

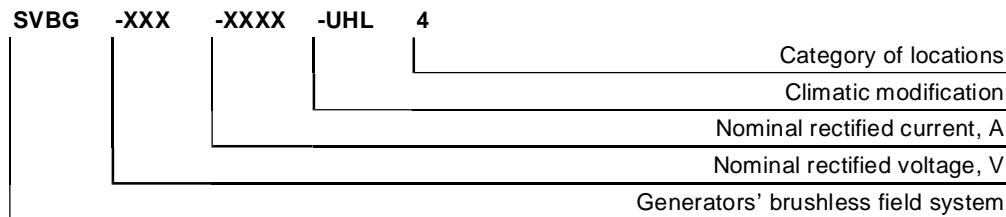


## BRUSHLESS FIELD SYSTEMS OF SVBG SERIES FOR HYDROGENERATORS

### PURPOSE

Brushless field system SVBG is designed for replacement of cross field systems for hydrogenerators with capacity from 1.0 up to 150 MW at reconstruction and at new construction.

### LEGEND STRUCTURE



### CONTENTS

Brushless field system includes:

- brushless diode exciter,
- field control cabinet,
- converter transformer (group of transformers).

### BRUSHLESS EXCITER

Brushless exciter is synchronous generator with rotating armature. Its AC winding is located on the armature, and its field winding is located on the stator. The exciter armature is strongly connected through rotating diode rectifier with field winding of the hydrogenerator. Adjustment of generator excitation is performed by adjustment of exciting current of the exciter.



**Fig. 1.** General view of brushless exciter armature.  
Cascade of the Kuban HPS

The exciter, as a rule, has the same dimensions that the replaced cross-field DC exciter. Meanwhile, the generator preserves power contact ring where buses and cables from DC lead-outs of rotating rectifier can be connected. The mentioned reconstruction mode is relatively expensive since it requires production of a new exciter in the conditions of electric machine engineering enterprise.

We developed the new reconstruction mode based on remaking of the regular exciter into the brushless one. Thus, the existing armature winding is re-commutated into a m-phase AC winding with n-parallel branches in each phase. The rotating diode rectifier is located instead of the commutator.

As a rule, insulation of armature winding is quite satisfactory, and only re-insulation of separate sections could be required.

At industrial conditions, modes of circuits of winding Y-connections and the so-called “closed ring” windings demanding considerably smaller amount of works on rework of the exciter are approved. The rotating diode rectifier is made using the bridge connection with number of diodes in the arm equal to number of parallel of branches in the armature winding. Special armature diodes like D105-630 of 24-28 class are applied.

Additional poles are dismantled from the exciter magnetic system. In order to preserve the field suppressor in the circuit of the generator armature, the third power contact ring can be mounted.

### FIELD CONTROL CABINET

To control of excitation of the exciter and, consequently, of the generator, field control cabinet of series SUW (TU 8555-009-46885854-2003) is used. Control cabinets are produced with one or two independent converting and regulating channels, i.e. the latter case provides 100% reservation. Each channel includes the microprocessor automatic field regulator containing the power transistor converter.

The regulator programmatically realizes all the functions of control, regulation, protection, diagnostics, and signaling on the field system state. Transitions from one channel to another are carried out automatically at occurrence of any malfunction prohibiting performance of its functions or at operator’s command. Power supply of each channel can be performed from the generator lead-outs, from the armature lead-outs through the power contact rings, and (or) from DC auxiliary mains. Initial excitation is performed from DC control mains.



**Fig. 2.** General view of field control cabinet in two-channel embodiment

The company performs the works on exciter remaking, installation supervision and setting-up operations, complex tests of field system together with the generator, training of the service personnel, guarantee and post-guarantee service, and technical consultations. Works are performed in the terms from 3 up to 6 months depending on payment conditions and readiness of the station equipment to dismantling and installation works.

---