

# Advanced calibration sphere (ACS-1)





**WILLRICH PRECISION  
I N S T R U M E N T**  
*THINK MEASUREMENT... THINK WILLRICH*

Ph 866-945-5742 email:sales@willrich.com

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# Before you begin

## Warranty

Unless you and Renishaw have agreed and signed a separate written agreement, the equipment and/or software are sold subject to the Renishaw Standard Terms and Conditions supplied with such equipment and/or software, or available on request from your local Renishaw office.

Renishaw warrants its equipment and software for a limited period (as set out in the Standard Terms and Conditions), provided that they are installed and used exactly as defined in associated Renishaw documentation. You should consult these Standard Terms and Conditions to find out the full details of your warranty.

Equipment and/or software purchased by you from a third-party supplier is subject to separate terms and conditions supplied with such equipment and/or software. You should contact your third-party supplier for details.

## CNC machines

CNC machine tools must always be operated by fully trained personnel in accordance with the manufacturer's instructions.

## Care of the system

Keep system components clean and treat the unit as a precision tool.

## Patents

Features of the ACS-1 and features of similar Renishaw products, are the subject of one or more of the following patents and/or patent applications:

CN 2021/191589  
EP 2021/191589  
JP 2021/191589  
TW 202140194  
WO 2021/191589

## Intended use

The ACS-1 is used to accurately calibrate a Renishaw spindle probe, within a CNC machine tool. The stylus offset, size and probe length can be established.

The advantage of ACS-1 over a calibration sphere is an improved method of calibrating the probe length. Calibrating probe length on a standard sphere requires operator skill: the ACS-1 removes this element, leading to a more consistent and accurate result. An accurate probe length is particularly important on 5-axis machines, especially when the probe is used to fine tune the rotary axis pivot points, for example, using cycles such as Renishaw AxiSet™ Check-Up.

# Safety

## Information to the user

In all applications involving the use of machine tools, eye protection is recommended.

## Information to the machine supplier/installer

It is the machine supplier's responsibility to ensure that the user is made aware of any hazards involved in operation, including those mentioned in Renishaw product literature, and to ensure that adequate guards and safety interlocks are provided.

If the probe fails, the probe signal may falsely indicate a probe seated condition. Do not rely on probe signals to halt the movement of the machine.

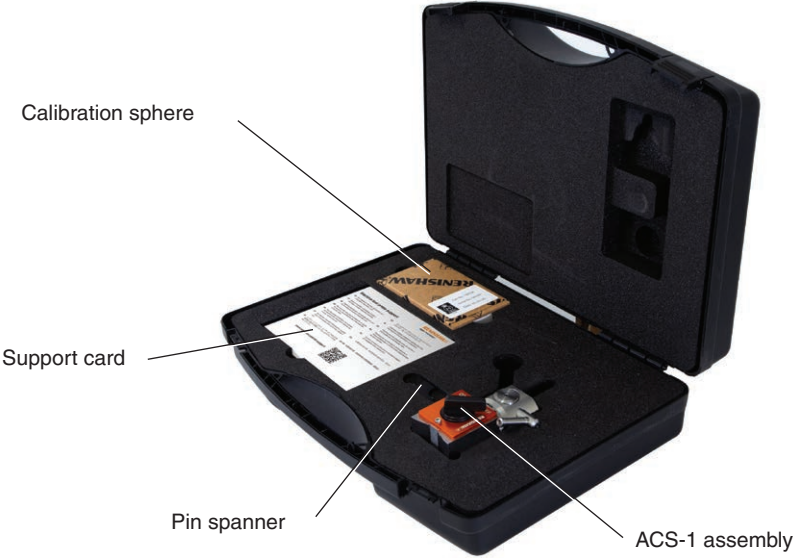
## Information to the equipment installer

All Renishaw equipment is designed to comply with the relevant UK, EU and FCC regulatory requirements. It is the responsibility of the equipment installer to ensure that the following guidelines are adhered to, in order for the product to function in accordance with these regulations:

- Any interface **MUST** be installed in a position away from any potential sources of electrical noise, (for example power transformers, servo drives).
- All 0 V/ground connections should be connected to the machine "star point" (the "star point" is a single point return for all equipment ground and screen cables). This is very important and failure to adhere to this can cause a potential difference between grounds.
- All screens must be connected as outlined in the user instructions.
- Cables must not be routed alongside high current sources (for example, motor power supply cables), or be near high-speed data lines.
- Cable lengths should always be kept to a minimum.

