

Seica

Test Solutions



PILOT H4

PILOT H4
OPERATOR MANUAL

PUBLICATION ISSUED BY:

The logo for Seica, featuring the word "Seica" in a bold, blue, sans-serif font. The letters are slightly shadowed, giving it a 3D appearance as if it's floating above a white surface.

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1 GENERAL

The PILOTH4 system belongs to the new generation of flying probers, created to solve the problem of testing electronic boards without the aid of fixtures or specialized mechanical devices.

PILOTH4 is particularly suitable for testing prototypes, samples, small series, SMD boards with specific accessibility problems: in general, when the costs and time of constructing a fixture are not justifiable.

The technology and materials used for measuring head motion provides extremely high levels of acceleration and speed. The system requires little maintenance and offers a high level of system uptime for critical time-to-market" situations.

The brushless motors used for the horizontal movements of the heads also require little maintenance and the integrated encoders keep the position of the heads constantly under control so no realignment or calibration is necessary after a stop.

This manual contains all of the required information to use the test system safely and correctly. The procedures used to test electronic boards together with inspection and maintenance on the system are considered in detail.

The operator is recommended to read this manual thoroughly and familiarize with test procedures and system operation.

A knowledge on testing, electronics and use of Personal Computer is required.

1.1 AUDIENCE

This manual contains useful information for:

- Operators in charge of testing mounted boards
- Developers of test programs
- Technicians in charge of maintenance operations on the system

1.2 ASSUMPTIONS

Technical knowledge on testing, electronics and use of Personal Computer is required.

1.3 SYNTAX CONVENTIONS

To facilitate the understanding of the sentences used to describe the software, we have used the following symbols:



WARNING Indicates a potential hazard for the operator or the system that could result from the action described in the warning.



NOTE: Indicates a note, a recommendation or a point on which readers should focus more carefully.

The syntax to select a software menu or menu item is as follows:

MENU\item 1 = Select the menu indicated, then choose item 1.

Example: BOARD\Select

MENU 1\MENU 2\MENU n \item 1 = Select menu 1, submenu 2, ..., submenu n, and then item 1.

Example: TOOLS\HARDWARE\Autolearn\Debug

The keyboard selection is indicated as follows:

Button 1+ Button 2 = Press button 1 and button 2 simultaneously.

Button 1, Button 2 = Press button 1, release it and press button 2.

The files are indicated using the following syntax:

File.nod

File.srg ... etc,

where "File" is the filename and ".nod" and ".srg" are the file extensions.

The dialog windows and their components are described by means of the terms described in Fig. 1-1

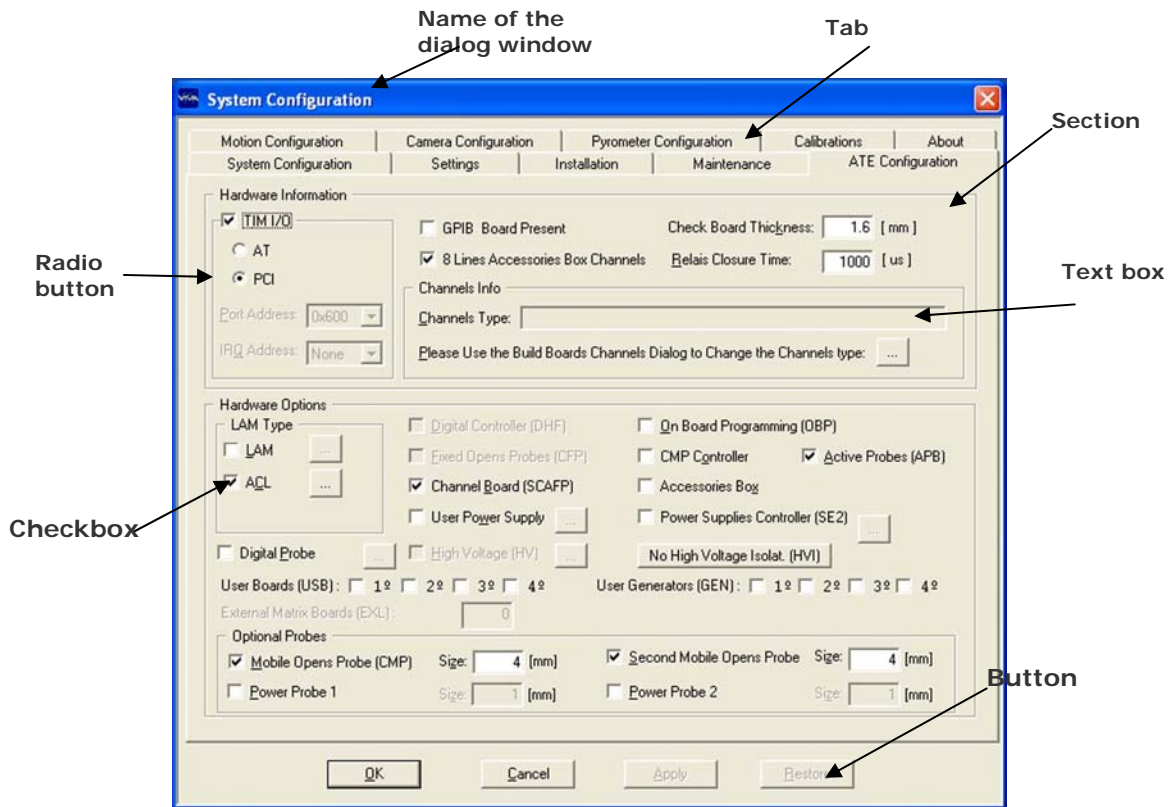


Fig. 1-1 PILOT H4: "System configuration" dialog window

The Graphical User Interface of the VIVA software provides a set of commands and buttons, arranged in horizontal and vertical toolbars. Fig. 1-2 is an example of the VIVA software GUI.

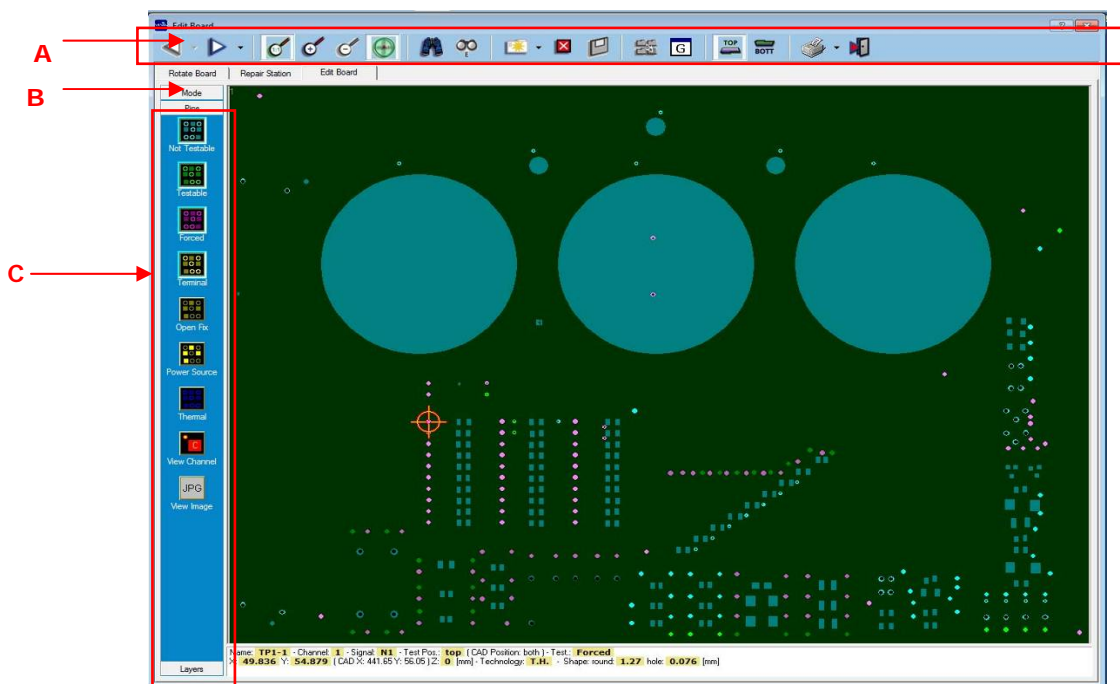


Fig. 1-2 PILOT H4: Example of VIVA Software GUI

1.4 SEICA CUSTOMER CARE CENTER

SEICA "CUSTOMER CARE CENTER" (SCCC) is the support to the customers. It is always possible to call the SCCC if you can't solve your problem through the product help on line or technical documentation. Before calling the SCCC please be sure to have the following info:

- System type
- System serial number
- Software release

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1.5 COMMENTS ABOUT THE DOCUMENTATION

You can email to: seica@seica.com if you have comments or suggestions about the documentation.

1.6 INTERNET WEBSITE

You can find update info about products, technologies and events on: <http://www.seica.com>

1.7 SAFETY RECOMMENDATIONS

1.7.1 Project criteria

The system PILOT H4 has been designed and manufactured in accordance with the essential safety requirements contained in the Machine Directive 2006/42/CE; in the EMC DIRECTIVE 2004/108/EC (and subsequent amendments) on electromagnetic compatibility; in the Low Voltage Directive 2006/95/CE (and subsequent amendments) on electric safety.

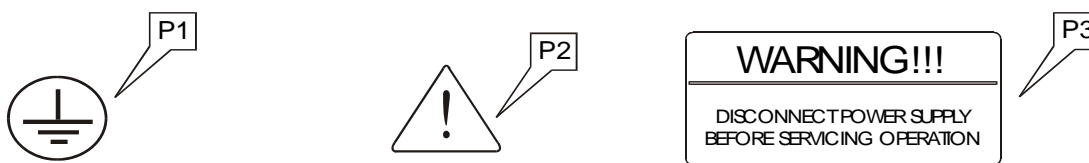
The compliance with the aforementioned directives has eliminated or reduced hazards to the minimum, both during ordinary operation and servicing.

1.7.2 Safety devices

The system is manufactured with premium quality components. All components used are thoroughly tested in accordance with the quality standards set forth in the laws in force.

The system is equipped with several safety devices to reduce operators' hazards to a minimum. The section that follows lists the devices installed on the system.

(P1,P2,P3) Warning labels



They warn the operator of possible hazards or preventive actions that must be followed.

(P4) Protection panels: Protect the system from environmental hazards and prevent users from coming into contact with internal components that can be powered during operation. These panels can only be removed with the help of a socket wrench.

(P5) Protective cover: It prevents the operator from putting his/her arms inside the working area where there can be mechanical parts in motion. In fact, the system halts if the operator opens the cover while the system is working.

It powers off the measurement electronics. It doesn't switch off the Personal Computer.

(P6) Lock on the cover: There is a button on the protective cover that must be pressed to open it. This button prevents the operator from accidentally opening the cover.

(P7) Emergency button: When pressed, it switches the system off (not the Personal Computer).

(P8) Automatic switches: They automatically switches off the system when there is extra current absorption.

(P9) Fuses: In the system there are 10 fuses that protect electrical parts of the test system when there may be current ranges in excess of system operational requirements.

(P10) Ground protection circuit: It refers to the ground potential of all parts in the system that can be touched by the operator to avoid electrical shocks.

1.7.3 Safety devices location

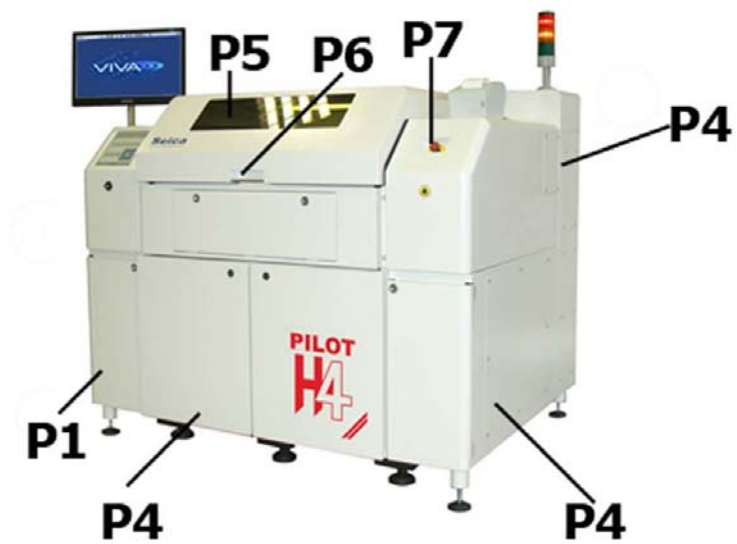
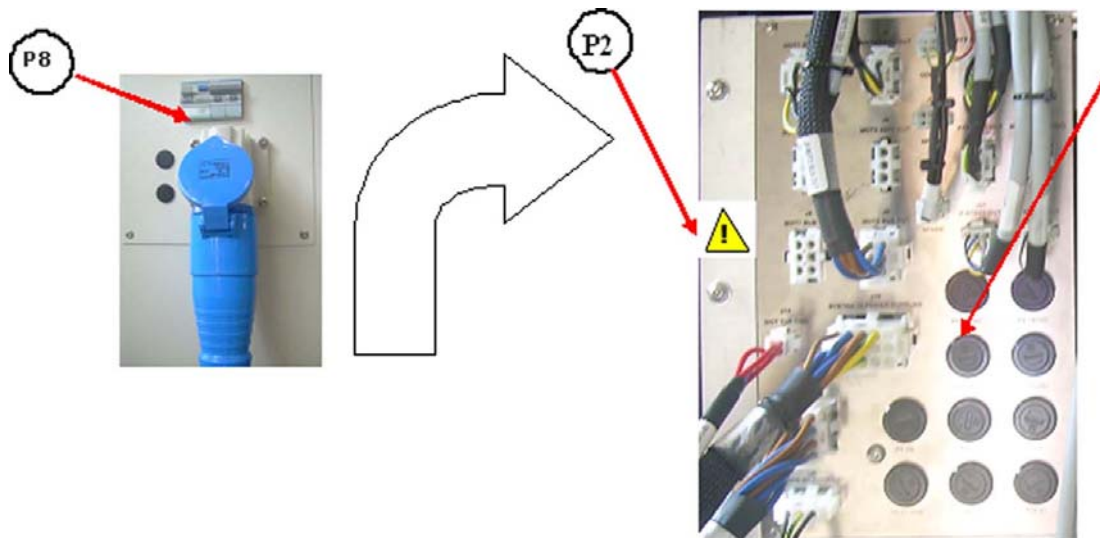


Fig. 1-3 PILOT H4: Safety device location

1.7.4 Warnings and recommended behavior

In order to avoid all risks of injury to persons or damage to the machines installed, it is recommended to follow the warnings and rules of behavior:



Note: Seica declines all liability for any damage to things and/or injury to persons deriving from failure to follow these warnings.



WARNING Do not perform on the mechanical and/or electronic parts of the system other operations than those listed in the maintenance section of this manual



WARNING If the test system is used in a manner not specified by the manufacturer (see paragraph INTENDED USE), the protection provided by the equipment may be impaired. See paragraph 1.7.5 Intended use



WARNING Seica does not assume any liability in case of damages caused by incorrect operations, not compliant with the instructions provided.



WARNING Operation of the PILOTH4 system is very easy; however, these simple rules should be followed: Equipments in motion can be dangerous. Despite the safety devices are installed to prevent or reduce to a minimum the operator errors, do not perform any actions if not in compliance with the instructions provided.



WARNING Do not mount any tool on the flying probes that is different from the needle used to test electronic boards (drill, cutter, miller, etc).



WARNING When the system is testing, do not introduce into it any object different from the board to be tested.



WARNING Do not introduce any liquid in the system.



WARNING Refer to MAINTENANCE SECTION of this manual for complete instructions concerning cleaning, inspection and ordinary maintenance.



WARNING If the system needs to be moved from the installation site, make sure that this operation is carried out by qualified and authorized personnel only.



WARNING USER PLUGS: Max current: 8A. Max leakage current: 30mA (to be intended as the sum of the currents for the two user plugs)

1.7.5 Intended use

The PILOTH4 system is to be used **exclusively** to test different types of electronic boards (*specifically, prototypes, samples, small series and SMD boards with particular accessibility problems*). The use of the system for different purposes, for example to test electronic boards whose dimensions exceed the set limits, or boards containing liquid or inflammable parts) may cause injury to persons or damage to the system, and are therefore considered as **improper uses** for which Seica declines any liability.



