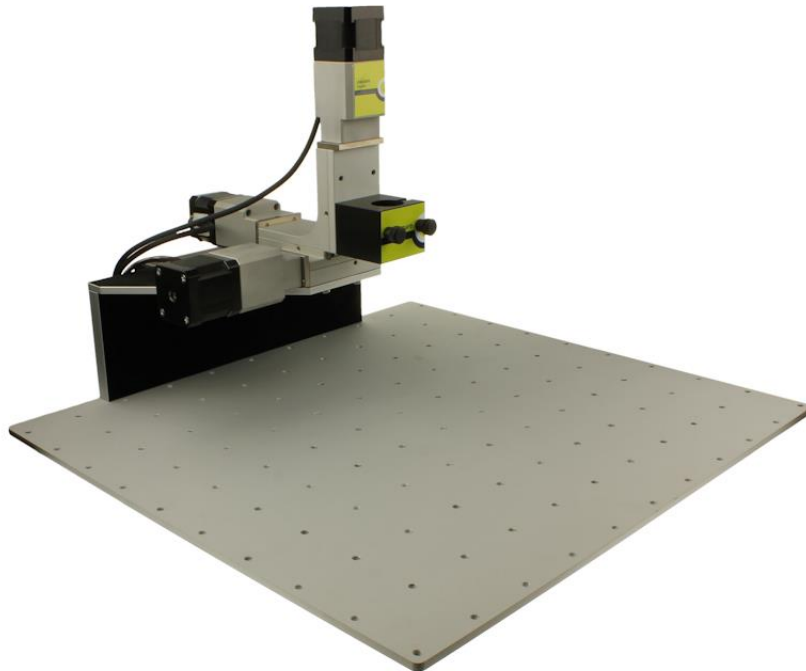


Probe Station

Quick Start Guide



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What is in the box

The box contains the Probe Station and all accessories to connect it to a computer and to fix targets.



Box content checklist

Quantity [1]	Description	Photo	Identifier [2]
1	Probe Station 4		
1	Set of fixing accessories: 4 x Adjuster Bracket Square 4 x Adjuster Bracket Round 1 x Adjuster Bracket Support 15 x Thumb Screw M5 x12 1 x Hexagonal Wrench M4		
1	Power supply: 1 x unit, 24 V DC, input 100 V - 240 V, AC 50 - 60 Hz 1 x power cable	 Country specific	PSU

Quantity [1]	Description	Photo	Identifier [2]
1	Communication cable:: USB-A – USB-B male		USB
	This “Probe Station- Quick Start Guide”		

[1] Quantity of items registered in the package

[2] Identifier used in references in this document.

What does it do

The Probe Station is a high precision probing workbench used in security evaluations. It is capable of moving a probe over the encapsulation of semiconductors chips and smart cards.

The Probe Station is used with the EM Probe or EMFI Probe to detect and perturb cryptography related hotspots in a target.

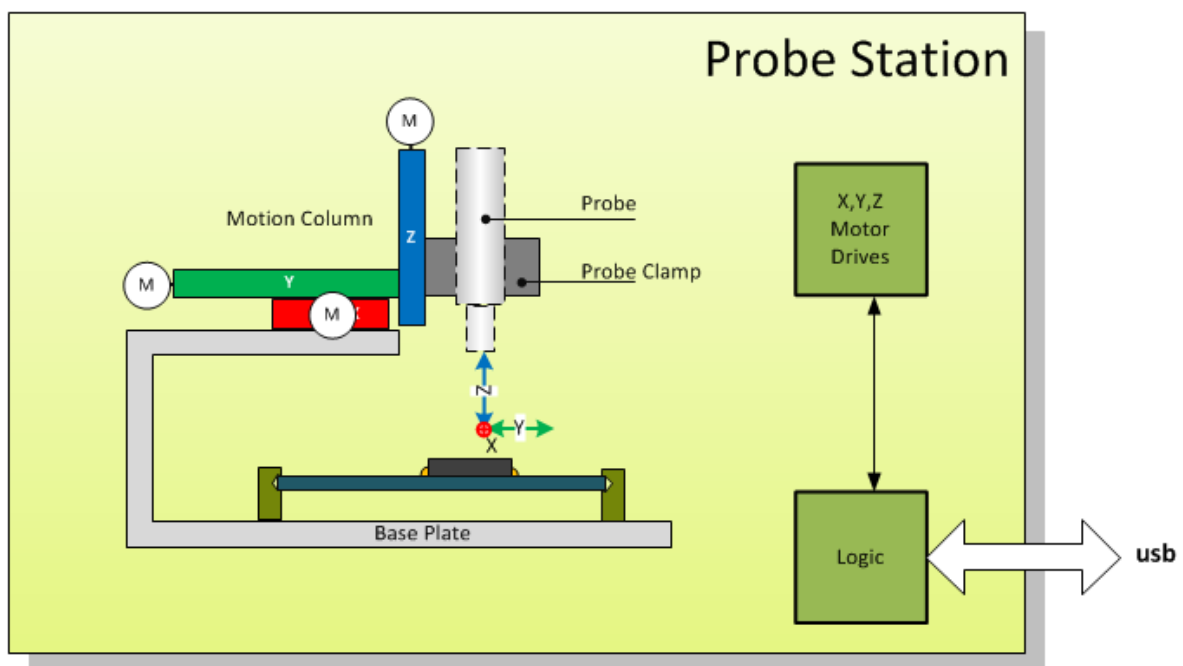


Figure 1 Functional overview of the Probe Station .