# ACS-1 basics

## ACS-1 components



Recommended parts for use with ACS-1 (images are examples only):



Typical spindle probe  
(Renishaw strongly recommends a RENGAGE™ strain gauge probe)



Test bar (tool of known length)

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# System installation

## Mounting the ACS-1

Fit the calibration sphere into the desired position on the ACS-1 using the pin spanner supplied.



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**CAUTION:** Ensure the working area is clear from swarf and debris when mounting the unit.

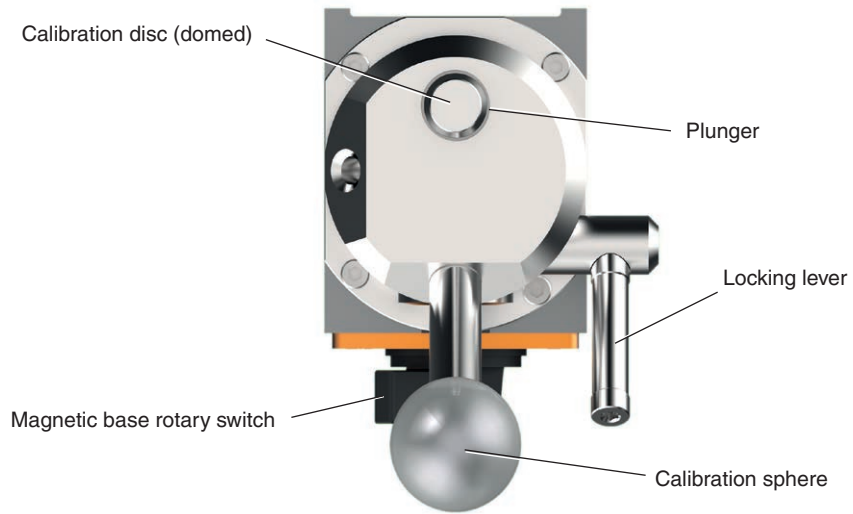
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Mount the ACS-1 to the CNC machine table or chuck and hold in place by moving the magnetic base rotary switch from OFF to ON.

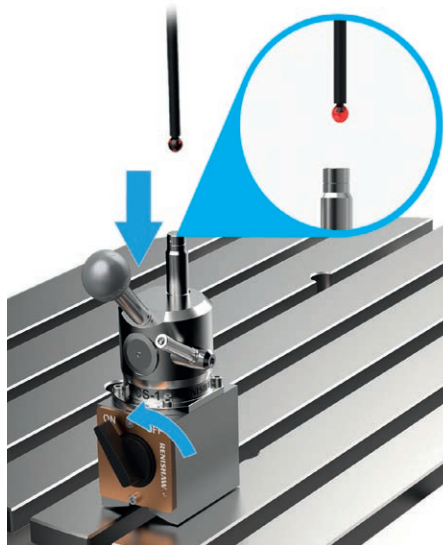
The following pages are an overview of the calibration process.

This may differ based on the CNC controller or the calibration cycles used.

Refer to your software programming guide for a detailed explanation.



Mount the ACS-1 on the machine table.



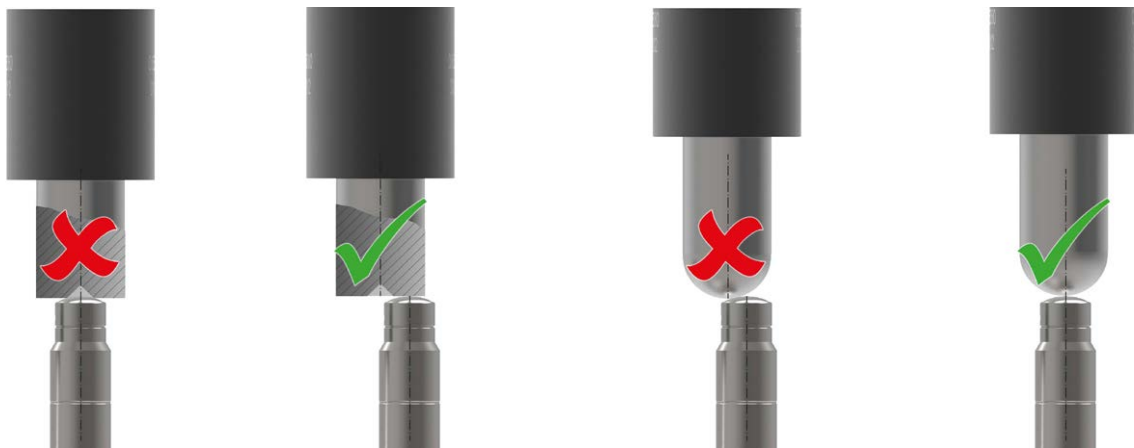
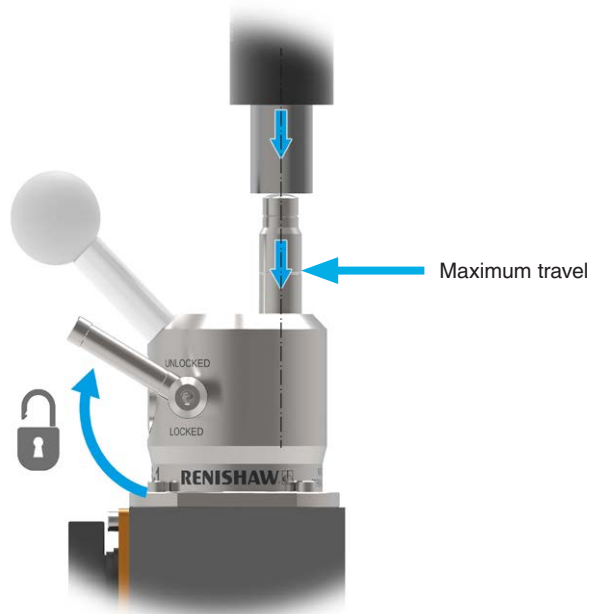
Mount the ACS-1 on the multi-tasking lathe.



