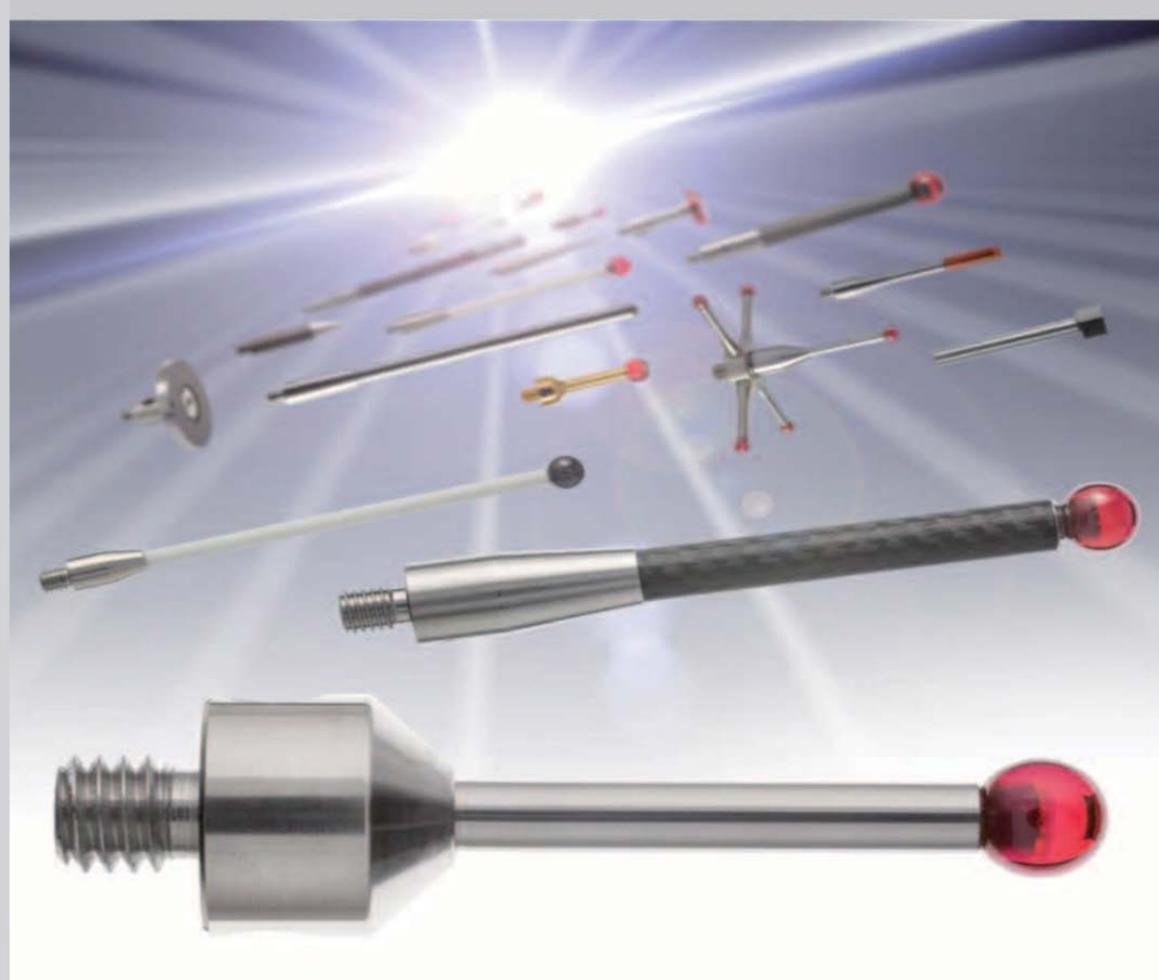


测针

Measuring styli



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CMM Styli

三坐标测针

随着工业质量保证标准和工件要求不断提高，为了适应高速度，高性能扫描系统可以在很短的时间内实现高精度测量。我公司为您提供高精度、品质优良的产品。触针是坐标测量机和工件之间的纽带，因此触针在接触点提供尽可能高的精度至关重要。我公司拥有测针开发和制造经验，拥有品种齐全的三坐标测量机和CNC专用触针产品。

As industrial quality assurance standards and workpiece requirements continue to increase, in order to adapt to high speeds, high-performance scanning systems can achieve high-precision measurements in a very short time. Our company provides you with high-precision, high-quality products. The stylus is the link between the CMM and the workpiece, so it is vital that the stylus provides the highest possible accuracy at the point of contact. Our company has experience in stylus development and manufacturing, and has a full range of CMM and CNC special stylus products.

The Importance Of Measuring For Precision Measurement

测针对精密测量的重要性

为了保持竞争力，制造商不断升级其坐标测量机。如今，坐标测量机（CMM）已直接融入制造业，成为生产过程的一部分。高速、高性能的扫描系统可以确保测量机能够在极短的时间内实现极其精确的测量。触针是坐标测量机和工件之间的第一个连接，因此触针在接触点提供尽可能高的精度至关重要。使用接触式测头进行测量时，机床使用触针采集工件表面的数据点。每个触发器生成的点由 X、Y 和 Z 坐标值定义。然后根据这些点计算特征、尺寸、形状和位置。

To stay competitive, manufacturers are constantly upgrading their coordinate measuring machines. Nowadays, coordinate measuring machines (CMM) have been directly integrated into the manufacturing industry and become part of the production process. High-speed, high-performance scanning systems can ensure that the measuring machines can achieve extremely accurate measurements in a very short period of time.

The stylus is the first connection between the CMM and the workpiece, so it is vital that the stylus provides the highest possible accuracy at the point of contact. When measuring with a touch probe, the machine tool uses a stylus to collect data points on the surface of the workpiece. The points generated by each trigger are defined by X, Y and Z coordinate values. Features, dimensions, shapes and positions are then calculated from these points.



Select and use styli 选择及使用测针

选择测针时一定要非常谨慎，以确保最适合您的测量应用。选择测针总是涉及到坐标测量机传感器上的连接螺纹，通常是M2、M3、M4和M5螺纹。工件的几何形状决定了测针组件的选择，测针必须很容易到达工件的所有测量点，使其对每一个被测特征都能达到所需的测量标准和测量能力。

在配有固定传感器的坐标测量机上对工件进行全面测量，通常需要很多测针，这些测针安装在不同方向，并需要不同形状的测针组件、加长杆及关节。所有这些组件的组合称为测针配置，安装在转接块上。借助于螺纹转接头，测针使用起来十分灵活，例如您可以在M5传感器连接螺纹上使用M2/M3/M4测针。

Be very careful when selecting styli to ensure the most suitable measurement for your application. Selecting a stylus always involves connecting threads on the CMM sensor, typically M2, M3, M4 and M5 threads. The geometry of the workpiece determines the choice of the stylus assembly. The stylus must be easily accessible to all measuring points of the workpiece, enabling it to achieve the required measurement standards and measurement capabilities for each measured feature.