The Probe Station is an assembly of an XYZ-positioned column above a baseplate. The column has a socket to clamp cylindrical probes. The socket is replaceable to support other shaped probes.

The baseplate provides a grid of locations to fit mounting accessories. This enables a robust positioning of diverse shapes of printed circuit boards as well as Riscure product casings.

The Probe Station is normally controlled by the Inspector application.

How to build a setup

Upgrading a Probe Station 3 setup

The upgrade of a Probe Station 3 with the new baseplate requires unlocking of 6 assembly screws with an M4 hexagonal wrench. The screws are reused on the Probe Station 4 baseplate.

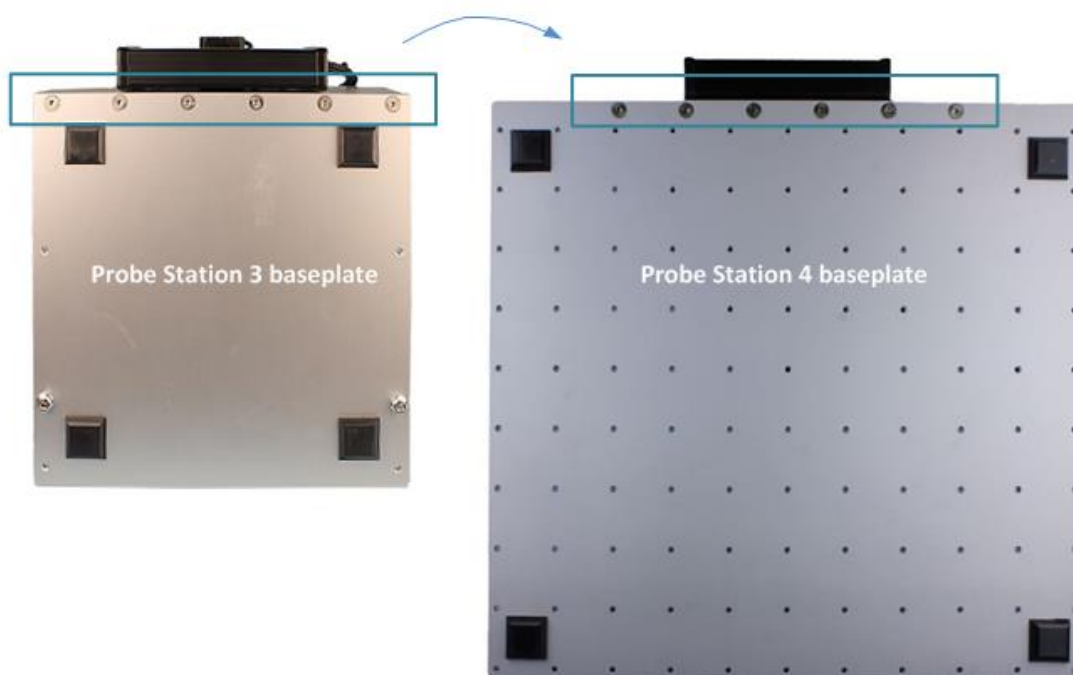


Figure 2 Location of assembly screws on baseplate bottom side.



DO NOT put the Probe Station upside down, to prevent the Z-axis motor carrying all the weight.



Position the baseplate over the edge of a table when (un)locking the screws.

Fixing a target on the baseplate

The Probe Station is supplied with three types of adjuster brackets to fix a target on the baseplate.

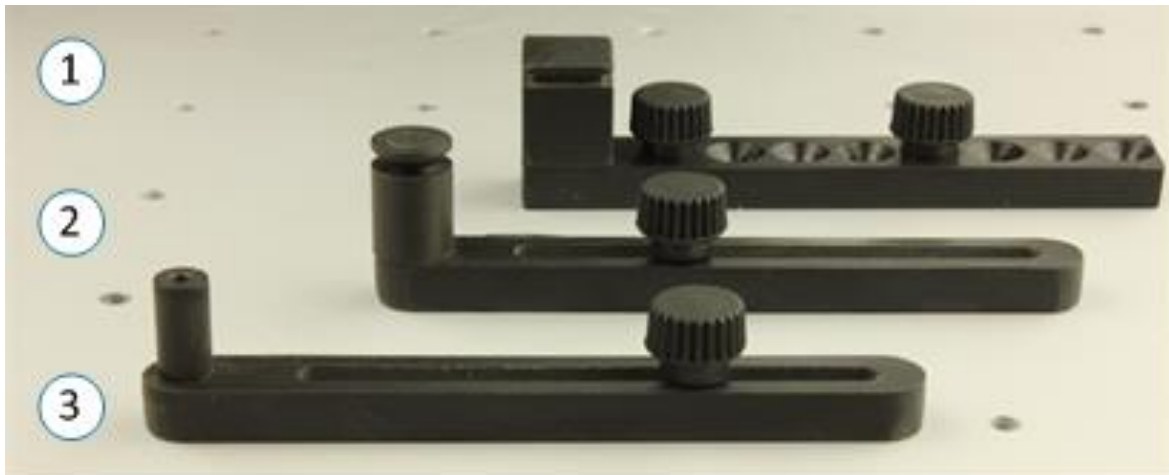


Figure 3 Adjuster brackets of type square (1), round (2) and support (3).



