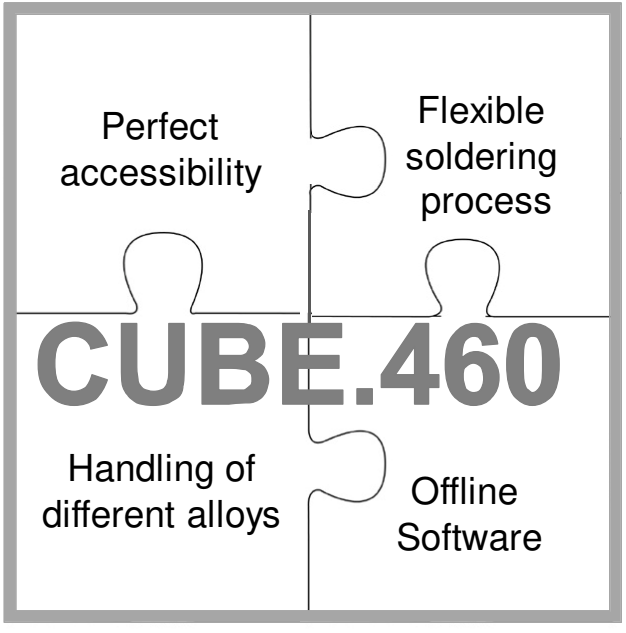
Selective Soldering System

CUBE.460

INERTEC developed the new CUBE.460 which is a new – perfect machine platform

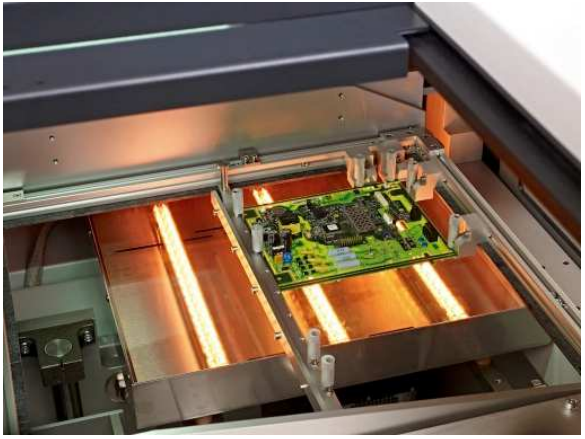
This entry level machine offers already a high technical standard as already proven components like CAN open bus servo motors are used.

Professional functions to an attractive price



Especially for smaller size companies or subcontractors is the easy handling and operation as well as the high flexibility the main key and the crucial competitive edge.

As a standard the drop jet fluxer as well as a coated soldering aggregate is installed for the use of lead free alloys. INERTEC can also install the quick reacting quartz heater.



The top side heater is defined as a plug-in module covering the full size of 460 x 460 mm. Using an IR convection heater with a special nozzle for a defined heat transfer from the top side.

Loading Module

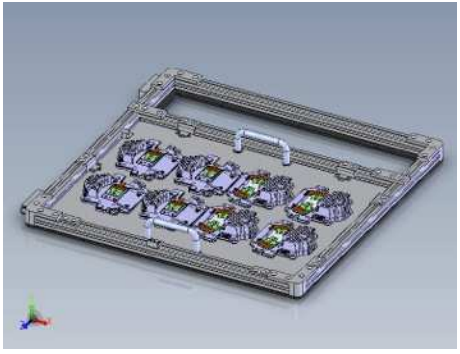
The machine is batch loaded and so the operator can load and unload one pallet during the second pallet is in process.

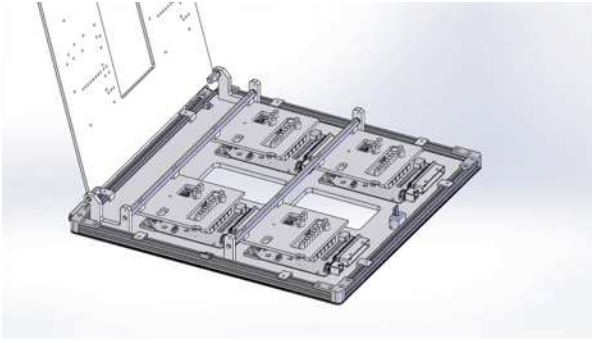
Handling with pallets

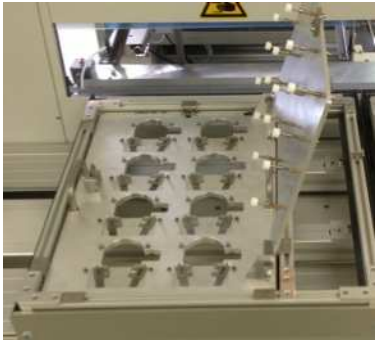
The different handling possibilities
with the machine CUBE.460

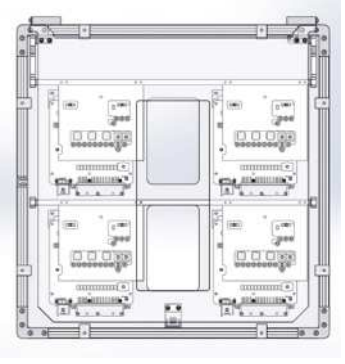
- The Batch loaded system CUBE.460 or the series ELS 3.3 do offer with their loading shuttle a very flexible production possibility.
- By using only two pallets, the machine cycle can be optimized.
- During one pallet is in production; means fluxing - preheating - soldering, the other pallet can be unloaded and loaded again with new products.

Handling with customized pallets







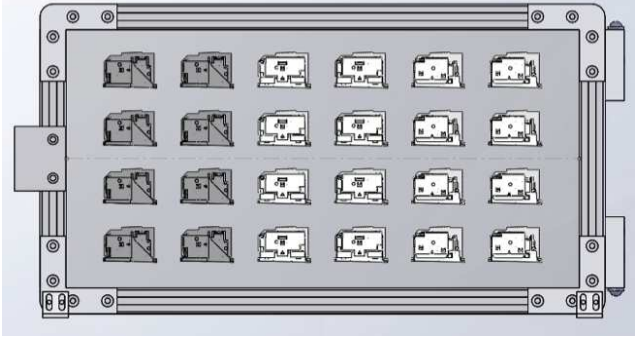


Handling with customized pallets

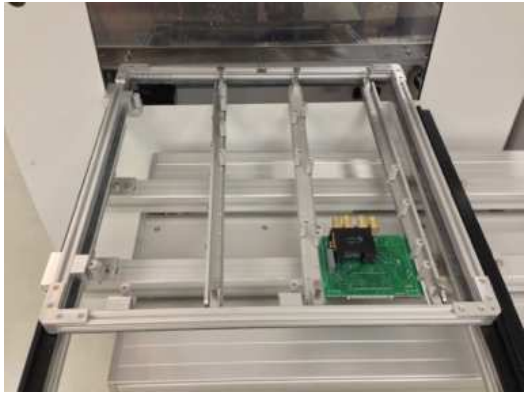
The advantage of customized pallets is, that special functions as downholding or fixation of parts can be integrated easily in the pallet.

Also this can be used to secure the assembly of components as the previous samples show.

This will help and guide the operator on a very easy and practical way.

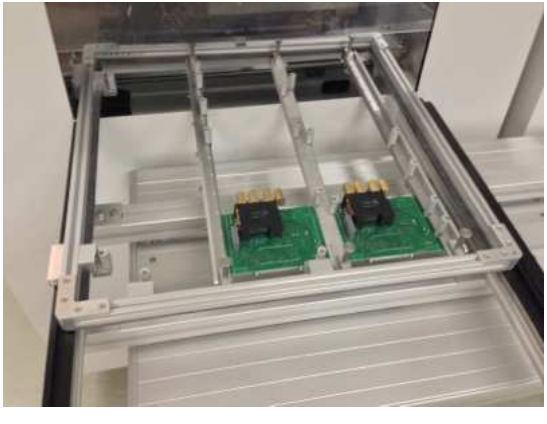


Handling with standard pallets



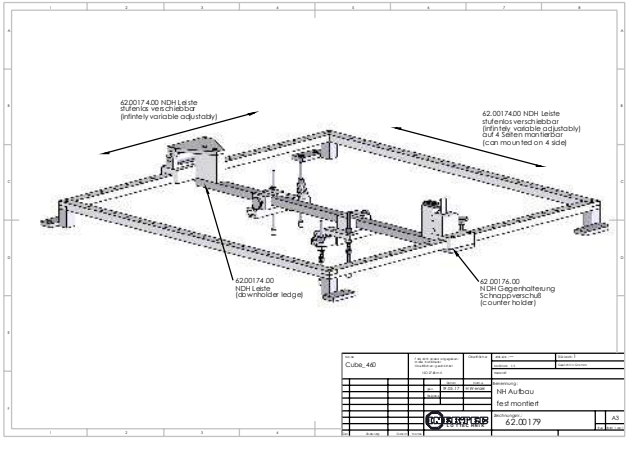
The standard INERTEC pallets are equipped with adjustable rails, which allow an easy changeover from one product to another.

Handling with standard pallets

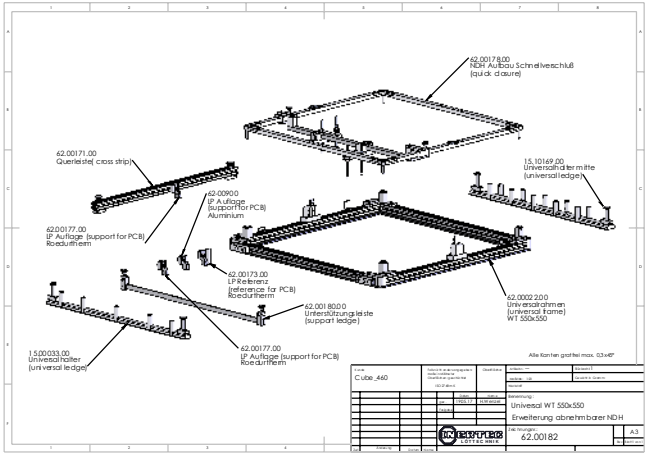


To optimize the throughput of the machine, the pallet can be equipped with rails which allow the placement on both sides. So it is easy to load multiple boards into the pallet and optimize the cycle time of the machine.

Handling with standard pallets



To be able to support special PCB types of he customer, did INERTEC design a flexible system of available supports and down holding devices.

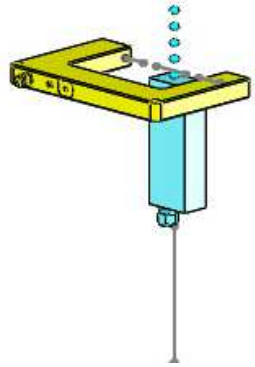


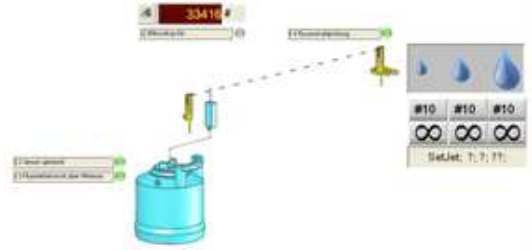
The Interior

Fluxer

- Spray fluxer for faster speeds, PCB's which have to be cleaned or by using the 200 mm wide full wave.
- Micro-Dot-Drop-Jet for precise control when using low solids, no-clean flux
- 3 liter pressurized flux pot including level control
- Possibility of multiple, separately controlled flux pots for using different fluxes simultaneously

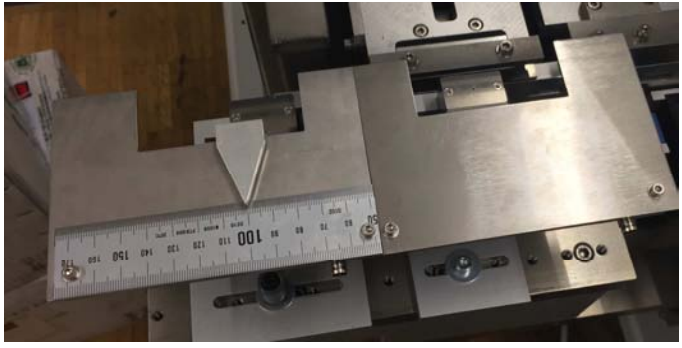
Fluxer





- Standard Micro-Dot-Drop-Jet Fluxer sensor
- Ensures accurate spraying
- Permanent monitoring of the fluxer beam

Fluxer



For cycle time optimiazion and in the use of two mini wave modules, it is possible to install a second Microp Drop Jet Fluxer.

This can also be done with the use of two different fluxes.

The adjustment of the flux dimensions is manually.

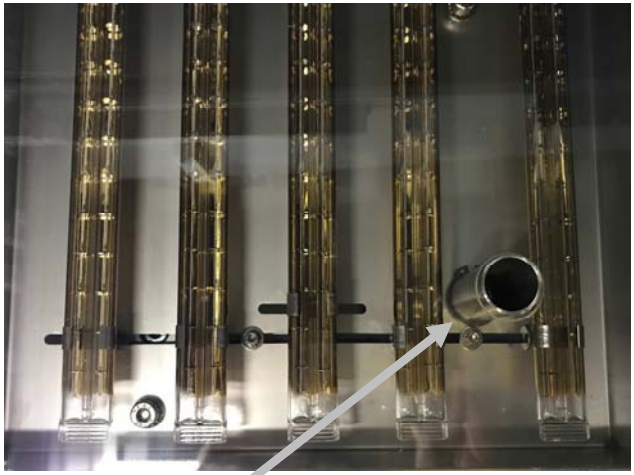
Preheat & top side heat

- Standard Bottom side fast reacting quartz IR pre-heat
- Top side process heater available on Cub.460 Batch

Preheat & top side heat

The pre-heat will be set manually in the s/w but the Pyrometer will monitor the temperature of the PCB and automatically make adjustments to the pre-heat time and temperature setting.

Preheat & top side heat



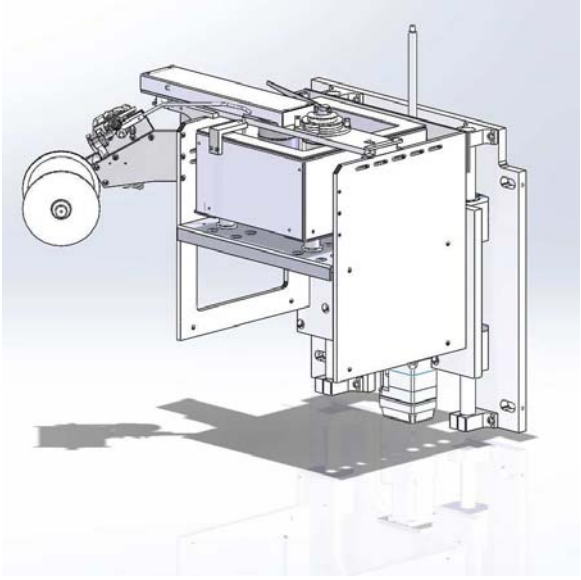
The Pyrometer is mounted on a fix position inside the quartz pre heater.

The electronic is installed inside the switch cabinet and connected to the BECKHOFF PLC.

