Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

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Product catalog
Issue 18

Introduction

Foreword

All prices are quoted in U.S. dollars and are subject to change without notice. Prices include packaging, but exclude freight, tax and insurance (where applicable).

All freight is shipped F.O.B. Hoffman Estates, Illinois. Renishaw automatically ships and insures items via United Parcel Service unless the customer specifies otherwise.

Renishaw's terms of business are thirty (30) days net.

Renishaw's return policy for unused items returned by customers is as follows:

A notice requesting goods to be returned must occur within 30 days of shipment. A Return Goods Authorization number (RGA) will be issued by Renishaw's Customer Service department and is required prior to goods being returned. Goods must then be returned within 30 days of issue date. The RGA number must be noted on all paperwork and labels for return. Shipment to Renishaw without an RGA number may be refused.

Returned product will be inspected and credit will be issued, except where an item is damaged, incomplete, or not in the original packaging. Specials, or non-standard assembled products, are non-returnable.

If you require further information regarding Renishaw products, please contact us at:

The Renishaw mission

Renishaw will design, manufacture and supply metrology systems of the highest quality and reliability to enable customers worldwide to carry out dimensional measurements to traceable standards.

Our product offerings will enhance quality and productivity, and we will strive for total customer satisfaction through superior customer service.

Our aim is to provide leading edge technology by encouraging innovation to address our customers' needs.

We are committed to sustained growth through continued investment in product development and manufacturing methods.

Renishaw wishes to be recognized collectively and individually as leaders and contributors in our field and our community.

We wish to achieve our aims in a way that is caring, open and honest.

Renishaw is an environmentally conscious and responsible company. We will strive to ensure that all aspects of the business have the least harmful effect on the environment.

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

PH5

A 5-way fixed head, which accommodates up to five probes simultaneously.

Number of probe sockets:	5
Probe status indication:	2 LEDs
Cable connection:	5 pin DIN 180° socket
Mounting options:	Shank to suit your CMM

Part number: A-1045-1883

PH5/1

The PH5/1 incorporates positive B-axis indexing and limited overtravel protection.

Number of probe sockets:	5
Probe status indication:	2 LEDs
Cable connection:	5 pin DIN 180° socket
Overtravel break load:	Adjustable from 20 gf (0.7 ozf) to locked solid
A-axis indexing:	N/A
B-axis indexing:	15° steps through 360°
Mounting options:	Shank to suit your CMM

Consists of:

Part number: A-1045-1883
Part number: A-1045-1893

PH6

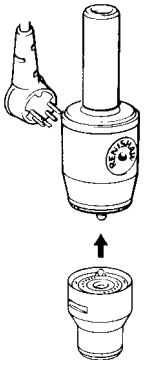
A compact, vertical probe head for a single probe, with a choice of integral cables (see below).

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

MIH-S

The MIH-S is a derivative of the well-established MIH design with enhanced functionality to provide feedback of status and lock position over an RS232 serial communications link.

2σ positional repeatability:	1 µm
Probe status indication:	1 LED
Cable connection:	12 pin hirose connector
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-1373-0001

MH20

The MH20 is an ultra-compact manually adjustable probe head offering maximum flexibility in probe orientation. The full range of TP20 probe modules can be used via its integral probe mounting. The MH20 is incompatible with the MCR20.

Probe mounting:	TP20 kinematic mount
Head mounting:	MS/T 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:	Non-indexing swivel ±93°
B-axis indexing:	Non-indexing swivel ±300°
Maximum extension bar:	EM2 extension module – 75 mm (2.95 in)

MH20 head with low force module

Part number: A-4043-0000

MH20 head with standard force module

Part number: A-4043-0100

MH20 head with medium force module

Part number: A-4043-0200

MH20 head with extended force module

Part number: A-4043-0300

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

The new 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 optimize 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 overleaf)

(Additional charge for 6-way module per module)

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 overleaf)

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**

Motorized probe heads

PH10T

The new PH10T motorized 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:	0.5 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 (purchased separately)
Dimensions:	Length 102 mm excluding AM1, width 62 mm
Weight:	645 g

Part number: A-1025-1520

PH10M

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

The PH10M has an autojoint mounting.

2σ positional repeatability:	0.5 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 (purchased separately)
Dimensions:	Length 102 mm excluding AM1, width 62 mm
Weight:	645 g

Part number: A-1025-0050

PH10MQ

The PH10MQ 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 is identical to that of the PH10M, with the following exceptions:

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

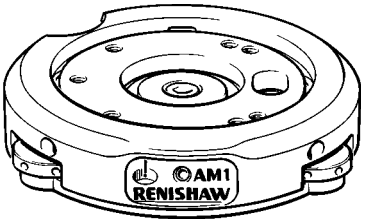
Part number: A-1036-0001

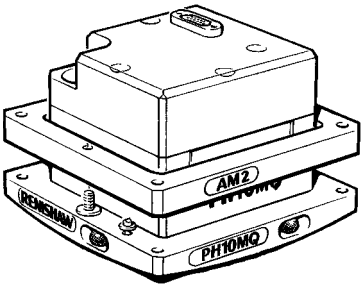
***** On all the PH10 series of probe heads, it is possible to extend beyond 300 mm using our range of CF extensions.

Motorized 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 motorized 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

The PHC10-3 head control receives instructions and processes signals to rotate the angles of the PH10 series probe heads. The PHC10-3 is compatible with all PH10 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-5684-0100

HCU1

The HCU1 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-1345-0220

MCU*lite-2* joystick

Part number: A-5331-0015

MCU5 joystick kit

Part number: A-5121-0003

MCU5 wireless joystick

Part number: A-5121-0077

NOTE: MCU joysticks are for use with UCC products only.

PL163

5 meter cable for MCU1.

Part number: A-1016-8098

PL164

10 meter cable for MCU1.

Part number: A-1016-8099

PL171

20 meter cable for MCU1.

Part number: A-1016-8100

12U retrofit cabinet

Part number: A-5567-1000

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, minimizing stylus changes. Five-axis simultaneous motion allows larger parts to be measured on the CMM by minimizing 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, minimizing 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		MCR20NI and MCR20		
Joystick		Multifunction MCU*lite-2*		
ISO 10360-5 (2001) typical performance			CMM TOUCH	HEAD TOUCH
standard force module with 12 x 4 mm		Size	0.0006 mm (0.00002 in)	0.0002 mm (0.00001 in)
stylus on a CMM with ISO 10360-2 (2002)		Form	0.0026 mm (0.00010 in)	0.0024 mm (0.00009 in)
specification of 0.48+ L/1000*		Location	0.0013 mm (0.00005 in)	0.0009 mm (0.00003 in)

* specified with a TP7

PH20 kit part numbering scheme

A-5669-####

The first number represents the controller kit:

1 = No controller kit
2 = PH20 UCC kit 1 (PH20, PCI, UCC, SPA, MCU*lite-2*)
3 = PH20 UCC kit 2 (PH20, PCI, UCC, SPA, MCU*lite-2*)

The second number represents MODUS™ and labor:

1 = No MODUS™ or labor
2 = MODUS™ and labor
3 = MODUS™ only

The third and fourth numbers represent the shank or quill (specified at the time of order).

PH20 with UCC kit 1

Includes: PH20
Interface
Licence
Cable
UCC
SPA
MCU*lite-2*

Part number: A-5669-21##

PH20 with UCC kit 2

Includes: PH20
Interface
Licence
Cable
UCC
SPA
MCU*lite-2*

Part number: A-5669-31##

PH20 with UCC kit 1, MODUS™ and labor

Includes: PH20
Interface
Licence
Cable
UCC
SPA
MCU*lite-2*
Labor
MODUS™

Part number: A-5669-22##

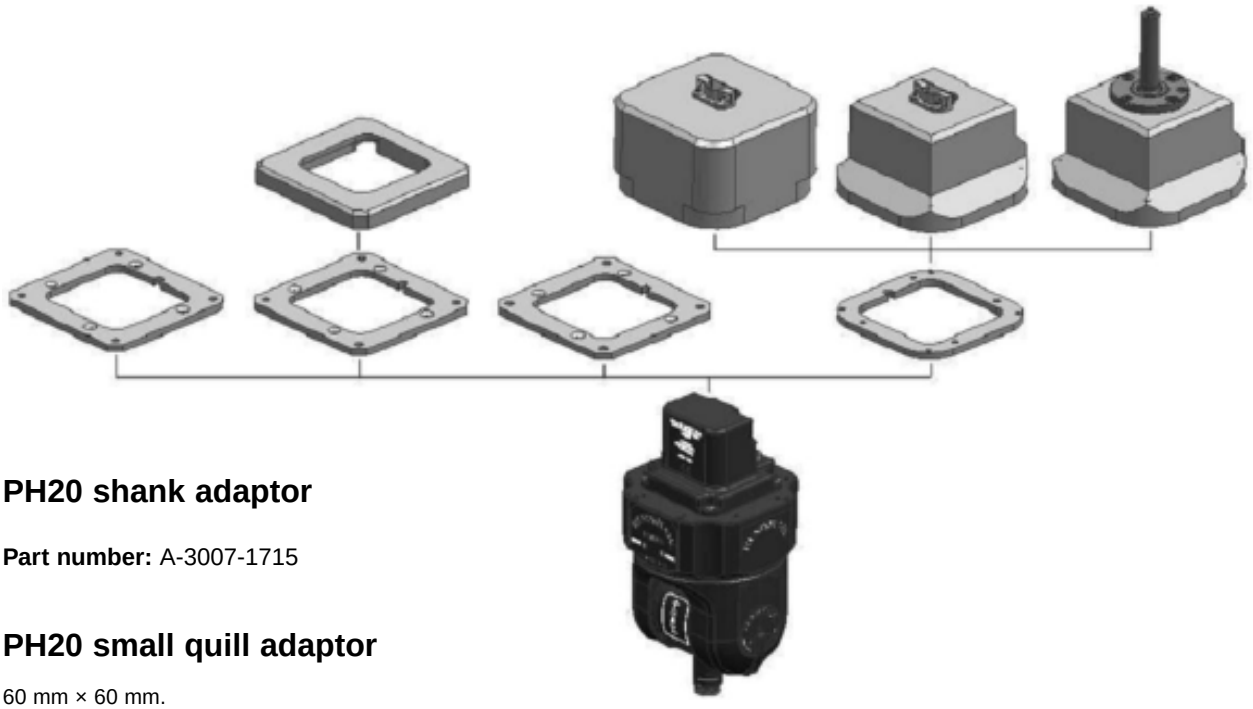
PH20 with UCC kit 2, MODUS™ and labor

Includes: PH20
Interface
Licence
Cable
UCC
SPA
MCU*lite-2*
Labor
MODUS™

Part number: A-5669-32##

NOTE: This equipment requires installation by a Renishaw-certified technician. Prices quoted do not include a controller cabinet, scales, adaptor cables or any repair work to machine mechanics.

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

Rack for PH20

MCR20NI

Part number: A-5669-0020

NOTE: See CMM probe shanks starting on page 1-39.

REVO®

The REVO® measuring head features spherical air bearing technology in each of its two axes, driven by brushless motors linked to high-resolution encoders to provide fast, ultra-high accuracy positioning.

REVO® system overview

The system comprises the following elements:

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

REVO® – '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 minimized by using a low scanning force.

REVO® features and benefits:

- Incorporates **Renscan*5***™ five axis scanning technology minimizing 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 five axis motion reduces non-productive transitions between features
- Stylus wear minimized by extremely low scanning forces
- Infinite positioning and five 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*2*** is fundamental to the REVO® system
- The **UCC*2*** controller features **Renscan*5***™ scanning routines particular to five-axis motion and scanning
- **SPA*2*** is a servo power amplifier used to drive the head and CMM
- MCU1 or MCU5 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®			
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: ISO8537.1)	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: ISO8537.1)	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® entry level kit 1

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

Part number: A-3060-0003

REVO® entry level kit 2

Includes:
- REVO® head kit
- RSP2 kit
- RSH250 kit
- RSH350 kit
- REVO® rack kit #4
- 45 mm diameter datum ball kit

Part number: A-3060-0004

REVO® standard kit 1

Includes:
- REVO® head kit
- RSP2 kit
- RSP3 kit
- RSH250 kit
- RSH350 kit
- REVO® rack kit #1
- 45 mm diameter datum ball kit

Part number: A-3060-0002

REVO® standard kit 2

Includes:
- REVO® head kit
- RSP2 kit
- RSP3 kit
- RSH250 kit
- RSH350 kit
- REVO® rack kit #2
- 45 mm diameter datum ball kit

Part number: A-3060-0008

REVO® head kit

Part number: A-3060-0040

RSP2 REVO® probe kit

Part number: A-3060-0020

RSP3-1 REVO® probe kit

RSP3-1 and SH25-1.

Part number: A-3060-0031

RSP3-3 REVO® probe kit

RSP3-3 and SH25-3A.

Part number: A-3060-0030

RSP3-4 REVO® probe kit

RSP3-4 and SH25-4A.

Part number: A-3060-0034

REVO® rack kit #1

Includes: 600 mm MRS kit
FCR25 flexible change rack unit
FCR adaptor kit
REVO® RCP kit (2 ports)
Additional 62.5 mm MRS legs
REVO® PRCP kit (2 ports)

Part number: A-3060-0011

REVO® rack kit #2

Includes: 1000 mm MRS kit
FCR25 flexible change rack unit
REVO® RCP kit (2 ports)
Additional 62.5 mm MRS legs
REVO® PRCP kit (2 ports)

Part number: A-3060-0013

REVO® rack kit #3

Includes: 1000 mm MRS kit
FCR25 flexible change rack unit
REVO® RCP2 rack changing port
REVO® TDA tip correction block
Additional 62.5 mm MRS leg
REVO® PRCP powered rack port
MRS adjustable foot plate kit
MRS heavy duty leg

Part number: A-3060-0012

REVO® rack kit #4

Includes: 600 mm MRS kit
REVO® RCP kit (2 ports)
Additional 62.5 mm legs

Part number: A-3060-0014

RSH250 kit

Part number: A-3060-0021

RSH350 kit

Part number: A-3060-0022

RSH450 kit

Part number: A-3060-0026

RSH500 kit

Part number: A-3060-0023

45 mm diameter datum ball kit

Part number: A-3060-0310

RCP*TC* kit 1

REVO® rack changing port – thermally controlled

Includes: RCP*TC* port × 2
REVO® RCP*TC* PSU

Part number: A-3061-0300

REVO® TDA tip correction block

Part number: A-3060-0085

REVO® RCP2 rack changing port

Part number: A-3060-0090

REVO® SFP1 surface finish probe

Surface finish is traditionally measured with hand-held sensors or on a dedicated measuring machine. The REVO® SFP1 probe makes surface finish inspection an integral part of your CMM measurement procedure. Surface finish analysis can form part of a single measurement report.

SFP1 system benefits

- Automatic changing of the SFP1 probe and stylus holders is possible using the standard MRS rack and RCP ports. This enables surface finish measurement to be fully integrated with the standard CMM inspection program.
- The SFP1 probe takes advantage of the infinite positioning capability of the REVO® head.
- Sensor calibration involves measuring the surface finish of the surface finish calibration artifact (SFA) that is mounted on the MRS rack. The calibration software adjusts parameters within the probe in accordance with the calibrated value for the artifact.
- The SFP1 includes a passive C axis that enables surface finish measurements to be made at all required orientations around a part. The process of changing the C axis angle is fully automatic, utilizing the B axis positioning of the REVO® head to rotate the SFP1.
- The SFCP (C axis port) is mounted on the MRS rack and features spring-loaded pins to facilitate rotation of the C axis using the REVO® head's B axis motion.

Probe characteristics

- SFP1 is a skidded probe type with a 2 µm radius diamond stylus tip. The skid is held against the surface with a controlled force of approximately 0.2 N whilst the stylus tip force is 0.001 N.
- The SFS-1 straight and SFS-2 cranked stylus holders have been designed to facilitate access to a wide range of features.
- The probe size with a straight stylus holder allows measurement within a 10 mm diameter bore to a depth of 100 mm.
- Surface measurement capability: 6.3 to 0.05 Ra.
- Output: Ra, RMS and raw data are returned from UCCServer to the metrology application client software using the I++ DME protocol. The raw data can subsequently be presented to specialist surface analysis software packages for further detailed reporting.

SFP1 combination kit

Includes: SFP1 probe
SFS-1 straight stylus holder
SFA calibration artifact

Part number: A-5453-3000

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.

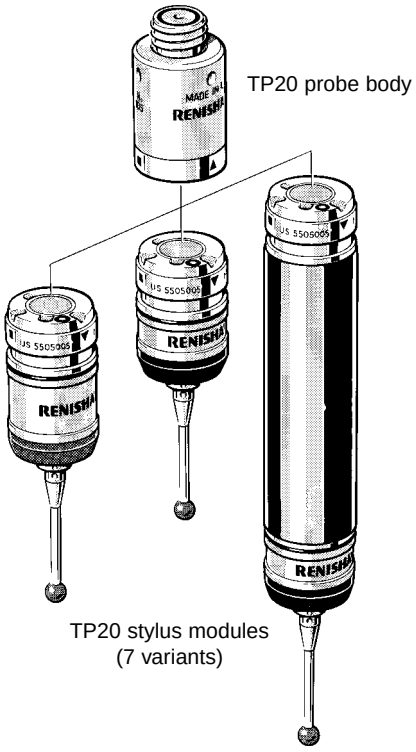
A direct replacement for the industry standard Renishaw TP2 probe, the TP20 probe system brings a range of new benefits to manual and DCC CMM applications, and can easily be retrofitted to existing TP2 installations.

The TP20 can be used on a wide range of Renishaw's manual or motorized 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 optimization 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.



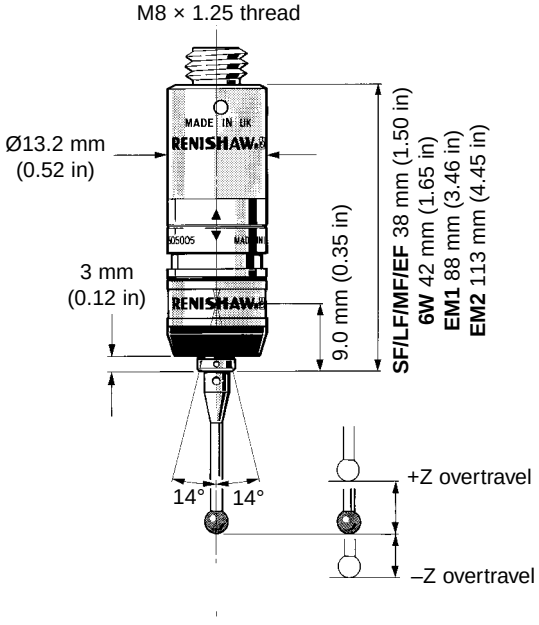
TP20 probe body

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 magnetized 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

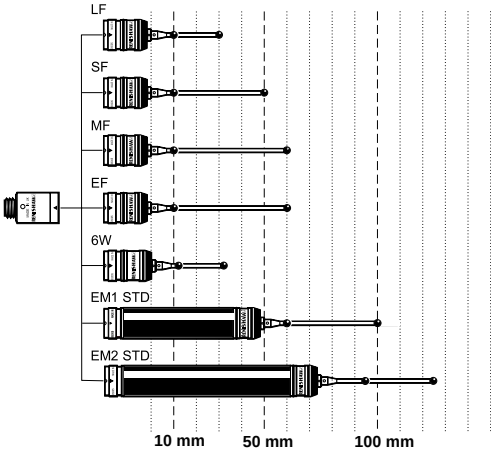
6W	1.5 mm (0.06 in)

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 fiber 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 fiber 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-1371-0265

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 Pt 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 0.5 µm	(0.000016 in) (0.000020 in)	0.4 µm 0.5 µm	(0.000016 in) (0.000020 in)
XY (2D) form measurement deviation		Trigger level 1 Trigger level 2	±0.8 µm ±0.9 µm	(0.000032 in) (0.000036 in)	±1.0 µm ±1.2 µm	(0.000040 in) (0.000047 in)
XYZ (3D) form measurement deviation		Trigger level 1 Trigger level 2	±1.0 µm ±1.4 µm	(0.000040 in) (0.000056 in)	±2.5 µm ±4.0 µm	(0.000100 in) (0.000160 in)
Repeatability of stylus change		With SCR200 Manual	±0.5 µm ±1.0 µm	(0.000020 in) max (0.000040 in) max	±0.5 µm ±1.0 µm	(0.000020 in) max (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			PI 200		PI 200	
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-1085-0370

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 optimize 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, PH10MQ, and PH6M • may be mounted to autojoint extension bars
Signal outputs:		Non-linear and non-orthogonal analog 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)

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

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

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

AC3 interface card

Part number: A-2237-1601

FCR25

The full potential of the SP25M system may be realized 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-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.

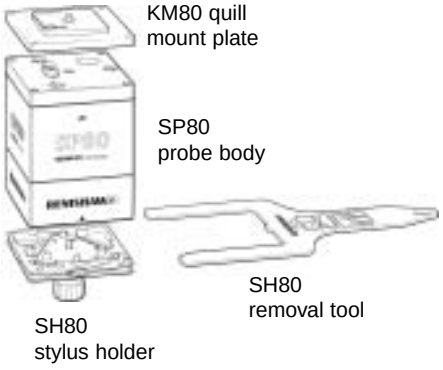
It is able to reach deep into parts by carrying styli up to 500 mm long and 500 g mass, including star configurations which do not require counterbalancing. Renishaw's M5 styli products are designed to complement SP80 and ensure maximum performance.

Detachable stylus holders (SH80) permit rapid and repeatable interchange between stylus configurations, thus eliminating recalibration, maximizing 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 1-50)

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 1-50)

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 1-50)

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 1-50.

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

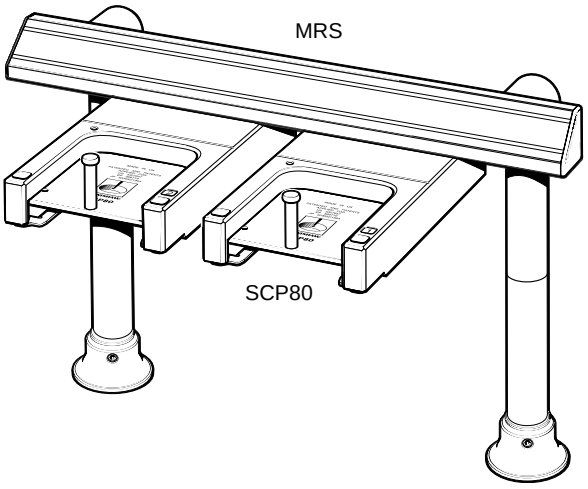
The standard mounting plate between the CMM quill (80 mm square) and the SP80 probe body. Provides easy and repeatable removal/replacement of the probe. Alternative CMM quill mountings are available (see KM6080 and SM80 below).

Part number: A-2238-0703

KM6080 quill mount plate

As KM80 but used to mount SP80 onto a 60 mm square CMM quill.

Part number: A-2238-0020



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 analog scanning probe which enables a CMM to gather large amounts of data very rapidly for inspection or digitizing 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):	Analog proportional voltage output scaling: 4 V to 8.5 V/mm
Interface:	AC1 or AC2 analog 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 analog converter PC card

Part number: A-2098-1000

AC2 analog 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 gage

The gram gage 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 gage maximizes 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 motorized heads, as well as the TP1 and MIP probes.

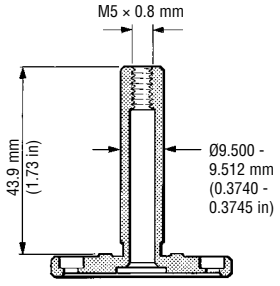
Note: The PH6 requires a different shank and has a separate listing (see overleaf).

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

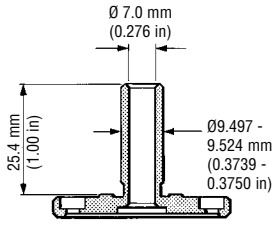
Shanks are included in the price of Renishaw heads and TP1 and MIP probes, but must be specified when placing an order. See the drawings on the following pages for the exact dimensions of each shank.

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 - 41.45 mm (1.630 - 1.632 in)



MS1



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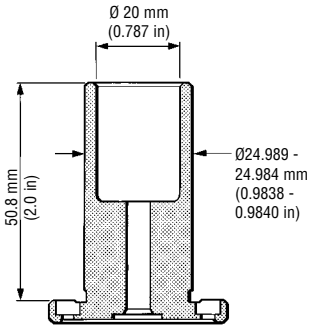
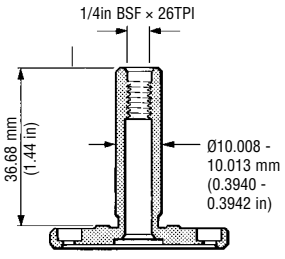


MS3



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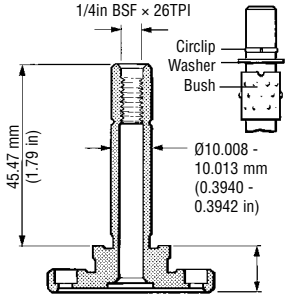

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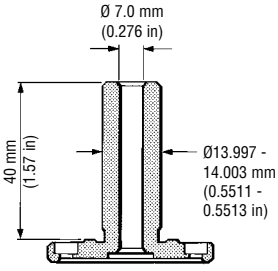

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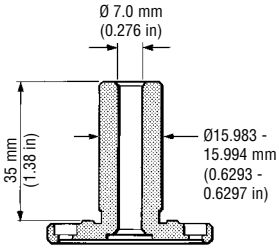

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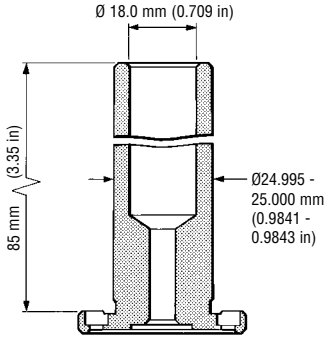
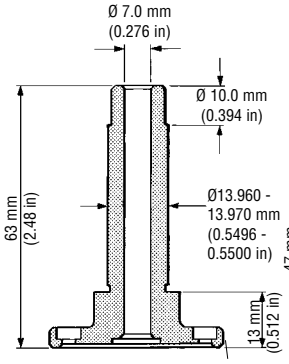


MS8



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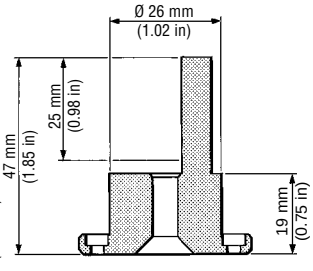

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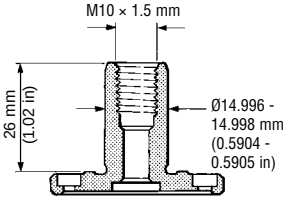
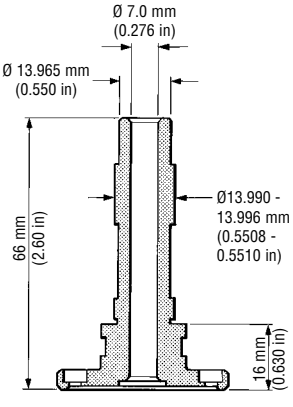


MS11



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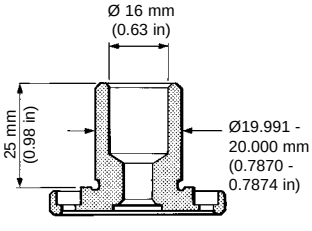

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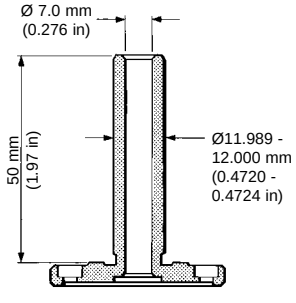

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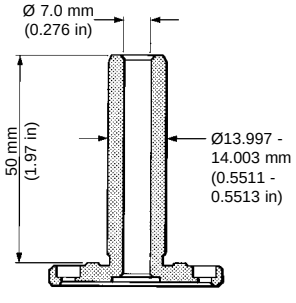
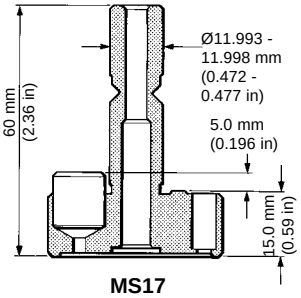


MS15

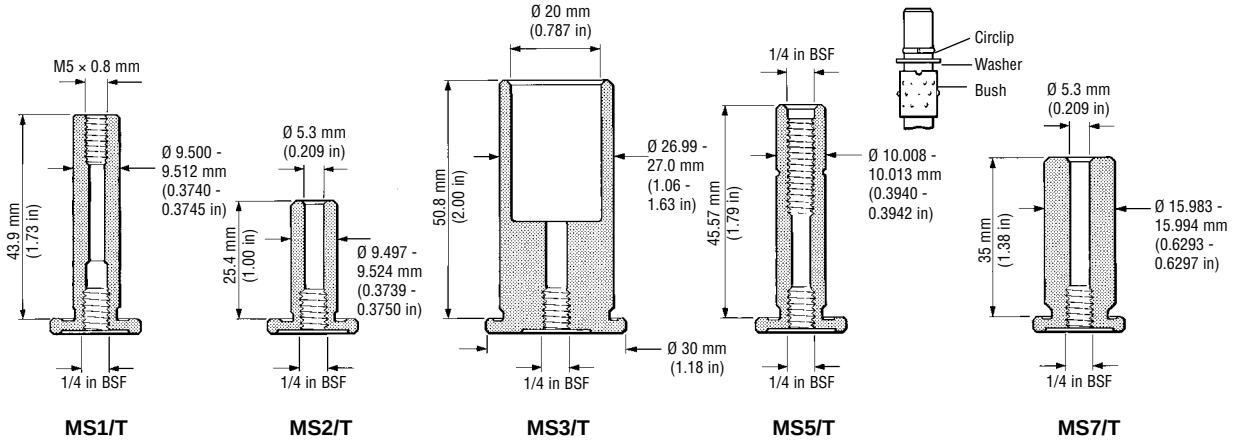


MS17

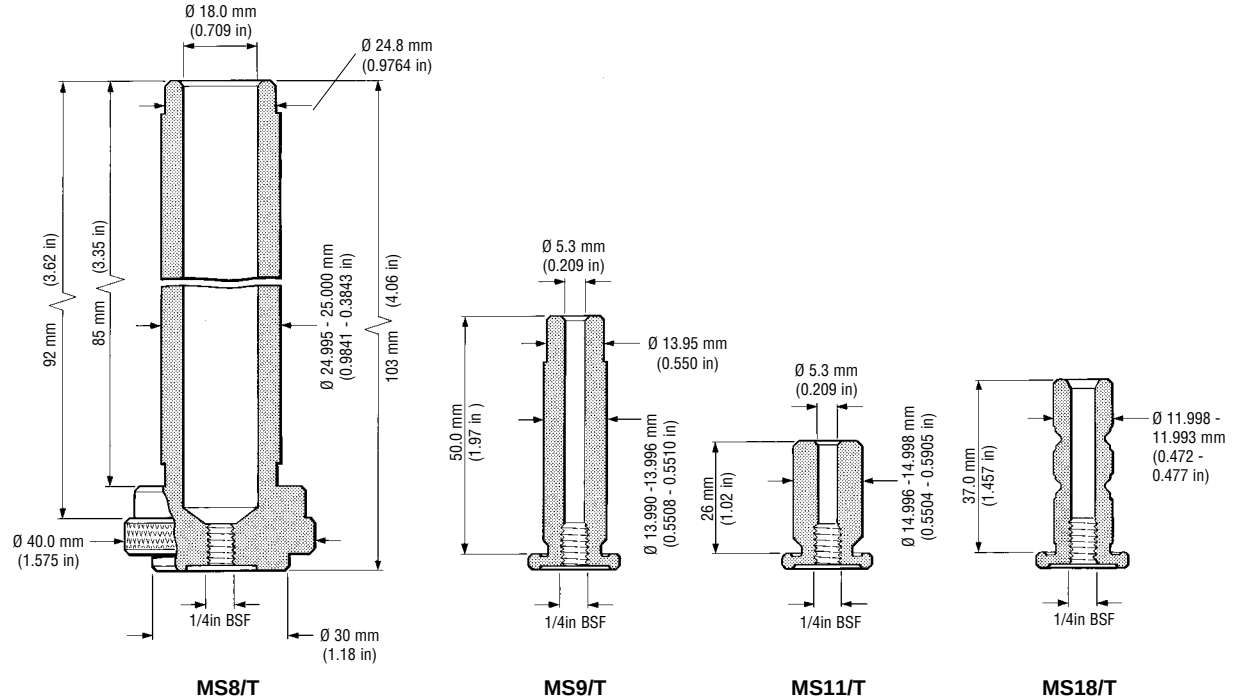
PH6 shanks

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 - 19.1 mm (0.74 - 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 DIN	A-1016-0004
PL2(T)	Coiled	465 mm – 1290 mm (18.3 in – 50.8 in)	5 pin DIN	A-1016-0006
PL3(T)	Coiled	765 mm – 2415 mm (30.1 in – 95.1 in)	5 pin DIN	A-1016-0012
PL4(T)	Plain	4510 mm (177.6 in)	5 pin DIN	A-1016-0001
PL14	Coiled	595 mm – 1830 mm (23.4 in – 72 in)	7 pin AMPHENOL	A-1016-0003
PL17(T)	Coiled	200 mm – 400 mm (7.9 in – 15.8 in)	14 pin LEMO	A-1023-7024
PL18(T)	Coiled	500 mm – 1300 mm (19.7 in – 51.2 in)	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

Motorized 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 (16 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	Aluminum	50 mm (1.97 in)	13 mm	A-1047-3484
PEL2	M8 thread to M8 thread	Aluminum	100 mm (3.94 in)	18 mm – 13 mm	A-1047-3485
PEL3	M8 thread to M8 thread	Aluminum	200 mm (7.87 in)	18 mm – 13 mm	A-1047-3486
PEL4	M8 thread to M8 thread	Aluminum	300 mm (11.81 in)	13 mm	A-1047-3487
PECF1*	M8 thread to M8 thread	Carbon fiber	50 mm (1.97 in)	13 mm	A-1047-7065
PECF2*	M8 thread to M8 thread	Carbon fiber	100 mm (3.94 in)	13 mm	A-1047-7064
PECF3*	M8 thread to M8 thread	Carbon fiber	200 mm (7.87 in)	13 mm	A-1047-7066

* These products are special order only. Please call Customer Service 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	Aluminum	140 mm (5.51 in)	25 mm – 13 mm	A-1051-0418
PAA3	Autojoint to M8 thread	Aluminum	300 mm (11.81 in)	25 mm – 13 mm	A-1051-0419
PAACF2*	Autojoint to M8 thread	Carbon fiber	140 mm (5.51 in)	25 mm – 13 mm	A-1051-0488
PAACF3*	Autojoint to M8 thread	Carbon fiber	300 mm (11.81 in)	25 mm – 13 mm	A-1051-0493
PAACF*	Autojoint to M8 thread	Carbon fiber	400 mm (15.74 in)	25 mm – 14 mm	A-1051-0513
PAACF*	Autojoint to M8 thread	Carbon fiber	450 mm (17.72 in)	25 mm – 14 mm	A-1051-0394
PEM1	Autojoint to autojoint	Steel/aluminum	50 mm (1.97 in)	25 mm	A-1076-0070
PEM2	Autojoint to autojoint	Steel/aluminum	100 mm (3.94 in)	25 mm	A-1076-0071
PEM3	Autojoint to autojoint	Steel/aluminum	200 mm (7.87 in)	25 mm	A-1076-0072
PEM4	Autojoint to autojoint	Steel/aluminum	150 mm (5.91 in)	25 mm (90°)	A-1076-0073
PEMCF1*	Autojoint to autojoint	Carbon fiber	50 mm (1.97 in)	25 mm	A-1051-0490
PEMCF2*	Autojoint to autojoint	Carbon fiber	100 mm (3.94 in)	25 mm	A-1051-0443
PEMCF3*	Autojoint to autojoint	Carbon fiber	200 mm (7.87 in)	25 mm	A-1051-0491
PEMCF*	Autojoint to autojoint	Carbon fiber	150 mm (5.91 in)	25 mm	A-1051-1132

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

Interfaces

PI4-2

The PI4-2 interface is the basic interface for standard touch-trigger probes that allows for a PICS or SSR output. The supply voltage is automatically detected. The unit is usually free-standing but can be rack-mounted.

Application:	TP1, MIP, TP2, TP20, TP6, TP6A, 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-1506-0010

PI6

The PI6 interface is used on the Brown & Sharpe Microval only. Connectors are 25 pin ‘D’ socket and plug. Please contact Renishaw for details.

Part number: A-1033-0001

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 motorized probing installations with no additional CMM communications or control signalling required. Optimum performance will be obtained on installations utilizing 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, analog, 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

Interface accessories

HC2

Probe arm/disarm switch used with PI12 and PI4-2.

Part number: A-1506-0100

RPM01

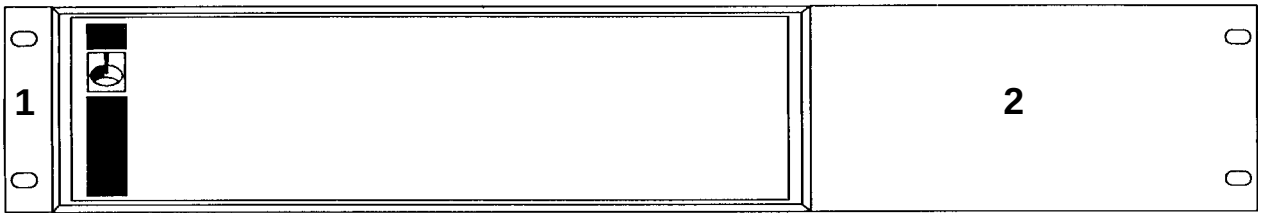
Touch-trigger probe interface module.

Part number: A-1009-0209

Mounting brackets

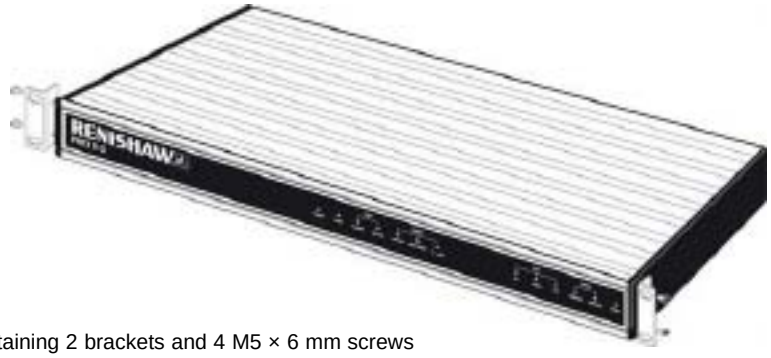
Renishaw controllers and interfaces are supplied in various different types of enclosures. Consult the drawings below to determine your bracket requirements based upon the combination of products you are installing.

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 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-1051-1300

Note: Adjustable base, legs and cable sold separately (see page 1-49).

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

ACC2-2 autochange controller

Data transmission:	Serial (RS232)
User-definable parameters:	Baud rate 300–19200
Voltage range:	85 V–135 V, 170 V–275 V, 50/60 Hz automatic selection
Dimensions:	Height 88 mm (3.46 in) Width 290 mm (11.42 in) Depth 220 mm (8.66 in)

Part number: A-1520-0101

ACR1 autochange systemaccessories

Adjustablerack 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

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 leg per kit.

Part number: A-4192-0020

MRS adjustable foot plate

Part number: A-4192-0702

MRS leg and foot adaptor

Part number: A-4192-0055

MRS fixed foot

Part number: A-4192-0056

MRS step back adaptor

Part number: A-4192-0058

M8 T nut *

Part number: P-NU18-0005

* no discounts

Manual autojoint probe stand

Renishaw's manual autojoint probe stand (MAPS) is a low-cost storage rack capable of holding up to six combinations of probes, extension bars, and accessories. The stand can be mounted directly on the table of a CMM using the appropriate socket head bolt (maximum size M10, 3/8 in) which is passed through the center of the base.

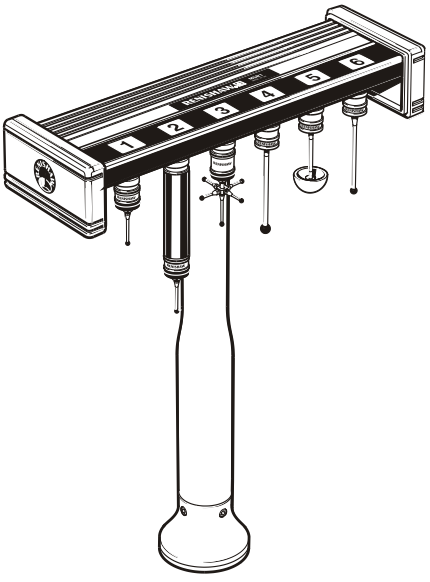
Standard autochange rack legs (100 mm and 200 mm long) are compatible with this stand and can be stacked to accommodate longer probe extensions with longer stylus extensions. As an alternative to the support pillar, a wall mounting bracket is available to enable the stand to be mounted to a cabinet, wall or any other vertical surface.

Height: 285 mm
Depth: 80 mm
Width: 235 mm

Part number: A-1071-0001

MSR1 rack

The MSR1 rack is intended for use on either manual or DCC CMMs to hold pre-qualified stylus assemblies fitted to TP20 or TP200 probe modules. The rack provides convenient storage and protects the kinematic coupling mechanism from contamination.



Overall height: 285 mm
Depth (inc wall bracket): 86 mm
Width: 236 mm

MSR1 with leg and base (wall mount kit included)

Part number: A-1371-0347

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		M-1034-0016
M8 × 1.25	MTI	M-1034-0015
M10 × 1.5	B&S, LK Tool & Sheffield	M-1034-0014
5/16–18 UNC		M-1034-0018
3/8–16 UNC	Carl Zeiss, Fanamation, LK Tool, & L.S. Starrett	M-1034-0017

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	M-1034-0042
3 way adaptor *	M-1034-0052
Pillar extension 75 mm (2.96 in) long	M-1034-0019

***** Special order

Mahogany boxes

Probe head boxes

Description	Part number
PH1 probe head, cable, TK6 box	A-1015-7725
PH6 probe head, TP2 probe, stylus, TK6 box	A-1015-7731
PH5 or PH5-1 probe head, cable, TK6 box	A-1015-7727
PH10M probe head kit box	A-1015-7698
PH6A probe head kit box	A-1015-7674
TP1 probe and stylus box (PC10)	A-1015-7686
MIH and accessories box	A-1015-7765
TP200 probe and stylus box	A-1015-7869

Extension bar boxes

Description	Part number
PEL extension bars (PC19)	A-1015-7694
PEM extension bars	A-1015-7761

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
Mulitwire extension bar (200 mm) PEM3	1	A-1076-0072
Joint key	1	A-1051-0040
Box	1	A-1015-7761

Stylustools

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-TL01-0300

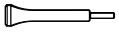
S5 wrench 2 mm A/F

Part number: P-TL01-0200

S6 hex key 2.5 mm A/F

Part number: P-TL01-0250

S7 stylustool (for use with M2 and M3 styli) Part number: M-5000-3540



double-ended spanner

Part number: A-1047-3932

S10 jointkey (for use with autojoint)

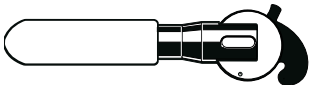
Part number: A-1051-0040

S12 hex key 0.9 mm A/F

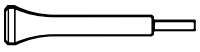
Part number: P-TL01-0089

S20 torquetool (for use with carbon fiber stylus)

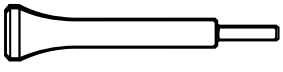
Part number: A-5003-2300



M4 stylustool (for use with M4 and M5 styli) Part number: M-5000-3707



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, MP700, 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

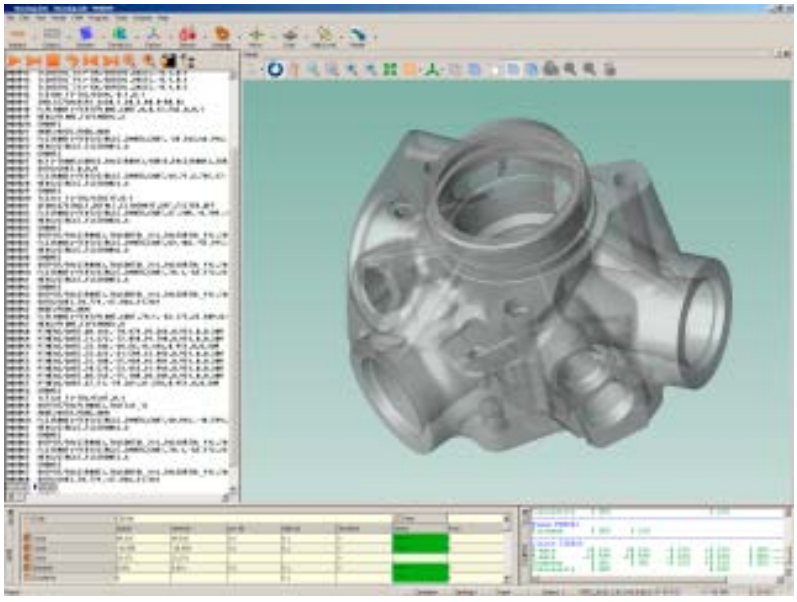
Includes: Joint key
S7 stylus tools (2)
Hex key 1.5 mm A/F

Part number: A-1039-0041

CMM metrology software

MODUS™

Renishaw's new 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

MODUS™ – 3-axis scanning

Part number: A-5639-0003

MODUS™ – 5-axis scanning

Part number: A-5639-0005

MODUS™ Offline*

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

Part number: A-5639-0101

MODUS™ – Offline 3-axis scanning

Part number: A-5639-0103

MODUS™ – Offline 5-axis scanning

Part number: A-5639-0105

Offline – Graphical reporting

Part number: A-5639-0007

* *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™.*

Options

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

CAD integration options

In addition to the native IGES and STEP support, MODUS™ offers a wide range of CAD options including VDA-FS, STEP, CATIA® (v5 and v4), Unigraphics®, Parasolid®, Pro/E® and SolidWorks®. For a complete list and pricing of CAD import / export options please contact Renishaw sales.

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™ training at Renishaw Inc

Charge per student.

4 days

Part number: A-5639-1701

3 days

Part number: A-5639-1700

2 days

Part number: A-5639-1702

1 day

Part number: A-5639-1703

Onsite MODUS™ training

Up to four people, all inclusive of expenses.

4 days

Part number: RI-A-5639-1701

3 days

Part number: RI-A-5639-1700

2 days

Part number: RI-A-5639-1702

1 day

Part number: RI-A-5639-1703

MODUS™ training block

Part number: A-5639-2500

Renishaw services

Renishaw has set up a series of part numbers which should be referenced when ordering Renishaw services. These part numbers will appear on your invoice.

Part number	Description
RI-6002-0001	CMM hourly labor
RI-6002-0002	CMM hourly travel
RI-6002-0003	CMM expenses
RI-6002-0004	CMM in-house training

Machine tool probes

Inspection probes for machining centers

MP11

The MP11 is a hard-wired probe ideal for small machine tools with manual tool changing. The probe is mounted in the machine spindle with the signal transmission cable connected to the machine control. With the MP11, the illuminated LED switches off every time the probe stylus contacts the workpiece.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±17.5°
	Z:	8 mm (0.31 in)
Stylus trigger force	X and Y:	50 gf – 150 gf
	Z:	180 gf – 700 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

MP11 retrofit kit

Includes: MP11 probe with cable and connectors
Remote socket kit
50 mm and 100 mm ceramic styli
Renishaw Inspection Plus software
Installation and applications support

A shank is not included in this kit. See the section entitled Shanks and Toolholders for price and part number information.

Part number: MP11-NS-S (Available at fixed price)
Call for details

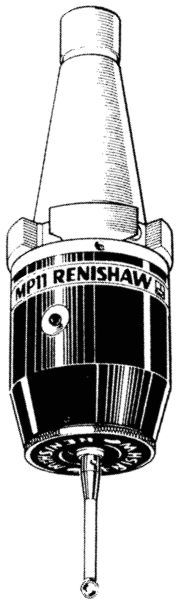
Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

MP11 hardware only kit

Includes: MP11 probe with cable and connectors
Remote socket kit
50 mm and 100 mm ceramic styli

A shank is not included in this kit. See the section entitled Shanks and Toolholders for price and part number information.

Part number: MP11-NS-KIT



MP11 probe

Includes: MP11 probe with cable and connectors

Part number: A-2045-0001

MP11 replacement parts

Spare MP11 cable

Part number: A-2045-0051

4 pin connector for MP11 cable

Part number: MP11 PLUG KIT

4 pin socket for MP11

Part number: P-CN21-0304

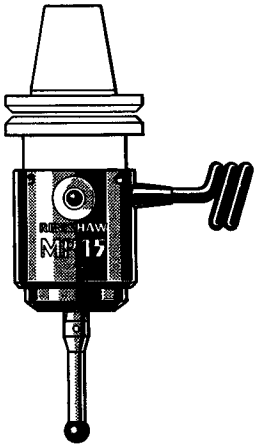
Outer diaphragm kit

Part number: A-2051-7105

MP15

The MP15 probe is used on small CNC machines with limited Z travel and manual tool changing.

The probe is mounted in the machine spindle with the signal transmission cable connected to the machine control. With the MP15, the illuminated LED switches off every time the probe stylus contacts the work piece.



MP15 hard-wired probe kit

Part number: A-2116-1802

MP15/MP11 adaptor

Part number: M-2116-1356

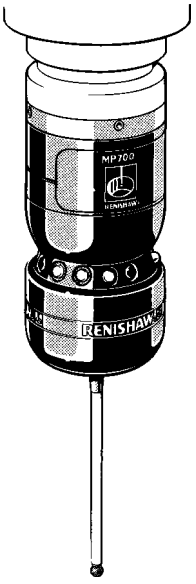
MI8 interface

Part number: A-2037-0010

MP700

The MP700 is an optical transmission part probing system for use on machining centers. The MP700 is specifically designed to deliver high-accuracy CMM type probe performance. The MP700 uses strain gage sensors and and an internal microprocessor to provide a solid state sensor mechanism with unprecedented life and reliability. Low trigger force and consistent pre-travel results in high accuracy with long styli.

The MP700 is available with either 35° or 70° output. An M code must be supplied to turn the probe on. An internal timer or M code is used to turn the probe off.



Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±16.5°
	Z:	11 mm (0.45 in)
Stylus trigger force	X and Y:	19 gf
	Z:	325 gf
Unidirectional repeatability	0.25 µm (0.00001 in)	

MP700 retrofit kit

Includes: MP700 probe with 70° OMP
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm carbon fiber styli
Sealtite conduit
9 V alkaline battery
TK1 tool kit
Renishaw Inspection Plus software
Installation and applications support

A shank is not included in this kit. See the section entitled Shanks and Toolholders for price and part number information.

Part number: MP700-NS-S (Available at fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

MP700 hardware only kit

Includes: MP700 probe with 70° OMP
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm carbon fiber styli
Sealtite conduit
9 V alkaline battery
TK1 tool kit

A shank is not included in this kit. See the section entitled Shanks and Toolholders for price and part number information.

Part number: MP700-NS-KIT

MP700 probe

Includes: MP700 probe
Adjusting plate
9 V alkaline battery
Tool kit

Part number:A-2107-0035 (35°)
Part number:A-2107-0070 (70°)

MP700 probe module

Part number: A-2108-0001

MP700 OMP only

Part number: A-2107-0036 (35°)
Part number: A-2107-0071 (70°)

OMM optical receiver

Part number: A-2033-0576

Receiver mounting bracket

Part number: A-2033-0830

MI12 interface

Part number: A-2075-0142

Sealtite conduit

¼ in conduit, 5 ft long. Includes one fitting.

Part number: SEALTITE, 7455

OMP40

The OMP40 is an ultra-compact optical transmission part probing system. Measuring just 40 mm diameter and 50 mm in length, the OMP40 is suitable for all machining and mill-turn centers. Utilizing a revised state-of-the-art modulated optical transmission method, the system offers the highest level of resistance to light interference when used with the OMI-2/OMI-2T. The OMP40 probe is also backwards compatible with existing OMM/MI12 and OMI receivers, enabling current MP7, MP8, MP9 and MP10 system users to benefit from its innovative features.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±12.5°
	Z:	6 mm (0.23 in)
Stylus trigger force	X and Y:	50 gf – 90 gf
	Z:	585 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

OMP40 retrofit kit

Includes: OMP40 probe
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm ceramic styli
Sealtite kit
Renishaw Inspection Plus software
Installation and applications support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: OMP40-NS-S (Available at fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

OMP40 hardware only kit

Includes: OMP40 probe
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm ceramic styli
Sealtite kit

Part number: OMP40-NS-KIT

OMP40 probe kit

Includes: OMP40
½ AA battery (2)
Tool kit

Legacy

Part number: A-4071-0001

Modulated

Part number: A-4071-2001

OMP40 upgrade kit

Current users of MP7, MP8, MP9 or MP10 optical transmission probes may upgrade to OMP40. A complete working system (probe module plus transmission system) must be exchanged.

Includes: OMP40 probe system

Part number: RI-4071-0001

OMP40 accessories and replacement parts

½AA battery (2 pack)

Part number: P-BT03-0007

OMP60/RMP60 style shank adaptor

Part number: A-4071-0031

OMP40 continued

OMM optical receiver

Part number: A-2033-0576

OMM-2 optical receiver

Part number: A-5492-0051

OMI-2 optical receiver/interface

Part number: A-5191-0049

OMI-2T optical receiver/interface

Part number: A-5439-0049

Receiver mounting bracket

Part number: A-2033-0830

MI12 interface

Part number: A-2075-0142

OSI interface

Part number: A-5492-2000

Sealtite conduit for OMM or OMI

¼ in conduit, 5 ft long. Includes one fitting.

Part number: SEALTITE, 7455

Sealtite conduit for OMM-2, OMI-2 or OMI-2T

5/16 in conduit, 1 meter long. Includes one fitting.

Part number: A-4113-0306

OMP400

OMP400 is an optical probe using strain gage technology. Measuring just 40 mm diameter × 50 mm in length, OMP400 is suitable for all machining and mill-turn centers requiring uncompromised 3D metrology performance. Utilizing a revised state-of-the-art modulated optical transmission method, the system offers the highest level of resistance to light interference when used with OMI-2. The OMP400 probe is also backwards compatible with existing OMM/MI12 and OMI receivers, enabling current MP7, MP8, MP9 and MP10 system users to benefit from its innovative features.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±18°
	Z:	11 mm (0.43 in)
Stylus trigger force	X and Y:	6 gf
	Z:	260 gf
Unidirectional repeatability	0.25 µm (0.00001 in)	

OMP400 retrofit kit

Includes: OMP400 probe
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm carbon fiber styli
Sealtite kit
Renishaw Inspection Plus software
Installation and applications support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: OMP400-NS-S (Available at fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

OMP400 hardware only kit

Includes: OMP400 probe
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm carbon fiber styli
Sealtite kit

Part number: OMP400-NS-KIT

OMM optical receiver

Part number: A-2033-0576

OMM-2 optical receiver

Part number: A-5492-0051

OMP400 probe kit

Includes: OMP400 probe
½ AA battery (2)
Tool kit

Legacy

Part number: A-5069-0001

Modulated

Part number: A-5069-2001

OMP400 upgrade kit

Current users of MP700 optical transmission probes may upgrade to OMP400. A complete working system (probe module plus transmission system) must be exchanged.

Includes: OMP400 probe

Part number: RI-5069-0001

Note: A new shank is required. See section entitled Shanks and Toolholders for price and part number information.

OMP400 continued

OMI-2 optical receiver/interface

Part number: A-5191-0049

OMI-2T optical receiver/interface

Part number: A-5439-0049

Receiver mounting bracket

Part number: A-2033-0830

MI12 interface

Part number: A-2075-0142

OSI interface

Part number: A-5492-2000

Sealtite conduit for OMM or OMI

¼ in conduit, 5 ft long. Includes one fitting.

Part number: SEALTITE, 7455

Sealtite conduit for OMM-2, OMI-2 or OMI-2T

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

To obtain optimal metrology performance, the following carbon fiber styli are recommended. Refer to the Styli section for more details.

Stylus	Part number
6 × 50 mm CF	A-5003-7306
6 × 100 mm CF	A-5003-6510
6 × 150 mm CF	A-5003-6511
6 × 200 mm CF	A-5003-6512

OMP60

OMP60 is an optical transmission probing system suitable for medium to large machining and mill-turn centers. Utilizing a revised state-of-the-art modulated optical transmission method, the system offers the highest level of resistance to light interference. The OMP60 probe is also backwards compatible with existing OMM/MI12 and OMI receivers. OMP60 also supports all methods of probe activation – shank switch, spin and M code – enabling current MP7, MP8, MP9 and MP10 users to benefit from some of its innovative features.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±18°
	Z:	11 mm (0.43 in)
Stylus trigger force	X and Y:	75 gf – 140 gf
	Z:	530 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

OMP60 retrofit kit

Includes: OMP60 probe
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm ceramic styli
Sealtite kit
Renishaw Inspection Plus software
Installation and applications support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: OMP60-NS-S (Available at a fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

OMP60 hardware only kit

Includes: OMP60 probe
OMM
Receiver mounting bracket
MI12 interface
50 mm and 100 mm ceramic styli
Sealtite kit

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: OMP60-NS-KIT

OMP60 probe kit

Includes: OMP60 probe
AA battery (2)
Tool kit

Legacy

Part number: A-4038-0001

Modulated

Part number: A-4038-2001

OMP60 upgrade kit

Current users of MP7, MP8, MP9 or MP10 optical transmission probes may upgrade to OMP60. A complete working system (probe module plus transmission system) must be exchanged.

Includes: OMP60 probe system

Part number: RI-4038-0001

OMP60 continued

OMM optical receiver

Part number: A-2033-0576

OMM-2 optical receiver

Part number: A-5492-0051

OMI-2 optical receiver/interface

Part number: A-5191-0049

OMI-2T optical receiver/interface

Part number: A-5439-0049

Receiver mounting bracket

Part number: A-2033-0830

MI12 interface

Part number: A-2075-0142

OSI interface

Part number: A-5492-2000

Sealtite conduit for OMM or OMI

¼ in conduit, 5 ft long. Includes one fitting.

Part number: SEALTITE, 7455

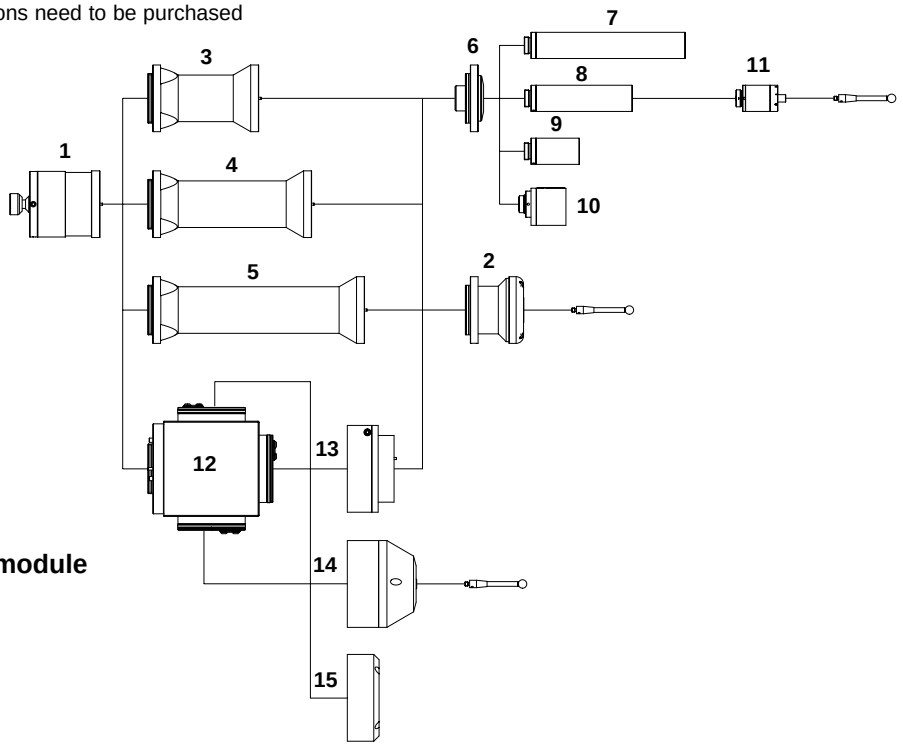
Sealtite conduit for OMM-2, OMI-2 or OMI-2T

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

OMP60M

OMP60M is a modular version of the OMP60. The OMP60M, probe module, adaptors and extensions need to be purchased separately.



1 – OMP60M transmission module

Part number: A-4038-1003

2 – OMP60M probe module

Part number: A-4038-1002

3 – OMP60M 100 mm extension

Part number: A-4038-1010

4 – OMP60M 150 mm extension

Part number: A-4038-1027

5 – OMP60M 200 mm extension

Part number: A-4038-1028

6 – OMP60M LP2 adaptor

Part number: A-4038-0212

7 – LPE3 150 mm extension

Part number: A-2063-7003

8 – LPE2 100 mm extension

Part number: A-2063-7002

9 – LPE1 50 mm extension

Part number: A-2063-7001

10 – MA4 90° adaptor

Part number: A-2063-7600

11 – LP2 probe assembly

Part number: A-2063-6098

12 – OMP60M 3-way adaptor

Part number: A-4113-0784

13 – OMP60M probe module adaptor

Part number: A-4113-0771

14 – MP3 probe

Part number: A-2053-5358

15 – Shorting cover

Part number: A-2053-6468

OMP60M upgrade kit

Current users of MP7, MP8, MP9 or MP10 optical transmission probes may upgrade to OMP60M. A complete working probe must be exchanged.

Includes: OMP60M module
OMP60M probe module

Part number: RI-4038-1003

RMP40

RMP40 is the latest generation of radio transmission part probes, ideal for use on small to medium machining centers. RMP40 features an integrated probe module delivering exceptional robustness and generous overtravel. RMP40 complies with FCC regulations and operates in the 2.4 GHz range. RMP40 delivers interference-free transmission through the use of FHSS (frequency hopping spread spectrum).

RMP40 supports two methods of probe activation:

Radio-on The probe is turned on via an RF signal produced by the RMI and initiated by an M code. The probe is turned off via an RF signal or the internal timer.

Spin-on The probe is turned on via an internal centrifugal switch. The probe is turned off via the centrifugal switch or the internal timer.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±12.5°
	Z:	6 mm (0.24 in)
Stylus trigger force	X and Y:	50 gf – 90 gf
	Z:	585 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

RMP40 retrofit kit

Includes: RMP40 probe and transmission system
RMI radio machine interface
Receiver mounting bracket
50 mm and 100 mm ceramic styli
Sealtite kit
Renishaw Inspection Plus software
Installation and applications support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: RMP40-NS-S (Available at a fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

RMP40 hardware only kit

Includes: RMP40 probe and transmission system
RMI radio machine interface
Receiver mounting bracket
50 mm and 100 mm ceramic styli
Sealtite kit

Part number: RMP40-NS-KIT

RMP40 probe kit

Includes: RMP40 probe
½AA battery (2)
Tool kit

Part number: A-5480-0001

RMI radio machine interface

Part number: A-4113-0050

Receiver mounting bracket

Part number: A-2033-0830

Sealtite conduit

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

RMP60

RMP60 is a radio transmission part probing system ideal for use on all machine tools. RMP60 features an integrated probe module delivering exceptional robustness and generous overtravel. RMP60 complies with FCC regulations and operates in the 2.4 GHz range. RMP60 delivers interference-free transmission through the use of FHSS (frequency hopping spread spectrum).

RMP60 supports three methods of probe activation:

Radio-on The probe is turned on via an RF signal produced by the RMI and initiated by an M code. The probe is turned off via an RF signal or the internal timer.

Spin-on The probe is turned on via an internal centrifugal switch. The probe is turned off via the centrifugal switch or the internal timer.

Switch-on The probe is turned on and off via a switch incorporated into the shank, activated when the probe is loaded into the spindle.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±18°
	Z:	11 mm (0.43 in)
Stylus trigger force	X and Y:	75 gf – 140 gf
	Z:	530 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

RMP60 retrofit kit

Includes: RMP60 probe and transmission system
RMI radio machine interface
Receiver mounting bracket
50 mm and 100 mm ceramic styli
Sealtite kit
Renishaw Inspection Plus software
Installation and applications support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: RMP60-NS-S (Available at a fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

RMP60 hardware only kit

Includes: RMP60 probe and transmission system
RMI radio machine interface
Receiver mounting bracket
50 mm and 100 mm ceramic styli
Sealtite kit

Part number: RMP60-NS-KIT

RMP60 probe kit

Includes: RMP60 probe
AA battery (2)
Tool kit

Part number: A-4113-0001

RMI radio machine interface

Part number: A-4113-0050

Receiver mounting bracket

Part number: A-2033-0830

Sealtite conduit

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

RMP60 upgrade kit

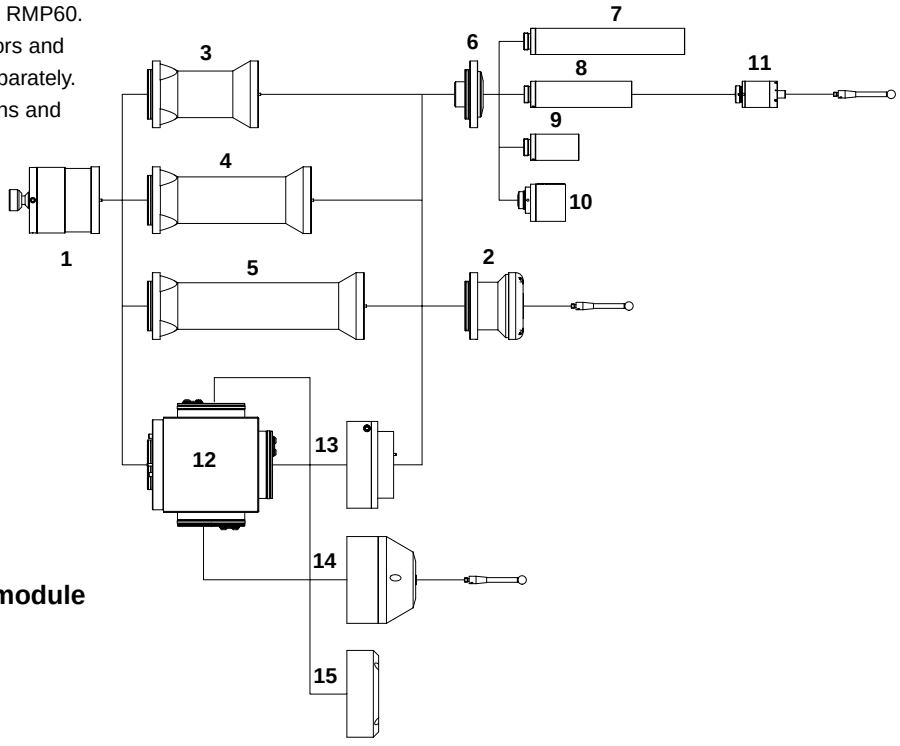
Current users of MP14, MP16 or MP18 radio probes may upgrade to RMP60. A complete working system (MP3 probe, transmission system, MI14 or MI16 interface and RMM antennas) must be exchanged.

Includes: RMP60 probe
RMI radio machine interface
Receiver mounting bracket
Sealtite kit

Part number: RI-4113-0001

RMP60M

RMP60M is a modular version of the RMP60. The RMP60M, probe module, adaptors and extensions need to be purchased separately. RMP60 complies with FCC regulations and operates in the 2.4 GHz range.



1 – RMP60M transmission module

Part number: A-4113-1003

2 – RMP60M probe module

Part number: A-4038-1002

3 – RMP60M 100 mm extension

Part number: A-4038-1010

4 – RMP60M 150 mm extension

Part number: A-4038-1027

5 – RMP60M 200 mm extension

Part number: A-4038-1028

6 – RMP60M LP2 adaptor

Part number: A-4038-0212

7 – LPE3 150 mm extension

Part number: A-2063-7003

8 – LPE2 100 mm extension

Part number: A-2063-7002

9 – LPE1 50 mm extension

Part number: A-2063-7001

10 – MA4 90° adaptor

Part number: A-2063-7600

11 – LP2 probe assembly

Part number: A-2063-6098

12 – RMP60M 3-way adaptor

Part number: A-4113-0784

13 – RMP60M probe module adaptor

Part number: A-4113-0771

14 – MP3 probe

Part number: A-2053-5358

15 – Shorting cover

Part number: A-2053-6468

RMP60M upgrade kit

Current users of MP14, MP16 or MP18 radio probes may upgrade to RMP60M. A complete working system (probe, MI14 or MI16 interface and RMM antennas) must be exchanged.

Includes: RMP60M module
RMP60M probe module
RMI radio machine interface
Receiver mounting bracket
Sealtite kit

Part number: RI-4113-1003

RMP600

RMP600 is the latest generation compact radio transmission probe using strain gage technology. Measuring only 63 mm in diameter and 76 mm in length, with an omni-directional transmission distance of 15 m, it is ideal for use on all machine tools. RMP600 features an integrated probe module delivering exceptional robustness and generous overtravel. It delivers interference-free transmission through the use of FHSS (frequency hopping spread spectrum). RMP600 complies with FCC regulations and operates in the 2.4 GHz range.

RMP600 supports three methods of probe activation:

Radio-on The probe is turned on via an RF signal produced by the RMI and initiated by an M code. The probe is turned off via an RF signal or the internal timer.

Spin-on The probe is turned on via an internal centrifugal switch. The probe is turned off via the centrifugal switch or the internal timer.

Switch-on The probe is turned on and off via a switch incorporated into the shank, activated when the probe is loaded into the spindle.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±15°
	Z:	11 mm (0.43 in)
Stylus trigger force	X and Y:	10 gf
	Z:	193 gf
Unidirectional repeatability	0.25 µm (0.00001 in)	

RMP600 retrofit kit

Includes: RMP600 probe
RMI radio machine interface
Receiver mounting bracket
50 mm and 100 mm carbon fiber styli
Sealtite kit
Renishaw Inspection Plus software
Installation and application support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: RMP600-NS-S (Available at a fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

RMP600 hardware only kit

Includes: RMP600 probe
RMI radio machine interface
Receiver mounting bracket
50 mm and 100 mm carbon fiber styli
Sealtite kit

Part number: RMP600-NS-KIT

RMP600 probe kit

Includes: RMP600 probe
AA battery (2)
Tool kit

Part number: A-5312-0001

RMI radio machine interface

Part number: A-4113-0050

Receiver mounting bracket

Part number: A-2033-0830

Sealtite conduit

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

RMP600 upgrade kit

Current users of MP14, MP16 or MP18 radio probes may upgrade to RMP600. A complete working system (MP3 probe, transmission system, MI14 or MI16 interface and RMM antennas) must be exchanged.

Includes: RMP600 probe
RMI radio machine interface
Receiver mounting bracket
Sealtite kit

Part number: RI-5312-0001

Shanks and Toolholders

Shanks for OMP60, MP11, MP700, RMP60 and RMP600 (spin-on, optical-on, radio-on) systems

Part number	Description
M-2045-0068	CAT30
M-2045-0069	CAT40
M-2045-0138	CAT45
M-2045-0071	CAT50
M-2045-0292	CAT60
M-2045-0077	BT30
M-2045-0027	BT40
M-2045-0038	BT45
M-2045-0073	BT50
M-2045-0186	HSK A40
M-2045-0187	HSK A50
M-2045-0188	HSK A63
M-2045-0189	HSK A80
M-2045-0190	HSK A100
A-2045-0243	½ in straight shank
A-2030-0252	1 in straight shank
A-2030-0211	25 mm straight shank
M-2045-0313	CAPTO C4
M-2045-0346	CAPTO C5
M-2045-0310	CAPTO C6
M-2045-0311	CAPTO C8
M-2045-0335	KM63
M-2045-1831591	KM63Y (Mazak)

Calibration masters

Calibration tools

Part number	Description
M-2253-0954	CAT40
M-2253-0955	CAT50
M-2253-1562	BT30
M-2253-1263	BT40
M-2253-1262	BT50

Shanks for OMP40, OMP400 and RMP40

Part number	Description
M-4071-0050	CAT30
M-4071-0058	CAT40
M-4071-0072	CAT50
M-4071-0049	BT30
M-4071-0057	BT40
M-4071-0071	BT50
M-4071-0048	ISO30 DIN69871
M-4071-0069	ISO40 DIN69871
M-4071-0044	HSK E25
M-4071-0055	HSK E32
M-4071-0054	HSK E40
M-4071-0045	HSK A32
M-4071-0046	HSK A40
M-4071-0047	HSK A50
M-4071-0129	HSK A63
M-4071-0141	CAPTO C4
M-4071-0066	CAPTO C5
M-4071-0067	CAPTO C6
M-4071-0065	KM63

OMP40, OMP400 and RMP40 shank kits

CAT40 shank kit

Includes: CAT40 shank
OMP60/RMP60 shank adaptor

Part number: M-4071-0058-RI

BT40 shank kit

Includes: BT40 shank
OMP60/RMP60 shank adaptor

Part number: M-4071-0057-RI

Shanks for OLP40 and RLP40

Part number	Description
A-5625-1003	25 mm straight shank
A-5625-1004	½ in straight shank
A-5625-1007	1 in straight shank

Tool setting probes for machining centers

NC3 tool setter

NC3 is a non-contact tool setter, available in a fixed configuration and offered in a single size. NC3 is compact and designed to accommodate tools up to 80 mm diameter making it ideal for small to medium machining centers and special applications.

Repeatability		±0.15 µm (0.000006 in)	
Tool diameter	Measurement	Min:	0.20 mm (0.008 in)
		Max:	80 mm (3.15 in)
		Off-center	100 mm (3.94 in)
	Breakage	Min:	0.10 mm (0.0039 in)

NC3 fixed system kit

Includes: NC3 fixed unit with 10 m integral cable
NCi-5 interface
Air regulator kit
Ø17 mm OD × 4 m conduit
Mounting plate

Part number: A-4179-1100

NC3 fixed unit only

Includes: NC3 fixed unit with 10 m integral cable

Part number: A-4179-1500

NC3 fixed system retrofit kit

NC3 retrofit kit includes all items above plus the following:

Tool setting software
Installation and application support

Part number: NC3-F135-S

NCi-5 interface

Part number: A-5259-2000

NC3 air regulator kit

Part number: A-4179-1600

NC3 air filter service kit

Part number: P-FI01-S002

Steel sheath conduit

Ø17 mm OD × 1 m length, for cable protection.

Part number: P-HO01-0008

45° mounting bracket

Part number: A-4179-1501

NC3 air nozzle kit

Part number: A-4179-0450

NC4 tool setter

NC4 is a non-contact tool setter and our most compact design. NC4 is available in fixed or separate configurations. NC4F (fixed) is available in four different sizes. NC4S (separate) systems are user-configurable operating between 500 mm and 5 m.

Repeatability		±1.0 µm (0.00004 in)
Minimum tool diameter	Measurement	0.03 mm (0.0012 in)
	Breakage	0.03 mm (0.0012 in)

NC4 fixed system retrofit kits

Include: NC4 fixed unit with 12.5 m cable
NCi-5 interface
Air regulator kit
Ø22 mm OD steel braided conduit
Mounting plate
Tool setting software
Installation and application support

Part numbers: NC4-F300-Modular-S *
NC4-F300-S *
NC4-F230-S *
NC4-F145-S *
NC4-F115-S *
NC4-F95-S *

NC4 separate system retrofit kits

Include: NC4 separate unit with 12.5 m cable
NCi-5 interface
Air regulator kit
Ø17 mm OD steel braided conduit
Tool setting software
Installation and application support

Part numbers: NC4-S800-S *
NC4-S1500-S *
NC4-S2000-S *
NC4-S3000-S *
NC4-S5000-S *

Note: When ordering a separate system retrofit kit, the customer must select an NC4 based on its operating range. In addition, the customer must select tool setting software based on the control type. Brackets and an adjusting method (see following page) are also needed for NC4 separate systems. These are not included with NC4 separate systems and must be ordered additionally. Mounting brackets for various machines are continually developed. Contact Renishaw for the latest list of compatibility. Bracket installation is **not** included with the standard separate system retrofit price, this service can be quoted upon request.

* Available at a fixed price. Call for details.

NC4 fixed kits

NC4 F300/225 with NCi-5 kit

Separation 225 mm

Part number: NC4-F300-Modular-kit

NC4 F300/240 with NCi-5 kit

Separation 240 mm

Part number: NC4-F300-kit

NC4 F230/170 with NCi-5 kit

Separation 170 mm

Part number: NC4-F230-kit

NC4 F145/85 with NCi-5 kit

Separation 85 mm

Part number: NC4-F145-kit

NC4 F115/55 with NCi-5 kit

Separation 55 mm

Part number: NC4-F115-kit

NC4 F95/23 with NCi-5 kit

Separation 23 mm

Part number: NC4-F95-kit

NC4 separate kits

NC4 S800 with NCi-5 kit

Separation 500 mm – 800 mm

Part number: A-4114-5060

NC4 S1500 with NCi-5 kit

Separation 800 mm – 1500 mm

Part number: A-4114-5065

NC4 S2000 with NCi-5 kit

Separation 1500 mm – 2000 mm

Part number: A-4114-5070

NC4 S3000 with NCi-5 kit

Separation 2000 mm – 3000 mm

Part number: A-4114-5075

NC4 S5000 with NCi-5 kit

Separation 3000 mm – 5000 mm

Part number: A-4114-5080

NC4 tool kit

Part number: A-4114-4110

NC4 air regulator kit

Part number: A-2253-5120

NC4 air filter service kit

Part number: P-FI01-S002

NCi-5 interface

Part number: A-5259-2000

NC4 access panel 0.2

Part number: A-4114-0082

NC4 access panel 0.4

Part number: A-4114-0084

NC4 access panel 0.6

Part number: A-4114-0086

Steel sheath conduit 22 mm OD × 1 m

For NC4 fixed cable protection.

Part number: P-HO01-0011

Steel sheath conduit 17 mm OD × 1 m

For NC4 separate cable protection.

Part number: P-HO01-0008

NC4F 90-degree cable exit kit

Part number: P-CA61-0068
Part number: P-CA61-0069

NC4F air blast nozzle and bracket

Part number: A-5450-0480

Solenoid kit

Part number: A-5450-0490

NC4 set-up tool

Part number: A-4114-8000

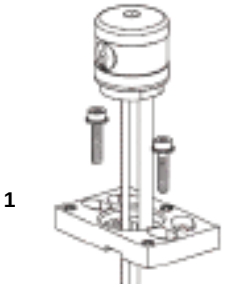
NC4S mounting hardware options

1. NC4 spacer plate – separate

Part number: A-4114-4400

2. NC4 adjuster pack – separate

Part number: A-4114-3100



OTS

The OTS is a new optical transmission tool setter for vertical and horizontal machining centers. Modeled on the TS27R, OTS can set tool length and diameter of rotating tools and perform broken tool detection. OTS is available in two configurations – OTS ½AA and OTS AA. OTS can be used with the OMI-2, OMI-2T or OMM-2/OSI interface. OMI-2T or OMM-2/OSI must be used if OTS is to be paired with another optical transmission probe.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±10°
	Z:	5.5 mm (0.21 in)
Stylus trigger force	130 gf – 240 gf	
Unidirectional repeatability	1.0 µm (0.00004 in)	

OTS retrofit kit

Includes: OTS ½AA or OTS AA probe
OMI-2T
Receiver mounting bracket
Sealtite kit
Renishaw tool setting software
Installation and application support

Part number: OTS-S (½AA configuration)
Part number: OTSAA-S (AA configuration)

Available at fixed price – call for details.

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

OTS hardware only kit

Includes: OTS ½AA probe or OTS AA probe
OMI-2T
Receiver mounting bracket
Sealtite kit

Part number: OTS-KIT
Part number: OTSAA-KIT

OTS ½AA probe kit

Includes: OTS probe
½ AA battery (2)
Tool kit

Part number: A-5401-2001

OTS AA probe kit

Includes: OTS probe
AA battery (2)
Tool kit

Part number: A-5514-2001

OMM-2 optical receiver

Part number: A-5492-0051

OMI-2 optical receiver

Part number: A-5191-0049

OMI-2T optical receiver

Part number: A-5439-0049

Receiver mounting bracket

Part number: A-2033-0830

OSI interface

Part number: A-5492-2000

Sealtite conduit for OMM-2, OMI-2 or OMI-2T

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

RTS *(available winter 2013)*

The RTS is a radio transmission tool setter for vertical and horizontal machining centers. Modeled after the OTS, RTS can set tool length and diameter of rotating tools and perform broken tool detection. RTS uses AA batteries (identical to RMP60). RTS can be used with either the RMI or the RMI-Q. The RMI-Q must be used if RTS is to be paired with another radio transmission probe.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±10°
	Z:	5.5 mm (0.21 in)
Stylus trigger force	130 gf – 240 gf	
Unidirectional repeatability	1.0 µm (0.00004 in)	

RTS retrofit kit

Includes: RTS AA probe
RMI-Q
Receiver mounting bracket
Sealtite kit
Renishaw tool setting software
Installation and application support

Part number: RTS-S

Available at fixed price – call for details.