Figure 4 Close-up view on the usage of the different adjuster brackets.

To create a good fixture, do the following:

1. Use two (or three) square adjuster brackets to create a fixed reference corner, and fix each with two thumb screws.
2. Place the object against the reference corner.
3. Add remaining round adjuster brackets at opposite locations against the object, and fix each of them with thumb screws as required.

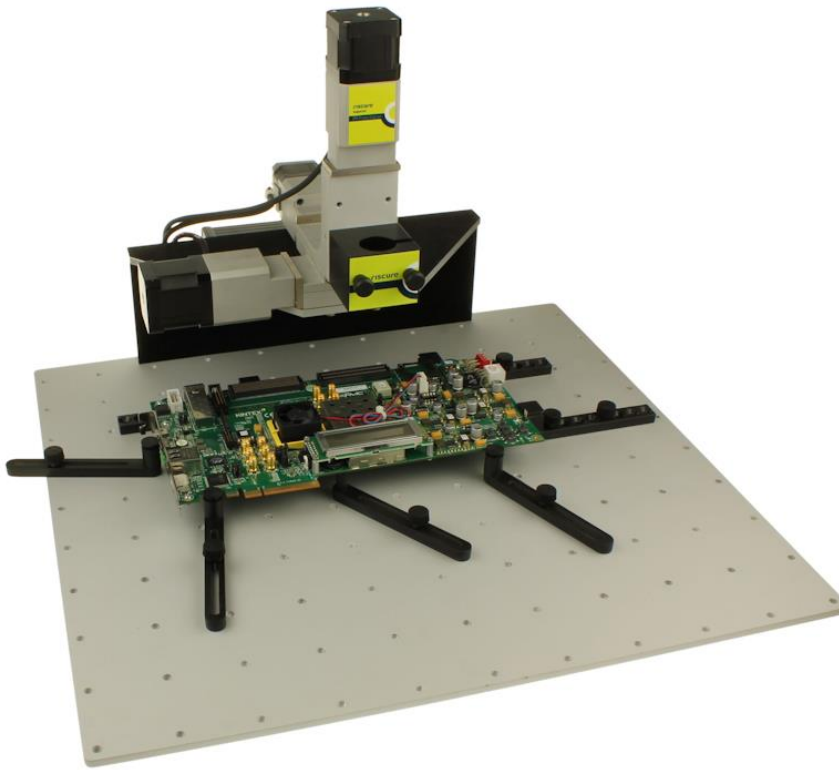


Figure 5 Example of fixing a printed circuit board.

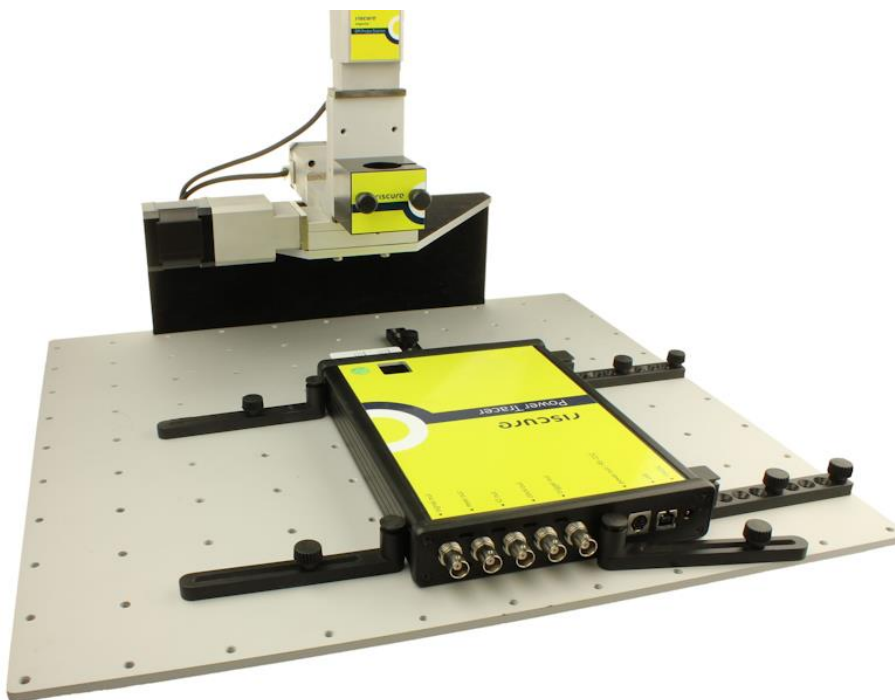


Figure 6 Example of fixing a Power Tracer.

Attaching the probe

The Probe Station has a clamp for attaching a cylindrical type of probe with an outer diameter of 25 mm. The EM Probe fits this probe clamp by default.

The EM-FI Transient Probe is too big for the probe clamp. It uses a clamp adapter fitted to its back panel which fits into the probe clamp.

