We would like to congratulate you on the purchase of your Status Pro Software. Before initial usage you should carefully read the safety instructions as well as the user guidelines contained in this manual. We wish you every success when using these measurement instruments.

Please note: User manuals can be amended when improvements or changes to the product range have been carried out. Use the link below to make sure you have the most up to date version of your User Guide: www.statuspro.com.

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1. System Components

1.1 Laser Sources

Status Pro puts two types of Laser at your disposal enabling complete flexibility, regardless of your straightness task:

**T250 – Block Laser (BG 830750)**

The T250 Laser is a highly developed Laser source especially for use in tight spots. The T250 as well as the T430 offer a laser beam of extreme high quality. The angle of the laser beam as well as the parallel shift can be adjusted over the 4 differential screw elements. Power for the laser is supplied through a mains cable.

**T430 – Self calibrating Rotational Laser (BG 832500)**

The T430 Rotational Laser delivers, in addition to the beam for straightness, a laser plane perpendicular to the linear beam. This laser plane enables flatness measurements to be carried out, using the self levelling properties of the T430 if needed. Ease of use and flexibility are keywords when describing the T430, making complex geometrical tasks a lot simpler. Another characteristic is the ability of self-calibration. Just by pressing a button the process starts and will finish within a minimum of time. Power is supplied by standard lithium ion accumulators. Different types of Laser Receiver as well as their fixing assemblies can be chosen depending on the Laser type and the task at hand. Adapting the Laser and the sensor to your particular machine and needs should be discussed together with your Status Pro representative.
1.2 Laser Receiver

When measuring straightness or linearity, a dual axis receiver is the standard choice. This kind of receiver facilitates the measurement of the X and Y axes (side and height) simultaneously. A Receiver for use with the T430 Rotational Laser can be chosen if a single axis measurement or a flatness measurement is required. Each of the system combinations have their particular advantages.

**R545 – Dual-Axis Laser Receiver (BG 830450)**
The R545 is a precise and robust 2D laser position detector for measuring guides and other similar tasks. The Receiver communicates with the Display Unit using Bluetooth technology.

**R540 – Dual-Axis Laser Receiver (BG 830440/1)**
The R540 is used in exactly the same way as the R545 but has a stepped sensor head enabling measuring very close to the object. Adverse effects caused through angular deviation along the measurement object are minimized.
R280 – Laser Receiver (BG 831500)
The R280 is a robust sensor for use with the rotating beam of the T430. The R280 has a measurement range of 40 mm. The measuring distance between T430 and R280 is up to 80 metres. Communication between the R280, the T430 and Remote Control (RC310) is over Infra-red, communication between R280 and Display Unit (UMPC) is over Bluetooth. A button for triggering a measurement remotely is also housed within the sensor, ensuring complete concentration on the measurement.

R290 – Laser Receiver (BG 831600)
The R290 is the new model of the robust sensor for use with the rotating beam of the T430 designed and produced by Status Pro. Characteristic for the new and better model is the even higher resolution. The measuring distance between T430 and R290 is up to 80 metres. Communication between the R290, the T430 and Remote Control (RC310) is over Infra-red, communication between R280 and Display Unit (UMPC) is over Bluetooth. A button for triggering a measurement remotely is also housed within the sensor, ensuring complete concentration on the measurement.

R310 – Laser Receiver (BG 830140)
The R310 is a robust sensor for use with the rotating beam of the T430. The R310 has a measurement range of 80mm. The measuring distance between T430 and R310 is up to 80 metres. Communication between the R310, the T430 and Remote Control (RC310) is over Infra-red. An LED display and a touchpad for the menu make the R310 into a complete measurement equipment in itself without the need for software or a PC. An optional Bluetooth attachment is available for use with the UMPC and software.
1.3 Supplementary components

**D140 - Distance Meter (BG 832200)**
The D140 Distance Meter by Status Pro measures the distance between T430 and the different laser receivers. The communication is ensured over Bluetooth.

**µLevel - Digital Spirit-Level with Bluetooth (BT 840100/1)**
µLevel is the high precision Spirit-Level with a resolution of 1/1000mm for use when assembling and/or measuring your machines; very useful in Quality Control. Thanks to its ease of use and easy to read display, the µ-Level is very popular with “the guys on the shop floor”. The Bluetooth capability allows the connection of an external display unit allowing the placing of the Level within the machine, and comfortable analysis of the results outside of the machine.
In conjunction with the ProLine measurement system, the twist of a Linear Guide as well as the Dual-Axis Straightness can be reliably measured.

