

LEVALIGN expert – System handbook

Dear Customer,

Thank you for acquiring LEVALIGN expert, a measuring system that incorporates an automatic self-levelling rotating laser and a sensor that uses Bluetooth communication to transfer measurement data to ROTALIGN Ultra iS computer. The levelling and flatness applications run on the ROTALIGN Ultra iS platform. The handbook is meant to be a quick learning tool that hopefully should make easy reading.

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Foreword

LEVALIGN expert has been specifically developed for precise flatness measurements of foundations, bed plates, machine half casings, and most surfaces. The system incorporates LEVALIGN expert laser and ROTALIGN Ultra iS computer using either sensALIGN sensor or LEVALIGN expert sensor. Either sensor is mounted on any magnetic surface using a magnetic base adapter or mounted on a tripod. The visible 635 nm laser beam measures the surface height at different positions. Stable Bluetooth communication between either sensor and the measurement computer ensures reliable and flexible operation.

ROALIGN Ultra iS computer instantaneously plots measurements in vertical and horizontal planes. Using offset tubes, it is possible to measure surfaces with different levels.

The Live Move function lets the user follow mechanical adjustments as they are made: all changes are shown in real time on the transfective backlit coloured screen.

The flatness application running on ROTALIGN Ultra iS computer is designed for especially simple and convenient operation. It leads the user through the entire measurement procedure step-by-step.

With this system, one is in possession of a geometric system that can be used in industries such as petrochemical, processing, paper mills, shipping, glass, marine engine builders, mobile crane manufacturers, and power generation. Service companies and OEMs should also find this system extremely useful.

We welcome your feedback and suggestions.

PRÜFTECHNIK Condition Monitoring
Ismaning, Germany

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LEVALIGN expert system handbook

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Chapter 1: LEVALIGN expert packages

The following LEVALIGN expert packages are available.

- › LEVALIGN expert stand-alone package ALI 4.040/2
- › LEVALIGN expert stand-alone package ALI 40.040
- › LEVALIGN expert add-on package ALI 4.046
- › LEVALIGN expert add-on package ALI 40.046
- › LEVALIGN expert reference line (machine axis) package ALI 40.060

If further assistance with regard to LEVALIGN expert package configurations is required, please contact your local PRÜFTECHNIK Condition Monitoring representative.



Note

1.1 LEVALIGN expert stand-alone package ALI 4.040/2

This stand-alone package includes ROTALIGN Ultra iS computer, LEVALIGN expert laser and LEVALIGN expert sensor.

ALI 6.985	Case for LEVALIGN expert laser using Bluetooth
ALI 6.930-LIB	LEVALIGN expert laser using Bluetooth
ALI 6.960-LI	LEVALIGN expert laser mains adapter
ALI 6.940	LEVALIGN expert sensor
ALI 6.961	LEVALIGN expert magnetic foot
ALI 6.962	LEVALIGN expert base plate
ALI 6.963-1	LEVALIGN expert sensor holder — long
ALI 6.964-1	LEVALIGN expert sensor holder — short
ALI 6.773	Flatness plunger holder
ALI 4.202	ROTALIGN Ultra computer
ALI 4.201	ROTALIGN Ultra stand
ALI 4.603	ROTALIGN Ultra rechargeable battery
ALI 12.651-I	AC power supply/charger
ALI 4.749	LEVALIGN expert Flatness registration certificate
DOC 06.802.en	LEVALIGN expert System handbook (this manual)
ALI 13.700 CD	ALIGNMENT CENTER CD
ALI 3.589	Tape measure mm/inch
ALI 12.502-2	PC/USB cable
ALI 12.503	USB/peripheral devices cable
ALI 4.451	USB memory stick
ALI 2.911	Lens cleaning cloth
DOC 69.100.en	LEVALIGN expert laser quick reference guide (menu settings)
DOC 40.201.en	LEVALIGN Ultra iS flatness handbook

1.2 LEVALIGN expert stand-alone package ALI 40.040

This stand-alone package includes ROTALIGN Ultra iS computer, LEVALIGN expert laser, and sensALIGN sensor.

ALI 6.985	Case for LEVALIGN expert laser using Bluetooth
ALI 6.930-LIB	LEVALIGN expert laser using Bluetooth
ALI 6.960-LI	LEVALIGN expert laser mains adapter
ALI 6.773	Flatness plunger holder
ALI 6.953	Distance sleeves
ALI 6.952-IS	Accessories for magnetic base adapter
ALI 2.173	Support post 250 mm (9 7/8")
ALI 4.501-IS	Magnetic base adapter
ALI 4.202	ROTALIGN Ultra computer
ALI 4.201	ROTALIGN Ultra stand
ALI 4.603	ROTALIGN Ultra rechargeable battery
ALI 4.900	sensALIGN sensor
ALI 4.960	sensALIGN rechargeable battery
ALI 4.921-2	sensALIGN sensor and laser cable
ALI 4.651	sensALIGN charger/adaptor
ALI 12.651-I	AC power supply/charger
ALI 4.749	LEVALIGN expert Flatness registration certificate
DOC 06.802.en	LEVALIGN expert System handbook (this manual)
DOC 40.201.en	LEVALIGN Ultra iS handbook
ALI 13.700 CD	ALIGNMENT CENTER CD
ALI 3.589	Tape measure mm/inch
ALI 12.502-2	PC/USB cable
ALI 12.503	USB/peripheral devices cable
ALI 4.451	USB memory stick
0 0739 1054	Allen key, size 2
0 0739 1055	Allen key, size 2.5
0 0739 1056	Allen key, size 3
ALI 2.911	Lens cleaning cloth
DOC 69.100.en	LEVALIGN expert laser quick reference guide (menu settings)
ALI 9.500.DG	sensALIGN sensor inspection certificate



ALI 6.985



ALI 6.930-LIB



ALI 6.940



ALI 6.964-1

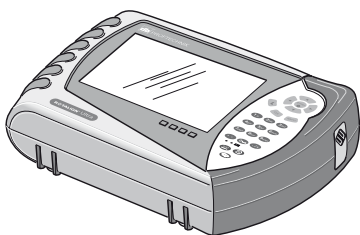


ALI 6.963-1

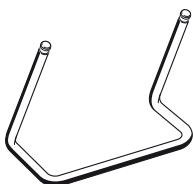
ALI 6.962



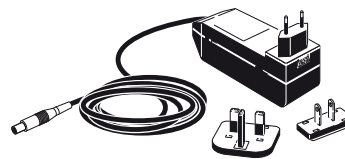
ALI 6.961



ALI 4.202

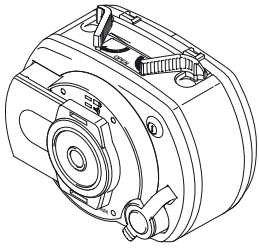


ALI 4.201

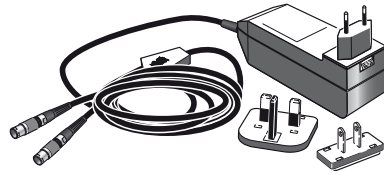


ALI 12.651-I

CAUTION: The universal mains adapter is supplied with plugs for the EU, US and UK. Care must be exercised when changing the plugs. Please refer to the plug mounting procedure on page 27.



ALI 4.900



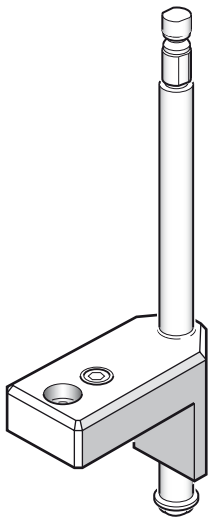
ALI 4.651



ALI 4.921-2



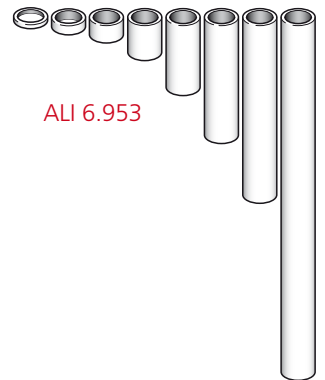
ALI 12.502-2



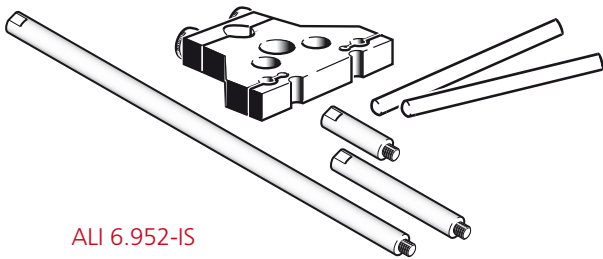
ALI 6.773



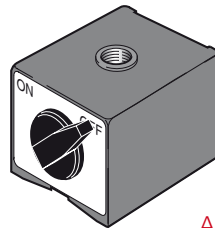
ALI 12.503



ALI 6.953



ALI 6.952-IS



ALI 4.501-IS



0 0739 1054

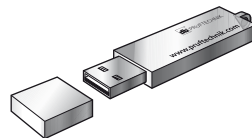
8



DOC 06.802.en



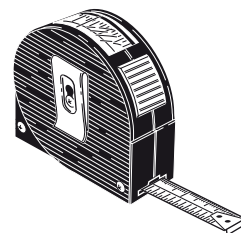
ALI 13.700.CD



ALI 4.451



ALI 2.911



ALI 3.589

1.3 LEVALIGN expert add-on package ALI 4.046

This add-on package includes, LEVALIGN expert laser and LEVALIGN expert sensor **without** ROTALIGN Ultra iS computer.

ALI 6.985	Case for LEVALIGN expert laser using Bluetooth
ALI 6.930-LIB	LEVALIGN expert laser using Bluetooth
ALI 6.960-LI	LEVALIGN expert laser mains adapter
ALI 6.940	LEVALIGN expert sensor
ALI 6.961	LEVALIGN expert magnetic foot
ALI 6.962	LEVALIGN expert base plate
ALI 6.963-1	LEVALIGN expert sensor holder — long
ALI 6.964-1	LEVALIGN expert sensor holder — short
ALI 6.773	Flatness plunger holder
ALI 4.739	LEVALIGN expert Flatness firmware voucher
DOC 06.802.en	LEVALIGN expert System handbook (this manual)
ALI 13.700 CD	ALIGNMENT CENTER CD
ALI 4.451	USB memory stick
ALI 2.911	Lens cleaning cloth
DOC 69.100.en	LEVALIGN expert laser quick reference guide (menu settings)
DOC 40.201.en	LEVALIGN Ultra iS flatness handbook
ALI 9.847.G	ROTAGIGN Ultra flatness operating instruction

1.4 LEVALIGN expert add-on package ALI 40.046

This add-on package includes LEVALIGN expert laser **without both** LEVALIGN expert sensor and ROTALIGN Ultra iS computer.

ALI 6.985	Case for LEVALIGN expert laser using Bluetooth
ALI 6.930-LIB	LEVALIGN expert laser using Bluetooth
ALI 6.960-LI	LEVALIGN expert laser mains adapter
ALI 6.773	Flatness plunger holder
ALI 6.953	Distance sleeves
ALI 6.952-IS	Accessories for magnetic base adapter
ALI 2.173	Support post 250 mm (9 7/8")
ALI 4.501-IS	Magnetic base adapter
ALI 4.739	LEVALIGN expert Flatness firmware voucher
DOC 06.802.en	LEVALIGN expert System handbook [This manual]
DOC 40.201.en	LEVALIGN Ultra iS handbook
ALI 13.700 CD	ALIGNMENT CENTER CD
ALI 4.451	USB memory stick
0 0739 1054	Allen key, size 2
0 0739 1056	Allen key, size 3
ALI 2.911	Lens cleaning cloth
DOC 69.100.en	LEVALIGN expert laser quick reference guide (menu settings)
DOC 40.201.en	LEVALIGN Ultra iS flatness handbook

1.5 LEVALIGN expert reference line (machine axis) package ALI 40.060

This package includes LEVALIGN expert laser, LEVALIGN expert sensor, sensALIGN sensor and ROTALIGN Ultra iS computer.

ALI 6.985	Case for LEVALIGN expert laser using Bluetooth
ALI 6.930-LIB	LEVALIGN expert laser using Bluetooth
ALI 6.960-LI	LEVALIGN expert laser mains adapter
ALI 6.940	LEVALIGN expert sensor
ALI 6.961	LEVALIGN expert magnetic foot
ALI 6.962	LEVALIGN expert base plate
ALI 6.963-1	LEVALIGN expert sensor holder — long
ALI 6.964-1	LEVALIGN expert sensor holder — short
ALI 6.773	Flatness plunger holder
ALI 4.202	ROTALIGN Ultra computer
ALI 4.201	ROTALIGN Ultra stand
ALI 4.603	ROTALIGN Ultra rechargeable battery
ALI 4.900	sensALIGN sensor
ALI 4.960	sensALIGN rechargeable battery
ALI 4.921-2	sensALIGN sensor and laser cable
ALI 4.651	sensALIGN charger/adapter
ALI 12.651-I	AC power supply/charger
ALI 4.741	ROTALIGN Ultra Advanced Shaft registration certificate
ALI 4.749	LEVALIGN expert Flatness registration certificate
ALI 13.700 CD	ALIGNMENT CENTER CD
ALI 3.589	Tape measure mm/inch
ALI 12.502-2	PC/USB cable
ALI 12.503	USB/peripheral devices cable
ALI 4.451	USB memory stick
ALI 2.911	Lens cleaning cloth
DOC 06.802.en	LEVALIGN expert System handbook (this manual)
DOC 40.201.en	LEVALIGN Ultra iS handbook
DOC 69.100.en	LEVALIGN expert laser quick reference guide (menu settings)
DOC 40.200.en	ROTALIGN Ultra iS Shaft handbook
DOC 40.100.en	ROTALIGN Ultra iS pocket guide

Chapter 2: Safety notes

2.1 Symbols, CE compliance, laser safety, transportation and data safety

The system and its associated components are to be used in industrial environments to carry out flatness measurements. The system components are precision instruments, and care must be taken to ensure they not subjected to mechanical knocks. The system must be operated only by properly trained personnel. No liability will be assumed when components or operating procedures as described in this handbook are altered without permission of the manufacturer.

2.1.1 Symbols used in this handbook

The following symbols are used in this manual in order to draw the reader's attention to especially important text, such as that regarding possible sources of danger or useful operating tips.

This symbol denotes general information and tips regarding operation of LEVALIGN expert.



This symbol denotes information which must be followed in order to avoid damage to equipment.



This symbol denotes information which must be followed in order to avoid personal injury.



This symbol denotes laser radiation.



LEVALIGN expert and its components ARE NOT to be used in explosive atmospheres.



2.1.2 CE compliance and electromagnetic compatibility

LEVALIGN expert system components fulfil the EC Guidelines for electric devices and those relating to electromagnetic compatibility as indicated in their respective conformity certificates. The certificates may also be downloaded from the PRÜFTECHNIK website.

2.1.3 Laser safety

The system uses LEVALIGN expert laser ALI 6.930-LI. According to IEC 60825-1:2007, the laser is classified as a Class 2 laser product. The laser operates at 630 – 680 nm and has a maximum radiant power <math>< 1\text{ mW}</math>. No maintenance is necessary to keep the laser in compliance with the referred to specifications.

- ▶ Do not look directly into the laser beam at any time. (The natural blink reaction of the human eye is normally sufficient to protect the eyes from any dangers posed by looking at the laser beam briefly. But as natural blink reaction may fail to occur, care should be taken to avoid staring into the beam.)
- ▶ Do not insert any optical devices into the beam path.
- ▶ CAUTION – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



Transporting lithium based battery operated system components

When returning lithium-ion battery operated LEVALIGN expert system components to PRÜFTECHNIK for inspection, service or repair, ensure that the batteries are not defective. If you suspect a defect in the battery, DO NOT ship the unit with the defect battery back to PRÜFTECHNIK. You may contact your local representative for further information. The relevant material safety data sheets for all PRÜFTECHNIK batteries are posted on the PRÜFTECHNIK website at www.pruftechnik.com. The packaging and dispatch regulations for any given battery are described under section 14 in the material safety data sheets.



Transporting magnetic brackets and other magnetic components

To ensure that stray magnetic fields do not affect the avionics in aircraft, the aviation industry has put forward stringent regulations for air transportation of magnetic material. The magnetic field strength of such components must not exceed specified limits. To comply with this regulation, a cover plate for all PRÜFTECHNIK magnetic components and brackets is available. The plate lowers the magnetic field strength significantly, keeping it well below the required limits and therefore causing no restrictions for air transportation. The relevant safety data sheets are available for download and reference on the PRÜFTECHNIK website at www.pruftechnik.com.



Data safety

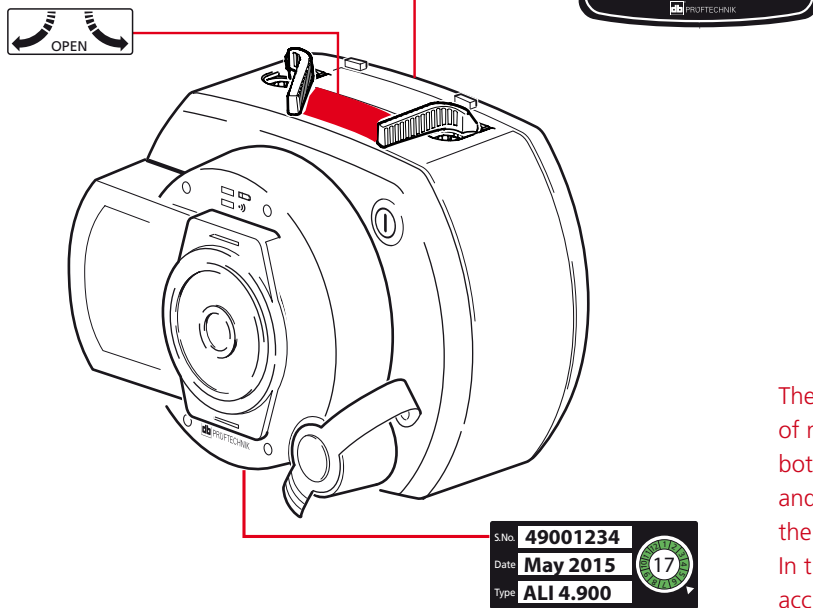
- ▶ As with any data processing software, data may be lost or altered under certain circumstances. PRÜFTECHNIK strongly recommends that you keep a backup or printed record of all important data.
- ▶ PRÜFTECHNIK assumes no liability for data lost or altered as a result of improper use, repairs, defects, battery replacement/failures or any other cause.
- ▶ PRÜFTECHNIK assumes no responsibility, directly or indirectly, for financial losses or claims from third parties resulting from the use of this product and any of its functions, such as loss or alteration of stored data.



2.1.4 Component labelling

The labelling diagram below represents sensALIGN sensor. The diagram shows the symbols, markings and labels as they appear on the sensor. The rechargeable battery label is located on the rear of sensALIGN rechargeable battery.

This symbol is engraved on the top of sensALIGN sensor, and indicates the direction of the clamping levers open position.



The black label is on the back of sensALIGN rechargeable battery ALI 4.960 which is mounted on sensALIGN sensor ALI 4.900.

The part number, serial number and date of manufacture are engraved on the bottom of sensALIGN sensor. The service and calibration label is also attached at the bottom of the sensor. In this example, the next calibration accuracy check is May 2017.

The following two labels are affixed to the ROTALIGN Ultra iS computer.



The above label is affixed on the back of ROTALIGN Ultra iS computer ALI 4.202.

The label opposite is on the back of ROTALIGN Ultra iS computer, affixed to the rechargeable battery in current use.

2.2 Handling precautions

2.2.1 LEVALIGN expert laser

The laser is essentially maintenance free. Keep all electrical connections clean. Do not clean LEVALIGN expert laser by spraying it with water. Clean all elements made of glass using a dry, soft cleansing cloth. Store LEVALIGN expert laser in a dry place and must only be transported using the provided transport case.

Any attempts to tamper with LEVALIGN expert laser by unauthorised personnel, will render all warranty coverage void. LEVALIGN expert laser must only be transported in the provided transport case when returned for servicing or repair, with the defects clearly described.

2.2.2 LEVALIGN expert sensor

Any unprofessional handling of LEVALIGN expert sensor nullifies the warranty. LEVALIGN expert sensor must only be transported in the provided transport case when returned for servicing or repair, with the defects clearly described.

2.2.3 sensALIGN sensor

All optical surfaces (e.g. sensALIGN sensor lens) must be kept clean. Use a cleaning cloth that is recommended for such surfaces. Avoid vigorous polishing to preserve the anti-reflective coatings of the glass elements.

2.2.4 ROTALIGN Ultra iS computer

ROTALIGN Ultra iS computer housing may be wiped clean using a soft cloth dampened with a mild, non-abrasive detergent (use soapy water with only 1% mild soap in water). The display should be cleaned using a soft dry cloth.

2.2.5 Calibration accuracy label

The calibration accuracy of the system components should be checked every two years as indicated by the coloured label (shown at right) affixed to the components. In the shown example, the calibration check due date is November 2017.

Please return the system components to your authorized PRÜFTECHNIK service centre for calibration checking by the date indicated, paying attention to the transport instructions given on page 12.



2.2.6 Storage

Use the provided case to transport the system and its related components. If the system is not used for an extended period, remove the related batteries from the components and store the components in a cool, dry and well-ventilated location. Observe the storage temperatures and humidity specified in the technical data.

2.2.7 Disposal

Any waste electrical and electronics parts of the system including memory sticks must be disposed of according to applicable safety and environmental regulations. Customers in member states of the European Union must adhere to the EU directive 2002/96/EC on waste electrical and electronic equipment (WEEE). PRÜFTECHNIK products that fall under this directive are marked with the shown crossed-out wheelee bin symbol and must be disposed of according to this directive.