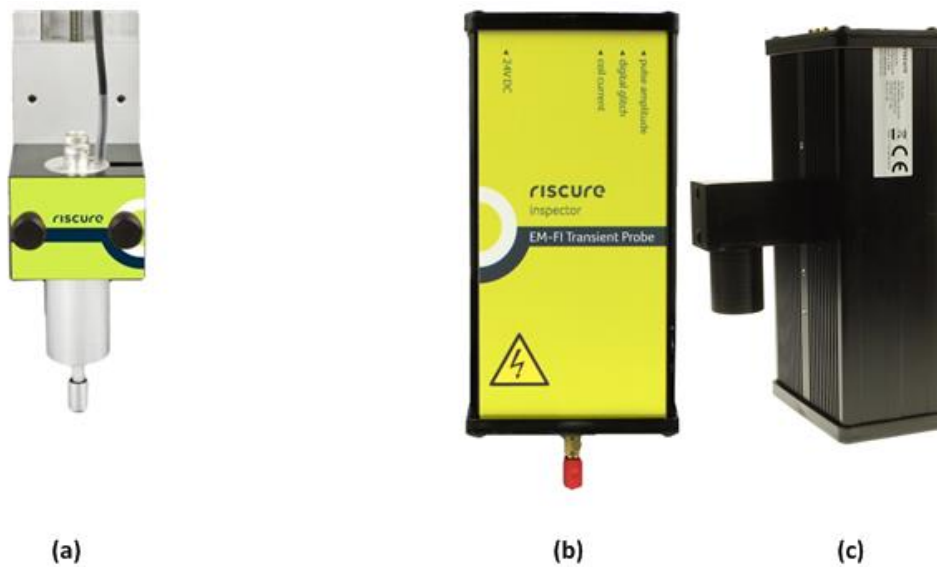


Figure 7 The EM Probe in the probe clamp (a), and the EM-FI Transient Probe (b) with the clamp adapter fitted (c).

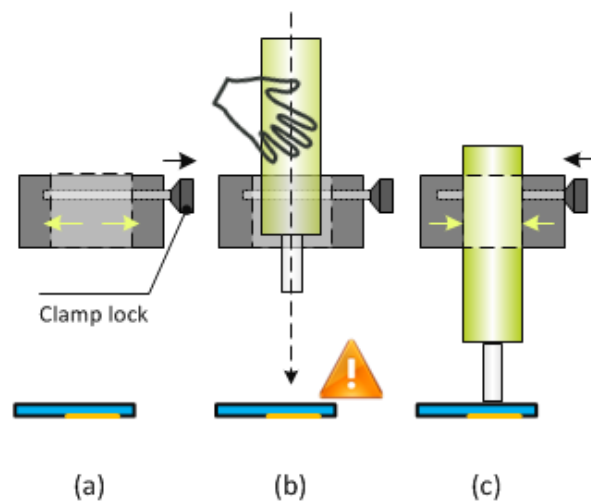


Figure 8 Close-up on fitting the probe into the probe clamp.

To safely insert the probe, do the following (Figure 8):

1. Unscrew the clamp lock (a) to open the probe clamp .
2. Insert the probe (or clamp adapter) into the clamp (b) and gently lower it until the probe tip makes contact with the target surface.
3. Screw the clamp lock (c) to tighten the probe in the clamp.

How to connect a setup

Preparation: Install the Inspector application on the computer.

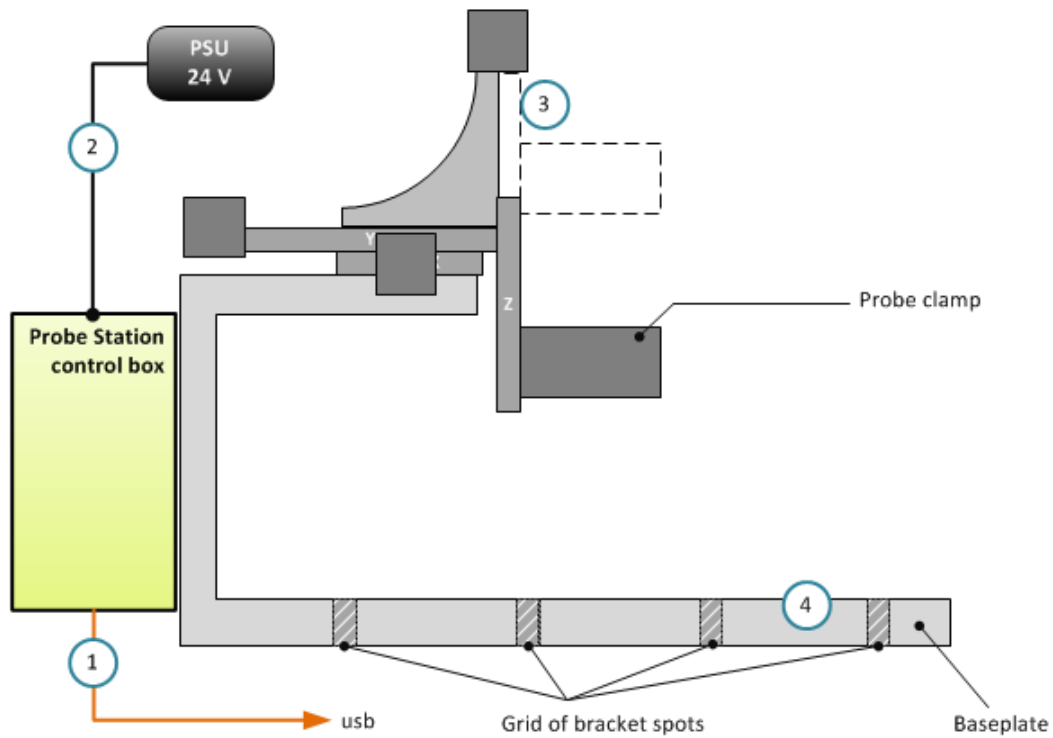


Figure 9 Numbered steps to build a setup.

