Coordinate measuring machine probes

Fixed and manual probe heads

PH1

A small swivel head, adjustable in both the A and B axes, with limited overtravel protection. The probe is offset from the mounting shank Z axis.

Number of probe sockets:	1
Probe status indication:	1 LED
Cable connection:	5 pin DIN 180° socket
Overtravel break load:	Adjustable from 20 gf (0.7 ozf) to locked solid
A-axis indexing:	Swivel of 115° locked with hexagonal key (3 mm A/F)
B-axis indexing:	15° steps through 360°
Weight:	125 g (4.5 oz)
Mounting options:	Shank to suit your CMM

Part number: A-1049-1795

PH6

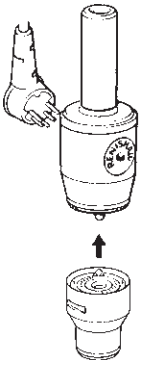
A compact, vertical probe head for a single probe, with a choice of integral cables (see below).

Number of probe sockets:	1
Probe status indication:	1 LED
Cable connection:	Integral cable
Mounting options:	Shank to suit your CMM

Part number: A-1046-5097 (coiled 12-28 in, 5 pin DIN)
Part number: A-1046-5098 (coiled 18-50 in, 5 pin DIN)
Part number: A-1046-5099 (coiled 30-95 in, 5 pin DIN)
Part number: A-1046-5094 (plain 177 in, 5 pin DIN)
Part number: A-1046-5096 (coiled 23-72 in, 7 pin amph)

PH6A

The PH6A is designed for use with autojoint probes and allows you to change probes or add extensions without having to requalify the probe. **Special order only**.



Number of probe sockets:	1
Probe status indication:	1 LED
Cable connection:	5 pin DIN 180° socket
Mounting options:	Shank to suit your CMM

Part number: A-1051-0012

PH6M

A fixed head with autojoint connection for probes and adaptors. For use with TP7M, SP600M, and SP25M.

Number of probe sockets:	1 autojoint
Probe status indication:	1 LED
Cable connection:	Micro ‘D’ connector
Mounting options:	Shank to suit your CMM

Part number: A-1074-0020

MH8

A manually indexable probe head with repeatable indexing, eliminating the need to requalify the stylus tip position after orientation. The MH8 can be used with the TP6 probe directly or with the TP20 probe with up to 50 mm extension. An easy upgrade, as there is no need for special software, cabling, or electronics.

2σ positional repeatability:	1.5 µm
Probe status indication:	1 LED
Cable connection:	5 pin DIN type connector
A-axis indexing:	0° to 90° in 15° steps = 7 positions
B-axis indexing:	±180° in 15° steps = 24 positions
Total number of positions:	168
Maximum support capability:	TP6 mounted directly
	TP20 with PEL1 50 mm extension
Probe mounting:	M8 bush
Mounting options:	Shank to suit your CMM

Part number: A-1332-0002

MIH

A manually indexable head, repeatable in 720 positions over two axes with LCD display, the MIH is designed for use with the autojoint TP6A touch probe and long extensions for large components. TP2, TP6, TP20 touch probes can be used with the addition of the PAA1 or PAA2 extensions.

2σ positional repeatability:	1 µm
Probe status indication:	1 LED
Cable connection:	5 pin DIN 180° socket
A-axis indexing:	105° to 0° in 7.5° steps = 15 positions
B-axis indexing:	±180° in 7.5° steps = 48 positions
Probe mounting:	Autojoint
Mounting options:	Shank to suit your CMM

Part number: A-1070-0003

MH20i

The MH20i offers the significant advantage of repeatable indexing positions, vastly improving productivity for multi-orientation measurement applications. The MH20i is incompatible with the MCR20.

Probe mounting:	TP20 kinematic mount
Head mounting:	MS range of shanks
Suitable interfaces:	PI4-2, PI200-3 or PI7-3
Number of probe sockets:	1
Probe status indication:	1 LED
Cable connection:	5 pin DIN 180° socket
A-axis indexing:	0° to 90° in 15° repeatable steps
B-axis indexing:	180° in 15° repeatable steps
Repeatability of position:	1.5 µm (0.00006 in) with TP20 and 10 mm stylus 2.5 µm (0.0001 in) with EM2 extension module and 10 mm stylus
Maximum extension bar:	EM2 extension module – 75 mm (2.95 in)

MH20i head with low force module

Part number: A-4099-0000

MH20i head with standard force module

Part number: A-4099-0100

MH20i head with medium force module

Part number: A-4099-0200

MH20i head with extended force module

Part number: A-4099-0300

RTP20

Renishaw's RTP20 compact head for DCC coordinate measuring machines (CMMs) offers low-cost 'motorised' head functionality and integral TP20 touch-trigger probe.

The RTP probe head allows the integral probe to be moved to 168 repeatable positions in 15° increments using both A and B axes, allowing a one-time qualification for a stylus tip position. This eliminates the need for costly time-consuming requalification routines, ensuring fast throughput for part inspection. Users can therefore easily access features to be measured and optimise system performance by ensuring the probe is applied to the surface at the best angle to achieve accurate measurements.

Probe mounting:	TP20 kinematic mount
Head mounting:	MS range of shanks
Suitable interfaces:	PI4-2, PI200-3 or PI7-3
Number of probe sockets:	1
Probe status indication:	1 LED
Cable connection:	5 pin DIN 180° socket
A-axis indexing:	0° to 90° in 15° repeatable steps
B-axis indexing:	180° in 15° repeatable steps
Repeatability of position:	1.5 µm (0.00006 in) with TP20 and 10 mm stylus 2.5 µm (0.0001 in) with EM2 extension module and 10 mm stylus
Maximum extension bar:	EM2 extension module – 75 mm (2.95 in)

RTP20 rack kit

Includes:
- RTP20 head
- Shank (various types)
- Pole
- Pole adaptor (various types)
- MCR20 rack
- 2 × TP20 modules (standard, medium, extended or low)
- 2 × M2 stylus spanners
- 2 × M4 stylus spanners
- Cleaning kit

Part number: A-5400-#### (see next page)

RTP20 non-rack kit

Includes:
- RTP20 head
- Shank (various types)
- Pole
- Pole adaptor (various types)
- 1 × TP20 module (standard, medium, extended or low)
- 2 × M2 stylus spanners
- 2 × M4 stylus spanners
- Cleaning kit

Part number: A-5400-8### (see next page)

RTP20 part numbers

Non-rack kit

A-5400-8###

This number represents the TP20 module required:

1 = Low force module
2 = Standard force module
3 = Medium force module
4 = Extended force module
5 = 6-way module
6 = EM1 module
7 = EM2 module

These numbers represent the shank required:

01 = MS1 shank
02 = MS2 shank
03 = MS3 shank
04 = MS4 shank
05 = MS5 shank
06 = MS6 shank
07 = MS7 shank
08 = MS8 shank
09 = MS9 shank
10 = MS10 shank
11 = MS11 shank
12 = MS12 shank
13 = MS13 shank
14 = MS14 shank
15 = MS15 shank
16 = MS7(S) shank
17 = MS17 shank
18 = MS1(S) shank
19 = no shank

PLUS the pole adaptor required:

+0 = M8 pole adaptor
+20 = M6 pole adaptor
+40 = 5/16 pole adaptor
+60 = 3/8 pole adaptor
+80 = M10 pole adaptor

Example

RTP20 with:

- No rack (8)
- Standard force module (2)
- MS3 shank + M6 pole adaptor (03 + 20 = 23)

= **A-5400-8223**

Rack kit

A-5400-####

This number represents the first TP20 module required:

1 = Low force module
2 = Standard force module
3 = Medium force module
4 = Extended force module
5 = 6-way module
6 = EM1 module
7 = EM2 module

This number represents the second TP20 module required:

1 = Low force module
2 = Standard force module
3 = Medium force module
4 = Extended force module
5 = 6-way module
6 = EM1 module
7 = EM2 module

These numbers represent the shank required:

01 = MS1 shank
02 = MS2 shank
03 = MS3 shank
04 = MS4 shank
05 = MS5 shank
06 = MS6 shank
07 = MS7 shank
08 = MS8 shank
09 = MS9 shank
10 = MS10 shank
11 = MS11 shank
12 = MS12 shank
13 = MS13 shank
14 = MS14 shank
15 = MS15 shank
16 = MS7(S) shank
17 = MS17 shank
18 = MS1(S) shank
19 = no shank

PLUS the pole adaptor required:

+0 = M8 pole adaptor
+20 = M6 pole adaptor
+40 = 5/16 pole adaptor
+60 = 3/8 pole adaptor
+80 = M10 pole adaptor

Example

RTP20 with:

- Rack
- Low force module (1)
- Standard force module (2)
- MS1(S) shank + M10 pole adaptor (18 + 80 = 98)

= **A-5400-1298**

See pages 1-45 to 1-47 for information on the shank type for your machine.

Motorised probe heads

PH10T PLUS

The PH10T PLUS motorised probe head allows complete, rapid, and repeatable inspection of most complex components with minimum human intervention. Full orientation of your TP2, TP6, TP20 or TP200 probe between any of 720 positions, under manual or program control, turns your 3 axis CMM into a 5 axis machine.

2σ positional repeatability:	0.4 µm
Cycle time (90° move):	3.5 seconds
Total angular movement:	A axis 105° to 0° in 7.5° steps = 15 positions
	B axis ±180° in 7.5° steps = 48 positions
Total number of positions :	720
Maximum extension bar length:	300 mm using PEL4 extension*
Head mounting:	Shank to suit your CMM
Probe mounting facility:	M8 thread
Probe head control:	PHC10-3 PLUS (purchased separately)
Dimensions:	Length 102 mm excluding AM1, width 62 mm
Weight:	645 g

Part number: A-5863-5000

PH10M PLUS

The PH10M PLUS motorised probe head has been developed for the new generation of contact and non-contact scanning probes. It has three times the torque of PH10 PLUS, allowing probe extension bars up to 300 mm long to be used.

The PH10M PLUS has an autojoint mounting.

2σ positional repeatability:	0.4 µm
Cycle time (90° move):	3.5 seconds
Total angular movement:	A axis: 105° to 0° in 7.5° steps = 15 positions
	B axis: ±180° in 7.5° steps = 48 positions
Total number of positions:	720
Maximum extension bar length:	300 mm using PAA3 extension*
Head mounting:	Shank to suit your CMM
Probe mounting facility:	Autojoint
Probe head control:	PHC10-3 PLUS (purchased separately)
Dimensions:	Length 102 mm excluding AM1, width 62 mm
Weight:	645 g

Part number: A-5863-4000

***** On all the PH10 PLUS series of probe heads, it is possible to extend beyond 300 mm using our range of CF extensions.

PH10MQ PLUS

The PH10MQ PLUS can be mounted vertically inside the CMM's quill for a greater working envelope by increasing the Z axis travel. The specification of the PH10MQ PLUS is identical to that of the PH10M PLUS, with the following exceptions:

Head mounting:	Direct to quill
Dimensions:	Length 73 mm, width 80 mm
Weight:	730 g

Part number: A-5863-6000

PH10M-iQ PLUS

PH10M-iQ PLUS functions identically to a traditional PH10M PLUS but with the addition of inferred qualification technology. Inferred qualification increases throughput by removing the need to qualify each head position that is used in a measurement program.

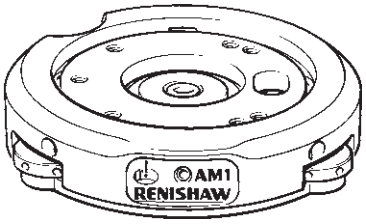
PH10M-iQ PLUS works with all PH10M compatible probes, but only touch-trigger probe configurations can utilise inferred qualification. Scanning probes can be used in traditional PH10M qualification mode but cannot use inferred qualification.

Part Number: A-5863-7000

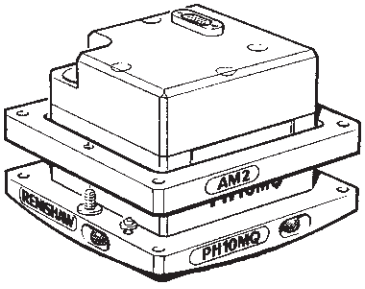
Motorised probe head accessories

AM1/AM2

The AM1 adjustment module is designed for use with the PH10T and PH10M probe heads. The AM2 is designed for the PH10MQ probe heads. Each module provides quick and accurate angular alignment of the motorised probe head with the CMM's axes and/or the autochange rack. The quick release mechanism allows the head to be removed for storage and replaced without further alignment.



	AM1	AM2
Size:	60 mm × 15.5 mm	80 mm × 10 mm
Adjustment:	±2° in pitch and roll*	±1° in pitch and roll
	±4.5° in yaw	±1° in yaw
Overtravel:	±3.5° in pitch and roll	0
Mounting:	Mounts to quill using shank	Mounts direct to quill



* Up to ±5.5° in pitch and roll is possible, but at the expense of overtravel.

Part number: A-1026-0320 (AM1)
Part number: A-1036-0080 (AM2)

PHC10-3 PLUS

The PHC10-3 PLUS head control receives instructions and processes signals to rotate the angles of the PH10 PLUS series probe heads. The PHC10-3 PLUS is compatible with all PH10 PLUS heads. It has its own internal power supply.

Data transmission:	RS232 or USB
Input connectors:	15 way 'D' probe
Output connectors:	7 pin DIN or 9 pin D type
Maximum cable length:	50 m (164 ft)
Hand control:	HCU1 (purchased separately)

Part number: A-5863-0100

PHC10-3 PLUS with internal PI200-3

This variant of the PHC10-3 PLUS controller includes a prefitted PI200-3 interface card in a single 1U case.

Part number: A-5863-0200

HCU2

The HCU2 hand control unit enables the probe head to be used in a manual mode or during a teach cycle. An LCD dot matrix display provides information and status of the PHC10-3 system.

Part number: A-5882-0010

MCU*lite-2* joystick

Part number: A-5331-00154

MCU5-2 joystick kit

Part number: A-5734-0100

MCU-W2 wireless joystick kit (no batteries)

Part number: A-5734-0200

MCU-W battery (2 pack)

Part number: A-5381-0095

MCU-W 1 battery

Part number: A-5381-0036

PL163

5 m cable for MCU.

Part number: A-1016-8098

PL164

10 m cable for MCU.

Part number: A-1016-8099

PL171

20 m cable for MCU.

Part number: A-1016-8100

PH20

PH20 is another innovative measurement product from Renishaw that transforms coordinate measuring machine (CMM) performance. For the first time, 5-axis technology developed for the multi-award winning REVO® measurement system is available for touch-trigger applications on all sizes of CMM.

PH20's unique 'head touches' allow measurement points to be taken by moving only the head rather than the CMM structure. Using only the rapid rotary motion of the head, points can be taken faster, and with improved accuracy and repeatability. Furthermore, 5-axis motion eliminates time spent indexing the head. Together these speed increases typically result in a three-fold improvement in throughput over conventional systems.

PH20's infinite positioning capability guarantees optimal feature access, minimising stylus changes. Five-axis simultaneous motion allows larger parts to be measured on the CMM by minimising the space required around the part for head rotation.

Users of the PH20 probe head will immediately have access to the range of proven TP20 probe modules, providing a wide selection of trigger forces, directional sensing options and extensions to meet application requirements*. The detachable modules provide crash protection and can be automatically changed using the MCR20 change rack.

* Excepting the extended force module

PH20 features and benefits

- Incorporates 5-axis measurement technology, minimising CMM motion and the associated CMM dynamic errors.
- Infinite positioning and 5-axis motion reduces non-productive transitions between features.
- Infinite positioning and 5-axis motion aid access to difficult features.
- Rapid calibration with all positions inferred means more time measuring.
- Maximum reach up to 200 mm with maintained effective working length.
- Standard M2 styli for convenience.