**DU420 - Rugged UMPC with touchscreen (IT 200420) – optional**

Rugged UMPC for industrial on-site.
The UMPC offers shockproof design and rubber grips with handstraps.
- Shock resistant
- Water resistant
2. System set-up

2.1 Setting up the T430 (rotating beam) with the R290 / R280 / R310

The T430 is used when measuring with either the R290/R280 or the R310. The Laser plane provides a reference against which we can measure. To carry out a measurement, the rotating beam of the T430 has to be aligned parallel to the measurement object, then the axis can be measured using the sensor. If necessary, the second axis can also be measured after aligning the T430 Laser appropriately. The advantage of this measurement is that the set-up is very quick, and if needed, the whole object can be adjusted “in level”, the disadvantage is that only one axis can be measured per measurement.

Measuring the Y-axis (Height)

1) Position the T430 Rotational Laser in the upright position in front of the guide.
2) Position the Sensor (R290/R280 or R310) at the start of the guide then zero the receiver.
3a) Using Levelling: Press the self levelling button then wait for the laser to complete adjustment. If necessary adjust the laser height again.
3b) Without levelling: move the receiver to the end of the guide and adjust the beam to zero using either the RC310 or the Launchpad (see Launchpad User Guide).
4) To measure, start nearest to the Laser, trigger a measurement then move further along the guide, measuring step by step until completed.
Measuring the X-Axis (Side)

1) Position the T430 Rotational Laser in the lying position in front of the guide. The laser plane is now vertically parallel to the side of the guide.
2) Position the receiver (R290/R280 or R310) at the start of the guide.
3) Adjust the T430 to the middle of the sensor using the Tilt/Swivel Adapter, then zero the sensor. Move the receiver to the far end of the guide, then adjust the laser towards zero using either the RC310 or Launchpad (see Launchpad User Guide).
4) To measure, start nearest to the Laser, trigger a measurement then move further along the guide, measuring step by step until completed.

2.2 Setting up the T430 (static beam) with the R540 / R545

The main advantage of using the R545 / R540 is that both axes are measured in one measurement. When measuring using the T430 Laser and the R540 / R545, the static or stationary beam of the T430 is used. Measurements in level are also possible using the T430.

To carry out a measurement, the T430 beam is aligned parallel to the guide in X & Y (height & side) as both axes will be measured simultaneously, as follows:

Aligning the laser beam to the measurement object

1) Position the T430 Rotational Laser in the lying position in front of the guide.
2) Mount the R540 / R545 onto the guide as near as possible to the T430 Laser.
3) Align the Laser coarsely to the middle of the receiver.
4) If measuring “in level”, the self-levelling function should now be activated by pressing the levelling button on the T430. Automatic levelling follows. If a measurement “in level” is not required, the T430 has to be finely adjusted in the vertical as well as the horizontal axis, as follows:

5) Finely adjust the laser beam to the middle of the receiver using the height adjustment on the tripod as well as the horizontal adjustment on the Tilt/Swivel adapter.

6) Now move the R5XX to the position farthest away from the laser.

7) Bring the laser beam back to the middle of the receiver using either the RC310 remote control or the Launchpad software.

Repeat steps 5 to 8 returning the R5XX to the position nearest to the T430 before carrying out! Remember!

– Parallel shift is adjusted using the tripod for the height and the Tilt/Swivel adapter for the side, with the receiver as near as possible to the laser.
– Angular correction is adjusted using the RC310, or the arrow buttons on the laser, with the receiver as far away as possible from the laser.
2.3 Setting up the T250 with the R540 / R545

To carry out a measurement, the T250 beam is aligned parallel to the guide in X & Y (height & side) as both axes will be measured simultaneously. The T250 offers excellent stability and complete ease of use.

Aligning the laser beam

1) Mount the T250 on a tripod or other suitable attachment in front of the guide.

2) Mount the R540 / R545 onto the guide as near as possible to the T250 Laser.

3) Align the Laser coarsely to the middle of the receiver carrying out the adjustments over the tripod or the mounting attachment.

4) Move the R5XX to the position farthest away from the laser.

5) Now adjust the angular error using the two front screw elements (X1 / Y1) until the laser hits the centre of the receiver.

6) Move the receiver back to the position nearest to the laser.
7) Adjust the laser beam to the centre of the receiver, screwing for each axis both screw elements (X1+X2, side) and (Y1+Y2, height) equally in or out to adjust the beam in a parallel fashion.

8) Return the receiver to the furthest away position and adjust the angular error using the two front screw elements (X1 / Y1) until the laser hits the centre of the receiver again. Repeat steps 6 – 8 if necessary to ensure the laser is central in the nearest and farthest points.

2.4 Measuring with a distance measurement instrument

You can automatically measure the distance (Z-axis) in a linear measurement with ProLine. Status Pro provides you with a D140 distance measuring device with Bluetooth interface, which is perfectly synchronized with ProLine and records the Z coordinates.

