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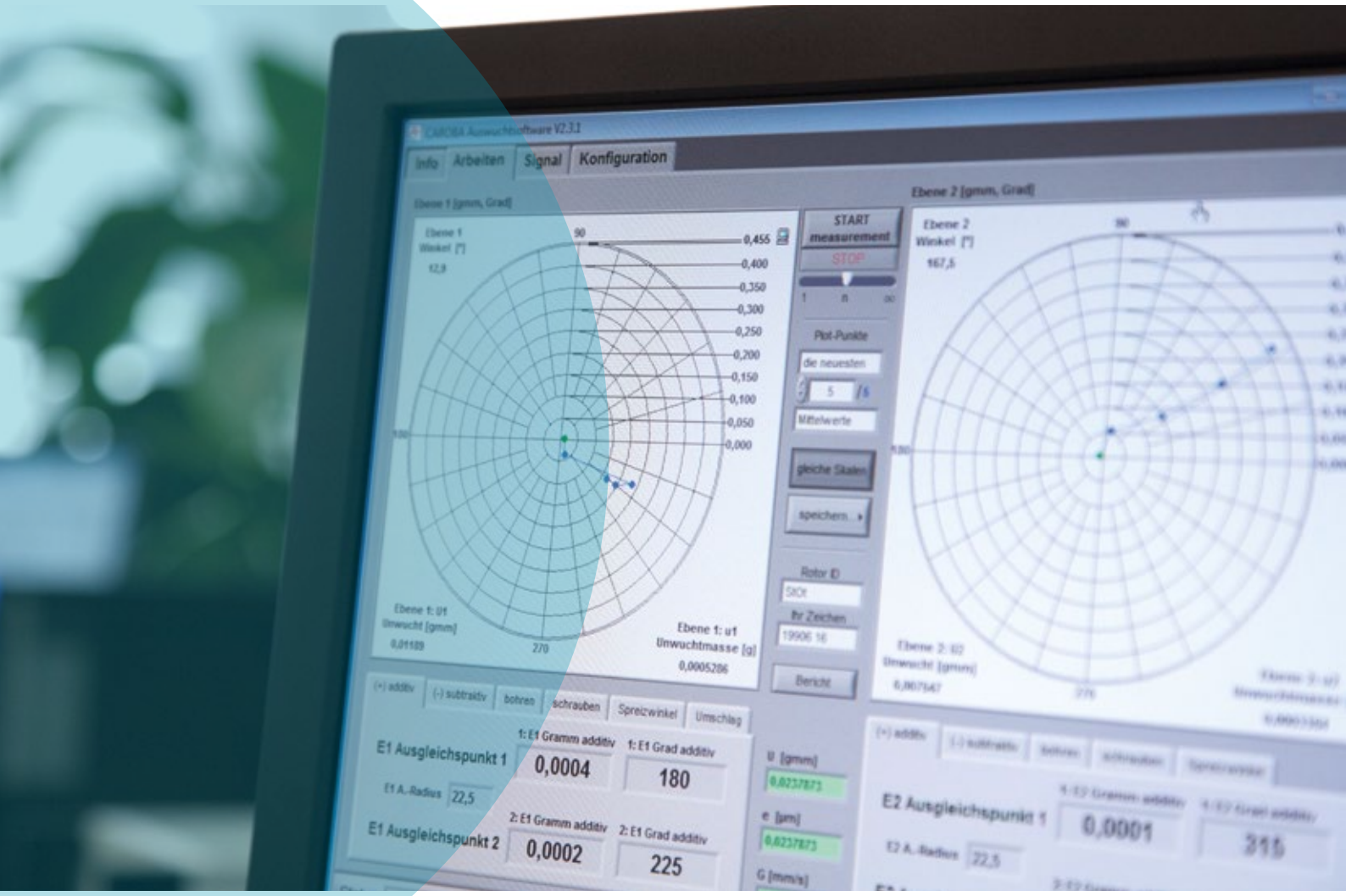
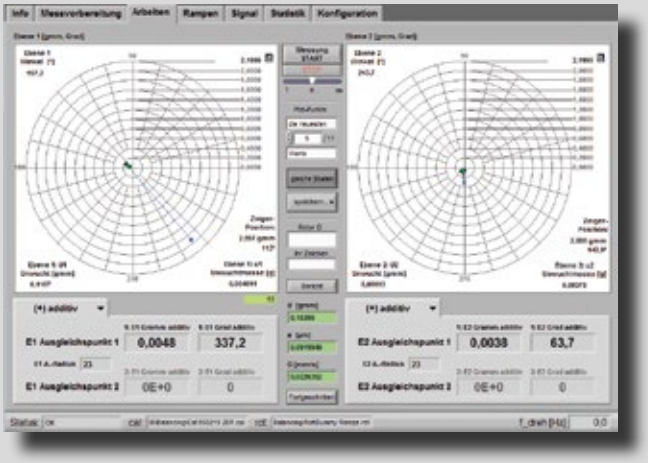