# Calibrating the probe

## How to calibrate the probe using the ACS-1

1. With the ACS-1 in the unlocked state, position the test bar in X and Y and then depress the plunger (whilst considering the guidance below for different test bar types). Ensure not to exceed the maximum travel mark.



2. The lever can now be locked and a machine datum set in Z.

If the test bar is positioned accurately on centre, the X,Y datum can be set; otherwise refer to step 4.



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**CAUTION:** Once the plunger has been set in position using the locking lever, do not depress the plunger again until calibration has been completed and the locking lever has been released. The plunger provides 10 mm (0.39 in) of travel. Damage to the unit can occur beyond this point.

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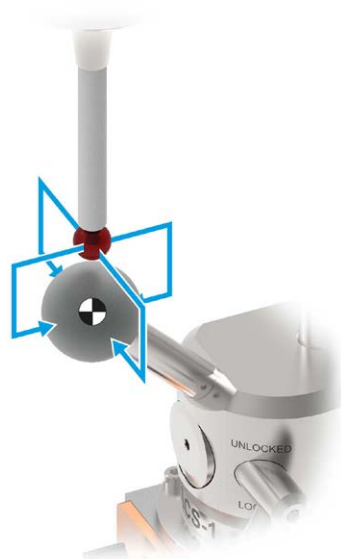
**NOTES:**

Because the calibration disc is domed the Z length calibration must be performed on centre.

For detailed calibration instructions when using Renishaw cycles, see the ACS-1 programming guide for your CNC model.

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3. Using the calibration sphere, set a datum and calibrate in X,Y.



4. Probe the calibration disc to accurately update X,Y datum. (Optional.)



5. Calibrate in Z.



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# Using ACS-1 in conjunction with Renishaw AxiSet™ Check-Up

The ACS-1 can be used in conjunction with the AxiSet Check-Up macro software. See the Advanced calibration sphere (ACS-1) and AxiSet Check-Up programming guides applicable to your machine tool controller.

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# Maintenance

The ACS-1 unit requires minimal maintenance and it has been designed to operate on all sizes of vertical and horizontal machining centres, multi-tasking machines and gantry machining centres.

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**CAUTION:** Keep the ACS-1 swarf free by brushing away any swarf residue that has accumulated.

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It is recommended that the ACS-1 is removed after use and before machining is commenced.

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# Parts list

Type	Part number	Description
ACS-1 (Metric)	A-6794-0200	ACS-1 advanced calibration sphere kit (25 mm sphere)
ACS-1 (Imperial)	A-6794-0210	ACS-1 advanced calibration sphere kit (1 inch sphere)
<b>Publications.</b> These can be downloaded from our website at <a href="http://www.renishaw.com">www.renishaw.com</a> .		
Data sheet	H-6794-8200	Data sheet: ACS-1 advanced calibration sphere

For details of the ACS-1 macro software kits and machine tool controller compatibility, refer to the *Probe software for machine tools - programs and features* data sheet (Renishaw part no. H-2000-2298) or visit [www.renishaw.com/machinetoolsoftware](http://www.renishaw.com/machinetoolsoftware).

[www.renishaw.com/acs-1](http://www.renishaw.com/acs-1)



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 **+44 (0) 01453 524524**  **UK@renishaw.com**

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