Soldering area

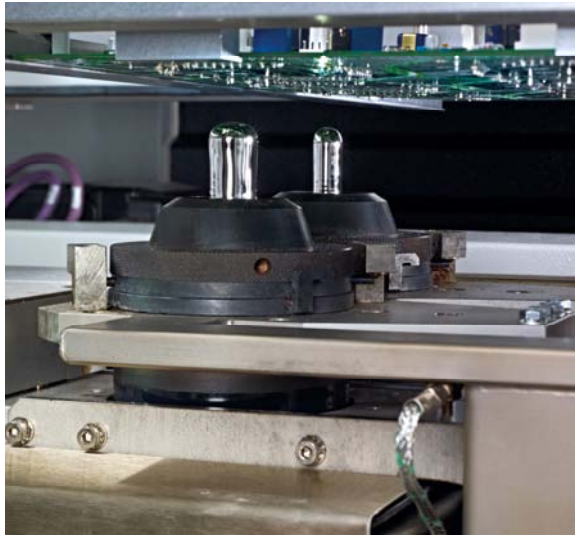
The standard machine is equipped with one mini wave module and can be upgraded to two mini waves easily in the field.

This makes the base machine very flexible.



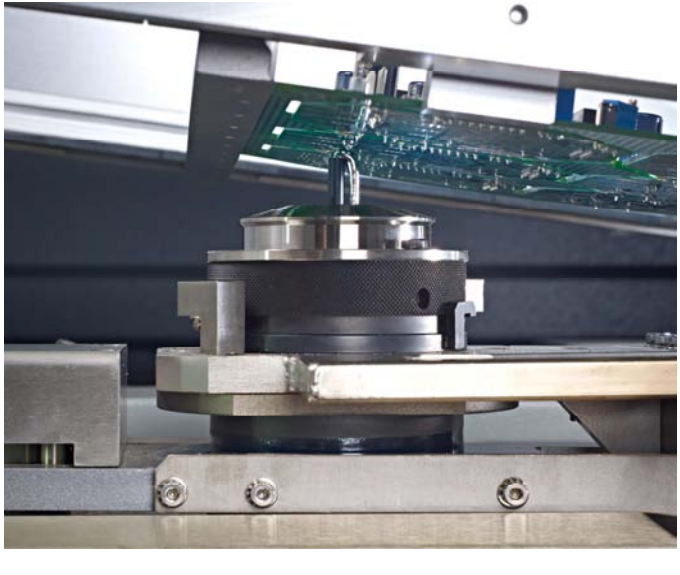
Soldering area

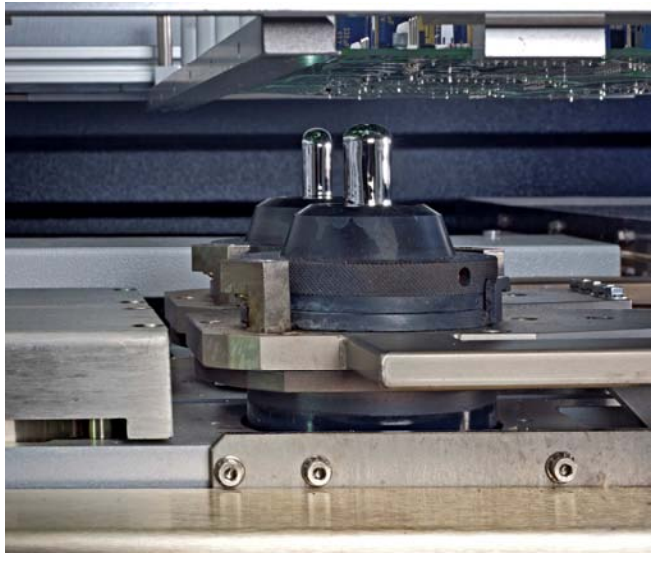
- INERTEC was the first to the market with many features including the first dual autonomous soldering nozzles which now sets the standard for flexibility
- Other systems offer dual nozzles, but some are not autonomous i.e. they can not operate individually with different types of nozzle diameters.



Soldering area

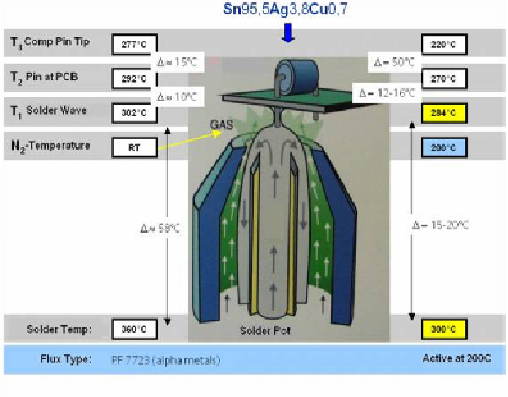
In this case different nozzle – e.g. the flowing style nozzle tother with the activated nozzle, or various sizes can be combined in the process.





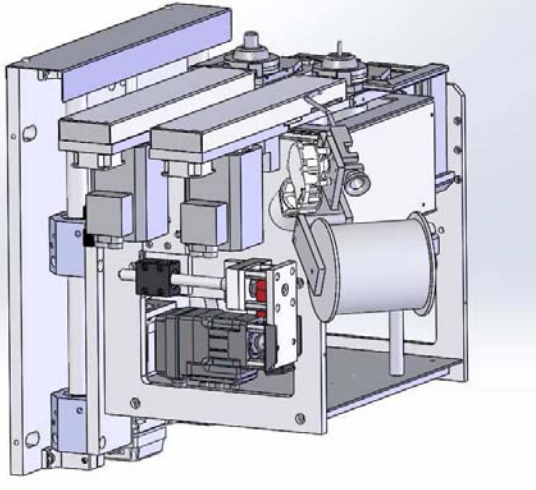
Soldering area

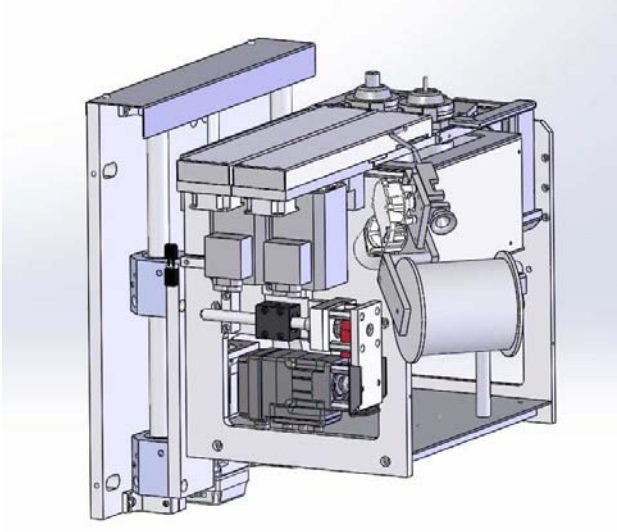
- The active hot gas technology is the perfect solution for the lead free soldering to prevent delamination and leaching on the PCB.
- Therefore the nitrogen is heated up via an 600 watt ceramic heater and actively guided to the soldering area.



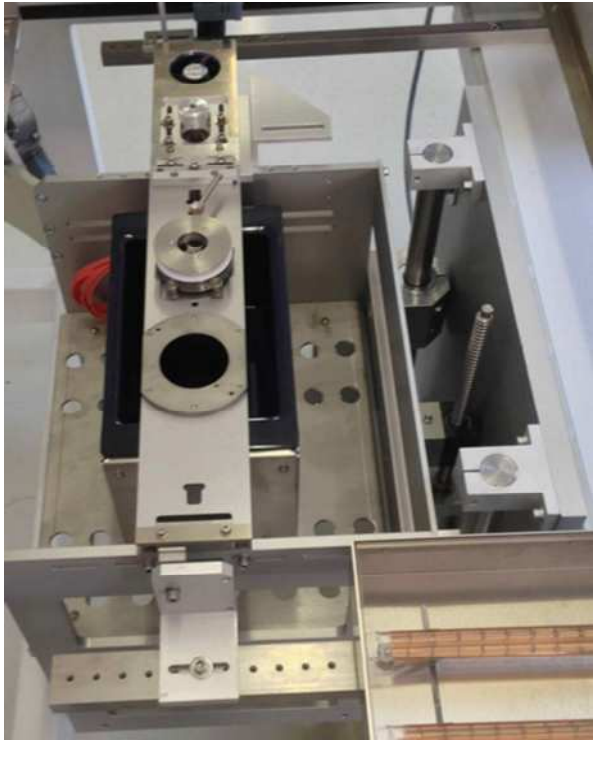
Soldering area

The CUBE also offers in alternative the automatic width adjustment of the mini wave modules. This allows to operate different with – by soldering panels with different distance – the automatic setup of the width up to 135 mm.

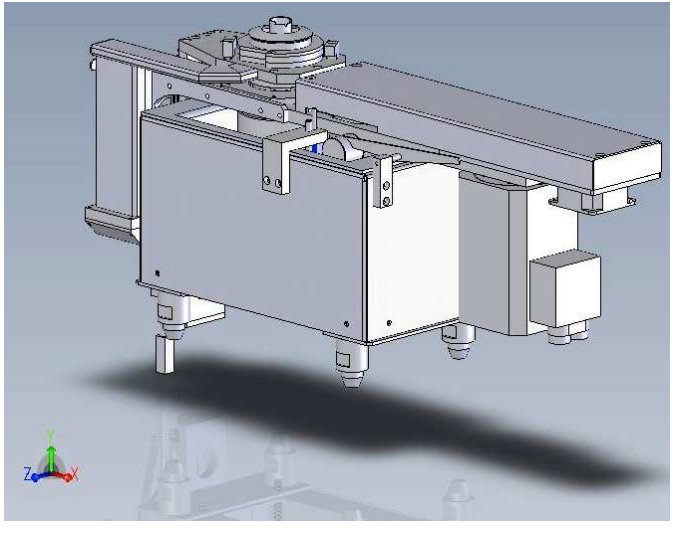




Soldering area

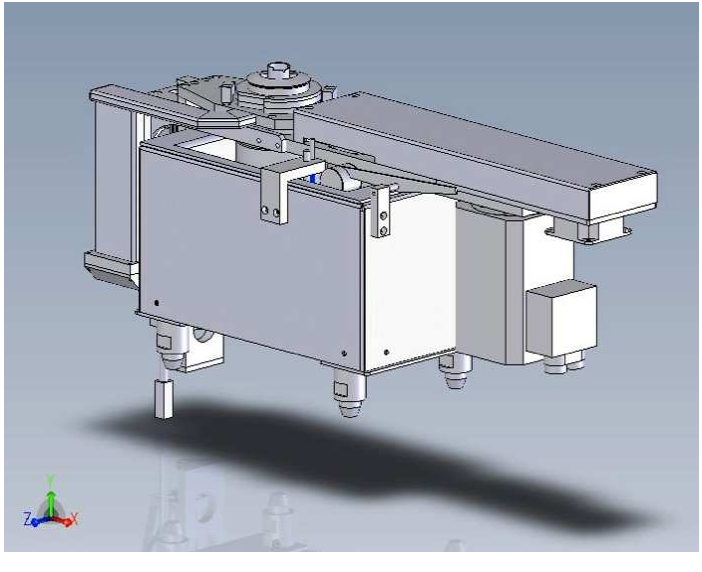


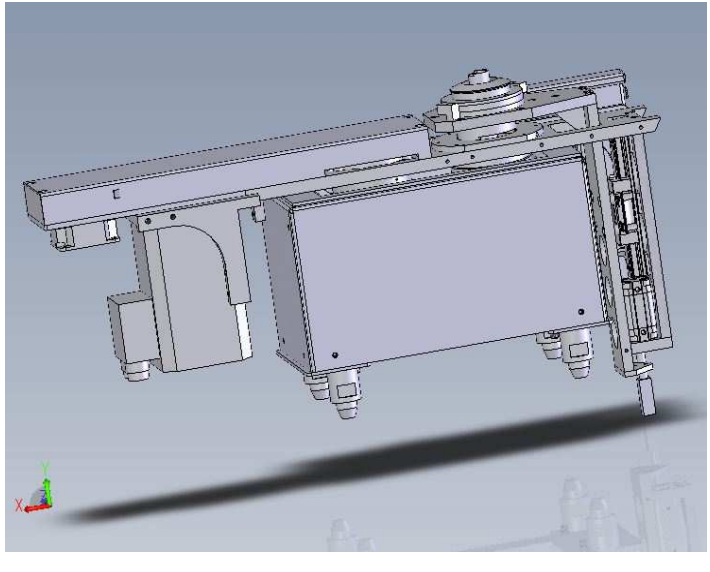
INERTEC also can offer two individual smaller solder pots for the use of different alloys in the CUBE.460



Soldering area

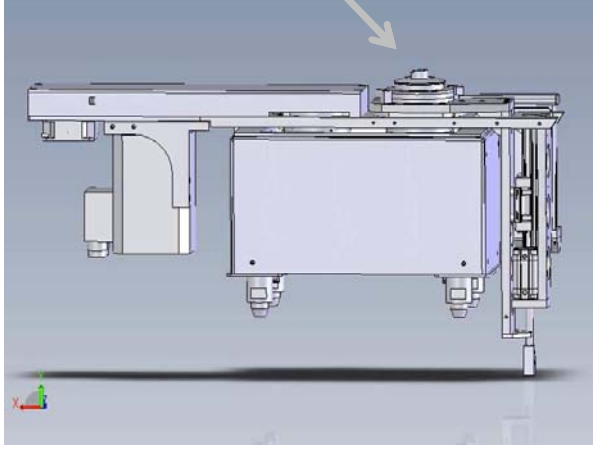
Two individual soldering modules are ready. So there is a base module – position to the operator side – available with hot gas nozzle and also an individual stroke cylinder.



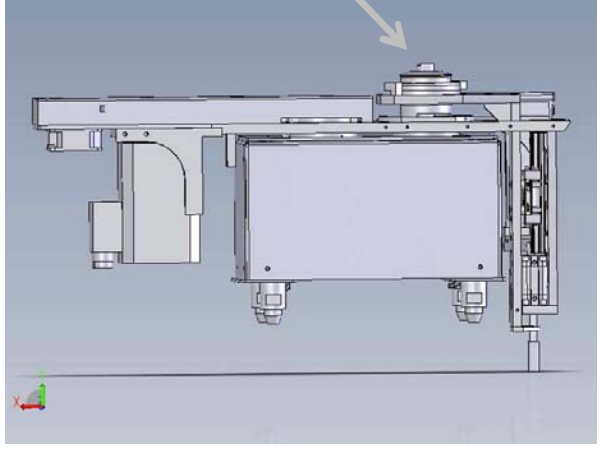


Soldering area

Standby **Position**



Soldering Position



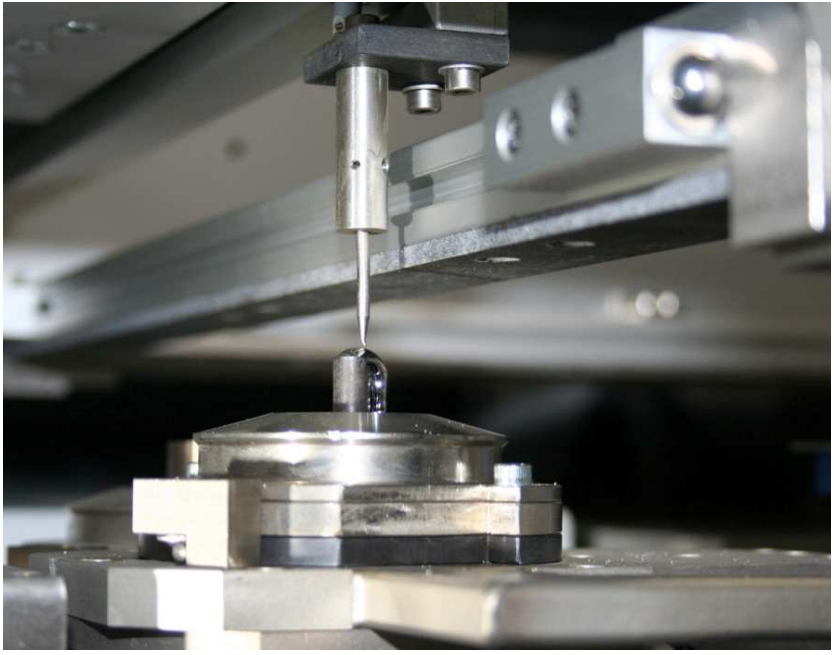
Perfect accessibility

The perfect accessibility to all parts for simple maintenance is one of the main features of the machine.

