

高精度显微硬度测试

MICRO HARDNESS TESTING IN ULTIMATE PRECISION



Q10
Q30
Q60

多种型号

THE VARIANTS

Q10 M
Q30 M
Q60 M



Q10 A
Q30 A
Q60 A



Q10 A+
Q30 A+
Q60 A+



测试载荷范围和应用

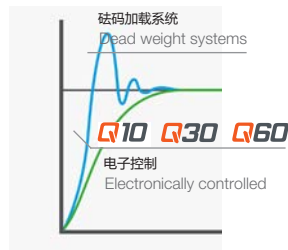
Test force range and force application



测试载荷扩展 (可选) / Test force extension (optional)

电子控制的传感器加载方式确保了快速精确的硬度测试结果,同时也保证测试方法的快速切换(免维护),并且自动进行对焦识别。

Electronically controlled test forces ensure quick and precise hardness testing as well as rapid test method changeover (maintenance free) and automatic recognition of the focus height.



测试方法和结果转换

Supported test methods and conversions



Vickers DIN EN ISO 6507, ASTM E-384, ASTM E92

HV0.0025	HV0.0005	HV0.001	HV0.002	HV0.005	HV0.01	HV0.02
HV0.025	HV0.05	HV0.1	HV0.2	HV0.3	HV0.5	HV1
HV2	HV3	HV5	HV10	HV20	HV30	HV50



Knoop DIN EN ISO 4545, ASTM E-384, ASTM E92

HK0.0025	HK0.0005	HK0.001	HK0.002	HK0.005	HK0.01	HK0.02
HK0.25	HK0.05	HK0.1	HK0.2	HK0.3	HK0.5	HK1, HK2



Brinell DIN EN ISO 6506, ASTM E-10

1/1	1/2.5	1/5	1/10	1/30	2,5/31,25	2,5/62,5	5/62,5*
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*) > 30 HBW

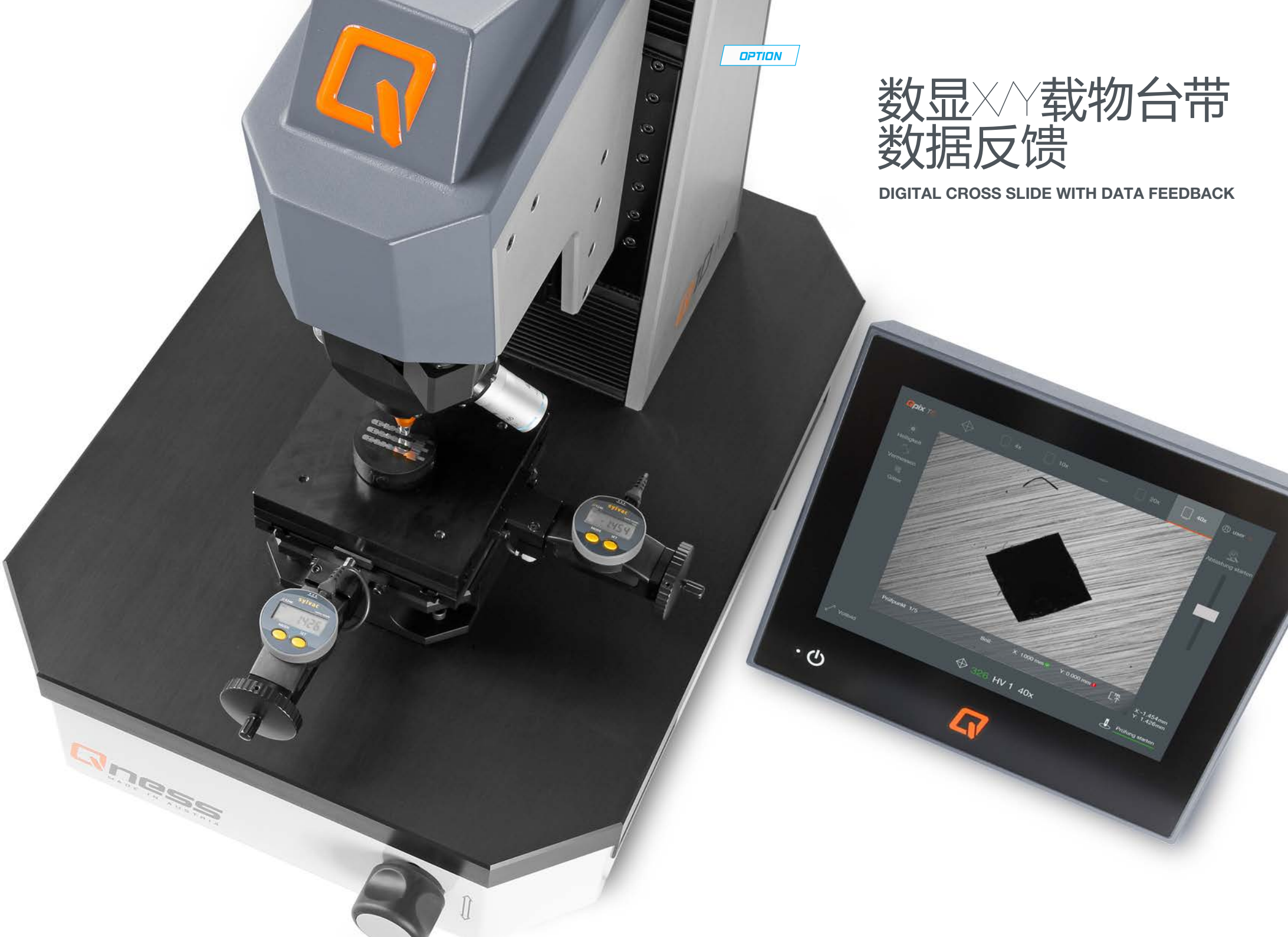
Integrierte Umwertungen / 集成的测试结果转换

DIN EN ISO 18265	DIN EN ISO 50150	ASTM E140
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OPTION