- › The marked components must be disposed of with PRÜFTECHNIK or their authorized disposal partners.
- › If you have any questions regarding the WEEE Directive, please contact your local PRÜFTECHNIK sales representative.

2.2.8 General information

- ▶ Content of this handbook is subject to change without further notice, particularly in the interest of further technical development.
- ▶ Any amendments to the issued certificates will be posted on the official PRÜFTECHNIK website – www.pruftechnik.com. Please visit the website on a regular basis for information on new and current products.



Note

Chapter 3: System description

3.1 Introducing LEVALIGN expert

3.1.1 What is LEVALIGN expert?

LEVALIGN expert is a measurement system used to determine the flatness of all types of surfaces be they horizontal, vertical or sloping. The system consists of LEVALIGN laser, an automatic self-levelling rotating laser, LEVALIGN expert sensor (optional) with 70 mm detection range and sensALIGN sensor (optional). Measurement data is transferred wireless to ROTALIGN Ultra iS computer.

3.1.2 What constitutes LEVALIGN expert?

LEVALIGN expert uses ROTALIGN Ultra iS computer to display measurement data. The main measuring components include:

- ▶ LEVALIGN expert laser using Bluetooth ALI 6.930-LIB – an automatic self-levelling laser
- ▶ LEVALIGN expert sensor ALI 6.940 – detects the position of the laser beam automatically (measurement distance of up to 100 m)
- ▶ sensALIGN sensor ALI 4.900 – measurement distance up to 10 m
- ▶ System brackets that include a magnetic foot, sensor holders and base plate

3.1.3 Licencing LEVALIGN expert

To be able to use LEVALIGN expert system within the Flatness firmware, the application must be licenced.

3.1.3.1 Licensing for add-on packages ALI 4.046 and ALI 40.046

1. Fill out the LEVALIGN expert Flatness firmware registration voucher ALI 4.739, which is included in the LEVALIGN expert add-on package.
2. Return the filled out voucher to PRÜFTECHNIK Condition Monitoring or your local representative who will then send you the LEVALIGN expert Flatness registration certificate ALI 4.749.
3. The registration certificate contains the licence code to activate use of both LEVALIGN expert sensor ALI 6.940 and sensALIGN sensor ALI 4.900 within the Flatness firmware.

3.1.3.2 Licensing for stand-alone packages ALI 4.040/2 and ALI 40.040

The LEVALIGN expert Flatness registration certificate ALI 4.749 is included in both stand-alone packages. The registration certificate contains the licence code to activate use of both LEVALIGN expert sensor ALI 6.940 and sensALIGN sensor ALI 4.900 within the Flatness firmware.

3.1.3.3 Licensing for the reference line (machine axis) package ALI 40.060











The LEVALIGN expert reference line (machine axis) package is delivered with ROTALIGN Ultra Advanced Shaft registration certificate ALI 4.741. The registration certificate contains the licence code to activate the Advanced Shaft firmware in ROTALIGN Ultra iS computer.

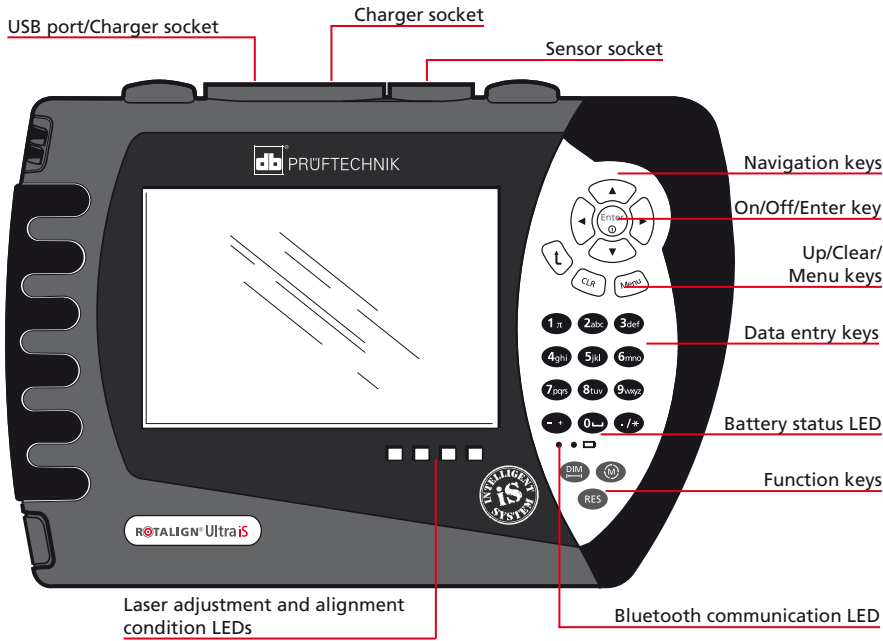
3.2 Getting to know the ROTALIGN Ultra iS computer

The ROTALIGN Ultra iS computer has been developed to effectively handle both simple and complex shaft, bore and turbine diaphragm applications. The computer is also used to carry out straightness and flatness measurements. ROTALIGN Ultra iS has a user friendly interface. It uses easy-to-follow icons and comprehensive on-screen menus and hint texts, that enable even first-time users to operate the computer without difficulty.

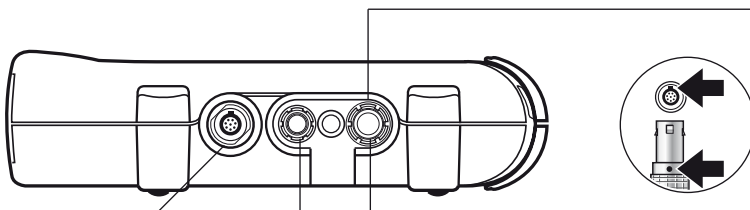
ROALIGN Ultra iS is built to rugged industrial standards of shock and water resistance. It contains a complete computer with a 5.7 inch (145 mm) color TFT full VGA display, oval-shaped function and data entry keys, 4-way navigation keys, an On/Off/Enter key, an up key, a clear key and a menu key.

3.2.1 Operating keys

- ▶ The navigation keys are used to navigate through the menu and display items. The 'Enter' key in the center is used to access any selected item or confirm an action. 
 - ▶ The 'On/Off/Enter' key is used to perform three functions – switching ROTALIGN Ultra iS on/off, and accessing any selected item. To switch on/off, press and hold , the 'On/Off/Enter' key, for approximately 5 seconds. 
 - ▶ The 'Up' key is used as a back/return key, taking user to previously selected function, or to exit current screen. 
 - ▶ The 'CLR' (Clear) key is used to delete information entered inadvertently. 
 - ▶ The 'Menu' key is used to call up menu options related to the selected display screen. Pressing it twice brings up the global menu. 
 - ▶ The data entry keys are used to enter relevant data. 
- ROALIGN Ultra iS possesses 3 function keys.
- ▶ The 'Dimension' key is used to access machine set-up where machine dimensions and properties are defined. 
 - ▶ The 'Measurement' key is used to access the measurement screen. 
 - ▶ The 'Result' key is used to call alignment results into the display. 



3.2.2 ROTALIGN Ultra iS top panel connectors



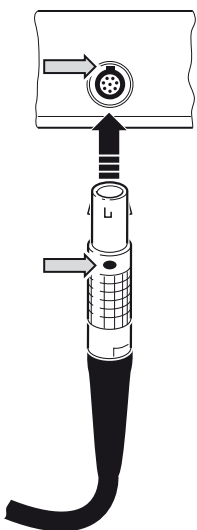
Sensor socket
Ensure correct sensALIGN sensor cable plug orientation to avoid damaging pins

Charger socket
The red dot on the charger plug must match the red dot on the battery socket

USB host/slave port
The red dot on the USB cable plug must match the red dot on the USB port

Note that available cables may be connected to the corresponding numbered sockets as follows:

- ① ALI 4.921-2 (sensALIGN sensor and laser cable)
- ② ALI 12.503 (short USB cable), ALI 12.651-I (charger)
- ③ ALI 12.502 (long USB cable), ALI 12.503 (short USB cable), ALI 12.651-I (charger)



Connecting the battery charger to ROTALIGN Ultra iS computer – The LED next to the battery symbol on the keypad blinks while charging takes place.

3.2.3 Power supply

ROTALIGN Ultra iS computer is powered using a 7.2 V 6.0 Ah Lithium-ion rechargeable battery ALI 4.603, which is to be charged only using the battery charger ALI 12.651-I. This can be done with the battery inside the computer. The computer may continue to be used if the battery is charged inside it.

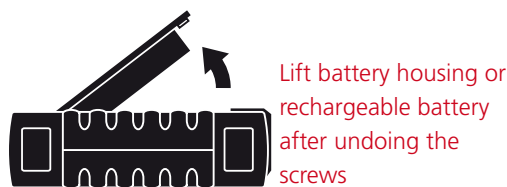
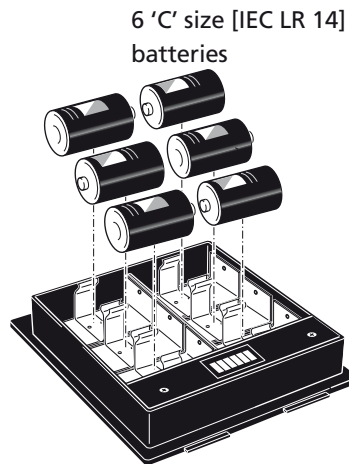
Alternatively, use 6 standard 'C' size [IEC LR 14] batteries contained in the optional battery compartment ALI 4.605.

If the ROTALIGN Ultra iS computer is not in use for extended periods of time, a month or more, the rechargeable battery or the standard batteries should be removed from the unit.



3.2.4 Replacing batteries

The rechargeable battery ALI 4.603 and the battery housing ALI 4.605 have identical shapes and are therefore interchangeable. If batteries require removal, turn over the computer taking care not to damage the display and the hard keys. Undo the two screws by turning them counterclockwise a quarter of a turn. With the screws loosened, lift and pull the rechargeable battery or the battery housing (depending on power supply source) out. The reverse procedure is used to reinstall the rechargeable battery or the battery housing back into the computer.



Lift battery housing or rechargeable battery after undoing the screws



Replace battery housing or rechargeable battery by sliding it into the groove

If you are using the standard 'C' size batteries, it is recommended to replace all of them at once. Note the battery polarity when inserting them in the battery housing ALI 4.605. The housing is removed and replaced in the same manner as the rechargeable battery ALI 4.603

3.3 LEVALIGN expert laser

ALI 6.930-LIB

LEVALIGN expert laser ALI 6.930-LIB is an automated self-levelling precision rotating laser for vertical and horizontal applications. The self-levelling and measurement is as follows:

- ▶ Mounted vertically, self-levelling takes place on the horizontal plane
- ▶ Mounted horizontally, self-levelling in the horizontal [beam] axis
- ▶ The horizontal and vertical laser beams form a 90° angle.

The two bubble levels next to the handle are used for preliminary set-up. If the rotor head manual adjustment knob is pulled out, the rotor rotates automatically and the emitted rotating laser beam forms a plane. Automatic rotor head rotation is stopped by pushing the rotor head manual adjustment knob in to lock. In this case, the laser rotor can be adjusted manually by rotating the adjustment knob



- 1 Level bubble on the rotor head for plumbing when laser is mounted horizontally
- 2 Level bubble for adjustment when laser mounted vertically
- 3 Level bubble for adjustment when laser mounted horizontally
- 4 Rotor head manual adjustment knob

Mounted vertically, the rotating laser projects a circular beam in the horizontal plane, while another laser beam is emitted perpendicular to the plane.



Mounted horizontally, the rotating laser projects a circular beam in the vertical plane. Another laser beam is emitted perpendicular to the plane.

3.3.1 Plumbing

The rotor head possesses a bubble level used for plumbing action when LEVALIGN expert laser is mounted in the horizontal position. When mounted in this orientation and the rotor head bubble is centred, then the beam emitted in the vertical direction is perfectly plumb.

3.3.2 Parts of LEVALIGN expert laser



- 1 Rotor head – rotor speed adjustable [0-800 rpm]
- 2 Laser label – with Bluetooth address (BT-ADR)
- 3 Foot – part of a special feet arrangement allowing laser to stand vertically or lie horizontally
- 4 Antenna
- 5 Handle – for comfortable set-up and safe transport
- 6 Manual adjustment knob –used to set the desired position of the rotor head or cut out the rotor motor



- 7 Rotor head bubble level – for plumbing action
- 8 LCD display – easily readable for device configuration and info
- 9 Easy-to-use keyboard
- 10 Charging socket – for built-in rechargeable battery
- 11 Caution label location

3.3.3 LEVALIGN expert laser battery care


- ▶ LEVALIGN expert laser ALI 6.930-LIB is to be charged only using the supplied LEVALIGN expert laser mains adapter ALI 6.960-LI.
- ▶ The mains adapter must be protected against high humidity and must be used indoors.
- ▶ Remove LEVALIGN expert laser from its case during battery charging.
- ▶ Never charge the battery at sub-zero temperatures.
- ▶ The battery charging time is approximately 10 hours.
- ▶ The battery attains 100% charge capacity after several recharge cycles.



CAUTION

3.4 LEVALIGN expert sensor

ALI 6.940

LEVALIGN expert sensor ALI 6.940 is used to detect the position of the rotating laser beam emitted from LEVALIGN expert laser. As soon as the rotating laser beam strikes the opening of the sensor detection area, the detector continues to move vertically [up and down] until the laser beam is positioned at exactly the centre of the detection range. The movement then stops but laser tracking continues. The reading at this position is manifested in the sensor display. A new search can be started by pressing .



3.4.1 Replacing sensor batteries

LEVALIGN expert sensor uses two 'AA' size batteries. To replace the batteries, rotate the plate at the bottom of the sensor in the direction indicated on the plate.

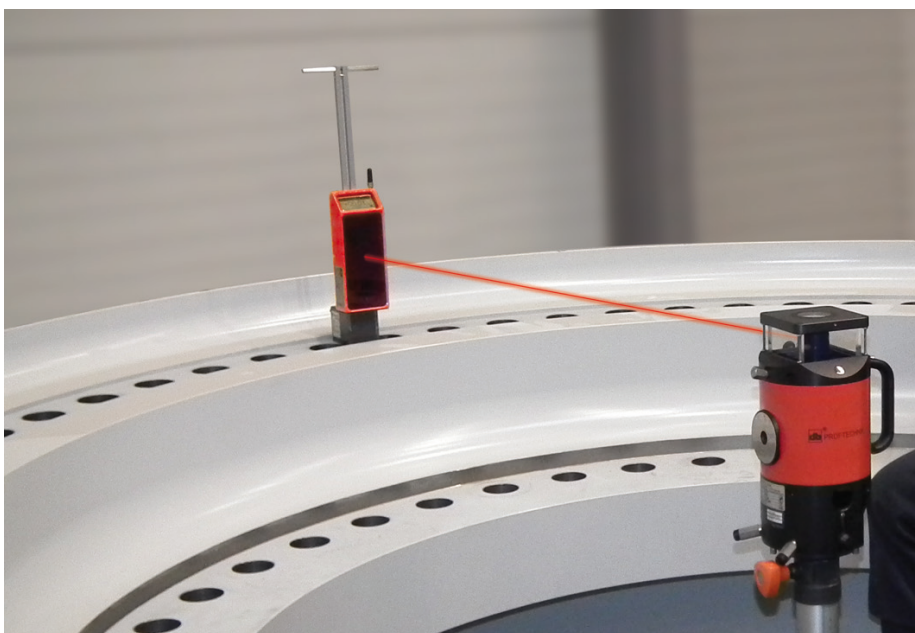
- ▶ Replace both 'AA' size batteries when the battery status symbol indicates low capacity.
- ▶ Ensure that the type of battery used is correctly set under the submenu item 'Type of battery' in 'Settings' (see section 4.2.4 "Settings – submenu items").
- ▶ Depleted batteries must be disposed of in an environmentally responsible manner in accordance with applicable regulations.



3.5 LEVALIGN expert sensor brackets

A standard system brackets set for mounting LEVALIGN expert sensor is supplied with every LEVALIGN expert package containing LEVALIGN expert sensor. The set includes the following parts:

- ▶ LEVALIGN expert magnetic foot, ALI 6.961
- ▶ LEVALIGN expert base plate, ALI 6.962
- ▶ LEVALIGN expert sensor holder (long), ALI 6.963-1
- ▶ LEVALIGN expert sensor holder (short), ALI 6.964-2



This image shows LEVALIGN expert laser mounted on the tripod ALI 6.956, and LEVALIGN expert sensor mounted on the long sensor holder ALI 6.963 attached to the magnetic foot ALI 6.961.

3.6 sensALIGN sensor

sensALIGN sensor ALI 4.900 contains two position detectors, which measure the exact position and inclination of the laser beam. Integrated in the sensor is Bluetooth technology for wireless transmission of measurement data to ROTALIGN Ultra iS computer.

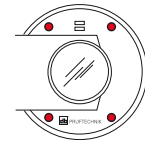
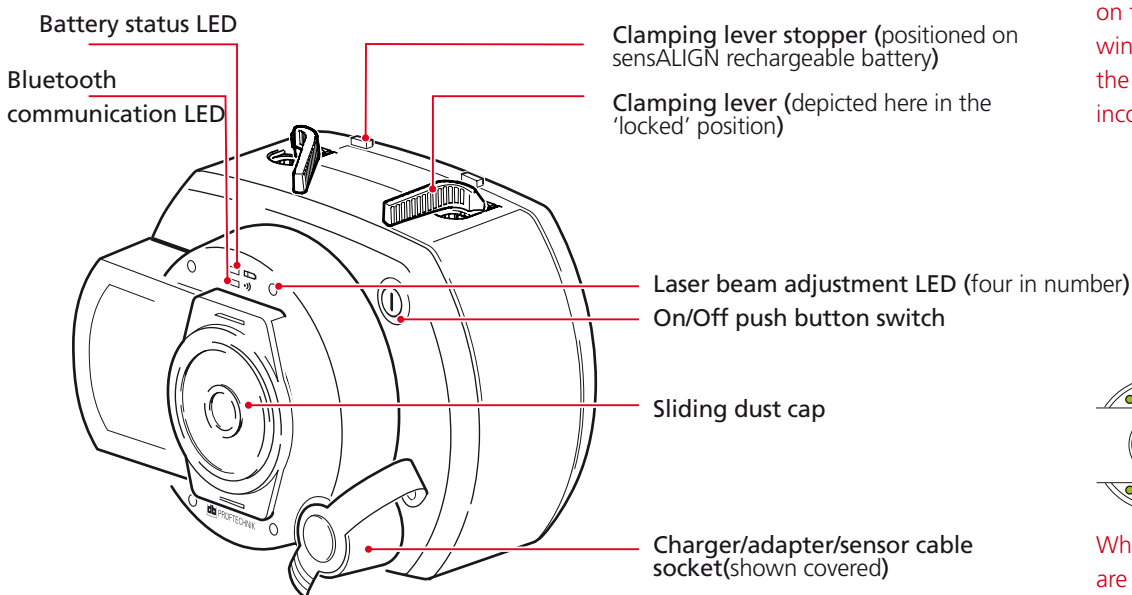
Positioned at the front of sensALIGN sensor are following indicator LEDs:

- ▶ Battery status LED
- ▶ Bluetooth communication LED
- ▶ Four beam adjustment LEDs

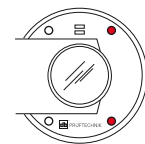
3.6.1 Understanding the beam adjustment LEDs

When sensALIGN sensor is switched on, it defaults to the Shaft mode, implying that the LEDs adapt the shaft alignment indication status. To revert to the correct flatness measurement status, the sensor must establish communication with ROTALIGN Ultra iS computer while in the sensor-sensitive flatness application "Measurement" screen. Only then will the correct LED indication for flatness measurement be resumed.

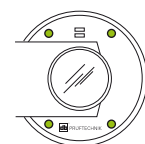
The four beam adjustment LEDs provide additional help when adjusting the laser beam position on sensALIGN sensor position detectors. The LEDs indicate the angle and position at which the laser beam enters the sensALIGN sensor lens. The LEDs blink either red or green depending on the angle at which the laser beam strikes the sensALIGN sensor lens.



All four LEDs blink red every second when the laser beam fails to strike the detector



When the two LEDs on the right blink red once every second, the laser beam is centred on the detection window, but strikes the detector at a bad incoming angle.



When all four LEDs are blinking green twice every second, the laser beam is not centred on the dotted area, although the beam strikes the detector at good incoming angle.

3.6.2 sensALIGN sensor rechargeable battery ALI 4.960

sensALIGN sensor ALI 4.900 is powered using the sensALIGN rechargeable battery ALI 4.960. The battery is charged via the charger/adaptor socket using the sensALIGN charger/adaptor ALI 4.651-I. If the battery capacity is greater than 50% [acceptable capacity for measurement], the battery status LED lights up green for 2 seconds on switching on. During the charging process, the battery status LED blinks green. When the battery is fully charged, the LED lights steady green if the charger remains connected.