CAROBA® Soft

Software for balancing, vibration analysis and drive control

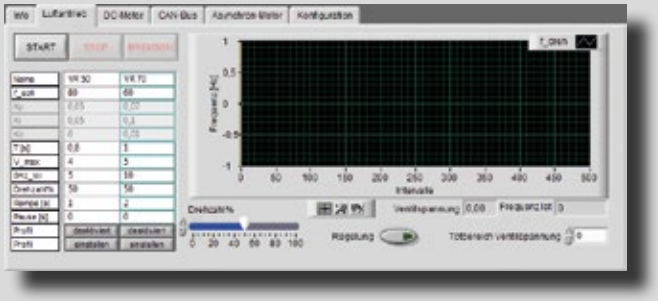
Precise evaluation is key

Precise balancing hinges on the perfect evaluation of the measured data and the output of effective balancing instructions. With the software solutions CAROBA® Soft we provide you outstanding tools for this tasks. The flexible and intuitive CAROBA® Soft balancing software is your operation center of the balancing process. It hosts a vast range of functions for all daily balancing tasks while still being easy to operate. For R&D and QA, the independent software package of the additional analysis software for vibration analysis is a valuable asset.
All our software solutions are fully compatible with the measuring systems CAROBA® UMS Pro, Pro-i and Compact. Our software is constantly evolving, growing in new functions and comfort. Our regular updates ensure the reliable and economical operation of your balancing system in the future.



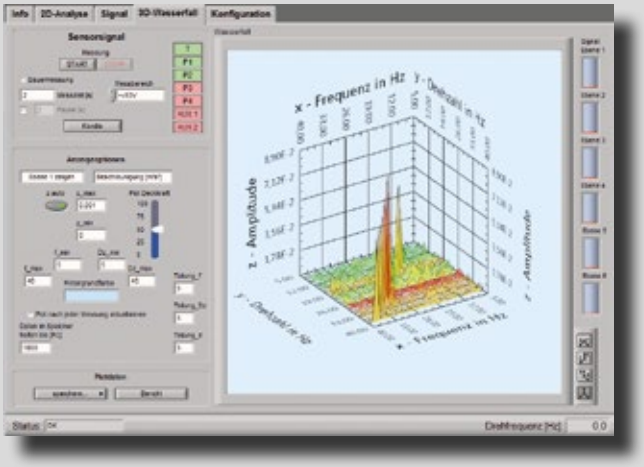
CAROBA® Balancing Software -intuitive and adaptable-

The CAROBA® balancing software is the heart of your balancing process. The software manages your workpieces, controls the data acquisition, visualizes the balancing status and provides clear balancing instructions for the selected correction method. The software can be „remote-controlled“ via interfaces to higher-level systems in automated systems - the advantage for you: You work with the same software from laboratory to series production. A variety of additional options adapts your software for special applications, prototype research, process automation or process analysis. With the CAROBA® balancing software you balance in an precision range that was unattainable until now.