Note: For other uses, consult the Seica Technical Department beforehand.

1.7.6 Improper uses

The system is not designed to support any tool on the probe that is different from the test needle. Do not mount any drill, cutter or miller on the test probe. See also the warning in the Safety notes.

1.7.7 Residual hazards

In order to avoid risks of injury to persons or damage to equipment caused by residual risks, that is, risks that remain despite all the measures adopted, or non-evident potential risks, we recommend that the operator always respects what is listed in the **Warnings and rules of behavior** paragraph and follow the instructions here below:

- The working staff must wear suitable clothing, do not wear baggy clothes, loose sleeves that can be entangled inside the system during operation.
- Do not wear dangling ties or scarves, necklaces, bracelets and rings
- Long hair (*wear a cap, if necessary*)
- Moreover, if the operator rashly inserts his/her limbs inside the lateral openings, there is the risk to crush the limbs.
- There is the risk of pricking the finger if a careless work is done when replacing the test needle.

1.7.8 WARNINGS FOR MAINTENANCE ACTIVITIES

The complexity and the high technological level of the PILOT H4 test system, require a detailed description and classification of the maintenance schedule, as well as the requirements for the personnel authorized to perform these activities.

The customer is authorized to carry out the ordinary maintenance operations described in the MAINTENANCE section of this manual. For other operations, customers should contact the Customer Service of Seica S.p.A., which will determine whether to provide specific instructions or to arrange an on-site inspection.

 **WARNING Customers must always contact the technical personnel of Seica S.p.A. before carrying out any operation.**

1.8 TECHNICAL SPECIFICATIONS

To ensure a correct operation of the system, it is necessary to verify that the requirements described here below are met.

1.8.1 Operating environment

The system should be installed in a relatively dry, clean environment, *preferably* with an air conditioning system, which maintains a constant temperature and humidity.

Temperature:	23±5 ° C
Humidity:	Min. 20% Max. 80%
Floor surface planarity:	5mm/m
Altitude:	< 4000m
Pollution degree:	2
Installation category:	II
Class:	I

1.8.2 Electrical rating

Input rating:	230 Vac +15% -10% 50-60 Hz 14A	
	120 Vac +15% -10% 50-60 Hz 24A	
Power cord	230 Vac	PVC 600V 90°C 3xAWG12 for 230VAC To be fitted with plug 60 IEC 309 2P+ \perp 50-60Hz ±15% IP44 230VAC
	120 Vac	TYPE SO, 3Xawg12 CONDUCTORS-NEOPRENE JACKET UNSHIELDED 90°C 600 Volt. Cable length :not more than 5 meters.
Socket outlet:	230 Vac	Series 62 IEC 309 2P+ \perp 50-60Hz ±15% IP44 230VAC
	120 Vac	NEMA L5-30R for 110VAC 50-60 Hz ±15%.

- The power supply source must be located not more than 5 meters (approx. 15 feet) from the PILOTH4 and must be accessible by an operator.
- The power supply source must be provided with a switch located near the power source plug.
- The power supply source must be provided with the ground reference.
- The sound pressure level, with system working in worst conditions is not to exceed 70dB.

1.8.3 Air specifications

Air supply:	Filtered at 3 µm 99.9% of the oil must be filtered from air The air must be dried with a dew point of 10 °Celsius		
Compressed air supply:	Typical: 4 Atm Max: 6 Atm		
Air supply setting:	Min. 4.5 Atm	Typ. 5.5 Atm	Max. 6 Atm
Air flow:	Min. 1N/l		
Air compressor capacity:	Min. 10 l/min		
Air input:	3/8" Female with GAS thread		
Air hose to system:	3/8" ID Minimum		

1.8.4 Weight

System weight:	1577 Kg (3469 lb)
System weight with packing:	1800 Kg (3960 lb)

1.8.5 Overall dimensions

The figure shows the system dimensions. It is necessary to reserve a certain clear space around the system to ensure good air circulation for the electronics and to have enough space for easy access to the inspection and maintenance points. The following is a scale drawing of the required work area and the place usually occupied by the operator.



Fig. 1-4 PILOT H4: System layout

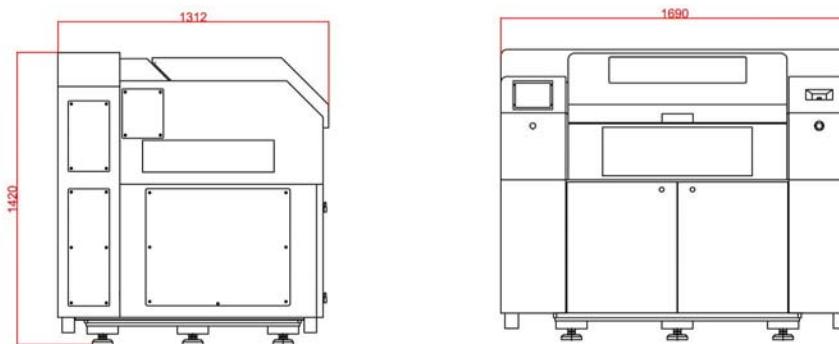


Fig. 1-5 PILOT H4: Side view and front view

1.8.6 Work Area

It is recommended to leave a clearance area between the system and possible external instrumentation, in order to guarantee a good air circulation for the electronics onboard and to have sufficient space to access the inspection/maintenance points of the system

The figures 1-4- and 1-5 respectively, show the system layout and the work area with overall dimensions

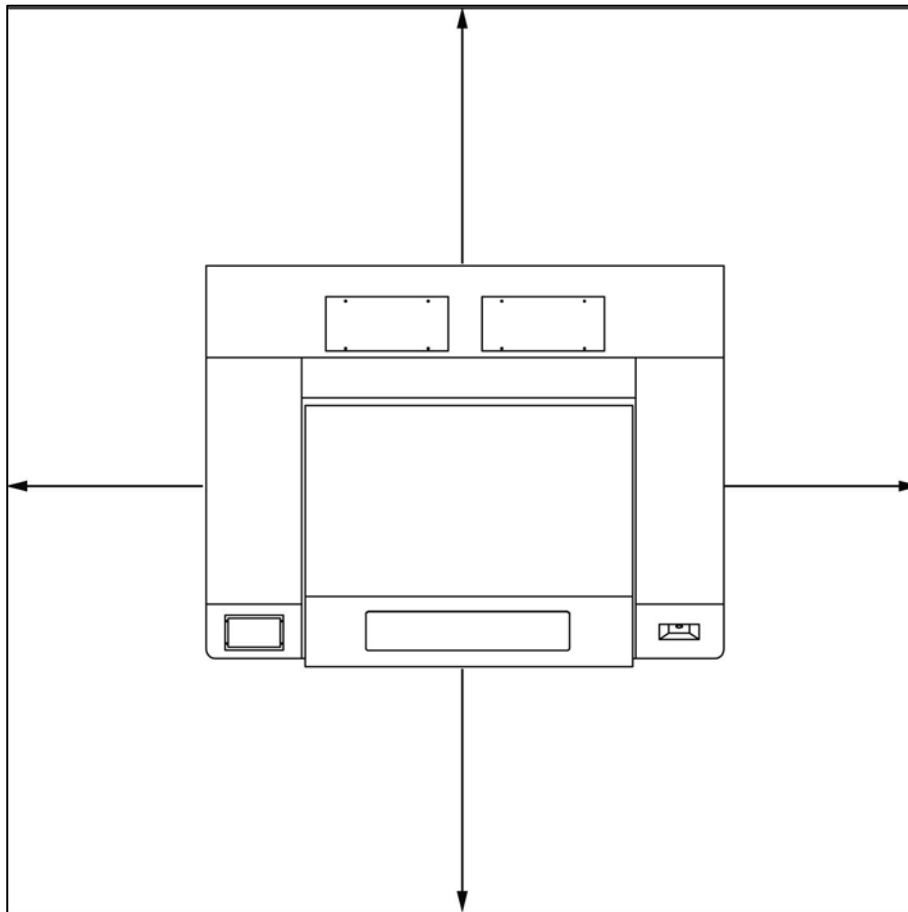


Fig. 1-6 PILOT H4: Work area

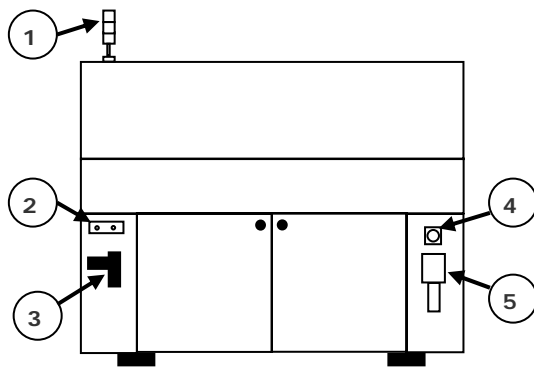
Height	1480mm (58.27")
Length	1740mm (68.50")
Width	1330mm (52.36")

2 SYSTEM OVERVIEW



Fig. 2-1 PILOT H4: System overview

- B1** - Front doors for easy access to all the systems electronic racks and components
- B2** - Side panel
- B3** - Protective cover (*tiltable*), protecting the work area
- B4** - PC compartment door
- B5** - Tilttable keyboard/mouse support
- B6** - Control Panel
- B7** - Work area
- B8** - LCD Monitor



- 1) Light indicator
- 2) SMEMA connection
- 3) Air filter and tap
- 4) Main ON/OFF Switch
- 5) System power plug

2.1 GENERAL ARCHITECTURE

The system can be considered as a whole with functional blocks interacting together. The picture below illustrates the system general architecture. What follows is a technical description for every block.

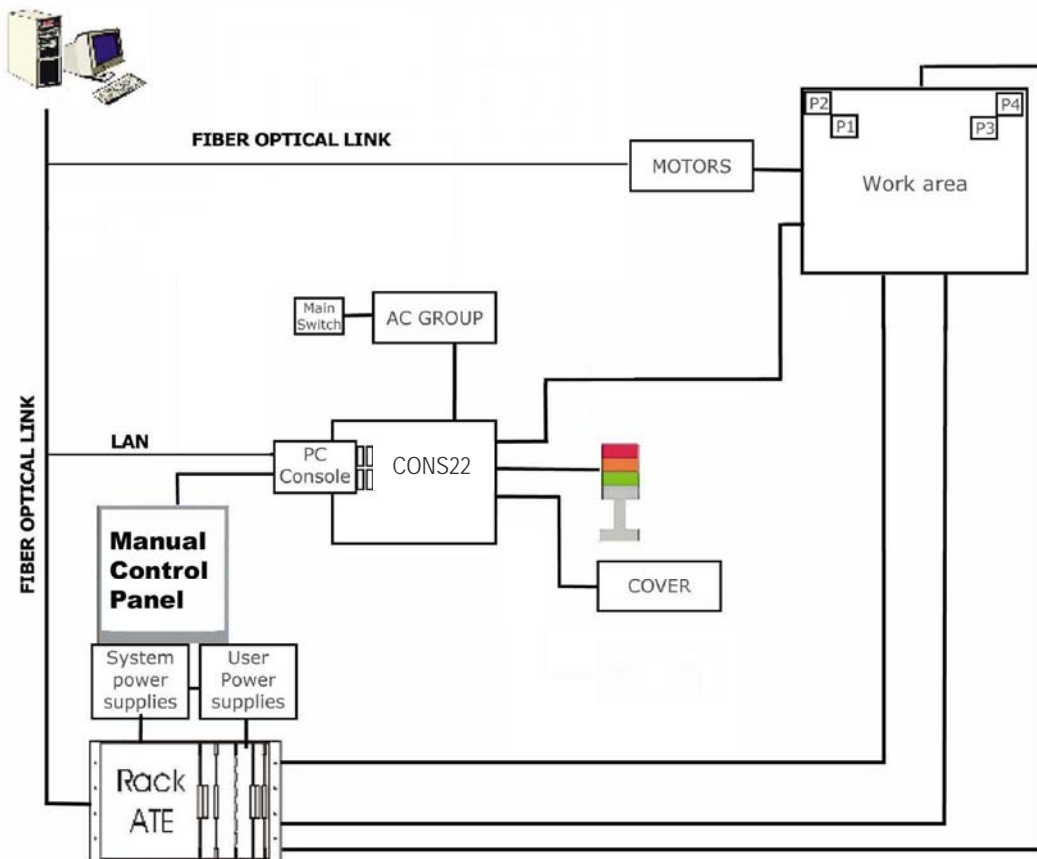
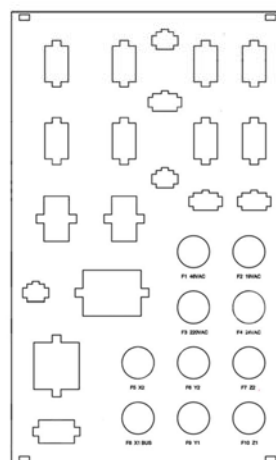
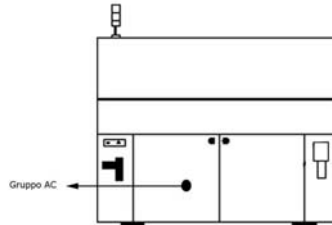


Fig. 2-2 PILOT H4: System synoptics

2.1.1 AC group

The AC Group provides the AC supply voltages to the entire system through a Main Transformer included within the AC Group itself. It is located under the right rear door as illustrated in the following figure.

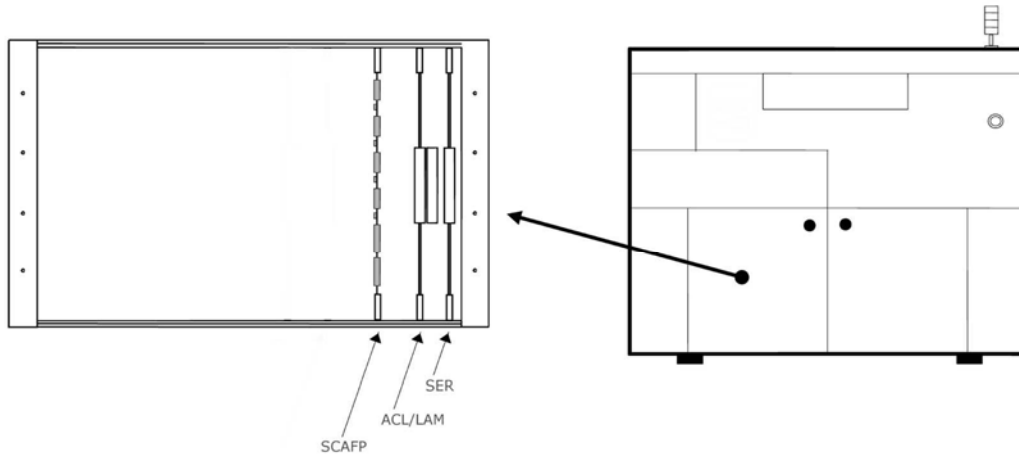


- F1 – F10** = fuses
- SW1 MAIN** = Main Switch
- SW2 MAIN** = User Plugs Switch
- USER PLUGS** = AC source sockets available to the user

F1	46Vac	3A	Board Handler motion drives protection [Not present]
F2	19Vac	3A	Board Handler sensors protection [Not present]
F3	220Vac		Protection of all units supplied with 230Vac
F4	24 Vac	3A	Contactors power supply circuits protection
F5			Not present
F6			Not present
F7			Not present
F8	230Vac	20A	X axes power supply AC input protection
F9	95 Vac	20A	Y axes power supply AC input protection
F10	22Vac	20A	Z axes motion drives protection
F11			Main Contactor protection (TRF2 output)
F12			PC protection

2.1.2 ATE rack

Located under the left front door, it is composed of electronic modules that are required for the system measurements.



2.1.3 Axis drivers and filters

Located under the rear left door of the system there are the axis drivers and filters. They control the head movements along the X,Y and Z axis generating the proper signals to drive the axis motors.

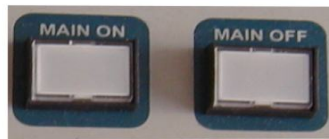
2.1.4 Control panel and emergency button

It is composed of LEDs and buttons that informs the operator of the status of the system, (system stopped system working, system in error,...). The control panel is located on the left side of the system above the keyboard bay.

