

# ONYX 32

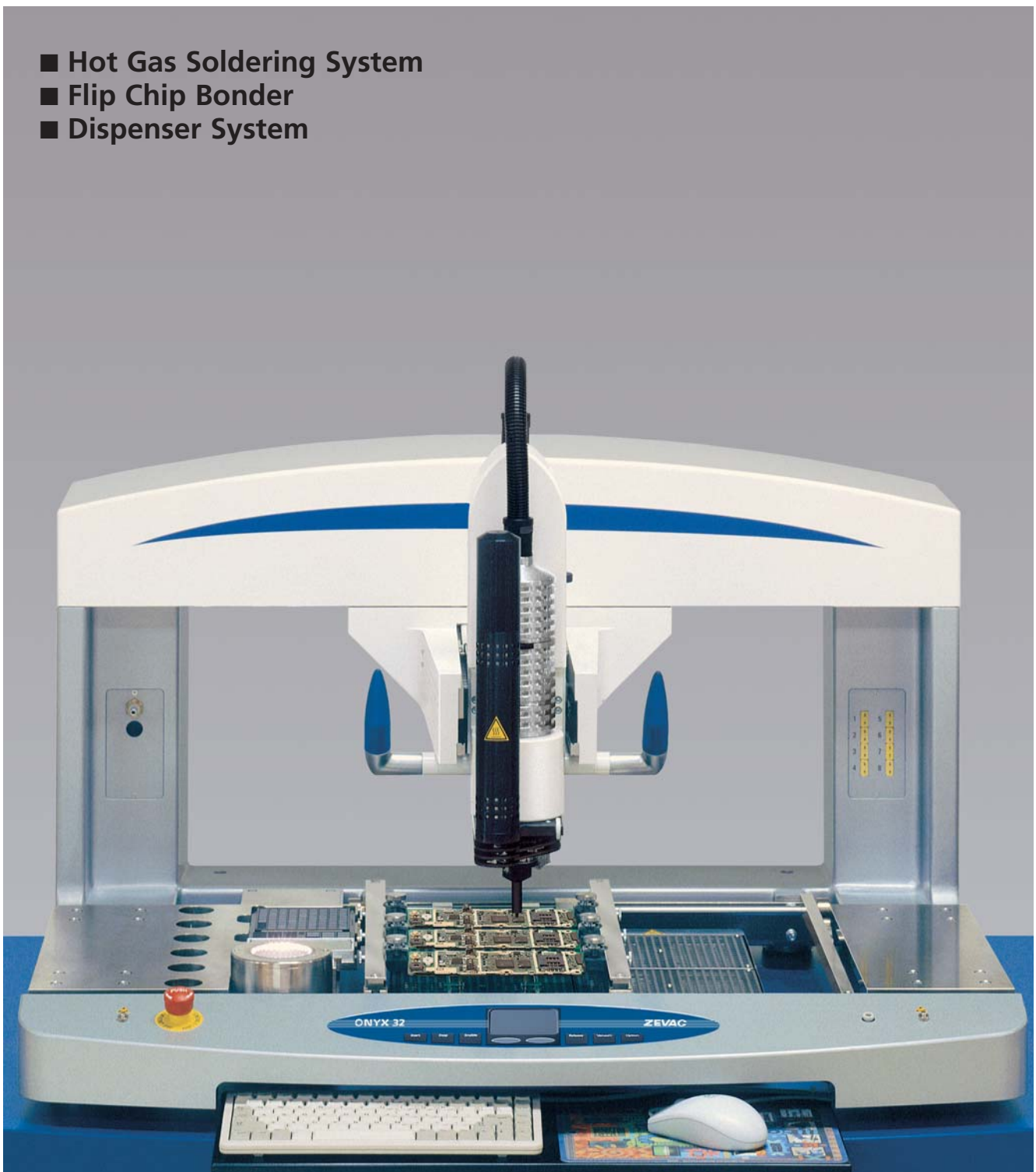
## MULTIFUNCTIONAL POSITIONING AND SOLDERING SYSTEM

**MACHINES****4.101****APPLICATION: SMT****ZEVAC-LINE: ONYX**

The complete ONYX product line documentation is composed of the following data sheets:

**MACHINES** 4.101**ACCESSORIES** 2.201, 2.202**OPTIONS**

- Hot Gas Soldering System
- Flip Chip Bonder
- Dispenser System



## GENERAL

THE ONYX 32 IS AN EXTREMELY FLEXIBLE MULTIFUNCTIONAL POSITIONING AND SOLDERING SYSTEM.