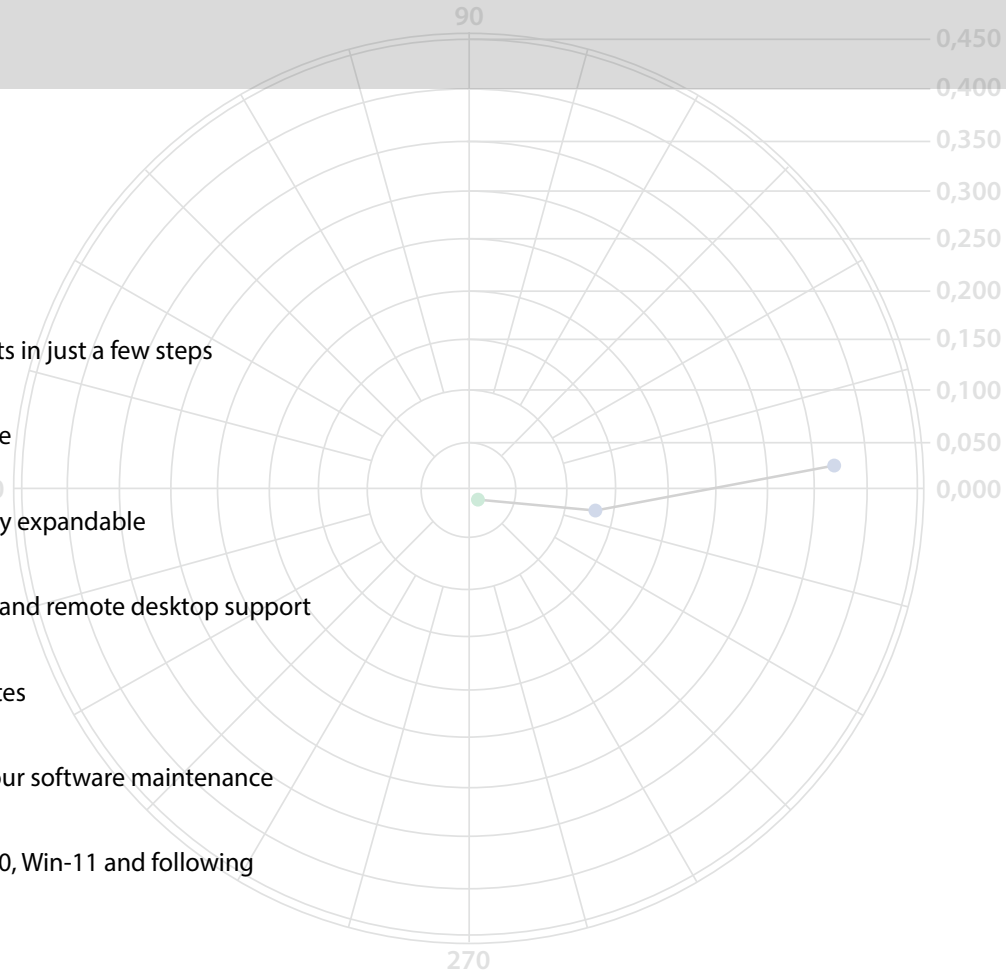
CAROBA® Drive control -the simplification of daily balancing tasks-

In our balancing machines or for your own drives: With our drive control, the PMB balancing system controls and regulates the optimum speeds and acceleration profiles for balancing. Therefore, it is a first step towards automation, which will make your daily balancing tasks much easier. DC motors, frequency inverters, air drives, CAN bus systems and via 0-10VDC almost all other drives can be controlled.
Your various settings are organized via presets, so that a wide variety of manual and automated tasks can be set up quickly.



CAROBA® Analysesoftware - vibration analysis, health monitoring and more-

Especially in the areas of R&D, QA and End-of-Line, the knowledge of the rotordynamic qualities and the vibration characteristics of the rotating part is of crucial importance. Our analysing software delivers exactly this information as 2D / 3D diagrams and as characteristic values. You will receive valuable information for improvements. Waterfall, fundamental frequency and harmonics, roll bearing analysis, orbiting, spectrum, cepstrum and envelope - the range of functions is large and user-friendly, because we also work with this every day. Many users particularly appreciate the intelligent limit monitoring with alarm and shutdown function.