数显XY载物台带 数据反馈

DIGITAL CROSS SLIDE WITH DATA FEEDBACK



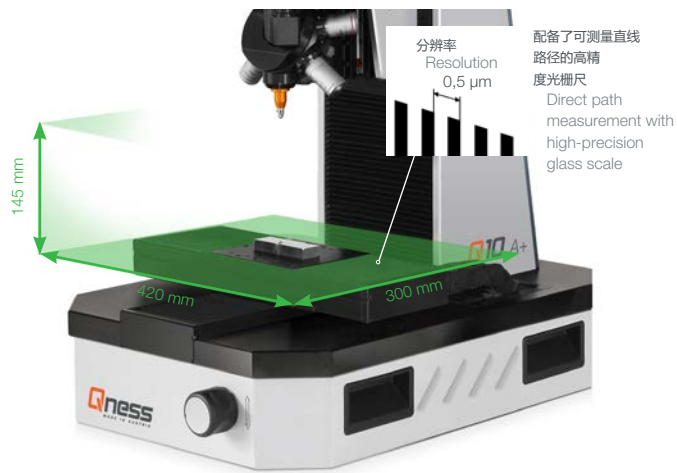
优点和特点

HIGHLIGHTS & FEATURES

1

定位精确，测试空间大

Exact positioning and large test room



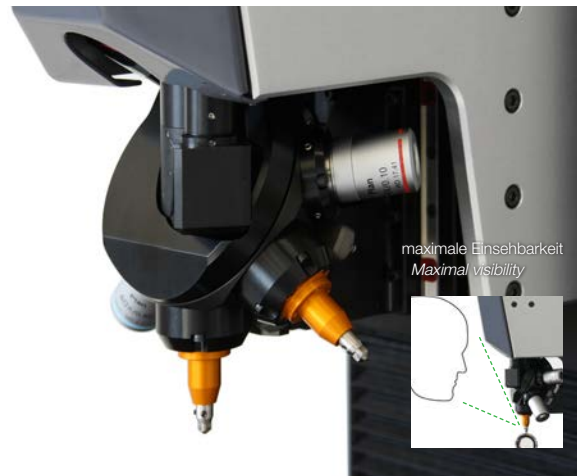
设备的整体结构均采用阳极氧化的铝材，测试空间较大。配有光栅定位的高精度自动XY试台可以配置一个8位的样品夹具。除此之外，客户可以在软件中创建和管理各种测试路径方法。

The sophisticated construction in anodized aluminium offers a large and well arranged test area. The fully automatic XY-slide with high precision optic path measurement system can be equipped i.e. with an 8-fold sample holder. Beyond that, customer specific magazines can be managed and created in the software.

2

6位自动转塔

6-fold measurement turret



所有型号均标配了6位自动转塔，因此能适用不同的测试方法。例如，它可以为维氏，努氏或布氏配备3种不同放大倍数的物镜和相应的压头。

The 6-fold measurement turret is supplied as standard in all models and offers space for various test methods. For example it can be equipped with 3 different magnification lenses and the corresponding penetrators for Vickers, Knoop or Brinell.

3

动态高度调节功能

Dynamic height adjustment



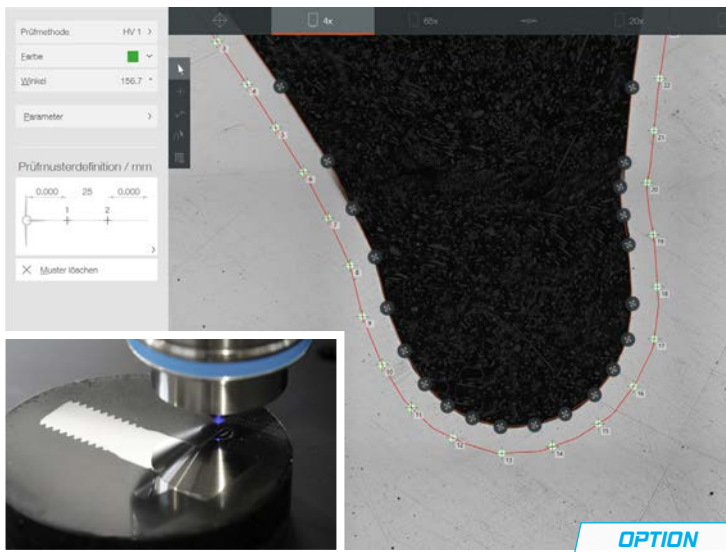
采用电子控制可以快速、精准、灵敏地移动测试头。通过旋转控制钮实现不费力、精确及防碰撞的测试头定位（速度0.01-20mm/s）。一个附加的电动Z轴可以实现此功能。

The electronic movement control allows quick, accurate and sensitive positioning of the test head. Forceless, precise and collision-proof positioning of the test head via rotating the control knob. (0.01 up to 20 mm/s). An additional Z-axis makes this helpful function possible.

4

轮廓扫描/边缘识别

Contour scan / Edge recognition



OPTION



借助物镜可以高精度地将全部轮廓或者部分轮廓识别出来，并存储到程序中。可以定义测试点的数量或者点与点之间距离进行点的设定。硬度测试将基于此程序进行全自动测试。

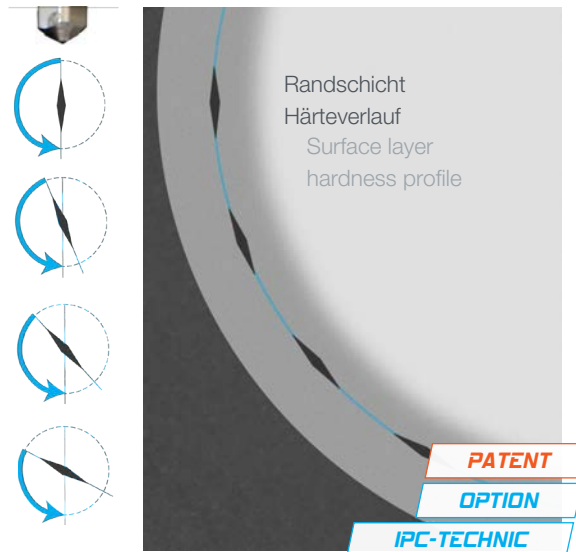
zum Video »
to the Movie »

Users can choose whether to approach the entire section or a partial segment of a contour. The measurement lens scans the entire route and stores all data in the program. Subsequently, a chosen number of the test points can be programmed into the system, or at chosen distances, relative to the edge. This programming enables the hardness testing sequence to be conducted completely automatically.

5

IPC—技术/压头旋转功能

IPC-technique / Penetrator turnable



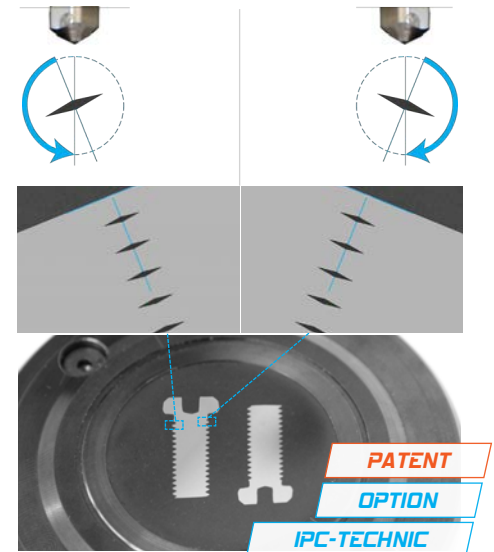
PATENT
OPTION
IPC-TECHNIC

IPC—压痕平行于轮廓

操作者可以调整压头位置对应于不同的样品轮廓边缘。可以选择手动或者自动的方式。基于此项新技术，可轻松对不同材料涂层进行合理、精准的测试。

IPC - Indenter Parallel to Contour

The operator can adapt the indenter to the respective contour, either manually or fully automatically. Based on this new development different material layers can be tested precisely.