D140 Distance meter

The D140 distance meter measures the distance between laser source and laser receiver (reference) by using a laser beam. The alignment can be horizontal or vertical. Communication with the ProLine® software is via Bluetooth. In connection with the ProLine systems, the distance data is immediately transmitted via Bluetooth at any time. This allows automatic measurement sequences to be generated and the possibility of incorrect measurements to be minimized.
2.5 Measuring with µLevel

In ProLine V4 you have the possibility to measure with laser receiver alone, in combination with a µLevel as twist measurement or with two Level for straightness (vertical) and twist.

For these measurements, the µLevel are arranged in "TPosition" as shown in the figure. The correct positioning of the spirit levels is crucial, as this determines the displayed sign. The handle of the spirit level for pitch measurement (Y-axis) must be aligned in the direction of displacement (see illustration). When positioning the spirit level for twist measurement, follow the illustration in the ProLine software.

Ensure a stable positioning of the µLevel so that no measurement errors occur due to tilting or shifting the spirit level. Make sure that the surface is free of dirt during positioning.

If the spirit levels are moved manually, the maximum length of the support points of the spirit levels and their positioning should not exceed a support slide by a maximum of the length of the support points of the slide. In addition, it is possible to use two further µLevel as reference givers. In this case, two µLevel are positioned at a fixed reference point, while two further µLevel are used for straightness or twist measurement on the shuttle. More detailed information on handling can be found in the µLevel operating instructions.

Is a spirit level connected to the laser receiver for measuring the Y-axis, the ProLine software shows you the values of the spirit level.
3 Software Installation and set-up

If you have purchased a complete measurement package with Display Unit (UMPC) from Status Pro, the installation and setting up will have already been completed, you simply unpack the system, turn on and measure! If you have purchased the software without a PC or need to install an upgrade, proceed with the installation as follows:

3.1 Installation with the Windows installer

You will have received a file named “ProLineV3_Setup.exe”. “Double-click” the file, then follow the instructions carefully.

If you are installing an upgrade and have already stored some measurements, be sure not to overwrite the data-base or the license files! You will be prompted to make a choice during the installation procedure.

The standard installation path: C:\Applications\Status Pro\ProLine V4.

Attention!
If you are using Windows 7 or 8, you have to create a separate folder on your hard drive! Windows prevents access to the files in the default program folder, and it may lead to storage problems! Create a folder C:\Applications, for example, into which you install the software from Status Pro! Now you can select the folder during installation.
The ProLine V4 file contains sub-files and other data:
- backup  ➔ Here is where the system back-ups are stored
- DB  ➔ Data bases with stored measurement
- export  ➔ Exported data and measurements are stored here
- log  ➔ If problems arise, valuable trouble-shooting information is stored here
- system  ➔ Databases, license keys and system adjustment parameters are stored here

The ProLine.exe file installs the program. During the process, a link to start the software will be placed on your desktop.

3.2 Select language

If your language is not activated when you start the program, go to the toolbox. You can get there by opening the toolbar (tool icon at the bottom left) and clicking the tool icon again in the toolbar. There is a flag symbol in the toolbox. Above this, the selection of the available Languages:

3.3 Connecting the receiver

When you run the program for the first time, no receivers are connected (unless you have purchased a complete system from Status Pro). If no receivers have been connected the sensor icons have a cross through them!

To connect a sensor, turn on the sensor and if applicable turn on the external Bluetooth pack. Enter the Toolbar by pressing the bottom left icon from the start screen. Then click the toolbox icon from the toolbar.

In the Toolbox you will find a magnifying glass symbol in the bottom left hand corner of the screen. Pressing this icon will open the Device Manager:
3.3.1 Choice of receiver/sensor

In the “Select Device” window you can choose which sensor is to be connected; either a measurement sensor, Disto or a spirit level with the requested specification. Make your choice accordingly, then press the magnifying glass icon (bottom left). The “Search for Devices” window will now be visible.

3.3.2 Sensor search

The software automatically search for Bluetooth devices by Status Pro in the nearer surrounding. Afterwards all located devices appear in the list. Choose the receiver with the matching serial number and press OK. The chosen receiver appear in the “Select Device”.

Repeat the process if you wish to connect a spirit level, a DistoTM or a second sensor. To do this, choose the appropriate device from the “Select Device“ window then press the “OK“ symbol.

All sensors that have been found and connected using the “Search for Devices“ window will be displayed in the “Select Devices“ window. If several measurement sensors, ie. R280 or R545 are registered with the software, a quick change between sensors is possible over the “Select Device“ window.