Your advantages

- Perfect balancing results in just a few steps
- Intuitive and easy to use
- Flexible and individually expandable
- Competent assistance and remote desktop support
- Regular software updates
- Future-proof through our software maintenance
- Compatible with Win-10, Win-11 and following

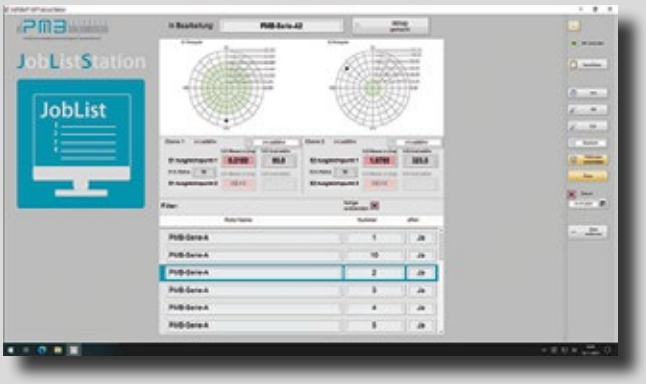
CAROBA® JobList-System

Simultaneous manual measurement and correction

Instead of measuring and correcting one by one on a manual balancing machine, with the PMB CAROBA JobList you can measure and correct simultaneously - with any number of measuring stations and correction stations. Split measurement and correction to multiple operators to multiply the output. Scale your manual balancing process step by step from laboratory to mass production.

Each balancing instruction of each measurement is written by each measurement station (at least one) with the workpiece ID (entered, scanned or automatically assigned) into a shared database on one of the measurement stations. Each correction station (at least one) accesses this database and displays the balancing instruction to the operator.

The JobList system consists of software and hardware. The software includes the database for parts tracking, the hardware enables the balancing instruction to be displayed independently of the measuring station.



CAROBA® JobList software

The software of the measuring station enters the correction data for the workpiece as „to be processed“ in a database. The operator at the correction station selects the current component from a list on the touch screen in the JobList software or simply scans it. He then receives the balancing instructions at the correction station and follows them, while the next component is already being measured at the measuring station.

After correction, the workpiece is marked as „processed“ in the database and can be measured again. If it is within specifications in a measurement, it is entered in the database as „OK“ and the operator sends it to the subsequent production process.
If required, wear monitoring can also be integrated in the correction station via the JobList system. After an adjustable number of corrections or a usage time, the software reports that a tool change is due or requests that the station be cleaned, for example.

