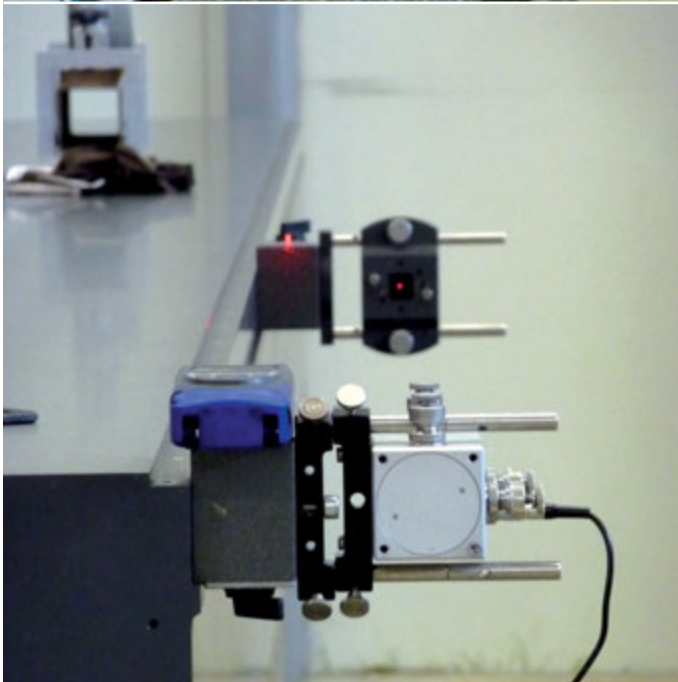
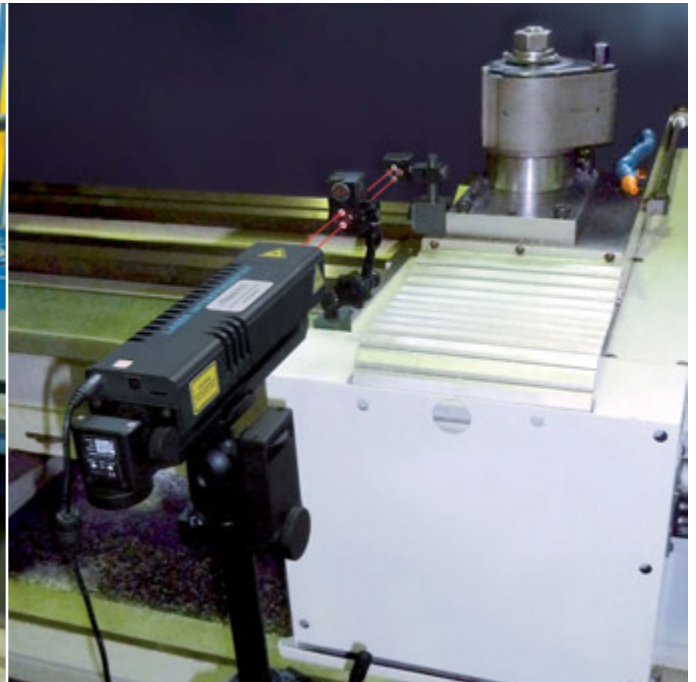
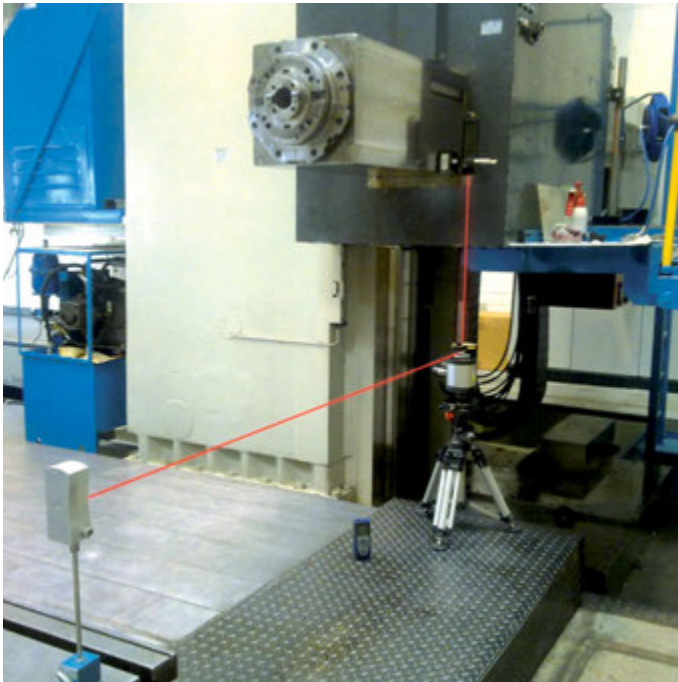


Methods and Instrumentation for the measurement of Machine Tools

(according to ISO 230 and ISO 1101)

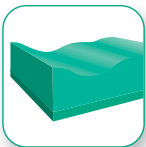
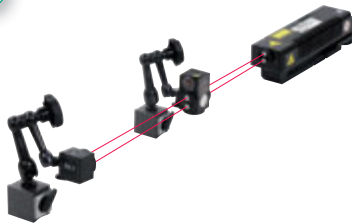


