SP80 - ultra-high accuracy scanning probe

The SP80 is a passive scanning probe using digital scale and readheads which enable a system resolution of 0.02 µm (0.00000079 in). This gives exceptional scanning performance, even with long styli.

The SP80 can carry styli up to 800 mm (31.50 in) long and 500 g (17.64 oz) mass, including star configurations. Unbalanced star configurations do not require counterbalancing. Kinematic stylus holder changing allows for the repeatable re-location of the stylus, optimises stylus arrangements for each feature, and overcomes the need for re-qualification.

The SP80 has a kinematic mount that provides a repeatable connection to the mating plate mounted on the quill (KM80), allowing the probe to be easily removed.

Kinematic stylus holders provide crash protection in the XY plane, and a bump-stop prevents damage to the probe in the Z axis.

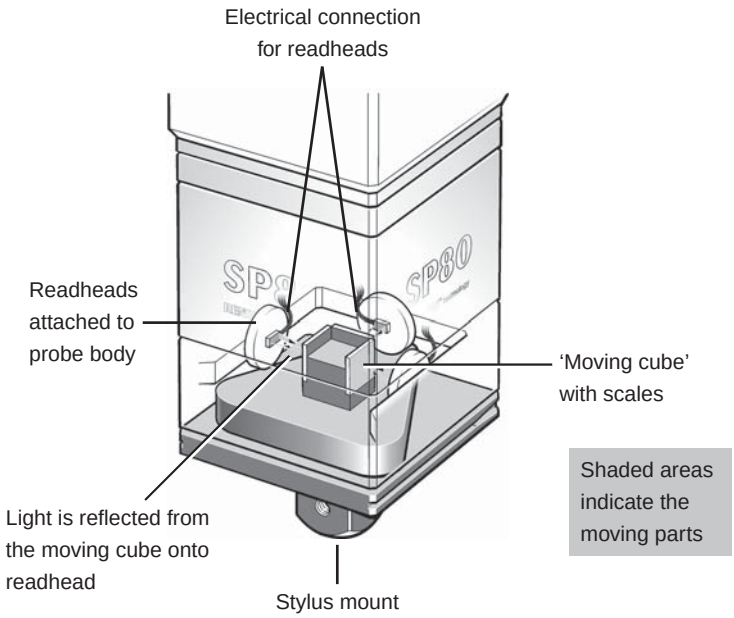
NOTE: Please see the accessories page 13-4 for details of adaptor plates PHA80 and PHA3 which permit rapid interchange between SP80 and PH10MQ indexing motorised head.

Isolated optical metrology system

Using an isolated optical metrology system, SP80 directly measures the deflection of the whole mechanism, thus providing outstandingly accurate position sensing.

The isolated optical metrology system can detect sources of variable error such as thermal and dynamic effects. In contrast, probes with displacement sensors mounted to stacked axes suffer from latency under changing inertial loads, and cannot detect thermal growth in their mechanisms.

The readheads for each axis are fixed to the body of the probe, and measure the deflection in each direction. Any inter-axis errors caused by the arc motion of each pair of parallel-acting springs are directly measured by the sensor system. Isolated optical metrology systems have no moving wire connections.



Isolated optical metrology

SP80 probe body

The sensor mechanism comprises an arrangement of three sets of parallel springs, one for each body axis, set in a cube - hence the body shape. The motion of the stylus is coupled to a 'moving cube' holding graduated reflective scales - again one for each axis. The readheads are mounted on the wall of the probe and the light projected from them is reflected from the moving scales. This method of motion detection does not require any form of moving wire connection.

Interface options

Interfacing the SP80 to a CMM can be achieved by:

- Using an SP80 daughtercard for direct UCC1 or **UCC*2*** integration
- Using a Renishaw PCI counter card (CC6) and the Renishaw interpolator unit IU80
- Using interface cards designed by the machine builder and used in conjunction with an IU80
- Using a counter card and interpolator unit designed by the machine builder

The IU80 conditions the probe signal to provide a digital industry standard EIA RS422 quadrature scale output, which can be accepted by CMM controllers.

Please contact Renishaw for full information on the methods detailed above.

KM80 quill mount

This is fixed to the quill and provides rapid and repeatable kinematic mounting of the SP80 body to the CMM.

SH80 stylus holder

The detachable stylus holder is located on the probe body using a repeatable kinematic joint and magnets. It provides automatic stylus changing capability and has an M5 stylus mount attachment. For additional flexibility, this may be rotated by adjusting a grub screw, and does not need to be removed from the probe body to make the adjustment.