CAROBA® JobList station

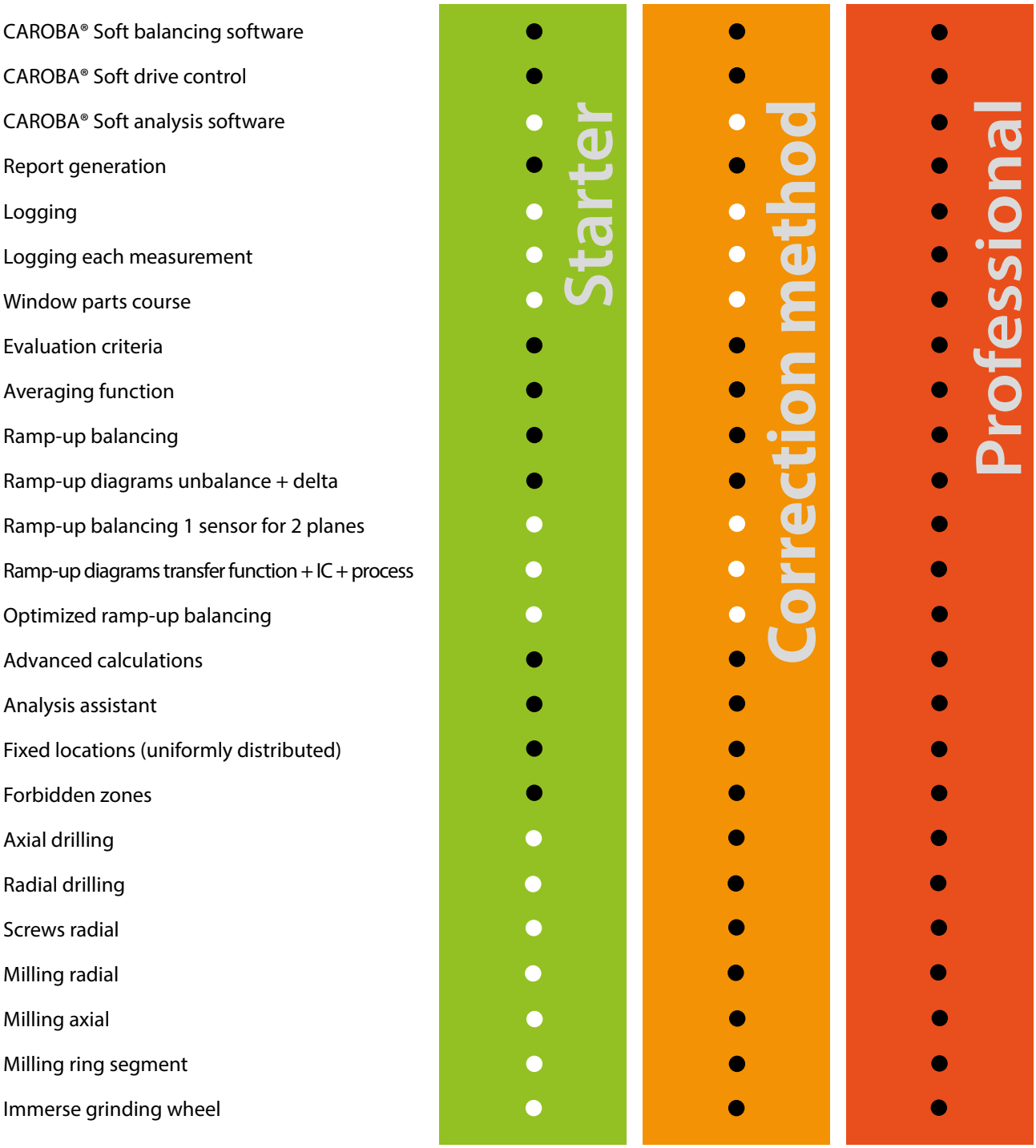
To use the JobList software, the user can use their own PC with touch monitor and scanner. We recommend using our customised and fully equipped system of support arm, monitor and robust industrial PC with fully installed and configured JobList software. The monitor can be rotated and swivelled; use the screen in landscape or portrait format (recommended).
A scanner can be connected via USB or Bluetooth and can be supplied directly.