Activity	sensALIGN sensor battery status LED
Switch on	<ul style="list-style-type: none"> › Lights up green for 3 seconds when battery run time is > 10 hrs › Blinks green every 3 seconds when battery run time is between 1 – 5 hrs › Blinks red constantly when battery run time is < 1 hr › Blinks red every 3 seconds when battery run time is insufficient for longer measurements
Charging battery	<ul style="list-style-type: none"> › Blinks green when charging › Lights steady green when fully charged › Lights red when a failure occurs during charging

3.6.3 sensALIGN sensor ‘ON/OFF/CHARGE’ workflow

Action	sensALIGN sensor status
With sensor OFF, press the ‘On/Off’ push button briefly	Sensor turns on but defaults to the Shaft mode. To revert to the correct flatness measurement status, the sensor must establish communication with ROTALIGN Ultra iS computer while in the sensor-sensitive flatness application “Measurement” screen.
Sensor connected to mains supply using sensALIGN charger/adaptor ALI 4.651-I with rechargeable battery ALI 4.960 attached	Sensor switches to ‘charge’ mode and measurement is NOT possible. Measurement may be reactivated by pressing the ‘On/Off’ push button briefly.
Sensor connected to mains supply using sensALIGN charger/adaptor ALI 4.651-I with rechargeable battery ALI 4.960 detached	Sensor turns ON and measurement is POSSIBLE
With sensor ON, press the ‘On/Off’ push button and hold down for a few seconds.	Sensor turns OFF

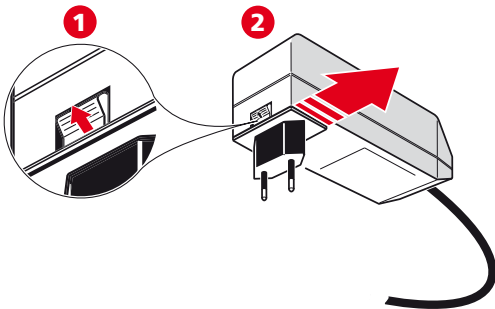
3.6.4 Mounting and dismounting sensALIGN charger/adapter plug

sensALIGN charger/adapter ALI 4.651-I comes with three different regional plugs. The available plugs are for the Euro zone, the US, and the UK.

To avoid damaging the charger/adapter when mounting or dismounting a plug, follow the outlined steps carefully. Pay attention to the direction of the arrow on the plug just above the pins, and the arrow on the latching nipple on the charger housing.



To dismount a plug, push the latching nipple in the forward direction [❶] as indicated by the arrow on it and hold, then push the plug to the right [❷] as on the arrow on the plug.

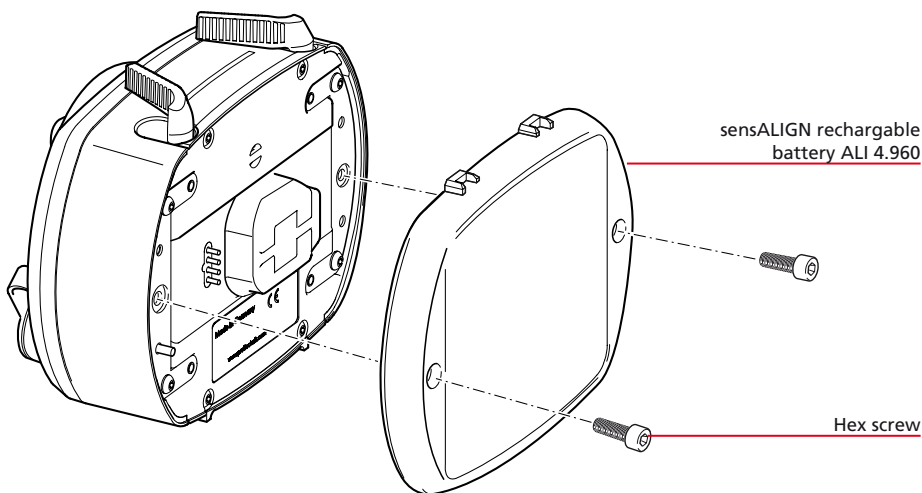


To mount a plug, push the latching nipple in the forward direction [❶] as indicated by the arrow on it then slip the plug into the protruding prongs and slide it to the left until it latches.

3.6.5 Replacing sensALIGN sensor rechargeable battery

To replace the rechargeable battery, use the provided 2.5 mm allen key [0 0739 1055] to undo the two hex screws that affix the battery to sensALIGN sensor.

Used batteries should be disposed of in an environmentally-sound manner!

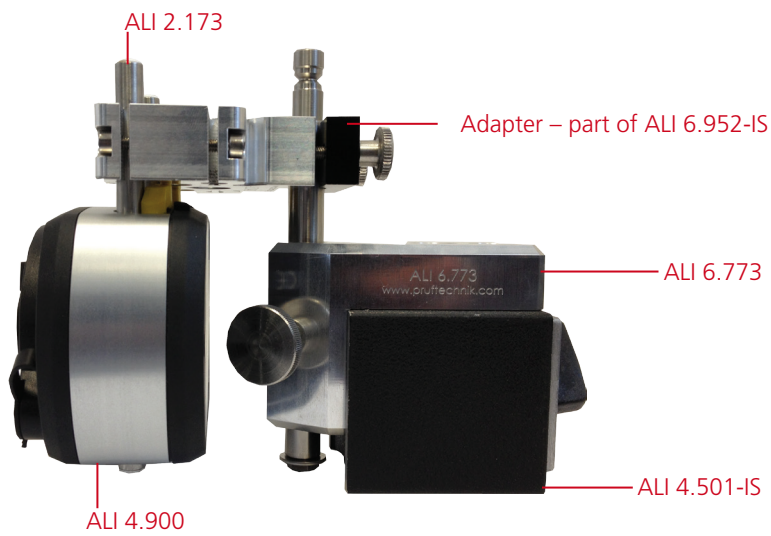


3.7 System brackets for mounting sensALIGN sensor

A brackets accessories set is available for mounting sensALIGN sensor. The set comprises:

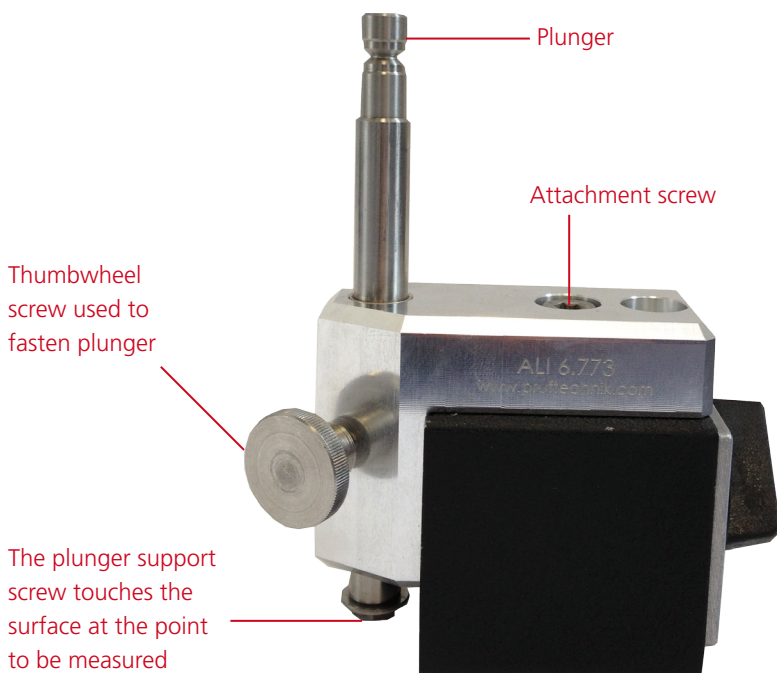
- ▶ Magnetic base adapter ALI 4.501-IS
- ▶ Distance sleeves ALI 6.953
- ▶ Plunger holder ALI 6.773
- ▶ Support posts ALI 2.173

Mount sensALIGN sensor as low as possible to attain optimal stability and measurement accuracy.

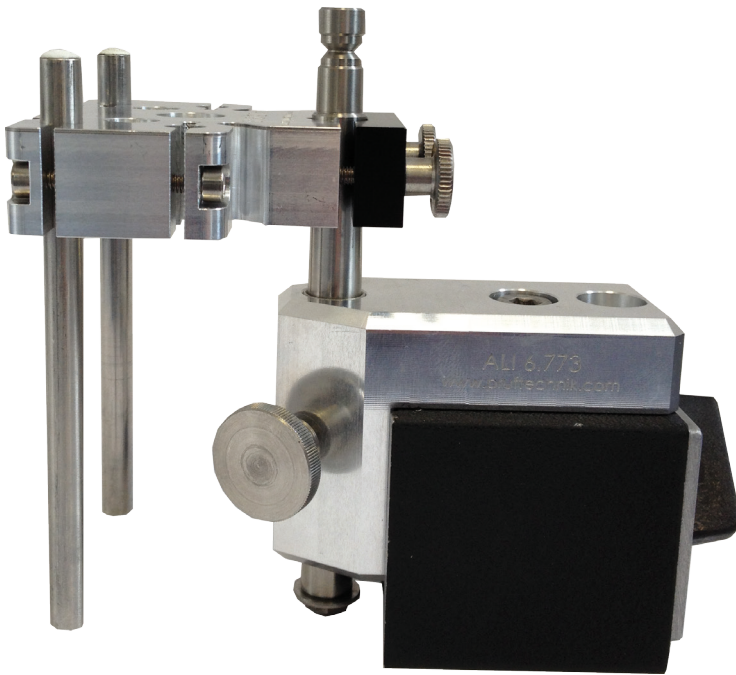


3.7.1 Mounting sensALIGN sensor

1. Use the supplied magnetic base adapter with the upright removed.
2. The plunger holder is attached to the magnetic base using the attachment screw.



3. Fix the multi-purpose adapter to the plunger using two thumbwheel screws.
4. Mount the support posts are onto the adapter dependent of the position of the sensor.





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Chapter 4: Setup

4.1 LEVALIGN expert laser – Menu settings

Measurement may be carried out with LEVALIGN expert laser positioned in either vertical or horizontal position. The device sits firmly on any horizontal surface. This can either be the surface being measured or an outside one. LEVALIGN expert laser can be mounted also on an industrial tripod stand such as ALI 6.956 (optional).

4.1.1 Preparing LEVALIGN expert laser for measurement

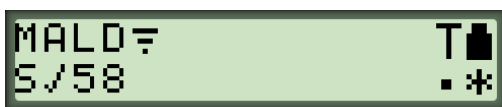
1. Mount the device as desired. Ensure that the respective bubble level is centred.
2. Press and hold  the ON/OFF key on the keyboard briefly. The device turns on. Turn the laser on by pressing  and holding briefly. LEVALIGN expert laser emits two beams perpendicular to each other. At the spot where the laser beams strike a surface, they will continue to blink until the system automatically self-levels. After the laser has levelled, the beams remain steady.
3. Before proceeding with measurement, the laser should be allowed to warm up for 30 minutes. This will help achieve better results.

4.1.2 Main menu – Operation settings

As soon as the device is turned on by pressing , the following information appears successively on the backlit LCD display:

- ▶ Product part number
- ▶ Product serial number
- ▶ Manufacturer info


This is followed by the main menu as shown below.





The following are the displayed functions:

- ▶ "M" — Laser modulation
- ▶ "A" — Automatic levelling
- ▶ "L" — Laser brightness
- ▶ "D" — Rotor speed (rpm of the rotor head)

Shown on the right of the display are the following statuses:

- ▶ "T" (or "R") — Tilt alarm function (or Automatic direction)
 - › "T" is displayed when activated in the submenu
 - › "T" blinks when the laser beam is automatically cut off. This occurs when LEVALIGN expert laser is disturbed. Press  briefly to switch the laser beam on again. After 30 seconds, the tilt alarm function is active again.
 - › "R" blinks when automatic direction is switched off. The function "R" is deactivated in the device settings when not used.

- › “T” / “R” blink alternately when both tilt alarm and automatic direction functions have been triggered. Deactivate the function “R”.
- ▶ Battery status
 - › The charge capacity is displayed in 4 levels; 100%, 75%, 50% and 25%
- ▶ Remote control —  indicates that the remote control connection is on and active
- ▶ Laser beam status
 - ›  — indicates laser is off during levelling
 - › * — indicates laser is on during levelling
 - › X — indicates laser has been switch off using the remote control

4.1.3 Main menu functions

4.1.3.1 “M” – Laser modulation

This function is used to match the characteristics of the emitted laser beam to the sensor and the given application. The following modulation options are possible:

- ▶ “S” and/or “-” for flatness measurements using LEVALIGN sensor and/or sensALIGN sensor
- ▶ “P” for straightness and shaft alignment measurements using sensALIGN sensor

4.1.3.2 “A” – Automatic levelling (also referred to as self-levelling)

This function takes place either on a plane or only on a single axis. Following settings are possible:

- ▶ ✓ — denotes levelling on a plane (LEVALIGN laser in a vertical position).
- ▶ – (minus) — denotes levelling on a single axis. This option is automatically selected when LEVALIGN laser is in a horizontal position.
- ▶ + (plus) — denotes automatic levelling has been turned off. This option is selected when self-levelling is not required.

The automatic levelling (**A**) operation settings are valid only when the device is in operation. Whenever the device is restarted, a hint requesting desired setting appears if the following conditions prevail:

- › The operation settings last used do not match with current setting
- › Automatic levelling turned off (**A** = + [plus])

4.1.3.3 “L” Laser brightness

Laser brightness is selected on a scale of 1-5. For LEVALIGN expert laser use the maximum brightness (5).







4.1.3.4 Rotor speed (rpm of the rotor head)

The speed is given in rpm and is on a scale of 1-8 where 1 denotes 100 rpm and the maximum is 800 rpm. For recommended setting refer to section 4.1.2.

4.1.3.5 Scanning functionality

The scanning functionality is not in use.

4.1.4 Editing functions

1. Press  to activate the editing mode. In the main menu, the laser modulation symbol "M" starts to blink. The value of any blinking symbol may be edited within 20 seconds of the blinking.
2. With "M" blinking, press  or  to edit the laser modulation.
3. Press  to confirm new setting.
4. Press  to move to the next function automatic levelling "A".
5. Repeat the editing procedure for all required functions.
6. Finally, press  briefly to exit the editing mode. The symbol of the function selected last stops blinking.

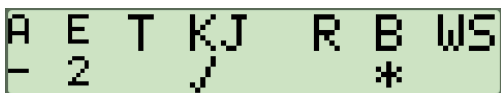
4.1.5 Second level menu settings

To access the second level menu items, the device editing mode must be inactive.



Note

- ▶ Press  long enough (approx. 10 seconds). The second level menu opens.



The following settings are displayed:

- ▶ "A" Automatic levelling (also referred to as self-levelling) – refer to section 4.1.3.2
- ▶ "E" Levelling sensitivity – measured on a scale of 1-3. Sensitivity may be increased for measurements in environments where vibration could affect the measurement results. This function is used to trigger automatic levelling when the selected sensitivity is surpassed. The lowest sensitivity is denoted 3, and the highest sensitivity is denoted 1.
- ▶ "T" Tilt alarm function – this function may be activated only when automatic levelling "A" is activated. When active, the laser beam is automatically cut off when LEVALIGN expert laser is disturbed. If LEVALIGN expert laser is inadvertently moved during measurement, the laser beam is cut off, and "T" blinks in the main menu.
- ▶ "K" Transmitter / Remote app – this function is used to switch the transmitter on. With the transmitter on, the laser is controlled using the remote app which runs on mobile devices such as tablet PCs and smartphones.
- ▶ "J" – this function is not in use.
- ▶ "R" Automatic direction – function not in use or deactivated
- ▶ "B" Laser beam status – this function is used to determine if the laser blinks during levelling (*) or is off during levelling (■).
- ▶ "W" Factory settings – used to reset to factory settings
- ▶ "S" Service or workshop information

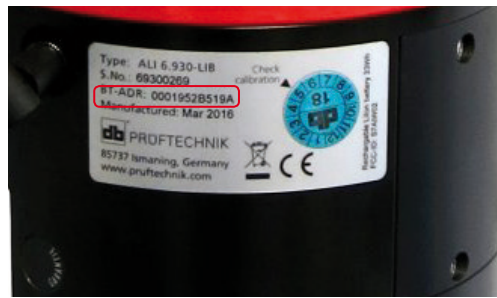
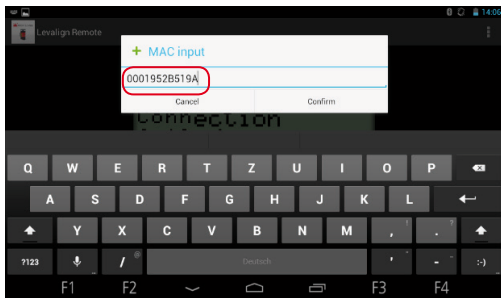
4.1.6 Installing remote control function for LEVALIGN expert laser

“LEVALIGN remote” app installed in mobile devices such as tablet PCs or smartphones is used to remotely control LEVALIGN expert laser. Follow the steps below to install the app and establish connection.

1. Activate “K” Transmitter / Remote app in the second level menu.
2. Install “LEVALIGN remote” app in an Android mobile device. The installation file “LevalignRemote.apk” is on the provided USB memory stick ALI 4.451
3. Start the “LEVALIGN remote” application. The opening screen shows the LEVALIGN expert laser LCD display and keyboard. The on-screen keyboard is controlled by tapping.





4. Tap the menu symbol at the right top corner of the screen then tap the menu item “MAC input”.
5. Enter the laser Bluetooth address as shown in the screen below. Note that the address is case-sensitive. The laser Bluetooth address (BT-ADR) is located on the laser label (see image below)



6. Tap “Confirm” to send the entered information to LEVALIGN expert laser. The information “Try to connect. Please wait” appears on the “LCD display” on the app. As soon as connection is established, the LEVALIGN expert laser main menu appears on the app.

4.2 LEVALIGN expert sensor – Menu settings

4.2.1 Preparing LEVALIGN expert sensor for measurement




Press and hold  the ON/OFF key down until a loud beep is heard. The sensor turns on. The sensor detector starts searching the laser by moving vertically within the detection range of 70 mm. If the sensor fails to detect the laser, it will revert to an 'idle mode'. In that case, press  to trigger a further search.

The sensor keyboard is used to access the sensor menu which is used to set parameters required for measurement.

4.2.2 LEVALIGN expert sensor display and menu items

With sensor on, press . The following menu items are displayed.

- ▶ The four available measurement modes
- ▶ Data memory
- ▶ Settings

The measurement mode used in conjunction with ROTALIGN Ultra iS computer is referred to as 'Continuous Measurement plus Bluetooth-radio'. Press  or  to place the bold arrow next to the desired measurement mode. Press  to confirm selection.


4.2.3 Data memory submenu items

Select 'Data memory' then press  to confirm selection. The available submenu items include:

- › Memory folder (A-Z)
- › Show stored data
- › Send data memory
- › Erase data memory

4.2.4 Settings – submenu items

The main menu item 'Settings' is used to set the following submenu items:

- › Position unit – used to set measurement unit as either mm or inch (mm is default)
- › Set zero on notch – the notch on the sensor housing corresponds to the zero point
- › Zero lock function – used to avoid accidental adjustment of the zero point to the notch (off is default)
- › Display back light – the back light can be operated manually (press  to turn the back light on and off as required) or automatically (the backlight remains on for one minute every time a key is pressed) – (auto is default)
- › Language – used to set the language on the sensor (English is default)
- › Clock function – used to deactivate the clock function; if deactivated, time is not shown on the sensor display (off is default)
- › Set date and time – used to set date and time; if there is no power supply to the receiver for approx. 10 minutes, the date and time have to be set anew
- › Type of battery – used to set type of battery used, hence providing the accurate battery capacity (alkaline is default)
- › Beeper – used to deactivate the beeper (off is default)

- › Factory defaults – used to reset to factory default settings
- › Device type / number – shows sensor name and part number
- › Version info – shows sensor firmware and hardware versions
- › Service menu – intended for manufacturer's use and therefore requires unlocking using a special code

4.3 Mounting LEVALIGN expert laser and sensor

The manner in which the laser and sensor are mounted will depend on the application. LEVALIGN expert laser may be levelled horizontally or vertically by allowing it to stand on its specialised three-point feet or mounting it on an industrial tripod (ALI 6.956) using either of the two 16 mm (5/8") tapped holes on the laser. When mounting the laser in either horizontal or vertical orientation, ensure that the corresponding bubble level is centred. The laser should be mounted at least one metre away from the sensor. As good measurement practice, mark a grid on the object surface to be measured.

Remember to allow the laser beam to warm up for at least 30 minutes before taking measurement.



Note


LEVALIGN expert sensor is mounted on the surface to be measured using the provided system brackets. With both LEVALIGN expert laser and sensor turned on and configured as required, pull out the rotor head manual adjustment knob to allow the rotor to turn automatically. A rotating laser beam is emitted, and self levelling takes place on either the plane or on a single axis depending on the physical orientation of LEVALIGN expert laser.

If LEVALIGN expert laser is moved such that the levelling is affected, self-levelling takes place once again. The emitted laser beam blinks during self-levelling (automatic levelling) if the laser beam status "B" has been set to blink (*) – (refer to section 4.1.5). The blinking action of the beam perpendicular to the one on the rotating plane is much easier to observe.



Note

4.3.1 Laser beam detection (using LEVALIGN expert sensor)

The sensor detector starts to search the laser beam by moving up and down along the detection window. The up/down arrows on the display indicate the direction of the sensor detector during the search of the laser beam. If the laser beam is detected, the sensor detector gradually comes to a halt and a stable value is captured on the display. Note that the two up/down arrows on the display toggle when a stable value is attained. If the laser beam is not detected, the search process stops after a few minutes. Press  to reactivate the search process.

4.3.2 Laser beam detection (using sensALIGN sensor)

sensALIGN sensor is mounted such that the rotating laser beam strikes the centre of the sliding dust cap, then slide the dust cap to open the sensor aperture.