Choose your desired device over the “Select Devices“ window then press the large “tick“ in the display; the chosen sensor will now be connected.
3.3.3 Assigning a license key

After initial connection of a measurement device, you will be prompted to enter a license key. You should have received copy of the code with the equipment documentation. Simply enter the supplied 16 digit code (with or without hyphens) then confirm by pressing “OK”.

3.3.4 Connecting status

When all required sensors are “connected” with the software, the symbols at the top right hand corner of the screen will be coloured red and yellow.

1) Bluetooth on the Display Unit is turned off: No sensors are connected
   ➔ Check that the UMPC Bluetooth function has been activated.

2) Bluetooth is available but no sensor has been connected
   ➔ If you have not connected your sensors with the ProLine software, proceed as described in paragraphs 3.3.1 – 3.3.3. Ensure the sensors, and if applicable, the Bluetooth unit is turned on and then re-start the ProLine software.

3) Bluetooth is available, sensors have been connected but are not turned on / active
   ➔ Check to see if the software is in “Pause“ modus (Toolbar, pause symbol).
   ➔ Click the sensor symbol once to activate a quick search for sensors that have already been connected. If there are no further problems, the symbol should change to yellow/red.

4) Bluetooth available, sensors are connected.
4 ProLine V4 - User Interface

4.1 2D View - Main or Measurement screen

When you start the program, the software searches and connect the pre-paired sensors (see previous chapter) and you will be presented with an empty measurement matrix.

At the top of the screen (Measurement name) you can enter the measurement name, which will be displayed throughout the measurement. Below the measurement graphics, where ("point name or comment") is displayed, you can enter comments about the point being measured. Simply click the space to enter your names or comments.
4.1.1 Display mode

- The magnifying glass signifies that you are in the Zoom Mode, pull your stylus from the top left hand to the bottom right hand corner to zoom in.

- Click on the left hand (Zoom) magnifying glass to change to Move Mode. When this is activated you can move around the zoomed screen using the stylus or your finger.

- Click on the Max Icon to return to the Full Screen Mode.

- Via the spirit level symbol you can select whether you want to display the raw data, a differential or a reference measurement.

- By clicking the “X,Y,Z” Icon repeatedly you can toggle through, Measurement point (MP) displaying; No information, MP with MP Number and MP with measured value.

- In the “Labels” pop-up you can choose which information is to be displayed: Point Nr, Value and Twist. Furthermore, you can adjust the size of the text in the display. These properties can be assigned to the first measurement and also to the second measurement as required.

- By clicking on the Point Size Icon you can reduce or increase the point size within the measurement graphic.

- Click the “cake“ symbol to obtain a complete analysis of the quality of the selected measurement point. See chapter 6 -Point Quality.
4.1.2 2D-Grafic display

2 Dimensional Graphic Display for the X and Y Axes
If fields of tolerance have been entered, they will be displayed as a green line above and below the 0-line.

Points above the desired tolerance are displayed in red.

Points within the tolerances are displayed in green.

Points below the desired tolerance are displayed in blue. Maximum and Minimum are displayed as a triangle.

- A selected measured point is highlighted with a grey bar as shown in the diagram on the right at 1600 mm.
- The present position is signified by a red line as displayed in the diagram on the right, at 1500 mm.
- When the present position is over a previously measured point, a blue circle will appear. The blue circle is an “Auto-snap” function allowing the previously measured point to be substituted. The tolerance for how near to the previously measured point the present position has to be, can be set as wished in the menu (default is 10 mm).

2-Dimensional View when measuring "twist" with the µLevel
- When using the µ-Level in addition to the laser receiver, the values for the horizontal roll movement will be shown in the display for the X-axis.
- The measurement values for the µ-Level are displayed as a bar above or below the zero line.
- A scale in µ-Rad is displayed at the right hand side of the X-axis view:
Maximising the X or the Y display
By clicking the black bar containing the axis title, the chosen axis diagram will be maximised. By clicking again, both axes diagram will displayed again.

4.1.3 Measurement values
In the diagram below, the values for the present position are displayed in red and the values for the selected or highlighted point are displayed in gray.

<table>
<thead>
<tr>
<th>Punkt-Nr.</th>
<th>Disto</th>
<th>Laser-Receiver</th>
<th>Laser-Receiver</th>
<th>µLevel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distanz</td>
<td>X-Wert</td>
<td>Y-Wert</td>
<td>Messwert Twist</td>
</tr>
<tr>
<td>24</td>
<td>2300,0</td>
<td>300,7</td>
<td>-114,9</td>
<td>-337,3</td>
</tr>
<tr>
<td>24</td>
<td>2300,0</td>
<td>300,2</td>
<td>-108,4</td>
<td>-354,7</td>
</tr>
</tbody>
</table>

4.1.4 Main task bar

Pause
By pressing the pause icon you can activate the pause function where the sensors are temporarily deactivated. This may be useful for the analysis of a complete measurement. To reactivate the sensors just press the icon again. You may need to click on the sensor icons in the main window upper right to reconnect the sensors manually.
4.1.5 Data View Options

Main Screen

➔ Switch to the main screen.