A comprehensive measurement of the workpiece on a CMM with a fixed sensor usually requires a lot of styli, which are mounted in different directions and require differently shaped stylus assemblies, extensions and joints. The combination of all these components is called the stylus configuration and is mounted on the adapter block.

The stylus is very flexible to use with a threaded adapter. For example, you can use the M2/M3/M4 stylus on the M5 sensor connection thread.



为保持触碰点的精度，我们建议您：

■ 尽量选用短测针

测针弯曲或变形量越小，精度越高。使用尽可能短的测针是您的最佳选择。

■ 尽量减少接头

每增加一个测针与加长杆的连接，便增加了一个潜在的弯曲和变形点。在您的应用中尽可能减少测针组件数。

■ 选用的测球直径要尽量大

这样能增大测球/测杆的距离，从而减少由于碰撞测杆所引起的误触发；

测球直径越大，受被测工件表面光洁度的影响越小。

To maintain the accuracy of the touch point, we recommend that you:

■ Try to use short styli

The smaller the stylus bend or deformation, the higher the accuracy. Using the shortest possible stylus is the best choice for you.

■ Minimize joints

Each additional stylus is connected to the extension stem to add a potential bend and deformation point. Minimize the number of stylus assemblies in your application.

■ The diameter of the selected ball should be as large as possible

This increases the distance between the ball/stem and reduces false triggers caused by the impact bar;

The larger the diameter of the ball, the less affected by the surface finish of the workpiece being tested.

Ball material 测球材料

红宝石

对于绝大多数测量场合来说，在具有业界标准和最佳特性的测球材料中，红宝石是已知最硬的材料之一。人造红宝石是在2000 °C下用Vemeuil工艺方法烧结成的纯度为99%的氧化铝晶体（刚玉）。

然后将刚玉切割并逐渐加工为高精度球体。红宝石测球的表面极为光滑，具有极高的抗压强度和很高的机械耐磨性能。

Ruby

For most measurement applications, ruby is one of the hardest materials found in ball gauges with industry standard and best characteristics. The artificial ruby is an alumina crystal (corundum) having a purity of 99% sintered at 2000 °C by the Vemeuil process.

The corundum is then cut and gradually processed into a high precision sphere. The surface of the ruby ball is extremely smooth, with extremely high compressive strength and high mechanical wear resistance.

Stem material 测杆材料

不锈钢

采用不锈钢制造的测杆广泛用于测球/测尖直径为2mm或2mm以上、最长为30mm的测针。在此范围内，一体式钢杆提供最佳的刚性与重量比，在测杆和螺纹本体之间采用一个接头，既可提供足够的球/杆间隙，又不降低刚性。

Stainless steel

Stems made of stainless steel are widely used for measuring styli with a ball/tip diameter of 2 mm or more and a maximum length of 30 mm. Within this range, the integral steel bar provides the optimum stiffness to weight ratio, with a joint between the stem and the threaded body that provides sufficient ball/rod clearance without reducing stiffness.

钨钢

对于需要较大刚性的小直径测杆或短测杆（长度不超过50mm），使用碳化钨是最好的选择，小直径测杆可用于测球直径为1mm或更小的测针。除此之外，测杆重量将带来负面影响，而且由于杆与本体之间的接头可能发生偏折，因此刚性也可能降低。

Tungsten carbide

For small diameter stems or short stems (lengths up to 50 mm) that require greater rigidity, tungsten carbide is the best choice. Small diameter stems can be used to measure styli with a ball diameter of 1 mm or less. In addition, the weight of the pole will have a negative impact, and the rigidity may also be reduced due to the possible deflection of the joint between the stem and the body.

陶瓷

对于测球直径大于3 mm、长度超过30 mm的测杆，陶瓷测杆所具有的刚性类似于钢测杆，但重量远比碳化钨测杆轻。采用陶瓷测杆的测针因发生碰撞时测杆会破碎，因此测针对测头有额外的碰撞保护作用。

Ceramics

For stems with a ball diameter bigger than 3 mm and a length more than 30 mm, the ceramic stem has a stiffness which similar to that of a steel stem, but is much lighter than a tungsten carbide stem. When the stylus with the ceramic stem is broken due to the collision, the test has additional collision protection for the probe.

碳纤维

碳纤维的材料有多种等级。Bevy所采用的材料在拉伸和扭曲的情况下都能提供最佳的刚性特性，而且重量极低。碳纤维是一种惰性材料，这种特性与特殊树脂基体相结合，在大多数极恶劣的机床环境下具有优异的防护作用。

Carbon fiber

Carbon fiber materials come in a variety of grades. The materials used by Bevy provide optimum stiffness characteristics under tensile and twisting conditions and are extremely low in weight. Carbon fiber is an inert material that combines with a special resin matrix to provide excellent protection in most extremely harsh machine environments.

对于长度大于50mm的测杆，Bevy是刚性最高、质量极轻的理想材料。它是高精度应变片式测头的最佳测杆材料，具有优异的减振性能和可忽略不计的热膨胀系数。

For rods longer than 50mm, Bevy is the ideal material for the highest rigidity and extremely light weight. It is the best rod material for high-precision strain gauge probes with excellent vibration damping and a negligible coefficient of thermal expansion.