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

RTS hardware only kit

Includes: RTS AA probe
RMI-Q
Receiver mounting bracket
Sealtite kit

Part number: RTS-KIT

RTS AA probe kit

Includes: RTS probe
AA battery (2)
Tool kit

Part number: A-5646-0001

RMI radio machine interface

Part number: A-4113-0050

RMI-Q radio machine interface

Part number: A-5687-0050

Receiver mounting bracket

Part number: A-2033-0830

Sealtite conduit

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

TS27R

The TS27R is a tool setter for vertical machining centers that enables the user to set both tool length and diameter of rotating tools, and to carry out broken tool detection.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±10°
	Z:	5.5 mm (0.21 in)
Stylus trigger force	130 gf – 240 gf	
Unidirectional repeatability	1.0 µm (0.00004 in)	

TS27R retrofit kit

Includes: TS27R probe
HSI interface
Sealtite kit
Renishaw toolsetting software
Installation and application support

Part number: TS27R-S (Available at fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

TS27R hardware only kit

Includes: TS27R probe
HSI interface
Sealtite kit

Part number: TS27R-KIT

TS27R probe, stylus, and holder kit

Part number: A-2008-0368

HSI interface

Part number: A-5500-1000

OTS, RTS or TS27R replacement parts and accessories

Tungsten carbide stylus (0.5 in disk)

Part number: A-2008-0382

Ceramic stylus (19 mm square)

Part number: A-2008-0384

Retrofit stylus kit

Includes: Break protection
Tether
Screws

Part number: A-5003-5171

Break protect link

Part number: A-5003-0661

Stylus holder with 4 set screws

Part number: A-2008-0389

Stylus holder set screws

Part number: P-SC13-0403

Crank for horizontal machining centers

Part number: A-2008-0448

100 mm riser

Part number: M-2008-0866-RI-KIT

TS27 stylus (0.5 in disk)

For TS27 probes shipped prior to July 1995.

Part number: M-5003-1033 (steel)
Part number: M-2008-0197 (ceramic)

TRS2

TRS2 is a cost-effective laser-based solution for high-speed broken tool detection. Working with the reflective properties of a rotating tool, TRS2 can detect broken tools at a distance of between 300 mm and 2 m, but optimized for use between 300 mm and 1 m. Toolwise™ Electronics makes TRS2 especially effective with tiny, easily broken tools down to 0.019 in (0.5 mm) diameter. TRS2 is suitable for solid profile tools including drills, taps, reamers and end mills.

TRS2 hardware kit

Includes: TRS2 laser system with integral interface
Tool kit
Air regulator kit
Sealtite kit
Mounting bracket
Renishaw TRS2 BTD software

Part number: TRS2-KIT

TRS2 probe only

Includes: TRS2 laser system with integral interface

Part number: A-5450-0400

TRS2 retrofit kit

Includes: TRS2 laser system with integral interface
Tool kit
Air regulator kit
Sealtite kit
Mounting bracket
Renishaw TRS2 BTD software
Installation and application support

Part number: TRS2-S (Available at fixed price)
Call for details

Special pricing available for multiple systems.

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

TRS2 air regulator kit

Part number: A-2253-5120

TRS2 air filter service kit

Part number: P-FI01-S002

Sealtite conduit for TRS2

¼ in conduit, 5 ft long. Includes one fitting.

Part number: SEALTITE, 7455

TRS2 replacement air cap

Part number: A-4178-0440

TS34

TS34 is a hard-wired tool setter for vertical and horizontal machining centers that enables users to set both length and diameter of rotating tools and perform broken tool detection.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±9°
	Z:	4 mm (0.157 in)
Stylus trigger force	X and Y:	65 gf – 142 gf
	Z:	550 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

TS34 probe, stylus and holder kit

Rear exit

Part number: A-2197-2100

Side exit

Part number: A-2197-3000

HSI interface

Part number: A-5500-1000

Inspection probes for turning centers

OLP40

OLP40 is the latest generation of optical transmission part probes, ideal for use on turning centers. OLP40's compact design features an integrated probe module delivering exceptional robustness and generous overtravel. Utilizing a revised state-of-the-art modulated optical transmission method, the system offers the highest level of resistance to light interference. The OLP40 probe is also backwards compatible with existing OMM/MI12 and OMI receivers. OLP40 supports two methods of probe activation – M code and spin-on.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±12.5°
	Z:	6 mm (0.24 in)
Stylus trigger force	X and Y:	50 gf – 90 gf
	Z:	585 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

OLP40 retrofit kit

Includes: OLP40 probe and transmission system
OMI-2 optical machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit
Renishaw lathe inspection software
Installation and applications support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: OLP40-NS-S (Available at fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to us before a retrofit order can be processed.

OLP40 hardware only kit

Includes: OLP40 probe and transmission system
OMI-2 optical machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit

Part number: OLP40-NS-KIT

OLP40 probe kit

Includes: OLP40 probe
½ AA battery (2)
Tool kit

Legacy

Part number: A-5625-0001

Modulated

Part number: A-5625-2001

OMM optical receiver

Part number: A-2033-0576

OMM-2 optical receiver

Part number: A-5492-0051

OMI-2 optical receiver/interface

Part number: A-5191-0049

OMI-2T optical receiver/interface

Part number: A-5439-0049

Receiver mounting bracket

Part number: A-2033-0830

MI12 interface

Part number: A-2075-0142

OSI interface

Part number: A-5492-2000

Sealtite conduit for OMM or OMI

¼ in conduit, 5 ft long. Includes one fitting.

Part number: SEALTITE, 7455

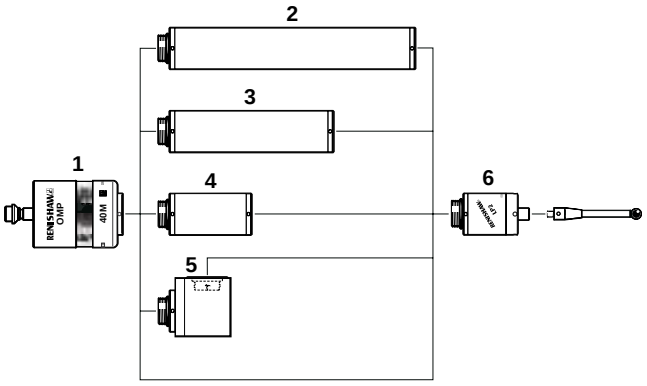
Sealtite conduit for OMM-2, OMI-2 or OMI-2T

5/16 in conduit, 1 meter long. Includes one fitting.

Part number:A-4113-0306

OMP40M

OMP40M is a modular version of the OLP40. The LP2 probe module, adaptors and extensions need to be purchased separately.



1 – OMP40M transmission module

Legacy

Part number: A-5626-0001

Modulated

Part number: A-5626-2001

2 – LPE3 extension 150 mm

Part number: A-2063-7003

3 – LPE2 extension 100 mm

Part number: A-2063-7002

4 – LPE1 extension 50 mm

Part number: A-2063-7001

5 – MA4 90° adaptor

Part number: A-2063-7600

6 – LP2 probe assembly

Part number: A-2063-6098

OMP40M retrofit kit

Includes: OMP40M transmission system
LP2 probe
OMI-2 optical machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit
Renishaw lathe inspection software
Installation and applications support

Part number: OMP40M-NS-S (Available at fixed price)
Call for details

OMP40M hardware only kit

Includes: OMP40 transmission system
LP2 probe
OMI-2 optical machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit

Part number: OMP40M-NS-KIT

A shank is not included in the above kits. See section entitled Shanks and Toolholders for price and part number information.

OMM optical receiver

Part number: A-2033-0576

OMM-2 optical receiver

Part number: A-5492-0051

OMI-2 optical receiver/interface

Part number: A-5191-0049

OMI-2T optical receiver/interface

Part number: A-5439-0049

Receiver mounting bracket

Part number: A-2033-0830

MI12 interface

Part number: A-2075-0142

OSI interface

Part number: A-5492-2000

Sealtite conduit for OMM or OMI

¼ in conduit, 5 ft long. Includes one fitting.

Part number: SEALTITE, 7455

Sealtite conduit for OMM-2, OMI-2 or OMI-2T

5/16 in conduit, 1 meter long. Includes one fitting.

Part number: A-4113-0306

RLP40

RLP40 is the latest generation of radio transmission part probes, ideal for use on turning centers. RLP40's compact design features an integrated probe module delivering exceptional robustness and generous overtravel. RLP40 complies with FCC regulations and operates in the 2.4 Ghz range. RLP40 delivers interference-free transmission through the use of FHSS (frequency hopping spread spectrum).

RLP40 supports two methods of probe activation:

Radio-on The probe is turned on via an RF signal produced by the RMI and initiated by an M code. The probe is turned off via an RF signal or the internal timer.

Spin-on The probe is turned on via an internal centrifugal switch. The probe is turned off via the centrifugal switch or the internal timer.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±12.5°
	Z:	6 mm (0.24 in)
Stylus trigger force	X and Y:	50 gf – 90 gf
	Z:	585 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

RLP40 retrofit kit

Includes: RLP40 probe and transmission system
RMI radio machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit
Renishaw lathe inspection software
Installation and applications support

A shank is not included in this kit. See section entitled Shanks and Toolholders for price and part number information.

Part number: RLP40-NS-S (Available at fixed price)
Call for details

Note: The retrofit questionnaire at the end of this section must be filled out and returned to Renishaw before a retrofit order can be processed.

RLP40 hardware only kit

Includes: RLP40 probe and transmission system
RMI radio machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit

Part number: RLP40-NS-KIT

RLP40 probe kit

Includes: RLP40 probe
½ AA battery (2)
Tool kit

Part number: A-5627-0001

RMI radio machine interface

Part number: A-4113-0050

Receiver mounting bracket

Part number: A-2033-0830

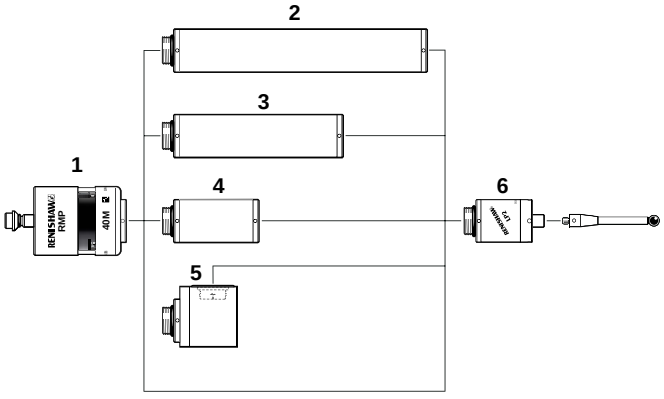
Sealtite conduit

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

RMP40M

RMP40M is a modular version of the RLP40. The LP2 probe module, adaptors and extensions need to be purchased separately.



1 – RMP40M transmission module

Part number: A-5628-0001

2 – LPE3 extension 150 mm

Part number: A-2063-7003

3 – LPE2 extension 100 mm

Part number: A-2063-7002

4 – LPE1 extension 50 mm

Part number: A-2063-7001

5 – MA4 90° adaptor

Part number: A-2063-7600

6 – LP2 probe assembly

Part number: A-2063-6098

RMP40M retrofit kit

Includes: RMP40M transmission system
LP2 probe
Receiver radio machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit
Renishaw lathe inspection software
Installation and applications support

Part number: RMP40M-NS-S (Available at fixed price)
Call for details

RMP40M hardware only kit

Includes: RMP40 transmission system
LP2 probe
RMI radio machine interface
Receiver mounting bracket
30 mm stainless steel stylus (×2)
Sealtite kit

Part number: RMP40M-NS-KIT

A shank is not included in the above kits. See section entitled Shanks and Toolholders for price and part number information.

RMI radio machine interface

Part number: A-4113-0050

Receiver mounting bracket

Part number: A-2033-0830

Sealtite conduit

5/16 in conduit, 1 m long. Includes one fitting.

Part number: A-4113-0306

LP2

The LP2 probe is used on CNC lathes for workpiece inspection and tool setting. It is also used in special applications where its small body makes it suitable for gaging workpiece features with restricted access.

The LP2 is universal and can be fitted to optical, inductive, hard-wired and radio transmission systems. An array of sockets and adaptors is available to support these applications. Please contact Renishaw for further details.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±12.5°
	Z:	6.5 mm (0.25 in)
Stylus trigger force	X and Y:	50 gf – 90 gf
	Z:	585 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

Includes: LP2 probe
2 C spanners
TK1 tool kit

Part number: A-2063-6098

LP2H

The LP2H probe is used on CNC lathes for workpiece inspection and tool setting. It is designed for heavier duty applications where machine vibration or heavy stylus arrangements may cause unexpected triggers.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±12.5°
	Z:	5 mm (0.20 in)
Stylus trigger force	X and Y:	200 gf – 400 gf
	Z:	3000 gf
Unidirectional repeatability	2.0 µm (0.00008 in)	

Includes: LP2H probe
2 C spanners
TK1 tool kit

Part number: A-2064-0002

LP2DD

The LP2DD probe is based on the LP2 design, but incorporates a revised diaphragm assembly. This probe is recommended for grinding machines and other installations where dust-filled coolant is abundant.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±15°
	Z:	6.5 mm (0.25 in)
Stylus trigger force	X and Y:	50 gf – 90 gf
	Z:	585 gf
Unidirectional repeatability	1.0 µm (0.00004 in)	

Includes: LP2DD probe
2 C spanners
TK1 tool kit

Part number: A-2063-8020

LP2/LP2DD replacement parts

Conversion kit

This kit allows the conversion of your existing LP2 probe to LP2DD.

Includes: 2 C spanners
Front ring
Outer diapragm
O ring

Part number: A-2063-8023

LP2DD diaphragm replacement kit

An outer diaphragm replacement kit for the LP2DD.

Includes: Diaphragm
O ring

Part number: A-2063-8030

Chip deflector

This deflector is recommended if the LP2DD is subjected to continual exposure to hot chips.

Part number: M-2063-8003

C spanner

A C spanner is required for fitting an LP2 to your machine.

Part number: A-2063-7587

LP2 service kit (DK2)

Includes: Front cap
Metal eyelid
Spring
O ring

Part number: A-2063-7542

TK1 tool kit

Includes: Stylus tool
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

Part number: A-2053-7531

LP2 accessories

FS1 adjustable female socket

Provdies ±4° of angular rotation about the centerline of the LP2. Supplied with 500 mm long cable, protective cover and adjusting screws.

Part number: A-2063-6697

FS2 fixed female socket

Designed for rigid mounting of an LP2. Supplied with 500 mm long cable and protective cover.

Part number: A-2063-5431

FS3 single axis adjustable holder

The socket pivots on two balls, this provides ±4° of pitch adjustment about the centerline of the LP2. Supplied with 500 mm long cable, protective cover and adjusting screws.

Part number: A-2063-5308

MA4 90° adaptor

Part number: A-2063-7600

COS to LP2 adaptor

This adaptor allows the use of the LP2 on the MP7/MP8/MP9/MP10 OMP.

Part number: A-2063-7774

IMP inductive module

Part number: A-2028-7574

MI5 interface

Part number: A-2019-0006

MI8 interface

Part number: A-2037-0010

LPE1 extension

A 50 mm long extension which can be fitted between the LP2 and holder.

Part number: A-2063-7001

LPE2 extension

100 mm long.

Part number: A-2063-7002

LPE3 extension

150 mm long

Part number: A-2063-7003

LP2 straight shanks

LP2 straight shanks are fitted with FS2 socket assemblies to accommodate the LP2 probe. An MI8 interface is also required.

LP2 0.75 in straight shank with FS2 and cable assembly

Part number: A-2063-8326

LP2 1 in straight shank with FS2 and cable assembly

Part number: A-2063-8328

LP2 22 mm straight shank with FS2 and cable assembly

Part number: A-2063-8366

MP250

MP250 is the next generation compact probe. Measuring just 25 mm in diameter and 40 mm in length, MP250 is identical in size to the popular LP2. MP250 uses Rengage™ strain gage sensing technology and delivers superior metrology performance. MP250 is aimed at the tool cutter grinder and special CNC lathe markets. MP250 is supported via hard-wired only and must be used with the HSI interface and FS sockets designed specifically for the MP250. MP250 is not suitable for use with inductive, optical or radio transmission.

Sense directions	±X, ±Y, +Z	
Stylus overtravel	X and Y:	±15°
	Z:	6.5 mm (0.25 in)
Stylus trigger force	X and Y:	11 gf
	Z:	220 gf
Unidirectional repeatability	0.25 µm (0.00001 in)	

MP250 probe kit

Includes: MP250 probe
Tool kit

Part number: A-5500-1600

MP250 accessories

FS1 adjustable female socket for MP250

Part number: A-5500-1710

FS2 fixed female socket for MP250

Part number: A-5500-1810

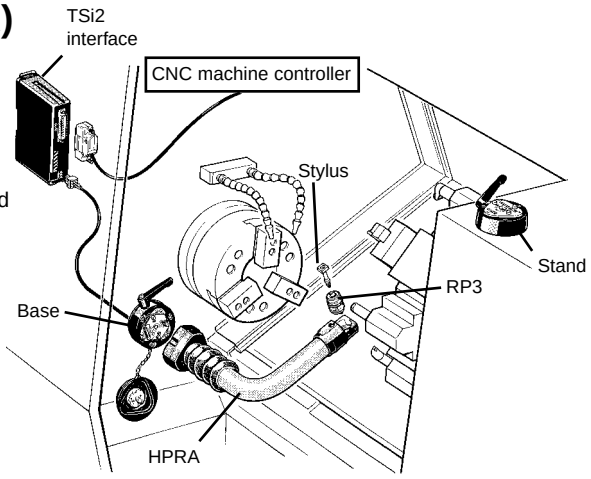
HSI interface for MP250

Part number: A-5500-1000

Tool setting for turning centers

High precision removable arm (HPRA)

The HPRA is a 'plug-in', cost effective, precision tool setting system for use on CNC lathes. When needed, the arm is manually introduced to the machine envelope and held in place through the use of the machine resident HPRA base. The arm is locked in position through the duration of the tool setting cycle. After use, the arm is removed and stored on the HPRA storage stand.

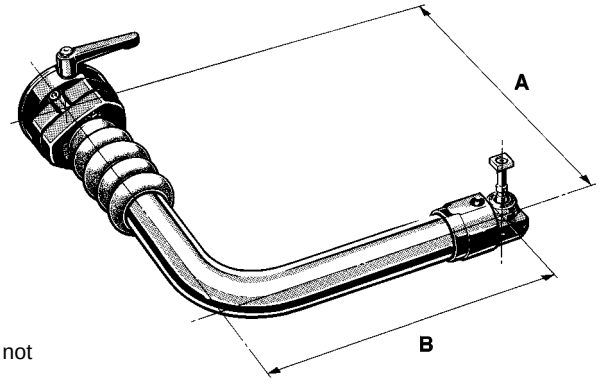


Unidirectional repeatability

Max 2 sigma value:	5.0 µm (0.0002 in) for arms supporting 6 in to 15 in chucks 8.0 µm (0.0003 in) for arms supporting 18 in to 24 in chucks
Max arm dimensions:	A=580 mm B=450 mm
Min arm dimensions:	A=250 mm B=211 mm

HPRA is available to fit most common chuck sizes from 6 in to 24 in. Each HPRA standard kit (see below) is supplied complete with:

- RP3 probe (A-2197-0049)
- 90° probe holder
- TSi2 interface (A-2176-0010)
- HPRA storage stand (A-2176-0019)



Standard kits

Part number: See below

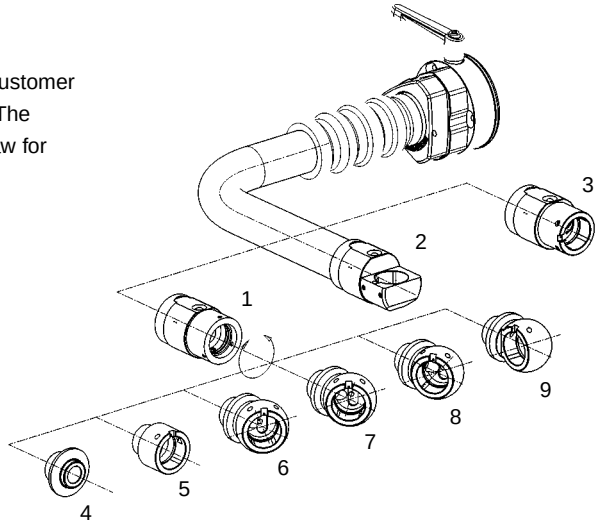
* A stylus assembly and base (R/E or S/E) rear exit or side exit are not included and must be ordered separately.

Part description	Part number	A-dimension	B-dimension
HPRA 6 in chuck with RP3 kit	A-2176-0883	250	211
HPRA 8 in chuck with RP3 kit	A-2176-0884	280	241
HPRA 10 in chuck with RP3 kit	A-2176-0885	325	290
HPRA 12 in chuck with RP3 kit	A-2176-0886	355	290
HPRA 15 in chuck with RP3 kit	A-2176-0887	455	335
HPRA 18 in chuck with RP3 kit	A-2176-0888	510	375
HPRA 24 in chuck with RP3 kit	A-2176-0889	580	450

Custom kits

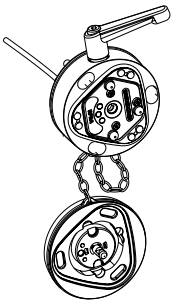
The HPRA can also be designed for specific applications. The customer must specify arm length, probe holder, stylus configuration etc. The items below depict some of the options. Please contact Renishaw for pricing.

1	A-2176-0268	PCB/LED housing
2	A-2176-0018	90° holder fixed
3	A-2176-0257	I/L holder fixed
4	A-2048-0523	LP2 adaptor
5	A-2176-1291	I/L adj RP3 holder
6	A-2176-1290	30° adj RP3 holder
7	A-2176-0269	45° adj RP3 holder
8	A-2176-1289	60° adj RP3 holder
9	A-2176-1288	90° adj RP3 holder



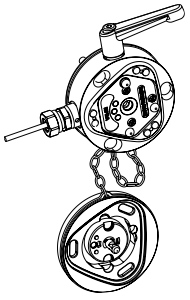
HPRA bases

The HPRA base is designed to provide a repeatable location for fixing the HPRA arm during tool setting cycles. The base is designed to stay resident within the machine and is supplied with a cover to protect the unit from coolant and debris when the arm is not in use. HPRA bases are available in rear and side exit configurations and are supplied with 3 meters of cable.



HPRA rear exit base

Part number: A-2176-0025



HPRA side exit base

Part number: A-2176-0187

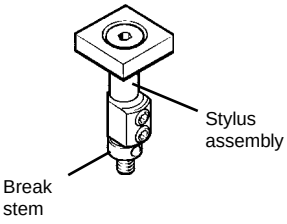
HPRA storage stand

Part number: A-2176-0019

HPRA/HPPA/HPMA stylus kits

There are six primary configurations of styli to support HPRA. Each is designed to be compatible with standard sizes of block tooling ranging from 5/8 in to 2 in. Each stylus kit is supplied complete with:

- 15×15×4 stylus assembly
- Break stem
- Stylus extension/adaptor
- Screws and tool kit



Part number: A-2197-0157 (16 mm tooling)
Part number: A-2197-0158 (20 mm tooling)
Part number: A-2197-0159 (25 mm tooling)
Part number: A-2197-0160 (32 mm tooling)
Part number: A-2197-0161 (40 mm tooling)
Part number: A-2197-0162 (50 mm tooling)

HPRA/HPPA/HPMA break stems

Part number: M-2197-0156 (16 and 20 mm tooling)
Part number: M-2197-0150 (25 to 50 mm tooling)

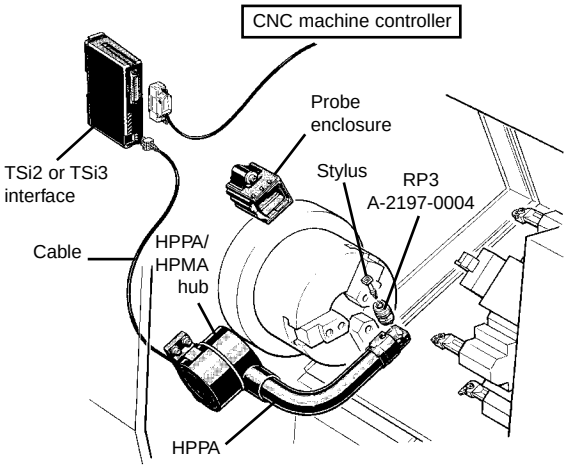
High precision pull-down arm (HPPA)

High precision motorized arm (HPMA)

The HPPA is a manual 'pull-down' 'push-up' tool setting system for use on CNC lathes. The HPMA is an 'automatic' servo driven system. Both products are designed to permanently reside in the machine envelope.

When needed, the HPPA is manually 'pulled-down' into position. After use, the arm is 'pushed-up' away from the cutting volume. HPMA requires the use of CNC M codes to drive the arm to its active and stowed positions.

All HPPA and HPMA systems are supplied with an enclosure to protect the probe and stylus assembly when not in use. HPPA and HPMA hubs are available in both R/E (rear exit) and S/E (side exit) configurations. S/E hubs are supplied with a fixed 5 m cable. **R/E hubs are supplied with a bulkhead connector and require the purchase of a separate cable.**



Specifications

Unidirectional repeatability	
max 2σ value in machine XZ axis:	5.0 µm (0.0002 in) for arms supporting 6 in to 15 in chucks 8.0 µm (0.0003 in) for arms supporting 18 in to 24 in chucks
HPPA max arm dimensions:	A=555 mm B=458 mm
HPPA min arm dimensions:	A=250 mm B=219 mm
HPMA max arm dimensions:	A=555 mm B=458 mm
HPMA min arm dimensions:	A=250 mm B=219 mm

HPPA and HPMA are available to fit most common chuck sizes from 6 in to 24 in. Each 'standard' kit (see below) is supplied complete with:

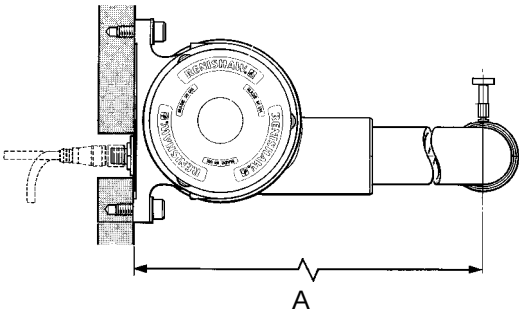
- Arm
- HPPA or HPMA hub
- RP3 probe (A-2197-0049)
- 90° probe holder
- TSi2 interface for HPPA (A-2176-0010)
- TSi3 interface for HPMA (A-2181-0465)
- Probe enclosure (A-2275-0098)
- Cable (supplied with S/E systems only, **purchase separately for R/E systems**)

HPPA standard kits

Part number: See below

* A stylus assembly is not included and must be ordered separately. In addition HPPA and HPMA R/E systems require the separate purchase of a cable.

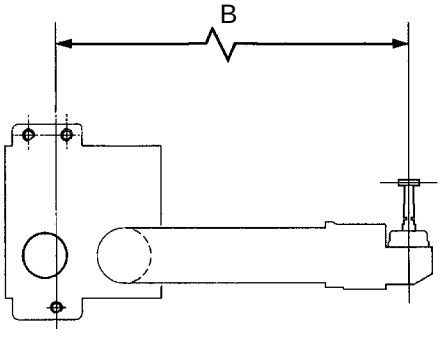
Part description	Part number	A-dimension	B-dimension
HPPA 6 in R/E with RP3 kit	A-2275-0181	250	219
HPPA 8 in R/E with RP3 kit	A-2275-0182	286	249
HPPA 10 in R/E with RP3 kit	A-2275-0183	335	298
HPPA 12 in R/E with RP3 kit	A-2275-0184	368	298
HPPA 15 in R/E with RP3 kit	A-2275-0185	400	343
HPPA 18 in R/E with RP3 kit	A-2275-0186	469	383
HPPA 24 in R/E with RP3 kit	A-2275-0187	555	458
HPPA 6 in S/E with RP3 kit	A-2275-0188	250	219
HPPA 8 in S/E with RP3 kit	A-2275-0189	286	249
HPPA 10 in S/E with RP3 kit	A-2275-0190	335	298
HPPA 12 in S/E with RP3 kit	A-2275-0191	368	298
HPPA 15 in S/E with RP3 kit	A-2275-0192	400	343
HPPA 18 in S/E with RP3 kit	A-2275-0193	469	383
HPPA 24 in S/E with RP3 kit	A-2275-0194	555	458



HPMA standard kits

Part number: See below

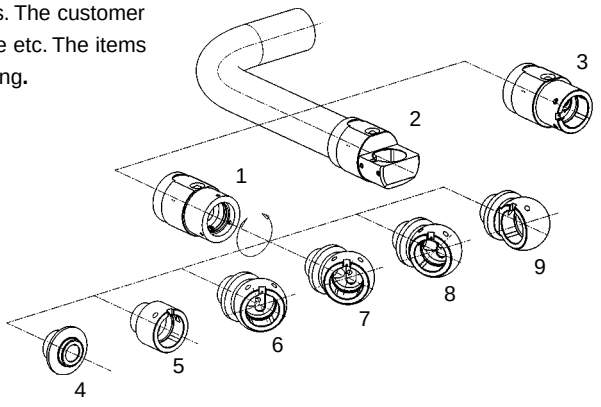
Part description	Part number	A-dimension	B-dimension
HPMA 6 in R/E with RP3 kit	A-2181-0645	250	219
HPMA 8 in R/E with RP3 kit	A-2181-0646	286	249
HPMA 10 in R/E with RP3 kit	A-2181-0647	355	298
HPMA 12 in R/E with RP3 kit	A-2181-0648	368	298
HPMA 15 in R/E with RP3 kit	A-2181-0649	400	343
HPMA 18 in R/E with RP3 kit	A-2181-0650	469	383
HPMA 24 in R/E with RP3 kit	A-2181-0651	555	458
HPMA 6 in S/E with RP3 kit	A-2181-0652	250	219
HPMA 8 in S/E with RP3 kit	A-2181-0653	286	249
HPMA 10 in S/E with RP3 kit	A-2181-0654	355	298
HPMA 12 in S/E with RP3 kit	A-2181-0655	368	298
HPMA 15 in S/E with RP3 kit	A-2181-0656	400	343
HPMA 18 in S/E with RP3 kit	A-2181-0657	469	383
HPMA 24 in S/E with RP3 kit	A-2181-0658	555	458



Custom kits

The HPPA and HPMA can also be designed for specific applications. The customer must specify arm length, probe holder, stylus configuration, hub type etc. The items below depict some of the options. Please contact Renishaw for pricing.

1	A-2176-0268	PCB/LED housing
2	A-2176-0018	90° holder fixed
3	A-2176-0257	I/L holder fixed
4	A-2048-0523	LP2 adaptor
5	A-2176-1291	I/L adj RP3 holder
6	A-2176-1290	30° adj RP3 holder
7	A-2176-0269	45° adj RP3 holder
8	A-2176-1289	60° adj RP3 holder
9	A-2176-1288	90° adj RP3 holder



HPPA/HPMA cables

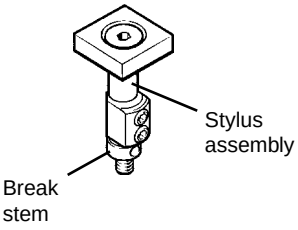
The HPPA and HPMA R/E systems require the use of one of the cables below:

Part number: P-CA82-1010 (2 meters)
Part number: P-CA82-1009 (5 meters)
Part number: P-CA82-1011 (10 meters)

HPRA/HPPA/HPMA stylus kits

There are six primary configurations of styli to support HPPA and HPMA. Each is designed to be compatible with standard sizes of block tooling ranging from 5/8 in to 2 in. Each stylus kit is supplied complete with:

- 15×15×4 stylus assembly
- Break stem
- Stylus extension/adaptor
- Screws and tool kit



Part number: A-2197-0157 (16 mm tooling)
Part number: A-2197-0158 (20 mm tooling)
Part number: A-2197-0159 (25 mm tooling)
Part number: A-2197-0160 (32 mm tooling)
Part number: A-2197-0161 (40 mm tooling)
Part number: A-2197-0162 (50 mm tooling)

HPRA/HPPA/HPMA M4 break stems

Part number: M-2197-0156 (16 mm and 20 mm tooling)
Part number: M-2197-0150 (25 mm to 50 mm tooling)
Part number: M-2048-2093 (Mori Seiki)

Legacy HPA stylus kits

TS20 replacement stylus kit

Includes stylus 10×10×4, break protect link, adaptor and screw.

Part number: A-2008-0601 (25 mm tooling)
Part number: A-2008-0602 (32 mm tooling)
Part number: A-2008-0603 (40 mm tooling)

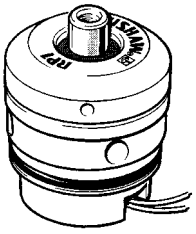
TS20 break protect link

Part number: M-2008-0333 (25 mm tooling)
Part number: M-2008-0604 (32 mm tooling)
Part number: M-2008-0605 (40 mm tooling)

RP1, RP2 and RP3 tool setting probes

The RP1, RP2 and RP3 probes are suitable for OEM installation into purpose-built holders, or for use with Renishaw's automatic or manual tool setting arms.

RP1 – Tool setting/inspection probe and tool kit



For use on OEM installation into purpose-built holders.

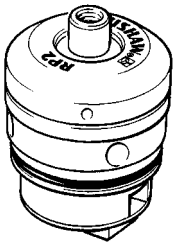
Part number: A-2154-0007

RP1 DD – RP1 double diaphragm version and tool kit

For use on OEM installation into purpose-built holders.

Part number: A-2154-0008

RP2 – Probe for tool setting arm (TSA) only

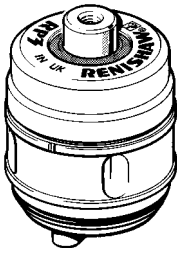


Part number: A-2116-0149

RP2DD – RP2 double diaphragm version for TSA only

Part number: A-2116-0150

RP3 – Probe for HPRA, HPPA and HPMA arms

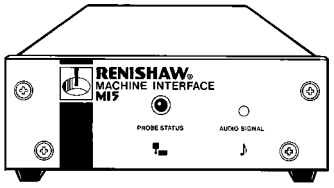


Part number: A-2197-0049

Interfaces

MI5 interface

The MI5 interface is required for use with Renishaw's inductive transmission probe systems. The MI5 converts probe signals into an acceptable form for the CNC machine control. This interface has solid state relay outputs.



Part number: A-2019-0006

MI5 board only (SSR)

Part number: A-2084-0500

MI12 interface

The MI12 interface is required for use with Renishaw optical probes using Legacy transmission. The MI12 converts signals received from the OMM receiver into an acceptable form for the CNC machine control. This interface has solid state relay outputs.

Part number: A-2075-0142

MI12 board only (SSR)

Part number: A-2075-0141

OSI interface

The OSI interface is required for use with Renishaw optical probes using Modulated transmission. The OSI works exclusively with the OMM-2 receiver.

Part number: A-5492-2000

HSI interface

The HSI interface is required for use with Renishaw's MP250 and TS34 probes. The HSI converts signals received from the probe into an acceptable form for the CNC machine control. The HSI has solid state relay output.

Part number: A-5500-1000

NCi-5 interface

An NCi-5 interface is required for use with Renishaw non-contact tool setting systems. The interface converts probe signals into an acceptable form for the CNC machine control. This interface has solid state relay outputs.

Part number: A-5259-2000

Receivers and interfaces

OMI, OMI-2 and OMI-2T are optical receivers that transmit signals between the probe and CNC control. These interfaces differ from the OMM as they include machine interface circuitry that eliminates the MI12 interface. All three systems offer visual indicators of probe status, start signal status, battery condition and error condition.

OMI

OMI is compatible with all Renishaw optical transmission systems including the new OMP60, OMP40 and OMP400 when configured for Legacy transmission (does not work with the OTS).

Part number: A-2115-0001

OMI-2

OMI-2 offers increased resistance to light interference and is exclusively compatible with Renishaw optical transmission systems operating in Modulated transmission mode (OMP60, OMP40, OMP400 or OLP40).

Part number:A-5191-0049 (8 m cable)
Part number:A-5191-0050 (15 m cable)

OMI-2T

OMI-2T is identical to the OMI-2 and is the exclusive interface supporting the twin probe system. OMI-2T is capable of communicating with multiple optical probes. CNC must have supporting M codes. This interface should be used when combining an OTS with an OMP60, OMP40 or OMP400.

Part number:A-5439-0049 (8 m cable)
Part number:A-5439-0050 (15 m cable)

OMM optical machine module

The OMM receiver is required for use with Renishaw optical probes using Legacy transmission. The OMM works exclusively with the MI12 interface.

Part number: A-2033-0576 (25 m cable)

OMM-2 optical machine module

The OMM-2 receiver is required for use with Renishaw optical probes using Modulated transmission. The OMM-2 works exclusively with the OSI. OMM-2 is capable of communicating with multiple optical probes.

Part number: A-5492-0051 (25 m cable)

RMI radio machine interface

The RMI interface is required for use with Renishaw's radio transmission probes. The RMI converts RF signals into an acceptable form for the CNC machine control. The RMI has solid state relay output.

Part number:A-4113-0050 (15 m cable)

RMI-Q radio machine interface *(available winter 2013)*

RMI-Q is identical to RMI and is the exclusive interface supporting multiple (up to four) probe systems. RMI-Q is capable of communicating with multiple radio probes. CNC must have supporting M codes. This interface should be used when combining an RTS with an RMP40, RMP60 or RMP600.

Part number:A-5687-0049 (8 m cable)
Part number:A-5687-0050 (15 m cable)

RMI accessories

RMI 30 m replacement cable

Part number: A-4113-0303

RMI 50 m replacement cable

Part number: A-4113-0304

RMI antenna cover

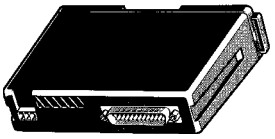
Part number: A-4113-0305

Lathe tool setting arm interfaces

There are two primary configurations of interfaces supporting lathe arms. The TSi2 and TSi3 deliver OCT (active high) output for probe status and arm positions, while the TSi2-C and TSi3-C interfaces deliver SSR solid state relay outputs for probe status and arm positions. The TSi2 and TSi2-C support the HPRA and HPPA lathe arms. The TSi3 and TSi-3C support the HPMA lathe arm.

TSi2

Part number: A-2176-0010

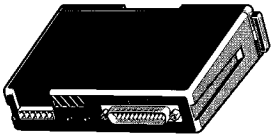


TSi2-C

Part number: A-2176-1152

TSi3

Part number: A-2181-0465



TSi3-C

Part number: A-2181-2239

Machine tool software

Macro based programming

Renishaw probing and tool setting software is a set of macros that control probing motion and data manipulation for a number of routines with input of a few parameters. Some capabilities may vary by specific software package and individual controller. All software is supplied on CD-ROM with electronic user's guide.

Inspection Plus software for machining centers

Available measurement cycles include:

- X or Y or Z single surface measure
- Any angle web/pocket
- 3 or 4 point bore/boss
- Internal/external corner
- 4th or 5th axis measure
- Feature to feature measure
- Print data via RS232

Description	Memory	Part number
Brother 32A (June 2002 and above)	35K/87M	A-4012-0908
Brother 32B	35K/87M	A-4012-1028
Fanuc 0-31	47K/117M	A-4012-0516
Haas	47K/117M	A-4012-0880
Mazak Fusion	47K/117M	A-4013-0023
Mazak Matrix	65K/163M	A-4013-0112
Meldas	47K/117M	A-4012-0516
Mori Seiki (Fanuc control)	47K/117M	A-4012-0936
Okuma OSP	53K/133M	A-4016-1035
Siemens 810D/840D (Ver 4 or less)	77K/190M	A-4014-0075
Siemens 810D/840D (Ver 5 and above)	77K/190M	A-4014-0356
Toshiba Tosnuc 888	47K/117M	A-4012-0610
Yasnac I80, MX3, J50, J300	47K/117M	A-4014-0070

Inspection Plus software for machining centers using strain gage probes

Available measurement cycles include:

- X or Y or Z single surface measure
- XYZ vector measure
- Any angle web/pocket
- 3 or 4 point bore/boss
- Internation/external corner
- 4th or 5th axis measure
- Feature to feature measure
- Print data via RS232

Description	Memory	Part number
Fanuc 0-31	47K/117M	A-4012-0685
Haas	47K/117M	A-4012-0890
Mazak Fusion	47K/117M	A-4013-0040
Meldas	47K/117M	A-4012-0685
Mori Seiki (Fanuc control)	47K/117M	A-4012-0942
Okuma OSP	53K/133M	A-4016-1035
Siemens 810D/840D (Ver 4 or less)	77K/190M	A-4014-0152
Siemens 810D/840D (Ver 5 and above)	77K/190M	A-4014-0362
Yasnac I80, MX3, J50, J300	47K/117M	A-4014-0104

Tool setting software for machining centers

Renishaw tool setting software allows you to set tool length and diameter offsets for single point and multiple point tools, perform in-cycle broken tool detection and manual or automatic (programmed) positioning.

Contact tool setting

Description	Memory	Part number
Brother 32A (June 2002 and above)	13K/32M	A-4012-1007
Brother 32B	13K/32M	A-4012-1103
Fadal	13K/32M	A-4016-0043
Fanuc 0-31	9K/23M	A-4012-0584
Haas	9K/23M	A-4012-0886
Mazak 640M, M32, M+	9K/23M	A-4013-0036
Meldas	9K/23M	A-4013-0007
Okuma OSP	9K/23M	A-4016-1039
Siemens 810/840D (Ver 4 or less)	9K/23M	A-4014-0090
Siemens 810/840D (Ver 5 and above)	9K/23M	A-4014-0396
Yasnac J50, J300, I80/MX3	9K/23M	A-4014-0018

Non-contact tool setting

Description	Memory	Part number
Brother 32A (June 2002 and above)	27K/67M	A-4012-0904
Brother 32B	27K/67M	A-4012-1035
Fadal	27K/67M	A-4016-0061
Fanuc 0-31	24K/67M	A-4012-0820
Haas	24K/67M	A-4012-0895
Makino	27K/67M	A-4012-0900
Mazak Fusion	24K/67M	A-4013-0062
Mazak Matrix	57K/143M	A-4013-0119
Meldas	24K/67M	A-4013-0050
Okuma OSP	27K/67M	A-4016-1021
Siemens 810/840D (Ver 4 or less)	34K/84M	A-4014-0157
Siemens 810/840D (Ver 5 and above)	27K/67M	A-4014-0401
Yasnac MX3, I80, J50, J300	27K/67M	A-4014-0020

Special non-contact tool setting

Description	Memory	Part number
Fanuc angle beam 0-31	27K/67M	A-4012-0821
Makino angle beam	27K/67M	A-4013-0900
Mazak angle beam Fusion	27K/67M	A-4013-0088
Mazak Matrix angle beam	57K/143M	A-4013-0119
Mazak E-Series Matrix	52K/130M	A-4013-0123
Mazak E-series Fusion	27K/67M	A-4013-0092
Mazak Mark III Fusion	27K/67M	A-4013-0567
Yasnac angle beam	27K/67M	A-4014-0025

Inspection software for turning centers

Renishaw's Inspection software for turning centers offers macros for:

- single-point (radial) measurement
- two-point (diameter) measurement
- rib/groove measurement
- single Z-surface measurement

It can update tool offsets and work offsets. It has an upper tolerance band which can be set for no offset correction. On completion of each measurement cycle it is possible to print out the results.

Description	Memory	Part number
Fanuc 0-31	11K/27M	A-4012-0541
Haas	11K/27M	A-4012-0874
Mazak Fusion	11K/28M	A-4013-0071
Siemens 810D/840D	19K/47M	A-4014-0137
Yasnac LX3	10K/26M	A-4014-0011

Inspection software for multi-axis turning centers

- horizontal and vertical head orientations
- X, Y and Z single surface measure
- bore/boss
- web/pocket
- C axis find

Description	Memory	Part number
Mazak Mark III Fusion	45K/113M	A-4013-0030
Mazak E-series Fusion	75K/188M	A-4013-0083
Mori Seiki MTNT	43K/106M	A-4012-0834
Hitachi Hi-Cell	75K/188M	A-4012-0843
Nakamura NTX	46K/113M	A-4012-1074
Mazak Mark IV and E-series Matrix	110K/275M	A-4013-0106
Doosan MT	43K/106M	A-4012-1016

Tool setting software for turning centers

The Renishaw tool setting software for turning centers sets tool length and/or diameter for static and powered tools. It has manual or automatic (programmed) positioning capability.

Description	Memory	Part number
Fanuc 0-31	4K/8M	A-4012-0528
Haas	4K/8M	A-4012-0877

AxiSet™ Check-Up

Compatible with common formats of 5-axis machines, AxiSet™ Check-Up provides machine users a fast and accurate method for determining rotary axis pivot points. The system is comprised of macro software, dedicated calibration artifact and PC-based data analysis software. Performance analysis is reported graphically via Microsoft® Excel®, compared against user-defined tolerances and stored for historical comparison.

The solutions defined below are compatible with 5-axis table-table machines. New solutions are being developed. Contact Renishaw for the latest list of compatibility. Each solution includes:

- CNC specific macro
- Artifact with magnetic base
- PC-based data analysis software

AxiSet™ Check-Up Mazak Variaxis

Part number: A-5642-1000

AxiSet™ Check-Up Fanuc (Table-Table)

Part number: A-5642-1100

AxiSet™ Check-Up Mori Seiki NMV NMH

Part number: A-5642-1400

AxiSet™ Check-Up Siemens (Table-Table)

Part number: A-5642-1500

AxiSet™ Check-Up Mazak Mark IV

Part number: A-5642-1005

AxiSet™ Check-Up Mazak eV/eH

Part number: A-5642-1009

AxiSet™ Check-Up HurcoWinmax (Table-Table)

Part number: A-5642-1105

AxiSet™ Check-Up Haas

Part number: A-5642-1600

AxiSet™ Check-Up Mori Seiki NT

Part number: A-5642-1405

AxiSet™ Check-Up Siemens (Head-Head)

Part number: A-5642-1515

Off-line programming

Productivity+™ is a new software module designed to simplify the process of integrating probing cycles into the CNC machining program. Productivity+™ Active Editor Pro runs standalone, while the Productivity+™ GibbsCAM® plug-in runs in the GibbsCAM® environment and requires GibbsCAM® version 7 or above.

Productivity+™:

- Imports the native CAD model
- Creates and edits probing programs
- Allows simulation of inspection routines in a virtual environment
- Requires no detailed knowledge of macro codes
- Is compatible with many popular controls

Productivity+™ comes with three CAD importers as standard: IGES, STEP and Parasolid®. Other CAD importers are available (select from the list below).

Productivity+™ is supplied with one post processor (select from the list below).

The Productivity+™ GibbsCAM® plug-in requires the GibbsCAM® machine post processor to be upgraded to allow compatibility. The first post processor upgrade is included.

Productivity+™ GibbsCAM® plug-in

Part number: A-4007-1000

Productivity+™ Active Editor Pro

Part number: A-4007-1400

Productivity+™ post processors

Control	Part number
Brother	A-4007-5900
Fanuc Macro B	A-4007-5100
Haas	A-4007-5200
Heidenhain	A-4007-6000
Hitachi Seicos	A-4007-5300
Hurco	A-4007-6800
Makino	A-4007-5400
Mazatrol ISO	A-4007-5500
Mitsubishi Meldas	A-4007-5600
Mori Seiki	A-4007-6600
Okuma	A-4007-6300
Siemens	A-4007-6700
Yasnac	A-4007-5700

Productivity+™ CAD importers

CAD system	Part number
Pro-E	A-5226-0007
CATIA	A-5226-0008
UG/NX	A-5226-0009
ACIS	A-5226-0010
SolidWorks®	A-5226-0011
Inventor™	A-5226-0012
All of the above	A-5226-0020

GibbsCAM® post processor upgrade service

Part number: A-4007-1000-RI

One-year maintenance contract

Part number: A-4007-4000

Productivity+™ Active Editor Pro 90-day trial

Part number: A-4007-8999

Renishaw CappsNC

Renishaw CappsNC is a comprehensive part verification software package for machine tools, designed to give confidence to the user that the part produced conforms to the CAD model.

- Generate measurement programs from the CAD model, offline, in a virtual PC environment.
- Using the comprehensive probe builder, various shanks, Renishaw probes and styli can be modeled.
- Generate probe paths for 3-axis machines measuring 2D and 3D prismatic features and 3D free-form surfaces.
- Collision avoidance automatically detects obstructions and generates avoidance paths.
- Supports a variety of CNCs and machine communication protocols (RS232, Ethernet, FOCAS, Mnet, TNCDirect, Siemens OPC, MTConnect).
- Uses industry-standard DMIS code to generate machine motion, construction, dimensioning and tolerance instructions.
- Generate comprehensive measurement reports with full GD&T.
- Using the optional 4th/5th axis module, CappsNC supports a variety of multi-axis machine configurations.
- Using the optional tool and work offset module, tool compensation commands and work offset shifts can be incorporated into the post processed output.
- First year maintenance and support included.

CappsNC Advanced

CappsNC Advanced is a single software license designed for the user who intends to program inspection cycles and capture measurement results on a single PC.

Includes: Complete CappsNC license
Machine interface option*
CAD importers (IGES and STEP)
One-year CappsNC maintenance and support

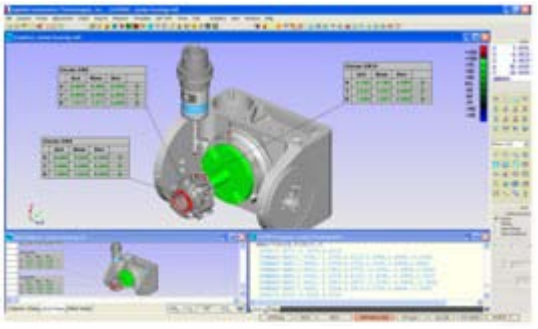
Part number: A-5722-1000

CappsNC Advanced Programming Server

CappsNC Advanced Programming Server is a modular configuration designed for users who have the requirement to program remotely while capturing measurement results locally, at the machine tool.

Includes: Complete CappsNC license
CappsNC execution module*
CAD importers (IGES and STEP)
One-year CappsNC maintenance and support

Part number: A-5722-1001



CappsNC options

Additional machine interface option

Part number: A-5722-3000

Additional execution module

Includes one machine interface option.

Part number: A-5722-1100

4th-axis option

Part number: A-5722-6000

5th-axis option

Part number: A-5722-6001

Work offset and tool compensation

Part number: A-5722-6002

Work offset only

Part number: A-5722-6005

Tool compensation only

Part number: A-5722-6006

AAT SPC

Part number: A-5722-6003

AAT Modify Bestfit for NC part program correction

Part number: A-5722-6004

* specify control type (Fanuc, Mazak, Haas, Siemens or Heidenhain) and interface type (RS232, FOCAS, TNCDirect, Mnet or MT Connect)

CappsNC CAD importers

Catia4 Direct Import

Part number: A-5722-5000

Catia5 Direct Import

Part number: A-5722-5001

Pro-E Direct Import

Part number: A-5722-5002

Unigraphics Import

Part number: A-5722-5003

Parasolid Import

Part number: A-5722-5004

Solid Works Import

Part number: A-5722-5005

VDA Import

Part number: A-5722-5006

CappsNC maintenance

The first year's maintenance is included. Subsequent years' maintenance is offered at 15% of the list price for all components.

Part number: A-5722-4000

CappsNC networking options

CappsNC License Manager – Programming Server

Includes two connections.

Part number: A-5722-3100

CappsNC License Manager – Execution Module

Includes two connections.

Part number: A-5722-3101

CappsNC License Manager – additional connections

Part number: A-5722-3102

Additional retrofit customer information

Machine tool software requirements

Machining center:	Inspection Plus	46.5 Kb	117 m
	Tool setting	9 Kb	23 m
	NC4 tool setting	15 Kb	38 m
Lathe software:	Inspection	11 Kb	28 m
	Tool setting	6 Kb	15 m

Program number requirements

Renishaw program numbers range from 9002 through 9100, and 9700 through 9900.

Macro variables required #100–#149 (only used while macro is running)
#500–#565 (some variables in this range required and must be dedicated)

Training

Training will be provided after installation on the use and application of Renishaw probing cycles. Training will **not** include the incorporation of probe cycles into the customer's current manufacturing programs. Any special applications or additional software training which requires additional time or visits to the original scheduled installation/training will be charged at Renishaw Inc standard service rates.

Note: Please indicate any additional training requirements on your purchase order.

Part probe system details

OMP40/OMP60/RMP60 Turn on (via optical or RF) / Turn off (via optical or RF) or time out

Installation time: Up to 8 hours
Training time: Up to 6 hours

Turn on methods: Auto start (OMP40/OMP60) sends a start signal every second until a probe command is received. This method can only be used if the probe is stored outside the machine enclosure when not in use.

Machine start (OMP40/OMP60/RMP60) requires that an M code be available for use to issue the start command.

Spin start (OMP60/RMP60) uses an internal switch. The probe will turn on after being spun at 650 RPM for 1 second.

Turn off methods: Time out (OMP40/OMP60/RMP60). A timer automatically switches the power off 12, 33 or 134 seconds (selectable) after turn on. Each time the probe is triggered, the timer is reset to the selected value.

Optical off (OMP40/OMP60) / RF off (RMP60) requires that an M code be available to initiate the turn off sequence.

OMP400 Optical (flash) on/optical off or time out (optical transmission)

Installation time Up to 8 hours
Training time Up to 6 hours

Turn on method: Machine start (optical on) requires that an M code be available for use to issue the start command. Auto start cannot be used with the strain gage probes.

Turn off methods: Time out. A timer automatically switches the power off 33 or 134 seconds (selectable) after turn on. Each time the probe is triggered, the timer is reset to 33 or 134 seconds.

Optical off. Requires the use of an M code as stated for machine start above.

RMP40M
OLP40M Turn on (via optical or RF) / Turn off (via optical or RF) or time out

Installation time Up to 8 hours
Training time Up to 6 hours

Turn on method: Machine start requires that an M code be available for use to issue the start command. Auto start cannot be used with these probes (for lathe applications).

Turn off method: Optical off. Requires the use of an M code as stated for machine start above.

Tool setting probe details

TS27R Hard-wired

Installation time	Up to 6 hours
Training time	Up to 6 hours

OTS Machine start requires that an M code be available for use to issue the start command. Auto start cannot be used with these probes.

These probes are fixed either to a T slot in the machine bed, or can be mounted on a riser if required to allow tools to reach the stylus. A riser is not provided by Renishaw unless specified on the quotation. The TS27R is wired to the probe interface via a tough cable conduit. The TS27R cannot be mounted on pallets or rotary tables.

NC4 or TRS2 Hard-wired

Fixed installation time	Up to 8 hours
Training time	Up to 6 hours

Fixed system — The probe is fixed either to a T slot in the machine bed, or can be mounted on a riser if required to allow tools to reach the laser beam. A riser is not provided by Renishaw unless specified on the quotation. The NC4 is wired to the probe interface via a tough cable conduit. **The NC4 cannot be mounted on pallets or rotary tables.**

Separate installation time	Up to 12 hours *
Training time	Up to 6 hours

Separate system — The probe transmitter and receiver are mounted to brackets which attach to the machine. Brackets and their installation are not provided by Renishaw unless specifically stated in the quotation. Brackets not provided by Renishaw must be mounted prior to the arrival of a Renishaw engineer. The brackets should allow for complete machine motion (pallet shuttles, rotary tables, axis travels etc), laser beam alignment and expected system performance.

* Depending on bracket mounting requirements, additional time may be required.

Fixed or separate — The NC4 must be mounted in such a way that the tool can access the laser beam and move in all three axes (X, Y, Z) with respect to the beam. For basic functionality (length, diameter, basic broken tool), no M code is required. For additional features (missing/broken insert, profile checking, rapid broken tool check) a level M code pair is required.

HPRA Hard-wired — The HPRA must be mounted to a bracket which attaches to the machine. The brackets and their installation are not provided by Renishaw unless specifically stated in the quotation. Brackets not provided by Renishaw must be mounted prior to the arrival of a Renishaw engineer. The brackets should allow for complete machine and expected system performance.

Dual probe installations (part and tool probe on same machine)

Requires either two independent probe inputs (multi-channel skip) or an M code driven relay. The M code driven relay must be installed and available prior to the probe installation.

Example M51 – part probe (selected) M61 – tool setter (selected)

M51 energize relay (coil latches and stays energized) program continues
M61 de-energize relay (coil resets) program continues

M code for flash (optical) on and off

M71 pulse (momentarily energize relay) program continues

Example: Pulse M code M71 (flash on and flash off)

Gaging systems

EQUATOR™

the versatile gauge™

The Renishaw EQUATOR™ is a versatile alternative to custom gaging, offering inspection of an unprecedented variety of manufactured parts.

Fast, repeatable and versatile

The EQUATOR™ system consists of a highly repeatable, “parallel kinematic” structure, machine coupled with a high-power, multi-axis universal controller and digital servo power amplifier. The resultant system is capable of high-speed, comparative gaging for inspection of high-volume manufactured parts, directly on the shop floor. Additionally, the optimized ratio of working envelope (300 mm × 300 mm × 150 mm) to machine footprint (~ 570 mm × 500 mm), means EQUATOR™ can be set to work in even the most crowded of factory spaces. The lightweight machine, weighing just 55 lbs, requires just single phase power and needs no costly air supply.

Re-configuration of the gaging system to cater for part design changes, or to measure new parts, is possible in a fraction of the time it would take with conventional custom gaging. An operator can switch between parts in seconds, perfect for flexible manufacturing processes or for accepting parts from multiple machines.

Easy to use

The included, intuitive MODUS™ Organizer operator front-end software requires little or no training, while on the programmable system the comprehensive MODUS™ EQUATOR™ programming software allows engineers to rapidly create gaging routines for any part – simple or complex, prismatic or free-form – using industry-standard DMIS programming.

Thermally “stable” – for shop floor use

Re-mastering is as swift as measuring a production part and immediately compensates both the machine and the part being measured, for temperature variations typical of a shop floor environment.

Integrated stylus changing

Further versatility is offered by the included, EQUATOR™-specific stylus changing rack, allowing automated in-cycle changing of SM25 stylus modules. The SM25 modules couple to the industry-standard SP25 CMM probe, allowing EQUATOR™ users to swap the stylus configurations without re-qualifying each time. Up to six stylus combinations can be loaded into the rack at any time. These can be used on a single complex part or with multiple parts of varying geometries.

Traceability to calibrated CMMs

Master parts do not need to be expensive custom parts like a traditional gage; take a production part and measure it on a CMM to establish feature variation from CAD or drawing nominals. The results from any CMM can be configured to be used directly within the EQUATOR™ software.

Effectively, the calibrated absolute accuracy of the CMM can be “extended” onto the shop floor to provide calibrated traceability to EQUATOR™ measurements. With the calibration file loaded into the EQUATOR™ software, measurements made in the EQUATOR™ system can be referred back to the CAD or drawing nominals. This allows true process control with SPC packages.

Machine kit

Includes: EQUATOR™ 300 machine
EQUATOR™ 6-port rack
SP25M scanning probe kit
Calibration accessory kit
Joystick (or 'E-stop' button)
Cables

Controller kit

Includes: EQUATOR™ controller
Intuitive "front-end" software package

EQUATOR™ tiles

Renishaw fixture plates (various options available).

EQUATOR™ combination kits

Operator's version (shop floor version)

Description	Part number
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer software and M6 threaded fixture plate	A-EQ33-1J10
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer software and ¼ in threaded fixture plate	A-EQ33-1J20
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer software and M8 threaded fixture plate	A-EQ33-1J30
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer software and ¼ in R&R threaded fixture plate	A-EQ33-1J40
EQUATOR™ machine with 6-port rack and stop button, controller with Organizer software and M6 threaded fixture plate	A-EQ33-1S10
EQUATOR™ machine with 6-port rack and stop button, controller with Organizer software and ¼ in threaded fixture plate	A-EQ33-1S20
EQUATOR™ machine with 6-port rack and stop button, controller with Organizer software and 8 mm threaded fixture plate	A-EQ33-1S30
EQUATOR™ machine with 6-port rack and stop button, controller with Organizer software and ¼ in R&R threaded fixture plate	A-EQ33-1S40

Programmer's version

Description	Part number
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer and MODUS™ programming software and M6 threaded fixture plate	A-EQ33-2J10
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer and MODUS™ progrmming software and ¼ in threaded fixture plate	A-EQ33-2J20
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer and MODUS™ software and M8 threaded fixture plate	A-EQ33-2J30
EQUATOR™ machine with 6-port rack and joystick, controller with Organizer and MODUS™ software and ¼ in R&R threaded fixture plate	A-EQ33-2J40

Replacement equipment

Stop button

Part number: A-5504-0255

Joystick kit

Part number: A-5504-0258

Joystick cable only

Part number: A-5358-5016

Autochange rack (6 ports)

Part number: A-5504-0250

Rack set-up tool

Part number: A-2237-0682

MODUS™ EQUATOR™ dongle

Part number: A-5639-3000

Power cables

Part number: P-EQ33-MAINS

Fixturing plate (¼-20 in)

Part number: PCR-501212-50-20

Fixturing plate (M4)

Part number: PCR-13300300-10-4

Fixturing plate (M8)

Part number: PCR-13300300-15-8

Fixturing plate spacer 300

Part number: A-5504-0203

Optional equipment

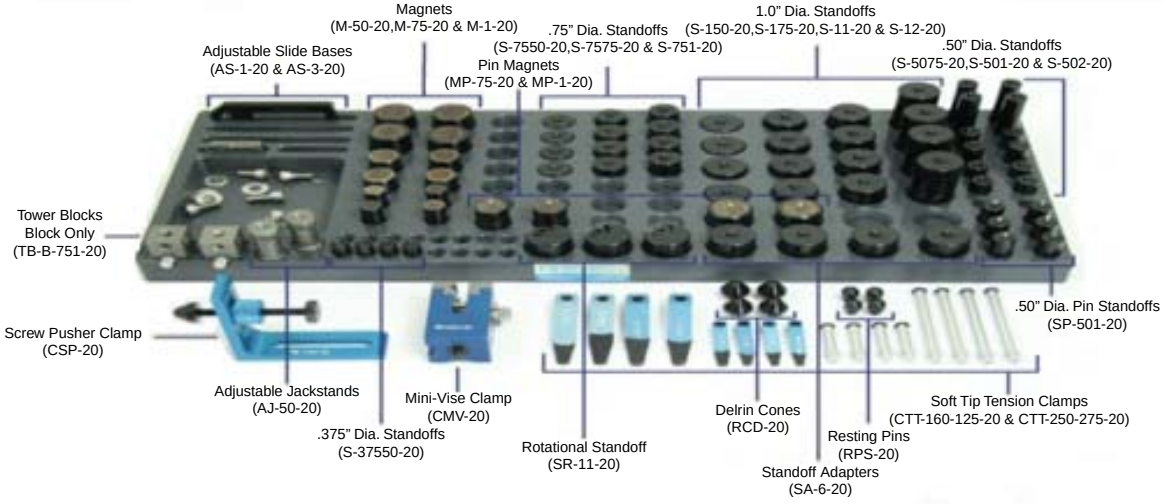
Digital I/O box

Part number: A-5504-0259

Fixturing components

R&R component kit FSC-MCR-20 (¼-20 in)

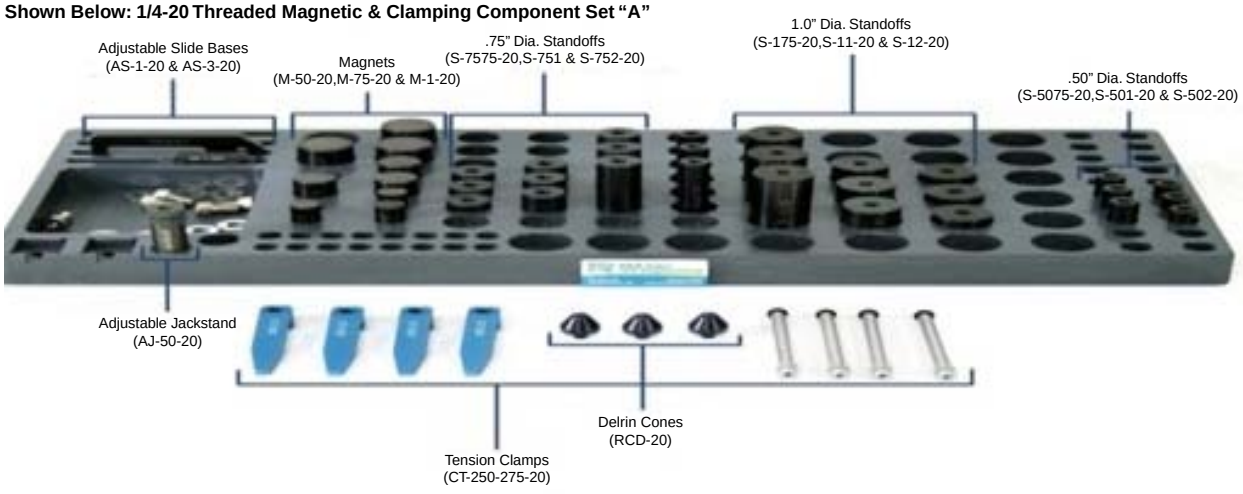
Part number: FSC-MCR-20



R&R component kit FSC-MCA-20 (¼-20 in)

Part number: FSC-MCA-20

Shown Below: 1/4-20 Threaded Magnetic & Clamping Component Set "A"

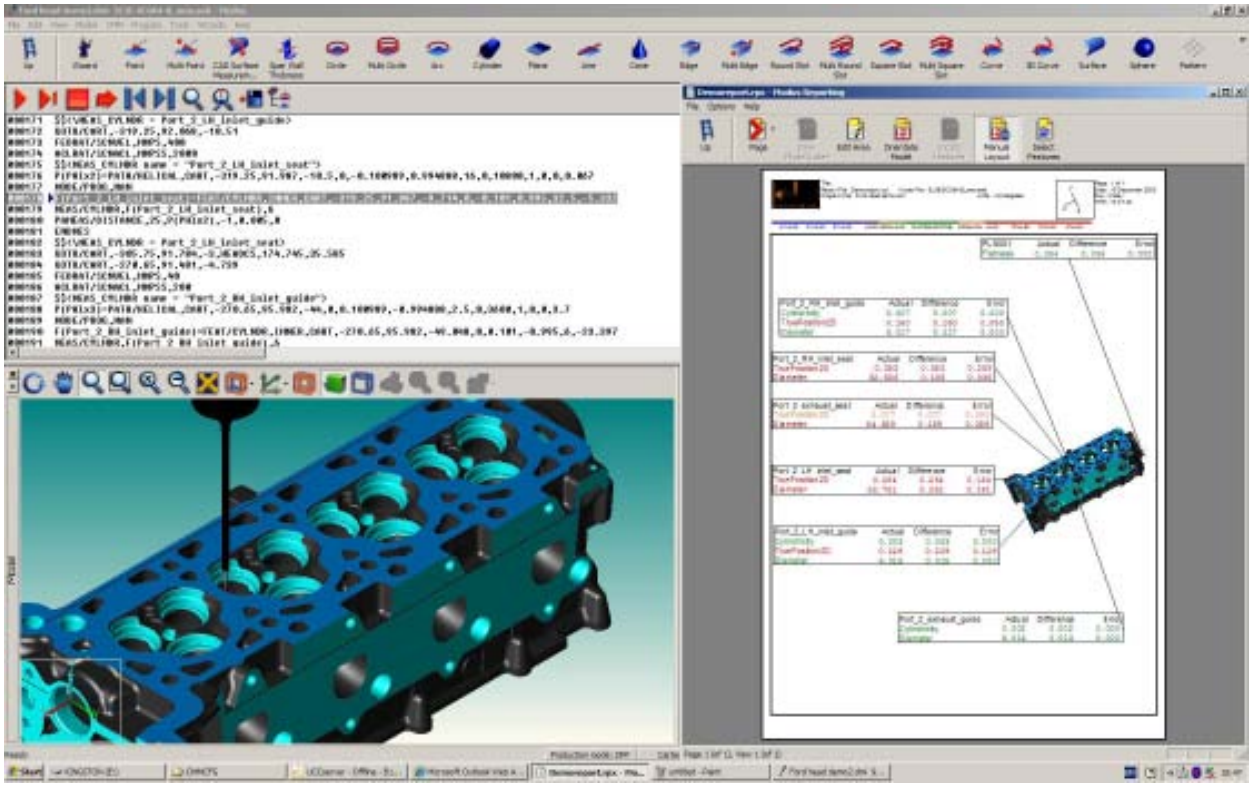


R&R component kit FSC-CA-20 (¼-20 in)

Part number: FSC-CA-20

Shown Below: 1/4-20 Threaded Clamping Component Set "A"

EQUATOR™ MODUS™ software training



On site training (maximum 4 students)

Description	Part number
EQUATOR™ MODUS™ scanning training (US travel) – 4 days	A-5639-1701-EQT
EQUATOR™ MODUS™ advanced training (US travel) – 2 days	A-5639-1702-EQT

Training at Renishaw Inc*

Description	Part number
EQUATOR™ MODUS™ scanning training (US) – 4 days	A-5639-1701-EQ
EQUATOR™ MODUS™ advanced training (US) – 2 days	A-5639-1702-EQ

* per student

Portable laser measurement and calibration

XL laser calibration system

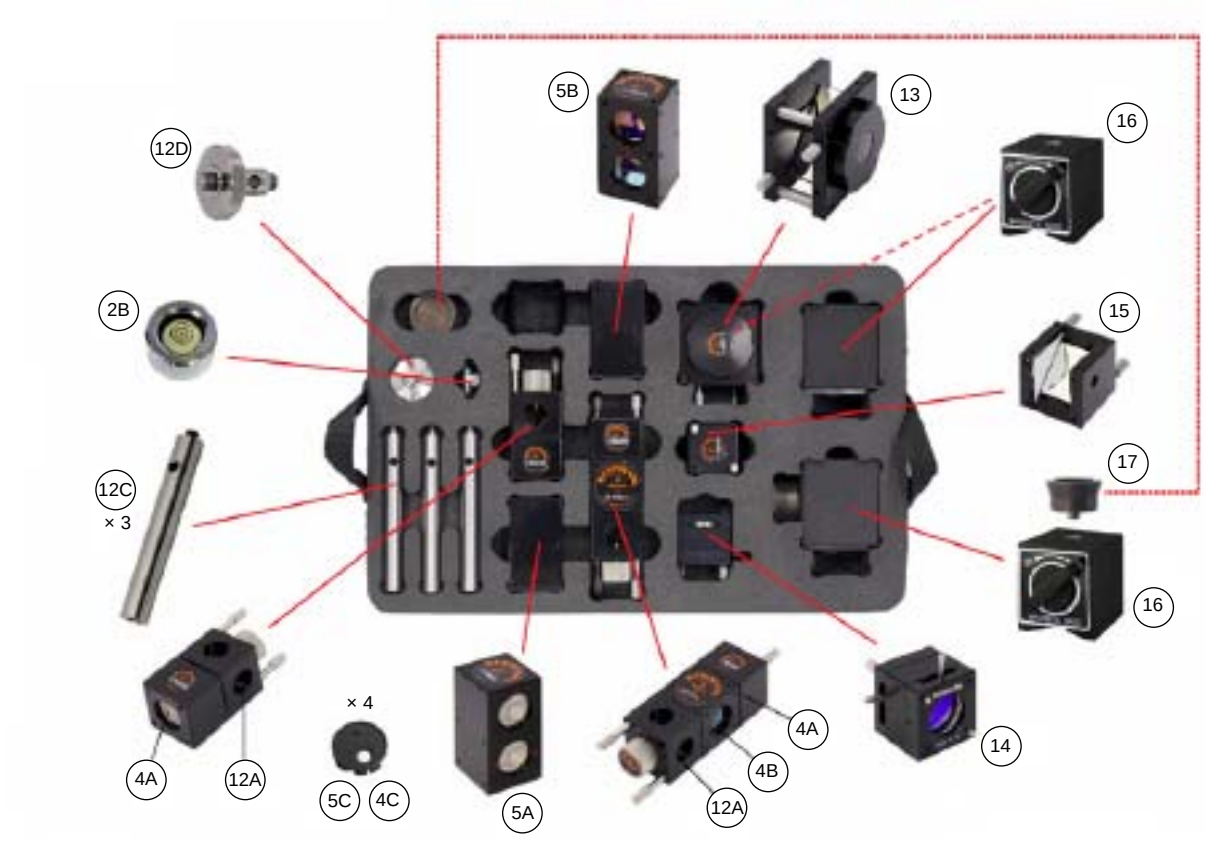
Used for comprehensive accuracy and performance measurement of any machine or system.

Linear measurement range	80 meters
Linear measurement accuracy	±0.5 ppm
Laser frequency accuracy	±0.05 ppm
Resolution	1 nm
Maximum travel velocity	4 m/s
Dynamic capture rate	10 Hz – 50 kHz

Contents of base XL system case

XL laser system components

Kit part number	Includes	Part number		Index
A-9908-0405	XL-80 laser Universal power supply USB cable XL system support disk AUX I/O connector	N/A A-9908-0299 A-9908-0286 A-9908-0303 A-9908-0329		1A 1B 1C Not shown Not shown
A-9908-0700	XL translation stage Spirit level circular Tripod adaptor	A-9908-0700 A-9908-0323 A-9908-0770		2A 2B Not shown
A-9908-0510	XC-80 compensator Material temperature sensor and cable Air temperature sensor and cable XC mounting plate USB cable	A-9908-0564 A-9908-0879 A-9908-0878 A-9908-0892 A-9908-0286		3A 3B 3C 3D 3E
	LaserXL™ software	A-9908-0301		Not shown
A-8003-0440	Linear reflector (qty 2) Linear interferometer Alignment target (qty 2)	A-8003-0219 A-8003-0557 A-8003-0478		4A 4B 4C
A-8003-0441	Angular interferometer Angular reflector Alignment target (qty 2)	A-8003-0186 A-8003-0181 A-8003-0478		5A 5B 5C
A-8003-0443	Short range straightness reflector Woollaston short range	A-8003-0615 A-8003-0393		6A 6B
A-8003-0444	Long range straightness reflector Woollaston long range	A-8003-0620 A-8003-0430		7A 7B
A-8003-4209	Straightness shutter	A-8003-4209		8A
A-8003-STAK	Laser beam steerer LS350 Fixed turning mirror Large straightness retroreflector Straightness base	A-8003-3072 A-8003-1325 A-8003-0604 A-8003-0576		14 8B 8C 8D
A-8003-0665	Optical square Bracket squareness optic	N/A M-8003-1680		9A 9B
A-8003-0442	Flatness mirror (qty 2) Base (150 mm) Base (100 mm) Base (50 mm)	A-8003-0630 A-8003-0256 A-8003-0257 A-8003-0258		10A 10B 10C 10D
A-8003-4270	Long range retroreflector Periscope Long range target Clamp screw (qty 2)	A-8003-2061 A-8003-2039 M-8003-2081 M-8003-0221		11A 11B 11C 11D
A-8003-0447	Clamp block (qty 2) Base plate (qty 2) Mounting pillar (qty 3) M8 adaptor	A-8003-0262 A-8003-0522 M-8003-0470 A-8003-0979		12A 12B 12C 12D
	Base case	M-9908-0313		
	Full system case	M-9908-0314		
	Tripod	A-9908-0295		Not shown
	Tripod case	M-9908-0527		Not shown
	Swivel mirror	A-8003-1304		13
	Fixed turning mirror	A-8003-1325		15
	Magnetic base	A-9908-0780		16
	Magnetic base adaptor	A-9908-0760		17



Contents of full XL system case (tray)

Contents of full XL system case (tray removed)

XL laser calibration systems

Base system kit

Includes:
- XL-80 laser head
- XC-80 environmental compensator kit
- LaserXL™ software
- Software support disk
- XL tripod stage kit

Part number: XL80-BASE

XL-80 laser head

Linear system kit

Includes:	Components of base system kit	XL80-BASE
	Linear measurement optics	A-8003-0440
	Beam steerer LS350	A-8003-3072
	Optics mounting kit	A-8003-0447
	2 magnetic bases	A-9908-0780
	Magnetic base adaptor	A-9908-0760
	Tripod	A-9908-0295
	Tripod case	M-9908-0527
	Base system case	M-9908-0313

XC-80 environmental compensation unit

Linear/angular system kit

Includes:	Components of base system kit	XL80-BASE
	Linear measurement optics	A-8003-0440
	Angular measurement optics	A-8003-0441
	Beam steerer LS350	A-8003-3072
	Optics mounting kit	A-8003-0447
	2 magnetic bases	A-9908-0780
	Magnetic base adaptor	A-9908-0760
	Tripod	A-9908-0295
	Tripod case	M-9908-0527
	Base system case	M-9908-0313

Advanced system kit

Includes:	Components of base system kit	XL80-BASE
	Linear measurement optics	A-8003-0440
	Angular measurement optics	A-8003-0441
	Swivel mirror	A-8003-1304
	Long range straightness optics	A-8003-0444
	Short range straightness optics	A-8003-0443
	Straightness accessory kit	A-8003-STAK
	Straightness shutter	A-8003-4209
	Squareness measurment kit	A-8003-0665
	Optics mounting kit	A-8003-0447
	2 magnetic bases	A-9908-0780
	Magnetic base adaptor	A-9908-0760
	Tripod	A-9908-0295
	Tripod case	M-9908-0527
	Full system case	M-9908-0314

XL system case and tripod case

Optics

All Renishaw optics housings are lightweight aluminum with a hard anodized finish for durability and good thermal stability.

Linear kit (standard 40 m)

Includes: 1 linear beam splitter
2 linear reflectors
2 alignment targets

Part number: A-8003-0440

Small linear accessory kit

Please call for details.

Part number: A-8003-3244

Long range linear optics kit (80 m max)

For use with the ML10X for linear measurements in excess of 40 m.

Includes: Periscope
Large retroreflector

Part number: A-8003-4270

Angular kit

Includes: 1 angular beam splitter
1 angular reflector
2 alignment targets

Part number: A-8003-0441

Linear/angular combination kit

This combination kit is a cost-saving solution, allowing linear and angular measurement to be made with a single set-up.

Includes: 1 angular beam splitter
1 angular reflector
1 linear reflector
2 alignment targets

Part number: A-8003-2774

Straightness measurement kits

Short range
Suitable for measurements up to 4 m (160 in)

Part number: A-8003-0443

Long range
Suitable for measurements from 1 m to 30 m (40 in to 1200 in)

Part number: A-8003-0444

Straightness accessory kit

Facilitates measurements on vertical axes and in other difficult configurations.

Includes:
- 1 fixed turning mirror
- 1 large retroreflector
- 1 stainless steel base
- 1 LS350 beam steerer

Note: XL-80 and ML10 users require straightness shutter, part number A-8003-4209, shown on page 4-8.

Part number: A-8003-STAK

Squareness measurement

This precision pentaprism is used in conjunction with straightness optics to measure squareness of machine axes. It includes a mounting bracket for a fixed turning mirror and LS350 beam steerer.

Part number: A-8003-0665

Flatness measurement kit

The turning mirrors rotate and tilt for easy alignment and are fitted with non-slip pads. The lightweight aluminum bases have precision stainless feet and guides.

Includes:
- 2 turning mirrors
- 1 50 mm flatness base
- 1 100 mm flatness base
- 1 150 mm flatness base

Part number: A-8003-0442

Standard optics mounting kit

This universal mounting kit is designed for use with the complete range of Renishaw measuring optics.

Includes:
- 2 mounting blocks
- 3 stainless pillars
- 1 stainless M8 adaptor
- 2 stainless bases

Part number: A-8003-0447

Magnetic base

Suitable for mounting optics and XL80 laser head when fitted with A-9908-0760 magnetic base adaptor (sold in pairs).

Part number: A-9908-0780

CMM optics mounting kit

Designed specifically to aid the mounting of laser optics and other accessories on coordinate measuring machines. Recommended for UCC error mapping requirements.

Part number: A-1333-0174

Beam steerer LS350

This is the best time-saving device a laser system user could buy. It works with all the measuring optic kits, including HP optics using the HP optic adaptor plate. Included in straightness accessory kit.

Part number: A-8003-3072

Swivel mirror

This is used for directing the laser beam through any angle from 0° to 106°, for example for diagonal measurement and slant bed lathes. It works with all the optics kits, including HP optics using the HP optic adaptor plate.

Part number: A-8003-1304

Fixed turning mirror

This can be used with angular optics for 90° accessories. Included in straightness accessory kit.

Part number: A-8003-1325

Quarter wave plate

Used with linear optics for plane mirror interferometry applications.

Part number: A-8003-1998

Straightness shutter

Required for vertical straightness measurements.

