

Probe changing systems



Free Renishaw changer racks offer from your CMM supplier



Optimise speed and accuracy

Fast, repeatable, automatic probe exchange



Increase reach and flexibility

Configure your extension bar and probe combinations to suit your needs



Change racks and manual storage systems



Change racks and manual storage systems

Renishaw has a comprehensive range of versatile change racks and manual storage systems for your CMM.

The range of features and components that must be measured means that manufacturers need a flexible measuring solution. A single sensor and stylus configuration will not be sufficient in most cases.



Is it best to change sensors, or should you change styli?

Stylus and module changing

Unless you are measuring a simple component, you will need to change your stylus configuration to suit different measurement tasks. This can be done manually using a threaded connection and requires requalification, but probe systems such as TP20 are now available with a repeatable, automated means to switch styli. This means reduced cycle times can be achieved by fast stylus changing without requalification. Probe and stylus performance is also optimised by using specialised probe modules.



This greatly increases your flexibility by allowing you to access features that demand long or complex styli, as well as using different tips (sphere, disc, cylinder). This can be achieved with automated stylus changing, reducing operator intervention, increasing accuracy by using optimised styli and increasing measurement throughput.

Probe autochange systems

A scanning sensor is the most flexible sensor you can fit to your machine, since it can perform both discrete point measurement as well as scanning. However, it is not the optimum sensor for more specialised tasks like measurement of soft materials where possibly a non-contact sensor would be better.



One sensor may not be suitable for all your measurement needs. If the range of features and parts that you measure demands a range of sensors, then a sensor changing system is essential.

Sensor changing requires a repeatable, automated joint between the probe head or CMM quill and the probes that you want to use. You will also need to store sensors that are not in use.

In brief:

MCR20 - change rack for TP20 stylus modules.

SCR200 - change rack for TP200 stylus modules.

FCR25 - three port change rack unit for SP25M probe elements.

ACR3 (half price) -- autochange rack with four ports for changing autojoint mount probes / extensions.

Why change sensors?

Probe sensor changing

Not all parts can be measured with one sensor!

If the range of features that you measure demands a range of sensors, then a sensor changing system is essential.

Scanning probes

- Ideal for features with functional fits where form is important.
- Digitising contoured surfaces.

Touch-trigger probes

- Ideal for discrete point inspection, for size and position control.
- Compact for easy access to deep features.

Optical probes

- Ideal for pliable surfaces.
- Inspection of flat components such as printed circuit boards.

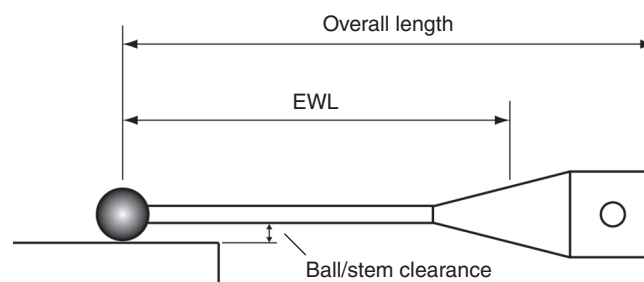
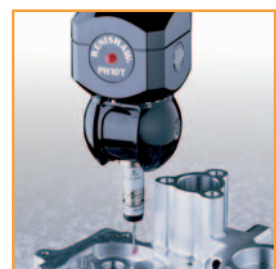


Stylus changing

Many probe systems now feature a repeatable stylus module changer. Automated stylus changing allows a whole part to be measured with a single CMM programme. Benefits include access to features that demand long or complex styli, different tips (sphere, disc, cylinder) needed for special features, reduced operator intervention and increased throughput.

Optimise your measurement repeatability for each feature by selecting a stylus with:

- Minimum length - longer styli degrade repeatability
- Maximum stiffness
- Minimum joints
- Maximum ball size - maximise the effective working length (EWL)

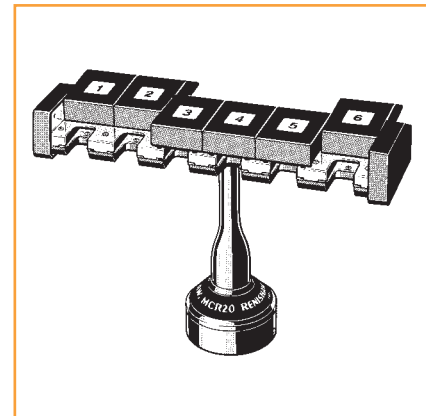


Change racks and manual storage systems

MCR20 module changing rack

The MCR20 probe module change rack is designed to securely store the range of TP20 stylus modules ready for rapid automatic changing, whilst protecting mating surfaces from any airborne contaminants within the working environment.

