



Selective Soldering Systems made by SEHO
Flexible | Productive | Innovative

Complete Solutions for Soldering Processes and Automated Production Lines

Flexible | Productive | Innovative Key Factor for Cost Reduction



1

Adaption to market requirements

Responsiveness to changing customer needs.

2

Increase in productivity

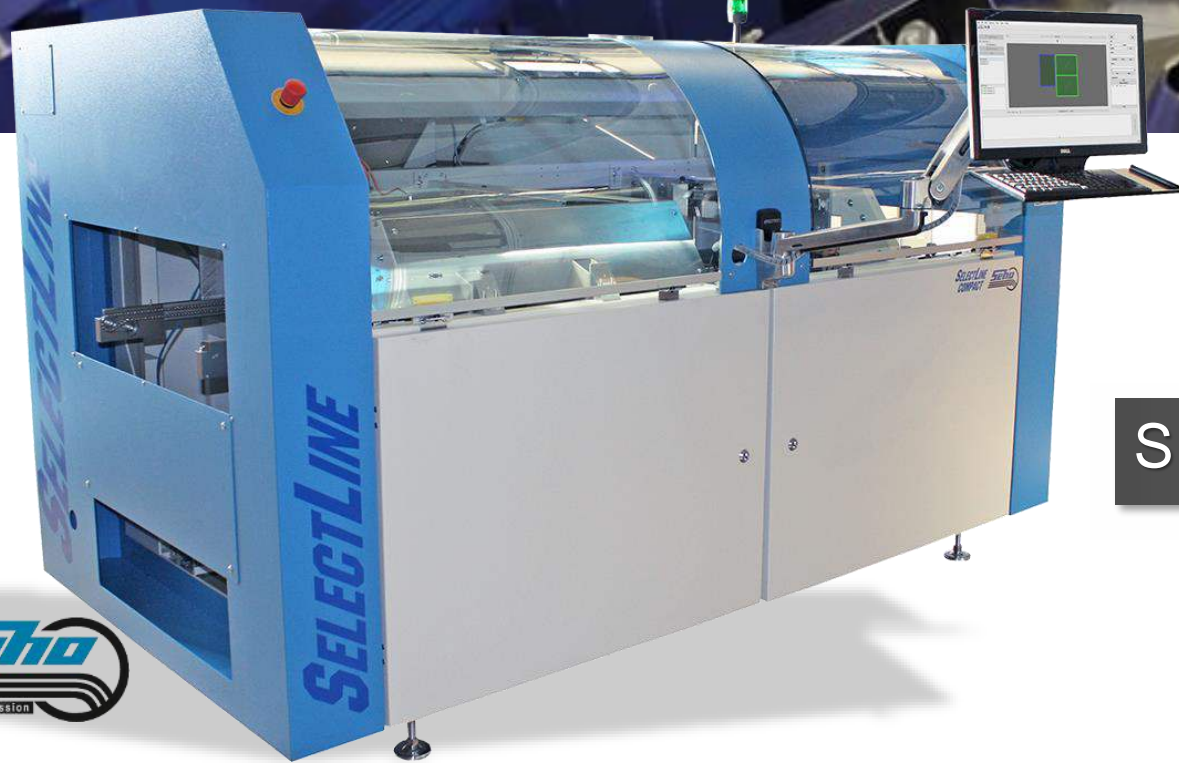
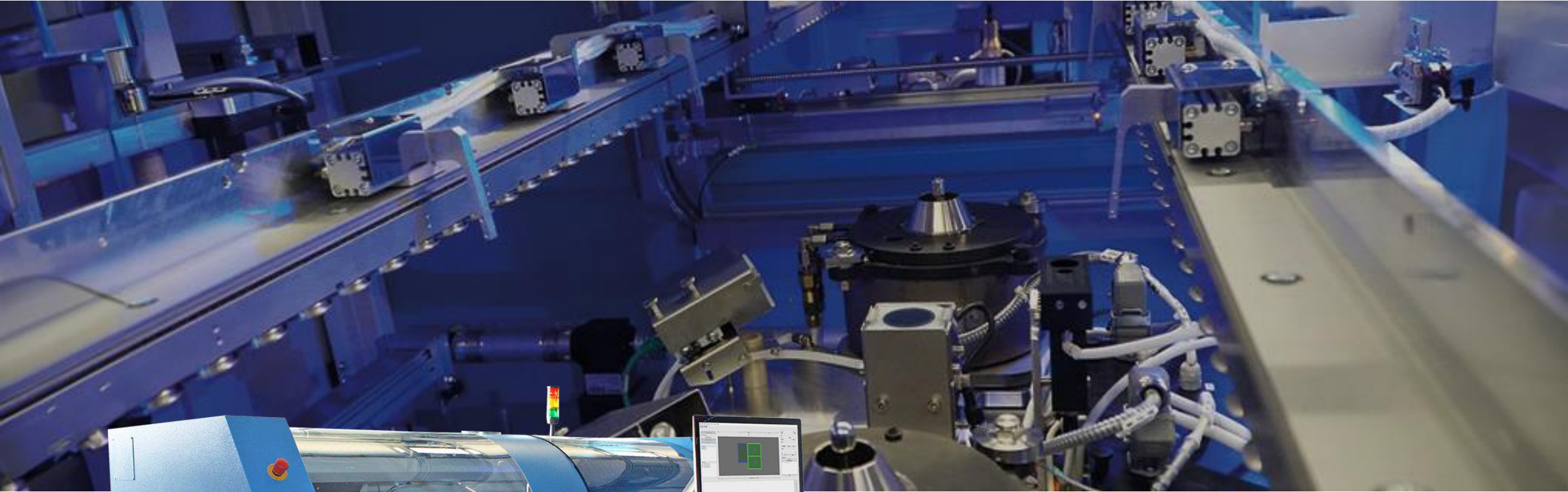
Optimum utilization of resources and materials.

3

Improved quality

Minimization of errors.





