ONYX 32
MULTIFUNCTION POSITIONING AND ASSEMBLY PLATFORM

MACHINES	**5.101**

APPLICATION: MICROTECHNICS

ZEVAC-LINE: ONYX

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

MACHINES	5.101
ACCESSORIES	
OPTIONS	

GENERAL

THE ONYX 32 IS AN EXTREMELY FLEXIBLE MULTIFUNCTION POSITIONING AND ASSEMBLY PLATFORM.

DETECTION, PICK UP, ALIGNMENT AND PLACING OF COMPONENTS AS WELL AS DISPENSING OR STAMPING OF LIQUIDS ARE JUST A PART OF THE POSSIBLE RANGE OF PROCESSES.
HANDLING AND PROCESSING OF COMPONENTS IN THE FIELD OF MICROMECHANICS, MICROOPTICS OR MICROELECTRONICS WITH SMALLEST DIMENSIONS IS NOT A MAJOR CHALLENGE FOR THE SYSTEM.

THE MAIN RANGE OF APPLICATIONS ARE: SMALL MEDIUM SERIAL PRODUCTION, PROTOTYPE ASSEMBLY AND EVERY TRICKY PRECISION WHICH IS UP TO NOW PROCESSED MANUALLY.
REVOLUTIONARY IS THE FACT, THAT ALL PARAMETERS SUCH AS FORCE, PRESSURE, TEMPERATURE, FLOW RATE, AS WELL AS THE POSITIONING DATA AND CAMERA SIGNALS TRANSMITTED VIA THE SAME BROAD BAND BUS SYSTEM.

RANGES OF APPLICATION

A simple and quick configuration of the platform allows the following process steps:

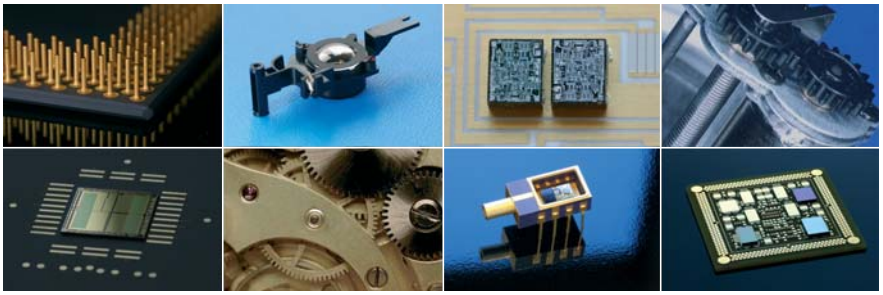
- Pick up, alignment and placing with accurate force control
- Dispensing
- Stamping (pin-print transfer)
- Dipping
- Curing
- Die-bonding
- Flipping
- Screwing
- Measuring and inspecting
- Recognition of the absolute or relative position and orientation

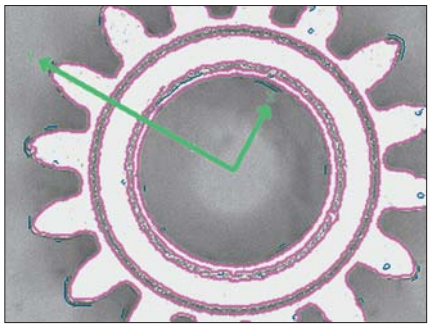
Components

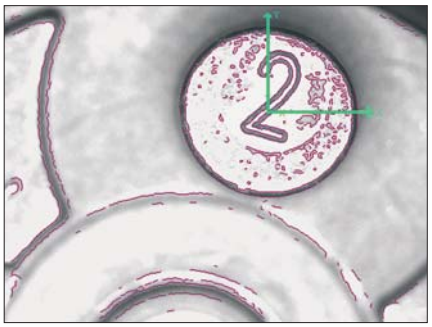
With the new ONYX 32 all electronic SMT components, such as

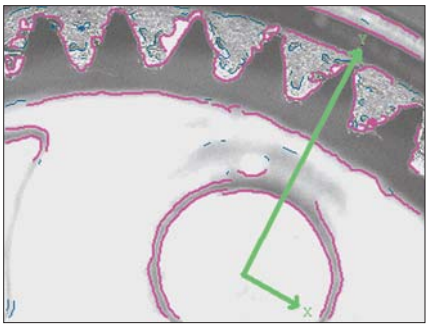
- Gearwheels
- Injection molding micro parts
- Apertures
- Lenses
- Laser Diodes
- Flip chips
- µBGA / CSP

can be easily handled.
Standard fixtures, vacuum tips and grippers could be applied to the ONYX 32 without additional effort.