M2 THREAD STYLUS SERIES

M2螺纹测针系列



订购编号说明 Order number description

M2 - 10T - 005R - 7805

M2:
Thread size

10T: 测杆长度和材质
Rod length and material

005R: 测球大小和材质
Ball size and material

7805: 雷尼绍对应编号(后四位数)
Renishaw corresponding number (last four digits)

R: 红宝石 Ruby
S: 不锈钢 Stainless Steel
T: 碳化钨 Tungsten Carbide
C: 陶瓷 Ceramic
F: 碳纤维 Carbon Fiber

CY: 柱形测针 Cylindrical Stylus
E: 加长杆 Extension
A: 转接头 Adapter
ST: 星形测针 Star Stylus
D: 盘形测针 Disc

红宝石球测针(碳化钨测杆)

M2

Ruby ball stylus
(tungsten carbide rod)

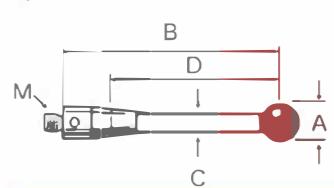


螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	碳化钨 Tungsten carbide	红宝石 Ruby	0.5	10	3	M2-10T-005R-7805
	碳化钨 Tungsten carbide	红宝石 Ruby	0.7	10	4	M2-10T-007R-7801
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	10	4	M2-10T-01R-1325
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	20	7	M2-20T-01R-7808
	碳化钨 Tungsten carbide	红宝石 Ruby	0.5	20	7	M2-20T-005R-1345
	碳化钨 Tungsten carbide	红宝石 Ruby	0.7	20	12	M2-20T-007R-0577
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	20	12.5	M2-20T-01R-0033
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	20	12.5	M2-20T-015R-0034
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	20	14	M2-20T-02R-3822
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	20	15.4	M2-20T-025R-1896
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	20	17	M2-20T-03R-0938
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	20	22	M2-20T-04R-1029
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	20	20	M2-20T-05R-0046
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	30	20.5	M2-30T-01R-8663
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	30	22.5	M2-30T-015R-0035
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	30	22.5	M2-30T-02R-0036
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	30	22.5	M2-30T-025R-0038
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	30	27	M2-30T-03R-0040
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	30	30	M2-30T-04R-0043
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	30	30	M2-30T-05R-0047
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	40	32.5	M2-40T-02R-0037
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	40	37	M2-40T-025R-0039
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	40	37	M2-40T-03R-0041
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	40	40	M2-40T-04R-0044
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	40	40.25	M2-40T-05R-0048
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	50	47	M2-50T-03R-0042
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	50	50	M2-50T-04R-0045
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	50	50	M2-50T-05R-0049

红宝石球测针(不锈钢测杆)

M2

Ruby ball stylus (stainless steel rod)

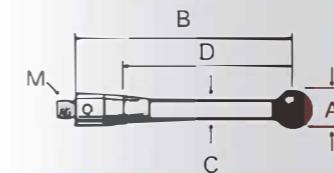


螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	不锈钢 stainless steel	红宝石 Ruby	1.0	10	4.5	M2-10S-01R-7806
	不锈钢 stainless steel	红宝石 Ruby	1.5	10	4.5	M2-10S-015R-7802
	不锈钢 stainless steel	红宝石 Ruby	2.0	10	6	M2-10S-02R-7807
	不锈钢 stainless steel	红宝石 Ruby	2.5	10	6.5	M2-10S-025R-7803
	不锈钢 stainless steel	红宝石 Ruby	3.0	10	7	M2-10S-03R-3604
	不锈钢 stainless steel	红宝石 Ruby	4.0	10	10	M2-10S-04R-4154
	不锈钢 stainless steel	红宝石 Ruby	5.0	10	10	M2-10S-05R-4155
	不锈钢 stainless steel	红宝石 Ruby	6.0	10	10	M2-10S-06R-4156
	不锈钢 stainless steel	红宝石 Ruby	8.0	10	11	M2-10S-08R-4158
	不锈钢 stainless steel	红宝石 Ruby	2.0	20	20	M2-20S-02R-3603
	不锈钢 stainless steel	红宝石 Ruby	2.5	20	16.4	M2-20S-025R-7804
	不锈钢 stainless steel	红宝石 Ruby	3.0	20	17	M2-20S-03R-4160
	不锈钢 stainless steel	红宝石 Ruby	4.0	20	20	M2-20S-04R-4161

红宝石球测针(碳纤维测杆)

M2

Ruby ball stylus (carbon fiber rod)

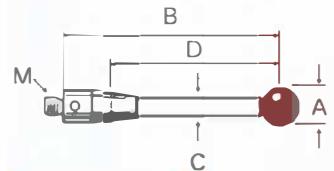


螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	碳纤维 carbon fiber	红宝石 Ruby	4.0	30	30	M2-30F-04R-4241
	碳纤维 carbon fiber	红宝石 Ruby	5.0	30	30	M2-30F-05R-4781
	碳纤维 carbon fiber	红宝石 Ruby	6.0	30	30	M2-30F-06R-4782
	碳纤维 carbon fiber	红宝石 Ruby	4.0	50	50	M2-50F-04R-2285
	碳纤维 carbon fiber	红宝石 Ruby	5.0	50	50	M2-50F-05R-2286
	碳纤维 carbon fiber	红宝石 Ruby	6.0	50	50	M2-50F-06R-2287
	碳纤维 carbon fiber	红宝石 Ruby	4.0	75	75	M2-75F-04R-4784
	碳纤维 carbon fiber	红宝石 Ruby	5.0	75	75	M2-75F-05R-4785
	碳纤维 carbon fiber	红宝石 Ruby	6.0	75	75	M2-75F-06R-4786
	碳纤维 carbon fiber	红宝石 Ruby	4.0	100	100	M2-100F-04R-2289
	碳纤维 carbon fiber	红宝石 Ruby	5.0	100	100	M2-100F-05R-2290
	碳纤维 carbon fiber	红宝石 Ruby	6.0	100	100	M2-100F-06R-2291

红宝石球测针(陶瓷测杆)

M2

Ruby ball stylus (ceramic rod)

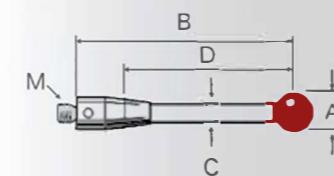


螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	陶瓷 Ceramics	红宝石 Ruby	3.0	30	27	M2-30C-03R-4177
	陶瓷 Ceramics	红宝石 Ruby	4.0	30	30	M2-30C-04R-1370
	陶瓷 Ceramics	红宝石 Ruby	5.0	30	30	M2-30C-05R-4779
	陶瓷 Ceramics	红宝石 Ruby	6.0	30	30	M2-30C-06R-4780
	陶瓷 Ceramics	红宝石 Ruby	3.0	50	47	M2-50C-03R-0064
	陶瓷 Ceramics	红宝石 Ruby	4.0	50	50	M2-50C-04R-0065
	陶瓷 Ceramics	红宝石 Ruby	5.0	50	50	M2-50C-05R-0066
	陶瓷 Ceramics	红宝石 Ruby	6.0	50	50	M2-50C-06R-0470