Control Panel Description



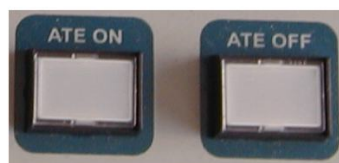
The section here below provides a description of the control panel:



BUTTON	DESCRIPTION	LIGHT
MAIN ON	Switches the main electronics ON	MAIN ON = ON MAIN OFF = OFF
MAIN OFF	Switches the main electronics OFF	MAIN ON = OFF MAIN OFF = OFF



BUTTON	DESCRIPTION	LIGHT
MOTOR ON	Powers motor axes ON	MOTOR ON = ON MOTOR OFF = OFF
MOTOR OFF	Powers motor axes OFF	MOTOR ON = OFF MOTOR OFF = OFF



LED	DESCRIPTION	LIGHT
ATE ON	All test system instruments are powered	ATE ON=ON ATE OFF=OFF
ATE OFF	All test system instruments are depowered	ATE ON=OFF ATE OFF=OFF



The pedal is factory configured to behave in the same way as the fixture control panel buttons, for operator's comfort. It can open/close the clamps (like the UPPER, LOWER button) or block/unblock movements of the upper guide (like the ADJUST button)

BUTTON	DESCRIPTION
PEDAL	open/close clamps
PEDAL	Block/unblock upper rail movements



	DESCRIPTION
JOYSTICK	It moves the camera along the XY axes



BUTTON	DESCRIPTION
EMERGENCY	It immediately stops the system (it stops any movements of axes and probes), switching OFF the power. The Personal Computer remains ON



BUTTON	DESCRIPTION
START	It starts the test



BUTTON	DESCRIPTION
STOP	<ul style="list-style-type: none"> • It stops the TEST • It resets the condition "insufficient air" caused by a inadvertently fall of pressure

2.1.5 Cover

Protective cover (tiltable) with plexiglass window.

2.1.6 Power supplies

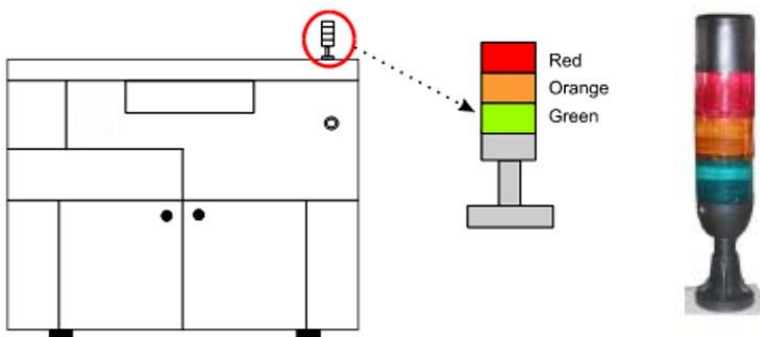
Several power supplies provide voltages both to the system and the Unit Under Test (herein after: UUT).
















2.1.7 Motors






Brushless and stepper motors drive probes along X,Y and Z axes.

2.1.8 Light indicator or semaphore

These device signal the system operating conditions as illustrated below.



DESCRIPTION	GREEN	ORANGE	RED
System in AUTO mode, waiting for a board	 for more than 40 seconds		
System in AUTO mode, ready for a board			
System in AUTO or MANUAL mode. The cycle is not active (waiting for operator)			
Probes in movement or there is board on board clamping			
System Failure (in MAN or AUTO mode)			

-  Green color: ON
-  Intermittent (0.5 seconds ON/0.5 seconds OFF)
-  Orange color: ON
-  Red color: ON
-  Color: OFF

2.1.9 PC-main

Personal computer running the test software, essential to operate the system.

2.1.10 Test area

The test area is a (530 x 400mm) area where the UUT is loaded for the test. In the work area there are the four measuring probe heads, the accessory box, the board handler and the movable plate. It is not possible to access the test area during test, for operator safety.

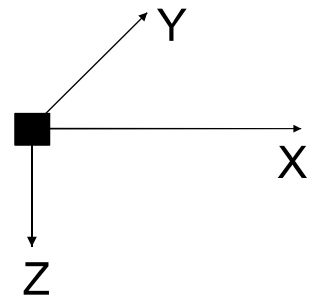


- C3 - Movable plate
- C5 - Measuring head supports

2.1.11 Measuring heads

The system has four independent heads each of which may move along three axes (X, Y and Z) to test the UUT. Observing the work surface from the top, the translation directions of the 3 axes are:

- X axis** - Horizontal translation from right to left and vice versa
- Y axis** - Horizontal translation from front to rear and vice versa.
- Z axis** - Vertical translation from top to bottom and vice versa.



2.2 FIXTURE CONTROL PANEL

The fixture control panel is located into the work area and helps the operator to block the PCB rails (in particular for the flexible ones). The three buttons are depicted here below:

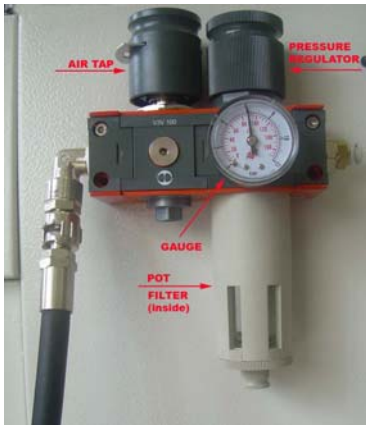


BUTTON	DESCRIPTION
LOWER	To open/close the lower clamp
UPPER	To open/close the upper clamp
ADJUST	To block/ unblock the upper rail movement to adjust the loader width
SELECTOR	Combined with buttons lower and upper, allows to open the left or right side of the clamps or both sides if placed in the middle

3 GETTING STARTED

Before starting to test a board it is a good rule to check some parameters and settings in order to obtain the desired result. In this chapter there are all operations necessary to start the test activity together with the description of all parameters present in the different dialogs that appear on the screen.

3.1 SYSTEM STARTING




Open the air tap located on the rear side of the system.




Set the MAIN-SWITCH on the rear side of the system to "1".




Press the button  MAIN ON on the control panel (the light indicator of the button will turn ON)



Press the button  MOTOR ON on the control panel (the light indicator of the button will turn ON)



Press the button  ATE ON on the control panel (the light indicator of the button will turn ON)

3.2 TRANSLATION

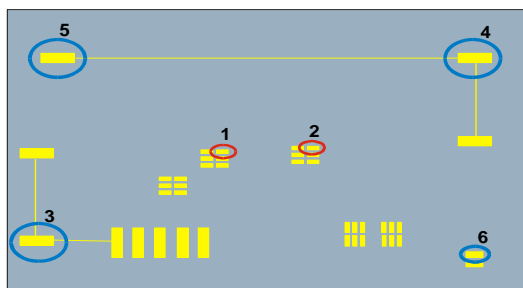
To test the board in a correct way it is very important to perform a correct translation and marker setting. The translation procedure is used to reference the board coordinates to the test system and it is executed by the operator on the first board. On subsequent boards the translation is performed automatically by the test system with the markers recognition. The details on these procedures are given here below.

3.2.1 Translation

- Translating a board means moving all the test points as compared to a specific point of the testing system referred to as system zero. This enables the system to acquire the position of the board that needs to be tested and to attain a common reference so that the translation of a probe has the same value of the translation of the board. Translation is a very important phase of the testing because if it is not carried out accurately, the probe will not be positioned correctly on the supports and could yield to a higher percentage of false errors. To attain a correct translation, make sure that appropriate measures are taken. It is advisable to select the points visually holding the board sample in order to verify that the points selected are appropriate for testing purposes. It is preferable to select areas with a squared shape or with limited dimensions as translation points in order to facilitate centering and limit positioning errors.

It is also very important to select the position of the points on the board, that should be as distant as possible and in diagonal, as shown in the figure below. It is advisable to avoid the pair 1-2 and prefer, instead, pairs 3-4 and 5-6.

The following sections describe in detail the recommended steps for a correct translation.

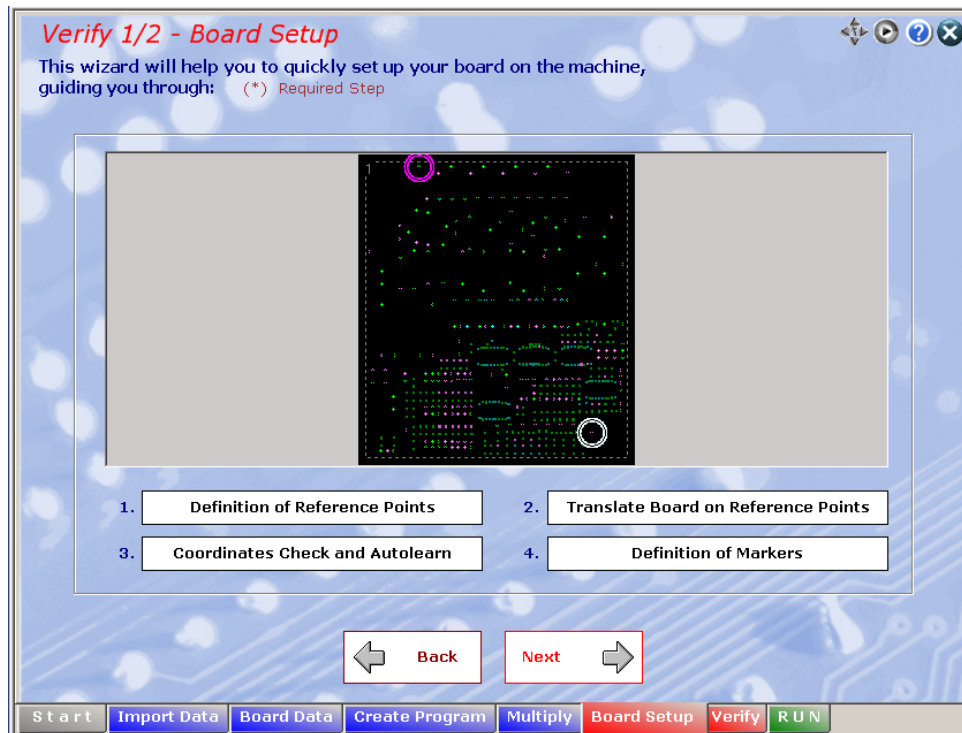


If not already opened, press the  button to enter the Wizard Environment.



- Select the Board setup page:

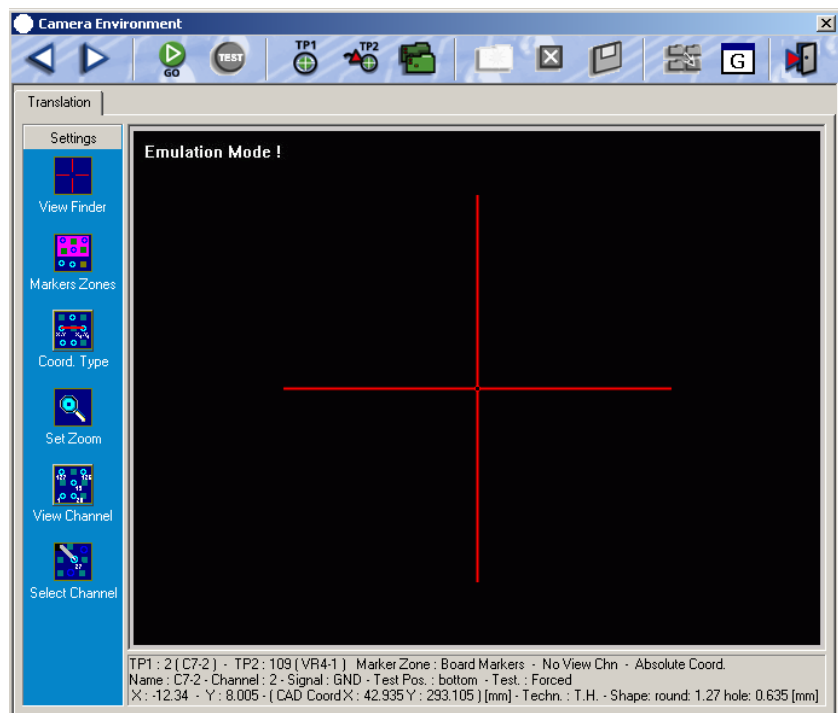
The system displays a window that shows the board layout:



2. Press the **Translate Board on Reference Points**. The system will display window *Translation*.



The translation procedure is the alignment of the board reference system to the test system. In this way the test system acquires the position of the board to be tested and use it as a common reference. **The translation is a very important test phase because if it isn't performed properly, the position accuracy of the probes on the pads will not be precise with a result of false diagnosis.**

The camera will be positioned on the co-ordinate of the first point selected for the translation, displayed in window Set Reference points. The co-ordinate reached by the camera may not correspond to the correct position on the board. In this case, it is necessary to align the two points. The following step explains how to perform this operation.





3. Position the cross displayed on the center of the selected point. This can be done in three ways:
- Use the directional buttons or the joystick (option) on the Control Panel until the correct position is reached.
 - Keep the left button of the mouse pressed and simultaneously move it in the correct direction to center the point.

- o Position the mouse pointer on the point that has to be reached, then press the right button of the mouse. The cross will reach the position indicated by the point of the arrow before the pressing of the right button of the mouse.

4. When the pad center and the pointer are aligned, click on the  icon. The system will move the camera on the second point (defined as TP2).
5. Align TP2 in the same way as for TP1.
6. Press the  icon again. The system checks that the coordinates acquired with the camera correspond to the theoretical points previously selected in the *Definition of Reference Points*.

If there is an error on the two point distance, the system will give a fail report and suggest to cancel the operation or to acquire the two values again.

7. If no error is visualized, press the  icon to save the translation and then press the  icon to exit.

At this point the translation has been successfully completed and it is possible to continue with the next steps.


3.3 TEST PROGRAM EXECUTION

The system can work in manual mode:

- In **MANUAL** mode, the operator manually executes all operations necessary to test the board.

If, during test execution phase, the protective cover is opened or the emergency button pressed, the current test is stopped immediately. To restart the system, follow the instructions in the section System Starting.

3.3.1 TEST ENVIRONMENT

1. If not already opened, press the  button to enter the Wizard Environment. The following dialog windows is displayed

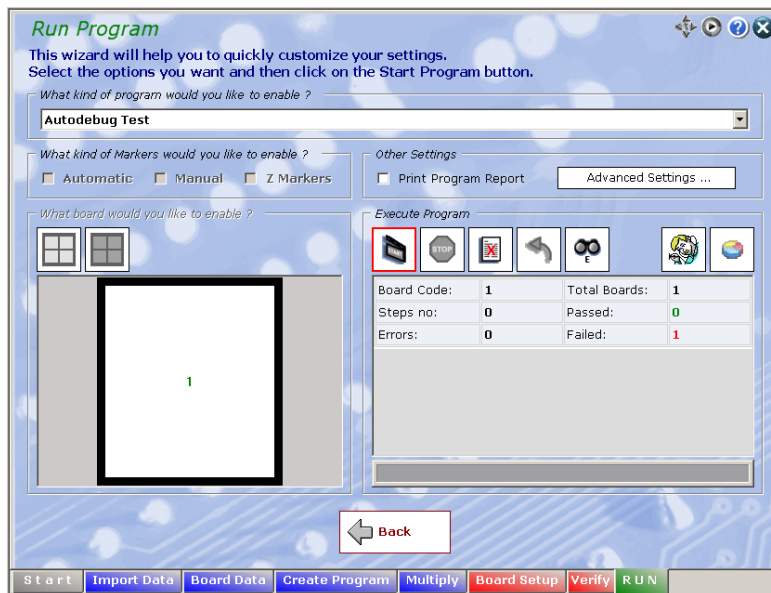



Fig. 3-1 PILOT H4: Run Page of the VIVA software

Once you are in the “Run page”, press the button  to start the test program.