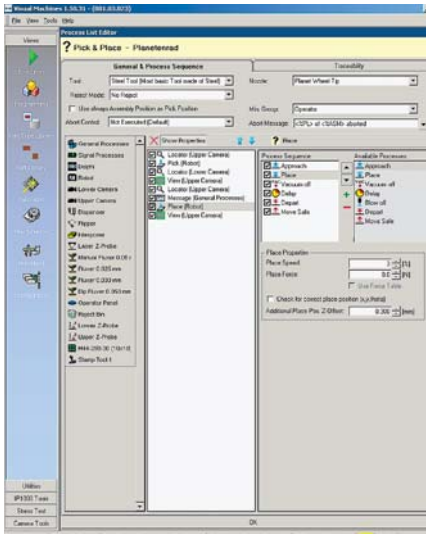




PROCESS DESCRIPTION

(Example based on a micro gear)
Once the multiple fixture with the gearboxes are manually loaded on the application plate, the ONYX 32 automatically and repeatedly runs the following process steps:

- Infeeder-recognition of the position and orientation of the gearwheel with the upper camera
- Pick up and pre-alignment
- Recognition of the component center with the lower camera
- Measuring and fine-tuning of the known place position with the upper camera according to local non-ambiguous features
- Matching of the determined position and orientation data of the gearwheel and the carrier
- Measuring the placement height with the tactile Z-probe
- Dispensing of grease to the gearbox axis
- Final alignment and placement of the wheel with accurately defined force
- Simple visual inspection with the upper camera

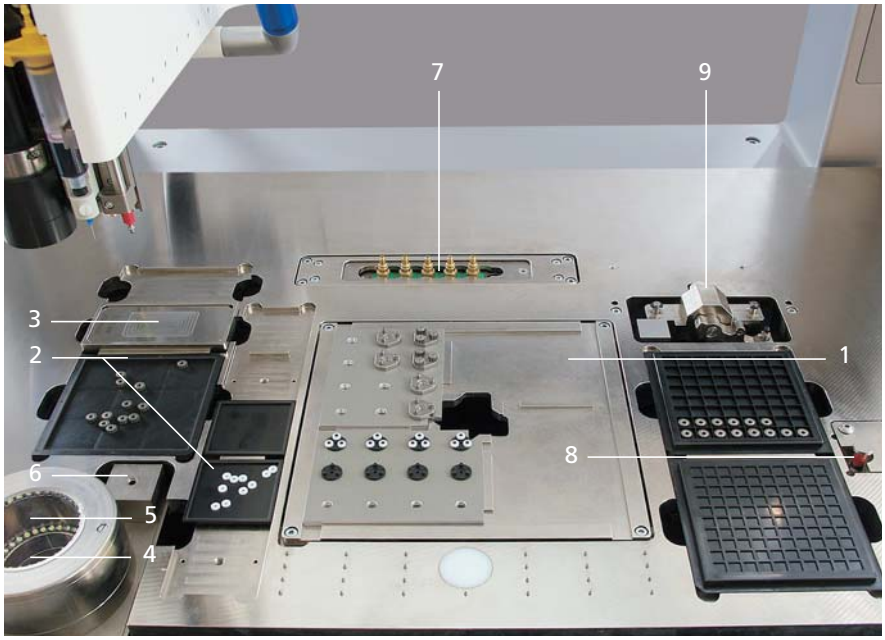


SOFTWARE / PROGRAMMING

All parameters, functions and configuration data of the ONYX 32 are controlled by the user-friendly software VisualMachines™. It's a object-oriented, open and modular in-house software solution.
The single process steps are presented as small boxes which can be easily inserted in the process flow by „drag-and-drop". That way the process sequence can be comfortably developed and optimized without any knowledge of a programming language. The user gets to the detailed information and parameters by clicking on a process box.
Furthermore, the software supports working with part type libraries with what predefined process lists could be stored and linked with the component in the software database. In this manner, components or part types could be accessed in variable applications without any limitation.
As an option, VisualMachines™ provides interfaces to import CAD data and to export traceability in order to support any quality management system.

ONYX 32 ASSEMBLY PLATFORM ON MACHINE TABLE

1 Robot head with camera
2 Handles for the manual movement of the X and Y axis
3 Application plate
4 Machine table
5 Machine support / control cabinet
6 Emergency button
7 Integrated control panel
8 Computer
9 External vacuum connection



ROBOT HEAD

1 Upper digital color camera, moves in Z
2 Upper adjustable LED-illumination
3 Double-Z-slide
4 Tool holder for vacuum tips, collets and grippers
5 Tactile Z-probe, down-looking

WORKTABLE

1 Substrate fixture
2 Component feeder (Waffle Trays, Gel-Packs, etc.)
3 Dip-station with various cavities
4 Lower digital camera
5 Lower adjustable LED-Illumination
6 Camera calibration station
7 Tool changer (option)
8 Tactile Z-probe, up-looking (option)
9 Component flipper (option)

OPTIONS

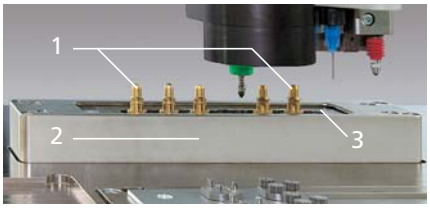
LIQUIDS DISPENSER

For dispensing of liquid media with various viscosity. Time/pressure or auger systems are available, depending on the viscosity and the application. All dispense parameters are accessible and controllable via the machine control software. Thus, the dispense process can be fully implemented in the application's main process list.