碳化钨球柱形测针

M2

Tungsten carbide ball cylindrical stylus

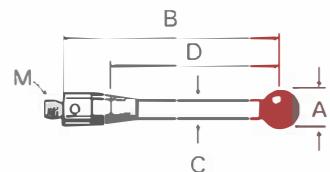


螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	/	碳化钨 Tungsten carbide	0.5	15.3	7.75	M2-15T-005CY-1210
	/	碳化钨 Tungsten carbide	1.0	35.5	28	M2-35T-01CY-1218
	/	碳化钨 Tungsten carbide	1.5	15.8	8.3	M2-15T-015CY-1219
	/	碳化钨 Tungsten carbide	2.0	8.5	8.5	M2-8T-02CY-1228
	/	碳化钨 Tungsten carbide	2.0	40	32	M2-40T-02CY-0074
	/	碳化钨 Tungsten carbide	3.0	22.5	15	M2-22T-03CY-1258

红宝石球柱形测针(不锈钢测杆)

M2

Ruby ball cylindrical stylus
(stainless steel rod)

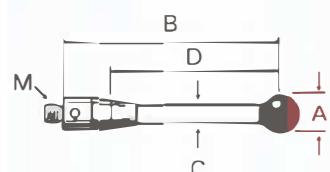


螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	不锈钢 stainless steel	红宝石 Ruby	1.0	15	8	M2-15R-01CY-8876
	不锈钢 stainless steel	红宝石 Ruby	1.5	15	8	M2-15R-015CY-8877
	不锈钢 stainless steel	红宝石 Ruby	2.0	20	7.2	M2-20R-02CY-7812
	不锈钢 stainless steel	红宝石 Ruby	4.0	22	10	M2-22R-04CY-0073

银质钢球柱形测针

M2

Silver steel ball
cylindrical stylus



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	/	银质钢 Silver steel	3.0	12.75	3.75	M2-12S-03CY-7590
	/	银质钢 Silver steel	1.5	10.75	1.25	M2-10S-15CY-7589

M3 THREAD STYLUS SERIES

M3螺纹测针系列



订购编号说明 Order number description

M3 - 10S - 01R - 7401

M3:
Thread size

10S:
Rod length and material

01R:
Ball size and material

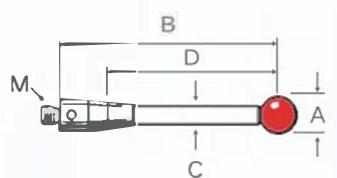
7401:
Renishaw corresponding
number (last four digits)

R: 红宝石 Ruby
S: 不锈钢 Stainless Steel
T: 碳化钨 Tungsten Carbide
C: 陶瓷 Ceramic
F: 碳纤维 Carbon Fiber
CY: 柱形测针 Cylindrical Stylus
E: 加长杆 Extension
A: 转接头 Adapter
ST: 星形测针 Star Stylus
D: 盘形测针 Disc

红宝石球测针(不锈钢测杆)

M3

Ruby ball stylus
(stainless steel rod)

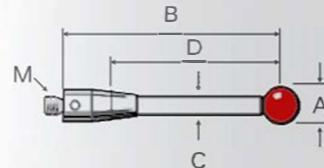


螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M3	不锈钢 stainless steel	红宝石 Ruby	1.0	10	4	M3-10S-01R-7401
	不锈钢 stainless steel	红宝石 Ruby	2.0	10	6	M3-10S-02R-0421
	不锈钢 stainless steel	红宝石 Ruby	3.0	10	6.5	M3-10S-03R-0422
	不锈钢 stainless steel	红宝石 Ruby	4.0	10	7	M3-10S-04R-0423
	不锈钢 stainless steel	红宝石 Ruby	1.0	21	4	M3-21S-01R-3551
	不锈钢 stainless steel	红宝石 Ruby	2.0	21	9.6	M3-21S-02R-3552
	不锈钢 stainless steel	红宝石 Ruby	3.0	21	14.7	M3-21S-03R-3553
	不锈钢 stainless steel	红宝石 Ruby	4.0	21	17.2	M3-21S-04R-7606
	不锈钢 stainless steel	红宝石 Ruby	5.0	21	21	M3-21S-05R-7630
	不锈钢 stainless steel	红宝石 Ruby	4.0	31	27	M3-31S-04R-3554
	不锈钢 stainless steel	红宝石 Ruby	5.0	31	31.1	M3-31S-05R-7648

红宝石球测针(碳化钨测杆)

M3

Ruby ball stylus
(tungsten carbide rod)



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M3	碳化钨 Tungsten carbide	红宝石 Ruby	0.5	21	2	M3-21T-005R-7632
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	20	12.5	M3-20T-01R-2442
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	20	12.5	M3-20T-02R-3676
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	20	14	M3-20T-03R-7402
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	21	12.5	M3-21T-015R-0050
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	20	12.7	M3-21T-025R-0054
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	30	22.5	M3-30T-01R-0051
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	30	22.8	M3-30T-02R-0052
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	30	22.6	M3-30T-025R-0055
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	30	24	M3-30T-03R-0057
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	40	32.5	M3-40T-02R-0053
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	40	32.7	M3-40T-025R-0056
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	40	33.7	M3-40T-03R-0058
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	40	36	M3-40T-04R-0060
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	40	40	M3-40T-05R-0062
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	50	43.7	M3-50T-03R-0059
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	50	46	M3-50T-04R-0061
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	50	50	M3-50T-05R-0063

红宝石球测针(不锈钢测杆)

Ruby ball stylus (stainless steel rod)