Measurement Instrumentation for Machine Tools



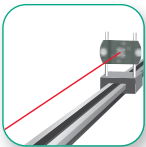
Interferometer

for position calibration



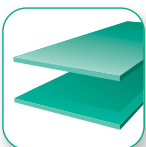
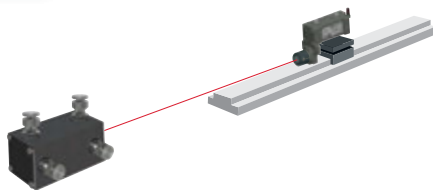
Precision Spirit Level

for assembly and calibration



Straightness Measuring Instrument

for assembly and alignment

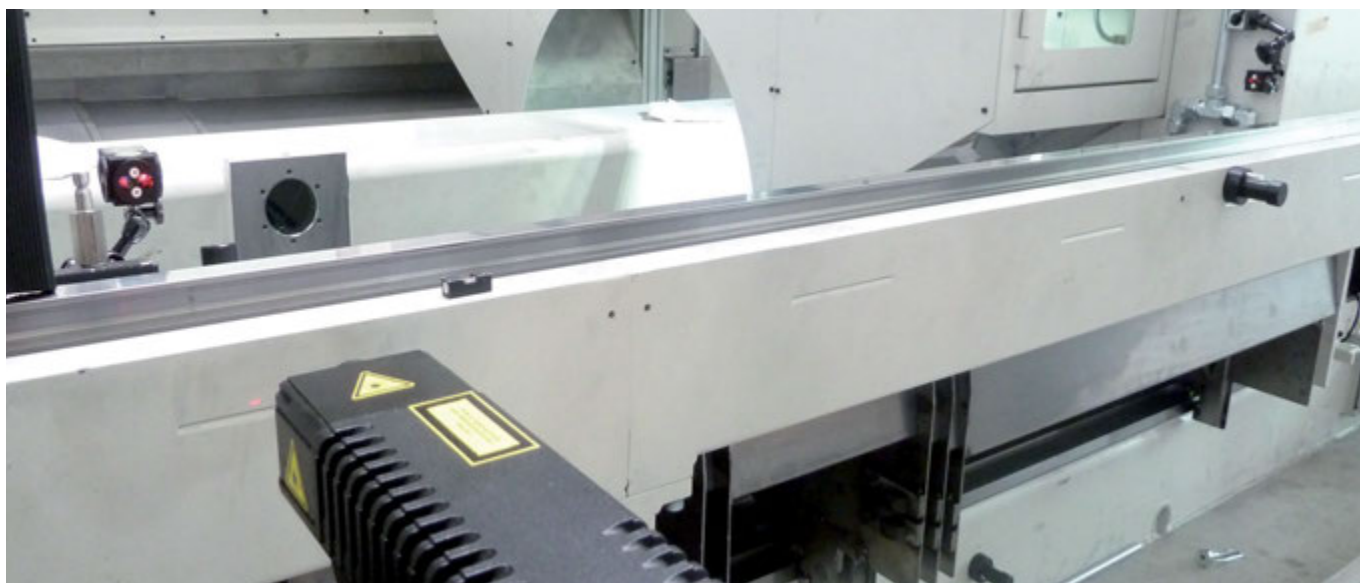


Precision Self-levelling Sweep Laser

for flatness and levelling large scale machines



... turnkey solutions from Status Pro!



A good Interferometer like the μ Line is practically indispensable for the calibration of modern machine tool assemblies. However, before the calibration can take place the machines must be step by step assembled and aligned with great precision. We offer a number of instruments like ProLine and ProLevel to support this important assembly and alignment process.

Status Pro has been developing and manufacturing machine measurement and alignment instrumentation since 1995. Through close teamwork with our customers, suppliers and service professionals we continue to improve our equipment. Making precision instrumentation that's easy to use is our first priority.

Our customers are typically machine manufacturers, assembly, repair, service and quality control professionals. We pursue long-term customer relationships; to support this we often customise our software and mechanical adaption according to specific customer requirements. We also offer a broad range of support services like Instrumentation Rental, repair and calibration services.

We hope that the following gives you an overview of our "Standard" Instruments and Methods for the Machine Tool professionals.

We invite you to visit our web site

www.statuspro.com

For more information

just call us at

+49 2327 9881-0.



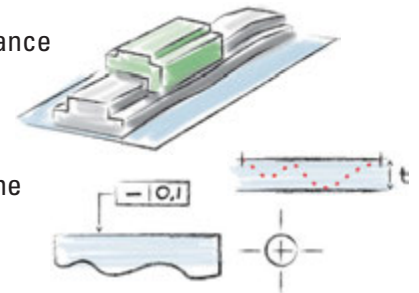
The measurement and alignment of Machine Tool Geometry

Terminology: For the sake of clarity the following is a short description of the terms used.

Most of the following measurements, structures and tolerances are based on the ISO 1101 and its relatives.

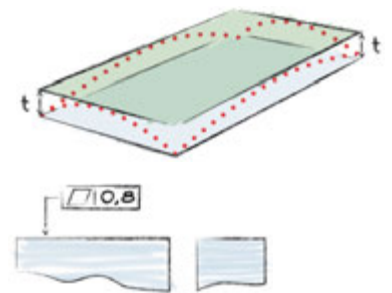
Straightness

Straightness according to the Norm DIN ISO 1101 is defined as follows: The tolerance zone is defined by two parallel lines drawn above and below the best fit of the measured data. The lines are separated by the tolerance (t). Naturally, a line is defined by the shortest distance between two points. If we have 20 points then the "best fit" line is the line through these points where the sum of the errors is a minimum. The tolerance lines are drawn parallel to this best fit line.



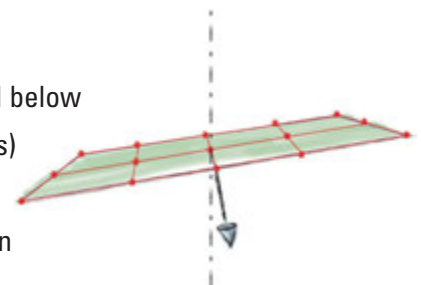
Flatness

The tolerance zone is defined by two parallel planes above and below the best fit plane through the measured data. The tolerance planes are separated by the tolerance t . As with the line above, if we have measured 20 points. The best fit plane is the plane where the sum of the errors (hills and valleys) is a minimum. Don't forget: The flatness of a plane makes no comment about how level (wrt gravity) a plane is.