1 Cartridge with medium to dispense
2 Cartridge holder (time/pressure)
3 Dispense needle
4 Mechanical Z-adjustment

TOOL CHANGER

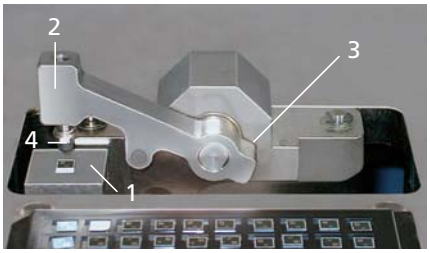
For take-up of standard JUKI, Siemens or other vacuum tips, diecollets, Gripper. The standard tool changer has a capacity for six tools.



1 Tool pockets
2 Lift mechanism
3 Release blade

COMPONENT-FLIPPER

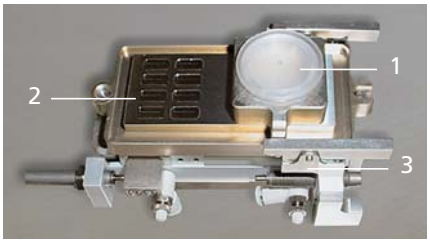
Is primarily used for die-bonding. The component edge dimension can vary from 0.2 mm to 25.4 mm.



1 Interposer
2 Flipper-lever
3 Lift and rotate mechanism
4 Standard or application specific vacuum tip

LINEAR SQUEEGEE

The automatic linear squeegee is mainly used for stamping adhesives. The encapsulated liquid reservoir tops up the cavity plate with every slide movement.



1 Reservoir
2 Cavity plate
3 Slide mechanism

Tape feeder and die-feeder connection and other application specific options are on request.

TECHNICAL DATA

Technical data subject to change

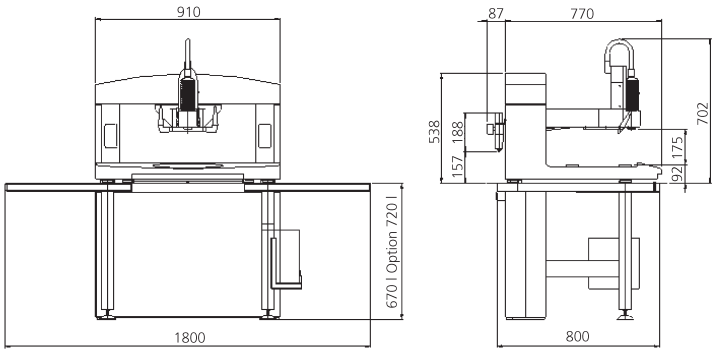
BASE PLATFORM

ONYX 32	Electrical powersupply	at machine support		100–240 VAC 50/60 Hz 1-phase	
	Air pressure	minimum 5 bar		10 Nm^3 / h	
	Standard work space	minimum		20 x 20 mm	
		maximum		500 x 320 mm	
	Traverse path in Z	maximum		80 mm	
		X	Y	Z	Theta
	Axes acceleration	0,75 ms^{-2}	0,75 ms^{-2}	0,75 ms^{-2}	4 $rots^{-2}$
	Axes speed	0,15 ms^{-1}	0,15 ms^{-1}	0,15 ms^{-1}	0.8 $rots^{-1}$
	Working area	500 mm	320 mm	80 mm	∞
	Axes resolution	0,001 mm	0,001 mm	0,0015 mm	0,003°
	Placement accuracy +/– 3 Sigma (glass flip-chip measurement)	±0,01 mm	± 0,01 mm	±0,01 mm	±0,02°
	Digital color cameras	Standard resolution		640 x 480 pixels	
		HiRes		1024 x 768 or 1280 x 960 Pixel	
	Force sensor in Z	Range		0.1 - 50 N	
		Resolution		0.1 N	
Machine support	Acc. CE safety regulations	1 x 240 VAC 1PNE fuse		50 Hz	1-phase
				1 x 16 A	
Machine support	Acc. UL safety regulations	1 x 110 VAC 1PE fuse		50/60 Hz	1-phase
				1 x 20 A	

OPTIONS

	Liquids Dispenser	Smallest dot	Ø 0.25 mm
		Placement accuracy	±0.05 mm
	Component Flipper	min. component dimension	0.2 x 0.2 mm
		max. component dimension	75.0 x 75.0 mm
	Tool changer	max. Positions	6
Weights	ONYX 32 = 135 kg	Machine table = 90 kg	Packaging = 35 kg / 45 kg
Certificates	CE	UL	

Dimensions



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