PATENT
OPTION
IPC-TECHNIC

硬度测试领域第一次在测试过程中全自动将压头位置调整到与样品边界平行的位置。

For the first time in hardness testing the indenter adapts itself fully automatically parallel to the contour during the test cycle.

12"触摸屏实现最简便操作

ULTRA SIMPLE 12" TOUCHSCREEN OPERATION

高质量、坚固的铝合金外壳
High-quality and sturdy aluminium case

物镜和压头之间的快速切换
Quick change between lenses and penetrators

自动亮度调节功能
Automatic brightness regulation

4x变焦镜头
4x zoom saves lenses

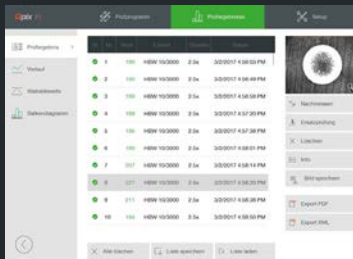
多点触摸

12"电容触摸屏显示器
Capacitive 12" touch display

符合人体工程学的可调节设计
Ergonomically adaptable

用于数据输出和导入的USB接口
USB for data export and data input

- 连续的软件设计
- 全自动图像分析
- 每个镜头为4x变焦
- 快速自动聚焦
- 可以手动进行重新测量
- 大量的数据统计功能：条形图、进度图、直方图
- 以'Excel'输出测试结果列表（CSV使用输出配置器）
- 根据标准提供每个压痕的详细信息
- PDF/直接打印为A4协议
- 提供不同安全级别的管理权限
- Across-the-line software design
- Fully automatic image analysis
- 4x zoom as standard for each lens
- Quick auto-focus
- Possibility for manual remeasurement
- Numerous statistic functions: bar graph, progression, histogram
- Measurement value list to export as „Excel“ (CSV via export configurator)
- Detailed information to each indent according to standard
- A4 protocol as PDF / direct print
- User management with different security access levels



数据管理和测试报告创建功能
Data management and test report creation



CHD测试进度图
CHD progression

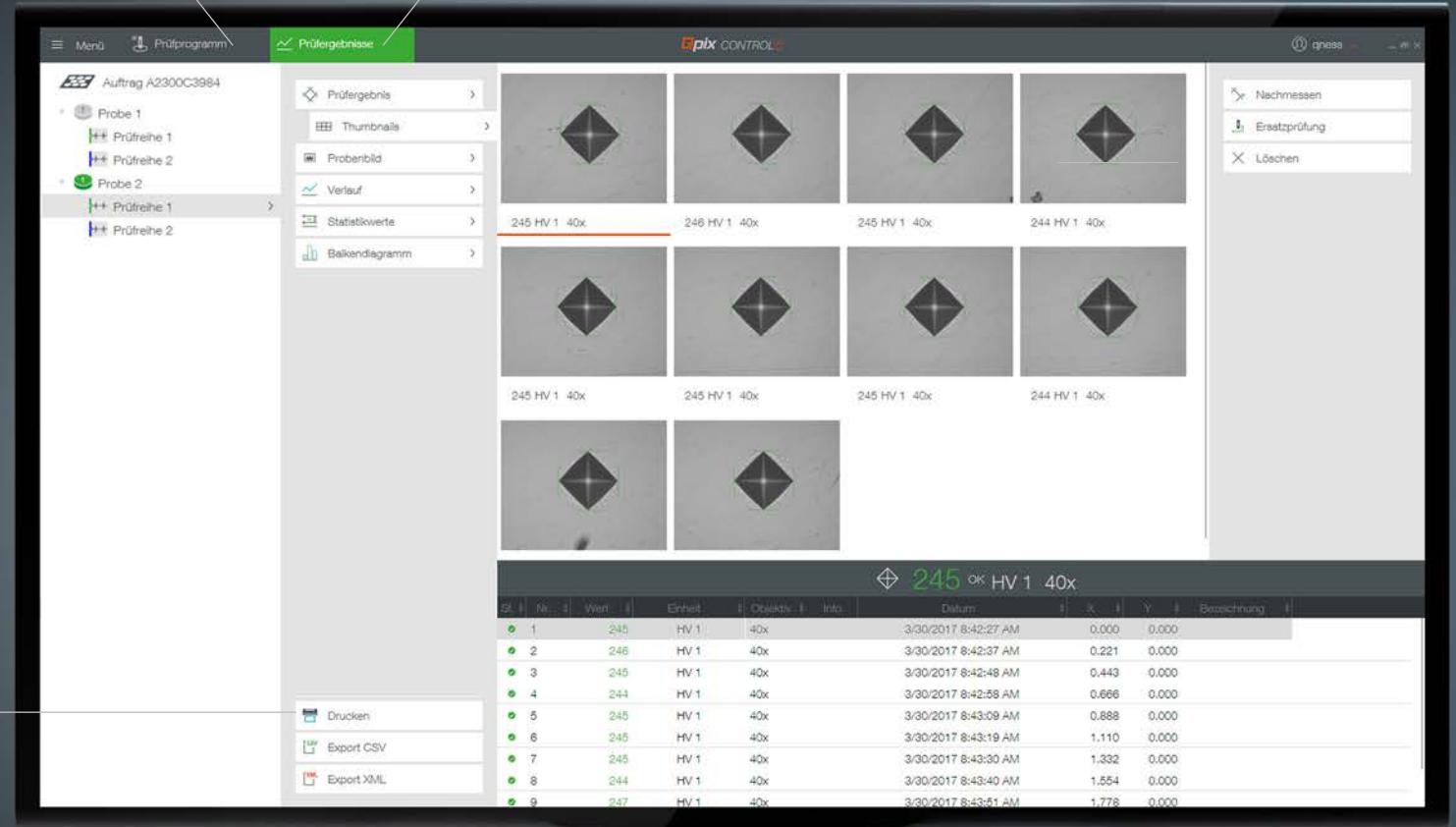


大量数据统计信息
Numerous statistics



虚拟键盘输入功能
Input by virtual keyboard

- 1 测试数据的生成
Creation of test data
- 2 测试数据的管理
Test result management



可配置的协议和数据显示。广泛的结构化选项用于储存测试项目数据。输出文件的适应性内容和算法内容使得Qpix Control2每天的操作变得更加简单。



Configurable protocol and data presentation. Wide range of structuration options for stored test item data. Adaptable content for export files and protocol content simplifies daily operation with Qpix Control2 software.

最大的测试重复性。所有测试的详细数据储存在每一个测试单点中，因而可以很容易查看或者重新测试这些点。
Maximum repeatability. All test specific data are stored for every single test point. Test points can be easily checked or tested a second time.