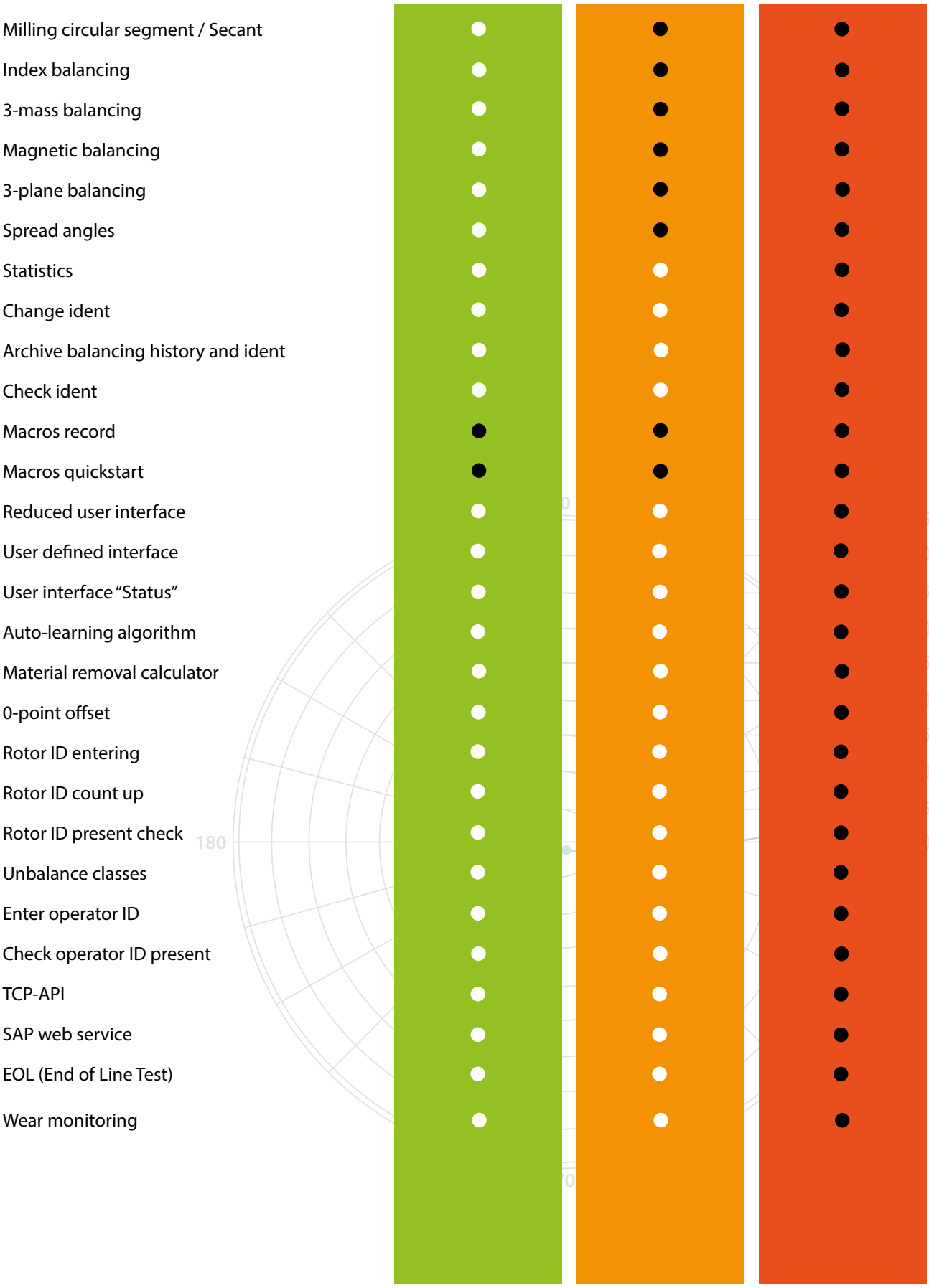
Your advantages

- Higher output through simultaneous measurement and correction
- Intuitive and easy to use
- Can be used flexibly and expanded as required
- Bundled software and hardware already fully set up and ready for immediate use
- Robust industrial PC

CAROBA® Software packages

The PMB balancing and analysis software facilitates the balancing of your rotors with additional functions - this individual adaptability makes the daily use of our balancing systems simple and efficient.
Additional features from comfort functions to additional benefits, integration into higher-level controls, simplified fully automatic operation, quality assurance and much more - we advise you and you have the choice.
You have a new idea? Special requests or specific functions can be programmed into the software at any time. To simplify the selection of functions, we have preconfigured 3 packages for you. Compare the range of functions here and choose the package that meets your requirements. By the way, a later rebooking is possible.




Milling circular segment / Secant
Index balancing
3-mass balancing
Magnetic balancing
3-plane balancing
Spread angles
Statistics
Change ident
Archive balancing history and ident
Check ident
Macros record
Macros quickstart
Reduced user interface
User defined interface
User interface “Status”
Auto-learning algorithm
Material removal calculator
0-point offset
Rotor ID entering
Rotor ID count up
Rotor ID present check
Unbalance classes
Enter operator ID
Check operator ID present
TCP-API
SAP web service
EOL (End of Line Test)
Wear monitoring
180

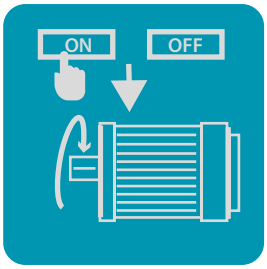
Starter

The **„Starter“** software package is already very comprehensive and contains everything that is basically required for additive and subtractive balancing in 2 planes. In addition to the balancing functions, e.g. signal display (oscilloscope), spectrum (FFT) are already included. You can balance at fixed (selectable) speed and likewise in the innovative ramp procedure during the run-up/run-down determine the unbalance.

The CAROBA drive control for our or your drives is also already included. With this software function you regulate and control the speed and ramp-up of DC motors, frequency converters, air drives and via 0-10 VDC setpoint output your own individual drives. The control of the servo motors of our balancing machines is of course also included as a basic function incl. positioning for correction.

Balancing software

The balancing software is the center of your balancing process. It manages your workpieces, controls data acquisition, visualizes the balancing status and provides clear balancing instructions for correcting the unbalance. The software is remotely controlled in automated systems via interfaces to higher-level systems.