Hardware integration

- The UCC controller is fundamental to the PH20 system.
- The UCC controller features routines particular to 5-axis motion and head-touch measurement.
- MCU*lite-2* is the multi-function hand control unit required for the system.
- PH20 can fit to any machine, either directly to the quill or via a shank using a range of mounting adaptors.
- The PH20 is compatible with the existing range of TP20 modules, excepting the extended force module.
- MCR20NI is the recommended rack for stylus changing, but it is possible to use an MCR20.
- No air supply is needed.

Software integration

- The Renishaw UCCserver™ software application will provide the interface for PH20 control.
- UCCserver is based on I++DME command protocol.
- PH20 is fully integrated with Renishaw's MODUS™ application software.

Specification summary		PH20		
Weight (excluding module and cables)		810 g (28.6 oz)		
Temperature range	Operating	15 °C to 35 °C (59 °F to 95 °F)		
	Storage	–25 °C to 70 °C (–13 °F to 158 °F)		
Maximum movement speed		3 revs/s (1281 mm/s with standard module and 10 mm stylus)		
Maximum head touch speed		50 mm/s		
Rotation angles	A axis	–115° to 115°		
	B axis	∞		
Angular resolution		0.4 µRadians		
Bearings		Mechanical		
Change rack system		TCR20 or MCR20 with TDA block		
Joystick		MCU*lite-2*, MCU5 or MCU-W		
ISO 10360-5 (2001) typical performance standard force module with 12 × 4 mm stylus on a CMM with ISO 10360-2 (2002) specification of 0.48+ L/1000*			CMM TOUCH	HEAD TOUCH
		Size	0.0006 mm (0.00002 in)	0.0002 mm (0.00001 in)
		Form	0.0026 mm (0.00010 in)	0.0024 mm (0.00009 in)
		Location	0.0013 mm (0.00005 in)	0.0009 mm (0.00003 in)

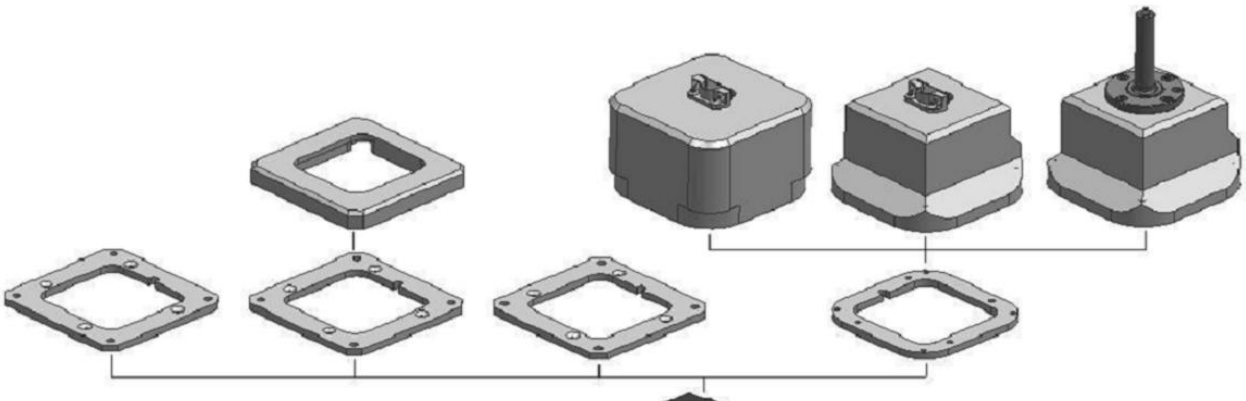
* specified with a TP7

PH20 head

Includes: PH20 head with standard force module TP20

Part number: A-5669-0001

PH20 shanks



PH20 shank adaptor

Part number: A-3007-1715

PH20 small quill adaptor

60 mm × 60 mm.

Part number: A-3007-1716

PH20 large quill adaptor

80 mm × 80 mm.

Part number: A-3007-1717

PH20 PH10MQ quill adaptor

Part number: A-3007-1720

PH20 calibration stylus

Part number: A-5004-21820

PH20 calibration sphere

Part number: A-1034-0026

Rack for PH20

TCR20

Part number: A-1371-1001

NOTE: See CMM probe shanks starting on page 1-45.

REVO-2

The 5-axis REVO-2 system incorporating the REVO-2 head provides fast, ultra-high accuracy positioning.

REVO-2 system overview

The system comprises the following elements:

- REVO-2 head
- RSP2 2D tip sensing probe and associated stylus holders and accessories
- RSP3 3D probe and associated accessories
- **UCC** universal CMM controller
- REVO-2 PCI interface card (for **UCC**)
- **SPA** servo power amplifier
- Air filter unit

REVO-2 – 'tip sensing' probe technology

- Enclosed laser directed onto a reflector at the stylus tip.
- The stylus touches the part and bends.
- The reflector is displaced.
- The altered return path of the laser is sensed by a PSD.
- The exact tip position is known because the reflector and the stylus ball are close together.
- Stylus wear is minimised by using a low scanning force.

REVO-2 features and benefits

- Incorporates **Renscan*5***™ 5-axis scanning technology minimising CMM motion and the associated CMM dynamic errors
- Increased measuring speed, up to 500 mm/s, resulting in increased measurement throughput
- Data collection rates up to 6,000 points per second
- Infinite positioning and 5-axis motion reduces non-productive transitions between features
- Stylus wear minimised by extremely low scanning forces
- Infinite positioning and 5-axis motion aid access to difficult features
- Rapid calibration with all positions inferred means more time measuring
- Maximum reach up to 500 mm with maintained effective working length
- Standard M2 styli for convenience
- Probe and stylus changing capability allowing flexibility and future probing technology compatibility

Hardware integration

- The **UCC** is fundamental to the REVO-2 system
- The **UCC** controller features **Renscan*5***™ scanning routines particular to 5-axis motion and scanning
- **SPA** is a servo power amplifier used to drive the head and CMM
- MCU is the multi-function hand control unit required for the system

Software integration

- The Renishaw **UCC*server***™ software application will provide the interface for REVO® control
- **UCC*server***™ is based on I++DME command protocol

Specification summary		REVO-2			
Operating temperature		14 °C to 30 °C (57 °F to 86 °F)			
Storage temperature		–10 °C to 70 °C (14 °F to 158 °F)			
Weight (excluding probe and cables)		1.75 kg			
Dimensions	Height (overall)	239 mm (9.41 in)			
	B axis	86 mm (3.40 in) square			
	A axis swept diameter	118 mm (4.65 in)			
Air specification	Incoming supply to filter specification (ref: ISO 8537.1)	Particle size	Class 4	15 µm	Line pressure of 6 bar to 6.5 bar
		Dirt concentration	Class 4	8 mg/m³	
		Dewpoint	Class 4	3 °C	
		Oil	Class 4	5 mg/m³	
	After filtration air specification (ref: ISO 8537.1)	Particle size	Class 2	1 µm	Pressure 5 bar
		Dirt concentration	Class 2	1 mg/m³	
		Dewpoint	Class 3	–20 °C	
		Oil	Class 2	0.1 mg/m³	
Movement speed		3 revolutions per second			
Rotation angles	A axis	–5° to 120°			
	B axis	Continuous			
Angular resolution		0.08 arc second			
Bearings		Air			
Change rack system		Allowing both probe changing and stylus holder changing			

REVO-2 head kit

Includes: REVO-2®
RSP2
RSH250
45 mm diameter datum ball

Part number: A-5518-1095

REVO-2 head only

Part number: A-5759-0001

REVO® RSP2 V2 probe

Part number: A-3060-0028

REVO® RSH250 stylus holder kit

Part number: A-3060-0021

REVO® RSH350 stylus holder kit

Part number: A-3060-0022

REVO® RSH500 stylus holder kit

Part number: A-3060-0023

REVO® RSH175 stylus holder kit

Part number: A-3060-0024

REVO® RSH450 stylus holder kit

Part number: A-3060-0026

RSP3-1 REVO® probe kit

Includes: RSP3-1
PSH3-1

Part number: A-3060-0331

RSP3-2 REVO® probe kit

Includes: RSP3-2
RSH3-2

Part number: A-3060-0332

RSP3-3 REVO® probe kit

Includes: RSP3-3
RSH3-3

Part number: A-3060-0333

RSP3-4 REVO® probe kit

Includes: RSP3-4
RSH3-4

Part number: A-3060-0334

RSH3-1

Includes: PA25 - RSH3

Part number: A-3061-2521

RSH3-2

Includes: PA25 - RSH3

Part number: A-3061-2522

RSH3-3

Includes: PA25 - RSH3

Part number: A-3061-2523

RSH3-4

Includes: PA25 - RSH3

Part number: A-3061-2524

RSP3-6 probe kit

Includes: Probe
Portspacer

Part number: A-6084-0001

REVO® RSH3-6C-500 (500 mm crank)

Part number: A-6084-0015

REVO® RSH3-6C-600 (600 mm crank)

Part number: A-6084-0016

REVO® RSH3-6-600 (600 mm straight)

Part number: A-6084-0006

REVO® RSH3-6-700 (700 mm straight)

Part number: A-6084-0007

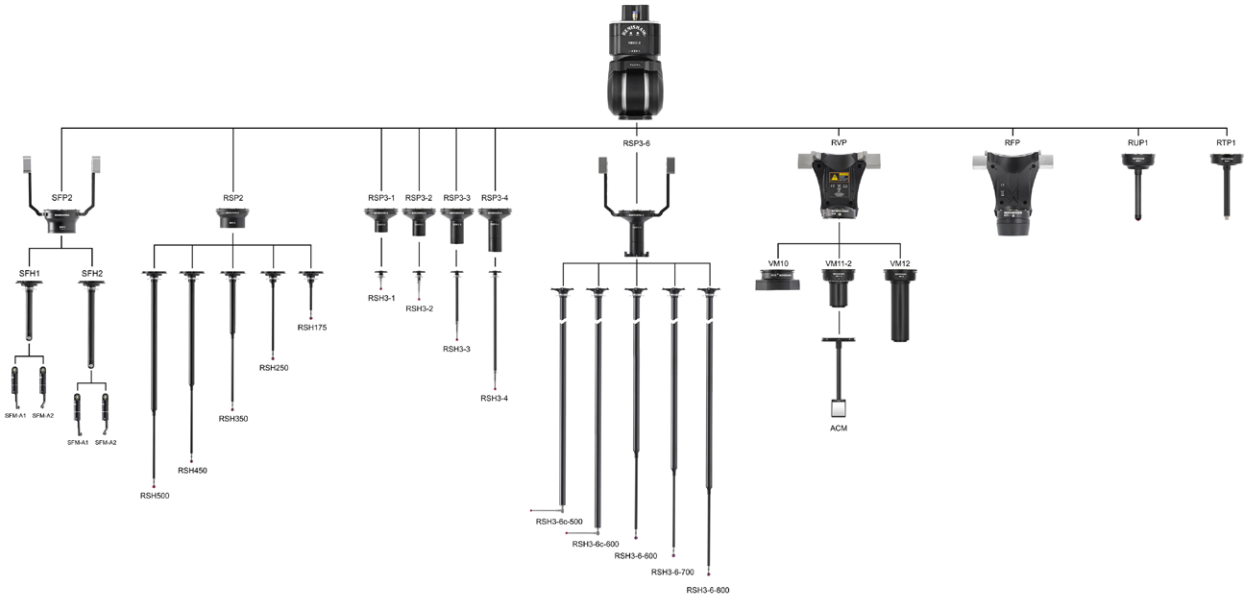
REVO® RSH3-6-800 (800 mm straight)

Part number: A-6084-0008

REVO® to REVO-2 upgrade kit

Includes: REVO-2
UCCS5 and PSU
SPA3
Blanking plate

Part number: A-1032-0025



RVP vision probe for REVO-2

The REVO vision probe (RVP) provides non-contact vision measurement on an infinitely positioning, 5-axis platform. Now, tactile scanning measurement, surface finish analysis and non-contact inspection can all be performed on one CMM.

The RVP system is a breakthrough in technology in the world of non-contact CMM inspection. The combination of non-contact vision measurement and a 5-axis, infinitely positioning platform makes the RVP system truly unique.

RVP further expands the range of applications for the REVO-2 system with a non-contact edge detecting sensor automatically interchangeable with all other REVO probe options. As a result, the system provides the optimum tool to measure multiple features, and a wider variety of parts can be inspected.

System components

The RVP system comprises a vision probe body, a number of vision modules, rack ports and a calibration artefact. The image capture and processing components of the system are held inside the vision probe body and include an industry standard, robust, CMOS sensor for reliable image capture. The vision modules allow a range of features with different sizes and shapes to be inspected. All vision modules contain integral LED lighting to achieve a sharp contrast between holes and part material. Background feature enhancement is also available using backlighting combined with bespoke part fixturing.

Benefits

Added part inspection capability

Small features and delicate or flexible parts that cannot be measured using tactile probes can now be inspected on a 5-axis non-contact measurement platform.

Added value multi-sensor system

A machine equipped with REVO-2 can be used for a large range of inspection applications including scanning measurement, surface finish analysis and now, non-contact inspection.

High speed data collection

5-axis motion between part features and real time image processing dramatically increase data collection rates.

Innovations

5-axis movement, infinite positioning

RVP benefits from REVO's infinite positioning and 5-axis movement, which ensure accurate and unrestricted placement in front of features at any angle.

Automatically interchangeable sensors

The RVP non-contact probe is automatically interchangeable with all other probe options available for REVO-2, and data from multiple sensors is automatically referenced to a common datum.

3D surface reconstruction

5-axis motion and infinite positioning provide access to the data required for 3D surface reconstruction.