4.4 Recommended settings

Using sensALIGN sensor			
Menu	Parameter	Measurement distance	Setting
Main menu – LEVALIGN expert laser	“A” Automatic levelling		✓ or – (minus)
	“D” Rotor speed	1 m – 4 m	“6” => 600 rpm
	“D” Rotor speed	4 m – 5 m	“5” => 500 rpm
	“D” Rotor speed	5 m – 8 m	“4” => 400 rpm
	“D” Rotor speed	8 m – 10 m	“3” => 300 rpm
	“L” Laser brightness		“5” => maximum brightness
“M” Laser modulation		“S” or “–” for flatness measurements	
ROTALIGN Ultra iS computer	Averaging		3 seconds
Using LEVALIGN expert sensor			
Menu	Parameter	Measurement distance	Setting
Main menu – LEVALIGN expert laser	“M” Laser modulation		“S” or “–”
	“A” Automatic levelling		✓ or – (minus)
	“L” Laser brightness		“5” => maximum brightness
	“D” Rotor speed		“6” – “8” => 600 – 800 rpm

4.5 Measurement tips

4.5.1 Applications that require automatic levelling to be turned off

Every time movement outside the selected laser beam sensitivity is detected, the laser self levels. This is okay when measuring flat rigid surfaces. When carrying out measurement in ships and other floating vessels, it may be necessary to turn off automatic levelling. The same applies for measurement of inclined surfaces as the laser would never be level.

4.5.2 Positioning sensor

To improve accuracy, LEVALIGN expert sensor should not be placed in line with any of the four corner positions of the rotor head glass window. The emitted beam could be hindered by the metal supports positioned at these corners.

4.5.3 Laser beam status


During measurement, do not change the status of the rotating laser beam from automatic rotation to manual, and vice versa.

Metal support at
the corner of the
rotor head window



4.6 Troubleshooting

4.6.1 LEVALIGN expert laser

1. If laser beam is not emitted, check the battery status icon on the display. Battery may require recharging.
2. If the expected range of the laser beam is not attained, clean the rotor head window.
3. If the laser beam blinks slowly, tilt LEVALIGN expert laser to set off self-levelling.
4. If LEVALIGN expert laser shuts off automatically, the tilt alarm function is possibly active. Press  briefly to turn the laser on.

4.6.2 LEVALIGN expert sensor

1. If no function is displayed, check the capacity of the batteries.
2. If there is interference with sensor reception, check for interference from strong light sources.
3. If time is not shown on the display, it has been deactivated via the 'Setting' submenu item 'Clock function'.
4. If using rechargeable batteries and the battery status displayed is inaccurate, use batteries with low self discharge. The following rechargeable battery types are recommended: maxE, eneloop, Infinium

Chapter 5: Flatness measurement

5.1 Starting the flatness application


Before the application can be started, a licence code must be entered in the licence manager. In most cases the application is licenced at the factory and the system is delivered with the flatness firmware registration certificate which contains the entered licence code.

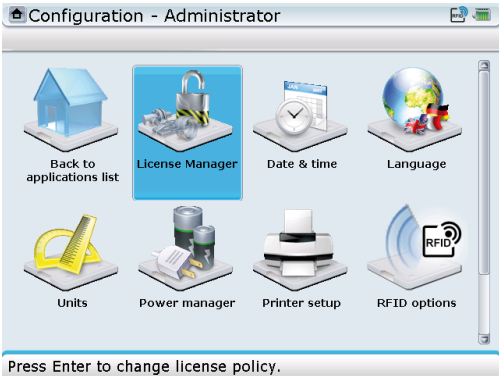






5.1.1 Starting the licence manager

After switching ROTALIGN Ultra iS on, use the navigation keys and highlight 'Configuration' icon.



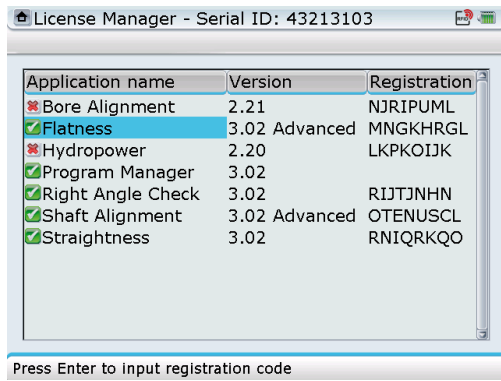
Press  to access this option, then use the navigation keys and highlight the 'Licence Manager' icon.



With the icon highlighted, press  to access the "Licence Manager" screen. Use / and highlight 'Flatness', then press  to proceed with entering the application registration key in the editing box.

After successful registration, a green check mark appears next to the application. The licenced flatness level appears as a suffix to the firmware version.

LEVALIGN expert system handbook




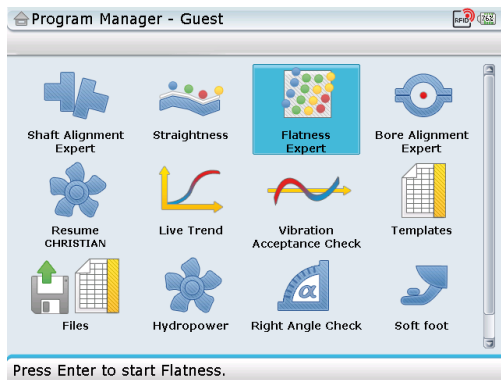
The application levels are 'Standard' and 'Advanced' for the LEVALIGN flatness laser and 'Expert' for LEVALIGN expert laser. The registered level will appear as a suffix to the firmware version.

The application 'Flatness' may now be started.


5.2 Dimensions

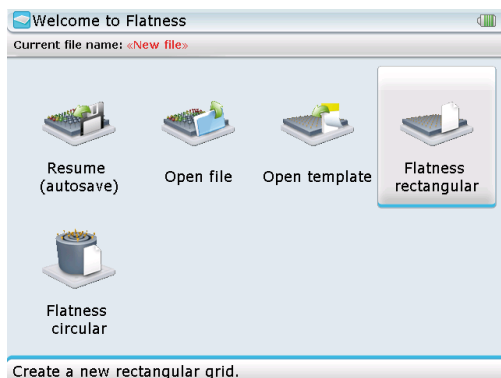
5.2.1 Switching on ROTALIGN Ultra iS computer


If not already switched on, press  and hold for approximately 1-2 seconds. The opening screen shown below appears.

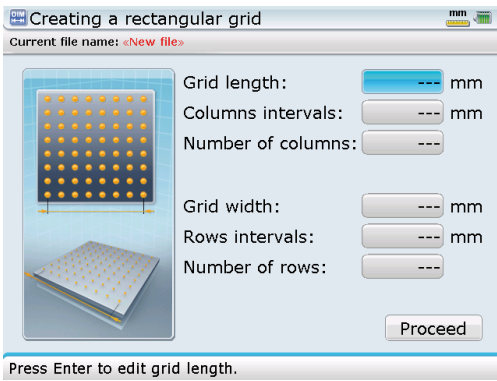


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Use the navigation keys and highlight the 'Flatness Expert' application icon. Press  to start the application. The "Welcome to Flatness" screen opens.

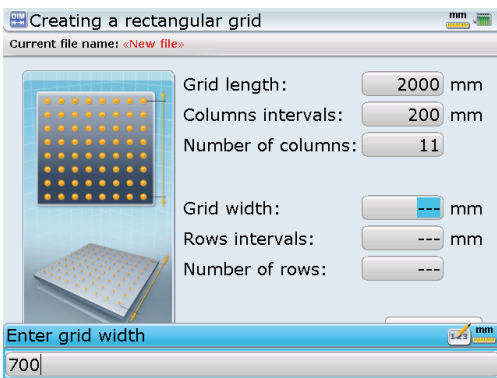


Use the navigation keys and select surface shape required or choose the necessary template, confirming selection by pressing . The screen in which the surface grid dimensions are to be entered appears.



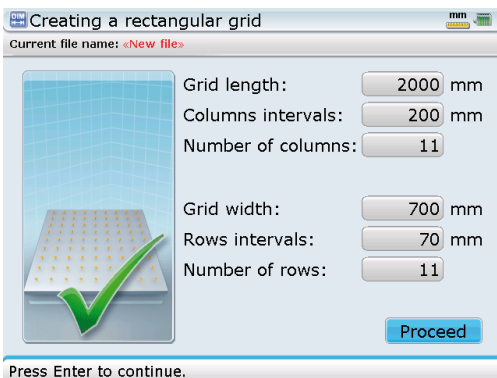
In this example, a rectangular surface grid has been selected.

Use the navigation keys to select item to be edited. Enter the required values directly using the data entry keys. Press either or to confirm entry.

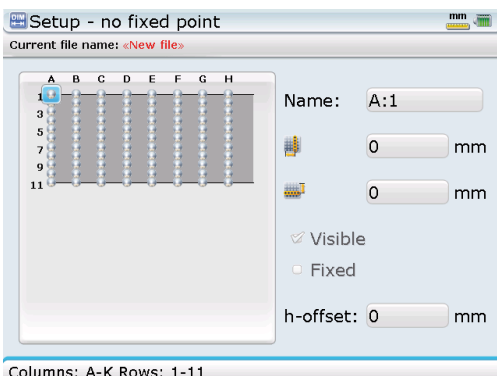


The editing box appears when entering a value in the value boxes. The editing box appears also when the value box is highlighted then pressed.



Use the navigation keys to move through the grid value boxes. After all required grid values have been entered, use the navigation keys to highlight 'Proceed'.

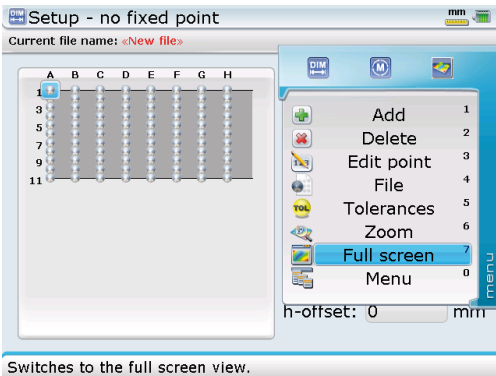





Confirm selection by pressing . An overview screen of the configuration appears.




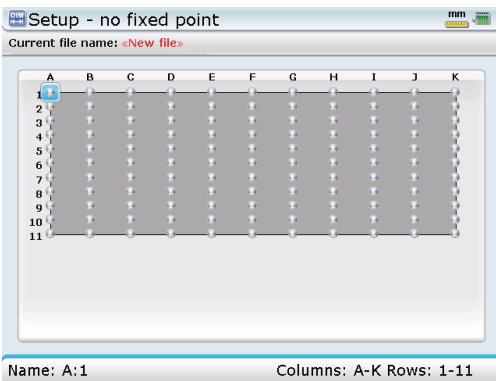
LEVALIGN expert system handbook

The full screen mode is accessed by pressing  or via the context menu item 'Full screen'. To access the context menu item, press  then use the navigation keys to highlight 'Full screen'.

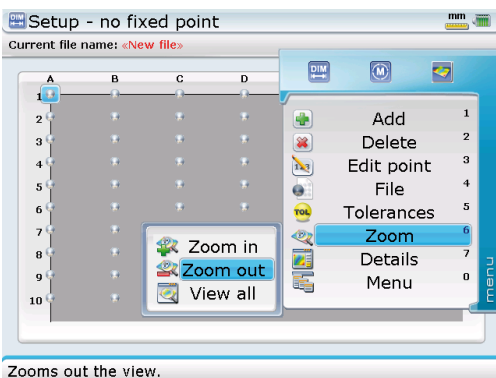


Use / to highlight 'Full screen'. The full screen mode appears by pressing  to confirm selection.

After highlighting 'Full screen', confirm selection by pressing . The full screen mode appears.



The "Set-up" screen context menu item 'Zoom' may be used to zoom the surface grid in or out.

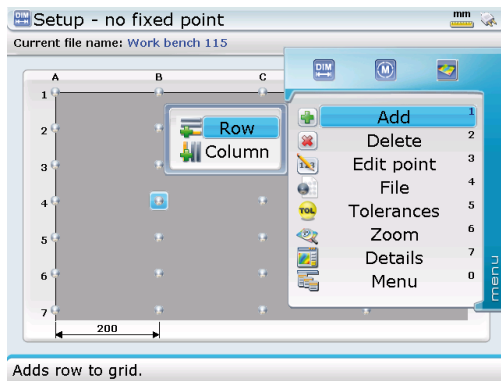


To edit points of interest on the grid, use the appropriate context menu item.

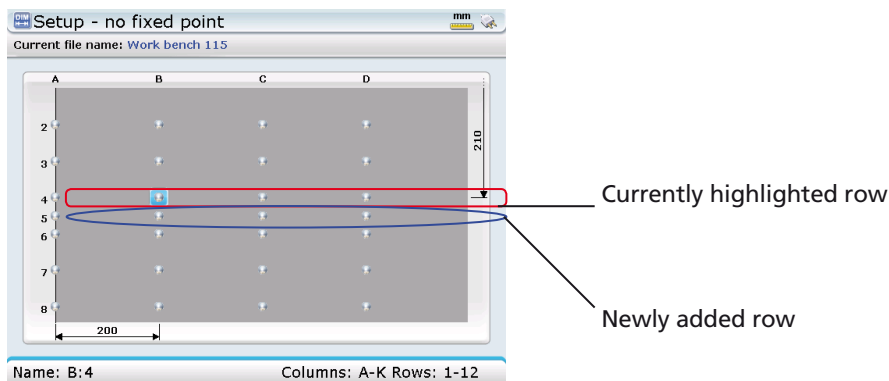
5.3 Editing grid points

5.3.1 Adding new rows and columns

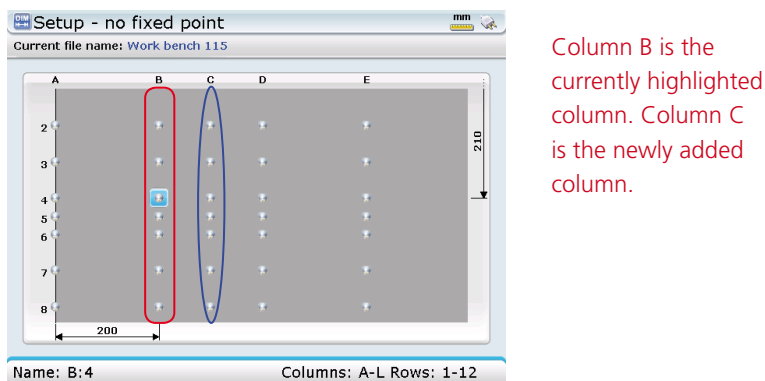
The "Set-up" screen context menu item 'Add' is used to add complete rows or columns to the existing grid.



With the context menu displayed, use the navigation keys to highlight 'Add' followed by either 'Row' or 'Column', depending on grid item being added. Press **Enter** to confirm selection. If 'Row' was selected, a new row appears below the one currently highlighted.



If however 'Column' was selected, a new column appears to the right side of the one currently highlighted.

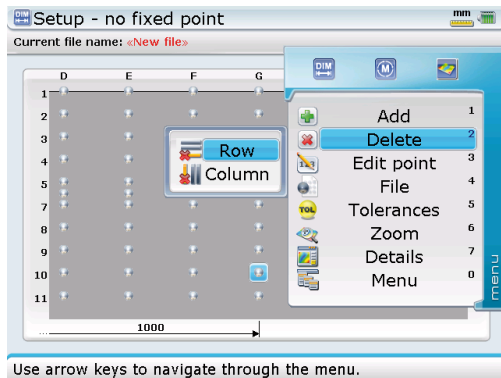


The newly added column or row is always equidistant from the two neighbouring columns or rows.

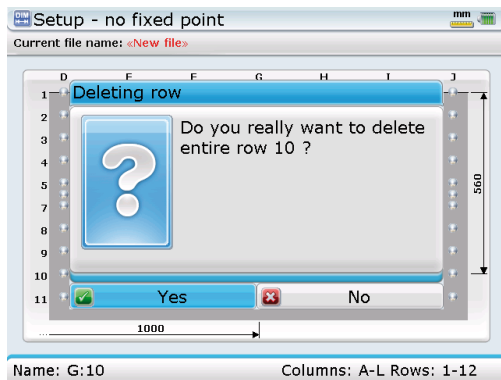


5.3.2 Deleting rows and columns

The "Set-up" screen context menu item 'Delete' is used to delete complete rows or columns from the existing grid.



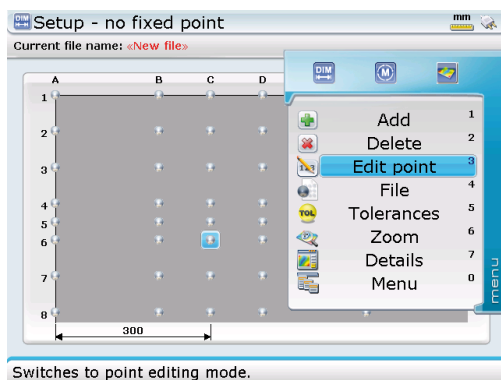
With the context menu displayed, use the navigation keys to highlight 'Delete' followed by either 'Row' or 'Column', depending on grid item to be deleted, then press Enter . The confirm delete dialog appears.



44 Use \leftarrow / \rightarrow to highlight 'Yes' then confirm row/column deletion by pressing either Enter or t .

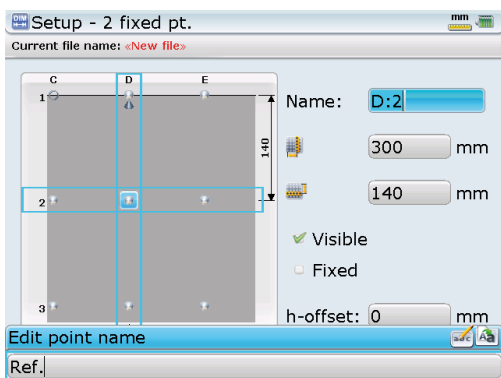
5.3.3 Editing measurement points

From the set-up screen, use the navigation keys to highlight the measurement point to be edited, then press Menu . The context menu appears. Use Δ / ∇ and highlight the context menu item 'Edit point'.



Alternatively, pressing Enter with the required measurement point highlighted opens the point editing pane.

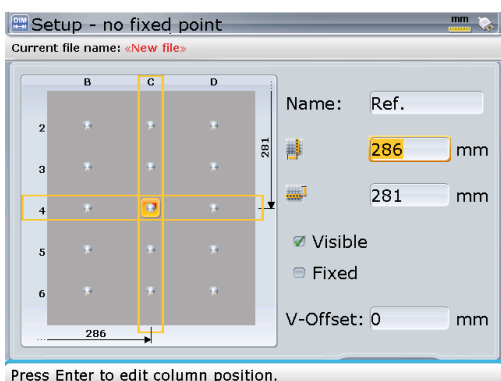
Press Enter to confirm selection. The point editing pane appears. Use the navigation keys to access the pane.



In this example, the measurement point D2 is being assigned the name 'Ref.'

The name and the position of the selected measurement point is edited as follows:

1. Highlight the name or dimension box using the navigation keys.
2. Either press **Enter** to access the editing box or edit the name or dimension directly using the data entry keys.
3. Confirm changes by pressing either **Enter** or **Tab**.
4. Use the navigation keys to select the next item to be edited.

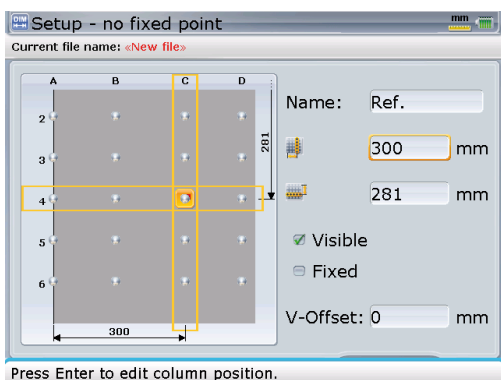


The red flag on the grid point [C4] indicates that the grid point name has been edited.

If either the x or y position of a measurement point is edited, the entire column or row changes. Before changes can be effected, a 'confirm change' dialog appears.



Note



In this example, the x value of the measurement point C4 [assigned the name 'Ref.']) has been edited from 286 mm to 300 mm. Once the changes are confirmed, all measurement points in column C are affected.

5.3.4 Adding offset values

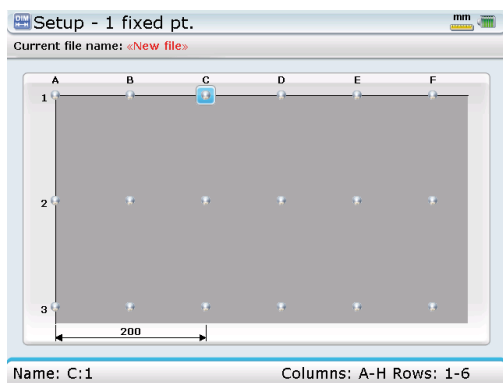
If the object being measured has different levels, the offset must be taken care of without moving LEVALIGN flatness laser. This offset is compensated by applying offset tubes and shims on the sensor bracket assembly.

Use of the offset tubes and shims is restricted to using the magnetic base adapter without the plunger holder.