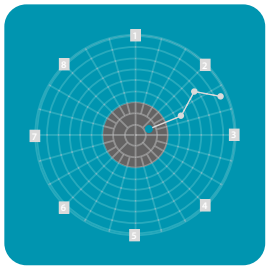


Drive control

Control and regulation of drives by UMS (hardware, unbalance measuring system). Controls the drives of our complete systems as well as your own drives. Output of set values for DC motors, frequency inverters (VFD), air drives and CAN bus commands. Manual operation possible, automated remote control by the balancing software is the most used standard.

Report generation

Output of a freely configurable report (balancing protocol) about the balancing process as HTML or PDF file.

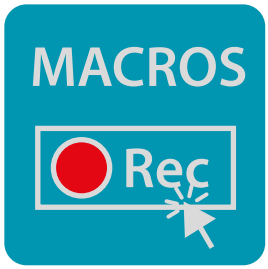


Evaluation criteria

Colored marking of the required / actual ranges in the polar diagram and the balancing instructions. The operator can see at a glance whether he has already reached the specifications. In automated balancing, this also determines when the automated process transfers the balancing object as good or bad piece to the workpiece handling.

Ramp-up balancing

Instead of measuring at fixed rotational speed, the run-up is recorded and used to calculate the balancing solution. This allows you to change the balancing speed simply by moving a cursor without the need for an additional run. This is a great simplification when setting up new balancing tasks, especially for rotors whose rotational speed is difficult to control. You can see at a glance in the curve whether the running smoothness has also been reduced over the entire speed range and save yourself an additional after-running analysis.



Macros record

Records a series of recurring operating steps. These steps can be retrieved with a user-assigned keyboard shortcut or a freely assignable macro button in the footer of the software. Saves time in the workflow.

Macros quickstart

Buttons that allow the start of the previously set up macros from any desktop of the software. The buttons are freely assignable and can be named as desired.

Averaging function

Calculates the average of several measurements. Individual measurements and average values are plotted in the diagrams so that you can see the quality of your setup at a glance. From external interfering influences on the result are minimized, limits of reproducible balancing are pushed to better balancing results.

Ramp-up diagrams unbalance + delta

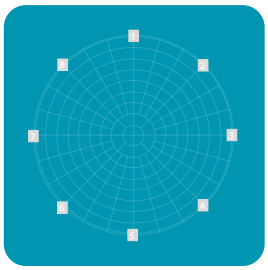
Extension for the ramp-up balancing. Additional diagrams with unbalance over speed and unbalance difference between two balancing operations (delta) over speed are displayed. Helpful for selecting the optimum balancing speed when setting up new balancing tasks.

Analysis assistant

In the ramp-up balancing, analysis speeds are selected by the setter or operator. The analysis assistant automates this for tasks with challenging rotor behavior. After a few test measurements, a preset of good settings is automatically generated.

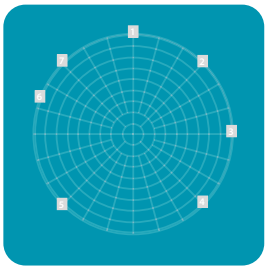
Advanced calculations

Extended information on characteristic values, the identification and the distribution of the unbalance over the bearings of the balancing object. Very well suited for simulating the effects of changes in the design of rotating parts (e.g. bearing distance) on the unbalance situation („What if...“). Most used function: Display the exact difference between 2 unbalance points („What did I do?“).



Fixed locations (uniformly distributed)

Specification of the compensation instruction for uniformly distributed fixed locations instead for angles. The instruction is thereby correctly distributed to neighboring fixed locations, which are output as numbering or with their angles. Simplifies and accelerates the manual balancing process for the operator.



Forbidden zones (fixed locations unequally distributed)

Free definition of arbitrarily distributed fixed locations to be used. Thus also definition of positions where, as a forbidden zone, no mass balancing may or can be performed. Comfortable input of these positions.

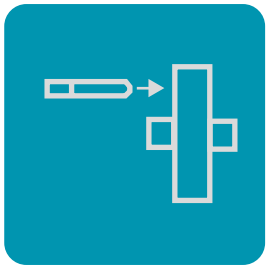
Space for notes!