DETECTION, PLACEMENT AND SOLDERING OF COMPONENTS OR DISPENSING OF LIQUIDS ARE JUST A FEW OF THE POSSIBLE APPLICATIONS. PROCESSING OF SMD COMPONENTS UP TO FLIP CHIPS WITH A PITCH OF 200 $\mu$ m WITHOUT A PROBLEM. THE MAIN RANGES OF APPLICATION ARE: SMALL TO MEDIUM SERIAL PRODUCTION, PROTOTYPE ASSEMBLY AND REWORK OF LARGER BATCHES.

REVOLUTIONARY IS THAT WITH THE ONYX 32, ALL PARAMETERS (LIKE FORCE, TEMPERATURE, FLOW RATE, AIR PRESSURE) AS WELL AS THE POSITIONING DATA AND CAMERA SIGNALS ARE TRANSMITTED VIA A IEEE-1394 FIREWIRE INTERFACE BUS (WITH 400 MB DATA RATE).

## RANGES OF APPLICATION

By a quick-change of the robotic head, the following applications can be handled with the ONYX 32:

### Hot gas selective soldering

- Pick up and place with accurate placement force
- Selective hot gas soldering (reflow)
- Selective desoldering
- Flux the component or board
- Site solder cleaning (Option)

### Conductive heat soldering system (Option)

- Pick up and place with accurate placement force
- Desoldering and soldering with conductive heat
- Flux

### Dispenser for liquids (Option)

- Solderpaste dispensing
- Adhesive dispensing
- Underfill dispensing

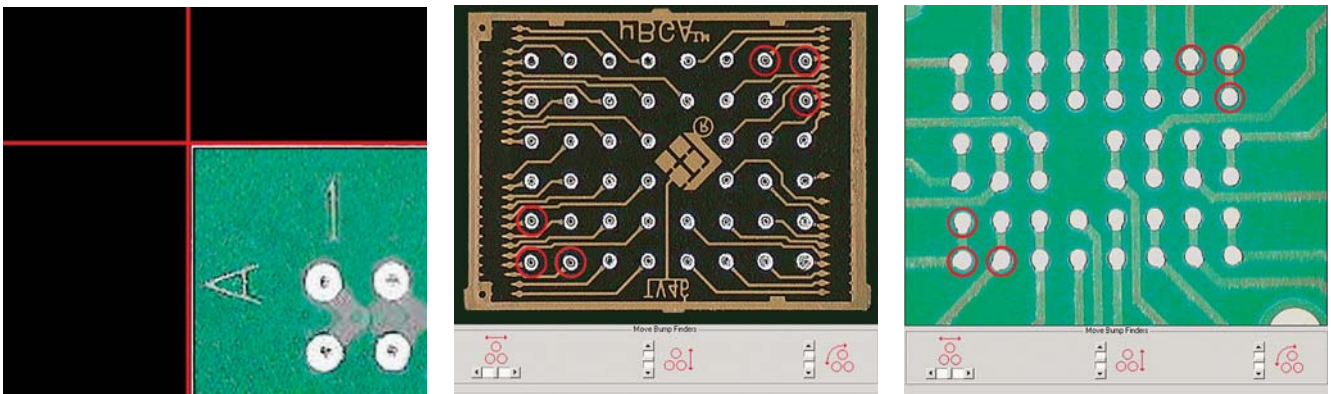
## Components

With the new ONYX 32 all electronic SMT components, such as

- Flip Chip,
- $\mu$ BGA / CSP, BGA
- CCGA, TCP
- QFP and Fine Pitch
- Connectors and Sockets
- HF shieldings
- Customer specific components can be handled easily.

Zevac's standard gas nozzles from the proven DRS selective soldering machines can be used on the ONYX 32 without any modification.