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order NO.
M4	不锈钢 Stainless steel	红宝石 Ruby	5.0	10	10	M4-10S-05R-6350
	不锈钢 Stainless steel	红宝石 Ruby	1.0	20	4.5	M4-20S-01R-7545
	不锈钢 Stainless steel	红宝石 Ruby	2.0	20	8.9	M4-20S-02R-7547
	不锈钢 Stainless steel	红宝石 Ruby	3.0	20	13	M4-20S-03R-7549
	不锈钢 Stainless steel	红宝石 Ruby	4.0	20	13.7	M4-20S-04R-7551
	不锈钢 Stainless steel	红宝石 Ruby	5.0	17.5	13.4	M4-17S-05R-7553
	不锈钢 Stainless steel	红宝石 Ruby	5.0	20	20	M4-20S-05R-4161
	不锈钢 Stainless steel	红宝石 Ruby	6.0	20	13.3	M4-20S-06R-7555
	不锈钢 Stainless steel	红宝石 Ruby	8.0	20	16	M4-20S-08R-7557
	不锈钢 Stainless steel	红宝石 Ruby	5.0	30	26	M4-30S-05R-6352
	不锈钢 Stainless steel	红宝石 Ruby	5.0	50	33.5	M4-50S-05R-7521
	不锈钢 Stainless steel	红宝石 Ruby	5.0	100	83.2	M4-100S-05R-7522
	不锈钢 Stainless steel	红宝石 Ruby	5.0	150	133	M4-150S-05R-7523

银质钢球柱形测针

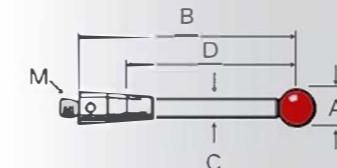
Silver steel ball cylindrical stylus



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M4	/	银质钢 Silver steel	1.0	20	10	M4-20S-01CY-5370

碳化钨球测针(不锈钢测杆)

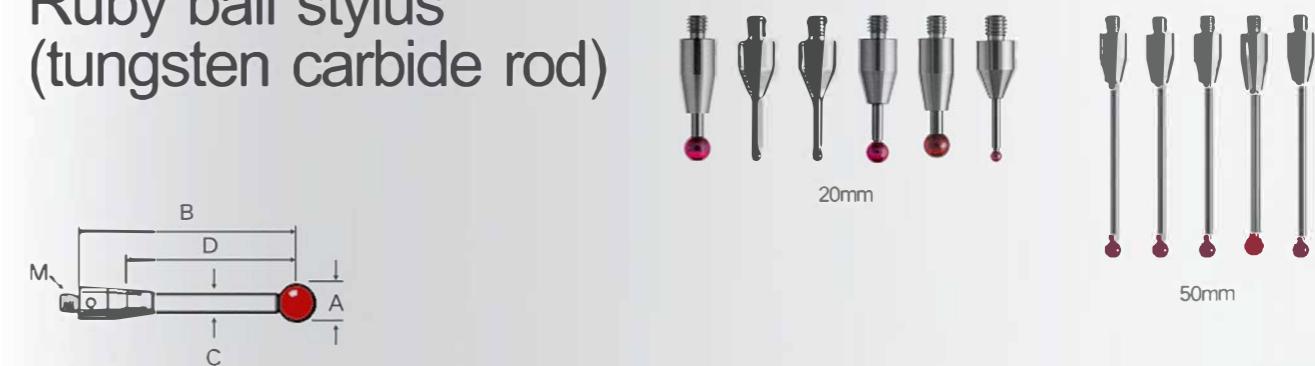
Tungsten carbide ball stylus (stainless steel rod)



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M4	不锈钢 Stainless steel	碳化钨 Tungsten carbide	3.0	55	25.8	M4-55S-03T-9697
	不锈钢 Stainless steel	碳化钨 Tungsten carbide	5.0	50	35	M4-50S-05T-7670
	不锈钢 Stainless steel	碳化钨 Tungsten carbide	5.0	54	50	M4-54S-05T-9685
	不锈钢 Stainless steel	碳化钨 Tungsten carbide	5.0	100	83.3	M4-100S-05T-7671
	不锈钢 Stainless steel	碳化钨 Tungsten carbide	5.0	150	132.5	M4-150S-05T-7672

红宝石球测针(碳化钨测杆)

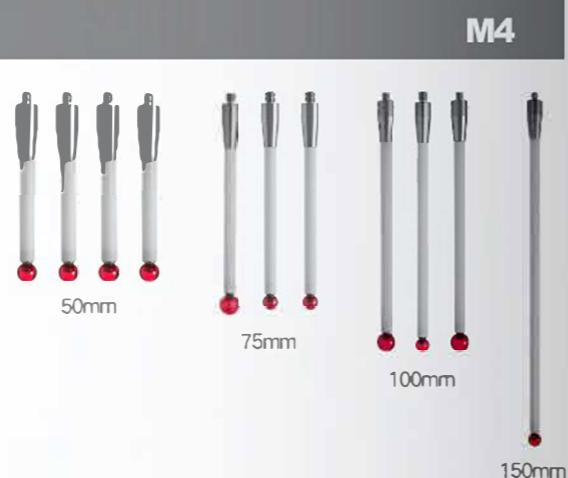
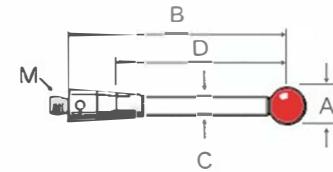
Ruby ball stylus (tungsten carbide rod)



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M4	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	20	10	M4-20T-01R-4792
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	20	22	M4-20T-02R-2932
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	20	8.5	M4-20T-03R-4793
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	20	8.5	M4-20T-04R-4794
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	20	7.9	M4-20T-05R-4795
	碳化钨 Tungsten carbide	红宝石 Ruby	6.0	20	10.7	M4-20T-06R-4796
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	50	40	M4-50T-02R-4797
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	50	38.5	M4-50T-03R-3680
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	50	38.5	M4-50T-04R-4799
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	50	50	M4-50T-05R-4800

红宝石球测针(陶瓷测杆)

Ruby ball stylus
(ceramic rod)

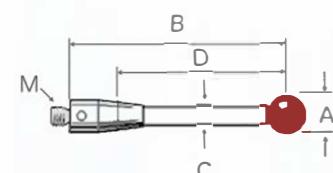


M4

螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M4	陶瓷 Ceramics	红宝石 Ruby	4.0	50	33.5	M4-50C-04R-0233
	陶瓷 Ceramics	红宝石 Ruby	5.0	50	33.5	M4-50C-05R-0235
	陶瓷 Ceramics	红宝石 Ruby	6.0	50	38.5	M4-50C-06R-3709
	陶瓷 Ceramics	红宝石 Ruby	8.0	50	50	M4-50C-08R-7795
	陶瓷 Ceramics	红宝石 Ruby	5.0	75	58.5	M4-75C-05R-0236
	陶瓷 Ceramics	红宝石 Ruby	6.0	75	63.5	M4-75C-06R-2764
	陶瓷 Ceramics	红宝石 Ruby	8.0	75	75	M4-75C-08R-4802
	陶瓷 Ceramics	红宝石 Ruby	5.0	100	83.5	M4-100C-05R-9761
	陶瓷 Ceramics	红宝石 Ruby	6.0	100	83.5	M4-100C-06R-3712
	陶瓷 Ceramics	红宝石 Ruby	8.0	100	100	M4-100C-08R-7796
	陶瓷 Ceramics	红宝石 Ruby	6.0	150	135	M4-150C-06R-8156

