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SP25M - the world's most compact and versatile scanning system

The SP25 family range of applications



The SP25M is two sensors in one, and has unrivalled flexibility due to the system's modularity. Users can scan for form, position, and size but also take high accuracy discrete points by using a dedicated scanning module or, alternatively, use an adaptor to carry Renishaw's TP20 range of touch-trigger probe modules.

The SP25M's compact size and autojoint mounting makes it compatible with PH10M, PH10MQ and PH6M probe heads. It can also be mounted on an extension bar, providing excellent reach and access to part features.

Five scanning modules feature a pivoting design which delivers exceptional dynamic performance and optimised high accuracy performance over the entire stylus range from 20 to 400 mm effective working length (EWL). This avoids most of the performance loss seen in other scanning probes as stylus length increases.

A range of stylus holders (SH25-2A/3A/4A) is now available to offer improved crank/non-straight stylus carrying on the existing module range. For superior performance with crank/star/non-straight styli the use of the new SM25-5 module and SH25-5 stylus holder, based upon Renishaw's SP600 and SP80 scanning technology, is recommended.

Module and stylus changing is enabled using the FCR25 flexible change rack, which can be located either on the CMM bed, or in Renishaw's MRS modular rack system.

Key benefits

Excellent part accessibility
At just 25 mm (0.97 in) diameter, the SP25M is small and light, making it ideally suited to mounting on articulating heads and on extensions of up to 100 mm (3.94 in). Thus a total reach of some 600 mm (23.62 in) is possible. However, it is also sufficiently compact to suit very small CMMs and multi-sensor machines.

Modularity to allow unrivalled flexibility
The SP25M system allows the user to configure a basic installation which can be readily expanded at any time.

Two sensors in one - scanning and touch-trigger
SP25M allows the user to always select the most suitable measurement solution to match the application, either scanning or touch-trigger. Now you can efficiently do both with a single probe system!

Innovations

Isolated optical metrology
A pivoting mechanism and isolated optical metrology system directly measures each axis of probe deflection. This avoids errors generated in stacked measurement axes, as used in 'tower' scanning probes.

Five scanning modules provide optimal performance across a range of stylus lengths
Each scanning module has a spring rate and gain optimised for a range of stylus lengths. SP25M measures accurately with styli up to 400 mm (15.74 in) long.

