



# **KALUGA ELECTROMECHANICAL PLANT**

TIME DEMANDS NEW QUALITY

2012



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Director of Open Joint-Stock Company «KEMZ»  
Movtyan Boris Anatolievich

The plant has entered the new stage of its development; there are new exciting opportunities, and the best confirmation of that is a significant increase in production volumes.

The stable and constant flow of orders gives us reason to be confident and optimistic about the future.

Today, we can confidently say that a number of technologies that have been implemented and widely used at the plant are among the most advanced modern technologies.

We can clearly see further growth and our great future - the future of our plant!

Movtyan B. A.







## Main stages of the plant development

Kaluga Electromechanical Plant was founded on August 24, 1917, on the basis of telegraph and telephone gear repair workshops. It went a difficult path of development and practically became the founder of instrument-making industry in Kaluga.

In 1918 – 1922, the plant performed repair and restoration of the captured communication gear for the Red Army.

1929 – 1930 – Design and construction of new production buildings.

During the next ten years, the plant masters and manufactures Russia's first teleprinters BTA-31. Manufacture of the first public telephone 'Coin telephone'. Manufacture of the first automatic telephone systems.

Development of the first-class 9-tube radio SVD-9. Manufacture of ST-35, Morse-38, Baudot telegraph sets.

During the Great Patriotic War in 1941 – 1945, the plant was evacuated. At that time, it manufactures telegraph sets for the front and creates front-line brigades. After the war, the plant starts reconstruction of production.

1946 – 1950 – Manufacture of the first post-war batch of CT-35 devices; manufacture of switches. As a result of plant reequipment and reconstruction, the production capacity exceeds the pre-war level threefold.

1961 – Mastering the production of the Volga facsimile communications gear (used to receive signals from the artificial satellite of the moon).

1962 – Development of the Vesna electronic equipment. Mastering the production of the Bystrota device; development and manufacture of ferro-transistor memory units and

printing devices with print speeds of 3000 characters per minute. Social development: construction of the Druzhba pioneer camp, plant dining room, school for working class youth and plant medical clinic.

1968 – Development and design of the micro module Vesna 3 device by DDB (Development and Design Bureau).

1969 – The Podsněžnik radioline team begins mastering the on-board and surface gear Veter 3 (by Scientific Research Institute NII Avtomatika) used for controlling the Kosmos series satellite.

1970 – Order of the Red Banner of Labor awarded to the plant. During the following years, the plant undergoes reconstruction and modernization of instrumentation, and masters the production of consumer goods.

1980 – 1985 – Design of the base support structure and beginning of manufacturing the products on its basis.

1986 – 1991 – Manufacture of ASP-901 for assembly and mounting of circuit plates with planar microchips.

1991 – The plant participates in the All-Union seminar on implementation of high-performance equipment for manufacture of integrated circuit submodules.

2004 – 2007 – Commercial manufacture of microprocessor products and a number of Ispolkom complex products (designer - NII Avtomatika); work on producing new types of spacecraft.

Today, the plant develops and produces special purpose and commercial communication gear, as well as consumer goods.





## Assembly Workshop

The assembly workshop is equipped with an automated line for installation of SMD-components on circuit plates with JADE S200 selective soldering machine. The line consists of 100DX component installer, a convection reflow oven HELLER 1707 MK111, circuit plate loader / unloader, and a conveyor system.

### JADE S200 Specifications:

- Tips used: AP-1, AP-1 Extended, APJet Extended, JetWave, broad wave tip (150 mm)
- Fluxing spray
- Training with the use of color programming video camera
- Infrared heating of the whole circuit plate (including during soldering) with feedback
- Selective preheating
- Wave height control

### HELLER 1707 MK 111 Specifications:

- Maximum circuit plate width: 460 mm
- Maximum temperature: 350°C
- Heating zones: 7
- Cooling zones: 1

### MY 100DX Specifications:

- Component installation rate: 34000 units / hour
- Component installation speed per unit: 0.18 seconds
- Component installation accuracy: 95 µm, 2.6
- Minimum component package size: 0.4x0.2 mm
- Maximum component size: 56 x 56 x 15 mm
- Maximum component weight: 140 g
- Maximum circuit plate size: 70 x 50 mm
- Circuit plate thickness: 0.4 – 6 mm
- Capability to install components in all types of frames, wrapped in tape, cases and matrix trays.
- Capability to check the electrical parameters of resistors, capacitors, diodes and transistors







## Milling Workshop

The milling workshop is equipped with 14 modern CNC milling centers. Due to the use of imported tools, the high-speed and high-performance milling machines ensure high-quality surface finish. Modern vacuum devices can handle parts made of sheet material. The Operations/Process Service is supported by computer-aided design programs and PowerMill (T-Flex).

### Victor Specifications:

- Mounting plate motion: X-axis 850; Y-axis 520
- Spindle motion: Z-axis 560
- Maximum rotary velocity: 10000 rpm
- Processing accuracy: 0.01 mm





## Turning Workshop

CNC sliding headstock turning machines and multi-purpose CNC turning centers perform milling, off-center drilling, cross drilling and tapping, in addition to turning operations.