**PROCESS DESCRIPTION**

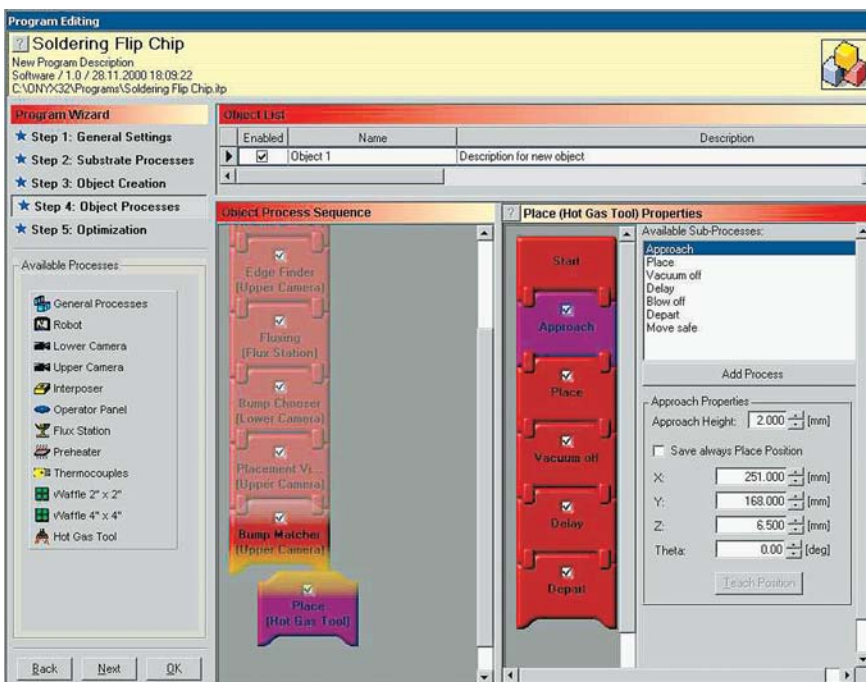
(example on the basis of a  $\mu$ BGA / CSP)

Once the board/substrate is manually loaded into the carrier, the ONYX 32 can fully automatic:

- Pick up the component from a pick up place, e.g. waffle tray.
- With the upper or lower camera the body outlines are localized (edge finder). Then the component is aligned at the nozzle.

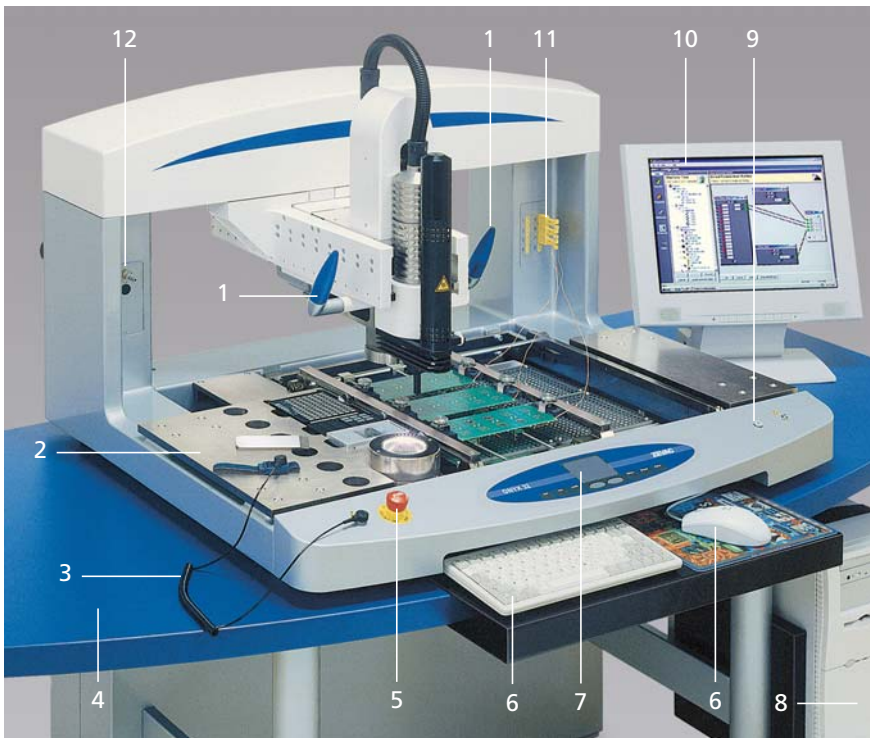
- Over the lower camera previously defined balls are detected now and are stored (bump chooser).
- With the upper camera the solder joints on the board are located. The computer matches this data with the component data (bump matcher).