Probe specification	RVP
Weight	551 g
Dimensions	158 mm × 131 mm × 134 mm
Rack port compatibility	VPCP (heated)
Sensor type	1/1.8” CMOS sensor
Head compatibility	REVO-2
Operating temperature	+10 °C to +40 °C
Software compatibility	UCCsuite 5.0 onwards MODUS™ 1.7 onwards
Integration	I++ DME protocol

Module specification	VM10	VM11-2	VM12
			
Weight	153 g	134 g	138 g
Dimensions	86 mm × 39 mm	74 mm × 67 mm	144 mm × 67 mm
Rack port compatibility	VMCP (heated)	VMCP (heated)	VMCP (heated)
Measurement range	1 mm diameter or greater	0.4 mm diameter or greater	0.05 mm diameter or greater
Field of view	50 mm × 40 mm	12.5 × 10 mm	3.1 mm × 2.5 mm
Stand-off	80 mm	120 mm	50 mm
Depth of field	5 mm	5 mm	0.2 mm
Resolution	40 µm	20 µm	2.5 µm
LED illumination	24 LEDs	10 LEDs	10 LEDs
Backlight compatibility	Yes	Yes	Yes

RVP probe

Part number: A-5378-0080

VM10 vision module

Part number: A-5378-0082

VM11-2 vision module

Part number: A-5378-0093

VM12 vision module

Part number: A-5378-0088

RVP ACM module only

Part number: A-5378-0094

VPCP vision probe change port

Part number: A-5378-0081

VMCP vision module change port

Part number: A-5378-00837

VA11 calibration artefact

Part number: A-5378-0089

RVP kits

RVP combo kit

Includes: RVP probe
VPCP vision probe change port
VM10 vision module
VM11-2 vision module
VMCP vision module change port
VA10 calibration artefact

Part number: A-5378-9504

RVP VM10 kit

Includes: RVP probe
VPCP vision probe change port
VM10 vision module
VMCP vision module change port
VA10 calibration artefact

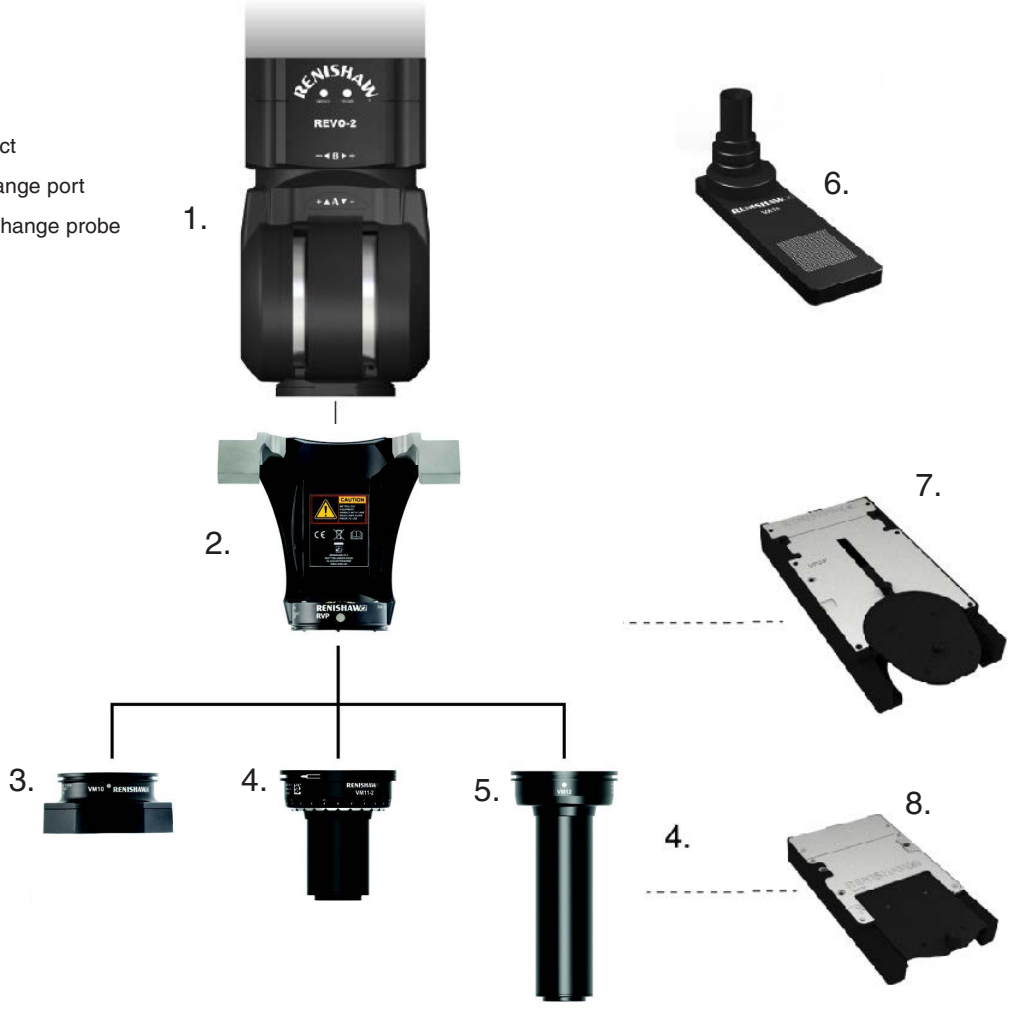
Part number: A-5378-9505

RVP VM11-2 kit

Includes: RVP probe
VPCP vision probe change port
VM11-2 vision module
VMCP vision module change port
VA10 calibration artefact

Part number: A-5378-9506

1. REVO-2 head
2. RVP probe
3. VM10 vision module
4. VM11-2 vision module
5. VM12 vision module
6. VA10 calibration artefact
7. VPCP vision probe change port
8. VMCP vision module change probe



RUP1 ultrasonic probe

The RUP1 ultrasonic probe increases the multi-sensor capability of the REVO® 5-axis measurement system for CMMs, offering ultrasonic thickness inspection.

Unlike many other ultrasonic systems, RUP1 probe does not require the use of water tanks or coupling gel to enable a good transmission of the signal. Instead, it uses an innovative elastomer tip ball to provide excellent coupling between the probe and the material. As a result, the RUP1 probe eliminates the need for skilled operators to interpret oscilloscope screens and releases shop floor space occupied by the dedicated immersion tanks.

The use of ultrasonics for single-sided measurement of part thickness also delivers clear advantages over traditional tactile probing techniques for parts where access to internal features is challenging.

The RUP1 probe uses a 20 MHz transducer and provides a thickness measurement range of 1 mm to 20 mm with an accuracy of better than 10 microns using touch points.

The RUP1 probe is fully integrated into Renishaw's MODUS™ metrology software (version 1.12) and UCCsuite software (version 5.8). It includes features such as geometry and material calibration, tip ball size monitoring and compensation, automatic calculation of REVO head positions based on the back-wall angle for non-parallel surfaces, and tip life monitoring.

Aircraft landing gear parts, power generation drive shafts, and hollow aerospace blades are just a few parts that will significantly benefit from using the RUP1.

Material thickness range	1 mm to 20 mm on typical metal parts (aluminium, steels and titanium). Not supported are: parts made from cast iron, CF, GF, glass and additive materials, and those with coatings.
Thickness measurement accuracy	Better than 0.010 mm on parallel surfaces Better than 0.100 mm on wedge angles of up to 10°
Tip composition	Elastomer bead swollen with an ethylene glycol and distilled water solution
In use tip life	1–5 shifts – dependent on environment
Ready to use tip life	7 days when stored in a rack with protective cap
Tip shelf life	12 months minimum
Measurement method	Point measurement of near parallel surfaces and wedges up to 10°
Probe changing	Fully automated to operate as part of a multi-sensor measurement system

RUP1 system kit 1

Includes: RUP
TC-3
UMA1
10 balls
Artefact

Part number: A-6159-0001

REVO RUP UMA1 kit

Step block holder (step block not included).

Part number: A-6159-1501

REVO RUP balls

Pack of 10.

Part number: A-6159-1508

SFP2 surface finish probe

Enhanced access and inspection capability for integrated surface finish measurement.

The SFP2 probe increases the surface finish measurement ability of the REVO® system, which offers multi-sensor capability providing touch-trigger, high-speed tactile scanning and non-contact vision measurement on a single CMM.

Powered by 5-axis measurement technology, the SFP2's automated surface finish inspection offers significant time savings, reduced part handling and greater return on CMM investment.

The SFP2 system consists of a probe and a range of modules and is automatically interchangeable with all other probe options available for REVO, providing the flexibility to easily select the optimum tool to inspect a wide range of features, all on one CMM platform. Data from multiple sensors is automatically referenced to a common datum.

The surface finish system is managed by the same I++ DME compliant interface as the REVO system, and full user functionality is provided by Renishaw's MODUS™ metrology software.

Key benefits

Unrivalled feature access

SFP2 benefits from REVO's infinite positioning and 5-axis movement, and features an integral motorised C axis. The SFM variants offer a range of tip arrangements which, combined with the knuckle joint between module and holder, provide access to the features most difficult to reach.

Operator independent data collection

CMM programs can now include automated and operator-independent surface finish measurement. All results, including surface finish data, are recorded and stored in a single location for easy retrieval.

Greater return on investment in CMMs

Integrated surface finish and dimensional inspection can remove the need for dedicated surface measurement equipment, reducing factory footprint, part handling and associated costs.

Specification summary		SFP2 surface finish probe			
SFM-A1 and SFM-A2 modules	Surface finish range	0.05 µm – 6.3 µm Ra			
	Surface finish accuracy (of nominal Rs)	± (5% +15 nm)			
	Surface forces	Skid: 0.2 N		Stylus tip: 0.005 N	
	Encoder resolution	1 nm			
	Measurement range	1.0 mm			
	Measurement speed	Up to 1 mm/s			
	SFM range of adjustment	±90° at the knuckle joint			
SFP2 probe	C-axis positioning accuracy	±0.25°			
	C-axis rotation speed	Up to 90°/sec			
	Rotational capability	A axis (from REVO-2)		+120° / –110°	
		B axis (from REVO-2)		Infinite positioning	
		C axis		±180°	
	Mounting (probe and holder)	Magnetised coupling			
System features	Probe head	REVO-2 only			
	Change rack	MRS2 recommended for full capability			
	Software compatibility	UCCsuite 5.2 onwards MODUS 1.8 onwards			
	Weight	SFP2 probe	SFH1 holder	SFM-A1 module	SFM-A2 module
		330 g	33 g	12 g	12 g
	Operating temperature range	+10 °C to +40 °C			
	Storage temperature range	–25 °C to +70 °C			
	Operating humidity	0% to 80% (non-condensing)			
	Calibration and verification artefacts	SFA1		3.0 µm Ra sinusoid	
		SFA2		0.5 µm Ra sinusoid	
		SFA3		0.4 µm Ra sawtooth	
		TFP		Uses LF TP20 module; PICS interface to SPA3 amplifier	
	Outputs	MODUS basic		Ra, Rms(Rq)	
		MODUS standard surface texture		Rt, R3z, Rz, Rz1max, RzDIN, RzJIS, Rseg Rp, Rv Rpm, Rvm, Rc, Rsm	
		MODUS advanced surface texture		Rk, Rpk, Rvk, Rmr, Rmr1, Rmr2, Rpq, Rvq, Rmq, Rvoid, Rvdd, Rvddl, Rcvx, Rcvxl	
	Sampling rate	4 kHz			

REVO® SFP2 base kit

Part number: A-5764-0005-KIT

REVO® SFP2 probe

Part number: A-5764-0010

REVO® SFM-A1 (Straight, Type A Skid)

Part number: A1-D-02C90D

REVO® SFM-A2 (Crank, Type A Skid)

Part number: A2-D-02C90D

REVO® SFM-B1 (SM Straight, Type B Skid)

Part number: B1-D-02C90D

REVO® SFM-C3 (Straight, Type C Skid)

Part number: C3-D-02C90D

REVO® SFM-D1 (90°, Type D Skid)

Part number: D1-D-02C90D

Single artefact kit (SFA1 and 1 AF holder)

Part number: A-5764-0072

REVO® SFH-1 module holder

Part number: A-5764-0080

REVO® SFH-2 module holder

Part number: A-5764-0081

REVO® SFA1 3.0 sin artefact

Part number: A-5764-0060

REVO® SFA2 0.5 sin artefact

Part number: A-5764-0061

REVO® SFA3 0.4 ST artefact

Part number: A-5764-0062

REVO® OFA optical flat artefact

Part number: A-5764-3142

Triple artefact kit (SFA1, 2, 3 and 3 AF holder)

Part number: A-5764-0073

REVO® single AF holder (SFAH-1, tools)

Part number: A-5764-0070

REVO® triple AF holder (SFAH-2, tools)

Part number: A-5764-0071

REVO® SF2 TFP probe kit (LF, PL24, styli)

Part number: A-5764-0063

REVO® SF2 MST – module setting tool

Part number: A-5764-0091

REVO® SF2 system storage box

Part number: A-5764-0090

REVO® RCP TC-3 high force rack port

Part number: A-3061-03207

MRS MPS1 port spacing tool

Part number: A-6084-0017

RTP1

Technology

- High thermal conductive tip material to shorten temperature reading time.
- Flexible plunger design to work for different part geometry requirements.

Application and benefits

- Part temperature monitoring in-between part inspection.
- Challenging fixture design with fixed sensors.

Key specification

- 25 °C temperature accuracy: 0.5 °C.
- Measurement range: 5 °C to 55 °C.
- Typical temperature measurement time: < 10 seconds.

Compatibility

- UCCsuite 5.9 onwards.
- Modus version 1.12.

Part number: A-6656-0050

Touch probes

TP1S/TP1SM

A robust and reliable probe which is especially suited for manual CMMs. It is available in two versions with differing plug socket orientations:

TP1S	cable connects vertically
TP1SM	cable connects horizontally

Sense directions:	±X, ±Y, +Z
2σ unidirectional repeatability:	0.5 µm
Pre-travel variation:	±2.0 µm
Stylus force range:	10 g to 50 g
Stylus overtravel:	XY plane ±19.5°
	+Z axis 8.5 mm @ 15 g
	5.0 mm @ 50 g
Suitable interfaces:	PI4-2, PI7-3, or PI200-3
Stylus thread size:	M3
Mounting option:	Shank to suit your CMM
Test conditions:	31 mm stylus @ 8 mm/s with trigger force of 15 g

Part number: A-1041-7540 (TP1S)
Part number: A-1041-7541 (TP1SM)

TP20/TP20 NI modular probes

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 requalification of the stylus tips. It affords significant time savings in inspection routines.

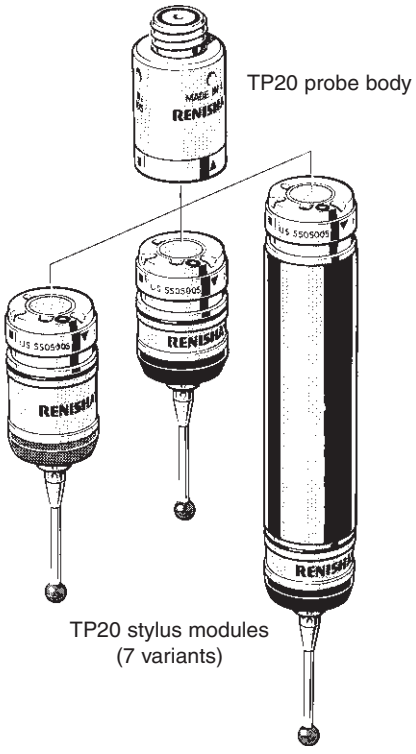
A direct replacement for the industry standard Renishaw TP2 probe, the TP20 probe system brings a range of new benefits to manual and DCC CMM applications, and can easily be retrofitted to existing TP2 installations.

The TP20 can be used on a wide range of Renishaw's manual or motorised probe heads, either by direct mounting using the standard M8 thread or, alternatively, by using a PAA# adaptor to connect to an autojoint.

The system components are:

- TP20/TP20 NI probe body
- TP20 stylus module – seven module variants allow for optimisation of performance to suit the application
- MCR20 module changing rack – automatic operation

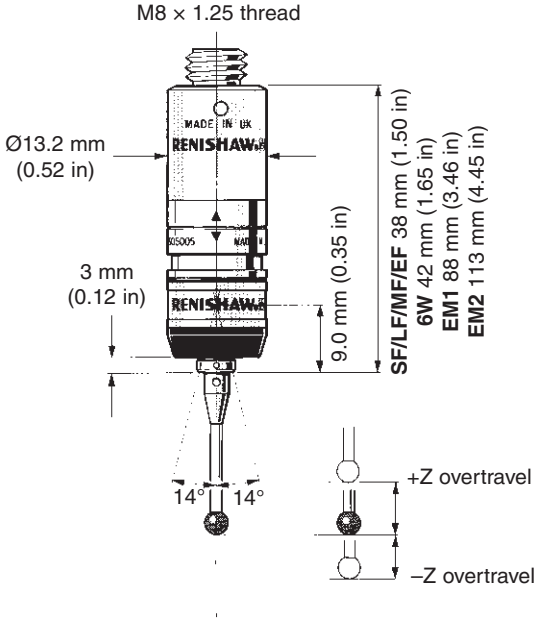
The TP20 probe system may be used with Renishaw's PI 4-2, PI 7-2 or PI 200 probe interfaces.



TP20 probe body

The TP20 probe body houses one half of the highly repeatable magnetic kinematic coupling that attaches the stylus module and body. The body also contains a magnetic proximity switch to inhibit triggering of the probe during automatic module changing with MCR20.

Note: If the probe is operated close to magnetised parts/ clamping etc, the probe trigger may become inhibited. Countermeasures include the use of long styli, stylus extensions or body orientation to increase the distance to the magnetic source. Alternatively, use the TP20 NI probe body.



TP20 NI probe body

The TP20 NI probe differs from the TP20 body in that it is not affected by magnetic fields. However the probe trigger must be inhibited through software during change cycles using the MCR20.