SEHO SelectLine-C



SEHO SelectLine-C

Modularity Reduces Manufacturing Costs

- consistently modular selective soldering system for miniwave and multiwave processes
- all options can be retrofitted at a later date
- upgradable by adding further modules
- can be downsized to use individual modules with other systems
- can be combined with other SEHO machine platforms

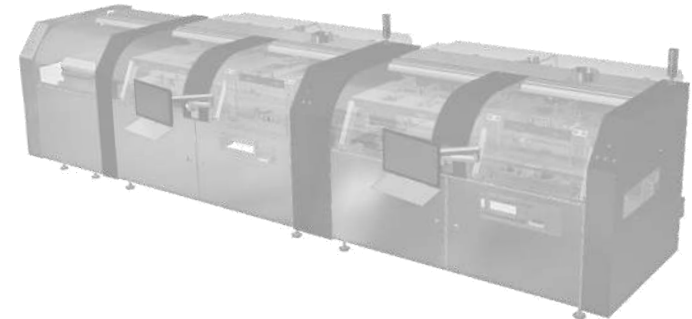
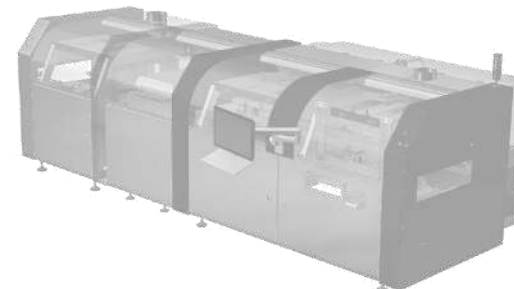
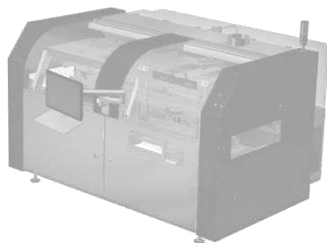


SEHO SelectLine-C

Modularity Reduces Manufacturing Costs



- timed investment
- low cost of equipment upgrades
- minimal footprint

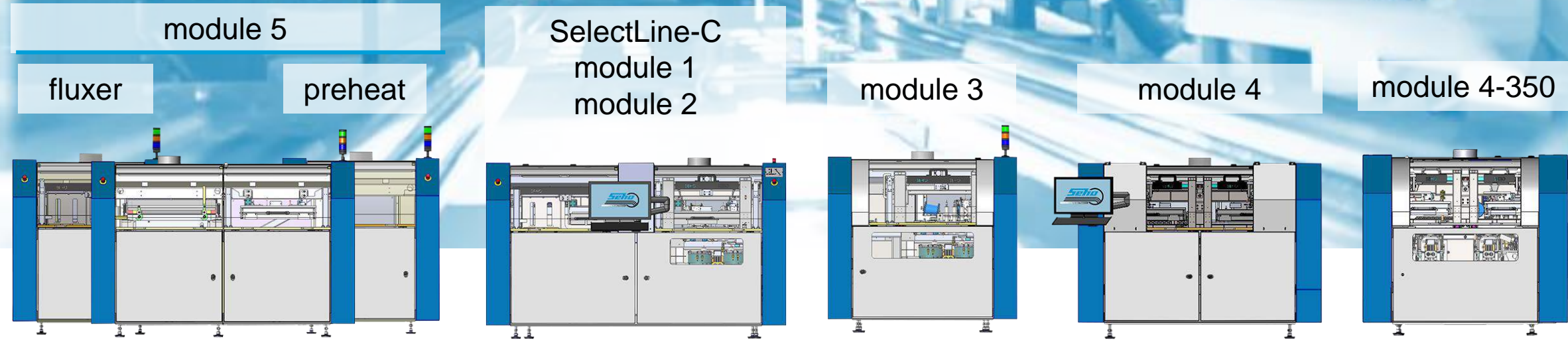




Consistently Modular = Cost Savings for You

Mix and Combine: The SelectLine-C Modules

15+ parallel workstations possible



quartz
pulsar
cluster
convection
infrared (top-side)

F	PH	S	S
F	PH	S	AOI
BU	PH	S	AOI
PH	PH	S	S
C	C	B	B
C	C	B	AOI

S	S
S	AOI
B	AOI

S	S
S	AOI
S	B
B	AOI
B	B

... or simply combine any SelectLine-C module with PowerSelective

F=fluxing | PH=preheating | S=soldering | B=brushing | AOI | C=cooling | BU=buffer



SEHO SelectLine-C: Consistently Modular = Cost Savings for You

Combination Example



flux module

module 5

module 4



F

PH

PH

S

S

SmartSplit

F=fluxing | PH=preheating | S=soldering | B=brushing | AOI | C=cooling | BU=buffer