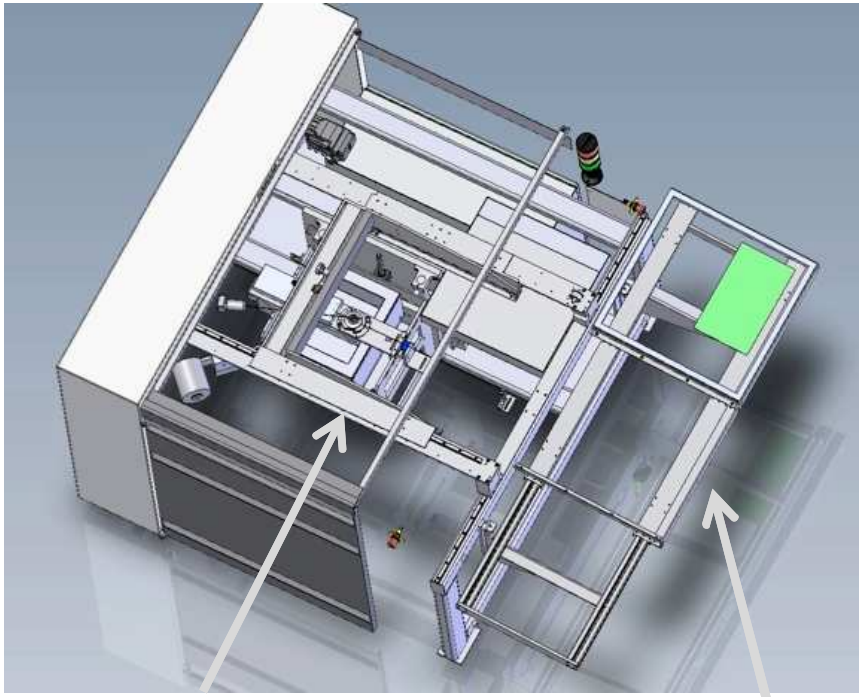
The machine can handle exchangeable soldering aggregates for the handling of different alloys. Easy change-over; approx. 3 hours including cool down and heat up.

Titanium Pin

Always before the first board will be soldered – start up, as well as in programmable cycles – the wave height is measured and adjusted via the titanum needle.



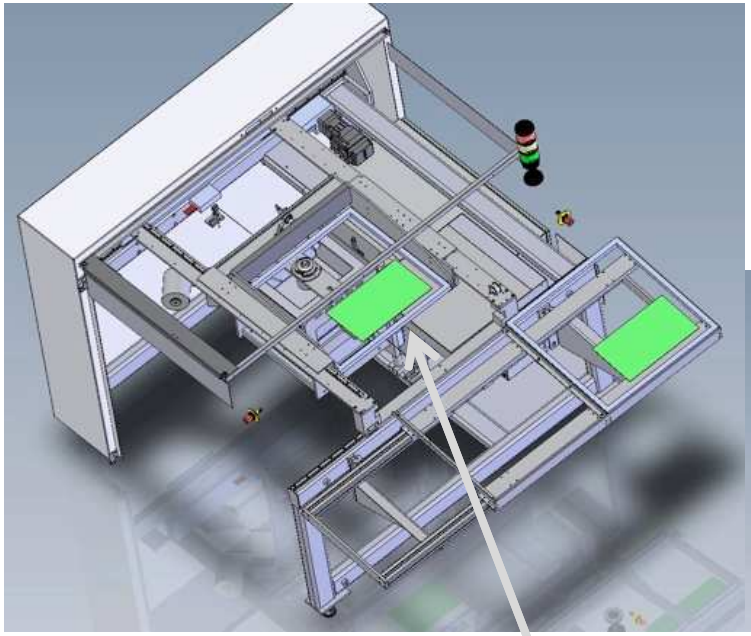
Construction details

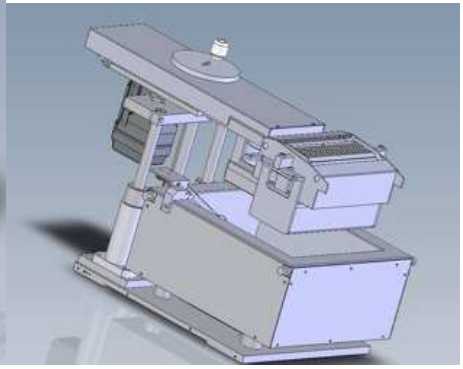


Solder aggregate with one or two individual soldering units

Loading Shuttle

Construction details



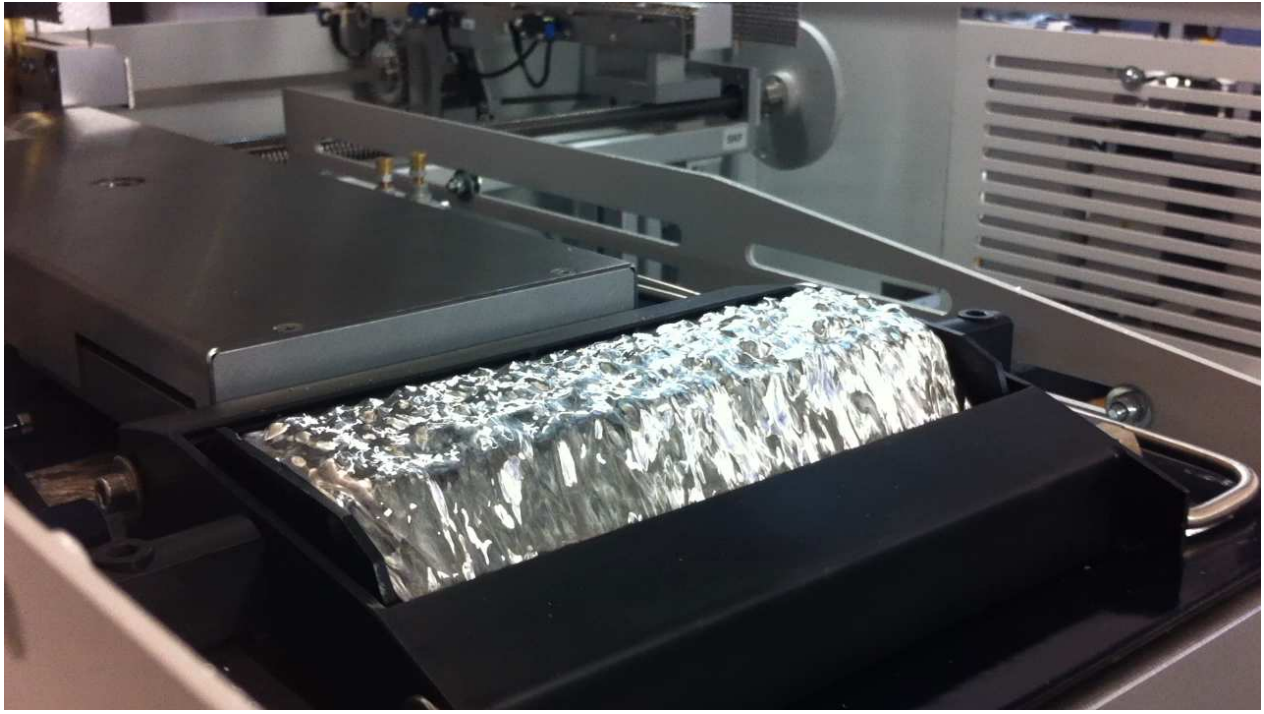


Based on the customers requirements INERTEC also can install a 200 mm wide wave module for the traditional wave soldering process

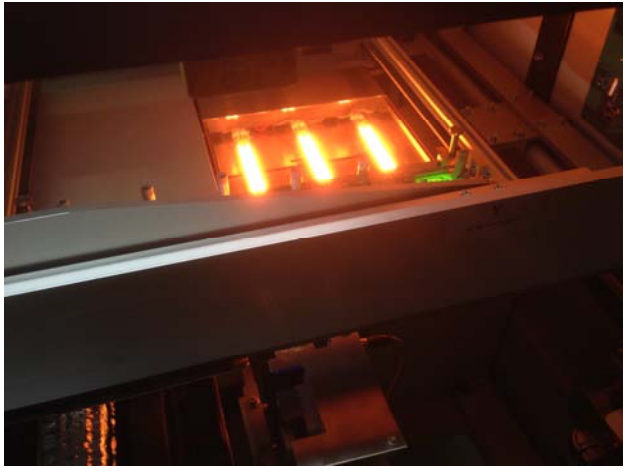
Full Wave Module

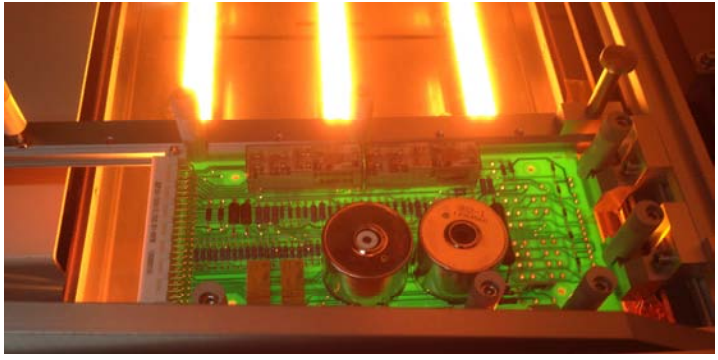
This module can be easily changed from a full wave to a mini wave by using a trolley.

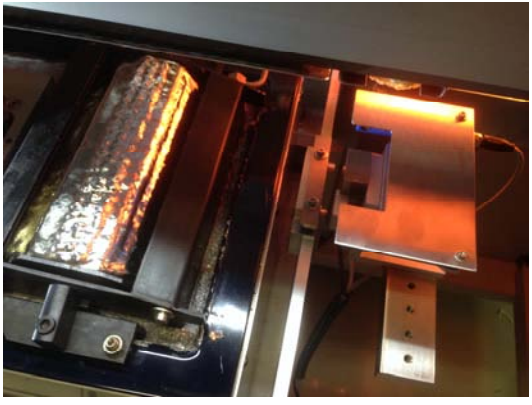
CUBE.460



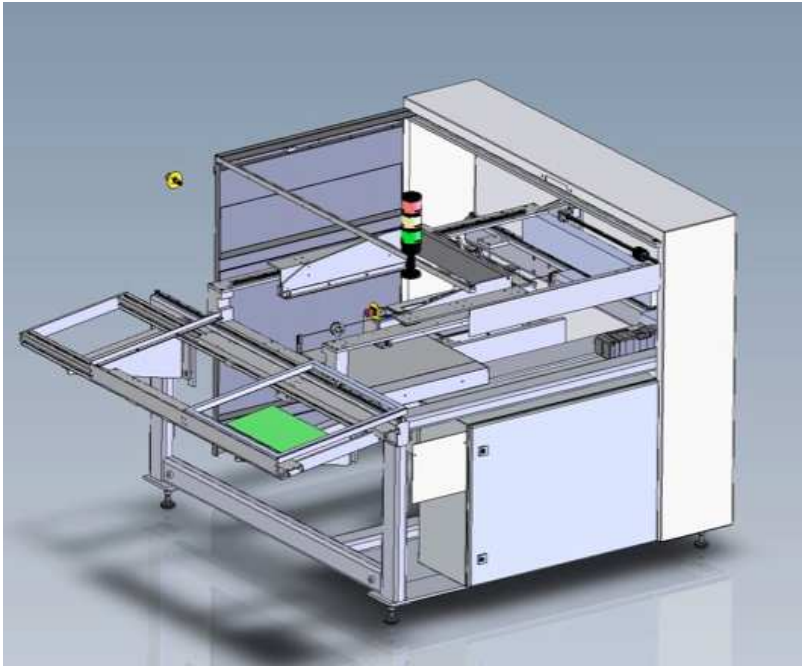
CUBE.460







CUBE.460



The gripper is able to handle the PCB in 0° and also in an 7° angle, what allows to operate activated and flowing style nozzles as well as an interpolation.

Soldering at 0° & 7°

Angle is adjusted automatically using pneumatic cylinder. Angle is based on the programming of the PCB, giving the ultimate flexibility to use various types of soldering nozzles.