+Z overtravel

SF/EM1/EM2	4.0 mm (0.16 in)
LF	3.1 mm (0.12 in)
MF	3.7 mm (0.15 in)
EF	2.4 mm (0.09 in)
6W	4.5 mm (0.177 in)

–Z overtravel

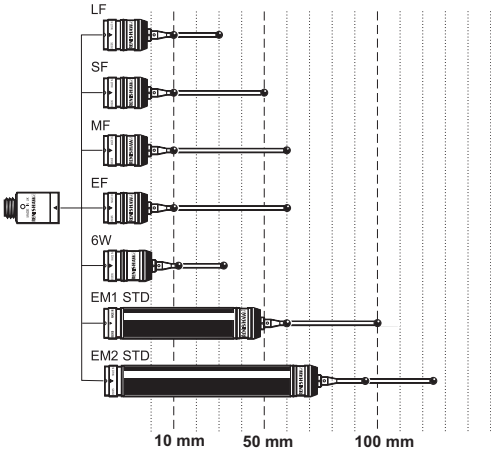
6W	1.5 mm (0.06 in)

Specification summary		TP20	TP20 NI
Principal application		DCC and manual CMMs suitable for most applications	DCC and manual CMMs where operation is within a magnetic field
Sense directions	All modules except 6W 6W	±X, ±Y, +Z ±X, ±Y, ±Z	±X, ±Y, +Z ±X, ±Y, ±Z
Pre-travel variation	LF SF/EM1/EM2 MF EF 6W	±0.6 µm (±0.000023 in) ±0.8 µm (±0.000032 in) ±1.0 µm (±0.000039 in) ±2.0 µm (±0.000079 in) ±1.5 µm (±0.000058 in)	±0.6 µm (±0.000023 in) ±0.8 µm (±0.000032 in) ±1.0 µm (±0.000039 in) ±2.0 µm (±0.000079 in) ±1.5 µm (±0.000058 in)
Repeatability of stylus change (max)	With SCR200 Manual	±0.5 µm (±0.000020 in) ±1.0 µm (±0.000040 in)	±0.5 µm (±0.000020 in) ±1.0 µm (±0.000040 in)
Stylus range		M2	M2
Probe mounting method		M8 thread	M8 thread
Suitable interface		PI 4-2, PI 7-2, PI 200	PI 4-2, PI 7-2, PI 200
Stylus module changing rack (automatic)		MCR20	MCR20
Stylus module storage rack (manual)		MSR1	MSR1

Module type and test stylus length	Trigger force XY	Trigger force Z	Overtravel force XY	Overtravel force +Z	Overtravel force –Z	Overtravel displacement XY	Overtravel displacement +Z	Overtravel displacement –Z	Unidirectional repeatability 2σ at stylus tip	2D (XY) form error
SF (black cap) 10 mm	0.08 N	0.75 N	0.2-0.3 N	3.5 N	-	±14°	4.0 mm (0.16 in)	-	0.35 µm (0.000014 in)	±0.8 µm (±0.000032 in)
LF (green cap) 10 mm	0.055 N	0.65 N	0.09 N	1.15 N	-	±14°	3.1 mm (0.12 in)	-	0.35 µm (0.000014 in)	±0.6 µm (±0.000024 in)
MF (grey cap) 25 mm	0.1 N	1.9 N	0.2-0.4 N	7.0 N	-	±14°	3.7 mm (0.15 in)	-	0.50 µm (0.000020 in)	±1.0 µm (±0.000039 in)
EF (brown cap) 50 mm	0.1 N	3.2 N	0.2-0.5 N	10.0 N	-	±14°	2.4 mm (0.09 in)	-	0.65 µm (0.000026 in)	±2.0 µm (±0.000079 in)
6W (blue cap) 10 mm	0.14 N	1.6 N	0.25 N	2.5 N	9.0 N	±14°	4.5 mm (0.18 in)	1.5 mm (0.059 in)	0.80 µm (0.000032 in)	±1.5 µm (±0.000059 in)
EM1 10 mm	0.08 N	0.75 N	0.2-0.3 N	3.5 N	-	±14°	4.0 mm (0.16 in)	-	0.35 µm (0.000014 in)	±0.8 µm (±0.000032 in)
EM2 10 mm	0.08 N	0.75 N	0.2-0.3 N	3.5 N	-	±14°	4.0 mm (0.16 in)	-	0.35 µm (0.000014 in)	±0.8 µm (±0.000032 in)

The above data applies for test conditions as follows:

Stylus length as stated above
Stylus velocity 480 mm/min (1.57 ft/min)



TP20 probe kits

TP20 probe kit 1

Includes two standard force modules.

Part number: A-1371-0290

TP20 probe kit 2

Includes one standard force and one medium force module.

Part number: A-1371-0291

TP20 probe kit 3

Includes one standard force and one extended force module.

Part number: A-1371-0292

TP20 probe kit 4

Includes two medium force modules.

Part number: A-1371-0293

TP20 probe kit 5

Includes one medium force and one extended force module.

Part number: A-1371-0294

TP20 probe kit 6

Includes two extended force modules.

Part number: A-1371-0295

TP20 probe kit 7

Includes one standard force and one 6-way module.

Part number: A-1371-0418

TP20 non-inhibit (NI) probe kits

TP20 non-inhibit probe kit 1

Includes two standard force modules.

Part number: A-1371-0640

TP20 non-inhibit probe kit 2

Includes one standard force and one medium force module.

Part number: A-1371-0641

TP20 non-inhibit probe kit 3

Includes one standard force and one extended force module.

Part number: A-1371-0642

TP20 non-inhibit probe kit 4

Includes two medium force modules.

Part number: A-1371-0643

TP20 non-inhibit probe kit 5

Includes one medium force and one extended force module.

Part number: A-1371-0644

TP20 non-inhibit probe kit 6

Includes two extended force modules.

Part number: A-1371-0645

TP20 accessories

TP20 probe modules

Standard force probe module

Part number: A-1371-0270

Medium force probe module

Part number: A-1371-0271

Extended force probe module

Part number: A-1371-0272

Low force module

This module has a lower trigger force for use on components where a low probing force is needed.

Part number: A-1371-0392

6-way probe module

Part number: A-1371-0419

EM1 module only kit

This module is based on the standard force module with an integral 50 mm carbon fibre extension piece.

Part number: A-1371-0430

EM2 module only kit

This module is based on the standard force module with an integral 75 mm carbon fibre extension piece.

Part number: A-1371-0431

EM1/EM2 kit

Includes: TP20 EM1 standard module assembly
TP20 EM2 standard module assembly
Test certificate
EMI1/EM2 user's information

Part number: A-1371-0432

Cleaning kit

Part number: A-1085-0016

MCR20

The MCR20 module changing rack provides rapid automatic changing of probe modules without the need to requalify. Rack function is completely passive and does not require any electrical connections.

Installation and set-up of the system is achieved with minimal operator skill as no special software or communications are required. The rack base and docking port assembly incorporate hinged overtravel mechanisms to assist crash protection. The kits include two probe modules, a mounting kit, a location plate, and a PS2R stylus.

Mounting fixture:	Single stud
Number of ports:	6
Repeatability of module change:	Automatic ≤ 1 µm Manual ≤ 2 µm

MCR20 probe module change rack kits

MCR20 module change rack kit 1

Includes two standard force modules.

Part number: A-1371-0261

MCR20 probe module change rack kit 2

Includes one standard force and one medium force module.

Part number: A-1371-0262

MCR20 probe module change rack kit 3

Includes one standard force and one extended force module.

Part number: A-1371-0263

MCR20 probe module change rack kit 4

Includes two medium force modules.

Part number: A-1371-0264

MCR20 probe module change rack kit 5

Includes one medium force and one extended force module.

Part number: A-1371-02650

MCR20 probe module change rack kit 6

Includes two extended force modules.

Part number: A-1371-0266

MCR20 location plate

Part number: M-1085-0301

TP2 5-way

TP2 5-way is the industry-standard probe for most CMM applications. Its compact dimensions are ideal for probing into restricted component features.

Sense directions:	5-way (±X, ±Y, +Z)	
2σ unidirectional repeatability:	0.35 µm	
Pre-travel variation:	±0.80 µm	
Stylus force range:	7 g to 15 g	
Stylus overtravel:	XY plane	±14°
	+Z axis	4.5 mm @ 7 g
		3.0 mm @15 g
Mounting options:	M8 thread	
Stylus thread size:	M2	
Suitable interface:	PI4-2, PI7-3 or PI200-3	
Test conditions:	10 mm stylus @ 8 mm/s with trigger force of 7 g to 8 g	

Part number: A-1042-1890

TP6/TP6A

The TP6 combines the robust characteristics of the TP1(S) with the repeatability of the TP2. It can be used on manual or DCC CMMs along with Renishaw's vast range of heads and extensions. The TP6A incorporates an autojoint for use with the Renishaw autochange system, or for manual probe changing. The TP6A allows for fast probe exchange without redatuming.

Sense directions:	±X, ±Y, +Z	
2σ unidirectional repeatability:	0.35 µm	
Pre-travel variation:	±1.0 µm	
Stylus force range:	10 g to 30 g	
Stylus overtravel:	XY plane	±22°
	+Z axis	6.5 mm @ 12 g
		3.0 mm @ 30 g
Mounting options:	TP6	M8 thread
	TP6A	Autojoint
Stylus thread size:	M3	
Test stylus length:	21 mm	
Suitable interface:	PI4-2, PI7-3, PI200-3	
Test conditions:	21 mm stylus @ 8 mm/s with trigger force of 11 g to 13 g	

Part number: A-1039-0001 (TP6)
Part number: A-1039-0028 (TP6A)

TP7M

The TP7M is designed to maintain a high level of accurate and reliable performance across a wide range of conditions. The TP7M must be used with either the PH10M probe head or a PH6M fixed head.

Sense directions:	±X, ±Y, ±Z	
2σ unidirectional repeatability:	High sensitivity	0.25 µm
	Mid sensitivity	0.25 µm
Pre-travel variation:	High sensitivity	±0.25 µm
	Mid sensitivity	±0.50 µm
Trigger force:	XY plane	2 g
	Z axis	15 g
Overtravel force:	XY plane	50 g
	Z axis	300 g
Stylus overtravel:	XY plane	16°
	+Z axis	5 mm
	–Z axis	5 mm
Max. extension on PH10M:	200 mm	
Mounting options:	Autojoint	
Stylus thread size:	M4	
Test stylus length:	50 mm	
Suitable interface:	PI7-3 only	
Test conditions:	50 mm stylus @ 8 mm/s	

TP7M probe kit

Part number: A-1073-0121

TP7M EP

The TP7M EP (enhanced performance) is capable of achieving a 3D accuracy of < 0.6 µm tested to ISO 10360 Part 2.

TP7M EP probe kit

Part number: A-1073-0261

TP200/TP200B modular probes

The TP200 and TP200B are electronic probes using strain gauge technology which gives higher accuracy than kinematic touch-trigger probes. They combine outstanding metrology performance with superior functionality to produce a highly versatile DCC CMM probing system with excellent productivity.

The TP200 system components are:

- TP200 probe body – the standard model
- TP200B probe body – a variant model with increased vibration tolerance
- TP200 stylus module – choice of fixed overtravel forces: 'SF' (standard force) or 'LF' (low force)
- PI 200 probe interface
- SCR200 stylus changing rack

TP200 probe body

The TP200 probe incorporates micro strain gauge transducers delivering excellent repeatability and accurate 3D form measurement even with long styli. The sensor technology gives sub-micron triggering performance and eliminates the lobing characteristics encountered with standard probes. The solid state ASIC electronics within the probe ensure reliable operation over millions of trigger points.

TP200B probe body

The TP200B probe uses the same technology as TP200 but has been designed to have a higher tolerance to vibration. This helps to overcome the problem of 'air' trigger generation which can arise from vibrations transmitted through the CMM or when using longer styli with faster positioning speeds. Please note that we do not recommend the use of TP200B with the LF module or cranked/star styli.

Measuring performance			**TP200**	**TP200B**
Principal application			DCC CMM where high accuracy measurement is required	As TP200 but where 'air' * trigger events occur
Sense directions			6-way (±X, ±Y, ±Z)	6 way (±X, ±Y, ±Z)
Unidirectional repeatability (2σ µm)		Trigger level 1 Trigger level 2	0.4 µm (0.000016 in) 0.5 µm (0.000020 in)	0.4 µm (0.000016 in) 0.5 µm (0.000020 in)
XY (2D) form measurement deviation		Trigger level 1 Trigger level 2	±0.8 µm (0.000032 in) ±0.9 µm (0.000036 in)	±1.0 µm (0.000040 in) ±1.2 µm (0.000047 in)
XYZ (3D) form measurement deviation		Trigger level 1 Trigger level 2	±1.0 µm (0.000040 in) ±1.4 µm (0.000056 in)	±2.5 µm (0.000100 in) ±4.0 µm (0.000160 in)
Repeatability of stylus change		With SCR200 Manual	±0.5 µm (0.000020 in) max ±1.0 µm (0.000040 in) max	±0.5 µm (0.000020 in) max ±1.0 µm (0.000040 in) max
Trigger force	XY plane Z axis	All modules All modules	0.02 N 0.07 N	0.02 N 0.07 N
Overtravel force (@ 0.5 mm displacement)	XY plane Z axis	SF/EO module LF module SF/EO module LF module	0.2 N – 0.4 N 0.1 N – 0.15 N 4.9 N 1.6 N	0.2 N – 0.4 N 0.1 N – 0.15 N 4.9 N 1.6 N
Weight (probe sensor + module)			22 g (0.8 oz)	22 g (0.8 oz)
Max. extension (if on PH10 series head)			300 g (11.8 oz)	300 g (11.8 oz)
Max. recommended stylus length (M2 stylus range)		SF/EO module LF module	50 mm (1.97 in) steel – 100 mm (3.94 in) GF 20 mm (0.79 in) steel – 50 mm (1.97 in) GF	50 mm (1.97 in) steel – 100 mm (3.94 in) GF 20 mm (0.79 in) steel – 50 mm (1.97 in) GF
Probe mounting method			M8 thread	M8 thread
Suitable interface			PI200	PI200
Stylus module changing rack (automatic)			SCR200	SCR200
Stylus module storage rack (manual)			MSR1	MSR1

The above data applies for test conditions as follows:

Stylus length 50 mm (1.97 in)
Stylus velocity 480 mm/min (1.57 ft/min)

* Air trigger (or false trigger). The TP200B reduces triggers that may be caused by vibrations.

TP200/TP200B probe kits

TP200 probe with standard force module

Part number: A-1207-0001

TP200 probe with low force module

Part number: A-1207-0002

TP200B probe with standard force module

Part number: A-1207-0055

TP200 accessories

Standard force stylus module

Part number: A-1207-0010

Low force stylus module

Part number: A-1207-0011

TP200 probe cleaning kit

Part number: A-1085-0016

GF stylus kit *

Part number: A-5003-2310

*See Stylus section for kit contents.

SCR200

The SCR200 stylus changing rack provides rapid, automatic changing of styli without the need to requalify probe tips. Installation and set-up of the system are achieved with minimal operator skill, as no special CMM cabling, software or communications are required. The SCR200 is powered and serviced entirely by the PI200-3 interface and is fully crashed protected.

Mounting:	Horizontal or vertical	
Mounting fixture:	Single stud	
Number of ports:	6	
Module location and retention:	Magnetic	
Repeatability of stylus change (2σ) at 50 mm:	Automatic:	1 µm
	Manual:	2 µm
Change cycle:	< 2 seconds	

SCR200 kit

Includes: 3 stylus changing modules
Mounting kit
PS2R stylus
Location plate

Part number: A-1207-0030 (standard force modules)
Part number: A-1207-0070 (low force modules)

SCR200 stylus changing rack only

Part number: A-1085-0002

SCR200 datum stylus (PS35R)

Part number: A-5000-7812

SCR200 cables

Part number: A-1016-7630 (PL63S – 5 m)
Part number: A-1016-7631 (PL64S – 10 m)
Part number: A-1016-7632 (PL65S – 20 m)

SCR200 mounting kit

Part number: A-1085-0005

SCR200 location plate

Part number: M-1085-0301

Special probing systems

SP25

The SP25M is actually two sensors in one – enabling the user to SCAN for form measurement or reverse engineering and TOUCH-TRIGGER PROBE (TTP) for geometry.

