INFLUENCE OF SCALE FACTORS OF THE DISCHARGE SYSTEM ON THE STABILITY OF ELECTRIC ARCS IN ATMOSPHERIC PRESSURE GAS MEDIA [[1]](#footnote-1)\*)

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The work is devoted to the study of extended high-current electric arcs of atmospheric pressure at the P-2000 facility of the Institute of Mechanics Lomonosov Moscow State University [1]. The study of such discharges is continued by studies [2] related to the refinement and development of ideas about the effect of an external magnetic field on the stability of an extended arc discharge and the formation of multichannel current structures. Unlike work [3], which is mainly devoted to discharges in air, in this work the main emphasis is on studying the influence of the orientation of an external magnetic field on the dynamics of initiation and development of a discharge in different gaseous media (CO2, Ar, N2) and comparing the results obtained with airborne research data. The main experiments were carried out in a discharge chamber with cylindrical side walls made of electrovacuum quartz glass at atmospheric pressure. Height and diameter - 250 mm. Previously, this chamber was tested in a series of experiments presented in reports [3-5]. Vertically oriented discharges are considered. Arcs between graphite (3OPG) electrodes of different diameters (6-150°mm) were studied. The discharge was initiated by opening the initially closed graphite electrodes. The interelectrode distance is 5 - 10 cm. The duration of the discharges is 0.5-2s. Theoretical modeling of arcs was carried out in the electrotechnical approximation based on the classical empirical data of H. Ayrton. High-speed video filming of discharges with a frequency of 1200 fps was carried out. The Toshiba-TCD1304 linear CCD - receiver of the spectrum analyzer recorded arc radiation in the range of 260–660 nm. According to the current and voltage oscillograms, synchronous diagnostics of the energy input and its evaluation for different areas of the arcs were carried out, as well as pyrometric measurement of the cathode temperature. The magnetic field and gas-dynamic pressure inside the discharge chamber were measured. It is shown that the stability of high-current arcs is significantly affected by the dynamics of electrode jets. Traditional models of arcs in an external magnetic field [6], without taking into account these factors, show that the direction of the external axial field does not affect the stability of the arcs, affecting only the direction of their twist.

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