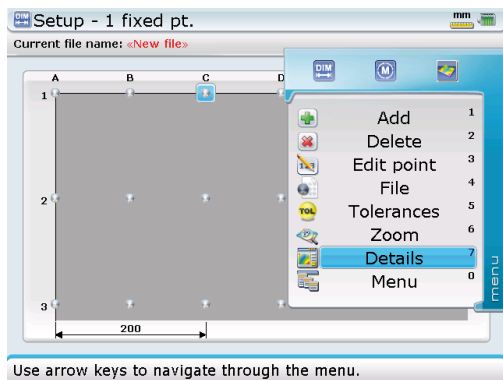


The added value is accounted for in the calculation as follows:

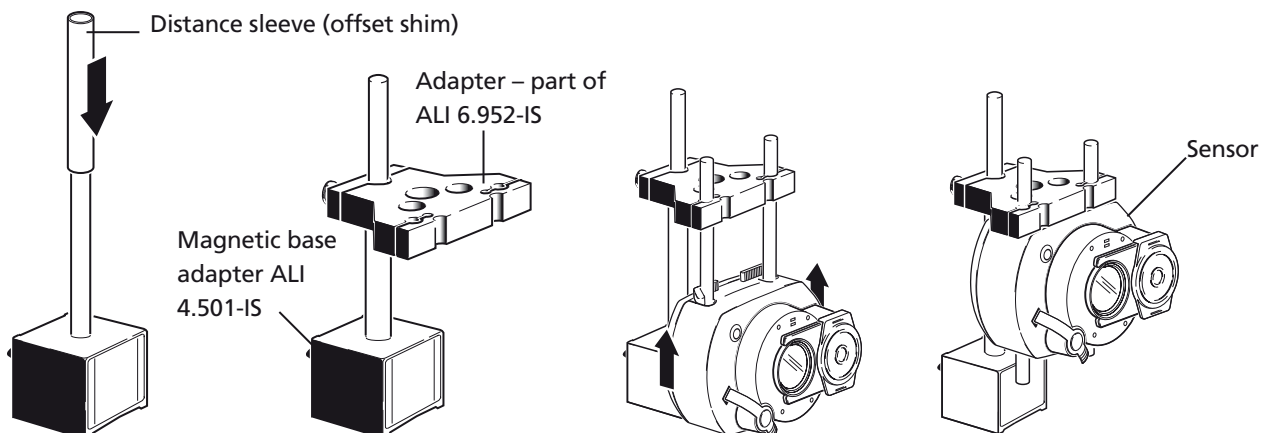
1. From the full screen in set-up, use the navigation keys to select grid point that requires shimming.



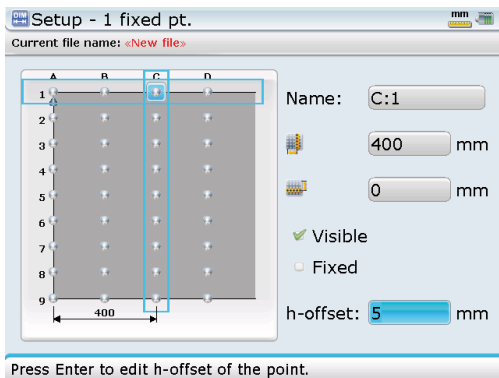
2. Press . From the context menu that appears, use / and highlight the context menu item 'Details'.



Alternatively, pressing with the required measurement point highlighted opens the point editing pane.

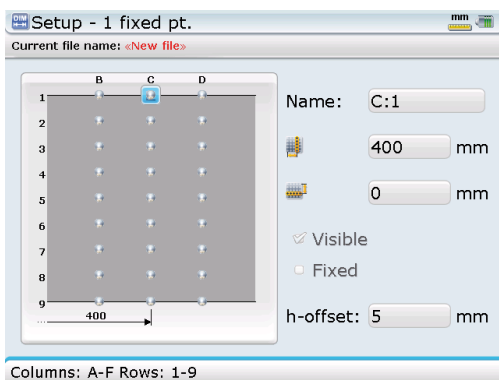


- Press to confirm selection. The point editing pane appears. Use the navigation keys to access the pane.
- Use the navigation keys to highlight the 'h-offset' value box then enter offset value using the data entry keys.



Note: "h-offset" stands for 'height offset'.

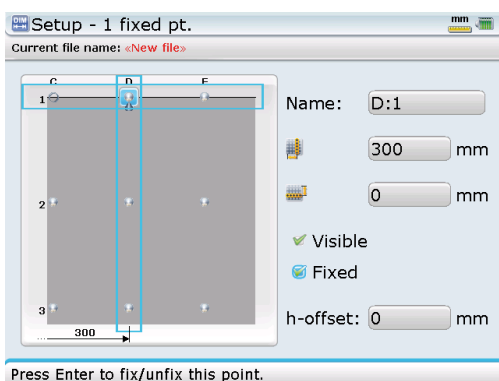
- Confirm entry by pressing .



The underscore appears at the applied grid point – in this case C1.




5.3.5 Defining non-existing and fixed points

Depending on the surface being measured, it may be necessary to define the state of certain grid points. These could either be physically non-existent or fixed in order to act as reference points. The definition of grid points is carried out in set-up either using the context menu item 'Edit point' or alternatively pressing with the respective grid point highlighted.



With the grid editing pane open, use the navigation keys and highlight the 'Fixed' box. Press to fix the grid point. A check mark appears in the 'Fixed' box, and a triangular symbol appears at the grid point.

After defining a grid point as required, press to exit the grid editing pane and proceed to define the next grid point. Use the navigation keys to select a specific grid point.

Grid points are 'Visible' by default. If desired, grid points may be made non-existent. With the desired grid point highlighted, press  to open the grid editing pane. Use the navigation keys and highlight the 'Visible' box. With the box highlighted, press  to make the grid point non-existent. The check mark next to 'Visible' disappears, and the O symbol  appears at the grid point.



Note

5.4 Laser beam adjustment

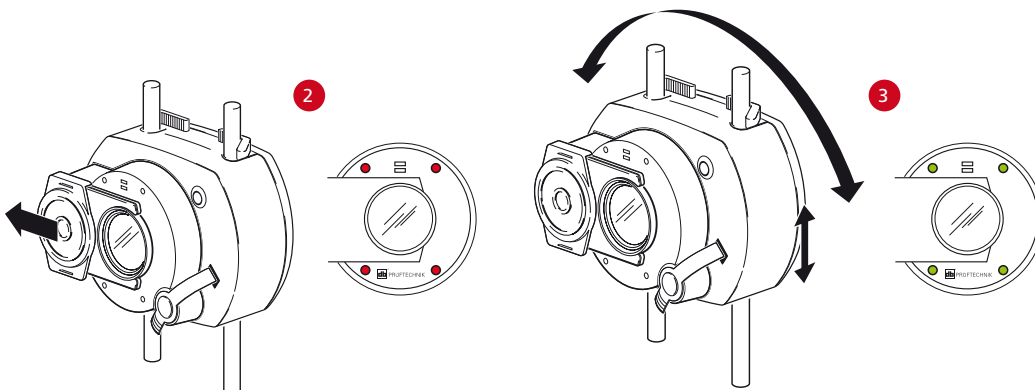
5.4.1 The principle

1. After completion of laser set-up, place the sensor assembly at a point of interest on the marked grid. If the set-up was carried out correctly, the laser beam should strike the center of the sensALIGN sensor dust cap
2. Slide the sensALIGN sensor dust cap to open the sensor lens and observe the four sensALIGN sensor laser beam adjustment LEDs. If all four LEDs are blinking green once every second, then the laser beam is correctly centered on the sensor, and you may proceed with measurement (section 5.5).
3. If however, the laser beam is not correctly centered, readjust the laser beam. Observe the four laser beam adjustment LEDs while carrying out the adjustments. It may be necessary to adjust the height of the sensor to ensure that the laser beam strikes the sensor position detector.



The intensity of the beam can be regulated by pressing the LEVALIGN flatness laser beam finder switch.

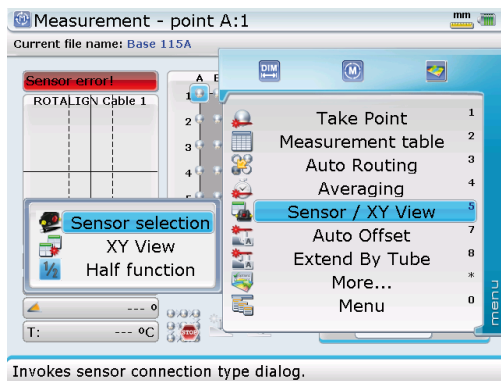
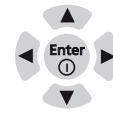



Note

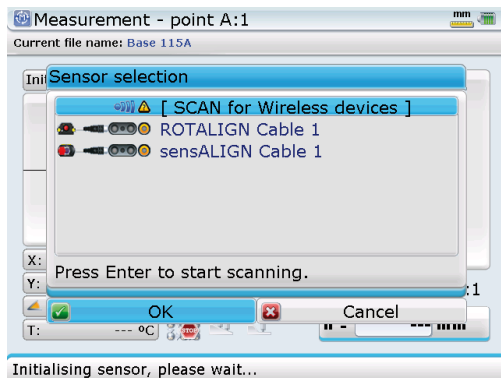





5.5 Taking measurements

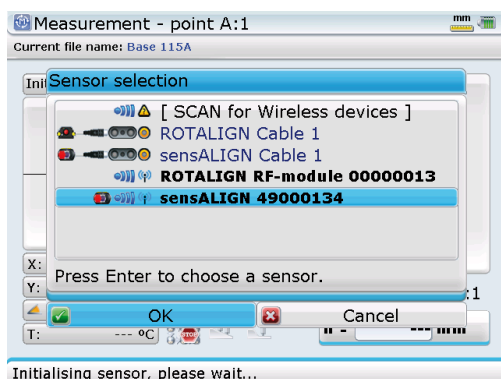
With all four sensALIGN sensor laser beam adjustment LEDs blinking green once every second – an indication that the laser beam has been correctly adjusted – press  to open the measurement screen. As sensALIGN sensor has not yet been initialized, the ‘Sensor error’ message will appear on the screen. Press  then use the navigation keys to the submenu context item ‘Sensor selection’.






Confirm selection by pressing . The sensor selection window opens.

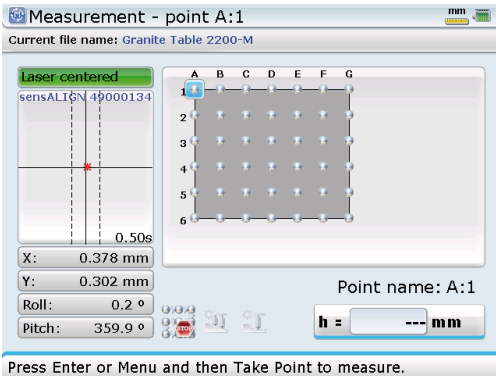


Use / to highlight ‘Scan for wireless devices’, then press  to confirm selection. With this step, the neighbourhood is scanned for Bluetooth devices. After the scanning process is completed, any Bluetooth devices detected will be listed on the screen.



Use / to select the appropriate sensALIGN sensor (e.g. ‘sensALIGN 49000134’). Press  to confirm selection and proceed with measurement.

When sensALIGN sensor is initialized, and the laser beam correctly adjusted, the measurement screen below appears.



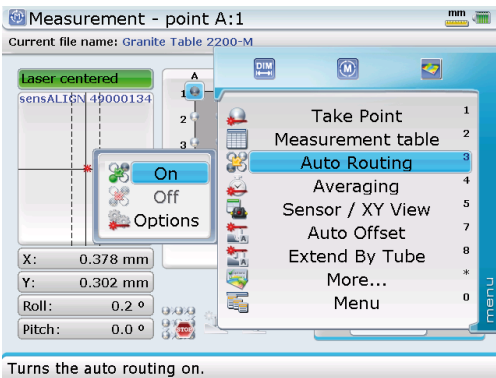
Press to take measurement at the current position on the grid. Use either the navigation keys or the auto-routing function to select the next measurement position on the display grid.

LEVALIGN flatness laser must not be moved after measurement has commenced.



5.5.1 Using auto-routing

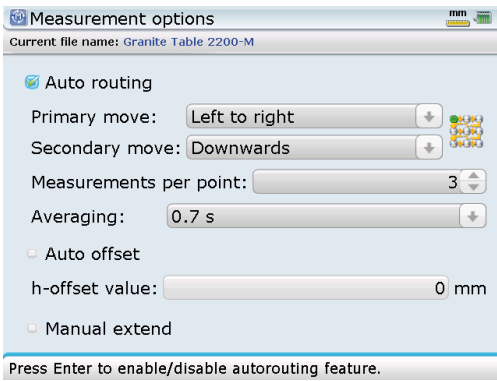
1. The auto-routing function enables the intelligent and automatic selection of the next measurement point. Auto-routing is accessed via the measurement screen.
2. While in the measurement screen press . The context menu appears.



In this example, the 'Auto-routing' submenu item 'Off' appears greyed out indicating that auto-routing has been turned off for the current measurement (indicated by the STOP sign in the auto-routing symbol).

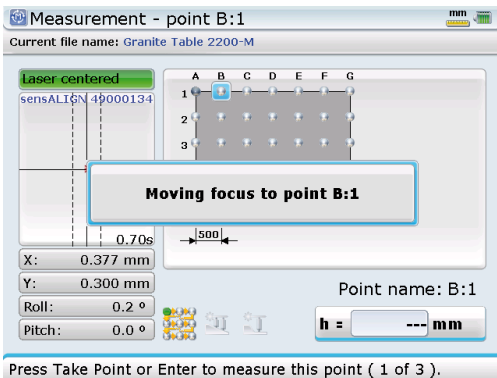
Auto-routing is turned on by highlighting 'On' using the navigation keys, then confirming selection by pressing .

3. Use the navigation keys to highlight the 'Auto-routing' submenu item 'On', confirming selection by pressing .
4. To determine the turn-by-turn directions and number of measurements to be made per point, use the 'Auto-routing' submenu item 'Options'. Highlight the submenu item 'Options' using the navigation keys then press to confirm selection.



The 'Primary move' drop down menu shows the available turn-by-turn directions. 'Secondary move' is either upward or downward. Other measurement items that may be set on the "Measurement options" screen include: Measurements per point, Averaging, Auto offset and Manual extend.

5. Press **t** to return to the measurement screen, then proceed to take measurement for the highlighted point by pressing **Enter**.
6. After taking point, move the sensor assembly to the next measurement point. If using auto-routing, this point will be assigned automatically.

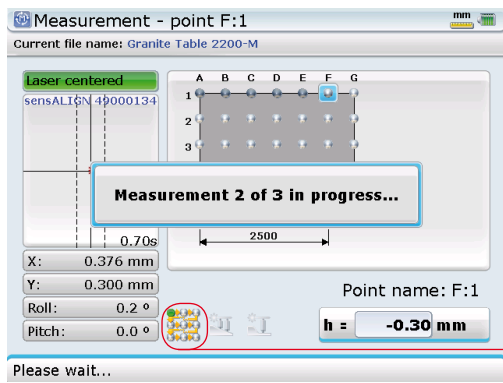


The navigation keys may be used to override the auto-routing function.



Note

7. Repeat step 6 for each remaining measurement position marked on the grid, pressing **Enter** to take measurement at each point. If selecting measurement points manually, move successively through the rows and columns.
8. If auto-routing is selected, the next measurement point will be highlighted automatically only after the set measurements per point have been attained. During the taking of these measurements, the message 'Measurement "x" of "y" taken' appears with each measurement.



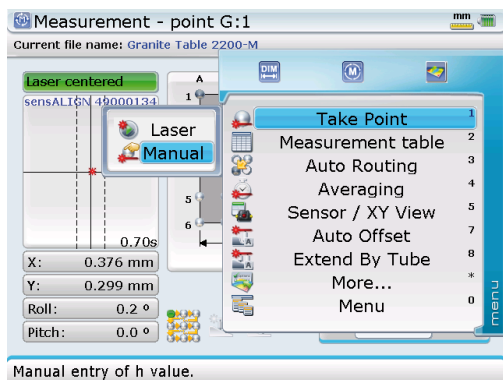
Points on the grid where measurement has been taken acquire a darker grey shade [■]. In this example, the 10 measurements per point has been set.

This symbol shows that auto-routing is active and the measurement routing is left to right going downwards as appearing on the screen.

5.6 Measurement context menu items

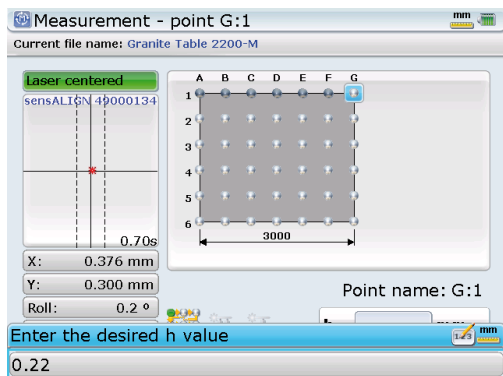
The measurement screen context menu items provide commands that facilitate measurement procedures. The context menu is accessed by pressing while in "Measurement" screen.

5.6.1 Take point



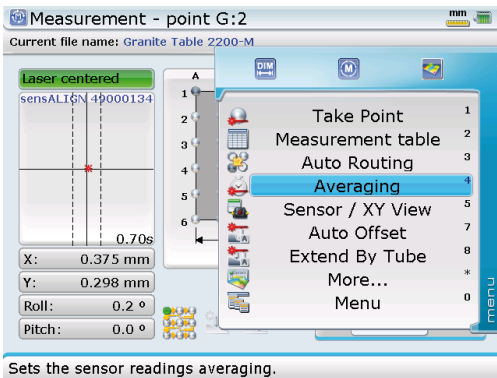
The context menu item 'Take point' has the submenu items 'Laser' and 'Manual'. Use or to toggle between these two submenu items. When 'Laser' is highlighted, the selected point is measured when is pressed.

The submenu item 'Manual' may be used to compare readings taken using conventional methods. Highlighting 'Manual' then confirming selection by pressing opens the editing box where the surface height value h may be edited.

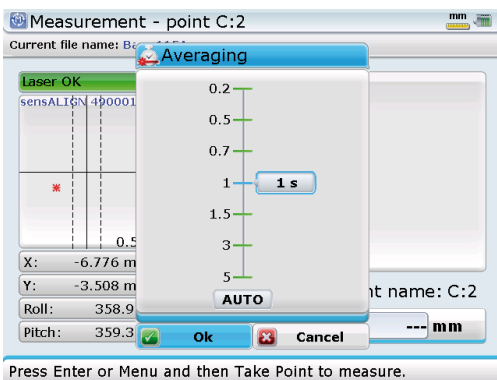


The surface height value h may be entered manually.

5.6.2 Averaging



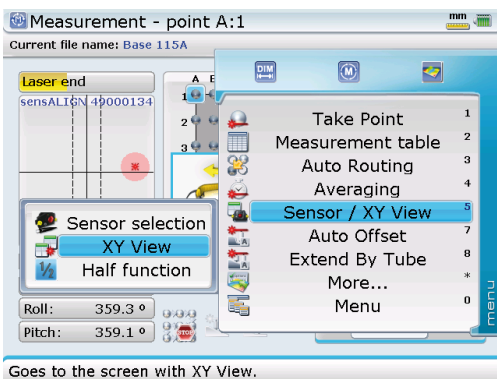
The context menu 'Averaging' is used to set the duration of averaging individual detector readings for a single measurement. With 'Averaging' highlighted, confirm selection by pressing **Enter**. Use **▲**/**▼** to select the desired averaging duration then use **◀**/**▶** to highlight the 'OK' bar.



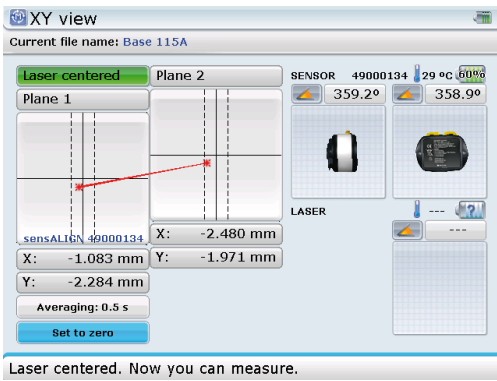
If 'Auto' averaging is selected, the system records automatically only when the readings are stable.

Confirm selection by pressing **Enter**. A higher averaging duration is recommended for surroundings with a high environmental vibration. The duration is indicated in seconds.

5.6.3 XY View

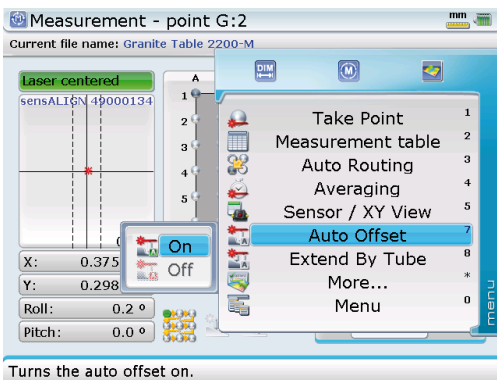


The submenu item 'XY View' is used to facilitate the centering of the laser beam on the two sensALIGN sensor detection planes before proceeding with measurement. Use the navigation keys to highlight 'XY View' then press **Enter** to confirm selection.



The two laser beam dots are centered on both planes using the micrometer screws and the fine adjustment knob.

5.6.4 Auto offset




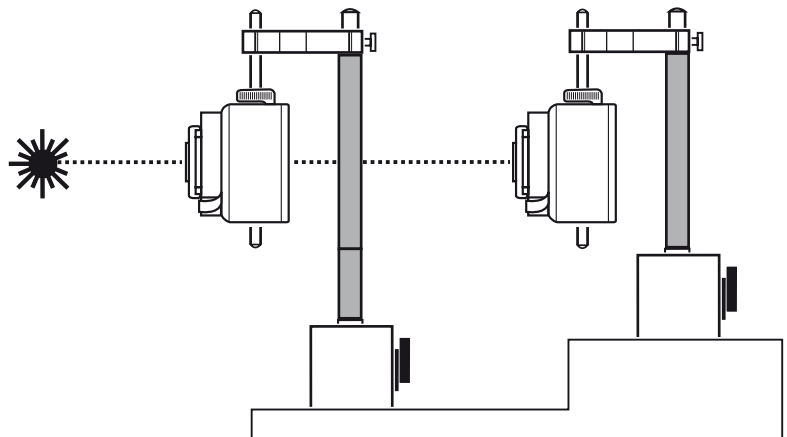
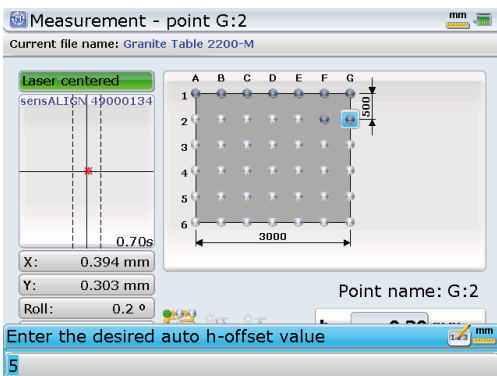
The context menu item 'Auto offset' has the submenu items 'On' and 'Off'.