Highly accurate scanning performance with (M3) stylus lengths from 20 mm to 200 mm together with the ability to carry Renishaw's TP20 range of touch-trigger probe modules mean that the SP25M system provides unmatched flexibility to optimise a measurement solution to suit the application.

The probe is just 25 mm in diameter, compatible with Renishaw's PH10M/MQ, PH6M and PHS1 probe heads, and can also be mounted using a multiwired extension bar. Together these combinations permit excellent reach and access to part features.

Physical measurement range:		±0.5 mm deflection in all directions in all orientations
Physical overtravel range:		X,Y ±2.0 mm +Z 1.7 mm –Z 1.2 mm
Resolution:		Capable of < 0.1 µm
Spring rate:		0.6 N/mm to 0.2 N/mm – dependent on stylus length
Dimensions:		Ø25 mm × length dependent on module used
Mass:	SP25M body	65 g
	SM25-1 scan module	35 g (includes SH25-1, but excludes stylus)
	SM25-2 scan module	40 g (includes SH25-2, but excludes stylus)
	SM25-3 scan module	49 g (includes SH25-3, but excludes stylus)
	TM25-20 TTP module	40 g (includes TP20 standard module, but excludes stylus)
Mounting:		Multiwired autojoint connnection • compatible with PH10M PLUS, PH10MQ PLUS, and PH6M • may be mounted to autojoint extension bars
Signal outputs:		Non-linear and non-orthogonal analogue outputs – rate, gain and resolution are not fixed
Interface:		AC3 card

SP25M special SCAN/TTP full combination kit

The full scanning system plus the capability to use TP20 modules – this kit includes all the equipment in these separate kits and is supplied as one complete kit:

1 × A-2237-1001	SP25M scanning probe kit #1 (includes SM25-1 kit)
1 × A-2237-1102	SM25-2 scanning module kit
1 × A-2237-1103	SM25-3 scanning module kit
1 × A-2237-1200	TM25-20 TTP module adaptor ONLY (to directly carry any TP20 module)

Part number: A-2237-1015

SP25M scanning probe kit #1 (entry level kit)

Includes: 1 × SP25M probe body
1 × SM25-1 scanning module kit (see below)

Part number: A-2237-1001

SP25M scanning probe kit #2 (entry level kit)

Includes: 1 × SP25M probe body
1 × SM25-2 scanning module kit (see below)

Part number: A-2237-1002

SP25M scanning probe kit #3 (entry level kit)

Includes: 1 × SP25M probe body
1 × SM25-3 scanning module kit (see below)

Part number: A-2237-1003

SP25M scanning probe kit #4 (entry level kit)

Includes: 1 × SP25M probe body
1 × SM25-4 scanning module kit (see below)

Part number: A-2237-1004

SM25-1 scanning module kit

Includes: 1 × SM25-1
2 × SH25-1

Part number: A-2237-1101

SM25-2 scanning module kit

Includes: 1 × SM25-2
2 × SH25-2

Part number: A-2237-1102

SM25-3 scanning module kit

Includes: 1 × SM25-3
2 × SH25-3

Part number: A-2237-1103

SM25-4 full module kit

Includes: 1 × SM25-4
2 × SH25-4
full stylus kit containing:
1 × M3 stylus D5R L21 EWL21 d2.5SS
1 × M3 stylus D5R L50 EWL50 d2.5CE
1 × M3 stylus D10R L200 EWL200 d4C/F
1 × M3 stylus D10R L150 EWL150 d4C/F
1 × M3 stylus D10R L100 EWL100 d4C/F
1 × M3 stylus D10R L75 EWL75 d4C/F
2 × M2-M3 stylus tools

Part number: A-2237-1104

SM25-4 entry level module kit

Includes: 1 × SM25-4
1 × SH25-4
basic stylus kit containing:
1 × M3 stylus D5R L21 EWL21 d2.5SS
1 × M3 stylus D10R L100 EWL100 d4C/F
2 × M2-M3 stylus tools

Part number: A-2237-1108

SM25-4 basic module kit

Includes: 1 × SM25-4
2 × SH25-4
basic stylus kit containing:
1 × M3 stylus D5R L21 EWL21 d2.5SS
1 × M3 stylus D10R L100 EWL100 d4C/F
2 × M2-M3 stylus tools

Part number: A-2237-1109

SM25-5 scanning module kit

Includes: 1 × SM25-5
2 × SH25-5

Part number: A-2237-1105

TM25-20 TTP module adaptor only

Part number: A-2237-1200

TM25-20 TTP module adaptor kit #1

Includes: 1 × TM25-20
2 × TP20 standard modules

Part number: A-2237-1201

SM25-1 scanning module only

Part number: A-2237-1111

SM25-2 scanning module only

Part number: A-2237-1112

SM25-3 scanning module only

Part number: A-2237-1113

SM25-4 scanning module only

Part number: A-2237-1114

SM25-5 scanning module only

Part number: A-2237-1115

SH25-1 stylus holder only

Part number: A-2237-1301

SH25-2 stylus holder only

Part number: A-2237-1302

SH25-3 stylus holder only

Part number: A-2237-1303

SH25-4 stylus holder only

Part number: A-2237-1304

SH25-5 stylus holder only

Part number: A-2237-1305

AC3 interface card

Part number: A-2237-1601

FCR25

The full potential of the SP25M system may be realised when the flexible change rack option is incorporated. Based on the versatile FCR25 triple-port rack unit, which allows any of the SP25M system elements to be rapidly exchanged in any of the ports, this is undoubtedly the most adaptable rack system yet from Renishaw. The FCR25 mounts directly to Renishaw's MRS modular rack system. Alternatively, compact 3-port and 6-port 'standalone' racks are available which incorporate FCR25.

FCR25 flexible change rack unit

Triple-port unit for MRS system.

Includes: 1 × FCR25
3 × PA25-SH
3 × PA25-20

Note: Requires an MRS kit for CMM mounting.

Part number: A-2237-1401

FCR25 TC

Thermally controlled FCR25 for use with SM25 modules only.

Part number: A-2237-1408

FCR25-L3 3-port standalone change rack unit

Includes: 1 × FCR25 with integral leg for table mounting
3 × PA25-SH
3 × PA25-20

Part number: A-2237-1403

FCR25-L6 6-port standalone change rack unit

Includes: 2 × FCR25 with integral leg for table mounting
3 × PA25-SH
3 × PA25-20

Part number: A-2237-1406

FCR25 port adaptor insert kit

Includes: 3 × PA25-SH
3 × PA25-20

Part number: A-2237-1415

SP80

The SP80 is a quill-mounted scanning probe that uses digital scale and readhead technology, plus Renishaw's innovative isolated optical metrology principles, to provide exceptional scanning performance, even with long styli.

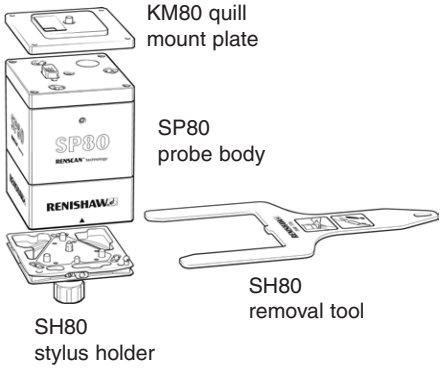
It is able to reach deep into parts by carrying styli up to 500 mm long and 500 g mass, including star configurations which do not require counterbalancing. Renishaw's M5 styli products are designed to complement SP80 and ensure maximum performance.

Detachable stylus holders (SH80) permit rapid and repeatable interchange between stylus configurations, thus eliminating recalibration, maximising productivity and permitting optimum solutions to match the application.

A simple and robust passive design, with no internal motors to generate heat or reliability issues, avoids unnecessary system complexity.

The SP80 probe body houses the sensor mechanism comprising a 'box' spring motion system and the isolated metrology system featuring high accuracy digital scale and readheads.

Longer stylus lengths may be carried subject to operating conditions (consult Renishaw for application assistance).



SP80 probe kit 1

Includes: SP80 probe body
SH80 stylus holder
KM80 quill mount plate
PL157 probe cable
60 mm long stylus
Tools

Part number: A-2238-0700

SP80 probe kit 2

Includes: SP80 probe kit 1
SCP80 stylus change port (3 off)
MRS kit 2 (600 mm rail length – see page 1-58)

Part number: A-2238-0732

SP80 probe kit 3

Includes: SP80 probe kit 1
SCP80 stylus change port (4 off)
MRS kit 2 (600 mm rail length – see page 1-58)

Part number: A-2238-0733

SP80 probe kit 4

Includes: SP80 probe kit 1
SCP80 stylus change port (5 off)
MRS kit 3 (1000 mm rail length – see page 1-58)

Part number: A-2238-0734

SP80 probe kit 5

Includes: SP80 probe kit 2
SH80 stylus holder (3 off)

Part number: A-2238-0735

SP80 probe kit 6

Includes: SP80 probe kit 3
SH80 stylus holder (4 off)

Part number: A-2238-0736

SP80 probe kit 7

Includes: SP80 probe kit 4
SH80 stylus holder (5 off)

Part number: A-2238-0737

SP80H

The SP80H is a horizontal quill-mounted version of the SP80 probe that uses the same digital scale and readhead technology as the SP80 probe.

The SP80H is intended for use on horizontal arm machines and uses the standard SH80 stylus holder and KM80 quill mount. It uses the SCP80V for automated stylus changing.

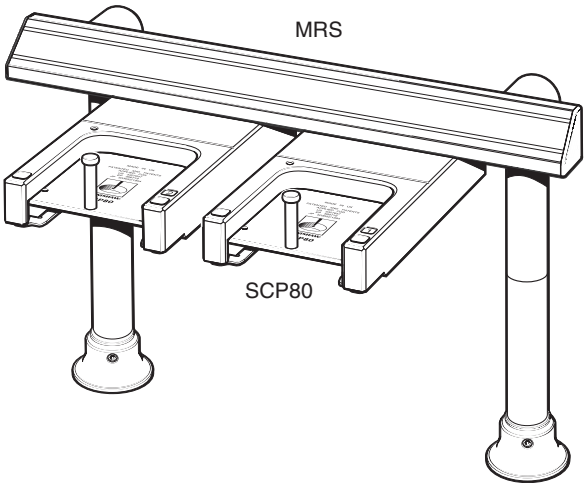
It is able to carry Renishaw's range of M5 threaded styli up to 500 mm long. Stylus configurations up to 300 g unbalanced are possible.

SP80H probe kit 1

Includes:
- SP80H probe body
- SH80 stylus holder
- SH80K stylus holder
- KM80 quill mount plate
- SH80 removal tool
- PL157 probe cable
- 60 mm long stylus
- Tools

Part number: A-2238-0419

Other probe kits similarly configured to the SP80 probe kits are available upon request. Please contact Renishaw for details.



SCP80 stylus change port

Individual ports for rapid interchange between SH80s. The SCP80 mounts to Renishaw's modular rack system (MRS) – see page 1-56.

Part number: A-2238-0706

SCP80V rack port

The SCP80V is a rack port designed for use with SP80H to allow automatic changing of the SCP80 stylus holders on horizontal arm machines. It may also be used for changing stylus holders that have long styli protruding from the rear of a horizontally mounted port.

Part number: A-2238-0726

SH80 stylus holder

Rapidly interchangeable onto the probe body via a magnetic kinematic joint, the SH80 features a 5-way stylus cube which can be rotated to align styli as desired.

Part number: A-2238-0705

SH80K stylus holder

The SH80K is a stylus holder that allows you to power off the SP80 and SP80H probes and turn them back on without needing to re-home the probe.

Part number: A-2238-0430

SH80 removal tool

The SH80 removal tool is used to manually remove the SH80 or SH80K stylus holder from the SP80 or SP80H.

Part number: M-2238-0443

KM80 quill mount plate

The standard mounting plate between the CMM quill (80 mm square) and the SP80 probe body. Provides easy and repeatable removal/replacement of the probe. Alternative CMM quill mountings are available (see KM6080 and SM80 below).

Part number: A-2238-0703

SM80 shank mount plate

As KM80 but with a shank mount to the CMM (non-preferred method).

Part number: A-2238-0704

IU80 interpolator unit

Required for all OEM controller installations (as opposed to Renishaw's UCC controller installations which require use of the UCC/SP80 daughter card).

Part number: A-2238-0720

CC6 counter card

Required where this function is not performed by the CMM controller/PC.

Part number: A-4068-0400

Cables

PL156

IU80 to OEM controller (supplied unterminated).

Part number: A-1016-7129

PL157

SP80 probe cable (included with all SP80 kits).

Part number: A-1016-7132

PL158

IU80 to CC6.

Part number: A-1016-7133

SP600M

The SP600M is an autojointed, multiwired analogue scanning probe which enables a CMM to gather large amounts of data very rapidly for inspection or digitising purposes. Low spring forces allow scanning of finely detailed parts. The probe can be used with a PH10M or PH6M probe head and is compatible with the Renishaw autochange system.

Measurement range:	±1 mm (0.04 in) X, Y, and Z
Return to zero:	< 5 µm (0.0002 in) from 0.5 mm deflection
Resolution:	0.1 µm (0.000004 in) with optional AC2 interface
	0.5 µm (0.00002 in) with optional AC1 interface
Spring rate:	120 gf/mm nominal
Outputs (X,Y,Z):	Analogue proportional voltage output scaling: 4 V to 8.5 V/mm
Interface:	AC1 or AC2 analogue converter PC card (optional)
Mounting:	Multi-wired autojoint
Dimension:	Length 107.5 mm, diameter 50 mm
Weight:	216 g

Part number: A-2098-0105

AC1 analogue converter PC card

Part number: A-2098-1000

AC2 analogue converter PC card

Part number: A-2172-0001

Stylus module – SH600 standard

Part number: A-2098-0284

Stylus module – SH600 extended

Part number: A-2098-1036

SP600Q

The SP600Q is a quill-mounted version of the SP600M probe. It can therefore be connected directly to the quill of a CMM and an external cable carries the probe signal to the interface card. The specification for the SP600Q is identical to the SP600M, with the following exceptions:

Mounting:	Direct in quill
Dimensions:	Length 99 mm, diameter 60 mm
Weight:	299 g

SP600Q kit

Part number: A-2098-0890

SCR600 stylus changing rack

The SCR600 is a passive stylus change rack for use with the SP600M and requires no electrical connections. It houses up to four stylus modules per rack. The rack kit includes two stylus changing modules and additional modules can be purchased separately.

Part number: A-2098-0255

Gram gauge

The gram gauge allows you to adjust, reset and check probe trigger force settings on all standard Renishaw CMM touch-trigger probes. Setting the optimum trigger force using the gram gauge maximises probe performance. It can be used to set trigger force settings over a range of 3 to 30 grams.

Overall length: 95 mm
Needle length: 41 mm
Depth: 27 mm
Width: 43 mm
Range: 4 to 35 gram range with 1 gram graduations

Probe	Stylus length (mm)	Optimum trigger force (grams) *
TP1	31	15
TP2-5W	10	7 to 8
TP2-6W	10	7 to 8
TP6	21	11 to 13
TP6A	21	11 to 13

* This is the optimum trigger force recommended by Renishaw. Higher trigger forces may be required for longer styli.

Part number: P-GA01-0001

CMM probe shanks

Shanks are used to mount the probe head to the quill of the CMM. The shanks listed below are suitable for all Renishaw manual and motorised heads, as well as the TP1 and MIP probes.