To stop the test program execution before it has been completed, it is possible to:



Press the STOP button on the operator panel






Press the STOP button available in the toolbar of the RUN page



Press the **ESC** button on the keyboard

Other buttons available in the Run page toolbar are as follows (in brackets is reported the corresponding command from keyboard):



	Start Program (Spacebar)	To start the test program for the selected board.
	Stop Program (Esc)	To stop the test program for the selected board.
	Failed Step Only	To display a list showing the program executions.. Select a row where the test result is "Fail"; then press the butto "Start Program". This will not execute the complete test program, but only the test (or tests) which output a "fail" result.
	Retry on Error	To disable/enable the option Retry on error, to repeat each test for a given number of times, moving the probe on the test point. This button is available only in you have defined the corresponding values in the section "Retry XY Axis" or "Z Axis Retry" in the Board Configuration Environment.
	Retest Errors	To disable/enable the option Retest errors; to repeat the tests with "fail" result upon completing the test program execution. If the checkbox "Automatic Error Retest after Test" in the Board Configuration Environment is selected, the button is selected. You may change its status from the Debug Environment.
	Stop and retest on Error	In case of error, the program is stopped and the system prompts a dialog to display the information related to the measurements performed. Besides, the dialog contains three other buttons  ,  and  to continue the test program execution, end the test program execution or view the position of the probes in the work area.
	Open the Debug Environment	To open the Debug Environment used to verify and adjust the test program execution.
	Open the Repair Station Environment	To open the Repair Station Environment used to identify the components where errors have been detected (Note: the availability of this environment depends on a hardware key which can enable the access to the environment). If the option "RPE or RPSE is not configured the button is greyed out.
	Statistics	To display statistics information related to the test program execution.

3.4 TEST RESULTS

When the test program execution is completed, the following dialog window is displayed to show the test results:

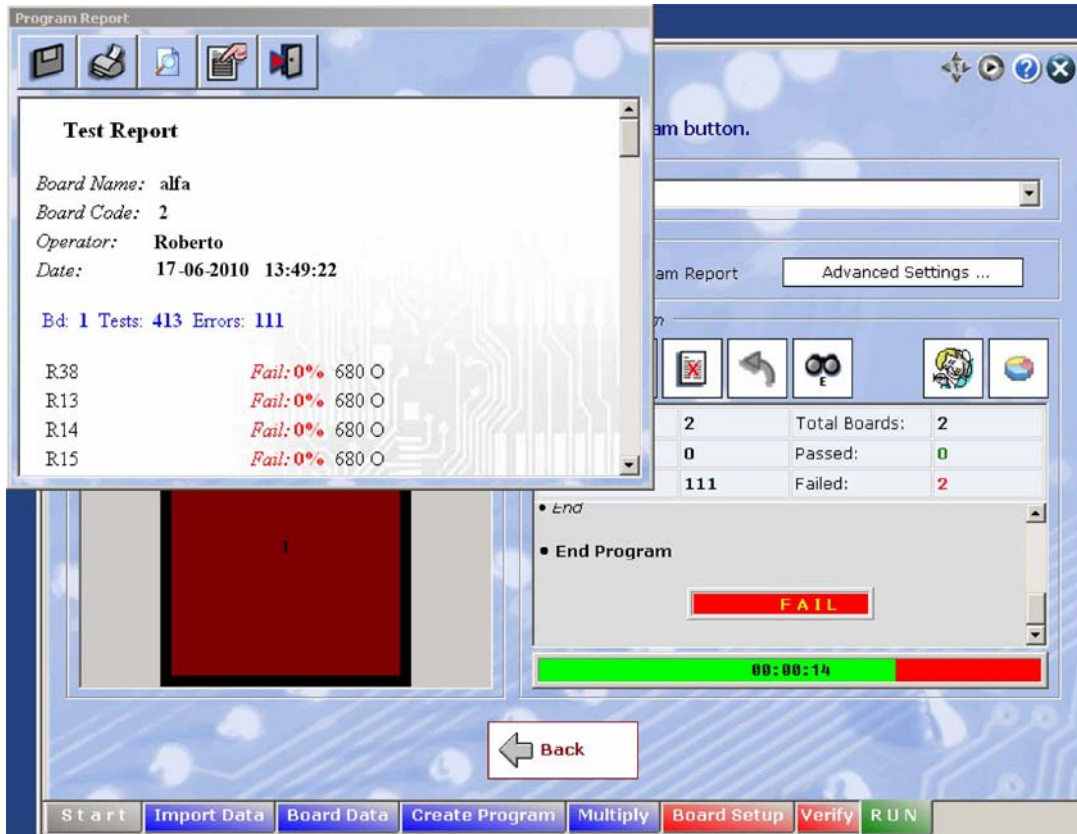




Fig. 3-2 PILOT H4: Program Report dialog window

Press the button  to save the test report.

Press the button  to print the test report

Press the button  to have a print preview of the test report

Press the button  to set the error message format:

- Small:** 100% R1 (error percentage + Component Name)
- Medium:** 100% R1 Device (error percentage + Component Name, component denomination)
- Large:** 100% R1 Device Values (error percentage + Component Name, component denomination, measured value and measure range)

Press the button  to exit the dialog window

3.5 SYSTEM SHUTDOWN

1. Press the button  on the control panel (the light indicator of the button will turn OFF)
2. Press the button  on the control panel (the light indicator of the button will turn OFF)
3. Press the button  on the control panel (the light indicator of the button will turn OFF)



4. Set the MAIN-SWITCH on the rear side of the system to "0".



5. Close the air tap located on the rear side of the system.

3.6 FIXED PROBES

Fixed probes increase the available number of test channels in the test area. The fixed channel can be connected to a channel card or to a user power supply. In this way the channel or power supply voltage is connected to the unit under test. Fixed probes are connected on the opposite side with respect to the flying probe side. The fixed probe is held in place by a magnet located on the probe base, that fixes it to the bottom of test area.



3.6.1 Fixed probe positioning

1. Place the board in the work area
2. On the board, acquire the point that will be used for fixed probe and assign a name
3. Repeat camera movement and point acquisition as many times as the number of fixed probes to add
4. Remove the board from the work area
5. Move the camera on those points previously acquired, used for fixed probes
6. Place the fixed probe under the camera and align it with the crosshair that is displayed on the screen

3.7 SUPPORTS

Supports prevents the board from bending during test especially when the board is not rigid enough. They are similar to a fixed probe but they do not have a needle or a connection cable. For support positioning, refer to similar instruction above used to position the fixed probe.



4 MAINTENANCE OPERATIONS

This section illustrates the inspection and maintenance operations for the PILOT H4 test system. The following table summarizes the inspection and maintenance operations.

Operation	To be performed...
General inspection of the system and cleaning of the various parts	Daily
Check of the air filter	Daily
Replacement of the air filter	When the filter becomes dark-colored
System diagnostics	Weekly or when a problem is suspected
Replacement of probe needle	Approximately after a million hits
Probe calibration	After each maintenance operations on Z axes
Openfix calibration	After each maintenance operations on Openfix probe replacement
Board handler calibration	When automatic positioning problems occur
Lubrication of the ball screws	About once every 500-600 working hours
Lubrication of probe guides	About once every 1000 working hours

Tab. 4-1: PILOT H4: Maintenance schedule

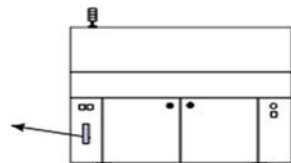
4.1 GENERAL INSPECTION AND CLEANING



Inspect the cleanliness of the system daily. Press **MOTOR OFF** and **ATE OFF** buttons to work under safety conditions. Only then open the protective cover and remove any traces of dust or dirt using a small aspirator (do not use a compressed air blower to avoid blowing impurities into inaccessible parts) or a clear brush if necessary.

4.2 CHECK OF THE FILTERS

The system has a filter to eliminate any condensation or moisture in the air. The filter is mounted into a pot that collects the exceeding water from the filter (especially when filter replacement approaches). The filter inspection frequency is related to the quality of the centralized air compressor system. A daily check is suggested in any case.

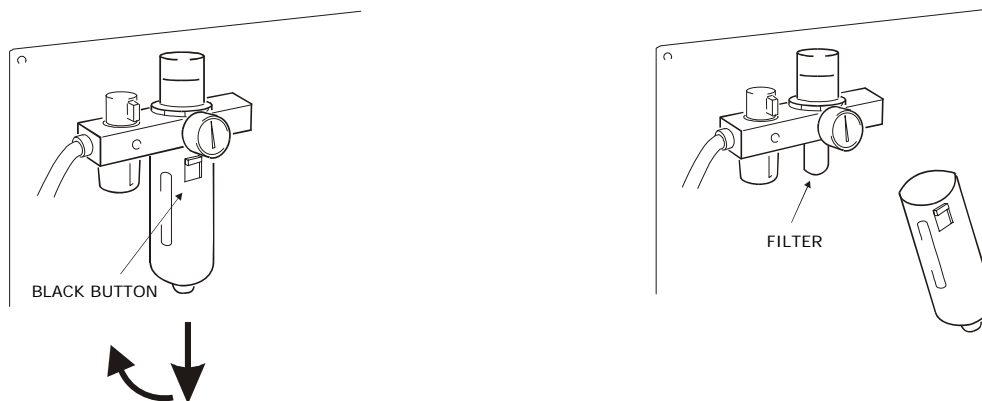


- A1 -Air on/off tap
- A2 -Pressure regulator
- A3 -Pressure gauge
- A4 -Filter pot

4.2.1 Replacing the filter

The air filter is located on the back of the system. Here are listed the operations to follow to replace the filter part number: PM-FILTCOND-00.

1. Move the air tap to OFF position to close air
2. Push the black button on the filter pot downwards and, at the same time, turn the pot counterclockwise to unhook it
3. Turn the black ring with bayonet joint counterclockwise. The ring is located on the lower part of the filter to support it
4. Remove the internal filter and fix it with the ring



5. Fit the pot and rotate it clockwise to hook it
6. Move the air tap to ON position to open air

4.3 DIAGNOSTIC TOOLS


The system has three diagnostic programs:

1. System diagnostic
2. DMC Manager (Diagnostic Mechanical Check)
3. OVP (Operation Verification Program)

4.3.1 System diagnostic

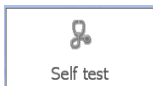
It is possible to check the system functionality with the system diagnostic.



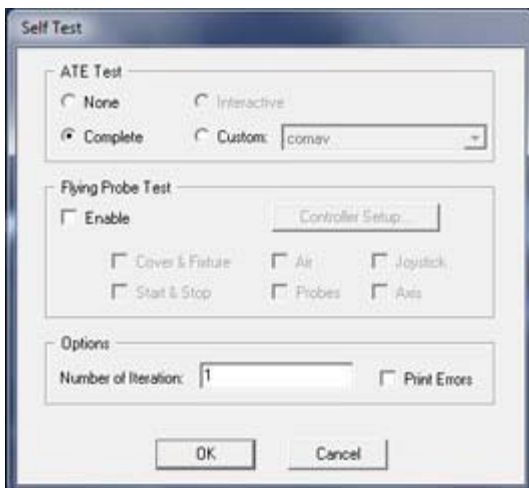
To run the diagnostic, from the VIVA main window, press the  button to enter the Wizard Environment.



Press



Press the  button. The Self Test dialog window is displayed. The figure besides shows the Diagnostic dialog.



ATE TEST section

NONE: does not run any test on the ATE rack.


it performs a diagnostic test on all the ATE modules installed and configured, as indicated in the System configuration




( icon, ATE Configuration folder)

Option Interactive: the diagnostic program is carried out interactively to allow users to select

which ATE modules have to be tested. At the end of the interactive test, users can save the diagnostic configuration set so that it can be called at a later stage.

Option CUSTOM: this option enables to call a diagnostic configuration stored during an interactive diagnostic procedure. The selection of button  opens a dialogue that facilitates the selection of the desired configuration.

CUSTOM: with this option is possible to recall a diagnostic configuration previously stored (during the INTERACTIVE option). The  button opens a dialogue that facilitates the selection of the desired configuration.

Flying Probe Test section:

Enable: this field enables the user to test all the parts not included in the ATE section.

Cover & Fixture: this field enables the user to check the operation of the protection cover and of the jaws that clamp the board.

Air: this field enables to check the operation of the pressure switch.

Joystick: this field enables the user to check the operation of the joystick (option).

Start & Stop: this field enables the user to check the operation of the START and STOP buttons.

Probes: this field enables the user to check the motion of the four mobile probes along the axis Z.

Axis: this field enables the user to check the motion of the four mobile probes along axes X and Y.

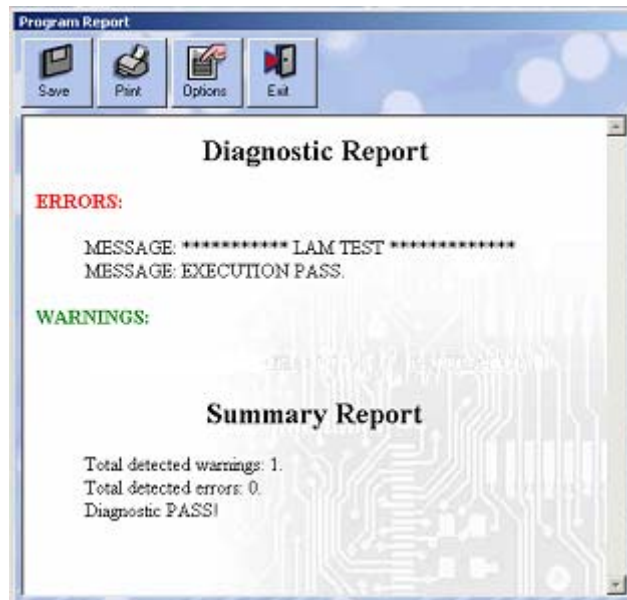
Options section:

Number of Iteration: this field specifies how many times the diagnostic test has to be performed.

Print Errors: if checked, this field enables the user to print the results of the diagnostic program.

4.3.2 Meaning of the error messages

At the end of the diagnostic test, the system displays the results of the individual tests as shown in the figure below



The following table lists the possible corrective actions for the problems detected by the diagnostic test.

MODULE	ERROR	SOLUTION
ACLAM	Any	Contact Seica's Customer Service
CHANNEL BOARD S64	% SH LN 1 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾	Replace the faulty relay on line 1.
	% SH LN 2/3 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾	Replace the faulty relay on lines 2 and/or 3.
	% SH LN 4 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾	Replace the faulty relay on line 4.
	% OP LN 1/2 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾	Replace the faulty relay on lines 1 and/or 2
	% OP LN 3/4 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾	Replace the faulty relay on lines 3 and/or 4.
CHANNEL BOARD SCAFP	% SH LN 1 CH <i>n</i> (<i>p/65</i>) ⁽¹⁾	Replace the faulty relay on line 1.
	% SH LN 2/3 CH <i>n</i> (<i>p/65</i>) ⁽¹⁾	Replace the faulty relay on lines 2 and/or 3.
	% SH LN 4 CH <i>n</i> (<i>p/65</i>) ⁽¹⁾	Replace the faulty relay on line 4.
	% OP LN 1/2 CH <i>n</i> (<i>p/65</i>) ⁽¹⁾	Replace the faulty relay on lines 1 and/or 2
	% OP LN 3/4 CH <i>n</i> (<i>p/65</i>) ⁽¹⁾	Replace the faulty relay on lines 3 and/or 4.
	Problems other than those described above	Contact Seica's Customer Service
CHANNEL BOARD F32 / P32	% SH LN 1 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾⁽²⁾	Replace the faulty relay on line 1.
	% SH LN 2/3 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾⁽²⁾	Replace the faulty relay on lines 2 and/or 3.
	% SH LN 4 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾⁽²⁾	Replace the faulty relay on line 4.
	% OP LN 1/2 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾⁽²⁾	Replace the faulty relay on lines 1 and/or 2
	% OP LN 3/4 CH <i>n</i> (<i>p/s</i>) ⁽¹⁾⁽²⁾	Replace the faulty relay on lines 3 and/or 4.
	Problems other than those above	Contact Seica's Customer Service
FIXED OPENS PROBES	Any	Contact Seica's Customer Service

Tab. 4-2: Table of corrective actions

⁽¹⁾ *n*: indicates the channel number of the system
p: indicates the channel number of the board
s: indicates the board number

⁽²⁾ The number of channels is always counted on 64-basis. The way of interpreting the result varies according to the type of channel modules mounted on the system. The error can be in fact referred to a 64 or 32-channel card. **Example:** if S64 modules are present in the system and an error occurs on channel 33, the error is referred to channel 33 of the first S64 card. Differently, if F32 or P32 cards are present in the system and channel 33 is failing, the error is referred to the 1st channel of the **second** F32/P32 card. Similarly, channel 125 is the 29th of the **fourth** F32 / P32 but it is the 29th of the **second** S64.

