STUDY OF EXTENDED HIGH-CURRENT DISCHARGES INITIATION AND EXTINGUISHING [[1]](#footnote-1)\*)

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Earlier, on the electric discharge stand of the P-2000 facility of the Research Institute of Mechanics of Moscow State University, stable combustion modes of an extended (up to 30 cm) high-current (up to 700 A) stationary electric arc in open air were implemented [1]. The result was obtained without using traditional stabilization methods (external magnetic field, insulating walls or external gas flows). Stabilization was provided due to the choice of materials, sizes and shapes of the electrode assemblies, and the speed of moving the electrodes (40 - 400 mm / s). A stable cathode jet appeared, interacting not with the solid surface of the anode, but with a narrow (~ 1 cm) anode plasma layer formed by the anode jets, both from the supporting spots of the arc and from the hot (~ 2000 ° C) surface of the anode. These results can be claimed: in the development of systems for initiation and extinguishing of extended electric arcs; to simulate tests of protective coatings of aircraft when they enter the dense layers of the atmosphere of planets, in particular the Earth; in the development of disposal facilities (including toxic) wastes that are difficult to decompose when using traditional chemical technologies [2].

The main goal of this work is the development of a system for initiating and extinguishing arcs by diluting the initially closed electrodes [1, 3] by optimizing the process of extending the electrodes. Additionally, the possibilities of stabilizing a stationary arc with such initiation and in an external axial magnetic field were investigated. Based on the approaches and techniques developed in [4, 5], a theoretical and experimental study of the processes at initiation, stabilization and extinguishing of extended high-current electric arcs in open air at atmospheric pressure was carried out. Mainly vertically oriented discharges are considered. The arcs between graphite (3OPG) electrodes of different diameters (15-150 mm) and shapes (from - rod to - saucer-shaped) were studied.

New data on the permissible levels of disturbances in the interelectrode gap that do not lead to destabilization of the discharge have been obtained and refined. The first results have been achieved in the implementation of automatic extinguishing of arcs at a given point in time using the electrode spreading system (under the control of a special software module in the PURELOGIC system used for CNC machines). The arc extinguishing process is realized without the direct participation of the operator of the control panel of the experimental setup and the use of circuit switching devices.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVIII/Pt/ru/GR-Glinov.docx) [↑](#footnote-ref-1)