红宝石球测针(碳纤维测杆)

Ruby ball stylus
(carbon fiber rod)



M4

螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M4	碳纤维 Carbon fiber	红宝石 Ruby	6.0	50	38.5	M4-50F-06R-1436
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	100	88.5	M4-100F-06R-1358
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	150	138.5	M4-150F-06R-1255
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	200	188.5	M4-200F-06R-1075
	碳纤维 Carbon fiber	红宝石 Ruby	8.0	300	300	M4-300F-08R-3461

M5 THREAD STYLUS SERIES

M5螺纹测针系列



订购编号说明 Order number description

M5 - 20T - 005R - 5202

M5: 螺纹大小
Thread size 20T: 测杆长度和材质
Rod length and material 005R: 测球大小和材质
Ball size and material

R: 红宝石 Ruby
S: 不锈钢 Stainless Steel
T: 钨钢钨 Tungsten Carbide
C: 陶瓷 Ceramic
F: 碳纤维 Carbon Fiber

CY: 柱形测针 Cylindrical Stylus
E: 加长杆 Extension
A: 转接头 Adapter
ST: 星形测针 Star Stylus
D: 盘形测针 Disc

5202: 雷尼绍对应编号(后四位数)
Renishaw corresponding number (last four digits)

红宝石球测针(碳化钨测杆)

M5

Ruby ball stylus (tungsten carbide rod)



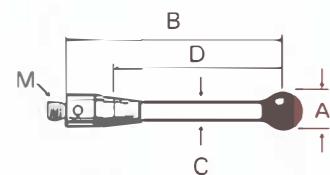
20mm



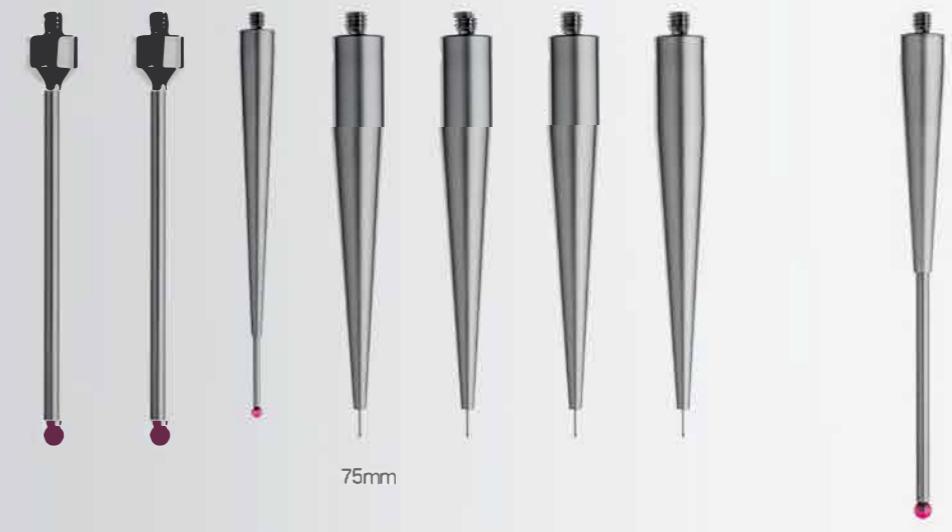
30mm



40mm



50mm



75mm

100mm

螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M5	碳化钨 Tungsten carbide	红宝石 Ruby	0.5	20	4	M5-20T-005R-5202
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	20	5	M5-20T-01R-5204
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	20	11	M5-20T-015R-5205
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	20	11	M5-20T-02R-5206
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	20	11	M5-20T-025R-5207
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	20	11	M5-20T-03R-5208
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	20	11.9	M5-20T-04R-5209
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	20	11.5	M5-20T-05R-5210
	碳化钨 Tungsten carbide	红宝石 Ruby	0.5	30	4	M5-30T-005R-5212
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	30	5	M5-30T-01R-5214
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	30	12	M5-30T-015R-5215
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	30	21	M5-30T-02R-5216
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	30	21	M5-30T-025R-5217
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	30	30	M5-30T-03R-5218
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	30	21	M5-30T-04R-5219
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	30	21.5	M5-30T-05R-5220
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	40	22	M5-40T-015R-5221
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	40	31	M5-40T-02R-5222
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	40	31	M5-40T-025R-5223
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	40	31	M5-40T-03R-5224

螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M5	碳化钨 Tungsten carbide	红宝石 Ruby	0.5	50	4	M5-50T-005R-5226
	碳化钨 Tungsten carbide	红宝石 Ruby	0.7	50	5	M5-50T-005R-5227
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	50	5	M5-50T-01R-5228
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	50	5	M5-50T-015R-5229
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	50	41	M5-50T-02R-5230
	碳化钨 Tungsten carbide	红宝石 Ruby	2.0	50	5	M5-50T-02R-5231
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	50	41	M5-50T-025R-5232
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	50	5	M5-50T-025R-5233
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	50	41	M5-50T-03R-5234
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	50	50	M5-50T-04R-5235
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	50	50	M5-50T-05R-5236
	碳化钨 Tungsten carbide	红宝石 Ruby	0.5	75	4	M5-75T-005R-5241
	碳化钨 Tungsten carbide	红宝石 Ruby	0.7	75	5	M5-75T-007R-5242
	碳化钨 Tungsten carbide	红宝石 Ruby	1.0	75	5	M5-75T-01R-5243
	碳化钨 Tungsten carbide	红宝石 Ruby	1.5	75	5	M5-75T-015R-5244
	碳化钨 Tungsten carbide	红宝石 Ruby	3.0	75	20	M5-75T-03R-5253
	碳化钨 Tungsten carbide	红宝石 Ruby	4.0	75	66	M5-75T-04R-5248
	碳化钨 Tungsten carbide	红宝石 Ruby	5.0	75	66	M5-75T-05R-5249
	碳化钨 Tungsten carbide	红宝石 Ruby	2.5	100	55	M5-100T-025R-5254