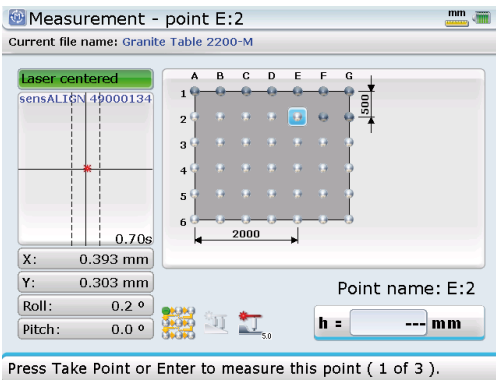
Auto offset is used if there is an intentional difference in height between two surfaces, e.g. between a pump base plate and a motor foundation. In this case, offset shims may be placed beneath the sensor to compensate the height difference.

54

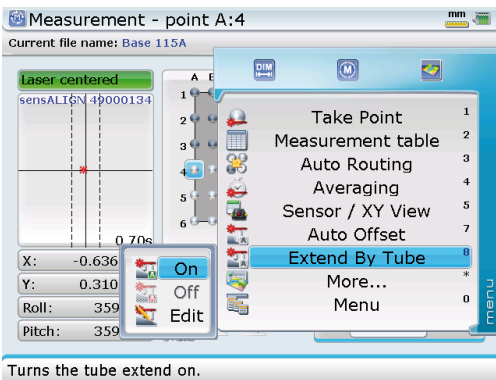
Auto offset is then used to automatically enter predefined offset values for affected positions during measurement without the need of manually editing individual points.

If auto offset has been selected, the submenu item 'On' appears greyed. If not selected, 'On' is automatically highlighted. Press  to confirm selection. The editing box opens, and the required offset value is entered.





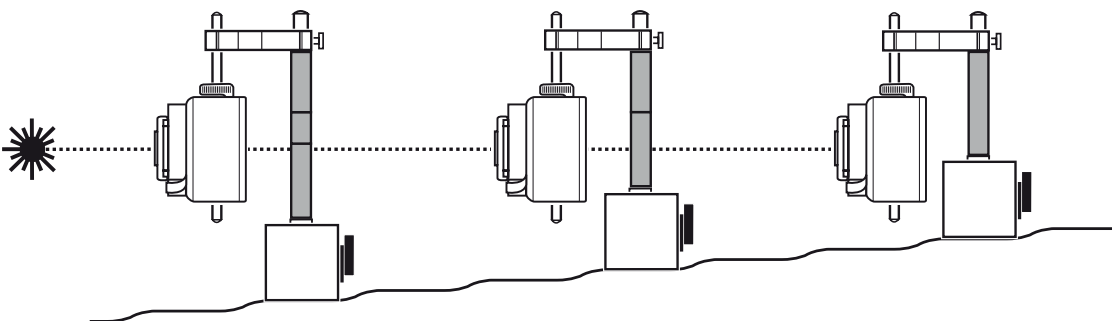
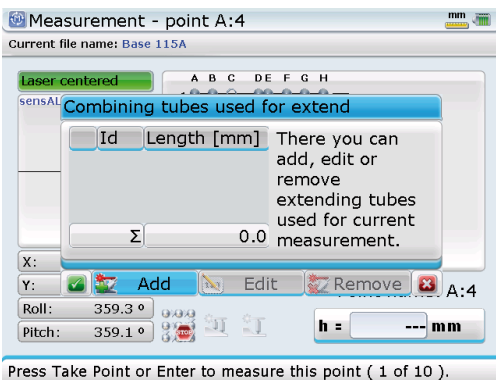
5.6.5 Extend by tube




The context menu item 'Extend by tube' has the submenu items 'On', 'Off' and 'Edit'.

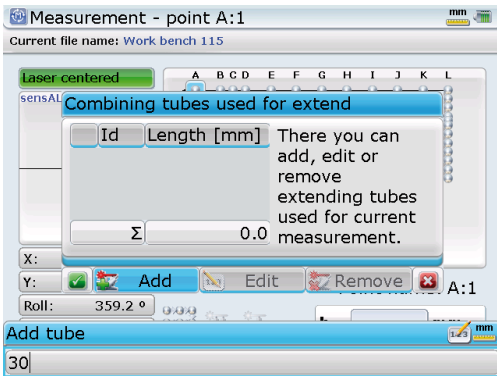
If a surface is so uneven that the laser no longer strikes the sensor at some measurement points, shims may be used to raise the sensor to a height in which the current position is again measurable.


The context menu item 'Extend by tube' is used to edit the value of extension tubes used to raise the sensor. Use the navigation keys to highlight either the submenu item 'On' or 'Edit'. Confirm selection by pressing Enter thereby accessing the editing screen.




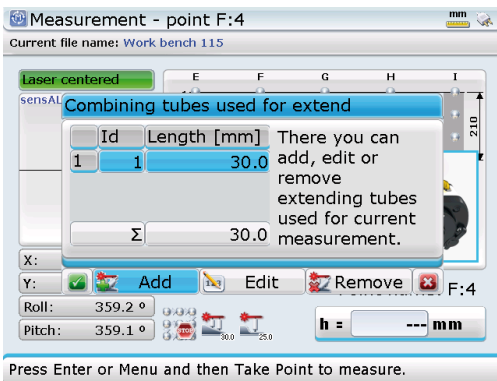
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With the button 'Add' highlighted, press  to edit the height of the tube used in the extension of the sensor at the selected location.

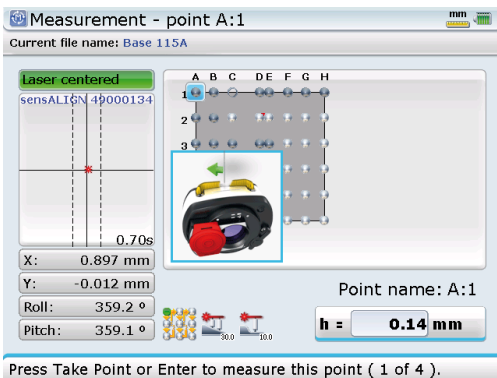


With the 'Add' button highlighted, pressing  opens the editing box where the total height of the distance sleeves used is entered.

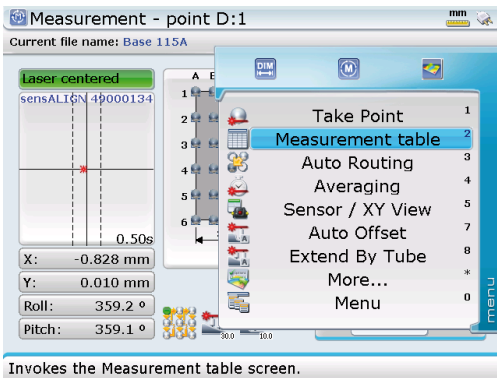
Confirming entered height value by pressing  reveals a tubes value table.



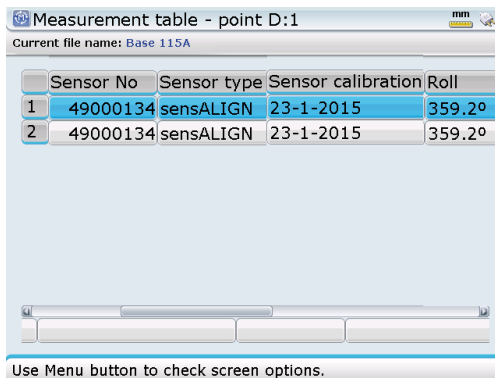
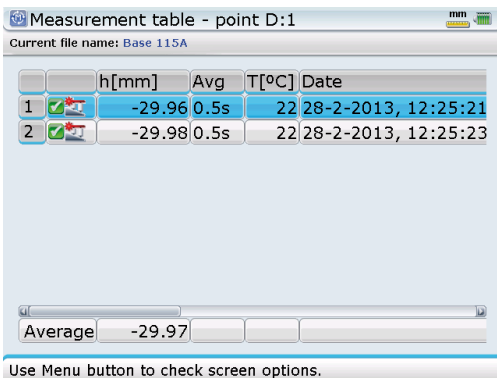
After editing height value, press  to proceed with measurement.



5.6.6 Measurement table

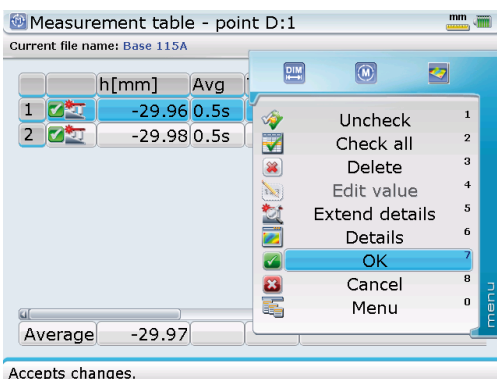


The context menu item 'Measurement table' shows a detailed history of measurements for each individual position. Use Δ / ∇ and highlight 'Measurement table' then press Enter to confirm selection. A table appears showing all measurements taken at a given point – in this case D1



Selected measurements are averaged into a composite reading for graphic depiction and recording in results display. To select/deselect a measurement, use Δ / ∇ to mark the desired measurement line, then press Enter to place (or remove) a checkmark on (or from) that line.

Pressing Menu while viewing the measurement table prompts the "Measurement table" screen context menu.



The context menu items are highlighted using Δ / ∇ and selection confirmed by pressing Enter .

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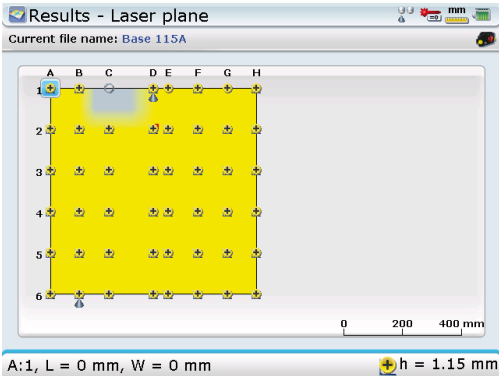
The following items are available:

- › Uncheck/Check – used to place (or remove) a checkmark on the selected measurement
- › Check all – used to place checkmarks on all measurements on the table
- › Delete – used to delete highlighted measurement
- › Extend details – used to show height of extension tubes used
- › Details/Fullscreen – used for the graphic depiction of the measurement point



5.7 Evaluating results

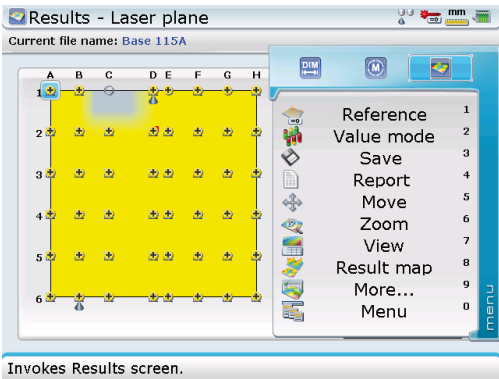
After completing taking measurements, press **RES** to display results.



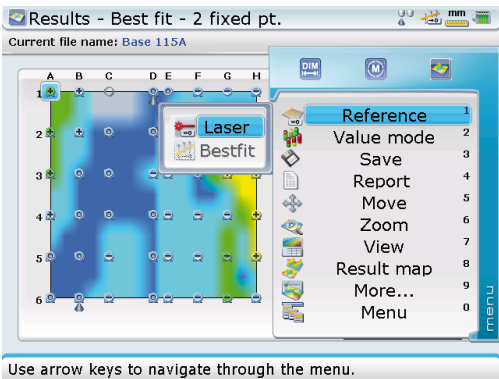
The results displayed in this example use the laser as reference. To be able to interpret results correctly, there is a need to understand the "Results" screen context menu items.

5.7.1 "Results" screen context menu items

With the "Results" screen open, press **Menu** to prompt the corresponding context menu.



5.7.2 Reference



The reference in this example is 'Best fit' which then appears grayed out in the submenu list.

The context menu item 'Reference' has two submenu items – 'Laser' and 'Best fit'.
With Laser as reference, the grid shows the height of the measured points with respect to the laser beam.
With 'Best fit' selected as reference is, the the grid shows the height of the measured points with respect to the best possible plane.

5.7.3 Value mode

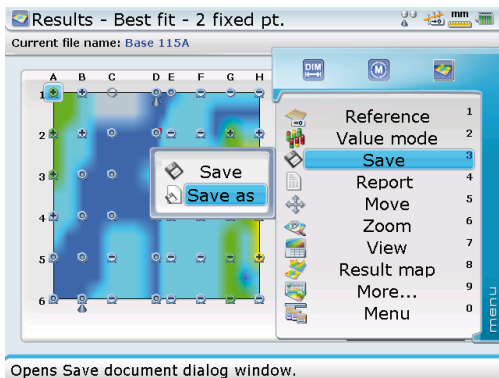


The context menu item 'Value mode' has three submenu items – 'Original values', 'Positive' and 'Negative'.

The value mode takes the reference plane into consideration.

- › Original values – values with reference to the selected plane
- › Positive – the reference plane has the lowest height
- › Negative – the reference plane has the highest height

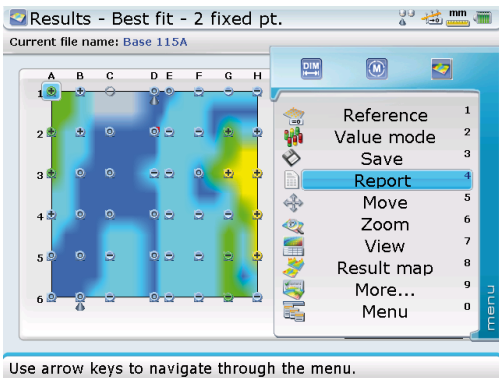
5.7.4 Save



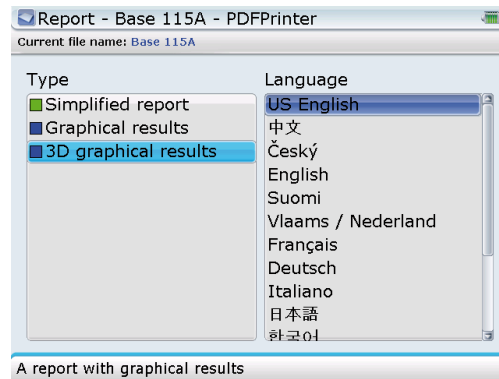
60

The context menu item 'Save' and its two submenu items 'Save' and 'Save as' are used to save measurement files.

5.7.5 Report



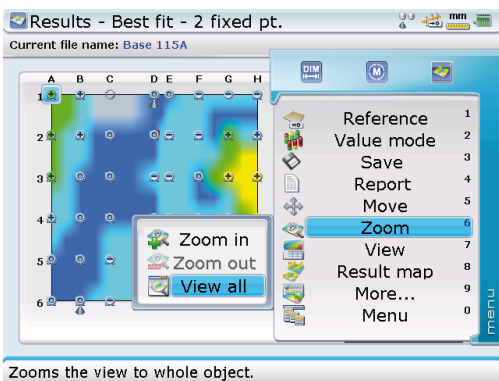
After confirming selection, the screen below opens. It shows types of reports and languages available.



After selecting type of desired report and language, and computer connected to the appropriate peripheral device, pressing **Enter** sends the report to the desired peripheral device. Depending on the printer configuration the measurement report may be saved as PDF or printed directly.

The context menu item 'Report' may be used to print measurement reports directly from ROTALIGN Ultra iS computer or save measurement files directly from the computer as a PDF copy (refer to section 4.1.5 'printer set-up').

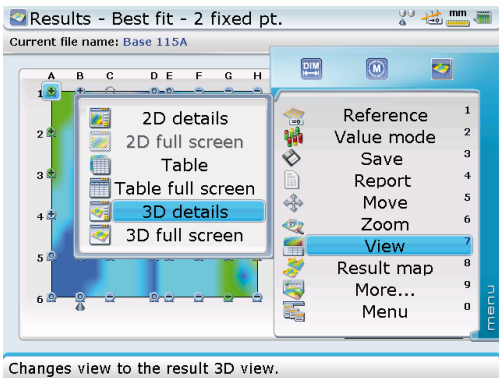
5.7.6 Zoom




The context menu item 'Zoom' has three submenu items – 'Zoom in', 'Zoom out' and 'View all'.

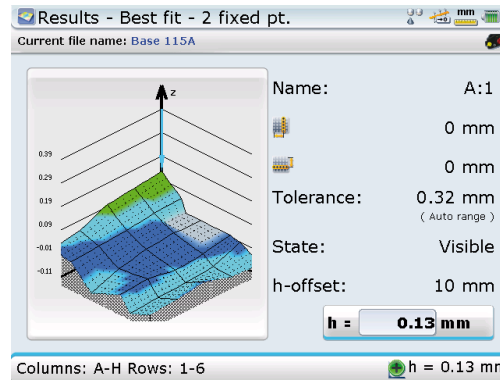
- › 'Zoom in' is used to enlarge the grid on the display
- › 'Zoom out' is used to reduce the size of the grid on the display
- › 'View all' is used to show complete grid on the display

5.7.7 View



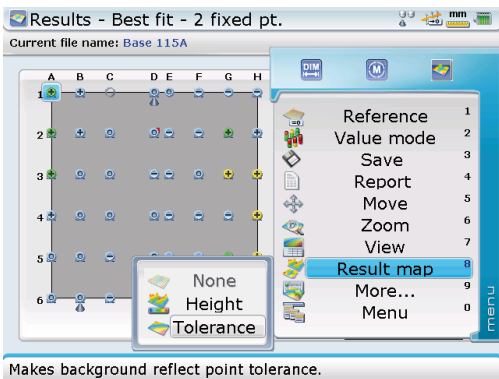
In this example, the 'View' context submenu item '3D details' has been highlighted. Confirming selection by pressing  reveals the corresponding screen below.

The context menu item 'View' provides a set of submenu items that may be used to display measurement results in a variety of formats that include, tabular, 2D and 3D formats.



If a 3D view is selected, the screen context menu provides an opportunity to rotate the 3D grid either to the left or right.

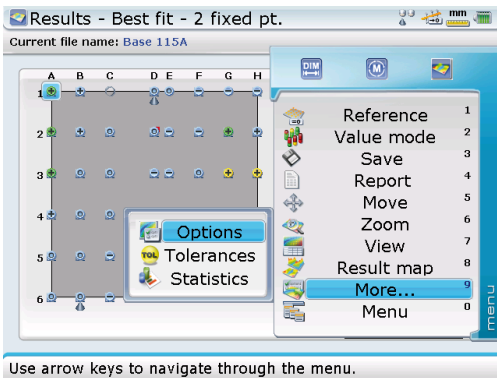
5.7.8 Result map



The context menu item 'Result map' has three submenu items – 'None', 'Height' and 'Tolerance'.

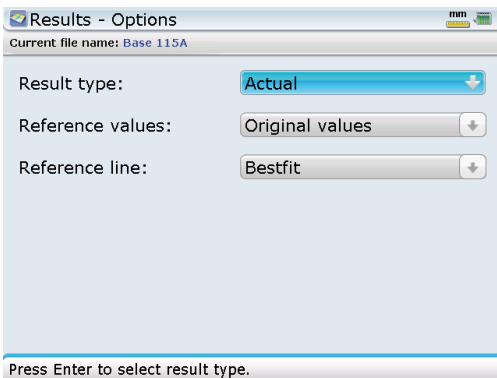
- › The submenu item 'None' shows the results at individual points within the grid.
- › The submenu item 'Height' shows the relative height of the entire surface relative to the reference points.
- › The submenu item 'Tolerance' shows the tolerances across the entire surface relative to the reference points

5.7.9 Options, tolerances and Statistics

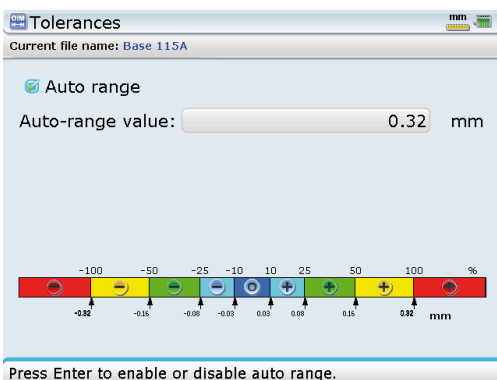


The submenu items 'Options', 'Tolerances' and 'Statistics' are accessed via the context menu item 'More'.

The submenu 'Options' is used to set the reference value mode and the default reference.

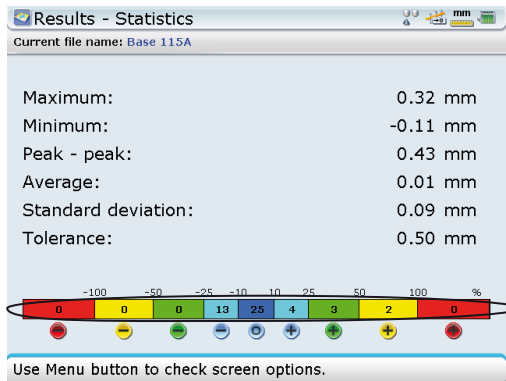


The submenu item 'Tolerances' is used to set the maximum tolerance value. The tolerance value is entered in the value box when the 'Auto range' box is unchecked.