Steps to install the driver (Windows).

1. Connect the Probe Station with the USB cable to the computer.
2. Connect the PSU to the Probe Station
3. Go to Device Manager and right click “Trinamic Stepper Device”
4. Click “Update Driver Software...”
5. Click “Browse my computer for driver software
6. Click “Let me pick from a list of device drivers on my computer
7. Scroll to “Ports(COM & LPT) select it and press the “next” button
Click on “Have Disk...” and browse to the TMCM-6110.inf file C:\Program Files (x86)\Inspector 4.*.*\hardware\EMPS\driver\ and press “ok”
8. The model is Trinamic TMCM-6110 ,Click “next”
9. An update Driver Warning will show up, Click “Yes”
10. Windows security will show up, Click “Install this driver software anyway”
11. The driver has now been installed ,Click “Close”
12. With Inspector, move the probe clamp into top position, to create free working space on the baseplate.
For information on moving the clamp, see page 13, “Is the Probe Station responding to commands?”
13. Fix the target object on the baseplate using the adjuster brackets.



The Device Manager will show the COM port number for the Trinamic Stepper Device. This COM port is needed for device registration with the Inspector hardware manager.



If the Probe Station is reconnected to a different USB port on the computer, it will be assigned a different COM port by Windows.

To prevent manual updating of the Inspector hardware manager registration, always connect the Probe Station to the same port.

How to verify your setup

Perform the following checks in order:

1. Is the Probe Station powered?
2. Is the Probe Station recognized by the computer?
3. Is the Probe Station responding to commands?

Please ensure that a check is successful, before proceeding to the next one. If not successful, refer to page 15 for solutions.

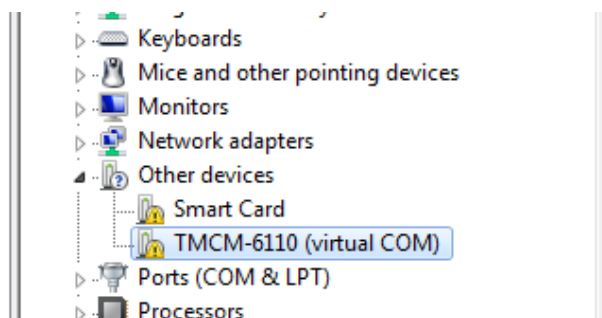
Is the Probe Station powered?

There are no visible signs to verify if the Probe Station is powered.

When powered, a faint but audible high pitch sound (about 2 kHz @ 40 dB) can be heard from the control box, produced by the motor drive electronics.

Is the Probe Station recognized?

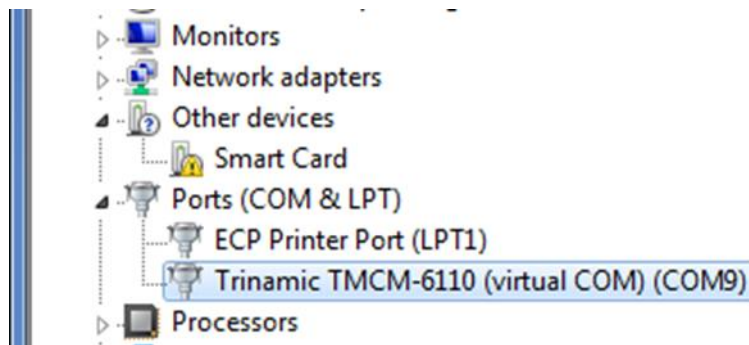
4. Open the Windows device manager.
5. If device 'TMCM-6110 (virtual COM)' is listed under **Other devices**, then the Probe Station is **not properly installed**.



For a solution, see page section “Steps to install the driver (Windows)”.

”.

6. If device 'Trinamic TMCM-6110 (virtual COM)' is listed under **Ports (COM & LPT)** devices, then the Probe Station is successfully recognized.



Is the Probe Station responding to commands?