If an error is detected on a channel board, it is recommended to replace the relay listed under the column SOLUTION. To locate the faulty relays, refer to the channel boards layouts in the following pages. Use the report messages as a bi-dimensional array coordinate where the line number indicates the row and the channel number indicates the column. If for example the report message is:

% SH LN 2/3 CH 4101 (5/65)

it is necessary to replace relays CH 4101 LN 2 and CH 4101 LN 3. If the report message is:

% SH LN 1 CH 4101 (5/65)

it is necessary to replace relay CH 4101 LN 1.

SCAFP board layout

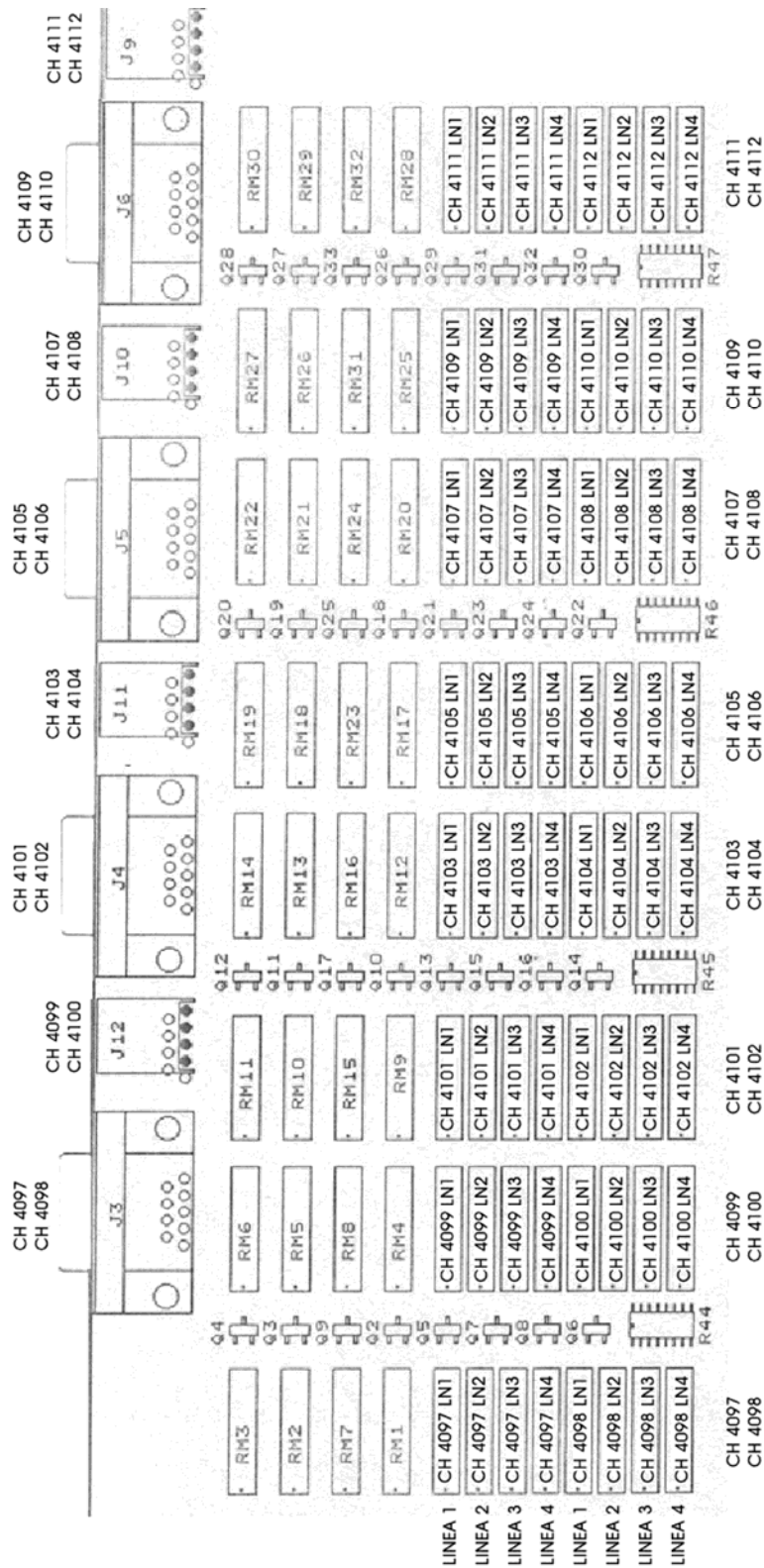


Fig. 4-1 PILOT H4: SCAFP Module layout

F32/P32 board layout

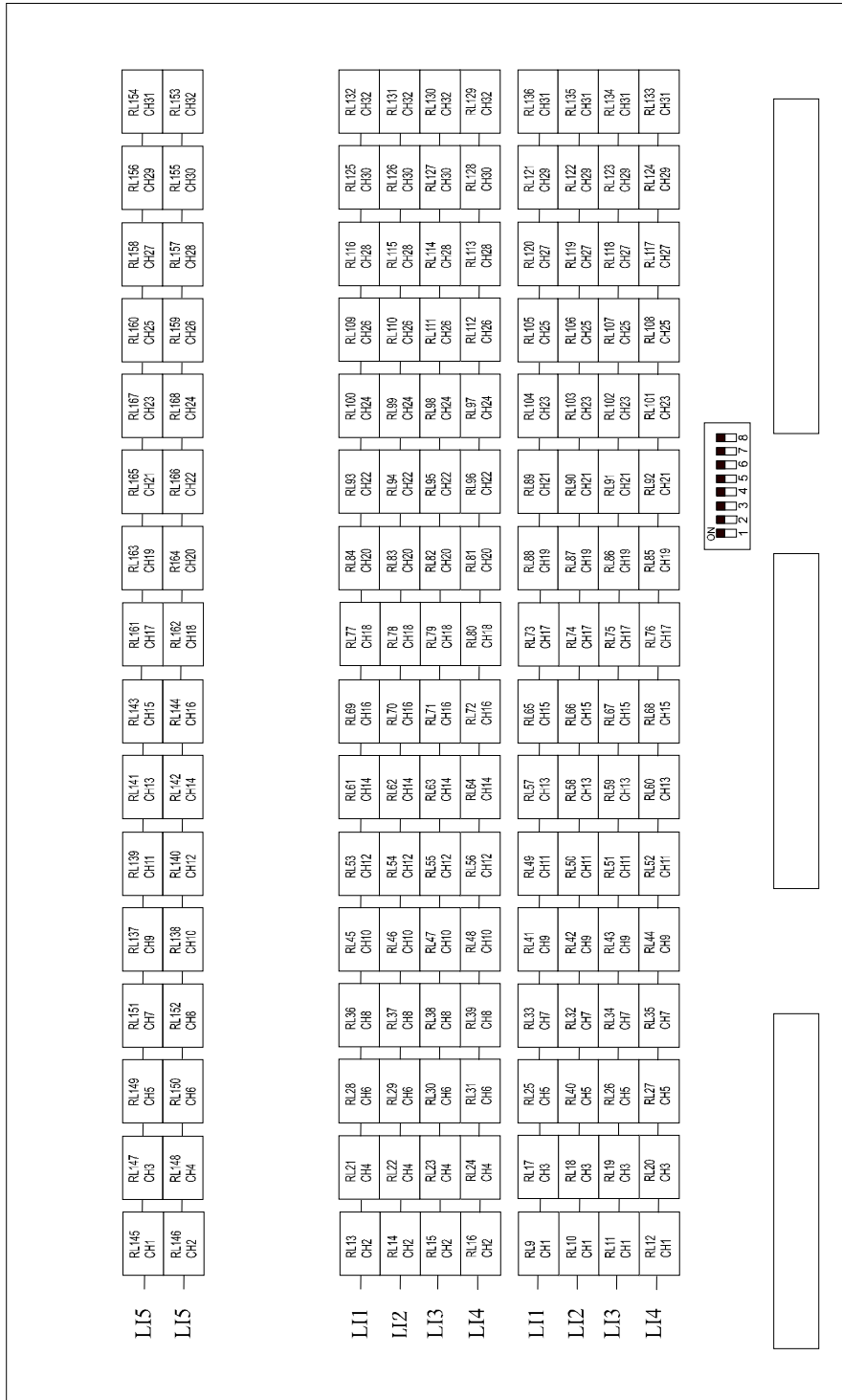


Fig. 4-2 PILOT H4: F32/P32 Module layout

S64 board layout

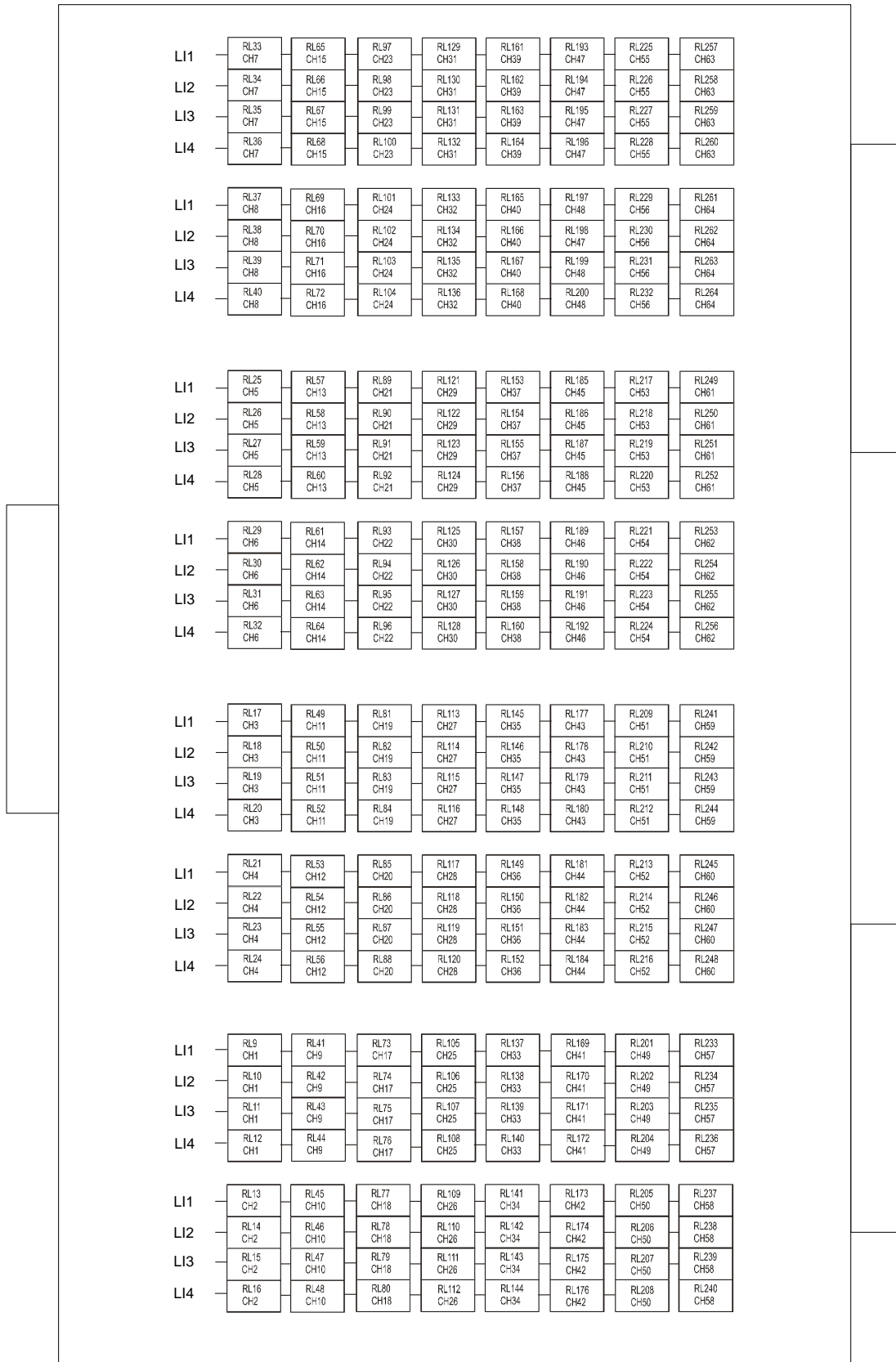


Fig. 4-3 PILOT H4: S64 Module layout

4.3.3 OVP

This program can be run only with a check-board (part number: PT-OVPFP000-00, Figure 4-3-7). The check board needs to be installed in the test area with the TOP side facing upwards. Select the OVP program as if it were an ordinary test program. Before performing a test with OVP program, it is advisable to carry out an automatic translation using channels 124 (TP61-1) and 61 (TP108-1). If the result of the test is FAIL, contact the your nearest Seica support office for further information.

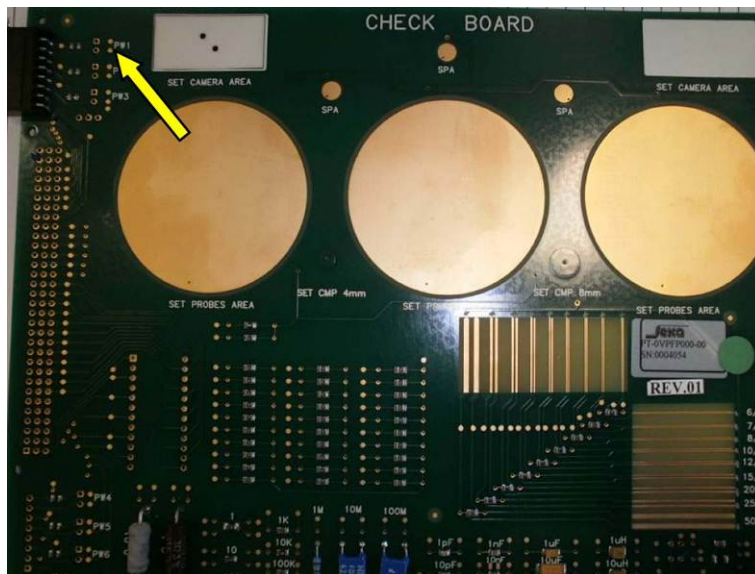
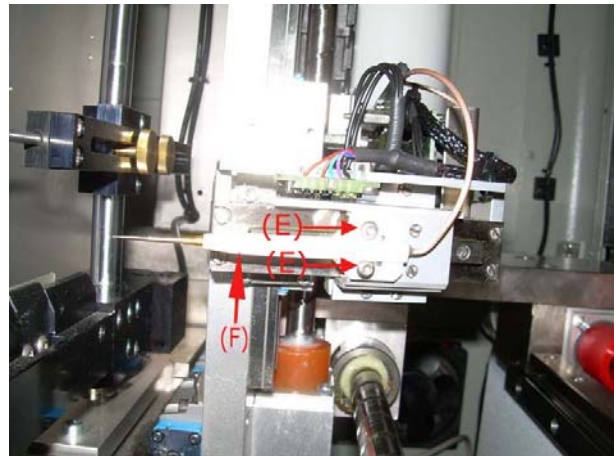





Fig. 4-4 PILOT H4: OVP board




4.4 REPLACING THE PROBE NEEDLE

The probe needle will wear in time, so it must be replaced. We recommend you proceed as follows:



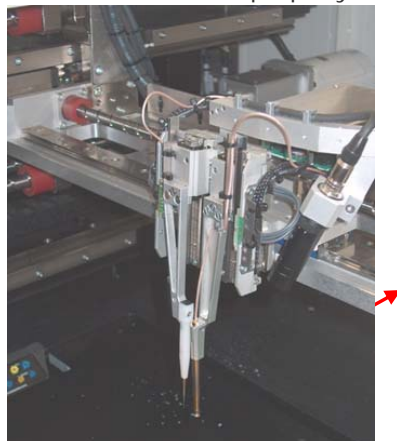
- 1). Press ,  and  buttons in order to work under safety conditions.
- 2). Hold cable (1) with hands and disconnect it from the probe support
- 3). Loosen the screws (2) using a screwdriver and move down the cable guide
- 4). Remove the internal socket head screw using a 2mm Allen wrench and remove also the white needle support (4).
- 5). Remove the needle (5) and take it out from the top. Install a new needle.
- 6). Mount the white needle support (4), and insert the internal socket head screw using a 2mm Allen wrench (3).
- 7). Move the cable guide upwards and tighten the screws (2)
- 8). Hold cable (1) with hands and connect it to the probe support.