When 'Auto range' is selected, the value displayed automatically is dependent on the entire measurement.

The submenu item 'Statistics' displays the statistical data related to the entire measurement.

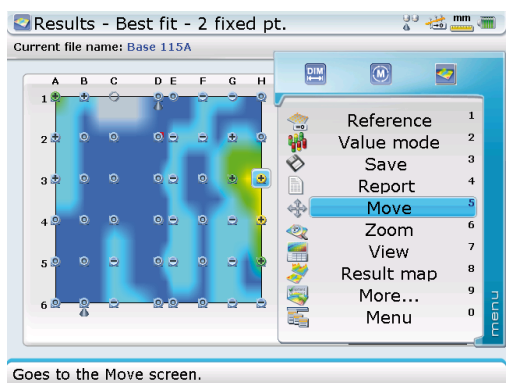


The tolerance bar within the statistics screen shows the number of measured points falling within the specified tolerance categories.

5.8 Move

In specific applications, it is possible to make height corrections by moving the surface using specialized anchoring bolts. The Live Move function within the flatness application assists the user make the necessary corrections when moving respective sections of the object surface. A major goal during the correction process is to minimize movement and still reach the required objective. The Live Move function, accessed via the "Results" screen context menu item 'Move', makes it possible to monitor these corrections, hence minimizing the chances of overshooting the required correction.

With results displayed, use the navigation keys to highlight measurement point that needs adjusting then press to open the "Results" screen context menu. Use / and highlight the context menu item 'Move'.




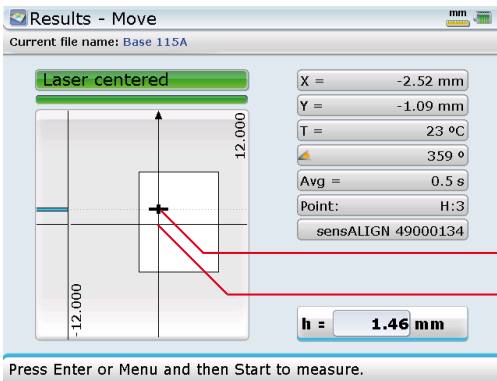
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Before starting Live Move, it is important to ensure that sensor is positioned at the point to be moved and the laser beam is centered on the detector. This is achieved by observing the four sensor beam adjustment LEDs which should all blink green once every two seconds.






Note

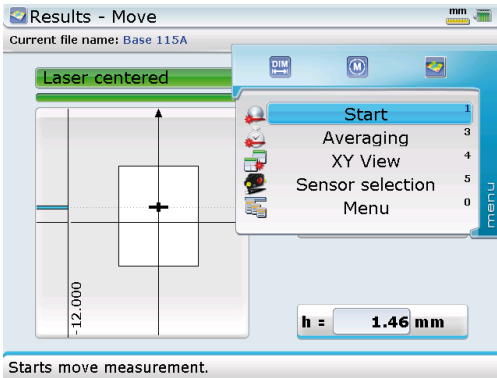
With laser beam centered, press  to confirm selection.




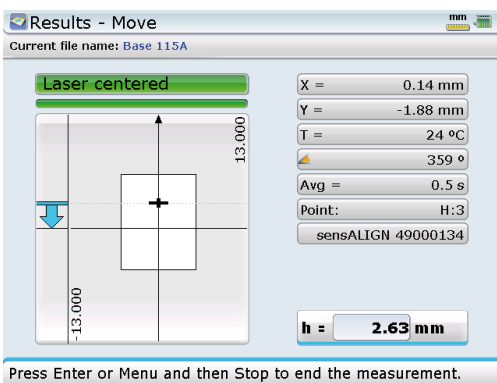
Measurement position to be moved

The 'best fit' position where the measurement position is to be moved




By previously ensuring that the laser beam is centered, both the measurement position and the desired position (in this case 'best fit') fall within the detector surface. Press  then use / and highlight the context menu item 'Start'.

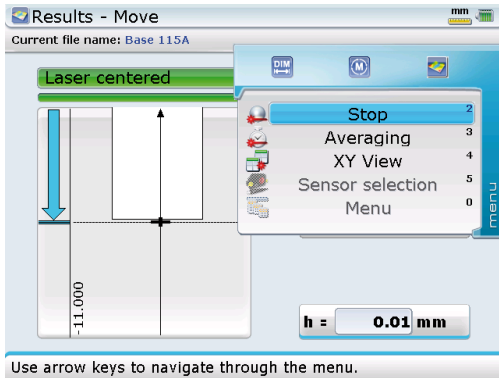


With 'Start' highlighted, confirm selection by pressing .




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Carry out the adjustments while observing the the changes on the display. The selected measurement position should be moved such that it intersects the 'best fit' position on the display. When this is attained, press  to open the "Move" screen context menu, then use / and highlight the context menu item 'Stop'.



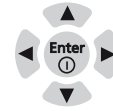
Confirm completing the Live Move measurement by pressing .

To view the results after the adjustment, press  to return to the "Results" screen.

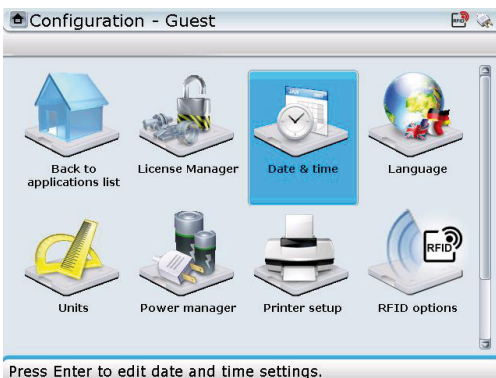
Chapter 6: ROTALIGN Ultra iS configuration

6.1 Configuration

From the “Program Manager” screen use the navigation keys to highlight the icon ‘Configuration’.



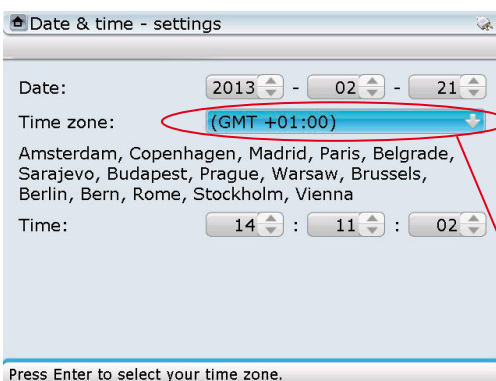
Press  to reveal the items used to configure the ROTALIGN Ultra iS computer.






The “Configuration” screen allows the following computer settings to be made: ‘Date and time’, ‘Language’, ‘Dimension and temperature units’, ‘System power management’, ‘Printer set-up’, ‘Display brightness’, ‘Word completion’ and ‘Customization’.

6.1.1 Setting date and time

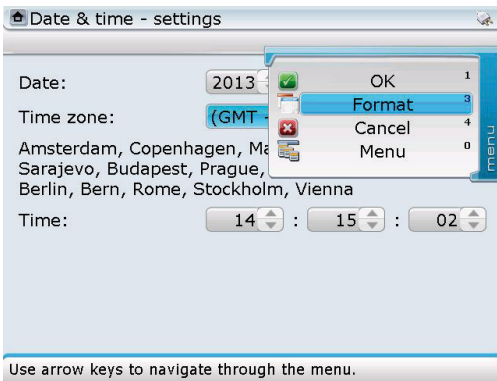
Accessing this section allows you to set the current date and time, choose the proper time zone, and change the date and time presentation formats.



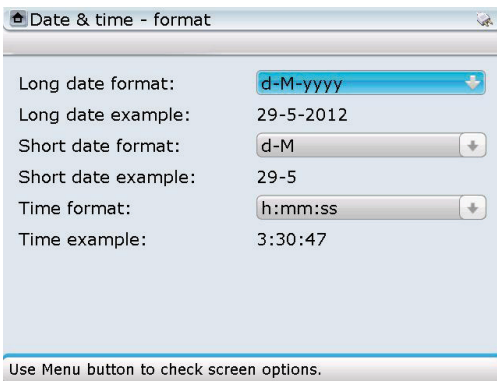
Use the navigation keys to select item to be changed. To change digit values press  then use  to increase value or  to decrease value.

A drop down menu is available for the selection of time zones.

To change the presentation format, press . The context menu appears.



Use / to highlight 'Format' then press to confirm selection. The "Date and time format" screen appears.

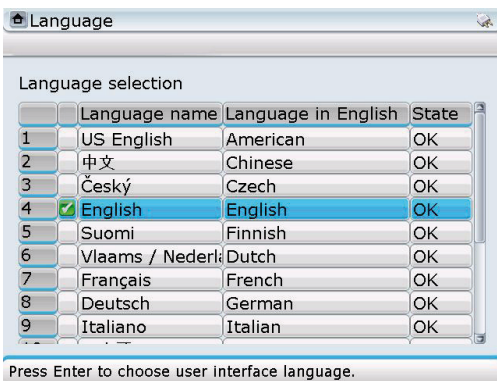


Use the navigation keys to move from one drop down menu to the next. When a drop down menu box is highlighted, press to display the available formats. Use / to highlight the desired format, confirming selection by pressing either or .

6.1.2 Language selection

Accessing this section allows you to select preferred country language.

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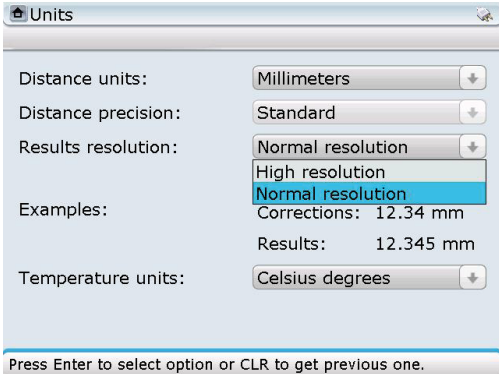


The green check mark indicates the currently set language.

Use / to highlight preferred language. Press to confirm selection.

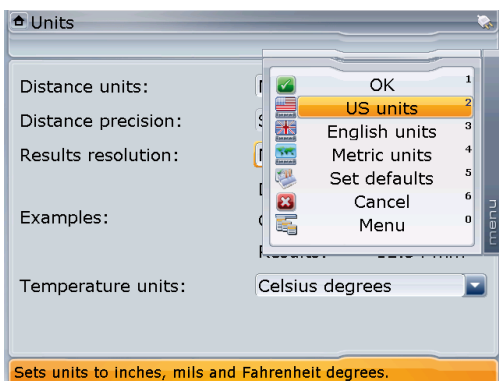
6.1.3 Setting units

Accessing this section allows you to change the dimensions and temperature units, as well as the resolution of physical quantities used in ROTALIGN Ultra iS. In this case, resolution is defined as the measurement precision in two or three decimal places



Use the navigation keys to move from one drop down menu to the next. When a drop down menu box is highlighted, press to display the available options. Use / to highlight the desired option, confirming selection by pressing either or .

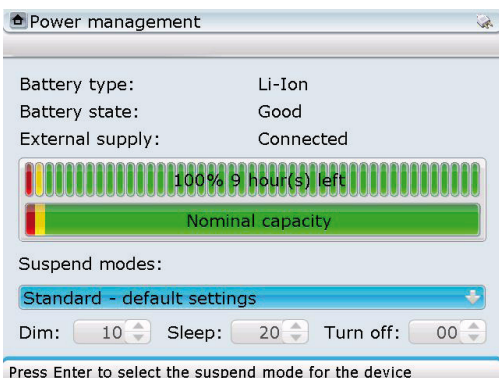
Different system units can be configured by pressing while in the unit screen. The context menu appears.



Use / to highlight the preferred system of units. Confirm selection by pressing .

6.1.4 Power management

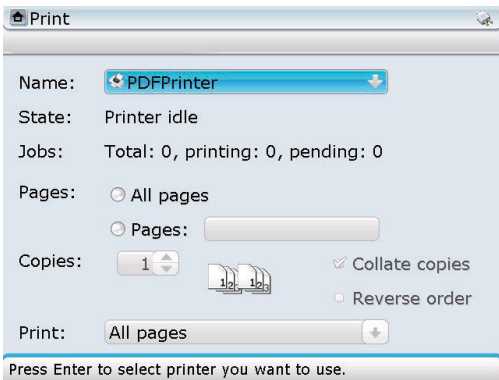
This section displays the current battery status, allows you to control the power management features of shutdown, hibernate (sleep mode), and standby.



To set standby and hibernate modes, press while in the "Power management" screen then use / to highlight required mode from the drop down menu that appears. Confirm selection by pressing or . In hibernate, power is cut off completely while in standby it is not cut off completely.

6.1.5 Printer set-up

Accessing this section allows you to set-up printers and the printing configuration on ROTALIGN Ultra iS.

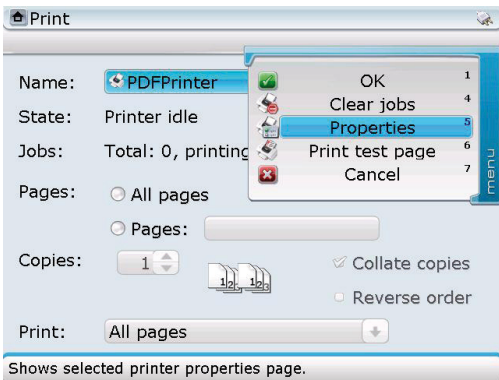


Select printer by pressing **Enter**, while in the "Print" screen then use **Up**/**Down** to highlight required printer from the drop down menu that appears. Selection is confirmed by pressing any one of these keys – **Enter** or **T** or **Left** or **Right**.

The default printer is 'PDF printer'. Using this printer setting, measurement files are saved as PDF directly to a memory stick (aka jump drive).

Use the navigation keys to scroll through the settings and print options. Press **Enter** to select or edit an option or setting.


More printing options can be accessed by pressing **Menu** while in the print screen. The context menu appears.






Scroll the context menu using **Up**/**Down**. Press **Enter** to confirm selection. 'Properties' context menu item is used to access the screen where page size and page orientation may be set. This menu item is not available if the selected printer is 'PDF printer'.

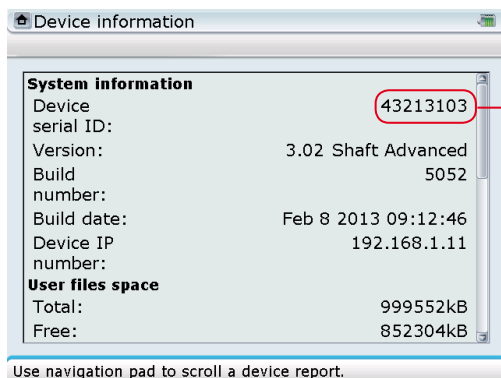
6.1.6 Device info

Accessing this section allows you to see the current file space and operating memory statistics, the CPU data, the ROTALIGN Ultra iS serial number, and information about the core software used in the device.

'Device information' is accessed via either the 'Application information' icon or the 'Application options' icon within the "Configuration" screen. When the "About Program Manager" screen or the "Applications options" screen appears, press . A context menu with the item 'Device information' appears.



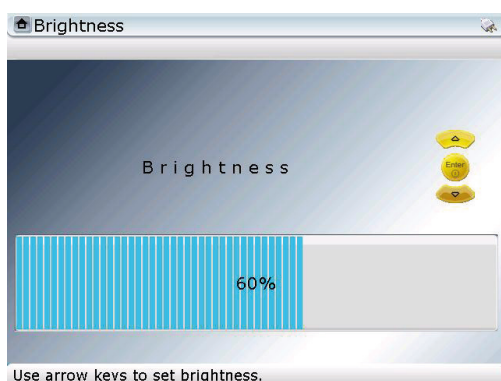
Use / to highlight 'Device information'. Press  to confirm selection and display device information.



ROTALIGN Ultra iS serial number


6.1.7 Display brightness

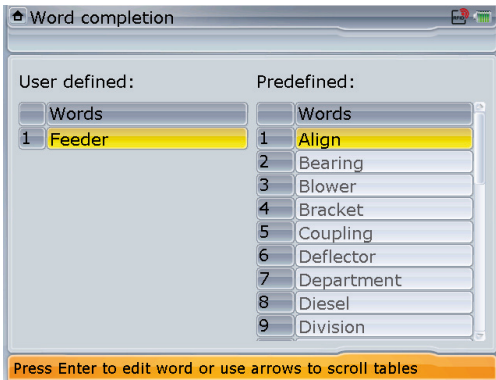
Accessing this section allows you to change the brightness of the display screen.




The display brightness is adjusted using  (increases) or  (decreases).

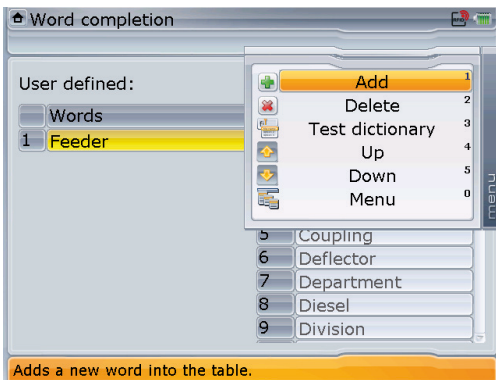
6.1.8 Word completion




The word completion mechanism helps save keystrokes and time while typing. It also helps you to make sure that the misspelling of words is avoided. When a user begins the entry of a word already listed in the system dictionary, the word is completed automatically, and may be adopted by pressing .






The 'Word completion' screen displays choice of words available for the automatic completion mechanism.

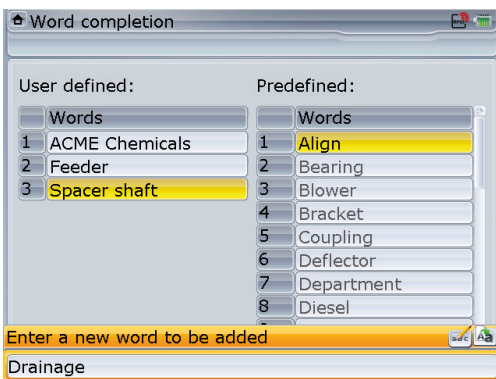
To add, delete or test the completion mechanism, press . The context menu appears.






Use / to highlight action required from the context menu confirming selection by pressing .



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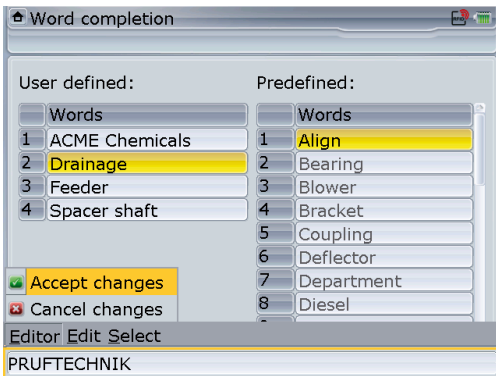
New additions are be made on the 'User defined' column only. To do this, use / to highlight 'Add'. Press  to confirm selection. Use the data entry keys to enter the new word in the dialog box that appears.







When entering user defined words that contain both upper and lower case characters, as well as numerals, use  to cycle through the three options. Press and hold down  while observing the status indicator at the top right corner of the dialog box. This displays the character to be entered.

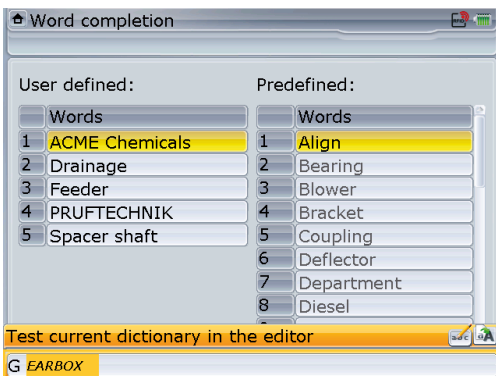
When entering letters,  is used to enter a blank space.

The new word is adopted within the user defined column by pressing either / or using the context menu item 'Accept changes'.



An additional editing facility is achieved using the dialog box menu bar items. The bar appears by pressing  when the dialog box is open. The menu bar is navigated using the navigation keys.

To test if a word is available in the dictionary, use / to highlight the context menu item 'Test dictionary'. Press  to confirm selection. Use the data entry keys to enter the first letter of the word required. The word high up in alphabetical order will appear in the dialog box. Test further by entering the second letter. If necessary enter the third and fourth letters to confirm whether the word is available in the dictionary.




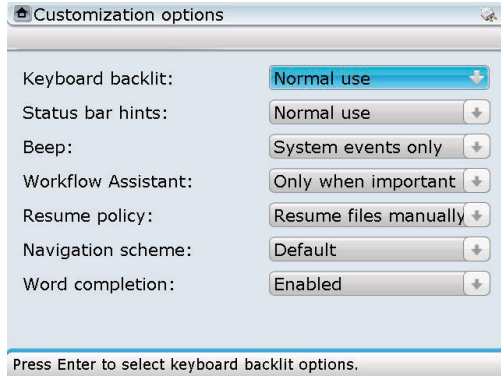
In this example, the letter 'G' has been entered first revealing that the word 'Gearbox' exists in the dictionary. If looking up the word 'Generator', we would be required to enter the first three letters ('gen') for results.






Addition and deletion of words is possible only with user defined words. Predefined words are not available for editing.



6.1.9 Customization

Customization makes it possible to change the device settings such that the information displayed is suited to individual needs. These settings are carried out in the “Customization options” screen which is accessed by pressing  with the ‘Customization’ icon highlighted.