- Automatic fluxing of the component.
- Placement of the component with a defined force.
- Soldering of the component with hot gas. Temperature, flow rate, time and force are freely programmable and are monitored during the complete process.



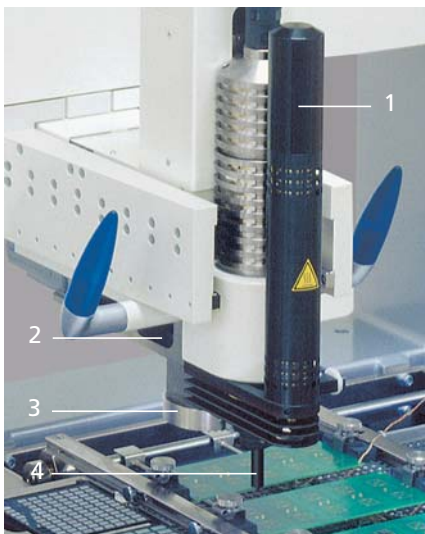
**SOFTWARE / PROGRAMMING**

The entire ONYX 32 is controlled via the user-friendly software *Visual Machines™*. It is a completely object-oriented, open software solution. The individual program steps are represented in the form of process-blocks. They can be shifted with the mouse at will. So the program run can be created or optimized in a simplest way. By clicking on a block all detail information of this process step are displayed.



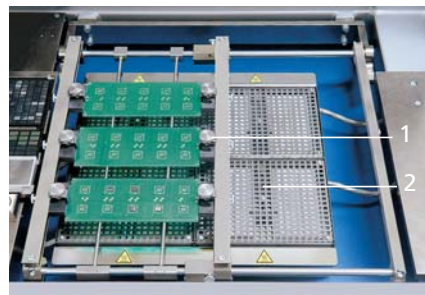
**ONYX 32 WITH HOT GAS SOLDERING SYSTEM ON MACHINE TABLE**

- 1 Handles for the manual movement of the X and Y axis
- 2 Application plate
- 3 ESD wrist strap
- 4 Machine table
- 5 Emergency button
- 6 Keyboard/Mouse
- 7 Integrated Control panel
- 8 Computer
- 9 External vacuum connection
- 10 Monitor
- 11 Temperature sensor board with 8 inputs
- 12 Additional cooling air (Option)



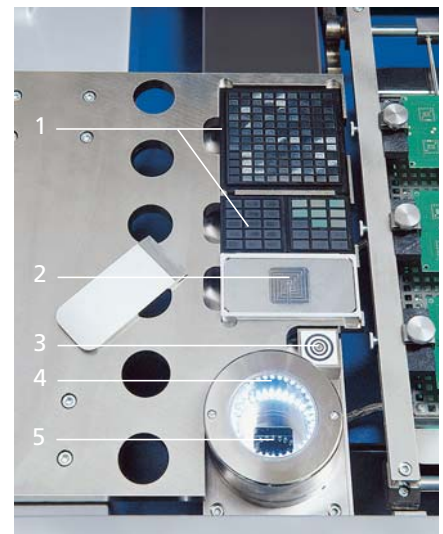
**HOT GAS SOLDERING SYSTEM**

- 1 2000W Heating element
- 2 Upper digital color camera
- 3 Upper adjustable illumination with LED's
- 4 Zevac standard gas nozzle



**BOARD HOLDER AND PREHEATER**

- 1 Adjustable board holder with supports
- 2 4000W preheater with 4 independent sections