Part number: A-8003-4209

Tripod and cases

Universal tripod

Tripod only, without the stage.

Part number: A-9908-0295

XL translation stage

Part number: A-9908-0700

Tripod adaptor

This allows the XL translation stage to be used with the Renishaw universal tripod or any other tripod with a standard camera mounting thread.

Part number: A-9908-0770

Tripod converter ML-XL

Part number: A-9908-0765

Magnetic base adaptor

This allows the XL translation stage to be mounted on any base or fixture with an M8 × 1.25 mounting hole.

Part number: A-9908-0760

Universal tripod case

Lightweight fabric.

Part number: M-9908-0527

System cases

Base system case

Suitable for basic laser system including linear and angle optics with accessories.

Part number: M-9908-0313

Full system case

Suitable for an advanced laser system including linear, angle, short range and long range straightness, squareness and flatness optics with accessories.

Part number: M-9908-0314

Software

LaserXL™ calibration software

This is the standard software package for use with the Renishaw XL80 laser system. It provides for linear, angle, straightness, squareness and parallelism measurement. Data can be analyzed to many national and international machine tool and CMM standards. LaserXL™ is not compatible with ML10 lasers. Windows® XP or Vista only.

Part number: A-9908-0301

Linear correction software

This is used with both Laser10 and LaserXL™. It provides automatic linear correction to a range of CNC machine tool controllers.

Controller model	Part number
Fanuc 10 through 21	A-8003-4182
Fanuc 0	A-8003-4188
Mazak M2, M32, M+	A-8003-4185
NUM 750, 760, 1040, 1050, 1060	A-8003-4184
Siemens 810, 810D, 820, 840, 840D, 880	A-8003-4183
Acramatic 2100	A-8003-4186
Cincinnati 850, 950	A-8003-4187
All options	A-8003-4190

RS232 cable kit for linear correction software

Kit includes data cable, adaptors and gender changers to suit all above controls.

Part number: A-8003-4178

QuickView XL software

QuickView is the simple, intuitive software package that allows you to understand the dynamic performance of many different machines and devices such as stages, machine tools and CMMs. It brings the functionality of an oscilloscope to the mechanical engineer, right on your desktop.

- Capture, review, and save dynamic data
- Measure distance, velocity and acceleration against time
- Display continuous “streaming” data or set trigger levels to capture single or multi-shot “events”
- Linear, angular or straightness modes
- Optional hardware – compact low mass optics kit

Applications

- Measure consistency of position, velocity and acceleration
- Determine movement in a locked rotary axis (torsional vibration)
- Detect dynamic yaw and lateral play (slop)
- Measure vibration
- Perform ASME B5.54 CNC tests such as Feedrate and acceleration, Minimum Block Execution Time (MBET) and Least Increment

Benefits include:

- Live data display allowing analysis of motion and positional characteristics
- Save data for analysis in other applications such as Excel® and MathCad
- Flexible measurement – avoids the need for defined measurement targets and sequences

Part number: A-9908-0302

Spare parts

The following items are normally supplied as parts of system kits but can be purchased as individual components for replacement purposes.

Clamp block

Part number: A-8003-0262

Locking screw assembly

For use with clamp block.

Part number: A-8003-4501

Locking screw pressure pad

Brass pad and rubber retaining ring.

Part number: A-8003-4500

Clamp screws

Long (for use with clamp block)

Part number: M-8003-0264

Short (for use with linear and angular optics)

Part number: M-8003-0221

LS350 (for use with LS350 beam steerer)

Part number: M-8003-3083

For use with fixed turning mirror.

Part number: M-8003-1070

For use with swivel mirror.

Part number: M-8003-1063

Mounting pillar

110 mm long with M8 × 1.25 male thread at one end, female at the other.

Part number: M-8003-0470

Straightness accessory base

Part number: A-8003-0576

Large retroreflector

For use with vertical straightness measurements.

Part number: A-8003-0604

M8 adaptor

Part number: A-8003-0979

Alignment target

Part number: A-8003-0478

Linear beam splitter

Part number: A-8003-0557

Linear reflector

Part number: A-8003-0219

Angular reflector

Part number: A-8003-0181

Angular beam splitter

Part number: A-8003-0186

Cables

USB single port extension cable (5 m)

Part number: CBL-USBX-1

USB dual port extension cable (5 m)

Part number: CBL-USBX-2

XC80 temperature sensor cable (5 m)

Part number: A-9908-0932

USB to serial adaptor

Allows QC10 ballbar and other serial devices to be used with notebook PCs that do not have an RS232 serial port.

Part number: A-8014-0670

DX10 interface kit (USB)

Connects ML10 and EC10 to any Windows® XP based computer via USB. Compatible with Laser10.06 and subsequent versions. (Driver update may be required for older versions of Laser10.) Operational indicators provide status condition. Supplied with 3 m USB cable.

Part number: A-8003-3116

XR20-W rotary axis calibrator and components

XR20-W rotary axis calibrator

The XR20-W rotary axis calibrator allows the measurement of rotary axis positional accuracy to within 1 arc second. Totally wireless operation and modular mounting systems ensure suitability for a wide range of machines.

Includes: XR20-W
Mounting ring
Adaptor plate
Centration aid
Chuck adaptor
Battery charger
Batteries Li-polymer × 3
Electrical adaptor for use in any territory
USB cable and mains adaptor
Rotary XL software including system manual
Peli™ system case

Part number: A-9920-0400

XR20-W rotary axis calibrator upgrade

Part number: XR20W-UPG

When trading in an RX10 less than 7 years old:
When trading in an RX10 more than 7 years old:

NOTE: The standard trade-in allowance quoted is on the basis that a complete and fully functional RX10 kit is returned. Non-functional, damaged or incomplete kits may be considered for trade-in at Renishaw's discretion. If accepted, the trade-in allowance will be reduced.

XR20-W kit components

Mounting ring

The mounting ring bolts or clamps directly to the test surface for ease of centring the system on the test axis.

Part number: A-9920-0440

Mounting ring adaptor 150 mm

The adaptor plate enables fitting to rotary tables with unsuitable centre recesses. It can also be used to secure the XR20-W to the chuck adaptor and custom mounts.

Part number: A-9920-0270

Chuck (lathe) adaptor

The adaptor has a 40 mm diameter to fit most popular chuck sizes. It can also be used to secure the XR20-W to users' own custom mounts.

Part number: A-9920-0280

Centration aid

The centration aid fits temporarily inside the mounting ring to assist visual centration before XR20-W insertion.

Part number: A-9920-0340

Fixings kit

A complete set of screws and allen keys for XR20-W.

Part number: A-9920-0430

Battery Li-Polymer 3.7 V

High-power rechargeable lithium battery (three batteries supplied with each XR20-W).

Part number: A-9920-0330

Battery charger and cables

Battery charger and a set of power cables for any territory (UK, Europe and USA).

Part number: A-9920-0320

Battery cover

Replacement battery cover for XR20-W.

Part number: A-9920-0460

USB cover plug

Replacement protective plug for USB socket on XR20-W.

Part number: A-9920-0380

USB power supply

USB power supply adaptors for any territory (UK, Europe and USA).

Part number: A-9920-0450

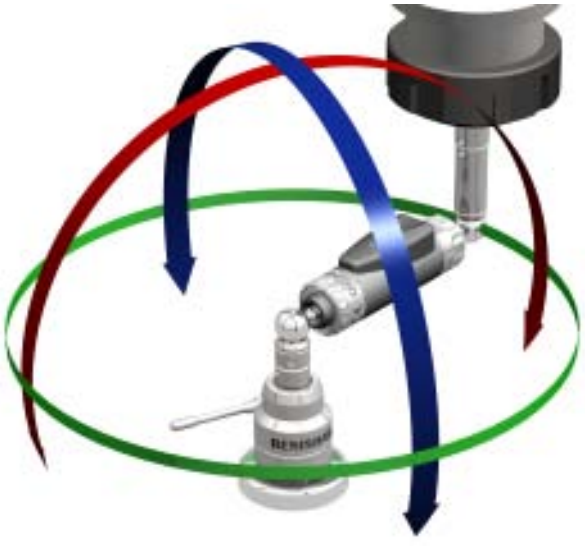
XR20 case

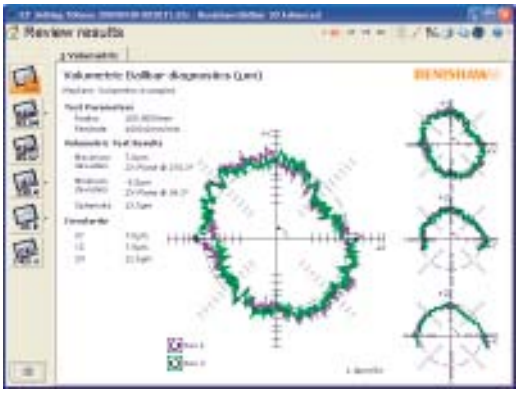
Heavy duty transport and storage case for XR20-W.

Part number: A-9920-0360

QC20-W wireless ballbar

Bluetooth®





QC20-W ballbar kit with Zerodur® calibrator

The Renishaw QC20-W ballbar contains a precision linear transducer of Renishaw's own design. Signal processing is carried out within the ballbar and data transmitted to a suitable PC using a Bluetooth® Class 2 module.

Includes: QC20-W wireless ballbar (and one CR2 battery)
Center pivot
Tool cup
Extension bars – 50 mm, 150 mm and 300 mm
Zerodur® calibrator
System software (including manuals)
Setting ball
Machine validation cards
Calibration certificate
Bluetooth® adaptor (A-8014-BTA1)
System carry case (the case includes cut-outs for the optional small circle and VTL adaptors)

Part number: A-8014-1510

NOTE: Special "trade-in" offer. Customers can trade-in a complete working QC10 kit and claim ance". This will give a net price of . Contact Renishaw or reseller for further details.

QC20-W ballbar upgrade kit

The lowest cost entry to QC20-W use is with the QC20-W upgrade kit. The kit includes a new ballbar, battery and BB20 software. The packaging fits directly into the later style aluminum framed case. Users with earlier plastic or wooden cases should purchase a new QC20-W case separately (see below).

Includes: QC20-W wireless ballbar upgrade kit (A-8014-1530)
- QC20-W wireless ballbar
- Tool cup
- System software (including manuals)
- Setting ball
- Machine validation cards
- Calibration certificate
- Foam tray (fits aluminium QC10 case only)

Partial arc test kit (A-8014-1575)
Bluetooth® adaptor (A-8014-BTA1)
2nd spare battery (A-8014-CR2)

Part number: A-8014-BBUG

QC20-W system carrying case

The new QC20-W case has dedicated locations to carry the small circle accessory kit and VTL, and is lockable.

Part number: M-8014-1600

Small circle accessory kit (SCAK)

The small circle accessory kit is used with the QC20-W ballbar to allow tests with a radius of 50 mm. The existing QC10 small circle accessory kit (SCAK) cannot be used with the QC20-W. The SCAK includes a 50 mm Zerodur® calibrator, calibration certificate and the small circle adaptor, which is supplied with an additional center ball already fitted.

If you already use the QC10 SCAK, just purchase the new adaptor, which is a simple screw mount to the QC20-W body. You can retain your existing 50 mm Zerodur® calibrator (see QC20-W spare parts overleaf).

Part number: A-8014-1540

VTL adaptor kit

The VTL adaptor is available for 2-axis CNC applications. This replaces the “tool cup” in the standard set-up and gives restricted movement of the center cup in a single axis, enabling typical 2-axis machines such as vertical turning lathes and laser cutting machines etc to benefit from QC20-W ballbar diagnosis.

Part number: A-8014-0417

Lathe adaptor kit

The lathe adaptor kit allows you to perform 360°, 100 mm radius ballbar tests on a lathe. The kit consists of an arm assembly for attachment to the lathe turret and a spindle bar for attachment in the lathe spindle. Both arm and spindle include magnetic cups in which to locate the ballbar.

Includes:
- Lathe adaptor arm assembly
- Spindle bar assembly
- Spherical adaptor
- Center cup
- Cup screw (with magnetic cup)
- 5 mm long-arm hex key
- 3 mm hex key
- Set of user instructions
- Plastic carrying case

Part number: A-8014-0551

Lathe adaptor kit upgrade

Required for users upgrading from QC10 to QC20-W. Includes spherical adaptor and center cup.

Part number: A-8014-LKUG

QC20-W ballbar system spare parts

Item	Description	Part number
1	QC20-W ballbar assembly (including balls)	Only available as RBE
2	QC20-W system carrying case (not fully shown)	M-8014-1600
3	Transducer ball	A-8014-0182
4	Center cup	A-8014-0522
5	Center ball	A-8014-0141
6	Cover ring	A-8014-1592
7	Center pivot assembly	A-8014-1281
8	50 mm extension bar	A-8014-0231
9	150 mm extension bar	A-8014-0144
10	300 mm extension bar	A-8014-0145
11	Tool cup assembly	A-8014-0521
12	Setting ball	A-8014-1570
13	Tool cup extension	A-8014-1610
14	Zerodur® calibrator	A-8014-0280
15	Spanner set	A-8014-1141
16	Lithium battery	A-8014-CR2
17	Battery end cap assembly	A-8014-1593
Not shown	Getting started DVD	A-8014-1285
Not shown	Validation card (minimum order quantity 10)	A-8014-VCAR
Not shown	Validation card holder (minimum order quantity 10)	A-8014-VCHD
Not shown	Ballbar20 software upgrade	A-8014-0717
Not shown	Cup cleaning kit	A-8014-0423

Small circle accessory kit

Item	Description	Part number
18	50 mm Zerodur® calibrator	A-8014-0491
19	Small circle adaptor	A-8014-1560

VTL adaptor kit

Item	Description	Part number
20	VTL adaptor kit	A-8014-0417

Lathe kit (cannot be stored in system case)

Item	Description	Part number
Not shown	Cup screw assembly	A-8014-0552
Not shown	Spindle bar assembly	A-8014-0553

Zerodur® calibrator

A Zerodur® calibrator is supplied with all QC20-W kits and is used to calibrate the length of a ballbar. This type of calibrator is manufactured from a material which has a temperature expansion coefficient of almost zero.

Part number: A-8014-0280

Cover ring

The cover ring needs to be removed from the QC20-W body before attaching the small circle adaptor.

Part number: A-8014-1592

Tool cup assembly

The condition of the phosphor bronze bearings in the tool cups affects the errors measured by the transducer. Tool cups cannot be repaired (if they are damaged they must be replaced).

Part number: A-8014-0521

Tool cup extension

The tool cup extension will provide the required clearances for conducting a vertical 220° partial arc test on a machine, for collet sizes up to ER40 (63 mm diameter collet nut). It has two different outer diameters, the smaller diameter is 12 mm and the larger diameter is ½ inch, to suit different collets.

Part number: A-8014-1610

Transducer ball

If a ball joint is dropped onto a hard surface, the ball sphericity may be affected, which will add to the errors measured by the ballbar system. If this happens, discard the ball joint and replace it with a new one, using the special spanner provided.

Part number: A-8014-0182

Battery end cap assembly

The battery end cap assembly is supplied with a center ball already fitted.

Part number: A-8014-1593

QC20-W spare parts continued

Center ball

If a ball joint is dropped onto a hard surface, the ball sphericity may be affected, which will add to the errors measured by the ballbar system. If this happens, discard the ball joint and replace it with a new one.

Part number: A-8014-0141

Center pivot assembly

The magnetic center pivot assembly has a clamping mechanism that can be locked/unlocked by pulling the lever to the horizontal/vertical position. The center pivot assembly is supplied with a center cup fitted.

Part number: A-8014-1281

Center cup

The condition of the phosphor bronze bearings in the center cups affects the errors measured by the transducer. Center cups cannot be repaired (if they are damaged they must be replaced).

Part number: A-8014-0522

Setting ball

The setting ball is placed into the center mount cup when setting the zero coordinates for a test.

Part number: A-8014-1570

Extension bars

By assembling the ballbar with different combinations of extension bars, it is possible to carry out ballbar tests with 100, 150, 250, 300, 400, 450, 550 or 600 mm radii.

Length 50 mm

Part number: A-8014-0231

Length 150 mm

Part number: A-8014-0144

Length 300 mm

Part number: A-8014-0145

Spanner set

The C spanners can be used to ensure the screw joints on the ballbar (including any extension bars) are not loose and the screw joints on the tool cup extension (if used) are tight. The battery end cap spanner is designed to securely hold the battery end cap when unscrewing the center ball.

Part number: A-8014-1141

Validation card

Double-sided card for recording ballbar test results and displaying on the tested machine (insert into card holder below).

Note: Pack of 10.

Part number: A-8014-VCAR

Validation card holder

Plastic wallet with self-adhesive back to attach to the machine.

Note: Pack of 10.

Part number: A-8014-VCHD

Cup cleaning kit

The tool cups are magnetic and may attract steel swarf and chips into the cup during use. Clear any swarf from the cups before storing them away with the cleaning kit.

Part number: A-8014-0423

50 mm Zerodur® calibrator (small circle accessory kit)

The 50 mm Zerodur® calibrator includes a calibration certificate.

Part number: A-8014-0491

Small circle adaptor (small circle accessory kit)

The small circle adaptor is supplied with an additional center ball already fitted. The adaptor is a simple screw fitting to the main ballbar body.

Part number: A-8014-1560

Spindle bar assembly (lathe adaptor kit)

The spindle bar assembly is fitted with a clamp holder and clamp.

Part number: A-8014-0553

Cup screw assembly (lathe adaptor kit)

The cup screw assembly is supplied with a center cup already fitted.

Part number: A-8014-0552

QC20-W spare parts continued

Bluetooth® USB wireless adaptor

Provides Windows PC with Bluetooth® communications capability. Tested and compatible with QC20-W.

Part number: A-8014-BTA1

Lithium battery for QC20-W

CR2 lithium battery.

Part number: A-8014-CR2

Machine checking gage

The Renishaw MCG is designed for rapid, volumetric accuracy evaluation for CMMs. The gage takes account of variations due to probe, machine and software errors.

Measuring range:	Vertically:	±45°
	Horizontally:	360°
Total gage error:	±0.5 µm	

Two kits are available, each supplied in a hardwood box.

MCG1 – small kit

Suitable for machines up to 40 in (1000 mm) cubed.

Part number: A-1007-0006

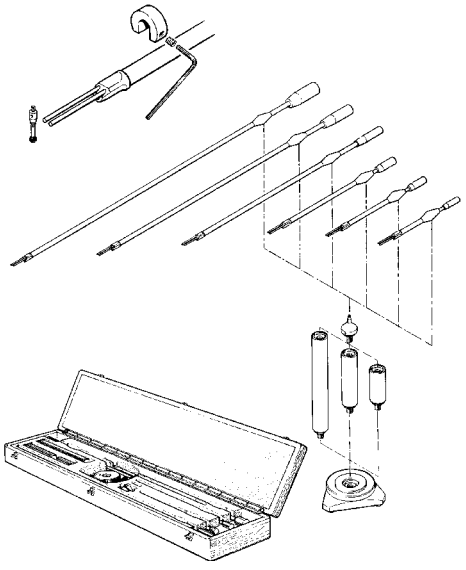
MCG2 – large kit

Suitable for machines larger than 40 in (1000 mm) cubed.

Part number: A-1007-0056

MCG spares and accessories

Description	Part number	MCG1	MCG2
SA3-M3/M2 stylus adaptor	M-5000-4163	*	*
SE2-20 mm stylus extension	M-5000-3592	*	*
SE7-5 mm stylus extension	M-5000-7634	*	*
Pivot	A-1007-0017	*	*
Special stylus	A-5000-7650	*	*
101 mm arm	A-1007-0007	*	*
151 mm arm	A-1007-0008	*	*
226 mm arm	A-1007-0009	*	*
380 mm arm	A-1007-0010	*	*
532 mm arm	A-1007-0011		*
685 mm arm	A-1007-0012		*
76 mm pillar	M-1007-0023	*	*
127 mm pillar	M-1007-0024	*	*
235 mm pillar	M-1007-0025		*
Baseplate	A-1007-0061	*	*
Additional weights	A-1007-0018	*	*



Training

Renishaw offers world class training at their modern facilities in Hoffman Estates, Illinois, only 45 minutes from Chicago's O'Hare airport. Regular classes are held once per month for both laser and ballbar product groups. In-house courses start on Tuesday morning and conclude around midday on the Friday. The training includes a mix of classroom work and hands-on experience in the Renishaw technology center where we have a selection of modern machines for students to work with. If you have a large group, or prefer not to travel, on-site training is also available.

Our standard, in-house training courses cover the following subjects:

- The 21 degrees of freedom
- Accuracy and the environment
- Relative thermal behaviour
- Machine geometry and design
- Determining relative errors
- Interpreting analysis data
- Troubleshooting set-up and machine errors
- Machine tool part programs
- Hardware set-up procedure
- Software set-up and data capture
- Correcting errors on the machine

Two basic training courses are offered:

Learning practical laser interferometry

In addition to the standard metrology subjects, the laser class will cover the following aspects:

- Laser interferometry theory
- Laser kit parts identification
- Current laser technology
- Linear, angular and straightness measurements
- Cosine, deadpath and Abbé errors
- Error compensation
- Using the laser as a diagnostic tool
- Implementing maintenance programs
- Accessories for the laser

Part number: A-8003-LATC

Using and understanding the QC20-W ballbar and machine metrology

The comprehensive course provides students with a detailed understanding of the most powerful machine tool diagnostic device you can buy.

Specialist features of the course include:

- Why buy a ballbar?
- When to use a ballbar
- Ballbar theory
- Ballbar kit parts identification
- Ballbar accessories

Training materials, lunch and refreshments are provided each day.

Part number: A-8003-BBTC

Advanced training at Renishaw Inc

Charged per student, per day

Part number: A-8003-0008

Training on-site at customer's premises (1-2 days)

Part number: T-2000-1080-S

Training on-site at customer's premises (4 days)

Part number: T-2000-1081-S

Additional day's training on-site at customer's premises

Part number: A-8003-0006

Non-contact position encoders

RENISHAW
apply innovation™

Product range

Welcome to non-contact position encoders **5-4**

Absolute position optical encoders

RESOLUTE™ absolute optical encoder range

- RESOLUTE absolute linear encoder system **5-6**
- RESOLUTE absolute rotary encoder system **5-6**

Incremental position optical encoders

RG2 20 µm pitch linear encoder range

- RGH22 series readhead **5-10**
- RGH24 series readhead **5-11**
- RGH25F series readhead **5-12**
- RGH26 series serial comms readhead **5-13**
- RGS20 gold scale **5-14**

RG2 20 µm pitch rotary encoder range

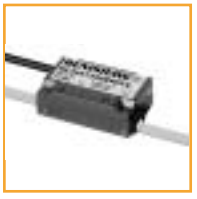
- RGH20 series readhead **5-16**
- RESR angle encoder scale **5-17**

Ultra-high vacuum (UHV) encoder range

- RESOLUTE UHV, TONiC™ UHV, RGH25F UHV and RGH20F UHV readheads **5-18**

RG4 40 µm pitch linear encoder range

- RGH34 series readhead **5-20**
- RGH40 series readhead **5-21**
- RGH41 series readhead **5-22**
- RGS40 gold scale **5-14**
- RGS40-G glass scale **5-23**



SiGNUM™ encoder range

- SiGNUM series readhead **5-24**
- SiGNUM with FANUC serial interface **5-26**

TONiC encoder range

- TONiC encoder system **5-28**
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- RGSZ20 gold scale **5-32**

TONiC and SiGNUM linear and rotary scale range

- RELM linear ZeroMet™ scale **5-34**
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- *FASTRACK*™ and RTLC-S high-accuracy incremental linear encoder scale system **5-36**
- RESM angle encoder scale **5-38**
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- RPI parallel interface **5-59**

Welcome

Renishaw offers a wide range of compact magnetic and optical encoders to meet the diverse requirements of industrial automation. This section details an extensive selection of robust magnetic linear, ring and rotary encoders, optical incremental linear and rotary encoders, laser interferometers and our new range of optical true-absolute linear and rotary encoders.

Renishaw's optical encoder systems are based on an innovative non-contact arrangement which provides zero mechanical hysteresis and excellent metrology, yet can withstand a variety of contaminants such as dust, light oils and scratches without compromising signal integrity. This ensures customers' machines run reliably with little or no maintenance.

TONiC (see page 5-28) is our smallest high-performance packaged encoder for applications requiring very high fidelity feedback and truly outstanding scale accuracy, and high reliability. LM13 and LM15 are magnetic encoders made for Renishaw by our associate company RLS d.o.o., taking the product line into rugged application areas where optical encoders cannot survive (see pages 5-42 and 5-53).

The highlight in Renishaw's range is the ground-breaking RESOLUTE absolute encoder (see page 5-6). Featuring single-track technology, a completely unique mode of operation and performance that defies convention, RESOLUTE is a world-leading product that defines Renishaw's commitment to unrivaled innovation in encoder development.

In addition to these benefits, Renishaw encoders have an established reputation for being easy to install and set up. Scale is available in many lengths with special formula self-adhesive backing, removing the need for drilling and tapping, and saving time and money.

All optical readhead and interface combinations feature a unique set-up LED which speeds installation and removes the need for complex set-up equipment or oscilloscopes.

In addition to market-leading product performance, Renishaw provides unequalled engineering back-up with a global team of experienced engineers always on hand to offer application advice and expert installation support.

To ensure that we never hold up your production, stock is held at over 30 Renishaw operations worldwide and, thanks to flexible manufacturing techniques, even out-of-stock items can be manufactured and shipped promptly.

Renishaw's encoder systems are used in all sectors of industrial automation such as semiconductor, electronics, medical, flat panel display manufacturing, printing, scientific research, robotics, solar PV, specialist machine tools, precision metrology and advanced motion systems.

Innovation

Each year, Renishaw re-invests approximately 20% of turnover into engineering, research and development. The results are ground-breaking products such as RESOLUTE and TONiC that demonstrate our commitment to developing unique technologies that push encoder performance to new levels. You will not find 'me too' replicas of competitors in this catalog, only superior encoder designs that offer higher fidelity positional feedback.

Quality

We are so confident of our products that we warrant them with a comprehensive two-year guarantee. If you need to exchange a product, we will offer an immediate replacement, anywhere in the world, to ensure that you do not suffer additional downtime. All returned products are thoroughly investigated and you will receive a report explaining exactly what caused the fault. In cases where problems are caused by customer damage, we can apply our applications engineering experience to help eliminate the cause.

Delivery

ISO9001 certified quality management system meets rapid delivery! Our efficient processes are tuned to enable us to react quicker than the competition to increases in demand. Allied to this, we hold large quantities of stock locally at subsidiaries around the world for 'next-day' deliveries. OEM customers can also benefit from consignment stock and kanban arrangements.

Price

Renishaw not only supplies encoders at a fair price, but also gives customers better price performance ratios and minimizes cost of ownership. How? As well as embedding quality and reliability into the fundamental encoder design, we develop novel production techniques that reduce manufacturing costs, allowing us to pass on the savings.

Operating principles of optical encoders

RESOLUTE

RESOLUTE is a family of true absolute, fine pitch optical encoder products. Linear scale options include high-accuracy RSLA stainless steel spar scale, RELA ZeroMet scale and RTLA-S stainless steel tape scale, also available with the *FASTRACK* RTLA track-mounted linear encoder scale system. Rotary options include RESA stainless steel rings and REXA ultra-high accuracy rings.

How it works…

RESOLUTE communicates bi-directionally in purely serial format, using a variety of industry-standard protocols, of both proprietary and open standard.

The process begins...

The controller initiates operation by sending a demand message to the readhead, instructing it to capture the absolute position on the scale – linear or rotary – at that instant. The head responds by flashing a high-power LED source to illuminate the scale. The flash duration is as brief as 50 ns to minimize image blur on moving axes. Crucially its timing is controlled within a few nanoseconds to preserve the relationship between demanded and reported position – one of the essential features that makes RESOLUTE ideally suited to very high specification motion systems.

Single track scale

The scale is essentially a single track of full-width contrasting lines, based on a nominal pitch of 30 µm. The absence of multiple parallel tracks gives important immunity from yaw errors and much more lateral tolerance in head position.

Image acquisition

The scale is imaged, via an aspheric lens which minimizes distortion, onto a custom detector array designed specifically for RESOLUTE. The optical arrangement, with a folded illumination path but direct imaging, is highly compact yet stable, thus assuring the fidelity essential for excellent metrology.

Data decoding and analysis

Once captured by the detector, the image is transferred by analog-to-digital converter (ADC) at about 500 Mb/s to a powerful Digital Signal Processor (DSP). Specially developed algorithms then obtain a true absolute, but relatively 'coarse' position from the code embedded in the scale. This process is checked, and corrections are made by further algorithms in the DSP which exploit redundancy and intentional restrictions in the scale code. Meanwhile other routines calculate a very high resolution 'fine' position, which is then combined with the coarse position to provide a truly absolute and very high resolution location.

Final checks and data output

After final error-checking procedures this information is uploaded again in the appropriate protocol to the controller, as a pure serial word representing position to within 1 nm. Protection against electrical noise disturbance is provided by addition of a Cyclic Redundancy Check (CRC). The entire process, from demand to response, can take as little as 12 µs and be repeated up to 25 000 times per second. By a variety of techniques, including adjusting the light flash duration to the axis speed, this performance is achieved at up to 100 m/s while, crucially, preserving exceptionally low positional jitter at lower operating speeds.

And the result is...

The outcome is an encoder with generous installation tolerances: RESOLUTE allows ±0.5° in yaw, pitch and roll and an impressive ±150 µm in ride height. Meanwhile the generous optical footprint and advanced error correcting procedures confer excellent immunity to optical contamination, both particulate and greasy smears. All this while maintaining 1 nm resolution at 100 m/s: RESOLUTE is the answer to the toughest absolute challenge.

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CE

RESOLUTE absolute optical encoder summary

- True absolute non-contact optical encoder system: no batteries required
- Wide set-up tolerances for quick and easy installation
- High dirt immunity to scratches and light oils
- Resolutions to 1 nm or 32-bit rotary
- 100 m/s maximum speed for all resolutions (to 36,000 rev/min)
- 30 µm nominal scale pitch ensures exceptional motion control performance
- ±40 nm sub-divisional error for smooth velocity control
- Less than 10 nm RMS jitter for improved positional stability
- Built-in separate position-checking algorithm provides inherent safety
- IP64 sealed readhead for high reliability in harsh environments
- Integral set-up LED enables easy installation and provides diagnostics at a glance
- Readhead and linear/rotary scales are bolt-hole compatible with SiGNUM encoders
- Operates up to 80 °C
- Integral over-temperature alarm
- Variety of serial protocols available. Contact your local representative for the latest list

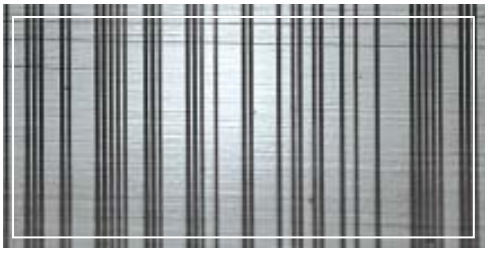
Compatible with:

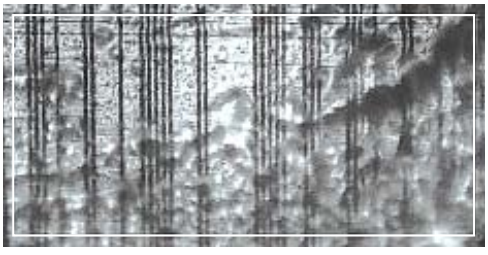
- RELA ZeroMet spar scales
- RSLA stainless steel spars
- *FASTRACK* with RTLA
- RTLA-S self-adhesive tape scale
- RESA angle encoders
- Ultra-high accuracy REXA angle encoders

System features

Unique single track absolute optical scale

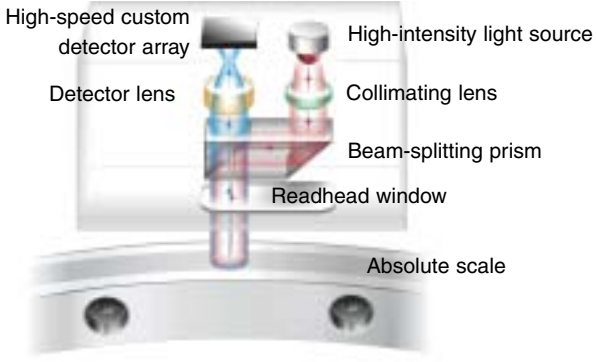
- Absolute position is determined immediately upon switch-on
- No battery back-up
- Much higher tolerance to yaw de-phasing than dual-track systems
- Fine pitch (30 µm nominal period) optical scale for superior motion control compared to inductive, magnetic or other non-contact optical absolute encoders
- High-accuracy graduations marked directly onto tough engineering materials for outstanding metrology and reliability





High dirt immunity

- Advanced optics and embedded surplus code means RESOLUTE even reads dirty scale.
- Absolute position can be determined in all three cases shown here; clean scale (left), grease contamination (below left), particle contamination (below).



Unique detection method

- Readhead acts like an ultra-fast miniature digital camera, taking images of a coded scale.
- Photos are analyzed by a high-speed DSP to determine absolute position.
- Built-in position-check algorithm constantly monitors calculations for ultimate safety and reliability.
- Advanced optics and determination algorithms are designed to provide low noise (jitter <10 nm RMS) and low sub-divisional error (SDE ±40 nm).

Range of rotary (angle) and linear scales

- Tough RELA high-precision ZeroMet spars with ±1 µm accuracy available up to 1130 mm length
- Shatter-proof RSLA high-precision stainless steel scale, offering higher accuracy than glass scales and long lengths up to 5 m, with ±4 µm accuracy over a complete 5 m length (for longer lengths contact your local representative)
- RTLA with *FASTRACK*, and RTLA-S tape scales with ±5 µm/m accuracy and easiest installation
- RESA ring with unique taper mount has large through hole for easy installation
- REXA ultra-high accuracy ring with ±1 arc second total installed accuracy with dual readheads

Range of protocols and resolutions

Protocol	Resolutions	
	Linear	Rotary
BiSS	50 nm 5 nm 1 nm	18-bit 26-bit 32-bit
Drive-Cliq (available Fall 2012)	50 nm 1 nm	26-bit 29-bit 32-bit
FANUC	50 nm 1 nm	23-bit (high type A) 27-bit (high type B)
Mitsubishi	50 nm 1 nm	23-bit 27-bit
Panasonic	100 nm 50 nm 1 nm	–

RGH22 series readhead

Renishaw's RG2 linear encoder system is a non-contact optical encoder designed for position feedback solutions.

The system uses a common reflective tape scale scanned by a readhead chosen from a range of options offering industry standard digital square wave or analog sinusoidal output signal formats.

Renishaw's patented optical scheme is used in all readhead series and gives proven performance benefits together with high tolerance to scale contamination.

The RGH22 range is suitable for use in a broad range of applications, offering high resolution and high speed with stability and reliability.

A dual limit sensor option is also available offering two dedicated signal outputs, left and right end-of-axis travel indication.

RGH22 is an ideal feedback solution wherever precision controlled movement is required. The RGH22 readheads offer the full set of RG2 features and integral interpolation in a robust package, with an integral set-up LED for quick and easy installation.

Common applications include coordinate measuring and layout machines, semi-conductor/electronics manufacturing and inspection, height gages, electronics assembly and test, linear motors, digital image setters and a variety of custom linear motion solutions.

Single limit range

RGH22D – 5 µm resolution
RGH22X – 1 µm resolution
RGH22Z – 0.5 µm resolution
RGH22Y – 0.1 µm resolution
RGH22B – 1 Vpp differential
RGH22C – 12 µA differential (no limit)

Dual limit range

RGH22P – 5 µm resolution
RGH22Q – 1 µm resolution
RGH22R – 0.5 µm resolution
RGH22S – 0.1 µm resolution
RGH22H – 50 nm resolution
RGH22A – 1 Vpp differential

- Non-contact open optical system
- Integral interpolation
- Industry standard digital and analog output options
- Resolutions from 5 µm to 50 nm
- Integral reference and limit sensors
- Dual limit sensor option
- Integral set-up LED
- Uses RGS20-S self-adhesive scale

RGH24 series readhead

Renishaw's RG2 linear encoder system is a non-contact optical encoder designed for position feedback solutions.

The system uses a common reflective tape scale scanned by a readhead chosen from a range of options offering industry standard digital square wave or analog sinusoidal output signal formats.

Renishaw's unique patented optical scheme is used in all readhead series to provide high tolerance to scale contamination.

RGH24 is an ideal feedback solution wherever precision controlled movement is required.

The RGH24 readheads offer a wide selection of output configurations and their compact size and low mass makes the system ideal for small XY stages and actuators.

An integral set-up LED enables quick and easy installation.

Common applications include semiconductor/electronics manufacturing and inspection, coordinate measuring and layout machines, height gages, linear motors, pre-press printing and a variety of custom linear motion solutions.

Digital range

RGH24D – 5 µm resolution
RGH24X – 1 µm resolution
RGH24Z – 0.5 µm resolution
RGH24W – 0.2 µm resolution
RGH24Y – 0.1 µm resolution
RGH24H – 50 nm resolution
RGH24I – 20 nm resolution
RGH24O – 10 nm resolution

Analog range

RGH24B – 1 Vpp differential
RGH24C – 12 µA differential

- Non-contact open optical system
- Compact size
- Low mass
- Integral interpolation
- Digital and analog output options
- Resolutions from 5 µm to 10 nm
- Integral set-up LED
- Uses RGS20-S self-adhesive scale
- Reference mark or limit switch capability

RGH25F series readhead

Renishaw's RGH25F offers all the benefits of the market leading RG2 non-contact linear encoder systems; patented filtering optical scheme, high contamination tolerance and high speed.

The RGH25F has been designed for use with Renishaw's RGS20-S gold-plated scale in precision applications requiring fine resolutions, high accuracy, compact size and low mass.

The readhead is enclosed in an RFI screened housing and uses proven solid state components to give outstanding reliability.

The REF interfaces can be mounted remotely to interpolate the signals produced by the readhead.

The interfaces incorporate automatic gain control and unique self-tuning adaptive electronics which, combined with the filtering optics, ensure excellent signal integrity, and give a low cyclic error.

Common applications include optical fiber alignment, semiconductor manufacturing, inspection, precision stages and other systems requiring high resolution where space is at a premium.

Readhead

RGH25F – common readhead

Interfaces:

Digital

REF0004 – 5 µm resolution
REF0020 – 1 µm resolution
REF0040 – 0.5 µm resolution
REF0100 – 0.2 µm resolution
REF0200 – 0.1 µm resolution
REF0400 – 50 nm resolution
REF1000 – 20 nm resolution
REF2000 – 10 nm resolution
REF4000 – 5 nm resolution

Analog

REF0000 – 1 Vpp differential

- Customer selectable AGC operational at all speeds
- Digital and analog output options
- Resolutions from 5 µm to 5 nm
- Binary interpolation factors from x4 to x4096
- Low cyclic error (<50 nm)
- Self-tuning adaptive electronics give reliability and high accuracy
- Uses low profile RGS20-S self-adhesive scale
- Low mass
- Tri-colored set-up LED indicating signal strength

RGH26 series serial comms readhead

The RGH26, based on Renishaw's RG2 range of linear encoders, has been specifically designed for use with Mitsubishi's MELSERVO®-J2 Super series of servo amplifiers. The RGH26 offers speeds of up to 6 m/s with resolutions to 0.5 µm.

The RG2 system uses a reflective tape scale scanned by a readhead chosen from a range of options. It offers industry standard digital square wave, analog sinusoidal, and now Mitsubishi-compatible serial communication signal formats.

Renishaw's patented filtering optical scheme is used in all RG2 linear encoders and gives outstanding performance combined with a high tolerance to dust, scratches and light oil contamination.

Unlike other serial communication linear encoders, the RGH26 does not require a separate bulky interface. Renishaw's innovative electronics, interpolation and serial conversion are all contained within the same compact body of the popular RGH22. The incremental count takes place within the readhead, resulting in exceptional system noise immunity.

Dual limit sensors have been incorporated as standard, offering two dedicated signal outputs for left and right end-of-axis travel indication. A repeatable reference mark output is also included, along dedicated real-time channels as well as part of the serial word.

The class-leading compact size, exceptional high speed, high accuracy, and zero-friction configuration make the RGH26 the encoder of choice for linear feedback applications wherever a MELSERVO® J2 Super is used.

Serial communication (dual limit) range

RGH26P – 5 µm resolution
RGH26Q – 1 µm resolution
RGH26R – 0.5 µm resolution

Compatible Mitsubishi products

MELSERVO®-J2 Super series

- Non-contact open optical system
- Integral interpolation
- Mitsubishi compatible serial communications
- Speeds up to 6 m/s
- Resolutions from 5 µm to 0.5 µm
- Integral reference and dual limit sensors
- No interface required
- Integral set-up LED
- Uses RGS20-S self-adhesive scale

RGS20 and RGS40 gold scale

Renishaw's patented RGS20-S scale comprises 20 µm graduations on a steel strip 6 mm wide and 0.2 mm thick and features a thin gold surface layer to enhance reflectivity.

A lacquer coating provides protection against handling and contamination. The 20 µm pitch scale is suitable for use with all Renishaw RG2 series readheads (RGH22, RGH24, RGH25 and RGH26), whilst the 40 µm RGS40-S is suitable for use with the RGH34 and RGH41 readheads.

The scale is supplied with a specially formulated adhesive backing tape. Installation is quick, easy and suits both high-volume production and one-off field service installations.

To simplify customer inventory and maximize production flexibility, the scale can be supplied on a reel for 'cut-to-suit' convenience at the point of installation.

RGS20-S and RGS40-S are suitable for mounting to most common engineering materials including metals, granites, ceramics and composites, whilst RGS20-PC and RGS40-PC polyester coated versions have an increased resilience to solvent and lubricant attack.

The scale ends are rigidly fixed to the axis substrate by means of epoxy fastened end clamps, eliminating the need to drill holes. Because the scale has a very small cross section, it is 'mastered' to the substrate and matches its thermal expansion. Differential movement between the scale and the substrate is close to zero, even throughout significant temperature swings.

- RGS20 20 µm tape scales for RGH22, RGH24, RGH25 and RGH26 readheads
- RGS40 40 µm tape scales for RGH34 and RGH41 readheads
- 'Cut-to-length' flexibility
- Lengths from 100 mm to over 50 m
- Protective lacquer or tough polyester coating option for applications using harsh solvents
- Efficient, accurate installation
- Affixes to most common engineering materials
- Self-adhesive
- Automated application

Technical specifications

Scale

Type	Reflective gold plated steel tape with protective lacquer coating or tough polyester coating option for applications using harsh solvents and self-adhesive backing	
Scale pitch	RGS20-S, RGS20-PC = 20 µm	RGS40-S, RGS40-PC = 40 µm
Linearity	RGS20-S = ±3 µm/m, ±0.75 µm/60 mm RGS20-PC = ±5 µm/m, ±1.5 µm/60 mm	RGS40-S = ±3 µm/m, ±1 µm/60 mm RGS40-PC = ±5 µm/m, ±1.5 µm/60 mm
Scale length	100 mm – 50 m (>50 m by special order)	
Substrate materials	Metals, ceramics and composites with expansion coefficients between 0 and 22 µm/m/°C (steel, aluminum, ZeroMet, granite, ceramic etc.)	
Expansion coefficient	Matches that of substrate material with scale ends fixed by epoxy mounted end clamps	
End fixing	Epoxy mounted end clamps (A-9523-4015) using two-part epoxy adhesive (A-9531-0342) Scale end movement <1 µm over temperature range -20 °C to 50 °C	
Operating specification	Temperature: -10 °C to 120 °C (scale only, also refer to data sheet) Minimum installation temperature 10 °C Humidity: 80% maximum RH (non-condensing)	

Reference mark

Type	Magnetic actuator	
Mounting options	Adhesive mounted Screw mounted Adhesive or screw mounted 90° actuator for use with RGH24, RGH25 or RGH34	A-9531-0250 A-9531-0287 A-9541-0037
Position	One or more at user selected locations	
Repeatability	Output synchronized with incremental channels Repeatability of position (uni-directional) maintained within these conditions: Temperature range: RGS20-S, RGS20-PC ±10 °C from installation temperature RGS40-S, RGS40-PC ±20 °C from installation temperature Speed: Refer to individual readhead specifications Magnetic field: steady ±0.02 T or changing ±7.5 T/s	

Limit switch

Type	Magnetic actuator	
Mounting options	Adhesive mounted 10 mm actuator Adhesive mounted 24.35 mm actuator Adhesive mounted 50 mm actuator Flush mounted actuator Adhesive or screw mounted 90° actuator for use with RGH24, RGH25 and RGH34	A-9531-0251 A-9531-2052 A-9531-2054 A-9531-0285 A-9541-0040
Position	One or more at user selected locations	
Repeatability	0.1 mm	

RGH20 series readhead

The RGH20 is a compact readhead for use with Renishaw's range of 20 µm RESR rotary encoders and RSLR high-accuracy linear scale.

Like all Renishaw encoders, the RGH20 offers reliable, high-speed, open, non-contact performance with excellent immunity to dust, scratches and light oils on the scale.

The RGH20 also benefits from Renishaw's patented readhead set-up LED which simplifies installation and monitors signal condition during operation.

The ultra-compact RGH20F connects to the REF interface to give high-accuracy digital and analog outputs. The REF interface incorporates advanced signal processing and offers high speed and resolution.

Digital and analog RGH20

RGH20D – 5 µm resolution
RGH20X – 1 µm resolution
RGH20Z – 0.5 µm resolution
RGH20W – 0.2 µm resolution
RGH20Y – 0.1 µm resolution
RGH20H – 50 nm resolution
RGH20I – 20 nm resolution
RGH20O – 10 nm resolution
RGH20B – 1 Vpp differential

RGH20F/REF system options

REF0004 – 5 µm resolution
REF0020 – 1 µm resolution
REF0040 – 0.5 µm resolution
REF0100 – 0.2 µm resolution
REF0200 – 0.1 µm resolution
REF0400 – 50 nm resolution
REF1000 – 20 nm resolution
REF2000 – 10 nm resolution
REF4000 – 5 nm resolution
REF0000 – 1 Vpp differential

- Compatible with 20 µm RESR angle encoder and RSLR high-accuracy linear scales
- Filtering optics provide excellent dirt immunity
- Compact and robust housing
- Industry standard digital and analog outputs
- Integral interpolation and set-up LED on RGH20 option
- Ultra-compact RGH20F/REF system gives high accuracy and high resolution
- Resolutions from 5 µm to 5 nm
- Reference mark or single limit switch sensor
- Hi-flex double screen 8 core cable

RESR angle encoder scale

The RESR is a one-piece stainless steel ring with graduations marked directly onto the periphery.

The RESR offers impressive accuracy with resolution to 0.008 arc second, suiting the most demanding precision applications.

Read by Renishaw's filtering optics readheads, including the RGH20, RGH34, RGH35 and RGH40, the system has a high tolerance to dirt, scratches and greasy fingerprints that can cause other encoder systems to miscount.

The low profile RESR, with a large internal diameter, is easy to design into most installations. More importantly, its low mass, low inertia design will not compromise system performance. A repeatable reference mark is available to provide a home (datum) position, while Renishaw's RGH40 readhead with filtering optics offers dual limit sensors.

System features

- High-speed, non-contact, optical performance
- Graduation accuracy to ±0.5 arc second
- Angular resolution to 0.008 arc second
- System repeatability to 0.008 arc second
- Wide range of sizes and line counts provide compatibility with industry-standard controllers (Ø52 mm to Ø550 mm with line counts from 4,096 to 86,400)
- Patented taper mount simplifies integration and minimizes installation errors
- Filtering optics provide excellent dirt immunity
- UHV compatible
- Low magnetic permeability as standard
- Compact size for easy integration
- Low mass and low inertia
- Compatible with RGH20, RGH34, RGH35 or RGH40 readheads to offer industry-standard analog or digital incremental outputs with reference mark option
- Integral set-up LED on all Renishaw encoders for quick set-up and instant "health check" at any time
- Ultra-low inertia versions also available in 75 mm, 100 mm, 150 mm and 200 mm sizes

Ultra-high vacuum (UHV) encoders

RESOLUTE UHV, TONiC UHV, RGH25F UHV and RGH20F UHV readheads

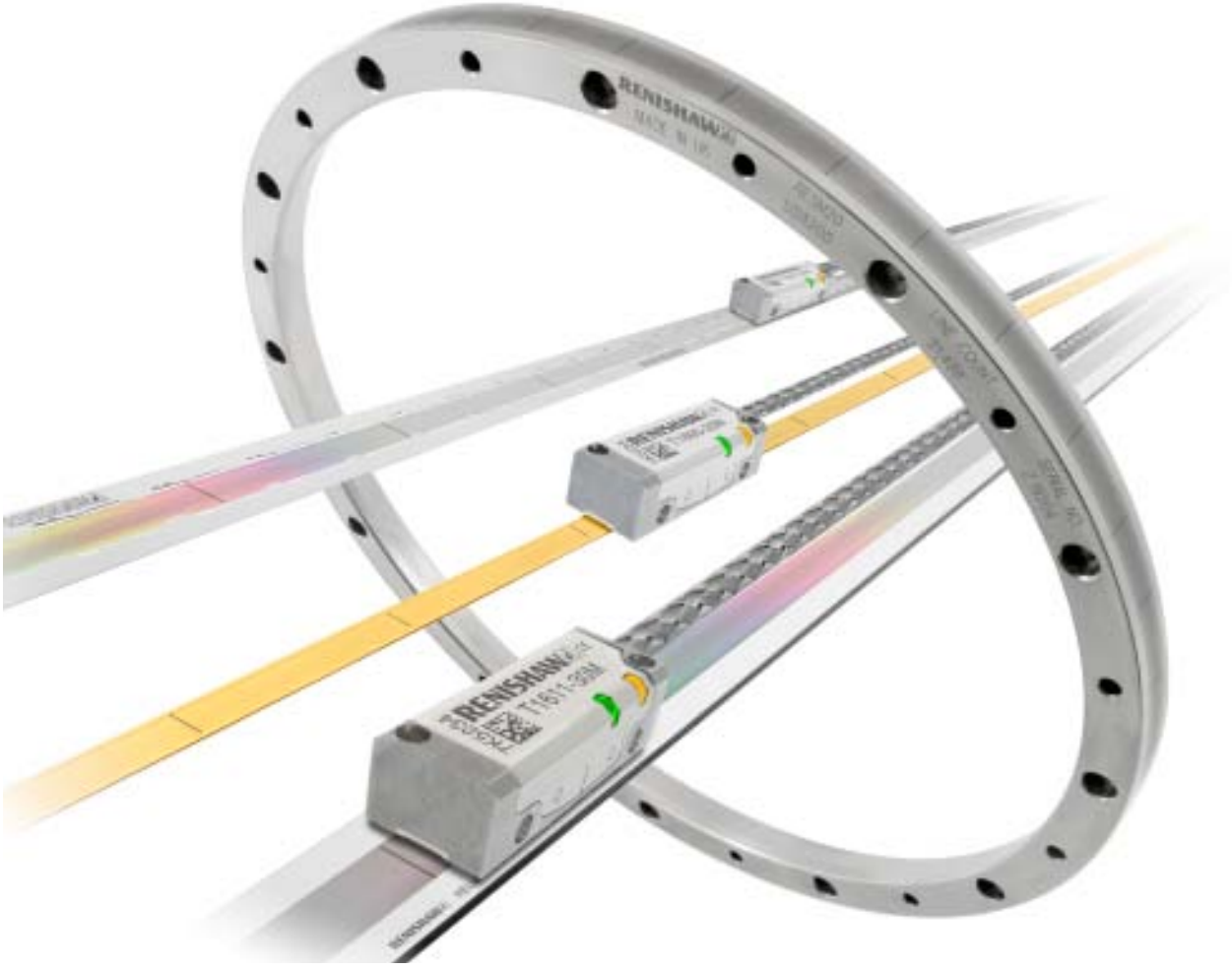
All products in Renishaw's range of ultra-high vacuum (UHV) compatible encoders are designed for use in a variety of scientific, semiconductor and other advanced industrial applications with vacuum pressures to 10^{-11} Torr. The fundamental principles of operation are the same as those for our equivalent standard-atmosphere products, but the UHV variants are designed to eliminate unvented voids and are specially constructed from clean, vacuum-compatible materials and adhesives. The suitability of the products for use in UHV environments is qualified by an independent specialist test house, including a Residual Gas Analysis (RGA) spectrum test.

The range includes versions of RESOLUTE, TONiC, RGH25F and RGH20F readheads, along with a variety of linear and rotary scales, offering superior performance and high reliability.

RESOLUTE UHV uses the same true-absolute encoder operating principles as the rest of the RESOLUTE range. This provides an encoder with fine-pitch performance, combined with wide set-up tolerances and built-in safety. RESOLUTE determines absolute position immediately upon switch-on, eliminating uncontrolled movements and facilitating complete command of axes without the need for reference returns or 'wake-and-shake' routines. With 1 nm resolution, ±40 nm SDE and <10 nm RMS noise, RESOLUTE also offers users a significant performance upgrade.

All incremental readheads in the range include dynamic signal conditioning comprising Auto Gain Control (AGC) for solid and dependable signals over extended machine lifetimes, and Auto Offset Control (AOC) for improved signal fidelity. AOC and the encoder's low positional noise also add the benefit of reducing velocity ripple on direct-drive systems, thereby helping minimize heat build-up in motors inside the vacuum.

High accuracy is assured, with linear measuring standards including options of self-adhesive tape scale, stainless steel and ZeroMet spars. Angle encoder options include the low-profile RESR/RESM and the ultra-high accuracy REXM ring with guaranteed installed accuracy better than ±1 arc second.

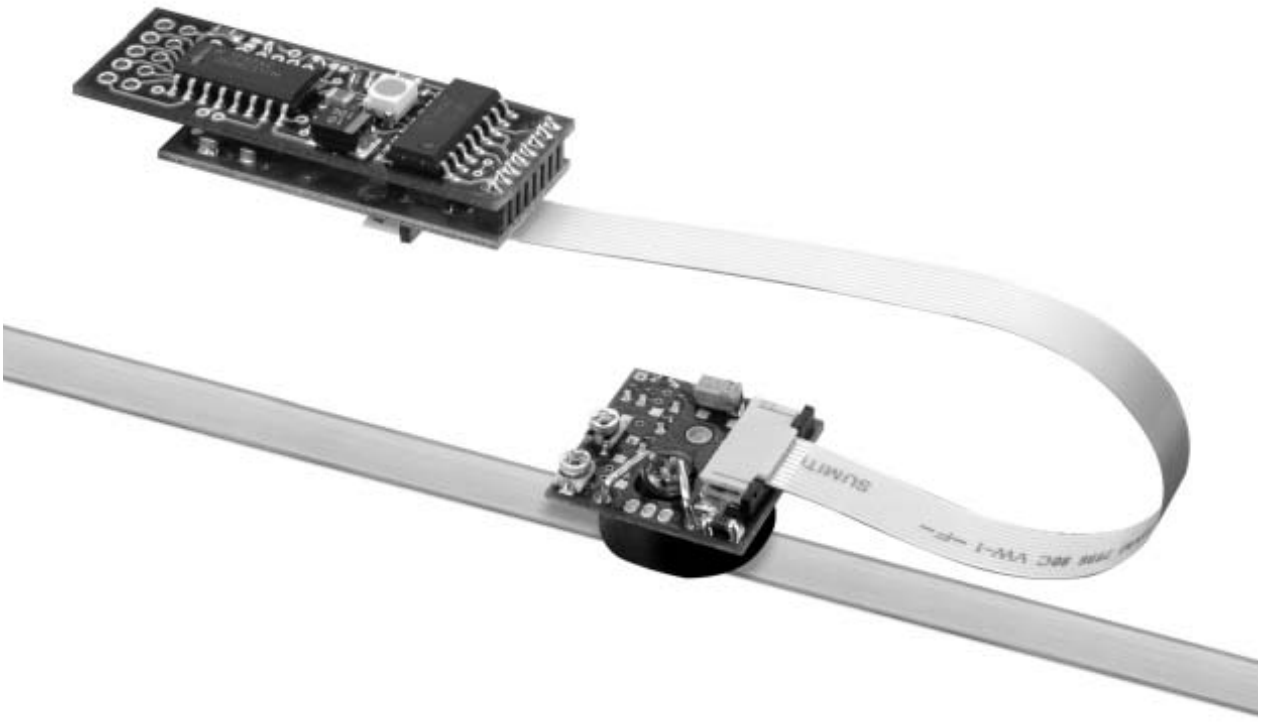


UHV product features

- RESOLUTE UHV is the first true-absolute optical encoder for UHV environments
- Constructed from vacuum-compatible materials and adhesives to give low outgassing rates
- Proven clean RGA
- Bake-out temperature of 120 °C
- Non-contact open optical system for high-speed, reliable operation with zero friction and zero wear
- Industry-standard digital and analog outputs with resolutions to 1 nm
- Low power consumption minimizes heat dissipation
- No unvented voids
- Adaptive electronics offer high performance, long-term reliability and low sub-divisional error (SDE) (±40 nm for RESOLUTE UHV, ±30 nm for TONiC UHV, ±50 nm for RGH25F UHV and RGH20F UHV)
- UHV compatible cables
- TONiC UHV encoder features optical reference mark
- Range of high-accuracy linear and rotary scales

Products	Scale options	Features
RESOLUTE UHV	*FASTRACK* RTLA track-mounted scale system RTLA-S stainless steel tape scale RSLA stainless spar RELA low expansion ZeroMet spar RESA ring REXA ultra-high accuracy ring	True-absolute with no movement required to determine absolute position, position-checking algorithm, safe extraction after power-outs, pure serial communications with CRC check, excellent motion control performance and easiest installation.
TONiC UHV	RGSZ20-S tape scale *FASTRACK* RTLC track-mounted scale system RTLC-S stainless tape scale RSLM stainless spar RELM low expansion ZeroMet spar RESM ring REXM ultra-high accuracy ring	High-accuracy scales, *IN-TRAC*™ optical reference mark technology, advanced Auto Gain Control (AGC) and Auto Offset Control (AOC), lowest noise (jitter) and SDE for the best motion control performance, and easy installation.
RGH25F UHV	RGS20-S tape scale	Easy installation, high repeatability, AGC and AOC.
RGH20F UHV	RESR ring	Angle encoder version of RGH25F UHV.

RGH34 series readhead



Renishaw's RGH34 series is a non-contact optical encoder system that offers the performance and reliability of the established RG2 linear encoder system with the versatility of a miniaturized component system.

Renishaw's unique patented filtering optical technology eliminates friction, hysteresis and wear while giving high contamination tolerance and exceptional reliability. The versatile system can read Renishaw's RGS40-S self-adhesive scale, RGS40-G glass scale and RESR rings as well as industry-standard 40 µm chrome/glass etched scale, making it suitable for a wide range of applications.

The component style construction allows integration flexibility for even the smallest motion systems, while the generous set-up tolerances, easy-to-install adhesive scale and patented set-up LED make installation quick and easy.

Designed for OEM applications where a conventional enclosed readhead cannot be fitted, the RGH34 brings reliable state-of-the-art performance to size-sensitive precision linear and rotary motion applications such as ultra-small linear actuators, microscopes and microstages.

Common readhead

RGH34U

Digital range

RGI34T – 10 µm resolution
RGI34D – 5 µm resolution
RGI34G – 2 µm resolution
RGI34X – 1 µm resolution
RGI34N – 0.4 µm resolution
RGI34W – 0.2 µm resolution
RGI34Y – 0.1 µm resolution

Analog range

RGI34B – Vpp differential

- Non-contact open optical system
- Compact component style readhead
- Large installation tolerances
- High-speed operation
- Industry-standard digital and analog output options
- Resolutions from 10 µm to 0.1 µm
- Optional reference or limit sensor
- Integral set-up LED
- Uses low profile RGS40-S self-adhesive scale, RGS40-G glass scale, RESR rings and other reflective scale types

RGH40 series readhead

Renishaw's RGH40 readhead offers all the benefits of the market-proven RG4 linear encoder system – high-speed, non-contact performance with filtering optics to guarantee reliable performance over light oils, dust and scratches.

The RGH40 readhead is designed for use with Renishaw's RGS40-G (40 µm pitch chrome grating) glass scale and RESR angle encoder. Enclosed within a rugged, die-cast housing, the readhead uses proven solid state components to give outstanding reliability.

Dual limit switch sensing is also included as standard to provide dedicated signals for each end-of-axis indication, together with a repeatable reference or datum mark.

Installation is quick and easy to achieve thanks to generous set-up tolerances and Renishaw's unique set-up LED that indicates when optimum conditions have been achieved. This removes the need for expensive oscilloscopes or set-up equipment.

These added benefits give RGH40 readheads greater flexibility, broadening the range of applications of the existing RG2 and RG4 systems, from coordinate measuring and layout machines to electronics assembly and test, high-speed motion control, semiconductor manufacture and a host of custom linear motors.

Digital range

RGH40T – 10 µm resolution
RGH40D – 5 µm resolution
RGH40G – 2 µm resolution
RGH40X – 1 µm resolution
RGH40N – 0.4 µm resolution
RGH40W – 0.2 µm resolution
RGH40Y – 0.1 µm resolution
RGH40H – 50 nm resolution

Analog range

RGH40A – 1 Vpp differential

- Non-contact open optical system
- Large installation tolerances
- High-speed operation – up to 10 m/s
- Industry-standard digital and analog output options
- Resolutions from 10 µm to 50 nm
- Integral reference and dual limit sensors
- Integral set-up LED
- Uses Renishaw RGS40-G glass scale and RESR angle encoder

RGH41 series readhead

Renishaw's 40 µm RGH41 series readheads offer all the benefits of the established 20 µm RG2 linear encoder system, such as reflective tape scale, patented filtering optics, set-up LED, good dirt immunity and high speed.

These compact readheads with integral interpolation provide an increased range of resolutions to match the demands of a wide range of applications, whilst their high speed enables an increase in the productivity of the end-user's system.

The 40 µm RGH41 increases the already generous set-up tolerances of the RG2, whilst maintaining Renishaw's famous contamination immunity.

For added flexibility, dual limit switch sensing is included as standard to enable dedicated signals for each end-of-axis indication, along with a repeatable reference or datum mark.

These benefits give the RGH41 greater flexibility complementing the breadth of applications in which the RG2 is already used, from coordinate measuring and layout machines to electronics assembly and test, linear motors and a host of custom linear motor solutions.

Digital range

RGH41T – 10 µm resolution
RGH41D – 5 µm resolution
RGH41G – 2 µm resolution
RGH41X – 1 µm resolution
RGH41N – 0.4 µm resolution
RGH41W – 0.2 µm resolution
RGH41Y – 0.1 µm resolution
RGH41H – 50 nm resolution

Analog range

RGH41B – 1 Vpp differential (single limit)
RGH41A – 1 Vpp differential (dual limit)

- Non-contact open optical system
- Large installation tolerances
- High-speed operation up to 15 m/s
- Industry-standard digital and analog output options
- Resolutions from 10 µm to 50 nm
- Integral reference and dual limit sensors
- Integral set-up LED
- Uses Renishaw RGS40-S self-adhesive scale

RGS40-G glass scale

The RGS40-G is a 40 µm chrome on glass scale designed for use with Renishaw's RG4 series RGH40 filtering readheads.

The RGS40-G system offers many of the features that have made Renishaw's famous RGS tape scale such a success – high-speed, non-contact optical performance that is immune to dust, light oil and scratches.

The RGH40 benefits from filtering optics and an integral set-up LED which ensure easy installation and reliable operation.

The RGS40-G scale is easy to install and can be mounted directly to the substrate using either mechanical clips or specially-formulated adhesive.

In addition to these features, the RGS40-G is ideally suited for applications where the scale does not need to be mastered to the substrate. The thermal behaviour of RGS40-G can be compensated for by simply entering the coefficient of expansion of the scale into the host controller.

The RGS40-G boasts an extensive list of application areas, e.g. linear motion stages, linear motors, scientific instruments, metrology instruments, optical inspection, XY stages, medical equipment.

- Suitable for use with RGH40 series readheads
- Available in 8 convenient lengths
- Defined thermal behaviour
- Reliable dirt immunity
- Compatible with reference marks and limit switches
- Clamp or adhesive mounting options
- Can be mounted on any substrate
- 3 × 18 mm cross section for compact installation

SiGNUM series readhead

Renishaw's SR readhead and Si interface are part of the SiGNUM range of optical encoders.

They have been designed for use with Renishaw's range of high-accuracy RESM and REXM angle encoders and RSLM and RELM linear encoders which incorporate the *IN-TRAC*™ bi-directional reference mark.

Like all Renishaw encoders, the SiGNUM range offers high-speed, reliable operation and open, non-contact performance with excellent immunity to dirt and electrical noise.

The interface incorporates dynamic signal control which, combined with the patented filtering optics, ensure excellent signal integrity and exceptionally low cyclic error.

The Si interface can be mounted remotely and a small connector on the readhead cable allows it to be fed easily through machines where access is restricted.

Readhead (SR)

SR005A – 0.5 m cable
SR010A – 1.0 m cable
SR015A – 1.5 m cable
SR030A – 3.0 m cable
SR050A – 5.0 m cable
SR100A – 10.0 m cable

Interface unit (Si)

Si-NN-0004 – 5 µm
Si-NN-0020 – 1 µm
Si-NN-0040 – 0.5 µm
Si-NN-0100 – 0.2 µm
Si-NN-0200 – 0.1 µm
Si-NN-0400 – 50 nm
Si-NN-1000 – 20 nm
Si-HN-2000 – 10 nm
Si-HN-4000 – 5 nm
Si-NN-0000 – Analog
Si-NN-0001 – Low noise analog

- *IN-TRAC* bi-directional reference mark and on-scale dual limit outputs
- Compatible with RESM and REXM (rotary) and RELM and RSLM (linear) scales
- Operating temperature up to 85 °C
- Speeds up to 12.5 m/s (4591 rev/min @ Ø52 mm)
- Dynamic signal control to give cyclic error of typically ±30 nm
- SiGNUM software for easy installation and system diagnostics
- Integral LEDs for optimum set-up and system diagnostics
- Industry-standard analog and digital outputs with resolutions from 5 µm to 5 nm (40 to 0.0038 arc seconds)
- Non-contact open optical system
- Filtering optics provide excellent dirt immunity
- High flex, UL approved cable

System features

IN-TRAC optical reference mark

- Integrated within the graduation for compact dimensions and simplified alignment
- Electronically phased, requiring no physical adjustment
- Sub-micron repeatability in both directions of travel over full operating temperature and speed range
- Mid-point (RELM and RSLM), end-point (RELE and RSLE), customer-selectable (RSLC) or distance-coded* (RSLD) location on linear scale system

* Distance-coded only available for digital systems with a resolution of 1 µm or finer.
The maximum speed for referencing is as per the speed table or 5 m/s, whichever is the lowest

Dynamic signal control

- Real-time signal conditioning for optimized performance across a range of operating conditions
- Includes Auto Gain Control (AGC), Auto Offset Control (AOC) and Auto Balance Control (ABC)
- Ultra-low cyclic errors, typically ±30 nm

Calibration at the touch of a button

- Click of a mouse via SiGNUM software or CAL button on Si interface
- Optimization for all output signals

Integrated LED diagnostics

- Simplifies initial alignment and set-up
- Reference mark and limit status

Dual optical limit switch

- For linear and rotary axes, provides end-of-travel indication
- User-selectable positioning
- Independent output for each limit position
- Ideal for linear and partial arc rotary applications

In-line connector (option)

- In-line connector between readhead and interface for easy connectivity
- IP68
- Protective caps available

SiGNUM software

- PC-based, providing real-time set-up, calibration and diagnostics
- USB connection to SiGNUM Si interface
- Simultaneous multiple axis connectivity
- Can be connected during full servo-loop operation
-

Recommended minimum PC requirements for the software:

- USB1.1
- .NET Framework 1.1 (redistributable version included with the software)
- Microsoft® Windows® 2000, Vista, XP or Windows® 7
- Microsoft® Internet Explorer 5.01 or later
- Pentium® II processor
- 128 MB RAM
- Screen resolution 800 × 600, 16-bit colors

SiGNUM with FANUC serial interface

The FANUC serial compatible Si-FN interface is part of the SiGNUM family of optical position encoders featuring the *IN-TRAC* autophase reference mark.

The interface connects to a standard SR readhead which works with the RESM high-accuracy angle encoder providing FANUC serial output to work with FANUC CNC controllers.

Like all Renishaw encoders, the SiGNUM range offers high-speed, reliable operation and open, non-contact performance with excellent immunity to dirt and electrical noise.

The interface incorporates dynamic signal control which, combined with the patented filtering optics, ensure excellent signal integrity and low cyclic error.

The Si-FN interface can be mounted remotely and a small connector on the readhead cable allows it to be fed easily through machines where access is restricted.

Readhead (SR)

SR005A – 0.5 m cable
SR010A – 1.0 m cable
SR015A – 1.5 m cable
SR030A – 3.0 m cable
SR050A – 5.0 m cable
SR100A – 10.0 m cable

Interface unit (Si)

Si-FN-0052 – Ø52 mm ring
Si-FN-0104 – Ø104 mm ring
Si-FN-0209 – Ø209 mm ring
Si-FN-0417 – Ø417 mm ring

- FANUC compatible serial communication eliminates need for FANUC 'High Resolution Serial Output Circuit'
- Resolutions up to 2^{26} positions per revolution
- *IN-TRAC* bi-directional reference mark and on-scale dual limit outputs
- IP64 sealed readhead
- Compatible with RESM (52 mm, 104 mm, 209 mm and 417 mm diameters)
- Operating temperature up to +85 °C
- Speeds up to 12.5 m/sec (4,591 rev/min @ Ø52 mm)
- Dynamic signal control to give cyclic error of less than ±40 nm
- SiGNUM software for ease of installation and system diagnostics
- Integral LEDs for optimum set-up and system diagnostics
- Non-contact design for exceptional dynamic performance
- High flex, UL approved cable

System features

***IN-TRAC* optical reference mark**

- Integrated within the scale graduations for compact dimensions and simplified alignment
- Electronically phased, requiring no physical adjustment
- Sub arc second repeatability in both directions of travel over full operating temperature and speed range

Dynamic signal control

- Real-time signal conditioning for optimized performance across a range of operating conditions
- Includes Auto Gain Control (AGC), Auto Offset Control (AOC) and Auto Balance Control (ABC)
- Ultra-low cyclic error, typically <±30 nm

Calibration at the touch of a button

- Click of a mouse via SiGNUM software or CAL button on Si interface
- Optimization for all output signals

Integrated LED diagnostics

- Remote access for convenient viewing
- Simplifies initial alignment and set-up
- Reference mark and limit status

Dual optical limit switch

- Provides end-of-travel indication
- User-selectable positioning
- Independent output for each limit position
- Ideal for partial rotation applications, eg machine tool A or B axes (RESM ring encoder)

SiGNUM software

- PC-based, providing real-time set-up, calibration and diagnostics
- Full function DRO capability
- USB connection to SiGNUM Si interface
- Simultaneous multiple axis connectivity

Recommended minimum PC requirements for the software:

- USB1.1
- .NET Framework 1.1 (redistributable version included with the software)
- Microsoft® Windows®, Millennium edition (Me), XP or Windows® 7
- Microsoft® Internet Explorer 5.01 or later
- Pentium® II processor
- 128 MB RAM
- Screen resolution 800 × 600, 16-bit colors

TONiC encoder system

Renishaw's TONiC series represents a new generation of super-compact encoders, designed for highly-dynamic precision motion systems, bringing higher accuracy, speed and greater reliability to a wide variety of demanding industry sectors.

The readhead is complemented by the latest evolution of RGSZ20 gold tape scale, REXM ultra-high accuracy angle encoder and *FASTRACK*/RTLC scale system with bi-directional optical *IN-TRAC* reference marks, in addition to established RSLM stainless steel scale, RELM high-accuracy ZeroMet scale and RESM rotary rings.

For ultimate reliability and high dirt immunity, TONiC readheads incorporate third-generation filtering optics, tuned for even lower noise (jitter), further enhanced by dynamic signal processing including Auto Gain Control and Auto Offset Control. The result is low sub-divisional error (SDE) giving smoother velocity control for improved scanning performance and increased positional stability.

TONiC readheads also feature a detachable analog or digital interface in the form of a robust, convenient connector that can be located up to 10 m from the readhead. The interface offers digital interpolation to 1 nm resolution, with clocked outputs for optimized speed performance at all resolutions for industry-standard controllers.

- Compact readhead (35 × 13.5 x 10 mm)
- Compatible with RGSZ20 gold tape scale, *FASTRACK*/RTLC scale system RSLM, RELM, RESM, RESD and REXM with customer-selectable *IN-TRAC* auto-phase optical reference mark (datum)
- Third-generation filtering optics optimized for even lower noise (jitter)
- Dynamic signal processing inside the readhead, provides ultra-low cyclic error of ±30 nm
- Auto Gain Control ensures consistent signal strength for long-term reliability
- Increased ride height tolerance and patented set-up LED for ease of installation
- Maximum speed to 10 m/s (3.24 m/s at 0.1 µm resolution)
- Detachable analog or digital connector with integral interpolation to 1 nm resolution (0.00075 arc seconds)
- Integral dual limits (linear only)
- Operating temperature to 70 °C
- Dual resolution version available

System features

Reference mark

Form	*IN-TRAC* reference mark, directly in incremental track
	Refer to RGSZ, *FASTRACK*/RTLC, RELM, RSLM, RESM, RESD or REXM data sheets for reference mark location
	Bi-directionally repeatable across full speed and temperature range
	Electronically phased, requires no physical adjustment
Selection	**T1xx0:** Single reference mark selection by magnetic actuator (A-9653-0143), customer-positioned
	T1xx1 and **T2xx1:** No selector required, all reference marks output
Repeatability	Unit of resolution repeatability, over full operating temperature and speed

Dual limit switches (linear systems only, not available on TD interfaces)

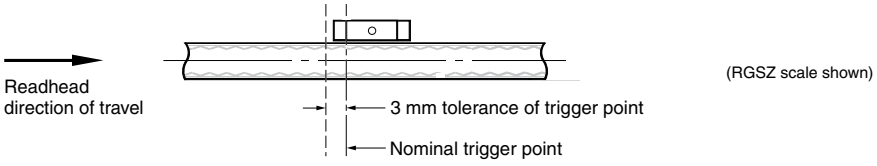
Form: Magnetic actuators for P and Q limit switches

10 mm P limit, North pole facing – A-9653-0138
10 mm Q limit, South pole facing – A-9653-0139
20 mm P limit, North pole facing – A-9653-0237
20 mm Q limit, South pole facing – A-9653-0238
50 mm P limit, North pole facing – A-9653-0235
50 mm Q limit, South pole facing – A-9653-0236

Typical P magnet Typical Q magnet

Trigger point: Leading edge of magnet from direction of travel

Trigger point tolerance



Mounting	Self-adhesive
Position	Customer-placed at desired locations
Repeatability	<0.1 mm

Dynamic signal processing

Real-time signal conditioning for optimized performance across a range of operating conditions

– Automatic Gain Control (AGC)

– Automatic Offset Control (AOC)

Ultra-low cyclic error of ±30 nm

Calibration

Simple calibration at the press of a button, no physical adjustment required

Optimization of incremental and reference mark signals

TD dual resolution interfaces

Allows output to be switched between two resolutions

NOTE: It is recommended that movement should be halted before switching resolutions

No limit outputs

TONiC DOP (dual output) encoder system

Renishaw's TONiC series encoders are now available with simultaneous dual output interfacing.

The robust DOP interface can be situated up to 10 m from the TONiC readhead and offers simultaneous analog and digital outputs with interpolation to 1 nm resolution. Digital outputs are clocked for optimized speed performance at all resolutions for industry-standard controllers.

The readhead is complemented by the latest evolution of RGSZ20 gold tape scale, REXM ultra-high accuracy angle encoder and *FASTRACK*/RTLC scale system with bi-directional optical *IN-TRAC* reference marks, in addition to established RSLM stainless steel scale, RELM high-accuracy ZeroMet scale and RESM rotary rings.

For ultimate reliability and high dirt immunity, TONiC readheads incorporate third-generation filtering optics, tuned for even lower noise (jitter), further enhanced by dynamic signal processing including Auto Gain Control and Auto Offset Control. The result is low sub-divisional error (SDE), giving smoother velocity control for improved scanning performance and increased positional stability.

- Compact readhead (35 × 13.5 × 10 mm)
- Detachable DOP interface with integral interpolation to 1 nm resolution (0.00075 arc seconds) and simultaneous digital and analog outputs
- Compatible with RGSZ20 gold tape scale, *FASTRACK*/RTLC scale system, RSLM, RELM, RESM, RESD and REXM with customer-selectable *IN-TRAC* auto-phase optical reference mark (datum)
- Third-generation filtering optics optimized for even lower noise (jitter)
- Dynamic signal processing inside the readhead provides ultra-low cyclic error of ±30 nm
- Auto Gain Control ensures consistent signal strength for long-term reliability
- Increased ride height tolerance and patented set-up LED for ease of installation
- Maximum speed to 10 m/s (3.24 m/s at 0.1 µm resolution)
- Integral dual limits (linear only)
- Operating temperature to 70 °C

System features

Reference mark

Form	*IN-TRAC* reference mark, directly in incremental track
	Refer to RGSZ, *FASTRACK*/RTLC, RELM, RSLM, RESM, RESD or REXM for reference mark location
	Bi-directionally repeatable across full speed and temperature range
	Electronically phased, requires no physical adjustment
Selection	**T1xx0:** Single reference mark selection by magnetic actuator (A-9653-0143), customer-positioned
	T1xx1 and **T2xx1:** No selector required, all reference marks output
Repeatability	Unit of resolution repeatability, over full operating temperature and speed

Dual limit switches (linear systems only)

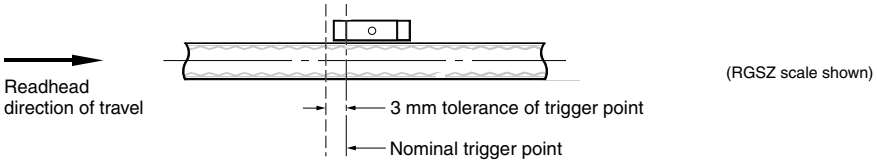
Form: Magnetic actuators for P and Q limit switches

10 mm P limit, North pole facing – A-9653-0138
10 mm Q limit, South pole facing – A-9653-0139
20 mm P limit, North pole facing – A-9653-0237
20 mm Q limit, South pole facing – A-9653-0238
50 mm P limit, North pole facing – A-9653-0235
50 mm Q limit, South pole facing – A-9653-0236

Typical P magnet Typical Q magnet

Trigger point: Leading edge of magnet from direction of travel

Trigger point tolerance



Mounting	Self-adhesive
Position	Customer-placed at desired locations
Repeatability	<0.1 mm

Dynamic signal processing

Real-time signal conditioning for optimized performance across a range of operating conditions

– Automatic Gain Control (AGC)

– Automatic Offset Control (AOC)

Ultra-low cyclic error of ±30 nm

Calibration

Simple calibration at the press of a button, no physical adjustment required

Optimization of incremental and reference mark signals

RGSZ20 gold scale

Renishaw's patented RGSZ20 20 µm gold scale features customer-selectable optical *IN-TRAC* reference marks. Uniquely these are directly embedded into the incremental channel to enable electronic auto-phasing simply by pressing a button.

RGSZ20 scale is suitable for use with the new TONiC encoder, featuring dynamic signal processing, ultra-low cyclic error (±30 nm) and resolutions to 1 nm.

The scale is supplied with a specially formulated adhesive backing tape. Installation is quick, easy and suits both high-volume production and one-off field service installations.

To simplify customer inventory and maximize production flexibility, the scale can be supplied on a reel for 'cut-to-suit' convenience at the point of installation.

RGSZ20 is suitable for mounting to most common engineering materials including metals, granites, ceramics and composites, whilst the RGSZ20-P polyester-coated version has an increased resilience to solvent and lubricant attack.

The scale ends are rigidly fixed to the axis substrate by means of epoxy-fastened end clamps, eliminating the need to drill holes. Because the scale has a very small cross section, it is 'mastered' to the substrate and matches its thermal expansion. Differential movement between the scale and the substrate is close to zero, even throughout significant temperature swings.