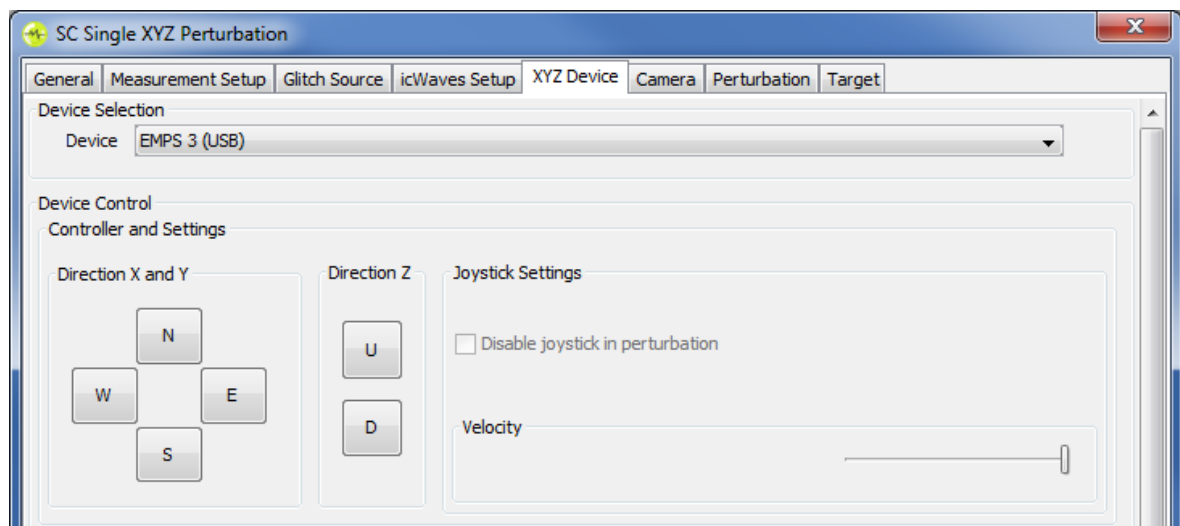
1. Open Inspector.
2. From the menu bar, go to **Perturbation >> Single XYZ >> Smartcard >> Protocol**.
3. In the dialog, select tab **XYZ Device**.
4. In Device Selection, from Device list, select **EMPS 3 (USB)**.



The label 'EMPS 3 (USB)' is a custom, user defined label.

If your Probe Station is not in the device list, you must register it first with the Inspector Hardware Manager. See page 15.

After selection of the device, the device controls will be enabled.



5. Set the Velocity slider to the right (maximum) value.



6. Press and hold the on-screen buttons N (North), E (East), S (South), W (West), U (Up) or D (Down). See Figure 10. This activates the different motors.

If the probe clamp can be moved in all directions, the Probe Station successfully responds to commands.

Help and troubleshooting

Common problems

Probe Station is not working. **CAUSE:** The Probe Station is not powered.

SOLUTION: Cable not connected, or PSU is not powered.

The column is not moving **CAUSE1:** The Probe Station is not powered.

SOLUTION1: Verify connection of the power cord and the PSU cable.

CAUSE2: The velocity slider is set to the minimum value.

SOLUTION2: Set the slider to a higher value.

Probe Station is not recognized by Inspector. **CAUSE:** The Probe Station USB drivers have not been registered successfully.

SOLUTION: Manually add the Probe Station USB drivers. Refer to page **Error! Bookmark not defined.** “**Error! Reference source not found.**”**Error! Bookmark not defined..**

Probe Station is moving erratically. **CAUSE:** By a power down of the computer with Inspector, the null-position has been lost.

SOLUTION: Use Inspector to recalibrate for the current state of Probe Station. (Refer to section Calibration).

Version differences

Version	
EM Probe Station 2	platform+column with RS232 control
EM Probe Station 3	platform+column with USB control
EM Probe Station 4	platform+column with USB control + enhanced baseplate

Storage and travel



Securing the Probe Station for travel.

If the Probe Station is going to be moved or packed up for travel, please move the column to the inward/blocked state on all axes to reduce the risk of damage when handled roughly.

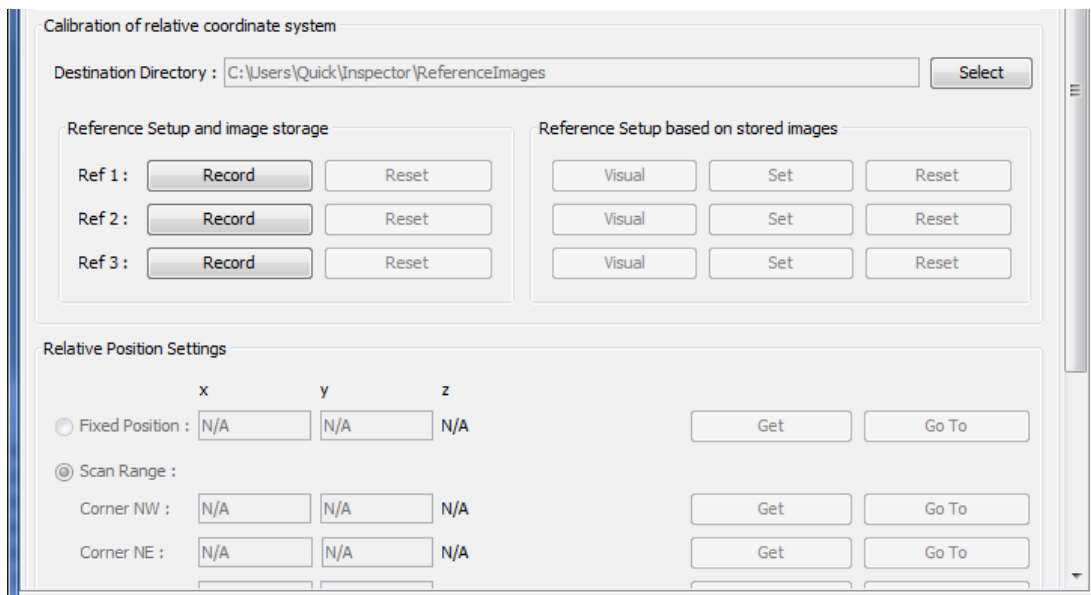
Calibration

After each power-on, the position sensors of Probe Station must be calibrated.

