



## **SUGP-0.5EX POLYETHYLENE GRANULATOR CONTROL SYSTEM**

### **APPLICATION**

SUGP-0.5Ex polyethylene granulator control system has been developed by CC "Energocomplekt" by order of OJSC "Salavatnefteorgsyntez". It is designed for soft change in rotation speed of the knife and the screw engines for obtaining a polyethylene granule of the preset size. The disadvantage of the previous system is its incapability to cut a polyethylene granule of the size required by GOST if the unit productivity increases over the nominal, which led to reduction of the end-product grade because of significant pressure beating inside the screw.



**Fig. 1** SUGP-0.5Ex control system in the workshop No.23 of OJSC "Salavatnefteorgsyntez" petrochemical plant

### **THE CONTROL SYSTEM PROVIDES:**

- ! possibility of separate and parallel start-up of the first step granulator drives from the operator's panel;
- ! remote control of rotation frequency of both drives together or separately by "more", "less" buttons with the established discretization interval ( $N + \text{number of turns/min}$ );
- ! maintaining the required pressure moment of polyethylene flux in the granulator operating cylinder at zero rotation;
- ! change of the engines rotation speed from 0 to 1,900 turn/min;
- ! displaying the screw and the cutting knife engines rotation speed on the digital panel;
- ! repeatability of preset values set of the engine rotation speed with subsequent reduction of tasks to the tabular form for convenience of the operator's work;
- ! high degree of reliability of the units operation (due to application of foreign components tested by experimental performance);
- ! increase of production efficiency by means of improving reliability of the equipment operation;
- ! twelve types of protection against wrong actions of the operator;
- ! binding and remote setting of linear speeds on 10 granulators simultaneously and providing production technology management in the structure of the automated control system.

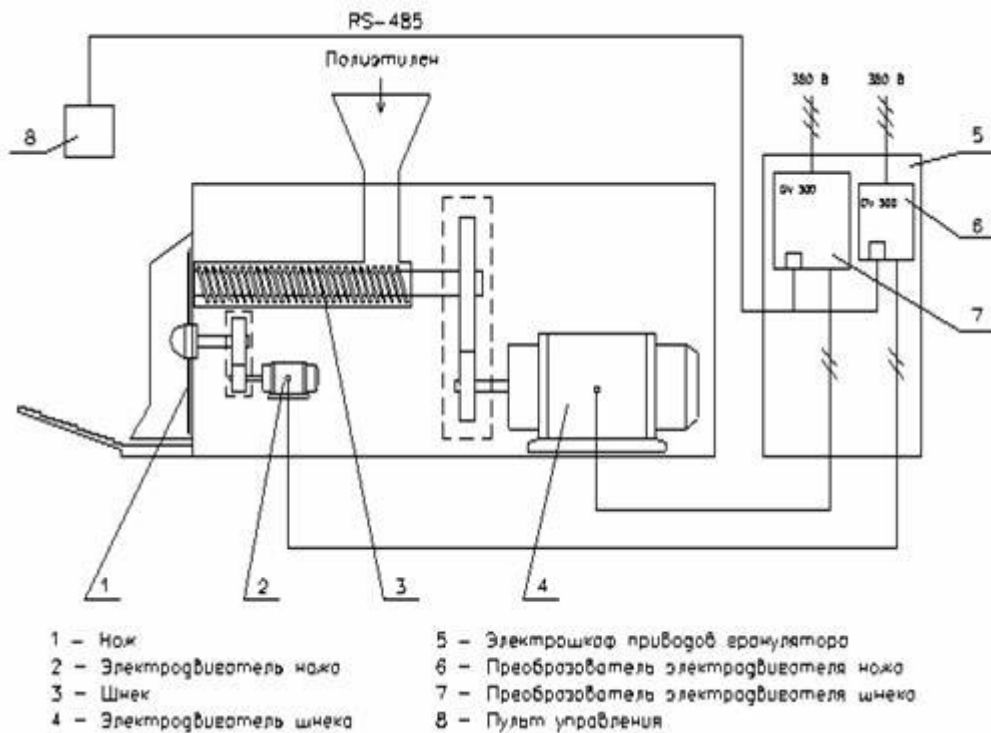


Fig. 2 Granulator operation control circuit.

#### LIST OF EQUIPMENT

Equipment	M-t un.	Number
Direct current electric motor of the screws drive 1850 turn/min, 142 kW, explosion-proof with air-transparent casing	pieces	1
Direct current electric motor of the cutting knife drive, 1850 turn/min, 3 kW, explosion-proof with air-transparent casing	pieces	1
Power cabinet with electric drives, control panel and extract-and-input ventilation system	pieces	1
GE Fanuc industrial controller	pieces	1

The company specialists have carried out full replacement of type "Leonardo" unit equipment (generator-engine) with an alternative set (General Electric DV-300 direct current electric drive for direct current engines), which provides electric power economy over 40 MW per month and at the price of 1 kW/h equal to 0.67 rubles makes an economy of 294,800 rubles per year.

The developed system provides obtaining only high-grade polyethylene granulate due to precision drives tuning, which allows creating uniformity of polyethylene flux pressure in the screw and by cutting with a knife, and polyethylene granule length on the drain bushing output corresponding to GOST. By means of task formation in the digital form, accuracy of the engines operation adjustment on both system drives is provided, which allows, without reducing the granulate grade, increasing the system productivity by 10% over the nominal capacity. At the price of 1 kg of polyethylene granulate equal to \$1, the system allows producing output above the norm for \$335,000 per a year. The system modernization allowed outputting the reactor to the nominal capacity (at the earlier existing design the reactor was underutilized), for the increase of productivity resulted in reduction of polyethylene granulate grade.

The company has executed designing, development and installation supervision of the control system, maintenance personnel training. The equipment is delivered within 3 months from the date of contract execution and prepayment.