for both the inner market and export, they conform with the technical demands of TY У 31.2–23189879–012:2007.

In the УППВ device there are can be used power semiconductor units and microprocessor controllers manufactured by Solcon Industries (Israel), an international company ABB, or by DEG itself, according to agreement with the customer.

IDENTIFICATION CODE STRUCTURE

<u>У</u>	<u>П</u>	<u>П</u>	<u>В</u>	<u>XXX</u>	<u>XXXX</u>	<u>У</u>	<u>5</u>	
								У — device;
								П — soft;
								П — starter;
								В — explosion-proof;
								XXX — rated current in amperes;
								XXXX — rated voltage in volts;
								У — climatic version according to standard ГOCT 15150-69;
								5 — location category according to standard ГOCT 15150-69.

OPERATION CONDITIONS

- ambient temperature from -5°C to $+35^{\circ}\text{C}$;
- relative humidity is $98\pm 2\%$ at the temperature of $+35^{\circ}\text{C}$;
- ambient dustiness up to 1200 mg/m^3 ;
- operation position — slides on the horizontal plane, installation deviation in any direction from the operation position up to 15° is allowed;
- mains voltage deviation from 85% to 110% of rated value is allowed.

The device supports the following:

- soft start of the motor with programmable parameters (starting current, initial voltage, starting time);
- dynamic braking of the motor with programmable parameters (braking current value and duration);
- semiconductor units automatic bridging with a contactor upon completion of starting procedure;
- starting current limitation;
- pump, fan and conveyor control modes;
- torque and current control for the purpose of starting and stoppage optimization;
- emergency stoppage of electric drive at the failure occurrence and when “emergency stop” button is pressed;
- local and remote control of device;
- possibility of the direct motor start through the bypass contactor;
- status and device failure information;
- communication with industrial control system (ICS) of the enterprise using the intrinsically safe RS-485 interface (protocol Modbus RTU).

The device proves the following protection types and interlocks:

- motor overcurrent protection;
- no-voltage interlock;
- overcurrent protection of outgoing power circuits and from internal short circuits in the device;
- motor overheat protection;
- power semiconductor units overheat protection;
- protection against short circuits in the remote control;
- precheck of the output connections insulation resistance;
- protection against frequent starts;
- protection against prolonged start-up;
- protection against phase loss and negative sequence phase of supply voltage;
- protection against overvoltage and undervoltage;
- protection against loss of load.

The device provides an indication of the following parameters:

- drive current;
- mains voltage;
- parameter settings;
- the reasons for failure or tripping of protections and interlocks;
- storage (at the removable medium) of data on the current loads, start-up parameters, triggered protections and failures of the device;
- data transfer using the intrinsically safe RS-485 interface (protocol Modbus RTU) to the top-level system.

Electrical drive with the device of УПНБ type functional diagram is given in Figure 1.

CONSTRUCTION

The device explosion-proof enclosure is a welded construction mounted on a sled. It consists of three sections: the network section, the apparatus section and the control circuits section.

The network section is designed for the power supply, main drive and auxiliary equipment cables input. Power circuits' lead-in devices support connection and explosion-proof sealing of flexible or armored cable. The section has two cable glands with the diameter of 63 mm and four cable glands with the diameter of 32 mm. There is an explosion-proof bulkhead between the network section and the control circuits section.

The control circuits section consists of inlet compartment and control and visualization module (MYB) compartment, separated by a bulkhead with holes intended for laying of control circuits. There are communicating plugs mounted in each compartment to support laying of control circuits from apparatus section to control circuits section. There are also terminal block sets mounted in the control circuit section.

The inlet compartment is designed for input/output of control cables containing intrinsically safe circuits only. For this purpose it has one cable gland with the diameter of 40 mm and one cable gland with the diameter of 32 mm. The inlet compartment is closed with a removable cover.

The MYB module compartment is designed for mounting the module of control and visualization and three control buttons. The MYB module and buttons are placed to the rotary cover, which has a rectangular viewing window covered with a transparent polycarbonate for the MYB module screen review. The MYB module compartment cover is mounted on hinges and is fixed to the casing with countersunk Allen-head screws.

The apparatus section contains line and bypass power contactors, semiconductor soft starter unit, power sources, control and protection apparatus. There can be a power automatic circuit breaker as a part of this section.

The apparatus section covers are mounted on the rotary hinges to allow of easy maintenance of the device.

All section covers are equipped with a warning plate "Open after power supply disconnection".

The devices' enclosures are equipped with the external and the internal earthing clips.

Outline drawings of УППБ enclosures are given in Figures 2 and 3.

TECHNICAL DATA

Rated supply main voltage, V	380; 500; 660; 1000; 1140	
Rated frequency, Hz	50	
Rated load current of the transit load transformer, A	160; 250; 400; 630	
Starting time, s	5–30	
Number of soft starts with an one minute intervals, not less	4	
Cooling	free air cooling	
Overall dimensions, mm, not more:	Rated current 160...400 A	Rated current 400...630 A
	height	1050
	width	970
	depth	500
Weight, kg, not more:	400	900

MANUFACTURER WARRANTY

Warranty period is 12 months from the date of the equipment commissioning but not more than 18 months since the delivery date.