全自动序列点和 进程测量
Fully automatic row- and progression measurement

连续和直观的测试循环
Across-the-line and intuitive test cycle

InfoGraphic-Technic

样品位置序列号
Sample place No.

测试模式
Measurement mode

不同颜色用于不同统计
Colour allocation for statistics

已测量
Measured

使用不同视场观察样品和测试点的位置
View work pieces and test positions with different fields of view



客户指定的样品夹具
Customer specific sample holder



相同的样品可以用3D模式在软件中按比例建立
Identical samples can be set up in the software in scale as 3D model.

3D-SmartView

直观，结构化和专业：Qpix Control2预示着新一代硬度软件的到来。它建立在客户的建议和反馈基础上，保证最大化的用户友好。由于测试头的自动高度调整功能和非接触测量，Qness样品夹具的完全集成，CAD与3D图像的兼容，大量的、易于理解的3D控制元素以及软件中的视角使其成为硬度测试领域的新标准。

Intuitive, structured and professional: Qpix Control2 heralds a new generation of hardness testing software. It has been developed based on customer input and feedback to guarantee maximum user-friendliness. New standards in hardness testing are now being established thanks to the controlled test head with automatic height adjustment and contact-free gauging, complete integration of the Qness sample holders, CAD compatibility with 3D component imaging and a wide variety of easily comprehensible 3D control elements and view angles within the software.



创新型的CAS技术（防撞系统）通过生成可视区域所有移动的3D预览计算，保护设备中的机械零部件不受到碰撞和防止操作错误。

Innovative CAS technology (Collision Avoidance System) protects the mechanical components in the device from collisions and operating errors by generating 3D preview calculations of all movements in the visualized testing area.

三步给出测试结果

A RESULT IN 3 STEPS

1 样品加载 Load samples



机器自动移动到样品夹具的高度。自动拍摄样品的图像。

The machine moves automatically to sample holder height. Image of sample is taken automatically.

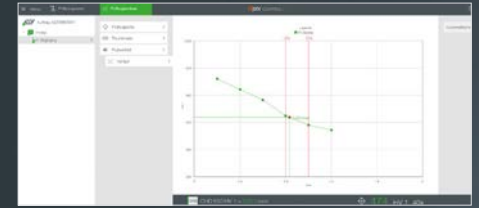
2 测试序列的设置 Load row



测试行的快速设置：将测试行拖至预想的位置。自动捕捉功能会自动校正测试行的起始点位置。

SRS – Speedy Row Set-up: Drag the row of test points to the desired position. The serial Auto-Snap function corrects the starting point of the test row automatically.

3 启动测试序列 Start test sequence



测试顺序依据所用的硬度测试标准进行执行。

The test sequence is executed according to the applicable hardness testing standards.

更快更准的硬度测试结果

MORE ACCURATE HARDNESS RESULTS RAPIDLY



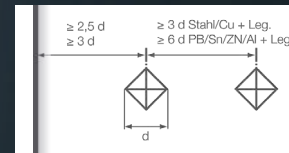
全自动硬度测试：可创建多个样品和多个序列（例如一次性测试8个样品，共60个测试序列），并且自动完成测试。

Fully automatic hardness testing: several progressions and samples are created and completed „unmanned“ (i.e. 60 progressions on 8 different samples in one test run)



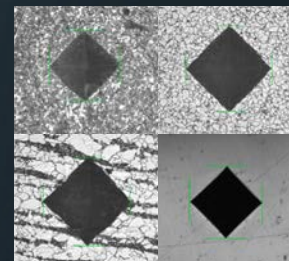
省时测试模式：‘测试所有压痕’—测量所有压痕；‘最优停止’—硬度值达到规定的下限时则测试结束。

Time-saving test mode ‘Complete all indentations – then evaluate’ and ‘Optimum Stop’ to complete test series as soon as the lower hardness limit has been undercut.



自动地以最小间隔生成测试点。得到的结果更加准确。

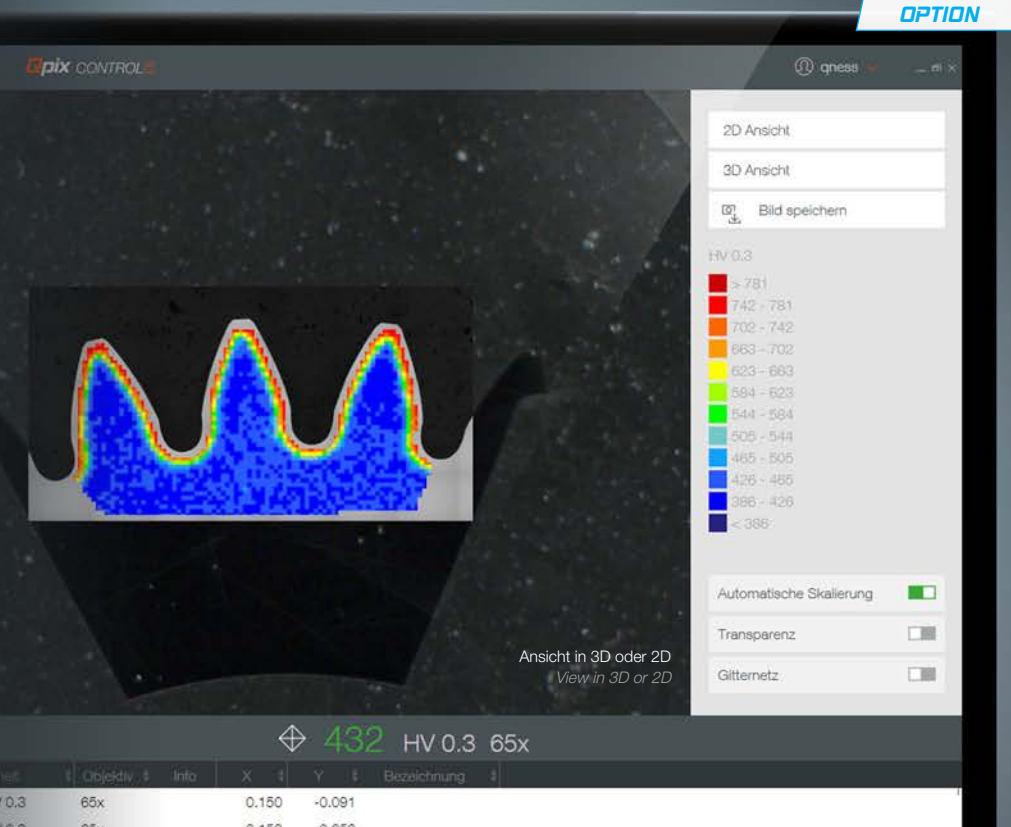
The distances of test points are automatically set to minimum norm distance for more accurate execution of test results.