- 9). Press ,  and . The light indicator of each button will turn ON
- 10). Perform the homing procedure
- 11). Perform the XYZ Axes Automatic calibration and after, the XY Axes Fine calibration

4.5 REPLACING THE OPENFIX PROBE




If the Openfix probe breaks or it doesn't function properly, it must be replaced. To execute this operation proceed as follows:





- 1). Press ,  and  buttons in order to work under safety conditions.
- 2). Remove the internal socket head screws (1) using a 2mm Allen wrench and remove also the cover
- 3). Loose the screws (2)
- 4). 4). Loose the screws (3) with an Allen wrench and move downwards the cable guide
- 5). Disconnect the connector (4)
- 6). Cut the plastic strips (5)
- 7). Remove the signal cable from the cable guide (6)
- 8). Mount a new probe into its seat and screw down the related screws without tightening them
- 9). Push the Openfix probe upwards until it stops and only then, tighten the related screws.
- 10). Insert the cable into its arranged path, move the cable guide upwards (3) until it stops and then tighten the screws
- 11). Stretch the cable and fix it into the cable guide (6).
- 12). Give the cable the same shape it had before the replacement. Connect the connector into its position (4).
- 13). Fix the cable in place using two plastic strips (5).
- 14). Place the cover and screw the four screws (1) using a 2 mm Allen wrench



- 15). Press ,  and . The light indicator of each button will turn ON
- 16). Perform the homing procedure.
- 17). Perform the Openfix probe calibration.

4.6 CALIBRATIONS



All the probes, as well as all the moving parts installed on the heads of a Flying Prober, should be occasionally calibrated when the part is replaced, and periodically, in order to guarantee the best performance.

Typically a calibration must be performed:

- a. every time a probe is replaced
- b. if the camera has been moved from its original position
- c. every time the system is moved from its original position
- d. if the system has not been used for a long time.
- e. Every time any of the probes appears to be out of its position during the test
- f. All the calibrations are carried out using the OVP check-board, hence this board should be loaded into the system before starting the calibration procedures.

Run VIVA  software.

In the  page of the Wizard Environment, press  and select the Template .

Now from page  of System Library press the button .

The system Maintenance dialog will be displayed on the screen.

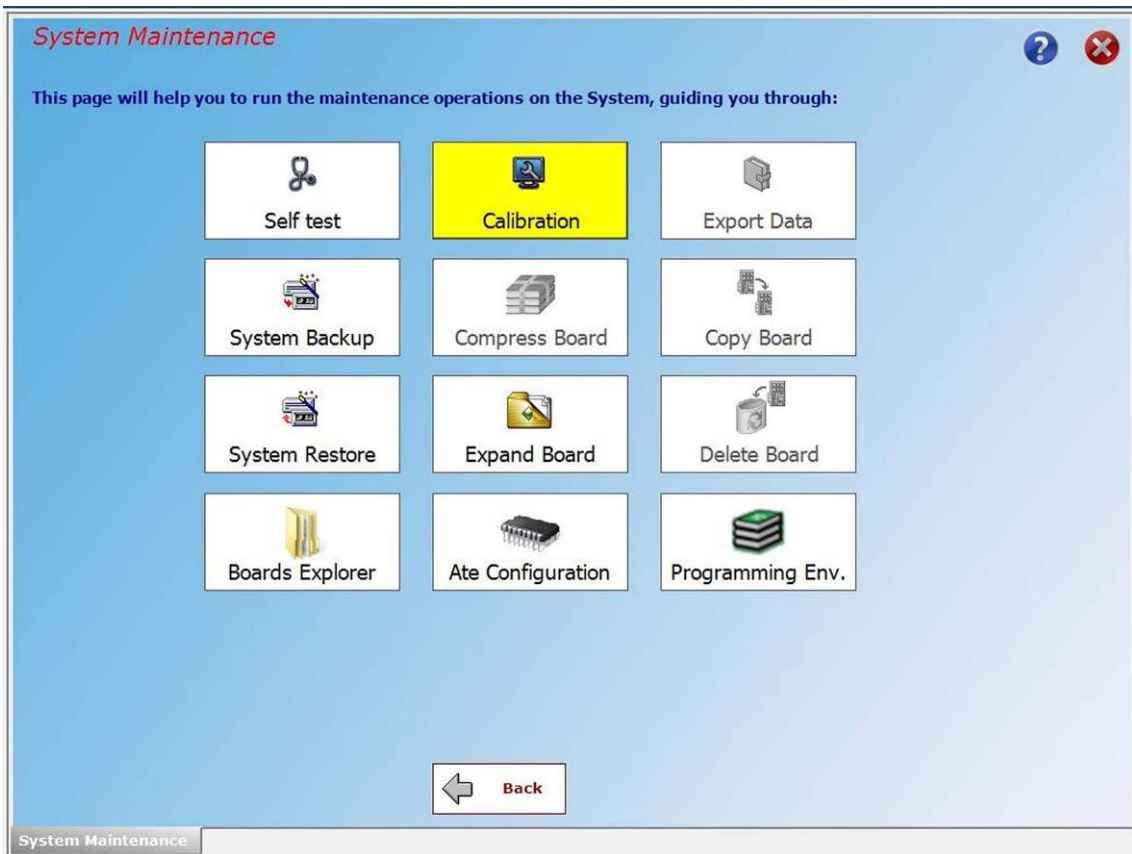


Fig. 4-5 PILOT H4: "System Maintenance" dialog window, tab "Calibration"

The tab Calibrations of the System Configuration Environment will open.

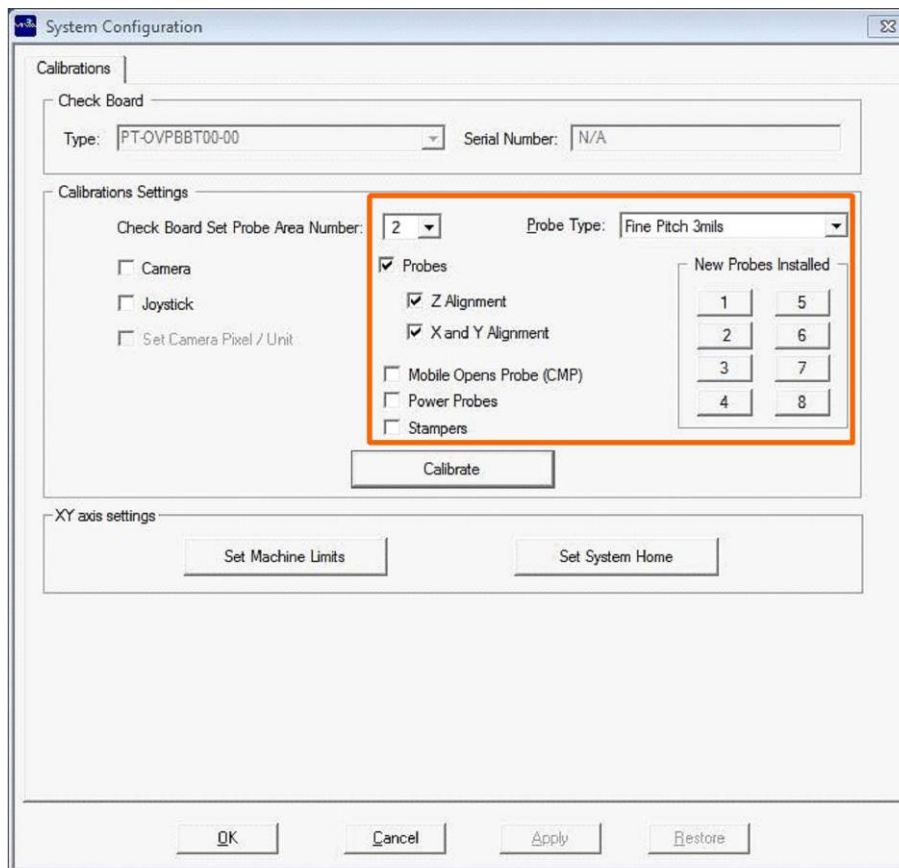

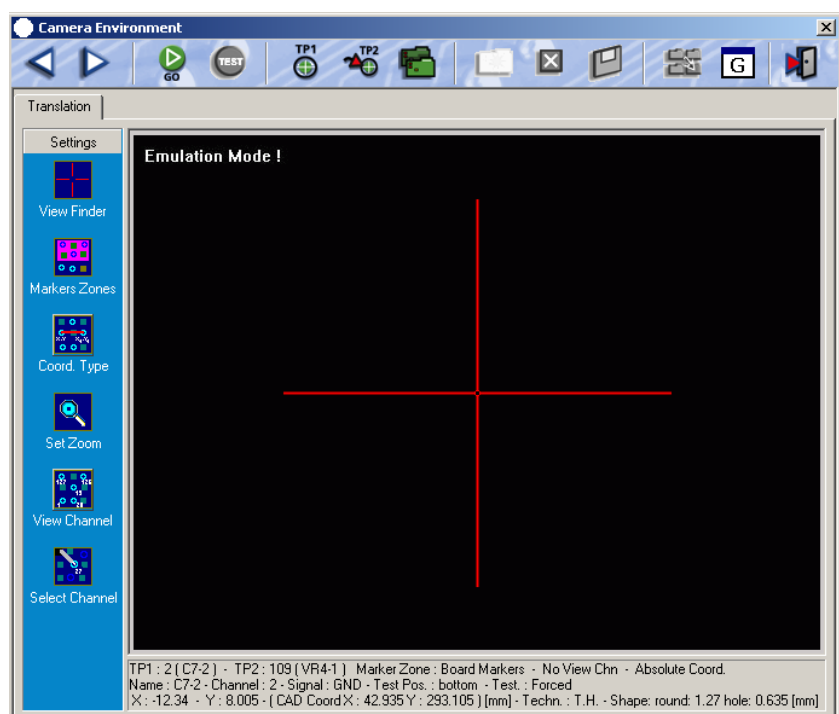


Fig. 4-6 PILOT H4: "System Configuration" dialog window, tab "Calibration"

Here the operator may select all the options to calibrate the electrical probes and launch the calibration of the following items installed on the heads:

- Electrical Probes
- Mobile Capacitive Probe
- Power Probes
- Stampers

 *Note: It is always recommended to perform the Electric Probe calibration first, regardless of the type of calibration needed. Please refer to the instructions reported in the dedicated chapters below.*



4.6.1 JOYSTICK CALIBRATION

This procedure checks the status of the joystick and determines the coordinates of its rest position.

- 1 – Select the “Joystick” Radio Button
- 2 – Press “Calibrate”

N.B. DO NOT move the joystick during this procedure.

4.6.2 CAMERA CALIBRATION

It is not necessary for the operator to execute this calibration. It is performed by Seica before delivering the system.

4.6.3 ELECTRICAL PROBES CALIBRATION

This procedure allows to automatically calibrate the measuring probes as compared to XY-Z axes.

1. Insert the OVP board into the work area positioning it as shown in Fig. 4-7.

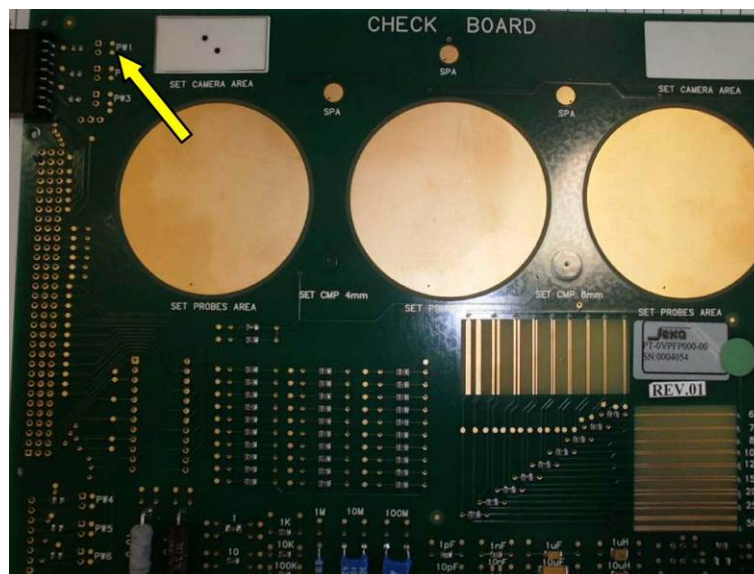


Fig. 4-7 PILOT H4 OVP Board

2. Close the protective doors.
3. Select the checkboxes as indicated in Fig. 4-5 (Probes, Z Alignment, X and Y alignment)
4. Press CALIBRATE
5. Follow the instructions on the screen.



NOTE: CHOOSE THE CENTRAL GOLD CIRCLE ONLY, TO EXECUTE THE CALIBRATION.

In the System Configuration dialog, select items: **"Probes"**; **"Z Alignment"** and **"X and Y Alignment"** (See fig.3-10):

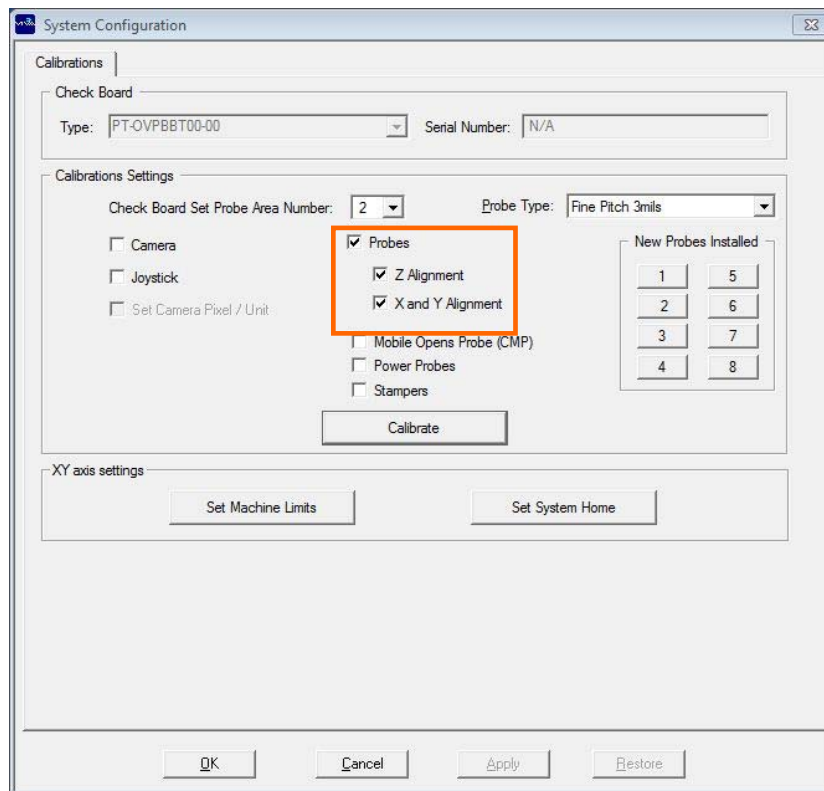
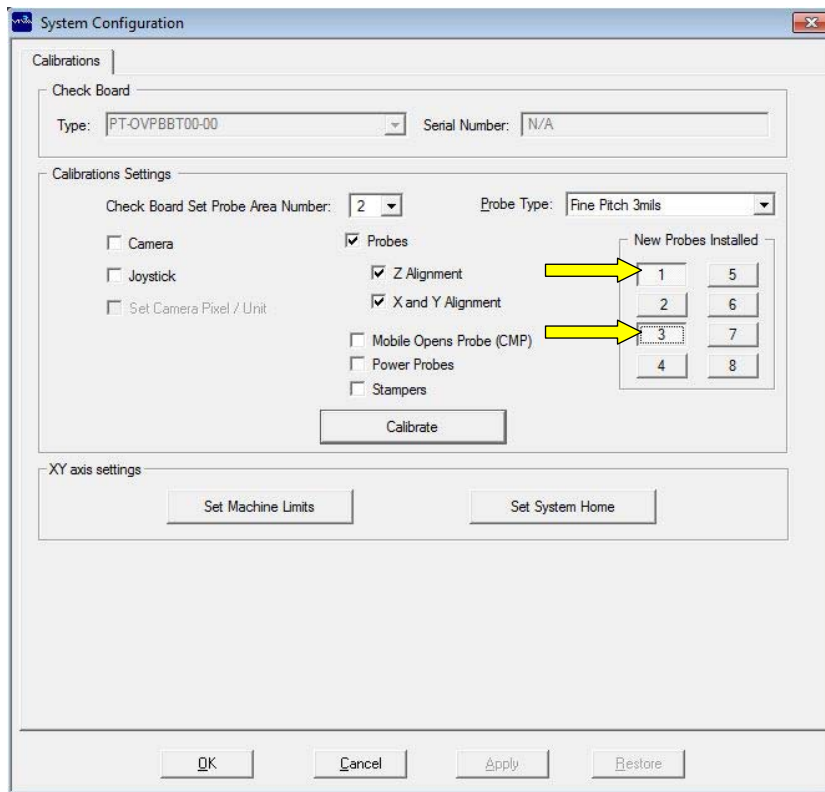