Calibrating means defining the parameters of a 3D plane which best describes the, possibly slanted, surface of the target.

1. Move and lower the probe tip onto a North-West corner using the XYZ control buttons.
2. Press button **Record** for Ref 1.
3. Repeat step 1 for two other corners for buttons Ref 2 and Ref 3.

Every position coordinates of the probe tip are now defined and displayed *relative* to this plane.



The reference points, when projected on the XY plane, define an area ranging from North West (X_{min}, Y_{min}) to South East (X_{max}, Y_{max}).

When executing a scan with Inspector, the probe will move along tracks from West to East (X-axis), and is stepped into South direction (Y-axis).

The probe height (Z) is automatically adapted to the calibration plane.

Device registration (Inspector)

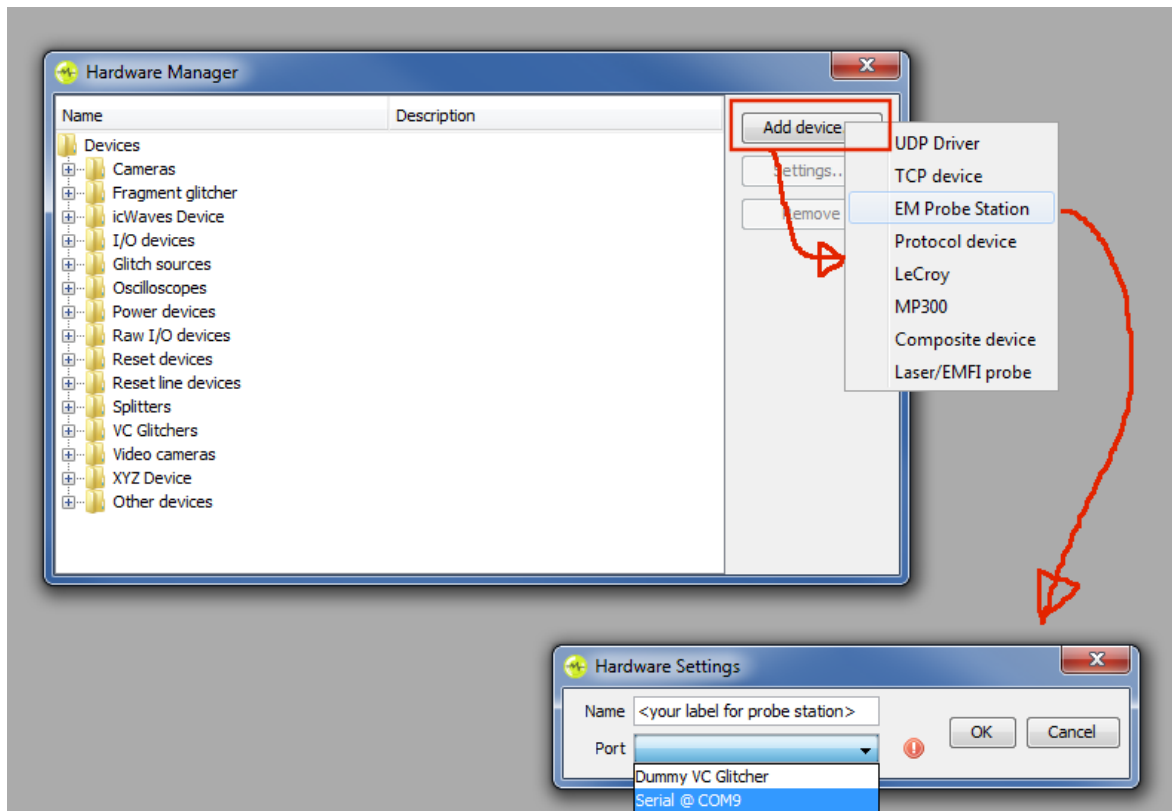
The Probe Station requires a user defined identification in Inspector.

1. Open Inspector
2. Go to menu item **Tools >> Hardware Manager**.
3. Press button **Add device** and select **EM Probe Station**.

4. Enter a Name, for example *EMPS 3 (USB)*.

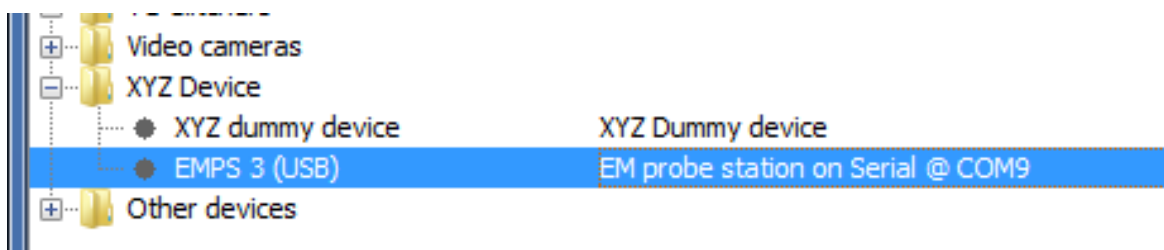
NOTE: A better naming structure uses the COM port x as assigned by Windows, for example “**EMPS @ COM9**”

5. From the Port-list, select the serial device with the correct COM-port assigned by the Windows Device Manager.



6. Press **Ok** to accept the values and close the dialog.

An entry will be added to group XYZ Device with the name just assigned.