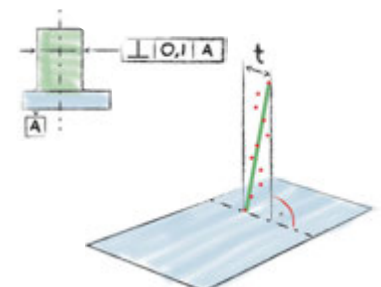
Levelling

The Tolerance Zone is here, like flatness, defined by two parallel planes above and below the data. The difference here is that the planes must be orthogonal (at right angles) to gravity. In plain English: These measured points are described as level or "in water" when they lie within a given tolerance (t) to a supposed waterline drawn through the average height of the points.



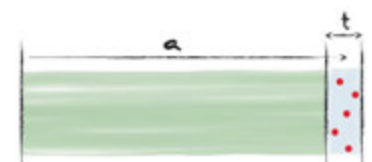
Right Angles:

The Tolerance Zone is here like straightness defined by two parallel planes above and below the data. The difference here is that the tolerance lines must be orthogonal (at right angles) to a reference line. Practically the reference line is either defined by two points or the "best fit line" through a large number of measured points.



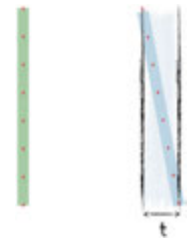
Position

The position refers to a distance travelled along a line. The tolerance is defined by two parallel lines on each side of the exact/desired distance. The tolerance is defined by the separation of these tolerance lines (t).



Parallelism

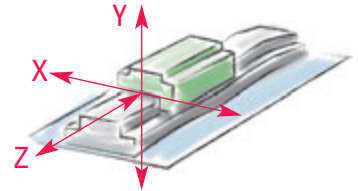
The Tolerance Zone is here (like in Right Angles above) defined by two parallel planes above and below the measured points. The difference here is that the tolerance lines must be parallel to a reference line. Practically the reference line is either defined by two points or the “best fit line” through a large number of measured points.



Definition of axes

Every Status Pro measurement system has got uniform definition of the axes:

X: horizontal axis | Y: vertical axis | Z: distance



Choice of Instrumentation

We must be clear about the which measurements we wish to make before we choose the appropriate instrument for exactly that task. For example, straightness can not only be measured using a Straightness measurement system like ProLine, an Interferometer can also be used. Indeed a Precision Spirit Level can be used for measurements in at least one degree of freedom. Often other issues like, environmental conditions, speed of measurement, or ease of use, or weight and size can play an important role in the choice of measurement method and Instrumentation.

Accuracy

It is often very difficult to interpret accuracy specifications: An inclinometer might be specified with a resolution of $1\mu\text{Rad}$ but also with a dynamic temperature co-efficient of $0.1\%(\text{FSD})/\text{K}/\text{min}$. But what does that mean practically? The following table should help as a practical guide under “good” industrial conditions. Practically, “good” means: clean, thermally stable and vibration free.

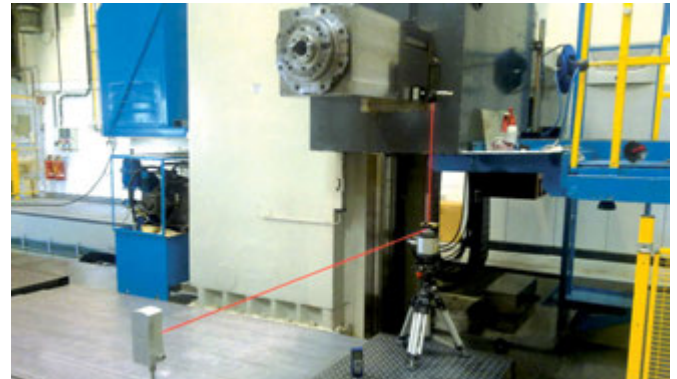
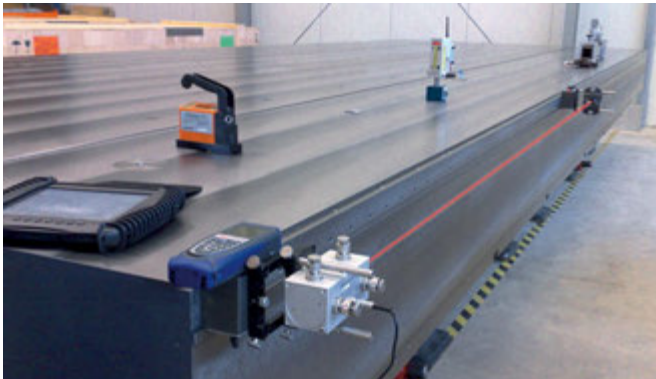
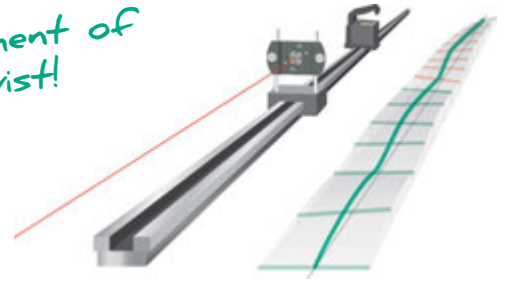
Instrument	Straightness 2 Axis	Straightness 1 Axis	Parallelism	Right Angles	Flatness	Position	Tablet-PC	Comment
Straightness								
ProLine 10	up to $1\mu\text{m}/\text{m}$	up to $1\mu\text{m}/\text{m}$					optional	quick setup
ProLine 20	up to $1,0\mu\text{m}/\text{m}$	up to $1,0\mu\text{m}/\text{m}$		up to $5\mu\text{m}/\text{m}$	with limitations		optional	expandable for Flatness and Perpendicularity
ProLine 30	up to $1,0\mu\text{m}/\text{m}$	up to $1,0\mu\text{m}/\text{m}$	up to $5\mu\text{m}/\text{m}$ depending on reference length	up to $5\mu\text{m}/\text{m}$	up to $10\mu\text{m}/\text{m}$ with R310		yes	all in one
Flatness								
ProLevel 10		up to $10\mu\text{m}/\text{m}$			up to $10\mu\text{m}/\text{m}$		optional	without Software
ProLevel 20		up to $10\mu\text{m}/\text{m}$		optional	up to $10\mu\text{m}/\text{m}$		yes	with Software
ProLevel 30		up to $10\mu\text{m}/\text{m}$		optional	up to $10\mu\text{m}/\text{m}$		yes	with an additional ref. Sensor
Inclination								
μLevel 10		up to $1\mu\text{m}/\text{m}$	only one axis		$1\mu\text{m}/\text{m}$		option	with Bluetooth
μLevel 20		up to $1\mu\text{m}/\text{m}$	only one axis		$1\mu\text{m}/\text{m}$		Remote display	differential measurement system
μLevel 30		up to $1\mu\text{m}/\text{m}$	only one axis		$1\mu\text{m}/\text{m}$		Remote display	with 2 μLevel
Interferometer								
μLine 10	optional	optional	optional, but difficult	optional	optional, but difficult	$0,001\mu\text{m}$	optional	multiple options available
μLine 20	$8\mu\text{m} \pm 8\mu\text{m}/\text{m}$	$8\mu\text{m} \pm 8\mu\text{m}/\text{m}$	optional, but difficult	$20\mu\text{m} \pm 15\mu\text{m}/\text{m}$	optional, but difficult	$0,001\mu\text{m}$	optional	multiple options available
μLine 30	up to $1\mu\text{m}/\text{m}$	up to $1\mu\text{m}/\text{m}$	optional	optional	optional	$0,001\mu\text{m}$	optional	multiple options available

