ROTALIGN® Ultra

Highest standards in machinery shaft alignment

Present in all industries

We care about your assets

PRÜFTECHNIK Alignment Systems, the inventor of laser alignment, has more than 25 years of experience in developing, manufacturing and applying laser-based alignment measurements systems.

Our measurement systems are used in many alignment applications of rotating machinery. In addition to shaft alignment ROTALIGN® Ultra offer various geometric solutions that include: measurement of straightness and surface flatness, alignment of bores and turbine diaphragms, monitoring machine positional change and vibration acceptance check, among others.

ROTALIGN® Ultra is a multi-application platform that helps reduce machine downtime and plant operation and maintenance costs. The reduced outage increases productivity hence an instant payback on investment.

Extend machine availability and efficiency

Precision alignment pays back

Rotating machinery is susceptible to misalignment. Machines should be well aligned at the commissioning stage and thereafter regularly maintained. The mean time between failures (MTBF) will increase resulting in high savings in maintenance costs.

Laser precision alignment extends machine availability and protects assets while increasing product quality as vibration is reduced to very low levels.

Precision alignment guarantees:

▶ Reduced energy consumption

▶ Reduction in bearing, seal, shaft and coupling failure

▶ Reduced bearing and coupling temperatures

▶ Reduced vibration

▶ No breaking (or cracking) of shafts

▶ Secure foundation bolts

Advantages of laser shaft alignment

The single laser technology shaft alignment systems from PRÜFTECHNIK take hundreds of readings, making it possible to perform the measurement under space constraints with the highest accuracy and simplicity.
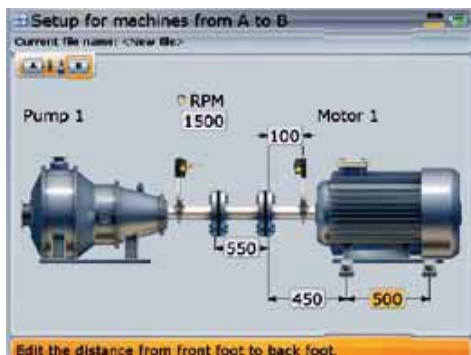
▶ Systems are user-friendly and intuitive

▶ Quick set-up of the fully assembled ready-to-use sag-free brackets

▶ On-screen guidance to enter required machine data

▶ Error free and accurate measurement with a resolution of 1 micron (0.00004")

▶ No human reading errors and bracket sag influences

▶ Quick on-screen laser beam adjustment

▶ Take readings at any desired position

▶ Instant display of coupling and feet values in both horizontal and vertical directions

▶ Evaluation of the alignment condition according to coupling tolerance

▶ Repeatability of results

▶ Documentation of the alignment job through PC software ALIGNMENT CENTER

Precise shaft alignment

ROTALIGN® Ultra Shaft is a top-of-the-range alignment system that is available as a tier system. Whether Lite, Advanced or Expert level, the choice is yours. The levels are upgradeable to the next to boost the feature level so as to master any alignment job faced. The system is user-friendly and features a large colour TFT screen which is sunlight readable, full VGA with a fast processor. The alphanumeric backlit keyboard is completely sealed. A long lasting rechargeable Li-Ion battery, USB interfaces and wireless communication are incorporated in the ROTALIGN® Ultra computer. Experience the ROTALIGN® Ultra system and realize that it faces no limitations when it comes to alignment.

3 keys to precision alignment
Toggle quickly from dimensions to results and vice versa for an instant evaluation of the alignment condition.
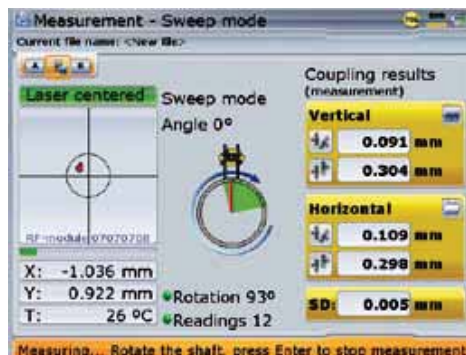
DIM 1. Enter Dimensions

M 2. Rotate shafts

RES 3. Display alignment condition

ROTALIGN® Ultra computer incorporates a wireless communication technology facilitating transmission of data between the computer and the sensor

Dimensions

All necessary machine and couplings dimensions and properties are entered

Measurements

Measurement is performed using the appropriate measurement mode then analysed

## High performance professional system

Machine properties

ROTALIGN® Ultra allows the user to configure correctly any machine train. The system's set-up screen is used to edit all machine and coupling properties including machine and coupling type, machine name, type of fixation, thermal growth and coupling target values. Based on the type of machine selected, an appropriate machine graphic is displayed for a better guidance and documentation of the alignment job. Machine graphics are also displayed in result screen for better evaluation.