3D View

➔ Have your measured values displayed graphically in a 3D profile.

Data View

➔ Display the measured values in a table.

Exporting of Data

➔ Export the measured values in .csv format (see 4.3).

Sensor Live Values

➔ Display the current values of your sensors.

Remote Control

➔ Use the remote control to control the laser with the sensor.

4.1.6 Status display

The status display shows if Bluetooth is activated and if sensors are connected, see 3.3.4 Connection status.

4.1.7 Power display

The remaining battery power of the sensor (upper) and of the Display Unit (lower) can be observed here. If the Display Unit is connected to the mains supply, a cable will be visible as in the picture to the right.
4.2 3D graphics display for Level

By pressing the 3D button in the main display, the display of the roll-behaviour appears: This is represented in three dimensions, how strong the measuring object is laterally tilted during the measurement.
4.3 Data view

4.3.1 Measurement values

All measured values are visible in the diagram, as shown above. The values within the set tolerances are displayed in green, values that are outside and too high are displayed in red. Values that are outside the tolerances and are too low are displayed in blue. Next to the value, in small grey script, is a value indicating the quality / stability of the measured point. These values are the Standard Deviation of the Median (Med.Std.Dev). (see Chapter 6).

For measurements with µLevel, the measured values are also listed in the table (Twist [µRad]). Using the horizontal scroll bar you can access further columns containing additional information:- point-name, the date and the time. etc.

4.3.2 Measurement analysis

In the lower box, the analytical data are summarized according to the prescribed tolerance in the first row of the X-axis and in the second row of the Y-axis:
• Standard deviation of the axis
• Average value for the axis
• Highest measured value in the axis
• Lowest measured value in the axis
• Sum of the highest and lowest points (Peak-Peak).

### 4.3.3 Navigation

Using the arrow button you can scroll through the data if all values are not displayed. Alternatively, click in the table (hold left mouse button or your finger when using the touchscreen) and the tables are shifted up or down.

As with many other database programmes you can sort the values either; highest to lowest or vice versa by clicking the symbol in the header of the column.

The “csv” button exports the present measurement (see 4.5).

If two measurements are loaded, the data table of each measurement can be shown via the buttons I and II.

### 4.4 Export

The “csv” button exports the actual measurement. On pressing the button, another window opens prompting you to specify where the measurement shall be saved to.

#### 4.4.1 Export path

The default is set to the export file within the program directory. If a differing directory or file location is needed, click on the file button to the right of the dialogue window and specify accordingly.
If a USB or pen drive is connected to the computer, the measurement can be saved directly to the same. The USB Icon to the right will be activated if a pen drive is connected. A file named “export” will be created automatically.

4.4.2 Export contents

The current measurement will be exported with all the zoom, zero’s and compensations that have been used whilst evaluating the measurement. Additional to the .csv file (comma separated values), which can be opened with Excel for further evaluation, diagrams of the axes (Y&X) in Bitmap form as well as a complete Report (.pdf) will also be exported. A corporate symbol can be pasted onto the .pdf report if desired. To do this, simply click the Status Pro symbol at the top right corner and then choose the appropriate symbol from elsewhere. The symbol should have a maximum size of 745x144 Pixels. The symbol will be centrally placed, and if the symbol is larger than 745x144 Pixel the exceeding information will be cropped.
4.5 Report

The exported report contains all the relevant details of the measurement:

- Desired corporate symbol
- Measurement name
- Who carried out the measurement
- Laser / Receiver Serial numbers
- Date / Time
- Comments
- X and Y axes diagrams
- Statistics
- Type of compensation (ie. Best-fit)
- Complete chart of the data

If two measurements were loaded during the export, the data tables and statistics are exported for both measurements.
If a μLevel measurement was made, the graphics and data of this measurement will also be exported.

4.6 Toolbar

Click on the tool symbol in the bottom left hand corner of the screen to open the tool bar.

1. The edit button allows you to enter information about the measurements that are saved. The information is also exported to the report header.
• Known Surveyors already stored can be re-called here.
• The serial number of the laser receiver is automatically detected when connected.
• The settings can be stored permanently by pressing DEFAULT button.

