finetech

FINEPLACER® lambda

Sub-Micron Bonding System

Operator's Manual

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1 Hints for Using this Manual

Please read the safety instructions first before operating the FINEPLACER®

- Have a look at the pictures before reading the operating instructions to familiarize yourself with the FINEPLACER®. Start with the basic machine and do the same with each module belonging to your special system configuration.
- Read the operating instructions.
- Read the maintenance instructions.
- Learn more about the most important points for avoiding problems.
- In case of defects, and before dismantling anything, contact your dealer or the manufacturer.
- Perform the same procedure for all other optional module-concerned parts attached after part A.

2 General Information on FINEPLACER® Systems and this Manual

This manual will be updated regularly, however, it is possible that it does not cover all the details of your equipment accurately, subject to errors and technical changes, especially those made on a customer's request. For optional modules, see also specific manual sections.

Assured properties must be agreed upon by contract expressly and in writing.

The trade name 'FINEPLACER®' is now registered with Systems 2000 GmbH within the United States of America.

2.1 Application of the FINEPLACER® lambda

The lambda is designed to position fine pitch devices e. g. Flip Chips and Flip Chip assemblies, optoelectronic components, micro electro mechanic systems (MEMS), micro optoelectronic mechanic systems (MOEMS), sensors, micro optics, TAB, bare chips and other high-count surface mounted devices (SMD). The FINEPLACER® System is based on a unique placement principle integrated into five machine models according to the type and sizes of the various components and substrate dimensions.

Using the highly accurate Vision Alignment System (**VAS**), the FINEPLACER® lambda is designed to accurately place the component on the first attempt. As its accuracy is 1 µm, it is possible to position new technology components with very fine pitch uniformly and accurately.

Optional accessories include special optics for positioning large fine pitch devices on their substrates and high magnification systems for observing chip bonding. All state of the art bonding technologies can be performed, such as thermocompression, ultrasonic/thermosonic bonding, ACF bonding, UV cure and bonding of C4 chips. Due to the modular system, the necessary configuration may easily be optimized, corresponding to your individual requirements. As every FINEPLACER®, the lambda allows cost effective and safe manual component placement and bonding at one work station and in the same operation.

2.2 Operating Principle, Method of Working and System Features

The patented advanced Vision Alignment System of the lambda is based on the principle of imaging two orthogonal images simultaneously into one common image plane, using a stationary beam splitter (30) and a single beam deflection (see fig. 1):

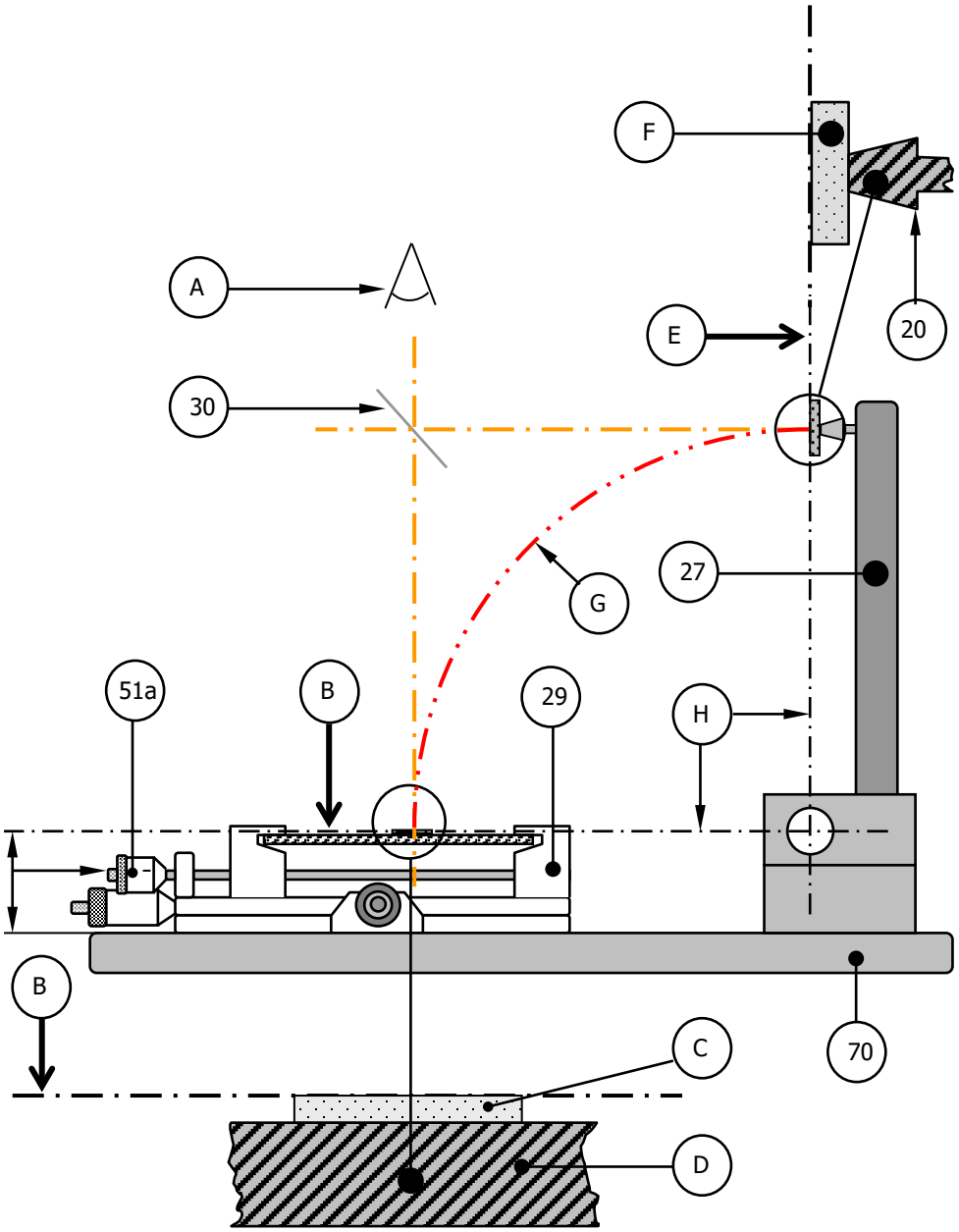


Fig. 1: Operating principle of A6/A7 (sketch of the lateral view, right hand side)

A	Observation point (camera)	B	Working level
C	Bottom glass scale or substrate	D	Surface of the heating
E	UAP Upper Arm Position	F	Top glass scale or component
H	Working level and UAP must form angle of 90°		

The configuration shown in fig. 1 allows orthogonal view of the objects component (F) and substrate (C), so both are seen to be observed "vertically from above" (A). The overlay image allows a comparison of all connectors on each component lead with each substrate pad at a glance.

2.3 Method of Working, Positioning and Placement

To adjust the positioning table (29) manually, observe the dual image overlay through the video system. Coarse align using the air cushion, fine align by means of the micrometer screws. Angular deviations are eliminated by turning the positioning table around an electromagnet mounted in the optical axis.

Shift the video optics to the right-hand end position and place the component held in the positioning head (F) on the substrate (C) by simply swinging down the pivot arm (27) following the curve (G). To release the component, switch off the placement head's vacuum by pressing the vacuum foot switch.

FOR AN ACCURATE PLACING IT IS AN ESSENTIAL PRECONDITION,

- THAT THE TABLE HEIGHT HAS BEEN BROUGHT INTO THE WORKING LEVEL (B) WITH THE HELP OF THE MICROMETER SCREW (51A) AND THAT THE **U**PPER **A**RM **P**OSITION (UAP) HAS BEEN ADJUSTED AS DESCRIBED IN 4.2.2, SO THAT LEVEL (B) AND (E) FORM AN RIGHT ANGLE.
- THAT THE BEAM SPLITTER (30) HAS BEEN ADJUSTED CORRECTLY AS DESCRIBED IN 4.2.3.. IT IS NOT NECESSARY TO PERFORM THE ADJUSTMENT PROCEDURE BEFORE EACH WORKING PROCESS BUT TO CHECK IT OCCASIONALLY.

2.4 Purpose of the Equipment; Warning Against Misuse; Warranty Conditions

The FINEPLACER® equipment is intended only for industrial and skilled trade use and must be run and serviced by qualified personnel only. Everyone must observe the caution, circumspection, and responsibility required to run this equipment, consisting of mechanical, optical, mains powered, electromechanical and electrical heating appliances, and possibly using compressed air or an inert gas. Operators must not be under the influence of alcohol or other drugs and must not allow their attention to be distracted.

FINEPLACER® equipment is designed to be used solely for work on components and substrates in the way intended in a configuration agreed with Finetech and together with Finetech approved equipment. In other cases it must be expressly agreed in writing with Finetech GmbH, Berlin, Germany, under the conditions stated in the manual. Any other use, changes, use of foreign controls or procedures not laid down in this manual may cause risks. Any single, complete FINEPLACER® Base Module in proper working condition, with or without additional optional Finetech modules, is considered to be one apparatus. Modules are not considered to be independent

equipment and must not be run without being combined with our Base Module as specified.

National and international standards and regulations for minimizing the risk of serious injury are, as far as possible, taken into account in the development and production of this equipment as applicable to ("Conformity", "CE"), but danger caused by improper use or by breakdown remains.

The operator of the equipment is responsible for carrying out safety checks as stated in the manual and should not hinder or diminish these by conditions of the working place and its surroundings.

Manufacturer and contractor are not liable for damages or injuries caused by improper use or unsuitable work.

The FINEPLACER® comes with a year's guarantee that equipment will be free from malfunctioning, material defects, and manufacturing faults, under the condition that the equipment is used for its intended purpose only and under the specified conditions of use, and does not extend to tools, wear and tear, glass, bulbs and rubber parts. During the guarantee period, equipment that does not work perfectly will be repaired or exchanged free of charge.

The guarantee only covers the aforementioned FINEPLACER® equipment, but no consequential damage of any kind arising from breakdown, malfunction or improper use of the equipment.

2.5 General Safety Instructions: Mass/ Weight

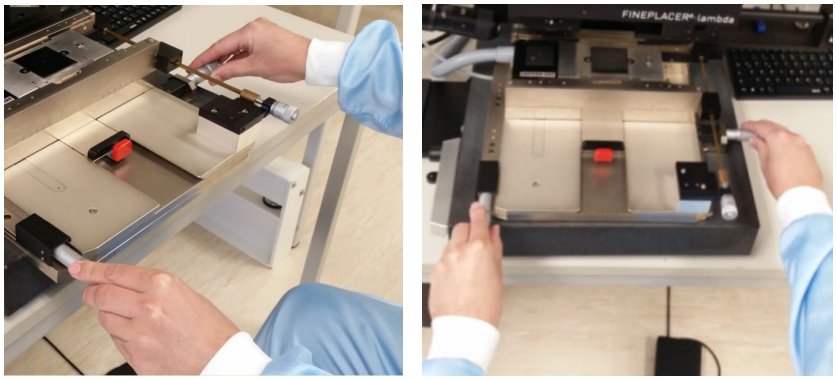
Some of the FINEPLACER® modules are heavy and may cause damage or be damaged by inattentive transportation or use.

Before setting up the system, make sure that the working table can bear sufficient load to carry the machine and its accessory. Further, check if the table is mounted in a technically correct manner. In case of using a height adjustable table, check the safety clamping of the height adjustment mechanism. Commercial damage or personal injury caused by neglecting the above safety measures is not covered by Finetech's responsibility.

Arrange cables and hoses so that nobody can get caught.

If you want to move the machine, first disconnect all cables and hoses and take the positioning table off the base plate.

Before moving the air-bearing positioning table both hands have to be placed at the table.
Press the pedal to move the table and keep both hands always at the table while moving it around.



Two-handed handling of the positioning table

Under no circumstances press the pedal unless both hands are on the positioning table. Risk of damage or injury.

With activated air cushion, the positioning table's outer edges can be moved beyond the edges of the base plate.

Make sure that the table is not placed in an extreme position that is unsuitable for work.

Damage can occur here due to incorrect behavior of the operator (by leaning or putting weight on the table).