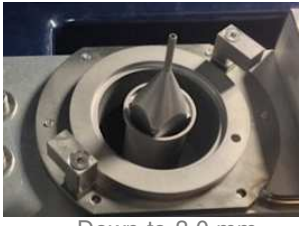
Mini wave nozzle

- Mini-wave nozzles can be purchased as an entire assembly or the inserts can be purchased individually
- Changing the inserts is very fast and easy
- Different sizes are available from 4 mm up to 20 mm

Solder nozzles


Traditional non-wetted


Wetted nozzle tips


Down to 3,0 mm

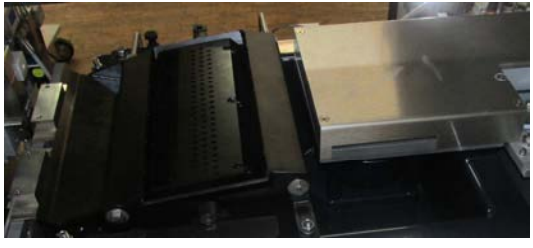

Special dual headed nozzle

Non wetted traditional nozzle

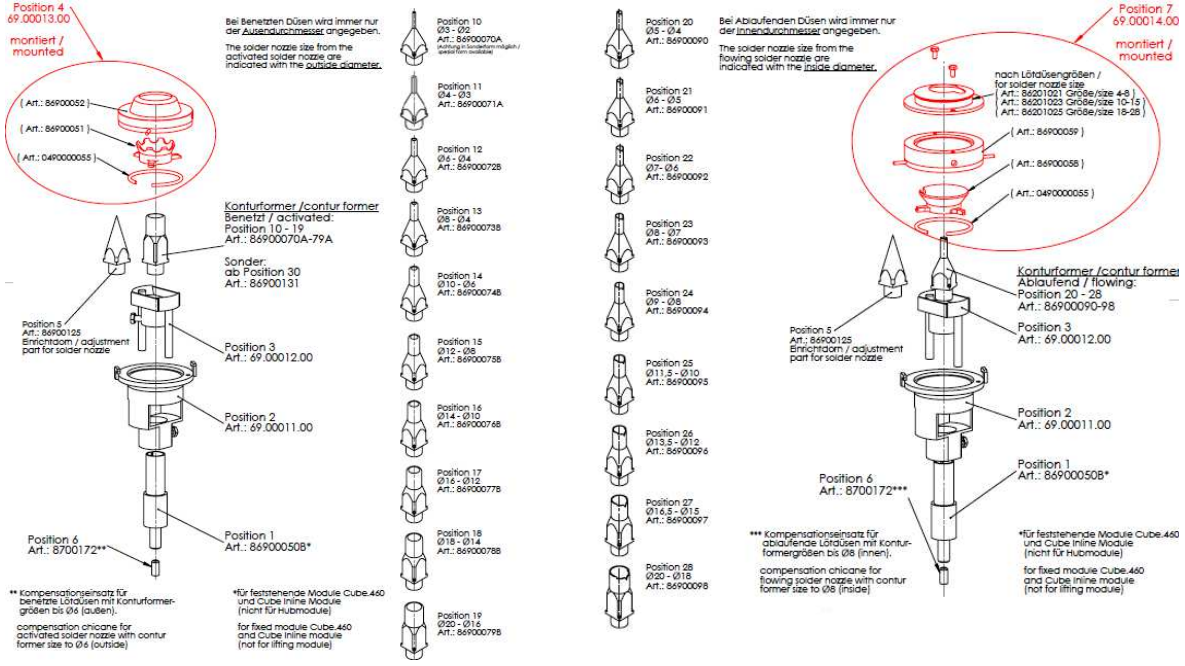
- Solders at 7° offering superior peel-off
- Solders left, right, forward, and dip
- Standard sizes from 4mm to 20mm
- Long life even with the most aggressive Pb free solders
- No Cleaning – lowest maintenance

Wetted (activated) nozzle

- Solders at 0° or 7°
- Can solder extremely close to other devices (less than 1mm)
- Solders in any direction
- Standard sizes from 4 mm to 20 mm



Solder nozzles

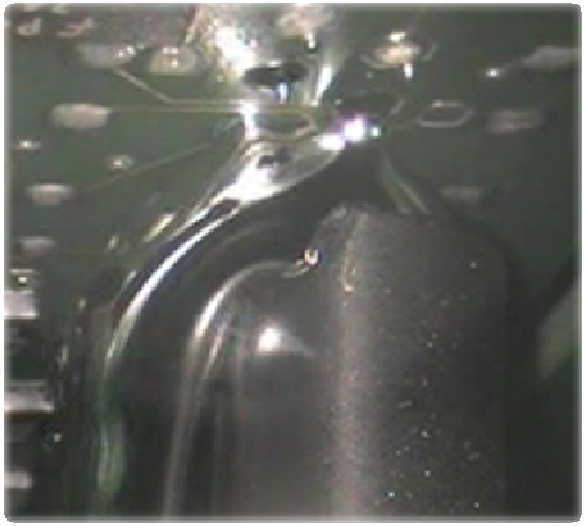


The standard of the available soldering nozzles is covering the area from 3 to 20 mm diameter. Special soldering nozzles on request.

Solder nozzles

Process viewing camera showing various available nozzles.

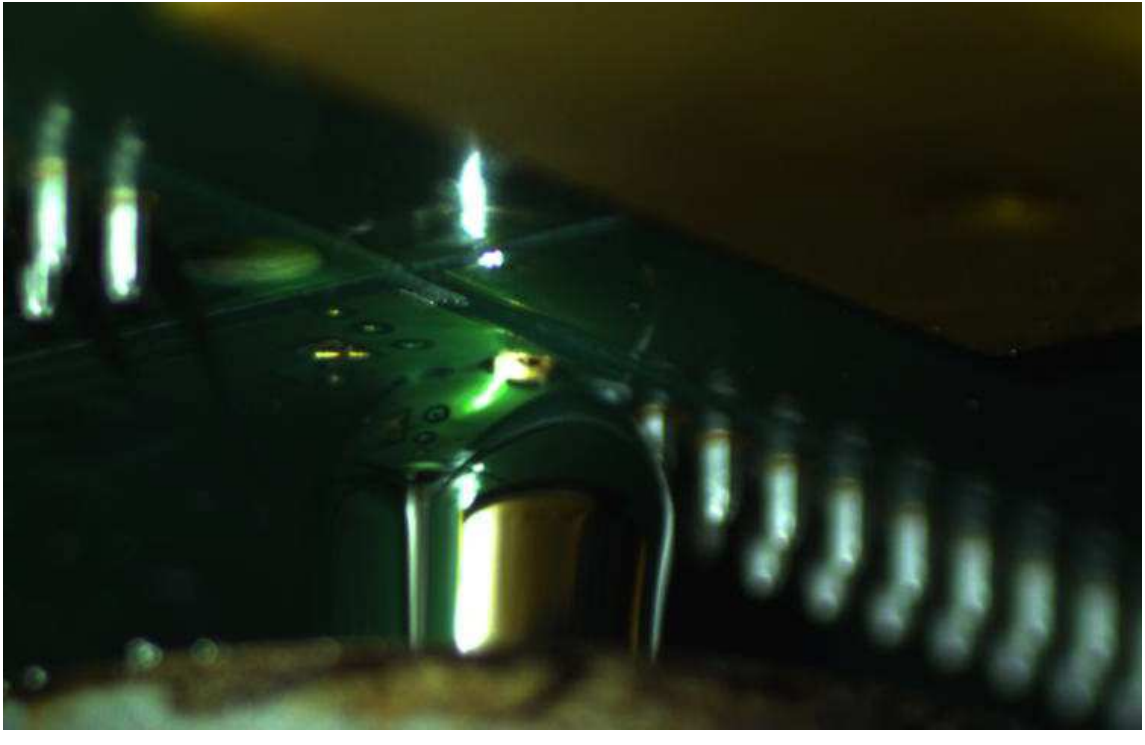
Wetted unidirectional



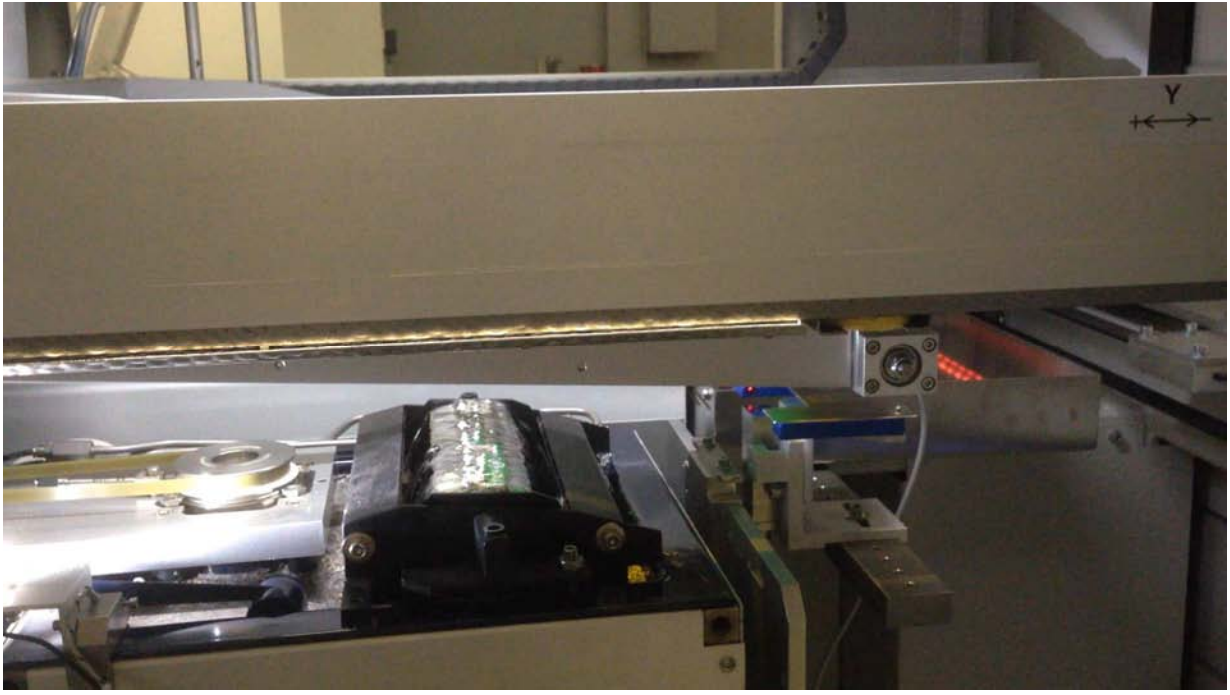
Non wetted directional

Non-wetted traditional nozzle

Wetted (activated) nozzle



Wave module 200 mm



Special nozzles

- Dual mini waves for special applications
- Special nozzles with a big variation of different forms as well as dual nozzles are available
- Nozzles up to 43 mm can be used for the process

- Solders at 7° like traditional wave
- Solders at much higher speeds compared to small selective nozzles
- Covers more area in a single pass

Special nozzles

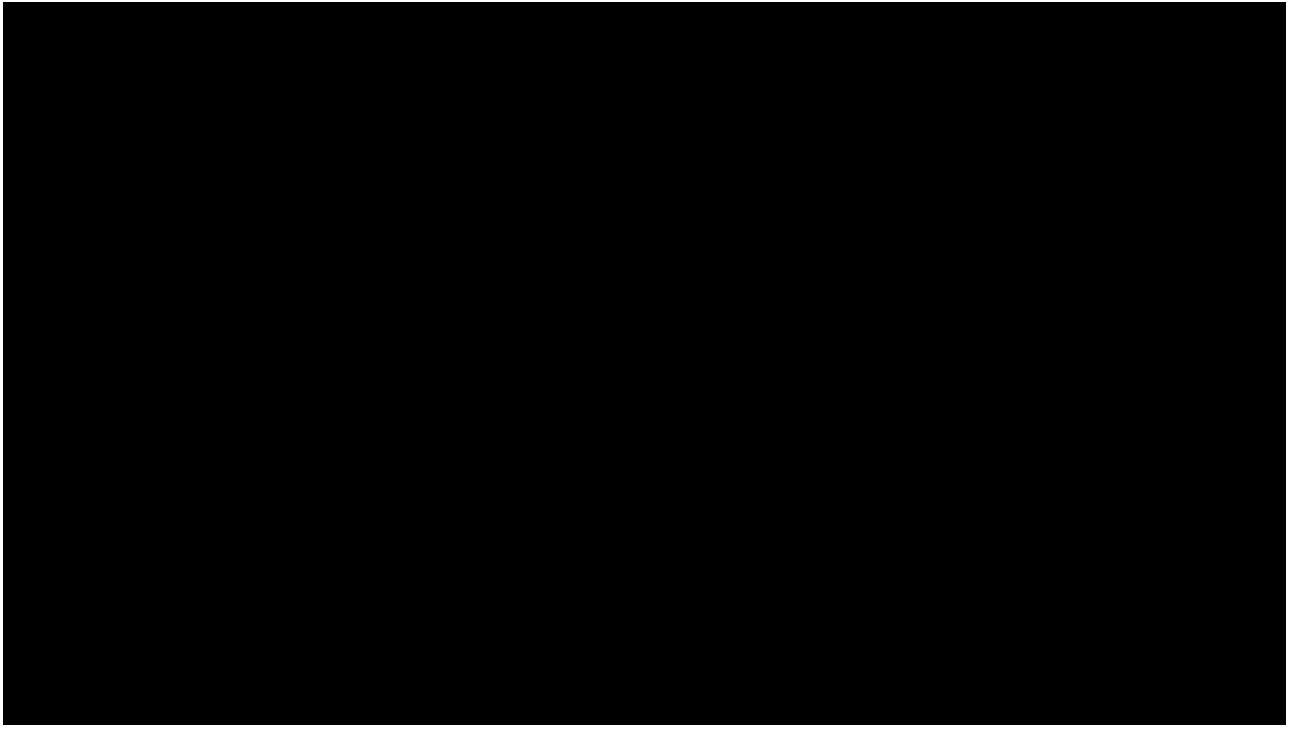
INERTEC has the Clear Advantage when it comes to solder nozzle flexibility

- Other selective soldering machines typically have a single nozzle, or sometimes dual nozzles which only function together as one, INERTEC has a real dual nozzle advantage where different nozzle sizes can be used simultaneously offering the ultimate flexibility
- This eliminates wasted time and hassle constantly changing over nozzles sizes to meet the needs of a specific soldering area
- Other Selective soldering machines typically only have One type of nozzle e.g. wetted (activated), non wetted, etc. INERTEC can use both wetted (activated) and non-wetted nozzles, which each have their advantages

Nozzle Cleaning

The automatic nozzle cleaning – especially for activated nozzles – is cleaning the nozzles in a programmable cycle.

Nozzle Cleaning

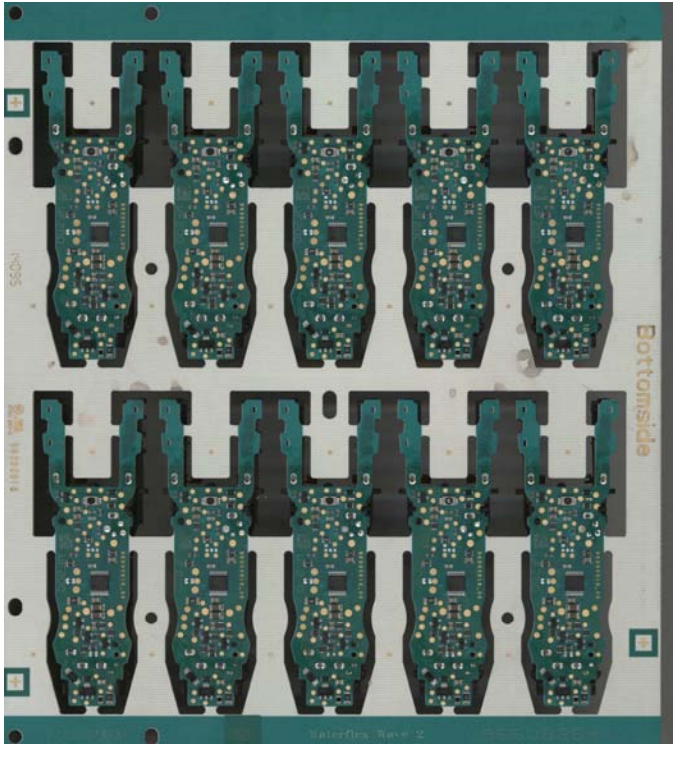


Special nozzles

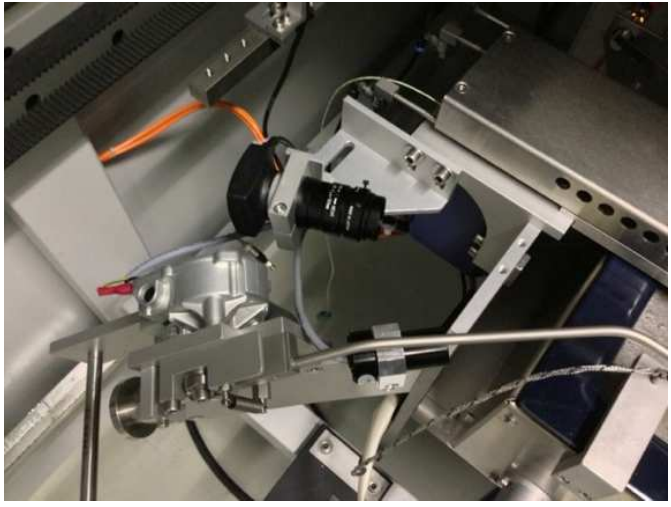
To realize even shorter cycle times, INERTEC can equip the machine with a so called multiport nozzle and a wider soldering aggregate.