Measuring Equipment for Linear Guides

ProLine®

The most practical Straightness Software

NEW!
Measurement of
roll / twist!



Laser Alignment Package for Linear Guides:

- Straightness in X and Y simultaneously
- Automatic z-axis log with Disto Com
- "hands free" measurement with automatic point capture
 - automatic measurement of twist / roll with μ Level
 - fast and easy measurement
- intelligent value evaluation
 - be sure about your measurement
- Resolution 0.1 μ m

- Superb user interface: practical and ergonomic, colour Touchscreen UMPC, rugged and light, intuitive usage and flexibility
- Automatic sensor recognition
 - no mess with cables
- Raw data, zeroed or use the best fit feature
- Export possibility as *.csv for use in Excel
- Extensive commenting and reporting facility
- Export the report using your USB memory stick
 - invest in the future

All ProLine Packages
include various accessories.

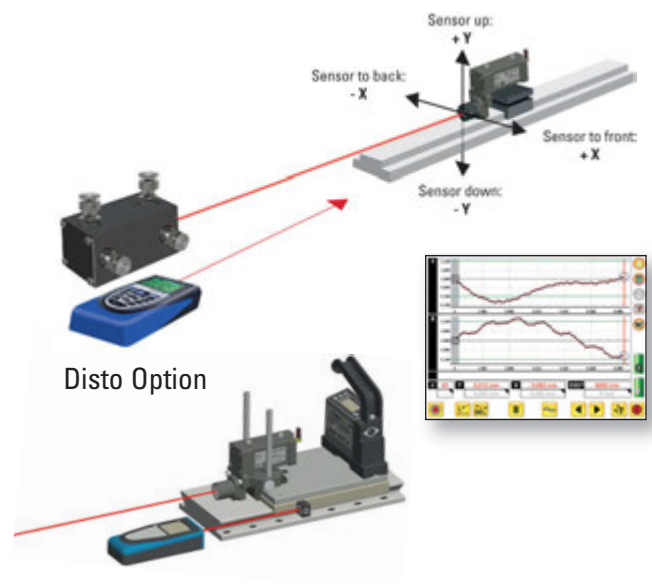


ProLine® 10

Straightness Starter Package

Contents of the package:

- Laser Source – with mounting adapter and power supply (SP T250-P)
- R540 Laser Position Detector with Bluetooth (SP R540-P)
- ProLine V4 Software with starter license (SW 200103)
- Option: Rugged UMPC with touchscreen (IT 200410)
- Laser Kit Case small with foam inlays (BG 990107)

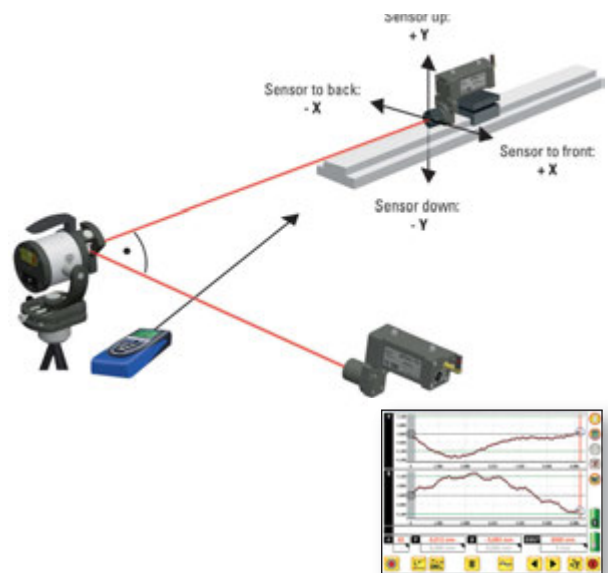


ProLine® 20

Straightness Professional Package

Contents of the package:

- T330 Self Levelling Sweep Laser (BG 830203)
- R540 Laser Position Detector with Bluetooth (SP R540-P)
- RC310 Remote Control for T330 and R310 Monitor (BG 830930)
- Leica DISTO™ Bluetooth distance meter (FIX DISTO-P II)
- ProLine V4 Software with starter license (SW 200103)
- Option: Rugged UMPC with touchscreen (IT 200410)
- Laser Kit Case small with foam inlays (BG 990109)

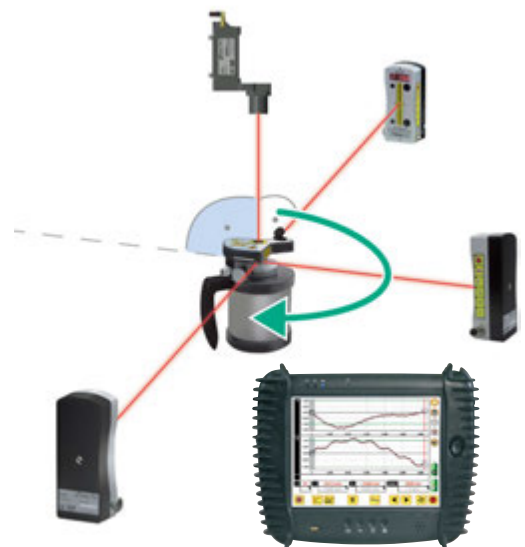


ProLine® 30

Straightness Professional Package with IT

Contents of the package:

- T330 Self Levelling Sweep Laser (BG 830203)
- 2x R310 Laser Receiver (BG 830134)
- R540 Laser Position Detector with Bluetooth (SP R540-P)
- RC310 Remote Control for T330 and R310 Monitor (BG 830930)
- Leica DISTO™ Bluetooth distance meter (FIX DISTO-P-V)
- ProLine V4 Software with starter license (SW 200103)
- Rugged UMPC with touchscreen (IT 200410)
- Laser Kit Case small with foam inlays (BG 990105)



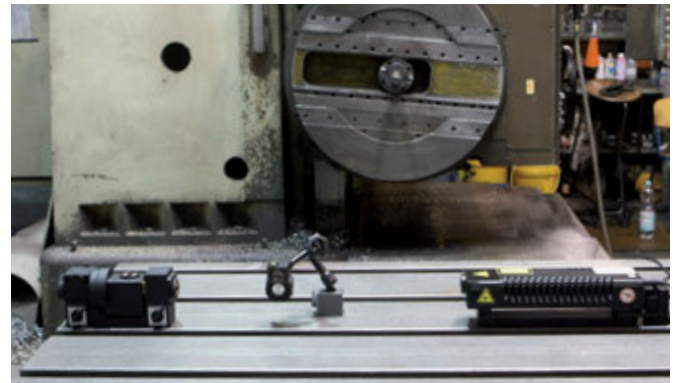
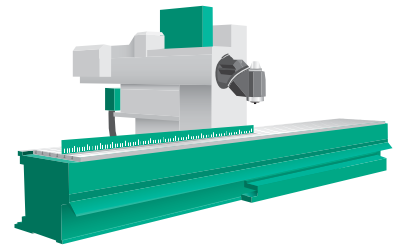
More information at www.statuspro.com/calibration_of_machine_tools/straightness/

System for the Measurement and Compensation of Machines

Laser-Interferometer

μ Line

compensation unit included!



Choose according to your requirements out of the following possibilities:

- Measurements according ISO 230-2, VDI 3441, BSI BS 4656 etc.
- Positioning of CNC and CMM machines
- Geometrical measurements
- Positioning of turntables
- Vibration measurements
- Straightness measurements
- Squareness measurements
- Dynamic measurements

→ fast and easy alignment!

→ save time and money

- Easy to use software in German / English
- Generation of G-codes and compensation tables
 - automatic generation of compensation tables
 - no long winded conversion
- Easy programmable in- and outputs
 - connect the system directly to your machine!
- Fast support, service and calibration
 - we offer you a fast and capable service

Features of the system:

- Wireless communication
 - no mess with cables!
- Extensive Starter Kit with 3D measurements
 - no additional components needed
- compensation unit included in laser head
 - Small size, case 350 x 200 x 250 mm
 - easy to transport and helpful in small areas
- Speed up to 6m/s in the base version
- 90° element for small machines included
- Electronic beam alignment and optical targets

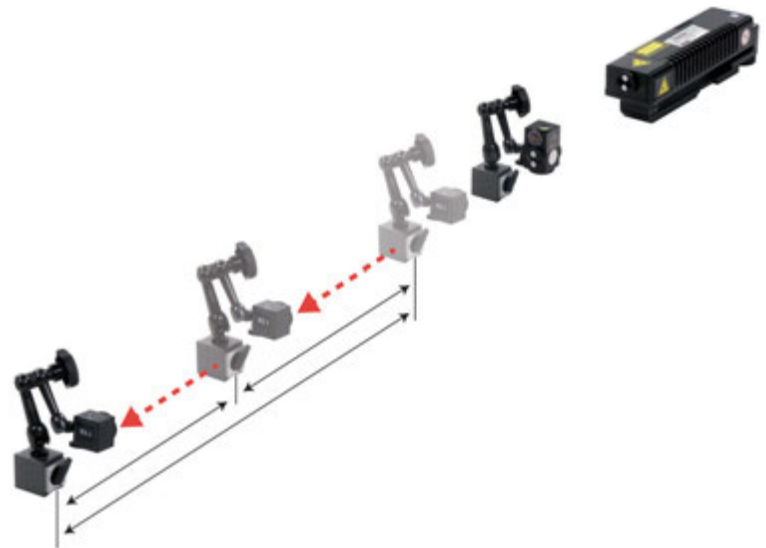


μ Line 10

Laser-Interferometer Starter Package

Contents of the package:

- μ Line F1 – Laser 1D (BT 840205)
- Compensation unit with wireless temperature sensors (BT 840290 + BT 840295)
- Interferometer element IL1 (BT 840270)
- Retro-Reflector element RL1 (BT 840280)
- μ Line PC Software base (SW 840200)

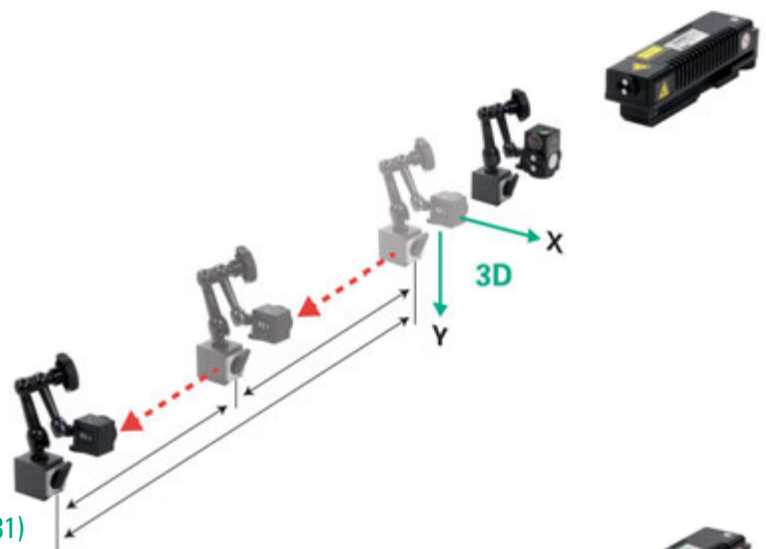


μ Line 20

Laser-Interferometer Professional package

Contents of the package:

- μ Line F1 – Laser 3D (BT 840205 + BT 840410)
- Compensation unit with wireless temperature sensors (3x BT 840290 + BT 840295)
- Interferometer element IL1 (BT 840270)
- Retro-Reflector element RL1 (BT 840280)
- Manual Trigger cable STROBE (BT 840310)
- μ Line PC Software complete with module 1-5 (SW 840200/1/2/3/4/5)
- Tripod complete with alignment head (BG 840231)

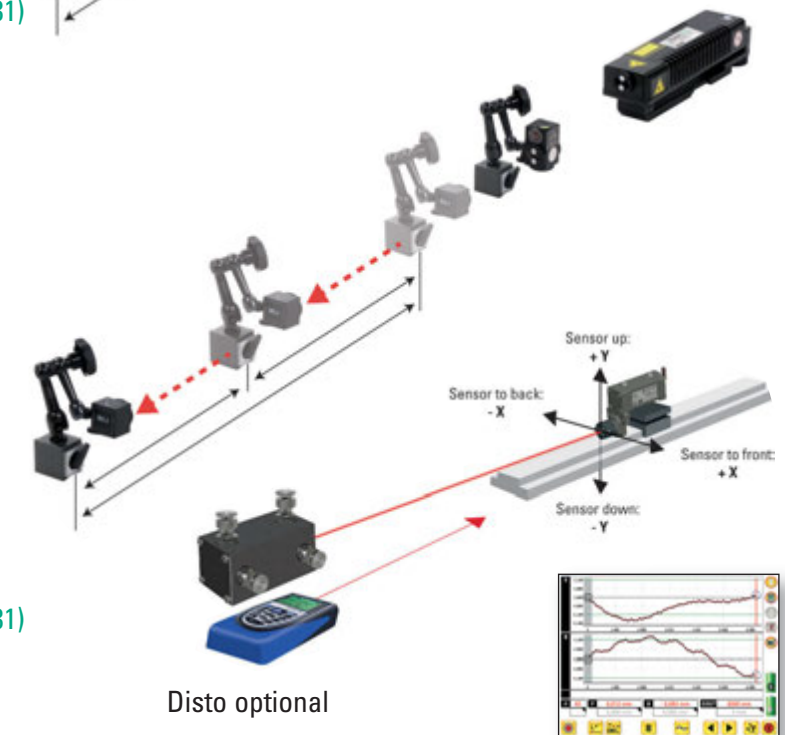


μ Line 30

Laser-Interferometer High-End package

Contents of the package:

- μ Line F1 – Laser 1D (BT 840205)
- Compensation unit with wireless temperature sensors (BT 840290 + BT 840295)
- Interferometer element IL1 (BT 840270)
- Retro-Reflector element RL1 (BT 840280)
- μ Line PC Software base + vibrations module and dynamic module (SW 840200/2/5)
- Tripod complete with alignment head (BG 840231)
- Complete ProLine 10 Package for straightness measurement (SP ProLine 10)

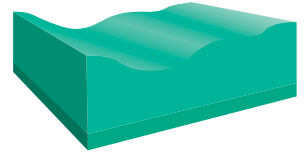


More information at www.statuspro.com/calibration_of_machine_tools/interferometry/