SEHO SelectLine-C: Consistently Modular = Cost Savings for You

Combination Example



SelectLine-C 350

module 1

module 3

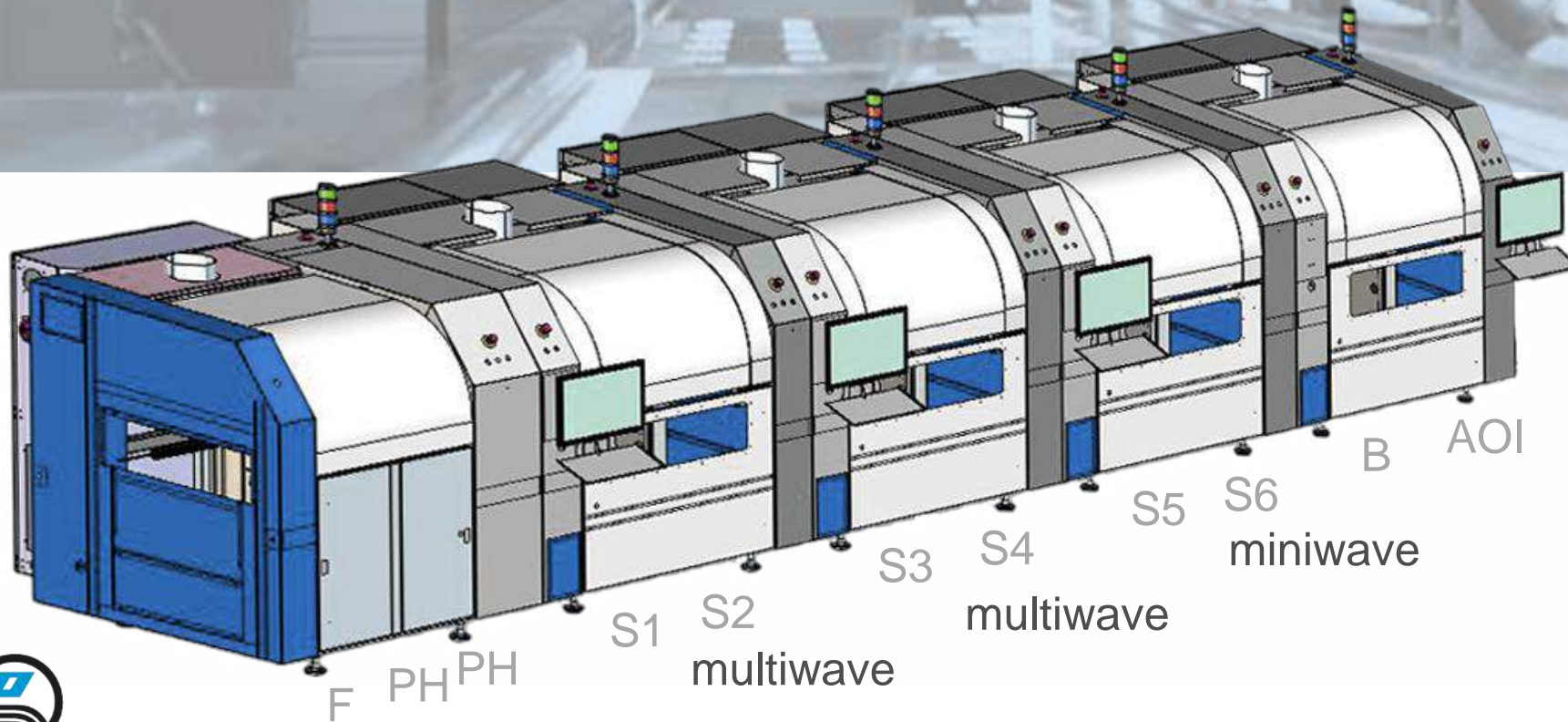
module 3



highest production volumes
6 soldering units, miniwave and multiwave, working in Synchro mode

SEHO SelectLine-C: Consistently Modular = Cost Savings for You

Combination Example



- module 5
- module 4-350
- module 4-350
- module 4-350
- module 4-350



SEHO SelectLine-C: Consistently Modular = Cost Savings for You

Combination with other SEHO Machine Platforms

- **SEHO PowerSelective**
to combine multiwave soldering and miniwave soldering, or to add a separate brush and/or AOI process.
- **SEHO Wave Soldering Systems**
to add a selective brushing process and/or AOI process.
- **Fully Automated Zero-Defect Manufacturing Line**
AOI and miniwave process used for automatic rework, works in combination with wave or selective soldering systems.





Machine Highlights to Sustainably Reduce Manufacturing Costs

SEHO SelectLine-C: Maximum Productivity – Soldering Area

Throughput Maximation with Synchro and SmartSplit

intelligent software | highest efficiency | minimum space required



Synchro: halving cycle time in **batch** production with minimal invest

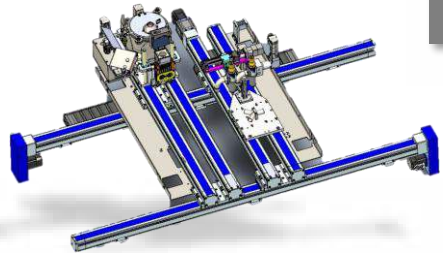
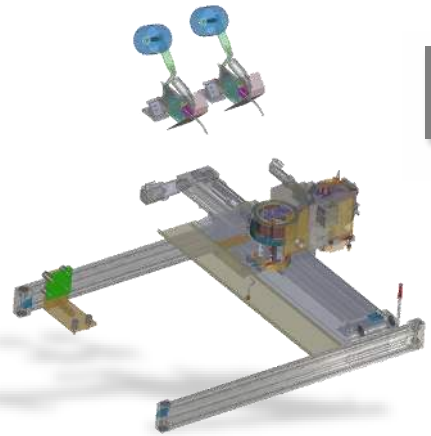
intelligent job sharing: cost-efficient low-mix-high-volume production

the software **automatically** coordinates the **soldering process** for the **same assemblies** at two soldering stations in such a way that the **production number is almost doubled**

SmartSplit: halving cycle time in **mixed** production with minimal invest

cost-efficient high-mix-high-volume production

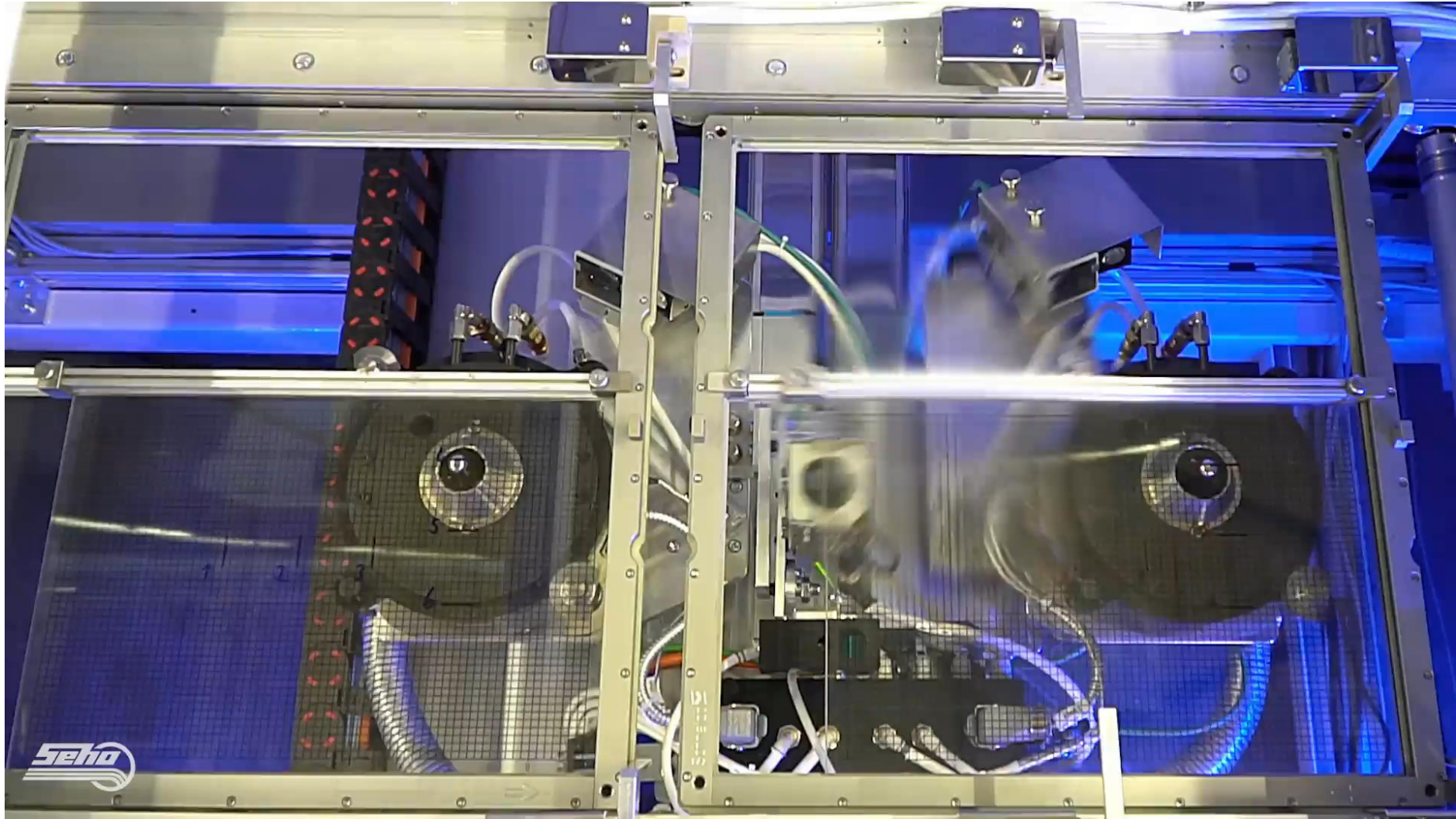
the software **automatically** controls and coordinates the **process flow** for **different assemblies** in mixed operation at several work stations, to **halven cycle times** and still making full use of the work area.