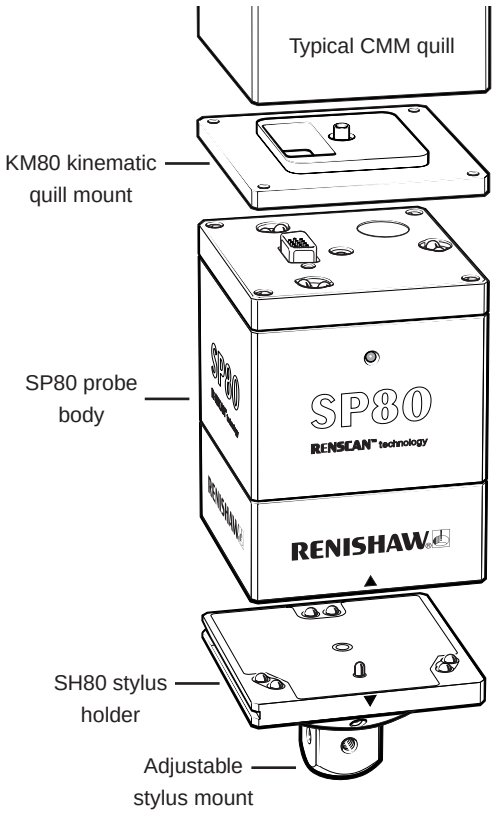
SCP80 stylus changing port

The SH80 stylus holder can be removed automatically and replaced on the probe body using an SCP80 mounted on a modular rack system (MRS). The SCP80 has a spring loaded mechanism which has been designed to ease the stylus holders away from the probe body. Using the SCP80, the SP80 pull-off force is reduced to less than 20 N.

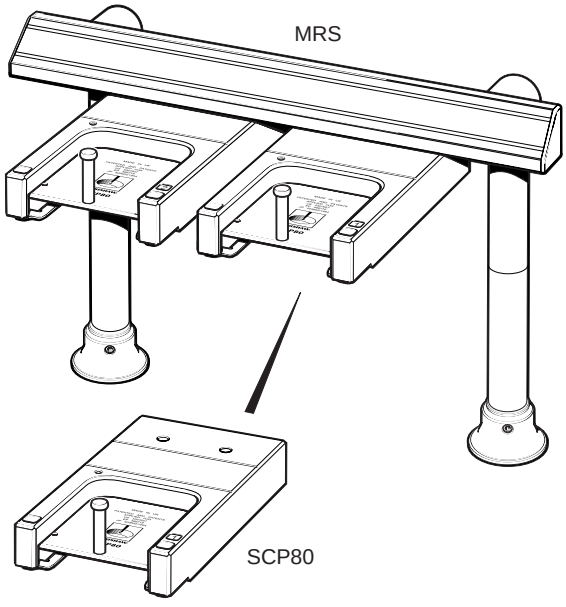
PHA3 and PHA80

The PHA3 and PHA80 adaptor plates enable rapid interchange between PH10MQ (using PHA3) and SP80 (using PHA80) on the same CMM.