During the automatic changing of probe modules, limited crash protection is provided by hinged overtravel mechanisms incorporated within both the base and the docking port assembly of the MCR20. Provided any collision occurs in the direction of overtravel, the hinged overtravel mechanisms can be manually reset and it should not normally be necessary to re datum the rack.



SCR200 stylus changing rack

The SCR200 provides rapid, automatic changing of TP200 stylus modules without the need to requalify stylus tips. The SCR200 is powered entirely by the PI 200 and provides features to facilitate safe stylus changing.

The rack is provided with an overtravel mechanism to reduce the possibility of damage should a collision occur. When the mechanism is deflected, signals are transmitted to the CMM controller to stop the CMM motion. The overtravel mechanism is self-resetting. After a collision, the rack should return to its normal operating position and should not require re-datuming.



Change racks and manual storage systems

FCR25 flexible change rack

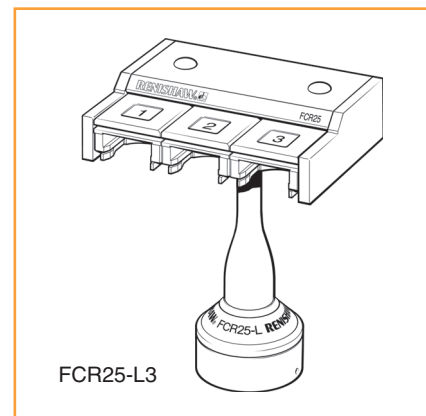
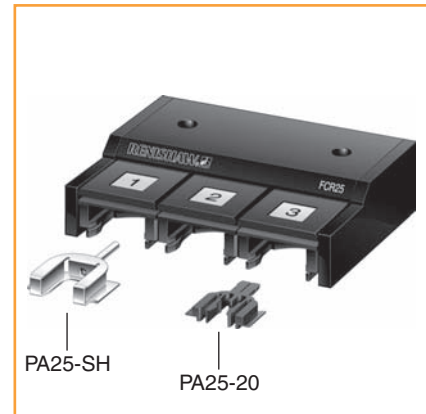
The full potential of the SP25M scanning probe system is realised when the measurement routine is automated using the FCR25 flexible change rack, a passive triple-port unit capable of storing any of the system elements.

The FCR25 port stores the SM25-1/-2/-3/-4 and TM25-20 modules, but can easily be configured to store the SH25-1/-2/-3/-4 stylus holders or TP20 modules by using the appropriate port adaptor insert:

- PA25-SH (for SH25-1/-2/-3/-4)
- PA25-20 (for TP20 modules).

The FCR25 mounts directly on Renishaw's MRS modular rack system for multiple port solutions (3, 6, 9, 12, 15 etc.).

Alternatively, there are the FCR25-L3 (3 port) and FCR25-L6 (6 port) stand-alone rack variants that are ideal where machine space is limited.



Change racks and manual storage systems

ACR3 autochange rack

Renishaw's ACR3 autochange rack is a passive, 4-port probe changing system. It is fitted to Renishaw's modular rack system (MRS) which has been designed to provide a platform for Renishaw's latest range of stylus and probe changing racks.

The ACR3 uses the motion of the CMM to lock/unlock the autojoint between the probe head and the probe/extension. ACR3 is therefore a passive mechanical design without the need for rack motors or electrical interfacing.

Integration with the metrology software is required (please consult your machine supplier for details).

All Renishaw probes and extension bars fitted with the autojoint can be carried. Some third party probes that incorporate the Renishaw autojoint can also be used with ACR3. (Please consult your machine supplier for details).

For additional flexibility, two four-port units can be linked to provide an eight-port system.

The total swept volume along the MRS during a change cycle is:

1 × ACR3 275 mm (10.83 in)

2 × ACR3s linked 460 mm (18.11 in)

The extruded rail of the MRS is available in different lengths 400 mm/600 mm/1000 mm (15.8 in/23.6 in/39.4 in) to suit the number and combination of changer requirements. In addition the height of the MRS can easily be upgraded after installation allowing further flexibility to meet application needs.