DELIVERY SET

- the explosion-proof soft starter device of УППБ type;
- certificate of identification;
- operation manual.

Designer and Manufacturer:

Private Joint Stock Company «DEG»
3, Peschanaya str., 14 office,
69089, Zaporozhye, Ukraine
Tel./fax: +38 (061) 228-74-47
E-mail: deg@deg.com.ua
www.deg.com.ua

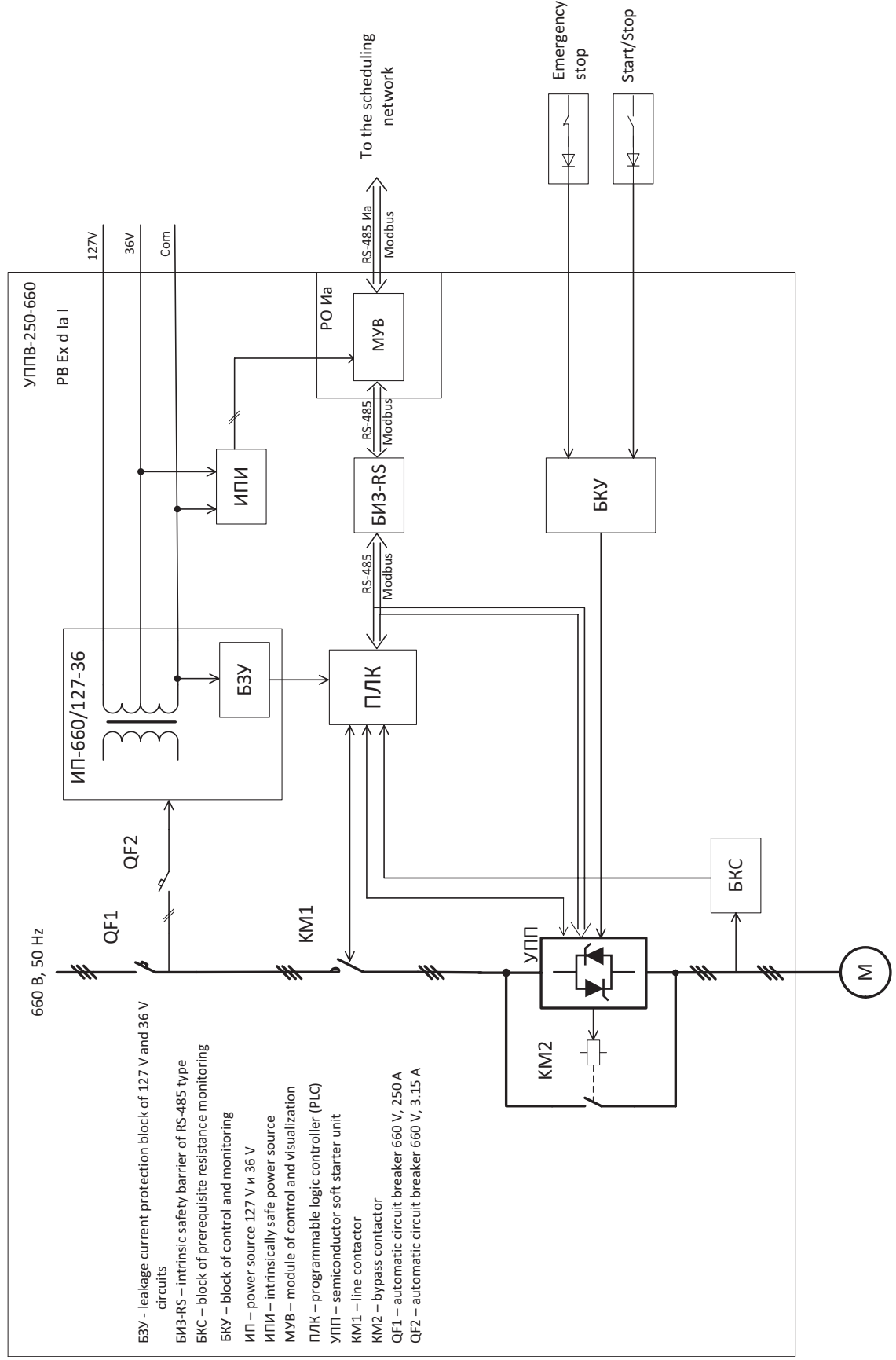