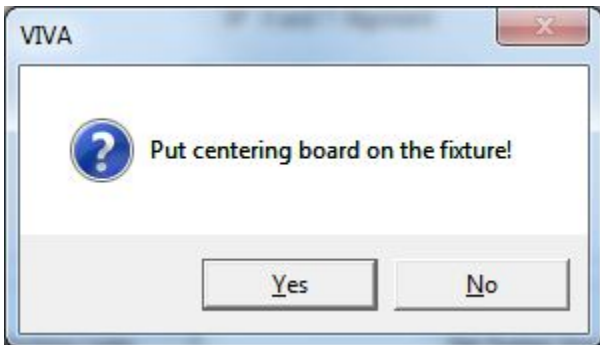
Fig. 4-8 PILOT H4 Setting the Electrical Probe Calibration

Set the value of field **"Check Board Set Area Number"** to 2
Select **"Probe type"** as shown in the picture

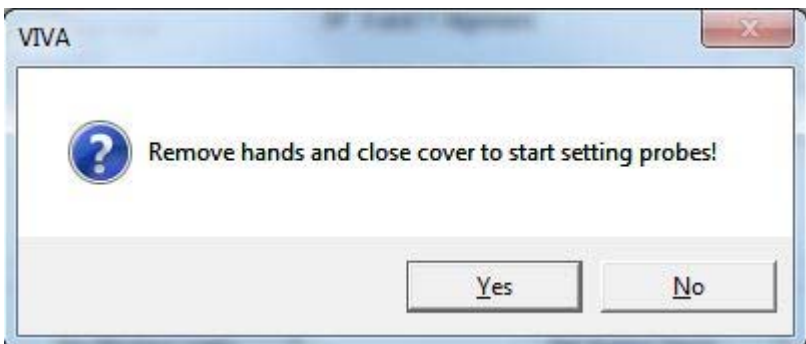
Press the button for each electrical probe installed (Here: 1 and 3)



and press 



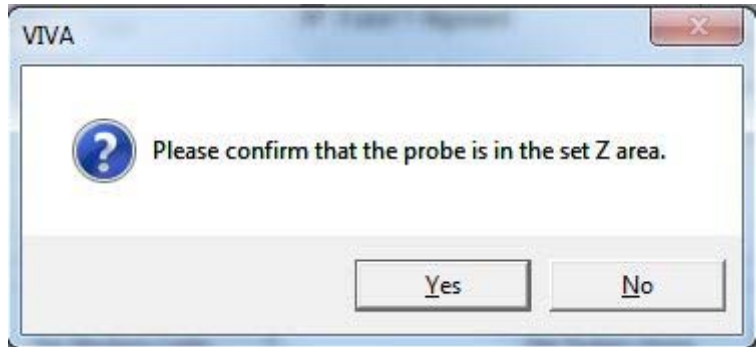
Follow the instructions on screen and press **YES** to continue



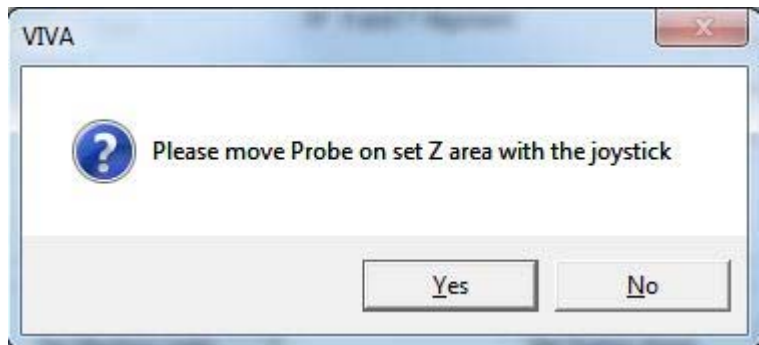
Follow the instructions on screen and press **YES** to continue

Check if the position of the probe 1 is over the central round probing area of the check-board and press . Skip the next picture to continue.

Press if the probe is not in that area and go on the next picture.



Use the joystick to move the Probe 1 over the central round probing area of the check board and press to continue



When the electrical probe calibration has been completed, a dialog will be displayed to perform the **X** alignment of the **Top** camera. (see fig. 3-11)

Press the button for higher accuracy

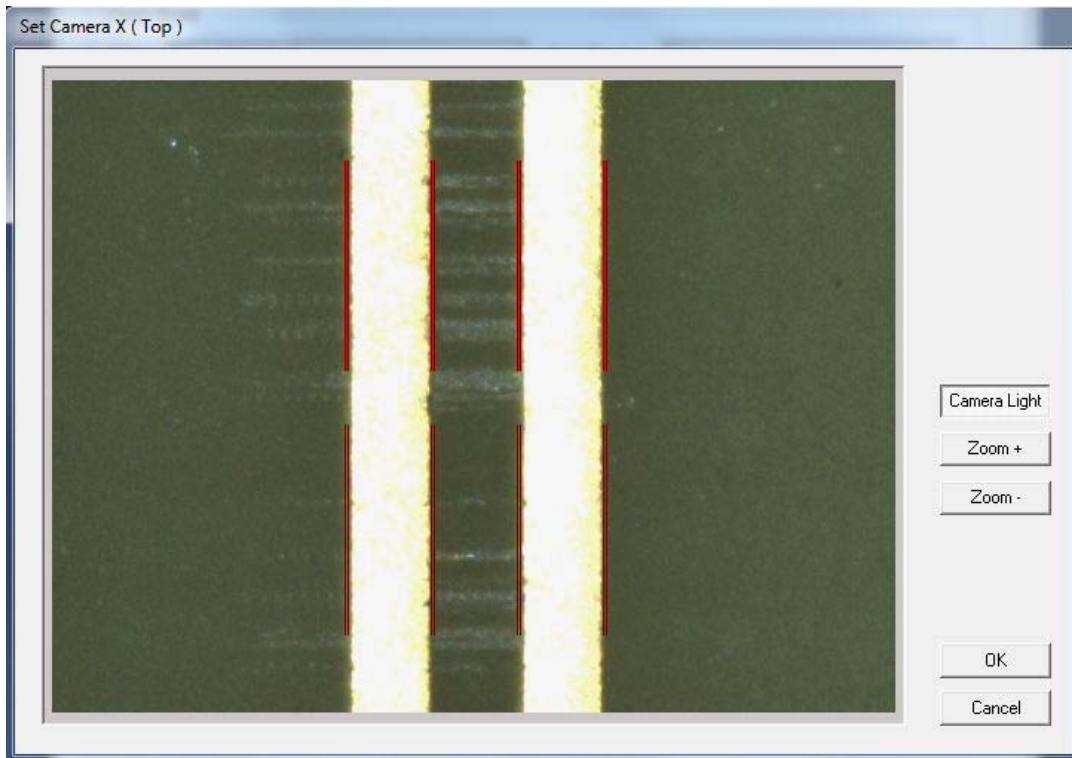


Fig. 4-9 PILOT H4 "Set Camera X (TOP) dialog window

Now adjust the **X** alignment of the **Top** camera with the arrow keys



Press to continue

Another dialog will be displayed to perform the **Y** alignment of the **Top** camera.

Press the button for higher accuracy

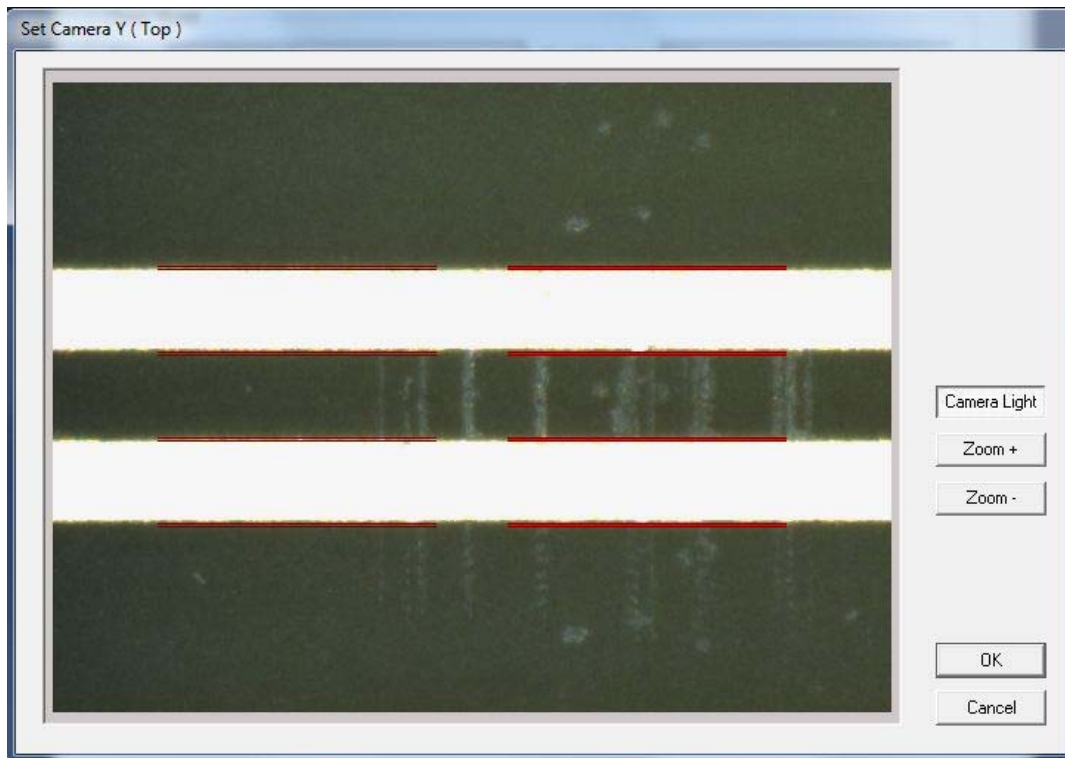


Fig. 4-10 PILOT H4 "Set Camera Y (TOP) dialog window"

Now adjust the **Y** alignment of the **Top** camera with the arrow keys



Press to continue

Align the Top Camera and the Bottom camera on the same hole on the Check Board.



Use the arrow keys to center the view-finder on the hole for the Top camera

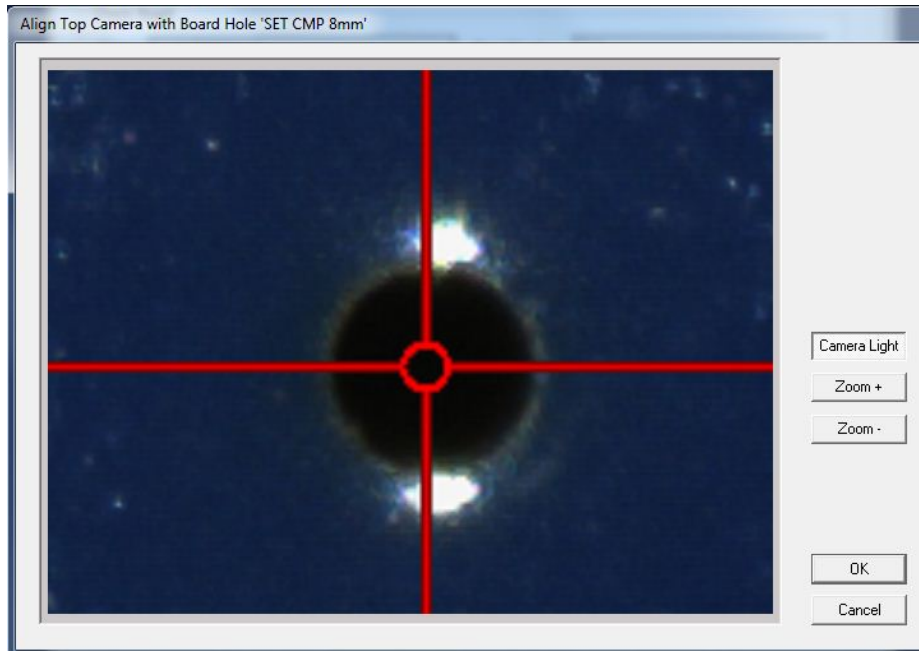


Fig. 4-11 PILOT H4 Align top camera

Press to continue

4.6.4 MOBILE CAPACITIVE PROBE CALIBRATION

In the dialog "System Configuration" select the checkbox "Mobile Opens Probe CPM", then press

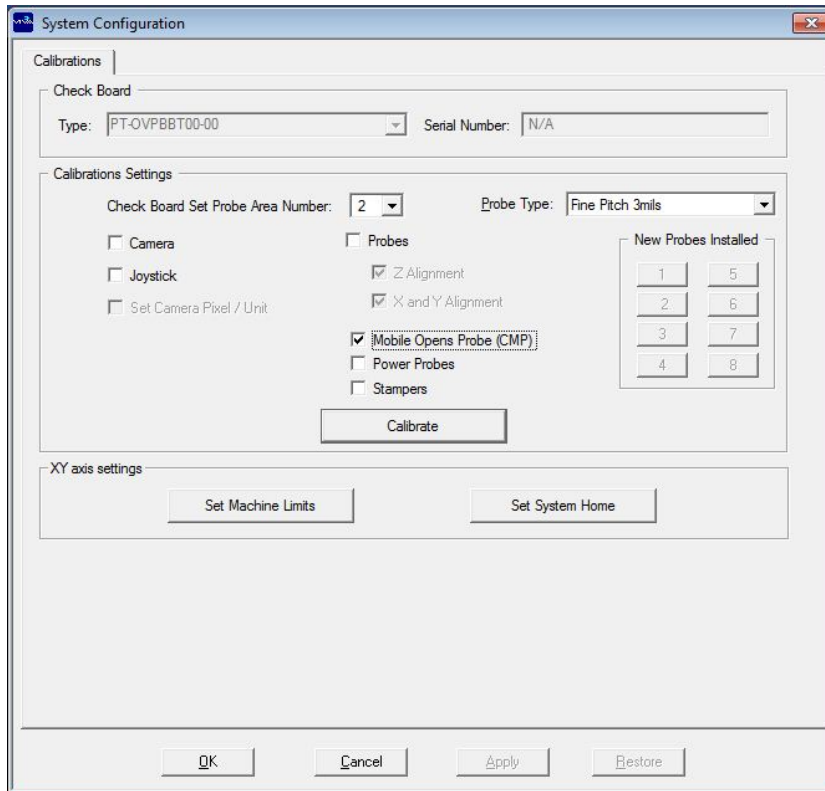
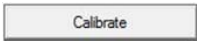
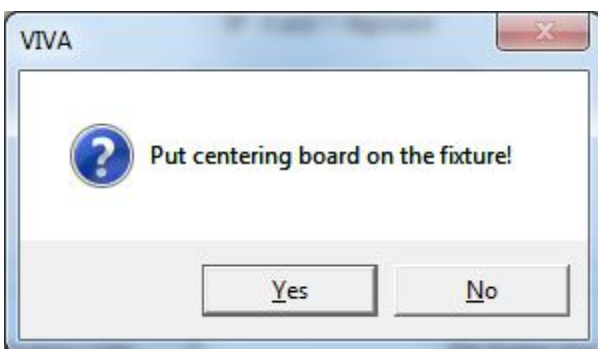
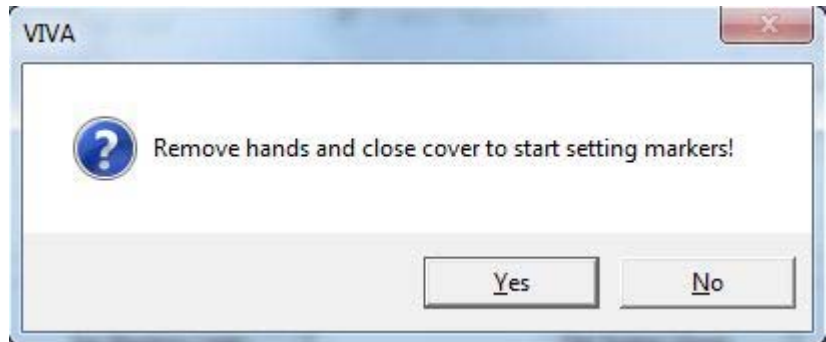



Fig. 4-12 PILOT H4 Setting the "Mobile Opens Probe" Calibration"



Follow the instructions on screen and press **YES** to continue when done.