Make sure the base plate has been adjusted correctly (see 3.2 Major Assemblies of the Basic Equipment).

2.6 Safety Regarding Electrical Mains Power

Be cautious of electrical hazards:

No wet hands, no children, no plants and no animals should come into contact with any machine part. Always keep the equipment dry. No thin or small electrical conducting parts (e.g. cut wires, washers) should come in the close vicinity of the machine's electrical equipment, into connectors, or especially into ventilation slots.

Before you disconnect from the mains:

- Lay down the pivot arm and switch OFF the electrical power.
- To connect the mains, first put the (female) plug into the control box socket, and then the other (male) plug into the (wall) outlet; disconnecting in reverse order.
- Never pull/push leads and hoses with the lead outside the plug. Always hold the plug in your hand.

Protect power cords from being stepped on, driven over, crushed, cut, split etc. especially when they are live. Only use power cords with an earth contact. Before connecting to the mains, check the correct voltage (see technical data)!

Before changing lamps, switch off the power and wait for it to cool down.

Before changing fuses find the cause of the fault, and pull out the mains power plug!

In case of equipment trouble, switch off the mains power and call for qualified maintenance personnel.

Electrical equipment casings must only be opened by a qualified electrician!

If using a computer to run FINEPLACER® Modules, we recommend that it is not supplied by the mains outlet of the placer control box to prevent unintentional shut down of the computer when turning off the FINPLACER® Modules.

2.7 Electrostatic Discharge, Electromagnetic Compatibility

Protection of ESD sensitive devices is the responsibility of the user. This means that the FINEPLACER® has to be operated in an ESD protected area (EPA according to IEC 61340) in any cases when ESD sensitive devices are handled. The equipment is prepared in so far as electrostatic charges are deflected to the ground terminal.

FINEPLACER®s and their modules conform to EC Directive of Electromagnetic Compatibility (EMC).

Magnetic fields being beyond the limits of the above directive could anyhow influence the function of Finetech heating modules resulting in temperature deviation or unexpected program stops.

2.8 Heat and Fire Hazards, Risk of Burns

Heating plates and other heating accessories may cause heat and fire hazards by improper use and in the case of equipment defects. Therefore, heating equipment must only be worked under supervision and be switched off if not in use.

During operation, heating plates, lamps and their adjacent parts may become hot; up to approximately 400°C, and should not be touched, please use suitable tools.

Heating modules may damage substrates and devices in the case of excessive temperature/time dosage, especially if heating plates are used. Excessive heat may produce fumes or smoke resulting in health hazards. Therefore, measure heat carefully, especially when using the manually controlled modules, and stop heating in good time. Increase temperature and time settings cautiously so as not to damage components and substrates.

Never run FINEPLACER® heating modules differently from rules given in the instructions! **Never use their heat abusively against people or heat sensitive material!** Keep the direct flow of heated gas away from people and temperature sensitive parts!

If there is any sign of increasing overheating (if display shows values much higher than set value, or heating period is longer than programmed, or ERROR light comes on etc.), switch off the equipment and call for qualified maintenance personnel!

Heating should be stopped in case of danger caused by any heated modules. This can be done by erecting the pivot arm, pushing the STOP key, or switching OFF the module itself immediately (see the respective module instructions).

As long as the pivot arm is erected, the heating should **not** be able to be switched ON (so as not to warm up the optics unnecessarily).

2.9 Conditions of Work Area; Other Possible Hazards

On installation of the equipment, please carefully inspect the surrounding area for possible dangers arising for people, equipment, or work pieces.

Environmental temperature conditions below 15°C or over 35°C should be avoided during work with the FINEPLACER®. Lower temperatures could cause functional trouble, higher temperatures could cause overheating of the control circuits - ensure sufficient cooling breaks. Temperature changes could influence the positioning accuracy.

Because of the high optical magnification required in some cases, intensity and beam concentration of the built-in illumination equipment may be rather high. On installing and running the FINEPLACER® beware of dazzling the eyes of the operator or people in the vicinity.

Always take care to avoid condensing water.

The optionally mounted Target Finder's Laser beam is directed downwards. During normal operation it only runs for short periods of time and is fundamentally not hazardous because of its low power (< 1 mW, class 2 product). However, you should avoid looking directly into the beam. Dazzling might be caused by unfavorable circumstances such as multiple reflections on metallic support plates.

Install hoses and electrical cabling free of mechanical tension and so as not to catch someone or to tear down parts of the equipment.

Hoses as well as compressed gas couplings and connectors should be handled cautiously and with care and protected against damage. Protect eyes and ears when connecting or disconnecting live gas hoses.

In case of using inert gases, insure there is sufficient ventilation of the working area!

The pressure of compressed gas for cooling purposes should be set to an adequate level so as not to exceed a tolerable noise level. If this is not possible, use ear protectors.

ATTENTION! SUPPLY MEDIA LIKE, E.G., COMPRESSED AIR OR INERT GAS, MUST HAVE A QUALITY ACCORDING TO THE STANDARDS DEFINED IN DIN ISO 8573-1, CLASS 4, WITH REGARD TO OIL, WATER, AND PARTICLE CONTENTS. OTHERWISE, SERIOUS MALFUNCTIONS MUST BE EXPECTED AND PARTS OF THE EQUIPMENT CAN BE DAMAGED. ANY DAMAGE DUE TO INSUFFICIENT MEDIA PURITY WILL NOT BE COVERED BY WARRANTY.

Air purity according to DIN ISO 8573-1, Class 4, stands for the following demands:

- Particle size 15 µm
- Particle density 8 mg/m³
- Pressure dew-point 3°C
- Water content 6000 mg/m³
- Oil content 5 mg/m³

Comply with the special safety conditions given with the descriptions of the modules. With the Finetech Bonding Force Applicators in particular, beware of bruising fingers or damaging the work piece.

3 The FINEPLACER® System

3.1 Introduction

Like every FINEPLACER®, the lambda has been designed for versatile use and ease of operation and maintenance, and is made up of functional modules. The operator should thoroughly understand the function and control of each module and tool in the system before using it.

The numbers of machine parts given in brackets correspond to the numbers in table 2 of this text.

The Flip Chip Bonder consists of the following parts:

- Base Module with base plate (70), support arm (71), stationary beam splitter optics (30), illumination, camera (18) and positioning table (29), further placer Control Box (39), table foot switch (64) and vacuum foot switch, as well as cables and hoses.
- Vision modules, e.g. or MIRAGE (37) or side camera with common video monitor.
- Process Modules, e.g. placer arm (27) with positioning head (20), Ultrasonic or ACF Module.
- Auxiliaries, e.g. optional pipette (24) or Target Finder.

FINEPLACER®s may be additionally equipped with various optional modules, mostly to be retrofitted easily to adapt to customer's requirements.

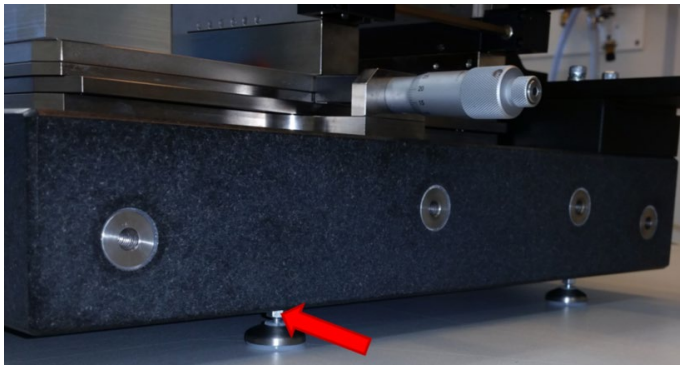
3.2 Major Assemblies of the Basic Equipment

3.2.1.1 Base Plate (70)

The base plate carries the support arm (71) and the pivot bearing with the pivot arm (27). Optionally it is possible to add an ultrasonic transducer to the pivot arm.

The base plate serves as the highly precise finished gliding plane for the positioning table (29), and also contains an electromagnet which holds the table in position when the air cushion is deactivated and allows the θ fine rotation.

The base plate rests on foot screws which are used to level it.

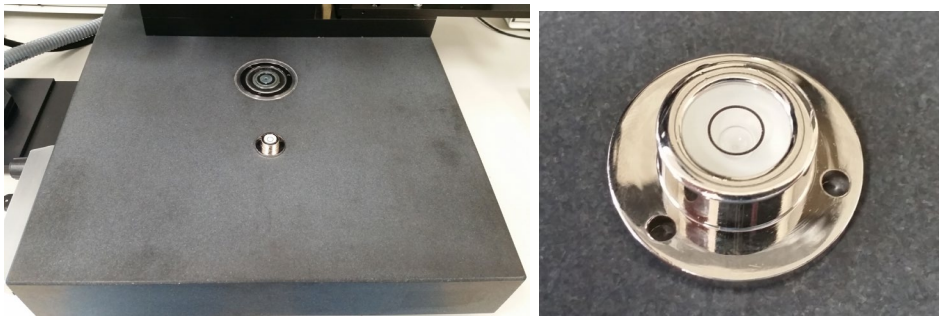


Foot screw at base plate

Align the base plate in a way that it slightly slopes backwards, away from the operator.

The incline should be between 0.1 mm/m and 0.3 mm/m.

Use a circular level for alignment.



Example: Machine base plate, adjusted with circular level

Alternatively, use a spirit level.

Example: Machine base plate, adjusted with spirit level

Make sure there is no horizontal tilt.

The table should always slowly slide away from the operator towards the machine when the air cushion is activated. After adjusting the angle of slope, test this movement carefully with both hands on the positioning table.

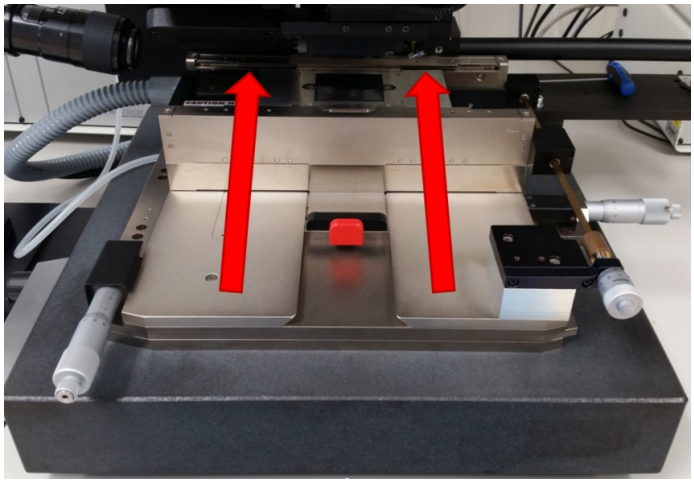


Table movement direction with activated air cushion

It is strictly prohibited to work with the machine before this setting has been made!

3.2.1.2 The Height Adjustable Positioning Table

- ... rests on the base plate (70). It carries the height adjustable tracks used to clamp in a substrate, a substrate support plate or a FINEPLACER® heating plate to hold the substrate.
- ... will secure the substrate position by its mass and its friction against the base plate (70), supported by the electromagnet buried in the base plate.
- ... can be moved easily for coarse positioning on an air cushion so that it may float above the base plate (70), using the micrometer screws (50) and (51) as temporary handles. Once coarse positioning is achieved, releasing the foot switch will lock the table in the optical axis.
- ... can be fine aligned using the x and y micrometer screws.
- ... can be rotated around the optical axis to achieve θ correction, prevented against accidental x or y shifting by the electromagnet.

A fundamental rule is that the height of the placement surface of the substrate must be equal to that of the pivot arm axis. To achieve this with substrates to be laid onto heating plates or support plates, the continuously height adjustable tracks of the positioning table have to be used to maintain the correct working height.