可调节的表面压痕识别功能可以有效减低在“非最佳”表面进行硬度测试时对样品制备的要求。因此，可在表面质量不好的情况下（例如腐蚀、磨光.....）进行自动压痕识别。

The adjustable surface indentation recognition function reduces the required effort of sample preparation for testing the hardness of non-optimum surfaces. Hence, automatic indentation recognition is also possible on critical surfaces (etching, grinding...).

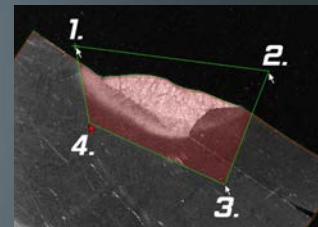
OPTION



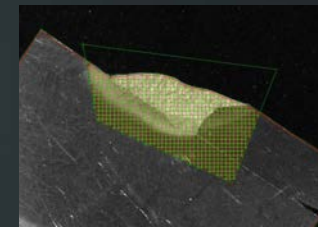
可选模块“平面硬度分布图”是对分析热处理零件表面的硬度分布非常有效的手段。对材料的研究、焊接质量及失效分析等都是一项非常重要的指标。

The optional software module „Plane hardness chart“ is the perfect aid for the detailed securing of the hardness distribution over the total cross section, especially of heat treated samples. This is extremely important in material exploration, and also for weld testing or in damage analysis.

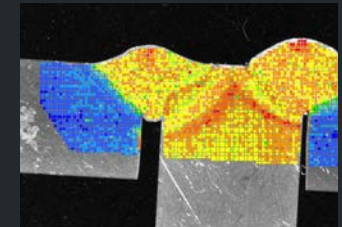
1 选定区域
Create area



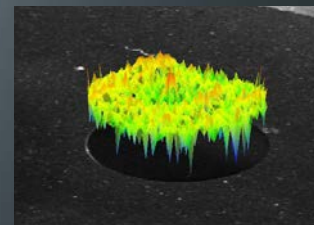
2 确定网格
Define grid



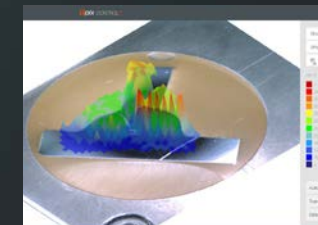
3 采用2D或者3D的显示方式
Display in 2D or 3D



应用领域 / FURTHER APPLICATION



线材断面三维硬度分布图
Homogenous plane hardness chart on wire cross section



焊接件透明3D硬度分布图
Transparent hardness chart in 3D on a welded sample

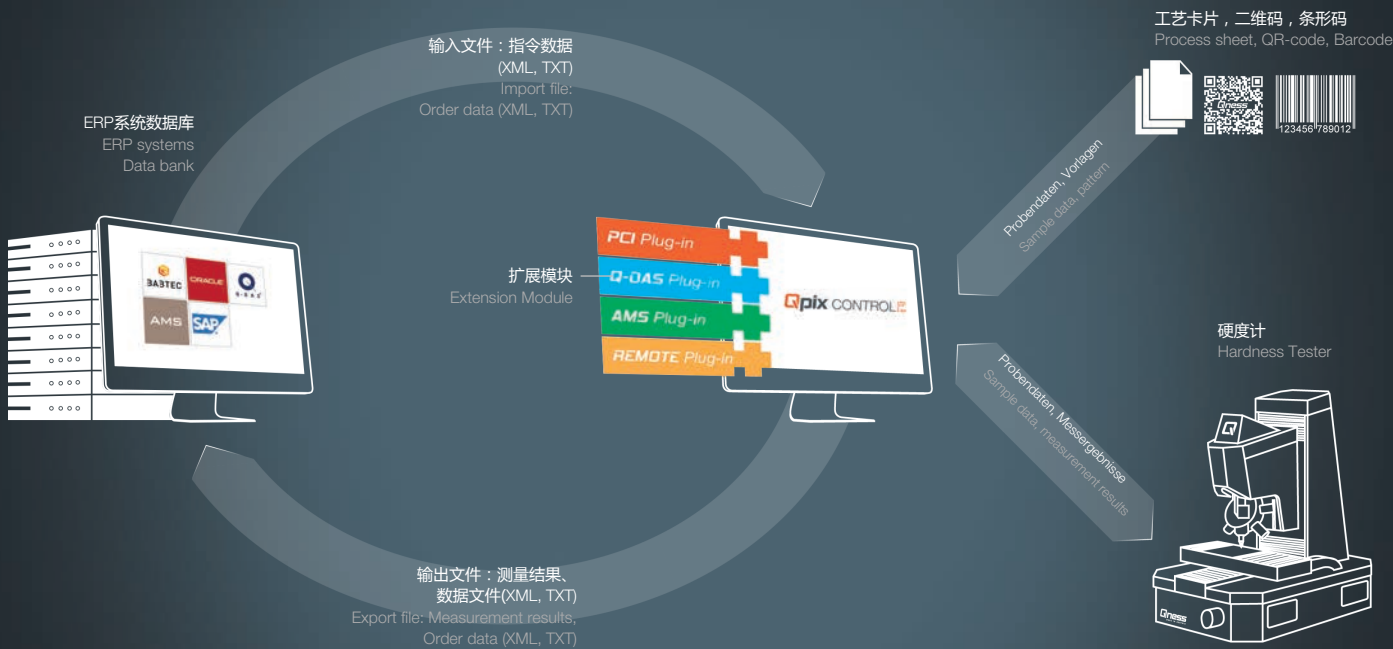


非镶嵌样表面测试点阵
Test point pattern on a non-bedded specimen

1

数据库系统中灵活的数据连接

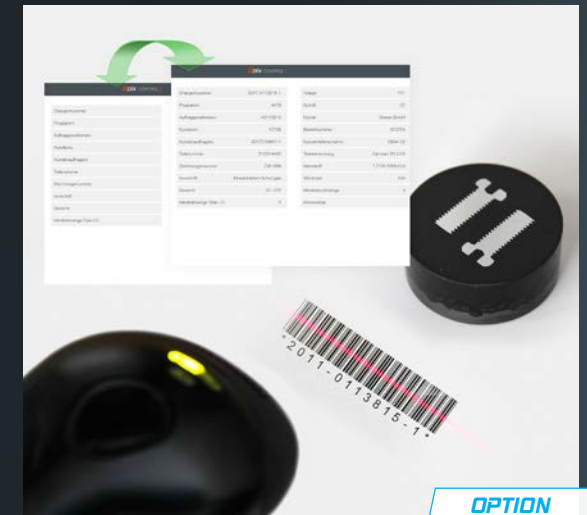
FLEXIBLE DATA CONNECTION IN DATA BANK SYSTEM



2

测试数据的输入和输出

TEST DATA IMPORT AND EXPORT



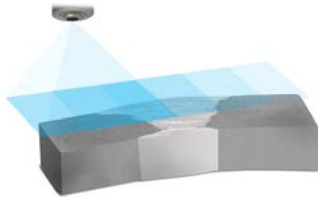
指令数据和试验计划可以采用扫描条形码的方式直接从中心控制系统下载到硬度计上，这样可以避免人工输入信息时的输入错误。

Order data and test plans can be loaded directly from a central system by means of a bar code scanner. So that incorrect input can be avoided.