- *IN-TRAC* optical reference marks embedded directly into the incremental channel
- Compatible with the new TONiC encoder system
- 'Cut-to-length' flexibility
- Lengths from 100 mm to over 50 m
- Protective lacquer or tough polyester coating option for applications using harsh solvents
- Quick and easy one-person installation
- Affixes to most common engineering materials
- Self-adhesive
- Dual limits provide end-of-travel indication
- Linearity of ±3 µm/m; ±0.75 µm/60 mm
- RGSN20 version is supplied without *IN-TRAC* reference marks

Technical specifications

Scale

Type	**RGSZ20-S:** High-stability gold-plated steel tape with protective polymer coating. Fitted with a self-adhesive backing tape. **RGSZ20-T:** High-stability gold-plated steel tape with protective polymer coating. No self-adhesive backing tape. **RGSZ20-P:** High-stability gold-plated steel tape with tough polyester coating for use in applications requiring resistance to harsh solvents. Fitted with a self-adhesive backing tape. **RGSZ20-Q:** High-stability gold-plated steel tape with tough polyester coating for use in applications requiring resistance to harsh solvents. No self-adhesive backing tape. **NOTE: RGSN20** variants of all above scales are manufactured without reference marks.
Scale pitch	20 µm
Linearity	**RGSZ20-S** and **RGSZ20-T:** ±3 µm/m; ±0.75 µm/60 mm **RGSZ20-P** and **RGSZ20-Q:** ±5 µm/m; ±1.5 µm/60 mm
Scale length	100 mm to 50 m in 50 mm increments (>50 m by special order)
Substrate materials	Metals, ceramics and composites with expansion coefficients between 0 and 23 µm/m/°C (e.g. steel, aluminum, ZeroMet, granite, ceramic etc.)
Expansion coefficient	Matches that of substrate material with scale ends fixed by epoxy-mounted end clamps
End fixing	Epoxy-mounted end clamps (A-9523-4015) Approved epoxy adhesive (A-9531-0342) Performance <1 µm movement over temperature range -20 °C to 50 °C
Operating specification	Temperature: -10 to 120 °C (Scale only, also refer to readhead data sheet) Minimum installation temperature: 10 °C Humidity: 80% maximum RH (non-condensing)

Reference mark

Type	*IN-TRAC* reference mark, directly embedded into incremental track 50 mm (nominal) spacing Bi-directional position repeatability
Selection	Single reference mark selection by magnetic actuator (A-9653-0143), customer-positioned
Repeatability	Unit of resolution repeatability (bi-directional) across full system-rated speed and temperature ranges

Limit switches

Type	Magnetic actuators; with dimple triggers Q limit, without dimple triggers P limit
Trigger point	The limit output is nominally asserted when the readhead limit switch sensor passes the limit magnet leading edge, but can trigger up to 3 mm before that edge
Mounting	Customer-placed at desired locations
Repeatability	<0.1 mm

RELM linear ZeroMet scale

RELM high-accuracy scale is compatible with Renishaw's new TONiC encoder system and established SiGNUM range of high-performance encoders, featuring the *IN-TRAC* auto-phase optical reference mark.

RELM offers the highest accuracy of any 20 µm pitch encoder system available today, combined with low thermal expansion ZeroMet to suit the most demanding precision applications. The high performance of the scale is backed up by Renishaw's TONiC and SiGNUM SR and Si encoder systems, offering ±30 nm cyclic error and digital resolution to 1 nm.

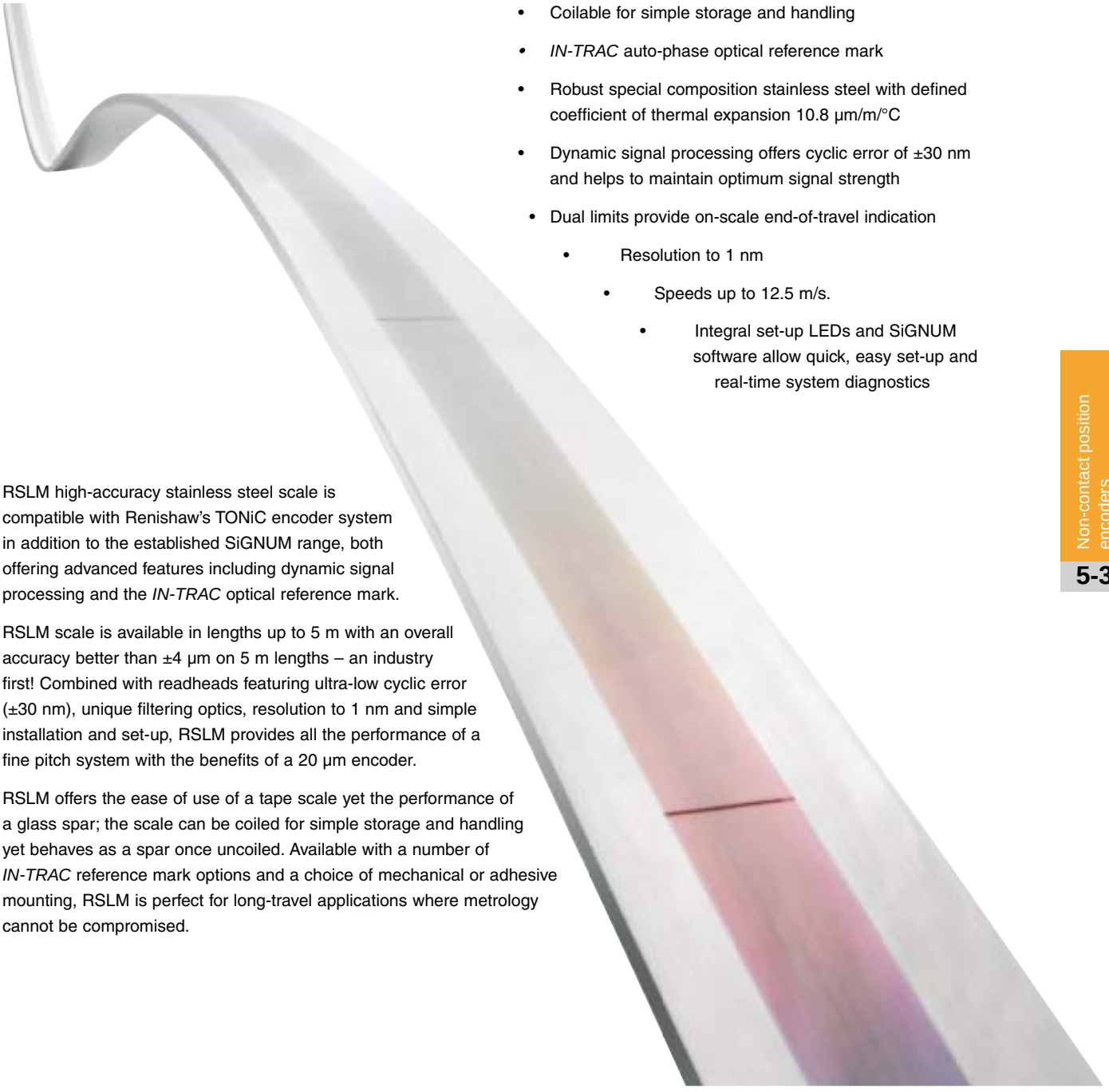
RELM offers dirt immunity and ease of set-up, whilst offering levels of performance previously only available from delicate fine pitch systems.

RELM is easy to design into most applications, due to the flexible mounting methods, integral set-up LEDs and optional SiGNUM software.

System features

- *IN-TRAC* bi-directional auto-phase optical reference mark.
- High accuracy, certified to ±1 µm, calibrated against International Standards.
- Dynamic signal processing offers cyclic error of ±30 nm and helps to maintain optimum signal strength.
- Resolution to 1 nm.
- Robust ZeroMet offers ~0.6 µm/m/°C (0 °C to 30 °C) thermal expansion plus ease of handling and installation.
- Dual limits provide on-scale end-of-travel indication.
- Speeds up to 12.5 m/s.
- Integral set-up indicator LEDs and SiGNUM software allow quick, easy set-up and real-time system diagnostics.
- Scale mounting with self-adhesive or clips and clamps.

RSLM linear stainless steel scale



System features

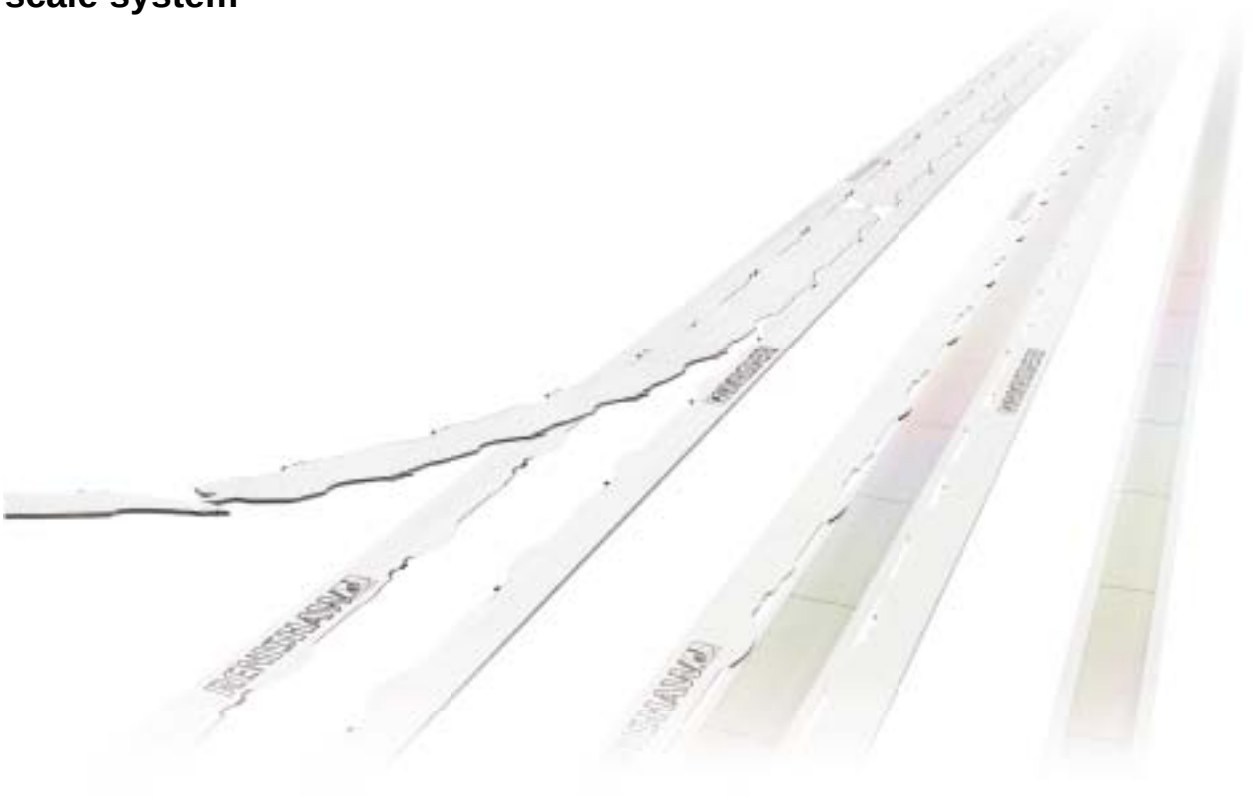
- Total accuracy of ±4 µm over 5 m
- Available in defined lengths up to 5 m
- Coilable for simple storage and handling
- *IN-TRAC* auto-phase optical reference mark
- Robust special composition stainless steel with defined coefficient of thermal expansion 10.8 µm/m/°C
- Dynamic signal processing offers cyclic error of ±30 nm and helps to maintain optimum signal strength
- Dual limits provide on-scale end-of-travel indication
- Resolution to 1 nm
- Speeds up to 12.5 m/s.
- Integral set-up LEDs and SiGNUM software allow quick, easy set-up and real-time system diagnostics

RSLM high-accuracy stainless steel scale is compatible with Renishaw's TONiC encoder system in addition to the established SiGNUM range, both offering advanced features including dynamic signal processing and the *IN-TRAC* optical reference mark.

RSLM scale is available in lengths up to 5 m with an overall accuracy better than ±4 µm on 5 m lengths – an industry first! Combined with readheads featuring ultra-low cyclic error (±30 nm), unique filtering optics, resolution to 1 nm and simple installation and set-up, RSLM provides all the performance of a fine pitch system with the benefits of a 20 µm encoder.

RSLM offers the ease of use of a tape scale yet the performance of a glass spar; the scale can be coiled for simple storage and handling yet behaves as a spar once uncoiled. Available with a number of *IN-TRAC* reference mark options and a choice of mechanical or adhesive mounting, RSLM is perfect for long-travel applications where metrology cannot be compromised.

FASTRACK and RTLC-S high-accuracy incremental linear encoder scale system



FASTRACK is a revolutionary track-mounted linear encoder scale system from Renishaw that combines ±5 µm/m accuracy, with the ruggedness of stainless steel, and the quick and easy installation of a carrier-type encoder system.

Designed for applications that demand high-accuracy and easily removable scale, the *FASTRACK* scale system consists of two miniature, yet rugged, guide rails. These securely retain Renishaw's new low-profile scales and allow them to freely expand at their own thermal expansion coefficient with almost zero hysteresis.

If damaged, the scale can be pulled out of the guide rails and quickly replaced, even where access is limited, thus reducing machine downtime. This feature also makes the new linear encoder system ideal for large machines that need to be sectioned for transportation.

Forming part of a modular solution, *FASTRACK* can be used with either Renishaw's RTLC incremental scale and super-compact TONiC readhead, or the new RESOLUTE linear absolute encoder and RTLA absolute scale. In both cases, the encoders feature advanced optoelectronics conferring resolutions to 1 nm, low sub-divisional error (SDE) and very low jitter for smoother velocity control and rock-solid positional stability.

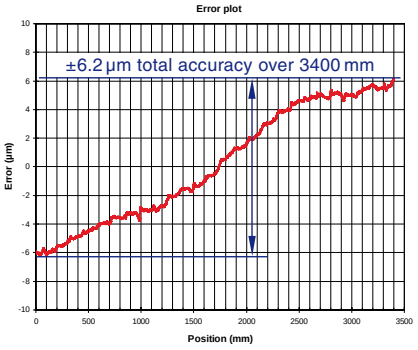
The *FASTRACK* linear encoder scale system is suitable for many applications, such as FPD manufacturing machines, linear motors with aluminum substrates, P-V manufacturing, axes that are exposed to potential damage, large CMMs and other machines that require the scale to be installed/removed for transit, or simply for any application where thermal expansion of the scale must be independent of the machine structure.

- High-accuracy (±5 µm/m) RTLC and RTLA scale. Further improvement possible with error correction
- Incremental and absolute versions
- Compatible with TONiC and RESOLUTE readheads
- RTLC/RTLA scale expands at its own low thermal coefficient (α = 10.6 µm/m/°C)
- Very low hysteresis between scale and *FASTRACK*
- *FASTRACK* guide rails are pre-aligned in reels for cut-to-suit flexibility
- Quick installation and fast scale replacement, even with limited access
- Scale can be locked to the substrate at a single datum point anywhere along the axis
- RTLC/RTLA scale can bridge gaps in the substrate up to 25 mm
- High solvent immunity

RTLC-S and RTLA-S self-adhesive versions

RTLC and RTLA scales are also available with self-adhesive backing for use without *FASTRACK*, in lengths up to 5 m for applications requiring high accuracy with a narrower overall scale installation. These scales, known as RTLC-S and RTLA-S, also benefit from defined, independent thermal expansion coefficient.

System features



Example accuracy test result of 3400 mm length of RTLC scale

High-accuracy RTLC and RTLA scale

- Incremental and absolute versions
- ±5 µm/m accuracy@20 °C, including slope and linearity. Further improvement possible with error correction
- Hardened stainless steel construction is rugged and reliable, with high scratch and solvent resistance
- Independent expansion coefficient (α = 10.6 µm/m/°C)
- Very low hysteresis: sub-micron on a center-clamped 2 m axis over the entire operating temperature range, for example
- 20 µm incremental or 30 µm absolute graduations
- Incremental version features optical *IN-TRAC* reference marks every 200 mm (on scale lengths over 1 m) or every 50 mm (on scale lengths 1 m or less); identify one or more using the reference mark selector magnet(s)
- Scale can be cut to length using a guillotine, for easy customization

RTLC version is compatible with TONiC readheads

- Filtering optics and Auto Gain Control for high reliability and solid Lissajous signals
- Dynamic signal processing ensures ultra-low SDE of just ±30 nm. Result: smoother scanning performance
- High signal-to-noise ratio provides ultra-low jitter (to 0.5 nm RMS) for optimum positional stability
- CAL button enables auto-phasing of *IN-TRAC* reference mark
- Analog outputs or digital resolutions to 1 nm and maximum speed to 10 m/s
- Clocked outputs ensure optimized speed performance for all resolutions, for a wide variety of industry-standard controllers
- DOP Dual output interfaces available to provide simultaneous analog and digital outputs

Compatible with RESOLUTE readheads

- True absolute optical encoder: absolute position is determined immediately upon switch-on, eliminating reference returns
- Unique single track 30 µm pitch optical scale combines absolute position and incremental phase information into one code
- Resolution to 1 nm
- Low Sub-Divisional Error (SDE = ±40 nm) and low jitter (to 7 nm RMS) for smoother velocity control and rock-solid positional stability
- 100 m/s maximum speed for all resolutions!
- Wide set-up tolerances: ±150 µm ride height, ±0.5° yaw, pitch and roll

RESM angle encoder scale

The RESM is a one-piece stainless steel ring with 20 µm scale marked directly onto the periphery, featuring the *IN-TRAC* auto-phase optical reference mark.

The RESM offers impressive accuracy with resolution to 0.00075 arc second, suiting the most demanding precision applications.

Read by Renishaw's new TONiC and established SiGNUM encoder systems, it has high tolerance to dirt, scratches and greasy fingerprints that can cause other encoder systems to miscount.

The low profile RESM, with large internal diameter, is easy to design into most installations. Equally important, its low mass, low inertia design does not compromise system performance. Available in a wide range of sizes and line counts, providing compatibility with industry-standard controllers.

System features

- Compatible with the new TONiC encoder range and the established SiGNUM system to offer industry-standard analog or digital incremental outputs
- *IN-TRAC* bi-directional optical reference mark
- High-speed operation, up to 4,591 rev/min (12.5 m/s)
- Graduation accuracy to ±0.5 arc second (550 mm ring)
- Low-noise analog 1 Vpp version
- New high-resolution, 2 nm and 1 nm digital versions (TONiC only)
- Angular resolution to 0.00075 arc second
- System repeatability to 0.00225 arc second
- Patented taper mount simplifies integration and minimizes installation errors
- Large internal diameter for ease of integration
- Available in sizes from Ø52 mm to Ø550 mm with line counts from 8,192 to 86,400
- Custom sizes also available
- Low mass and low inertia
- Ultra-low inertia versions also available
- Integral set-up LED on readhead for quick set-up and instant 'health check' at any time
- Dual limits (SiGNUM only)

RESD distance-coded scale

The RESD is a one-piece stainless steel ring with 20 µm scale marked directly onto the periphery, featuring distance-coded *IN-TRAC* auto-phase optical reference marks.

Distance-coded reference marks are spaced at defined unique intervals, allowing a controller to calculate absolute position with only a small movement of the axis.The RESD offers impressive accuracy with resolution to 0.001 arc second, suiting the most demanding precision applications.

Read by Renishaw's TONiC encoder system, it has high tolerance to dirt, scratches and greasy fingerprints that can cause other encoder systems to miscount.

The low profile RESD, with large internal diameter, is easy to design into most installations. Equally important, its low mass, low inertia design does not compromise system performance. RESD is available in a range of sizes and line counts, providing compatibility with industry standard controllers.

System features

- Compatible with the TONiC T20x1 encoder system offering industry-standard analog or digital incremental outputs
- Distance code *IN-TRAC* bi-directional optical reference marks allow absolute position to be calculated after a small movement
- High-speed operation, up to 3,672 rev/min (10 m/s)
- Graduation accuracy to ±0.99 arc second (209 mm ring)
- New high-resolution, 2 nm and 1 nm digital versions
- Angular resolution to 0.002 arc second
- System repeatability to 0.003 arc second
- Patented taper mount simplifies integration and minimizes installation errors
- Large internal diameter enables easy design-in
- Available in sizes from Ø52 mm to Ø209 mm with line counts from 8,192 to 32,768
- Custom sizes and very large diameters also available
- Low mass and low inertia
- Integral set-up LED on readhead for quick set-up and instant 'health check' at any time
- True absolute encoders also available from Renishaw. Please contact your local representative for details.

REXM/REXT ultra-high accuracy angle encoder

With zero coupling losses and exceptional repeatability, the REXM/REXT ultra-high accuracy angle encoder achieves better than ±1 arc second total installed accuracy.

Like the RESM encoder, the REXM/REXT is a stainless steel ring with the scale graduations marked axially onto the periphery, but with a number of differences to improve upon RESM's already impressive accuracy.

REXM/REXT has a thicker cross section, to ensure that the only significant installation error is eccentricity. Eccentricity is easily removed using two readheads, either with Renishaw's **DSi** (Dual Signal interface), or by combining the signals inside the host controller. The only errors remaining are graduation errors and readhead SDE, both of which are so small they are often negligible.

As a non-contact encoder, REXM/REXT offers dynamic performance advantages, eliminating coupling losses, oscillation, shaft torsion and other hysteresis errors that plague enclosed encoders.

Combining two readheads is easy with the **DSi**, which also offers an angularly repeatable reference position (*propoZ*™) which is unaffected by bearing wander or power cycling.

The REXM/REXT system operates at temperatures up to +85 °C (SiGNUM) and speeds to 4500 rev/min.

REXM/REXT total installed accuracy grades:

REXM/REXT diameter	Total installed accuracy
⩾100 mm	±1 arc second
75 mm	±1.5 arc second
⩽57 mm	±2 arc second

Designed for axes that are limited to partial rotation, REXT rings have two reference marks, oriented diametrically opposed, for use with partial arc versions of DSi. DSi processes these reference marks to give a single, angularly-repeatable *propoZ* reference output.

- Use with two SiGNUM or TONiC encoders, combined with **DSi** to give ultra-high accuracy
- Installed accuracy to ±1 arc second with dual readheads
- Sub-divisional error to ±0.03 arc second
- Resolutions to 0.001 arc second
- Repeatability to 0.003 arc second
- Wide range of standard sizes from 52 mm to 417 mm
- Large internal diameter for ease of integration
- Flange-mounted with easy 4-point adjustment method
- Angularly repeatable *propoZ* reference position is unaffected by bearing wander or power cycling

Optical encoder accessories and custom solutions

Scale applicator kits and applicators ensure the easiest, most precise installation for all readhead types.

Magnetic reference mark actuators are required to produce a repeatable home position for all RG2/4 readheads. Limit switch actuators (end-of-travel output) are available in various lengths and types.

Various end clamps for RGS scale.

The RGH22 ribbon cable variant features an integral connector for standard ribbon cable.

3 axis digital readout for resolutions to 0.1 µm and maximum input frequency of 10 MHz.

The magnetic track system is designed for use with longer axes on which the scale requires occasional re-installation. Standard RGS scale is held magnetically in an aluminum extrusion.

Assembled extension cables, bulk cable and connectors to suit all system combinations.

Very long axes present some unique challenges, often requiring a method of maintaining readhead installation tolerance or the ability to read across gaps in the scale. The sprung wheeled guide and dual readhead interface offer practical solutions.

Swipe blocks enable a functional test of readheads without having to install a complete axis.

Not all application needs can be met with standard products. Often a custom solution is necessary, so talk to us about your requirements; anything from a special connector to a purpose designed angle encoder ring.

To provide complete solutions for optical linear and angle encoders a full range of accessories is available, from reference mark actuators to digital readouts. Renishaw is committed to providing position feedback solutions to satisfy customer specific requirements, such as custom angle encoder diameters and cross sections. Please contact Renishaw for further information on how we can meet your specific requirements.

Magnetic encoder overview

OnAxis™ encoder ICs

AM4096, AM256, AM512B, AM8192B and AM8192B1

OnAxis encoder modules

RMB20, RMB28, RMB30 and RMF44

Rotary encoders

RM22, RM36, RM44, RE22, RE36 and RE58

Linear encoders

LM10, LM15 and magnetic scales MS

Ring encoders

LM13 and rings

Accessories

Magnets, magnet actuators, reference marks and USB interfaces

Rotary magnetic encoders

Based on the proven OnAxis Hall sensor technology, a range of incremental and absolute encoder solutions are produced for use in harsh environments. There are many housing options available for use in a wide range of applications including automotive, industrial, medical and marine. Custom designs can also be offered where needed to match specific design requirements.

OnAxis – The IC senses the angular position of a permanent magnet placed above it. The sine and cosine signals produced are then converted to absolute angle position data with a fast flash interpolator.

The sensor chip can be used directly on a circuit board or packaged into a protective housing.

The ability of the encoder to operate with a gap between the magnetic actuator and the encoder chip allows its incorporation into designs that need isolation of the moving elements.

Standard interface flanges with bearing/shafts can be provided for easy integration to existing designs.

Why rotary magnetic?

- Resolutions to 13 bit (8,192 cpr)
- High-speed operation to 60,000 rpm
- Non-contact, frictionless design
- Excellent dirt immunity to IP68
- Operational temperature from -40 °C to +125 °C
- Industry standard absolute, incremental and analog output formats
- Accuracy to ±0.2°
- Simple installation – with self-locating design

Optional 58 mm mounting flanges

RM08 / RE08 incremental and SSI encoder

RM08

RE08

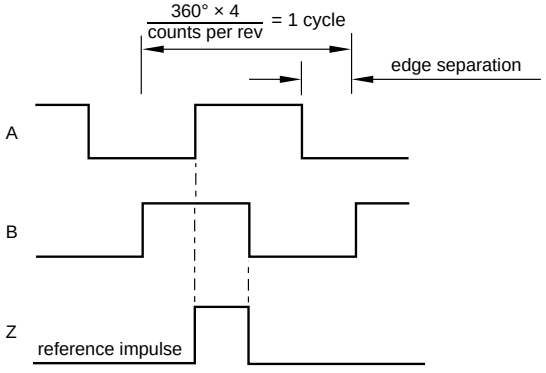
Features

- Super-small size 8 mm encoder
- 5V power supply version
- Non-contact
- High-speed operation to 60,000 rpm
- Protection grade IP68
- Incremental resolution up to 4096 cpr
- SSI output up to 12 bit
- Accuracy to ±0.3°
- RoHS compliant (lead free)
- For limited space application

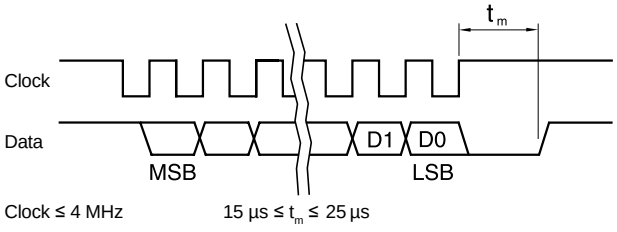
Technical specifications

Power supply	V_{dd} = 5 V ±5%	
Power consumption	26 mA typical	
Incremental output	Resolution up to 4096 cpr	
	Signals: A, B, Z	
SSI output	Resolution up to 12 bit	
	Signals: Serial data, Clock	
Temperature	Operating	-40 °C to +80 °C
	Storage	-40 °C to +125 °C

Timing diagram for incremental outputs

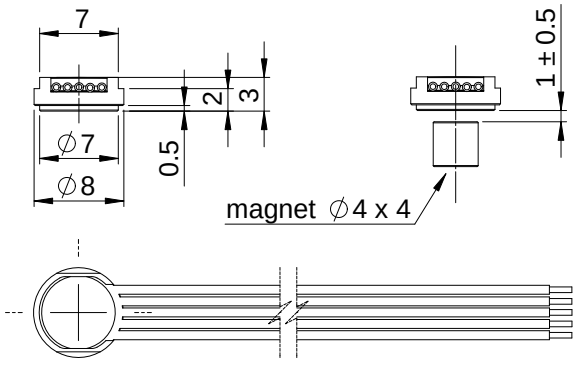


Timing diagram for SSI

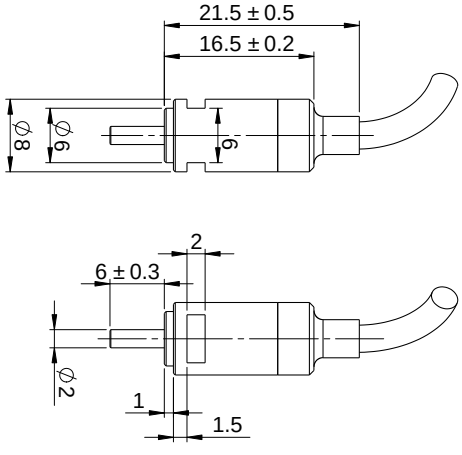


RM08 / RE08 dimensions

RM08



RE08



Dimensions and tolerances in mm

NEW! Wrap-up incremental rotary encoder for large diameters

Features

- For external diameter installation
- Full circle measurement
- Spring-supported magnetized scale with built-in tensioning mechanism
- Substrate thermal expansion compensation
- Excellent dirt and moisture immunity
- Wrap-around diameter from 250 mm to 1,500 mm
- Large diameter tolerance ±0.5 mm
- Resolution to 0.1 arc sec at 1 m diameter
- Maximum rotational speed 560 rpm at 1 m diameter
- Accuracy ±0.01° (±36 arc sec) at 1 m diameter
- Wide temperature range from -20 °C to +85 °C
- Single, periodic or distance coded reference mark
- Compatible with LM10, LM13 and LM15 readheads

Applications

Wind turbine

Radio telescope

Medical scanning

Robots on assembly line

Technical specifications

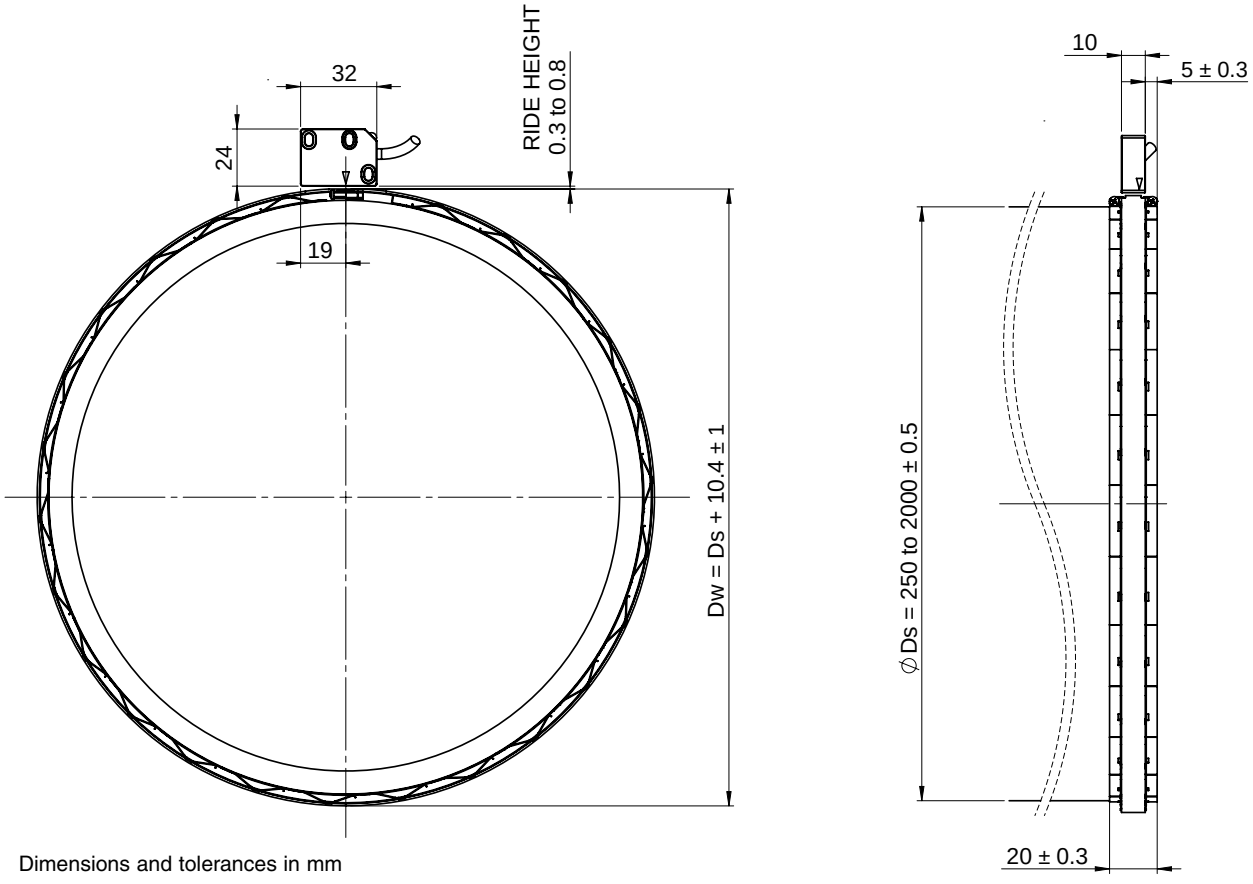
Readhead type	LM10, LM13	LM15
Acceptable substrate diameter	250 mm – 1500 mm	
Number of poles N (approx)	N = Dw × π / 2 *	N = Dw × π / 5 *
Resolution (max)	cpr = 2000 × N	
Measuring tape accuracy**	±40 µm/m	
Hysteresis	< 3 µm at 0.5 mm ride height	< 15 µm at 2 mm ride height
Reference mark	Single, periodic, or distance coded***	
Maximum permissible speed (mechanical limit)	rpm = 1800 / (pi × Dw / 1000)	
Operating temperature	from -20 °C to +85 °C	
Storage temperature	from -40 °C to +85 °C	

* Dw is outside diameter of assembled tape in mm (see drawing below)

** Accuracy does not include influence of eccentricity and/or circularity of substrate

*** Basic increment of distance coded reference depends on selected diameter

Wrap-up dimensions



Dimensions and tolerances in mm

NEW! AksIM™ off-axis absolute rotary encoder

Features

- True absolute
- Single track
- Resolution to 18 bits
- No hysteresis
- Non-contact
- High speed
- Low profile
- Custom ASIC-based magnetic sensor
- Built-in self-monitoring
- Integrated status LED
- CAN, SSI, SPI, I²C, PWM or analog communication interface
- Corrosion-resistant magnetic ring
- Protection degree IP67

Applications

Robotic arm joints

Pan/tilt positioning

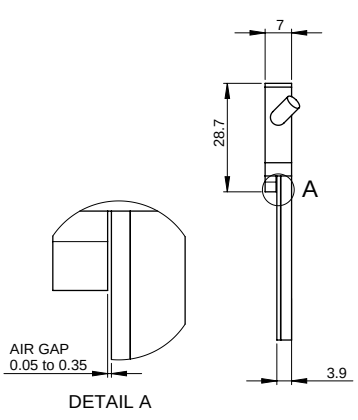
Precise gearbox

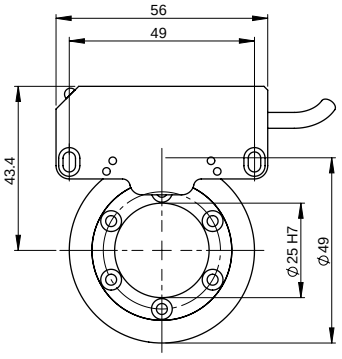
Technical specifications

System data	**Ring sizes**	Type 7 – 49 mm outer diameter, 25 mm inner diameter, holes on the inside	
		Type 8 – 80 mm outer diameter, 55 mm inner diameter, holes on the inside	
	Maximum speed	> 10,000 rpm	
	System accuracy	±15 mdeg (±54 arcsec)	
	Hysteresis	0 µm	
Electrical data	**Supply voltage**	5 V ±10%, other voltages on request	
	Current draw	Max. 150 mA	
Mechanical data	**Materials**	Ring	Stainless steel based ring (AISI 416)
		Readhead	Aluminum
	Ride height	0.05 mm – 0.30 mm	
Environmental data	**Operating temperature**	-40 °C to +85 °C (-40 °F to +185 °F)	
	Protection	IP67	

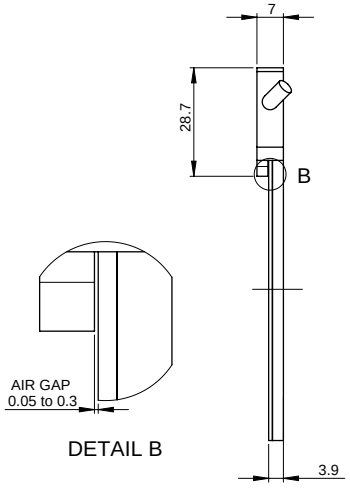
Dimensions

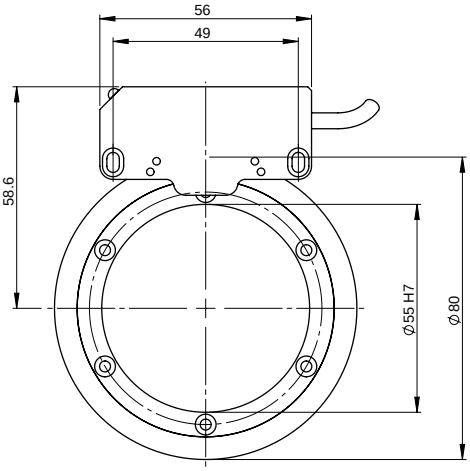
Ring type 7





Ring type 8





Dimensions and tolerances in mm

Linear magnetic encoders

The linear encoder range is based on the magnetoresistive sensing principle. The readhead detects the magnetic signature of the magnetized scale as it moves over it. The analog signals are then processed to produce a range of digital resolutions to 1 µm. The system is suitable for linear and partial arc applications.

Sine and cosine signals are produced as the sensor moves along the scale. These analog signals can then be interpolated internally to produce a range of resolutions to 1 µm.

The system is easy to install with a set-up LED on the readhead and an applicator tool for the tape scale.

A stick-on reference mark can be easily installed at the required position using the provided tool. Alternatively, the reference mark can be ordered at a set position within the scale.

The scale can be supplied on a reel or cut to a specific length. A stainless steel cover strip can be provided to protect the scale.

Why linear magnetic?

- Selectable resolutions from 250 µm to 1 µm
- High-speed operation
- Excellent dirt immunity to IP68
- Stick-on reference mark
- Integral set-up LED
- Axis lengths of up to 100 m
- Industry standard digital and analog output options

NEW! LMA10 absolute linear magnetic encoder system

Features

- True absolute system
- Suitable for high bandwith control loops
- System accuracy ±40 µm/m
- Resolutions to 0.244 µm
- Lengths up to 16.2 m
- Speeds up to 7 m/s at 0.977 µm resolution
- Integral status LED
- BiSS-C unidirectional communication protocol
- Simple and fast installation
- Excellent degree of protection to IP68
- Double-shielded, drag-chain compatible cable
- For limited space application
- Built-in diagnostic system
  - Error output if position data is not valid
  - Warning output if operation is close to limits

Applications

SMT pick and place

Printing technology

Machine tools

Assembly lines

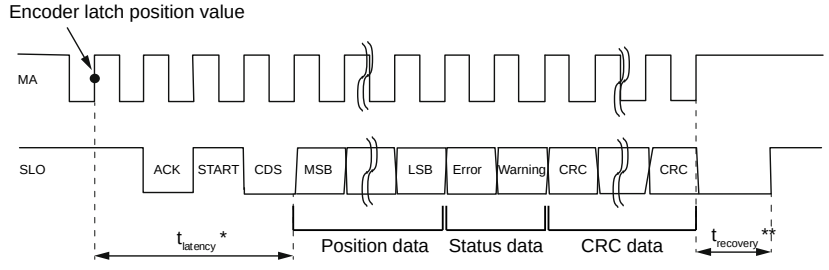
Medical

Technical specifications

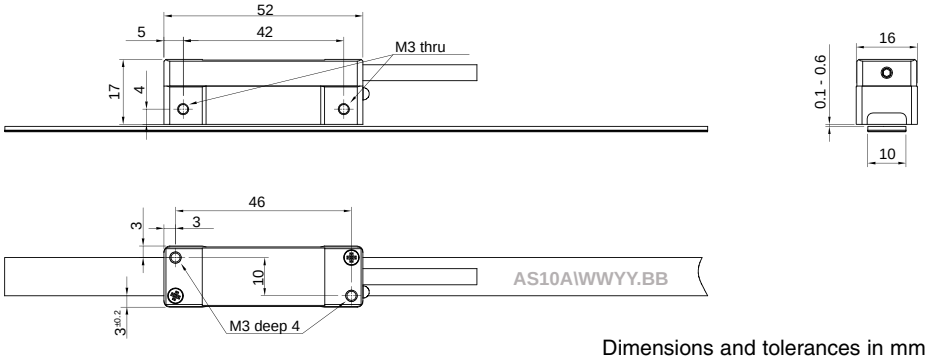
System data				
Incremental pole length	2 mm			
Maximum scale length	16.2 m			
System accuracy	±40 µm/m			
Short range accuracy	< ±10 µm/10 mm			
Hysteresis	< 1 µm (at 0.1 mm ride height)			
Unidirectional repeatability	Unit of resolution			
Available resolutions	0.244 µm	0.488 µm	0.976 µm	1.953 µm
Maximum traverse velocity	1.75 m/s	3.5 m/s	7 m/s	14 m/s
Maximum velocity during power on	0.5 m/s			
Electrical data				
Power supply	5 V ±5%			
Set-up time after switch-on	< 50 ms			
Power consumption (without any load)	< 250 mA			
Mechanical data				
Mass	Readhead (with 1 m cable, no connector) 41 g, magnetic scale 60 g/m			
Cable	PUR high-flexibility cable, drag-chain compatible, double-shielded 8 × 0.05 mm²; durability: 20 million cycles at 20 mm dynamic bend radius			

Environmental data		
Temperature	Operating	0 °C to +55 °C
	Storage	-20 °C to +85 °C
Vibration (55 Hz to 2000 Hz)	300 m/s² (IEC 60068-2-6)	
Shock (11 ms)	300 m/s² (IEC 60068-2-27)	
Humidity	100% (condensation permitted)	
EMC immunity	IEC 61000-6-2 (particularly: ESD: IEC 61000-4-2; EM fields: IEC 61000-4-3; Burst: IEC 61000-4-4; Surge: IEC 61000-4-5; Conducted disturbances: IEC 61000-4-6; Power frequency magnetics fields: IEC 61000-4-8; Pulse magnetic fields: IEC 61000-4-9)	
EMC emission	IEC 61000-6-4 (for industrial, scientific and medical equipment: IEC 55011)	
Environmental sealing	IP68 (according to IEC 60529)	
Communication protocol – BiSS-C unidirectional		
Type of interface	BiSS-C unidirectional (point to point)	
Signal level	RS422	
Maximum MA frequency	5 MHz	
Length of position data	26 bit	
Length of status data	2 bit (Error 1 bit; Warning 1 bit)	
Length of CRC	6 bits, MSB first, transmitted inverted. Generator polynomial: $x^6 + x + 1$	
Position data encoding	Pure binary	
Latency time *	< 1 µs at 5 MHz MA frequency	
Recovery time **	< 5 µs	

Timing diagram



LMA dimensions

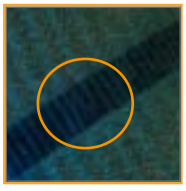


Dimensions and tolerances in mm

Magnetic ring encoders

The ring encoder system consists of a compact readhead and a magnetized ring. As the ring rotates, the readhead detects the magnetic signature of the ring and processes these signals to the required output.

The LM13 features a compact sealed readhead that rides at up to 1.5 mm from the ring's surface. Simple to install, the LM13 features an integral set-up LED.



Integral bidirectional reference mark.

We offer a range of standard ring sizes for easy system integration.

Why magnetic ring?

- Resolutions from 1,280 to 327,680 cpr
- High-speed operation to 25,000 rpm
- Excellent dirt immunity to IP68
- Integral set-up LED
- Industry standard digital output options

RoLin component level magnetic encoder

RoLin is a component level encoder consisting of an RLM readhead and MS magnetic scale or MR ring. It has been designed for embedded motion control applications as a position control loop feedback element.

Dimensions: 12 × 5 × 11 mm
Mass: 1.4 g (without flex)

The position information is output in incremental quadrature format with the option of a periodic reference mark (every pole) or a unique reference mark.

A wide range of resolutions is available: for linear applications from 0.244 µm, for ring applications up to 753,664 cpr. The maximum traverse velocity depends on the chosen resolution and minimum edge sepraration time, to 4 m/s at 1 µm and to 40 m/s at 10 µm.

Pin / flex options available.

NEW! RLB incremental encoder module

Features

- Miniature dimensions
- For rotary and linear measurement
- Incremental quadrature TTL output signals A, B, Z
- Periodic, bidirectional reference
- Accuracy to ±40 µm
- Resolution from 0.244 µm for linear
- Speed up to 4.16 m/s at 1 µm resolution and 0.12 µs edge separation
- Zif flat flex connection
- RoHS compliant

Applications

Medical

Printing technology

Security cameras

Robots on assembly line

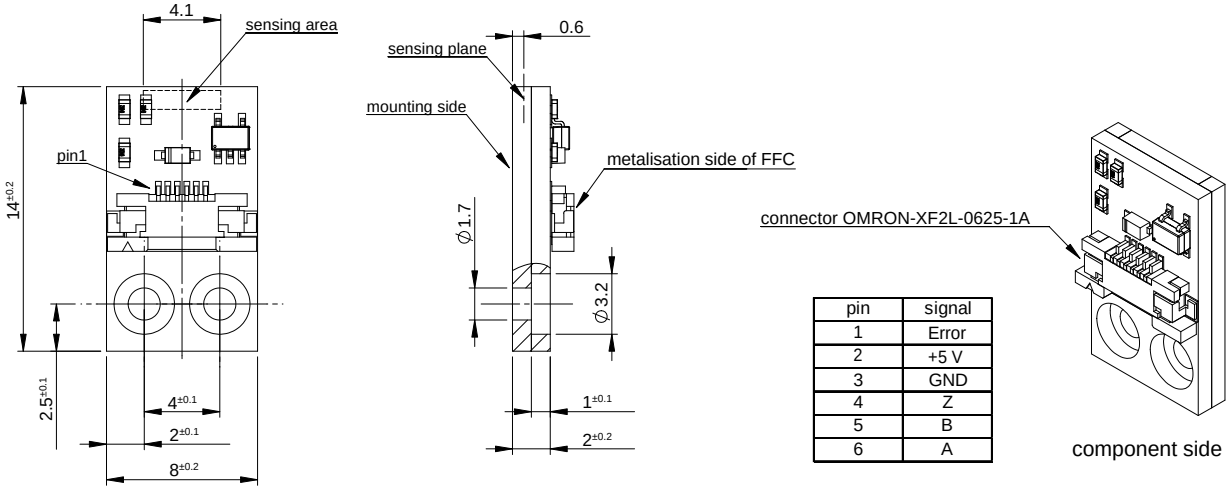
UAV

Technical specifications

System data	Incremental pole length	2 mm	
	Hysteresis	< 3 µm (at 0.2 mm ride height)	
	Unidirectional repeatability	< 2 µm	
Electrical data	Power supply	5 V ±0.25 V	
	Saturation voltage hi (I = -4 mA)	Vdd – 0.4 V	
	Saturation voltage lo (I = 4 mA)	0.4 V	
	Power consumption (without any load)	< 25 mA	
	Rise and fall time (CL = 50 pF)	60 ns	
Mechanical data	Weight of module	0.5 g	
Environmental data	Temperature	Operating	-20 °C to +85 °C
		Storage	-40 °C to +85 °C
	Vibrations (55 Hz to 2000 Hz)	300 m/s² (IEC 60068-2-6)	
	Shocks (11 ms)	300 m/s² (IEC 60068-2-27)	

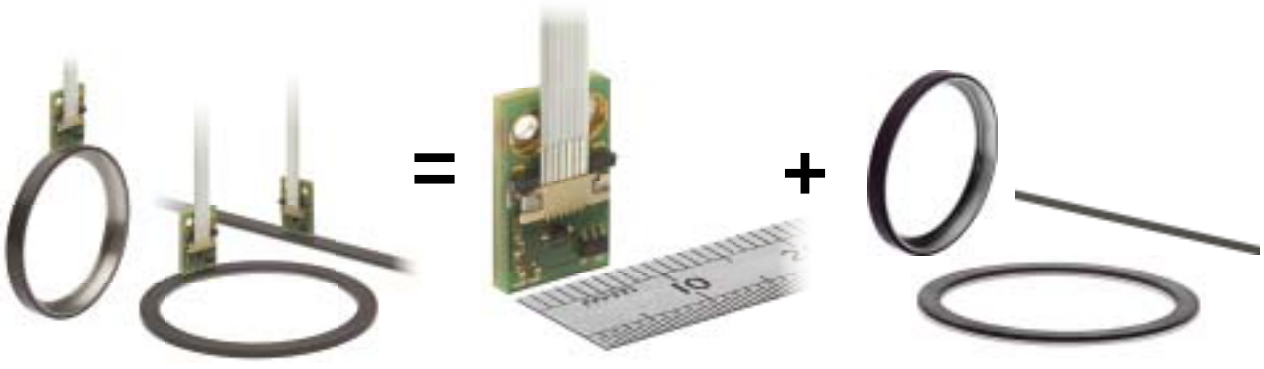
Available resolutions	Maximum traverse velocity
0.244 µm	1.01 m/s
0.488 µm	2.02 m/s
1 µm	4.16 m/s
2 µm	8.32 m/s
5 µm	20.80 m/s
10 µm	40 m/s
20 µm	40 m/s
50 µm	26 m/s

Dimensions



pin	signal
1	Error
2	+5 V
3	GND
4	Z
5	B
6	A

System configuration



RLB system = **RLB readhead** + **Magnetic scale / ring**

Interferometric feedback solutions

The RLE system is a unique, advanced homodyne laser interferometer system, specifically designed for position feedback applications.

Simple system architecture reduces hardware requirements to an RLU laser unit, one or two RLD10 detector heads and measurement optics.

Optical configurations within the range of RLD10 detector heads enable linear, planar (X-Y) and differential measurements to be performed.

The fully compatible range of user selectable system components enables a unique configuration to match a specific application, and provides sub-nanometer resolution capability at velocities to 2 m/s for axis lengths up to 4 m.

The RLU laser unit, containing the HeNe laser tube, the majority of system electronics and the fiber optic launch mechanism, forms the heart of the RLE system.

Fiber optic launch capability allows the laser unit to be mounted remotely from the measurement axis, thereby eliminating a potential heat source without increasing the demands on alignment stability.

Two models of RLU are available – RLU10 and RLU20. Each model is available in either single or dual axis configuration, with the main difference between the two models being the frequency stability specification: ±50 ppb (parts per billion) over one hour for the RLU10 and ±2 ppb over one hour for the RLU20. The choice of RLU laser unit determines the designation of the complete system: a system incorporating an RLU10 laser unit is referred to as an RLE10, a system incorporating an RLU20 laser unit is referred to as an RLE20 system.

Position output signals from the RLU are directly available in differential digital RS422 format and/or 1 Vpp analog sine/cosine formats. From the digital output, resolutions to 10 nm are available. The signal period for the analog output is 158 nm when using a double pass plane mirror or differential interferometer, and 316 nm for a single pass retroreflector based system. Optionally, an REE interpolator or RPI20 parallel interface can be used in combination with the analog output to provide resolutions to 0.39 nanometers or 38.6 picometers respectively.

RLE10 laser system

RLU10 laser user

X-Y stage application – Anorad – Rockwell Automation

RLE laser interferometer systems

RLD detector units

Most RLD10 detector units contain the fringe detection scheme, interferometer optic and integrated laser beam steerer(s). Six different RLD detector heads are available based on four variants.

- **Single pass interferometer** – Uses an external retroreflector target optic for linear applications with axis lengths up to 4 m. Available with 0° or 90° beam launch orientation. 316 nm signal period enables resolutions to 20 nm, or 77.2 picometers when used with the optional RPI20 parallel interface.
- **Double pass interferometer** – Requires an external plane mirror target optic for X-Y applications with axis lengths up to 1 m. Available with 0° or 90° beam launch orientation. 158 nm signal period enables resolutions to 10 nm, or 38.6 picometers when used with the optional RPI20 parallel interface.
- **No internal interferometer** – The absence of interferometer optics within this head enables the RLE system to be configured with external optics that allow linear, angle and straightness measurements to be made. 0° beam launch orientation only.
- **Double pass differential interferometer (column reference)** – Requires external plane mirror targets for both reference and measurement arms for X-Y applications with axis lengths to 1 m. 158 nm signal period enables resolutions to 10 nm, or 38.6 picometers when used with the optional RPI20 parallel interface.

  As the measurement and reference beam paths have an element of commonality, this detector head offers a number of benefits.

  - Measures stage versus column or workpiece versus tool for a true differential measurement.
  - Removal of errors due to thermal translation of the interferometer mounting position.
  - Minimization of the effects of laser frequency instability as the differential path length (between measurement and reference paths) is reduced.
  - Common mode environmental effects enable the detector head to be mounted outside the process chamber with minimal effect on positioning accuracy.

RLE system benefits

The unique fiber optic launch based architecture provides interferometer system performance with the ease of use normally associated with glass or tape scale based encoder systems.

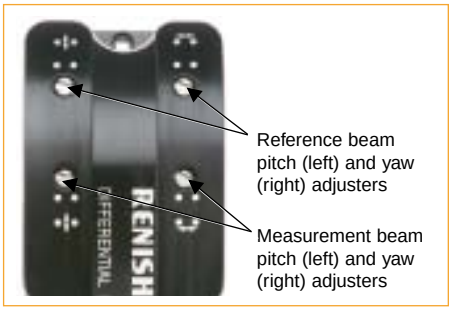
These architectural advantages are achieved through a combination of the following features:

- **Fiber optic laser launch** – Enables the laser light to be taken directly to where the axis position needs to be measured, eliminating the requirement for remote beam benders, splitters and associated mounts.
- **Integrated laser beam steerers** – Incorporated in all RLD10 detector heads to further reduce alignment complexity.
- **Integrated interferometer optics** – Most RLD detector heads include prealigned interferometer optics and fringe detection system, making installation simple: align the RLD10 with the external optic on the moving element.
- **Removal of potential heat error source** – Fiber optic launch enables the RLU laser head to be mounted in a location that is insensitive to dissipated heat without affecting alignment or stability.

RLD10 single pass interferometer

RLD10 double pass interferometer

RLD10 differential interferometer



RLE system accessories

RCU10 compensation system

When using any laser interferometer system in a non-vacuum environment, some form of refractive index compensation is required to maintain accuracy under varying environmental conditions. This is because the fundamental fringe spacing (unit of count) is a function of the wavelength of the laser light which varies fractionally depending on the refractive index of the air through which it travels.

To counter these refractive index changes, Renishaw offers the RCU10 real-time quadrature compensation system, providing the following features and benefits:

- ±1 ppm positioning over a broad range of environmental conditions
- Simultaneous implementation of multiple error correction algorithms
- Individual air temperature sensors for each axis
- RCU10-CS configuration software enables the RCU10 system to be configured to match the specific requirements of the application
- One to six axis capability: multi-axis systems can be formed using a number of individual RCU10 compensators connected via a high-speed serial link

RPI parallel interface

Renishaw's RLE laser interferometer systems directly produce 1 Vpp sine/cosine signals with periods of 316 nm and 158 nm from single and double pass interferometers respectively. These sinusoidal signals can be interpolated to provide ultra-high resolution positional feedback.

Although sine/cosine interpolation is available within a number of proprietary control systems, the analog bandwidth of these systems is often designed for tape and glass scale based encoders. These scale systems produce relatively coarse signal periods and the sinusoidal frequencies for any given velocity are considerably lower than those produced by an interferometer. This bandwidth limitation means that laser interferometer feedback systems can only be used in low velocity motion applications.

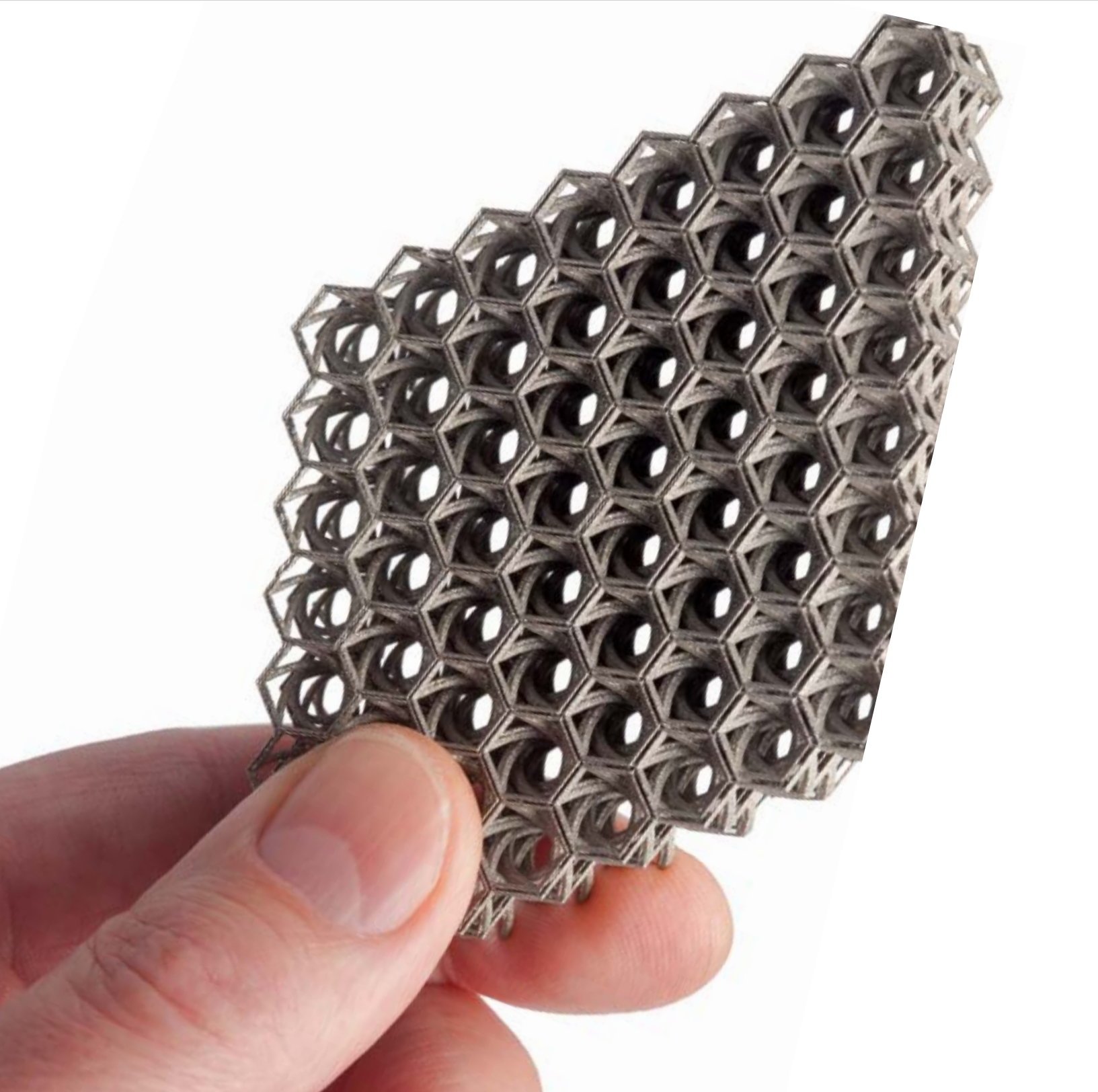
The Renishaw RPI20 parallel interface has been specifically designed to overcome this limitation by providing ultra-high resolution parallel format output at high speed. The RPI20 interpolates by 4096, produces resolutions of up to 38.6 picometers and has an analog input bandwidth of <6.5 MHz, enabling the interferometer system to be used in applications that have velocity requirements of up to 1 m/s.

RCU10 compensator and sensors

RPI20 parallel interface

The RCU10 can be used to compensate digital position feedback signals from a variety of sources and can produce compensated output signals in analog or digital format.

Additive manufacturing solutions



CAD-driven direct manufacturing in a wide range of metals

Renishaw's laser melting is a pioneering, additive manufacturing process capable of producing fully dense metal parts direct from 3D CAD, using a high-powered fiber laser. Parts are built from a range of fine metal powders that are melted in a tightly controlled atmosphere, in layer thicknesses ranging from 20 microns to 100 microns.

The technology is already widely employed for the manufacture of custom medical implants, lightweight aerospace and motorsports parts, efficient heat exchangers, and injection molding inserts with conformal cooling channels.

The capability to safely process reactive materials such as titanium and aluminum is a standard feature on all Renishaw laser melting machines, with safe systems for process emissions and powder handling. Laser melting machine users also benefit from minimal waste product, as over 98% of the material is reusable after refinement in the Renishaw powder conditioning system.

Technical specification

	AM 250	AM 125
Maximum part building area	245 mm × 245 mm × 300 mm (X, Y, Z) (360 mm Z axis by request)	120 mm × 120 mm × 125 mm (X, Y, Z)
Build rate *	5 cm^3 – 20 cm^3 per hour	
Scan speed	up to 2000 mm/s	
Positioning speed (maximum)	7000 mm/s	
Layer thickness	20 µm – 100 µm	
Laser beam diameter	70 µm diameter at powder surface	35 µm diameter at powder surface
Laser options	200 W or 400 W	100 W or 200 W
External dimensions **	1700 mm × 800 mm × 2025 mm (L × W × H)	1350 mm × 800 mm × 1900 mm (L × W × H)
Weight	1225 kg gross, 1100 kg net	1125 kg gross, 900 kg net
Power supply	230 V 1 PH, 16 A	
Qualified materials	Stainless steel 316L and 17-4PH, H13 tool steel, aluminum Al-Si-12 and Al-Si-10, titanium CP, Ti-6Al-4V and Ti-6Al-7Nb, cobalt-chrome (ASTM75), inconel 718 and 625	
Materials in development	We have a range of materials in development. Please contact Renishaw for an up-to-date list.	

* Build rate is dependent upon material, density and geometry. Not all materials process at the highest build rate.
** Dimensions are without accessories.

Applications

Early adopters of laser melting for medical orthopedics benefit significantly from the ability of laser melting to manufacture complex geometries and structures in high grade materials, such as titanium.

From custom orthopedic implants to volume production of medical devices featuring hybrid structures and textures, laser melting has the potential to unlock manufacturing capabilities that combine free-form shapes and intricate lattice structures. This improves osseointegration in orthopedics, leading to much improved patient outcomes. It also allows aerospace and motorsport companies to 'add lightness' to components in a range of demanding applications.

From tooling inserts, featuring conformal cooling, to lightweight structures for aerospace and high technology applications, laser melting gives designers more freedom, resulting in structures and shapes that would otherwise be constrained by conventional processes or the tooling requirements of volume production. Laser melting is complementary to conventional machining technologies and forms part of a manufacturing system including heat treatment and surface post-processing, and directly contributes to a reduction in lead times, tooling costs and material waste.

Industrial components

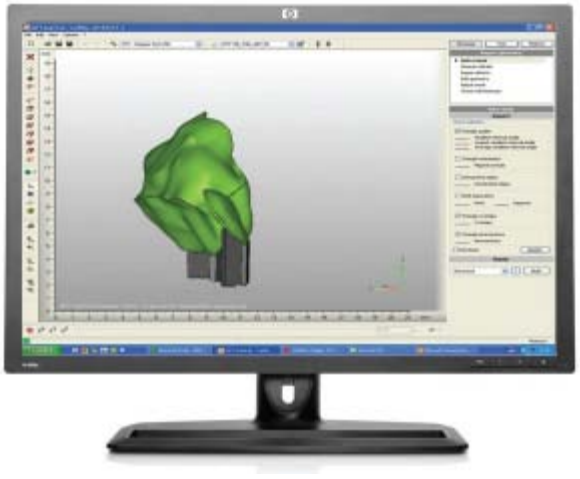
Medical devices

Laser melting software applications

All additive manufacturing technologies rely on the interpretation of 3-dimensional CAD data to create the necessary machine-specific file format. The most common file input type is STL data, an output option available in most 3D CAD software packages. Using STL data, the file preparation software creates structures to anchor the part to the build substrate, support overhanging sections, and securely locate parts of the geometry that are separate at the start of the build, but join as the build progresses.

The machine input file contains process variables, unique to the Renishaw laser melting system, that contain the laser power, exposure and other critical parameters that are suited to each individual material, build geometry type and productivity requirements.

Renishaw offers a consultation service advising which package is most suited to the individual customer's requirements and will include the preferred choice as part of a turnkey solution.



The huge potential for Additive Manufacturing

In the world of manufacturing technology, we occasionally experience breakthroughs that have the potential to transform the industry, enabling existing products to be made faster, cheaper and better, and opening up a world of new product possibilities.

Just like the advent of CNC machining, CAD/CAM, co-ordinate measuring machines and lasers, metal-based Additive Manufacturing will transform part production, but we are only at the start of this exciting journey.

At the core of metal-based Additive Manufacturing is the use of focused laser energy to fuse fine metallic powders to form highly complex functional components that go way beyond the designs of today.

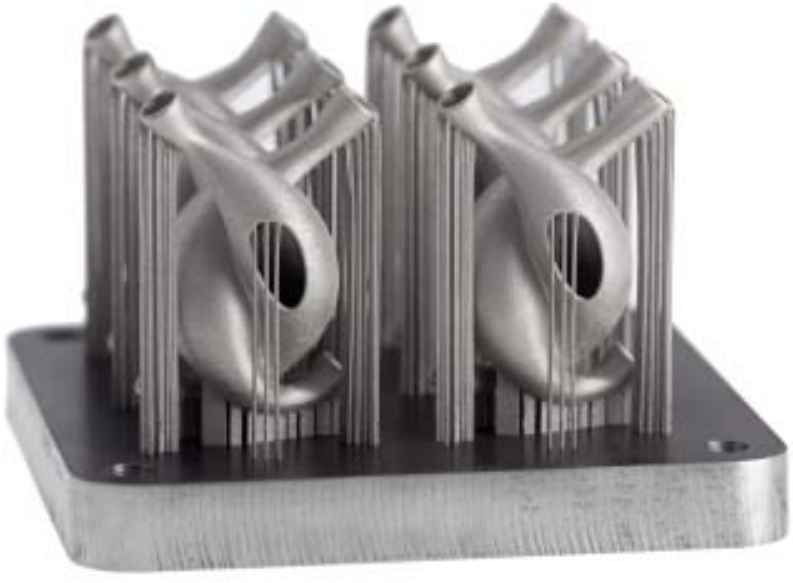
In comparison to other technological advances, lasers are something of a quiet revolution, spanning the last 50 years, but their influence on fields as diverse as bio-medical, surface analysis, electronics, ship building, molecular diagnostics, precision measurement and a multitude of others is immeasurable.

Yet, just like Additive Manufacturing, in their early years, lasers were something of a solution in search of an application – not unusual in disruptive technologies.

Renishaw's laser melting technology has the power to unlock this hidden potential and, in the hands of talented engineers, the full commercial and technical advantages offered by Additive Manufacturing can be enjoyed by manufacturers like you.

Laser melting machine build chamber

Tool with conformant cooling



Styli and accessories

RENISHAW
apply innovation™

Page 7-3 **Technical specifications and quick reference guides**

Quick selection from our extensive range.

Page 7-8 **Accuracy at the point of contact**

An explanation of why it is important to choose the right stylus for your application, and an overview of the entire range of stylus types.

Page 7-13 **M2 threaded stylus range**

Styli for use with the industry-standard CMM probes TP2, TP20 and TP200.

Page 7-21 **M3 threaded stylus range**

Styli for use with manual CMM probes TP1 and TP6 and the most flexible scanning probe, SP25M.

Page 7-27 **M4 threaded stylus range**

Optimised for stiffness and weight, styli purposely designed for the high accuracy TP7M and our comprehensive range of probing for machine tools.

Page 7-38 **M5 threaded stylus range**

A premium range specifically designed for highest accuracy scanning probes from Renishaw and other manufacturers.

Page 7-53 **Styli for Faro arms and Zeiss probing systems**

These styli have been designed especially for use on Faro portable arm CMMs and with Zeiss probing systems.

Page 7-87 **Accessories**

All of the 'bits and pieces' that you need to assemble anything from the most complex stylus clusters to a simple star.

RENISHAW apply innovation™

Technical specifications

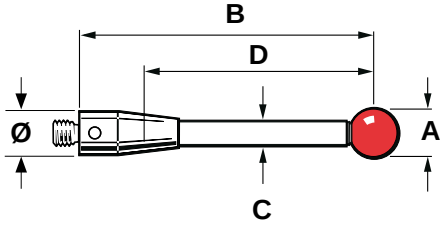
Ball material properties

Stylus type	Material	Grade	Deviation from spherical form	Structure	Composition	Purity	Density	Hardness	Compression strength	Bending strength	Fracture toughness K1c
			(µm)	–	(wt%)	(%)	(g/cm^3)	HV	(MPa)	(MPa)	($MN/m^{3/2}$)
AL_2O_3 ruby balls	Synthetic ruby monocrystalline	Grade 5*	0.13	mono	99% AL_2O_3	99.90	3.90	2300	2100	400-700	1
Silicon nitride balls	Hard pressed Si_3N_4	Grade 5*	0.13	poly	Si_3N_4	90	3.0-3.2	1600	3000	850	6
Zirconia oxide balls	Sintered ZrO_2	Grade 5*	0.13	poly	ZrO_2	90-95	6.05	1200	2000	1000	10
Alumina hollow balls	White ceramic sintered alumina AL_2O_3	–	1	poly	AL_2O_3	99.80	3.8-3.9	1900	2500	350	3.5
Silver steel disks	Silver steel	–	1	–	–	–	8	450	–	–	–
Silver steel simple cylinder	Silver steel	–	Roundness 4 µm	–	–	–	8	200	–	–	–
Ruby ball ended cylinder	Synthetic ruby	Ball: Grade 5*	Ball deviation from spherical form: 0.13 Concentricity: Ball/cylinder 4 µm	mono	99% AL_2O_3	99.90	3.99	2300	2300	400-700	1
Tungsten carbide ball ended cylinder	Tungsten carbide	–	+ 20 µm end radius	–	92-93.5% WC 6.5-8% CO	14.8	14.95	1550	6000	–	–
Silver steel simple pointer	Silver steel	–	Cone angle 30°	–	–	–	8	300	–	–	–
Tungsten carbide radius end pointer	Tungsten carbide	–	Cone angle 30°	–	92-93.5% WC 6.5-8% CO	99.90	15	1550	6000	–	–
Aluminum hollow balls	Al. alloy 6082-T6	–	30 µm	–	95.2-98.3% AL	–	2.7	95	–	–	–

* Refers to DIN-5401 ball grade standard
* Grade 3 sphericity balls are available on request.

Extension material properties

Material	Coefficient of expansion @ 25 °C
Stainless steel	$16x10^{-6}$/°C
Tungsten carbide	$5x10^{-6}$/°C
White ceramic sintered alumina	$8.1x10^{-6}$/°C
Carbon fiber	$-0.4x10^{-6}$/°C
Titanium	$9.2x10^{-6}$/°C
Ruby	$4.5x10^{-6}$/°C
Silicon nitride	$3.2x10^{-6}$/°C
Zirconia	$10.5x10^{-6}$/°C



A Ball diameter
B Overall length
C Stem diameter
D Effective working length
Ø M2 = 3 mm
Ø M3 = 4 mm
Ø M4 = 7 mm
Ø M5 = 10 mm

RENISHAW
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M2 styli and extensions quick reference guide

These are a selection of the most popular styli.

Ruby ball / stainless steel stem

Ball diameter		1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)
Length	10 mm	A-5000-7806	A-5000-7802	A-5000-7807	A-5000-7803	A-5000-3604	A-5000-4154	A-5000-4155	A-5000-4156	A-5000-4158
	20 mm	–	–	A-5000-3603	A-5000-7804	A-5000-4160	A-5000-4161	–	–	–

Ruby ball / tungsten carbide stem

Ball diameter		0.3 (0.012)	0.5 (0.02)	0.7 (0.03)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
Length	10 mm	A-5000-7800	A-5000-7805	A-5000-7801	A-5003-1325	–	–	–	–	–	–
	20 mm	–	A-5003-1345	A-5003-0577	SEE DRAWING	A-5003-0034	A-5003-3822	A-5003-1896	A-5003-0938	A-5003-1029	A-5003-0046
	30 mm	–	–	–	A-5000-8663	A-5003-0035	A-5003-0036	A-5003-0038	A-5003-0040	A-5003-0043	A-5003-0047
	40 mm	–	–	–	–	–	A-5003-0037	A-5003-0039	A-5003-0041	A-5003-0044	A-5003-0048
	50 mm	–	–	–	–	–	–	–	A-5003-0042	A-5003-0045	A-5003-0049

Ruby ball / ceramic stem

Ball diameter		3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
Length	30 mm	A-5003-4177	A-5003-1370	A-5003-4779	A-5003-4780
	50 mm	A-5003-0064	A-5003-0065	A-5003-0066	A-5003-0470

Ruby ball / carbon fiber stem

Ball diameter		4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
Length	30 mm	A-5003-4241	A-5003-4781	A-5003-4782
	50 mm	A-5003-2285	A-5003-2286	A-5003-2287
	75 mm	A-5003-4784	A-5003-4785	A-5003-4786
	100 mm	A-5003-2289	A-5003-2290	A-5003-2291

Stylus extensions

Length	5.0 (0.20)	10.0 (0.40)	20.0 (0.80)	30.0 (1.19)	40.0 (1.58)	50.0 (1.97)	70.0 (2.76)	90.0 (3.55)
Stainless steel	M-5000-7634	M-5000-3647	M-5000-3648	M-5000-4162	M-5000-7779	–	–	–
Ceramic	–	–	–	A-5003-0070	A-5003-0071	A-5003-0072	–	–
Carbon fiber	–	–	–	–	A-5003-2280	A-5003-2281	A-5003-2282	A-5003-2283

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M3 styli and extensions quick reference guide

These are a selection of the most popular styli.

Ruby ball / stainless steel stem

Ball diameter		1.0 (0.04)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
Length	21 mm	A-5000-3551	A-5000-3552	A-5000-3553	A-5000-7606	A-5000-7630
	31 mm	–	–	–	A-5000-3554	A-5000-7648

Ruby ball / tungsten carbide stem

Ball diameter		0.5 (0.02)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
Length	21 mm	A-5000-7632	A-5003-0050	–	A-5003-0054	–	–	–
	30 mm	–	A-5003-0051	A-5003-0052	A-5003-0055	A-5003-0057	–	–
	40 mm	–	–	A-5003-0053	A-5003-0056	A-5003-0058	A-5003-0060	A-5003-0062
	50 mm	–	–	–	–	A-5003-0059	A-5003-0061	A-5003-0063

Ruby ball / ceramic stem

Ball diameter		3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
Length	50 mm	A-5003-0067	A-5003-0068	A-5003-0069

Ruby ball / carbon fiber stem

Ball diameter		6.0 (0.24)	8.0 (0.32)
Length	75 mm	A-5003-4860	A-5003-4861
	100 mm	A-5003-4862	A-5003-4863

Stylus extensions

Length	10.0 (0.40)	20.0 (0.80)	35.0 (1.38)	50.0 (1.97)	70.0 (2.76)
Stainless steel	M-5000-7633	M-5000-3592	M-5000-3593	–	–
Ceramic	–	–	–	A-5003-0075	–
Carbon fiber	–	–	–	A-5003-4864	A-5003-4865

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M4 styli and extensions quick reference guide

These are a selection of the most popular styli.

Ruby ball / stainless steel stem

Ball diameter		1.0 (0.04)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)
Length	10 mm	–	–	–	–	A-5000-6350	–	–
	20 mm	A-5000-7545	A-5000-7547	A-5000-7549	A-5000-7551	SEE DRAWING	A-5000-7555	A-5000-7557
	30 mm	–	–	–	–	A-5000-6352	–	–
	50 mm	–	–	–	–	A-5000-7521	–	–
	100 mm	–	–	–	–	A-5000-7522	–	–

Ruby ball / tungsten carbide stem

Ball diameter		1.0 (0.04)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
Length	20 mm	A-5003-4792	A-5003-2932	A-5003-4793	A-5003-4794	A-5003-4795	A-5003-4796
	50 mm	–	A-5003-4797	A-5003-3680	A-5003-4799	A-5003-4800	A-5003-4801

Ruby ball / ceramic stem

Ball diameter		5.0 (0.20)	6.0 (0.24)	8.0 (0.32)
Length	50 mm	A-5003-0235	A-5000-3709	A-5000-7795
	75 mm	A-5003-0236	A-5003-2764	A-5003-4802
	100 mm	A-5000-9761	A-5000-3712	A-5000-7796

Ruby ball / carbon fiber stem

Ball diameter		6.0 (0.24)	8.0 (0.32)
Length	50 mm	A-5003-1436	–
	100 mm	A-5003-1358	–
	150 mm	A-5003-1255	–
	200 mm	A-5003-1075	–
	300 mm	–	A-5003-3461

Stylus extensions

Length	10.0 (0.41)	15.0 (0.60)	20.0 (0.79)	30.0 (1.19)	50.0 (1.97)	100.0 (3.94)
Stainless steel	M-5000-7583	M-5000-7584	M-5000-7585	M-5000-7586	–	–
Ceramic	–	–	–	A-5000-7754	A-5000-7755	A-5000-7727

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M5 styli and extensions quick reference guide

These are a selection of the most popular styli.

Ruby ball / tungsten carbide stem

Ball diameter	0.3 (0.012)	0.5 (0.02)	0.7 (0.03)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
Length 20 mm	A-5003-5201	A-5003-5202	A-5003-5203	A-5003-5204	A-5003-5205	A-5003-5206	A-5003-5207	A-5003-5208	A-5003-5209	A-5003-5210
30 mm	A-5003-5211	A-5003-5212	A-5003-5213	A-5003-5214	A-5003-5215	A-5003-5216	A-5003-5217	A-5003-5218	A-5003-5219	A-5003-5220
40 mm	–	–	–	–	A-5003-5221	A-5003-5222	A-5003-5223	A-5003-5224	–	–
50 mm	A-5003-5225	A-5003-5226	A-5003-5227	A-5003-5228	A-5003-5229	SEE DRAWING	A-5003-5232	A-5003-5234	A-5003-5235	A-5003-5236
75 mm	A-5003-5240	A-5003-5241	A-5003-5242	A-5003-5243	A-5003-5244	–	–	A-5003-5253	SEE DRAWING	SEE DRAWING
100 mm	–	–	–	–	–	–	A-5003-5254	–	–	–

Ruby ball / carbon fiber stem

Ball diameter	2.5 (0.10)	6.0 (0.24)	8.0 (0.32)	10.0 (0.40)
Length 20 mm	–	–	–	–
30 mm	–	–	–	–
40 mm	–	–	–	–
50 mm	–	A-5003-5237	A-5003-5238	A-5003-5239
75 mm	–	A-5003-5250	A-5003-5251	A-5003-5252
100 mm	–	SEE DRAWING	SEE DRAWING	SEE DRAWING
150 mm	–	A-5003-5265	A-5003-5266	A-5003-5267
200 mm	–	A-5003-5268	A-5003-5269	A-5003-5270
300 mm	–	A-5003-5271	A-5003-5272	A-5003-5273

Stylus extensions

Length	10.0 (0.41)	20.0 (0.79)	30.0 (1.19)	40.0 (1.58)	50.0 (1.97)	60.0 (2.37)	70.0 (2.76)	80.0 (3.15)	90.0 (3.55)	100.0 (3.94)
CF/titanium (Ø11 mm)	–	–	–	A-5555-0647	A-5555-0648	A-5555-0649	A-5555-0623	A-5555-0650	A-5555-0651	A-5555-0652
CF/titanium (Ø20 mm)	–	–	–	A-5555-0620	A-5555-0657	A-5555-0658	–	A-5555-0621	–	A-5555-0659
Stainless steel	A-5555-0142	A-5555-0140	A-5555-0669	–	A-5555-0670	–	–	–	–	A-5555-0136
Aluminum tube	–	–	–	–	A-5555-0671	–	–	–	–	A-5555-0127

Length	120.0 (4.76)	150.0 (5.91)	180.0 (7.09)	200.0 (7.88)	250.0 (9.85)	300.0 (11.82)	400.0 (15.76)	500.0 (19.70)	600.0 (23.64)
CF/titanium (Ø11 mm)	A-5555-0425	A-5555-0424	A-5555-0653	A-5555-0654	A-5555-0655	A-5555-0642	A-5555-0656	–	–
CF/titanium (Ø20 mm)	A-5555-0660	A-5555-0661	A-5555-0662	A-5555-0663	A-5555-0427	A-5555-0664	A-5555-0665	A-5555-0667	A-5555-0668
Stainless steel	–	–	–	–	–	–	–	–	–
Aluminum tube	–	–	–	A-5555-0125	–	–	–	–	–

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Accuracy at the point of contact

As industry has developed its requirement for increasingly diverse and complex manufactured parts, inspection systems have had to work hard to keep up. The use of co-ordinate measuring machines (CMMs) with probing systems and in-process inspection on machine tools are two of the solutions offered by Renishaw to help you maximize your productivity and maintain the highest quality.

Successful gaging depends very much on the ability of the probe's stylus to access a feature and then maintain accuracy at the point of contact. At Renishaw, we have used our expertise in probe and stylus design to develop a comprehensive range of CMM and machine tool styli to offer you the greatest possible precision.

These notes explain the critical features of every stylus type, helping you to choose the right design for each inspection need.

What is a stylus?