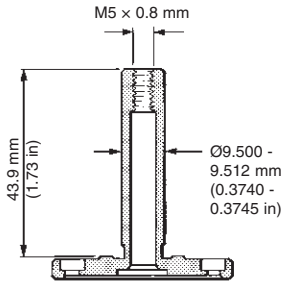
Note: The PH6 requires a different shank and has a separate listing (see page 1-47).

The correct shank must be chosen to suit the mounting facility of your coordinate measuring machine.

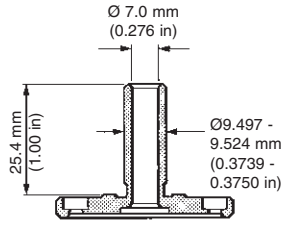
Shanks are included in the price of Renishaw heads and TP1 and MIP probes, but must be specified when placing an order. See the drawings on the following pages for the exact dimensions of each shank.

Shank	Used on the following machines	Part number
MS1	Brown & Sharpe, Bridgeport, Elm Systems, Fanamation, Giddings & Lewis, I.T.P., Poli, Portage Machine, Tesa, Zett-Mess	M-1041-2146
MS1(S)	New Carl Zeiss	A-1041-7114
MS2	Boice, Carl Zeiss, Federal Products, Helmel, Kemco, Metrologic, MFO, Mora, Numerex, Real Meca, Starrett, Tokyo-Boeki, Tri-mesures, TSK, and Wenzel	M-1041-1650
MS3	LK Tool (meter 4), Ferranti, Tarus, W & A, Eley & Warren	M-1041-1656
MS5	Ferranti	M-1041-1652
MS6	C.E. Johannson (old specification)	M-1041-1653
MS7	Renault (Seiv), Tri-Measures	M-1041-1654
MS7(S)	Starrett (new specification)	M-1041-7132
MS8	Olivetti	M-1041-1657
MS9	MTI Corporation (UK)	M-1041-4843
MS10	MTI Corporation	M-1041-7507
MS11	Crown Windley	M-1041-1088
MS12	MTI Corporation (new specification)	M-1041-7068
MS13	DEA Corp	M-1041-5348
MS14	CTA, Real Meca	M-1041-5981
MS15	C.E. Johannson (new specification)	M-1041-2153
MS17	Stiefelmayer	A-1041-7113

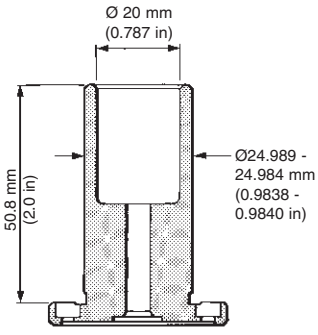
Standard base diameter 41.35 mm – 41.45 mm (1.630 in – 1.632 in)



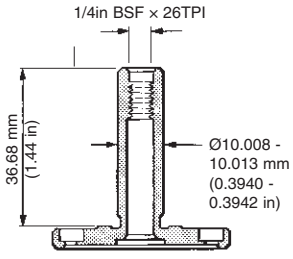
MS1



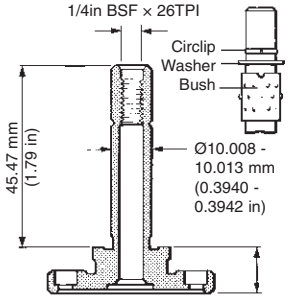
MS2



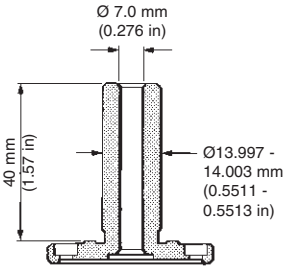
MS3



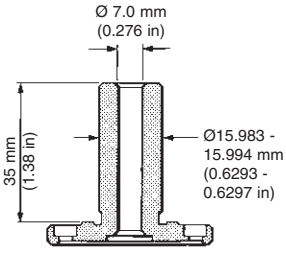
MS4



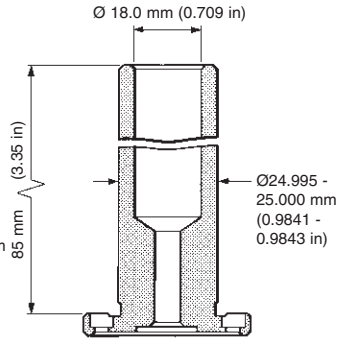
MS5



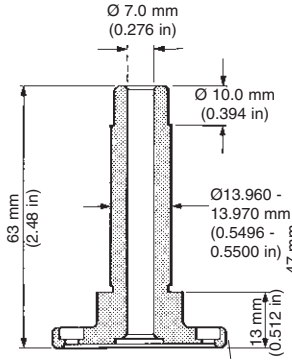
MS6



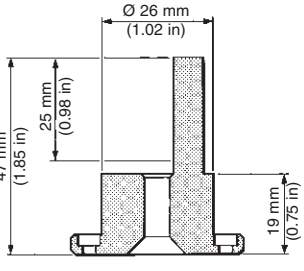
MS7



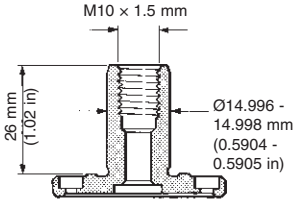
MS8



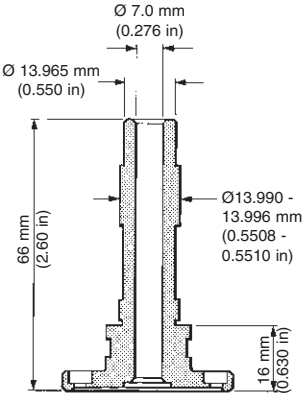
MS9



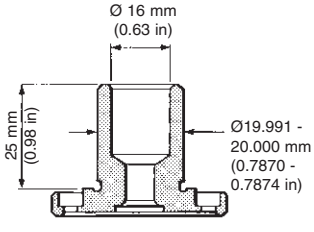
MS10



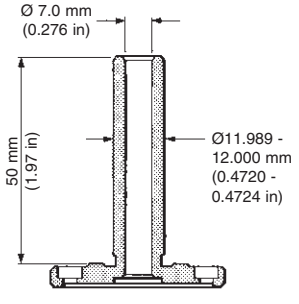
MS11



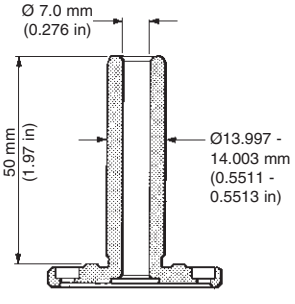
MS12



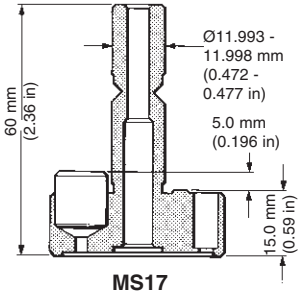
MS13



MS14



MS15

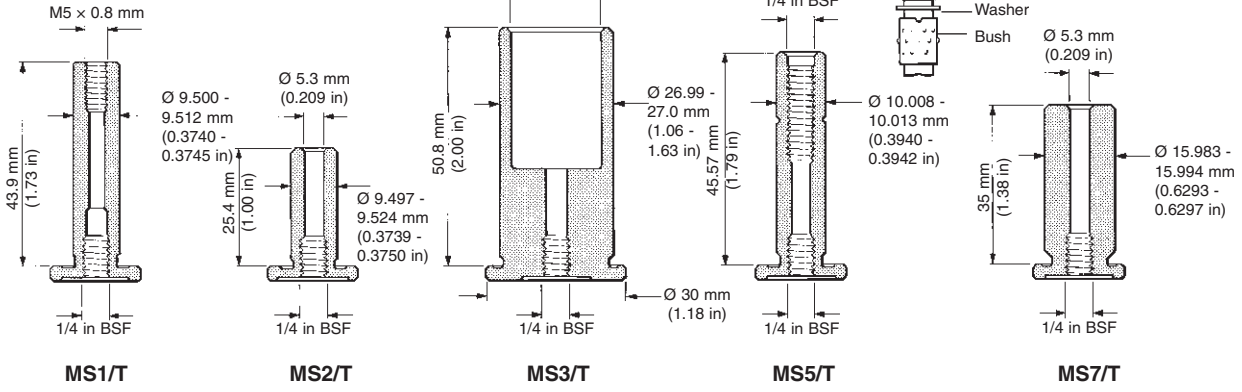


MS17

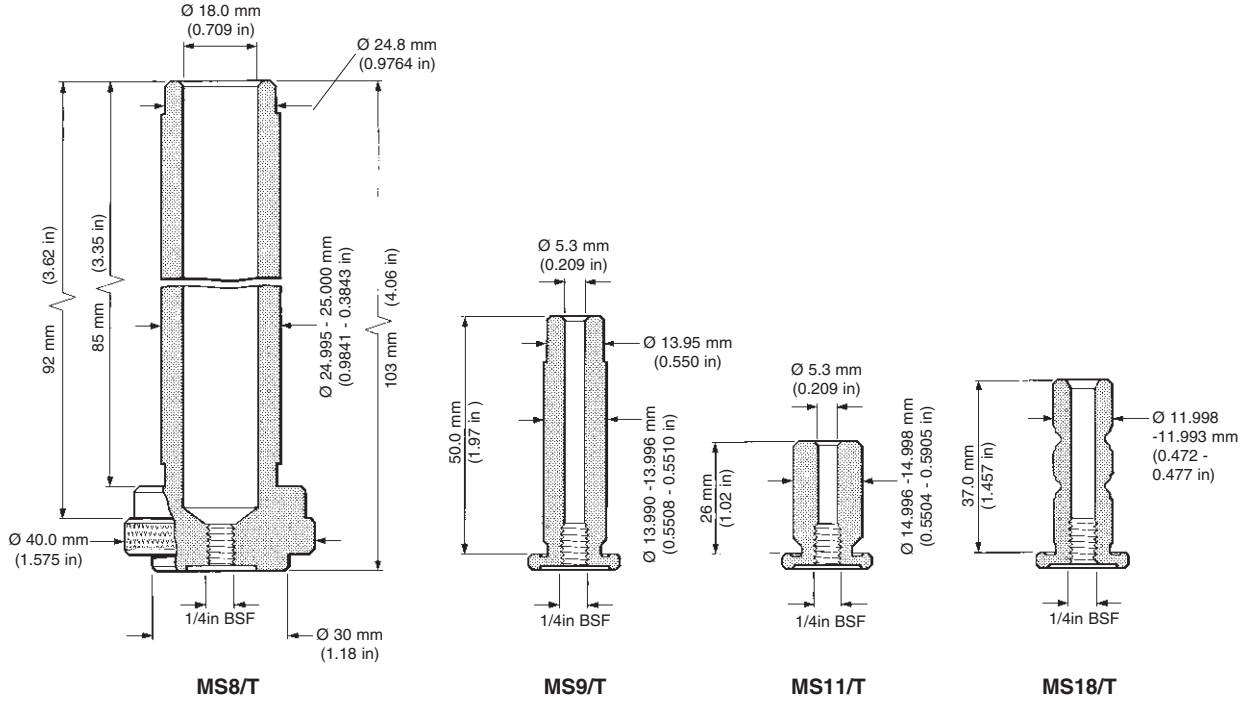
PH6 shanks

Shank	Used on the following machines	Part number
MS1/T	Brown & Sharpe, Bridgeport, Elm Systems, Fanamation, Giddings & Lewis, Poli, Portage Machine	M-1046-1121
MS2/T	Federal Products, Helmel, Kemco, Mora, Numerex, Starrett, Tokyo-Boeki, Wenzel	M-1046-1120
MS3/T	Eley, Ferranti, LK Tool (meter 4), Tarus, W & A, Warren	M-1046-1126
MS4/T	LK Tool (micro)	M-1046-1128
MS5/T	Ferranti	M-1046-1122
MS6/T	C.E. Johannson	M-1046-1123
MS7/T	Renault	M-1046-1124
MS8/T	Olivetti	M-1046-1802
MS9/T	MTI Corporation (UK)	M-1046-4545
MS11/T	Crown & Windley	M-1046-2661
MS18/T	Mora	M-1046-7107

Standard base diameter 18.9 mm – 19.1 mm (0.74 in – 0.75 in) unless stated



MS1/T **MS2/T** **MS3/T** **MS5/T** **MS7/T**



MS8/T **MS9/T** **MS11/T** **MS18/T**

CMM cables

Manual probe head cables

Cable	Type	Overall length	Machine connector	Part number
PL1(T)	Coiled	315 mm – 730 mm (12.4 in – 28.7 in)	5 pin mold – 5 pin DIN	A-1016-0004
PL2(T)	Coiled	465 mm – 1290 mm (18.3 in – 50.8 in)	5 pin mold – 5 pin DIN	A-1016-0006
PL3(T)	Coiled	765 mm – 2415 mm (30.1 in – 95.1 in)	5 pin mold – 5 pin DIN	A-1016-0012
PL4(T)	Plain	4510 mm (177.6 in)	5 pin mold – 5 pin DIN	A-1016-0001
PL14	Coiled	595 mm – 1830 mm (23.4 in – 72 in)	5 pin mold – 7 pin AMPHENOL	A-1016-0003
PL17(T)	Coiled	200 mm – 400 mm (7.9 in – 15.8 in)	5 pin mold – 14 pin LEMO	A-1023-7024
PL18(T)	Coiled	500 mm – 1300 mm (19.7 in – 51.2 in)	5 pin mold – 14 pin LEMO	A-1023-7025
PL27(T)	Coiled	203 mm (8 in)	5 pin mold – 5 pin mold	A-1016-6370
PL27(T)	Plain	152 mm (6 in)	5 pin mold – 5 pin mold	A-1016-6440

Motorised probe head cables

Cable	Type	Overall length	Machine connector	Part number
PL5(U)	Coiled	0.4 m – 0.8 m (16 in – 31 in)	PH9/10 to machine cable	A-1016-7672
PL6(U)	Coiled	0.8 m –1.6 m (31 in – 63 in)	PH9/10 to machine cable	A-1016-7673
PL12(U)	Plain	0.1 m (4 in)	PH9/10 to machine cable	A-1016-7674
PL13(U)	Coiled	0.1 m – 0.2 m (4 in – 8 in)	PH9/10 to machine cable	A-1016-7675
PL33(U)	Plain	3 m (118 in)	PH9/10 to machine cable	A-1023-7056
PL93(U)	Plain	0.1 m (4 in)	PH10MQ to PLM6/7/8/9S	A-1016-7676

Machine cables

Cable	Type	Overall length	Machine connector	Part number
PLM6(T)	Plain	6 m (19 ft)	PH10 cable to PHC10-3 controller (chassis)	A-1016-7564
PLM7(T)	Plain	4 m (13 ft)	PH10 cable to PHC10-3 controller (chassis)	A-1016-7563
PLM8(U)	Plain	6 m (19 ft)	PH10 cable to PHC10-3 controller (socket)	A-1016-7677
PLM9(U)	Plain	4 m (13 ft)	PH10 cable to PHC10-3 controller (socket)	A-1016-7678

Output cables

Cable	Type	Overall length	Machine connector	Part number
PL7	Plain	3 m (118 in)	5 pin DIN to 5 pin DIN	A-1029-0166
PL15	Plain	4.5 m (177 in)	5 pin DIN, interface to CMM	A-1004-0110
PL26(T)	Plain	0.6 m (23 in)	PI200-3 to PHC9 (7 pin)	A-1057-0132
PL37	Plain	0.5 m (19 in)	7 pin DIN to 7 pin DIN	A-1054-0003

Multiwired cables

Cable	Type	Overall length	Description	Part number
PL38V	Plain	25 m (82 ft)	Multiwired cable	A-1016-7625
PL42V	Plain	15 m (49 ft)	Multiwired cable	A-1016-7624
PL44V	Plain	8 m (26 ft)	Multiwired cable	A-1016-7627
PL45V	Plain	1.8 m (5.9 ft)	Multiwired cable	A-1016-7629
PL46V	Plain	3.7 m (12 ft)	Multiwired cable	A-1016-7628
PL56V	Plain	12 m (39.3 ft)	Multiwired cable	A-1016-7626
PL75V	Plain	1 m (3.2 ft)	IS1-2 extension cable	A-1016-7644

Adaptor/extension cables

Cable	Type	Overall length	Description	Part number
PL9	Plain	0.6 m (23 in)	Machine cable to probe interface cable	A-1029-0182
PL10	Plain	0.1 m (4 in)	Machine cable to probe/head cable (5 pin)	A-1029-0111
PL22	Plain	0.3 m (12 in)	Probe head cable adaptor (PL1S, 2S, 3S, 4S to PI4-2, PI200-3 input)	A-1057-0131
PL23(T)		0.5 m (19 in)	PI4-2, PI200-3 adaptor cable (machine cable to PHC9 extension cable PL82V to video interface)	A-1057-0133
PL97(S)	Plain	0.1 m (4 in)	SCR200 Y adaptor cable	A-1016-7660

PICS interconnection cables

Cable	Overall length	Description	Part number
PL24	5 m (196 in)	PI200-3 or PI7-3 to CMM	A-1016-0121
PL25(T)	0.3 m (11 in)	PI200-3 or PI7-3 to PHC10-3/ACC2-2	A-1016-0120
PL70(V)	0.5 m (19 in)	PI200-3 and PI7-3 interfaces	A-1016-7634
PL72	2 m (6.5 in)	PI200-3 or PI7-3 to PHC10-3/ACC2-2	A-1016-7637
PL76(S)	0.7 m (2.25 in)	T cable	A-1016-7643

Extensions

The extensions and knuckle joint are the primary means of adding flexibility to fixed heads. Extensions provide penetration into deep features, while the knuckle joint allows inspection of angular features. The knuckle joint allows 360° in the B axis and ±100° in the A axis.