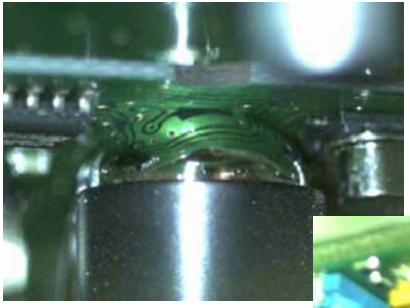
Special nozzles

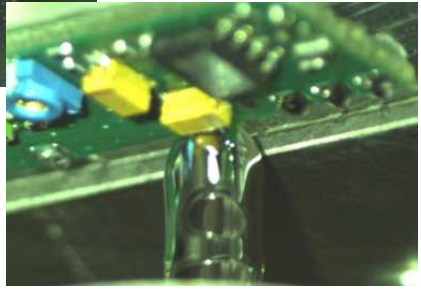
With this technology we can realize cycle times of less than 5 seconds for the PCB shown in the slide.



Process visualization







A live process viewing camera can assist on initial setup as well as give a live view of the process during the entire cycle.

N2 Generator

99.999 (10 PPM) is recommended for all machines

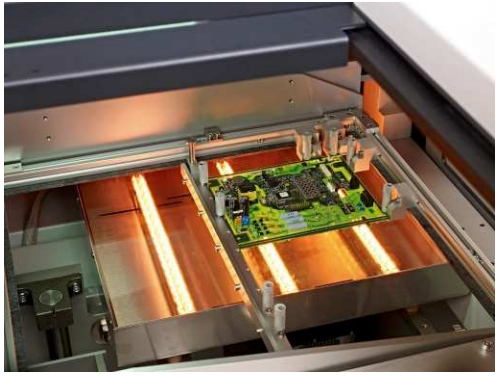
- Nitrogen flow is precisely controlled via a calibrated flow meter to ensure we use precisely what we “say we use”
- N2 generation is the preferred method to supply N2 and to guarantee the proper purity and flow

General facts

- ✓ Loading tray with 460 x 460 mm
- ✓ 1 flexible pallet
- ✓ Coated soldering aggregate
- ✓ Drop Jet Fluxer
- ✓ Offline Software

Options CUBE.460

- ✓ Solder wire feeder
- ✓ Quick reacting quartz heater
- ✓ Pyrometer Software
- ✓ Digital nitrogen flow meter
- ✓ Tilting function of 0° and 7°



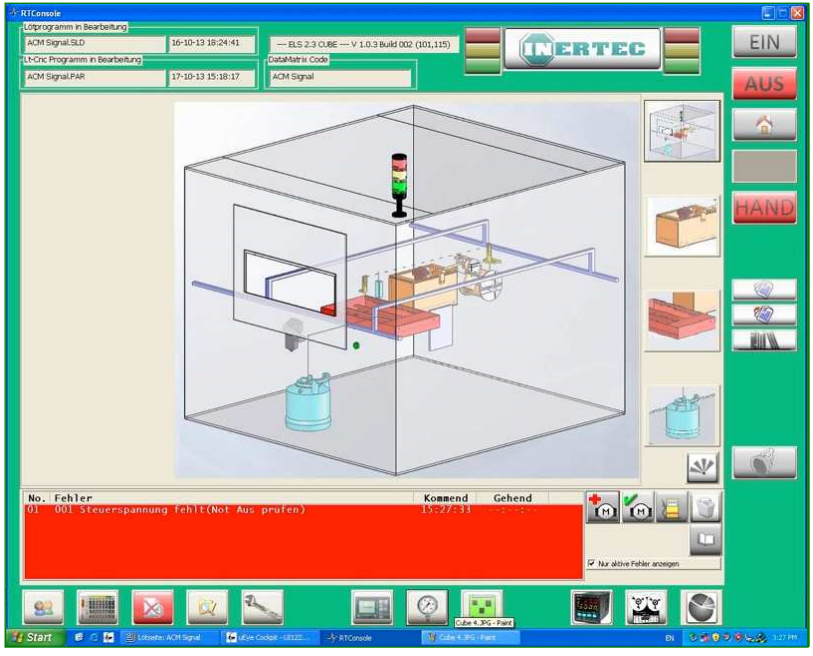
Options CUBE.460

Solder Wire Feeder;
Wire, max. 5 kg

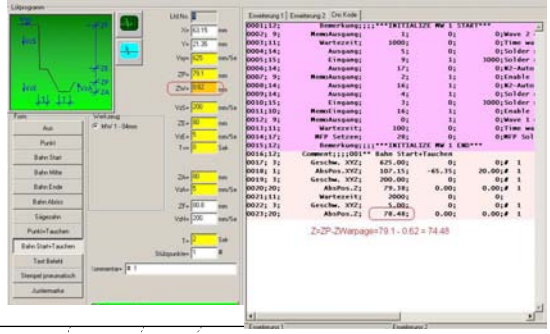
Pressurized Flux tank with a volume of 3 Liter incl. a level control

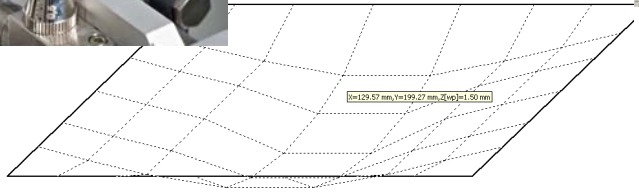
Software

The base software already has been changed and INERTEC is working very deeply already on the visualization of the machine software



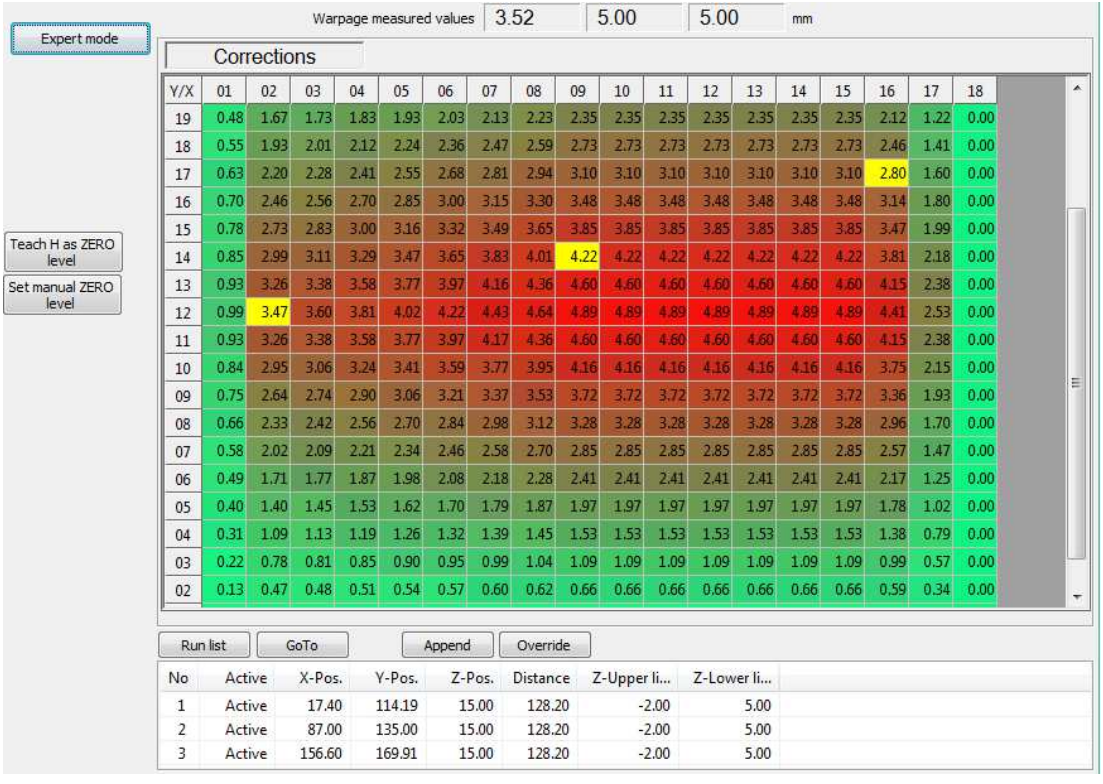
Warpage





- Warpage Compensation – automatic or manually
- Automatic: Measuring of single or multiple points on the PCB and automatic correction of the Z-height
- Manually: Via the Offline Software a general warpage can be defined. This is a global parameter which corrects always the same value and without the warpage sensor.
- Please Note:
  As soon as the spray fluxer is installed, this option cannot be used!

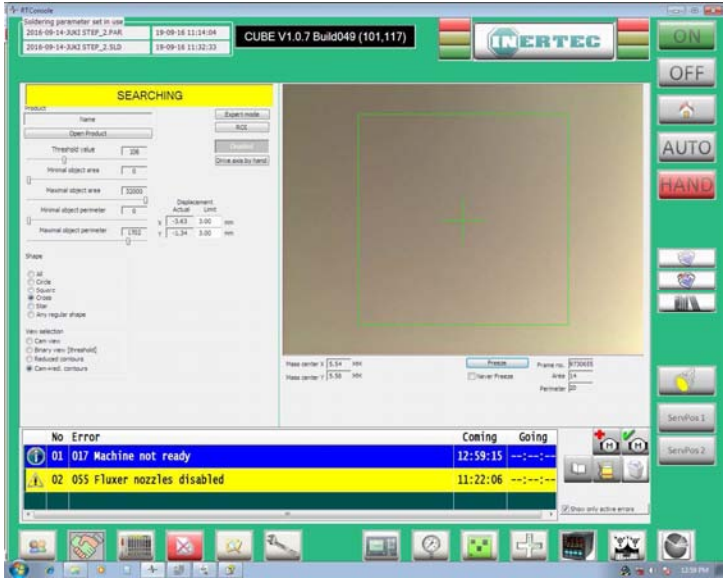
Warpage – Visualisation of the values



Y/X	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
19	0.48	1.67	1.73	1.83	1.93	2.03	2.13	2.23	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.12	1.22	0.00
18	0.55	1.93	2.01	2.12	2.24	2.36	2.47	2.59	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.46	1.41	0.00
17	0.63	2.20	2.28	2.41	2.55	2.68	2.81	2.94	3.10	3.10	3.10	3.10	3.10	3.10	3.10	2.80	1.60	0.00
16	0.70	2.46	2.56	2.70	2.85	3.00	3.15	3.30	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.14	1.80	0.00
15	0.78	2.73	2.83	3.00	3.16	3.32	3.49	3.65	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.47	1.99	0.00
14	0.85	2.99	3.11	3.29	3.47	3.65	3.83	4.01	4.22	4.22	4.22	4.22	4.22	4.22	4.22	3.81	2.18	0.00
13	0.93	3.26	3.38	3.58	3.77	3.97	4.16	4.36	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.15	2.38	0.00
12	0.99	3.47	3.60	3.81	4.02	4.22	4.43	4.64	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.41	2.53	0.00
11	0.93	3.26	3.38	3.58	3.77	3.97	4.17	4.36	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.15	2.38	0.00
10	0.84	2.95	3.06	3.24	3.41	3.59	3.77	3.95	4.16	4.16	4.16	4.16	4.16	4.16	4.16	3.75	2.15	0.00
09	0.75	2.64	2.74	2.90	3.06	3.21	3.37	3.53	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.36	1.93	0.00
08	0.66	2.33	2.42	2.56	2.70	2.84	2.98	3.12	3.28	3.28	3.28	3.28	3.28	3.28	3.28	2.96	1.70	0.00
07	0.58	2.02	2.09	2.21	2.34	2.46	2.58	2.70	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.57	1.47	0.00
06	0.49	1.71	1.77	1.87	1.98	2.08	2.18	2.28	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.17	1.25	0.00
05	0.40	1.40	1.45	1.53	1.62	1.70	1.79	1.87	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.78	1.02	0.00
04	0.31	1.09	1.13	1.19	1.26	1.32	1.39	1.45	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.38	0.79	0.00
03	0.22	0.78	0.81	0.85	0.90	0.95	0.99	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	0.99	0.57	0.00
02	0.13	0.47	0.48	0.51	0.54	0.57	0.60	0.62	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.59	0.34	0.00

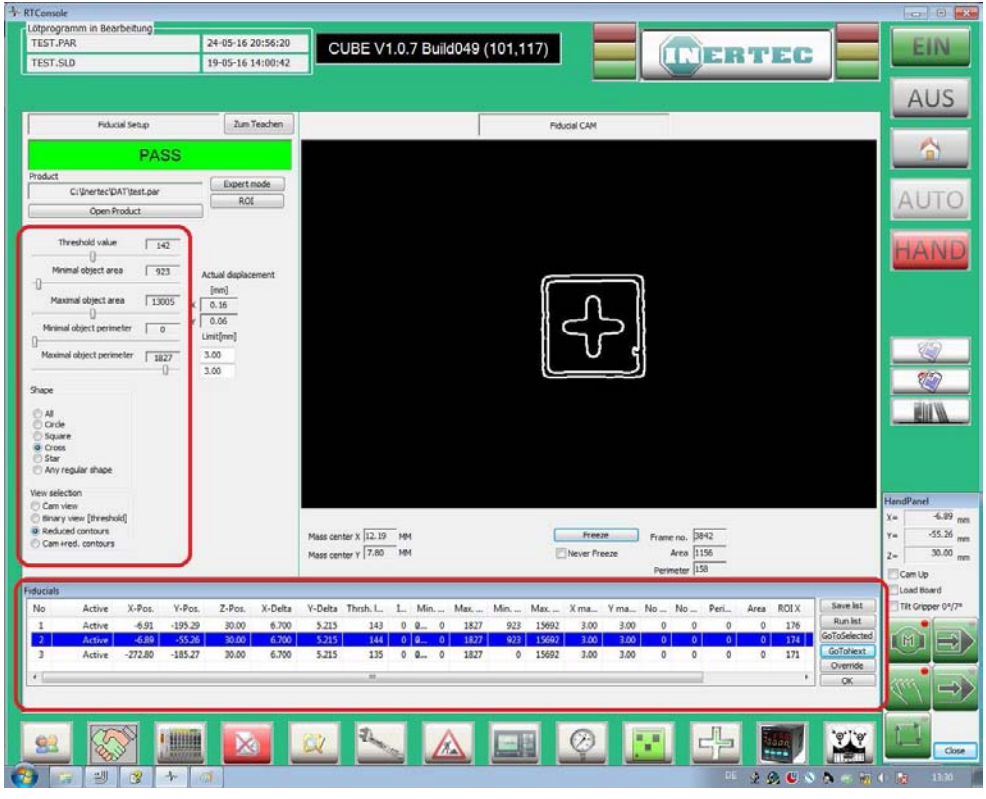
No	Active	X-Pos.	Y-Pos.	Z-Pos.	Distance	Z-Upper li...	Z-Lower li...
1	Active	17.40	114.19	15.00	128.20	-2.00	5.00
2	Active	87.00	135.00	15.00	128.20	-2.00	5.00
3	Active	156.60	169.91	15.00	128.20	-2.00	5.00