A stylus is that part of the measuring system which makes contact with the component, causing the probe's mechanism to displace. The generated signal enables a measurement to be taken. The feature to be inspected dictates the type and size of stylus used. In all cases, however, maximum rigidity of the stylus and perfect sphericity of the tip are vital.

To achieve this, Renishaw's stylus stems are produced on CNC machine tools to exacting standards. Great care is taken to ensure that location faces give maximum stiffness whilst stylus mass is optimized to suit Renishaw's range of probes.

Genuine Renishaw stylus balls are produced to the highest standards and are bonded to the stems in such a way as to ensure maximum joint integrity.

The performance of your gaging can easily be degraded if you use a stylus with poor ball roundness, poor ball location, bad thread fit or a compromised design that allows excessive bending during measurement. To ensure the integrity of the data you gather, make certain that you specify and use a stylus from the comprehensive range of genuine Renishaw styli.

What naming protocol do Renishaw use to describe their styli range?

Renishaw uses the following naming protocol to allow easy identification of styli by name and part number. The examples below show how this protocol is assigned and describe the abbreviations used:

Straight styli

M2 STY D2R L20 EWL14 d1.4SS

The above protocol describes an M2 threaded straight stylus fitted with a 2 mm diameter ruby ball. It has an overall length of 20 mm, has an effective working length (EWL) of 14 mm and has a 1.4 mm diameter stainless steel stem.

Star styli

M2 STR D2R L20 5BALL L19.5 S32

The above protocol describes an M2 threaded star stylus fitted with a 2 mm diameter ruby ball. It has five balls on the star and an overall length of 19.5 mm (from the center of the ball to the rear of the star mounting face when assembled to a probe). The span of the star cluster is 32 mm.

Disk styli

M2 DSC SD18 SLVS T2.2 L2.6 BR-Y

The above protocol describes an M2 threaded disk stylus with a spherical diameter disk of 18 mm. It is made from silver steel with a disk thickness of 2.2 mm and a length of 2.6 mm. BR stands for balls/rollers followed by yes (Y) or no (N).

Cylinder styli

M2 CYL D3 SLVS L13 EWL4

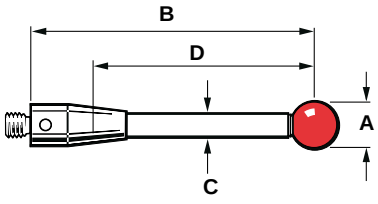
The above protocol describes an M2 threaded cylinder stylus with a critical measuring element diameter of 3 mm made from silver steel. It has an overall length of 13 mm and an EWL of 4 mm.

Extensions

M4 EXT L15 d7 SS

The above protocol describes an M4 threaded extension with a length of 15 mm and a diameter of 7 mm. The extension is made from stainless steel.

Terminology



A Ball diameter

B Overall length

C Stem diameter

D Effective working length

Overall length

Renishaw uses a standard description of overall length, measuring from the rear mounting face of the stylus to the center of the ball.

Effective working length (EWL)

This is measured from the center of the ball to the point at which the stem will foul against the feature when measuring ‘normal’ to the part.

Choosing a stylus

To maintain accuracy at the point of contact, we recommend that you:

Keep styli short

The more a stylus bends or deflects, the lower the accuracy. Probing with the minimum stylus length for your application is the best option.

Minimize joints

Every time you join styli and extensions, you introduce potential bending and deflection points. Try, wherever possible, to keep to the minimum number of pieces for your application.

Keep the ball as large as possible

There are two reasons for this:

- firstly, it maximizes your ball/stem clearance, thereby reducing the chances for false triggers caused by ‘shanking out’ on the stylus stem
- secondly, the larger ball reduces the effect of the surface finish of the component being inspected.

The range of genuine Renishaw styli

Ball material

Ruby

The industry standard and the optimum stylus ball material for a vast majority of measurement applications, ruby is one of the hardest known materials. Synthetic ruby is 99% pure aluminum oxide which is grown into crystals (or “boules”) at 2000 °C using the Verneuil process.

The boules are then cut and gradually machined into a highly spherical form. Ruby balls are exceptionally smooth on the surface, have great compressive strength and a high resistance to mechanical corrosion.

Very few applications exists where ruby is not the preferred ball material, however there are two applications where balls manufactured from other materials are recommended.

The first is for heavy-duty scanning applications on aluminum. Because the materials attract, a phenomenon known as ‘adhesive wear’ can occur, which involves build up of aluminum from the surface onto the ball. A better ball material for such applications is silicon nitride.

The second is in heavy-duty scanning applications on cast iron. Interaction between the two materials can result in ‘abrasive wear’ of the ruby ball surface. For such applications, zirconia balls are recommended.

Silicon nitride

Silicon nitride possesses many similar properties to ruby. It is a very hard and wear-resistant ceramic which can be machined into very high precision spheres. It can also be polished to an extremely smooth surface finish. Silicon nitride does not have the attraction to aluminum and so does not exhibit the adhesive wear seen with ruby in similar applications. However, silicon nitride does show significant abrasive wear characteristics when scanning on steel surfaces and so its applications are best confined to aluminum.

Zirconia

Zirconia is a particularly tough ceramic material with hardness and wear characteristics approaching those of ruby. Its surface properties make it an ideal material for aggressive scanning applications on cast iron components.

Stem material

Steel

Stylus stems manufactured from stainless steel are used widely for styli with ball/tip diameters of 2 mm or greater and with lengths up to 30 mm. Within this range, one-piece steel stems offer the optimum stiffness-to-weight ratio, giving adequate ball/stem clearance without compromising stiffness with a joint between the stem and threaded body.

Please contact us if you require any styli with special ball materials. We can recommend the most suitable material for scanning different materials.

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Tungsten carbide

Tungsten carbide stems are best used for maximizing stiffness with either small stem diameters required for ball diameters of 1 mm and below, or lengths up to 50 mm. Beyond this, weight can become a problem and stiffness is lost due to deflection at the stem to body joint.

Ceramic

For ball diameters greater than 3 mm, and lengths over 30 mm, ceramic stems offer stiffness comparable to steel but are significantly lighter than tungsten carbide. Ceramic stemmed styli can also offer additional crash protection to your probe as the stem will shatter in a collision.

Carbon fiber (Renishaw GF)

There are many grades of carbon fiber materials, however Renishaw GF combines optimum stiffness characteristics, both longitudinally and in torsion (important in star constructions), with extremely low weight. Carbon fiber is inert and this, combined with a special resin matrix, provides excellent protection in the most hostile of machine tool environments.

Renishaw GF is ideal for maximizing stiffness while giving very low mass for styli above 50 mm in length. It is the optimum stem material for high-accuracy strain gage technology probes with excellent vibration-damping characteristics and negligible co-efficient of thermal expansion.

The genuine Renishaw stylus range comprises several types:

Straight styli

These are the simplest form of stylus, incorporating highly spherical industrial ruby balls and a choice of stem material.

Ruby is an extremely hard material and hence stylus wear is minimized. It is also of low density, keeping tip mass to a minimum, which avoids unwanted probe triggers caused by machine motion or vibration.

Mounted on stems made from a range of materials – stainless steel, tungsten carbide, ceramic and a specialized carbon fiber material, “Renishaw GF” – these simple ruby ball styli are suitable for most inspection applications.

Each stylus has an effective working length (EWL) which is the penetration that can be achieved by the ball before the stem fouls against the feature.

The size of the ball and the EWL of the stylus chosen are dictated by the size of the feature to be inspected. However, keeping the stylus ball as large as possible and the stem as short as possible will ensure maximum ball/stem clearance, whilst providing a greater yet still rigid EWL. Using larger ruby balls also reduces the effect of the surface finish of the component being inspected.

Probing with very long stylus/extension combinations is not recommended with standard kinematic touch trigger probes as the rigidity is reduced and accuracy lost due to stylus bending. This is not the case with other types of probe such as those with strain gage technology, as their very low trigger forces permit the use of long stylus/extension combinations without a significant loss of accuracy.

Star styli

These stylus clusters provide you with multiple-tip probing of complex features and bores. Four or five ruby ball systems are mounted rigidly on a stainless steel center. Three standard sizes are offered – alternatively, you can create custom-made star styli using a 5-way stylus center and any of the genuine Renishaw stylus range.

Star styli can be used to inspect a variety of different features. Their use can reduce inspection cycle times by allowing multi-tip probing, minimizing the need to move the probe to extreme points of internal features such as the sides or grooves in a bore. Using star styli also allows effective probing in the –Z (upwards) direction when using a 5-way probe, provided that the stylus tips extend beyond the diameter of the probe body. Each tip on a star stylus requires datuming (sometimes referred to as ‘qualifying’ or ‘calibrating’) in the same manner as a single-ball stylus. The ‘span’ of star styli is taken from ball center to ball center.

Disk styli

These styli are used to probe undercuts and grooves within bores which may be inaccessible to star styli. They are ‘sections’ of highly spherical balls and are available in various diameters and thicknesses. Full rotational adjustment and the ability to add a center stylus are features of the Renishaw range of disk styli that make them particularly flexible and easy to use.

Probing with the 'spherical edge' of a simple disk is effectively the same as probing on or about the equator of a large stylus ball. However, only a small area of this ball surface is available for contact and hence thinner disks require careful angular alignment in order to ensure correct contact with the feature being probed.

A simple disk requires datuming for only one diameter (usually in a ring gage), but limits effective probing to only X and Y directions.

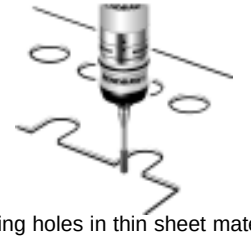
Adding a 'radius end roller' allows you to datum and hence probe in the Z direction, provided that the center of the 'radius end roller' extends beyond the diameter of the probe. The 'radius end roller' can be datumed on a sphere or a slip gage. Rotating and locking the disk about its center axis allows the 'radius end roller' to be positioned to suit the application.

Disks may also have a threaded center to allow the fixing of a center stylus, giving the additional flexibility of probing the bottom of deep bores (where access for the disk may be limited).

Styli for specialist applications

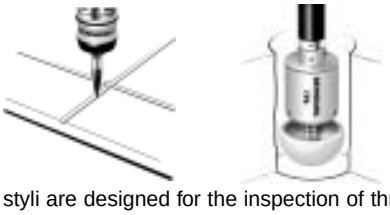
A range of specialist styli is available to enable probing of features such as thread form, thin sectioned material, tool setting and other specialist applications.

Cylinder styli



These are used for probing holes in thin sheet material. In addition, various threaded features can be probed and the centers of tapped holes located. Ball-ended cylinder styli allow full datuming and probing in X, Y and Z directions, thus allowing surface inspection to be performed.

Pointer and ceramic hollow ball styli



Pointer styli are designed for the inspection of thread forms, specific points and scribed lines (to lower accuracy). The use of a radius end pointer stylus allows more accurate datuming and probing of features as detailed above and can also be used to inspect the location of very small holes.

Ceramic hollow ball styli are ideal for probing deep features and bores in X, Y and Z directions, with the need to datum only one ball. There are two versions in the range, 18 mm and 30 mm diameter, specially designed for the TP2 / TP20 / TP200 and TP6 probes respectively. Probing with such a large diameter ball can average out the effects of very rough surfaces.

Tool setting styli

Typically, these are fitted with a square tip and can have threaded or plain shaft attachments. The tip faces are ground to ensure high squareness and parallelism. The TS27R tool setting probe for machining centers can also be fitted with a tungsten carbide disk stylus.

Crash protection devices

Renishaw's stylus crash protection devices are designed to break in the event of impact and protect the probe from damage.

Accessories and tools

A wide range of accessories including extensions, 4 and 5-way centers and stylus knuckles complement the genuine Renishaw stylus range to achieve fully flexible inspection.

Stylus centers

These provide maximum probing flexibility with a single probe. Taking up to five styli of the same mounting thread, this accessory allows you to build stylus configurations to your own specification.

Stylus knuckles

These give full adjustment about two axes, allowing the stylus to be orientated to probe angled features. This adjustment is especially useful when the probe cannot be correctly orientated by the probe head, or when access for the head is limited.

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Stylus extensions

These provide additional probing penetration by extending the stylus away from the probe. However, using stylus extensions can reduce probe accuracy due to loss of rigidity. This is not the case with electronic probes, whose extremely low trigger forces render them less sensitive to this type of inaccuracy.

Stylus thread adaptors

These allow M2, M3, M4 and M5 threaded styli to be interchanged on the majority of touch trigger probes. They are particularly useful for adapting the extensive range of specialized application M2 styli for use on larger probes.

Stylus tools

Specifically designed for mounting styli correctly onto probes and for the construction of specialized stylus combinations, Renishaw's stylus tools protect your investment.

S7 stylus tool

The S7 stylus tool is used for tightening styli and accessories when connecting to one another or directly into the probe. It is specifically designed to yield if excessive tightening force is applied, avoiding damage to the threads of stylus and probe.

Stylus crank

A stylus crank can allow access to features that are otherwise difficult to reach, and are often used in lathe inspection applications.

Renishaw stylus kits

Renishaw styli and accessories are available in a wide selection of kits, ranging from a small precision set of the most frequently used styli, to a comprehensive set to meet virtually every inspection need.

Some sets are housed in a quality wooden case for maximum protection and superb presentation. The styli are held in a wood insert, individually located in a nylon sleeve providing protection for the mounting threads. This type of box features a removable module which houses up to twelve ruby ball styli and contains a tray for disks, tools and accessories. This allows the stylus selection for a particular inspection task to be brought to the CMM's table. The sloping lid design of this kit provides easy access to styli, minimizing handling of ruby balls and contact surfaces, thus aiding cleanliness.

Probing kits are also available to include a probe, probe head, extension bars and styli.

Custom design service

If you cannot achieve your objectives using our extensive range of standard products, Renishaw's Styli and Custom Products Division offers a unique service by providing customers with a total solution for their probing needs for CMM, machine tool or scanning applications.

The Division includes expertise in applications, design, engineering and manufacturing with extensive experience in providing tailor-made product solutions to specific customer's requirements.

In many application problems, the solution lies in the choice of the stylus which influences access of the workpiece features, inspection times and probe performance. All of these aspects are considered within the design of a custom stylus, ensuring that the solution incorporates the ideal choice of materials and optimizes probe performance for your particular application.

Renishaw's Styli and Custom Products Division has supplied over 5,000 different custom styli into probing applications worldwide, so the solution to your application problem may already exist.

For advice and further details, please contact your nearest Renishaw distributor.

Always use genuine Renishaw styli or your probe performance will be compromised!

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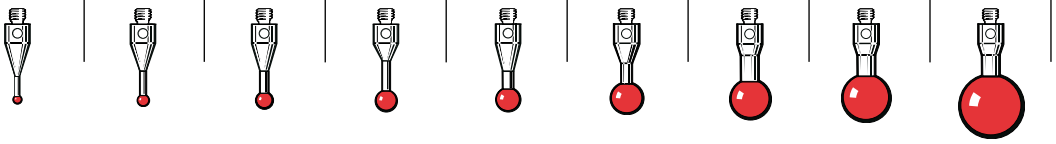
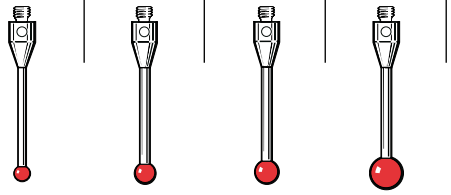
M2 threaded stylus range

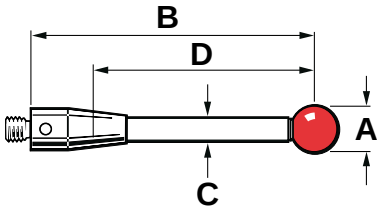
Ruby ball styli (stainless steel stems)

Ball material		Part number								
Ruby		A-5000-7806	A-5000-7802	A-5000-7807	A-5000-7803	A-5000-3604	A-5000-4154	A-5000-4155	A-5000-4156	A-5000-4158
Silicon nitride		A-5004-0210	A-5004-1918	A-5003-6120	A-5004-1920	A-5003-2138	A-5003-9524	A-5004-1921	A-5004-0237	A-5004-1922
Zirconia		A-5003-7757	A-5004-0165	A-5003-7723	A-5004-2913	A-5004-2914	A-5003-7261	A-5003-2186	A-5004-2203	A-5004-2915
A	Ball dia. mm (inch)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)
B	Length mm (inch)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	11.0 (0.44)
C	Stem dia. mm (in.)	0.7 (0.03)	0.7 (0.03)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)	1.5 (0.06)	2.5 (0.10)	2.5 (0.10)	2.5 (0.10)
D	EWL* mm (inch)	4.5 (0.18)	4.5 (0.18)	6.0 (0.24)	6.5 (0.26)	7.0 (0.28)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	11.0 (0.44)
	Mass grammes	0.3	0.3	0.3	0.3	0.4	0.4	0.7	0.9	1.5
10 mm range										

Ball material		Part number			
Ruby		A-5000-3603	A-5000-7804	A-5000-4160	A-5000-4161
Sillicon nitride		A-5003-1730	A-5004-1923	A-5003-6691	A-5004-0236
Zirconia		A-5004-2916	A-5004-2917	A-5004-1057	A-5004-2918
A	Ball dia. mm (inch)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)
B	Length mm (inch)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
C	Stem dia. mm (in.)	1.4 (0.06)	1.4 (0.06)	1.5 (0.06)	1.5 (0.06)
D	EWL* mm (inch)	14.0 (0.56)	16.4 (0.65)	17.0 (0.67)	20.0 (0.79)
	Mass grammes	0.4	0.4	0.5	0.6
20 mm range					

Ruby ball styli (tungsten carbide stems)

Ball material		Part number			
Ruby		A-5000-7800	A-5000-7805	A-5000-7801	A-5003-1325
Silicon nitride		A-5004-2016**	A-5003-2020**	–	A-5004-2018
Zirconia		–	A-5003-7672	A-5004-2632**	A-5004-2919**
A	Ball dia. mm (inch)	0.3 (0.012)	0.5 (0.02)	0.7 (0.03)	1.0 (0.04)
B	Length mm (inch)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)
C	Stem dia. mm (in.)	0.2 (0.01)	0.4 (0.02)	0.5 (0.02)	0.7 (0.03)
D	EWL* mm (inch)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	4.0 (0.16)
	Mass grammes	0.3	0.3	0.3	0.3
10 mm range					



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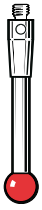
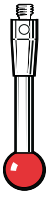
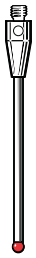
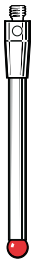
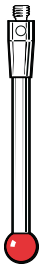
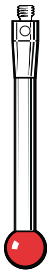
Ruby ball styli (tungsten carbide stems) – continued

Ball material		Part number				
Ruby		A-5003-1345	A-5003-0577	A-5000-7808	A-5003-0033	A-5003-0034
Silicon nitride		A-5004-2019**	–	A-5004-1508	A-5004-2021	A-5004-1925
Zirconia		A-5004-2920	A-5004-1714**	A-5004-0435	A-5004-2921	A-5004-2922
A	Ball dia. mm (inch)	0.5 (0.02)	0.7 (0.03)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)
B	Length mm (inch)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
C	Stem dia. mm (in.)	0.3 (0.012)	0.5 (0.02)	0.7 (0.03)	0.8 (0.04)	1.0 (0.04)
D	EWL* mm (inch)	7.0 (0.28)	12.0 (0.48)	7.0 (0.28)	12.5 (0.50)	12.5 (0.50)
	Mass grammes	0.48	0.32	0.50	0.41	0.50
20 mm range						

Ball material		Part number				
Ruby		A-5003-3822	A-5003-1896	A-5003-0938	A-5003-1029	A-5003-0046
Silicon nitride		A-5004-1017	A-5004-1928	A-5004-1021	A-5004-1929	A-5004-1930
Zirconia		A-5004-2923	A-5004-2924	A-5004-0437	A-5004-2925	A-5004-2926
A	Ball dia. mm (inch)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	22.0 (0.87)	20.0 (0.79)
C	Stem dia. mm (in.)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)
D	EWL* mm (inch)	14.0 (0.55)	15.5 (0.62)	17.0 (0.67)	22.0 (0.87)	20.0 (0.79)
	Mass grammes	0.48	0.50	0.77	1.24	1.98
20 mm range						

Ball material		Part number						
Ruby		A-5000-8663	A-5003-0035	A-5003-0036	A-5003-0038	A-5003-0040	A-5003-0043	A-5003-0047
Silicon nitride		A-5004-2022	A-5004-1931	A-5003-7573	A-5004-1932	A-5004-1933	A-5004-1944	A-5004-1945
Zirconia		A-5004-2927	A-5004-1711	A-5004-1058	A-5004-2928	A-5004-0264	A-5004-2929	A-5004-2930
A	Ball dia. mm (inch)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	27.5 (1.08)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
C	Stem dia. mm (in.)	0.7 (0.03)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)
D	EWL* mm (inch)	20.5 (0.81)	22.5 (0.89)	22.5 (0.89)	22.5 (0.89)	27.0 (1.06)	30.0 (1.19)	30.0 (1.19)
	Mass grammes	0.40	0.58	0.99	1.48	1.49	1.57	2.57
30 mm range								

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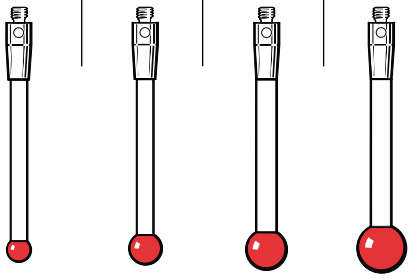
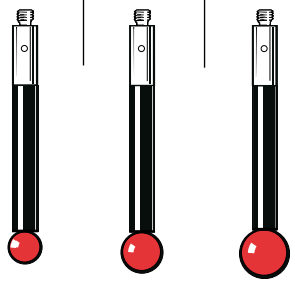
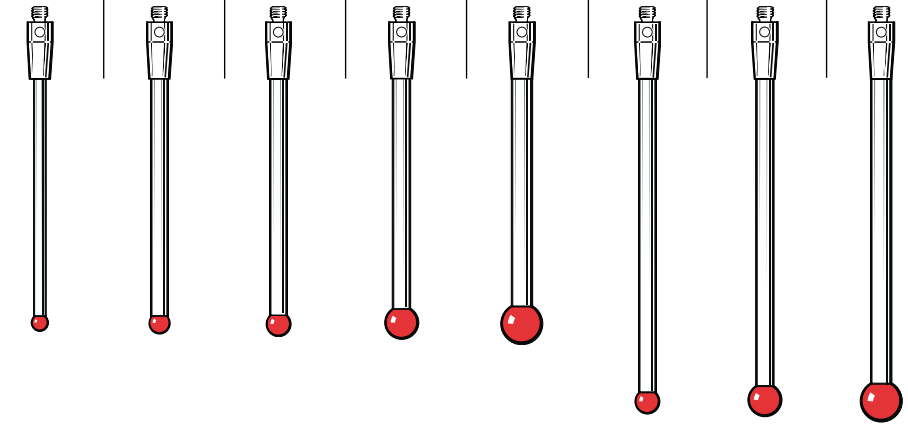
Ruby ball styli (ceramic stems)

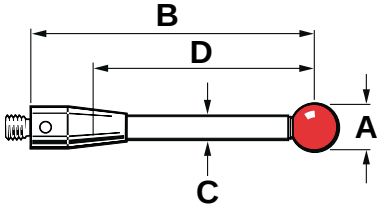
Ball material		Part number			
Ruby		A-5003-4177	A-5003-1370	A-5003-4779	A-5003-4780
Silicon nitride		A-5004-1946	A-5004-1952	A-5004-1953	A-5004-1954
Zirconia		A-5004-2931	A-5004-2932	A-5004-2933	A-5004-2934
A	Ball dia. mm (in)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
B	Length mm (in)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
C	Stem dia mm (in)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)	2.5 (0.10)
D	EWL* mm (in)	27.0 (1.06)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
	Mass grammes	0.44	0.68	0.93	1.11
30 mm range					

Ruby ball styli (carbon fiber stems)

Ball material		Part number		
Ruby		A-5003-4241	A-5003-4781	A-5003-4782
Silicon nitride		A-5004-1955	A-5004-1956	A-5004-1957
Zirconia		A-5004-2935	A-5004-2936	A-5004-0618
A	Ball dia. mm (in)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
B	Length mm (in)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
C	Stem dia mm (in)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)
D	EWL* mm (in)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
	Mass grammes	0.57	0.79	0.96
30 mm range				

Ruby ball styli (tungsten carbide stems)

Ball material		Part number							
Ruby		A-5003-0037	A-5003-0039	A-5003-0041	A-5003-0044	A-5003-0048	A-5003-0042	A-5003-0045	A-5003-0049
Silicon nitride		A-5003-7269	A-5004-1959	A-5004-1960	A-5004-1961	A-5004-1962	A-5004-1963	A-5004-1964	A-5004-1965
Zirconia		A-5004-2937	A-5004-2938	A-5004-1059	A-5004-2939	A-5004-2940	A-5004-2942	A-5004-2943	A-5004-2944
A	Ball dia. mm (inch)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in.)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)
D	EWL* mm (inch)	32.5 (1.28)	32.5 (1.28)	37.0 (1.46)	40.0 (1.58)	40.0 (1.58)	47.0 (1.85)	50.0 (1.97)	50.0 (1.97)
	Mass grammes	1.29	1.95	1.97	2.04	3.17	2.44	2.52	3.75
40 mm – 50 mm range									



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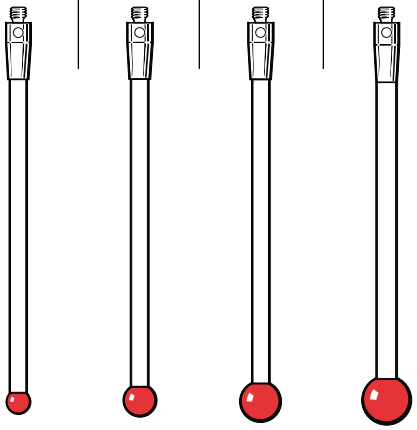
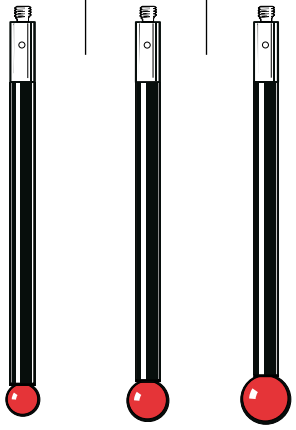
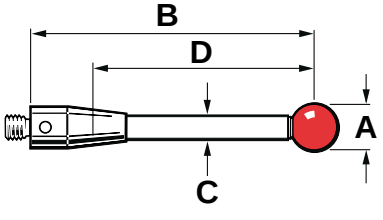
Ruby ball styli (ceramic stems)

Ball material		Part number			
Ruby		A-5003-0064	A-5003-0065	A-5003-0066	A-5003-0470
Silicon nitride		A-5004-1967	A-5004-1519	A-5004-1968	A-5004-1969
Zirconia		A-5004-2945	A-5004-2946	A-5004-2947	A-5004-2948
A	Ball dia. mm (in)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
B	Length mm (in)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)	2.5 (0.10)
D	EWL* mm (in)	47.0 (1.85)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
	Mass grammes	0.83	0.91	1.31	1.49
50 mm range					

Ruby ball styli (carbon fiber stems)

Ball material		Part number		
Ruby		A-5003-2285	A-5003-2286	A-5003-2287
Silicon nitride		A-5004-1970	A-5004-1971	A-5004-1972
Zirconia		A-5004-1331	A-5004-1330	A-5004-1329
A	Ball dia. mm (in)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
B	Length mm (in)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)
D	EWL* mm (in)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
	Mass grammes	1.00	1.10	1.20
50 mm range				



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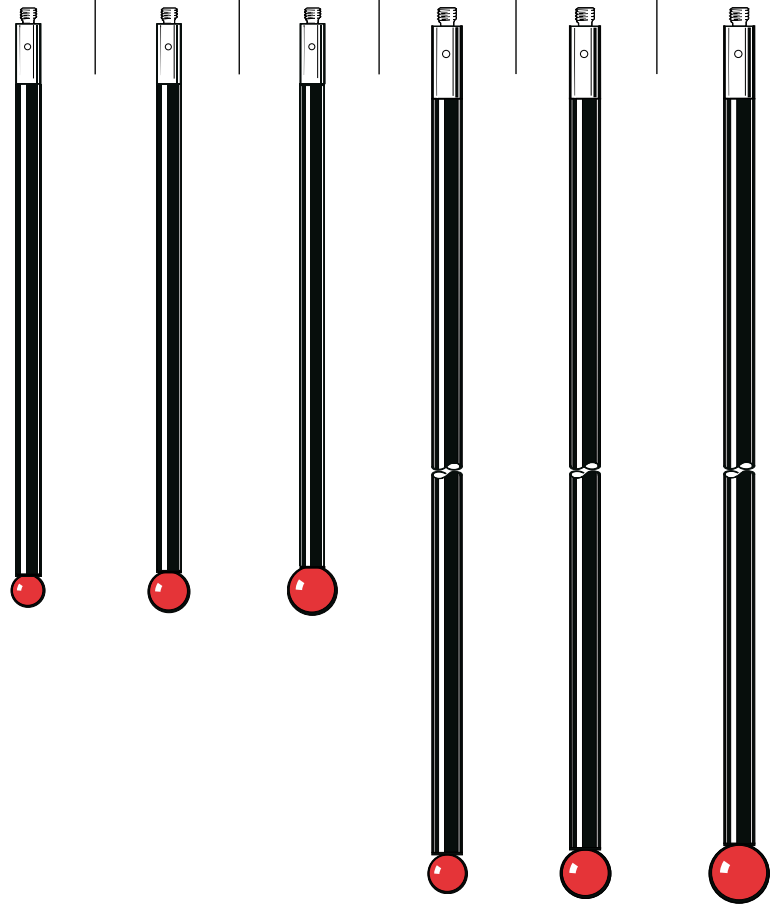
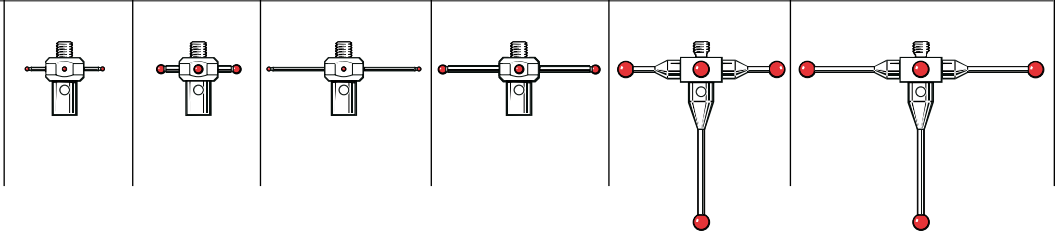
Ruby ball styli (carbon fiber stems)

Ball material		Part number					
Ruby		A-5003-4784	A-5003-4785	A-5003-4786	A-5003-2289	A-5003-2290	A-5003-2291
Silicon nitride		A-5004-1973	A-5004-1974	A-5004-1975	A-5004-1976	A-5004-1977	A-5004-1978
Zirconia		A-5004-2949	A-5004-2950	A-5004-2951	A-5004-2952	A-5004-2953	A-5004-2954
A	Ball dia. mm (inch)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
B	Length mm (inch)	75.0 (2.96)	75.0 (2.96)	75.0 (2.96)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)
C	Stem dia. mm (in.)	2.0 (0.08)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)
D	EWL* mm (inch)	75.0 (2.96)	75.0 (2.96)	75.0 (2.96)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)
	Mass grammes	0.75	1.35	1.45	1.50	1.59	1.78
75 mm – 100 mm range							

Star styli (fixed)

Part number	A-5003-4011	A-5000-7811	A-5003-4787	A-5003-4788	A-5000-7629	A-5000-3626
Span mm (inch)	10.0 (0.40)	10.0 (0.40)	20.0 (0.79)	20.0 (0.79)	18.0 (0.71)	30.0 (1.19)
Ball mm (inch)	0.5 (0.02)	1.0 (0.04)	0.5 (0.02)	1.0 (0.04)	2.0 (0.08)	2.0 (0.08)
Stem dia. mm (inch)	0.3 (0.012)	0.7 (0.03)	0.3 (0.012)	0.7 (0.03)	1.4 (0.06)	1.4 (0.06)
EWL* mm (inch)	N/A	N/A	N/A	N/A	12.0 (0.48)	12.0 (0.48)
Mass grammes	0.7	0.5	0.7	0.9	1.3	1.8
						

* Effective working length

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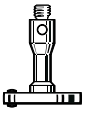
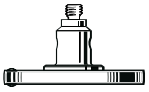
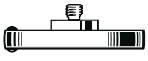
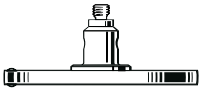
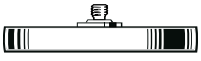
Star stylus centers

Part number	A-5003-4789	A-5003-4790	A-5003-4791	A-5000-3609
Ball mm (inch)	1.0 (0.04)	0.5 (0.02)	1.0 (0.04)	2.0 (0.08)
Stem dia. mm (inch)	0.7 (0.03)	0.4 (0.02)	0.7 (0.03)	1.4 (0.06)
EWL* mm (inch)	3.5 (0.14)	7.0 (0.28)	11.0 (0.44)	12.0 (0.48)
Mass grammes	0.31	0.43	0.45	0.44

Disk styli

Part number	A-5000-3611 Ruby	A-5004-1387 Silver steel	A-5004-1395 Silver steel	A-5004-1396 Silver steel	A-5000-7809 Silver steel
Disk dia. mm (inch)	6.0 (0.24)	10.0 (0.39)	12.0 (0.47)	14.0 (0.55)	18.0 (0.71)
Disk depth mm (inch)	1.2 (0.05)	1.2 (0.05)	1.6 (0.06)	1.6 (0.06)	1.6 (0.06)
Roller depth mm (inch)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)	2.5 (0.10)	2.5 (0.10)
Stem dia. mm (inch)	2.0 (0.08)	2.0 (0.08)	4.2 (0.17)	4.2 (0.17)	4.2 (0.17)
Mass grammes	0.6	1.0	2.0	2.5	3.0
					

Part number	A-5000-3613 Silver steel	A-5000-7810 Silver steel	A-5000-4187 Silver steel
Disk dia. mm (inch)	18.0 (0.71)	25.0 (0.99)	25.0 (0.99)
Disk depth mm (inch)	2.3 (0.10)	1.6 (0.06)	3.1 (0.13)
Roller depth mm (inch)	3.0 (0.12)	2.5 (0.10)	N/A
Stem dia. mm (inch)	N/A	4.2 (0.17)	N/A
Mass grammes	2.7	4.0	3.8
			

Cylinder styli

Part number	M-5000-4152 Silver steel	M-5000-4153 Silver steel	A-5000-8876 Ruby	A-5000-8877 Ruby	A-5000-7812 Ruby	A-5003-0073 Ruby
Cylinder dia. mm (inch)	1.5 (0.06)	3.0 (0.12)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	4.0 (0.16)
Overall length mm (inch)	10.75 (0.42)	12.75 (0.50)	15.0 (0.60)	15.0 (0.60)	21.2 (0.83)	22.0 (0.87)
Stem dia. mm (inch)	1.0 (0.04)	1.5 (0.06)	N/A	N/A	1.6 (0.07)	2.0 (0.08)
EWL* mm (inch)	1.25 (0.05)	3.8 (0.15)	8.0 (0.32)	8.0 (0.32)	7.2 (0.29)	10.0 (0.40)
Mass grammes	0.3	0.6	0.3	0.3	0.5	0.9

* Effective working length

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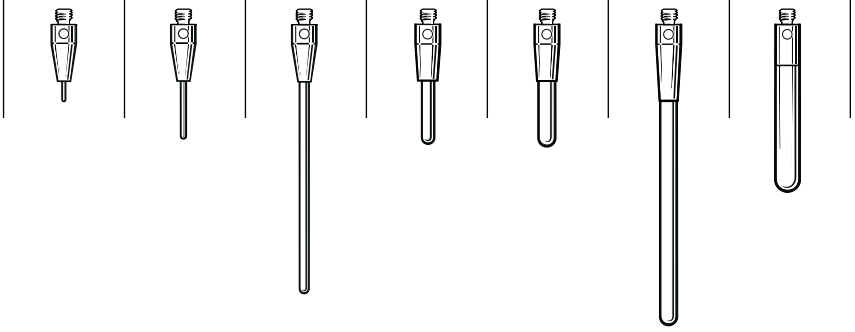
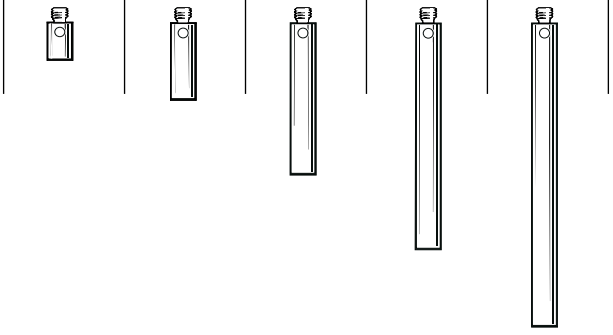
Parallel hemispherical-ended styli (tungsten carbide)

Part number	A-5003-1208	A-5003-1210	A-5003-1218	A-5003-1219	A-5003-1228	A-5003-0074	A-5003-1258
Cylinder dia. mm (inch)	0.3 (0.012)	0.5 (0.02)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	3.0 (0.12)
Overall length mm (inch)	10.2 (0.41)	15.3 (0.61)	35.5 (1.40)	15.8 (0.63)	16.0 (0.63)	40.0 (1.58)	22.5 (0.89)
EWL* mm (inch)	2.7 (0.11)	7.8 (0.31)	28.0 (1.10)	8.3 (0.33)	8.5 (0.34)	32.0 (1.26)	22.5 (0.89)
Mass grammes	0.3	0.3	0.7	0.6	0.8	2.0	2.0



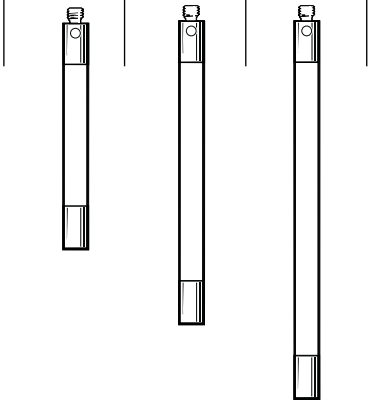
Stylus extensions (stainless steel)

Part number	M-5000-7634	M-5000-3647	M-5000-3648	M-5000-4162	M-5000-7779
Length mm (inch)	5.0 (0.20)	10.0 (0.40)	20.0 (0.79)	30.0 (1.19)	40.0 (1.58)
Stem dia. mm (inch)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)
Mass grammes	0.2	0.4	0.9	1.4	1.8



Stylus extensions (ceramic)

Part number	A-5003-0070	A-5003-0071	A-5003-0072
Length mm (inch)	30.0 (1.19)	40.0 (1.58)	50.0 (1.97)
Stem dia. mm (inch)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)
Mass grammes	0.97	1.22	1.51



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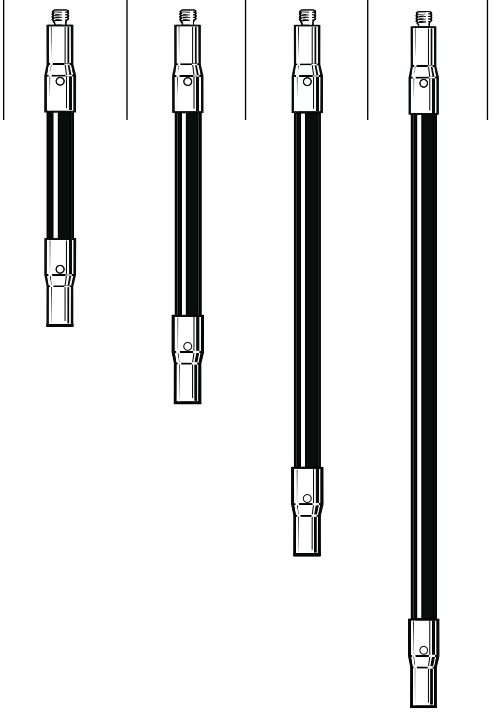
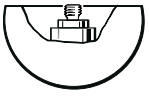
Stylus extensions (carbon fiber)

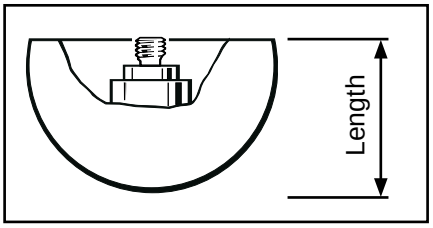
Part number	A-5003-2280	A-5003-2281	A-5003-2282	A-5003-2283
Length mm (inch)	40.0 (1.58)	50.0 (1.97)	70.0 (2.76)	90.0 (3.55)
Stem dia. mm (inch)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)	3.0 (0.12)
Outer dia. mm (inch)	3.5 (0.14)	3.5 (0.14)	3.5 (0.14)	3.5 (0.14)
Mass grammes	0.9	1.0	1.3	1.5



Special purpose styli

Part number	M-5000-4150 Silver steel	A-5000-7813 Tungsten carbide	A-5000-3614 Ceramic
Length mm (inch)	15.0 (0.60)	10.0 (0.40)	11.0 (0.44)
Ball dia. mm (inch)	N/A	N/A	18.0 (0.71)
End feature mm (inch)	Flat rad. 0.05 (0.002)	Spherical rad. 0.1 (0.004)	N/A
Angles	30° inclusive	30° inclusive	N/A
Mass grammes	0.7	0.7	3.3





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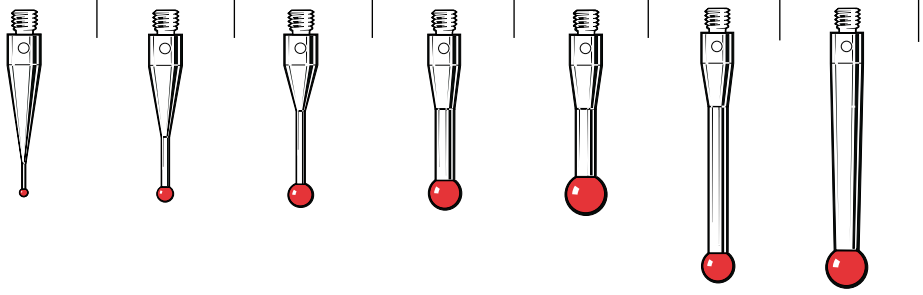
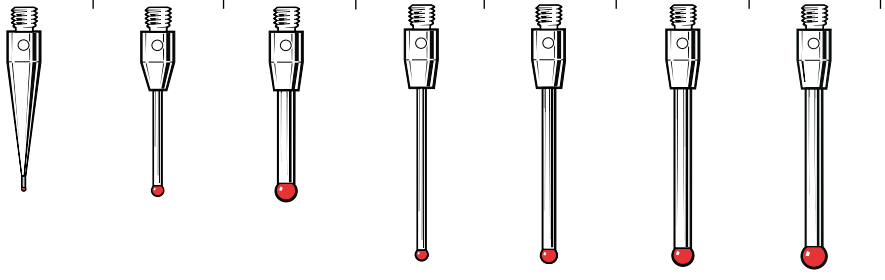
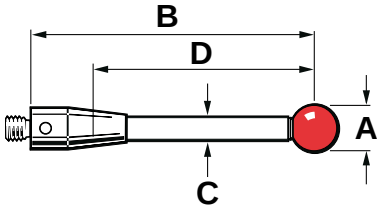
M3 threaded stylus range

Ruby ball styli (stainless steel stems)

Ball material		Part number						
Ruby		A-5000-3551	A-5000-3552	A-5000-3553	A-5000-7606	A-5000-7630	A-5000-3554	A-5000-7648
Silicon nitride		A-5004-1979	A-5003-5723	A-5003-6257	A-5003-5061	A-5003-6695	A-5004-1980	A-5004-1981
Zirconia		A-5004-2955	A-5003-5736	A-5004-2956	A-5003-5737	A-5003-9500	A-5004-2957	A-5004-2958
A	Ball dia. mm (inch)	1.0 (0.04)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	21.0 (0.83)	21.0 (0.83)	21.0 (0.83)	21.0 (0.83)	21.0 (0.83)	31.0 (1.23)	31.0 (1.23)
C	Stem dia. mm (in.)	0.7 (0.03)	1.4 (0.06)	1.5 (0.06)	2.5 (0.10)	2.5 (0.10)	2.5 (0.10)	3.5 (0.14)
D	EWL* mm (inch)	4.0 (0.16)	9.6 (0.38)	14.7 (0.58)	17.2 (0.68)	21.0 (0.83)	27.0 (1.07)	31.0 (1.23)
	Mass grammes	1.0	1.0	1.0	1.3	1.5	2.5	3.0
21 mm – 31 mm range								

Ruby ball styli (tungsten carbide stems)

Ball material		Part number						
Ruby		A-5000-7632	A-5003-0050	A-5003-0054	A-5003-0051	A-5003-0052	A-5003-0055	A-5003-0057
Silicon nitride		A-5004-2023**	A-5004-1198	A-5004-1982	A-5003-8091	A-5003-5724	A-5004-1983	A-5004-1984
Zirconia		A-5004-2959	A-5004-2960	A-5004-2961	A-5004-2962	A-5003-5738	A-5004-2963	A-5003-6766
A	Ball dia. mm (inch)	0.5 (0.02)	1.5 (0.06)	2.5 (0.10)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)
B	Length mm (inch)	21.0 (0.83)	20.0 (0.79)	20.2 (0.80)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
C	Stem dia. mm (in.)	0.4 (0.02)	1.0 (0.04)	2.0 (0.08)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)
D	EWL* mm (inch)	2.0 (0.08)	12.5 (0.50)	12.5 (0.50)	22.5 (0.89)	22.8 (0.90)	22.5 (0.89)	24.0 (0.94)
	Mass grammes	1.0	0.8	1.3	0.93	1.32	1.81	1.83
20 mm – 30 mm range								



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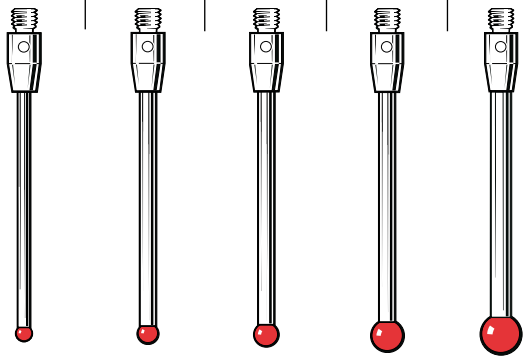
Ruby ball styli (tungsten carbide stems) – continued

Ball material		Part number				
Ruby		A-5003-0053	A-5003-0056	A-5003-0058	A-5003-0060	A-5003-0062
Silicon nitride		A-5004-1985	A-5004-1986	A-5004-1987	A-5004-1195	A-5004-1718
Zirconia		A-5003-2043	A-5004-2964	A-5004-2965	A-5003-6767	A-5004-2966
A	Ball dia. mm (inch)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)
C	Stem dia. mm (in.)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)
D	EWL* mm (inch)	32.5 (1.28)	32.5 (1.28)	33.7 (1.33)	36.0 (1.42)	40.0 (1.58)
	Mass grammes	1.58	2.28	2.30	2.38	3.50

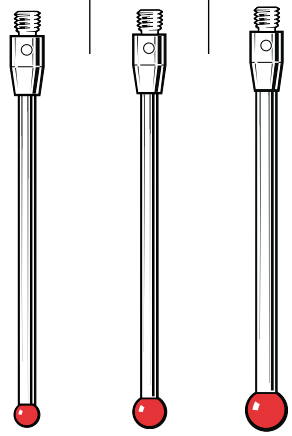
40 mm range



Ruby ball styli (tungsten carbide stems)

Ball material		Part number		
Ruby		A-5003-0059	A-5003-0061	A-5003-0063
Silicon nitride		A-5004-1199	A-5004-1988	A-5004-1201
Zirconia		A-5004-2968	A-5003-6768	A-5003-7665
A	Ball dia. mm (inch)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in.)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)
D	EWL* mm (inch)	43.7 (1.72)	46.0 (1.82)	50.0 (1.97)
	Mass grammes	2.78	2.85	4.10

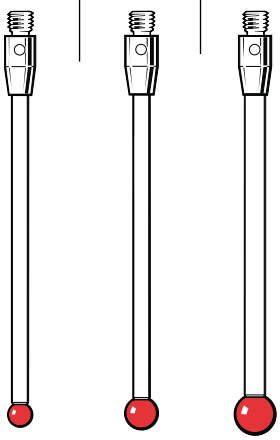
50 mm range

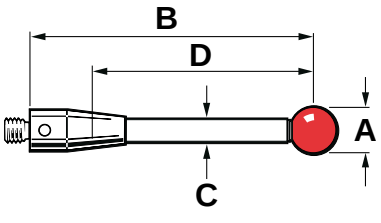


Ruby ball styli (ceramic stems)

Ball material		Part number		
Ruby		A-5003-0067	A-5003-0068	A-5003-0069
Silicon nitride		A-5004-1989	A-5003-5725	A-5004-1990
Zirconia		A-5004-2969	A-5003-5739	A-5004-2970
A	Ball dia. mm (inch)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in.)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)
D	EWL* mm (inch)	43.7 (1.72)	46.0 (1.82)	50.0 (1.97)
	Mass grammes	1.17	1.24	1.33

50 mm range





* Effective working length

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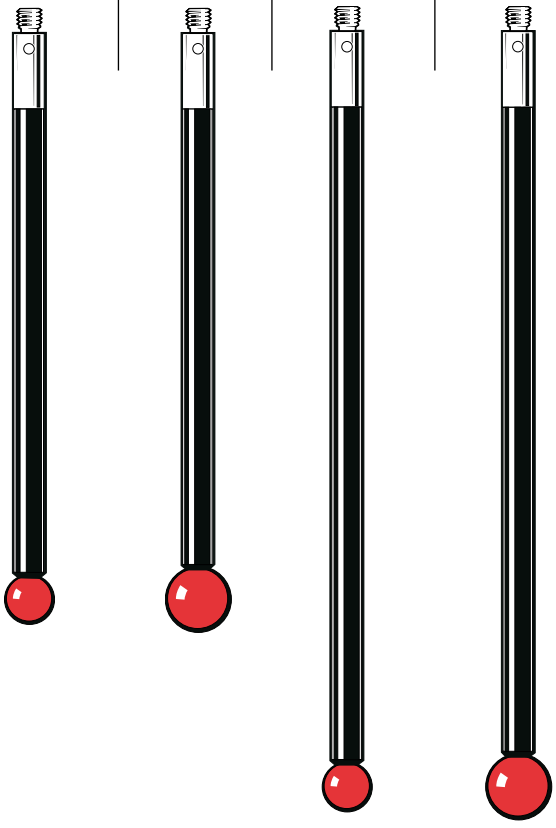
Ruby ball styli (carbon fiber stems)

Ball material		Part number			
Ruby		A-5003-4860	A-5003-4862	A-5003-4861	A-5003-4863
Silicon nitride		A-5003-5726	A-5004-1991	A-5003-5727	A-5004-5466
Zirconia		A-5003-5740	A-5003-6771	A-5003-5741	A-5003-6778
A	Ball dia. mm (inch)	6.0 (0.24)	8.0 (0.32)	6.0 (0.24)	8.0 (0.32)
B	Length mm (inch)	75.0 (2.96)	75.0 (2.96)	100.0 (3.94)	100.0 (3.94)
C	Stem dia. mm (in.)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)
D	EWL* mm (inch)	75.0 (2.96)	75.0 (2.96)	100.0 (3.94)	100.0 (3.94)
	Mass grammes	2.40	2.98	2.89	3.47
75 mm – 100 mm range					

* Effective working length

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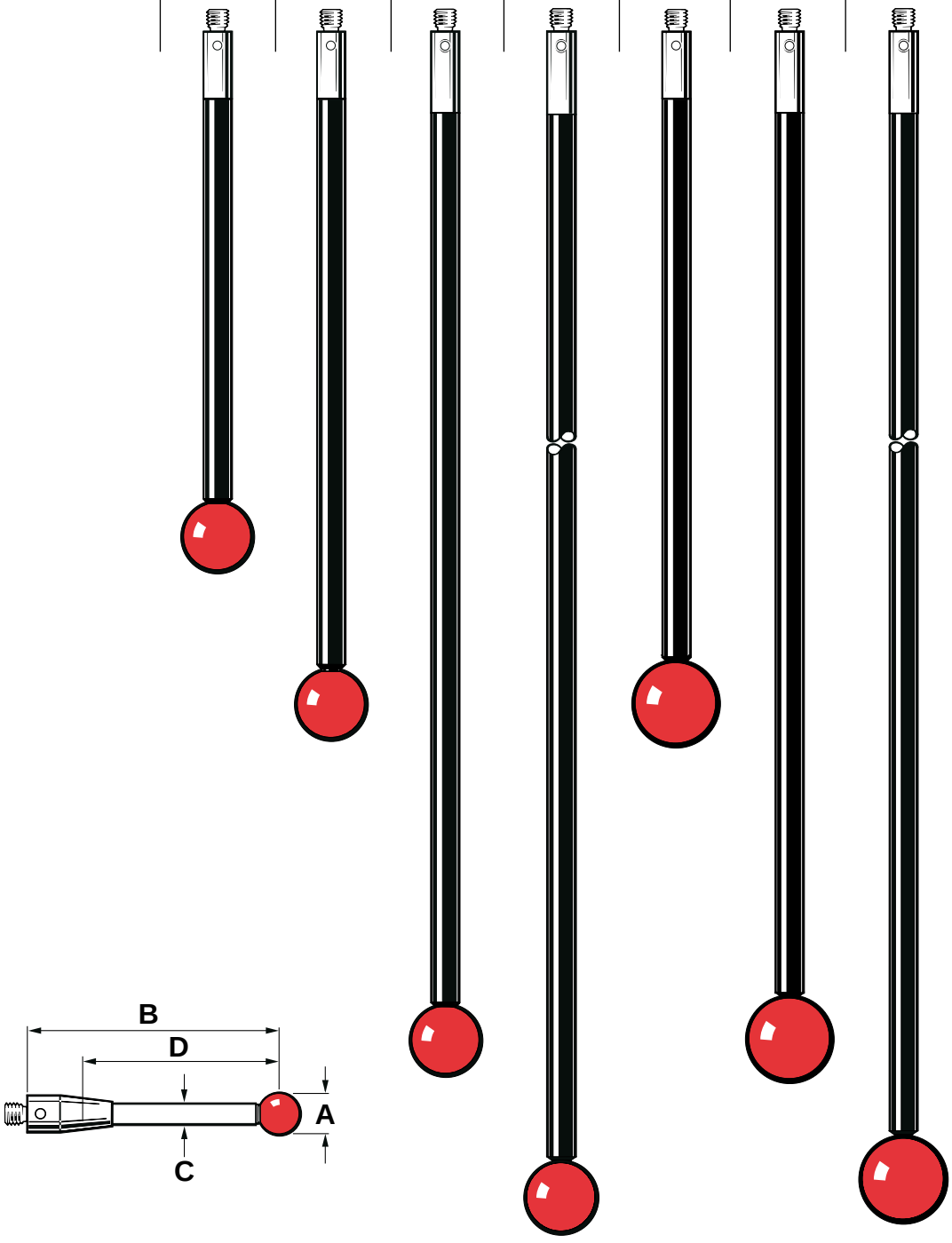
Ruby ball styli (carbon fiber stems) – continued

Ball material		Part number						
Ruby		A-5003-7057	A-5003-7056	A-5003-7055	A-5003-7054	A-5003-7445	A-5003-7446	A-5003-7447
Silicon nitride		A-5004-1992	A-5004-1993	A-5004-1994	A-5004-1995	A-5004-1996	A-5004-1997	A-5004-1998
Zirconia		A-5004-2972	A-5003-9495	A-5004-2973	A-5004-2974	A-5004-2975	A-5004-2976	A-5004-2977
A	Ball dia. mm (inch)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	10.0 (0.40)	12.0 (0.48)	12.0 (0.48)	12.0 (0.48)
B	Length mm (inch)	75.0 (2.96)	100.0 (3.94)	150.0 (5.91)	200.0 (7.88)	100.0 (3.94)	150.0 (5.91)	200.0 (7.88)
C	Stem dia. mm (in.)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)
D	EWL* mm (inch)	75.0 (2.96)	100.0 (3.94)	150.0 (5.91)	200.0 (7.88)	100.0 (3.94)	150.0 (5.91)	200.0 (7.88)
	Mass grammes	4.05	4.53	5.49	6.47	5.9	6.9	7.9



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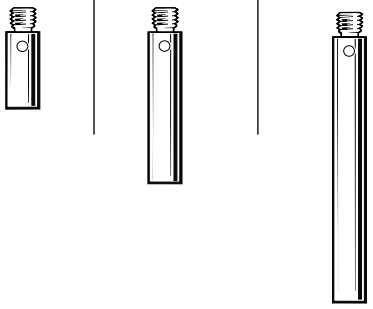
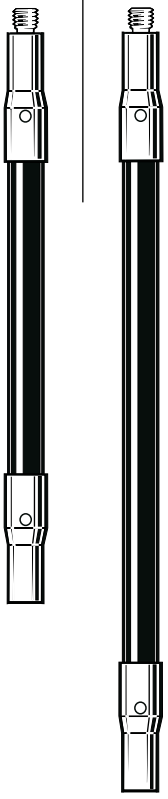
Stylus extensions (stainless steel)

Part number	M-5000-7633	M-5000-3592	M-5000-3593
Length mm (inch)	10.0 (0.40)	20.0 (0.79)	35.0 (1.38)
Stem dia. mm (inch)	4.0 (0.16)	4.0 (0.16)	4.0 (0.16)
Mass grammes	0.9	1.6	2.9



Stylus extensions (carbon fiber)

Part number	A-5003-4864	A-5003-4865
Length mm (inch)	75.0 (2.96)	100.0 (3.94)
Stem dia. mm (inch)	4.0 (0.16)	4.0 (0.16)
Mass grammes	2.53	3.02



Stylus extensions (ceramic)

Part number	A-5003-0075
Length mm (inch)	50.0 (1.97)
Stem dia. mm (inch)	4.0 (0.16)
Mass grammes	2.95

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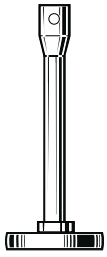
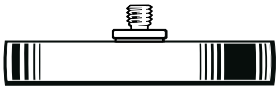
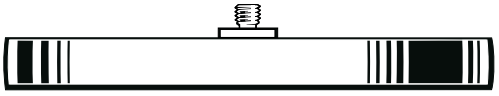
Disk and hollow ball styli

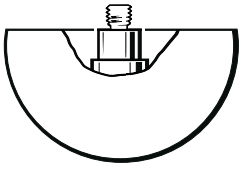
Part number	A-5000-3615 Silver steel	A-5000-7612 Silver steel	A-5000-7669 Carbon steel
Disk dia. mm (inch)	12.7 (0.50)	35.0 (1.38)	63.5 (2.51)
Disk depth mm (inch)	2.2 (0.09)	5.0 (0.20)	6.0 (0.24)
Stem dia. mm (inch)	3.5 (0.14)	N/A	N/A
Mass grammes	4.0	10.0	45.0

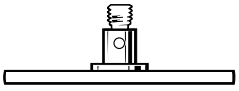


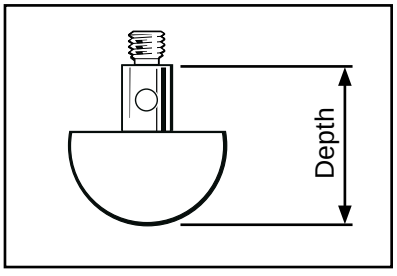




Part number	A-5000-7814 Ceramic	A-5003-7098 Ceramic
Disk dia. mm (inch)	30.0 (1.19)	30.0 (1.19)
Disk depth mm (inch)	17.0 (0.67)	1.5 (0.06)
Stem dia. mm (inch)	N/A	4.0 (0.16)
Mass grammes	13.0	3.6

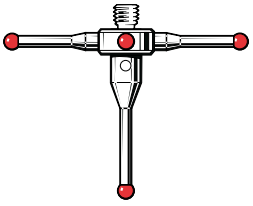


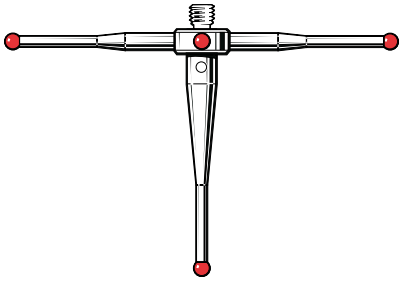


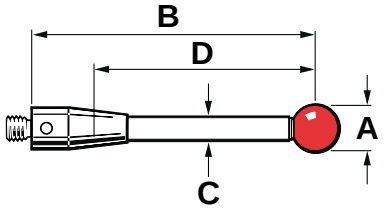


Star styli (fixed)

Part number	A-5003-0076	A-5003-0077
Span mm (inch)	30.0 (1.19)	50.0 (1.97)
Ball mm (inch)	2.0 (0.08)	2.0 (0.08)
Stem dia. mm (inch)	1.4 (0.06)	1.4 (0.06)
EWL* mm (inch)	11.0 (0.44)	11.0 (0.44)
Mass grammes	2.38	5.25







* Effective working length

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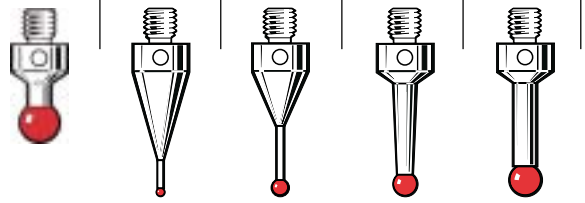
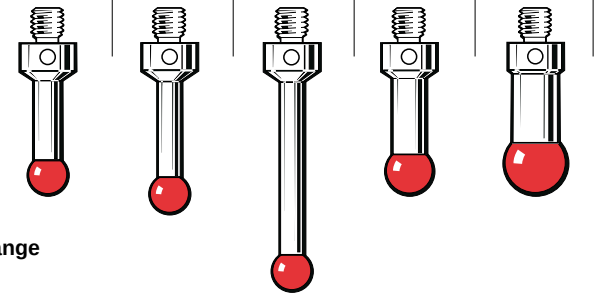
M4 threaded stylus range

Ruby ball styli (stainless steel stems)

Ball material		Part number				
Ruby		A-5000-6350	A-5000-7545	A-5000-7547	A-5000-7549	A-5000-7551
Silicon nitride		–	–	A-5003-5728	–	A-5003-5729
Zirconia		–	–	A-5003-5742	–	A-5003-5743
A	Ball dia. mm (inch)	5.0 (0.20)	1.0 (0.04)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)
B	Length mm (inch)	10.0 (0.39)	19.5 (0.77)	19.0 (0.75)	18.5 (0.73)	18.0 (0.71)
C	Stem dia. mm (in.)	3.0 (0.12)	0.7 (0.03)	1.4 (0.05)	2.0 (0.08)	3.0 (0.12)
D	EWL* mm (inch)	5.0 (0.20)	4.5 (0.18)	9.2 (0.36)	13.0 (0.52)	13.7 (0.54)
	Mass grammes	1.9	2.5	2.3	2.0	2.1



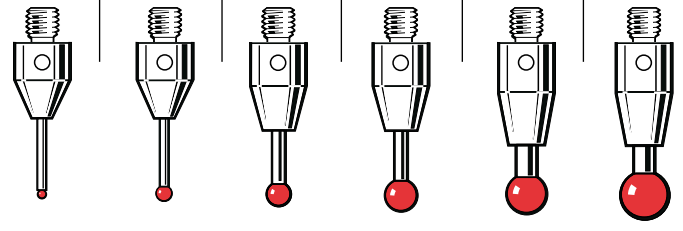
Part number		A-5000-7553	A-5000-6731	A-5000-6352	A-5000-7555	A-5000-7557
A	Ball dia. mm (inch)	5.0 (0.20)	5.0 (0.20)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)
B	Length mm (inch)	17.5 (0.69)	20.0 (0.79)	30.0 (1.19)	17.0 (0.67)	16.0 (0.63)
C	Stem dia. mm (in.)	3.5 (0.14)	3.0 (0.12)	3.0 (0.12)	4.5 (0.18)	6.0 (0.24)
D	EWL* mm (inch)	13.6 (0.54)	15.89 (0.63)	26.0 (1.03)	13.3 (0.52)	16.0 (0.63)
	Mass grammes	2.3	2.4	3.0	3.0	3.9



10 mm – 30 mm range

Ruby ball styli (tungsten carbide stems)

Part number		A-5003-4792	A-5003-2932	A-5003-4793	A-5003-4794	A-5003-4795	A-5003-4796
A	Ball dia. mm (inch)	1.0 (0.04)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
B	Length mm (inch)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
C	Stem dia. mm (in.)	0.7 (0.03)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)	2.5 (0.10)
D	EWL* mm (inch)	10.0 (0.40)	10.0 (0.40)	8.5 (0.33)	8.5 (0.33)	7.9 (0.31)	10.7 (0.42)
	Mass grammes	2.39	3.01	3.53	3.53	4.52	4.66



20 mm range

* Effective working length

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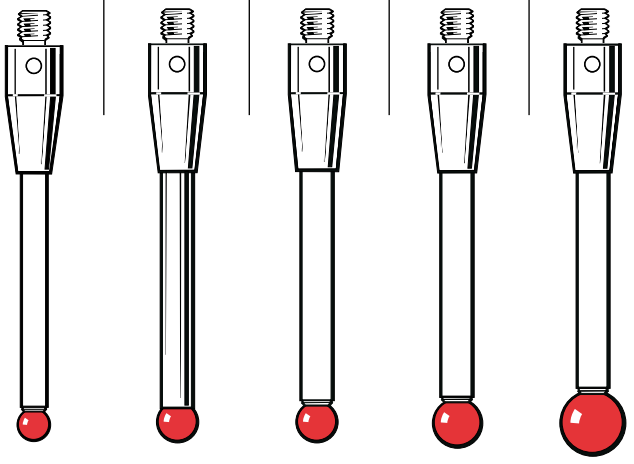
Ruby ball styli

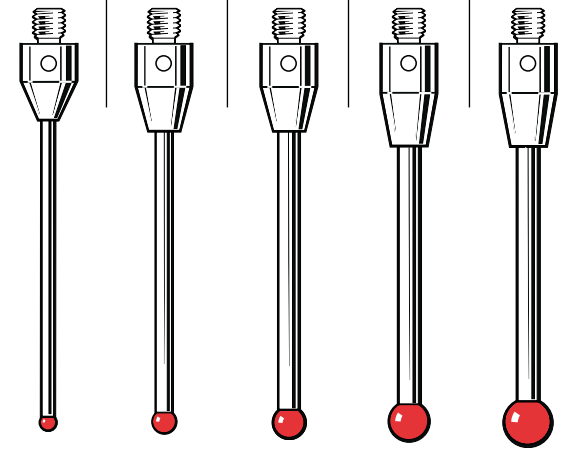
Part number		A-5003-0233 Ceramic	A-5000-7521 Stainless steel	A-5003-0235 Ceramic	A-5000-3709 Ceramic	A-5000-7795 Ceramic
A	Ball dia. mm (inch)	4.0 (0.16)	5.0 (0.20)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)
B	Length mm (inch)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in.)	3.0 (0.12)	4.5 (0.18)	3.8 (0.15)	4.5 (0.18)	4.5 (0.18)
D	EWL* mm (inch)	33.5 (1.32)	33.5 (1.32)	33.5 (1.32)	38.5 (1.52)	50.0 (1.97)
	Mass grammes	3.9	5.8	5.0	4.8	5.4

50 mm range



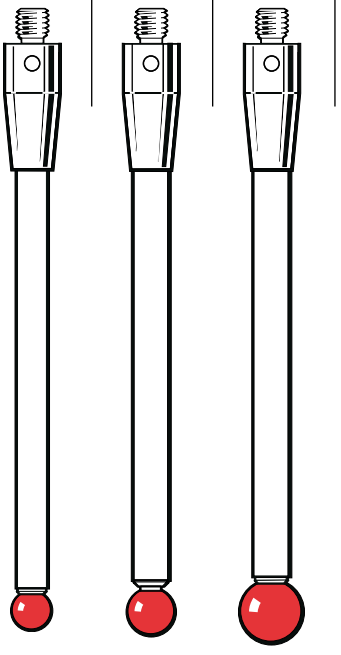
Part number		A-5003-4797 Tungsten carbide	A-5003-3680 Tungsten carbide	A-5003-4799 Tungsten Carbide	A-5003-4800 Tungsten carbide	A-5003-4801 Tungsten carbide
A	Ball dia. mm (inch)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)
B	Length mm (inch)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in.)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)	2.5 (0.10)
D	EWL* mm (inch)	40.0 (1.58)	38.5 (1.52)	38.5 (1.52)	37.9 (1.49)	40.7 (1.60)
	Mass grammes	3.80	4.94	4.99	6.72	6.86

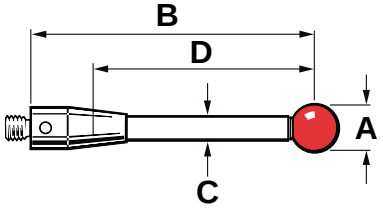
50 mm range



A-5003-0236 Ceramic	A-5003-2764 Ceramic	A-5003-4802 Ceramic
5.0 (0.20)	6.0 (0.24)	8.0 (0.32)
75.0 (2.96)	75.0 (2.96)	75.0 (2.96)
3.8 (0.15)	4.5 (0.18)	4.5 (0.18)
58.5 (2.30)	63.5 (2.51)	75.0 (2.96)
5.63	5.64	6.20

75 mm range





* Effective working length

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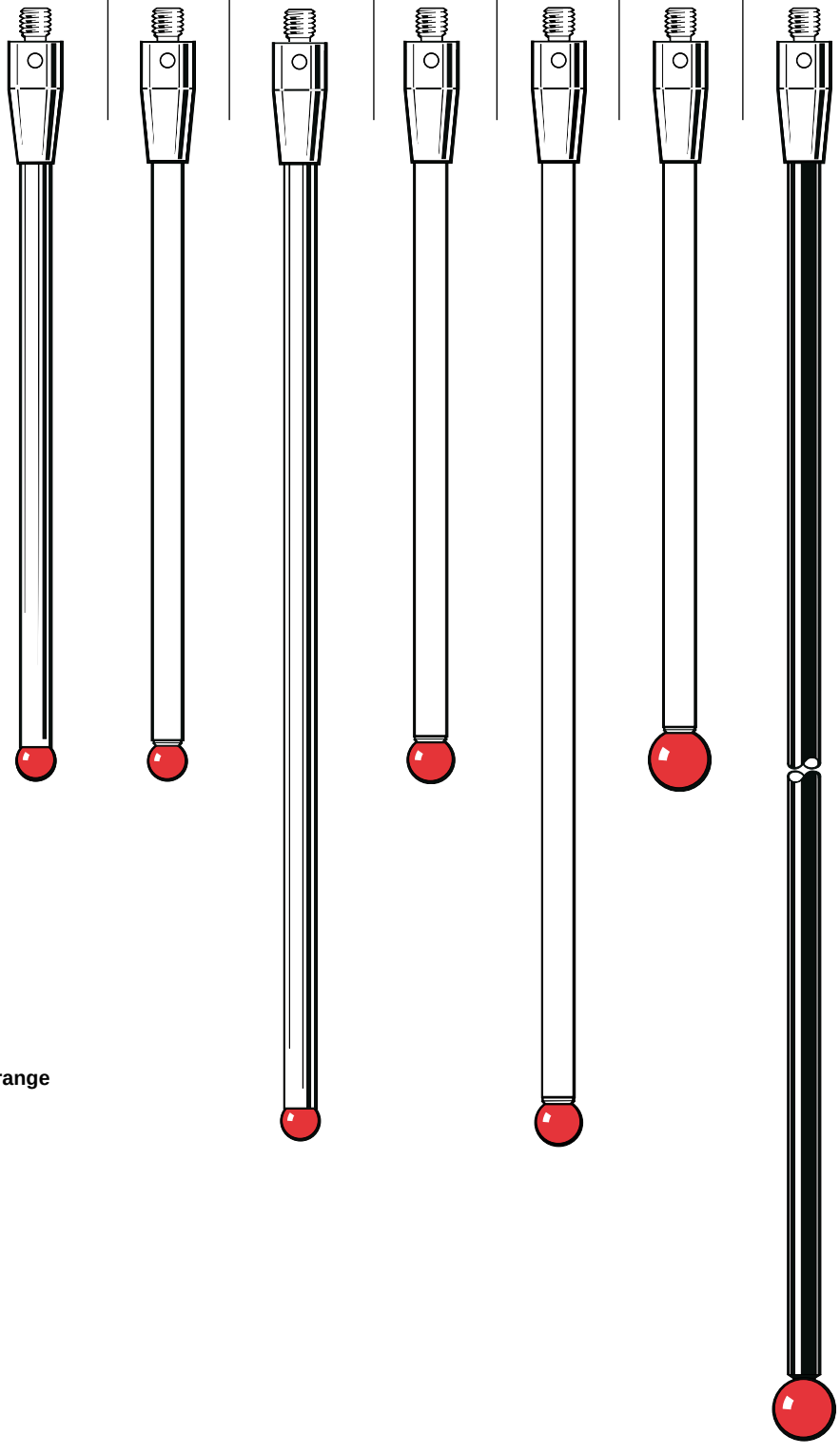
Ruby ball styli

Part number		A-5000-7522 Stainless steel	A-5000-9761 Ceramic	A-5000-7523 Stainless steel	A-5000-3712 Ceramic	A-5000-8156 Ceramic	A-5000-7796 Ceramic	A-5003-3461 Carbon fiber
A	Ball dia. mm (in)	5.0 (0.20)	5.0 (0.20)	5.0 (0.20)	6.0 (0.24)	6.0 (0.24)	8.0 (0.32)	8.0 (0.32)
B	Length mm (in)	100.0 (3.94)	100.0 (3.94)	150.0 (5.91)	100.0 (3.94)	150.0 (5.91)	100.0 (3.94)	300.0 (11.82)
C	Stem dia mm (in)	4.5 (0.18)	3.8 (0.15)	4.4 (0.17)	4.5 (0.18)	4.5 (0.18)	4.5 (0.18)	4.5 (0.18)
D	EWL* mm (in)	83.2 (3.38)	83.5 (3.29)	133.00 (5.24)	88.5 (3.48)	135.0 (5.31)	100.0 (3.94)	300.0 (11.82)
	Mass grammes	11.3	6.3	17.4	6.3	7.9	7.5	10.4



100 mm – 300 mm range

* Effective working length

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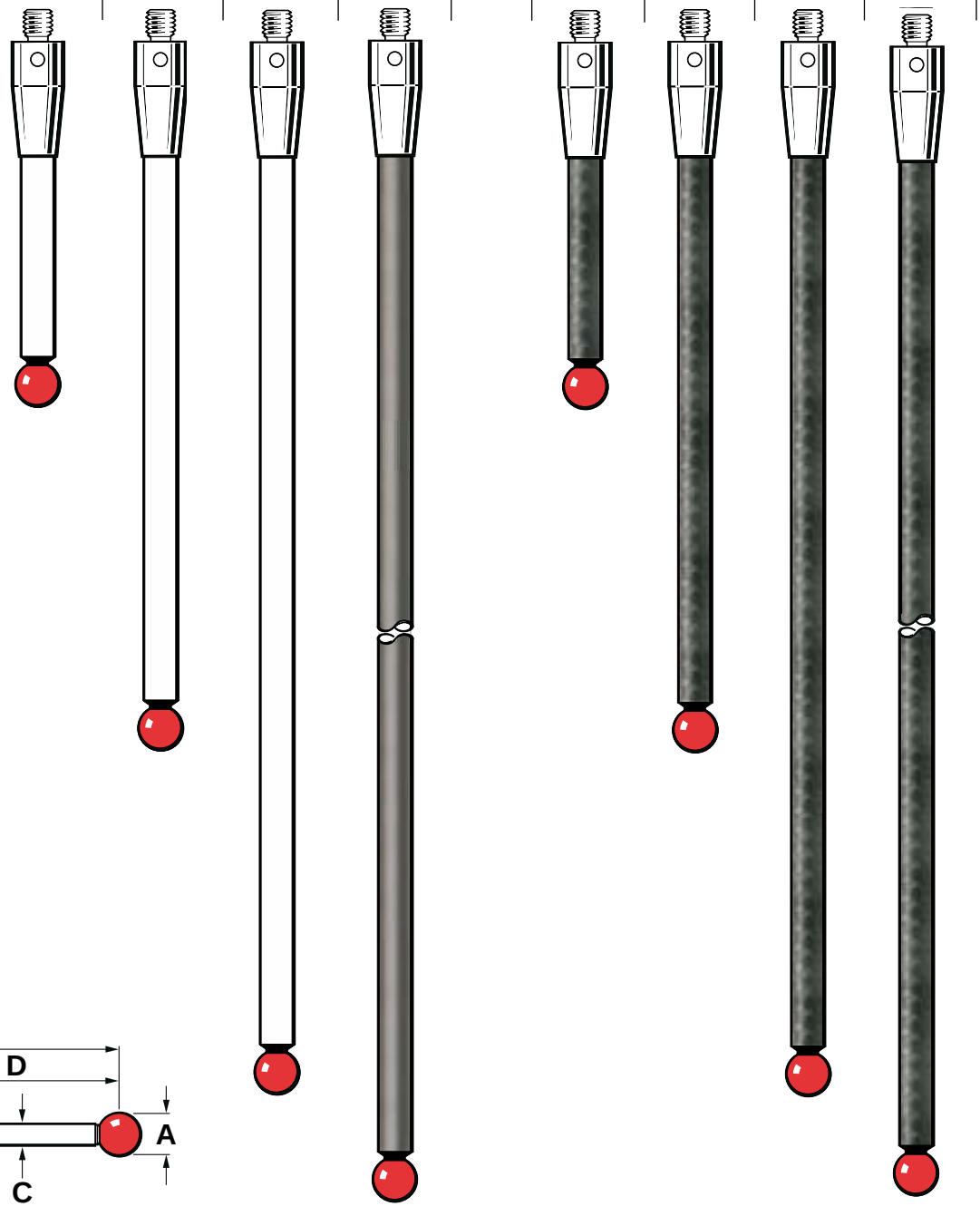
Ruby ball styli (carbon fiber stems)

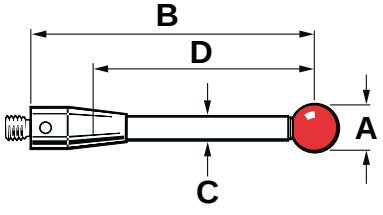
Recommended for use with OMP400 and RMP600

Ball material		Part number			
Ruby		A-5003-7306	A-5003-6510	A-5003-6511	A-5003-6512
Silicon nitride		A-5003-5730	A-5003-5731	–	–
Zirconia		A-5003-5744	A-5003-5745	–	–
A	Ball dia. mm (in)	6.0 (0.24)	6.0 (0.24)	6.0 (0.24)	6.0 (0.24)
B	Length mm (in)	50.0 (1.97)	100.0 (3.94)	150.0 (5.91)	200.0 (7.88)
C	Stem dia mm (in)	4.5 (0.18)	4.5 (0.18)	4.5 (0.18)	4.5 (0.18)
D	EWL* mm (in)	38.5 (1.52)	88.5 (3.48)	138.5 (5.45)	188.5 (7.42)
	Mass grammes	4.1	6.2	7.5	8.7

Recommended for use with MP700

A-5003-1436	A-5003-1358	A-5003-1255	A-5003-1075
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
6.0 (0.24)	6.0 (0.24)	6.0 (0.24)	6.0 (0.24)
50.0 (1.97)	100.0 (3.94)	150.0 (5.91)	200.0 (7.88)
4.5 (0.18)	4.5 (0.18)	4.5 (0.18)	4.5 (0.18)
38.5 (1.52)	88.5 (3.58)	138.5 (5.46)	188.5 (7.42)
4.1	6.2	7.5	8.7





* Effective working length

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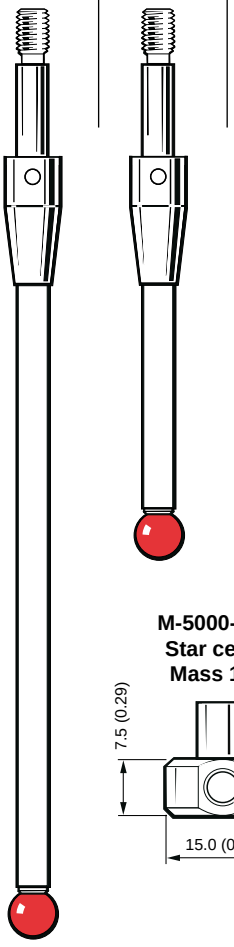
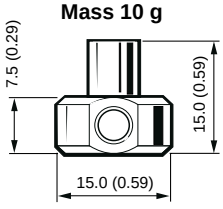
Star styli

Part number	A-5000-6462 Ceramic	A-5000-7098 Ceramic
Ball mm (inch)	6.0 (0.24)	6.0 (0.24)
Length mm (inch)	100.0 (3.94)	50.0 (1.97)
Stem dia. mm (in.)	4.5 (0.18)	4.5 (0.18)
EWL* mm (inch)	88.5 (3.48)	38.5 (1.52)
Mass grammes	7.5	6.0

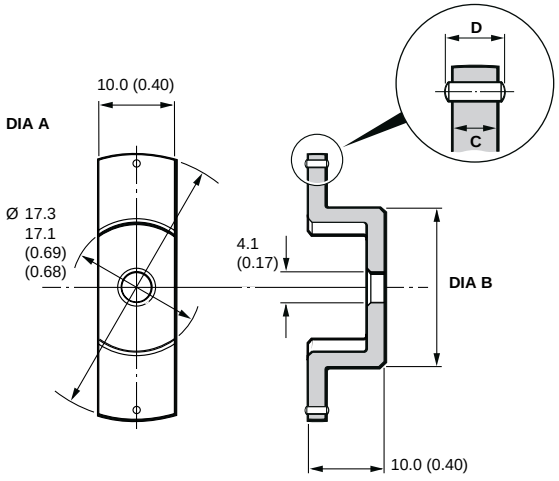


M-5000-6460
Star center
Mass 10 g

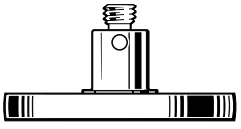


Disk styli

Part number	A-5000-7596	A-5000-7597	A-5000-7598
Diameter A mm (inch)	30.0 (1.19)	35.0 (1.38)	50.0 (1.97)
Diameter B mm (inch)	21.0 (0.83)	21.0 (0.83)	23.0 (0.91)
C mm (inch)	2.2 (0.09)	2.2 (0.09)	3.0 (0.12)
D mm (inch)	3.0 (0.12)	3.0 (0.12)	4.0 (0.16)
Mass grammes	8.01	9.57	13.55

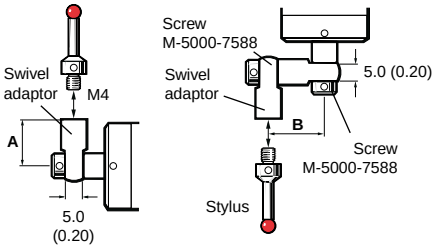


Part number	A-5000-6351 Silver steel
Disk dia. mm (inch)	30.0 (1.18)
Disk depth mm (inch)	3.0 (0.12)
Length mm (inch)	10.0 (0.39)
Rollers	NO
Mass grammes	7.9



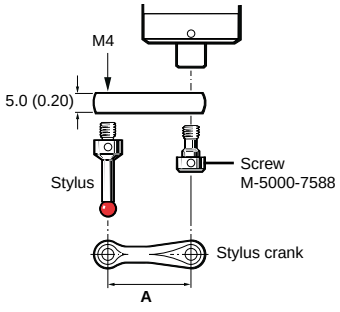
Swivel adaptor

Part number	M-5000-7591	M-5000-7592
Length A mm (inch)	10.0 (0.40)	13.5 (0.54)
Length B mm (inch)	12.5 (0.50)	16.0 (0.63)
Mass grammes	2.76	3.70



Stylus crank

Part number	M-5000-7589	M-5000-7590
Length A mm (in)	21.9 (0.86)	27.6 (1.09)
Mass grammes	6.07	6.94



* Effective working length

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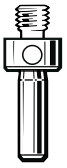
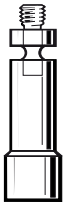
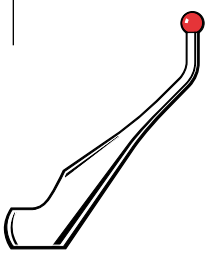
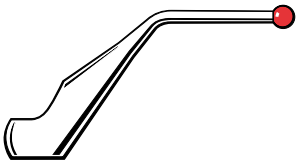
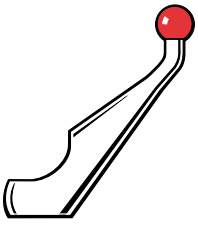
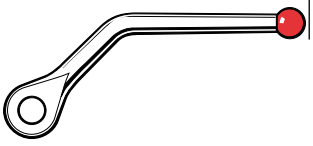
Crash protection devices

Part number	M-5000-7582	M-5000-7587	M-5000-7588	M-2085-0069	* A-5003-0661	M-2197-0156	M-2197-0150
	Stainless steel	**Stainless steel**	**Stainless steel**	**Silver steel**	**Silver steel**	**Silver steel**	**Silver steel**
For pack of ten	–	–	–	–	**A-5004-1865**	**A-5004-1867**	**A-5004-1869**
Length mm (inch)	8.0 (0.32)	8.0 (0.32)	10.0 (0.40)	12.0 (0.48)	15.2 (0.60)	9.0 (0.36)	16.0 (0.63)
Mass grammes	1.8	1.4	1.5	2.7	4.6	1.5	2.1
For use on	LP2	LP2	LP2	MP10	TS27R	HPMA	HPMA
	–	–	–	MP12	–	HPRA	HPRA
	–	–	–	RMP60	–	HPPA	HPPA
	–	–	–	OMP60	–	–	–
	–	–	–	MP3	–	–	–
	–	–	–	MP11	–	–	–
				Use P-TL09-0003 to tighten			

* Please note: If you require the full TS27R break stem kit, please order A-5003-5171.