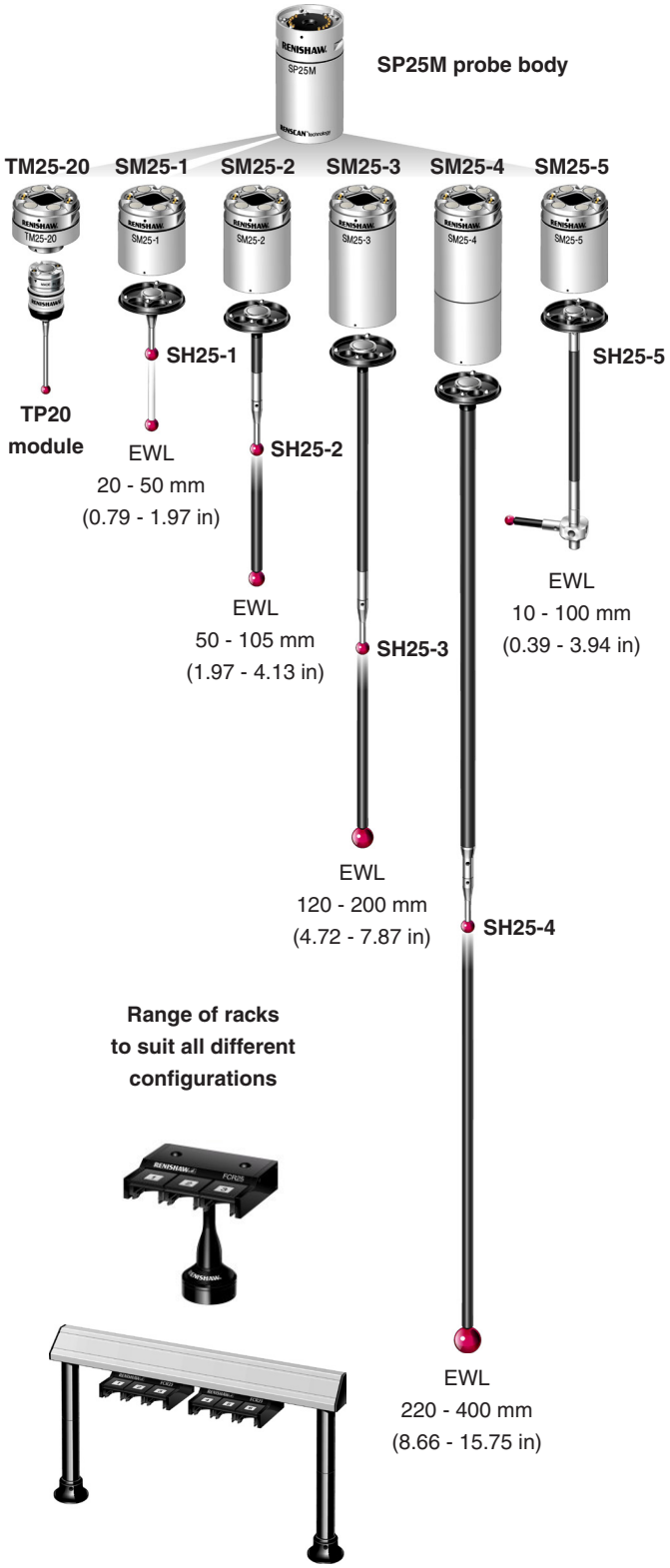
3rd order polynomial calibration
Renishaw has developed sophisticated calibration methods for its range of scanning probes to ensure maximised performance. SP25M uses the most advanced of these methods.

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Mounting	Renishaw's autojoint: PH10M, PH10MQ or PH6 heads and may be mounted on ≤100 mm autojoint extension bars
Probe dimensions	Ø25 mm (Ø0.98 in) x length dependent upon module used
Probe attributes	3 axis analogue measurement (X, Y, Z). Pivoting motion in XY plane with translation in Z.
SM25-5	Plane translation in all 3 axes XYZ
Measurement range	±0.5 mm (±0.02 in) deflection in all directions in all orientations
SM25-5	±0.3 mm
Overtravel range	±X, ±Y = 2.0 mm (0.08 in) +Z = 1.7 mm (0.07 in) -Z = 1.2 mm (0.05 in)
SM25-5	±X, ±Y = 0.95 mm (0.037 in) +Z = 1.0 mm (0.039 in) -Z = 1.1 mm (0.043 in)
Crash protection	X, Y, -Z via break-off of either module or stylus holder +Z via integral bump-stop design
Resolution	<0.1 µm (0.000004 in) with either UCC controller or AC3 interface card
Spring rate	~0.2 N/mm (with longest stylus) ~0.6 N/mm (with shortest stylus)
Damping	Single viscous fluid damper
SM25-5	Two viscous fluid dampers
Power supply	+12 V (±5%), -12 V (+10% / -8%), +5 V (+10% / +13%) DC at probe
Outputs (X, Y, Z)	Non-linear and non-orthogonal analogue outputs – rate, gain and resolution are not fixed
Probe calibration	SP25M requires a non-linear, third-order polynomial calibration method
Suitable styli	M3 range
Stylus length (EWL)	
SM25-1	20 - 50 mm (0.78 - 1.97 in) using 20 mm - 50 mm stylus
SM25-2	50 - 105 mm (1.97 - 4.11 in) using 20 mm - 75 mm stylus
SM25-3	120 - 200 mm (4.72 - 7.87 in) using 20 mm - 100 mm stylus
SM25-4	220 - 400 mm (8.66 - 15.75 in) using 20 mm - 200 mm stylus
SM25-5	10 - 100 mm (0.39 - 3.94 in) using 10 mm - 100 mm stylus
Interface options	Renishaw's UCC controllers or AC3 PC interface card for machines not fitted with the UCC controller



Additional information

A range of SP25M probe kits is available to suit your application - from entry-level kits for touch-trigger users, to full combination kits. A range of module kits are available to supplement the probe kits, allowing SP25M users to build up their probing capability over time.