2 The white paper button 📄 starts a new measurement.

3 The folder button “I” 🗂️ opens a saved measurement.

You can choose the measurement to be reviewed from this screen then press the open folder button. All measurement are stored with a date and time stamp. Comments to a chosen measurement will be visible in the comments box at the bot- tom of the screen. A chosen measurement can be deleted by pressing the waste bin button 🗑️ after high-lighting the measurement to be deleted.

The folder button “II” 🗂️ opens a second measurement for comparison with the first one.

4 The floppy disk button 📁 saves the measurement.

• You can enter a store name, enter or select the surveyor, deposit information about the devices and enter a comment for the measurement.

• By double-clicking on an entry from the list of available measurements, this name is entered in the field “Measurement Name”.

• A Measurement name can be used only once. If the floppy disk button is grayed out (disabled) there is probably already a measurement with this name. Simply change the name or add a suffix to allocate a unique name.
The pause button can be used to activate the pause function to temporarily deactivate the sensors. This can be useful for analyzing a completed measurement. To reactivate, press the Pause button again. You may need to click on the sensor icons in the upper right main window to reconnect the sensors manually.

To enter the menu and parameter level (Toolbox), click on the toolbox button within the toolbar.

4.7 Toolbox

All parameters concerning the measurement can be viewed and/or edited in the toolbox.
Toolboxfunktionen:

1. **System units** → Metric units (mm) or Inches (inch).
2. **Distance Mode** → Z-value recording manually or via D140 (See 5.2).
3. **Precision settings** → Resolution accuracy in 1/10, 1/100 or 1/1000 mm.
4. **Measure Mode** → Manual measurement, Distance Trigger Mode or Continuous Measure Mode (see 5.3 and 5.4).
5. **Twist Length** → Specify the basic length of the twist length.
6. **Bluetooth** → Bluetooth on/off.
7. **Language** → Select language.

8. **Display averaging time** → Averaging of the measured value.
   Over the time set an appropriate number of measurements is recorded, averaged and displayed. About 4 values are measured per second. The higher the averaging time, the calmer (and more stable) is the measured value display.

9. **Measurement duration** → Measuring time / averaging.
   Over the time set, an appropriate number of measurements is recorded, averaged and stored as measured value. About 4 values are measured per second. The higher the averaging time, the more accurate the measurement, as spikes are ignored and fluctuations are compensated.

10. **Axis Control** → Orientation and labelling of the axes (see 4.8).

11. **Tolerances** → Setting the tolerances
    a) Point snap tolerance: Snap radius for point overwriting. If the distance of e.g. a measurement with DistoTM is set to the measuring distance of a point already measured, it will only be overwritten if the point is in the snap radius. For example, a point was measured at a distance of 650 mm. If the current position approaches this point at +/- 10 mm, the old measured value is overwritten when the measurement is taken again. If it is 11 mm or more next to the point, a new point is created.

    b) Tolerance + / -: Tolerance limits in +/- of the 0 axis.
c) Std.Dev.Point Quality: Tolerance limit for the measurement quality of each individual point (See 6.2).

**Remote Help** ➔ If unexpected errors occur, you can request help here.

**HD Graphics** ➔ Smoother display (turn off for slow computers).

**Window Control** ➔ Adjust screen size (for screen resolutions > 800x600).

### 4.8 Axis Control

The titling of the axes as well as the prefix definition (+ or -) can be set here.

#### 4.8.1 Axis definition

The system standard is X=side or horizontal, Y=height or vertical and Z= distance between sensor and laser. If different names are required you can change these at will.

**Example:** X = A1  |  Y = A2  |  Z = D

**Value prefix**

If you are using a different Co-ordinate system to that of the sensor, then you can change the prefix of the value to plus or minus using the arrow symbols as required.

### 4.9 Database Management

You can create databases at will, enabling secure file organization. When you open the database management, you will see the available databases in the program directory. You can either select one, create a new one, or delete one marked from the list. The bottom left button with the magnifying glass will update the list. Cancel the operation via the button with the cross.
5 ProLine v4 - Carrying out a measurement

Preparation

- Set up your measurement equipment as described in chapter 2, turn on the whole equipment then start the software.
- Make sure that the sensor, Disto and µLevel are connected with the software (see 3.3.4)
- Checks the parameters within the Toolbox and menu, then choose the distance measuring method. There are three distance measurement methods:
  1) Manual entry
  2) Distance Trigger measuring
  3) Continuous measuring

5.1 Manual entry

There are three sub modes available when measuring in the Manual mode:

a) Measuring using the Disto:
   The Z distance is transmitted to the PC over Bluetooth. Simply move the sensor along the guide to measure all three axes (X,Y&Z)

b) Measuring without a Disto with differing distances between measurement points: You will be prompted to enter the distance at each point before the measurement can be recorded.

c) Measuring without a Disto with similar distances between measurement points: You will be prompted to enter a distance at the start of a measurement, the distance for every new point will be recorded automatically.
5.2 Automatic Distance Triggering

When measuring in this mode, the Disto is used as a distance trigger. After measuring and recording a value, the sensor has to be moved a certain distance before a new value can be recorded.