3.2.2 Support Arm (71), holding the following parts:

- Vision/observation devices, basically consisting of the stationary mounted beam splitter optics (30), providing the dual image overlay, and a video option for vertical view, are used to view the super-imposed image of the substrate's pads and the corresponding component leads.
- Lighting: COAX-Illumination and diffuse illuminationis standard, a Target Fínder (AC1) is integrated.
- The pivot bearing for the pivot arm (27). Zero play of the bearing and stiffness of the arm are fundamental for the lambda's outstanding placement accuracy.
- The connector for electromagnet, and air for the table (4).
- The adjustment means for beam splitter (31), (32), arm-UAP (72) and arm-LAP (89).
- Target Finder (AC1), pointing to the placement area (TARGET) on the substrate.
- Optional: Force Applicators (e.g. FD2).

3.2.3 Pivot Arm (27)

The pivot arm may be e.g. a pivot arm (27); further special arms are available, e.g. FE1. for ultrasonics application (chip bonding). Pivot arms have their own cables and hoses for energy transportation and control. Each arm is equipped with a hose for the vacuum holding the component to be placed in the positioning head, e.g. (20), and signal cabling for arm tilt switch. The tilt switch sensing the arm position, (erected or laid down), influences many equipment functions, e.g. switching vacuum by pipette.

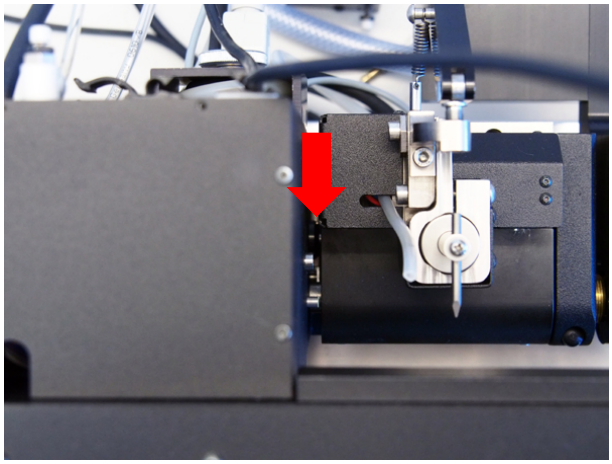
The arm is only mounted to the pivot log by 2 screws (148) so it may be changed easily if required.

Fine-θ-Adjustment-pivot arms are available.

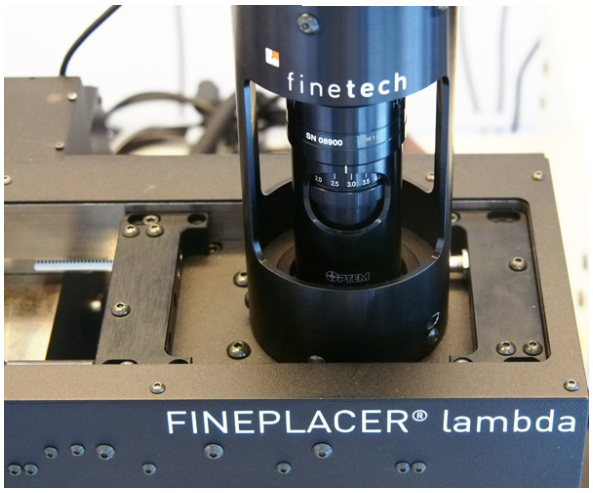
Attention: Pivot Arm Interlock (for manual configurations)

For FINEPLACER® lambda systems in manual configuration, a specific magnetic interlock mechanism ensures that the pivot arm can only be swivelled down as long as the optics shifting is in swivel position.

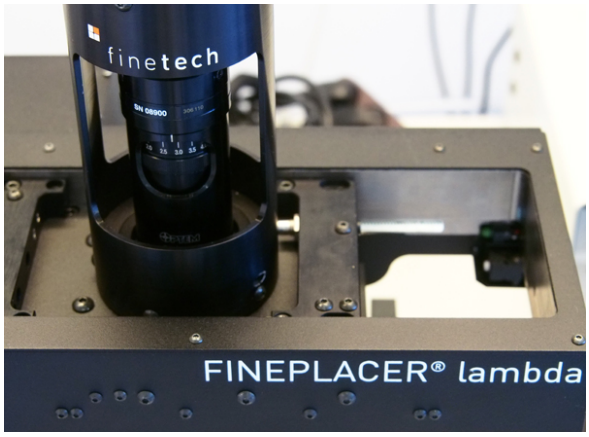
This safety function prevents the pivot arm from swivelling down and possibly hitting and damaging the optics while the optics shifting is not in swivel position.



Magnetic interlock



Optics shifting in swivel position. Pivot arm can be swivelled down.



Optics shifting in working position (each position apart from swivel position). Pivot arm cannot be swivelled down.

3.2.4 Placer Control Box

The Placer Control Box is an essential part of any FINEPLACER® Basic Module. It generates and reacts to all signals for operating the placer, as well as supplying it with compressed air and a vacuum.

The Placer Control Box contains the following basic functional groups:

1. mains connection
2. displays and operating elements
3. generation of vacuum for fixing devices and compressed air for the positioning table air cushion
4. placer support, consisting of:
   - lighting control
   - supervision of pivot arm

- locking electromagnet control
- Target Finder control

5. camera control and power supply for options
6. RS 232 interface
7. Finetech Module Interface (FMI) for connecting Finetech modules

3.3 Short Description of Basic Functions and Directions For Installation

3.3.1 Mains Connection

The Placer Control Box has to be connected to the mains via the POWER IN plug in the rear panel of the box using the supplied cable.

As soon as the Placer Control Box is switched on, the rear mains outlet AUX POWER OUT is energized. Please connect all additional control boxes via the supplied multiple box plugged into AUX POWER OUT so all FINEPLACER®-modules are switched on at the same time.

Check your mains voltage! The box must not be connected to mains voltages different to those indicated on the rear panel's type plate.

The socket 'POWER IN' contains a fuse which exclusively serves to protect the Placer Control Box but not all the other control boxes connected to the multiple socket.

Please take care never to exceed the maximum output current of 10 A at 230 V or 15 A at 115 V (resistive load) respectively delivered by the AUX POWER OUT socket.

There are two different green LED's. The LED 'LINE' indicates the presence of the mains voltage whereas the LED 'ON' shines as soon as the equipment is switched on.

3.3.2 Displays and Operating Elements

The LED '**VACUUM STATUS**' and the interior red lit switch '**VACS OFF**' is used for indication and further control of the vacuum. More detailed information about the meaning and function of these elements is given in the following operating instructions of the Placer Control Box (see below).

Pushing the selector switch '**PIPETTE MODE**' changes the working method of the pipette.

In the case of the lambda standard configuration the revolution transmitters 'HEAD' is without function, and works only in combination with optional illumination modules.

The light intensity can be used because the light of head and target is balanced by an optical shutter. For further information, refer to the operating instructions (see below).

3.3.3 Generation And Connection Of Vacuum And Compressed Air

The built in vacuum pump operates permanently as soon as the Placer Control Box is switched on. It supplies the placer and the pipette alternately.

In the case of placement only, the hose connector of the pivot arm is directly connected to the socket HEAD VACUUM OUT of the Placer Control Box. In the case of thermo compression, HEAD VACUUM OUT is connected to the Control Box of the Heated Pick-and-Place Tool using a supplied hose. The pipette is always connected to the plug PIPETTE.

The compressed air, necessary for the positioning table, is provided at the TABLE AIR OUT connector.

3.3.4 Placer Support

The locking electromagnet holding the positioning table and the optional Target Finder are connected to the SUB-D socket of the Placer Control Box via a 25-pin plug.

The Target Finder is switched on as long as the foot switch is pressed to move the positioning table while the pivot arm is in its upright position.

The electrical cable of the pivot arm is directly connected to the socket PIVOT ARM. The foot switch for coarse positioning is connected to the socket TABLE FOOT SWITCH. An additional foot switch, used for controlling the pipette, may be connected to the PIPETTE FOOT SWITCH plug. For further information, refer to the operating instructions (see below).

3.3.5 Camera Control and Power Supply For Options

The 12 V camera power supplies of two video modules (if existing), must be connected to the output sockets CAMERA I and CAMERA II. They are switched on alternately depending on the position of the pivot arm: CAMERA I is on when the arm is in the upright position, CAMERA II is on when the arm is horizontal.

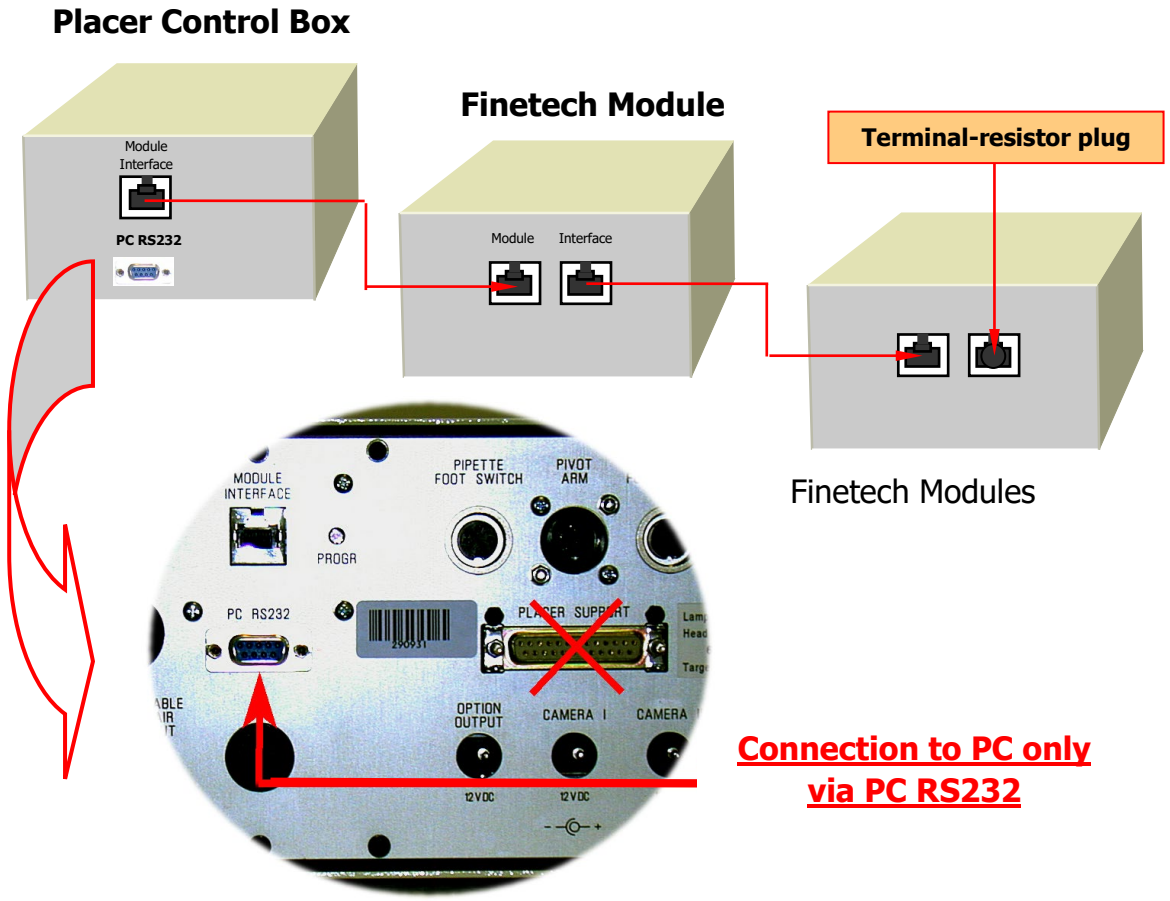
At the socket OPTION OUTPUT, 12 V DC is provided continuously for driving optional devices with a max. current of 600 mA. This output is short protected by an automatic recovery circuit breaker.

3.3.6 RS-232 Interface

The Placer Control Box possesses an RS 232 interface, its connector PC RS-232 is in the back panel. It can be used for linking the PC to the Placer Control Box, allowing modifications of the internal software, as well as communication between the PC and every module connected to the placer Control Box.

3.3.7 Finetech Module Interface

All current and future Finetech® modules will communicate via a common interface bus.



Connecting PC and Interface Module

For this connect all Finetech® boxes in a chain as shown in the picture above. Begin with the Placer Control Box and connect all further module boxes with the delivered interface cables (Western Plug) in any order. Please note that the last box in the chain must be terminated by the terminal resistor plug.