Extension bars

Number	Description	Material	Length	Diameter	Part number
PEL1	M8 thread to M8 thread	Aluminium	50 mm (1.97 in)	13 mm	A-1047-3484
PEL2	M8 thread to M8 thread	Aluminium	100 mm (3.94 in)	18 mm – 13 mm	A-1047-3485
PEL3	M8 thread to M8 thread	Aluminium	200 mm (7.87 in)	18 mm – 13 mm	A-1047-3486
PEL4	M8 thread to M8 thread	Aluminium	300 mm (11.81 in)	13 mm	A-1047-3487
PECF1*	M8 thread to M8 thread	Carbon fibre	50 mm (1.97 in)	13 mm	A-1047-7065
PECF2*	M8 thread to M8 thread	Carbon fibre	100 mm (3.94 in)	13 mm	A-1047-7064
PECF3*	M8 thread to M8 thread	Carbon fibre	200 mm (7.87 in)	13 mm	A-1047-7066

* These products are special order only. Please call for details.

Knuckle joint

Number	Description	Part number
PK1	Knuckle joint	A-1014-1720

Autojoint extension bars

Number	Description	Material	Length	Diameter	Part number
PAA1	Autojoint to M8 thread	Steel	30 mm (1.18 in)	25 mm – 18 mm	A-1051-0417
PAA2	Autojoint to M8 thread	Aluminium	140 mm (5.51 in)	25 mm – 13 mm	A-1051-0418
PAA3	Autojoint to M8 thread	Aluminium	300 mm (11.81 in)	25 mm – 13 mm	A-1051-0419
PAACF2*	Autojoint to M8 thread	Carbon fibre	140 mm (5.51 in)	25 mm – 13 mm	A-1051-0488
PAACF3*	Autojoint to M8 thread	Carbon fibre	300 mm (11.81 in)	25 mm – 13 mm	A-1051-0493
PAACF*	Autojoint to M8 thread	Carbon fibre	400 mm (15.74 in)	25 mm – 14 mm	A-1051-0513
PAACF*	Autojoint to M8 thread	Carbon fibre	450 mm (17.72 in)	25 mm – 14 mm	A-1051-0394
PEM1	Autojoint to autojoint	Steel/aluminium	50 mm (1.97 in)	25 mm	A-1076-0070
PEM2	Autojoint to autojoint	Steel/aluminium	100 mm (3.94 in)	25 mm	A-1076-0071
PEM3	Autojoint to autojoint	Steel/aluminium	200 mm (7.87 in)	25 mm	A-1076-0072
PEM4	Autojoint to autojoint	Steel/aluminium	150 mm (5.91 in)	25 mm (90°)	A-1076-0073
PEMCF1*	Autojoint to autojoint	Carbon fibre	50 mm (1.97 in)	25 mm	A-1051-0490
PEMCF2*	Autojoint to autojoint	Carbon fibre	100 mm (3.94 in)	25 mm	A-1051-0443
PEMCF3*	Autojoint to autojoint	Carbon fibre	200 mm (7.87 in)	25 mm	A-1051-0491
PEMCF*	Autojoint to autojoint	Carbon fibre	150 mm (5.91 in)	25 mm	A-1051-1132

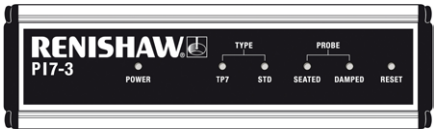
* These products are special order only. Please call for details.

Interfaces

PI7-3

The PI7-3 interface is a dual-purpose probe interface designed to process signals from the TP7M high-accuracy probe and standard touch-trigger probes (TP2, TP20, TP6, and TP6A). Special auto-selecting electronics within the interface allow the automatic use and exchange of all of these probes without any setting changes to the interface.

The PI7-3 performs all the functions of the PI4 and PI9 interfaces, but has additional features such as probe damping, probe inhibit, and emergency stop. This interface can be either free-standing or rack-mounted.



Application:	TP7, TP2, TP6, TP6A, TP20, MH20, and MH20i	
Power supply:	85 V – 135 V, 50/60 Hz	
	170 V – 270 V, 50/60 Hz	
Dimensions:	Height	88 mm (3.46 in)
	Width	146 mm (5.75 in)
	Depth	208.5 mm (8.21 in)
Input:	9 way ‘D’ type socket	
TP7M input:	15 way double density ‘D’ type socket or	
	9 pin ‘D’ type socket	
Compatibility:	Output TTL(PICS)/SSR 5 pin DIN socket	
	(PICS-9 pin ‘D’ type plug)	
Cables	Contact Renishaw	

Part number: A-5726-0100

PI200-3

The PI200-3 interface can be interconnected within the majority of Renishaw's manual and motorised probing installations with no additional CMM communications or control signalling required. Optimum performance will be obtained on installations utilising probe damping or halt signal facilities. Probe signalling between TP200 and PI200-3 must be direct and uninterrupted. Probe signal interfacing may be present within some CMM cabling arrangements. Call Renishaw for further details.

Application:	TP1, MIP, TP2, TP20, TP6, TP6A, TP200, MH20, and MH20i
Power supply:	85 V – 264 V, 47 Hz – 66 Hz
Dimensions:	Height 88 mm (3.46 in)
	Width 146 mm (5.75 in)
	Depth 183 mm (7.19 in)
Input:	9 way 'D' type socket
Compatibility:	Output PICS/SSR

Part number: A-5707-0100

IS1-2

The IS1-2 interface selector is a fully-automatic system for use on CMM installations requiring multiple sensor types (i.e. video, laser, analogue, etc.). The unit functions by identifying which probe has been fitted to the probe head and switches the probe signal/power lines to the appropriate interface. The unit is configurable by inserting different programming modules.

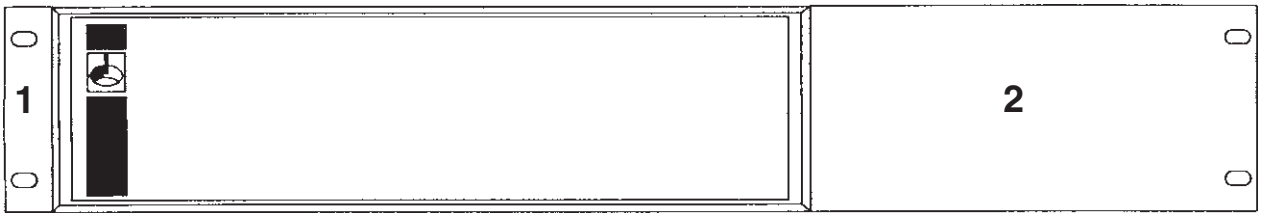
Applications:	TP7M, SP600M, TP2, TP20, TP6, TP200, SP25M, TP800
Power supply:	85 V – 264 V, 47 Hz – 66 Hz
Dimensions:	Height 88 mm (3.46 in)
	Width 164 mm (5.75 in)
	Depth 208 mm (8.21 in)
Input:	15 way double density 'D' type socket
Output:	15 way double density 'D' type plug and
	9 way 'D' type plug (PICS)
Cables:	Contact Renishaw

Part number: A-1327-0100

Mounting brackets

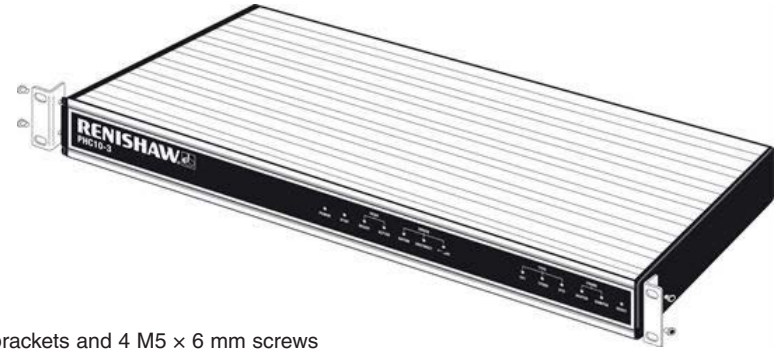
Renishaw controllers and interfaces are supplied in various different types of enclosures. Consult the drawings below to determine your bracket requirements based upon the combination of products you are installing.

PHC9 / PHC50 / PHC10-2 / ACC2-2



1. Rack mount bracket kit **Part number:** A-1018-0124
2. 1/3 blanking panel kit **Part number:** A-1018-0123

PHC10-3 PLUS cabinet mounting



Mounting kit containing 2 brackets and 4 M5 × 6 mm screws

Part number: A-1018-0189

PI7-3 alone / PI200-3

1/3 mounting panel kit containing 1U × 1/3 blanking plate and 2 M6 × 5 mm screws (2 kits required)

Part number: A-1018-0179

PI7-3 next to PHC10-2

Mounting kit containing PI7-3 to PHC10-2 conversion bracket

Part number: A-1018-0173

Autochange system

Renishaw's autochange equipment is the world's first integrated CMM probe exchange system. Mounted within the CMM's working envelope, autochange facilitates fast, automatic probe exchange without the need for redatuming. In addition, it provides covered storage for probes and extension bars.

ACR1 autochange rack with adjustable base

The ACR1 is designed to accept the SP600 and SP25M as well as all other Renishaw autojoint probes and extension bars (must be used in conjunction with the horizontal mounting kit – see below). The rack is supplied with eight long ports for maximum support. Where a probe greater than Ø25 mm is required, the rack can be configured by the user by swapping a long port for a short port (see below).

Number of stations: 8
Dimensions: 460 mm × 109 mm × 81 mm

This system can be mounted either horizontally or vertically.

Part number: A-1051-4000

Note: Adjustable base, legs and cable sold separately (see page 1-55).

Horizontal mounting kit

Includes: 1 × adjustable rack base
2 × 200 mm legs
2 × screws

Part number: A-1051-0441

Vertical mounting kit

Includes: 1 × support plate
8 × support pins (short)
8 × support pins (long)

Part number: A-1051-1308

ACC2-3 autochange controller

Data transmission:	Serial (RS232)
User-definable parameters:	Baud rate 300–19200
Voltage range:	90 V – 246 Vac 50 Hz / 60 Hz
Dimensions:	Height 44 mm (1.73 in) Width 440 mm (17.3 in) Depth 180 mm (7.1 in)

Part number: A-6299-0100

ACR1 autochange system accessories

Adjustable rack base

Part number: A-1051-0440

Leg (100 mm)

Part number: M-1051-0147

Leg (200 mm)

Part number: M-1051-0148

Port replacement kits

All kits contain four ports.

Short port replacement kit

Part number: A-5036-0049

Long port replacement kit

Part number: A-1051-7077

Mixed port replacement kit

Contains two short and two long ports.

Part number: A-1051-7076

ACR1 autochange system cables

PL19 5 m cable

Part number: A-1051-0199

PL20 10 m cable

Part number: A-1051-0045

PL21 15 m cable

Part number: A-1051-0102

PL40 30 m cable

Part number: A-1054-0002

ACR3 autochange rack

The ACR3 forms part of the modular rack system (MRS) and is an autochange rack for probes and extension bars that incorporate the Renishaw autojoint. The ACR3 is a four-port mechanical design that traverses the MRS rail. Driven by the motion of the CMM, it locks and unlocks the autojoint between the probe and the probe head.

ACR3 4-port rack

Part number: A-5036-0005

Note: For 8-port applications, two 4-port racks can be connected together. The 8-port configuration requires the use of either the MRS kit 2 or MRS kit 3 (see below).

MRS kits

Include: MRS rail (see below)
MRS feet (2)
125 mm legs (4)
Step back adaptors (2)

The MRS rail is available in 400 mm, 600 mm and 1000 mm lengths.

MRS kit 1

400 mm long rail.

Part number: A-4192-0001

MRS kit 2

600 mm long rail.

Part number: A-4192-0002

MRS kit 3

1000 mm long rail.

Part number: A-4192-0003

Note: The MRS kits are compatible with FCR25, SCP600 and ACR3.

MRS rails

Part number: A-4192-0050 (400 mm)
Part number: A-4192-0051 (600 mm)
Part number: A-4192-0052 (1000 mm)

ACR3 components

SCP600

Stylus change port for SP600.

Part number: A-2098-0933

MRS legs

One per kit.

Part number: A-4192-0061 (62.5 mm)
Part number: A-4192-0053 (125 mm)

MRS heavy duty leg kit

Ø60 mm × 350 mm long. One per kit.

Part number: A-4192-0020

MRS adjustable foot plate

Two per kit.

Part number: A-4192-0702

MRS leg and foot adaptor

One per kit.

Part number: A-4192-0055

MRS fixed foot

One per kit.

Part number: A-4192-0056

MRS step back adaptor

One per kit.

Part number: A-4192-0058

M8 T nut

Part number: P-NU18-0005

MRS spacer kit

Two per kit.

Part number: A-4192-0014

MRS2 kits

The MRS2 is a highly versatile storage solution for Renishaw probe and stylus configurations. It has been designed for users who are increasingly using their CMMs for multi sensor measurement, and therefore need to store greater varieties of probes and styli on racks within a limited machine working volume.

MRS2 is built entirely from extruded aluminium and is available in a variety of interchangeable rail and leg kits that can be configured according to the need of the individual. Leg and rail kits are sold separately to allow maximum flexibility. Rails can be tiered, using the front and back spacer kits, to offer up to 3 m of rail space.

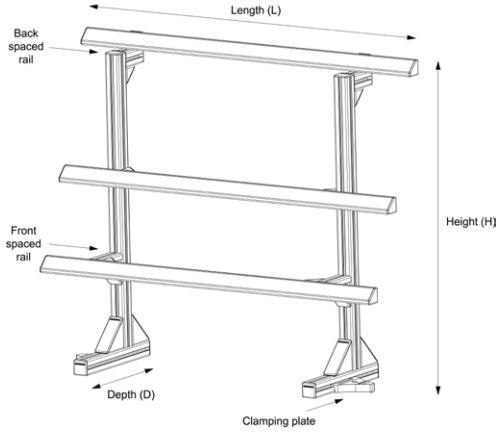
MRS2 leg kits

Includes: 2 × leg extrusions
4 × 40 mm brackets
6 × square end caps
2 × extrusion clamp plate kits

Not included: Rail, front spacer, and back spacer.