Measurement with continuous sweep and pass mode

Continuous sweep mode – Data is automatically collected as the shaft is rotated from any position in the machine operational direction. Shaft rotation restrictions are overcome as only a turn of 60° is required for results. This mode is quick and captures hundreds of measurement points, hence more accurate than the 3-position measurement methods.
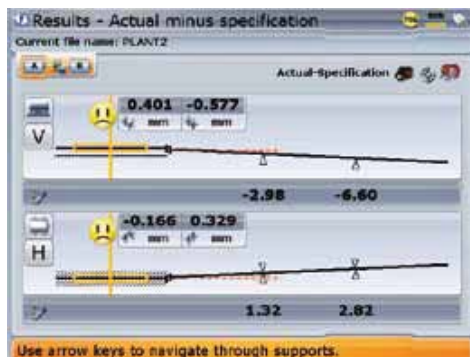
Pass mode – The ideal mode for uncoupled shafts in machines with high rotational inertia. The laser emitter is rotated past the sensor in at least 3 different positions. The internal inclinometer notes the rotation angle each time the beam passes the sensor.
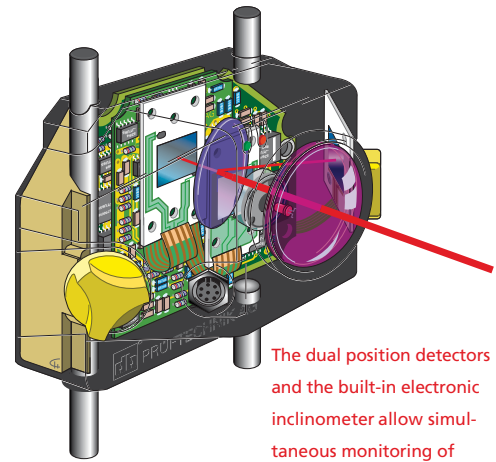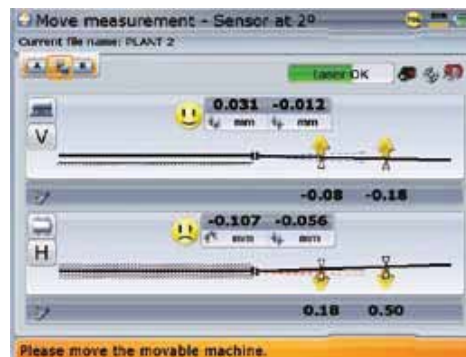
The 5-axis sensor

The dual position detectors and the built-in electronic inclinometer allow simultaneous monitoring of the vertical and horizontal machine corrections during Live Move

ROTALIGN® Ultra system has been designed for industrial applications and can be used in extreme working conditions. The computer is dustproof and water spray resistant in accordance with IP65 rating while the laser and sensor are both submersible and dustproof in accordance with IP67 rating

Results

Results are displayed and alignment quality shown with respect to tolerances

Live Move

Live monitoring of machine positional corrections in vertical and horizontal directions

Results and tolerances

Results are shown simultaneously in the vertical and horizontal direction including feet and coupling values. Machine graphics are displayed for a clear understanding. The under and over constrained feet feature allows defining any pair of feet to be static or moveable optimizing the results. Interactive and customised tolerances are necessary in evaluating the alignment condition and if this falls within the set coupling tolerances a happy smiley appears.

Move simulator and Live Move

The Move Simulator is used to simulate shim values and horizontal movement corrections. The simulator takes into account the shim thickness available and the amount by which the machines can be physically moved. The unique ROTALIGN® measurement principle allows the machine correction to be monitored simultaneously in both horizontal and vertical directions with laser and sensor mounted at any angular position on the shaft. Machine graphics show the direction and the correction value of feet to be moved. When the alignment condition falls within the set coupling tolerances a happy smiley appears.