Still have questions?

1. Go to the Inspector Help menu, and read detailed information on the Probe Station device.
2. Visit the Riscure Support Portal: <http://support.riscure.com>.

Technical specifications

Operational conditions

- Room temperature 20 .. 30 °C, (68 .. 86 °F), preferred.



Do not block the ventilation holes of the Probe Station. A blocked air flow may cause malfunction or break down.



Maintain a stable and identical environment in order to reliably repeat tests.



Turning OFF the Probe Station is not required but recommended when not used for an extended time.

Power supply input

- 24 V DC, nominal load 1.1 A.
- Center-positive plug, inner-Ø 2.5 mm, outer-Ø 5.5 mm.



Use of a PSU other than supplied by Riscure is not supported. Power spikes may cause internal damage and loss of accuracy.

Platform control

- Motion range X/Y/Z: 40 mm.
- Full range traversal time: 22 s @ max. velocity (min. step time).

Target fixture

- Fixation method: adjuster brackets, 3 types, thumb screws.
- Bracket spots: square grid, distance 46 mm, threaded holes M5.
- Baseplate: anodized aluminium 6 mm.

Probe fixture

- Probe clamp: cylindrical shape, diameter \varnothing 25 mm.

Product case

- Dimensions (incl. column) (W x D x H): 476 x 445 x 320 [mm].
- Clamp height above plate (H2) range: 85 ... 125 mm.

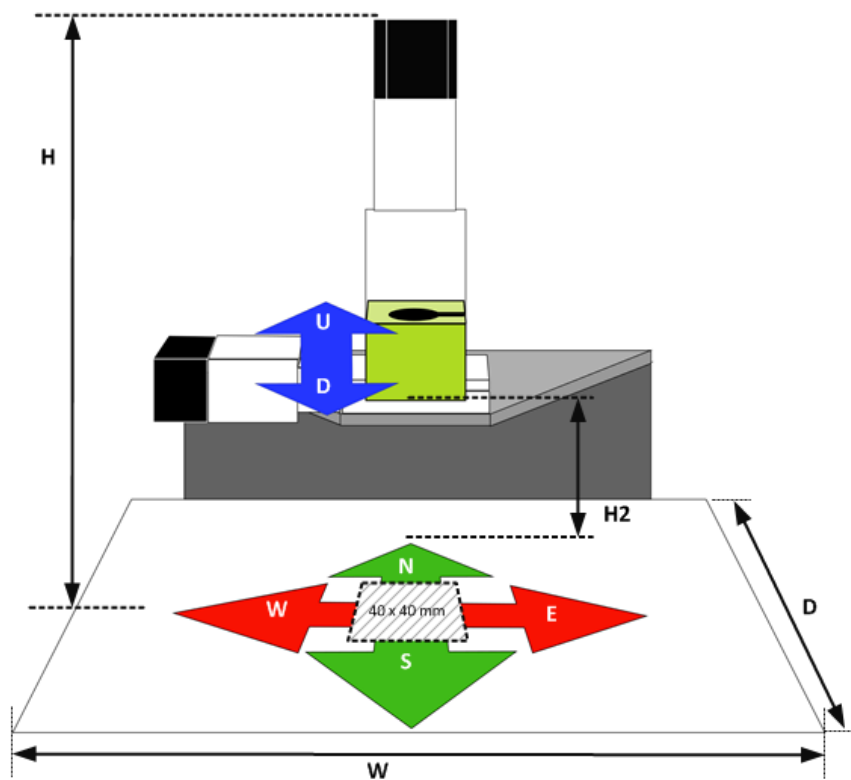


Figure 10 Main dimensions and control directions of the Probe Station.



Port	Label	Description
A1	usb	USB-B type port, USB 2.0. Communication link with a computer.
A2	24VDC	24 V DC Power supply input.
B1		Motor drive power lines for X, Y and Z motor.

Declaration of conformity

EC-DECLARATION OF CONFORMITY

Suppliers Details

Name

Riscure B.V.

Address

Frontier Building, Delftechpark 49, 2628 XJ Delft, The Netherlands

Product Details

Product Name

Inspector

Model Name(s)

EM Probe Station

Trade Name

Riscure

Applicable Standards Details

Directives:

- LVD (2006/95/EC) - EMC directive (2004/108/EC)

Standards:

- IEC 60825-1; IEC 320 C8; IEC 60950-1; 21 CFR 1040; ANSI/ESD S20.20:2007; BS EN 61340-5-1:2007; EN55022-B; EN61000-4-2, 4-5; CISPR 11; CISPR22-B; UL 1950

Supplementary Information

The appliance fulfils the relevant requirements of the EMC-directive and the LVD-directive according to our technical documentation TCD-EM Probe Station

Declaration

I hereby declare under our sole responsibility that the product(s) mentioned above to which this declaration relates complies with the above mentioned standards and Directives

Riscure B.V.
Frontier Building
Delftechpark 49
2628 XJ Delft
The Netherlands
Tel.nr.: +31 (0) 15 251 4090

Name	Issued Date
Dr.ir. F.G. de Beer / Technical Director	26 / 03 / 2015



Signature of representative