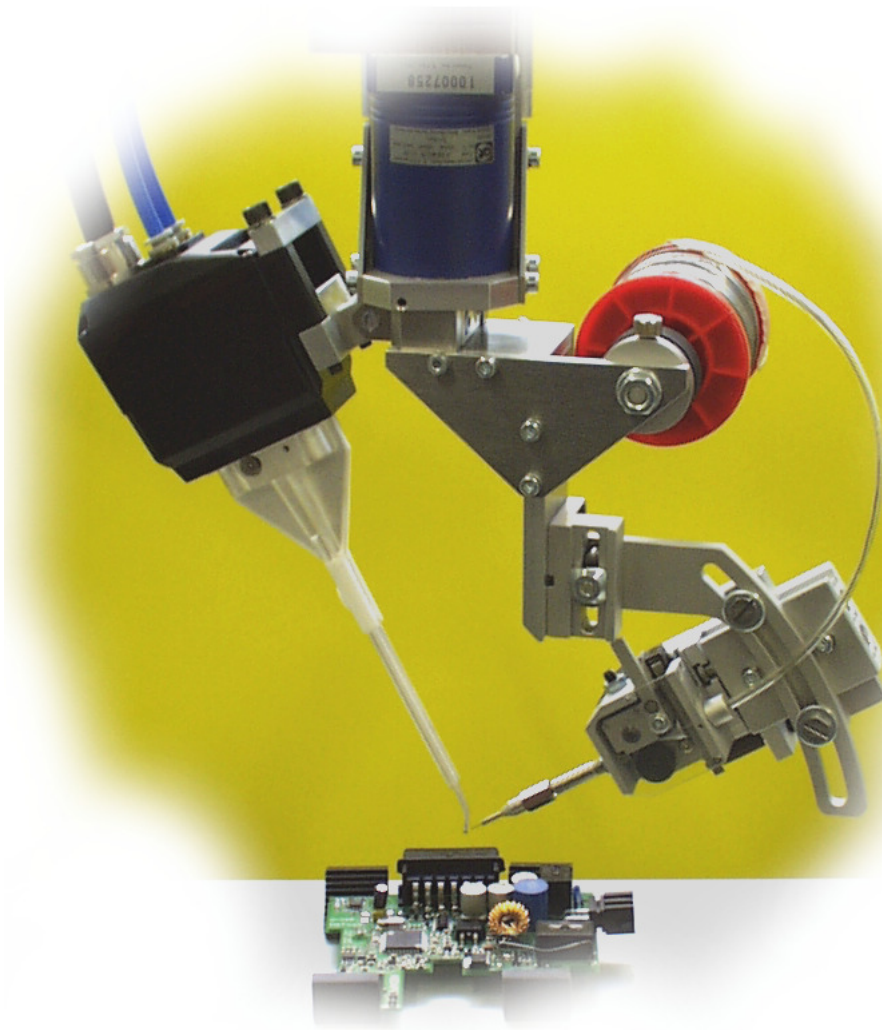# *Automated induction soldering*
with the robot tool LK-I

- *contactless heating up of the solder joint*
- *high power density*
- *2.6 kW HF inductor with water cooling*
- *optionally with solder feeder Mosquito A25*

Induction soldering

At a multiplicity of applications there are joints, which must be soldered individually: Cables, plugs, special construction components and modules with only a few solder joints.

A further application is the use of special elements, e.g. plugs and pin-through-hole on SMD-Boards. Often single point soldering is required because of assembling, e.g. if a completely equipped PCB is inserted into a housing and has to be connected with plugs or other components by soldering. Automation of these single point soldering processes does not only afford a cost-efficient mass production, it is also demanded to obtain a constant high quality. Thus, it cannot be done without automated single point soldering in the modern electronics manufacturing.

For induction soldering a secondary spool, the soldering inductor, is connected with a high-frequency generator. The alternating current flow in the inductor induces a magnetic field. Eddy currents in the soldering joint caused by that magnetic field effect the heating up to the soldering temperature. In order to avoid a warming up of the inductor, cooling water is pumped through the hollow spool wire. Induction soldering makes a large energy transfer possible. A further advantage of this procedure is the low expense for maintenance.

Technical data

HF-Induktor I15		Solder feeder (optional)	
Power at inductor	32 kVAR	Diameter of solder wire	0,5-1,5 mm
Frequency	0,5 – 1,0 MHz	Feed	0-24 mm/s
Dimensions inductor tool	107 x 52 x 77 mm	Power	1,7 W
Weigth inductor	1,3 kg	Ration of planetary gear	1:166
Length spool holder (standard)	144 mm	Stroke pneumatic axis	30 mm
		Angle solder wire feeder	20° to 40°
Power unit PC32-IL		**Water cooling KA07**	
Dimensions (w x h x d)	275 x 140 x 265 mm	Dimensions (w x h x d)	565 x 345 x 440 mm
Power supply	230V AC, 50Hz, 13A	Power supply	230V AC, 50Hz, 5,5A
Weight	10 kg	Weight	42 kg
Interfaces	24V IO / RS232	Nominal power	750 kcal/h

Technical description

This method is suitable both for Reflow soldering with soldering paste and for wire soldering.

The soldering tip is positioned so, that the solder joint is located in the induction field. First the inductor is switched on. The solder joint is heated up with the programmed power. After the preheating time the solder joint has reached the soldering temperature and solder wire can be fed. The solder cylinder is moved to the front position thereto and the solder feeder is switched on. The solder wire is fed at the programmed speed. After the feeding time the solder motor is switched off and the solder cylinder is moved backward. During the after-heating time heat energy is further delivered, so that the solder wets the whole solder joint and a meniscus can be formed.

The process can be optimally adjusted with the following parameters:

- Preheating time
- Solder feeding time
- After-heating time
- Power
- Solder wire feeding speed

In addition to the heat energy, the solder wire feeding is very important for an accurate soldering process. The solder wire is lead between two hardened knurled wheels with adjustable pressure for motion without slip. The pneumatic pressure unit allows a very precise pressure adjustment and a pressure relief during production pauses.

The fed solder is continuously detected with a miniaturised rotary encoder. The microprocessor of the control unit evaluates the signals and compensates any disturbance.

At the end of the forward solder feeding the rotating direction of the motor is returned and the solder wire is moved backward for a defined short distance. This allows an accurately constant melting of the solder wire and thus perfectly identical appearing solder joints. Furthermore, the control unit detects every solder wire hold-up and the end of the solder wire.

The process control works with 24V-signals or with the RS232-interface. The integrated microcontroller relieves the superior control unit and permits a reliable soldering process.

The parameters are adjusted by a menu-driven display. In an alternative version, the parameters can be set by RS232-interface.

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