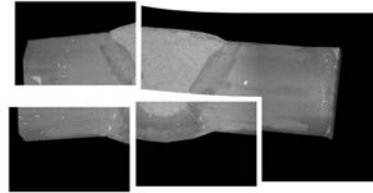
Qpix CONTROL插入模块：可进行双向输出输入指令的管理。硬度计可以从上位机管理系统中得到所有的试验指令和计划，在试验完成后，连同试验结果一同发回管理系统。文件是开放的，可以适应任何的系统。

Qpix CONTROL plug-in module: universal bi-directional data interface for order management. The hardness tester collects all order data and test plans fully automatically. After the test the data is added with results and returned to the order management system. File import and export is freely configurable and individually adaptable.

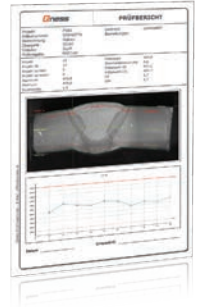
1 采用全景像机进行样品扫描
Scan sample with sample image camera



2 样品图像拼接
Sample image is assembled

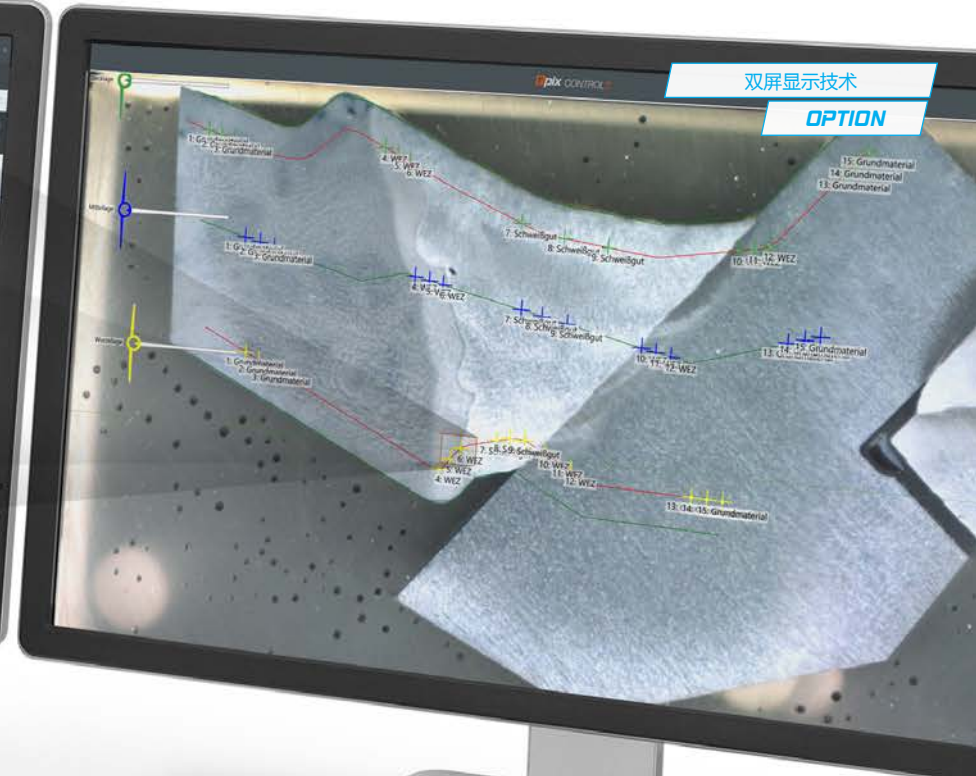


3 样品的宏观图像可以在另一台显示器上显示或者放入测试报告中
The sample image can be shown on a 2nd monitor or included into a test report



通过宏观和微观图像同步性可以实现最优的方位。特别适合焊接件或者其它测试点定位。基于图像显示功能，可根据测试规范定位测试点的位置。

Optimum orientation via simultaneous macro and micro view. Ideal for welding test or test point positioning. Test points can be norm-positioned based on the graphic presentation.