ROTALIGN® Ultra analysis tools

These tools are used to determine the quality of measurement
and machine alignment condition.

Soft foot wizard

Soft foot analysis is simplified through
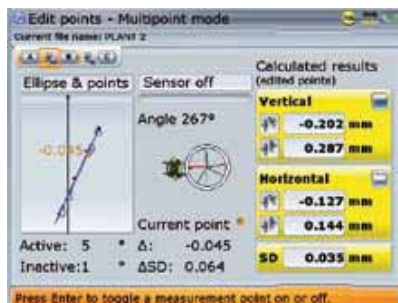a diagnostic tool

Thermal growth calculator

Used to determine mathematically the
machine expansion parameters

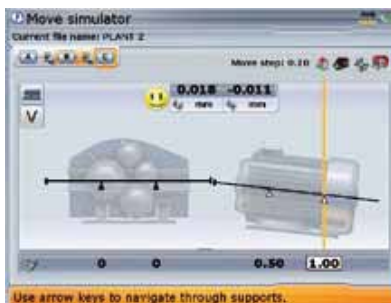### Measurement table and standard deviation

It allows determining precisely the quality
and repeatability of measurement

Editable ellipse

Allows the editing of raw measurement data
and the analysis of the alignment condition

Move Simulator

Simulates shim values and horizontal move-
ment corrections

Customised tolerances

The user can set his own tolerances allowing a
better evaluation of the alignment condition

High-end modular alignment system

Machine train and special applications

Machine trains with up to 13 couplings, cardan
drive machines, flanged machines, multi-feet
machines and spacer shaft couplings with
different diameters are some of the many shaft
applications included in the powerful ROTALIGN®
Ultra system.
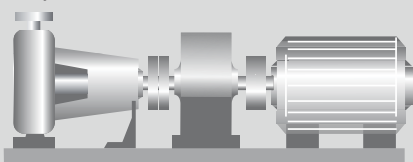
Thermal growth and coupling targets

When subjected to high operating temperatures, machine cases and pipes
tend to expand. This expansion influences the alignment condition. It is
therefore necessary to compensate for this thermal growth.
These values together with the coupling targets can be obtained from the
individual machine specifications and then entered in the ROTALIGN® Ultra
Shaft application. Additionally a thermal growth calculator is available.
Within the ROTALIGN® Ultra Shaft Expert platform, the Live Trend
application is used to measure machine expansion over time.

Document your job the most convenient way

ALIGNMENT REPORTER

With this freeware one is able to generate measurement reports and backup measurements files on a PC. The generated reports can be printed on any available printer.

Saving the measurement files to USB memory

A PDF report can be generated from a measurement file and saved on a USB memory stick. Additionally it is possible to backup all the user files from the ROTALIGN® Ultra computer to the USB stick allowing easy and safe data portability.

ALIGNMENT CENTER

ALIGNMENT CENTER is a state-of-the-art PC software database platform for all PRÜFTECHNIK Alignment instruments and applications. It is the perfect solution for preparing, analyzing, organizing and archiving measurements.

Measurement related data is also saved and the measurement history can also be followed and organized under hierarchies. The software generates professional colour reports that include photos, company information and logo.

File machine templates

A template is a file that serves as a pattern for alignment set-ups that are repeated frequently. The main purpose is to save time by not having to reconfigure the same set-up many times. The ROTALIGN® Ultra system offers file templates which contain all known dimensions, target specifications, thermal growth values, preferred measure mode, preferred machine icons and coupling types. All this with the benefit of saving time!

Soft foot measurement

Soft foot is the condition of machine frame distortion. Any cause that results in machine frame distortion when the machine is anchored to its foundation is a soft foot. Soft foot should be checked before aligning the shafts. This can be done quickly with the ROTALIGN® Ultra soft foot feature with the ROTALIGN® Ultra laser and sensor mounted at any angular position on the shaft. The soft foot measurement is saved and shown in the alignment report.