SEHO SelectLine-C: Maximum Productivity – Soldering Area

Throughput Maximation with Synchro and SmartSplit

intelligent software | highest efficiency | minimum space required

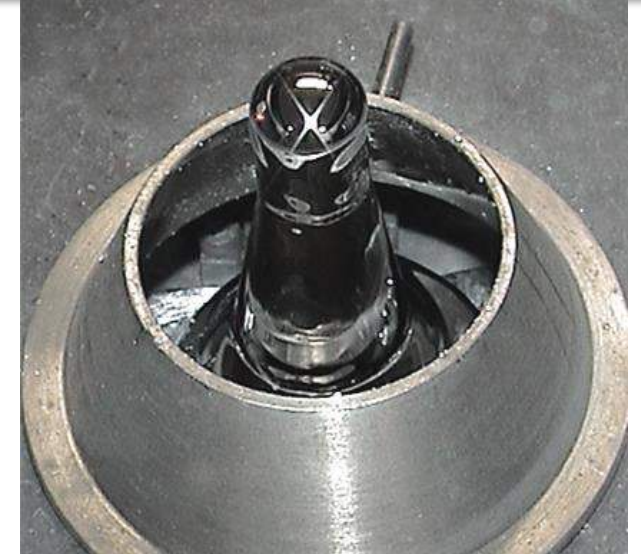


SEHO SelectLine-C: Reduction of Soldering Defects

Solder Nozzle Technology: high flexibility – high precision

wetted miniwave solder nozzles (360° flowing)

- highest precision also in small structures
- flexible in use and quickly exchangeable



SEHO LongLife Miniwave Solder Nozzle

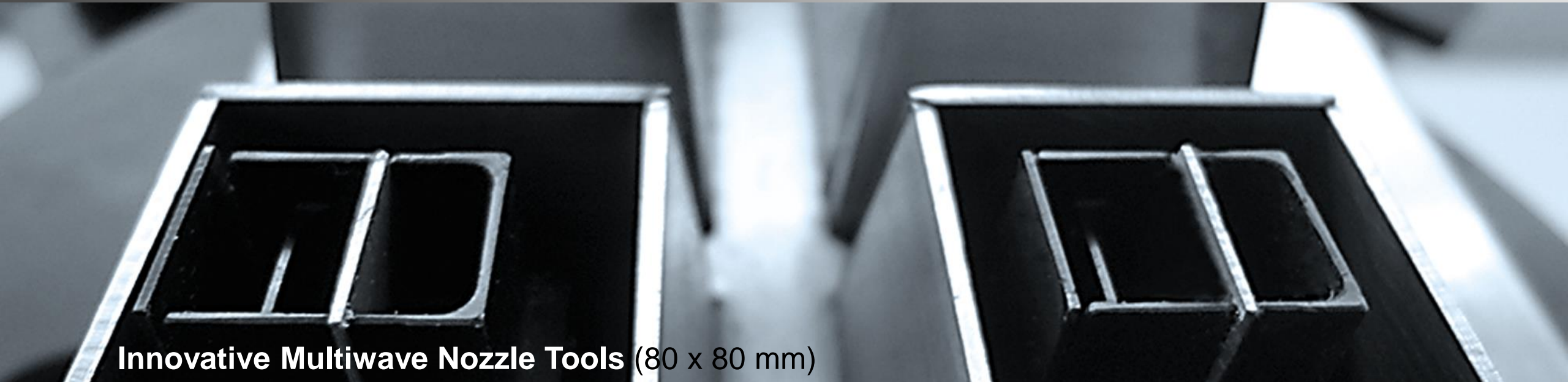


- outstanding lifetime, at least 3 times longer than conventional nozzles
- remarkably lower maintenance requirements

COST SAVINGS

SEHO SelectLine-C: Reduction of Soldering Defects

Solder Nozzle Technology: high flexibility – high precision

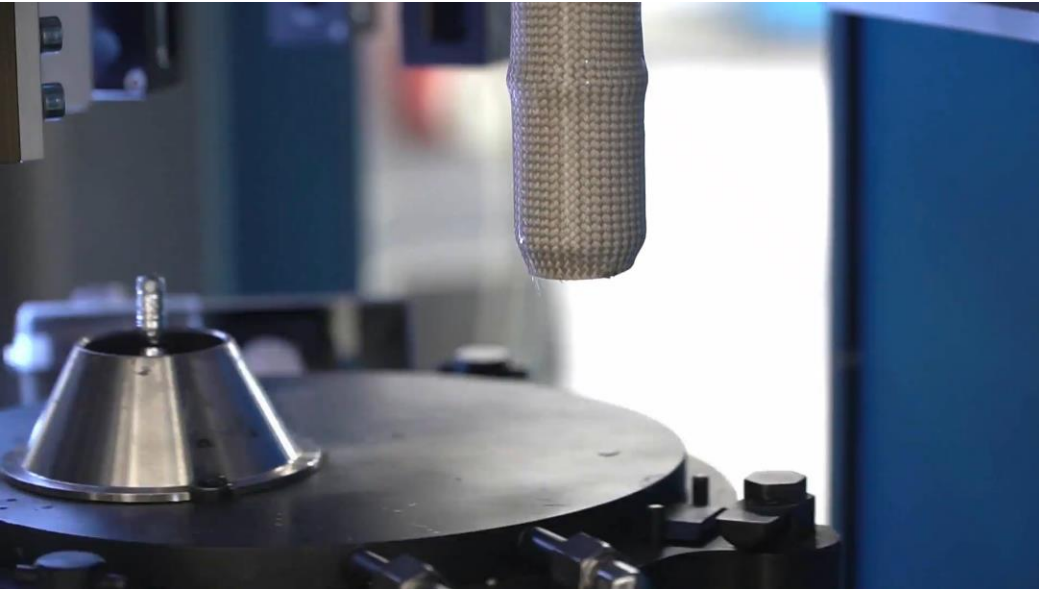


Innovative Multiwave Nozzle Tools (80 x 80 mm)