Part number	M-2008-0333	M-2008-0604	M-2008-0605	M-2048-2093	M-2116-0127
	M3	**M3**	**M3**	**M4**	**M4**
	Silver steel	**Silver steel**	**Silver steel**	**Silver steel**	**Silver steel**
Length mm (inch)	13.3 (0.52)	22.3 (0.88)	30.3 (1.19)	13.5 (0.53)	19.0 (0.75)
Mass grammes	2.43	3.6	4.5	1.37	2.2
For use on	TS20	TS20	TS20	RP1/RP2	TSA
					

Cranked styli

Part number	A-5000-5302	A-5000-5307	A-5000-6620	A-5000-7580
	M4	**M4**	**M4**	**M4**
	Tungsten steel	**Tungsten steel**	**Tungsten steel**	**Tungsten steel**
Length mm (inch)	32.0 (1.26)	21.6 (0.85)	27.4 (1.08)	38.8 (1.53)
Mass grammes	3.8	3.85	4.7	2.5
For use on	LP2	LP2	LP2	LP2
				

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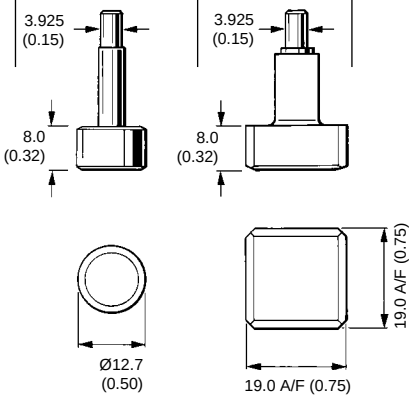
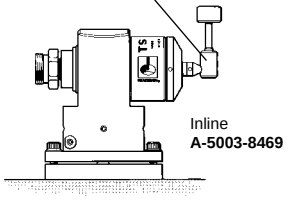
TS27R styli – parallel shafted (not M4) – not compatible with TS27 probes

Part number	A-2008-0382 Tungsten carbide	A-2008-0384 Ceramic
Overall length mm (inch)	23.0 (0.91)	22.0 (0.87)
Mass grammes	12.1	7.1



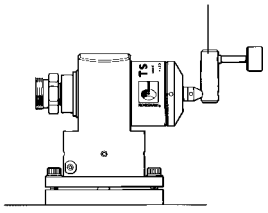
Stylus conversion kit for TS27R to allow horizontal machining applications **(A-2008-0448)**

Stylus holder assembly
A-2008-0389



Vertical machining applications

Stylus holder
M-2008-0447*

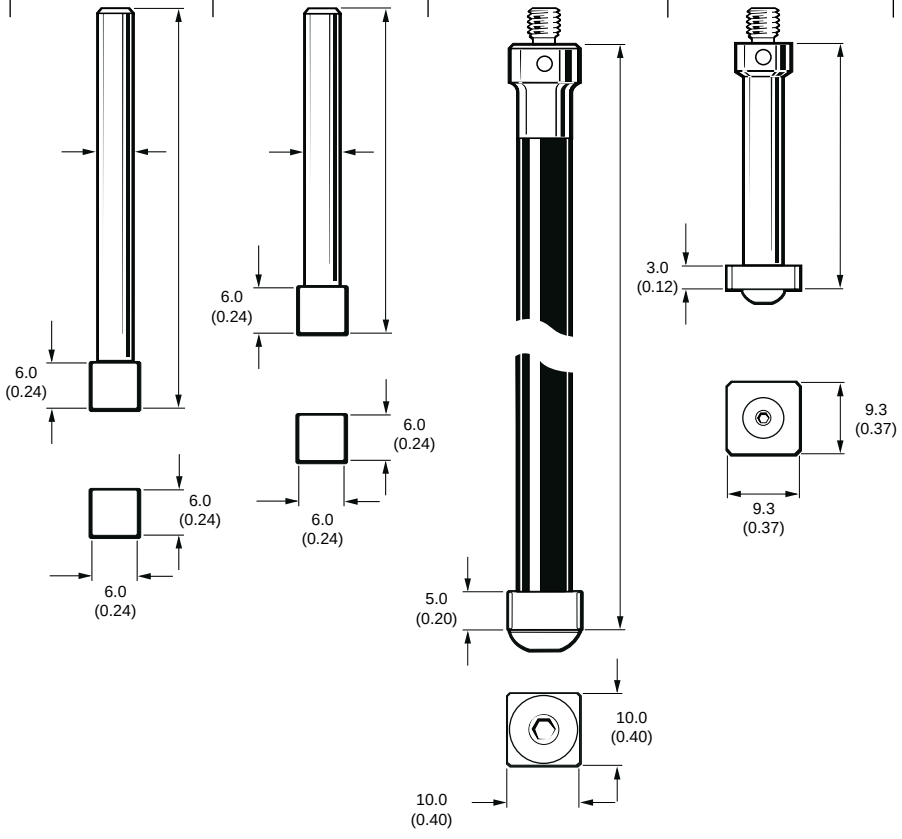


Horizontal machining applications

* Order also requires 2 x P-SC13-0404

Tool datuming styli

Part number	A-5000-3212 Stainless steel	A-5000-6701 Stainless steel	A-5000-6713 Aluminum	A-5000-6403 Stainless steel
Overall length mm (inch)	53.0 (2.09)	43.0 (1.70)	96.5 (3.80)	32.5 (1.28)
Stem dia. mm (inch)	4.5 (0.18)	4.5 (0.18)	7.5 (0.30)	5.4 (0.22)
Mass grammes	4.5	4.3	21.9	11.0



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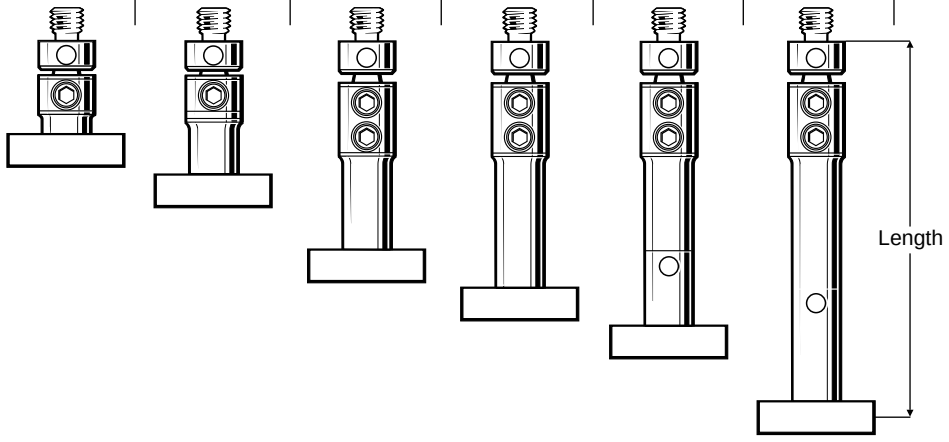
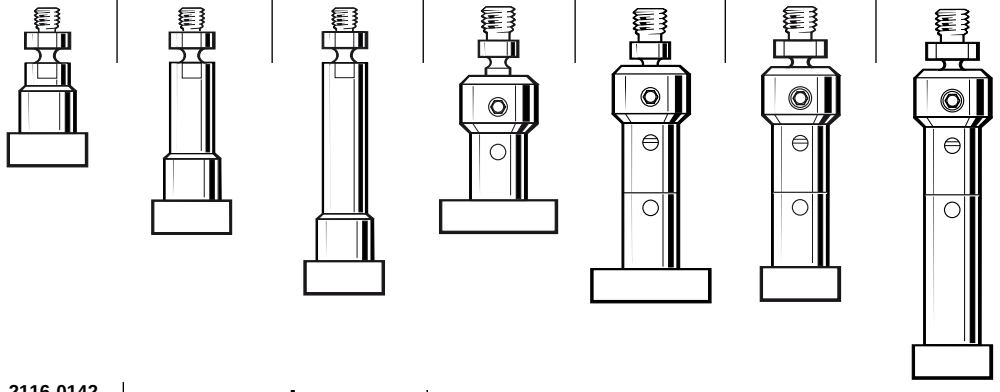
Tool datuming styli – continued

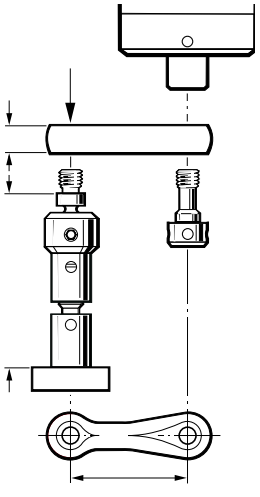
Part number	A-2197-0157 Tungsten steel	A-2197-0158 Tungsten steel	A-2197-0159 Tungsten steel	A-2197-0160 Tungsten steel	A-2197-0161 Tungsten steel	A-2197-0162 Tungsten steel
Length mm (inch)	14.2 (0.56)	19.5 (0.77)	29.5 (1.16)	34.5 (1.36)	39.5 (1.55)	49.5 (1.95)
Mass grammes	14.86	16.0	20.0	20.7	21.8	23.5
For use on	HPPA	HPPA	HPPA	HPPA	HPPA	HPPA
	HPMA	HPMA	HPMA	HPMA	HPMA	HPMA
	HPRA	HPRA	HPRA	HPRA	HPRA	HPRA
	RP3	RP3	RP3	RP3	RP3	RP3



Part number	A-2008-0601	A-2008-0602	A-2008-0603	A-2048-2050	A-2048-2051	A-2116-0140	A-2116-0141
	M3	M3	M3	M4	M4	M4	M4
	Tungsten steel	Tungsten steel	Tungsten steel	Tungsten steel	Tungsten steel	Tungsten steel	Tungsten steel
Length mm (inch)	15.4 (0.61)	24.0 (0.96)	32.4 (1.27)	23.2 (0.91)	32.0 (1.26)	32.0 (1.26)	42.0 (1.65)
Mass grammes	9.1	8.0	8.95	18.14	20.64	13.56	16.05
For use on	TS20	TS20	TS20	HPA (M6 MTG)	HPA (M6 MTG)	TSA	TSA



Part number	A-2116-0142
Length mm (inch)	30.3 (0.40)
Mass grammes	22.6
For use on	TSA



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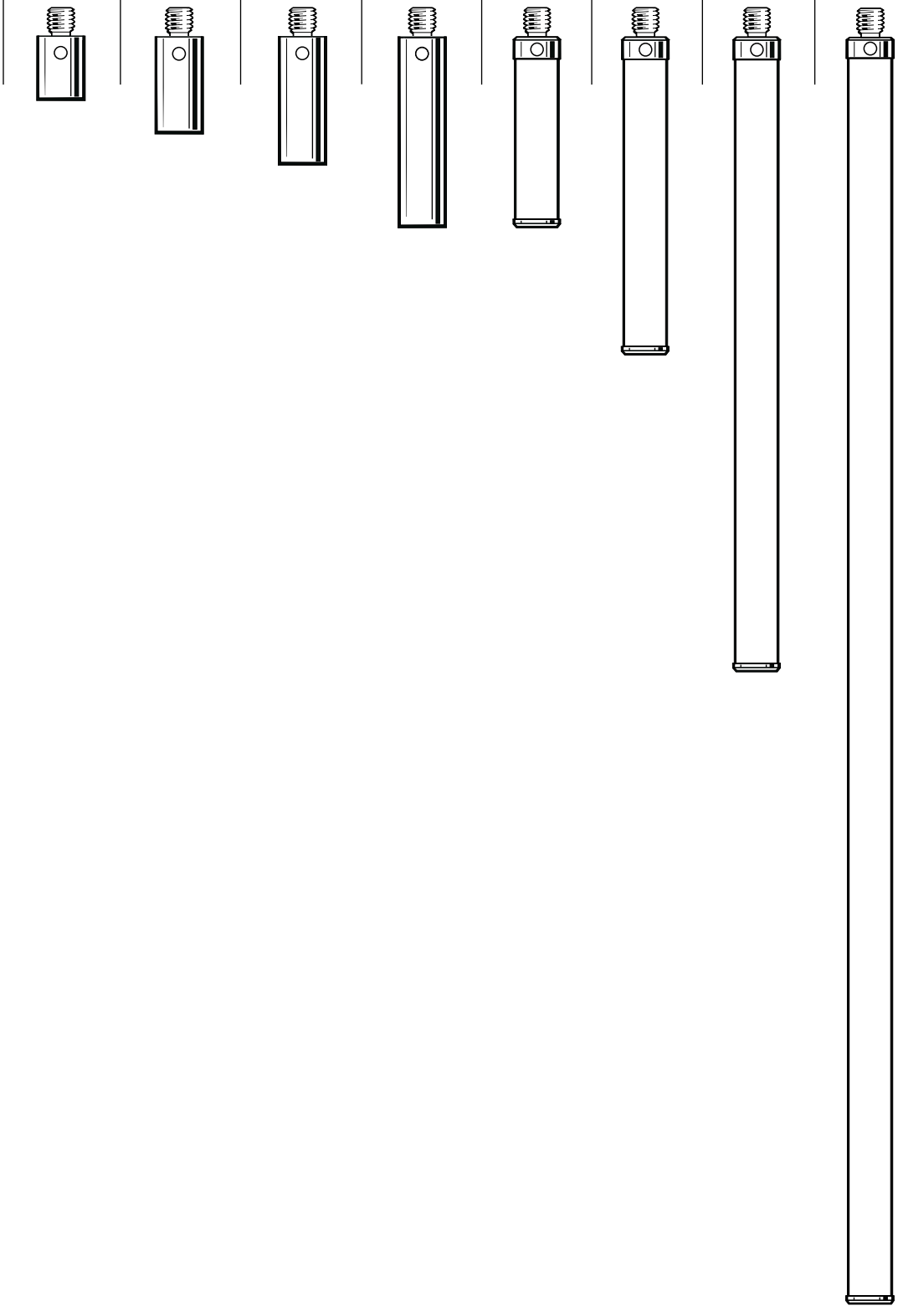
Stylus extensions

Part number	M-5000-7583 Stainless steel	M-5000-7584 Stainless steel	M-5000-7585 Stainless steel	M-5000-7586 Stainless steel	A-5000-7754 Ceramic	A-5000-7755 Ceramic	A-5000-7727 Ceramic	A-5003-0587 Ceramic
Length mm (inch)	10.0 (0.40)	15.0 (0.60)	20.0 (0.79)	30.0 (1.19)	30.0 (1.19)	50.0 (1.97)	100.0 (3.94)	200.0 (7.87)
Stem dia. mm (in.)	7.0 (0.28)	7.0 (0.28)	7.0 (0.28)	7.0 (0.28)	7.4 (0.29)	7.4 (0.29)	7.4 (0.29)	7.4 (0.29)
Mass grammes	2.4	3.7	4.8	7.4	5.1	6.7	10.6	18.4



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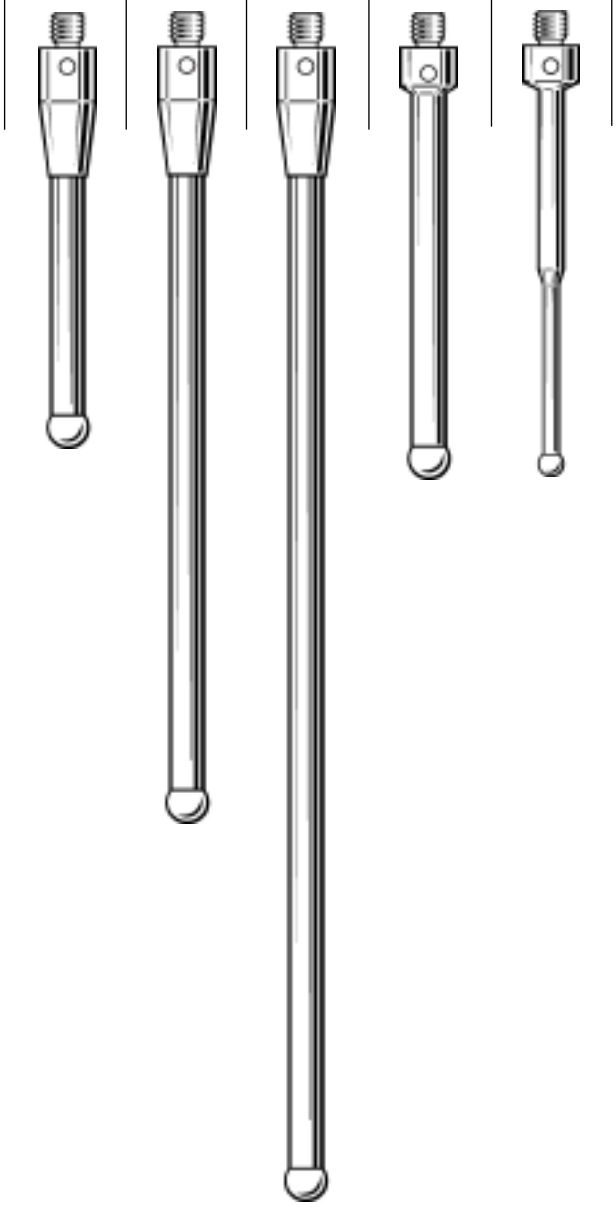
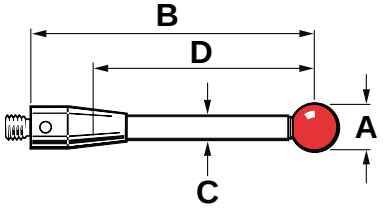
Tungsten carbide styli (stainless steel stems)

Part number		A-5000-7670	A-5000-7671	A-5000-7672	A-5000-9685	A-5000-9697
A	Ball dia. mm (inch)	5.0 (0.20)	5.0 (0.20)	5.0 (0.20)	5.0 (0.20)	3.0 (0.12)
B	Length mm (inch)	50.0 (1.97)	100.0 (3.94)	150.0 (5.91)	54.0 (2.12)	55.0 (2.17)
C	Stem dia. mm (in.)	4.5 (0.18)	4.5 (0.18)	4.5 (0.18)	3.9 (0.15)	1.9 (0.07)
D	EWL* mm (inch)	35.0 (1.38)	85.0 (3.35)	135.0 (5.31)	50.0 (1.97)	25.0 (0.99)
	Mass grammes	6.2	11.9	18.2	6.9	3.8





* Effective working length

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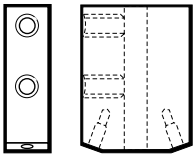
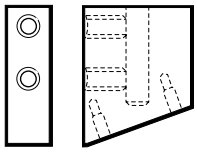
Walter styli

M1.4 thread styli

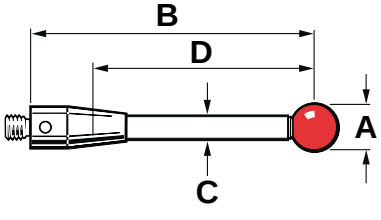
Part number		A-5003-3814	A-5003-3045	A-5003-3042	A-5000-9860	A-5003-1699
		M1.4	M1.4	M1.4	M1.4	M1.4
Stem material		Tungsten carbide	Stainless steel	Tungsten carbide	Tungsten carbide	Stainless steel
Ball material		Tungsten carbide	Tungsten carbide	Ruby	Tungsten carbide	Tungsten carbide
A	Ball dia. mm (inch)	0.5 (0.02)	1.0 (0.04)	0.5 (0.02)	1.0 (0.04)	0.6 (0.02)
B	Length mm (inch)	12.5 (0.49)	25.0 (0.98)	12.5 (0.49)	13.0 (0.51)	12.75 (0.50)
D	EWL* mm (inch)	1.5 (0.059)	1.5 (0.059)	3.0 (0.12)	1.0 (0.04)	1.0 (0.04)
	Mass grammes	0.2	1.1	0.19	0.22	0.41

Adaptors

Part number	A-5003-1448	A-5000-9724
D3 MTG	2 x M1.4 adaptor 20°	M1.4 adaptor 20°
Mass grammes	9.73	8.31
		

Crash protection device

Part number	M-5000-9712
Length mm (inch)	16.0 (0.63)
Mass grammes	2



* Effective working length

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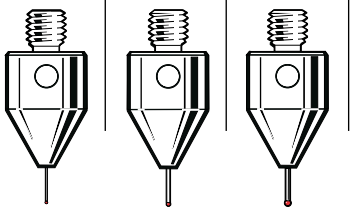
M5 threaded stylus range

Ruby micro ball styli (tungsten carbide stems)

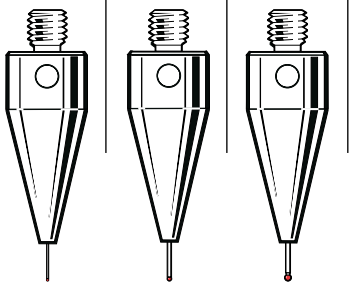
Part number		A-5003-5201	A-5003-5202	A-5003-5203
A	Ball dia. mm (inch)	0.3 (0.012)	0.5 (0.02)	0.7 (0.03)
B	Length mm (inch)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
C	Stem dia. mm (in.)	0.2 (0.01)	0.4 (0.02)	0.5 (0.02)
D	EWL* mm (inch)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
	Mass grammes	6.5	6.5	6.5

20 mm range



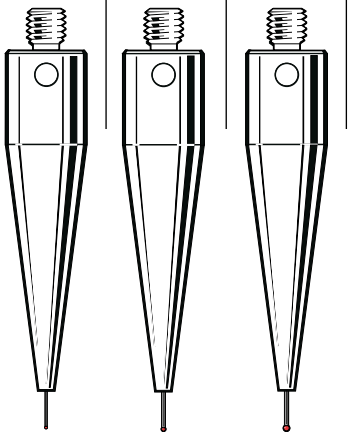
A-5003-5211	A-5003-5212	A-5003-5213
0.3 (0.012)	0.5 (0.02)	0.7 (0.03)
30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
0.2 (0.01)	0.4 (0.02)	0.5 (0.02)
3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
8.95	8.95	8.98

30 mm range



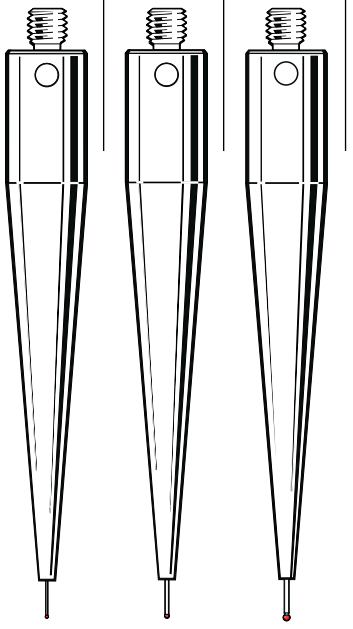
Part number		A-5003-5225	A-5003-5226	A-5003-5227
A	Ball dia. mm (inch)	0.3 (0.012)	0.5 (0.02)	0.7 (0.03)
B	Length mm (inch)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in.)	0.2 (0.01)	0.4 (0.02)	0.5 (0.02)
D	EWL* mm (inch)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
	Mass grammes	15.79	15.79	15.79

50 mm range



A-5003-5240	A-5003-5241	A-5003-5242
0.3 (0.012)	0.5 (0.02)	0.7 (0.03)
75.0 (2.96)	75.0 (2.96)	75.0 (2.96)
0.2 (0.01)	0.4 (0.02)	0.5 (0.02)
3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
23.84	23.84	23.84

75 mm range



* Effective working length

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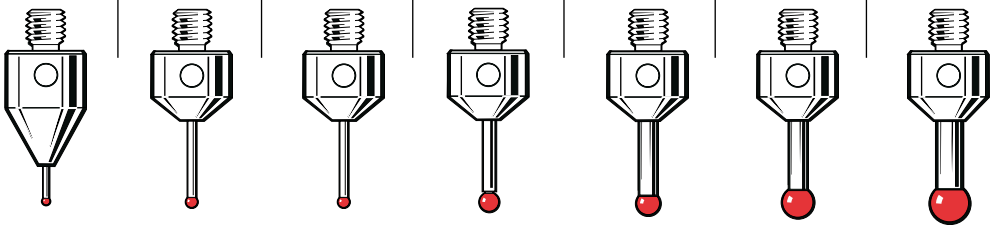
Ruby ball styli (tungsten carbide stems)

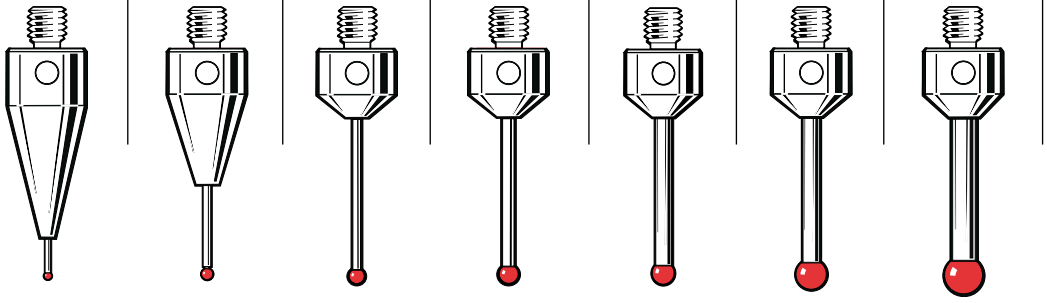
Ball material		Part number						
Ruby		A-5003-5204	A-5003-5205	A-5003-5206	A-5003-5207	A-5003-5208	A-5003-5209	A-5003-5210
Silicon nitride		–	–	A-5003-5732	–	–	A-5003-5733	–
Zirconia		–	–	A-5003-5746	–	–	A-5003-5747	–
A	Ball dia. mm (inch)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
C	Stem dia. mm (in.)	0.7 (0.03)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	3.0 (0.12)
D	EWL* mm (inch)	5.0 (0.20)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.9 (0.47)	11.5 (0.45)
	Mass grammes	6.52	4.68	4.70	4.84	5.12	5.19	6.06

20 mm range



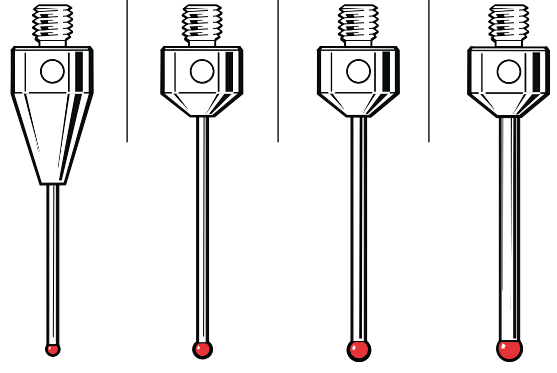
Part number		A-5003-5214	A-5003-5215	A-5003-5216	A-5003-5217	A-5003-5218	A-5003-5219	A-5003-5220
A	Ball dia. mm (inch)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)
B	Length mm (inch)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)	30.0 (1.19)
C	Stem dia. mm (in.)	0.7 (0.03)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	3.0 (0.12)
D	EWL* mm (inch)	5.0 (0.20)	12.0 (0.48)	21.0 (0.83)	21.0 (0.83)	21.0 (0.83)	21.9 (0.86)	21.5 (0.85)
	Mass grammes	9.01	7.28	4.81	5.14	5.58	5.64	7.10

30 mm range



Part number		A-5003-5221	A-5003-5222	A-5003-5223	A-5003-5224
A	Ball dia. mm (inch)	1.5 (0.06)	2.0 (0.08)	2.5 (0.10)	3.0 (0.12)
B	Length mm (inch)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)	40.0 (1.58)
C	Stem dia. mm (in.)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)
D	EWL* mm (inch)	22.0 (0.87)	31.0 (1.23)	31.0 (1.23)	31.0 (1.23)
	Mass grammes	7.39	4.93	5.40	6.04

40 mm range



* Effective working length

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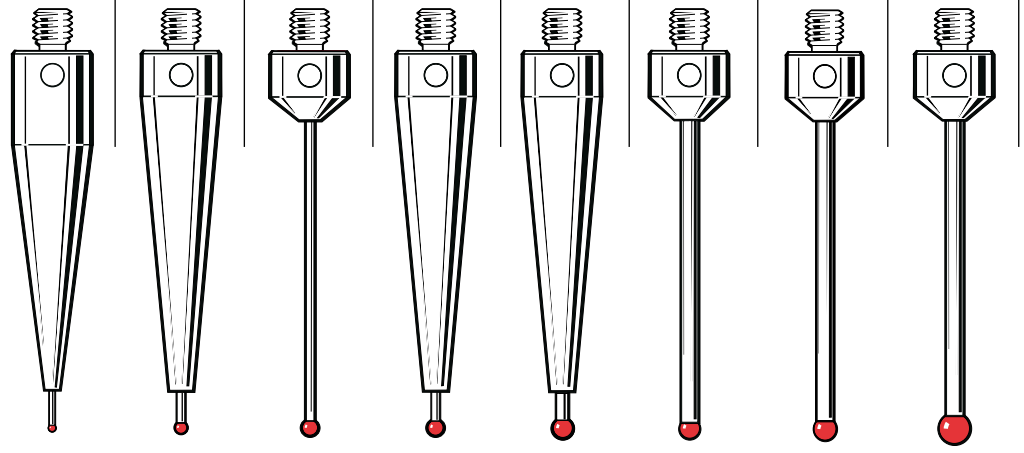
Ruby ball styli (<5 mm ball diameter) (tungsten carbide stems)

	Part number	A-5003-5228	A-5003-5229	A-5003-5230	A-5003-5231	A-5003-5233	A-5003-5232	A-5003-5234	A-5003-5235
A	Ball dia. mm (inch)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	2.5 (0.10)	2.5 (0.10)	3.0 (0.12)	4.0 (0.16)
B	Length mm (inch)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C	Stem dia. mm (in.)	0.7 (0.03)	1.0 (0.04)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)	2.0 (0.08)	2.0 (0.08)	2.0 (0.08)
D	EWL* mm (inch)	5.0 (0.20)	5.0 (0.20)	41.0 (1.62)	5.0 (0.20)	5.0 (0.20)	41.0 (1.62)	41.0 (1.62)	41.9 (1.65)
	Mass grammes	15.81	14.82	5.05	14.85	14.94	6.48	6.50	6.55

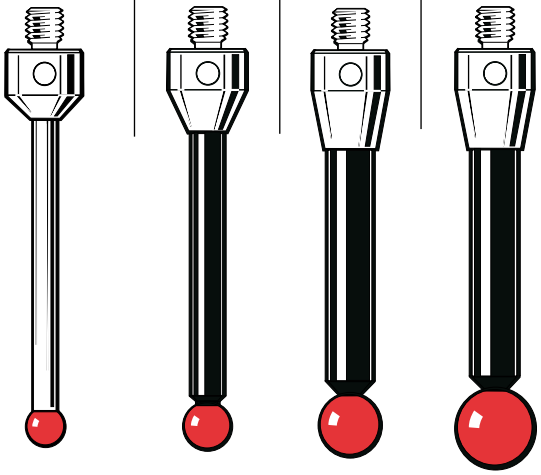
50 mm range

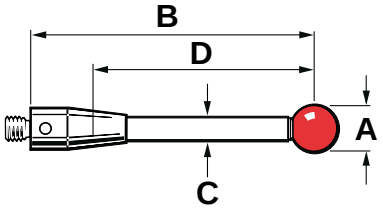


Ruby ball styli (≥5 mm ball diameter)

Ball material	Part number			
Ruby	A-5003-5236	A-5003-5237	A-5003-5238	A-5003-5239
Silicon nitride	–	A-5003-5734	–	–
Zirconia	–	A-5003-5748	–	–
	Tungsten carbide	Carbon fiber	Carbon fiber	Carbon fiber
A Ball dia. mm (inch)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)	10.0 (0.40)
B Length mm (inch)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
C Stem dia. mm (inch)	3.0 (0.12)	4.0 (0.16)	6.0 (0.24)	6.0 (0.24)
D EWL* mm (inch)	41.5 (1.63)	39.5 (1.56)	39.5 (1.56)	44.5 (1.75)
Mass grammes	9.19	6.10	7.96	8.91

50 mm range





* Effective working length

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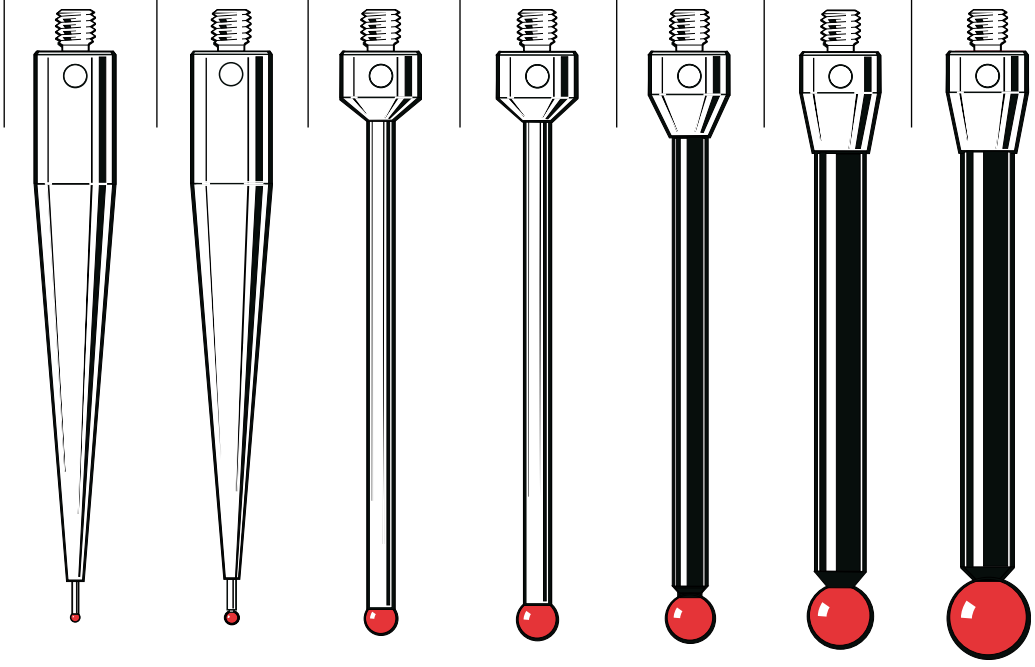
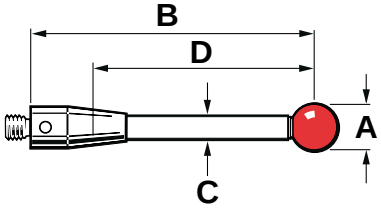
Ruby ball styli (1 mm – 10 mm ball diameter)

Part number		A-5003-5243 Tungsten carbide	A-5003-5244 Tungsten carbide	A-5003-5248 Tungsten carbide	A-5003-5249 Tungsten carbide	A-5003-5250 Carbon fiber	A-5003-5251 Carbon fiber	A-5003-5252 Carbon fiber
A	Ball dia. mm (inch)	1.0 (0.04)	1.5 (0.06)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)	10.0 (0.40)
B	Length mm (inch)	75.0 (2.96)	75.0 (2.96)	75.0 (2.96)	75.0 (2.96)	75.0 (2.96)	75.0 (2.96)	75.0 (2.96)
C	Stem dia. mm (inch)	0.7 (0.03)	1.0 (0.04)	3.0 (0.12)	3.0 (0.12)	4.0 (0.16)	6.0 (0.24)	6.0 (0.24)
D	EWL* mm (inch)	5.0 (0.20)	5.0 (0.20)	66.0 (2.60)	66.0 (2.60)	65.1 (2.56)	64.5 (2.54)	69.5 (2.74)
	Mass grammes	23.86	23.90	11.61	11.80	6.59	9.06	10.01

75 mm range





* Effective working length

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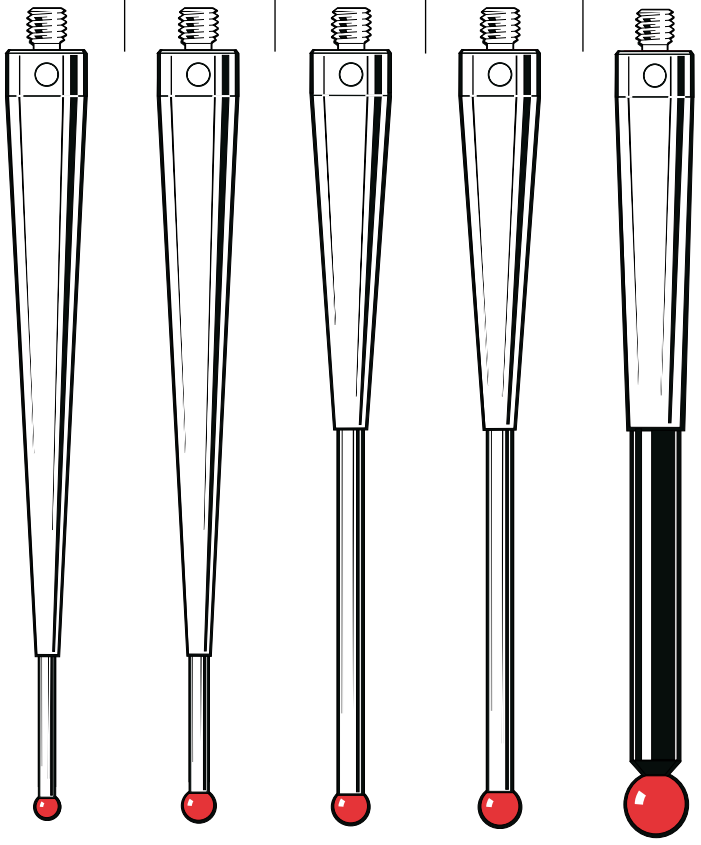
Ruby ball styli (≤50 mm EWL)

Part number		A-5003-5253 Tungsten carbide	A-5003-5255 Tungsten carbide	A-5003-5256 Tungsten carbide	A-5003-5257 Tungsten carbide	A-5003-5261 Carbon fiber
A	Ball dia. mm (inch)	3.0 (0.12)	4.0 (0.16)	4.0 (0.16)	5.0 (0.20)	8.0 (0.32)
B	Length mm (inch)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)
C	Stem dia. mm (inch)	2.0 (0.08)	2.0 (0.08)	3.0 (0.12)	3.0 (0.12)	6.0 (0.24)
D	EWL* mm (inch)	20.0 (0.79)	30.5 (1.20)	50.0 (1.97)	50.0 (1.97)	50.0 (1.97)
	Mass grammes	25.71	25.75	23.07	23.31	22.97

100 mm range



* Effective working length

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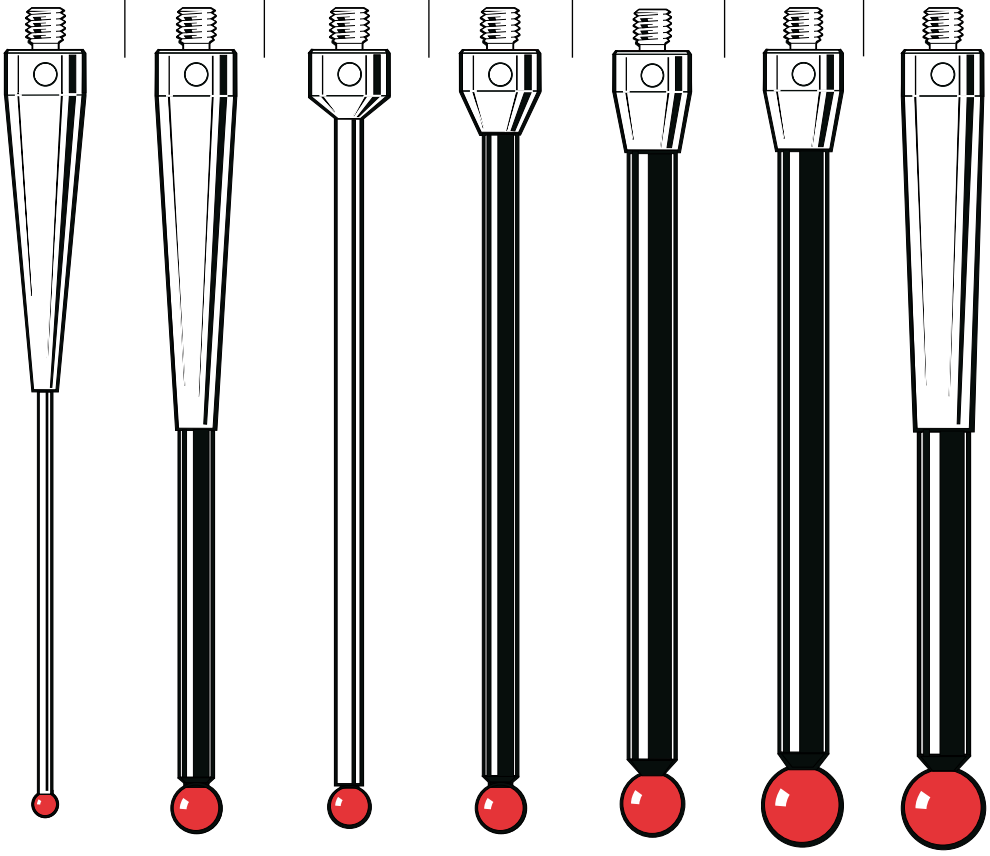
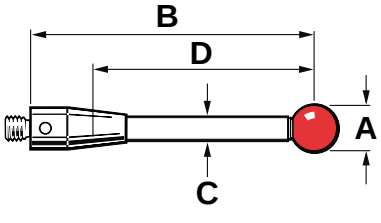
Ruby ball styli (⩾50 mm EWL)

Ball material		Part number						
Ruby		A-5003-5254	A-5003-5259	A-5003-5258	A-5003-5260	A-5003-5262	A-5003-5264	A-5003-5263
Silicon nitride		–	A-5003-5735	–	–	–	–	–
Zirconia		–	A-5003-5749	–	–	–	–	–
		Tungsten carbide	Carbon fiber	Tungsten carbide	Carbon fiber	Carbon fiber	Carbon fiber	Carbon fiber
A	Ball dia. mm (inch)	3.0 (0.12)	6.0 (0.24)	5.0 (0.20)	6.0 (0.24)	8.0 (0.32)	10.0 (0.40)	10.0 (0.40)
B	Length mm (inch)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)	100.0 (3.94)
C	Stem dia. mm (inch)	1.5 (0.06)	4.0 (0.16)	3.0 (0.12)	4.0 (0.16)	6.0 (0.24)	6.0 (0.24)	6.0 (0.24)
D	EWL* mm (inch)	55.0 (2.17)	58.9 (2.32)	91.0 (3.59)	90.1 (3.55)	89.5 (3.52)	94.5 (3.72)	95.5 (3.76)
	Mass grammes	16.30	19.66	14.40	7.08	10.17	11.11	23.91

100 mm range





* Effective working length

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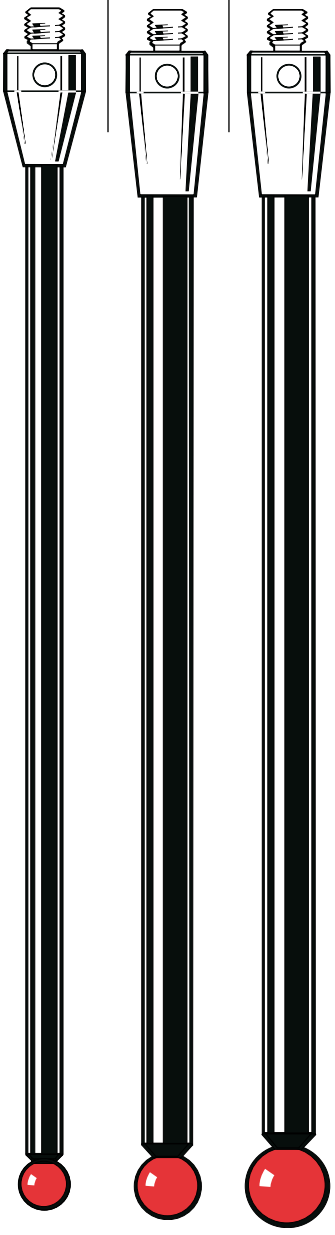
Ruby ball styli (carbon fiber stems)

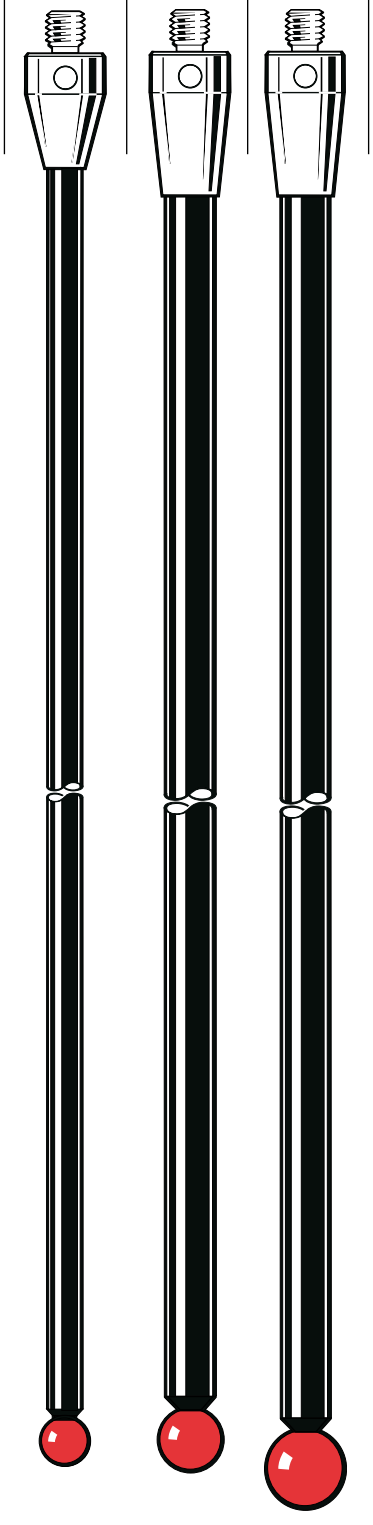
Part number		A-5003-5265	A-5003-5266	A-5003-5267
A	Ball dia. mm (inch)	6.0 (0.24)	8.0 (0.32)	10.0 (0.40)
B	Length mm (inch)	150.0 (5.91)	150.0 (5.91)	150.0 (5.91)
C	Stem dia. mm (in.)	4.0 (0.16)	6.0 (0.24)	6.0 (0.24)
D	EWL* mm (inch)	137.0 (5.39)	135.0 (5.31)	144.5 (5.69)
	Mass grammes	9.09	13.71	14.66

150 mm range



A-5003-5268	A-5003-5269	A-5003-5270
6.0 (0.24)	8.0 (0.32)	10.0 (0.40)
200.0 (7.88)	200.0 (7.88)	200.0 (7.88)
4.0 (0.16)	6.0 (0.24)	6.0 (0.24)
187.0 (7.36)	180.0 (7.09)	194.5 (7.66)
10.07	15.92	16.87

200 mm range



* Effective working length

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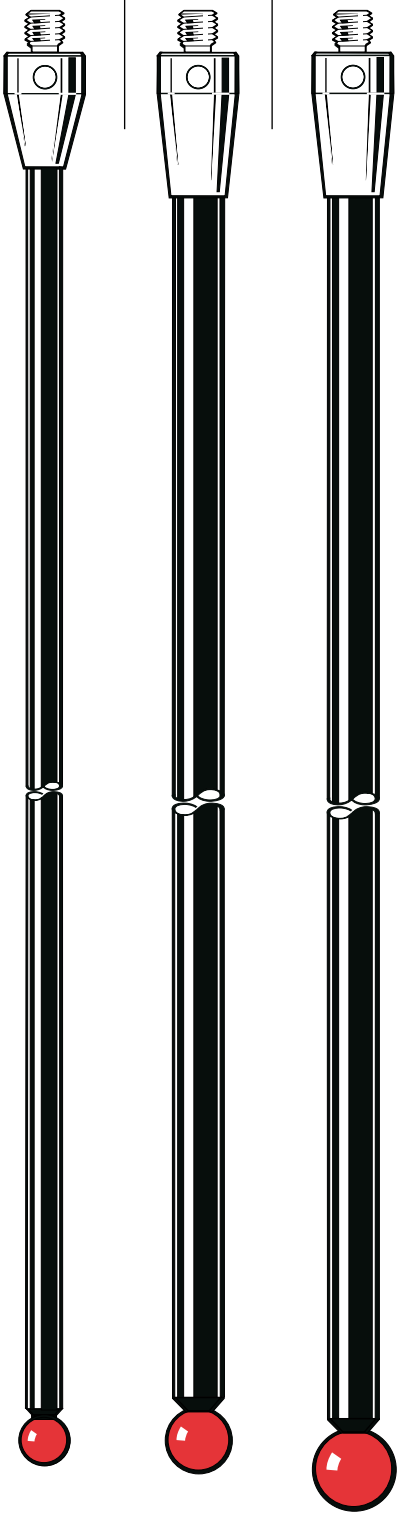
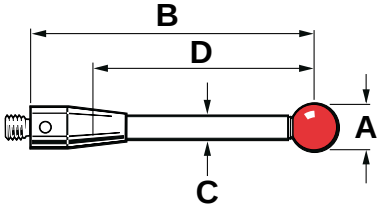
Ruby ball styli (carbon fiber stems)

Part number		A-5003-5271	A-5003-5272	A-5003-5273
A	Ball dia. mm (inch)	6.0 (0.24)	8.0 (0.32)	10.0 (0.40)
B	Length mm (inch)	300.0 (11.82)	300.0 (11.82)	300.0 (11.82)
C	Stem dia. mm (inch)	4.0 (0.16)	6.0 (0.24)	6.0 (0.24)
D	EWL* mm (inch)	287.0 (11.30)	280.0 (11.03)	294.5 (11.59)
	Mass grammes	12.02	20.33	21.28

300 mm range





* Effective working length

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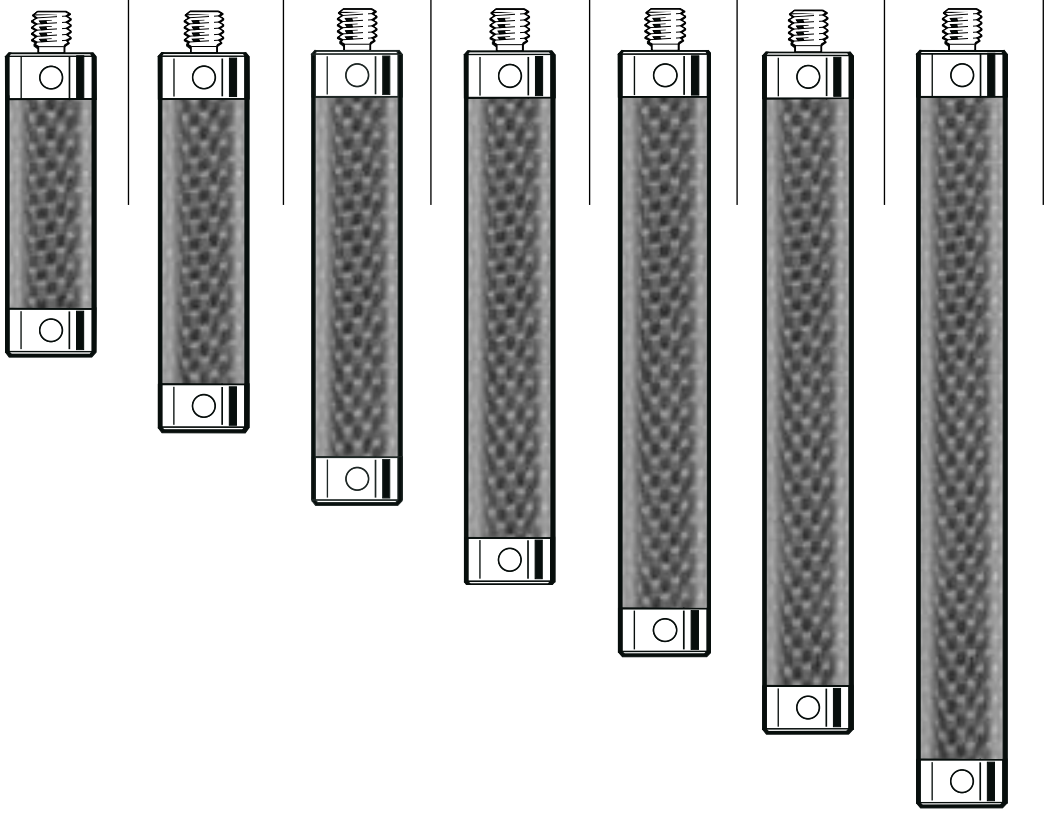
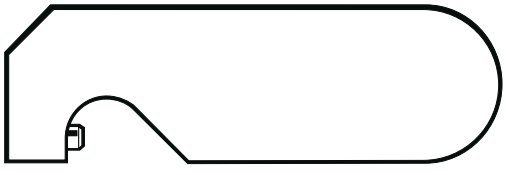
Stylus extensions – thermo stable carbon fiber stems, titanium ends

Part number	A-5555-0647	A-5555-0648	A-5555-0649	A-5555-0623	A-5555-0650	A-5555-0651	A-5555-0652
Length mm (inch)	40.0 (1.58)	50.0 (1.97)	60.0 (2.37)	70.0 (2.76)	80.0 (3.15)	90.0 (3.55)	100.0 (3.94)
Stem dia. mm (inch)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)
Mass grammes	7.6	8.3	9.0	9.7	10.4	11.1	11.8

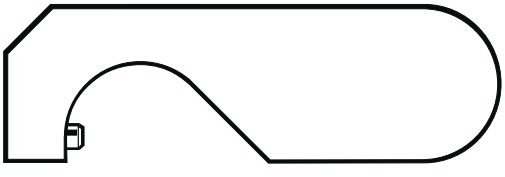


M5 extension tools

A-5003-6134
For M5 threaded extensions with
11 mm (0.44 mm stem diameter



A-5003-6135
For M5 threaded extensions with
20 mm (0.79 in) stem diameter



Note: These tools are designed to fit stylus extensions for Renishaw probes without causing any internal damage.

** Special

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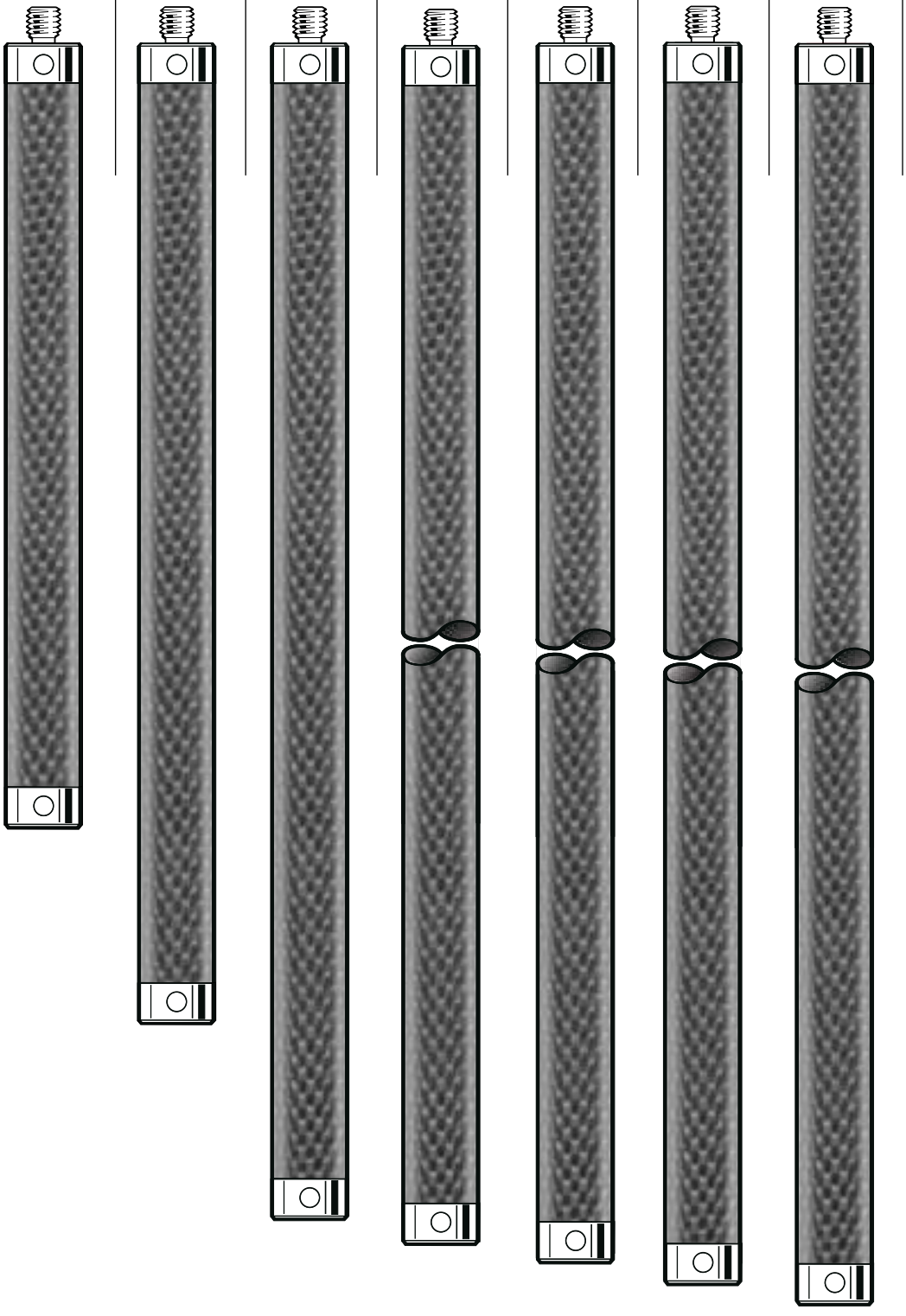
Stylus extensions – thermo stable carbon fiber stems, titanium ends

Part number	A-5555-0425	A-5555-0424	A-5555-0653	A-5555-0654	A-5555-0655	A-5555-0642	A-5555-0656
Length mm (inch)	120.0 (4.73)	150.0 (5.91)	180.0 (7.09)	200.0 (7.88)	250.0 (9.85)	300.0 (11.82)	400.0 (15.76)
Stem dia. mm (inch)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)
Mass grammes	13.2	15.4	17.5	18.9	22.4	25.9	33.0



** Special

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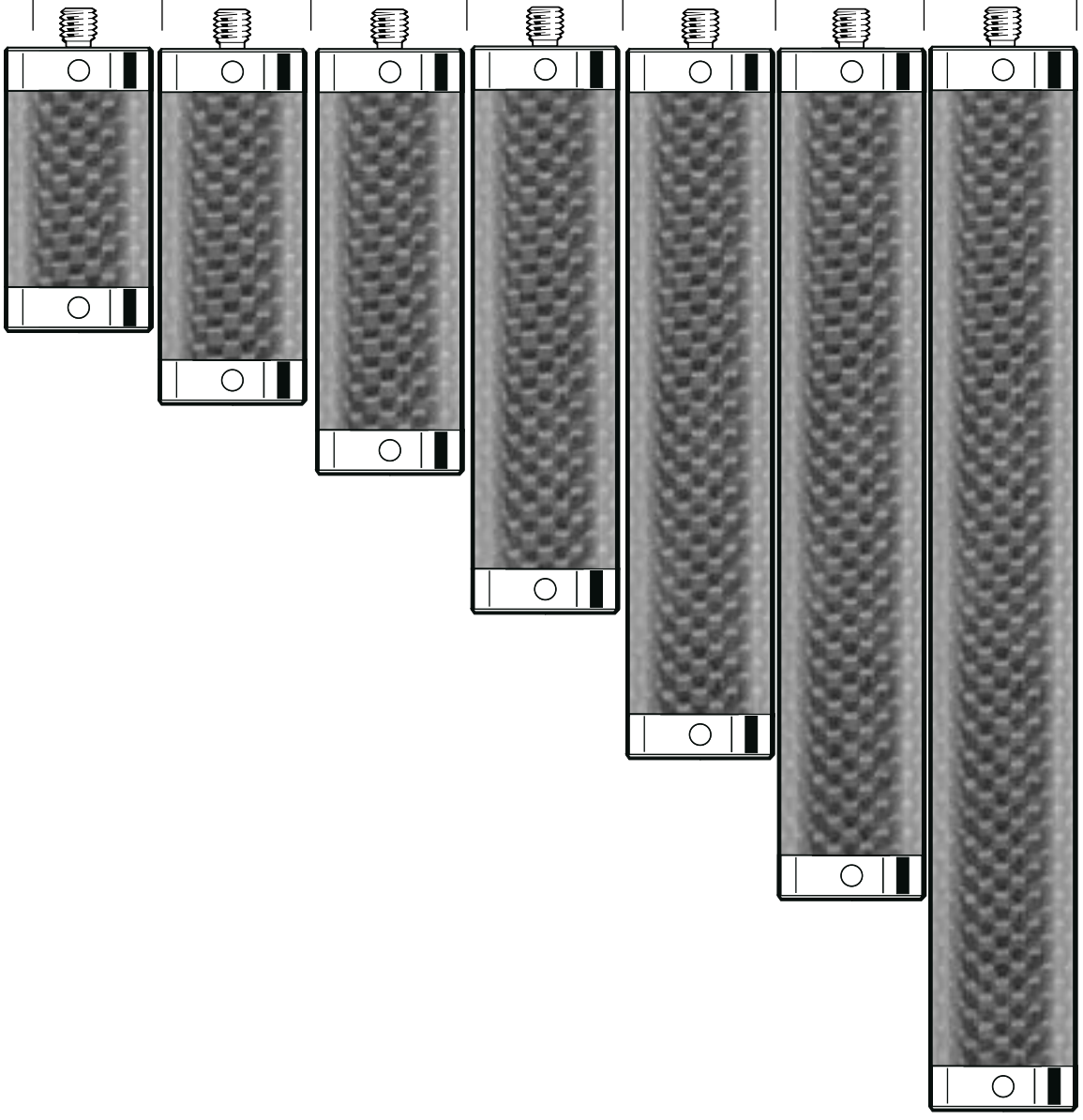
Stylus extensions – thermo stable carbon fiber stems, titanium ends

Part number	A-5555-0620	A-5555-0657	A-5555-0658	A-5555-0621	A-5555-0659	A-5555-0660	A-5555-0661
Length mm (inch)	40.0 (1.58)	50.0 (1.97)	60.0 (2.37)	80.0 (3.15)	100.0 (3.94)	120.0 (4.73)	150.0 (5.91)
Stem dia. mm (in.)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
Mass grammes	23.8	25.1	26.5	29.3	32.1	34.9	39.0



** Special

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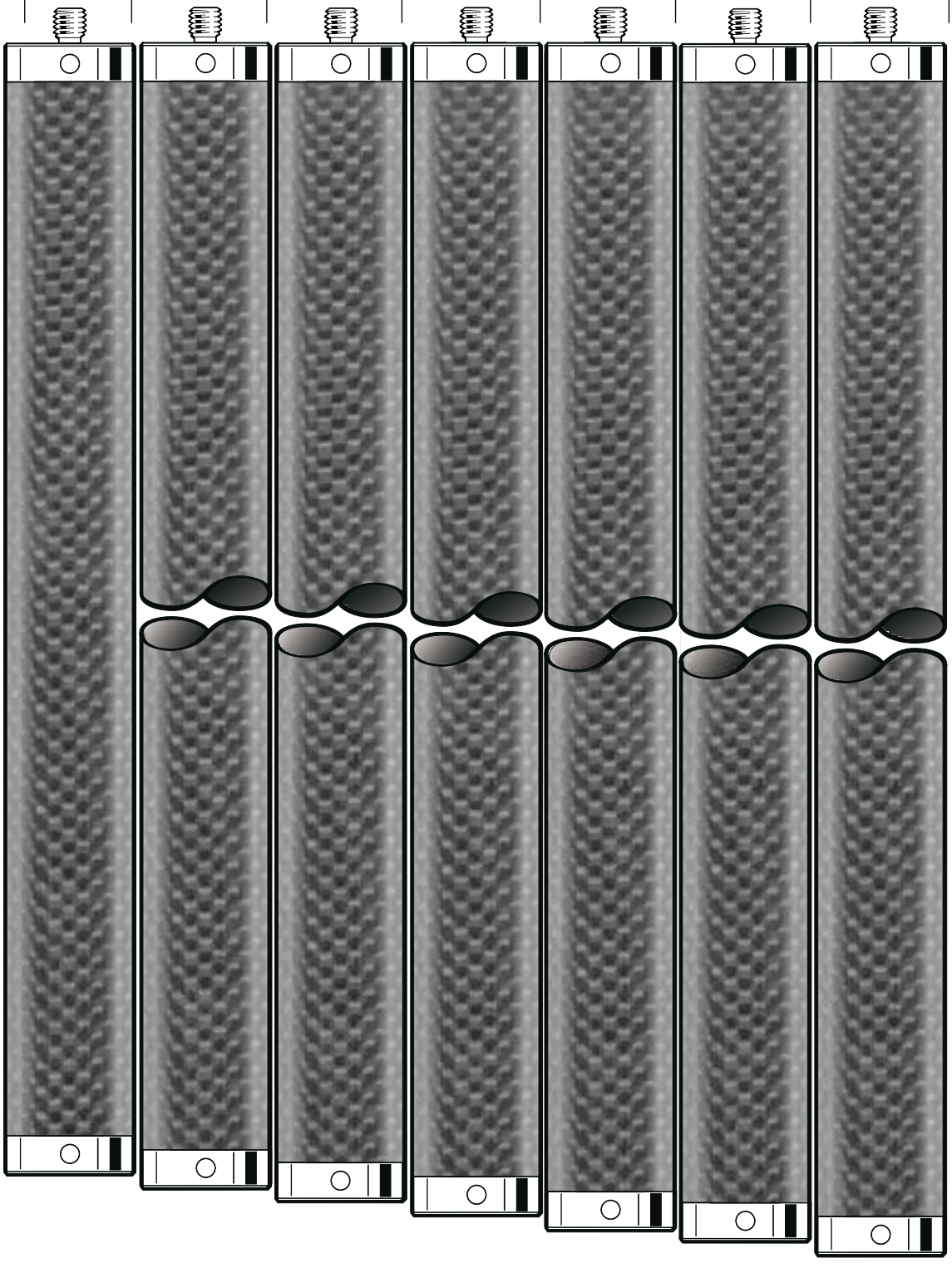
Stylus extensions – thermo stable carbon fiber stems, titanium ends

Part number	A-5555-0662	A-5555-0663	A-5555-0427	A-5555-0664	A-5555-0665	A-5555-0667	A-5555-0668
Length mm (inch)	180.0 (7.09)	200.0 (7.88)	250.0 (9.85)	300.0 (11.82)	400.0 (15.76)	500.0 (19.70)	600.0 (23.64)
Stem dia. mm (in.)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
Mass grammes	43.2	46.0	52.9	59.9	73.8	87.7	101.5



** Special

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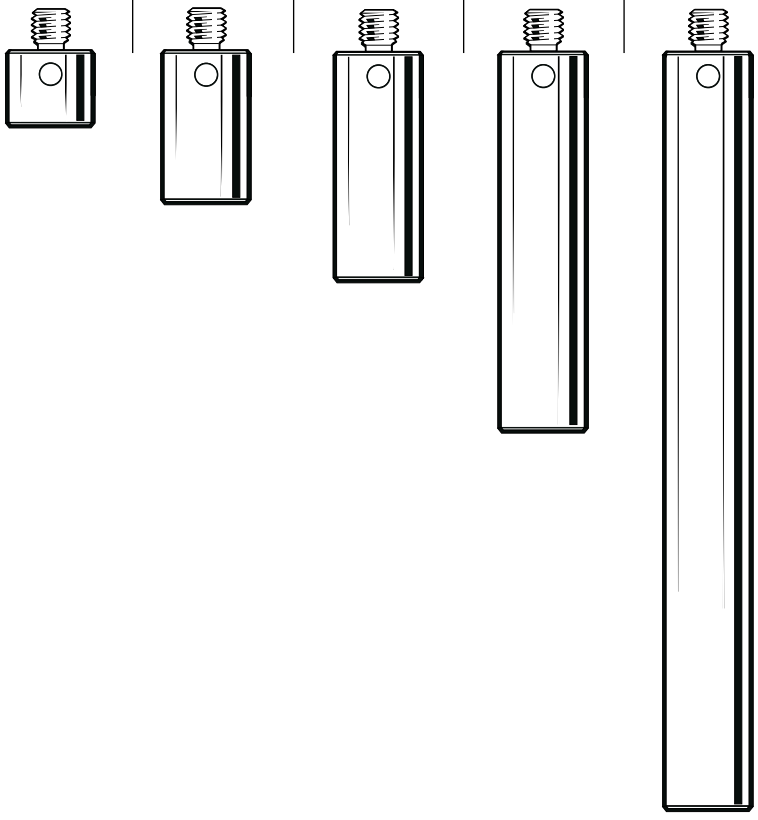
Stylus extensions – stainless steel

Part number	A-5555-0142	A-5555-0140	A-5555-0669	A-5555-0670	A-5555-0136
Length mm (inch)	10.0 (0.40)	20.0 (0.79)	30.0 (1.19)	50.0 (1.97)	100.0 (3.94)
Stem dia. mm (inch)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)	11.0 (0.44)
Mass grammes	6.0	13.0	20.0	34.8	73.0



** Special

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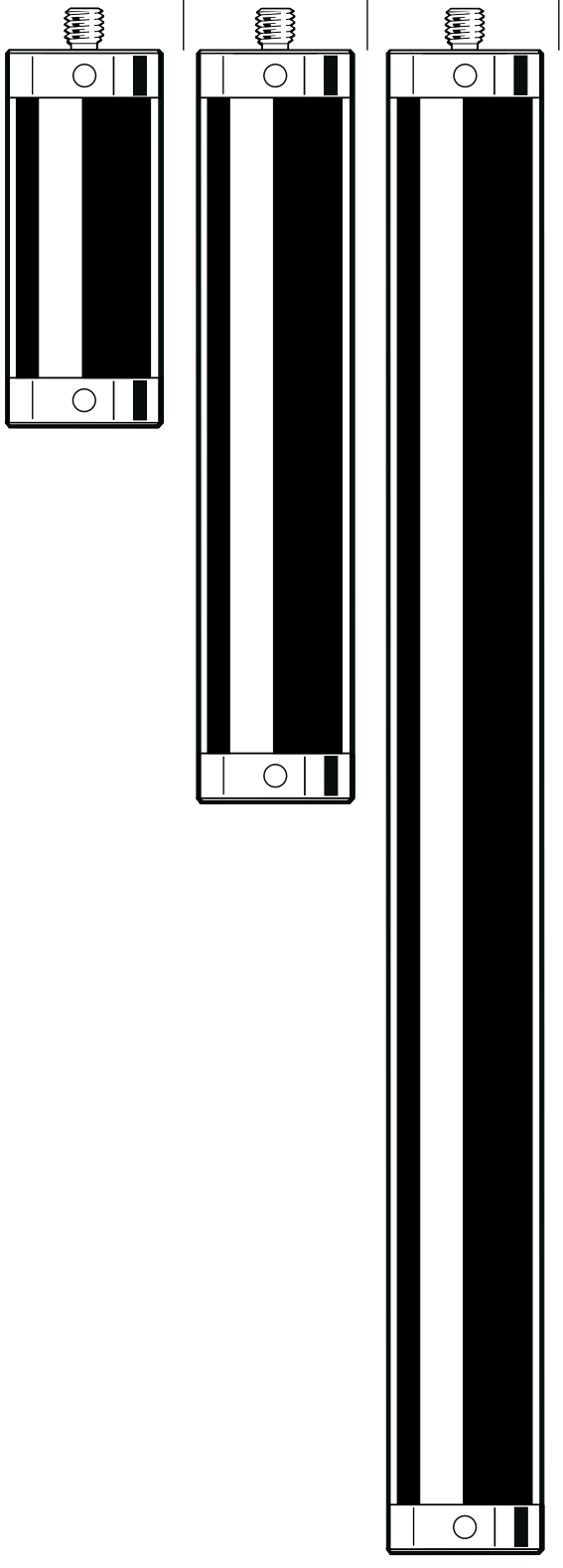
Stylus extensions – aluminum

Part number	A-5555-0671	A-5555-0127	A-5555-0125
Length mm (inch)	50.0 (1.97)	100.0 (3.94)	200.0 (7.88)
Stem dia. mm (inch)	20.0 (0.79)	20.0 (0.79)	20.0 (0.79)
Mass grammes	47.2	50.0	85.0



** Special

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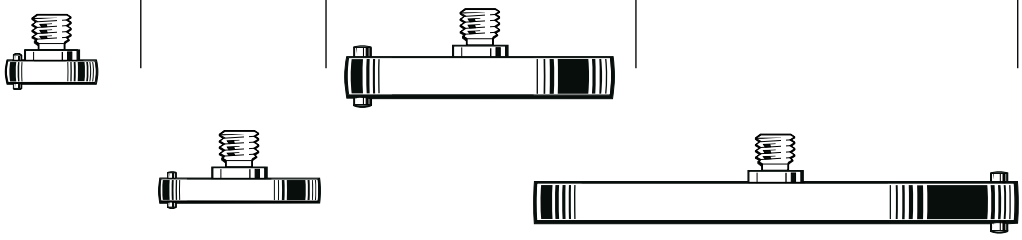
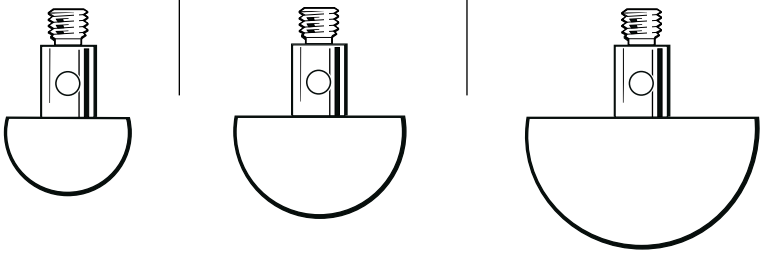
Disk styli

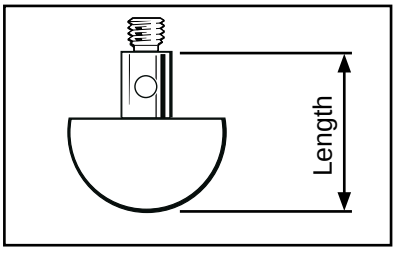
Part number	A-5003-5288 Silver steel	A-5003-5289 Silver steel	A-5003-5290 Silver steel	A-5003-5291 Silver steel
Disk diameter mm (inch)	12.0 (0.48)	21.0 (0.83)	35.0 (1.38)	63.5 (2.51)
Disk depth mm (inch)	3.0 (0.12)	3.0 (0.12)	5.0 (0.20)	5.0 (0.20)
Roller depth mm (inch)	5.0 (0.20)	5.0 (0.20)	8.0 (0.32)	8.0 (0.32)
Mass grammes	2.52	5.23	14.00	51.00



Hemispherical styli

Part number	A-5003-5275 Ceramic	A-5003-5276 Ceramic	A-5003-5277 Ceramic
Ball diameter mm (inch)	16.0 (0.63)	22.0 (0.87)	30.0 (1.19)
Length mm (inch)	19.5 (0.77)	20.5 (0.81)	24.5 (0.96)
Mass grammes	7.0	14.0	19.7



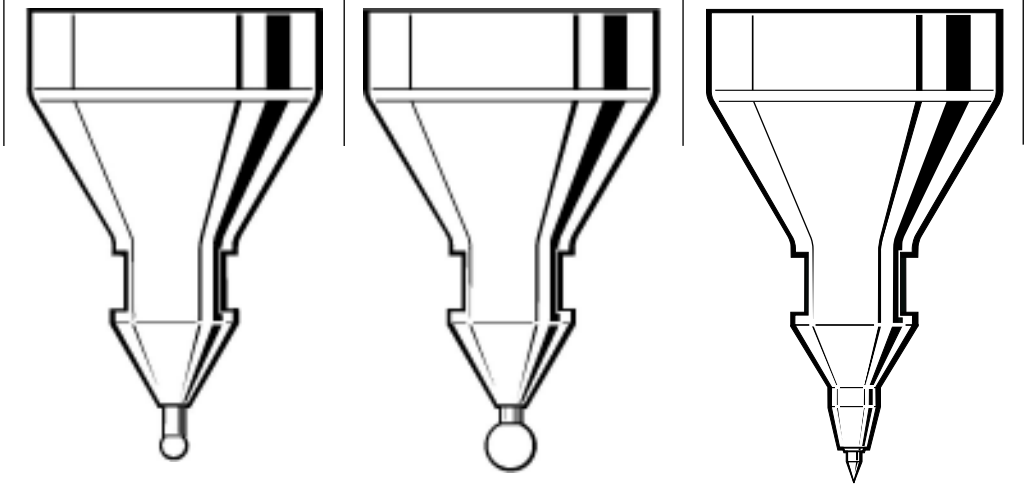


Styli for FARO® arms

These styli have been designed especially for use on FARO® portable arm CMMs. Their robust design and construction utilizes Grade 5 Zirconia balls that have a high fracture toughness. The balls are bonded to the high strength tungsten carbide stem with impact resistant adhesive, and specialist construction techniques have been incorporated to ensure that the joint between the body and stem is extremely rigid and virtually indestructible.