ROTALIGN® Ultra Shaft Expert platform

The Expert platform allows the user to go a step further into the world of alignment applications – two useful applications are available at this level. Upgrade your ROTALIGN® Ultra to this ultimate shaft alignment level – The Expert.

Vibration Acceptance Check

The ROTALIGN® Ultra Vibration Acceptance Check application works in combination with the VIBTOOL® device to measure vibration level according to ISO 10816-3 international standard. The RMS velocity value is wireless transferred and stored back onto ROTALIGN® Ultra computer. The result is instantly evaluated against the machine classification threshold.

Live Trend

Cold alignment targets may not accurately predict the actual operating condition of a running machine. Live Trend is used to monitor movement of machines during run-up or coast-down phase, in order to exactly determine the positional change over time and the influences of given events. The machines can then be precisely aligned using these values.

The Vibration Acceptance Check report can be issued either separately or included within the shaft alignment report.

The Live Trend report can be issued with a default layout or in Excel.

Vibration measurement results incorporated within shaft alignment program

Machine positional changes are monitored in real time

The powerful expert platform

Vibration Acceptance Check

The VIBTOOL® device can measure the following parameters:

- Vibration severity
- Bearing condition
- Temperature
- RPM
- Pump cavitation

Bracket configuration for Live Trend

The brackets are available in two different configurations: Magnetic or permanent fixation with the optional RF wireless module also mounted on a magnetic bracket.

Services and customer support

Quality of service

The PRÜFTECHNIK Alignment high-tech lab is the heart of our development. Everyday, sensors, lasers and new systems are developed, tested and produced to the highest quality.
Because we care about the quality of our products and our customers needs, we have established service centres worldwide to ensure that customers do not give up precision alignment at any particular time.

Customized product training

Training and seminars are held by a professional team and are intended to support professional users to apply the systems and to be familiar with alignment applications in depth.

Machinery service

PRÜFTECHNIK Alignment provides a full range of high end alignment services. Our dedicated machinery service experts assist you in the overhaul of large and complex machinery as well as in large scale alignment projects such as the construction and installation of new turbines. Our services include shaft alignment, monitoring of positional changes, geometric alignment and turbine alignment.

Lite features

High resolution colour backlit TFT screen – 5,7 inches and backlit alphanumeric keyboard

USB interface for PC and printer

Heavy-duty Li-Ion rechargeable battery

Rigid pre-assembled universal brackets and additional support posts included in a pouch

UniBeam® - patented single laser-sensor technology for quick laser adjustment

Integrated electronic inclinometer

Alignment of horizontal, vertical and flanged-mounted machines

Alignment of coupled / non-coupled and rotatable / non-rotatable machines

Alignment of cardan and spacer shafts (for cardan, special bracket is required)

Machine train alignment up to 6 machines

Soft foot measurement and correction

User defined tolerances

TolChek® - automatic evaluation of alignment condition with "Smiley" and LEDs

Variety of measurement modes: SWEEP, Clock, Multi-Point, Dial gauges inputs

InfiniRange® extends detector measurement range to handle gross misalignment

Live monitoring of horizontal and vertical corrections – Live Move

Move simulator

Static feet selection to resolve base-bound and bolt-bound problems

Realistic machine graphics which can be named

Save thousands of measurement files in the device

Save reports as PDFs directly to memory stick

Data protection – auto save and resume capability

In compliance with classifications IP 65 and IP 67

ALIGNMENT REPORTER, freeware for reports printing and files backup

PC display for presentations/training in customer premises

Platform prepared for other alignment applications like, Straightness, Flatness and Bore concentricity measurement

Lite
Advanced
Expert

ROTALIGN® Ultra Shaft is based on a three-level system. The fundamental Lite version is packed with powerful high-end features that include the Move simulator and user defined tolerances among others. This version is easily upgradable to the Advance version to include powerful analysis tools such as the soft foot wizard, pass mode measurement , vector tolerance to name but a few. The top tier is the Expert level, and comprises all features contained in both the Lite and Advanced versions plus the additional applications Live Trend and Vibration Acceptance Check.