SP80 probe kit

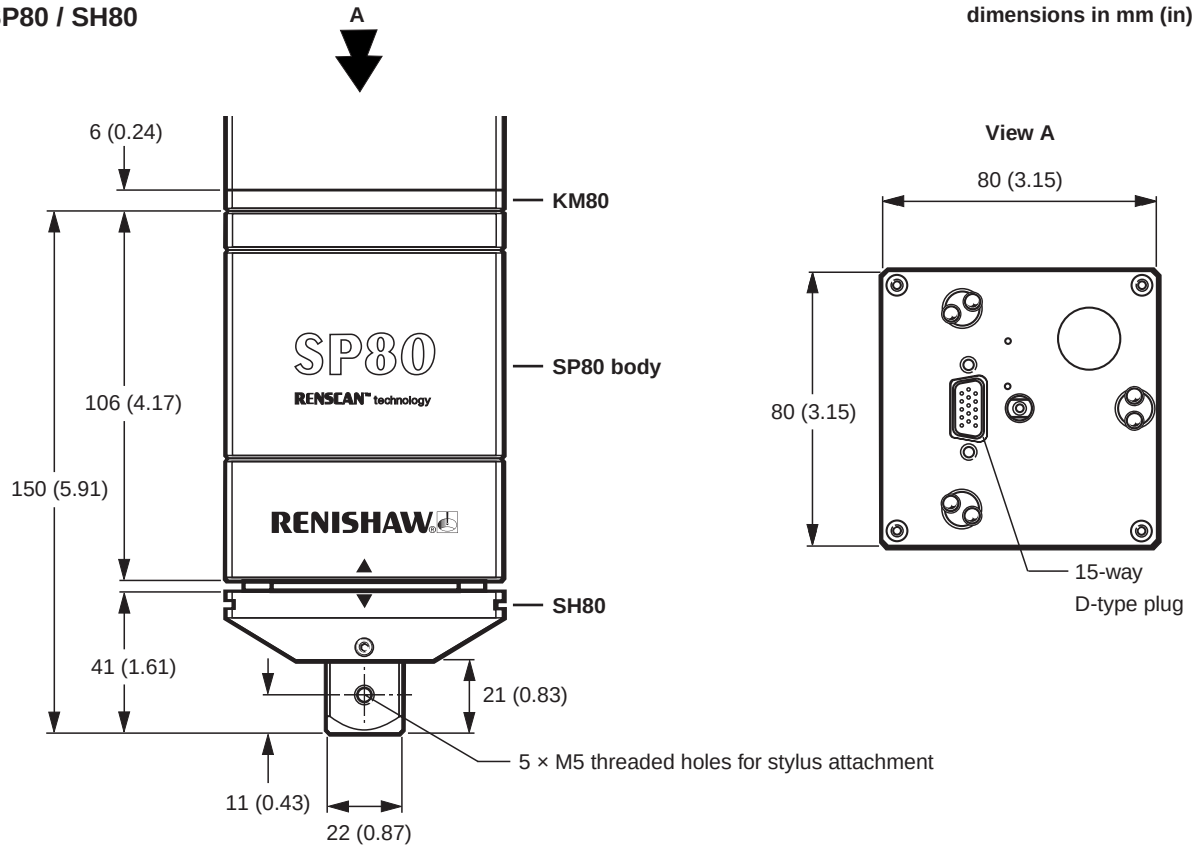


Two SCP80's mounted on an MRS

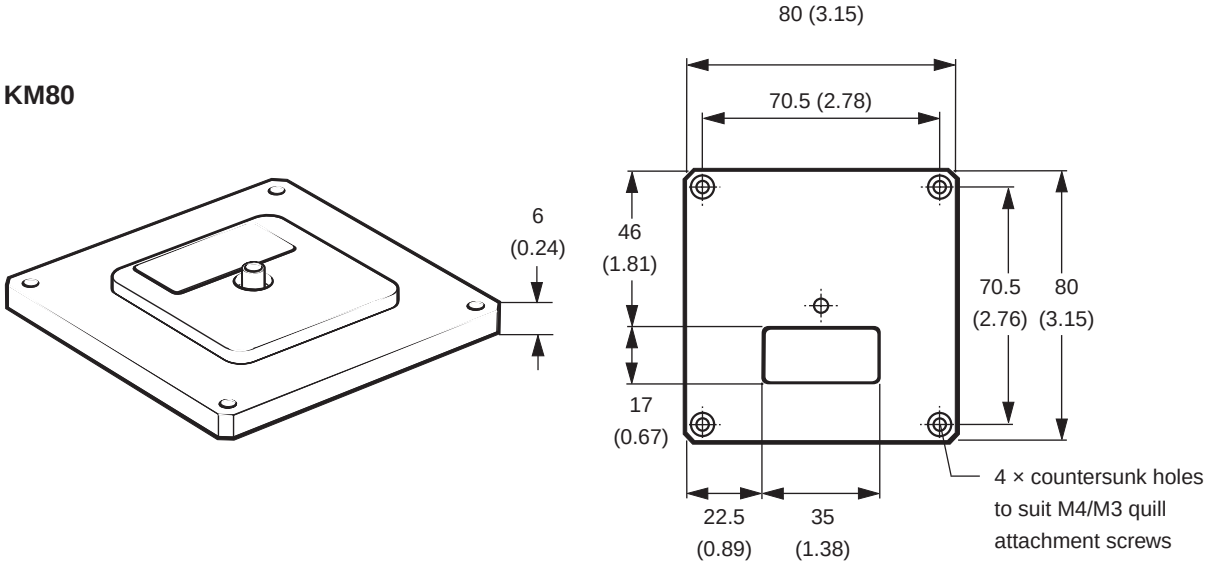


SP80 / SH80

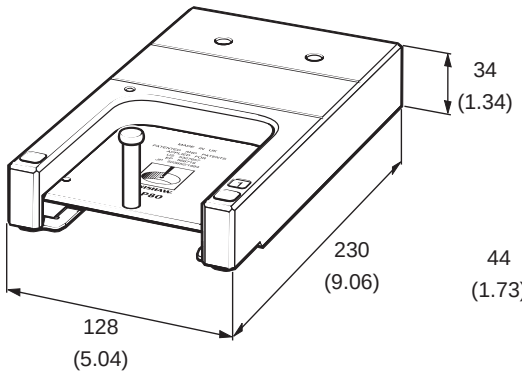
dimensions in mm (in)