3.4 Operating Instructions For The Placer Control Box

3.4.1 Switching on

Press the **POWER** switch to activate the Placer Control Box, together with all connected modules. After each push, the **POWER** switch is disabled for three seconds to avoid unintentional actuation.

⚠ *Please be aware that the Placer Control Box cannot be switched off as long as a component is in either the pivot arm or the pipette. This "component recognized" status may also exist if any object inhibits free air flow to the arm vacuum tube or to the pipette.*

3.4.2 Controlling the Brightness

The revolution transmitters have no mechanical stops at their end positions. Turning the knob clockwise will increase the brightness, turning counter clockwise will decrease it. As soon as the brightness is at its maximum or minimum, a signal is heard.

3.4.3 Understanding the Vacuum Control

The vacuum is used for holding components with the pipette and with the placement head alternately. It can therefore be changed over back and forth between the arm and the pipette. This is necessary for transferring devices e.g. from a tray to a Placement Head, using the vacuum pipette.

The vacuum pump cannot be switched off separately. If the FINEPLACER® is not in use for a longer period of time, to save the pump, switch the machine off at the main switch.

The vacuum status is shown by three LEDs:

- LED in the handle of the arm color: green
- LED in the vacuum pipette color: yellow
- Duo LED in the front panel of the Placer Control Box color: green/yellow

Table 1 gives further explanations:

TABLE 1

Vacuum	Arm LED	Pipette LED	LED "VACUUM STATUS"
at the arm, no component recognized	flashing	off	flashing green
at the arm, component recognized	flashing	off, if arm horizontal on, if arm vertical	on green
at the pipette, no component recognized	off	flashing	flashing yellow
at the pipette, component recognized	off	flashing	on yellow

A permanently shining pipette LED signals a "disabled" pipette. This status occurs in the following cases:

- Arm vertical, component recognized at the head.
- Arm horizontal and vacuum foot switch actuated for longer than 3 seconds, vacuum changed over from the arm to the pipette permanently.

If the vacuum is at the pipette, and no component is recognized, the vacuum can be switched back to the arm by lowering it to the horizontal position and lifting it up again to vertical. This status is equivalent to that after switching on the machine.

If the vacuum is at the pipette and a component is detected on it, changing the arm position will not initiate a switch-back of the vacuum to the arm and the component will remain at the pipette.

When the arm is in the horizontal position, it is possible to switch the vacuum to the pipette permanently. To do this, the vacuum foot switch has to be pressed for longer then three seconds.

3.4.4 Vacuum Control Safety System

The Vacuum Control Safety System minimizes the possibility of component loss caused by faulty operation. For visualization and handling of the Vacuum Control Safety System status, the red lit switch **VACS OFF** is used.

After switching on the Placer Control Box, the safety system is permanently active. The lamp in the **VACS OFF** switch is off. To deactivate the safety system permanently, press the **VACS OFF** switch for longer than three seconds. After three seconds, the deactivation of the safety system is indicated by the **VACS OFF** switch, which shines red permanently, independent of the arm position.

To re-activate the safety system, press the **VACS OFF** switch for longer than three seconds again. After this, the light in the switch goes out indicating the safety system is active again.

It is also possible to deactivate the safety system temporarily. For this, the arm has to be in the vertical position, and a component has to be recognized either in the head (**VACUUM STATUS** shines green permanently) or in the pipette (**VACUUM STATUS** shines yellow permanently). To unlock the safety system temporarily, the VACS OFF switch needs to be pressed for a short time only (< 3 s). This unlocked status is indicated by a red flashing of the switch. After the pipette switch or the vacuum foot switch is actuated once, the safety system is re-activated (**VACUUM STATUS LED** off again).

Please take into account that the vacuum foot switch is disabled as long as the arm is in its upright position.

3.5 Parts, Controls and Indicators

TABLE 2		
REF #	**NAME**	**FUNCTION**
4	Table air bearing connector	Air hose coupling to connect the hose to the Control Box (39), fitting (7)
4a	Table air bearing connector	Air hose coupling between support arm (71) and positioning table (29) via hose (87)
7	Table air outlet	Hose fitting at the Placer Control Box (39) for the positioning table (29) air cushion, supplies compressed air to (4) by hose (87) when foot switch is pressed
8	Locking screw	Locks bearing screw in place NEVER TURN THIS SCREW!
9	Table foot switch connector	Socket for the foot switch
12	Head lamp intensity knob	Used to control the brightness of the lamps
15	Leveling screws	Adjusted until base plate (70) is level

18	Zoom	Used to view alignment of component and substrate and to adjust FINEPLACER® placement accuracy
19	Parallelism fine adjustment screw	Rotates the tool around the x-axis to compensate an angular deviation between tool and working plain
19a	Locking screws	Locking screws for the parallelism adjust (19)
20	Placement head	Fits into head receiver (25) and is locked with screw (21), holds component to mount The figure shows a Heated Pick and Place Tool with cooling option
20a	Cooling for the Heated Pick and Place Tool	Outlet for compressed cooling air
20b	Plug for the Heated Pick and Place Tool	Connector plug to the socket of the corresponding Control Box
21	Placement head screw of the Placer Arm	Locks placement head (20) in the head receiver (25)
24	Pipette (with automatic vacuum switch-over)	Vacuum pickup device for moving component to and from a tray and vice versa
25	Placement head receiver	Holds the placement head (20) at the placer arm.
26	25-pin Sub D electrical connector (mounted plug)	Provides electrical power to the lighting devices and to the magnet of the base plate.
27	Pivot arm	Holds component in position during alignment and placement
28	Arm plug	Connection between placer arm and Placer Control Box (39), socket (66)
29	Positioning table	Holds a substrate, a substrate support plate or a heating plate. Floats on air cushion above the base plate (70) for coarse positioning
30	Beam splitter optics holder see 4.2.3	Hold the beam splitter
31	Mirror adjustment screws (y) see 4.2.3	Move the image of the component up & down (y) relating to the image of the substrate
32	Mirror adjustment screw (x) see 4.2.3	Moves the image of the component left & right (x) relating to the image of the substrate
34	Release button for front track	Locks or releases front track (23) of positioning table
38	25-pin Sub D Placer Control Box panel socket	Electrically connects control box (39) to support arm (71) via connector (26)
39	Placer Control Box	Controls all electronic, lighting, vacuum and air cushion/magnet requirements of the FINEPLACER® Base Module's placement and control functions. Features mains power switching for optional modules
41	Target Lamp intensity knob	. INACTIVE IF CONNECTED TO THE FINEPLACER® LAMBDA, used to control the brightness of the lamps
44	Head vacuum male connector (Vacuum filter at vacuum hose, #006)	Connects vacuum hose to head vacuum female connector (46) at the rear of the Placer Control Box (39) to provide vacuum to head receiver (25)
46	Head vacuum socket	To accept arm vacuum filter (44)
46a	Vacuum fine adjusting valve	Vacuum fine regulation for the recognition of components at the used placement head
47	Vacuum mode switch	See operating instructions of chapter 3.4.3

	"AUTO"	Vacuum can be switched over from the placement head (20) to the pipette (24) by pressing the pipette slightly on the body of the component to catch it
	"EXT"	Vacuum can be switched by an additional switch, e.g. a foot switch, connected to socket (65)
50	x micrometer screw	Acts as a handle to position x-y positioning table (29) during x-y coarse- and Θ fine alignment; used for fine positioning in x axis during final alignment
51	y micrometer screw	Acts as a handle to position x-y positioning table (29) during x-y coarse- and Θ fine alignment; used for fine positioning in y axis during final alignment
51a	Z micrometer screw see 2.2	Height adjust for the positioning table; used for fine adapting the working level
54	Vacuum status	Indicates the vacuum status of the head and pipette. See 3.4.3
55	VACS off	Switch to turn on/off the Vacuum Control Safety System, see 3.4.4
57	Mains Power pushbutton	Applies primary AC power to Placer Control Box (39) and optional modules connected to (62 e), by power relay (max. 10 A at 230V, 15 A at 115 V). Can't be switched OFF if the pivot arm (27) is upright and a component is in the placement head
58	Power ON indicator	When 'ON', indicates that the DC supply for the electronics in the Placer Control Box (39) is active
59	Magnification changer	Switches/zooms magnification of the FoV (18).
61	Vacuum pipette socket	Connects vacuum and pipette switch signal from Placer Control Box (39) to vacuum pipette (24).
62 a	Mains fuse for Placer Control Box	Opens when excess voltage occurs in the Placer Control Box (39) circuitry.
62 e	Aux. power female connector	Supplies mains voltage to video monitor and other optional modules via switch (57) and power relay
62 f	Mains male connector	Connects Placer Control Box (39) to power inlet cord.
65	Vacuum foot switch connector	Connects foot switch to Placer Control Box
66	Arm assembly socket	For plug (28) from pivot arm (27)
68	Camera connector socket: CAMERA I, yellow	Supplies 12 V DC to optional video module, e.g. FV2, switched on when the arm is raised, connect with the yellow marked plug
69	Camera connector socket: CAMERA II, blue	Supplies 12 V DC to optional video module, e.g. FW1, switched on when the arm is lowered, connect with the blue marked plug
69a	Option output	Permanent 12 V DC outlet for optional devices, e.g. additional camera
70	Base plate	Supports major assemblies
71	Support arm	Supports VAS (18), beam splitter, lighting and other vision options
72	Upper arm position (UAP) adjustment, see 4.2.2	Adjusts upper arm position, important for positioning accuracy of pivot arm (27)
87	Air cushion hose	Compressed air supply for positioning table from Placer Control Box via support arm
89	Lower Arm Position (LAP) lever	Allows the pivot arm (27) to be moved carefully for exact placement

148	Arm fastening screws	2 pcs. of 4 mm hexagon socket screws, M5 thread, included in the pivot arm assembly, for fixing the pivot arm (27)
151	Power LED "LINE"	In the front panel of the Placer Control Box (39), ON means that the mains is connected and live
152	Earth terminal	At the back panel of the Placer Control Box (39) connected to GND internally, for connecting antistatic leads from other modules
159	Fine rotation micrometer screw	Optional device, fine rotates the head together with the component to correct the angle deviation Θ (Theta)
160	Height adjustable tracks	To hold the clamped in substrate support or Heating Plate, which can be height adjusted with the z-micrometer screw (51a) to find the correct working level see 2.2
161	Side camera assembly	Observing camera module to watch the process from the side
162	Bonding Force Module	Boding device to provide a specific force for the bonding process
163	Balance weight	Counter weight
164	Sliding weight	Allows to choice the appropriate force by sliding the weight along the scale on the force lever
165	Locking screw	To fix the sliding weight at a definite place.
166	Image fader	For fading the image of either the chip or the substrate
167	Fitting for compressed air	Supplies the cooling (20a) with compressed air via corresponding Control Box
170	RS 232 connector	Serial connection to a free COM-port of the PC, see 3.3.6
171	Programming switch	Turns the programming mode on/off (only for firmware updates). If activated, it shines red. **FOR THE COMMON WORKING PROCESS IT MUST BE SWITCHED OFF!**
172	Module Interface	Connection for the Module Interface Bus (special cable supplied), which provides the communication between all Control Boxes of further modules and the PC within a Finetech System. The last Control Box at the end of this bus must be terminated with a terminal resistor plug.

4 Instructions for Set-Up

4.1 Initial Set-Up of the FINEPLACER®

4.1.1 Preparation of the Basic Components and Subassemblies

1. See safety instructions, chapters 2.5 to 2.9.!
2. Set-up should take place in a low-dust room. The base plate (70) on which the positioning table (29) floats, and the under side of the positioning table (29) should be cleaned thoroughly with a clean, dry, soft cloth before use. Put the positioning table onto the base plate (70). Keep the base plate clean at all times!
3. When the equipment is set up, level the ground plate by adjusting the leveling screws (15) below the base plate. After interconnecting cables and hoses to the Placer Control Box (39), verify that the level has a minimum lateral descent so that the positioning table will not float uncontrolled in any direction.
4. The alignment of the superimposed image of the component as well as the subject may be impaired by any light from the background. A dark wall or screen behind the erected pivot arm (27) will improve this. Take care not to blind operators in adjacent work stations.