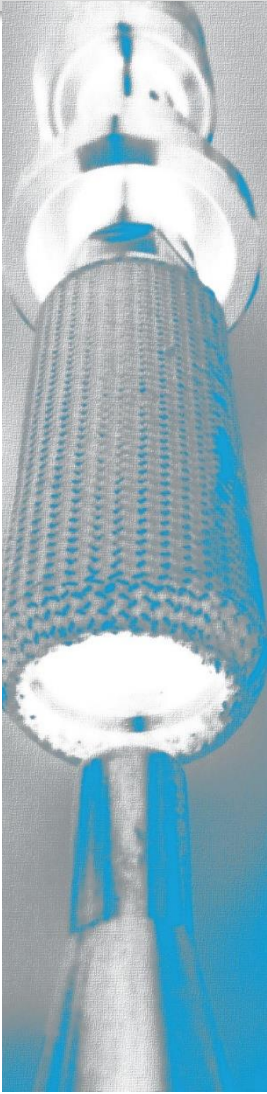
- highest production volumes, quickly exchangeable
- de-bridging knives ensure highest precision and effectively reduce solder bridges
- flowing waves guarantee perfect energy transfer and perfect hole fill
- solder ball protection with inside flowing solder waves

SEHO SelectLine-C: Maximum Process Reliability – Minimum Maintenance

Automatic Ultrasonic Nozzle Cleaning



- effectively dissolves residues from the solder nozzle and ensures a new and complete wetting
- automatic process without machine stop
- maximum process reliability
- remarkably longer lifetime of nozzles
- cleaning cycles programmable
- higher machine availability
- gentle cleaning – for environment, human and material



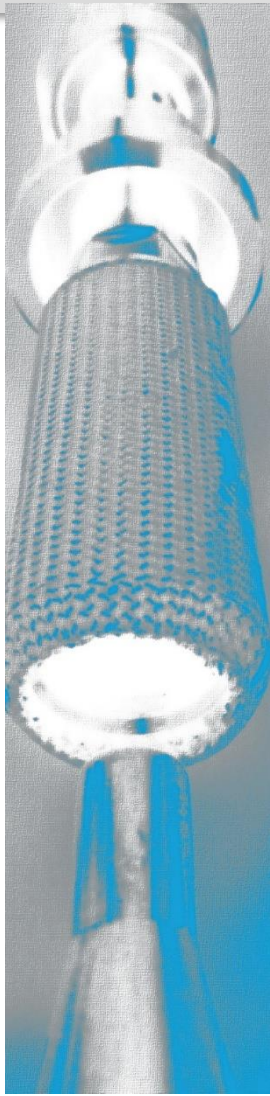
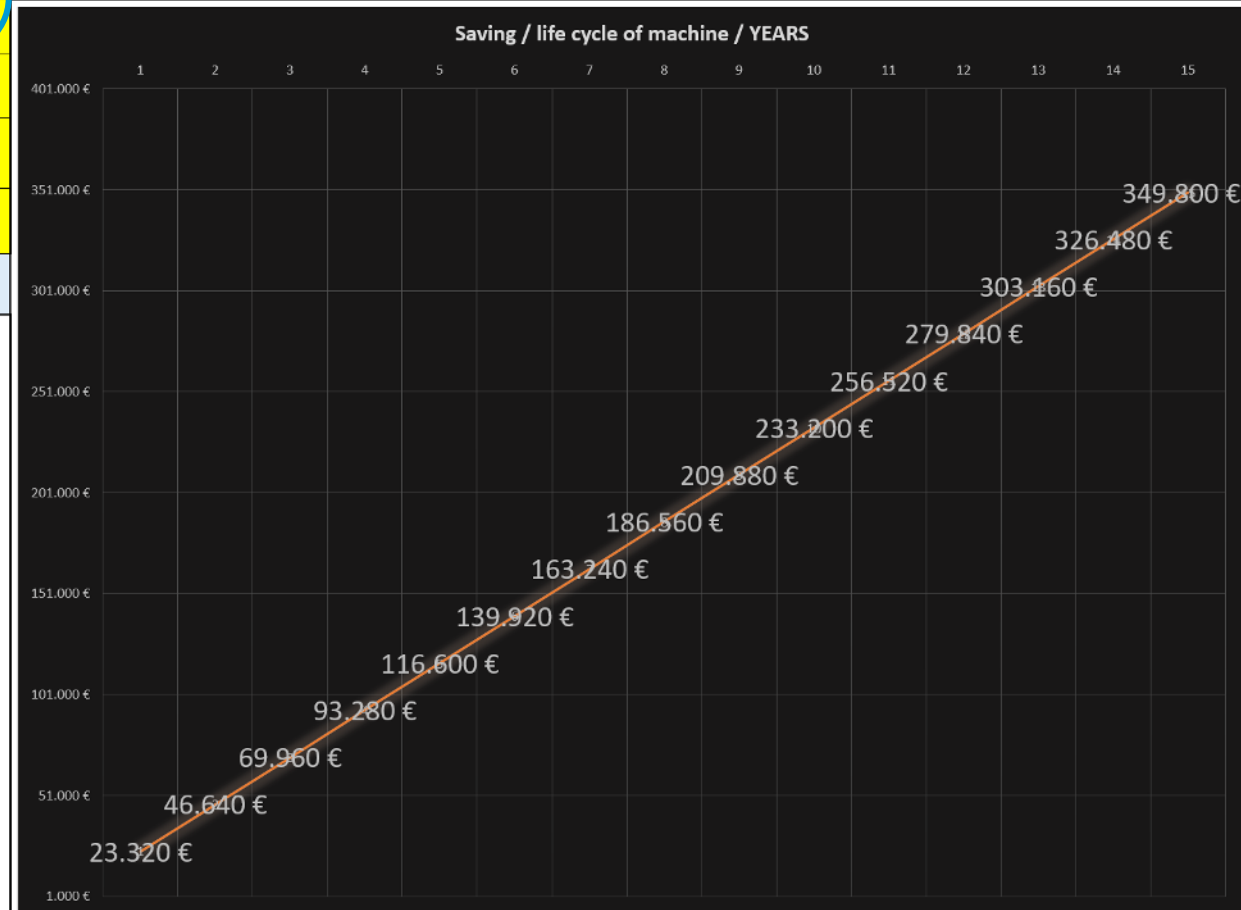
SEHO SelectLine-C: Maximum Process Reliability – Minimum Maintenance