Follow the instructions and press **YES** to continue when done.



In the dialog "Calibration Mobile Open Probe" press the button  to zoom in for more accuracy

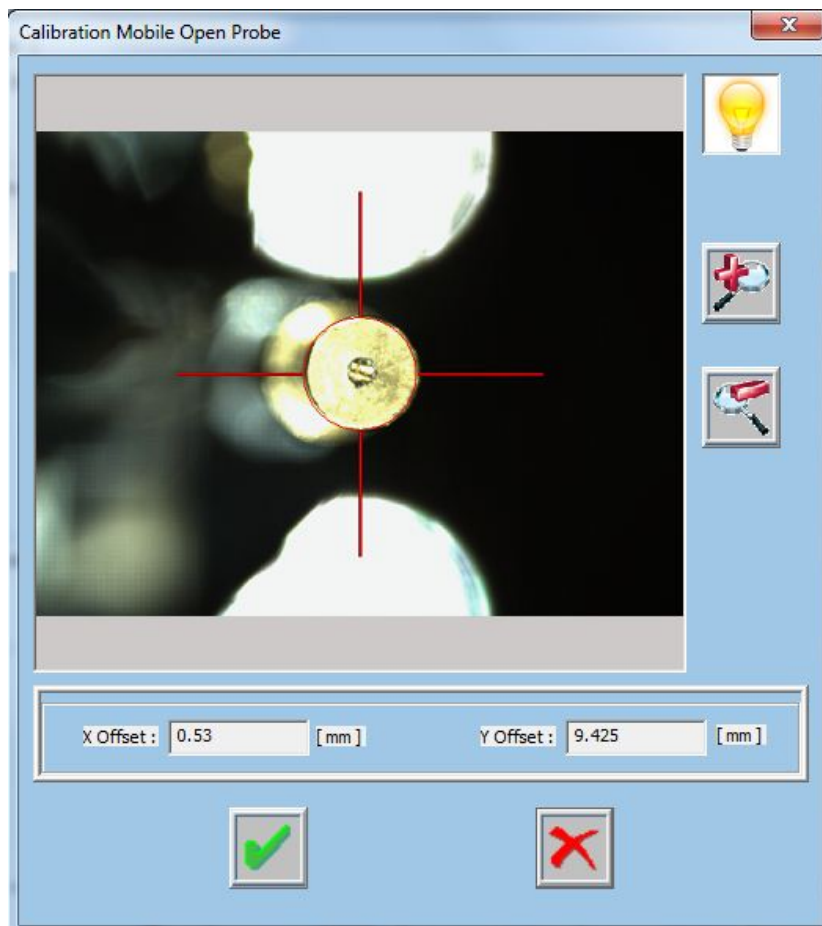
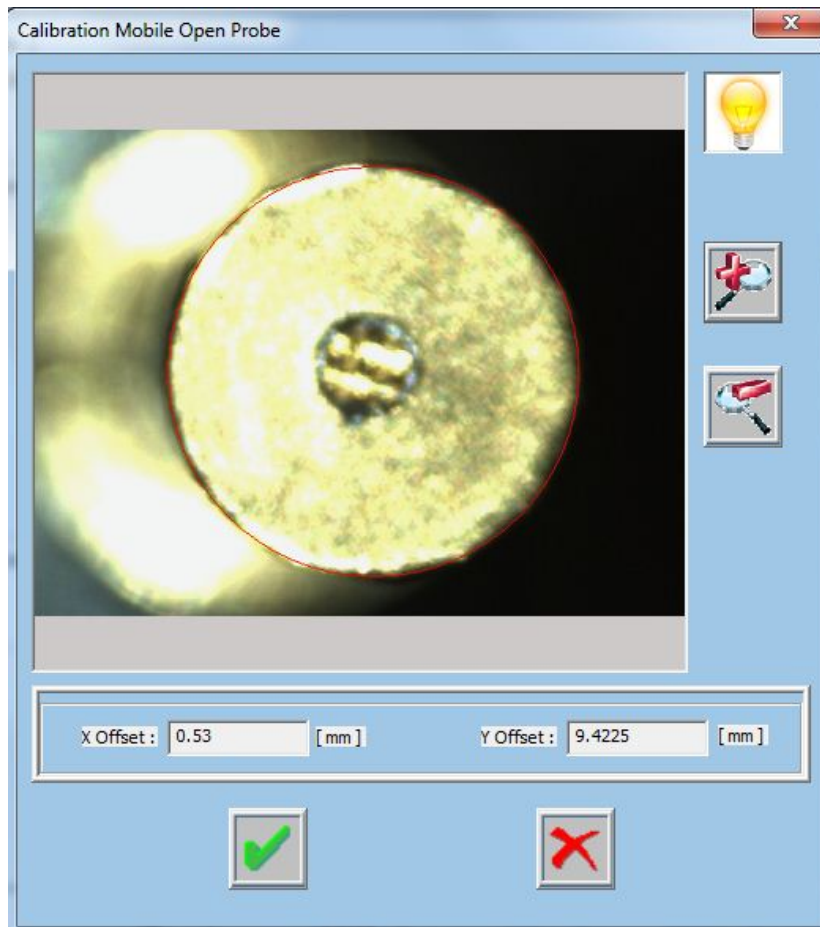




Fig. 4-13 PILOT H4 "Calibration Mobile Open Probe" dialog window



Use the arrow keys to adjust the alignment of the red circle over the top of the capacitive probe



Press  to save the new X,Y position

Repeat the same steps to align the bottom side of the capacitive probe and press  to save the new X,Y position.

4.6.5 STAMPER CALIBRATION

In the System Configuration dialog, select the checkbox **“Stamper”** (See fig. 3-19) and press

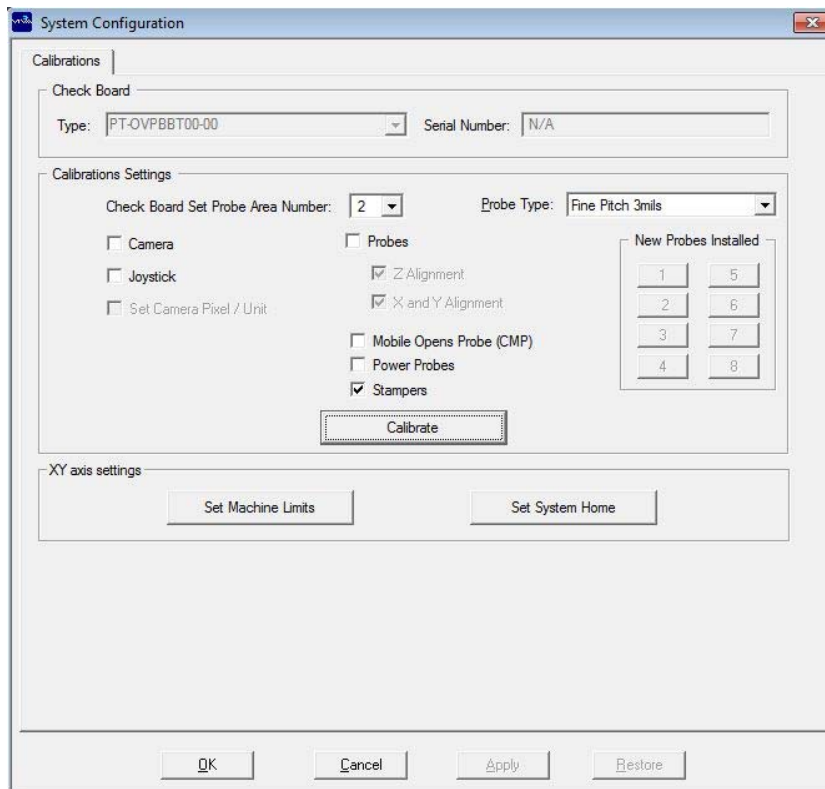
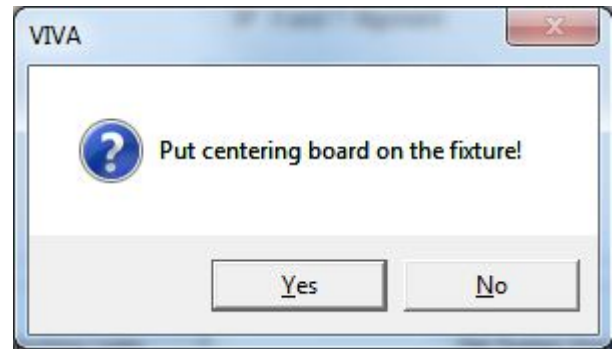
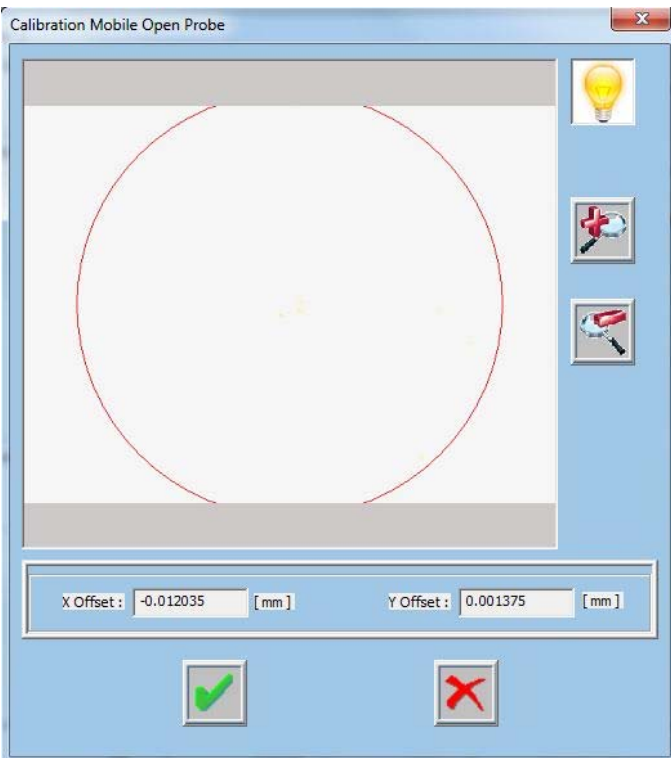
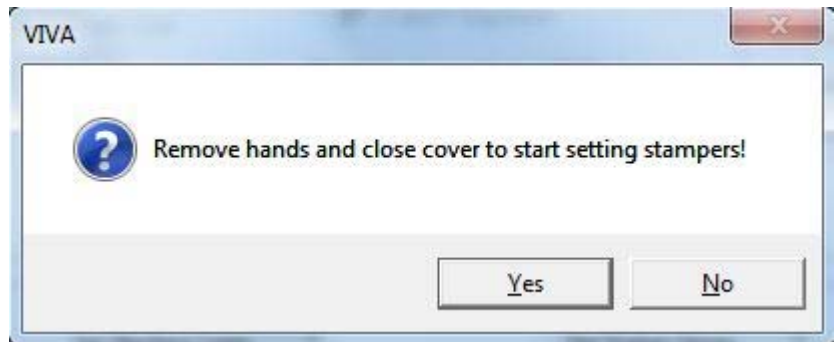



Fig. 4-14 PILOT H4 Setting the “Stamper” Calibration”

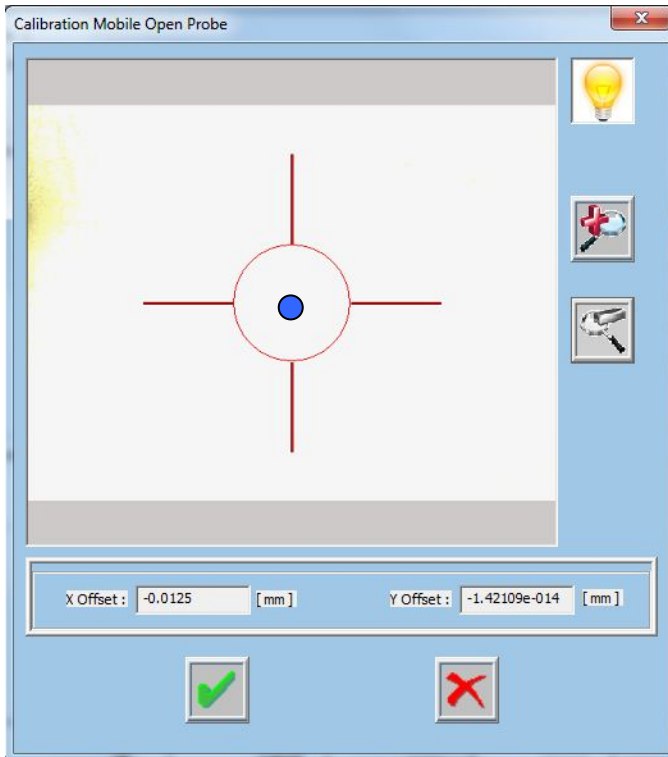
Follow the instructions and press **YES** to continue



Follow the instructions and press **YES** to continue




In the dialog displayed, press the button  to zoom out and enlarge the view to search the mark, if it is not displayed



Center the mark with the red circle using the

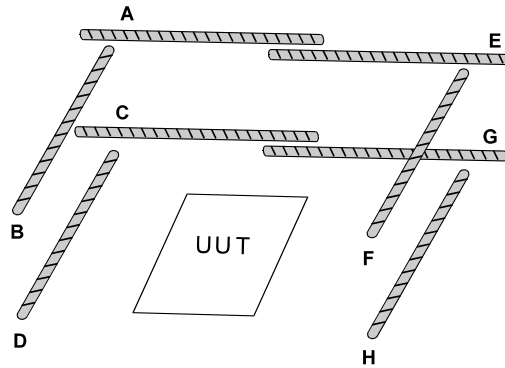
joystick or the arrow keys



Press  to save the new calibration

4.7 LUBRICATING THE BALL SCREWS

We recommend lubricating the ball screws with a small quantity of grease (for high speed movements) every 500-600 hours. Apply a little grease by hand, spreading it uniformly on the ball screws. The ball screws layout is shown in the figure below.





4.8 LUBRICATING THE PROBE GUIDE (X DIRECTION)

We recommend lubricating X probe guide with a small quantity of grease (for high speed movements) every 1000 hours. Apply a little grease by hand, spreading it uniformly on the guide. The Y probes guides don't need any lubrication.



5 APPENDIX

PILOT H4 system has been designed and manufactured in accordance with the main safety European requirements. Each system has got an identification label with a logo that certifies the compliance with these directives. The figure below shows an example of the abovementioned label.

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Series: PILOT Model: H4	
Voltage: 230V 2500VA 50Hz	Pressure 6 Atm. 600l/min.
S/N	

This sections provides instructions for the proper use of the HDU Recovery Utilities. Please, read carefully before you proceed.

5.1 USE THE HDU RECOVERY UTILITY

These instructions are valid solely to restore the HDU (Hard Disk Unit) to the factory settings. The recovery will irretrievably delete any data stored in the HDU, so any programme or information stored in the HDU after the date of creation of the recovery disk will be lost. It is recommended the user performs a backup copy of the data stored in the HDU periodically, using the dedicated tools, or to save data on external storage units (e.g. server o external disks).

The HDU allowed for recovery are the same as the factory configuration (same model and type). Before performing any HDU replacement on the PC, ensure the part is replaced with an equivalent part as OEM.

Seica S.p.A. declines any liability for data loss caused by the fault to comply with the instructions included in this section.


It is always recommended to make a backup copy of the Recovery DVD and store it in a safe place.

5.2 PC SETTINGS

Before performing the system recovery, configure your PC to bootstrap from CD/DVD. Refer to the instructions provided in the PC User Guide, included in the documentation provided.

5.3 RESTORING THE FACTORY CONFIGURATION

Restore the system to the factory configuration and settings using the **Bootable Image Archive DVD** system specific. Follow the instructions included in the "**Seagate DiscWizard™ User's Guide**" or "**Acronis® True Image WD Edition User's Guide**" included in the CD "User Guides for System Recovery".

 **WARNING – Always make sure the "Bootable Image Archive DVD" in use has been produced for the system you intend to restore; this information is reported on the DVD cover and identified with S/N (Serial Number) which shall correspond to the system serial number (see the label on the rear side of your Seica System)**



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