Select item to be customized by highlighting the respective item box using the navigation keys. Press  and use  /  to select desired setting from the drop down menu that appears. Confirm setting by pressing  /  or any of the navigation keys.

Options available include:

Keyboard backlit

Two options are available – backlit is set either ‘Off’ or in ‘Normal use’

Status bar hints

Four options are available – ‘Normal use’, ‘Never in menu’, ‘Only in menu’ and ‘Never’

Beep

The internal beeper can emit sound signals when specific tasks take place. The drop down menu reveals the following options:

‘Never’ – beeper is permanently off

‘System events only’ – the sound signal is emitted only when a system event occurs

‘Every key stroke’ – the sound signal is emitted when a system event occurs and each time a button is pressed

Workflow assistant

This option is used to provide hints to the user on how to proceed with using the system.

Options available include – ‘Never’, ‘Always’, and ‘Only when important’

Resume policy

This option is useful for the resume functionality of ROTALIGN Ultra iS. The drop down menu reveals the following items:

‘Resume files manually’ – a new job is started by loading a default template

‘Always resume last file’ – the most recent job resumes automatically

Navigation scheme

There are two navigation options – ‘Default’ and ‘Editing moves focus’

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This customization option is very important in that it determines how a user navigates through the system. It would be advisable to try out the different options to establish which option suits you best. In this operating instruction we will try to stay with the option ‘Editing moves focus’.



Word completion

Two options are available – ‘Enabled’ or ‘Disabled’

User viewable files


Two options are available – ‘Only user files and templates’ or ‘All files from all users’

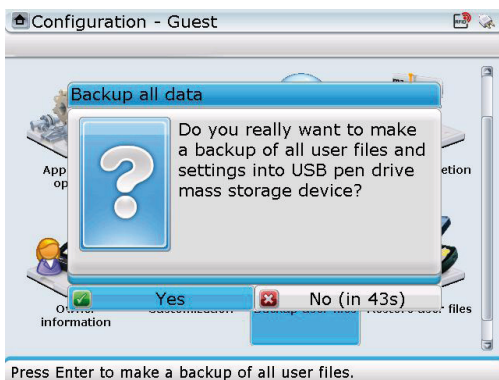
6.1.10 Measurement file backup




As an extra data storage capability, ROTALIGN Ultra iS Shaft measurement files may be saved and stored on memory devices such as memory sticks (aka jump drives) or on PCs.


The configuration item ‘Backup user files’ is used to create a backup file of all measurement files on any particular ROTALIGN Ultra iS computer.

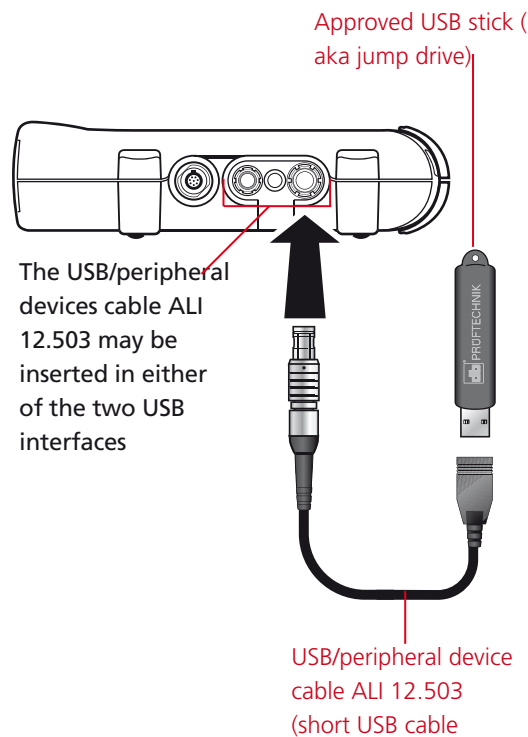
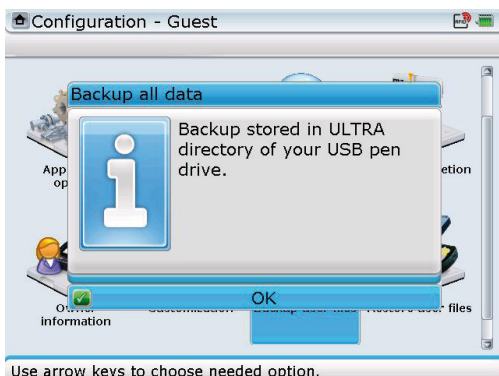
Attach an approved memory stick to the USB/peripheral devices cable ALI 12.503 (short USB cable) then connect the USB cable to the ROTALIGN Ultra iS computer USB port (refer to figure below).

Highlight ‘Backup user files’ icon then confirm selection by pressing . The following hint appears.



Use   to highlight ‘Yes’ then press  to confirm selection.


After backup completion, the following hint appears. Press  to confirm. You may now transfer the backup file to another storage device such as a PC.

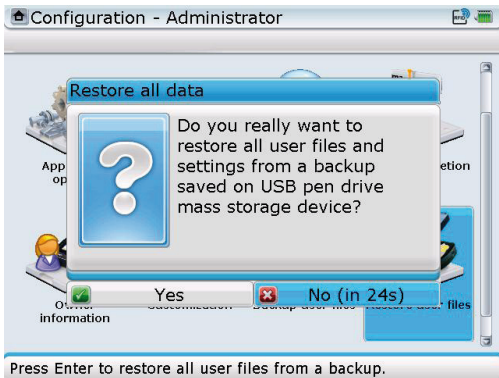


The backup file is stored in the ULTRA directory.

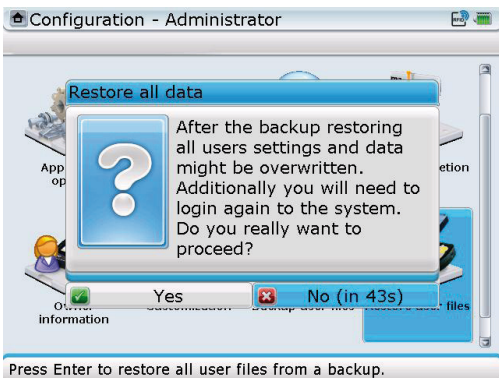
6.1.11 Restoring user files

Measurement files saved and stored as backup may be restored to the ROTALIGN Ultra iS computer using the facility 'Restore user files'.

Attach the memory stick containing the backup file to the short USB cable ALI 12.503 then connect the USB cable to the ROTALIGN Ultra iS computer as described in the previous section 6.1.10. Select the "Configuration" screen icon 'Restore user file' then press  to confirm selection. A hint to give the user the opportunity to ascertain whether the backup restoration should proceed appears on the screen.



Use / to highlight 'Yes' then press  to confirm selection. A further hint appears on the screen






This final hint is to ensure that restoration of the backup file is carried out on the original ROTALIGN Ultra iS computer where the backup was made.

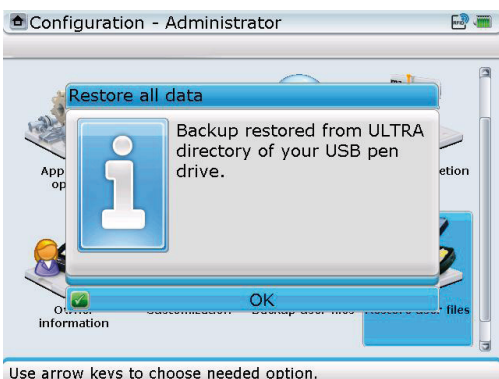
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DO NOT restore backup files to a different computer other than the one which the backup file was created from.



Note

Use / to highlight 'Yes' then press  to confirm selection and transfer the backup file into the ROTALIGN Ultra iS computer.



The backup file is the ULTRA directory has been restored to the ROTALIGN Ultra iS computer..

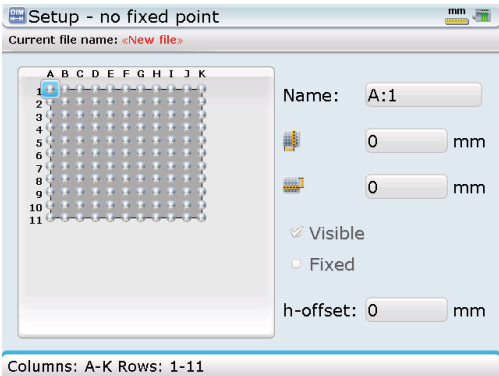
6.2 Creating templates

A template is a file that serves as a pattern for alignment set-ups that are repeated frequently. Their main purpose is to save you time by not having to configure the same set-up many times. As such, it can contain all known dimensions, target specifications, thermal growth values, preferred measure mode, preferred machine icons and coupling types.

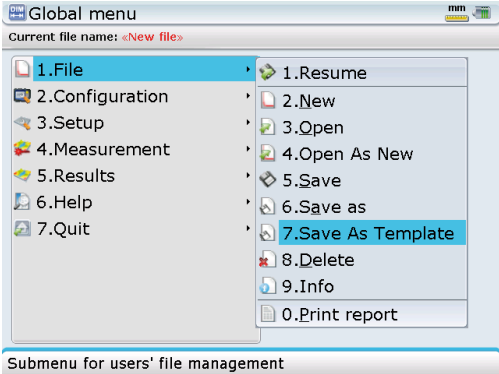
Any readings already taken and present in the measurement table will be flushed. Readings should only be saved in active job files and cannot be saved with a template.



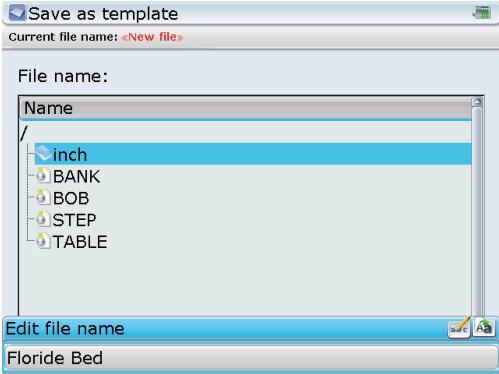
Start Flatness application and define template.




Press **Menu** twice to open the global menu.

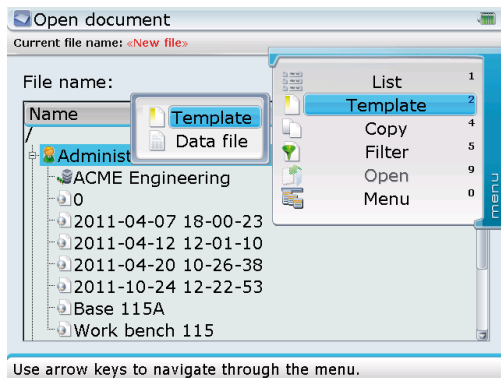


Use the navigation keys to highlight 'File' / 'Save as template'. Confirm selection by pressing **Enter**. The "Save as template" window appears. Press **Enter** to edit the name of the template in the editing box that opens.

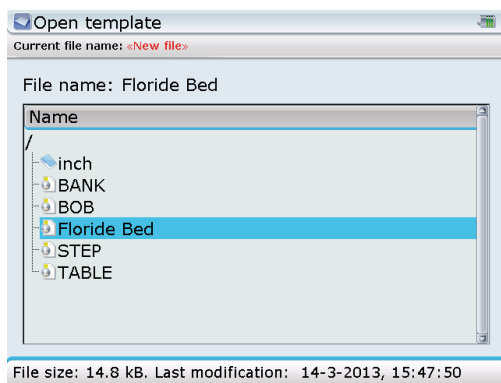


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Press  to confirm template name and save template. The new template will now appear on the templates list when the "Open template" screen is opened. The screen is opened via the global menu items 'File' -> 'Open', followed by the "Open document" screen context menu items 'Template'/'Template'.



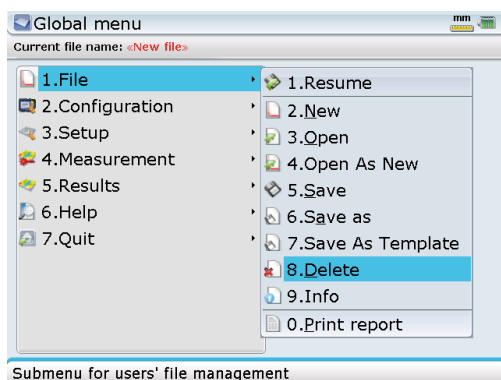
Pressing  to confirm selection reveals the templates list.





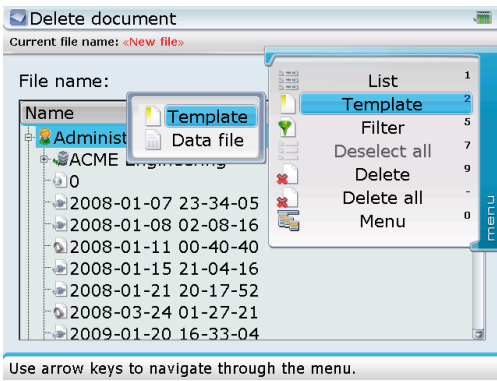
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6.3 Deleting created templates from the program manager

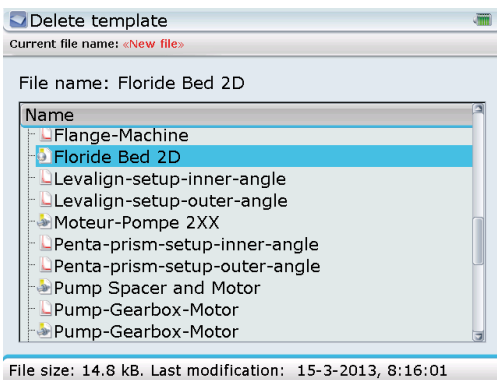
Press  twice to open the global menu while in Flatness application. Use the navigation keys and highlight the context menu items 'File' -> 'Delete'.



Confirm selection by pressing . The "Delete document" screen opens. Now press  to open the screen context menu, then use the navigation keys and highlight 'Template' -> 'Template'.

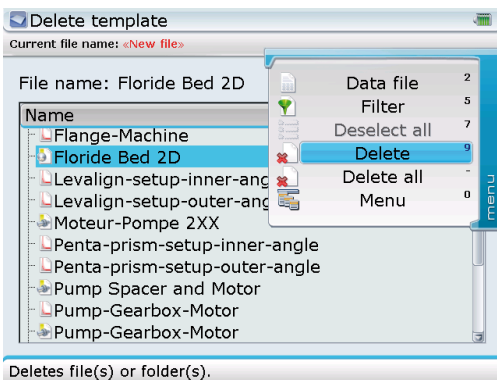


Confirming selection by pressing **Enter** opens the “Delete template” screen. Use **Up**/**Down** and highlight template to be deleted.

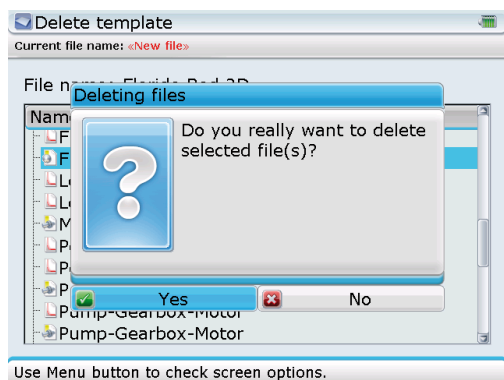


In this example, the selected template to be deleted is 'Floride Bed 2D'.

With the template to be deleted highlighted, press **Menu** to open the “Delete template” screen context menu, then use **Up**/**Down** and highlight the context menu item 'Delete'.



Confirm selection by pressing **Enter**. A message pops up requesting confirmation if the template should actually be deleted.



Use to highlight 'Yes' then confirm selection by pressing . The template is deleted from the templates list.

6.4 Available applications and options

The following applications and options can be selected via the program manager start screen.

- a) Resume – Depending on the set customization option, the resume option loads a default template or the most recent job.
- b) Shaft Alignment – used to position the centerlines of rotation of two (or more) machinery shafts in line with each other.
- c) Straightness – used to measure straightness.
- d) Flatness – used to determine levelness and flatness of surfaces.
- e) Bore Alignment – used for bore and turbine alignment.
- f) Live Trend – used to monitor machine positional change and measure machine vibration
- g) Vibration Acceptance Check – used to measure and evaluate the vibration level according to machine classification threshold
- h) Hydropower – measure the alignment condition of a hydro turbines
- i) Right angle check – used to measure perpendicularity.
- j) Tolerance editor – used to define individual alignment tolerance levels in terms of any desired coupling alignment parameters such as offset and angularity.
- k) Soft foot – starts the soft foot wizard [the wizard is available in Advanced Shaft only] which assists in correcting soft foot.
- l) Templates – used to select a specified template for a new measurement job.
- m) Device configuration – used to configure the ROTALIGN Ultra computer settings. When this option is selected, the following computer settings can be configured: date and time, language, units, power management, printer set-up, device info, display, owner info and users' list. The option is also used to open the licence manager, start the word completion function, customization, change users, backup and restore files.
- n) Turn off – is used to turn ROTALIGN Ultra off.

Certain applications must be purchased and licenced. Applications and options that have not been licenced will appear in program manager grayed out.



Note

Appendix

System technical data

ROTALIGN Ultra iS computer

CPU	Intel XScale® Processor 520 MHz
Memory	64 MB RAM, 64 MB Internal Flash, 1024 MB Compact Flash Memory
Display	Type: Transmissive (sunlight-readable) backlit TFT colour graphic display Resolution: Full VGA, 640 x 480 Pixel Dimensions: 5.7 inch (145 mm) diagonal Keyboard elements: Navigation cursor cross with up, clear and menu keys; Alphanumeric keyboard with dimensions, measure and results hard keys
LED indicators	4 LEDs for laser status and alignment condition 2 LEDs for wireless communication and battery status
Power supply	Operating time: 25 hours (using Li-Ion rechargeable battery) 12 hours (using disposable batteries) typical use (based upon an operating cycle of 25% measurement, 25% computation and 50% 'sleep' mode) Disposable batteries: 6 x 1.5 V IEC LR14 ("C") [optional] Lithium-Ion rechargeable battery: 7.2 V / 6.0 Ah
External interface	2 x USB host for printer, keyboard, USB stick 1 x USB slave for PC communication RS-232 (serial) for sensor RS-485 (serial) for sensor I-Data socket for sensor Ethernet Integrated wireless communication, class 1, transmitting power 100 mW AC adapter/charger socket
Environmental protection	IP 65 (dustproof and water jets resistant), shockproof Relative humidity 10% to 90%
Temperature range	Operation: 0°C to 45°C (32°F to 113°F) Storage: -20°C to 60°C (-4°F to 140°F)
Dimensions	Approx. 243 x 172 x 61 mm (9 9/16" x 6 3/4" x 2 3/8")
Weight	1 kg / 2.2 lbs (without battery)
EU declaration of conformity	Refer to the EU declaration of conformity in www.pruftechnik.com

LEVALIGN expert laser

Wavelength	635 nm
Safety class	2 (<1mW)
Range	100 m (Ø 200 m)
Self-levelling	Vertical and horizontal
Self-levelling range	±5%
Direction adjustment	±5%
Rotor rpm	Up to 800 rpm
Overall error (incl. conical +leveling + step)	< ±25µm + ±24µm/m
Power supply	Lithium-Ion rechargeable battery: 7.4 V DC External: 11 to 14 V DC via the charger Operating time: 28 hours (using 7.4 V DC Li-Ion rechargeable battery)
Temperature range	0°C to 40°C [32°F to 104°F]
Dimensions	Ø 130 mm x 270 mm (Ø 5 1/8" x 10 5/8")
Weight	3.4 kg (7.5 lbs)

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LEVALIGN expert sensor

Measurement distance	Up to 100 m, Ø 200 m
Resolution	10 µm
Accuracy	±0.02 mm
Measurement range	70 mm
Zero point adjustment	70 mm
Internal memory	2600 points
Wireless communication	Bluetooth®
Power supply	2 x 1.5 V ("AA") batteries
Dimensions	214 x 70 x 40 mm (8 7/16" x 2 3/4 x 1 9/16)
Weight	0.62 kg (1.36 lbs)

sensALIGN sensor

Measurement distance	Up to 10 m, Ø 20 m
Resolution	1 µm
CPU and memory	ARM Cortex™ M3 and 2GB Flash memory
Environmental protection	IP 65 (dustproof and water jets resistant), shockproof Relative humidity 10% to 90%
Ambient light protection	Optical and active electronic digital compensation
Temperature range	Operation: -10°C to 50°C (14°F to 122°F) Storage: -20°C to 60°C (-4°F to 140°F) Charging: 0°C to 40°C (32°F to 104°F)
Dimensions	Approx. 103 x 84 x 60 mm (4 1/32" x 3 5/16" x 2 3/8")
Weight	Approx. 310 g (10.9 oz)
Measurement range	Unlimited, dynamically extendible (US. Patent 6,040,903)
Measurement resolution	1 µm
Measurement error	< 1.0%
Inclinometer resolution	0.1°
Inclinometer error	± 0.25% full scale
Vibration measurement	mm/s, RMS, 10Hz to 1kHz, 0 mm/s – 5000/f • mm/s ² (f in Hertz [1/s])
External interface	Integrated Bluetooth® Class 1 wireless communication, RS232, RS485, I-Data
LED indicators	4 LEDs for laser adjustment, 2 LEDs for Bluetooth® communication and battery status
Power supply	Lithium Polymer rechargeable battery 3.7 V / 1.6 Ah 6 Wh
Operating time	12 hours continuous use
EU declaration of conformity	Refer to the EU declaration of conformity in www.pruftechnik.com

EU declaration of conformity

EU declaration of conformity for LEVALIGN expert system components may be downloaded from www.pruftechnik.com.

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