### Quick Tech Specifications:

- Bar diameter: 7 to 40 mm
- Maximum processing length: 100 mm
- Maximum sub-spindle bar: 30 mm
- Thread: M2 to M20
- Accuracy: 0.02 mm

### Victor Specifications:

- Bar diameter: 7 to 45 mm
- Maximum length of work part: 200 mm
- Thread: M1 to M6
- Accuracy: 0.01 mm

### Esco matik NM647 Specifications:

- Material diameter: 0.8 to 6.5 mm
- Maximum processing length: 60 mm.
- Maximum thread: M4
- Accuracy: 0.001 mm

### JIHNFA Specifications:

- Bar diameter: 2 to 20 mm
- Maximum processing diameter: 20 mm
- Maximum processing length: 200 (90) mm
- Thread: M2 to M6
- Accuracy: 0.005 mm







## Casting/Molding Site

The injection molding site is equipped with 10 imported machines for casting aluminum and zinc alloys, which allow manufacturing castings from 10 grams to 3 kilograms in weight, in sizes ranging from 21 x 10 to 500 x 300 x 80 mm up to grade 5.

CLPO 400/55-B2 Type Die Casting Machine for Aluminum and Zinc Alloys (vertical press chamber).



### Specifications:

- Plate dimensions: 990 x 1000 mm
- Distance between columns: 605 x 605 mm
- Mold height: 300-750 mm
- Pressing force: 280-560 kN
- Weight of poured alloy: 8 kg

711A08 Type Die Casting Machine for Aluminum and Zinc Alloys (horizontal press chamber).

### Specifications:

- Plate dimensions: 840 x 890 mm
- Distance between columns: 530 x 530 mm
- Mold height: 260-600 mm
- Pressing force: 300 kN
- Weight of poured alloy: 5.3 kg





## Stamping Site

The stamping site is equipped with the state-of-the-art equipment for sheet material processing, including Amada presses and multi-purpose presses with 10, 20, 50, 100, 110 and 200 ton force. Punch5, Unfold and Bendcam applications are used for control programming.

**Amada AC-2510NT Turret Press Specifications:**

- Stamping force: 20 tons
- Material: steel, aluminum, stainless steel
- Material thickness: 0.8-3.2 mm
- Maximum sheet dimensions: 1250 x 2500
- Accuracy: +/- 0.1 to +/- 0.07 (high accuracy mode)

**Amada HFP 80-25 Sheet-Bending Press Specifications:**

- Operating force: 80 tons
- Operating zone length: 2500 mm
- Material thickness: 0.5-5 mm

**Lonji Specifications:**

- Operating force: 110 tons
- BPM: 30-50
- Slider hall: 120 - 180 mm
- Maximum distance between slider and stamp slab: 320 - 350 mm
- Stamp slab dimensions: 1020 x 560 mm







### Finishing Workshop

The finishing workshop includes a galvanizing section, a painting section, and a plastic work section. At the galvanizing section, zinc, nickel, and multilayer coatings are applied to such materials such as steel, aluminum, and its alloys. It is possible to use electrolytes with brightening agents (bright zinc, nickel, or tin-bismuth). At the painting section, parts and components are covered with various enamels including the following: ML-12, EP-140, PF-115, PF-218 (including VL-02 (phosphating) and GF-0119 (anticorrosion) pre-primer).

#### Specifications:

##### Zinc lines:

- + Bath dimensions: 2100 x 1000 x 1200 mm
- + Possibility to apply coatings to parts in drums
- + Zinc baths: 3
- + Suspension output rate: 13 min
- + Line capacity: 5-7 m<sup>2</sup>/hour

##### Nickel and tin-bismuth lines (aluminum alloys):

- + NiOVi line capacity: 1.5 m<sup>2</sup>/hour
- + Suspension output rate: 15 min
- + Bath dimensions: 750 x 1000 x 1000 mm
- + Nickel baths: 2
- + Tin-bismuth baths: 2





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### Line for industrial assembly of electric motors

The line is developed according to advanced Italian technologies. Electric motors manufacturing is a complex and varied process, which includes work-pieces production, their mechanical treatment and assembly. Also all general machine building technological processes and special ones are carried out :

- + Automatic Brushless Stator Slot Insulating Machine
- + Automatic Brushless Stator End Moulding Placing Machine
- + Automatic Brushless Stator Winding Machine
- + Semiautomatic Brushless Stator Testing Machine
- + Automatic Pallet Conveyor System
- + Semiautomatic Brushless Rotor Magnets Inserting Machine
- + Surface treatment device for magnets
- + Semiautomatic Brushless Rotor Ball Bearings Placing Machine

The manufacturing capacity of the line allows to carry out issuing of electric motors with quantity of up to 25000 units monthly.

Electric motors of Open Joint-Stock Company «Kaluzhskii Electromekhanicheskii Zavod» are distinguished by high quality of the assembly, correspond to modern ISO standards and provide full-value operation of car systems, which operate without any break.







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