Differences in Vision Modules:

For FINEPLACER® lambda, different objective lenses are available. E.g. in case of insufficient image, first compare the S/N of the Finetech with the delivery note entry.

TABLE 3		FINEPLACER® lambda field diameter	
		x	y
A6	min	0,55mm	0,45mm
	max	6,7mm	5,4mm
A7	min	0,18mm	0,14mm
	max	ø 1.25 mm	
A7+	min	0,1 mm	0,08 mm
	max	ø 0.6 mm	

4.1.2 Preparation of the Positioning Table's Height Adjustable Tracks

- A fundamental rule is that the height of the substrate's placement surface must be the same as that of the pivot arm axis.
- The Tracks (13 and 23) of the positioning table (29) are parallel and contain V-shaped slots for receiving substrates, substrate support plates or heating plates.

- Whatever you clamp into the tracks, its upper side's edges must be pressed against the upper edge of the V-slots.
- To meet the working plane with substrates placed on a heating plate or on a substrate support plate, the positioning table has tracks that are continuously adjustable for substrate thickness from 0 to 10 mm.
- When the release button (34) is pressed (by your thumb), the front track (23) can be moved in and out. To do this, hold it between your thumb and first and middle fingers.
- To position something correctly between the tracks, open the tracks as described before, move the object first into the V-grooves of the rare track after that close the tracks and let slip the object into the front track. As soon as it is secured between the grooves, release the button (34), locking front track and board in place.
- To hold the substrate onto the heating plate, e.g. in the case of flexible material, it may be equipped with an integrated vacuum holder.

4.1.3 Providing Suitable Placement Heads for the Pivot Arm

- Make sure that the placer head is suitable for the height of your component. Custom specified positioning heads are available, please ask your dealer.
- Using the screw (21), the placer head (20) must be fixed so that its shaft is inserted fully to meet the correct working height (z-position).
- Check the correct mounting of the positioning head using the VAS.

4.1.4 Interconnection of the lambda

- Ensure the voltage adjustment of the Placer Control Box (see label at the back) corresponds to the mains voltage.
- Connect and fasten the 25-pin cable from the Placer Control Box, connector (38), to the support arm (71), connector (26). Take care not to confuse with the computer cable!
- Connect the foot switch (64) to connector (9) of the Placer Control Box.
- Connect the pivot arm (27) signal cable plug (28) to socket (66) of the Placer Control Box.
- Connect the pivot arm vacuum connection hose filter (44) to socket HEAD VACUUM (46) at the rear of the Placer Control Box.
- Connect the table air hose plug (2) to the table air coupling (4) at the rear of the support arm (71). Push in the fitting firmly until it clicks. To loosen it, push back the knurled nut of the socket and pull out the fitting.
- Connect the input end of the 3 mm vinyl hose (87) of the table air connector (4) to the air OUTPUT connection fitting (7).

- If available, connect the vacuum pipette (24) to the VACUUM PICKUP socket (61), at the front of the Placer Control Box (39).
- First connect the power cord with the Placer Control Box socket (62f) and then into the appropriate AC power source. Make sure that LED LINE (151) is 'ON'. Switch the Placer Control Box (39) to "I" 'ON'), pressing the POWER switch (57); LED (58) should now be ON.
- Connect the fiber optic illumination light control boxes to the Placer Control Box's rear 3-pole output socket using the cable supplied. Further custom specified lighting methods are possible.

4.1.5 Preliminary Settings and Checkout

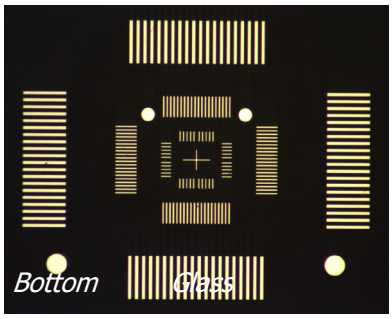
- Using the arm handle (11), rotate the pivot arm (27) to the vertical position (Upper Arm Position, UAP).
- Set the Placer Control Box (39) to "I" (ON) by pressing the POWER switch (57).
- Hold the positioning table by its X and Y micrometer screws (50 and 51) and use them as handles. Press or release the foot switch (64) to determine that the air cushion of the positioning table (39) is activated and can be moved freely on the base plate (70) or is fixed in its position by the magnet.
- When the foot switch is released, the positioning table lays directly on the base plate without air cushion. It should be able to be rotated a few degrees around the lambda's optical axis. Use the micrometer screws as handles to achieve coarse Θ (Theta) correction. During this procedure, the positioning table must not scrape the base plate.
- An optional Target Finder (1) should project its red spot on the target area as long as the foot switch is pressed and the optics slide is at its leftmost position.
- Check that the vacuum at the Placement Head (20) is strong enough to hold all your components safely.
- Check on the control box (39) that the relevant lighting control is able to dim the lighting from maximum brightness to dark.
- For general adjustment purposes refer to Chapter 4.2.

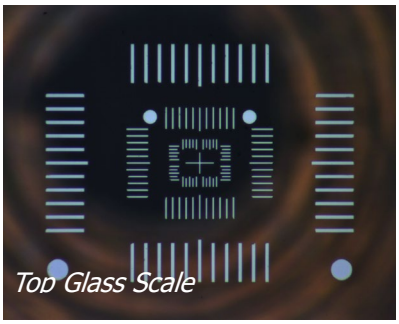
4.2 Adjusting the Placement Accuracy of the lambda

Before taking up work, you should read and understand the whole of part 3 and 2.2 of this handbook. We recommend you to get familiar with the logic of the vacuum control (see 3.43). After this, please print out or make a copy of the instructions below and take them to the machine. Follow each instruction thoroughly.

4.2.1 Required Tools:

- Finetech Adjustment Set for the pivot arm, resolution 1 µm, consists of a support plate, an accuracy adjustment head and a set of glass scales (top and bottom scale); see table 4 at the end of chapter 4.2.





- Allen key 4 mm
- If available, digital camera

4.2.2 Distinguishing Between lambda A6, A7 and A7+

Depending on the customer's application, the configuration of the optical components can vary.

The working area is exclusively observed by a camera on a video monitor. As this configuration allows parallax free view, you can omit adjustment 1 (chapter 4.2.3), just focus to the sharpest image on the monitor, and proceed to adjustment 2 (chapter 4.2.4), see below.

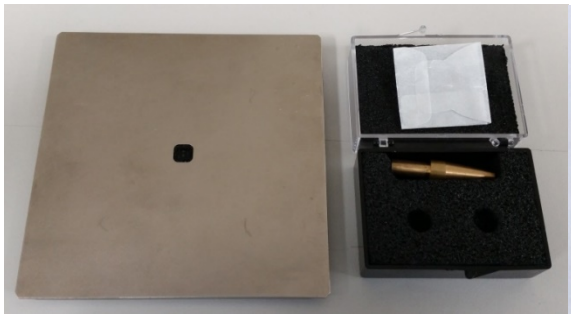
In case of working with an A6, the whole procedure always consists of two adjustment steps, to be carried out in the correct order. Never try to do step 2 before or without first doing step 1!

Adjustment 1: UAP (Stop point of upper arm position)
Adjustment 2: Beam splitter adjustment in x and y direction

4.2.3 Adjusting the Placement Accuracy

This process-related check should be done:

24/7=Every week or R&D=Every month



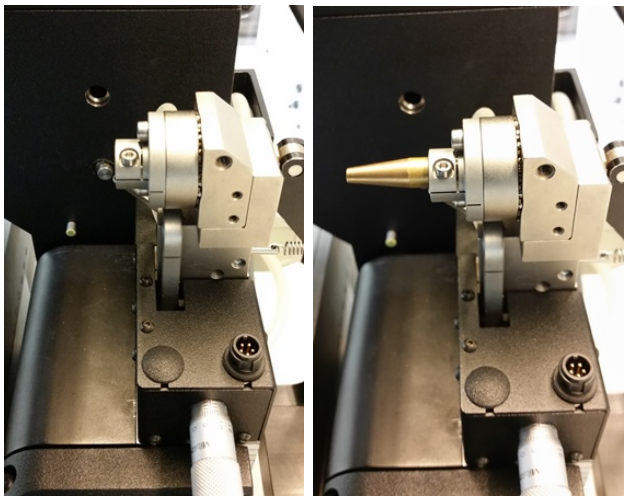
The set consists of a placement plate with nonius, a nonius glass chip, a placement tool and a short Allen key. Sales Code/Number: AJ3.P

All parts must be clean, free from dust and dirt.

You can clean all parts with isopropanol and a clean room wipe.

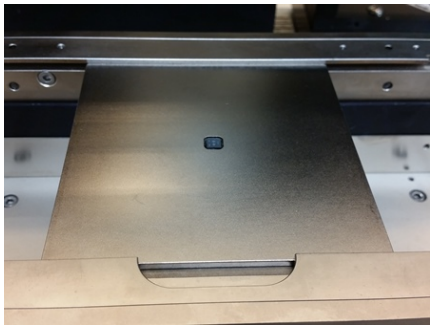
1. Plug the tool into the placer arm

The tool needs to be plugged in all the way to the limit stop.



2. Clamp the placement plate with nonius into the table

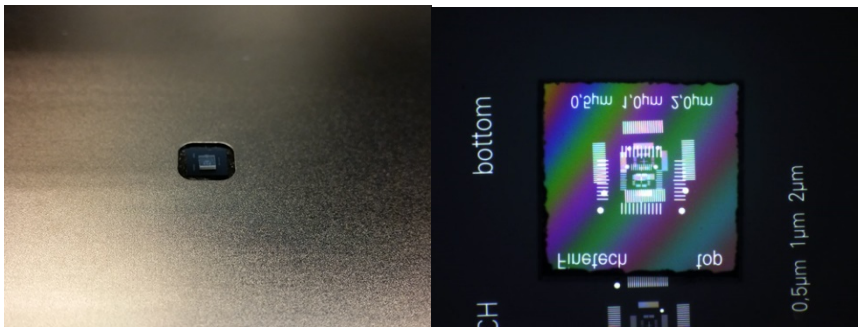
Make sure the plate is securely clamped and free of play.

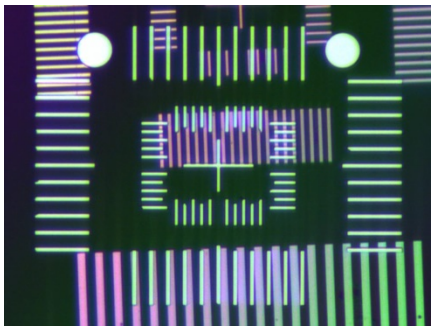


3. Place the nonius glass on the placement plate

The nonius needs to be placed structure on structure.

The glasses are placed correctly if you can see both structures in the same focal plane.

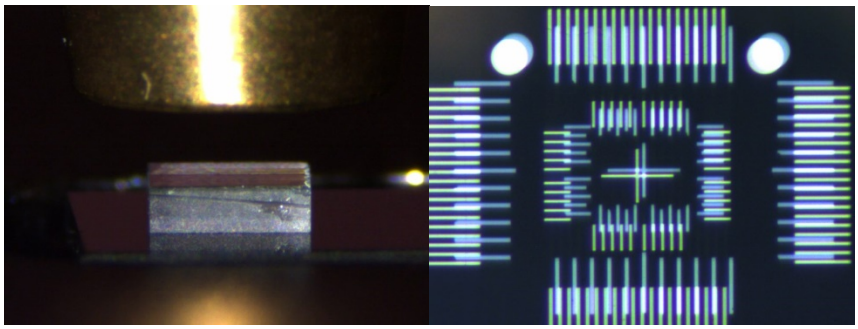




4. Pick up the nonius

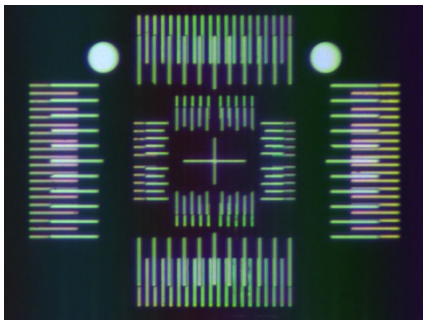
Align the center of the nonius glass to the middle of the field of view using a large magnification. Turn off the vacuum on the placer arm using the foot switch.