TP20 module changing

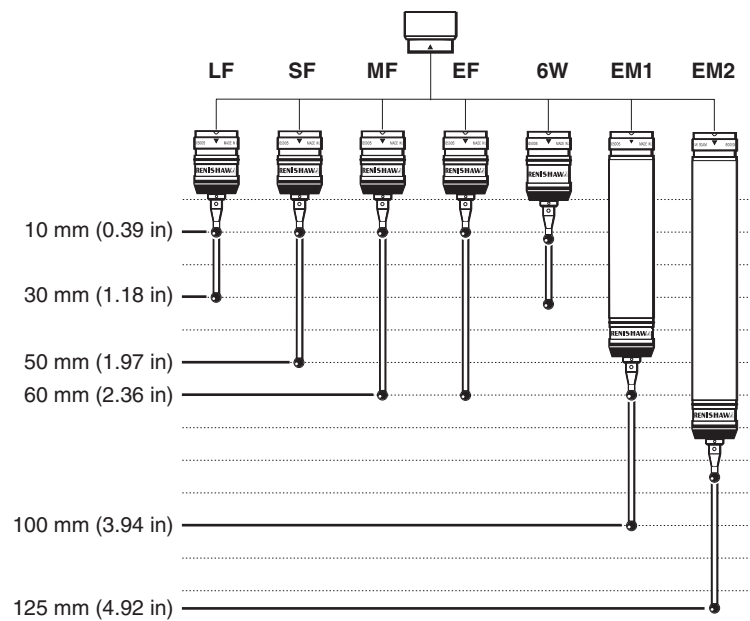
TP20 stylus module

The TP20 is a 5-way or 6-way kinematic touch-trigger probe. Its two piece design comprises a probe body and detachable stylus module(s), which gives the ability to change stylus configurations either manually or automatically without re-qualification of the stylus tips, providing significant time savings in inspection routines.

The TP20 stylus module houses the kinematic switching touch sensor mechanism, carries the stylus assembly and provides overtravel in $\pm X$, $\pm Y$ and $+Z$ axes (or $\pm Z$ in the case of TP20 6-way module). The stylus mounting thread accepts styli from the Renishaw M2 range.

A range of seven, application-specific stylus modules is available, being identified by coloured caps:

- **SF** - Standard force stylus module (black cap)
- **LF** - Low force stylus module (green cap)
- **MF** - Medium force stylus module (grey cap)
- **EF** - Extended force stylus module (brown cap)
- **6W** - 6-way stylus module (blue cap)
- **EM1 SF** - Standard force extension module
- **EM2 SF** - Standard force extension module



Stylus comparison

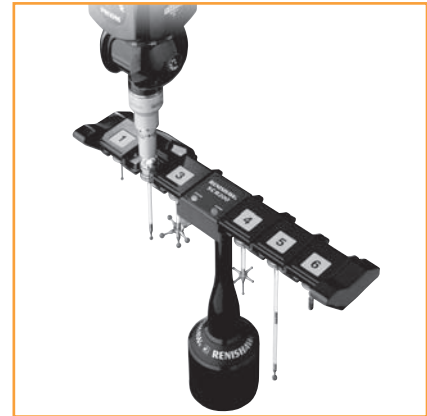
TP200 module changing

TP200 stylus module

The stylus module is mounted on the probe via a highly repeatable magnetic kinematic joint, providing a rapid stylus changing capability and probe overtravel protection.

There are three modules available, with two different overtravel forces:

- The SF (standard force) module is suitable for most applications.
- The LF (low force) module is recommended for use with small precision ball styli or on delicate materials.
- The EO (extended overtravel) module is recommended for use when increasing the speed of the CMM may lead to stopping distances which exceed the overtravel range provided in the SF/LF modules. The EO module has an additional 8 mm (0.32 in) of overtravel in the probe Z axis to protect against damage to the sensor in such circumstances. Overtravel force is the same as the SF module.