Automatic Ultrasonic Nozzle Cleaning Cost Advantages



Working days per year	220	Costs for the nozzles per year WITHOUT US cleaning approx.	23.760 €	Lifetime	10	Days or shifts
Number of Shifts	3	Costs for the nozzles per year WITH US cleaning approx.	5.940 €	Lifetime	40	Days or shifts
Number of solder baths	4					
Price per nozzle €	90					
Difference in maintenance h/day	0,5					
Hourly wage € / h	50					

Saving	Years
23.320 €	1
46.640 €	2
69.960 €	3
93.280 €	4
116.600 €	5
139.920 €	6
163.240 €	7
186.560 €	8
209.880 €	9
233.200 €	10
256.520 €	11
279.840 €	12
303.160 €	13
326.480 €	14
349.800 €	15



the specified values refer to a customer application



SEHO SelectLine-C: Maximum Process Reliability

Wave Height Control SEHO Cross Sensor



touchless wave height control
and **automatic measurement** of

- diameter of the solder nozzle
- height of the solder nozzle
- mounting position of the solder nozzle

Reliable Process = Perfect Quality



SEHO SelectLine-C | SEHO PowerSelective

Integrated Additional Processes Process and Cost Optimization



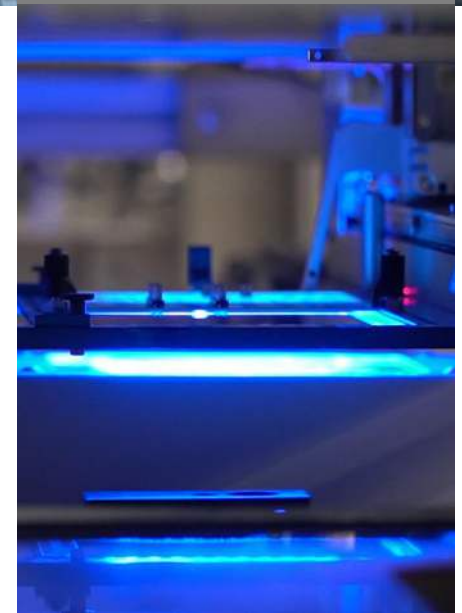
selective brushing

BENEFITS

THT AOI



- no or only small additional floor space needed
- control is made by the soldering system
- simple programming
- assemblies with defects automatically can be removed from the production line
- efficient communication: linking of all processes





SEHO PowerSelective



SEHO PowerSelective

Maximum Flexibility and Precision



- **3 Processes - 1 Machine**
miniwave soldering, multiwave processes and conventional wave
- two soldering units to be used simultaneously
- as stand-alone system, inline machine or lean production concept
- consistently modular and expandable any time – **timed invest**
- integrated additional processes: cooling, selective brush, AOI
- 100 % automated process control

SEHO PowerSelective

Soldering Area Diverse like no other System



Maximum Flexibility
and
Maximum Precision

miniwave soldering

multiwave soldering

conventional
wave soldering

3 processes **1** system



SEHO PowerSelective

Multi-Nozzle Tools Perfect Results with Innovative Technology



Ideal Energy Transfer

flowing solder waves

- no cooling of the solder during contact phase
- continuous supply of fresh and correctly heated solder
- ✓ perfect hole fill, even at high-mass connections
- ✓ perfect hole fill, even at pins with connections to inner layers
- ✓ perfect hole fill, even at pins located at outer edges

Solder Ball Protection

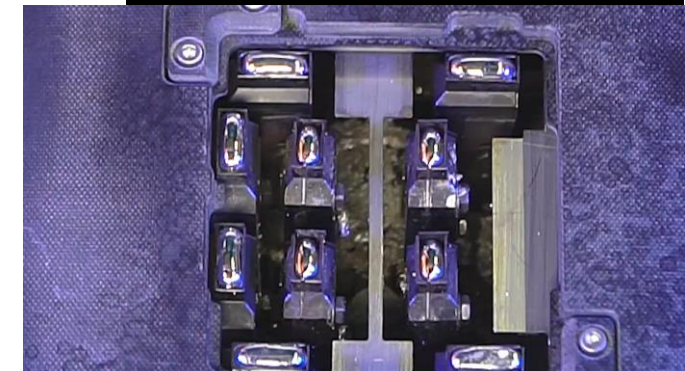
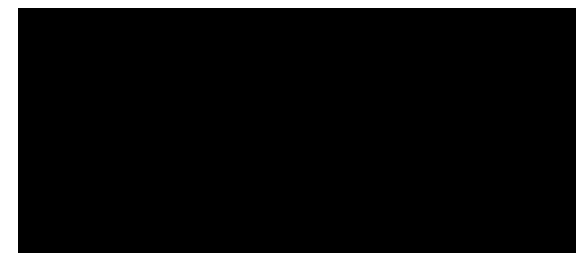
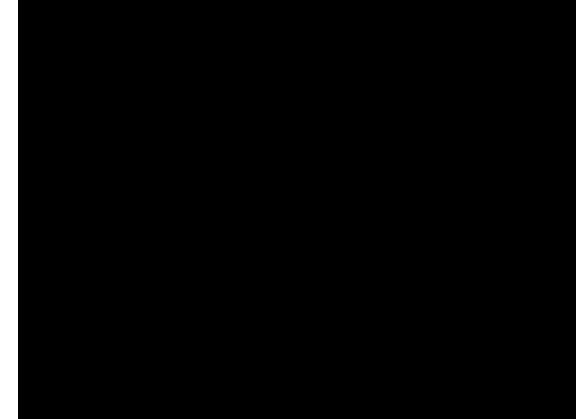
inside flowing solder nozzles

- directed and smooth solder flow
- additional cover
- ✓ efficient protection against solder balling

Bridging Protection

debridging knives

- perfect solder peel-off with wetted center plates
- ✓ efficient protection against bridging