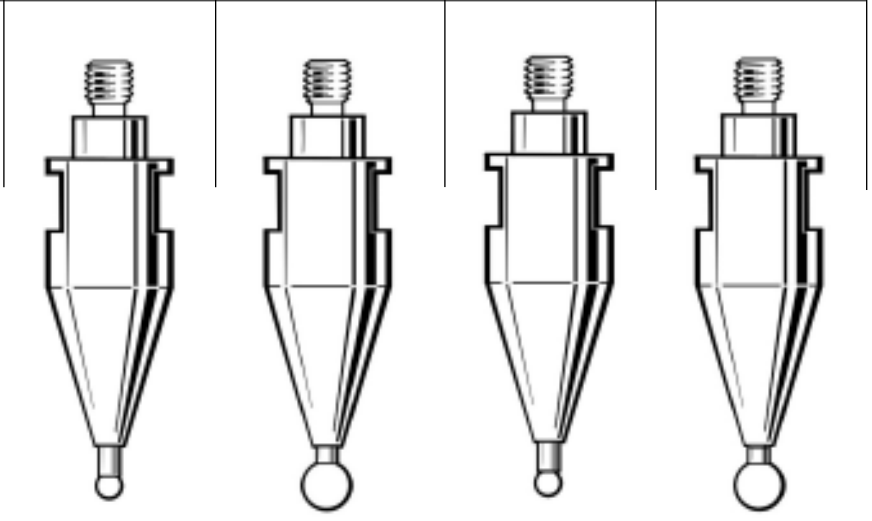
1¼–20 UN thread styli

Part number	A-5003-7673	A-5003-7674	A-5003-7675
Ball dia (mm)	3	6	N/A
Length (mm)	57	57	57



M6 styli

Part number	A-5003-7676	A-5003-7677	A-5003-7678	A-5003-7679
Ball dia	1/8 in	1/4 in	3 mm	6 mm
Length (mm)	43	43	43	43



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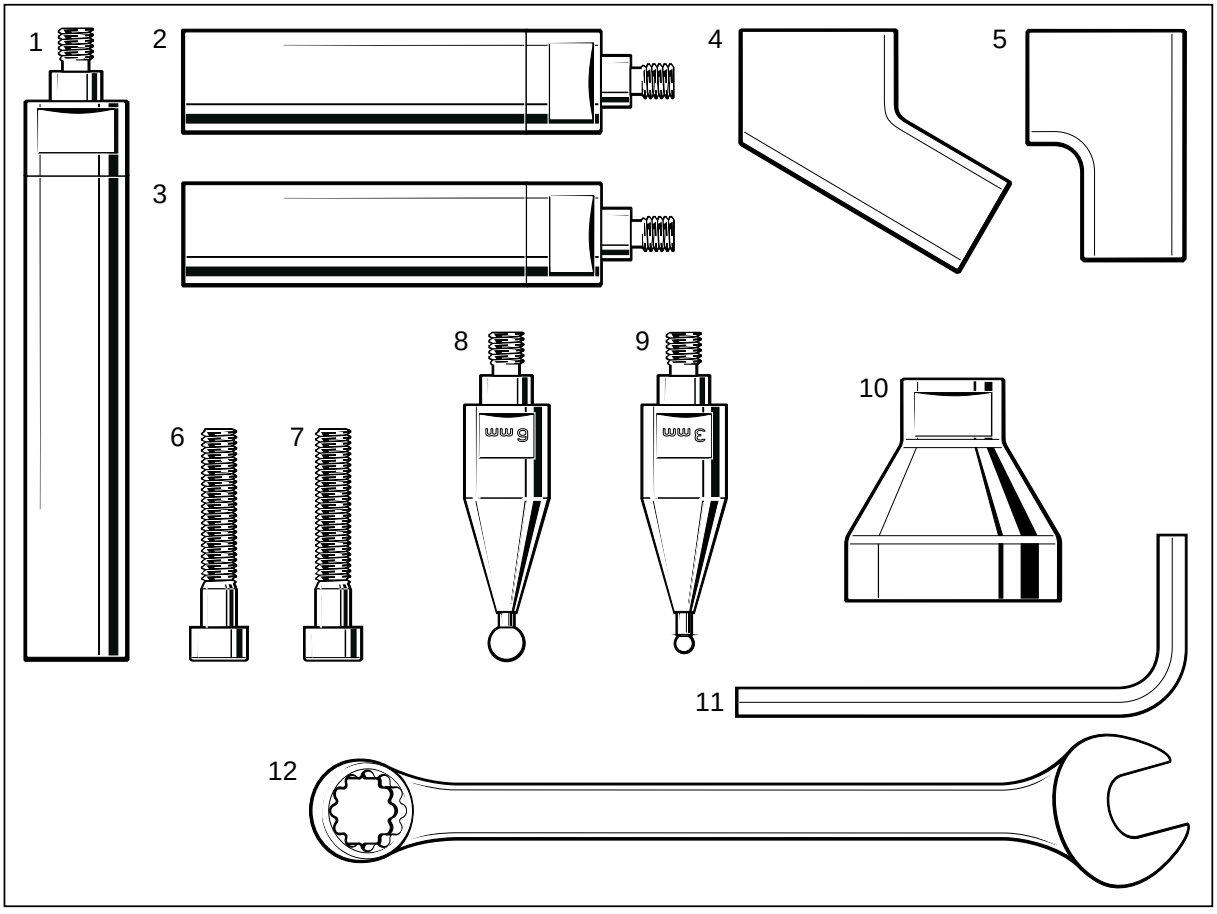
FARO® kit

A-5003-9190 FARO® probe kit 0073 12 piece



Position	Part number	Description
1	A-5003-9127	M6M - M6F EXT L101.6 (4.0) D18 AL
2 and 3	A-5003-9126	M6M - M6F EXT L76.2 (3.0) D18 AL
4	A-5003-9186	M6F FARO EXT 60 DEG ADAPTOR
5	A-5003-9187	M6F FARO EXT 90 DEG ADAPTOR
6 and 7	P-SC08-0635	SCREW HEX SKT CAPHD M6X35 STST
8	A-5003-7679	STYLUS M6 DIA 6 MM 21 PROBE 0067
9	A-5003-7678	STYLUS M6 DIA 3 MM 21 PROBE 0065
10	M-5003-9133	FARO ADAPTOR 1.25-20 UN-M6
11	P-TL01-0500	SKT WRENCH 5MM A/F
12	P-TL09-0012	12 MM A/F OPEN/RING SPANNER

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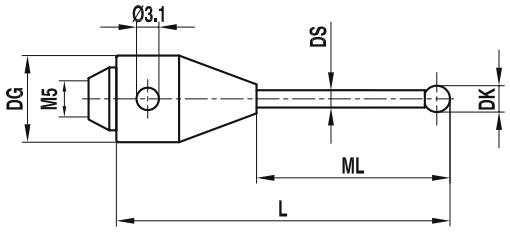
M5 styli, adaptors and accessories for Zeiss analog probe systems

Schematics not shown to scale

Styli with conical stem base, titanium base, tungsten carbide stem, ruby ball

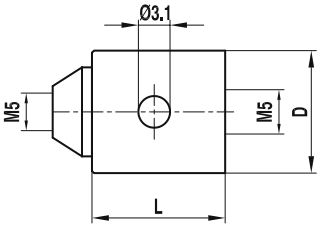
Part number	A-5555-0001	A-5555-0002	A-5555-0003	A-5555-0004	A-5555-0005	A-5555-0006	A-5555-0007	A-5555-0008
Zeiss order number	600331-9096	602030-9003	602030-9004	600331-9098	602030-9005	602030-9006	602030-9007	600331-9097
DK (mm)	3	3	3	3	5	5	5	8
L (mm)	50	75	75	115	75	75	100	80
DG (mm)	19	19	19	19	19	19	19	19
ML (mm)	21.5	35	50	18	35	50	60	57
DS (mm)	2	2	2	2	3.5	3.5	3.5	6
Weight (g)	23	30	22	56	34	28	38	45

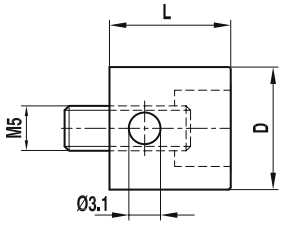
Part number	A-5555-0009	A-5555-0010	A-5555-0011
Zeiss order number	600331-9099	602030-9008	602030-9009
d (mm)	8	8	8
L (mm)	100	115	140
D (mm)	19	19	19
ML (mm)	60	56.5	100
ds (mm)	6	6	6
Weight (g)	57	68	74



Adaptor with thread/conical stem base, stainless steel

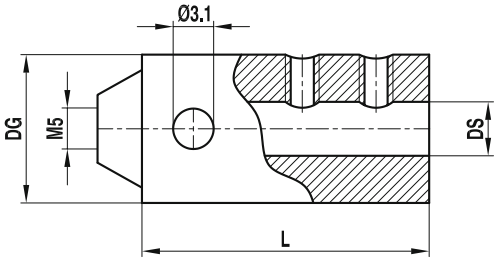
Part number	A-5555-0013	A-5555-0014
Zeiss order number	600331-0001	602030-0018
D (mm)	18	18
L (mm)	10	12
Weight (g)	12	10





Conical holder, stainless steel

Part number	A-5555-0015	A-5555-0016	A-5555-0017
Zeiss order number	602030-8350	602030-8351	602030-8352
DS (mm)	2	3.5	6
L (mm)	24	24	24
DG (mm)	19	19	19
Weight (g)	29	29	29



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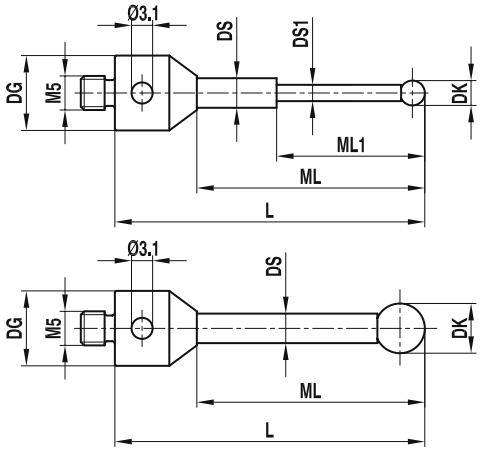
Tungsten carbide styli, titanium base, tungsten carbide stem, ruby ball

Schematics not shown to scale

Part number	A-5555-0018	A-5555-0019	A-5555-0020	A-5555-0021	A-5555-0022	A-5555-0023	A-5555-0024	A-5555-0025
Zeiss order number	602030-9010	600342-8020	602030-9011	600342-8021	600342-8025	602030-9012	602030-9013	600342-8022
DK (mm)	3	3	3	3	4	4	5	5
L (mm)	25	33.5	50	58	33.5	64	50	53
DG (mm)	11	11	11	11	11	11	11	11
ML (mm)	15	23.5	40	48	23.5	54	40	43
DS (mm)	2	2	2	2	2	2	3.5	3.5
Weight (g)	4	4.5	5.2	5.5	4.5	5.9	9	9.8

Part number	A-5555-0026	A-5555-0027	A-5555-0028	A-5555-0029	A-5555-0030	A-5555-0031	A-5555-0032	A-5555-0033
Zeiss order number	602030-9015	600342-8026	600342-8027	600342-8023	600342-8123	602030-9014	602030-9016	602030-9017
DK (mm)	5	6	7	8	8	8	8	8
L (mm)	75	54	55	63.5	63.5	74	75	100
DG (mm)	11	11	11	11	19	11	11	11
ML (mm)	65	44	45	50.5	41.5	61	62	87
DS (mm)	3.5	3.5	3.5	6	6	6	6	6
Weight (g)	12.5	10	10	24.8	36.7	29.5	30	40

Part number	A-5555-0034	A-5555-0035	A-5555-0036	A-5555-0037	A-5555-0038	A-5555-0039	A-5555-0040
Zeiss order number	600342-8024	600342-8124	600342-8028	600342-8128	600342-8029	600342-8129	602030-9018
DK (mm)	8	8	9	9	10	10	10
L (mm)	114.5	114.5	64.5	64.5	65.5	65.5	118
DG (mm)	11	19	11	19	11	19	11
ML (mm)	101.5	92.5	51.5	42.5	52.5	43.5	105
DS (mm)	6	6	6	6	6	6	6
Weight (g)	45.8	57.5	26.3	36.8	25.8	37.5	47.3



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Tungsten carbide styli, titanium base, tungsten carbide stem, silicon nitride ball

Schematics not shown to scale

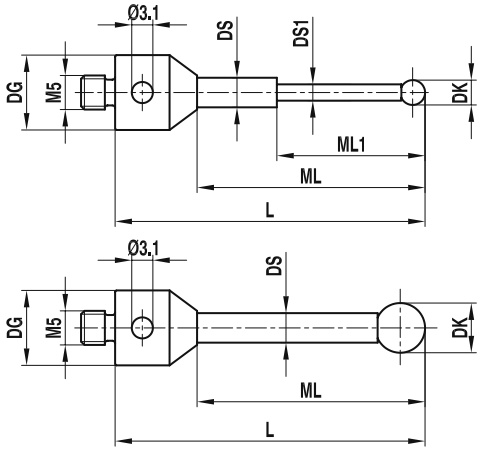
Part number	A-5555-3777	A-5555-3778	A-5555-3779	A-5555-3780	A-5555-3781	A-5555-3782	A-5555-3783	A-5555-3784
Zeiss order number	–	–	–	–	–	–	–	–
DK (mm)	1	1	1	1.5	2	2	2	2
L (mm)	20	25	30	30	20	25	30	40
DG (mm)	11	11	11	11	11	11	11	11
ML1 (mm)	5	5	5	8	–	–	–	–
ML (mm)	10	15	20	20	10	15	20	30
DS1 (mm)	0.8	0.8	0.8	1	–	–	–	–
DS (mm)	1	1	1	1.5	1	1	1.5	1.5
Weight (g)	3.5	3.5	3.8	3.5	3.5	3.5	3.8	4

Part number	A-5555-3785	A-5555-3786	A-5555-3787	A-5555-3734	A-5555-3788	A-5555-3789
Zeiss order number	626115-0303-025	626115-0300-033	626115-0302-050	626115-0300-058	626115-0400-034	6262115-0401-064
DK (mm)	3	3	3	3	4	4
L (mm)	25	33.5	50	58	33.5	64
DG (mm)	11	11	11	11	11	11
ML (mm)	15	23.5	40	48	23.5	54
DS (mm)	2	2	2	2	2	2
Weight (g)	4	4.5	5.3	5.5	4.5	5.9

Part number	A-5555-3790	A-5555-3791	A-5555-3792	A-5555-3793	A-5555-3794	A-5555-3795
Zeiss order number	–	626115-0501-050	626115-0501-053	626115-0500-075	–	–
DK (mm)	5	5	5	5	5	6
L (mm)	30	50	53	75	100	54
DG (mm)	11	11	11	11	11	11
ML (mm)	20	40	43	65	90	44
DS (mm)	3.5	3.5	3.5	3.5	3.5	3.5
Weight (g)	8	9	9.8	12.5	18	10

Part number	A-5555-3796	A-5555-3797	A-5555-3798	A-5555-3799	A-5555-3800	A-5555-3801
Zeiss order number	–	626115-0800-064	626115-0800-075	626115-0801-100	626115-0800-115	–
DK (mm)	7	8	8	8	8	9
L (mm)	55	63.5	75	100	114.5	64.5
DG (mm)	11	11	11	11	11	11
ML (mm)	45	50.5	62	87	101.5	51.5
DS (mm)	3.5	6	6	6	6	6
Weight (g)	10	36.6	29.4	39.9	45.7	26.3

Part number	A-5555-3802	A-5555-3803	A-5555-3804
Zeiss order number	–	–	–
DK (mm)	10	10	10
L (mm)	65.5	118	150
DG (mm)	11	11	11
ML (mm)	52.5	105	135
DS (mm)	6	6	6
Weight (g)	25.8	47.3	60



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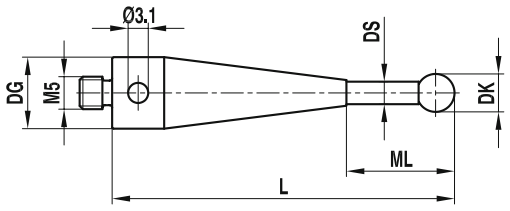
Reference styli (red dot), high-strength stainless steel base and stem, ruby ball

Schematics not shown to scale

Part number	A-5555-3805
Zeiss order number	600342-8023-010
DK (mm)	8
L (mm)	63.5
DG (mm)	11
ML (mm)	50.5
DS (mm)	6
Weight (g)	24.8



Thermo stable carbon fiber styli, titanium base, thermo stable carbon fiber stem, ruby ball

Part number	A-5555-1916	A-5555-1847	A-5555-0730	A-5555-3806	A-5555-1917	A-5555-0731
Zeiss order number	626105-0300-025	626105-0300-033	626105-0300-050	626105-0300-058	626105-0400-033	626105-0400-064
DK (mm)	3	3	3	3	4	4
L (mm)	25	33.5	50	58	33.5	64
DG (mm)	11	11	11	11	11	11
ML (mm)	15	23.5	40	48	23.5	54
DS (mm)	2	2	2	2	2	2
Weight (g)	4	4.2	4.5	4.9	4.2	4.6

Part number	A-5555-0732	A-5555-2013	A-5555-0735	A-5555-0410	A-5555-0733	A-5555-0734
Zeiss order number	626105-0510-050	–	626105-0510-075	626105-0510-100	626105-0610-054	626105-0710-055
DK (mm)	5	5	5	5	6	7
L (mm)	50	53	75	100	54	55
DG (mm)	11	11	11	11	11	11
ML (mm)	40	43	65	90	44	45
DS (mm)	3.5	3.5	3.5	3.5	3.5	3.5
Weight (g)	4.8	4.9	5	5.4	4.9	4.9

Part number	A-5555-3807	A-5555-2011	A-5555-1918	A-5555-3808	A-5555-9361	A-5555-1112
Zeiss order number	626105-0820-063	626105-0820-075	626105-0820-100	626105-0820-114	626105-0820-150	626105-0820-200
DK (mm)	8	8	8	8	8	8
L (mm)	63.5	75	100	114.5	150	200
DG (mm)	11	11	11	11	11	11
ML (mm)	50.5	62	87	101.5	137	187
DS (mm)	6	6	6	6	6	6
Weight (g)	7	7.3	7.5	9.5	11	13

Part number	A-5555-3809	A-5555-3810	A-5555-3811	A-5555-0643	A-5555-0644
Zeiss order number	–	626105-1020-065	626105-1020-118	626105-1020-150	626105-1020-200
DK (mm)	9	10	10	10	10
L (mm)	64.5	65.5	118	150	200
DG (mm)	11	11	11	11	11
ML (mm)	51.5	52.5	105	137	187
DS (mm)	6	6	6	6	6
Weight (g)	7.2	8	14.5	16	19

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Thermo stable carbon fiber styli, titanium base, thermo stable carbon fiber stem, silicon nitride ball

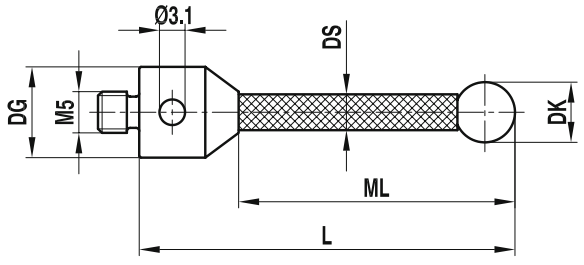
Schematics not shown to scale

Part number	A-5555-3812	A-5555-1828	A-5555-3813	A-5555-3814	A-5555-3815	A-5555-3816
Zeiss order number	–	626105-0301-033	–	626103-0301-058	–	–
DK (mm)	3	3	3	3	4	4
L (mm)	25	33.5	50	58	33.5	64
DG (mm)	11	11	11	11	11	11
ML (mm)	15	23.5	40	48	23.5	54
DS (mm)	2	2	2	2	2	2
Weight (g)	4	4.2	4.5	4.9	4.2	4.6

Part number	A-5555-3817	A-5555-0759	A-5555-2012	A-5555-9045	A-5555-3818	A-5555-3819
Zeiss order number	626105-0511-050	–	626105-0511-075	626105-0511-100	–	–
DK (mm)	5	5	5	5	6	7
L (mm)	50	53	75	100	54	55
DG (mm)	11	11	11	11	11	11
ML (mm)	40	43	65	90	44	45
DS (mm)	3.5	3.5	3.5	3.5	3.5	3.5
Weight (g)	4.8	4.9	5	5.4	4.9	4.9

Part number	A-5555-0720	A-5555-2010	A-5555-3820	A-5555-3821	A-5555-1169	A-5555-1179
Zeiss order number	626105-0821-063	–	626105-0821-100	626105-0821-114	626105-0821-150	626105-0821-200
DK (mm)	8	8	8	8	8	8
L (mm)	63.5	75	100	114.5	150	200
DG (mm)	11	11	11	11	11	11
ML (mm)	50.5	62	87	101.5	137	187
DS (mm)	6	6	6	6	6	6
Weight (g)	7	7.3	7.5	9.5	11	13

Part number	A-5555-3822	A-5555-3823	A-5555-3824	A-5555-3825	A-5555-1171
Zeiss order number	–	–	626105-1021-118	626105-1021-150	626105-1021-200
DK (mm)	9	10	10	10	10
L (mm)	64.5	65.5	118	150	200
DG (mm)	11	11	11	11	11
ML (mm)	51.5	52.5	105	137	187
DS (mm)	6	6	6	6	6
Weight (g)	7.2	8	14.5	16	19



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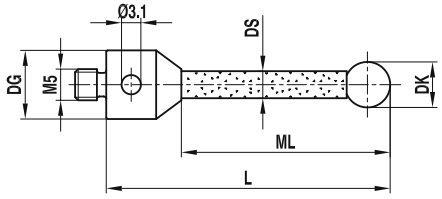
Ceramic styli, titanium base, ruby ball

Schematics not shown to scale

Part number	A-5555-0041	A-5555-0042	A-5555-0043	A-5555-0044	A-5555-0045	A-5555-0046	A-5555-0047	A-5555-0048
Zeiss order number	600342-8013	600342-8016	600342-8017	600342-8014	600342-8018	600342-8118	600342-8019	600342-8119
DK (mm)	5	6	7	8	9	9	10	10
L (mm)	53	54	55	63.5	64.5	64.5	65.5	65.5
DG (mm)	11	11	11	11	11	19	11	19
ML (mm)	43	44	45	50.5	51.5	42.5	52.5	43.5
DS (mm)	3.5	3.5	3.5	6	6	6	6	6
Weight (g)	4.6	4.7	5	8.3	8.4	21	9	38

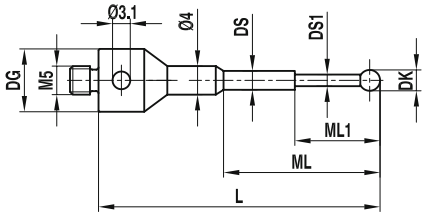
Part number	A-5555-0049	A-5555-0050	A-5555-0051
Zeiss order number	600342-8114	600342-8015	600342-8115
DK (mm)	8	8	8
L (mm)	63.5	114.5	114.5
DG (mm)	19	11	19
ML (mm)	41.5	101.5	92.5
DS (mm)	6	6	6
Weight (g)	33	11.8	38

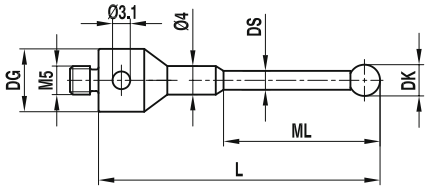


Small ball styli, stepped stem, stainless steel base, tungsten carbide stem, ruby ball

Part number	A-5555-0052	A-5555-0053	A-5555-0054	A-5555-0055	A-5555-0056	A-5555-0057	A-5555-0058	A-5555-0059
Zeiss order number	602030-8060	602030-8061	602030-8062	602030-8063	602030-8064	602030-8065	602030-8066	602030-8067
DK (mm)	0.8	1	1.35	1.35	1.5	1.5	2	2
L (mm)	32	32	32	44	32	44	32	44
DG (mm)	11	11	11	11	11	11	11	11
ML (mm)	12	12	12	19	12	19	12	19
ML1 (mm)	4.8	5.0	–	–	–	–	–	–
DS (mm)	1	1	1	1	1	1	1.5	1.5
DS1 (mm)	0.6	0.8	–	–	–	–	–	–
Weight (g)	6.8	6.8	6.9	7.5	6.5	7.5	7.3	8

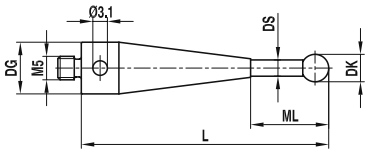
Part number	A-5555-0060	A-5555-0061	A-5555-0062	A-5555-0063
Zeiss order number	602030-8068	602030-8069	602030-8070	602030-8071
DK (mm)	2	2.5	2.5	2.5
L (mm)	58	32	44	58
DG (mm)	11	11	11	11
ML (mm)	33	12	19	33
DS (mm)	1.5	1.5	1.5	1.5
Weight (g)	8	7.3	8	8





Small ball styli, titanium base, tungsten carbide stem, ruby ball

Part number	A-5555-0064	A-5555-0065	A-5555-0066	A-5555-0067	A-5555-0068
Zeiss order number	602030-9019	602030-9020	602030-9021	602030-9022	602030-9023
DK (mm)	1	1.5	2	2.5	3.5
L (mm)	55	55	55	55	55
DG (mm)	11	11	11	11	11
ML (mm)	5	5	5	5	10
DS (mm)	0.8	1	1.5	2	2.5
Weight (g)	11.9	11.9	11.9	11.9	11.9



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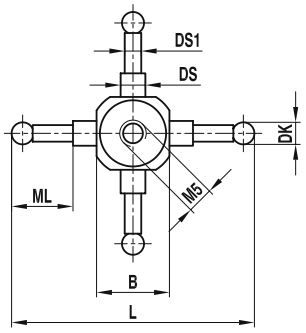
Cube star, titanium base, tungsten carbide stem, ruby ball

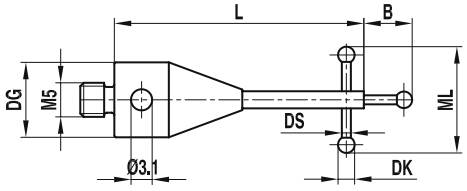
Schematics not shown to scale

Part number	A-5555-0069	A-5555-0070	A-5555-0071	A-5555-0072	A-5555-0073
Zeiss order number	602030-9024	602030-9025	602030-9026	602030-9027	602030-9028
DK (mm)	1	1.5	2	2.5	3.5
L (mm)	45	45	45	45	45
ML (mm)	7	7.5	7.5	8	15
DS (mm)	2	2	2	2	2
DS1 (mm)	0.8	1	1.5	1.5	–
B (mm)	15	15	15	15	15
Weight (g)	17.3	17.3	17.3	17.3	17.3



Styli for thread measurement, stainless steel base, tungsten carbide stem, ruby ball

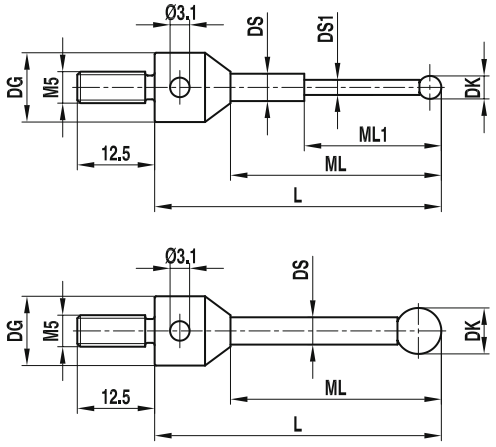
Part number	A-5555-0074	A-5555-0075	A-5555-0076	A-5555-0077
Zeiss order number	602030-9070	602030-9071	602030-9072	602030-9073
DK (mm)	1.35	2.3	1.8	0.8
L (mm)	40	40	40	40
DG (mm)	11	11	11	11
ML (mm)	9	12	10	5
DS (mm)	1	1	1	0.6
B (mm)	2	2.5	2	1.9
Weight (g)	11	13	12	7



Long threaded styli, thread length 12.5 mm, stainless steel base, tungsten carbide stem, ruby ball

Part number	A-5555-0078	A-5555-0079	A-5555-0080	A-5555-0081	A-5555-0082	A-5555-0083	A-5555-0084
Zeiss order number	600342-8200	600342-8201	600342-8202	600342-8203	600342-8221	600342-8222	600342-8250
DK (mm)	1.35	1.5	2	2.5	3	5	0.3
L (mm)	32.85	33	33.5	34	34.5	43.5	21.8
DG (mm)	11	11	11	11	19	19	11
ML (mm)	23.85	24	24.5	25	16.5	25.5	12.8
ML1 (mm)	–	–	–	–	–	–	2.3
DS (mm)	1	1	1.5	1.5	2	3.5	1
DS1 (mm)	–	–	–	–	–	–	0.2
Weight (g)	6	7	7	7	20	23	6

Part number	A-5555-0085	A-5555-0086	A-5555-0087	A-5555-0088
Zeiss order number	600342-8251	600342-8252	600342-8253	600342-8254
DK (mm)	0.5	0.6	0.8	1
L (mm)	22	22.1	22.3	22.5
DG (mm)	11	11	11	11
ML (mm)	13	13.1	13.3	13.5
ML1 (mm)	2.5	4.6	4.8	5.0
DS (mm)	1	1	1	1
DS1 (mm)	0.3	0.4	0.6	0.8
Weight (g)	6	6	6	6



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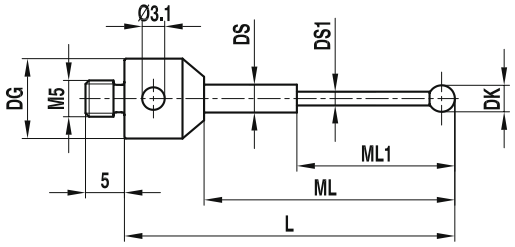
Long threaded styli, thread length 5 mm, stainless steel base, tungsten carbide stem, ruby ball

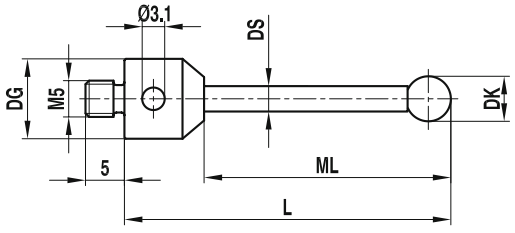
Schematics not shown to scale

Part number	A-5555-0799	A-5555-9324	A-5555-3826	A-5555-3827	A-5555-0686	A-5555-3828
Zeiss order number	626115-0140-033	626115-0150-033	626115-0200-034	–	626115-0250-034	–
DK (mm)	1.35	1.5	2	2.5	2.5	3
L (mm)	32.85	33	33.5	34	34	25.5
DG (mm)	11	11	11	11	11	11
ML (mm)	23.85	24	24.5	25	25	16.5
DS (mm)	1	1	1.5	1	1.5	2
Weight (g)	6	7	7	7	7	9

Part number	A-5555-3829	A-5555-0331	A-5555-1157	A-5555-1842	A-5555-1844	A-5555-1843
Zeiss order number	–	626115-0030-022	626115-0050-022	626115-0060-022	626115-0080-022	626115-0100-022
DK (mm)	5	0.3	0.5	0.6	0.8	1
L (mm)	34.5	21.8	22	22.1	22.3	22.5
DG (mm)	11	11	11	11	11	11
ML (mm)	25.5	12.8	13	13.1	13.3	13.5
ML1 (mm)	–	2.3	2.5	4.6	4.8	1.5
DS (mm)	3.5	1	1	1	1	1
DS1 (mm)	–	0.2	0.3	0.4	0.6	0.8
Weight (g)	9	6	6	6	6	6

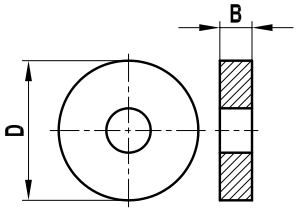
Part number	A-5555-1873
Zeiss order number	–
DK (mm)	1.5
L (mm)	33
DG (mm)	11
ML (mm)	24
ML1 (mm)	7
DS (mm)	1.5
DS1 (mm)	1
Weight (g)	7





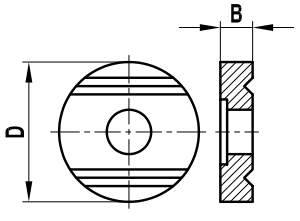
Flat washer for star styli, stainless steel

Part number	A-5555-0089	A-5555-0090
Zeiss order number	600341-0140	600341-0141
D (mm)	11	19
B (mm)	1.5	2
Weight (g)	1	4



Grooved washer for star styli, stainless steel

Part number	A-5555-0091	A-5555-0092
Zeiss order number	600341-0150	600341-0151
D (mm)	11	19
B (mm)	2	4
Weight (g)	1	7



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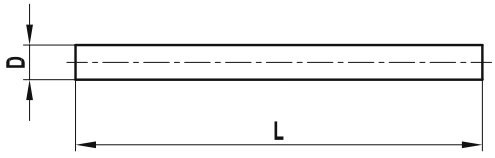
Tungsten carbide pin for star styli

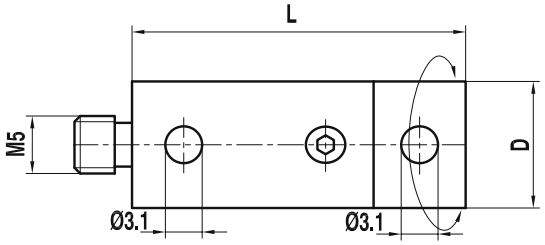
Schematics not shown to scale

Part number	A-5555-0093	A-5555-0094	A-5555-0095	A-5555-0096
Zeiss order number	600341-0520	600341-0521	600341-0522	600341-0523
L (mm)	10	10	18	18
D (mm)	1	1.5	2	3.5
Weight (g)	1	1	1	3



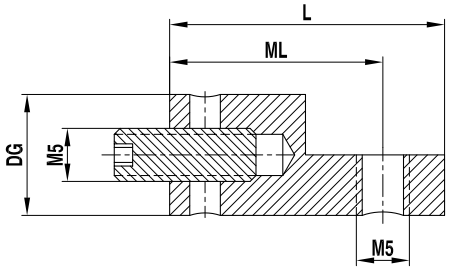
Rotary adaptor, titanium

Part number	A-5555-0099	A-5555-0713
Zeiss order number	602030-9095	612030-9737
L (mm)	30	29
D (mm)	18	11
Weight (g)	43	13



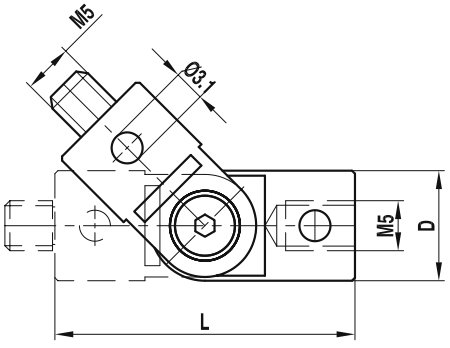
Holder, 90 degree offset, titanium

Part number	A-5555-1097
Zeiss order number	626105-6901-001
ML (mm)	17
DG (mm)	11
L (mm)	22.5
Weight (g)	6



Rotary knuckle, slewing range 360 degrees, swing range 180 degrees, titanium

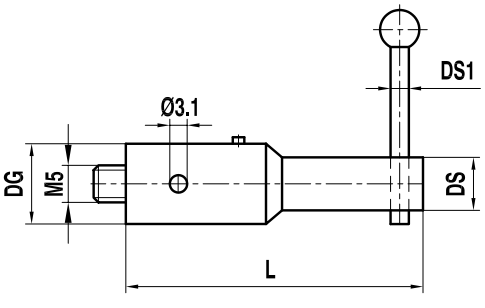
Part number	A-5003-5278	A-5555-3841
Zeiss order number	–	–
L (mm)	51	58
D (mm)	11	18
Weight (g)	19	58



Holder, 90 degrees, stainless steel

Part number	A-5555-0104
Zeiss order number	600341-8160
DS1 (mm)	1–1.5
L (mm)	45
DG (mm)	11
DS (mm)	6
Weight (g)	16

Fits with styli A-5555-0107 to A-5555-0115



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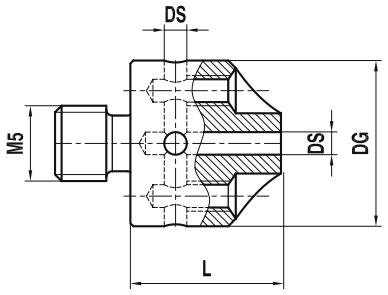
5-way holder, stainless steel

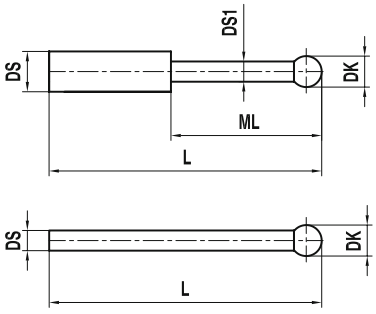
Schematics not shown to scale

Part number	A-5555-0105	A-5555-0106	A-5555-1245
Zeiss order number	600341-8367	600341-8368	626115-5000-199
DS (mm)	1	1.5	2
L (mm)	10	10	10
DG (mm)	11	11	11
Weight (g)	3.2	3.2	3.2



Styli for holder, tungsten carbide stem, ruby ball

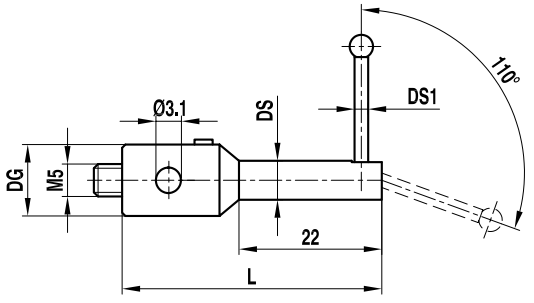
Part number	A-5555-0107	A-5555-0108	A-5555-0109	A-5555-0110	A-5555-0111
Zeiss order number	600341-8454	600341-8450	600341-8451	600341-8452	600341-8453
DK (mm)	1	0.3	0.5	0.6	0.8
L (mm)	16	15.3	15.5	15.6	15.8
DS (mm)	1	1	1	1	1
DS1 (mm)	0.8	0.2	0.3	0.4	0.6
ML (mm)	5	2.3	2.5	4.6	4.8
Weight (g)	1	1	1	1	1



Part number	A-5555-0112	A-5555-0113	A-5555-0114	A-5555-0115	A-5555-0116	A-5555-0117
Zeiss order number	600341-8500	600341-8501	600341-8502	600341-8503	600341-8510	600341-8511
DK (mm)	1.35	1.5	2	2.5	3	5
L (mm)	26.35	26.5	27	27.5	38	45
DS (mm)	1	1	1.5	1.5	2	3.5
Weight (g)	1	1	1	1	2	6

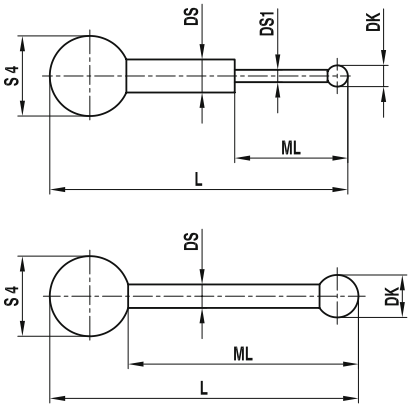
Holder for swivel styli, stainless steel

Part number	A-5555-0118
Zeiss order number	600341-8180
L (mm)	40
DG (mm)	11
DS (mm)	6
DS1 (mm)	1-1.5
Weight (g)	15



Styli for swiveling components, S4 steel ball, tungsten carbide stem, ruby ball

Part number	A-5555-0119	A-5555-0120
Zeiss order number	600341-8183	600341-8185
DK (mm)	1	2
L (mm)	17.5	28.5
DS (mm)	1	1.5
DS1 (mm)	0.8	–
ML (mm)	5	24.5
Weight (g)	1	1



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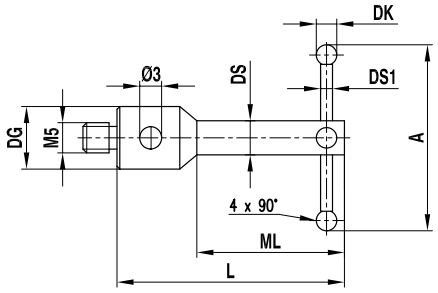
Star styli, stainless steel base, tungsten carbide stem, ruby ball

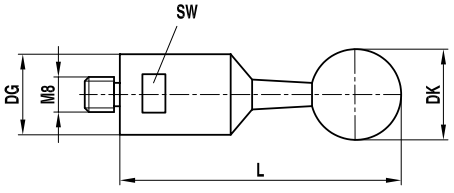
Part number	A-5555-1153	A-5555-1135	A-5555-3839
Zeiss order number	–	–	–
DK (mm)	0.6	0.8	1
L (mm)	40	40	40
DG (mm)	11	11	11
DS (mm)	4	4	4
DS1 (mm)	0.4	0.6	0.8
ML (mm)	30	30	30
A (mm)	8	8	8
Weight (g)	9	9	9

Schematics not shown to scale



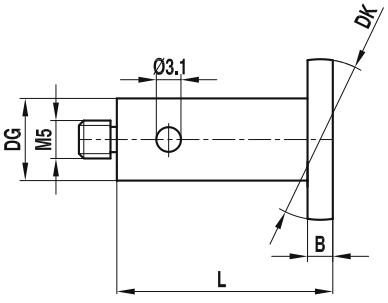
Reference sphere with stem, M8 thread, stainless steel, ceramic ball including certificate

Part number	A-5555-3842	A-5555-3843	A-5555-3844	A-1034-0124
Zeiss order number	–	–	–	–
DK (mm)	15	20	25	30
L (mm)	130	135	140	145
DG (mm)	24	24	24	24
SW (mm)	22	22	22	22



Spherical disk styli, aluminum base, high-strength steel disk

Part number	A-5555-0121	A-5555-0122	A-5555-0123	A-5555-0124
Zeiss order number	600341-8090	600341-8095	602030-8091	000000-1165-629
DK (mm)	10	15	20	15
L (mm)	21.5	21.5	60	40
DG (mm)	7	10	7	7
B (mm)	1.5	1.5	1	1
Weight (g)	3	6	8	5



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Extensions

Schematics not shown to scale

Aluminum, stainless steel ends

Part number	A-5555-0125	A-5555-0126	A-5555-0127	A-5555-0128	A-5555-0129	A-5555-0130	A-5555-0131	A-5555-0132
Zeiss order number	600341-8420	600341-8421	600341-8422	600341-8423	600341-8424	600341-8425	600341-8265	600341-8264
L (mm)	200	150	100	80	60	40	120	100
D (mm)	20	20	20	20	20	20	11	11
Weight (g)	84.7	67.4	50.7	44.8	37.7	29	30.9	25.6

Part number	A-5555-0133	A-5555-0134	A-5555-0135
Zeiss order number	600341-8263	600341-8262	600341-8261
L (mm)	80	60	40
D (mm)	11	11	11
Weight (g)	20.6	15.4	10.3

Stainless steel

Part number	A-5555-0136	A-5555-0137	A-5555-0138	A-5555-0139	A-5555-0140	A-5555-0141	A-5555-0142
Zeiss order number	600341-0260	600341-0258	600341-0256	600341-0254	600341-0252	600341-0251	600341-0250
L (mm)	100	80	60	40	20	15	10
D (mm)	11	11	11	11	11	11	11
Weight (g)	73	58	42	28	13	9	6

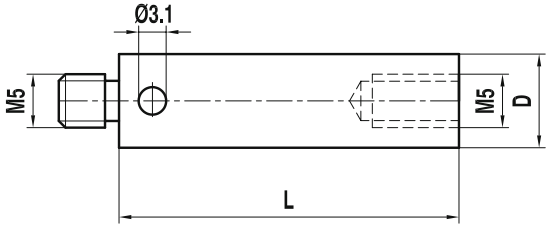
Titanium

Part number	A-5555-0143	A-5555-0144	A-5555-0145	A-5555-0146	A-5555-0147	A-5555-0148	A-5555-0149	A-5555-0150
Zeiss order number	602030-9044	602030-9045	602030-9046	602030-9047	602030-9048	602030-9049	602030-9050	602030-9051
L (mm)	10	15	20	25	25	40	40	50
D (mm)	11	11	11	11	18	11	18	11
Weight (g)	3.9	5.7	7.5	9.5	24.6	12.6	31.5	13.2

Part number	A-5555-0151	A-5555-0152	A-5555-0153	A-5555-0154	A-5555-0155	A-5555-0156	A-5555-0157	A-5555-0158
Zeiss order number	602030-9052	602030-9053	602030-9054	602030-9055	602030-9056	602030-9057	602030-9058	602030-9059
L (mm)	50	60	60	75	75	80	80	90
D (mm)	18	11	18	11	18	11	18	11
Weight (g)	33.3	14.2	35.1	15.3	37.9	15.6	38.8	16.5

Part number	A-5555-0159	A-5555-0160	A-5555-0161	A-5555-0162	A-5555-0163	A-5555-0164	A-5555-0165	A-5555-0166
Zeiss order number	602030-9060	602030-9061	602030-9062	602030-9063	602030-9064	602030-9065	602030-9066	602030-9067
L (mm)	90	100	100	120	120	150	150	200
D (mm)	18	11	18	11	18	11	18	18
Weight (g)	40.6	17.2	42.5	19.8	46.1	22.5	51.6	61

Part number	A-5555-0167	A-5555-0168
Zeiss order number	602030-9068	602030-9069
L (mm)	250	300
D (mm)	18	18
Weight (g)	70	79



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Black thermo stable carbon fiber, titanium ends

Schematics not shown to scale

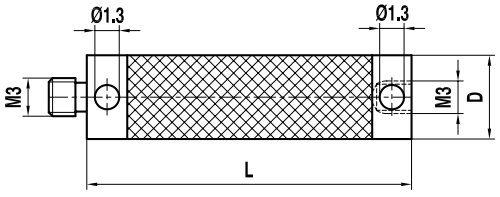
Part number	A-5555-0647	A-5555-0648	A-5555-0649	A-5555-0623	A-5555-0650	A-5555-0651
Zeiss order number	626107-1040-100	626107-1050-100	626107-1060-100	626107-1070-100	626107-1080-100	626107-1090-100
L (mm)	40	50	60	70	80	90
D (mm)	11	11	11	11	11	11
Weight (g)	9	10	11	10	12	13

Part number	A-5555-0652	A-5555-0425	A-5555-0424	A-5555-0653	A-5555-0654	A-5555-0655
Zeiss order number	626107-1100-100	626107-1120-100	626107-1150-100	626107-1180-100	626107-1200-100	626107-1250-100
L (mm)	100	120	150	180	200	250
D (mm)	11	11	11	11	11	11
Weight (g)	14	15	17	19	21	24

Part number	A-5555-0642	A-5555-0656	A-5555-0620	A-5555-0657	A-5555-0658	A-5555-0621
Zeiss order number	626107-1300-100	626107-1400-100	626107-2040-100	626107-2050-100	626107-2060-100	626107-2080-100
L (mm)	300	400	40	50	60	80
D (mm)	11	11	21	20	21	21
Weight (g)	27	34	26	28	29	32

Part number	A-5555-0659	A-5555-0661	A-5555-0663	A-5555-0427	A-5555-0664	A-5555-0665
Zeiss order number	626107-2100-100	626107-2150-100	626107-2200-100	626107-2250-100	626107-2300-100	626107-2400-100
L (mm)	100	150	200	250	300	400
D (mm)	21	21	21	21	21	20
Weight (g)	34	41	48	55	62	75

Part number	A-5555-0667	A-5555-0668
Zeiss order number	626107-2500-100	626107-2600-100
L (mm)	500	600
D (mm)	20	20
Weight (g)	89	103



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Adaptor plate extension for MT/VAST. Black thermo stable carbon fiber, titanium cube and plate adaptor

Schematics not shown to scale

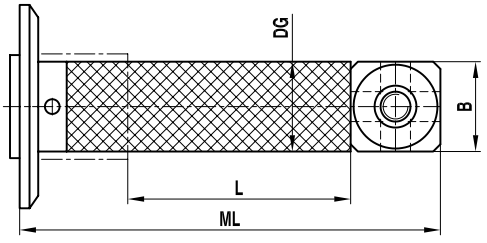
Part number	A-5555-3845	A-5555-3846	A-5555-3847	A-5555-3848	A-5555-3849	A-5555-3850
Zeiss order number	–	–	–	–	–	–
L (mm)	25	40	50	60	80	100
DG (mm)	11	11	11	11	11	11
ML (mm)	66.5	81.5	91.5	101.5	121.5	141.5
B (mm)	15	15	15	15	15	15
Weight (g)	60	62	64	66	68	70

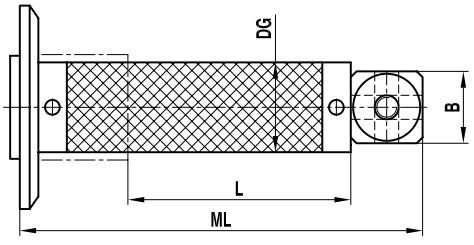
Part number	A-5555-3851	A-5555-3740	A-5555-3852	A-5555-0699	A-5555-1985	A-5555-1986
Zeiss order number	–	–	–	625107-2025-130	625107-2040-130	625107-2050-130
L (mm)	120	150	200	25	40	50
DG (mm)	11	11	11	20	20	20
ML (mm)	161.5	191.5	241.5	66.5	81.5	91.5
B (mm)	15	15	15	15	15	15
Weight (g)	72	77	84	60	62	64

Part number	A-5555-1987	A-5555-0700	A-5555-1988	A-5555-1989	A-5555-0701	A-5555-1990
Zeiss order number	626107-2060-130	626107-2080-130	626107-2100-130	625107-2120-130	625107-2150-130	625107-2200-130
L (mm)	60	80	100	120	150	200
DG (mm)	20	20	20	20	20	20
ML (mm)	101.5	121.5	141.5	161.5	191.5	241.5
B (mm)	15	15	15	15	15	15
Weight (g)	66	68	70	72	77	84

Part number	A-5555-1979	A-5555-1980	A-5555-1855	A-5555-1981	A-5555-1982	A-5555-1983
Zeiss order number	626107-2025-110	626107-2040-110	626107-2050-110	625107-2060-110	625107-2080-110	625107-2100-110
L (mm)	25	40	50	60	80	100
DG (mm)	20	20	20	20	20	20
ML (mm)	71.5	86.5	96.6	106.5	126.5	146.5
B (mm)	20	20	20	20	20	20
Weight (g)	74	76	78	80	82	84

Part number	A-5555-1938	A-5555-1937	A-5555-1984
Zeiss order number	626107-2120-110	626107-2150-110	626107-2200-110
L (mm)	120	150	200
DG (mm)	20	20	20
ML (mm)	166.5	196.5	246.5
B (mm)	20	20	20
Weight (g)	86	91	98





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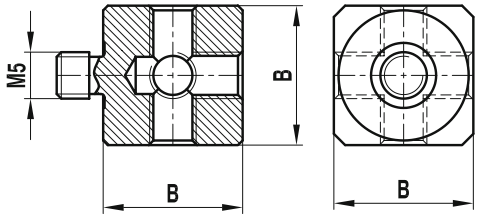
Schematics not shown to scale

Cube, titanium

Part number	A-5555-0189	A-5555-0190
Zeiss order number	600341-8361	600341-8002
B (mm)	15	20
Weight (g)	12.6	31.5

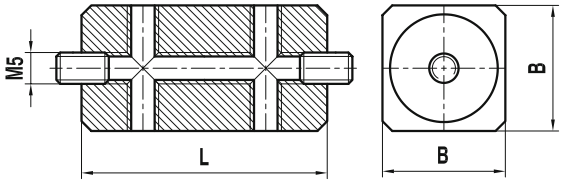


Cube, alumimum

Part number	A-5555-0191	A-5555-0192
Zeiss order number	602030-8363	602030-8362
B (mm)	15	20
Weight (g)	7.5	20

Double cube (titanium)

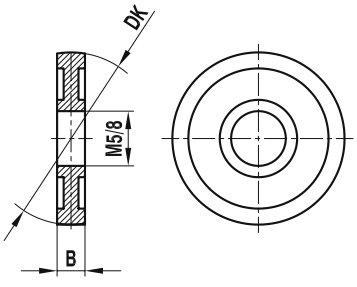
Part number	A-5555-0194
Zeiss order number	600342-8103
B (mm)	20
L (mm)	40
Weight (g)	64



Spherical disk, high-strength steel

Part number	A-5555-0196	A-5555-0197	A-5555-0198	A-5555-0199	A-5555-0200	A-5555-0201	A-5555-0203
Zeiss order number	602030-0004	602030-0005	602030-0006	602030-0007	602030-0008	602030-0009	602030-0011
B (mm)	4	4	4	5	5	5	4
DK (mm)	15	20	30	40	50	60	20
M5/8 (mm)	M5	M5	M5	M5	M5	M5	8
Weight (g)	5	9	21	42	64	89	8

Part number	A-5555-0204	A-5555-0205	A-5555-0206	A-5555-0207	A-5555-0208
Zeiss order number	600341-0200	600341-0203	600341-0204	600341-0205	600341-0206
B (mm)	2	4	4	5	6
DK (mm)	20	30	40	50	60
M5/8 (mm)	8	8	8	8	8
Weight (g)	4	10	21	36	59



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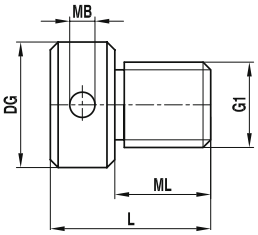
Hole location gage, stainless steel

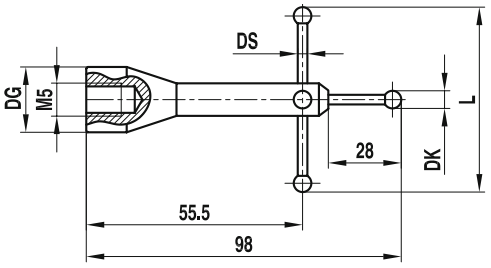
Schematics not shown to scale

Part number	A-5555-0209	A-5555-0210	A-5555-0211	A-5555-0212	A-5555-0213	A-5555-0214
Zeiss order number	602030-0012	602030-0013	600203-0014	602030-0015	602030-0016	600203-0017
G1	M4	M5	M6	M8	M10	M12
L (mm)	16	16	18	20	25	25
DG (mm)	10	10	12	15	18	20
ML (mm)	10	10	12	12	15	15
MB (mm)	1.8	1.8	1.8	3	3	3
Weight (g)	4	4	7	13	25	33



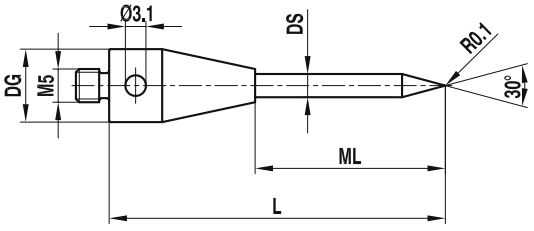
Star stylus, stainless steel base, tungsten carbide stem, ruby ball

Part number	A-5555-0215
Zeiss order number	600331-8093
DK (mm)	5
L (mm)	80
DG (mm)	19
DS (mm)	3.5
Weight (g)	70



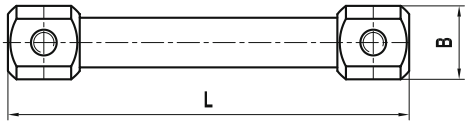
Pointed stylus, titanium base, tungsten carbide stem

Part number	A-5555-0216
Zeiss order number	600342-8051
L (mm)	61
DG (mm)	11
ML (mm)	39
DS (mm)	3.5
Weight (g)	12



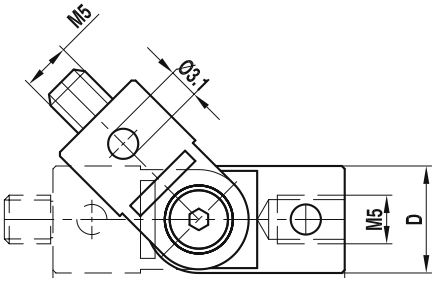
Cube extension, titanium

Part number	A-5555-0217
Zeiss order number	602030-0019
L (mm)	120
B (mm)	20
Weight (g)	87



Knuckle, swing range 180 degrees, titanium

Part number	A-5555-0218	A-5555-0219
Zeiss order number	600342-9002	600342-9003
L (mm)	30	36
D (mm)	11	18
Weight (g)	11.2	37.2



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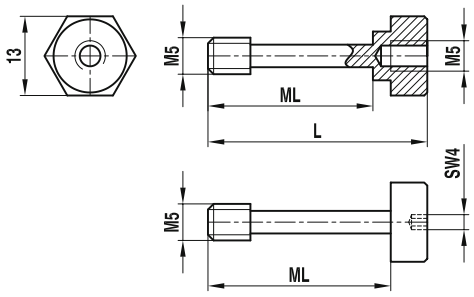
Bolts for spherical disk and cube, stainless steel

Schematics not shown to scale

Part number	A-5555-0221	A-5555-0222	A-5555-0223
Zeiss order number	600341-0210	600341-0211	600341-0212
L (mm)	35	30	17.5
ML (mm)	26	21	9
Weight (g)	9	9	7

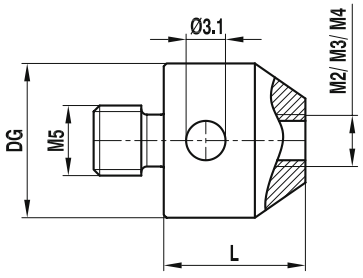


Bolts for cubes, stainless steel

Part number	A-5555-0224	A-5555-0225
Zeiss order number	600341-0220	600341-0221
ML (mm)	26	21
Weight (g)	4	3

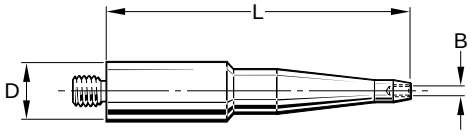
Adaptor, stainless steel

Part number	A-5555-0226	A-5555-0227	A-5555-0228
Zeiss order number	602030-0215	602030-0315	602030-0318
Threads	M5/M2	M5/M3	M5/M4
L (mm)	10	10	10
DG (mm)	11	11	11
Weight (g)	5.2	5.2	5.2



Holder for digitalization styli, stainless steel

Part number	A-5555-0231	A-5555-0232
Zeiss order number	602030-9113	602030-9115
L (mm)	119	127
D (mm)	15.81	9.52
B	M2	M2
Weight (g)	126	87



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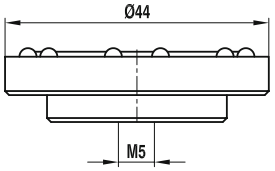
Adaptor plates for Zeiss probe heads

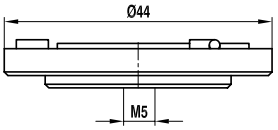
Adaptor plate for dynamic systems (ST), alumimum

Schematics not shown to scale



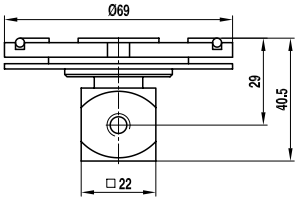
Part number	A-5555-0322	A-5555-0251
Zeiss order number	600660-8240	600660-8251
Quantity in kit	1	2
Weight (g)	72	144

Adaptor plate for Prismo dynamic systems (ST), alumimum



Part number	A-5555-0253	A-5555-3900
Zeiss order number	620660-8251-000	–
Quantity in kit	2	1
Weight (g)	144	72

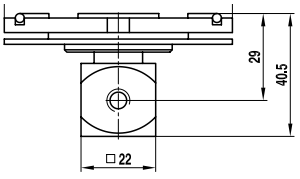
Adaptor plate for measuring systems MT/Vast, aluminum, with active ID chip



Part number	A-5555-0255	A-5555-0256	A-5555-0258*
Zeiss order number	600667-9601	600667-9611	600667-8571
Quantity in kit	1	2	1
Weight (g)	153	306	130

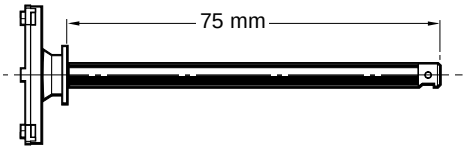
* adaptor plate without cube

Adaptor plate for XXT TL1, reference plate for XXT TL1



Part number	A-5555-1235	A-5555-1236
Zeiss order number	620161-8055-000	620161-8058-000
Weight (g)	4.6	4.6

Adaptor plate for VAST XXT TL2, reference plate for XXT TL2

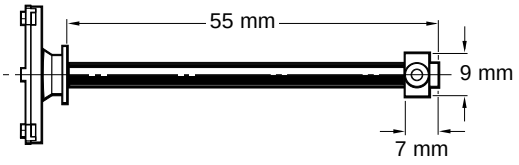


Part number	A-5555-1237	A-5555-1238
Zeiss order number	620161-8065-000	620161-8068-000
Weight (g)	5.4	5.4

Adaptor plate for VAST XXT TL3, reference plate for XXT TL3

Part number	A-5555-1239	A-5555-1240
Zeiss order number	620161-8075-000	620161-8078-000
Weight (g)	4.6	4.6

VAST XXT TL1 with star adaptor



Part number	A-5555-1241
Zeiss order number	626103-8031-055
Weight (g)	6.3

VAST XXT TL3 with star adaptor

Part number	A-5555-1242
Zeiss order number	626103-8033-055
Weight (g)	6.3

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M3 styli, adaptors and accessories for Zeiss analog probe systems

Schematics not shown to scale

Carbide styli XXT, titanium base, tungsten carbide stem, ruby ball

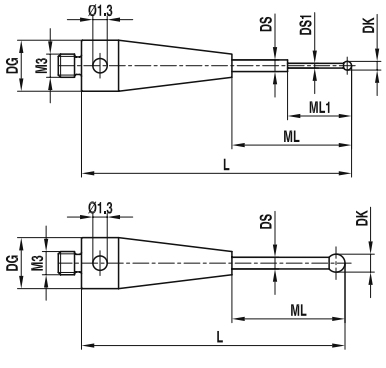
Part number	A-5004-3176	A-5004-2185	A-5004-1702	A-5004-2186	A-5555-3853	A-5004-3179
Zeiss order number	626113-0030-013	626113-0030-020	626113-0050-013	626113-0050-020	626113-0060-014	626113-0060-020
DK (mm)	0.3	0.3	0.5	0.5	0.6	0.6
L (mm)	13	20	13	20	14	20
DG (mm)	5	5	5	5	5	5
ML (mm)	4	11	4	11	5	1
ML1 (mm)	2.3	2.3	2.3	2.3	4.6	4.6
DS (mm)	1	1	1	1	1	1
DS1 (mm)	0.2	0.2	0.3	0.3	0.4	0.4
Weight (g)	0.62	0.69	0.61	0.69	0.61	0.68

Part number	A-5004-3273	A-5004-3274	A-5004-1883	A-5004-3187	A-5555-3854	A-5004-1863
Zeiss order number	626113-0080-014	626113-0080-020	626113-0080-034	626113-0100-014	626113-0101-020	626113-0100-020
DK (mm)	0.8	0.8	0.8	1	1	1
L (mm)	14	20	34	14	20	20
DG (mm)	5	5	5	5	5	5
ML (mm)	5	11	25	5	11	11
ML1 (mm)	–	4.8	4.1	–	5.1	5
DS (mm)	0.6	1	1	0.8	1	1
DS1 (mm)	–	0.6	0.6	–	0.6	0.8
Weight (g)	0.62	0.69	0.8	0.63	0.7	0.69

Part number	A-5004-3519	A-5004-3427	A-5555-9341	A-5004-3272	A-5004-1862	A-5555-9339
Zeiss order number	626113-0130-020	626113-0100-030	626113-0100-040	626113-0150-014	626113-0150-020	626113-0151-030
DK (mm)	1	1	1	1.5	1.5	1.5
L (mm)	20	30	40	14	20	30
DG (mm)	5	5	5	5	5	5
ML (mm)	11	21	31	5	11	21
ML1 (mm)	–	5	5	–	–	–
DS (mm)	0.8	1	1	1	1	1
DS1 (mm)	–	0.8	0.8	–	–	–
Weight (g)	0.7	0.8	1.5	0.65	0.72	0.84

Part number	A-5555-9340	A-5004-1779	A-5004-3188	A-5004-1861	A-5004-0656	A-5555-3855
Zeiss order number	626113-0150-030	626113-0151-040	626113-0200-014	626113-0200-020	626113-0200-030	626113-0021-040
DK (mm)	1.5	1.5	2	2	2	2
L (mm)	30	40	14	20	30	40
DG (mm)	5	5	5	5	5	5
ML (mm)	22.5	31	5	11	21	31
DS (mm)	1	1	1	1	1	1.5
Weight (g)	0.9	1.6	0.66	0.72	0.83	1.7

Part number	A-5555-3856	A-5555-3857	A-5004-3428
Zeiss order number	626113-0250-020	626113-0250-030	626113-0250-040
DK (mm)	2.5	2.5	2.5
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	1.5	1.5	1.5
Weight (g)	1	1.5	2



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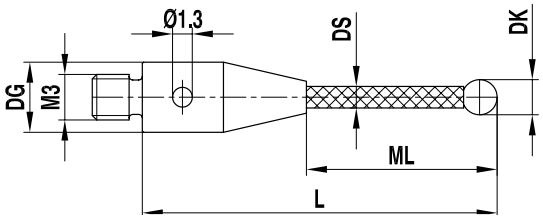
Reference styli XXT (red dot), titanium base, thermo stable carbon fiber stem, ruby ball

Schematics not shown to scale

Part number	A-5555-2033	A-5555-3858
Zeiss order number	626103-0501-030	626103-0501-050
DK (mm)	5	5
L (mm)	30	50
DG (mm)	5	5
ML (mm)	21	41
DS (mm)	3.5	3.5
Weight (g)	1.1	1.4



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Thermo stable carbon fiber styli XXT, titanium base, thermo stable carbon fiber stem, ruby ball

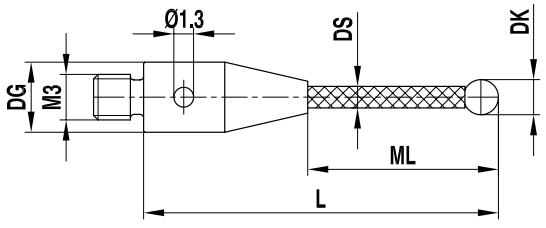
Schematics not shown to scale

Part number	A-5555-3859	A-5004-0802	A-5555-1251	A-5004-1884	A-5004-0803	A-5555-3860
Zeiss order number	626103-0300-025	626103-0300-033	626103-0300-040	626103-0300-042	626103-0300-050	626103-0300-058
DK (mm)	3	3	3	3	3	3
L (mm)	25	33	40	42	50	58
DG (mm)	5	5	5	5	5	5
ML (mm)	16	24	31	33	41	49
DS (mm)	2	2	2	2	2	2
Weight (g)	0.65	0.7	0.8	0.8	0.8	1

Part number	A-5555-3861	A-5555-3862	A-5004-2786	A-5004-2108	A-5003-0062	A-5004-0806
Zeiss order number	626103-0300-059	626103-0300-075	626103-0401-050	626103-0500-030	626103-0500-040	626103-0500-050
DK (mm)	3	3	4	5	5	5
L (mm)	59	75	50	30	40	50
DG (mm)	5	5	5	5	5	5
ML (mm)	50	66	41	21	31	41
DS (mm)	2	2	2	3.5	3.5	3.5
Weight (g)	1	1	1	1.1	1.2	1.4

Part number	A-5555-3864	A-5555-1114	A-5004-3429	A-5555-3865	A-5555-1115	A-5555-3866
Zeiss order number	626103-0500-060	626103-0501-075	626103-0600-050	626103-0610-070	626103-0600-100	626103-0800-030
DK (mm)	5	5	6	6	6	8
L (mm)	60	75	50	70	100	30
DG (mm)	5	5	5	5	5	5
ML (mm)	51	66	40	61	91	30
DS (mm)	3.5	3.5	3.5	3.5	3.5	5
Weight (g)	1.5	1.8	1.5	1.8	2.4	1.86

Part number	A-5555-3867	A-5555-3868	A-5555-3869	A-5004-0808
Zeiss order number	626103-0830-050	626103-0830-070	626103-0830-100	626103-0800-125
DK (mm)	8	8	8	8
L (mm)	50	70	100	125
DG (mm)	5	5	5	5
ML (mm)	50	70	100	125
DS (mm)	5	5	5	5
Weight (g)	2.1	2.6	2.7	2.9



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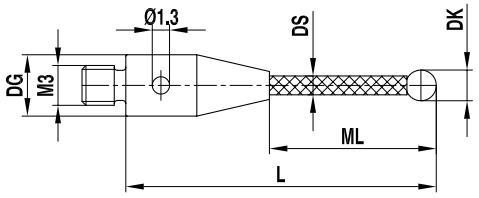
Thermo stable carbon fiber styli XXT, titanium base, thermo stable carbon fiber stem, silicon nitride ball

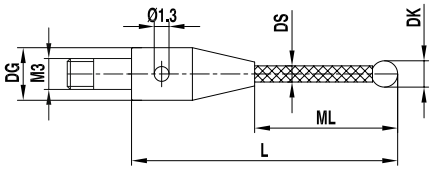
Schematics not shown to scale

Part number	A-5555-3870	A-5555-3871	A-5555-3872	A-5004-1858	A-5555-3873	A-5555-3874
Zeiss order number	626103-0301-033	626103-0301-050	626103-0502-050	626103-0500-075	626103-0801-070	626103-0801-125
DK (mm)	3	3	5	5	8	8
L (mm)	33	50	50	75	70	125
DG (mm)	5	5	5	5	5	5
ML (mm)	24	41	41	66	70	125
DS (mm)	2	2	3.5	3.5	5	5
Weight (g)	0.7	0.8	1.4	1.8	2.6	2.9



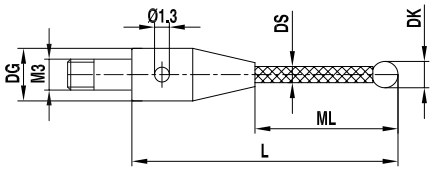
Thermo stable carbon fiber clamping styli XXT, titanium base, thermo stable carbon fiber stem, ruby ball

Part number	A-5555-3875	A-5555-3876	A-5004-3282
Zeiss order number	626103-0301-020	626103-0301-030	626103-0301-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	0.7	0.75	0.8



Thermo stable carbon fiber clamping styli XXT, titanium base, thermo stable carbon fiber stem, silicon nitride ball

Part number	A-5555-3877	A-5555-3878	A-5555-3879
Zeiss order number	626103-0311-020	626103-0311-030	626103-0311-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	0.7	0.75	0.8



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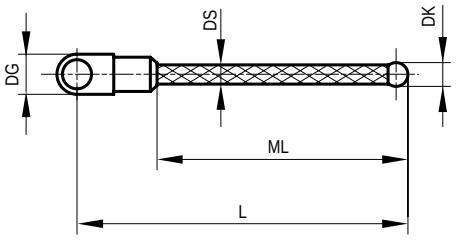
¼ star styli, thermo stable carbon fiber XXT, titanium base, thermo stable carbon fiber stem, ruby ball

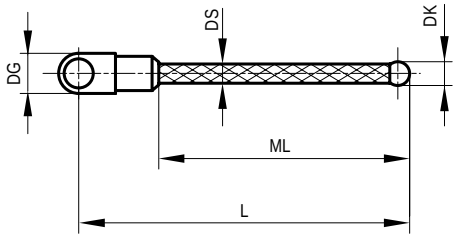
Schematics not shown to scale

Part number	A-5555-1273	A-5555-1274	A-5555-1275
Zeiss order number	626103-0302-020	626103-0302-030	626103-0302-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	0.8	0.9	1



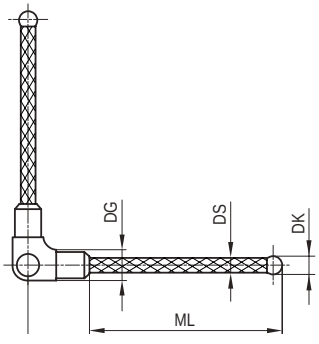
¼ star styli, thermo stable carbon fiber XXT, titanium base, thermo stable carbon fiber stem, silicon nitride ball

Part number	A-5555-3880	A-5555-3881	A-5555-3901
Zeiss order number	626103-0312-020	626103-0312-030	626103-0312-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	0.8	0.9	1



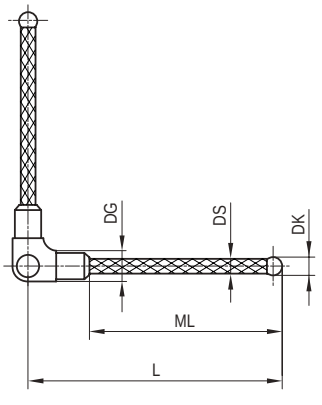
½ star styli, thermo stable carbon fiber XXT, 90 degrees, titanium base, thermo stable carbon fiber stem, ruby ball

Part number	A-5555-3882	A-5555-3883	A-5004-3284
Zeiss order number	626103-0303-020	626103-0303-030	626103-0303-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	1.4	1.5	1.6



½ star styli, thermo stable carbon fiber XXT, 90 degrees, titanium base, thermo stable carbon fiber stem, silicon nitride ball

Part number	A-5555-3884	A-5555-3885	A-5555-3886
Zeiss order number	626103-0313-020	626103-0313-030	626103-0313-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	1.4	1.5	1.6



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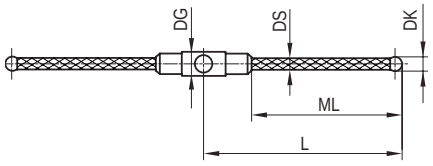
½ star styli, thermo stable carbon fiber XXT, 180 degrees, titanium base, thermo stable carbon fiber stem, ruby ball

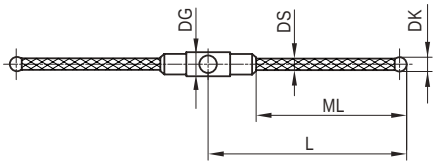
Schematics not shown to scale

Part number	A-5555-3887	A-5555-3888	A-5004-0654
Zeiss order number	626103-0304-020	626103-0304-030	626103-0304-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	1.4	1.5	1.6



½ star styli, thermo stable carbon fiber XXT, 180 degrees, titanium base, thermo stable carbon fiber stem, silicon nitride ball

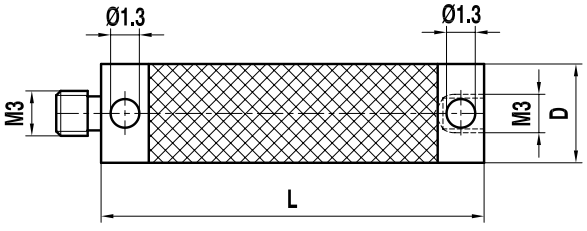
Part number	A-5555-3889	A-5555-3890	A-5555-3891
Zeiss order number	626103-0314-020	626103-0314-030	626103-0314-040
DK (mm)	3	3	3
L (mm)	20	30	40
DG (mm)	5	5	5
ML (mm)	11	21	31
DS (mm)	2	2	2
Weight (g)	1.4	1.5	1.6



Extension XXT, thermo stable black carbon fiber, titanium ends

Part number	A-5555-3892	A-5555-1947	A-5004-3430	A-5555-3893	A-5004-0002	A-5555-3894
Zeiss order number	626103-5020-000	626103-5025-000	626103-5030-000	626103-5040-000	626103-5050-000	626103-5060-000
D (mm)	5	5	5	5	5	5
L (mm)	20	25	30	40	50	60
Weight (g)	1.2	1.25	1.3	1.4	1.5	1.7

Part number	A-5555-1948	A-5004-2001	A-5004-1859	A-5555-3895	A-5555-1276
Zeiss order number	626103-5075-000	626103-5080-000	626103-5100-000	626103-5130-000	626103-5150-000
D (mm)	5	5	5	5	5
L (mm)	75	80	100	130	150
Weight (g)	1.7	1.8	2	2.5	2.7



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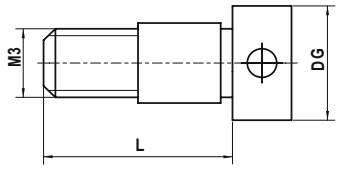
Schematics not shown to scale

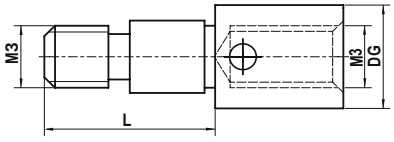
Clamping screw XXT, titanium

Part number	A-5004-1856
Zeiss order number	626103-6110-004
DG (mm)	5
L (mm)	8
Weight (g)	0.5



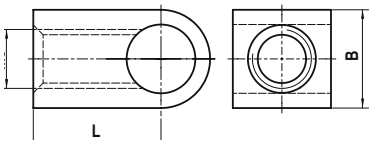
Clamping screw XXT with internal M3 thread, titanium

Part number	A-5004-1857
Zeiss order number	626103-6110-005
DG (mm)	5
L (mm)	8
Weight (g)	0.7



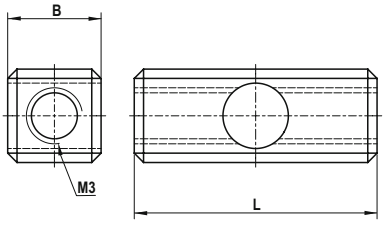
Cube XXT 90 degrees, 1 way, titanium

Part number	A-5004-3437
Zeiss order number	626103-6110-001
B (mm)	5
L (mm)	6.5
Weight (g)	0.64



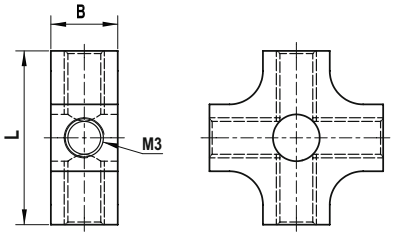
Cube XXT 180 degrees, 2 way, titanium

Part number	A-5555-3896
Zeiss order number	626103-6110-002
B (mm)	5
L (mm)	13
Weight (g)	1.05



Cube star XXT, titanium

Part number	A-5555-3897
Zeiss order number	626103-6110-003
B (mm)	5
L (mm)	13
Weight (g)	1.8



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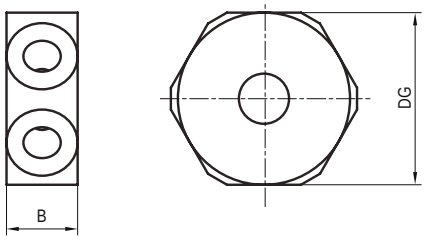
Cube XXT, 6 star, titanium

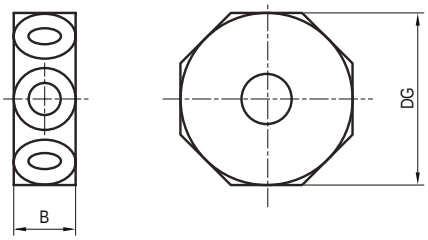
Schematics not shown to scale

Part number	A-5555-3898
Zeiss order number	626103-6110-006
B (mm)	5
DG (mm)	12
Weight (g)	1.8



Cube XXT, 8 star, titanium

Part number	A-5555-3899
Zeiss order number	626103-6110-007
B (mm)	5
DG (mm)	14
Weight (g)	2.3



Knuckle XXT, titanium

Part number	A-5004-3285
Zeiss order number	626103-6180-001
B (mm)	5
L (mm)	10
Weight (g)	1.65

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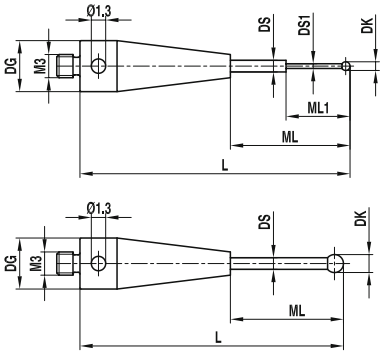
Tungsten carbide styli, stainless steel base, tungsten carbide stem, ruby ball

Schematics not shown to scale

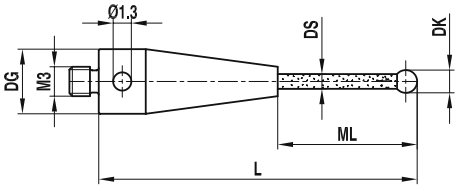
Part number	A-5555-0261	A-5555-0263	A-5555-0265	A-5555-0267	A-5555-0268	A-5555-0269	A-5555-0270	A-5555-0271
Zeiss order number	602030-8104	602030-8113	602030-8112	602030-8115	602030-8116	602030-8117	602030-8118	602030-8119
DK (mm)	2	3	4	0.5	0.6	0.8	1	1.5
L (mm)	22	40	33	22	22	22	22	22
DG (mm)	4	5.5	4	4	4	4	4	4
ML (mm)	9	21.5	23	9	9	9	9	9
ML1 (mm)	–	–	–	2.5	4.6	4.8	5	–
DS (mm)	1	2	2.5	1	1	1	1	1
DS1 (mm)	–	–	–	0.3	0.4	0.6	0.8	–
Weight (g)	1	4	2.5	1	1	1	1	1

Part number	A-5555-0272	A-5555-0273	A-5555-0274	A-5555-0276	A-5555-0277
Zeiss order number	602030-8120	602030-8121	602030-8023	602030-8021	602030-8106
DK (mm)	1	0.3	2	3	3
L (mm)	10.5	22	21	21.5	21
DG (mm)	4	4	4	4	4
ML (mm)	5.5	9	15	15.5	13
ML1 (mm)	5	2.3	–	–	–
DS (mm)	10	1	1	1.5	2
DS1 (mm)	0.8	.02	–	–	–
Weight (g)	1	1	1	1	1



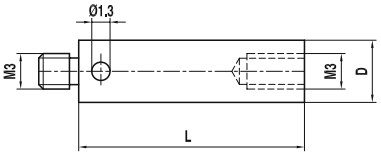
Ceramic styli, stainless steel base, ceramic stem, ruby ball

Part number	A-5555-0264	A-5555-0266	A-5555-0275
Zeiss order number	602030-8102	602030-8101	602030-8020
DK (mm)	4	5	6
L (mm)	32	32	13
DG (mm)	4	4	4
ML (mm)	26	19	9
DS (mm)	2	2	2
Weight (g)	1	1	1



Stainless steel extensions

Part number	M-5000-7633	M-5000-3592	A-5555-0286	A-5555-0287	A-5555-0288
Zeiss order number	602030-8301	602030-8302	602030-8303	602030-8304	602030-8305
L (mm)	10	20	30	40	50
D (mm)	4	4	4	4	4
Weight (g)	0.7	1.6	2.6	3.7	4.7



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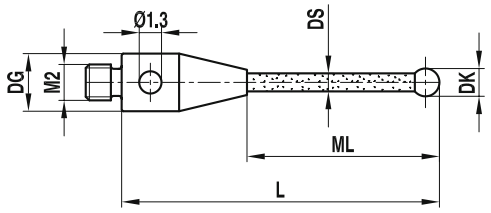
M2 styli, adaptors and accessories for Zeiss analog probe systems

Schematics not shown to scale

Ceramic styli, stainless steel base, ceramic stem, ruby ball

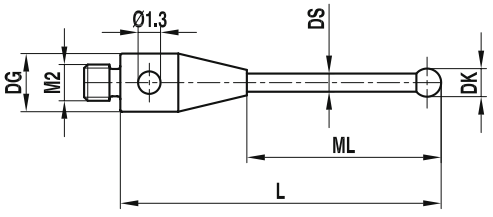
Part number	A-5555-0278	A-5555-0279
Zeiss order number	602030-8002	602030-8004
DK (mm)	6	5
L (mm)	13	22.5
DG (mm)	3	3
ML (mm)	9	16.5
DS (mm)	2	2
Weight (g)	1	1



Tungsten carbide styli, stainless steel base, tungsten carbide stem, ruby ball

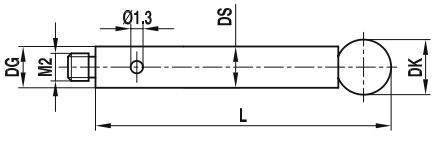
Part number	A-5555-0308	A-5555-0309	A-5555-0282	A-5555-0310	A-5555-0311	A-5003-3822	A-5003-0938	A-5555-0312
Zeiss order number	602030-8006	602030-8007	602030-8001	602030-8008	602030-8009	602030-8005	602030-8003	602030-8015
DK (mm)	1	1	2	2	2	2	3	4
L (mm)	10.5	15.5	11	11	16	21	21.5	12
DG (mm)	3	3	3	3	3	3	3	3
ML (mm)	6.5	11.5	5	7	12	15	15.5	8
DS (mm)	0.8	0.8	1	1	1	1	1.5	2.5
Weight (g)	0.3	0.3	1	1	1	1	1	1

Part number	A-5555-0313	A-5555-0283
Zeiss order number	602030-8016	602030-8034
DK (mm)	4	5
L (mm)	22	22.5
DG (mm)	3	3
ML (mm)	18	16.5
DS (mm)	2.5	2
Weight (g)	1	1



Steel styli, stainless steel base and stem, ruby ball

Part number	A-5555-0314	A-5555-0315	A-5555-0316
Zeiss order number	602030-8017	602030-8018	602030-8019
DK (mm)	6	6	8
L (mm)	13	28	13
DS (mm)	3	3	3
DG (mm)	3	3	3
Weight (g)	0.9	1.8	2



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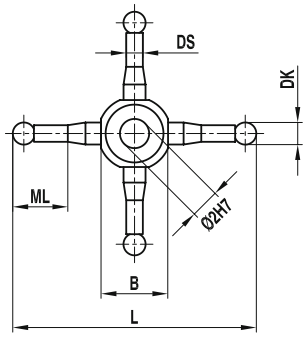
Star styli, stainless steel cube base and stem, ruby ball

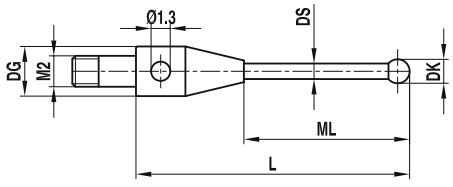
Schematics not shown to scale.