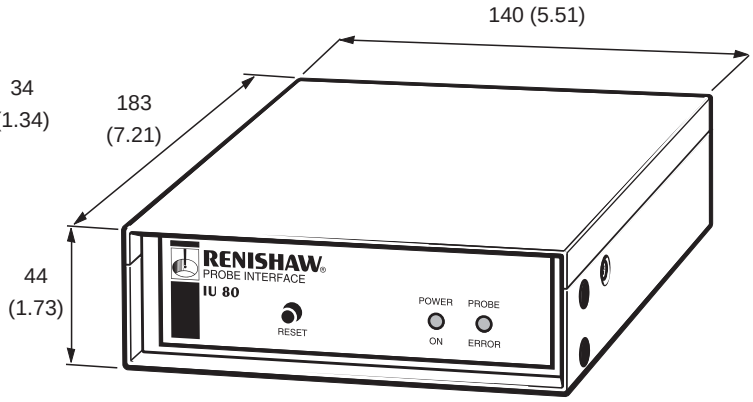
KM80



SCP80

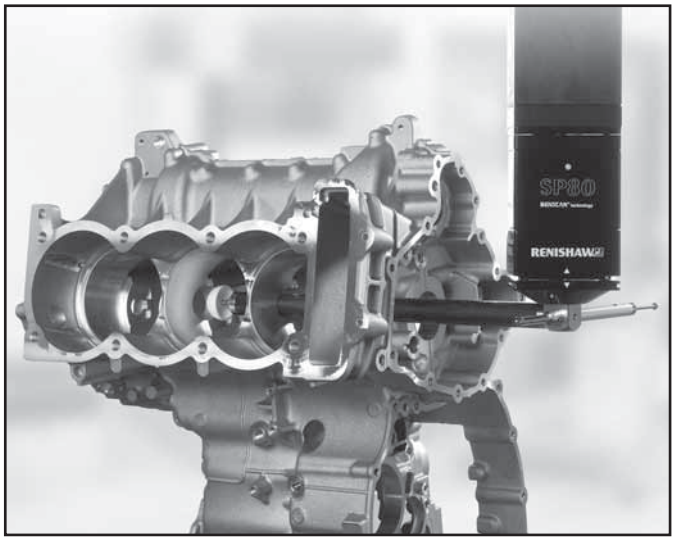


IU80



SP80 features and benefits:

- Ultra-high accuracy measurement, provided by digital scale and readheads
- Long styli carrying capability for access to deep features
- Isolated optical metrology for direct accurate measurement of stylus deflection
- Kinematic stylus changing for system flexibility
- Low inertia mechanism for excellent dynamic response
- Bump-stop crash protection in the Z axis, together with a detachable stylus holder for XY crash protection
- No motors, therefore improved thermal stability and reliability



Specification summary	SP80
PROBE ATTRIBUTES	Ultra-high accuracy scanning probe with 3-axis measurement (X, Y, Z)
ORIENTATION	Vertical
SIZE	80 mm (3.15 in) square body, 150 mm (5.91 in) long including stylus holder
QUILL MOUNTING	80 mm (3.15 in) kinematic quill mount (KM80) as standard Shank mount (SM80) and other custom made adaptor plates available - contact your nearest Renishaw supplier for details
MEASUREMENT RANGE	±2.50 mm (±0.10 in) X, Y, Z (3-axis measurement)
OVERTRAVEL RANGE	X and Y protected by a kinematic break-out joint on SH80 +Z has a mechanical 'bump-stop'
RESOLUTION OF SCALES	0.02 µm (0.0000007 in)
SPRING RATE	Approximately 1.8 N/mm (X, Y, Z)
WEIGHT	SP80: 860 g (30.34 oz) excluding mount and stylus holder SH80 stylus holder: 185 g (6.53 oz) KM80 quill mount: 110 g (3.88 oz)
PULL OFF FORCE OF MODULE	<20 N when using SCP80, otherwise approximately 80 N
PROBE POWER SUPPLY	+9 V to +18 V, maximum 300 mA dc
SYSTEM POWER SUPPLY (inc. IU80)	+5 V ±0.25 V @ 1 A maximum dc
SP80 PROBE OUTPUTS (X, Y, Z)	1.5 V ±0.25 V p-p. analogue quadrature signal (about 2.5 V ref.)
INTERFACING OPTIONS	The options are: • Using an SP80 daughtercard for direct UCC1 or **UCC*2*** integration • Using a Renishaw PCI counter card (CC6) and the Renishaw interpolator unit (IU80) • Using an interface card designed by the machine builder and used in conjunction with an IU80 • Using a counter card and interpolator unit designed by the machine builder
CHANGE RACK SYSTEM	SCP80 single port unit(s) mounted to the MRS