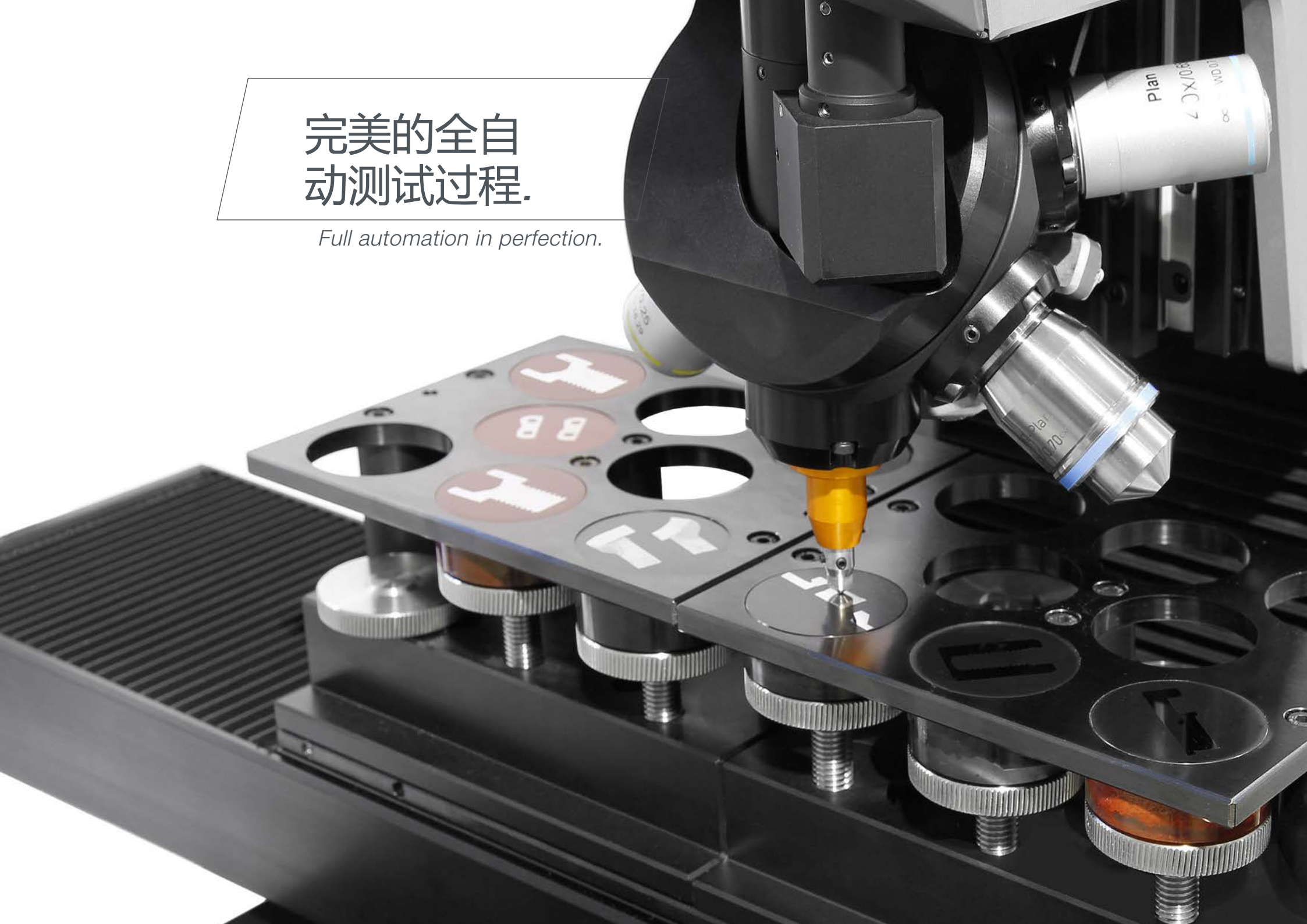


双屏显示技术

OPTION

完美的全自
动测试过程.

Full automation in perfection.



实际应用

PRACTICAL APPLICATIONS

1

高度自动控制功能

Automatic height control



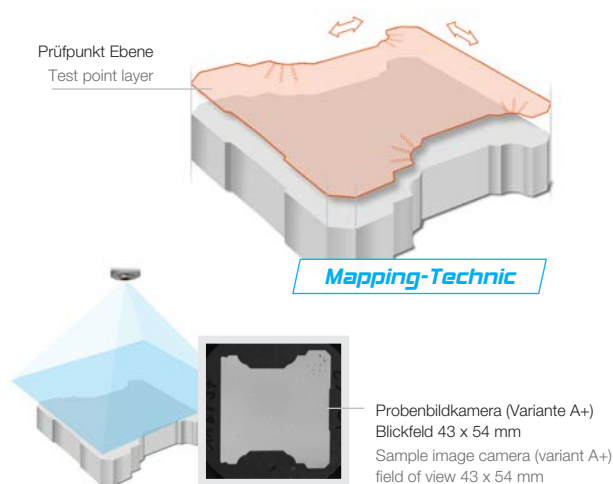
由于超动态测量转塔的独特设计，可以测试不同高度的样品。创新性的CAS技术可以防止碰撞的发生。

Due to the unique design of the ultra dynamic measurement turret, samples of different heights can be positioned in the test area. The innovative CAS technology prevents collisions.

2

模板功能

Template function



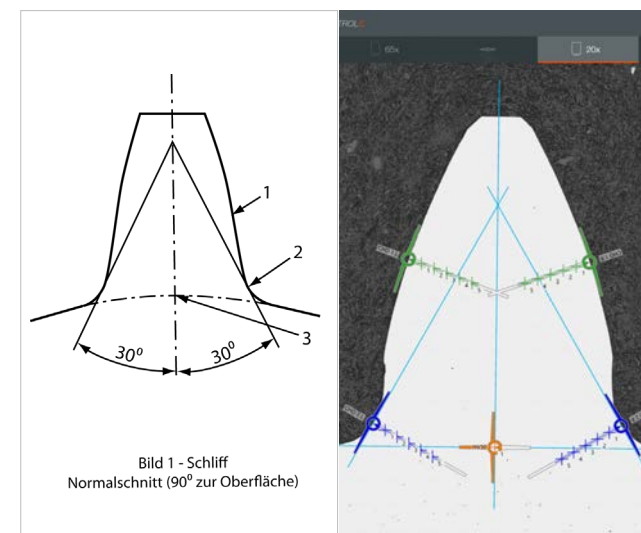
- 反复试验/重复样件的理想选择
- 使用参考线和基准线直接将‘测试点层’与工件对齐
- 无需‘fix stop’和样品夹具
- 样品图像可以放入测试报告中

- Ideal for repeated tests / components
- Alignment of „test point layers“ directly on the work piece with reference lines and bench marks
- No „fix stop“ or sample holder needed
- The sample image can be used in the test report

3

齿腹的硬度测试

Tooth flank testing



测试点的创建是一件很耗时的事情。通过预先设定好的测试模板可以将时间缩至最短。使用Q30A+一台设备，即可以实现HV0.5和HV30之间的整个规范程序。同时可以存储报告。报告可以根据客户的要求进行修改。

The time-consuming creation of test points, especially with tooth flank testing, is minimized by means of pre-defined test templates. With the Q30A+ the entire normed procedure between HV30 and HV0,5 can be done by one single device. Certainly a corresponding report is stored. The report can be adapted to customer specification.

4

样品夹具的应用 Application vice

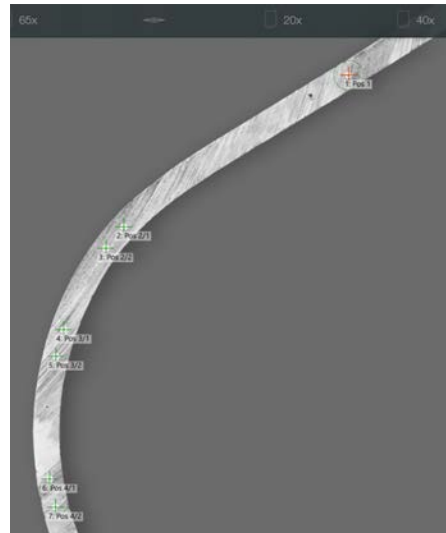


该夹具具有宽大而坚固耐用的测试区域，并且结构清晰，允许机器进行更大范围的硬度测试。除了直接将样品固定在平口钳中，同时减少了样品制备步骤，并且将可操作的区域扩展到了将来的测试工作。

The large, clearly-structured and robustly designed test area allows the machine to perform a wider range of tests. In addition to that direct clamping of samples in vices reduces sample preparation and extends the operational area for future test work.

5

单点位置的识别 Identification of single test points

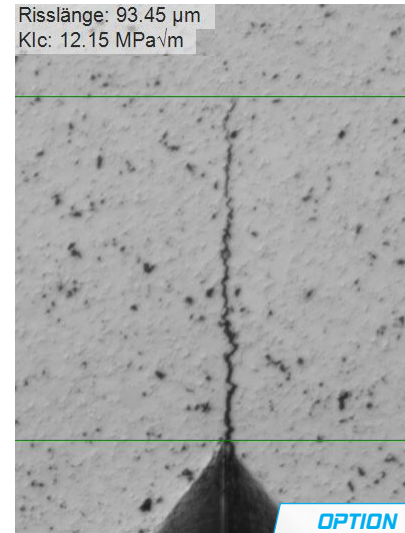


所有的测试点可以单个进行标识或者根据客户要求要求进行标识。标签会在测试结果列表和测试协议中显示出来。该功能对于后续处理分析非常重要。

All test points can be identified individually or to customer specifics. The label is shown in the test result list and in the test protocol. This is an important function for later analyses.