SP25M compact scanning probe system

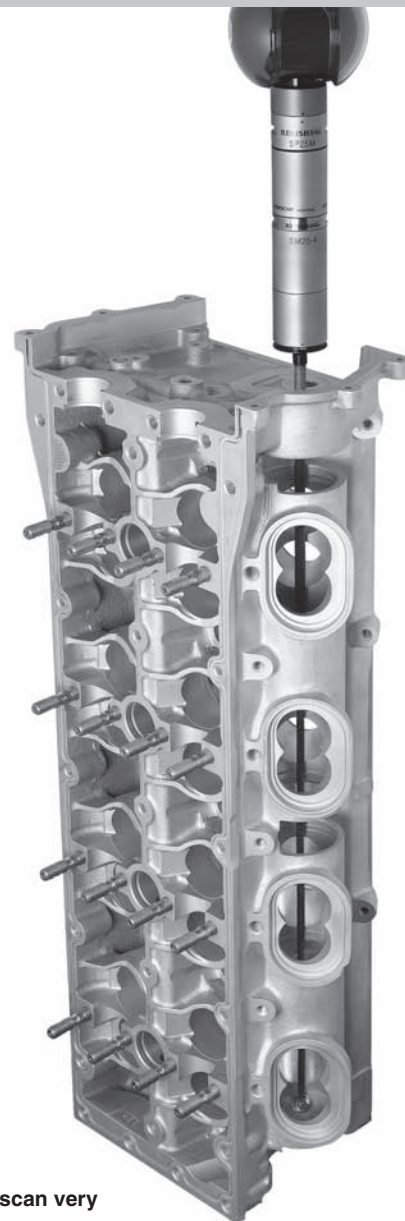
SP25M scanning probe

Only 25 mm (0.98 in) in diameter, and with a range of modules for high performance scanning and touch-trigger probing, the SP25M is the world's most compact and versatile scanning probe system.

The SP25M is actually two sensors in one, enabling scanning and touch-trigger probing in a single probe system. SP25M gives highly accurate scanning performance with stylus lengths from 20 mm to 400 mm (0.79 in to 15.75 in) using M3 stylus range. In addition, the ability to carry Renishaw's TP20 range of touch-trigger stylus modules means that the SP25M system enables optimisation of the measurement solution to suit the application.

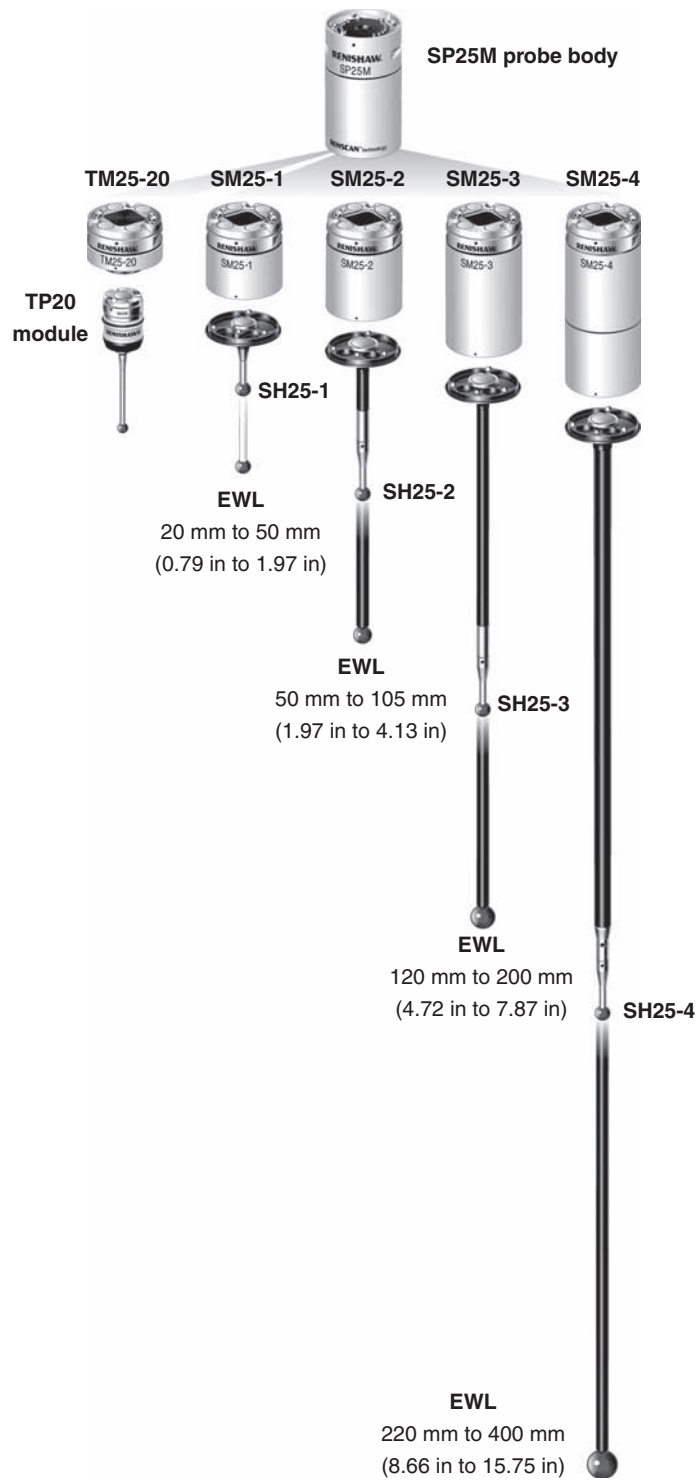
The SP25M's compact size and autojoint mounting make it compatible with the PH10M/MQ motorised probe heads and PH6M fixed probe head. It can also be mounted on a multiwired extension bar of up to 100 mm (3.94 in) length. Together, this combination permits excellent reach and access to part features.