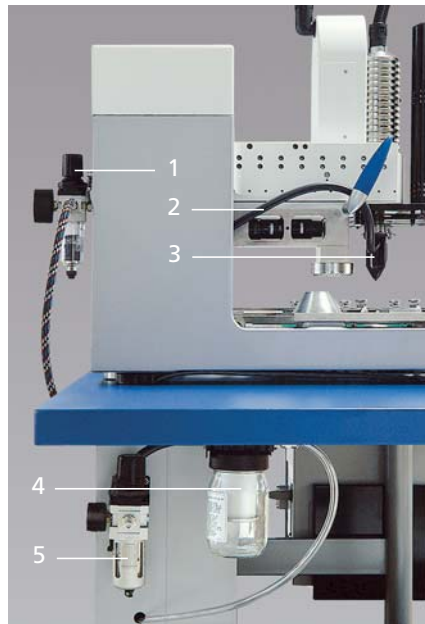
**STANDARD APPLICATION PLATFORM**

- 1 Waffle trays 4"x 4" and 2"x 2"
- 2 Fluxer with different cavity depths
- 3 Camera calibration station
- 4 Lower adjustable illumination with LED's
- 5 Lower digital color camera

A support for a "Jedec tray" is available.

**OPTIONS**

**SITE SOLDER REMOVAL SYSTEM**

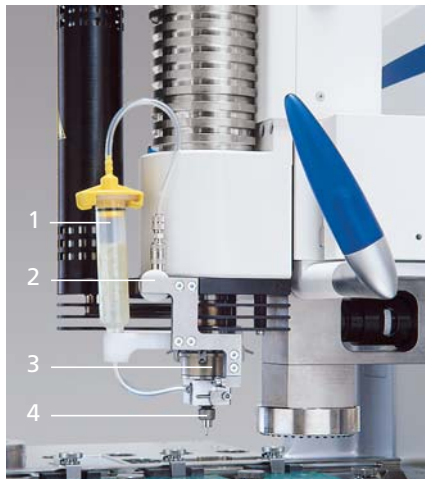


- 1 Maintenance unit for air feed (basic system)
- 2 Vacuum tube for removal of site solder
- 3 Site solder removal nozzle with different tips
- 4 Filter glass for site solder
- 5 Maintenance unit for nitrogen feed (basic system)

**LIQUIDS DISPENSER**

For dispensing of viscous media. Points up to a minimum diameter of 0.25mm can be placed.

The dispenser unit uses the same mechanical interface as the hot gas nozzles.



- 1 Cartouche with viscous medium
- 2 Valve for switching hot gas system / liquid dispenser
- 3 Dispenser unit with Archimedes screw
- 4 Dispensing needle

**CONDUCTIVE HEAT SOLDERING SYSTEM**

For soldering with conductive heat. The dimension of the conduct heating plate is optimized on the respective component. The soldering with conductive heat is suitable for components with small mass eg. Flip Chip. The cycle time is shorter than when soldering with hot gas systems.



- 1 Adapter with electrical connections
- 2 Radiator box with spring contacts
- 3 Conductive heating plate with vacuum nozzle