Select a low force at the Bonding Force Module.



Pick up the nonius.

Adjust the back focus of the nonius in the placement plate as well as the one of the picked up nonius.

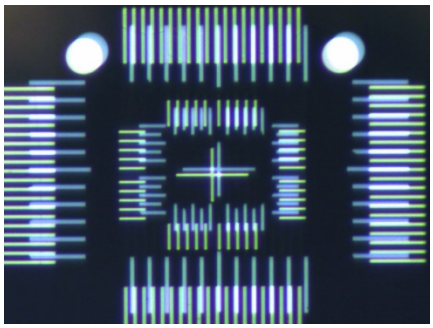


Align both nonius glasses to each other and place the picked-up one onto the other.

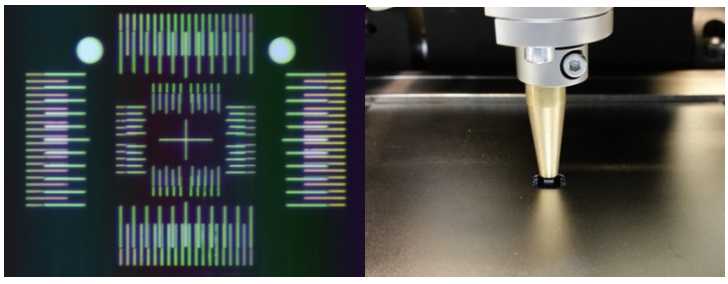
5. Place up the nonius

After the placement you will see that the structure is not in back focus.

Remember the z height of the xyz-table and bring the structure into back focus to check the placement accuracy. Make a screen shot if the placement accuracy is not within specification.



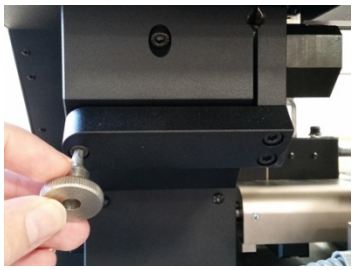
Bring back the table into the z height that you made a note of before and pick up the glass again.



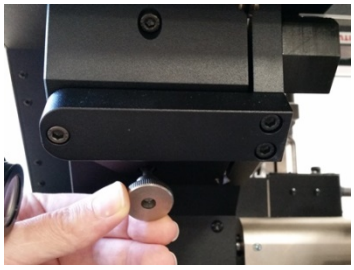
You should get a sharp image of both nonius glasses in backfocus again and the glasses should have a good alignment to each other.

6. Adjusting the Beam Splitter

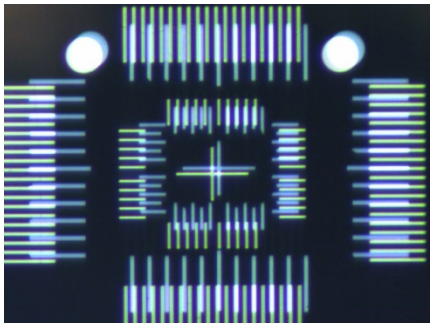
Reproduce the placement error as seen on the screen shot by using the Allen key. This compensates the offset / placement error at hand.



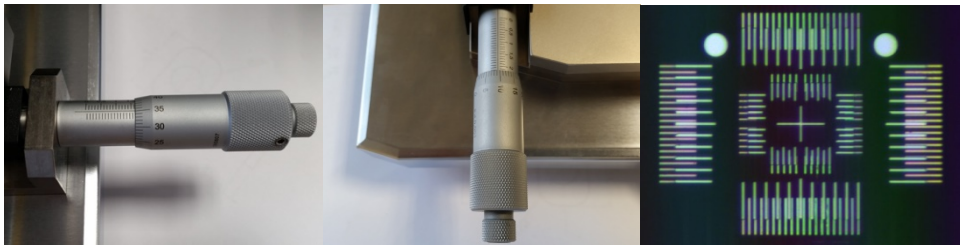
Adjust the x offset



Adjust the y offset



Adjust the nonius overlay again with the y-x-micrometer screws

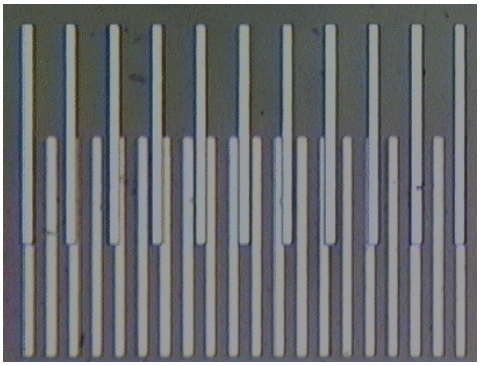


Repeat the placement and check the placement accuracy.

If you are still out of specification, repeat the steps.

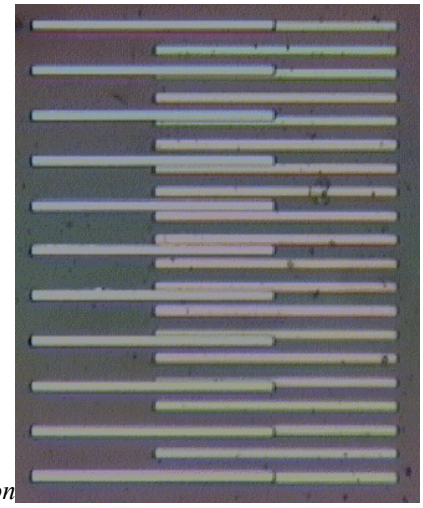
Available Adjustment Set

AJ3.P2 Adjustment Set, 1 µm for placement arm with fine rotation



Top: Optimal alignment in x direction

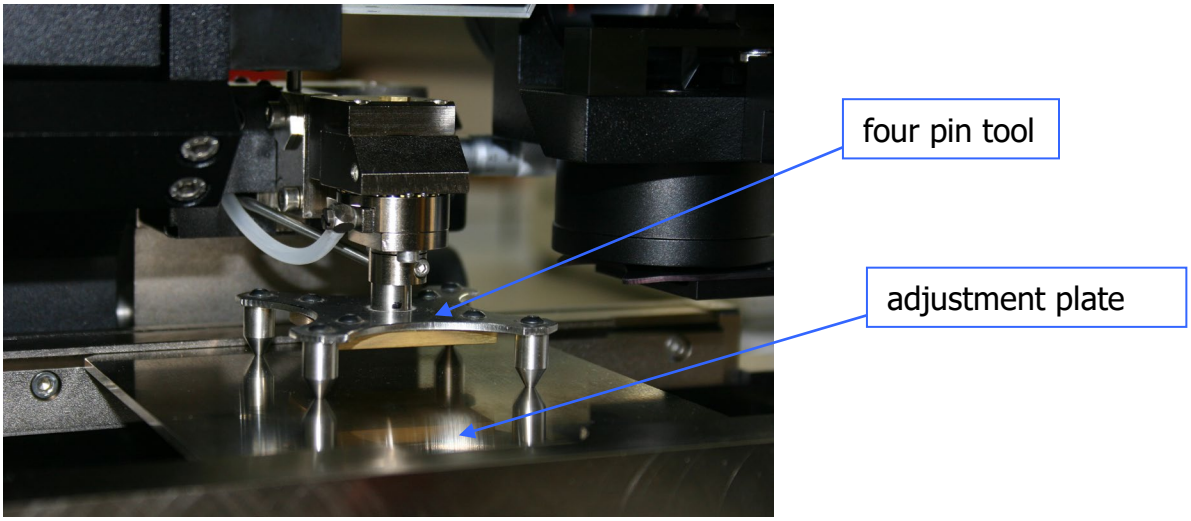
Right: Optimal alignment in y direction



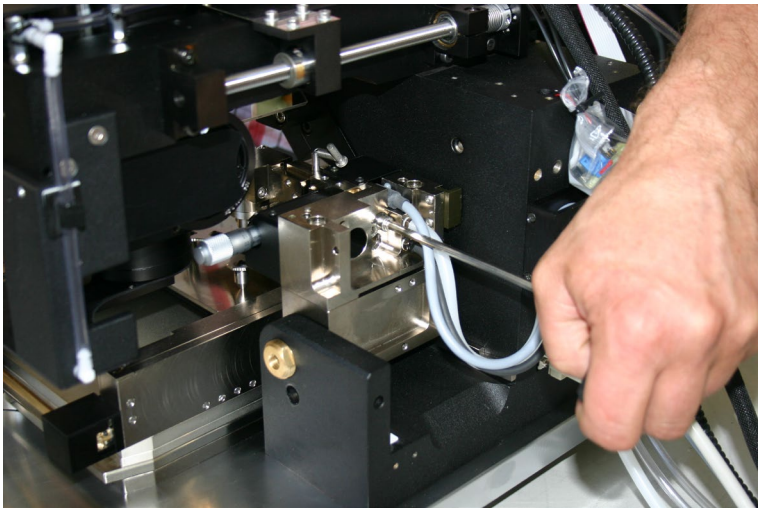
4.3 Adjusting the Placement Arm's Coplanarity

1. Clamp the adjustment plate into the positioning table (steel plate).
2. Use maximum magnification and put the adjustment plate into the focal point (use z micrometer screw at positioning table).
3. Slide optics into swivel position and switch off the system.
4. Remove the 25 pin connector at the back of the swivel module (allows you to move the placement arm manually).
5. Put the placement arm into the horizontal position and clamp in the four leg parallelism adjustment tool.

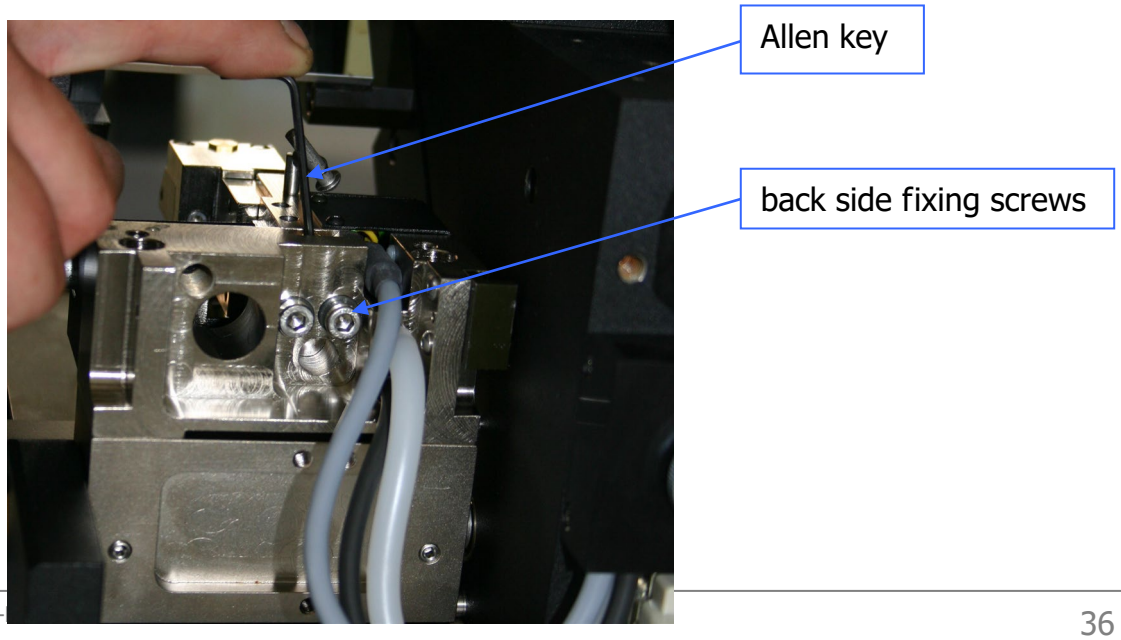
Never try to move the arm back to his vertical position as long as the four leg tool is in place!