Fiducial



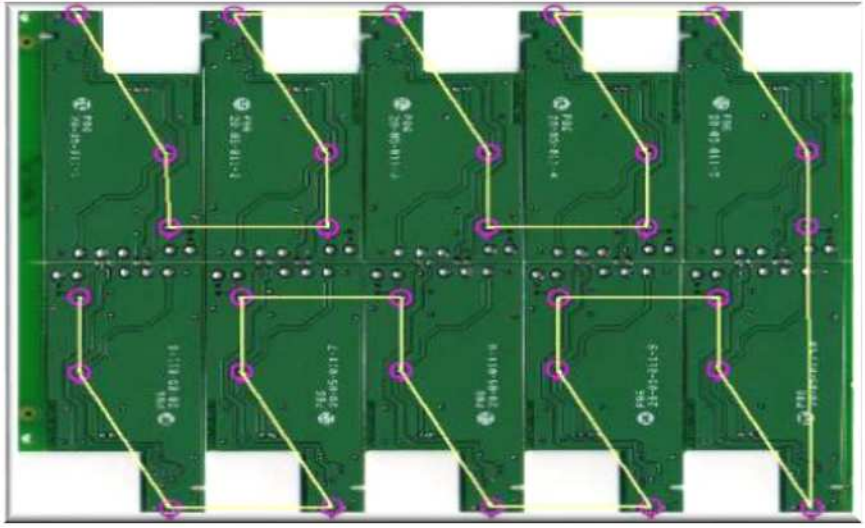
Automatic fiducial correction can measure and compensate for rotation, skew, poorly cut boards and ensure the accuracy and repeatability of the machine.

Fiducial



Simple adjustment of pre defined fiducials. In this case the teaching of at least 3 fiducials is necessary. This automatic correction of the PCB helps to prevent translations- and positioning failures.

Software



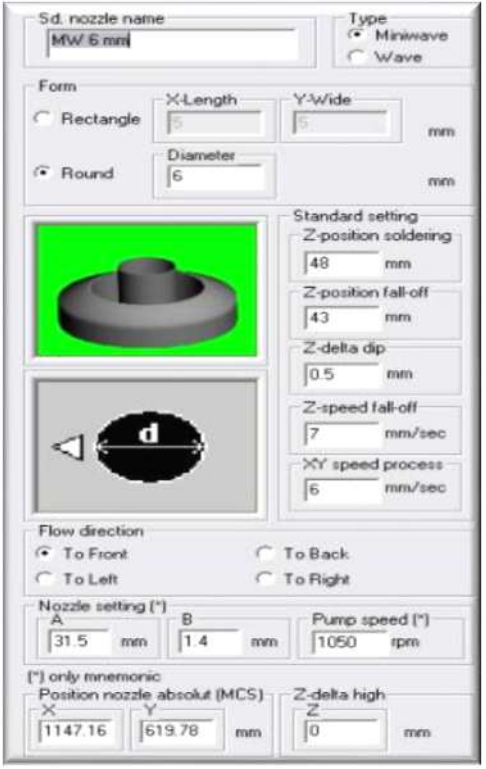
Point and Click programming using
JPG or Gerber

Software

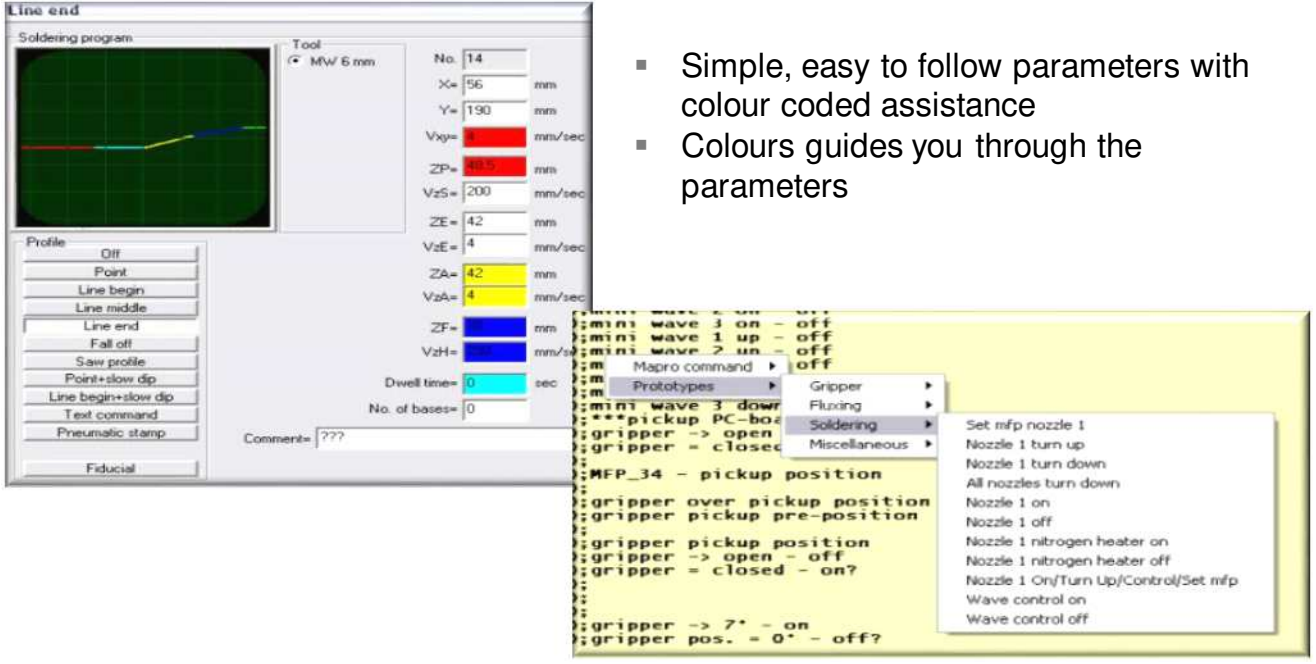
All parameters are stored with each nozzle definition e.g.

- Z height
- Dwell times
- Dip speed
- Pull away speed

These parameters can dramatically reduce fine tuning when creating a new program.

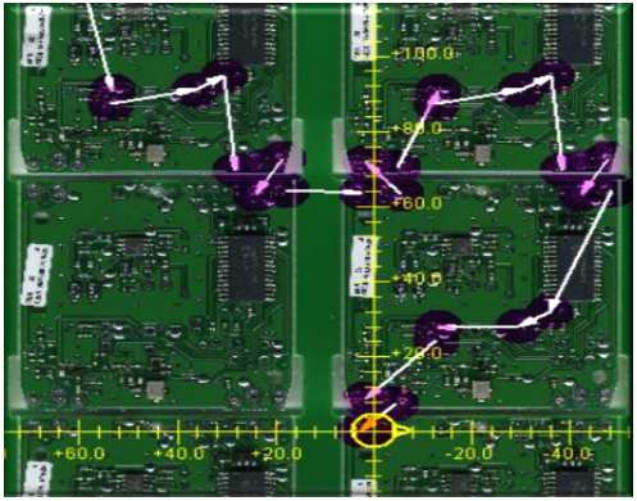


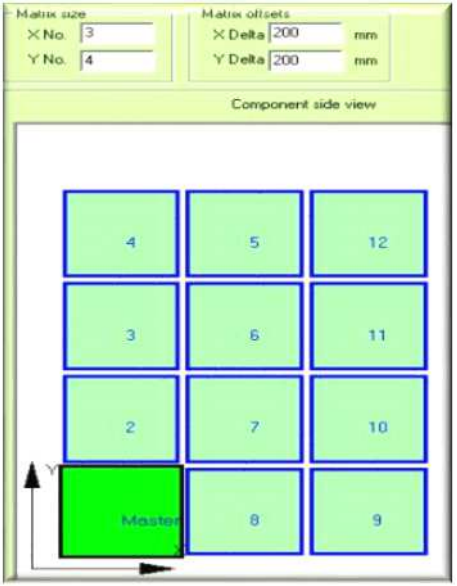
Software



- Simple, easy to follow parameters with colour coded assistance
- Colours guides you through the parameters

Software

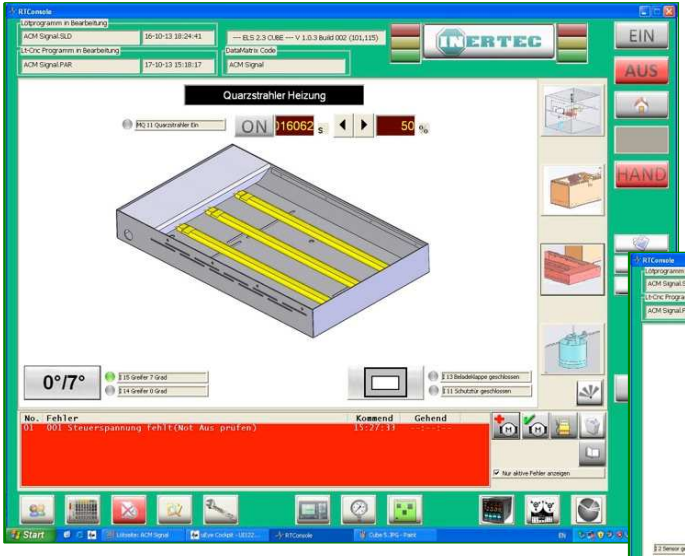




Step and repeat easy with an:

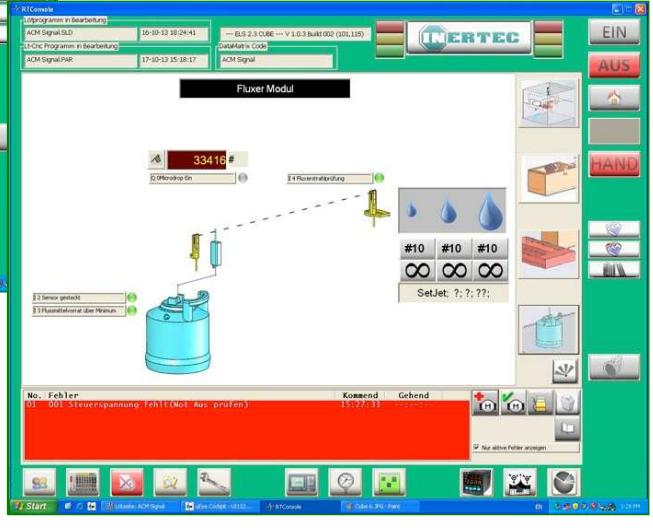
- Automated matrix function or,
- Simple windows commands surch as Ctrl-C, Ctrl-V

Software

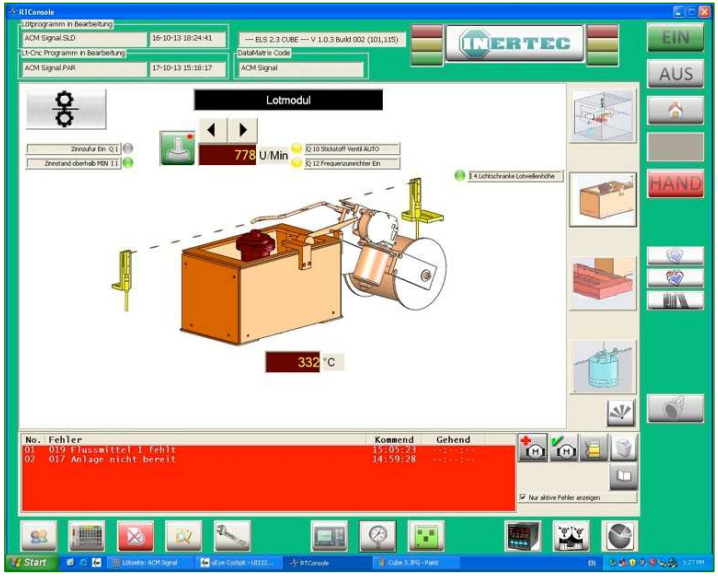


Preheater controls

Fluxer controls

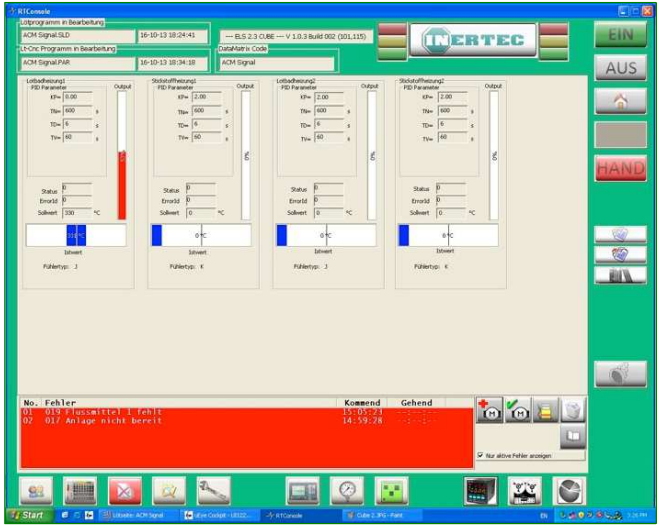


Software

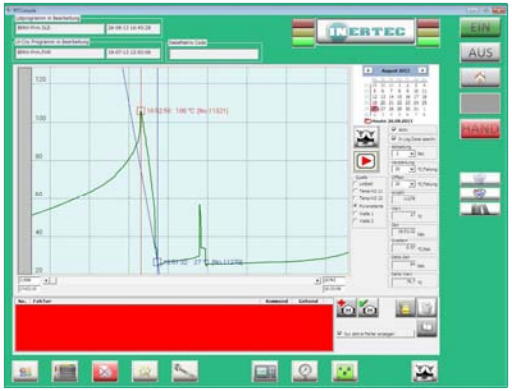


Solder pot controls

PID Parameters



Software

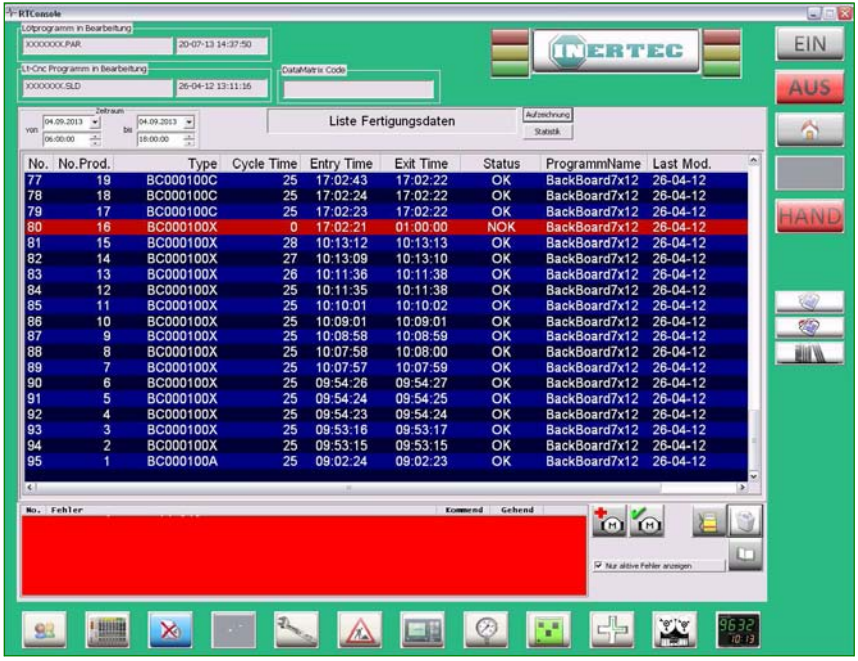


The following data will be stored:

- Analog value (set and actual, temperatures, solder bath, preheater; pyrometer, nitrogen heated nozzle) solder pump speed (set/actual), nitrogen flow, rest oxygen level, sensing: 2 seconds
  The stored data also can be displayed (line recorder)
- Analyses function:
  Gradient
  Time interval measuring via two measuring lines
  Separate parameter setting for both channels

Statistic Module

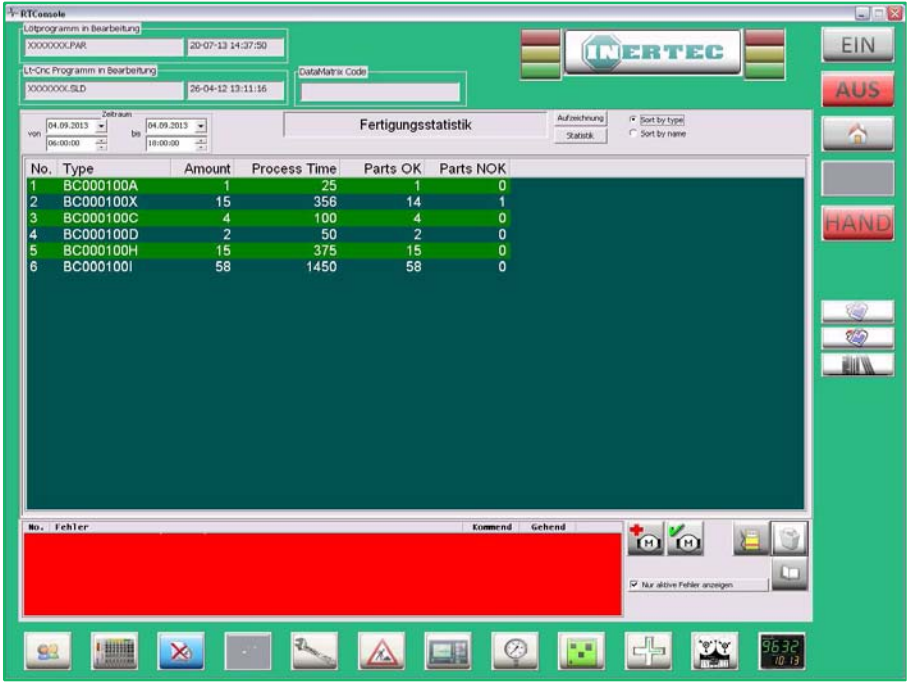
This module shows, which PCB´s have been produced, sorted to the barcode or the name of the program.



No.	No.Prod.	Type	Cycle Time	Entry Time	Exit Time	Status	ProgrammName	Last Mod.
77	19	BC000100C	25	17:02:43	17:02:22	OK	BackBoard7x12	26-04-12
78	18	BC000100C	25	17:02:24	17:02:22	OK	BackBoard7x12	26-04-12
79	17	BC000100C	25	17:02:23	17:02:22	OK	BackBoard7x12	26-04-12
80	16	BC000100X	0	17:02:21	01:00:00	NOK	BackBoard7x12	26-04-12
81	15	BC000100X	28	10:13:12	10:13:13	OK	BackBoard7x12	26-04-12
82	14	BC000100X	27	10:13:09	10:13:10	OK	BackBoard7x12	26-04-12
83	13	BC000100X	26	10:11:36	10:11:38	OK	BackBoard7x12	26-04-12
84	12	BC000100X	25	10:11:35	10:11:38	OK	BackBoard7x12	26-04-12
85	11	BC000100X	25	10:10:01	10:10:02	OK	BackBoard7x12	26-04-12
86	10	BC000100X	25	10:09:01	10:09:01	OK	BackBoard7x12	26-04-12
87	9	BC000100X	25	10:08:58	10:08:59	OK	BackBoard7x12	26-04-12
88	8	BC000100X	25	10:07:58	10:08:00	OK	BackBoard7x12	26-04-12
89	7	BC000100X	25	10:07:57	10:07:59	OK	BackBoard7x12	26-04-12
90	6	BC000100X	25	09:54:26	09:54:27	OK	BackBoard7x12	26-04-12
91	5	BC000100X	25	09:54:24	09:54:25	OK	BackBoard7x12	26-04-12
92	4	BC000100X	25	09:54:23	09:54:24	OK	BackBoard7x12	26-04-12
93	3	BC000100X	25	09:53:16	09:53:17	OK	BackBoard7x12	26-04-12
94	2	BC000100X	25	09:53:15	09:53:15	OK	BackBoard7x12	26-04-12
95	1	BC000100A	25	09:02:24	09:02:23	OK	BackBoard7x12	26-04-12

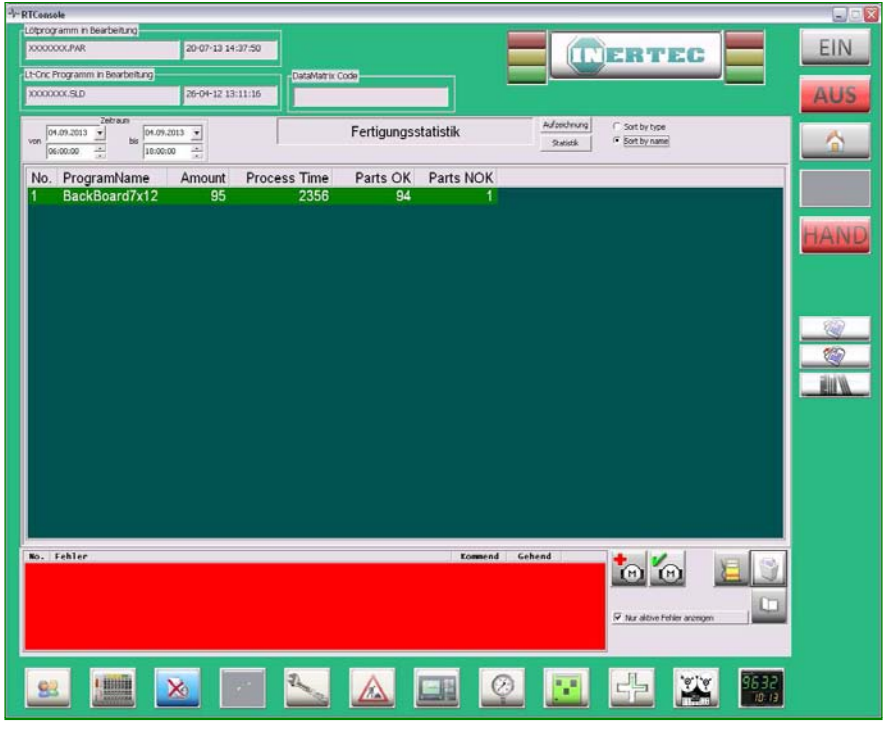
Statistic Module

Selected by barcode



Statistic Module

Selected by program name



Traceability Datas

24/24, 7/7 every two seconds (shortest sampling rate) following process values will be saved:

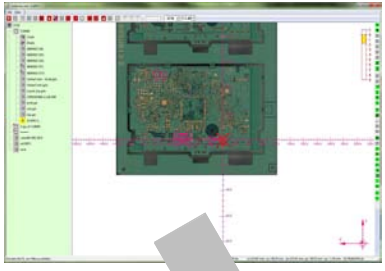
- Temperatures: preheating, solder, nitrogen (set point, actual)
- Wave speed (set point, actual)
- Nitrogen concentration (option)
- Nitrogen flow
- Pyrometer temperature (option)

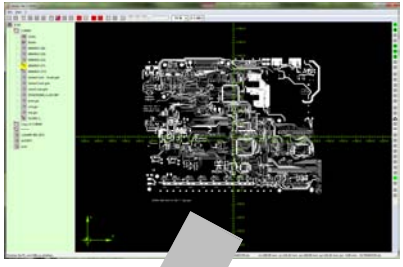
Carrier based data:

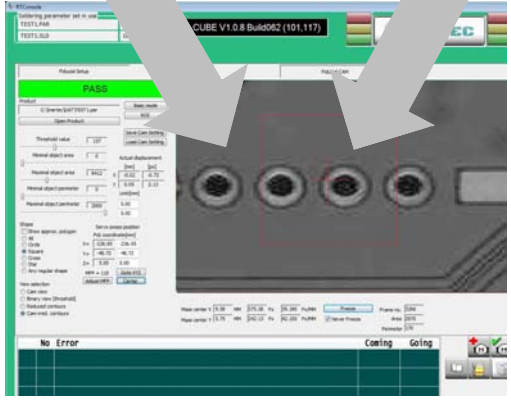
- Machine entry time point
- Machine leaved time point
- Barcode
- Program name
- Fluxer number of shots
- Fluxer amount value (option)
- Temperatures (individual value)
- Wave speed (individual value)

All error messages

CUBE.460 – new options







The programming of the PCB on the CUBE system is realized via the picture or Gerber data and the Offline Software.

Optionally we can use also the online teaching function.

Therefore we use the fiducial camera and define the individual soldering joints with the camera.

CUBE.460 – new options

Furthermore we want to show you the many different sides of the CUBE.460.

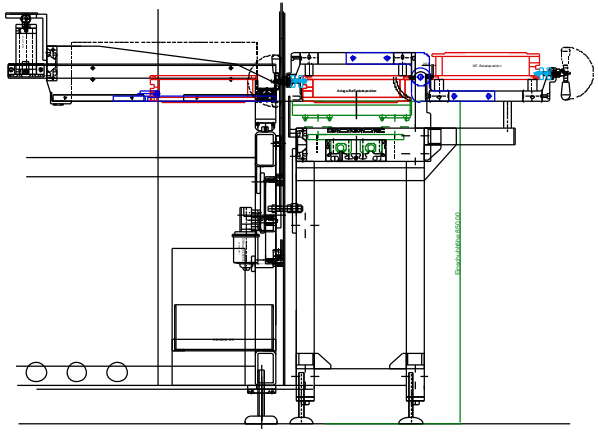
All the time we recommended the CUBE Batch as an entry level system, but in the meantime we did some really complicated customized solutions, which showed us that the CUBE Batch is pretty convertible.

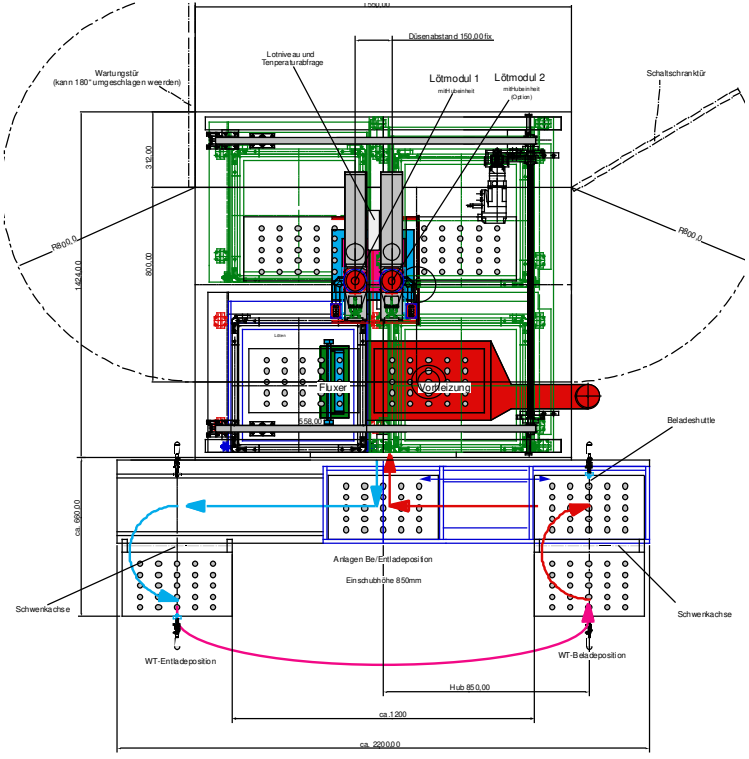
Here are some examples of the „high level“ CUBE.460´s...

CUBE.460 – new options

Requirement:

- Basic soldering system
- CUBE.460 equipped with a special loading function to be able to flip the pallet after loading the components.



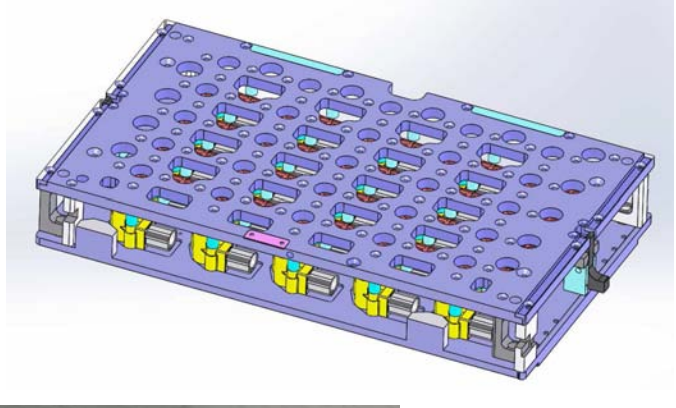


CUBE.460 – new options

The loading of the machine is realized via two special loading modules, where the operator is loading the pallet and downholded via the locking mechanism.
The soldered pallet will be guided out of the system and the loading unit turned by 180°, the soldered pallet is guided to the unloading position and the new loaded pallet will be guided into the process.