Details of probe and module kits, module change racks and spare parts can be found at www.renishaw.com/SP25M.

For worldwide contact details, please visit our main website at www.renishaw.com/contact

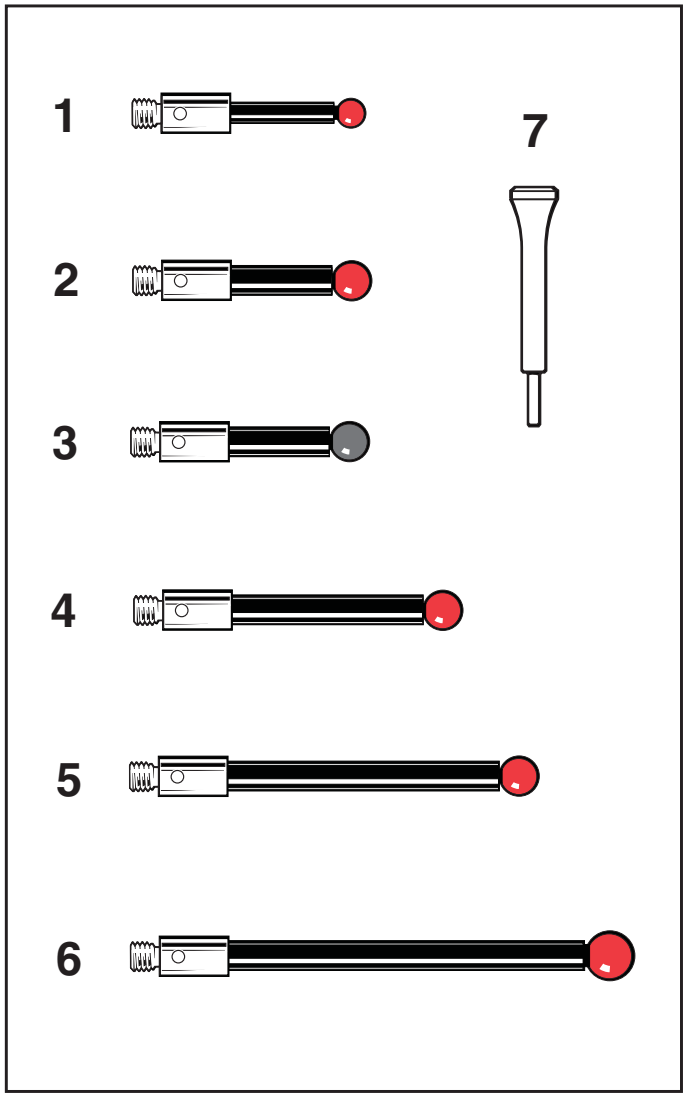
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A-5003-6151 M3 stylus kit for SP25M/SM25-1/SH25-1

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Position	Part number	Description
1	A-5003-5970	M3 STY D3R L21 EWL13.5 d2CF
2	A-5003-5971	M3 STY D4R L21 EWL13.5 d3CF
3	A-5003-5977	M3 STY D4SIN L21 EWL13.5 d3CF
4	A-5003-5972	M3 STY D4R L31 EWL23.5 d3CF
5	A-5003-5973	M3 STY D4R L40 EWL32.5 d3CF
6	A-5003-5974	M3 STY D5R L50 EWL42.5 d3CF
7	M-5000-3540	M2-M3 STYLUS TOOL

1. **Silicon Nitride** possesses many similar properties to ruby. It is a very hard and wear resistant ceramic which can be machined into very high precision spheres. It can also be polished to an extremely smooth surface finish

   Ruby (Al_2O_3) and aluminium are like materials and therefore have a natural attraction to each other. In extreme scanning applications this molecular attraction may cause 'adhesive wear' - the permanent transfer of the scanned aluminium surface to the ruby ball.