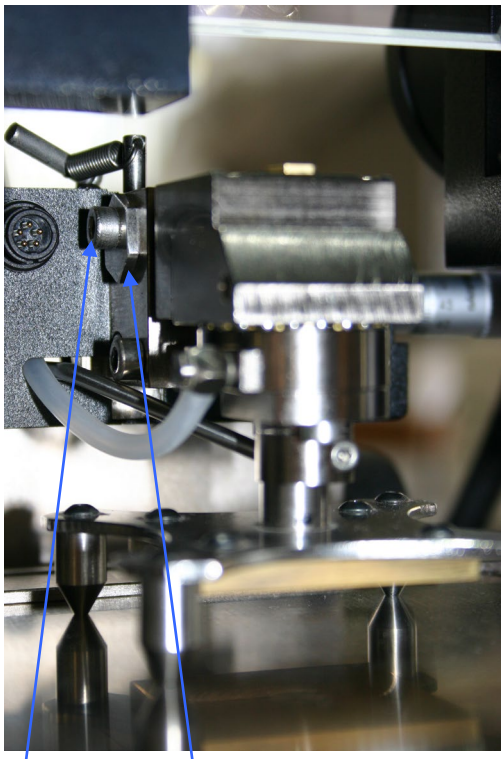
6. Check the parallelism by using a 50 µm spacer or a light reflection that can be viewed through a gap under one or more legs (all four legs need to be in contact with the plate).
7. For rotating the tool holder around the y axis, loosen the fixing screws at the back of the placement arm counter clockwise.

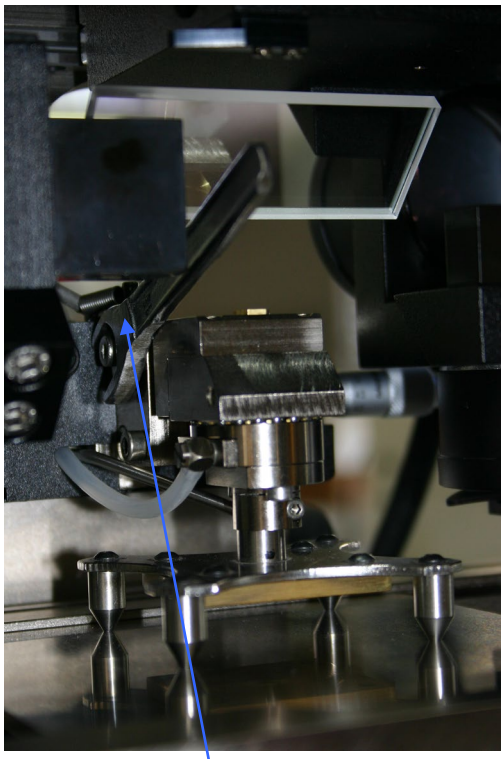


8. Use an Allen key to rotate the placement arm around the y axis.



9. Double check the orientation by using the parallelism adjustment tool with a spacer or reflecting light, as described under 6.
10. As soon as the orientation is adjusted, tighten the fixing screws on the back side.
11. For rotating the tool holder around the x axis, loosen the fixing screw on the left side of the placement arm counter clockwise.





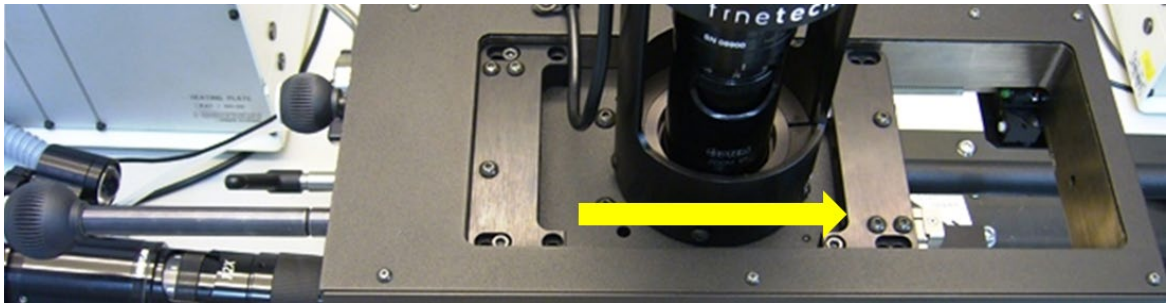
12. Use a wrench size 13 mm to rotate the tool holder around the x axis.
13. Check the orientation by using the parallelism adjustment tool with a spacer or reflecting light, as described under 6.
14. As soon as the orientation is adjusted, tighten the side fixing screws 1 and 2.
15. Never forget to remove the four leg parallelism adjustment tool.
16. Reconnect the 25 pin connector on the back side of the swivel module.
17. Switch on the system and, in case of a motorized machine, re-initialize it.

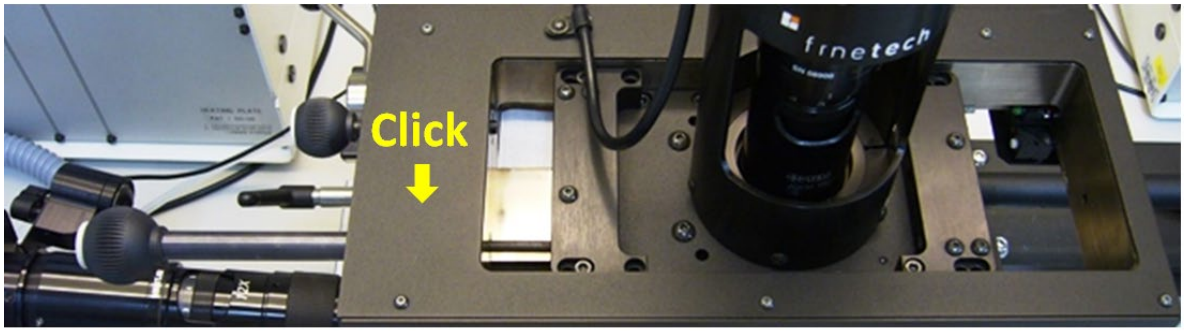
5 Operating Instructions

The following instructions assume that you are informed and fully aware of the function of the equipment (see chapter 3) and of the safety instructions (see chapter 2) and that the FINEPLACER® has been calibrated and checked out (see chapter 4.2).

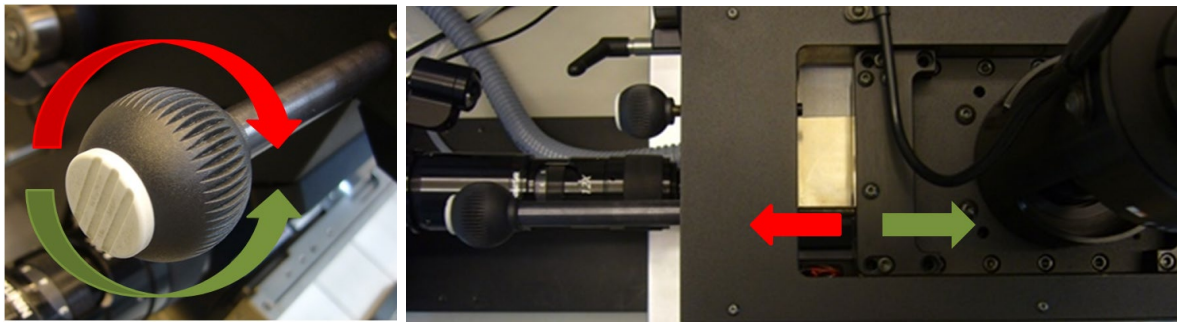
5.1 Adjustable lock position for the manual optics shifting

The manual optics shifting has a lock position to restore an optics position.





After the optics shifting locks into the right position you can adjust this position by rotating the slider.



5.2 Loading the component for Placement

Align the component, lying e.g. face-down in a tray, with the placement head. Then switch off the vacuum, lay down the arm, switch on the vacuum again and pick up the component with the head.

See chapter 3.2.4, for information on vacuum control.

5.3 Alignment

1. Look at the screen of the vision system. Look at the bottom side of the component. On the screen, all pads should be seen simultaneously. This image will be superimposed on the image of the substrate. Seeing both, you are able to compare the position of each pin of the component in relation to their pad counterpart on the substrate.
2. Put your hands on the x and y micrometer screws (50) and (51) and use them as handles for the positioning table.
3. Press the foot switch (64); the compressed air will be switched ON, lifting the positioning table. Shift the air cushion supported positioning table (29) and compare the images of component pins and substrate's pads; a coarse overlapping can be quickly accomplished. The optional Target Finder AC1 helps to make this easier.
4. When overlapping has been achieved, release the foot switch and the positioning table will be locked in the optical axis.
5. Look at two opposite chip contacts and their corresponding pads on the substrate. At first, correct the angle deviation Θ (Theta), again using the micrometers as handles to rotate the positioning table slightly around the optical axis, without the air cushion. Ensure there is no dirt on the base plate, because this might impair its positioning action.
6. Align the images of chip contacts and pads completely by adjusting the x and y micrometer screws.
7. If necessary, repeat steps 6. and 7. until good alignment is achieved.

5.4 Placement

After successful alignment of both images, proceed as follows:

- Move the optics to the right end position. Gently swing down the placer arm.
- After placing only: Release the vacuum by actuating the foot switch so that the component is released.

6 Maintenance

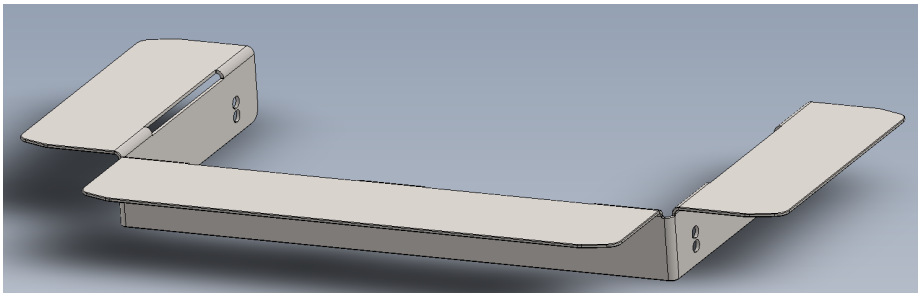
6.1 Preventive Maintenance

6.1.1 Maintenance - Duty of care

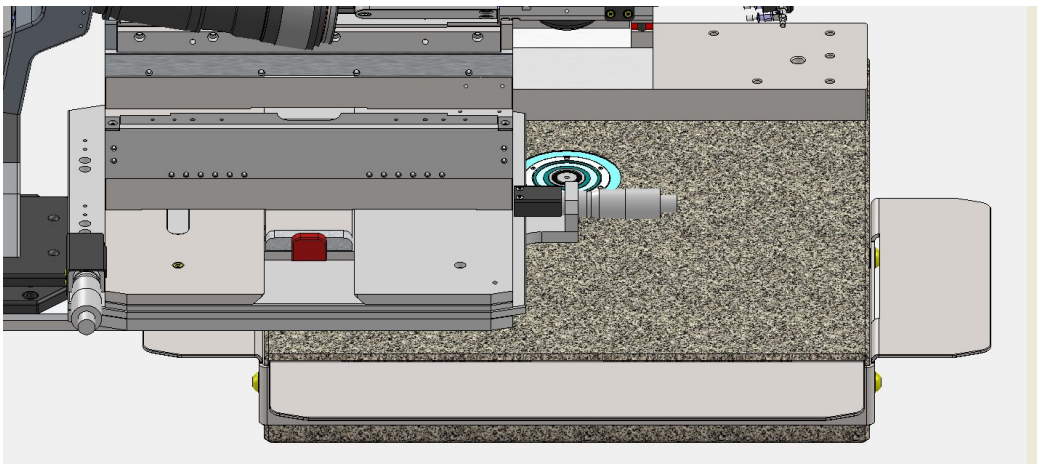
- Maintenance work should only be carried out by trained personnel
- Make sure that the machine is in a state where you cannot injure yourself: Substrate Heating Modules and Chip Heating Modules must be deactivated and cooled off, the positioning table has to be in a maintenance position. Bonding Force Modules and Optics Shifting Module must be deactivated.
- Make sure no process file is loaded to avoid sudden activation of machine parts

6.1.2 Positioning table maintenance position.

- Remove the heating plate or substrate support from the table, as well as all tray holders and other objects.
- Mount the maintenace table support to the granite ground plate.