Part number: A-6007-1020 (H = 200 mm)
Part number: A-6007-1040 (H = 400 mm)
Part number: A-6007-1060 (H = 600 mm)
Part number: A-6007-1080 (H = 800 mm)

MRS2 rail kits



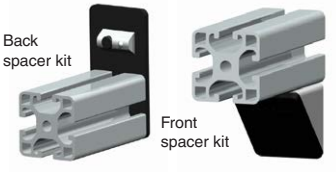
Includes: 1 × rail
2 × triangular end caps
2 × 40 mm brackets

Not included: Leg, front spacer, and back spacer.

Part number: A-6007-2040 (L = 400 mm)
Part number: A-6007-2060 (L = 600 mm)
Part number: A-6007-2100 (L = 1000 mm)

MRS2 spacer kits

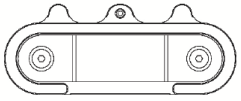
Part number: A-6007-3010 (front spacer kit)
Part number: A-6007-4008 (back spacer kit)



MRS2 accessories

MRS2 spirit level

Part number: A-6007-0630



MRS2 extrusion clamp plate kit

Part number: A-6007-0620 (1 per kit)

MRS2 end caps and brackets

Part number: A-6007-0710 (4 × triangular end caps)
Part number: A-6007-0720 (6 × square end caps)
Part number: A-6007-0740 (4 × 40 mm bracket end caps)
Part number: A-6007-0780 (4 × 80 mm bracket end caps)
Part number: A-6007-0810 (10 × D-nuts and bolts)

Datum sphere

The Renishaw universal datum sphere enhances the performance of manual and fully automated CMMs. It allows for quick and easy adjustment to set ball stem over a wide range of probe datuming angles. This enables datuming above, centrally and below the ball. Each datum sphere is supplied with its own certificate, giving ball diameter and roundness. All sphere measurements are performed on equipment traceable to UK (NPL) standards.

Specifications:	Hard-wearing tungsten carbide sphere (ball) available in five sizes
Metric:	Ø12 mm, Ø19 mm and Ø25 mm
Inch:	Ø3/4 in and Ø1 in
Sphericity:	to within 0.1 µm (0.000004 in)
Diametric tolerance:	±1 µm (0.00004 in)

Datum sphere kit

Includes:
- 1 datum ball (selected by size)
- Pivot pillar
- Base
- C spanner
- Ball certificate
- Storage box

Description	Part number
Ø12 mm ball	A-1034-0028
Ø19 mm ball	A-1034-0027
Ø25 mm ball	A-1034-0026
Ø¾ in ball	A-1034-0031
Ø1 in ball	A-1034-0035

Datum sphere fixing studs

A fixing stud is required with each kit to attach the pillar to the table surface. Select one from the list below.

Description	Manufacturer	Part number
M6 × 1		A-1034-0352
M8 × 1.25	MTI	A-1034-0351
M10 × 1.5	B&S, LK Tool & Sheffield	A-1034-0350
5/16–18 UNC		A-1034-0354
3/8–16 UNC	Carl Zeiss, Fanamation, LK Tool, & L.S. Starrett	A-1034-0353

Datum sphere accessories (M6 thread – stem is attached to the ball)

Description	Part number
Ø12 mm datum ball	A-1034-0005
Ø19 mm datum ball	A-1034-0023
Ø25 mm datum ball	A-1034-0002
Ø¾ in datum ball	A-1034-0032
Ø1 in datum ball	A-1034-0036
2 way adaptor	A-1034-0356
3 way adaptor *	A-1034-0357
Pillar extension 75 mm (2.96 in) long	A-1034-0355

* Special order

Probe extension kits

Kit EKL **Part number:** A-1047-7005

Description	Quantity	Part number
Lightweight extension bar (50 mm) PEL1	1	A-1047-3484
Lightweight extension bar (100 mm) PEL2	1	A-1047-3485
Lightweight extension bar (200 mm) PEL3	1	A-1047-3486
Double-ended spanner	1	A-1047-3932
Box	1	A-1015-7694

PEM Kit **Part number:** A-1076-0100

Description	Quantity	Part number
Multiwire extension bar (50 mm) PEM1	1	A-1076-0070
Multiwire extension bar (100 mm) PEM2	1	A-1076-0071
Multiwire extension bar (200 mm) PEM3	1	A-1076-0072
Joint key	1	A-1051-0040
Box	1	A-1015-7761

Stylus tools

S1 C spanner (for use with TP20 probe body)

Part number: A-1042-1486

S3 hex key 1.5 mm A/F

Part number: P-TL01-0150

S4 hex key 3.0 mm straight arm

Part number: P-TL01-03004

S5 wrench 2 mm A/F

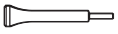
Part number: P-TL01-02004

S6 hex key 2.5 mm A/F

Part number: P-TL01-0250

S7 stylus tool (for use with M2 and M3 styli)

Part number: M-5000-3540



S9 double-ended spanner

Part number: A-1047-3932

S10 joint key (for use with autojoint)

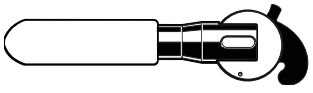
Part number: A-1051-0040

S12 hex key 0.9 mm A/F

Part number: P-TL01-0089

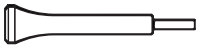
S20 torque tool (for use with M2 carbon fibre stylus)

Part number: A-5003-2300



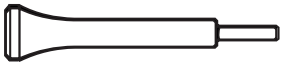
M4 stylus tool (for use with M4 and M5 styli)

Part number: M-5000-3707



Stylus tool (for use with adaptor M-5000-9301)

Part number: M-5000-9304



Tool kits

TK1 tool kit

The TK1 tool kit is included with the MP1, MP3, MP4, MP7, MP8, MP9, MP10, MP11, MP12, MP14 and LP2 probes.

Includes: Stylus tool Ø1.98 mm
Hex key 1.5 mm A/F
Hex key 2.0 mm A/F
Hex key 2.5 mm A/F
Hex key 3.0 mm A/F
Hex key 4.0 mm A/F

Part number: A-2053-7531

TK3 tool kit

The TK3 tool kit is included with the M6-3 probe.

Includes: Stylus tool Ø1.98 mm
Hex key 1.5 mm A/F
Hex key 2.0 mm A/F
Hex key 2.5 mm A/F
Hex key 3.0 mm A/F
Hex key 4.0 mm A/F
Hex key 5.0 mm A/F

Part number: A-2027-7046

TK4 tool kit

Includes: S7 stylus tool (2)
Hex key 1.5 mm A/F
Hex key 2.5 mm A/F

Part number: A-1041-7041

TK5 tool kit

Includes: S7 stylus tool (2)
S8 spanner
C spanner
Double-ended spanner
Hex key 1.5mm A/F

Part number: A-1042-7030

TK6 tool kit

Includes: Hex key 2.0 mm A/F
Hex key 2.5 mm A/F
Hex key 3.0 mm A/F

Part number: A-1042-7031

TK7 tool kit

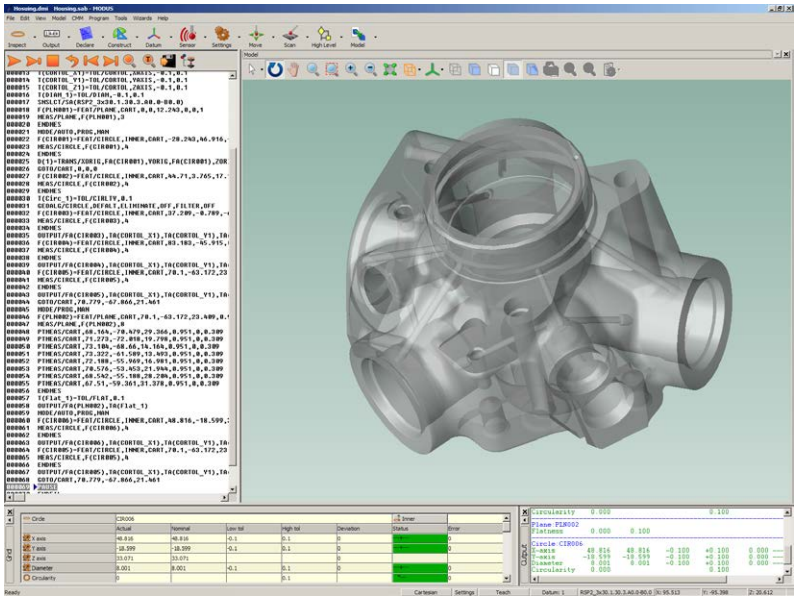
Includes: Joint key
S7 stylus tools (2)
Hex key 1.5 mm A/F

Part number: A-1039-0041

CMM metrology software

MODUS™

Renishaw's MODUS™ software provides a powerful platform for 3-axis and 5-axis measurement. A configurable user interface allows native DMIS programs to be developed online or offline, drawing geometry, embedded dimensions and tolerance data from CAD, with full simulation and collision detection. The software includes certified algorithms for feature measurement, feature construction and part alignment.



- Full support for I++ DME compliant metrology controllers, including Renishaw's UCC range of universal CMM controllers
- Full compatibility with REVO® and PH20
- CAD-driven online / offline programming
- Full motion simulation and collision detection, including 5-axis moves
- Native DMIS support
- Certified mathematical algorithms
- Powerful text and graphical reporting
- Flexible output of results data including certified Q-DAS

MODUS™

MODUS™ – 3-axis and 5-axis touch-trigger

Part number: A-5639-0001-KIT

MODUS™ – 3-axis scanning

Part number: A-5639-0003-KIT

MODUS™ – 5-axis scanning

Part number: A-5639-0005-KIT

MODUS™ Offline*

MODUS™ – Offline 3-axis and 5-axis touch-trigger

Part number: A-5639-0101-KIT

MODUS™ – Offline 3-axis scanning

Part number: A-5639-0103-KIT

MODUS™ – Offline 5-axis scanning

Part number: A-5639-0105-KIT

Options

Renishaw offers multiple application-specific analysis packages including Modus Airfoil. These are chargeable modules added to a base package of Modus 3-axis or 5-axis. Please contact Renishaw for details.

* *The online version of MODUS™ can also be run offline without the need to purchase MODUS™ Offline. Only purchase MODUS™ Offline if you require a dedicated offline seat of MODUS™.*

CAD integration options

MODUS™ v1.11 and newer includes a wide range of CAD options including IGES, STEP, VDA-FS, CATIA® (v5 and v4), Unigraphics®, Parasolid®, Pro/E® and SolidWorks®.

Modus PMI CAD license

Includes PMI support for Pro/E®, Solidworks®, Catia® v5 and Unigraphics®.

Part number: M-5639-5710

Software maintenance agreements

Every new purchase of MODUS™ comes with one year's free software updates, maintenance and support. After the first year, one-year maintenance agreements can be purchased for MODUS™ and its software options. Please contact Renishaw sales for details.

MODUS™ Planning Suite

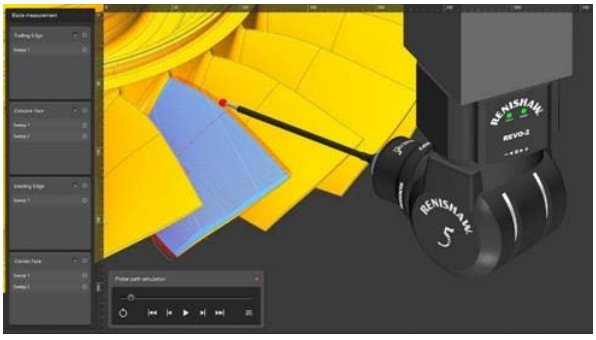
MODUS™ Planning Suite makes complex programming easy.

MODUS Planning Suite is a modular application that simplifies the creation of DMIS code for curve and surface measurement with REVO. It supports RSP2 and RSP3 probes and offers a range of tools to ensure a collision-free and optimised motion. The software is designed for use in conjunction with MODUS 1.9 or later.

The MODUS Planning Suite consists of three separately purchasable modules: Blade, Patch, and Curve.

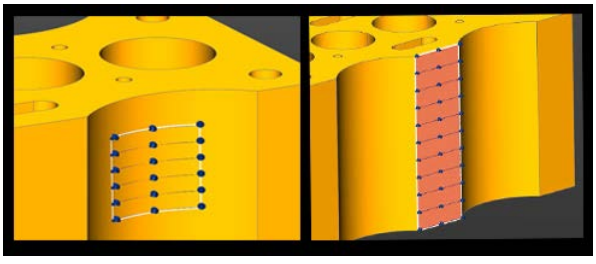
MODUS Planning Suite – Blade

The Blade module is an addition that incorporates the functionality of the previous APEXBlade product. It enables full blade inspection with sweep scans on concave, convex, leading and trailing edge surfaces using the REVO RSP2 sensor. It also allows section measurement with joined sweeps or curve scans on faces.



MODUS Planning Suite – Patch

The MODUS Patch application delivers the most efficient measurement path with the REVO RSP2 sensor, quickly and easily, with automatic path planning. The Patch module provides the ability to create a patch from an outline of points, selected faces, points on a centre line, or CAD edges.



MODUS Planning Suite – Curve

The curve planning module includes support of REVO's RSP2 and RSP3 curve measurements. RSP3 provides increased capability to measure complex geometries using different probe assemblies. Curves can be defined by the selection of edges from the CAD model or by clicking points on a plane.

RENISHAW apply innovation™

Renishaw Central

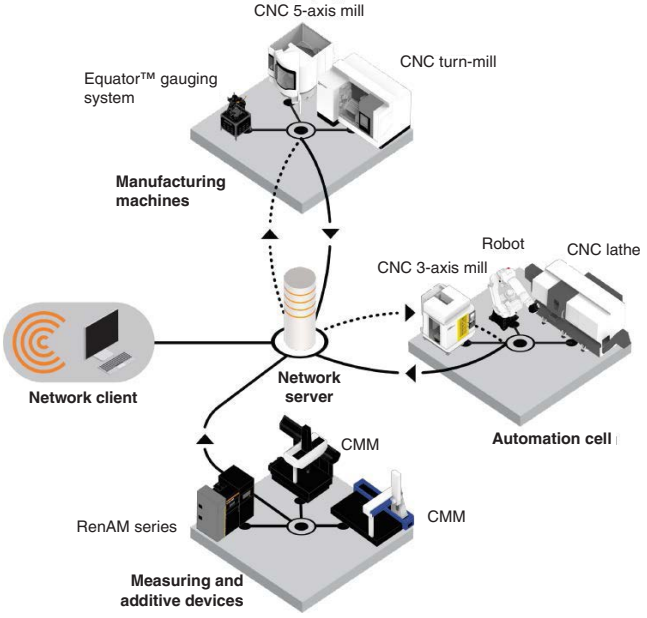
Accurate actionable process data

Renishaw Central – Smart manufacturing data platform

Renishaw Central provides a clear view of a manufacturing facility's process and metrology data.

It can do this by collecting process, machine and part data from across the machine shop, including additive manufacturing (AM) systems, on-machine measurements, shop floor gauging and co-ordinate measuring machines (CMMs).

We support our global customers with their smart manufacturing ambitions by helping them to operate their 'factories of the future' today.



Renishaw Central

Renishaw Central is a manufacturing connectivity and data platform that collects, and provides visibility of, manufacturing process data. Renishaw Central enables users to monitor and update machining and quality control systems. Its features also allow for manufacturing process parameters to be updated automatically using its IPC (Intelligent Process Control) functionality.

Renishaw services

Renishaw offers a number of services including: part inspection programming, bespoke training, CMM calibrations and other engineering support. Please contact us with the services you require and we will gladly put together a quotation to meet your company's unique business and technical needs.