PORTABLE APPARATUS FOR CONSUMABLE-NOZZLE ELECTROSLAG WELDING

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Information is presented on a portable apparatus for consumable-nozzle electroslag welding and surfacing. Design peculiarities and technical advantages of the apparatus, as well as recommendations for its application, in particular in construction, are given.

Keywords: *portable welding apparatus, consumable-nozzle electroslag welding*

Workers of the welding production are offered a portable versatile apparatus AShP 113 M2 UKhL4 for consumable-nozzle electroslag welding of longitudinal and curvilinear butt, fillet and T-joints with a thickness of 40–120 mm (Figure 1). Welding is performed at the direct current with a vertical position of the joint (deviation ±15°). The apparatus can be used for fabrication of thick-walled large-size metal structures of carbon and alloyed steels and parts of complex configuration, as well as for surfacing and repair operations under factory and field conditions.

The apparatus (see Figure 1) consists of compact mechanism *1* for feeding two welding wires, both solid and flux-cored ones, which is fixed on bracket *3*. The latter also provides fixation of a consumable nozzle and supply of the welding current to nozzle *5*. Device *5* for correction of position of the consumable nozzle relative to the weld edges in a gap provides its smooth displacement with fixation in two mutually perpendicular planes. High reliability of guiding of the electroslag process is provided by using the electrode wire feed drive based on AC reduction gear motor *2* with frequency regulation of revolutions. The modular configuration allows an easy and promptly positioning of the apparatus over a joint, as well as its fast dismantling from a workpiece.

Electric part of the apparatus is made on a modern element base. Control cabinet *2* (Figure 2) can be located separately from power supply *1* or directly on the power supply, this substantially improving reliability of operation

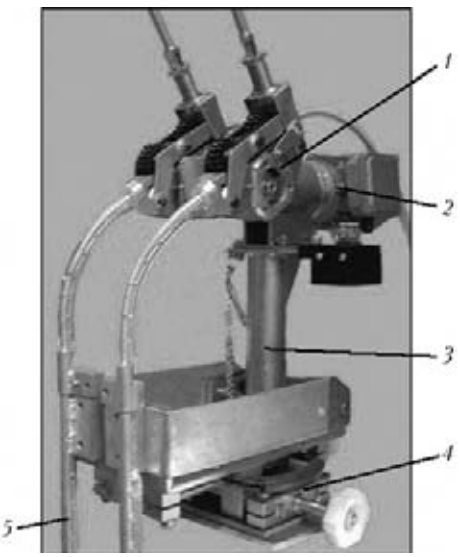

Figure 1. Appearance of apparatus AShP 113 M2 (see designations in the text)

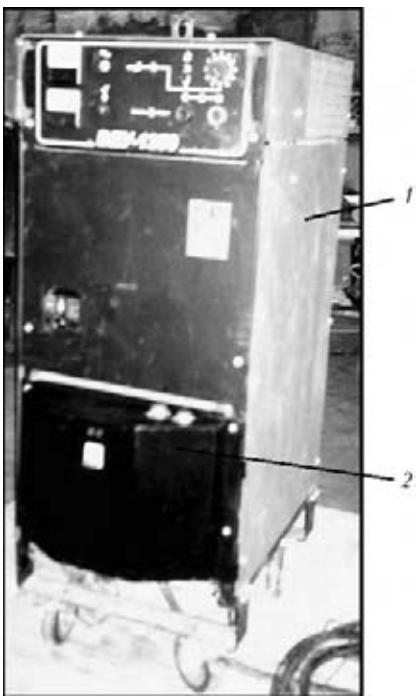

Figure 2. Power supply of apparatus AShP 113 M2 (see designations in the text)

Figure 3. Control panel of apparatus AShP 113 M2

of the electric part and facilitates re-arrangement of the welding equipment in welding of a large number of joints, especially in field operation. The welding process is performed by using a portable apparatus control panel (Figure 3), which meets all current requirements for information capability and ergonomics. The control panel provides digital indication of the main working parameters (slag pool voltage, welding current, electrode wire feed speed) and convenient control of the welding process. Indication elements and controls are protected from probable ingress of moisture and dust. The electric part of the apparatus provides for the possibility of connecting an extra unit comprising an information-recording system for monitoring of the welding process, and allows visualization and registering of the main parameters of the electroslag welding process, which can be used for certification of weldments.

Specifications of apparatus AShP 113 M2

Mains voltage, V	380
Mains frequency, Hz	50
Electrode wire diameter, mm	2.4–4.0
Quantity of electrode wires fed by welding module, pcs	2
Rated welding current per module (duty cycle 100 %), A	1000
Electrode wire feed speed, m/h	30–300

The apparatus can operate in the manual, automatic, or adjustment, 100 % duty cycle modes.

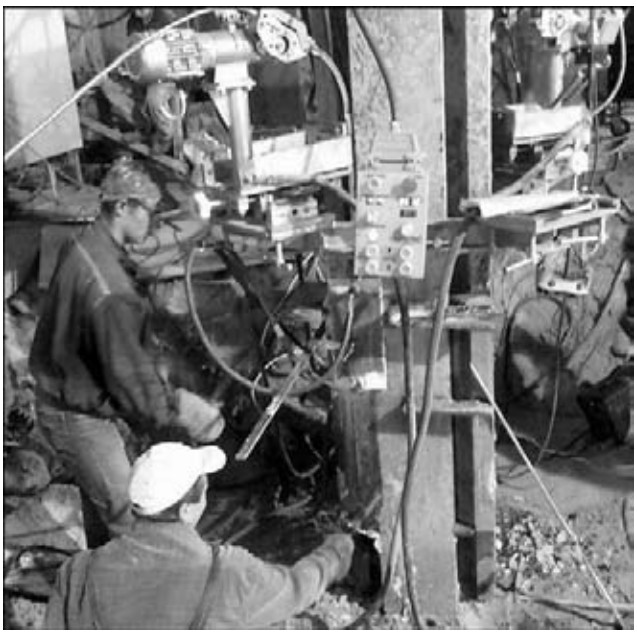

Figure 4. Electroslag welding of elements of reinforcement of building column flange openings by using apparatus AShP 113 M2

Main advantages of the apparatus:

• widening of technological possibilities of the consumable-nozzle electroslag welding process due to using both solid and flux-cored wires of different diameters;

• due to the modular configuration, it is possible to easily and promptly mount the apparatus over a joint, an dismantle it from a workpiece;

• high reliability of guiding of the electroslag process due to using the electrode wire feed drive based on the AC reduction gear motor with frequency regulation of revolutions;

• feed mechanisms are equipped with an increased-reliability electrode wire feed systems;

• for using the apparatus under field conditions, the indication elements and controls are protected from probable ingress of moisture and dust.

The new apparatuses are successfully applied for welding of openings of flanges of building columns of the cross wheel type (Figure 4). Up to now more than 1500 joints (about 1250 running metres of the welds) have been welded under field conditions.

The new apparatuses provide a substantial decrease in labour intensity of welding operations and increase in productivity due to reduction of time for mounting-assembly operations.