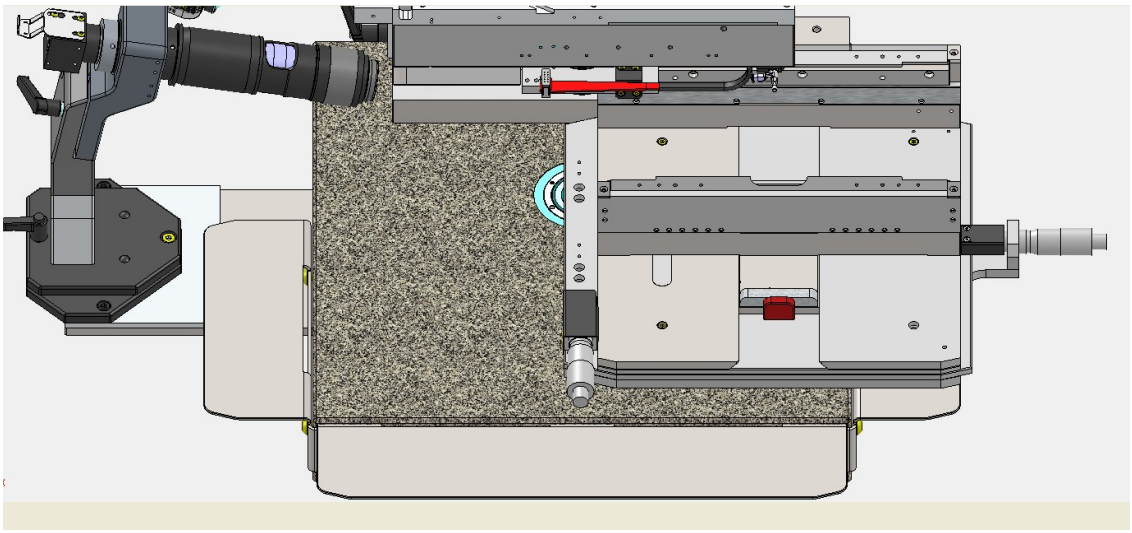


- Move the positioning table away from the operator towards the arm support and then to the left until the magnet inside the base plate is visible (see illustration). Turn off the machine. Clean the right side of the base plate. Turn on the maschine.



Left-hand maintenance position of the table

- Move the positioning table away from the operator towards the arm support and then to the right. This time, the magnet inside the base plate will remain covered by the table (see illustration). Turn off the machine. Clean the left side of the base plate. Move the positioning table back to the center. Remove the maintenance table support. Turn on the machine.



Right-hand maintenance position of the table

Damage can occur here due to incorrect behaviour of the operator (by leaning or putting weight on the table).

6.1.3 Daily

- Keep the base plate clean at all times. Do not allow dust or particles to collect on the underside of the positioning table. Wipe with a soft cloth, remove built-up flux deposits using the minimum amount of the proper solvent; (wiping with a bare hand may help you to decide about cleanliness). Dust the remaining subassemblies as required.
- Failure to keep the FINEPLACER® clean, or damage of the sliding planes may result in needless calibration, or difficulty in placing devices on the boards.
- Take care that the vacuum nozzles of the pipette and pivot arm do not suck in dirt, flux, or fumes. Do not operate the vacuum devices without the vacuum filter in the head vacuum socket (46) to avoid damage to the internal pump and magnet valves.
- Check whether the vacuum can safely hold your critical or expensive component. Change suction cups, gaskets, vacuum pump if required, protect hoses from being stepped on, driven over, crushed, cut, split etc. See spare part list for purchasing codes.

- Take care of the optical parts. Keep the optical surfaces clean at all times. Glass surfaces of the beam splitter (30) and other optics may be cleaned with customary optics hair pencils or cleaning rags, surface mirrors with alcohol and hair pencil. Checking the lighting means: change blown bulbs, so as not to affect the positioning accuracy.

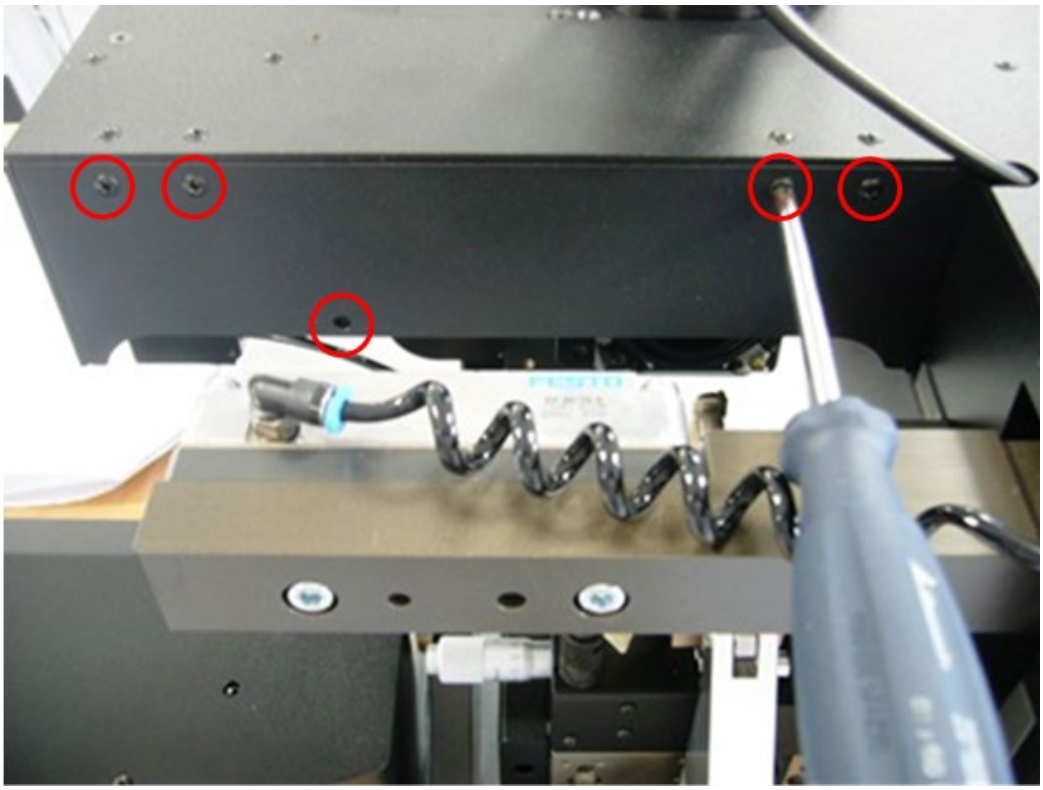
6.1.4 Monthly

Check the in-line vacuum filter which is plugged into the head vacuum socket (46) in the back plane of the Placer Control Box. The filter should be changed in case of a gray appearance, or if it diminishes the vacuum.

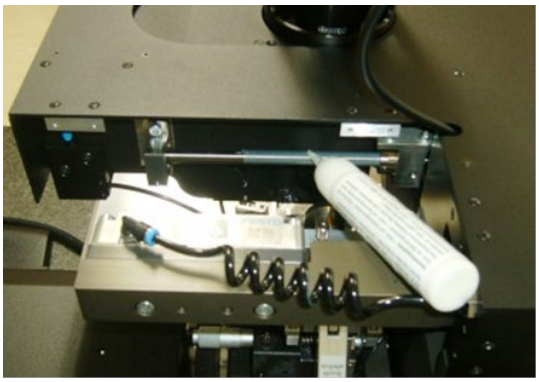
6.1.5 Every 3 Months

Grease the motor spindle driving the Optics Shifting Module (motorized configurations only).

Remove the cover from the spindle on the backside of the machine.



Apply WEICON "Allround Lubricant AL-F" grease onto the spindle.



Re-assemble the cover.

6.1.6 Yearly

Depending on the degree of accuracy needed for your task, check the possible accuracy of placement and re-adjust if required (see chapter 4.2). Checking the adjustment is also recommended after transportation

6.2 Corrective Maintenance

- All machine parts are manufactured using quality devices and are subjected to the most rigorous electrical and mechanical controls. Each FINEPLACER® product is tested as a unit before leaving the facility. Premature failure is therefore unlikely.
- In case of failure call, fax or mail your dealer or the manufacturer Finetech. You find the contact address on the first page of this part of the manual.
- Corrective maintenance essentially consists of identifying a defective component, removing it from the lambda and returning it to Finetech for repair or replacement.
- Finetech will also help you to identify the fault and give advice if you want to carry out repairs yourself.
- Before dismantling defective parts, please contact Finetech or your representative!
- Before sending anything, please agree what, when and how to dismantle, and the best method of return.

7 Technical Data

Survey table for general information (changes without notice, e.g. customer specified, errors excepted):

FINEPLACER® Version (Model)	lambda A6, A7
Dimensions (W x L x H)	620 mm x 420 mm □ x 700 mm ●
Total Weight (about) ■	140 kg
Range of bond force modules	0,1N – 400N
Working area	190mm x 52 mm
Positioning accuracy	A6.: 1 µm A7.: <1 µm
Power requirements (Placer only)	100/120/230/240 VAC 50/ 60 Hz 1 phase.; about 100 VA

□ Base plate dimension; Placer Control Box additional

● standard height over work bench, may be higher or lower depending on selected video module

■ incl. cabling, foot switch, Placer Control Box (W x D x H = 290 x 310 x 143 mm; 10 kg) and Positioning Table

Technical Data Sheet for Placer Control Box

Connection Description

- POWER	Mains Voltage In
- AUX POWER OUT	Mains Voltage Out, max 10A load
- FUSE	Mains Fuse, Placer Control Box
- MODULE INTERFACE	RJ-45 Socket, FMI Bus (Finetech Module Interface)
- PC RS-232	9 pin SUB-D Socket Serial Interface to PC
- PIPETTE FOOT SWITCH	3 pin Socket Pipette Footswitch (shutter)
- TABLE FOOT SWITCH	3 pin Socket Table Footswitch (shutter)
- PIVOT ARM	6 pin Socket Arm Position Switch, Arm-LED, Arm Button
- PLACER SUPPORT	25 pin SUB-D Socket Head and Target Lighting, Table Magnet, Target Finder

- OPTION OUTPUT, CAMERA I, CAMERA II	Sockets Output 12V DC, max. 12W/outlet, max. 24W collective load
- ILLUMINATION CONTROL	3 pin Socket Control Voltage Cold Light
- TABLE AIR OUT	Table Air Outlet
- HEAD VACUUM OUT	Arm Vacuum Outlet
- PIPETTE	Pipette Connector
- COMPRESSED AIR	Compressed Air Input
- INPUT VACUUM (option)	Connector ext. Vacuum
- Mains Voltage	230V, 240V / either 50Hz or 60 Hz * 100V, 120V / either 50Hz or 60 Hz * (* The Placer Control Box is factory-provided pre-adjusted internally for a specific mains voltage in combination with a specific frequency)
- Mains Fuse	230V, 240V: 1,25A slow 100V, 120V: 2,5A slow
- Power consumption	max. 200VA
- Vacuum generation	typical. -0,4bar/ -5,8psi

Alternatives:

- Vacuum generation (compressed air):	6 bar (-0,5/ +1 bar) free of water, oil and particles
- External vacuum supply (option):	General function range between -0,4 and -0,8bar **, (**factory-provided pre-adjusted internally for standard vacuum-switch actuation point at -0,6bar, in case of lower grad vacuum the vacuum switch must be readjusted)
- TABLE AIR OUT	1bar/ 14,5psi (internal pump)
- Weight:	Placer Control Box 9,3 kg, Placer Arm max. 1kg
- Dimension:	285 x 290 x 145mm (l x w x h)
- Length Placer-Arm-Connector:	ca. 1,8

Environment:

- Operating conditions:	15-35°C/ 59-95°F ambient temperature 20-75% relative humidity