CUBE.460 – new options

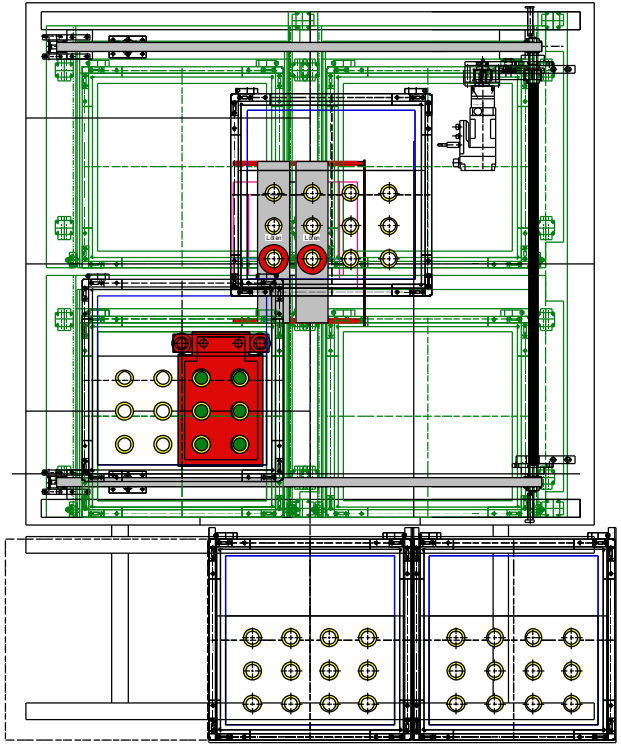
Tool carrier with locking mechanism



CUBE.460 – new options

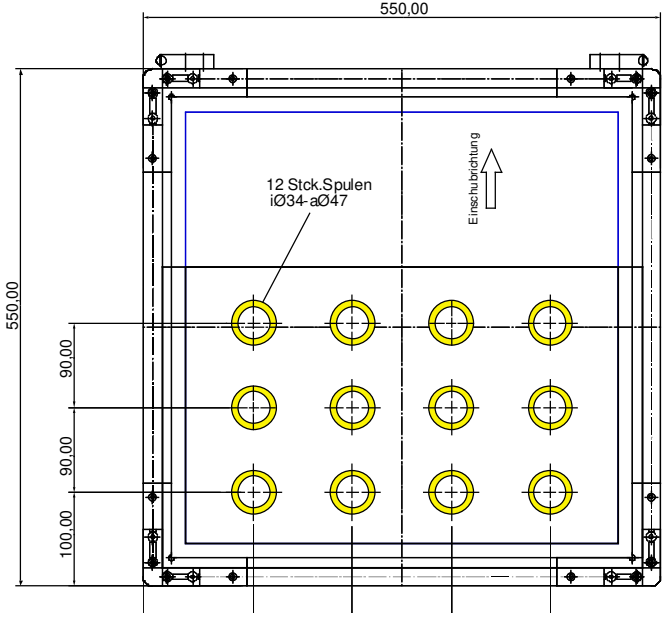
Requirement:

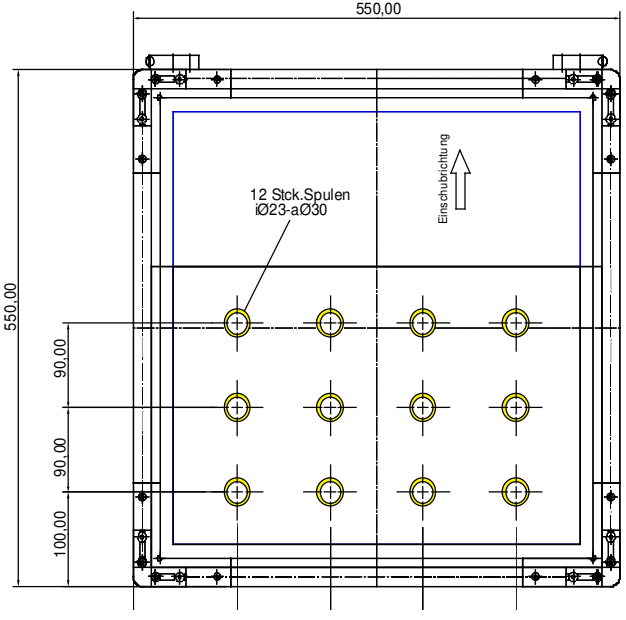
- Special workpiece carrier with position accuracy and particular fixation of the product
- Customised modification of fluxer and solder nozzle



CUBE.460 – new options

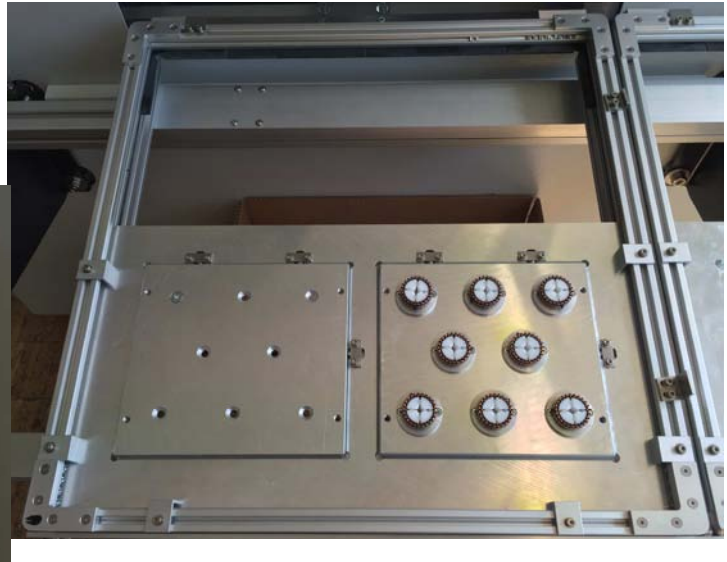
The customized carrier is placed into the standard pallet from INERTEC.

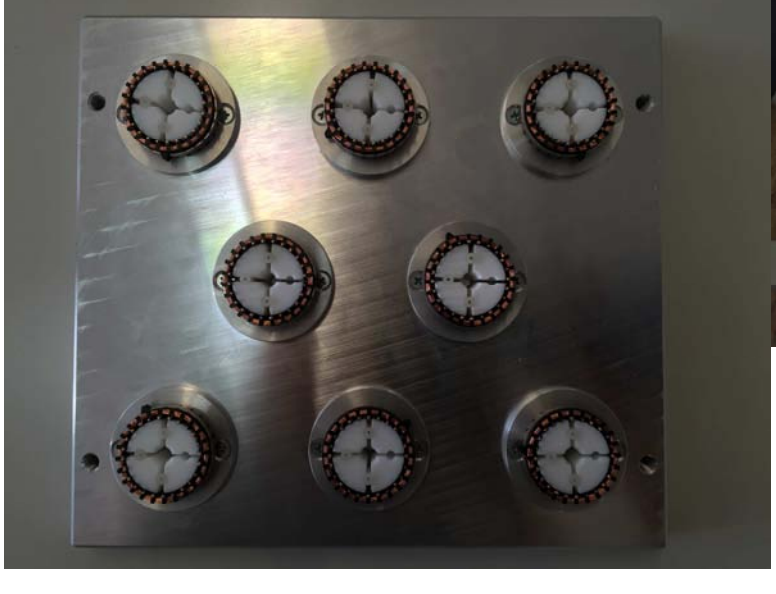




CUBE.460 – new options

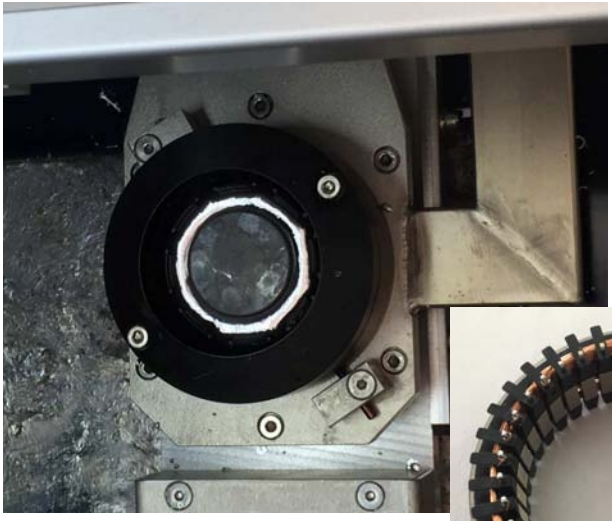
The tool carrier is constructed that the products don´t fall off although it have to be soldered upside down

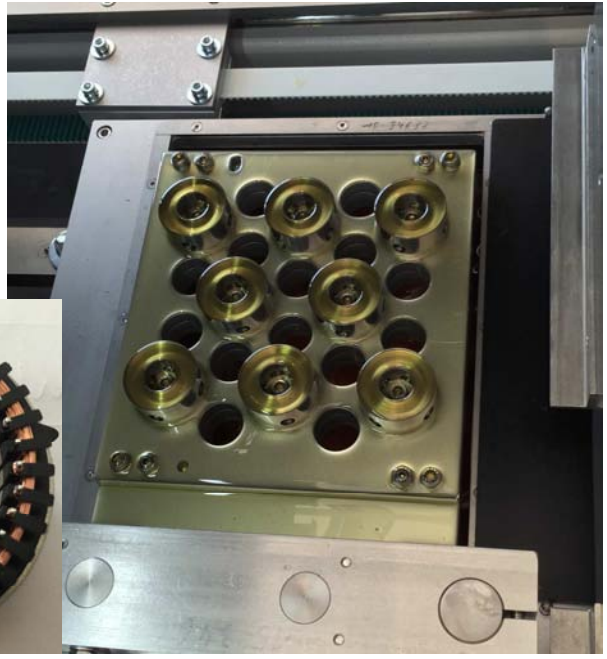




CUBE.460 – new options

Modified solder nozzle
The product is soldered with a temparature of 360° to burn of a protective lacquer from the pins.

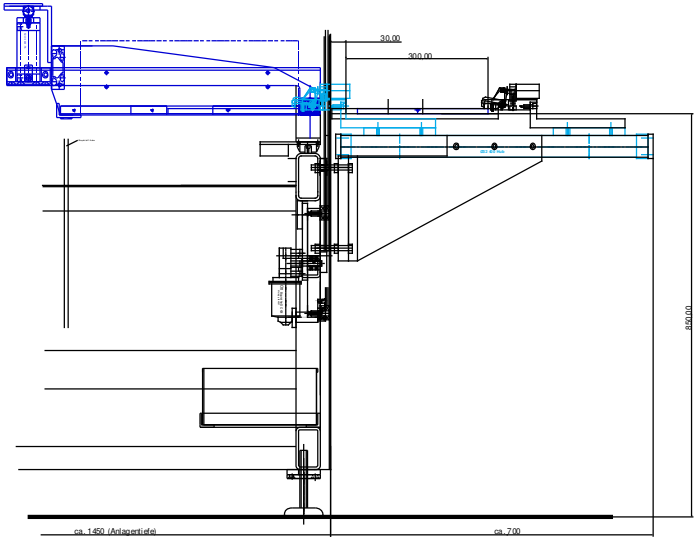


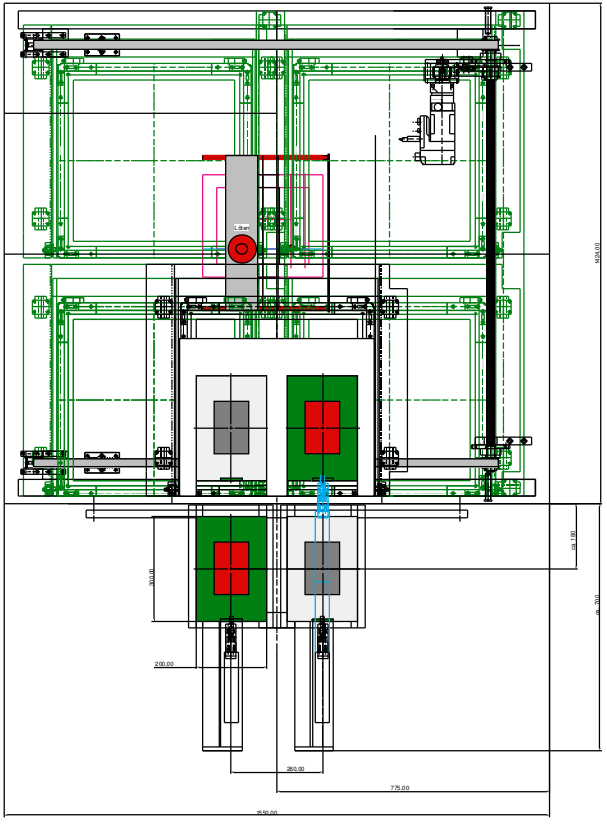


CUBE.460 – new options

Requirement:

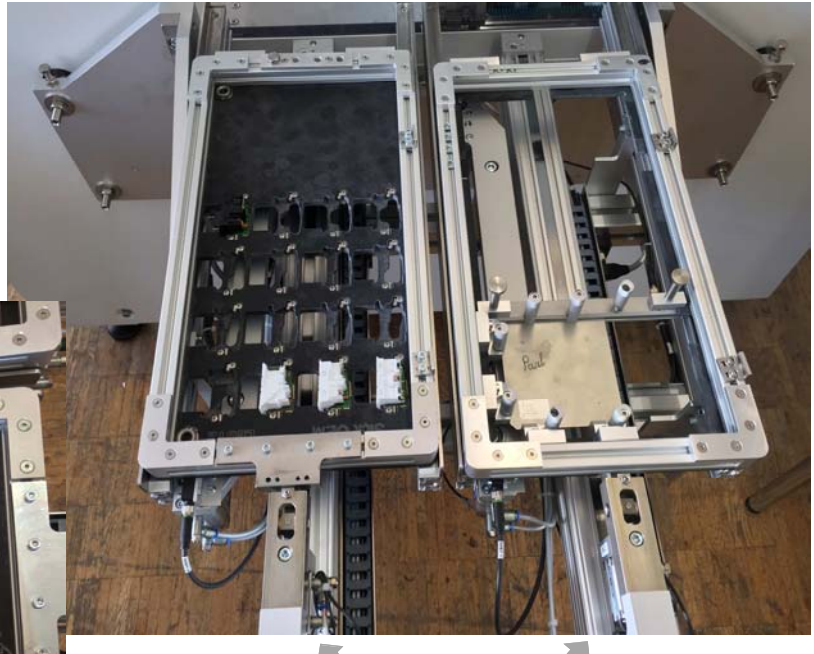
- Fully automized production line which loaded via a robot
- Special workpiece carrier which is loaded from a robot handling

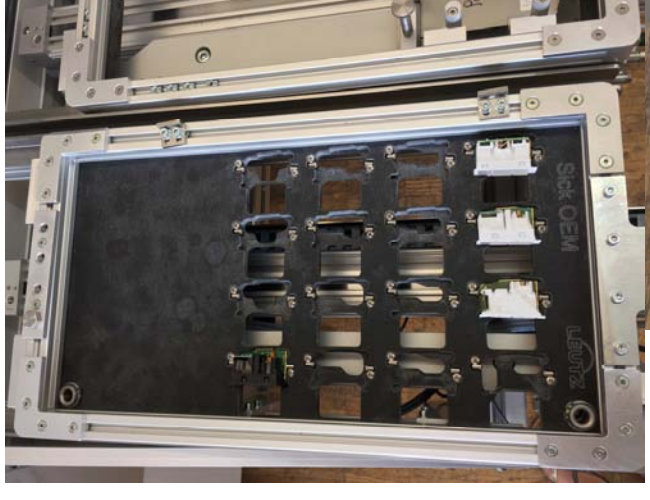




CUBE.460 – new options

Divided load and unloading, so two customized pallets can be hanled. The pallets are loaded and uloaded and are pushed in the solder process autmatically.





Pusher

CUBE.460

You still have any questions to the machine?

Please contact us, we look forward explaining the machine to you!

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