Ruby ball stylus (carbon fiber rod)



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M5	碳纤维 Carbon fiber	红宝石 Ruby	6.0	50	39.5	M5-50F-06R-5237
	碳纤维 Carbon fiber	红宝石 Ruby	8.0	50	39.5	M5-50F-08R-5238
	碳纤维 Carbon fiber	红宝石 Ruby	10.0	50	44.5	M5-50F-10R-5239
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	75	65.1	M5-75F-06R-5250
	碳纤维 Carbon fiber	红宝石 Ruby	8.0	75	64.5	M5-75F-08R-5251
	碳纤维 Carbon fiber	红宝石 Ruby	10.0	75	69.5	M5-75F-10R-5252
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	100	58.9	M5-100F-06R-5259
	碳纤维 Carbon fiber	红宝石 Ruby	8.0	100	89.5	M5-100F-08R-5262
	碳纤维 Carbon fiber	红宝石 Ruby	10.0	100	95.5	M5-100F-10R-5263
	碳纤维 Carbon fiber	红宝石 Ruby	10.0	100	94.5	M5-100F-10R-5264
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	150	137	M5-150F-06R-5265
	碳纤维 Carbon fiber	红宝石 Ruby	8.0	150	135	M5-150F-08R-5266
	碳纤维 Carbon fiber	红宝石 Ruby	10.0	150	144.5	M5-150F-10R-5267
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	200	187	M5-200F-06R-5268
	碳纤维 Carbon fiber	红宝石 Ruby	8.0	200	180	M5-200F-08R-5269
	碳纤维 Carbon fiber	红宝石 Ruby	10.0	200	194.5	M5-200F-10R-5270
	碳纤维 Carbon fiber	红宝石 Ruby	6.0	300	287	M5-300F-06R-5271
	碳纤维 Carbon fiber	红宝石 Ruby	8.0	300	280	M5-300F-08R-5272
	碳纤维 Carbon fiber	红宝石 Ruby	10.0	300	294.5	M5-300F-10R-5273

STYLUS EXTENSION ROD SERIES

测针加长杆系列



订购编号说明 Order number description

M2 - 5S - 03E - 7634

M2:
Thread size

5S:

03E:

7634: 雷尼绍对应编号(后四位数)

Rod length and material
Ball size and material

R: 红宝石 Ruby
S: 不锈钢 Stainless Steel
T: 钨化钨 Tungsten Carbide
C: 陶瓷 Ceramic
F: 碳纤维 Carbon Fiber

CY: 柱形测针 Cylindrical Stylus
E: 加长杆 Extension
A: 转接头 Adapter
ST: 星形测针 Star Stylus
D: 盘形测针 Disc

Renishaw corresponding
number (last four digits)

M2螺纹测针加长杆

M2

M2 threaded stylus extension

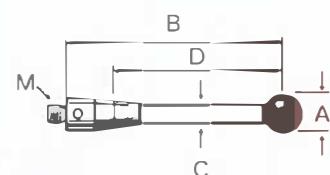


不锈钢
Stainless steel



陶瓷
Ceramics

碳纤维
Carbon fiber



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	不锈钢 Stainless steel	/	3.0	5	/	M2-5S-03E-7634
	不锈钢 Stainless steel	/	3.0	10	/	M2-10S-03E-3647
	不锈钢 Stainless steel	/	3.0	20	/	M2-20S-03E-3648
	不锈钢 Stainless steel	/	3.0	30	/	M2-30S-03E-4162
	不锈钢 Stainless steel	/	3.0	40	/	M2-40S-03E-7779
	陶瓷 Ceramics	/	3.0	30	/	M2-30C-03E-0070
	陶瓷 Ceramics	/	3.0	40	/	M2-40C-03E-0071
	陶瓷 Ceramics	/	3.0	50	/	M2-50F-03E-0072
	碳纤维 Carbon fiber	/	3.0	40	/	M2-40F-03E-2280
	碳纤维 Carbon fiber	/	3.0	50	/	M2-50F-03E-2281
	碳纤维 Carbon fiber	/	3.0	70	/	M2-70F-03E-2282
	碳纤维 Carbon fiber	/	3.0	90	/	M2-90F-03E-2283

M3螺纹测针加长杆

M3

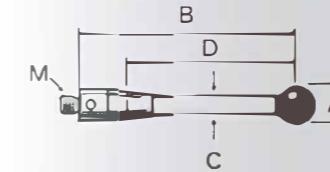
M3 threaded stylus extension



不锈钢
Stainless steel

陶瓷
Ceramics

碳纤维
Carbon fiber



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M3	不锈钢 Stainless steel	/	4.0	20	/	M3-20S-04E-7583
	不锈钢 Stainless steel	/	4.0	35	/	M3-35S-04E-7584
	不锈钢 Stainless steel	/	4.0	10	/	M3-10S-04E-7609
	陶瓷 Ceramics	/	4.0	50	/	M3-50C-04E-0075
	碳纤维 Carbon fiber	/	4.0	75	/	M3-75F-04E-4864
	碳纤维 Carbon fiber	/	4.0	100	/	M3-100F-04E-4865

M4螺纹测针加长杆

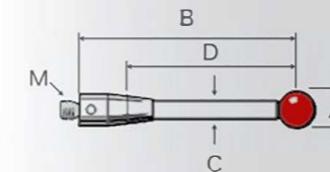
M4

M4 threaded stylus extension



不锈钢
Stainless steel

陶瓷
Ceramics



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M4	不锈钢 Stainless steel	/	7.0	10	/	M4-10S-07E-7599
	不锈钢 Stainless steel	/	7.0	15	/	M4-15S-07E-7600
	不锈钢 Stainless steel	/	7.0	20	/	M4-20S-07E-7601
	不锈钢 Stainless steel	/	7.0	30	/	M4-30S-07E-7602
	陶瓷 Ceramics	/	7.4	30	/	M4-30C-07E-7754
	陶瓷 Ceramics	/	7.4	50	/	M4-50C-07E-7755
	陶瓷 Ceramics	/	7.4	100	/	M4-100C-07E-7727
	陶瓷 Ceramics	/	7.4	200	/	M4-200C-07E-0587

