

ALFA-100 – domestic Top-class soldering system

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TERMOPRO – Russian leader in manufacturing of SMT and Rework/Repair equipment announced lately about new Soldering Station ALFA-100 production start up. And this new product has exceeded all expectations really standing in the same line with models of World leading manufacturers.

Soldering Station ALFA-100 was developed by heat engineers who have more than 20 years experience in this field. Their list of achievements includes NP-series pre-heaters and IK-650 – BGA soldering system with unique termoprofiling software "Termopro-Center". And these equipment became a widely popular in our Country, as well as in export. It is not a big surprise that designers have not just developed a new product for replacing imported ones, but to create Top-class instrument meets highest requirements of modern soldering technology.



Pic.1 Soldering Station ALFA-100.

Dynamic thermo-control is the modern trend in Development of modern Soldering Stations. The key-point of concept is in a fact that for high quality soldering of modern PCB's, which can contain both tiny components and bulky connectors with huge heat capacity, it is not enough just to support the soldering iron tip temperature set up. The heat dynamic is to be under control or in other case light contacts will be overheated very fast and bulky ones will me melting too slow. Dynamic thermo-control is realized with a helps of continuous automatic selection of applied power for soldering iron heater, what depends on heat capacity of processed solder joint. The soldering station estimates the applied power by speed of temperature deviation from set up value.

Dynamic Control "Fathers-Founders" for soldering irons were engineers of METCAL with their induction iron. Later, this technology was accepted and used by PACE in their last generation stations. Nowadays an iron with dynamic thermo-control is an industrial norm, and ALFA-100 is not exception. In a process of the Station development mathematical modeling of soldering processes was used, what let achieve a maximum heat transfer and fast reaction features for the system. Platinum thermo-sensor (which by the way does not need calibration) reads out go with a speed 120 circles per second and sent data to processor. The system reacts to a tip temperature deviation immediately, estimate the speed of this deviation and choose a optimal applied power.

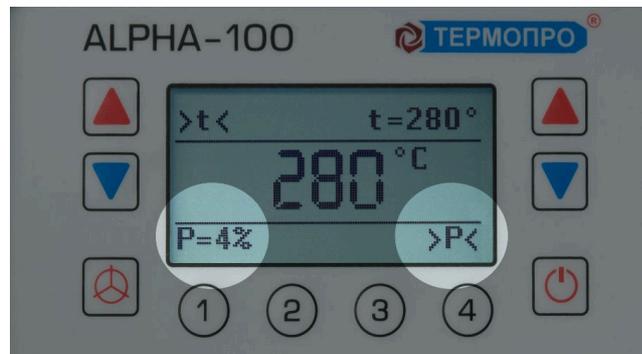
The weight and diameter of heater are minimal due to special modern materials used. At the same time, ALFA-100 Heat transfer ability is remarkable, and it is difficult to compare with any other analogue. It melts bulky contacts within couple seconds. Such effective heat transfer become a result of good heater design with tough side clipping of tip along the whole shank end as well as special space

industry materials. First of all, it is super heat-resistant insulation for heater coils, and heat-conductive materials filled voids – all these are Russian scientists' development.



Pic.2 Soldering Iron ALFA-100.

100 Watt capacity facilitates high tool's heat transfer as well. Such high wattage of soldering stations was not "really welcome" before dynamic control tools appeared, because it causes a high risk of light contacts overheating. Dynamic thermo-control in ALFA-100 station removes this problem completely with power dosage depended on contact heat capacity. In a practice, the tool needs a power more than 50 Watts very rare, and operator can see it on power indicator during a work (Pic.3). Additionally to that, applied power can be manually limited in ALFA-100 unit, what is done especially to meet some industries requirements.



Pic.3 instantaneous power indicator (left) and power limitation mode is on.

Of course, for ideal thermo-dynamic control it is preferable to make a tip with minimal mass, therefore superlight tips used in Top-grade systems are combined with heater into one unit (or cartridge). This technical approach is really good, but one problem, it is expensive. And by ALFA-100 designers mind the station has to cost as much as Russian customers can afford, and cannot be expensive. Therefore, separate design of tip-heater system had been selected (Pic.4). Bore diameter refers to one of wide spread standard, what let use a tips of world known manufacturers. This feature is convenient for those who already use some of importer systems and has a stock of tips available.



Pic.4 Fast tip replacement design

Special thanks has to be told to a tool's ergonomics. Hand-piece is well-balanced and, how they say, "sleeps in an palm" (Pic.5). The use of high quality materials and right geometry of hand-piece avoids its heating up higher than 40 centigrade's in most tough regimes of operation. Its weight with the heater is 45 grams. Cable has a soft thermo-resistant insulation and protected from fracture with special spring. A tip can be replaces within seconds without tool switching off.



Pic.5 Iron Hand-piece is well-balanced.

For tips endurance prolongation and effective electric power consumption ALFA-100 system contains automatic temperature drop down when the tool is not in use. Parameter of this "falling asleep", as well as a time of full turn off is programmable by a simple and convenient menu (Pic.6). In the same mode working temperature limits and tip temperature compensation factor can be set up. Upon setting temperature compensation factor the system adjusts set up temperature automatically taking into account running temperature and keeps working like the thermo-sensor is on "a top of the tip".

A screenshot of the ALFA-100 system's Set up menu. The menu is displayed on a blue background with white text. The title is "Параметры пайки" (Soldering Parameters). The menu items are: "1 tмин 150°", "2 tмакс 350°", and "3 tфикс" with a small square icon next to it.

Параметры	пайки
1 tмин	150°
2 tмакс	350°
3 tфикс	<input type="checkbox"/>

Pic. 6 One of pages of Set up menu.

All system settings are protected with password what prevents unauthorized access to re-set, and allows process supervisors to control soldering temperature regime completely. If an operator uses, or can use, several temperature settings for different operations he can store these into 4 memory cells, and change working temperature settings with one button press (Pic. 7). Memory cells data can be protected from change with pass too.



Pic. 7 A store of temperature settings in memory cell for a further fast change.

ALFA-100 Soldering System has an antistatic design and meets all modern ESD requirements. Additionally to that, equipotential soldering is provided too. For this matter processed board are to be connected to station control unit through a special terminal (Pic.8). This approach excludes appearance of electric potential between a board and soldering iron completely, and in result removes any risk electric discharge at component.



Pic. 8 Connection with unit for equipotential soldering.

Before starting up industrial production the new Soldering Station got through serious tests and demonstrated a high reliability. And this is understandable if we know what sort of materials and components were used in design. ALFA-100 is a first model in a future family line of soldering stations. 2-channels version does already exist under name ALFA-102, and in 36 Volt version. Thermo-tweezers, Hot-Air iron, and Vacuum desoldering iron hand-pieces production are in a plans. After all Russian Industrial customers have a real chance to get a full range of soldering systems in visible future, which will cover all manual soldering technology challenges both for production and rework/repair of Electronics.