A unique pivoting design achieves exceptional dynamic performance. Four scanning modules have been designed to optimise scanning accuracy across a wide range of stylus lengths, avoiding most of the deterioration in performance seen in other types of scanning probe as stylus lengths increase.



SM25-4 module can scan very deep features - shown here with 400 mm (15.75 in) stylus

SP25M modular component system



Renishaw applies innovation to provide solutions to your problems

Renishaw is an established world leader in metrology, providing high performance, cost-effective solutions for measurement and increased productivity. A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Renishaw designs, develops and manufactures products which conform to ISO 9001 standards.

Renishaw provides innovative and cost-effective solutions using the following products:

- **Probe systems for inspection on CMMs (co-ordinate measuring machines).**
- **Systems for job set-up, toolsetting and inspection on machine tools.**
- **Scanning and digitising systems.**
- **Laser and automated ballbar systems for performance measurement and calibration of machines.**
- **Encoder systems for high accuracy position feedback.**
- **Spectroscopy systems for non-destructive material analysis in laboratory and process environments.**
- **Styli for inspection and tool setting probes.**
- **Customised solutions for your applications.**

Renishaw offices worldwide

Australia

T +61 3 9521 0922
E australia@renishaw.com

Austria

T +43 (0) 2236 379790
E austria@renishaw.com

Brazil

T +55 11 4195 2866
E brazil@renishaw.com

The People's Republic of China

T +86 21 6353 4897
E china@renishaw.com

Canada

T +1 905 828 0104
E canada@renishaw.com

Czech Republic

T +420 548 216 553
E czech@renishaw.com

France

T +33 1 64 61 84 84
E france@renishaw.com

Germany

T +49 (0) 7127 981-0
E germany@renishaw.com

Hong Kong

T +852 2753 0638
E hongkong@renishaw.com

Hungary

T +36 23 502 183
E hungary@renishaw.com

India

T +91 80 25320 144
E india@renishaw.com

Israel

T +972 4 953 6595
E israel@renishaw.com

Italy

T +39 011 966 10 52
E italy@renishaw.com

Japan

T +81 3 5366 5315 (or 5324)
E japan@renishaw.com

Malaysia

T +6012 381 9299
E malaysia@renishaw.com

The Netherlands

T +31 76 543 11 00
E benelux@renishaw.com

Poland

T +48 22 577 1180
E poland@renishaw.com

Russia

T +7 495 231 1677
E russia@renishaw.com

Singapore

T +65 6897 5466
E singapore@renishaw.com

Slovenia

T +386 (1) 527 2100
E mail@rls.si

South Korea

T +82 2 2108 2830
E southkorea@renishaw.com

Spain

T +34 93 663 3420
E spain@renishaw.com

Sweden

T +46 (0)8 584 90 880
E sweden@renishaw.com

Switzerland

T +41 55 415 50 60
E switzerland@renishaw.com

Taiwan

T +886 4 2251 3665
E taiwan@renishaw.com

Thailand

T +66 2746 9811
E thailand@renishaw.com

Turkey (Representative Office)

T +90 (216) 380 92 40
E turkiye@renishaw.com

UK (Head Office)

T +44 (0)1453 524524
E uk@renishaw.com

USA

T +1 847 286 9953
E usa@renishaw.com

For all other countries

T +44 1453 524524
E international@renishaw.com