**TECHNICAL DATA**

Technical data subject to change

**BASE PLATFORM**

|   |                            |                           |                        |                              |       |  |
|---|----------------------------|---------------------------|------------------------|------------------------------|-------|--|
| ONYX 32 with Hot Gas Soldering System and Preheater | Electrical power           | at machine table          |                        | 100–240 VAC 50/60 Hz 1-phase |       |  |
|   | Air pressure               | Minimum 5 bar             |                        | 10 Nm <sup>3</sup> / h       |       |  |
|   | Board dimensions           | Minimum                   | 20 x 20 mm             |                              |       |  |
|   |                            | Maximum                   | 355 x 320 mm           |                              |       |  |
|   |                            | With manual rotation      | 355 x 680 mm           |                              |       |  |
|   |                            | Max. camera field of view | 355 x 250 mm           |                              |       |  |
|   | Preheater heating area     | 355 x 290 mm              |                        |                              |       |  |
|   |                            | Max. component height     | Top side               | 60 mm                        |       |  |
|   |                            | Bottom side               | 20 mm                  |                              |       |  |
|   | Axes acceleration          | X                         | Y                      | Z                            | Theta |  |
| Axes speed  | 0,75 ms <sup>-2</sup>      | 0,75 ms <sup>-2</sup>     | 0,75 ms <sup>-2</sup>  | 4 rots <sup>-2</sup>         |       |  |
| Working area  | 0,15 ms <sup>-1</sup>      | 0,15 ms <sup>-1</sup>     | 0,025 ms <sup>-1</sup> | 0.8 rots <sup>-1</sup>       |       |  |
| Placement accuracy +/- 3 Sigma                      | 500 mm                     | 320 mm                    | 80 mm                  | ∞                            |       |  |
| Digital color cameras                               | 0,001 mm                   | 0,001 mm                  | 0,0015 mm              | 0,003°                       |       |  |
| Hot Gas Soldering System                            | +/- 0,02 mm                | +/- 0,02 mm               | +/- 0,02 mm            | +/- 0,02°                    |       |  |
| Preheater   | Resolution                 | 640 x 480 pixels          |                        |                              |       |  |
| Force sensor in Z direction                         | Manual zoom area           | 2-20 mm                   |                        |                              |       |  |
|   | Max. temperature           | 420°C                     |                        |                              |       |  |
|   | Max. flow rate             | 85 l/min                  |                        |                              |       |  |
|   | Max. constant temperature  | 300°C                     |                        |                              |       |  |
|   | Force area                 | 1 - 30 N                  |                        |                              |       |  |
|   | Resolution                 | 0.1 N                     |                        |                              |       |  |
| Machine table 3 x 400VAC 3PNE                       | acc. CE safety regulations | 3 x 400VAC                | 50 Hz                  | 3-phase                      |       |  |
|   |                            | Fuse value                | 3 x 16A                |                              |       |  |
| Machine table 3 x 208VAC 3PE                        | acc. UL safety regulations | 3 x 208VAC                | 50/60 Hz               | 3-phase                      |       |  |
|   |                            | Fuse value                | 3 x 20A                |                              |       |  |

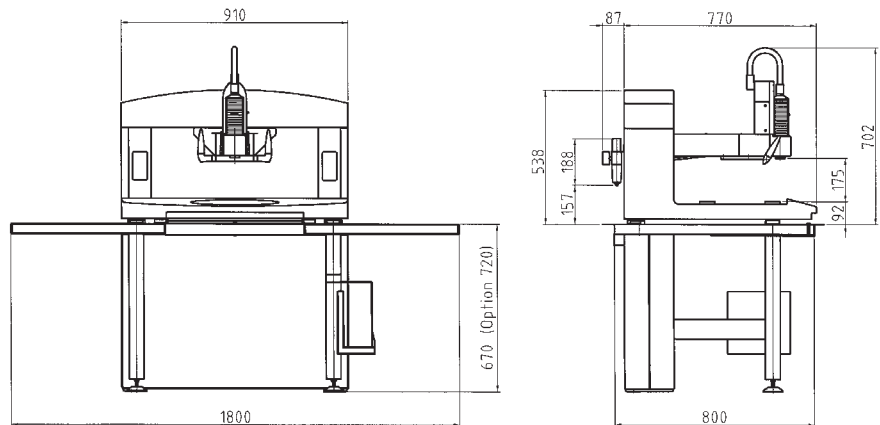
**OPTIONS**

|                                  |                     |                |  |
|----------------------------------|---------------------|----------------|--|
| Conductive Heat Soldering System | Max. temperature    | 400°C          |  |
|                                  | Max. component size | 25.4 x 25.4 mm |  |
| Liquids Dispenser                | Smallest dot        | Ø 0.25 mm      |  |
|                                  | Placement accuracy  | ±0.05 mm       |  |
| Site Solder Removal System       | Vacuum value        | 0.5 bar        |  |
|                                  | Vacuum flow rate    | 60 l/min       |  |

|                |                  |                       |                           |
|----------------|------------------|-----------------------|---------------------------|
| <b>Weights</b> | ONYX 32 = 135 kg | Machine table = 90 kg | Packaging = 35 kg / 45 kg |
|----------------|------------------|-----------------------|---------------------------|

|                     |    |    |
|---------------------|----|----|
| <b>Certificates</b> | CE | UL |
|---------------------|----|----|

**Dimensions**



**ZEVAC Distributor**

|              |                                   |           |                  |
|--------------|-----------------------------------|-----------|------------------|
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