Measure → move sensor → sensor is stationary → delay time → next measurement →

Adjustments for the Distance Trigger

The period of time (delay time) the sensor has to be stationary before the value is recorded can be set here.

In the system.ini file (Directory/ProLine V3/system/system.ini) you can set the minimum distance the sensor has to be moved between points before a new measurement can be triggered (TriggerReArmBand). The Trigger Death Band is principally the sensors way of knowing that it is stationary, the death band can allow a certain amount of fluctuation due to vibration etc. The higher the value, the more fluctuation is allowed.

```
[DIST_TRIGGER]
TriggerTime=3
TriggerDeathBand=5
TriggerReArmBand=20
```

Delay time [sec]
Fluctuation tolerance when stationary [+/- mm]
Minimum distance to the next point [+/- mm]

5.3 Continuous measuring

This mode allows non-stop measuring without the need for manual triggering of a measurement. The measurement is started by pressing the measurement button. The system measures continuously until the trigger is pressed again. The measurement frequency can be chosen by entering a value (in secs) in the Measurement Duration pull down.

The default is 0 secs., 3 secs = a measurement every 3 secs.
6 Analysis

6.1 Analysis of the laser measured values

It is possible to carry out a measurement without having to align the laser beam exactly parallel to the measurement object. This can result in measurement values that are way outside the tolerances set, as seen in the picture below.

In the following example, the Y axis of a measurement will be evaluated:

1) First case: the laser beam in this case was not aligned parallel to the object, resulting in raw-data values between –0,328 to –0,987 mm. Die Tolerances were set at +/- 0,05.

2) Second case: The first and the last measurement points have been “zeroed” using the Zero button. This method shows the straightness of the guide or object. The measurement points lay between 0,000 und 0,083 mm, four of the points are not within the set tolerances and should be corrected.
3) In case three, the “Best-Fit” compensation has been chosen. In this mode a straight line to which the smallest possible distance between each of the points and the straight line is calculated, is placed through all the points. In this mode, there is only one point outside the tolerances (0,006) which requires correction.

Conclusion:
If you need an objective analysis of the straightness of an object, then the Best Fit method is the most suitable method.
If corrective work is to be carried out, then you should take into account that there may be fixed points within the machine that can’t be adjusted. In this case, method two would be the best choice as it allows these fixed points to be zeroed. All other points are then corrected to the fixed points.

6.2 Analysis of the laser measuring quality

During the measurement procedure other values for each point are also collected and saved for further analysis. This information can be called upon to assess the quality of a particular measurement value. Press the Point Quality button to obtain information about the chosen measurement point.

The graphic illustration as at of values as well as a box dia appears from the side for evaluation. In the following example, the gray marked point with a measurement duration of 15 secs. Was chosen for analysis:
The individual analysis values are described below using the example of a point on the Y axis from a measurement with a measuring time of 15 seconds: The Box plot shows the distribution and the calculated average value. The table shows all the statistical values of the measurement point.

<table>
<thead>
<tr>
<th>Count</th>
<th>Number of recorded values (eg: 80).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>Average of all measured values. (Example: In the graphic blue bar)</td>
</tr>
<tr>
<td>Median</td>
<td>Adjusted average without outliers. This value is output as measured value. (Example: In the graphic red bar).</td>
</tr>
<tr>
<td>Med.Std.Dev</td>
<td>Standard deviation of the median. This value provides information about the measurement quality after neglecting outliers. The Std.Dev.Point Quality can be set in the toolbox. The limit value for the standard deviation of the median is specified in mm (Med.Std.Dev). Points that exceed this value are marked with a cross in the point graphic. The analysis always refers to the raw values - even if a best-fit adjustment is activated or points are zeroed.</td>
</tr>
<tr>
<td>Min</td>
<td>Lowest value of all measured values.</td>
</tr>
<tr>
<td>Max</td>
<td>Maximum value of all measured values.</td>
</tr>
<tr>
<td>Range</td>
<td>Value range between lowest and highest measured value of all measured values.</td>
</tr>
</tbody>
</table>
RMS  Root mean square. Estimation of the deviation - similar to the standard deviation.
Outlier  Number of outliers.
(Example: In the graphic, outliers are marked as red stars)

6.3 Analysis of µLevel measured values

In contrast to the laser measured values, there is no best-fit in the µLevel measurements. The values can only be set to zero at any given point, all other values are then added with the amount of the zeroed point.