SEHO PowerSelective | SEHO SelectLine-C

Soldering Area Minimum Energy Consumption

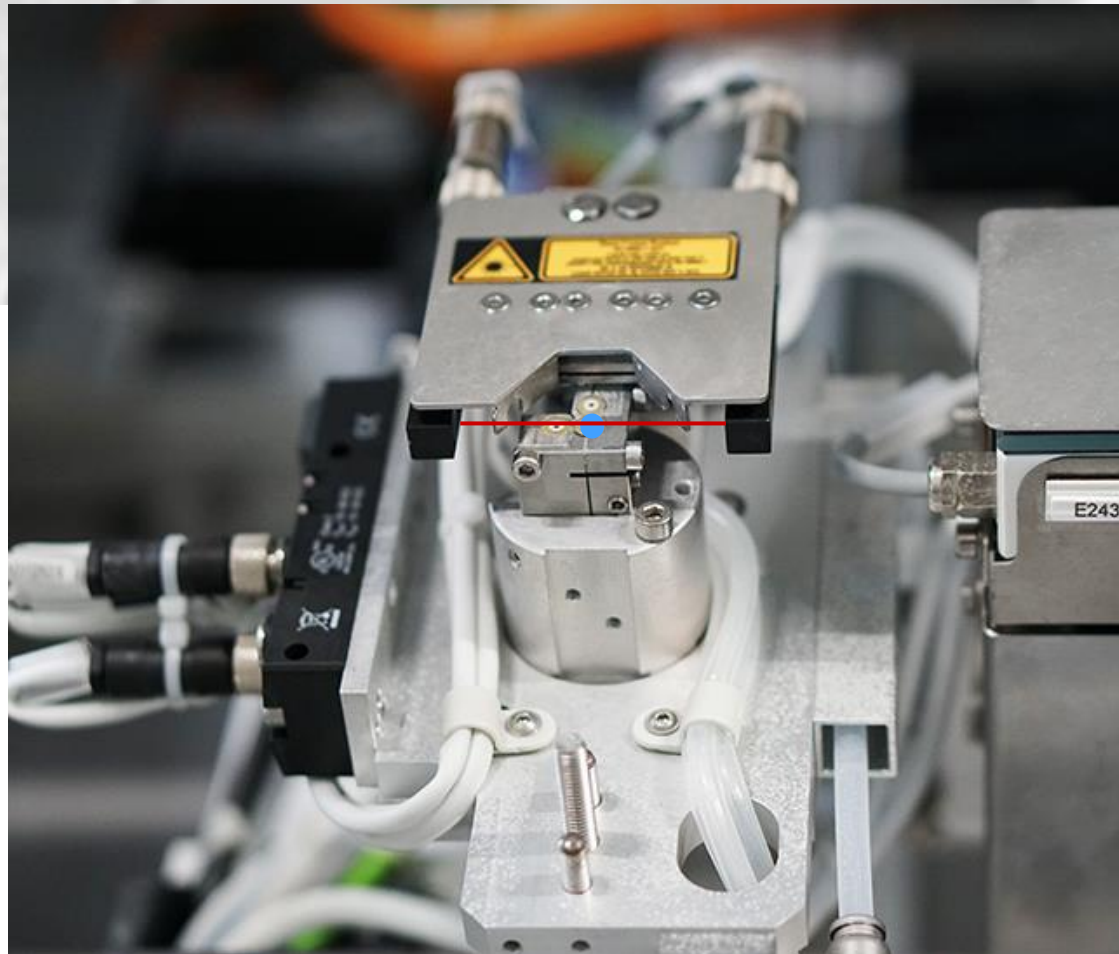


- **standby temperature control**
for unused soldering units or inactive machine:
automatic shutdown if a soldering unit is not used for
a programmable period of time, depending on the
process
- **deactivation of pump system and
nitrogen supply**
when the soldering unit or machine is inactive
- **ECO mode**
optimized heat-up process



SEHO PowerSelective | SEHO SelectLine-C

Flux Quantity Measurement Lower Flux Consumption

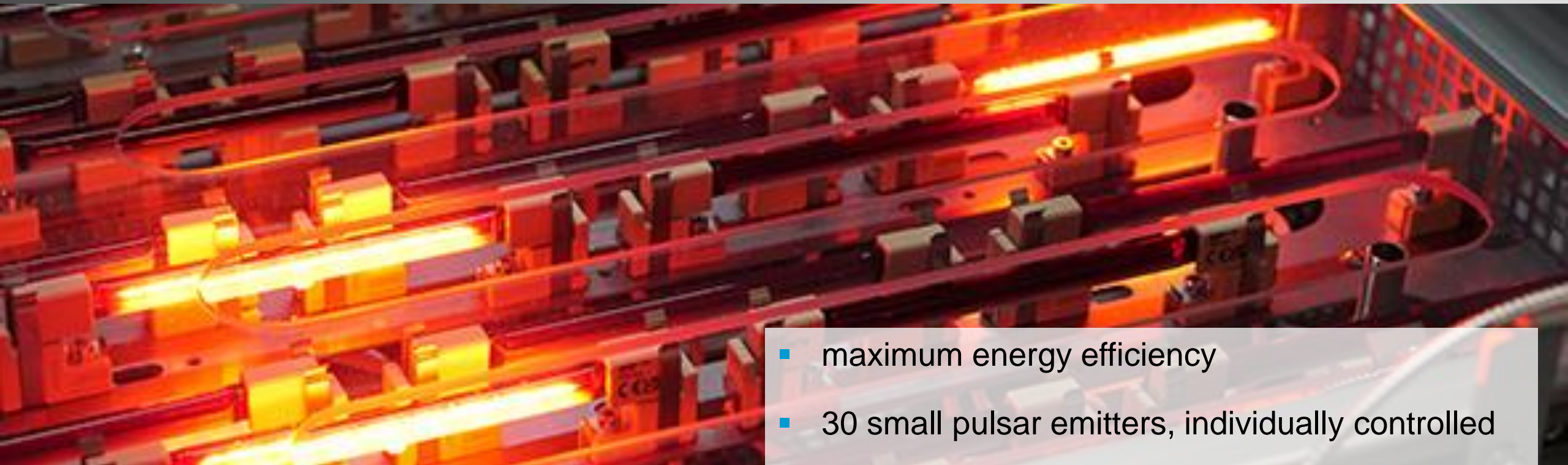


monitors the actual flux quantity jetted by the drop jet nozzle during the fluxing process

- + highest process reliability: minimizes soldering defects
- + no influence on cycle time
- + no reserves necessary

SEHO PowerSelective | SEHO SelectLine-C

Selective Cluster Preheat Lower Energy Consumption



- maximum energy efficiency
- 30 small pulsar emitters, individually controlled
- thermal energy is supplied to the assembly exactly where and in the quantity required

Potential Savings Summary in Numbers



Nitrogen

up to
20 %

- ECO mode

Flux

up to
10 %

- monitoring of the quantity applied

Load Peak

up to
20 %

- optimized heat-up process

Energy

up to
30 %

- pulsar emitters only switched on when required
- selective cluster preheating
- ECO mode

Soldering Defects/Rework

priceless

- flux quantity monitoring
- wave height & tool measurement
- ultrasonic nozzle cleaning
- multi-nozzle technology

values depending on application



There's more to come: Roadmap Selective Soldering

There's more to come: Roadmap Selective Soldering SEHO Energy Meter



- monitoring of the machine consumption for nitrogen and energy
- visualization of the current consumption
- log of the energy consumption in the trace data
- cost bread down of the consumption to each PCB