6

断裂韧性的测量 Crack length measurement

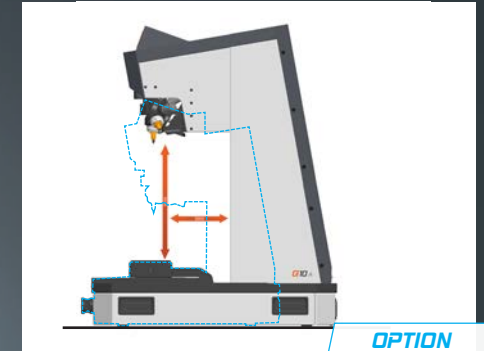


评估K1C时，按照规范要求测量压痕的4条裂纹长度。然后自动算出MPa_a/m值。

For evaluating the K1C value the 4 cracks are measured according to the norm. After that the MPa_a/m value is evaluated automatically.

扩展的测试区域
由客户指定测试高度和喉深。

Extended test area
Customer-specific test height and throat depth

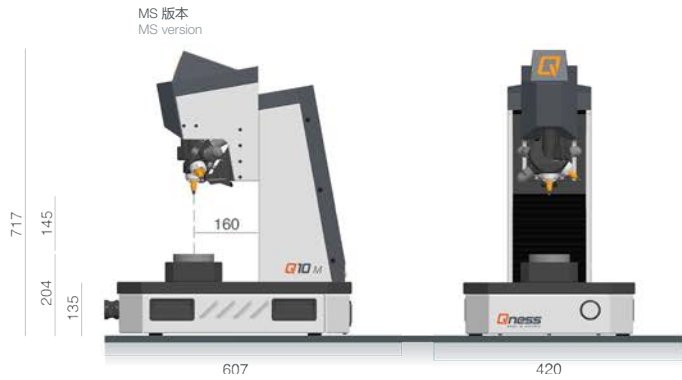


使用光栅定位的高精度大尺寸XY自动试台。
Large high-precision XY-test slide with glass scales



门式解决方案提供了超大移动路径，并且为显微/低载荷硬度测试提供了新的可能性。

A portal solution offers superior large traverse paths and opens new possibilities in micro-/low-load-hardness testing.



	Q10 M	Q10 A	Q10 A+	Q30 M	Q30 A	Q30 A+	Q60 M	Q60 A	Q60 A+
测试载荷范围 / Test force range	50 g - 10 kg (0,49 - 98,1 N)			100 g - 31,25 kg (0,98 - 306,6 N)			200 g - 62,5 kg (1,96 - 613,1 N)		
测试载荷扩展 / with test force extension	0,25 g - 10 kg (0,00245 - 98,1 N)			0,25 g - 31,25 kg (0,00245 - 306,6 N)			0,25 g - 62,5 kg (0,00245 - 613,1 N)		
转塔 / Tool changer	6-位 自动 / 6-fold, motorized								
软件 / Software	Qpix T ²	Qpix CONTROL ^E		Qpix T ²	Qpix CONTROL ^E		Qpix T ²	Qpix CONTROL ^E	
载物台/XY试台/ Test anvil/Cross slide	Ø 100 mm	自动 / motorized		Ø 100 mm	自动 / motorized		Ø 100 mm	自动 / motorized	
移动距离 X/Y/Z / Traverse path X/Y/Z	Z 145 mm	X 150 / Y 150 / Z 145 mm		Z 145 mm	X 150 / Y 150 / Z 145 mm		Z 145 mm	X 150 / Y 150 / Z 145 mm	
仪器基本重量 / Weight of basic machine	52 kg	58 kg	58 kg	52 kg	58 kg	58 kg	52 kg	58 kg	58 kg
数据接口 / Data interface	3x USB, 1x Ethernet, 1x RS232	1x USB3.0: Schnittstelle 界面 / Interface PC-硬度计		3x USB, 1x Ethernet, 1x RS232	1x USB3.0: Schnittstelle 界面 / Interface PC-硬度计		3x USB, 1x Ethernet, 1x RS232	1x USB3.0: Schnittstelle 界面 / Interface PC-硬度计	
全景像机 / Sample image camera	-	-	Ja / Yes	-	-	Ja / Yes	-	-	Ja / Yes
摄像头 / Camera system	18 MP 彩色摄像头 / 18 MP color camera		2x 18 MP Farbkamera	18 MP 彩色摄像头 / 18 MP color camera		2x 18 MP Farbkamera	18 MP 彩色摄像头 / 18 MP color camera		2x 18 MP Farbkamera
最大工件重量 / Max. work piece weight	50 kg								
电源 / Power supply	230~1/N/PE, 110~1/N/PE								
最大功率 / Max. power consumption	~ 200 W								
附件和选项 / Accessories and options									
通用型 / General	物镜 (2,5x, 4x, 10x, 20x, 40x, 65x, 100x), 压头 (Vickers, Knoop, Brinell)			物镜 (2,5x, 4x, 10x, 20x, 40x, 65x, 100x), 压头 (Vickers, Knoop, Brinell)			物镜 (2,5x, 4x, 10x, 20x, 40x, 65x, 100x), 压头 (Vickers, Knoop, Brinell)		
样品夹具 / Sample holder	1-样品, 4-样品 (Ø 30 / 40 / 50 mm), 8-样品 (Ø 30 / 40 mm) / 1-fold, 4-fold (Ø 30 / 40 / 50 mm), 8-fold (Ø 30 / 40 mm)			1-样品, 4-样品 (Ø 30 / 40 / 50 mm), 8-样品 (Ø 30 / 40 mm) / 1-fold, 4-fold (Ø 30 / 40 / 50 mm), 8-fold (Ø 30 / 40 mm)			1-样品, 4-样品 (Ø 30 / 40 / 50 mm), 8-样品 (Ø 30 / 40 mm) / 1-fold, 4-fold (Ø 30 / 40 / 50 mm), 8-fold (Ø 30 / 40 mm)		
载物台 (可选) / Cross anvil	手动 / manual *	X 300 x Y 150 mm		手动 / manual *	X 300 x Y 150 mm		手动 / manual *	X 300 x Y 150 mm	

*尺寸150 x 150 mm, 移动距离 X 25 x Y 25 mm, 通过手动千分尺或数显千分尺实现。 / Dimensions 150 x 150 mm Traverse path X 25 / Y 25 / Z 125 mm via analog or digital micrometer

可以通过www.qness.at官网上的在线配置
了解其它可选模块和附件。
Additional modules and accessories can be viewed
using the online product configurator at www.qness.at



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