Example:
The first graph shows the measurement with unedited raw data.

In the second graph, the first point was zeroed:

- Laser measurement was shifted by the amount of the first point (-0.941 mm)
- The µLevel measurement has been shifted by the amount of the first point (-784 µ/m).
In the third chart the **best-fit adjustment** has been activated:

- The laser measurement was compensated to Best-Fit
- The µLevel measurement remained unchanged, point 1 is set to Zero.

The fourth graphic shows the last result in 3D.
7 Accessories

**6x Battery Pack Li-Ion (BT 800071)**
External battery packs for R540, R280, R290.

**Battery Charger for 2x BT 800071 (BG 831680)**
External battery charger.

**Tripod and Adapter Package for the T430 and T250 (SP Toolkit 1 ... SP Toolkit 3)**
Expand your ProLine measurement package with a variety of mounting aids. The toolkit offers you help for every measuring situation for quick and efficient installation on various machines. Of course all following articles are also available separately.

**Content:**
1x T430 Adapter for large L bracket Interface to BG 832254 (BG 832253)
1x Switch Magnet Base for T430 Interface Plate BG _832251_ (BG 832252)
1x T430 Toolkit Interface Plate (BG 832251)
1x 90° Adapter for T430 mounting (BG 832254)
1x Allen key, 3 mm (BT 989119)
1x Allen key, 4 mm (BT 989083)
4x Screw M4 x 20 DIN 912 / ISO 4762 (BT 946013)
1x Universal G-Klamp for T430 (BG 832255/1)
3x Mini Tripod Magnetic foot (BG 832256)
3x Short Tripod Leg (BG 832257)
1x Tripod head for T430 (BG 832258)
1x T430 Tripod Interface for Tripod head BG 832258 (BG 832259)
1x Tripod Gimbal head for T430 (BG 832260)
1x Short tripod extension (BG 832261)
1x Tripod Leg extension in Carbon, length: 42,5-129 cm (BG 832262/1)
3x Mini Tripod Legs 200 mm (BG 832263)
8 Products and Services

Geometrical measurement techniques and alignment have been an issue since the pyramids.

Today the measurement and alignment of machinery components is an integral part of the assembly and quality control process. Be it linear guides, presses, flange connections, drive shafts or cylinder rolls, the precision of the alignment has a significant effect on the functionality of the component. The alignment of these machinery components will often affect the quality of the manufactured product and also the life-time of the machine components themselves. The use of a laser beam reference together with tradition industrial-measurement techniques has made it possible to build tools which simplify these alignment procedures.

Status Pro develops and manufactures laser alignment equipment and we are committed to this process.

Most of our customers are machine builders, assembly and quality control people. Typically our customers require a complete solution package including on-site training and support. When a customised solution is required, modifications are often necessary, be it in software, mechanical adaptations or the sensor housing itself in order to meet customer requirements.

We and our partner companies all over the world also provide alignment and industrial surveying services.

We invite you to visit our web site www.statuspro.com
For more information just call us at + 49 (0) 2327 – 9881 – 0.
9 Declaration of conformity

In accordance with the EMW Directive 2014/30/EU, the Low Voltage Directive 2014/35/EU, including amendments by the EC directives RoHS, 2011/65/EU.

**Type of equipment**
Alignment System

**Brand name or trade mark**
Status Pro Maschinenmesstechnik GmbH

**Type designation(s) / Model no(s)**
- T430 – BG 832500
- T250 – BG 830750
- R545 – BG 830450
- R540 – BG 830440
- R290 – BG 831600
- R280 – BG 831500

**Manufacturer’s name, address, telephone & fax no**
Status Pro Maschinenmesstechnik GmbH
Mausegatt 19
D-44866 Bochum
Germany
Tel.: +49 (0) 2327 / 9881 – 0
Fax: +49 (0) 2327 / 9881 – 81

The following standards and/or technical specifications, which comply with good engineering practice in safety matters in force within the EEA, have been applied:

**Standard / Test report / Technical construction file / Normative document**
- **Emission:** DIN EN 61000-6-3 authorisation 1:2012-11.
- **Immunity:** DIN EN 61000-6-2:2016-05.
- **Laser classification:** DIN EN 60825-1:2015-07
- **ISO9001:2008**

The laser is classified in accordance with the International Standard EN 60825-1:2015-07, USA FDA Standard 21 CFR, Ch I, Part 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007.

The wireless device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

**Additional information**
The products have been CE-marked in 2004.
As manufacturer, we declare under our sole responsibility that the equipment follows the provisions of the Directives stated above.

**Place and date of issue**
Bochum, 2014-04-01

Signature of authorized person

David Foley, Managing Director