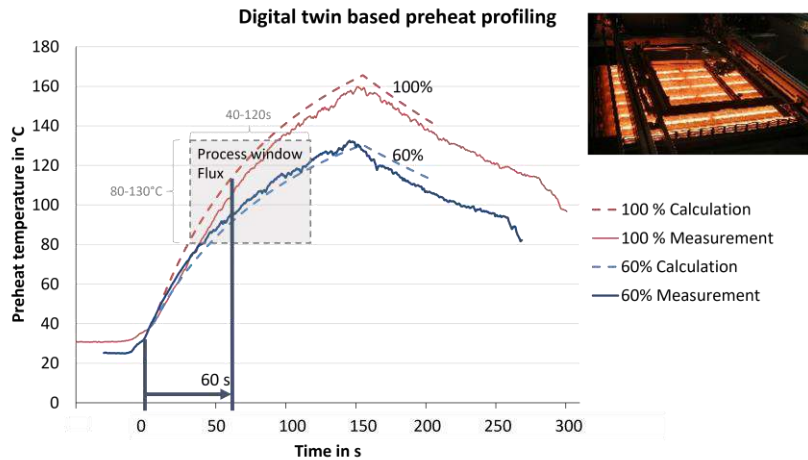
There's more to come: Roadmap Selective Soldering

Digital Twin of the Soldering Machine Expert Tool for Experts



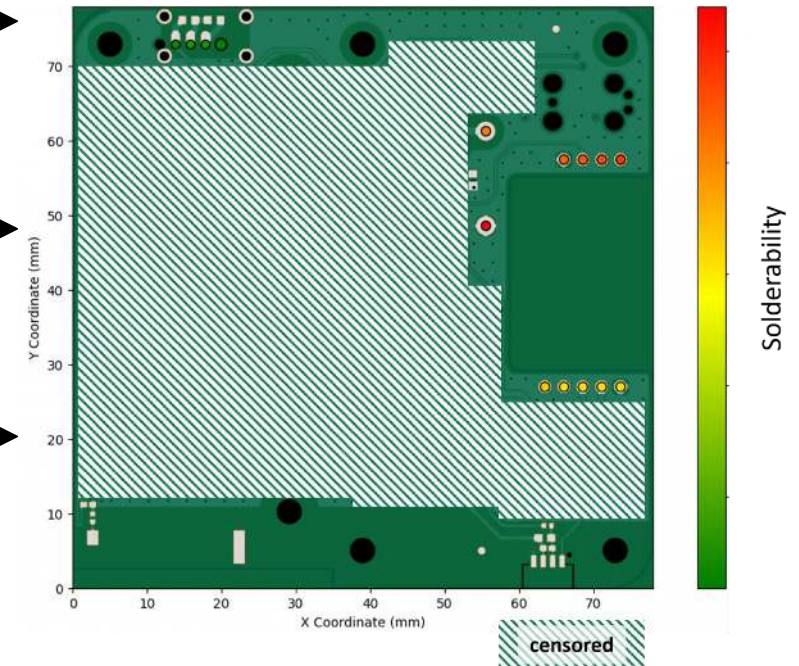
Preheat Assistant

preheat temperature calculation



Solder Wizard

solder contact time recommendation



There's more to come: Roadmap Selective Soldering Preheat Assistant Preheat Profile in less than 5 Minutes



PCB project definition

machine parameter selection

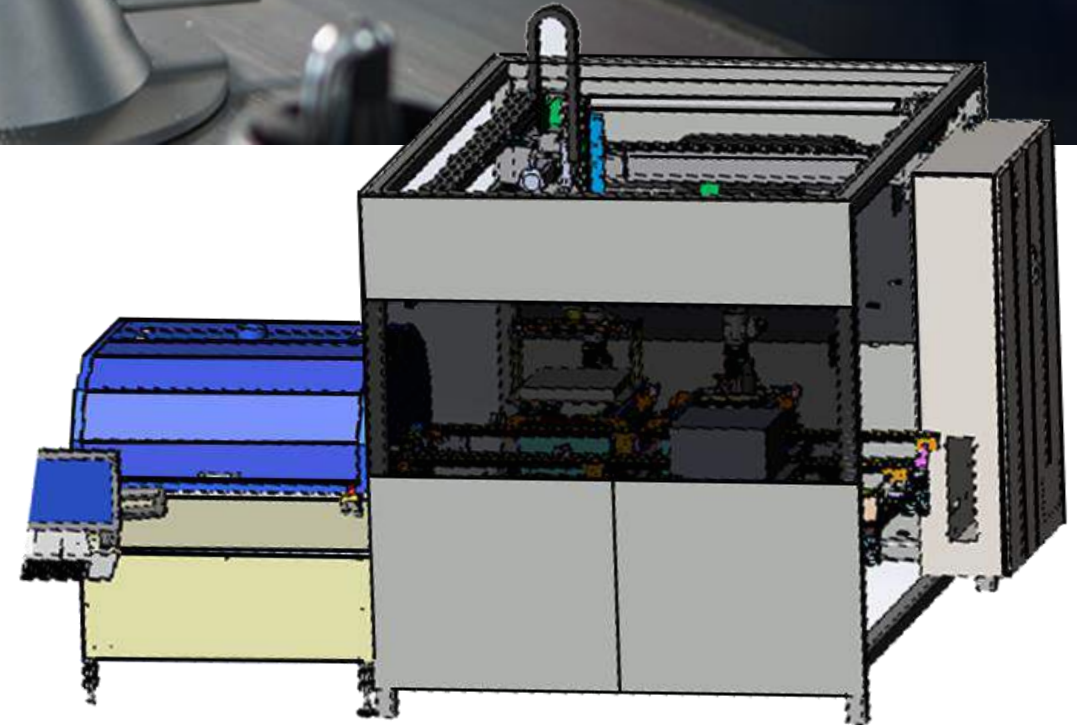
report export



There's more to come: Roadmap Selective Soldering
PowerSelective High Mass Assemblies



- new generation of PowerSelective for large and high mass products
- up to 25 kg per assembly
- cycle time of an assembly 500 x 500 mm < 30 sec.

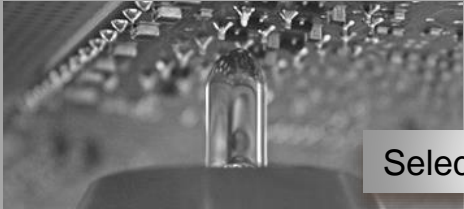




Wave Soldering



Reflow Soldering



Selective Soldering



THT-AOI



Automation



Know How

Thank You!

We look forward to getting in touch with you.