   Silicon nitride does not have the attraction and so, in similar extreme applications, does not exhibit the 'adhesive wear' seen with ruby.

   Silicon Nitride does, however, show significant 'abrasive wear' charateristics when scanning on steel surfaces, so its applications are best confined to aluminium.

2. **Extensions.** In order not to damage either the probe or an extension, we recommend that you hold the extension with its tightening tool whilst adding the stylus.

3. **Ball grade.** To ensure the accuracy of your measurements, we specify Grade 5 (DIN-5401, ISO 3290 and ABMA 3290) balls with a sphericity of 0.13 µm (0.000005 in) as standard.

1. Die Eigenschaften von **Siliciumnitrid** sind vergleichbar mit denen des Rubins. Siliciumnitrid ist ein sehr hartes und äußerst verschleißfestes Keramikmaterial, das sich zu perfekten Kugeln formen lässt. Seine Oberfläche lässt sich extrem glatt polieren.

   Rubin (Al_2O_3) und Aluminium sind ähnliche Werkstoffe und ziehen sich gegenseitig an. Bei extremen Scanning-Anwendungen kann diese molekulare Anziehungskraft ‚adhesive wear' (Abnutzung durch Anhaften) verursachen – eine permanente Ablagerung der gescannten Aluminiumfläche auf der Rubinkugel.

   Siliciumnitrid verfügt nicht über diese Anziehungskraft und weist daher nicht den Verschleißeffekt von Rubinkugeln bei derartigen extremen Anwendungen auf.

   Siliciumnitrid weist allerdings einen bedeutenden Abrasionseffekt beim Scanning von Stahloberflächen auf, sodass der Anwendungsbereich dieses Materials auf Aluminium beschränkt bleiben sollte.

2. **Verlängerungen.** Um weder den Messtaster noch die Verlängerung zu beschädigen empfehlen wir, daß Sie bei der Montage des Tastereinsatzes die Verlängerung mit seinem Anziehwerkzeug festhalten.

3. **Güteklasse der Kugel.** Um die Genauigkeit Ihrer Messungen zu gewährleisten, geben wir Kugeln der Güteklasse 5 (DIN-5401, ISO 3290 und ABMA 3290) mit einer Formgenauigkeit von 0,13 µm als Standard an.

1. **窒化珪素：** ルビーに類似した多くの特性を有します。 非常に硬く、磨耗に強いセラミック材で、真球度の高い球体に加工することが可能です。 また、非常に滑らかな表面に研磨することができます。

   ルビー(Al_2O_3)とアルミニウムは似たような材質であることから、お互いを引き付けあう力があります。過酷な条件のスキャニングでは、この分子同士が引き付けあう力により、「凝着磨耗」という、スキャンしているワーク表面のアルミニウム材がルビー球に付着する現象が起こります。

   窒化珪素はアルミニウムに引き寄せられないため、このような条件のスキャニングでもルビーのような「凝着磨耗」を起こしません。

   しかし、スチール面に対して窒化珪素を使用した場合、磨耗が顕著となるため、窒化珪素の使用はアルミニウムに限定することをお勧めします。

2. **エクステンション:** スタイラスを追加する場合、プローブやエクステンションの損傷を避けるため、エクステンションを締め付けツールで保持してください。

3. **球グレード:** レニショーでは計測精度を保証するため、真球度0.13 µm (0.000005")のグレード5(DIN-5401 ISO 3290 ABMA 3290) 球を標準仕様に定めています。

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