Figure 1. Electrical drive with the device of УППВ type functional diagram

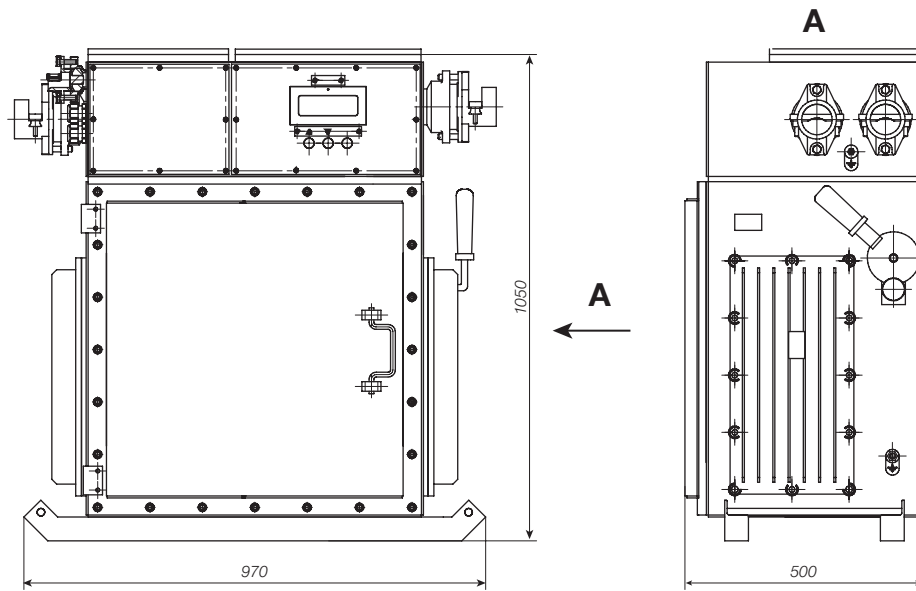


Figure 2. Device of УППВ type, rated current 160...400 A. Weight 400 kg, not more

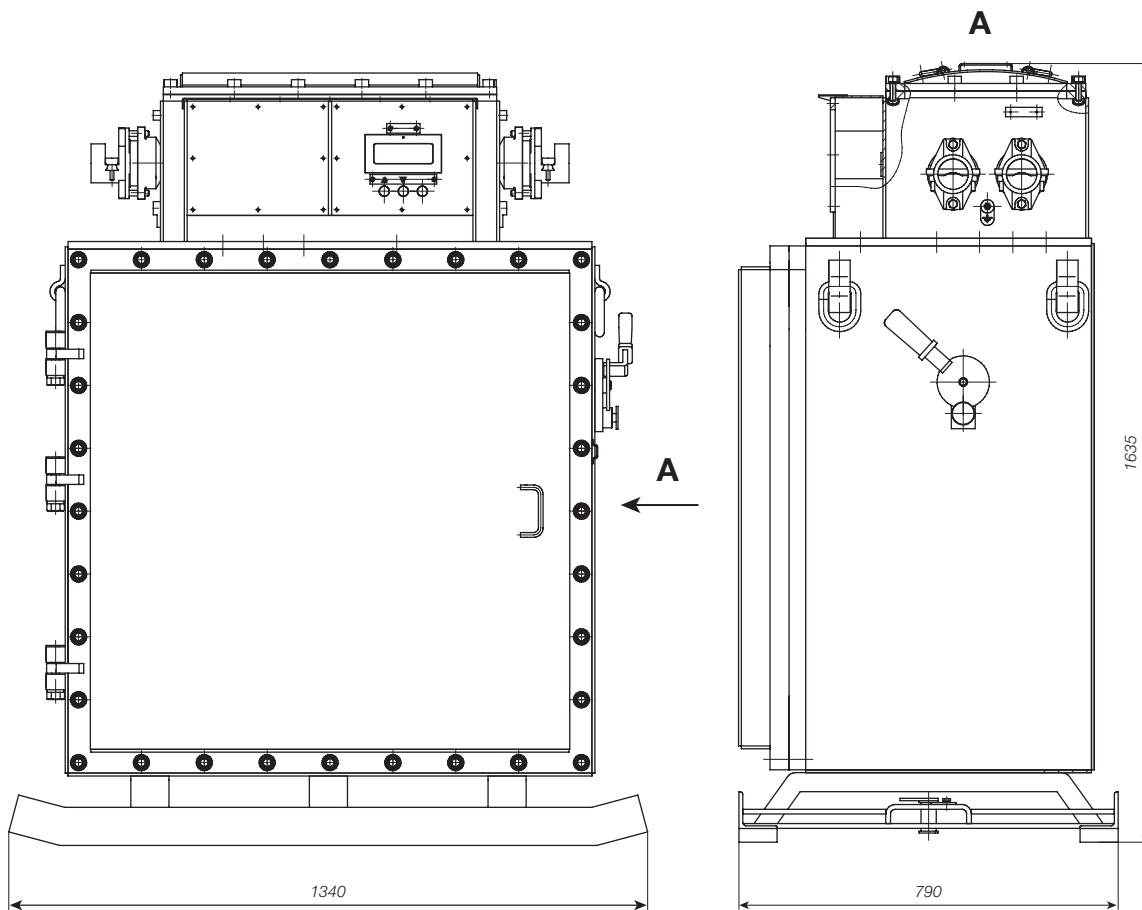


Figure 3. Device of УППВ type, rated current 400...630 A. Weight 900 kg, not more