M5螺纹测针加长杆

M5

M5 threaded
stylus extension



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
不锈钢 Stainless steel	/	11	10	/	/	M5-10S-11E-0142
不锈钢 Stainless steel	/	11	20	/	/	M5-20S-11E-0140
不锈钢 Stainless steel	/	11	30	/	/	M5-30S-11E-0669
不锈钢 Stainless steel	/	11	50	/	/	M5-50S-11E-0670
不锈钢 Stainless steel	/	11	100	/	/	M5-100S-11E-0136
碳纤维 Carbon fiber	/	11	40	/	/	M5-40F-11EF-0647
碳纤维 Carbon fiber	/	11	50	/	/	M5-50F-11EF-0648
碳纤维 Carbon fiber	/	11	60	/	/	M5-60F-11EF-0649
碳纤维 Carbon fiber	/	11	70	/	/	M5-70F-11E-0623
碳纤维 Carbon fiber	/	11	80	/	/	M5-80F-11E-0650
碳纤维 Carbon fiber	/	11	90	/	/	M5-90F-11E-0651
碳纤维 Carbon fiber	/	11	100	/	/	M5-100F-11E-0652
碳纤维 Carbon fiber	/	11	120	/	/	M5-120F-11E-0425
碳纤维 Carbon fiber	/	11	150	/	/	M5-150F-11E-0424
碳纤维 Carbon fiber	/	11	180	/	/	M5-180F-11E-0653
碳纤维 Carbon fiber	/	11	200	/	/	M5-200F-11E-0654
碳纤维 Carbon fiber	/	11	250	/	/	M5-250F-11E-0655
碳纤维 Carbon fiber	/	11	300	/	/	M5-300F-11E-0642
碳纤维 Carbon fiber	/	11	400	/	/	M5-400F-11E-0656
碳纤维 Carbon fiber	/	20	40	/	/	M5-40F-20E-0620
碳纤维 Carbon fiber	/	20	50	/	/	M5-50F-20E-0657
碳纤维 Carbon fiber	/	20	60	/	/	M5-60F-20E-0658
碳纤维 Carbon fiber	/	20	80	/	/	M5-80F-20E-0621
碳纤维 Carbon fiber	/	20	100	/	/	M5-100F-20E-0659
碳纤维 Carbon fiber	/	20	120	/	/	M5-120F-20E-0660
碳纤维 Carbon fiber	/	20	150	/	/	M5-150F-20E-0661
碳纤维 Carbon fiber	/	20	180	/	/	M5-180F-20E-0662
碳纤维 Carbon fiber	/	20	200	/	/	M5-200F-20E-0663
碳纤维 Carbon fiber	/	20	250	/	/	M5-250F-20E-0427
碳纤维 Carbon fiber	/	20	300	/	/	M5-300F-20E-0664
碳纤维 Carbon fiber	/	20	500	/	/	M5-500F-20E-0667
碳纤维 Carbon fiber	/	20	600	/	/	M5-600F-20E-0668

STYLIST AND ACCESSORIES

测针及附件



订购编号说明 Order number description

M4

13S

A

7608

M4:
Thread size

5S: 测杆长度和材质
Rod length and material

A: 测球大小和材质
Ball size and material

7608: 雷尼绍对应编号(后四位数)
Renishaw corresponding number (last four digits)

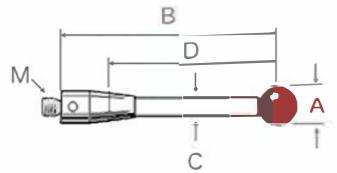
R: 红宝石 Ruby
S: 不锈钢 Stainless Steel
T: 碳化钨 Tungsten Carbide
C: 陶瓷 Ceramic
F: 碳纤维 Carbon Fiber

CY: 柱形测针 Cylindrical Stylus
E: 加长杆 Extension
A: 转接头 Adapter
ST: 星形测针 Star Stylus
D: 盘形测针 Disc

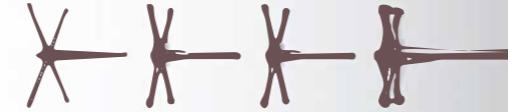
星形测针

Star stylus

4向
4-way



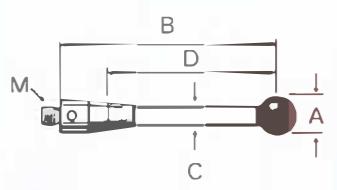
5向
5-way



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M2	红宝石 Ruby	4向 4-way	0.5	10	/	M2-10S-005ST-4011
	红宝石 Ruby	4向 4-way	0.5	20	/	M2-20S-005ST-4787
	红宝石 Ruby	4向 4-way	1.0	10	/	M2-10S-01ST-7811
	红宝石 Ruby	4向 4-way	1.0	20	/	M2-20S-01ST-4788
	红宝石 Ruby	5向 5-way	2.0	30	/	M2-30S-02ST-3626
	红宝石 Ruby	5向 5-way	2.0	20	/	M2-20S-02ST-7629
M3	红宝石 Ruby	5向 5-way	2.0	30	/	M3-30S-02ST-0076
	红宝石 Ruby	5向 5-way	2.0	50	/	M3-50S-02ST-0077

测针转换头

Stylus adapter



螺纹 Thread Size	测杆材质 Stem Material	测球材质 Ball Material	测球直径 (A) Ball Diameter	长度 (B) Overall Length	有效工作长度 (D) Effective Work Length	订购编号 Order No.
M4	不锈钢 Stainless steel	/	/	13.5	/	M4-13S-A-7608
M4-M2	不锈钢 Stainless steel	/	/	5	/	M4-M2-5S-A-7595
M4-M3	不锈钢 Stainless steel	/	/	9	/	M4-M3-9S-A-7597
	不锈钢 Stainless steel	/	/	20	/	M4-M3-20S-A-7596
	不锈钢 Stainless steel	/	/	50	/	M4-M3-50C-A-7597
	陶瓷 Ceramics	/	/	75	/	M4-M3-75C-A-7752
	陶瓷 Ceramics	/	/	100	/	M4-M3-100C-A-7753
	不锈钢 Stainless steel	/	/	7	/	M2-M3-7S-A-7593
M3-M2	不锈钢 Stainless steel	/	/	5	/	M3-M2-5S-A-7592
M5-M4	不锈钢 Stainless steel	/	/	9	/	M5-M4-9S-A-0856
M5-M4	不锈钢 Stainless steel	/	/	6.5	/	M5-M4-6S-A-7613
M5-M3	不锈钢 Stainless steel	/	/	10	/	M5-M3-10S-A-0227