Part number	A-5555-0294	A-5555-0295
Zeiss order number	602030-8011	602030-8010
DK (mm)	2	2
L (mm)	32	22
ML (mm)	9.5	4.5
DS (mm)	1.4	1.4
B (mm)	5.5	5.5
Weight (g)	1	1



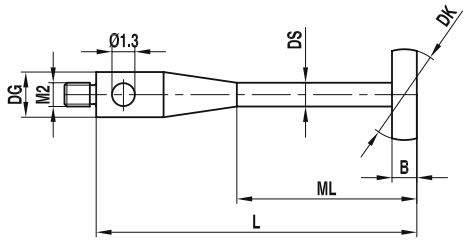
Styli for star configuration, stainless steel base and stem, ruby ball

Part number	A-5555-0296
Zeiss order number	602030-8012
DK (mm)	2
L (mm)	19.5
DG (mm)	3
ML (mm)	13.5
DS (mm)	1.5
Weight (g)	1



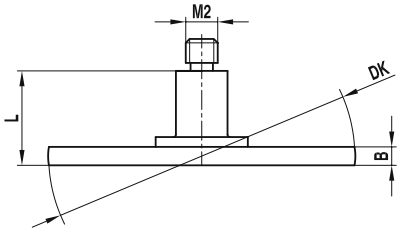
Spherical disk styli, stainless steel base, tungsten carbide stem, ceramic disk

Part number	A-5555-0297	A-5555-0298
Zeiss order number	602030-8201	602030-8202
DK (mm)	8	4
L (mm)	32	32
DG (mm)	3	3
ML (mm)	19	19
DS (mm)	1.5	1
B (mm)	1.5	1
Weight (g)	1	1



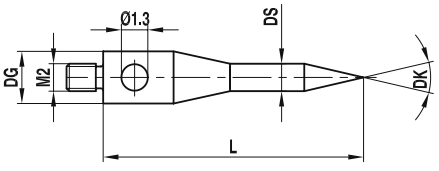
Spherical disk styli, stainless steel base and stem, ceramic disk

Part number	A-5555-0299	A-5555-0300
Zeiss order number	602030-8203	602030-8204
DK (mm)	14	20
L (mm)	5.5	5.5
B (mm)	2	2.5
Weight (g)	1	3



Pointer styli, stainless steel base, cone point, tungsten carbide

Part number	A-5555-0317	A-5555-0318
Zeiss order number	602030-8342	602030-8343
L (mm)	10	10
DG (mm)	3	3
DS (mm)	1.5	1.5
DK	30°	60°
Weight (g)	1	1



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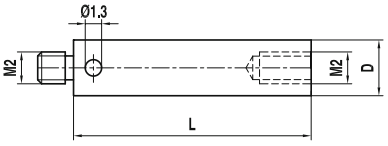
Stainless steel extension

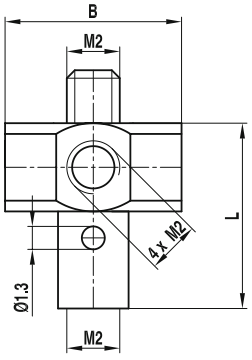
Schematics not shown to scale

Part number	M-5000-7634	M-5000-3647	M-5000-3648	M-5000-4162	M-5000-7779
Zeiss order number	602030-8321	602030-8322	602030-8323	602030-8324	602030-8325
L (mm)	5	10	20	30	40
D (mm)	3	3	3	3	3
Weight (g)	0.2	0.5	1	1.4	2.2



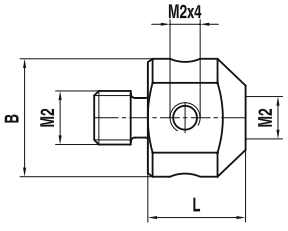
5-way holder, rotary, stainless steel

Part number	A-5000-3627
Zeiss order number	602030-8381
L (mm)	7.5
B (mm)	7
Weight (g)	1.2



5-way holder, stainless steel

Part number	A-5555-0319	A-5555-0320
Zeiss order number	602030-9104	602030-9103
L (mm)	9.1	5.4
D (mm)	10.5	7
Weight (g)	3.4	1



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Renishaw tools and accessories for the assembly of M2, M3 and M5 styli to Zeiss measuring probe heads

Schematics not shown to scale

Stylus tool (M2 and M3 styli)

Part number	A-5555-0233
Zeiss order number	602030-0001
DK (mm)	1.2
L (mm)	23
Weight (g)	1

Allen keys DIN 911

Part number	A-5555-0234	A-5555-0235	A-5555-0236
Zeiss order number	602030-0002	602030-0042	602030-0021
B (mm)	SW1.5	SW0.9	SW2.5
Weight (g)	1	1	2

Tool kit

Part number	A-5555-0237
Zeiss order number	600341-8595

consisting of:

	1 x offset screwdriver DIN 911-2	1 x offset screwdriver DIN 911-3	1 x offset screwdriver DIN 911-4	2 x pin-type spanner 2.9 mm	1 x single-headed spanner DIN 894
DK (mm)	–	–	–	2.9	–
L (mm)	–	–	–	70	–
D (mm)	–	–	–	5	–
B	SW2	SW3	SW4	–	SW13
Weight (g)	1	5	10	15 each	39

Stylus tool kit (2 × pin-type spanners 2.9 mm for M5)

Part number	A-5555-0238
Zeiss order number	600341-8596
DK (mm)	2.9
L (mm)	70
D (mm)	5
Weight (g)	15

Stylus tool 1.7 mm for M5

Part number	A-5555-0239
Zeiss order number	602030-0027
DK (mm)	1.7
L (mm)	49
D (mm)	2.5
Weight (g)	1

Pin-type spanner 2.9 mm for M5

Part number	A-5555-0240
Zeiss order number	602030-0222
DK (mm)	2.9
L (mm)	70
D (mm)	5
Weight (g)	7.5

Assortment of screws

Part number	A-5555-0241
Zeiss order number	600341-8590
Weight (g)	27

Includes:

10 spring-lock washers FS 5x7
2 cheese-head screws M5x12
2 cheese-head screws M5x20
4 grub screws 10 mm long
2 grub screws 25 mm long

Spring-lock washers

Part number	A-5555-0242
Zeiss order number	600341-0042

Includes:

10 x FS 5.7 spring-lock washers

C spanners DIN 1810

Part number	A-5555-0243	A-5555-0244
Zeiss order number	602030-0045	602030-0044
DK (mm)	11	21

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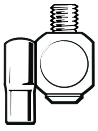
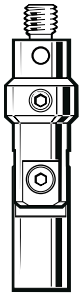
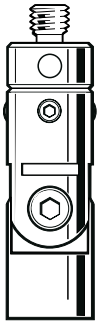
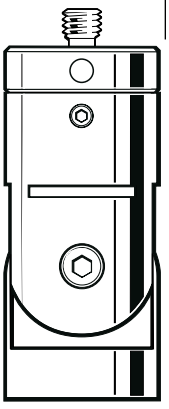
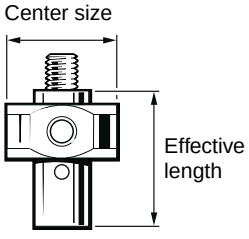
Accessories

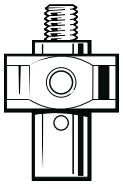
Stylus knuckles

Part number	A-5000-7534	A-5003-4697	A-5000-9902 Rotary	A-5000-7616	A-5003-4686 Rotary	A-5003-4689 Rotary	* A-5003-5278 Rotary	A-5003-5279 Rotary
Thread size	M2	M2	M2	M3	M3	M4	M5	M5
Effective length mm (inch)	8.0 (0.32)	13.5 (0.54)	16.5 (0.65)	12.0 (0.48)	17.0 (0.67)	33.0 (1.30)	36.5 (1.44)	46.5 (1.84)
Center offset mm (inch)	4.5 (0.18)	N/A	N/A	6.0 (0.24)	N/A	N/A	N/A	N/A
Mass grammes	1.6	1.1	1.3	3.7	1.5	9.8	16.5	64.9
								

* Not for use with SP80

Stylus centers



Part number	A-5000-8395 4-way	A-5000-3627 5-way	A-5000-7610 5-way	A-5000-7792 5-way
Thread size	M2	M2	M3	M4
Effective length mm (inch)	7.5 (0.30)	7.5 (0.30)	13.0 (0.52)	18.0 (0.71)
Center size mm (inch)	7.5 (0.30)	7.0 (0.28)	10.0 (0.40)	15.0 (0.60)
Mass grammes	1.1	0.8	3.6	12.1
				

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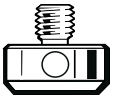
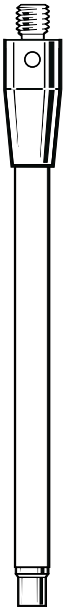
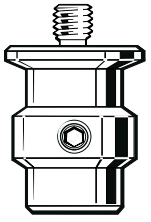
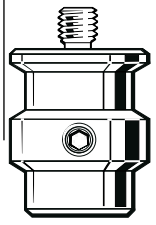
Adaptors

Part number	M-5000-4164 Stainless steel	M-5000-4163 Stainless steel	M-5000-6622 Stainless steel	M-5000-6714 Stainless steel	M-5000-6625 Stainless steel	M-5000-9301 Stainless steel	A-5003-0856 Stainless steel	A-5555-0227 Stainless steel
Male/female thread	M2/M3	M3/M2	M4/M2	M4/M3	M4/M3	M5/M4	M5/M4	M5/M3
Length mm (inch)	7.0 (0.28)	5.0 (0.20)	5.0 (0.20)	9.0 (0.36)	20.0 (0.79)	6.5 (0.26)	9.0 (0.36)	10.0 (0.40)
Mass grammes	0.4	0.6	1.5	1.4	3.2	6.0	4.6	5.0
								

Part number	A-5555-0226 Stainless steel	A-5000-7751 Ceramic	M-5000-8167 Stainless steel	A-5000-7752 Ceramic	A-5000-7753 Ceramic	A-2054-4657 Stainless steel	A-5000-9302 Stainless steel	A-5000-9303 Stainless steel
Male/female thread	M5/M2	M4/M3	TF6/M3	M4/M3	M4/M3	M4/Ø4.5	M5/Ø8.0	M5/Ø10.0
Length mm (inch)	10.0 (0.40)	50.0 (1.97)	18.0 (0.71)	75.0 (2.96)	100.0 (3.94)	10.0 (0.40)	22.0 (0.87)	22.0 (0.87)
Mass grammes	5.0	4.4	1.9	5.2	6.3	5.0	18.0	20.0
								

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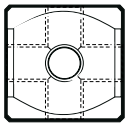
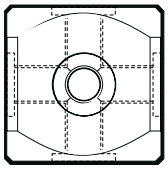
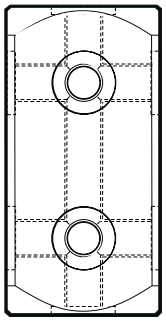
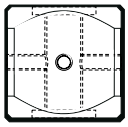
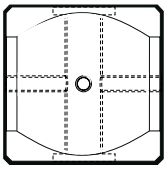
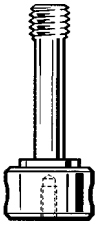
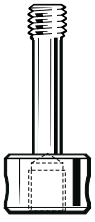
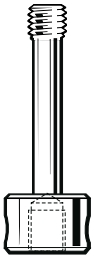
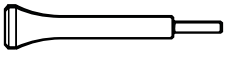
Cubes and bolts

Part number	A-5555-0189 Titanium	A-5555-0190 Titanium	A-5555-0194 Titanium	A-5003-5683 Titanium	A-5003-5684 Titanium
Thread size	M5	M5	M5	M5 – M2	M5 – M2
Length mm (inch)	15.0 (0.60)	20.0 (0.79)	20.0 (0.79)	15.0 (0.60)	20.0 (0.79)
Width mm (inch)	15.0 (0.60)	20.0 (0.79)	40.0 (1.58)	15.0 (0.60)	20.0 (0.79)
Mass grammes	12.85	32.55	63.50	13.75	35.18
					

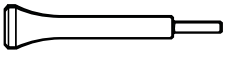
Part number	A-5003-5679 Stainless steel	A-5003-5678 Stainless steel	A-5003-5677 Stainless steel	A-5003-5676 Stainless steel
Thread size	M5 – M2	M5 – M2	M5	M5
Length mm (inch)	28.0 (1.11)	33.0 (1.30)	28.0 (1.11)	33.0 (1.30)
Mass grammes	6.7	7.1	6.0	6.4
				

Stylus tools

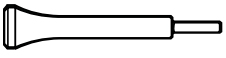
M-5000-3540
For M2 and M3
threaded styli



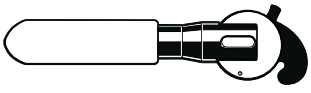
M-5000-3707
For M4
threaded styli



M-5000-9304
For M5
threaded styli



A-5003-2300
For the M2 carbon fiber
range of styli



These tools are designed to fit styli to Renishaw probes without causing any internal damage.

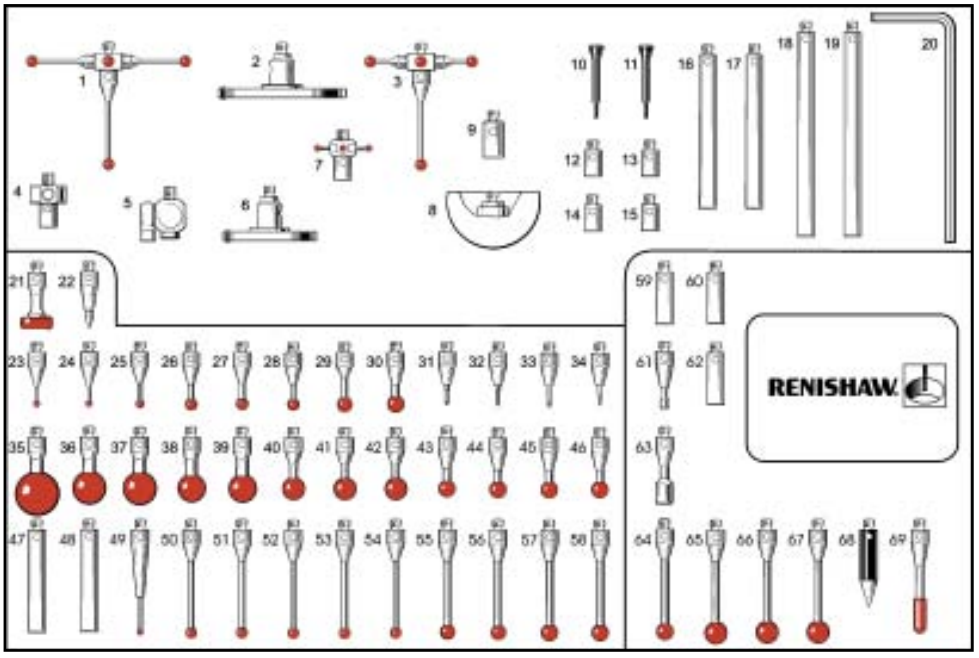
RENISHAW apply innovation™

Stylus kits

M2 comprehensivestyluskit

RENISHAW apply innovation™

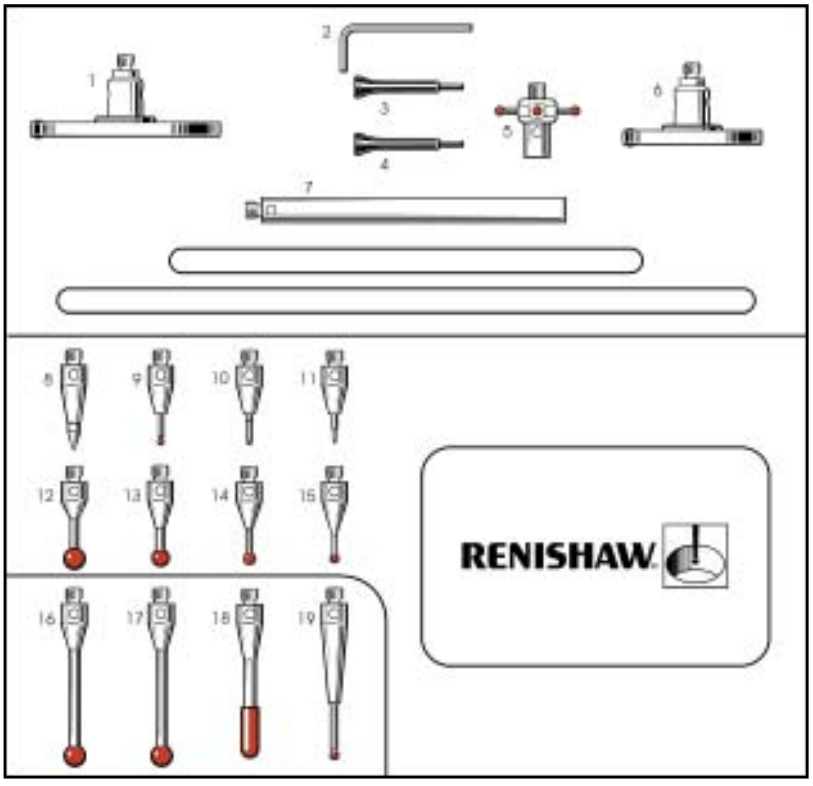
A-5000-0001



Position	Part number	Description
1	A-5000-3626	M2 STR D2 5BALL L19.2 S30
2	A-5000-7810	M2 DSC D25SLVS T1.5 L8.6 BR-Y2.5
3	A-5000-7629	M2 STR D2 5BALL L19.2 S18
4	A-5000-3627	M2 ACC CENTRE 5WAY
5	A-5000-7534	M2 ACC KNUCKLE OFFSET
6	A-5000-7809	M2 DSC D18SLVS T1.5 L8.6 BR-Y2.5
7	A-5000-7811	M2 STR D1 4BALL L7.5T S10
8	A-5000-3614	M2 HEM D18CE
9	M-5000-4164	M2-M3 EXT L7SS
10-11	M-5000-3540	M2-M3 STYLUS TOOL
12-15	M-5000-7634	M2 EXT L5 D3SS
16-17	M-5000-4162	M2 EXT L30 D3SS
18-19	M-5000-7779	M2 EXT L40 D3SS
20	P-TL01-0150	S3 HEX WRENCH 1.5 MM A/F
21	A-5000-3611	M2 DSC D6R T1.2 L10 BR-Y2
22	A-5000-7813	M2 PNT D1.4TC 30DEG L10
23-24	A-5000-7806	M2 STY D1R L10 EWL4.5 D0.7SS
25	A-5000-7802	M2 STY D1.5R L10 EWL4.5 D0.7SS
26-28	A-5000-7807	M2 STY D2R L10 EWL6 D1SS
29	A-5000-7803	M2 STY D2.5R L10 EWL6 D1SS
30	A-5000-3604	M2 STY D3R L10 EWL7.5 D1.5SS
31-32	A-5000-7805	M2 STY D0.5R L10 EWL3 D0.4TC
33	A-5000-7801	M2 STY D0.7R L10 EWL4 D0.5TC
34	A-5000-7800	M2 STY D0.3R L10 EWL2 D0.2TC
35	A-5000-4158	M2 STY D8R L11 EWL11 D2.5SS
36-37	A-5000-4156	M2 STY D6R L10 EWL10 D2.5SS
38-39	A-5000-4155	M2 STY D5R L10 EWL10 D2.5SS
40-42	A-5000-4154	M2 STY D4R L10 EWL10 D1.5SS
43-46	A-5000-3604	M2 STY D3R L10 EWL7.5 D1.5SS
47-48	M-5000-3648	M2 EXT L20 D3SS
49	A-5000-7808	M2 STY D1R L20 EWL7 D0.7TC
50-54	A-5000-3603	M2 STY D2R L20 EWL14 D1.4SS
55-56	A-5000-7804	M2 STY D2.5R L20 EWL16.5 D1.4SS
57-58	A-5000-4160	M2 STY D3R L20 EWL17.5 D1.5SS
59-60	M-5000-3647	M2 EXT L10 D3SS
61	M-5000-4152	M2 CYL D1.5SLVS L11 EWL1.5
62	M-5000-3647	M2 EXT L10 D3SS
63	M-5000-4153	M2 CYL D3SLVS L13 EWL3.8
64	A-5000-4160	M2 STY D3R L20 EWL17.5 D1.5SS
65-67	A-5000-4161	M2 STY D4R L20 EWL20 D1.5SS
68	M-5000-4150	M2 PNT D3SLVS 30DEG L15
69	A-5000-7812	M2 SPH D2R L20 EWL7.2 SS

M2 stylus enhancement kit

A-5000-0002



Position	Part number	Description
1	A-5000-7810	M2 DSC D25SLVS T1.5 L8.6 BR-Y2.5
2	P-TL01-0150	S3 HEX WRENCH 1.5 MM A/F
3-4	M-5000-3540	M2-M3 STYLUS TOOL
5	A-5000-7811	M2 STR D1 4BALL L7.5T S10
6	A-5000-7809	M2 DSC D18SLVS T1.5 L8.6 BR-Y2.5
7	M-5000-7779	M2 EXT L40 d3SS
8	A-5000-7813	M2 PNT D1.4TC 30deg L10
9	A-5000-7801	M2 STY D0.7R L10 EWL4 d0.5TC
10	A-5000-7805	M2 STY D0.5R L10 EWL3 d0.4TC
11	A-5000-7800	M2 STY D0.3R L10 EWL2 d0.2TC
12	A-5000-7803	M2 STY D2.5R L10 EWL6 d1SS
13	A-5000-7807	M2 STY D2R L10 EWL6 d1SS
14	A-5000-7802	M2 STY D1.5R L10 EWL4.5 d0.7SS
15	A-5000-7806	M2 STY D1R L10 EWL4.5 d0.7SS
16-17	A-5000-7804	M2 STY D2.5R L20 EWL16.5 d1.4SS
18	A-5000-7812	M2 SPH D2R L20 EWL7.2 SS
19	A-5000-7808	M2 STY D1R L20 EWL7 d0.7TC

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M2 high performance kit

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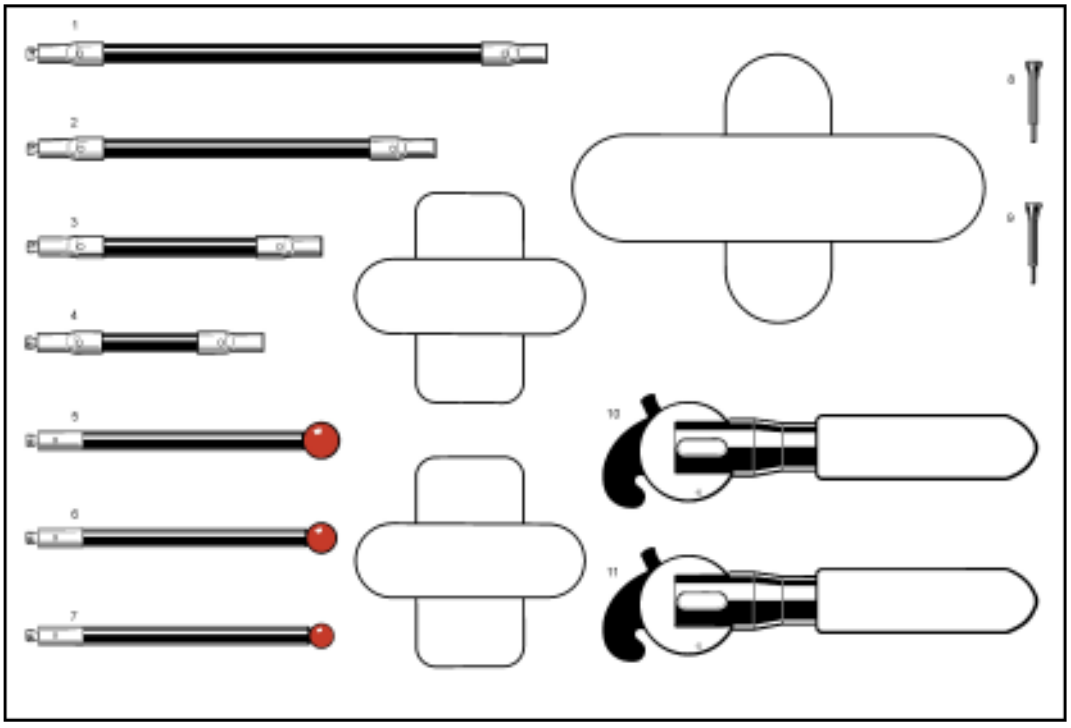
A-5003-2310



Position	Part number	Description
1	A-5003-2283	M2 EXT L90 d3CF
2	A-5003-2282	M2 EXT L70 d3CF
3	A-5003-2281	M2 EXT L50 d3CF
4	A-5003-2280	M2 EXT L40 d3CF
5	A-5003-2287	M2 STY D6R L50 EWL50 d3CF
6	A-5003-2286	M2 STY D5R L50 EWL50 d3CF
7	A-5003-2285	M2 STY D4R L50 EWL50 d3CF
8-9	M-5000-3540	M2-M3 STYLUS TOOL
10-11	A-5003-2300	M2 STYLUS TOOL CF RANGE

Styluskit 201 for M2 probes

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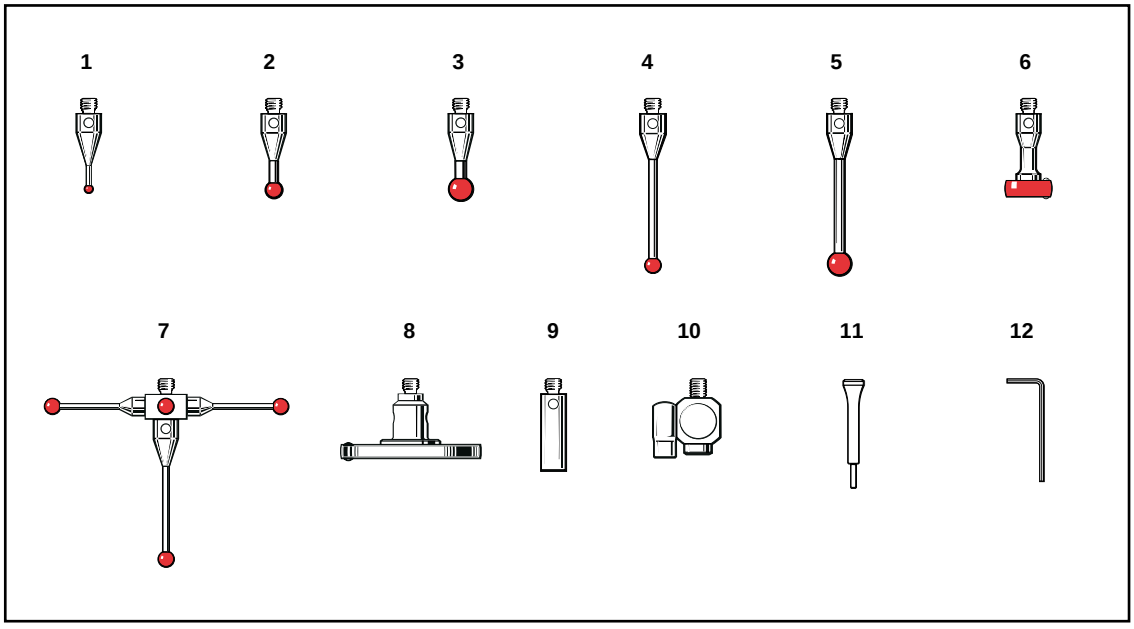

Position	Part number	Quantity	Description
1	A-5000-7806	1	M2 STY D1R L10 EWL4.5 d0.7SS
2	A-5000-7807	1	M2 STY D2R L10 EWL6 d1SS
3	A-5000-3604	1	M2 STY D3R L10 EWL7.5 d1.5SS
4	A-5000-3603	1	M2 STY D2R L20 EWL14 d1.4SS
5	A-5000-4160	1	M2 STY D3R L20 EWL17.5 d1.5SS
6	A-5000-3611	1	M2 DSC D6R T1.2 L10 BR-Y2
7	A-5000-3626	1	M2 STR D2 5BALL L19.2 S30
8	A-5000-7809	1	M2 DSC D18SLVS T1.5 L8.6 BR-Y2.5
9	M-5000-3647	2	M2 EXT L10 d3SS
10	A-5000-7534	1	M2 ACC KNUCKLE OFFSET
11	M-5000-3540	2	M2-M3 STYLUS TOOL
12	P-TL01-0150	1	S3 HEX WRENCH 1.5 MM A/F
13	M-5000-3541	1	S8 TP2 SPANNER (not pictured)
14	A-1015-7658	1	TP2 & STYLI BOX (not pictured)

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Styluskit 204 for M2 probes

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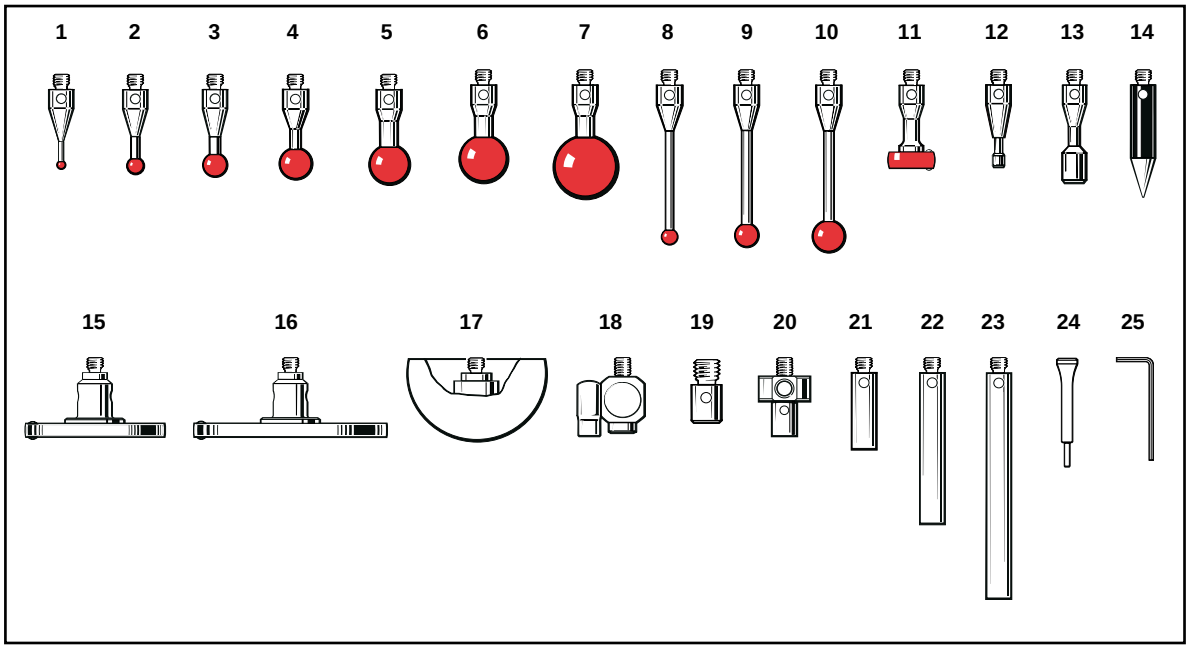

Position	Part number	Quantity	Description
1	A-5000-7806	1	M2 STY D1R L10 EWL4.5 d0.7SS
2	A-5000-7807	1	M2 STY D2R L10 EWL6 d1SS
3	A-5000-3604	1	M2 STY D3R L10 EWL7.5 d1.5SS
4	A-5000-4154	1	M2 STY D4R L10 EWL10 d1.5SS
5	A-5000-4155	1	M2 STY D5R L10 EWL10 d2.5SS
6	A-5000-4156	1	M2 STY D6R L10 EWL10 d2.5SS
7	A-5000-4158	1	M2 STY D8R L11 EWL11 d2.5SS
8	A-5000-3603	1	M2 STY D2R L20 EWL14 d1.4SS
9	A-5000-4160	1	M2 STY D3R L20 EWL17.5 d1.5SS
10	A-5000-4161	1	M2 STY D4R L20 EWL20 d1.5SS
11	A-5000-3611	1	M2 DSC D6R T1.2 L10 BR-Y2
12	M-5000-4152	1	M2 CYL D1.5SLVS L11 EWL1.5
13	M-5000-4153	1	M2 CYL D3SLVS L13 EWL3.8
14	M-5000-4150	1	M2 PNT D3SLVS 30deg L15
15	A-5000-7809	1	M2 DSC D18SLVS T1.5 L8.6 BR-Y2.5
16	A-5000-7810	1	M2 DSC D25SLVS T1.5 L8.6 BR-Y2.5
17	A-5000-3614	1	M2 HEM D18CE
18	A-5000-7534	1	M2 ACC KNUCKLE OFFSET
19	M-5000-4163	1	M3-M2 EXT L5SS
20	A-5000-3627	1	M2 ACC CENTRE 5WAY
21	M-5000-3647	2	M2 EXT L10 d3SS
22	M-5000-3648	2	M2 EXT L20 d3SS
23	M-5000-4162	2	M2 EXT L30 d3SS
24	M-5000-3540	2	M2-M3 STYLUS TOOL
25	P-TL01-0150	1	S3 HEX WRENCH 1.5 MM A/F
26	M-5000-3541	1	S8 TP2 SPANNER (not pictured)
27	A-1015-7749	1	COMP BOX ASSEMBLY (not pictured)

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Styluskit 206 for M2 probes

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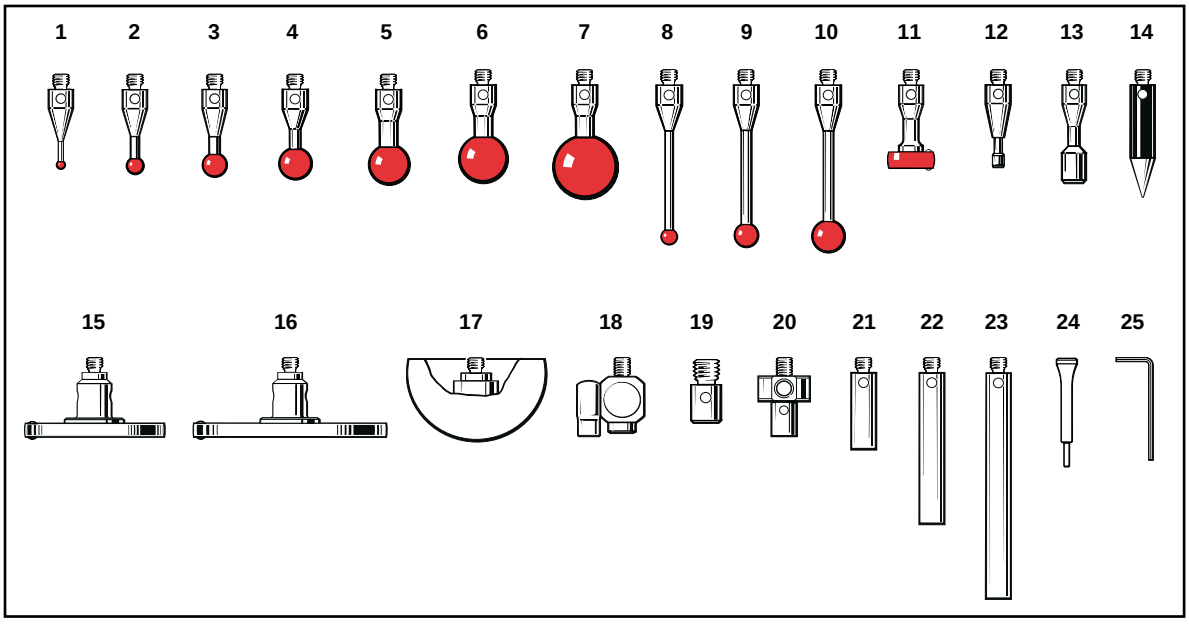

Position	Part number	Quantity	Description
1	A-5000-7806	5	M2 STY D1R L10 EWL4.5 d0.7SS
2	A-5000-7807	3	M2 STY D2R L10 EWL6 d1SS
3	A-5000-3604	5	M2 STY D3R L10 EWL7.5 d1.5SS
4	A-5000-4154	3	M2 STY D4R L10 EWL10 d1.5SS
5	A-5000-4155	2	M2 STY D5R L10 EWL10 d2.5SS
6	A-5000-4156	2	M2 STY D6R L10 EWL10 d2.5SS
7	A-5000-4158	1	M2 STY D8R L11 EWL11 d2.5SS
8	A-5000-3603	5	M2 STY D2R L20 EWL14 d1.4SS
9	A-5000-4160	3	M2 STY D3R L20 EWL17.5 d1.5SS
10	A-5000-4161	3	M2 STY D4R L20 EWL20 d1.5SS
11	A-5000-3611	1	M2 DSC D6R T1.2 L10 BR-Y2
12	M-5000-4152	1	M2 CYL D1.5SLVS L11 EWL1.5
13	M-5000-4153	1	M2 CYL D3SLVS L13 EWL3.8
14	M-5000-4150	1	M2 PNT D3SLVS 30deg L15
15	A-5000-7809	1	M2 DSC D18SLVS T1.5 L8.6 BR-Y2.5
16	A-5000-7810	1	M2 DSC D25SLVS T1.5 L8.6 BR-Y2.5
17	A-5000-3614	1	M2 HEM D18CE
18	A-5000-7534	1	M2 ACC KNUCKLE OFFSET
19	M-5000-4163	1	M3-M2 EXT L5SS
20	A-5000-3627	3	M2 ACC CENTRE 5WAY
21	M-5000-3647	3	M2 EXT L10 d3SS
22	M-5000-3648	2	M2 EXT L20 d3SS
23	M-5000-4162	2	M2 EXT L30 d3SS
24	M-5000-3540	2	M2-M3 STYLUS TOOL
25	P-TL01-0150	1	S3 HEX WRENCH 1.5 MM A/F
26	M-5000-3541	1	S8 TP2 SPANNER (not pictured)
27	A-1015-7749	1	COMP BOX ASSEMBLY (not pictured)

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A-5003-6151 M3 styluskit for SP25M/SM25-1/SH25-1

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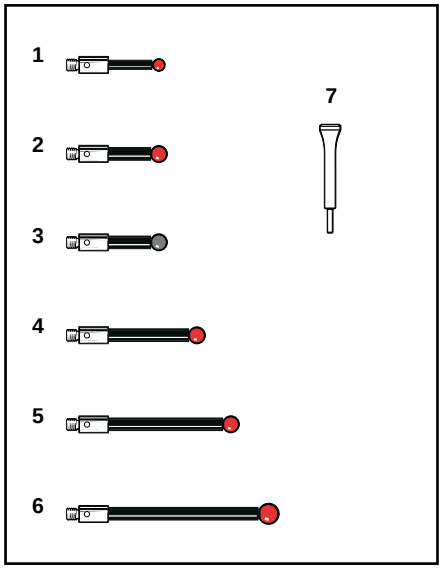

Position	Part number	Description
1	A-5003-5970	M3 STY D3R L21 EWL13.5 d2CF
2	A-5003-5971	M3 STY D4R L21 EWL13.5 d3CF
3	A-5003-5977	M3 STY D4SIN L21 EWL13.5 d3CF
4	A-5003-5972	M3 STY D4R L31 EWL23.5 d3CF
5	A-5003-5973	M3 STY D4R L40 EWL32.5 d3CF
6	A-5003-5974	M3 STY D5R L50 EWL42.5 d3CF
7	M-5000-3540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

A-5003-6152 M3 stylus kit for SP25M/SM25-2/SH25-2

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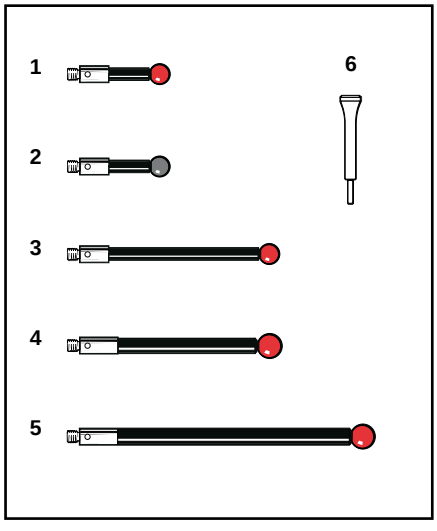

Position	Part number	Description
1	A-5003-5975	M3 STY D5R L21 EWL13.5 d3CF
2	A-5003-5978	M3 STY D5SIN L21 EWL13.5 d3CF
3	A-5003-5974	M3 STY D5F L50 EWL42.5 d3CF
4	A-5003-5976	M3 STY D6R L50 EWL50 d4CF
5	A-5003-4860	M3 STY D6R L75 EWL75 d4CF
6	M-5000-3540	M2-M3 STYLUS TOOL

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A-5003-6153 M3 stylus kit for SP25M/SM25-3/SH25-3

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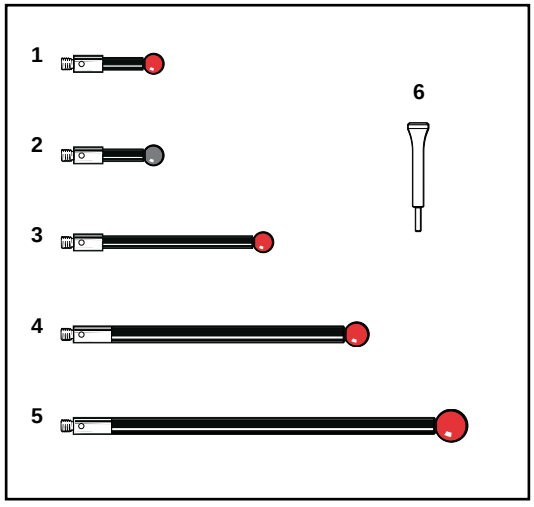

Position	Part number	Description
1	A-5003-5975	M3 STY D5R L21 EWL13.5 d3C/F
2	A-5003-5978	M3 STY D5SIN L21 EWL13.5 d3C/F
3	A-5003-5974	M3 STY D5R L50 EWL42.5 d3C/F
4	A-5003-4860	M3 STY D6R L75 EWL75 d4C/F
5	A-5003-4863	M3 STY D8R L100 EWL100 d4C/F
6	M-5000-3540	M2-M3 STYLUS TOOL

A-5003-8124 M3 styluskit for SP25M/SM25-4/SH25-4

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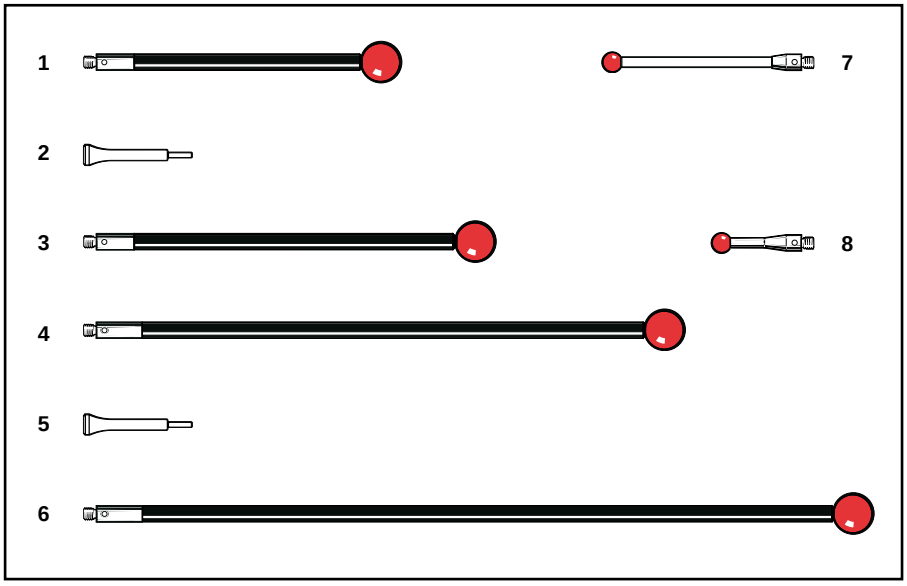

Position	Part number	Description
1	A-5003-7057	M3 STY D10R L25 EWL75 d4C/F
2	M-5000-3540	M2-M3 STYLUS TOOL
3	A-5003-7056	M3 STY D10R L100 EWL100 d4C/F
4	A-5003-7055	M3 STY D10R L150 EWL150 d4C/F
5	M-5000-3540	M2-M3 STYLUS TOOL
6	A-5003-7054	M3 STY D10R L200 EWL200 d4C/F
7	A-5003-0069	M3 STY D5R L50 EWL50 d2.5CER
8	A-5000-7630	M3 STY D5R L21 EWL21 d2.5SS

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Styluskit 101 for M3 probes

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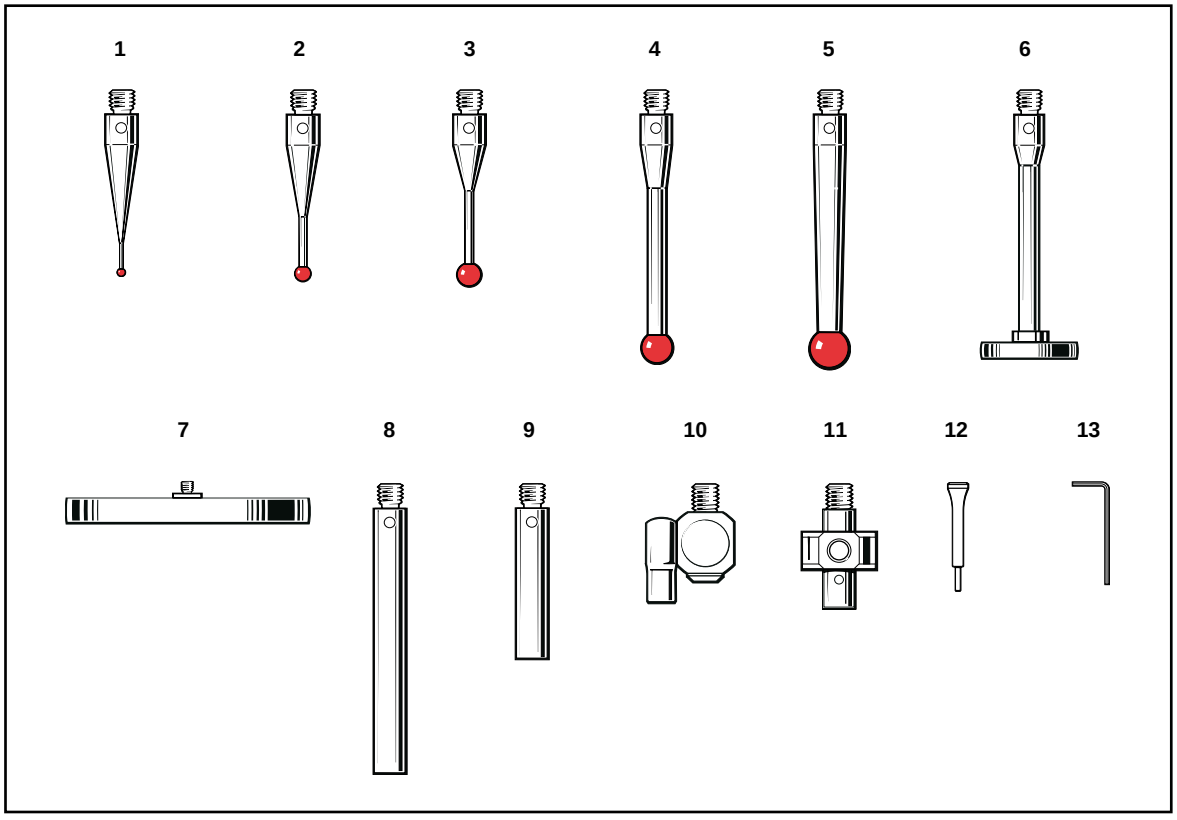

Position	Part number	Quantity	Description
1	A-5000-3551	1	M3 STY D1R L21 EWL4 d0.6SS
2	A-5000-3552	1	M3 STY D2R L21 EWL8 d1.4SS
3	A-5000-3553	1	M3 STY D3R L21 EWL12 d1.5SS
4	A-5000-3554	5	M3 STY D4R L31 EWL27 d2.5SS
5	A-5000-7648	1	M3 STY D5R L31 EWL31 d3.5SS
6	A-5000-3615	1	M3 DSC D12.7SLVS T2 L30.8 BR-N
7	A-5000-7669	1	M3 DSC D63.5CS T6 L4 BR-N
8	M-5000-3593	1	M3 EXT L35 d4SS
9	M-5000-3592	1	M3 EXT L20 d4SS
10	A-5000-7616	1	M3 ACC KNUCKLE OFFSET
11	A-5000-7610	1	M3 ACC CENTRE 5WAY
12	M-5000-3540	2	M2-M3 STYLUS TOOL
13	P-TL01-0150	1	S3 HEX WRENCH 1.5 MM A/F
14	A-1041-7569	1	SA7 ADAPTOR (not pictured)
15	M-5000-3571	2	STYLUS SHANK ADAPTOR (not pictured)
16	A-1015-7650	1	TP1 STYLI BOX (not pictured)

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Styluskit 102 for M3 probes

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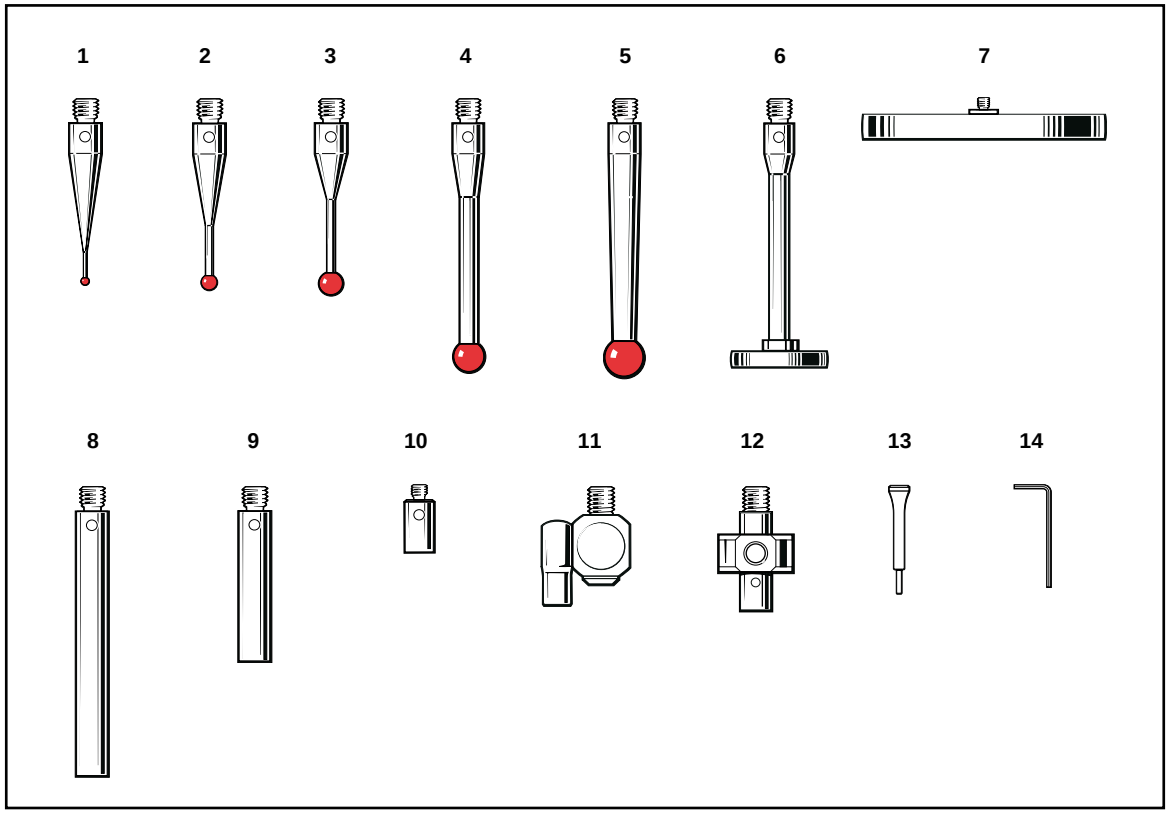

Position	Part number	Quantity	Description
1	A-5000-3551	3	M3 STY D1R L21 EWL4 d0.6SS
2	A-5000-3552	5	M3 STY D2R L21 EWL8 d1.4SS
3	A-5000-3553	3	M3 STY D3R L21 EWL12 d1.5SS
4	A-5000-3554	7	M3 STY D4R L31 EWL27 d2.5SS
5	A-5000-7648	1	M3 STY D5R L31 EWL31 d3.5SS
6	A-5000-3615	1	M3 DSC D12.7SLVS T2 L30.8 BR-N
7	A-5000-7669	1	M3 DSC D63.5CS T6 L4 BR-N
8	M-5000-3593	2	M3 EXT L35 d4SS
9	M-5000-3592	2	M3 EXT L20 d4SS
10	M-5000-4164	1	M2-M3 EXT L7SS
11	A-5000-7616	1	M3 ACC KNUCKLE OFFSET
12	A-5000-7610	2	M3 ACC CENTRE 5WAY
13	M-5000-3540	2	M2-M3 STYLUS TOOL
14	P-TL01-0150	1	S3 HEX WRENCH 1.5 MM A/F
15	A-1041-7569	1	SA7 ADAPTOR (not pictured)
16	M-5000-3571	2	STYLUS SHANK ADAPTOR (not pictured)
17	A-1015-7650	1	TP1 STYLUS BOX (not pictured

A-5000-7829 M4 styluskit (TP7M use)

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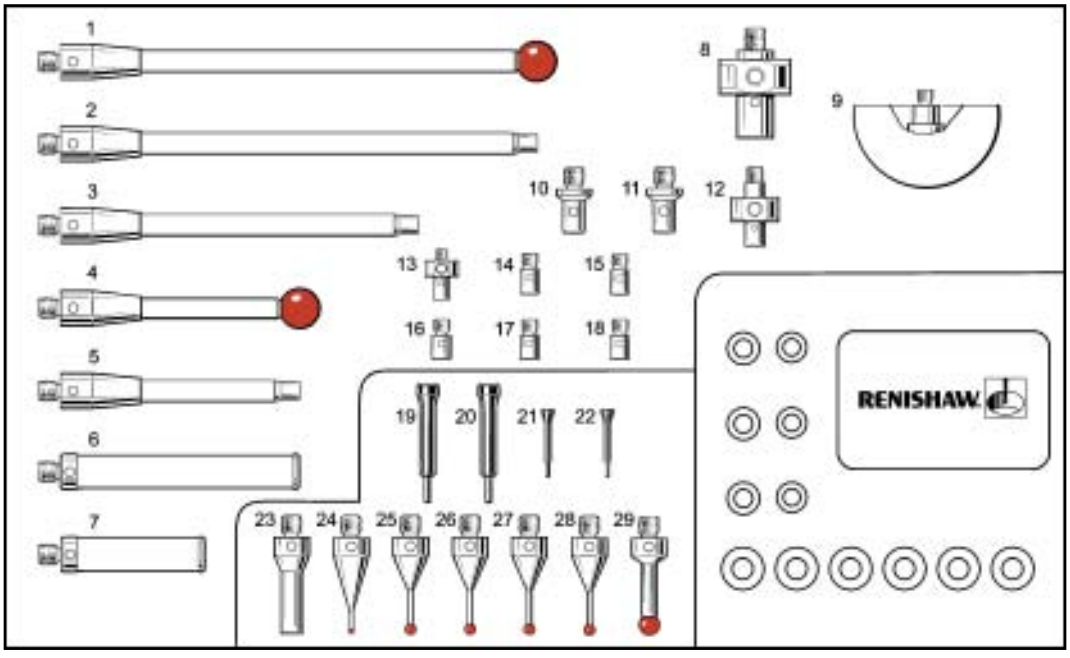

Position	Part number	Description
1	A-5000-7796	M4 STY D8R L100 EWL100 d4.5CE
2	A-5000-7753	M4-M3 EXT L100CE
3	A-5000-7752	M4-M3 EXT L75CE
4	A-5000-7795	M4 STY D8R L50 EWL50 d4.5CE
5	A-5000-7751	M4-M3 EXT L50C
6	A-5000-7755	M4 EXT L50 d7.4CE
7	A-5000-7754	M4 EXT L30 d7.4CE
8	A-5000-7792	M4 ACC CENTRE 5WAY
9	A-5000-7814	M3 HEM D30CE
10-11	M-5000-6714	M4-M3 EXT L9SS
12	A-5000-7610	M3 ACC CENTRE 5WAY
13	A-5000-3627	M2 ACC CENTRE 5WAY
14-18	M-5000-4163	M3-M2 EXT L5SS
19-20	M-5000-3707	M4 STYLUS TOOL
21-22	M-5000-3540	M2-M3 STYLUS TOOL
23	M-5000-6625	M4-M3 EXT L20SS
24	A-5000-7545	M4 STY D1R L19.5 EWL4 d0.7SS
25-28	A-5000-7547	M4 STY D2R L19 EWL8 d1.4SS
29	A-5000-7551	M4 STY D4R L18 EWL13 d3SS

A-5003-5911 M5 styluskit - standard

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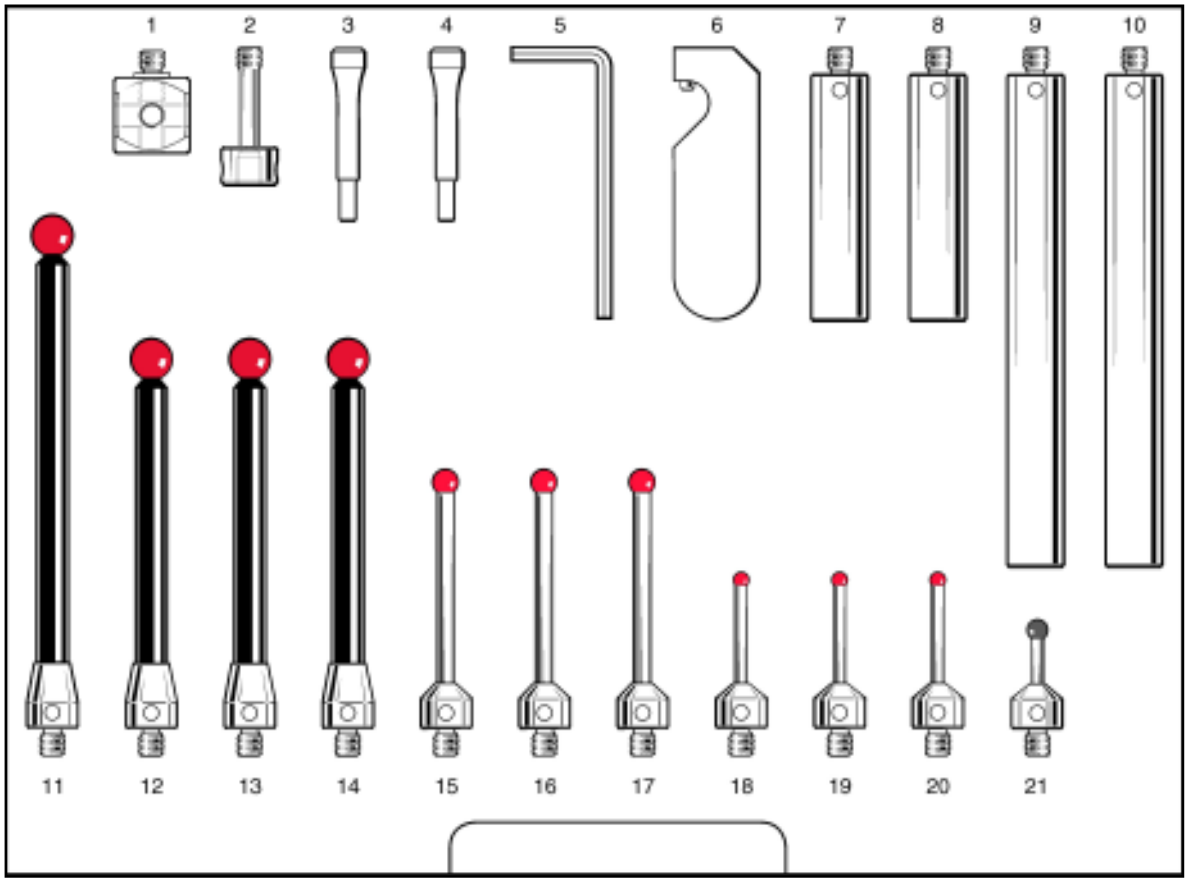

Position	Part number	Description
1	A-5555-0189	M5 ACC 15X15 CUBE
2	A-5003-5677	M5 ACC CUBE BOLT L28
3-4	M-5000-9304	M5 STYLUS TOOL
5	P-TL01-0250	S3 HEX WRENCH 2.5 MM A/F
6	A-5003-6134	M5 ACC D11 EXTENSION TOOL
7-8	A-5555-0670	M5 EXT L50 d11SS
9-10	A-5555-0136	M5 EXT L100 d11SS
11	A-5003-5262	M5 STY D8R L100 EWL87 d6CF
12-14	A-5003-5251	M5 STY D8R L75 EWL62 d6CF
15-17	A-5003-5236	M5 STY D5R L50 EWL41 d3TC
18-20	A-5003-5218	M5 STY D3R L30 EWL21 d2TC
21	A-5003-5733	M5 STY D4SN L20 EWL11 d2TC

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A-5003-5909 M5 styluskit - comprehensive

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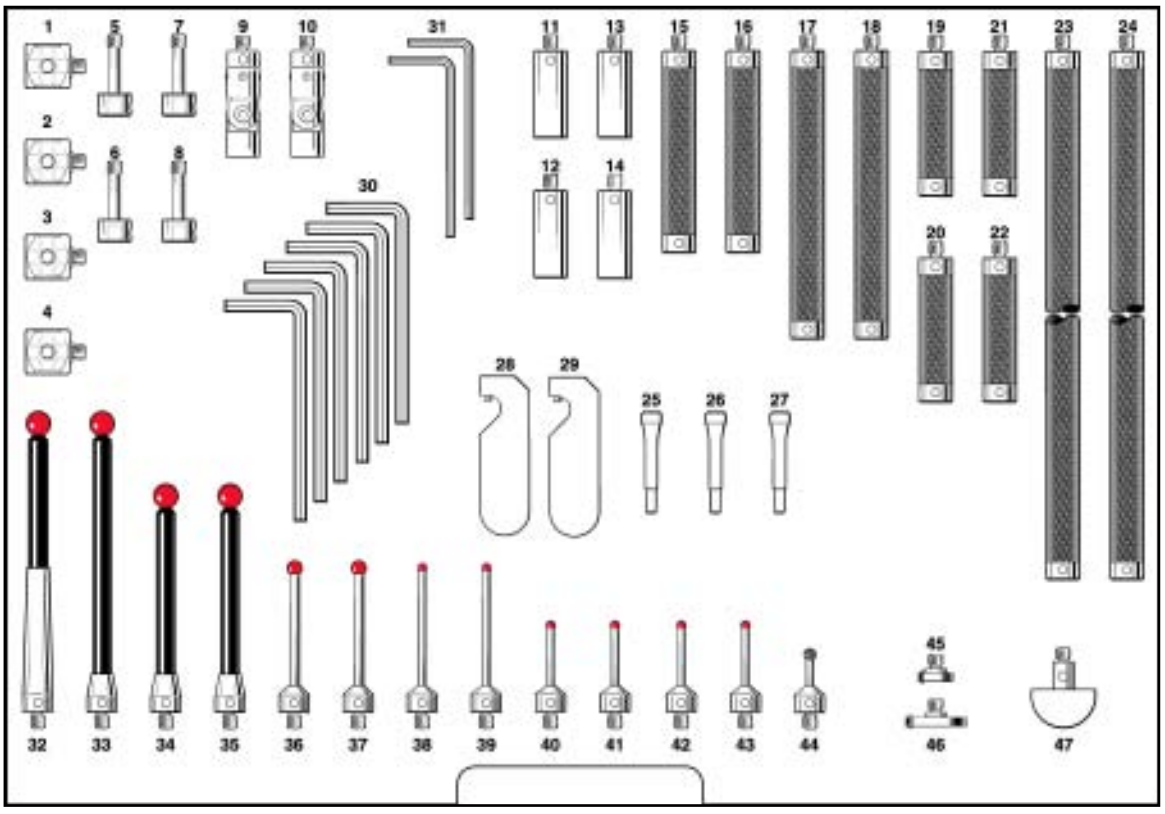

Position	Part number	Description
1-4	A-5555-0189	M5 ACC 15X15 CUBE
5-8	A-5003-5677	M5 ACC CUBE BOLT L28
9-10	A-5003-5278	M5 ACC KNUCKLE d11 ROTARY
11-14	A-5555-0669	M5 EXT L30 d11SS
15-16	A-5555-0623	M5 EXT L70 d11CF
17-18	A-5555-0652	M5 EXT L100 d11CF
19-22	A-5555-0648	M5 EXT L50 d11CF
23-24	A-5555-0654	M5 EXT L200 d11CF
25-27	M-5000-9304	M5 STYLUS TOOL
28-29	A-5003-6134	M5 ACC D11 EXTENSION TOOL
30	P-TL01-0250	S3 HEX WRENCH 2.5 MM A/F
31	P-TL01-0150	S3 HEX WRENCH 1.5 MM A/F
32	A-5003-5261	M5 STY D8R L100 EWL50 d6CF
33	A-5003-5262	M5 STY D8R L100 EWL87 d6CF
34-35	A-5003-5251	M5 STY D8R L75 EWL62 d6CF
36-37	A-5003-5236	M5 STY D5R L50 EWL41 d3TC
38-39	A-5003-5234	M5 STY D3R L50 EWL41 d2TC
40-43	A-5003-5218	M5 STY D3R L30 EWL21 d2TC
44	A-5003-5733	M5 STY D4SN L20 EWL11 d2TC
45	A-5003-5288	M5 DSC D12SLVS T3 L3 BR-Y5
46	A-5003-5289	M5 DSC D21SLVS T3 L3 BR-Y5
47	A-5003-5276	M5 HEM D22CE d7SS

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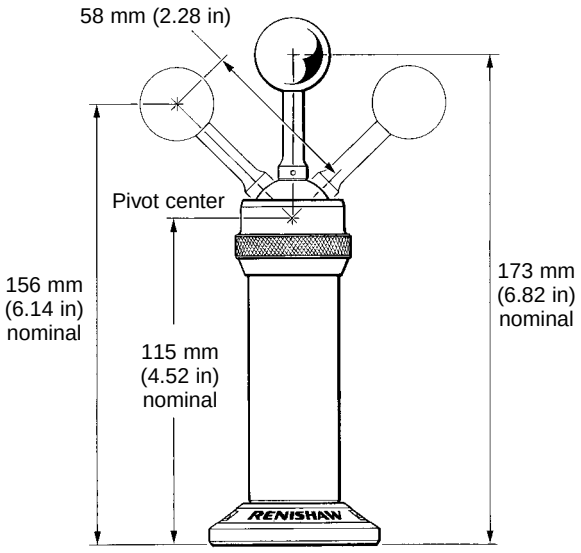
Datum balls

Datum spheres are made from hard-wearing tungsten carbide and come supplied with individual certificates stating ball diameter and roundness. All sphere measurements are performed on equipment traceable to UK (NPL) standards. Grade 3 sphericity balls are used.



Datum sphere kit	Part number
Ø12 mm datum ball	A-1034-0028
Ø19 mm datum ball	A-1034-0027
Ø25 mm datum ball	A-1034-0026
Ø¾ in datum ball	A-1034-0031
Ø1 in datum ball	A-1034-0035

Fixing stud – a fixing stud is required with each kit to attach the pillar to the table surface

Thread size	Part number
M6 x 1	M-1034-0016
M8 x 1.25	M-1034-0015
M10 x 1.5	M-1034-0014
5/16 - 18 x UNC	M-1034-0018
3/8 - 16 x UNC	M-1034-0017

Optional extras

Datum ball	Part number
Ø12 mm	A-1034-0005
Ø19 mm	A-1034-0023
Ø25 mm	A-1034-0002
Ø¾ in	A-1034-0032
Ø1 in	A-1034-0036

Adaptors/extension	Part number
2 way adaptor	M-1034-0042
3 way adaptor	M-1034-0052
Pillar extension 75 mm (2.96 in) long	M-1034-0019

Gram gage

The gram gage allows the optimum trigger force to be set to maximize probe performance on all standard Renishaw touch trigger probes.

Part number: P-GA01-0001

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

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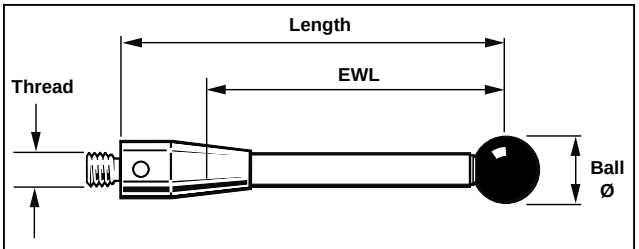
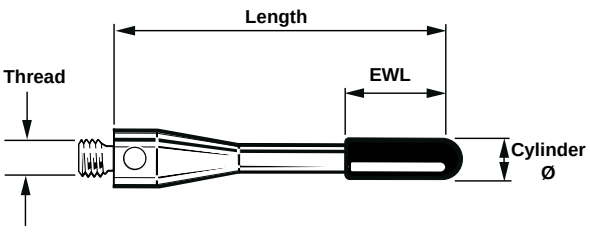
Customstylusfax backform

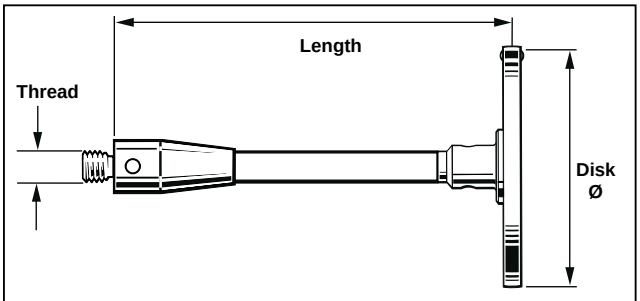
Please fill in your stylus requirements in the space provided and fax back to us. Our design team will carry out a feasibility study and present you with a solution to your application problem.



Thread size	Length	EWL	Ball diameter	Ball material	Stem material	Quantity required



Thread size	Length	EWL	Cylinder diameter	Cylinder material	Quantity required



Thread size	Length	Disk diameter	Disk thickness	Disk material	Disk roller Y or N?	Quantity required

Notes

Probe head: **Probing orientation:**

Application (what are you measuring?)

Company name: **Date:**

Address:

Telephone:

Contact name: **Fax:**

Department: **Email:**

Repair services

Renishaw repair services

Services offered

Repair

Your product is repaired to factory performance specifications, and carries a 3-month warranty.

Repair By Exchange (RBE)

Your product is replaced by a refurbished or as new product, shipped to you once we have received your failed product. RBEs carry a 6-month warranty.

Advance RBE

Your product is replaced by a refurbished or as new product, shipped to you on the same day that you report a fault. Advance RBEs carry a 6-month warranty.

Replace new

Your product is replaced by a new product, carrying a new factory warranty.

Please note:

The services offered on each product vary – please consult the detailed list that follows.

On Advance RBE, in order to get you a replacement product as soon as possible, it is necessary to charge a small additional premium on top of the price of the product to cover additional administration.

Available repair services for Specials are quoted per job.

All the following prices are for guidance only. When units are received with excessive wear and tear, or obsolete product is returned for repair, Renishaw reserves the right to quote a different service/replacement charge.

Advance replacements

Advance replacement is a Renishaw premium service aimed at minimizing your downtime. This service is only available on products where a Repair By Exchange (RBE) service is offered. Through this service we ship an RBE in advance of receipt of your inoperative product.

Please note:

1) A charge applies to each advance replacement.

2) Your inoperative product must be returned to Renishaw within 14 working days of receipt of the advance replacement.

3) Failure to do so will result in an issuance of a non-return invoice in the amount of the difference between the RBE price and the new list price.

4) Return of your inoperative product after the issuance of the non-return invoice will not result in a credit of the non-return invoice, and your inoperative product will be returned to you.

5) Advance replacements sent out under a warranty claim will not be credited if the returned product is damaged, or no fault is found with the returned product.

6) Returns of advance replacements will be accepted if:

   a) they are returned unused, and in the original packaging within ten working days of invoice date, and

   b) the return has been pre-approved by Renishaw through the issuance of a Return Goods Authorization (RGA) number, and

   c) the return passes Renishaw inspection, and

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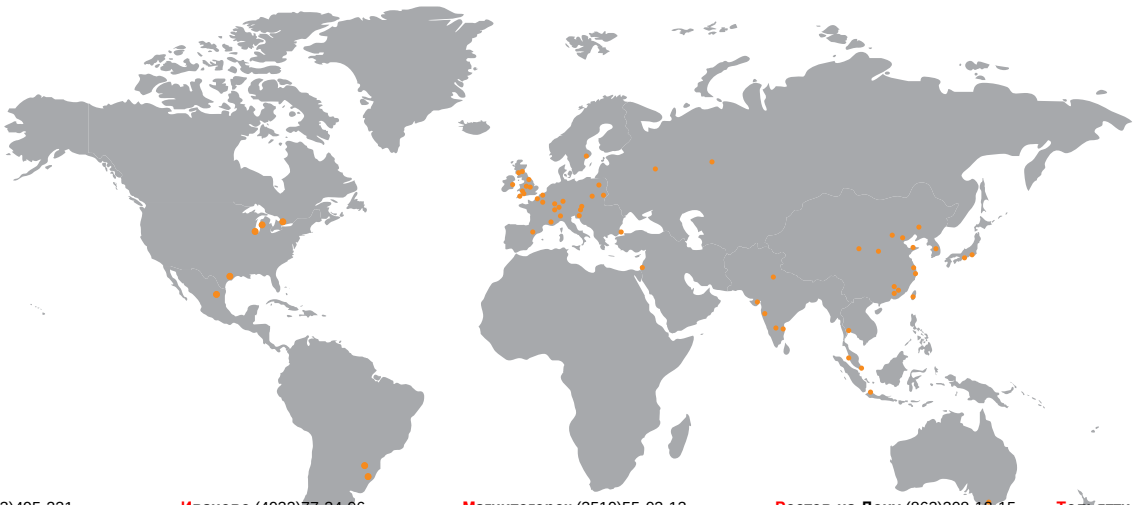
About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing, vacuum casting, and injection molding technologies for design, prototyping, and production applications
- Advanced material technologies with a variety of applications in multiple fields
- Dental CAD/CAM scanning and milling systems and supply of dental structures
- Encoder systems for high-accuracy linear, angle and rotary position feedback
- Fixturing for CMMs and gaging systems
- Gaging systems for comparative measurement of machined parts
- High-speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs (co-ordinate measuring machines)
- Styli for CMM and machine tool probe applications



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