System for Precision Flatness Measurements

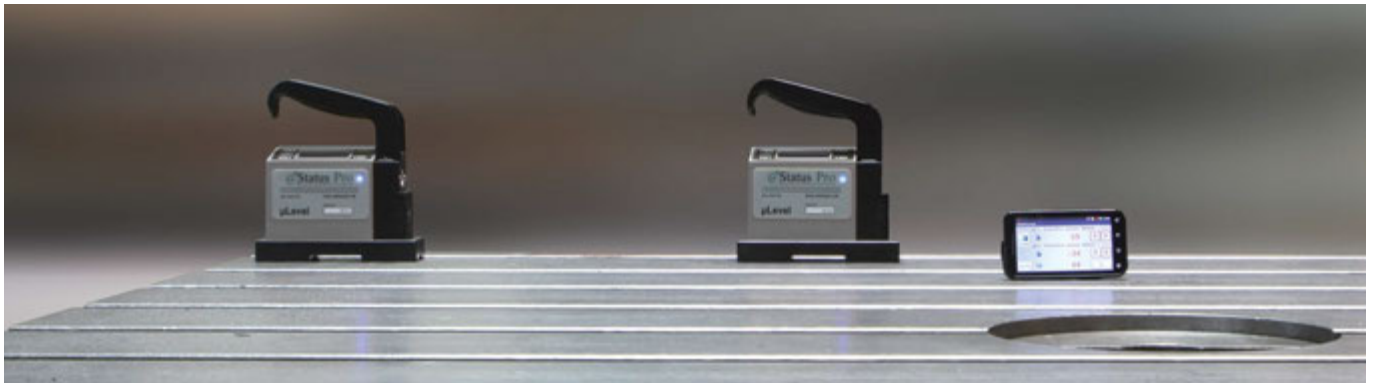
μ Level

Displays the values on your Android mobile phone!



μ Level is a precision Level system for measurements up to DIN 876/000.

According to your requirements we can offer a wide range from a simple handheld system up to a differential system with software.



Features of the system:

- Fast on site calibration
 - traceable and fast results
- Easy handling of system and software
 - no time consuming training
- Displays the values on your mobile phone
- Connection to PC and mobile phone via Bluetooth
 - no mess with cables
 - no time consuming setup
 - no extra devices needed
- Rugged design and signal colour
 - made for harsh environments
- Illuminated display
- Resolution and Repeatability 1 μ m/m
 - 1 μ m means a resolution of 0,1 μ m by a base length of 100 mm
- Software and reference sensor can be added optionally
 - small investment
- Cheap and cheerful
 - why spend more money than necessary?



μ Level 10

Levelling Starter Package

Contents of the package:

- μ Level Spirit Level (BT 840100)
- Case for μ Level differetial measurement system (BG 990108)



μ Level 20

Levelling Starter Package with IT

Contents of the package:

- μ Level Spirit Level with Bluetooth (BT 840100/1)
- External Display (Android-System) (IT 200610)
- Software for remote indication on Android System (SW 200190)
- Case for μ Level differetial measurement system (BG 990108)



μ Level 30

Professional Levelling Package with IT

Contents of the package:

- μ Level Spirit Level with Bluetooth (BT 840100/1)
- External Display (Android-System) (IT 200610)
- Software for remote indication on Android System (SW 200190)
- PC Software for the μ Level Level System (SW 200150)
- Case for μ Level differetial measurement system (BG 990108)

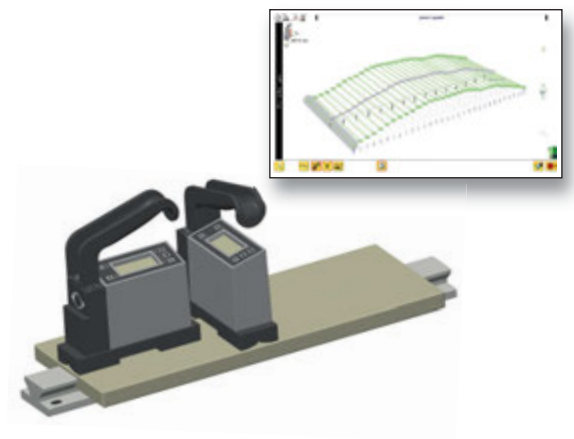


ProTwist

Professional Levelling Package with IT

Contents of the package:

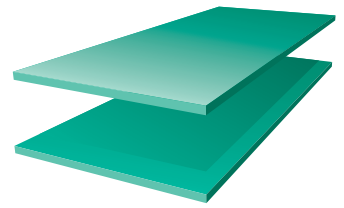
- 2x μ Level Spirit Level with Bluetooth (BT 840100/1)
- External Display (Android-System) (IT 200610)
- Software for remote indication on Android System (SW 200190)
- Case for μ Level differetial measurement system (BG 990108)
- ProLine V4 Software (SW 200103)



More information at www.statuspro.com/calibration_of_machine_tools/digital_spirit_level/

Equipment for Surface Measurement

ProLevel® *Measurement up to DIN 876/1*

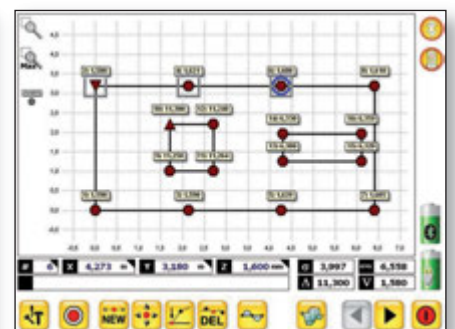
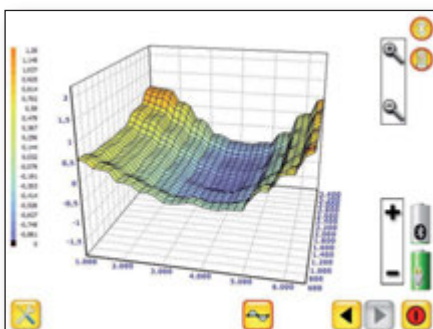


ProLevel is a first class alignment system for measuring the flatness of surfaces in level or relative to one another.