Advanced powerful package

Live simultaneously move in both horizontal and vertical directions

Soft foot wizard

Machine train up to 14 machines

Measurement Pass mode

Standard Deviation

Editable ellipse

Thermal Growth Calculator

Under/over constrained feet

File/Machine templates

Vector tolerances

History table

Expert platform

Live Trend with magnetic or permanent fixation brackets

Vibration Acceptance Check with VIBTOOL®

Additional features to the Advanced package

ROTALIGN® Ultra technical data

Computer	
CPU	Intel XScale Processor running at 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 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 or PC communication
	1 x USB slave for printer, keyboard or PC communication
	RS232 (serial) for receiver
	I-Data socket for receiver
	Ethernet
	Integrated wireless communication, class 1, transmitting power 100 mW
	AC adapter/charger socket
Environmental protection	IP 65 (dustproof and water spray 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 (without battery)
CE conformity	EC guidelines for electric devices (2004/108 EWG) are fulfilled
Receiver	
Particulars	5-axis receiver: 2 planes (4 displacement axes)
	Environmental protection: IP 67 (submersible, dustproof)
	Ambient light protection: yes
	Storage temperature: -20°C to 80°C [-4°F to 176°F]
	Operating temperature: 0°C to 60°C [32°F to 140°F]
	Dimensions: approx. 105 x 67 x 47 mm [4 5/32" x 2 5/8" x 1 55/64"]
	Weight: approx. 190 g [6 7/10 oz.]
	Measurement area: unlimited, dynamically extendible (U.S. Patent 6,040,903)
	Resolution: 1 µm (0.04 mil) and angular 10 µRad
	Accuracy (avg): > 98%
Laser	
Particulars	Type: GaAlAs semiconductor laser
	Beam divergence: 0.3 mrad
	Environmental protection: IP 67 (submersible, dustproof)
	Beam power: < 1 mW
	Wavelength (typical) 675 nm (red, visible)
	Safety class: Class 2, FDA 21 CFR 1000 and 1040
	Safety precautions: Do not look into laser beam
	Power supply 9V block battery (IEC 6LR61, alkali or lithium)
	Storage temperature: -20°C to 80°C [-4°F to 176°F]
	Operating temperature: -20°C to 60°C [-4°F to 140°F]
	Dimensions: approx. 105 x 67 x 47 mm [4 5/32" x 2 5/8" x 1 55/64"]
	Weight: approx. 165 g [5 13/16 oz.]
Carrying case	
Particulars	Standard: ABS, drop tested 2 m [6 1/2 ft])
	Case dimensions: approx. 565 x 375 x 193 mm [22 2/9" x 14 3/4" x 7 7/12"]
	Weight, including all standard parts: approx. 9 kg [19.8 lb]
RF module for wireless communication with transducer (optional)	
Particulars	Class 1 connectivity, transmitting power 100 mW
	Transmission distance: 10 m [33 ft.]
	Complies with FCC rules part 15.247
	LED indicators: 1 LED for wireless communication, 3 LEDs for battery status
	Power supply: Batteries 2 x 1.5 V IEC LR6 ("AA")
	Operating time: 14 hours typical use (based upon an operating cycle of 50% measurement, 50% standby)
	Operating temperature: -10°C to 50°C [14°F to 122°F]
Environmental protection	IP 65 (dustproof and water spray resistant), shockproof
Dimensions	Approx. 81 x 41 x 34 mm [3 1/8" x 1 11/16" x 1 5/16"]
Weight	Approx. 133 g [4.7 oz.] including batteries and cable

Contents may vary depending upon package ordered

ROTALIGN® Ultra shaft and more applications

The ROTALIGN® Ultra system is a multi-application platform. In addition to shaft alignment application, it supports various geometric solutions that include: measurement of straightness and surface flatness, alignment of bores and turbine diaphragms, monitoring machine positional change and vibration acceptance check.

Surface flatness and straightness

LEVALIGN® Ultra consists on a rotating laser system used for accurate measurement of surface flatness, levelness and straightness.

Bore alignment

CENTRALIGN® Ultra is the system for alignment of bores in combustion engines, compressors, pumps, gearboxes as well as stern tubes, steam and gas turbines.

High precision inclination measurement

INCLINEO® is a high precision instrument for accurately measuring angular deviation in any inclination on flat surfaces and shafts.
It suits measurements of flatness and parallelism of surfaces.