



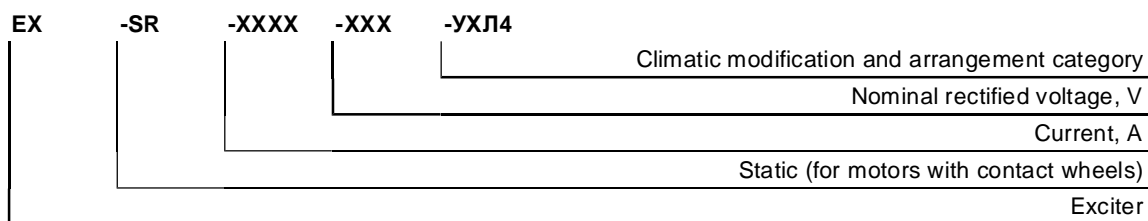
## EX-SR STATIC EXCITER FOR CAGE SYNCHRONOUS MOTORS

### APPLICATION

EX-SR series exciters, produced by CC "Energocomplekt", are designed for power supply of field winding of cage synchronous motors and compensators with automatically adjustable current in all operating modes.

EX-SR series exciters can be applied for replacement of static exciters with analog control of TE8, VTE, BVU, TV, TV2, TPE10, TPE series, and by modernization of motors and compensators with electric machine field systems. Thereby realization of the required field control and regulation functions is carried out programmatically.

### STRUCTURE OF SYMBOLS



The line of nominal values of the exciter currents in accordance with GOST 24688-81 (200, 250, 315, 400, 500, 630, 800, 1000 A, etc.).

The line of nominal values of the exciter voltages in accordance with GOST 24688-81 (36, 48, 60, 75, 115, 150, 230, 300, 345, 460, 600 V).

### EXCITER STRUCTURE



Fig. 1. EX-SR exciter for 400 A current



Fig. 2. EX-SR exciter for 1000 A current

EX-SR static exciter includes the following devices:

- automatic switch,
- controllable thyristor rectifier,
- starting resistor,
- thyristor arrestor with a control block,
- microprocessor control module,
- operator's panel,
- coordinating converters of the stator current and voltage signals,
- starting circuit current sensor,

- block of coordinating relays,
- exciter condition indicating devices,
- exciter controls.

Microprocessor control module of the exciter is realized on the basis of type ADSP-2181 signal processor and ST10F168 microcontroller. The signal processor carries out the basic control and regulation program, and the microcontroller realizes information interchange with the signal processor and the control panel, and also realizes service programs. Structurally, the exciter equipment is located in the cabinet of IP44 (IP54, IP23) design, GOST 14254, equipped with a ventilator. Measurement, control and indication units are located on the cabinet door. The exciter control circuits are powered from the auxiliary network.

The exciters are designed for long-term operation in a closed premise under the following conditions:

- I height above sea level not more than 1000 m; at heights more than specified, the permissible current is reduced by 1.2% for every 100 m of additional height;
- I ambient temperature (0...45 °C), at temperatures higher than (40 °C), reduction of the permissible current is 1.25% for every 1 °C over 40 °C;
- I air humidity from 5% to 85%, from 1 g/m<sup>3</sup> to 25 g/m<sup>3</sup> without moisture condensation or icing (class 3K3 according to EN 50178);
- I air pressure from 86 kPa to 106 kPa (class 3K3 according to EN 50178).

## FUNCTIONALITIES

### The exciter provides:

- I direct reactor start-up from smooth start-up device and start-up by underfrequency relay of cage synchronous motor with automatic field delivery in the function of frequency and of the rotor induced current phase;
- I forcing field of ratio not less than 1.4 for field current and 1.75 for field voltage by the motor power supply reduction to 0.8 and lower;
- I limiting forcing duration and the minimal duration between two subsequent forcing;
- I base limiting of field current;
- I limiting of field current when forcing the value of 1.4 of nominal;
- I forced killing of rotor field during motor switching-off, the motor power supply breaks and at presence of an additional signal for field clearing;
- I switching-off the motor from the network with adjustable time delay after disappearing of the exciter logic power supply.

**By operation in the automatic mode the exciter, apart from the above listed functions, provides automatic control of:**

- I stator voltage;
- I stator reactive current;
- I power coefficient.

Stepless switch from the automatic control mode to the manual mode and vice versa is provided. In the manual mode, the exciter provides field current stabilization with a possibility of regulation within the limits 0...1.2 of the nominal, according to the operator setting. Selection between the manual and the automatic operating modes is performed by the operator. Operation algorithms and regulation laws are realized programmatically. From the operator's panel it is possible to change regulation structure and parameters, to carry out monitoring of the motor and the exciter parameters, to look through the archive of 50 events. There is a possibility to connect the exciter control system through RS485, MODBUS or PROFIBUS serial interface with the object automatic process control system to organize remote monitoring. Under an additional order, the function of controlling temperature of the stator steel and copper, the motor bearings, the cooling air and the cooling water can be realized.

The company carries out installation supervision, adjustment and testing of field systems, warranty and post-warranty service, modernization and repair of motor field systems in operation, maintenance personnel training and technical advisory services on equipment selection. Field systems equipment is delivered within 3 months from the date of contract execution and prepayment.

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