Laser alignment package:

- Fast and easy setup and measurement
→ you save time and money!
- Flatness on rectangular, circular or more complex surfaces
→ absolute flexible
- Rapid template definition
→ prepared measurements
- Detector with 80 mm range and possibility to measure outside
→ measurement in the sunlight is possible
- Direct evaluation of flatness in 3D and in colour
→ faults can be corrected directly
- Superb user interface: practical and ergonomic
- Colour Touchscreen UMPC, rugged and light
→ intuitive usage and flexibility
- Automatic connection management
- No Bluetooth problems
→ no mess with cables
- True level, three point reference or use the best fit feature
- Export possibility as *.csv for use in Excel
- Complete control over the 3D image



ProLevel® 10

Flatness and Level Starter Package

Contents of the package:

- T330 Self Levelling Sweep Laser (BG 830203)
- R310 Laser Receiver (SP R310-P)
- RC310 Remote Control for T330 and R310 Monitor (BG 830930)
- Laser kit Case small with foam inlays (BG 990100)
- Mounting Accessory

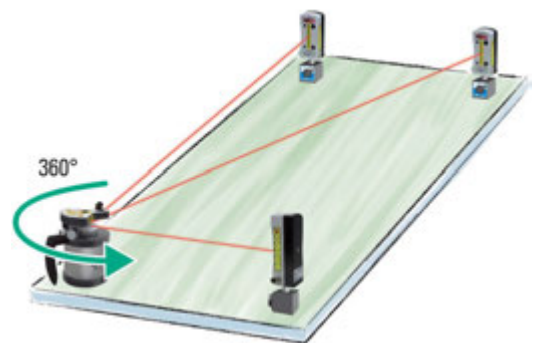


ProLevel® 20

Flatness and Level Starter Package with IT

Contents of the package:

- T330 Self Levelling Sweep Laser (BG 830203)
- R310 Laser Receiver with Bluetooth (SP R310BT-P)
- RC310 Remote Control for T330 and R310 Monitor (BG 830930)
- DU 320 Rugged UMPC with touchscreen (IT 200410)
- ProLevel v2 Software with starter license (SW 200030)
- Laser kit Case small with foam inlays (BG 990100)
- Mounting Accessory



ProLevel® 30

Flatness and Level Professional Package

Contents of the package:

- T330 self levelling sweep laser (BG 830203)
- R310 Laser receiver with Bluetooth (SP R310BT-P)
- RC310 Remote control for T330 and R310 Monitor (BG 830930)
- DU320 rugged UMPC with touchscreen (IT 200410)
- ProLevel V2 Software with starter license (SW 200030)
- Laser kit case small with foam inlays (BG 990100)
- µLevel spirit level with Bluetooth (BT 840100/1)
- Software remote indication on PC-System (SW 200180)
- case for µLevel differential measurement system (BG 990108)
- mounting Accessory



More information at www.statuspro.com/calibration_of_machine_tools/flatness_and_level/



Service of Status Pro

- Measurement of Bore mills, milling machines
- Measurement of lathes
- Measurement of Special machines
- Measurement of roll grinders
- Turbine measurements
- Development of special measurement procedures
- Flatness of machine beds
- etc.

Service jobs are made to your complete satisfaction. Our team is well trained in different measurement techniques and all of them are specialists. So we can guarantee a professional service with a optimal equipment. Furthermore we use our field service experience to improve and develop our products.

More information at www.statuspro.com/machine_geometry/

Calibration



Our R&C team repairs and calibrates not only our own equipment manufactured here in Germany but also equipment manufactured by Fixtur Laser AB and SPM Instruments AB from Sweden. Typically such equipment should be calibrated at least every two years. Ideally this is arranged by appointment, however we normally maintain a turn around time of 72 hours. If you need measuring equipment during the repair period we can offer rental systems.

More information at www.statuspro.com/service/repair_and_calibration/

Rental Systems

Status Pro GmbH offers you a range of equipments for rent. Usually those are needed during the time of our in-house calibration. You are able to rent more than one system, too. Several equipments might be needed at many places at the same time. The equipment may be rented with or without training however we recommend our personal delivery services with on the job training for first time users.



ProLevel®



ProLine®



ProFlange® v3



ProOrbit®

Rental Systems for Machine Geometry

- Flatness and Level
- Straightness
- Flange Measurement
- Bore Alignment

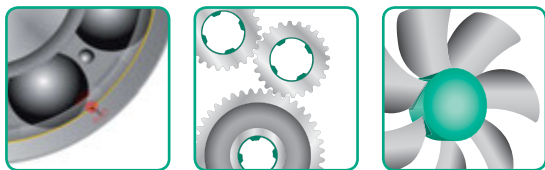
Equipment Rental Services

Most of Status Pro's portable products are available for rent on a daily basis. The equipment is also calibrated and checked before each rental. We calculate the rent on a daily basis plus inspection and calibration after the return of a system.

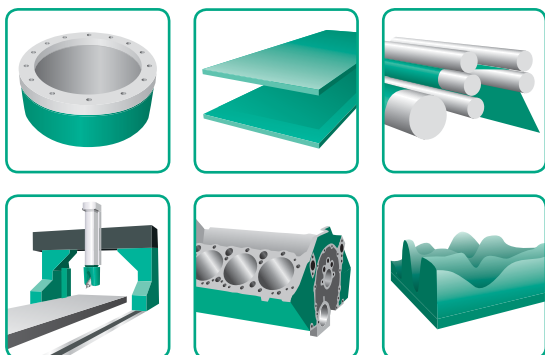


More information at www.statuspro.com/service/rental_services/

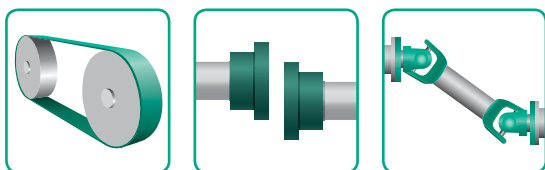
MASCHINENDIAGNOSTIK CONDITION MONITORING



MASCHINGEOMETRIE MACHINE GEOMETRY



WELLENAUSRICHTEN SHAFT ALIGNMENT



 **Status Pro**
maschinenmesstechnik

Status Pro Maschinenmesstechnik GmbH

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