Correction method

Incl. starter package

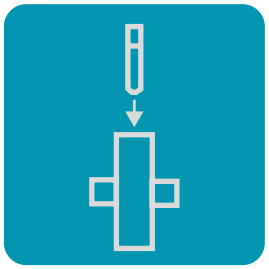
The software package **„Correction method„** extends the **„Starter„** package with helpful functions around the correction of the unbalance. Drilling, milling, grinding, screws radial/axial, fixed locations and much more is obtained.

You can already balance with the Starter package, the correction method package contains the Starter package and speeds up the unbalance correction with practical facilitations.



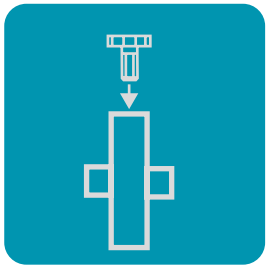
Axial drilling

Correction of unbalance by axial drilling. Direct output of the required drilling depth with previously defined characteristic values of the drilling tool (diameter and point angle) and the balancing object (density of the material, allowed maximum drilling depth).



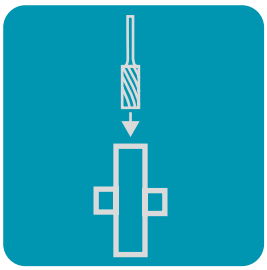
Radial drilling

Correction of unbalance by radial drilling. Output of the required drilling depth with previously defined characteristic values of the drilling tool (diameter and point angle) and the balancing object (density of the material, permitted maximum drilling depth). Correct consideration of the different effect with different drilling depth and thus different effective radius.



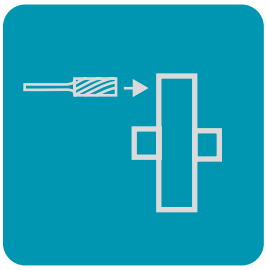
Screws radial

Correction of unbalance by screwing screws (e.g. grub screws) into threaded holes. The number of rotations required for balancing, in or out, is displayed. Very sensitive method that can be used again and again for rebalancing.



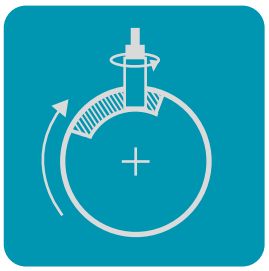
Milling radial

Correction of unbalance by radial milling. Output of the required milling values with previously defined characteristic values of the tool and the balancing object. Consideration of the different effect at different depths and thus different effective radius.



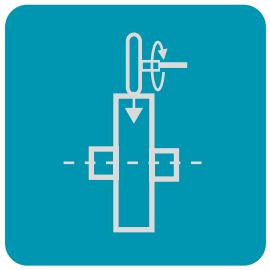
Milling axial

Correction of the unbalance by axial milling. Output of the required milling values with previously defined characteristic values of the tool and the balancing object.



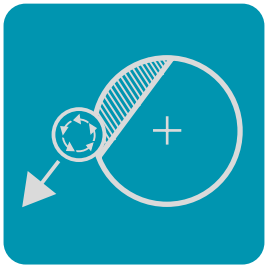
Milling Ring segment

The defined milling tool immerses radially into the component. The correction mass is removed as a ring segment. Output of the setting values depth and angle range.



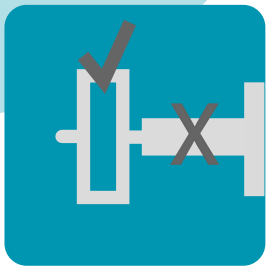
Immerse grinding wheel

The defined grinding wheel immerses radially into the component and removes the correction mass. Output of the setting values depth and angle range.



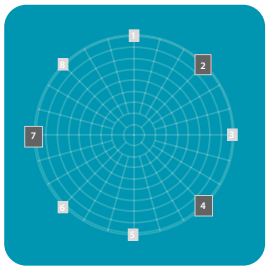
Milling circular segment / Secant

The defined milling tool immerses radially into the component and removes the correction mass as a circular segment. A straight edge is created. Only the milling cutter moves.



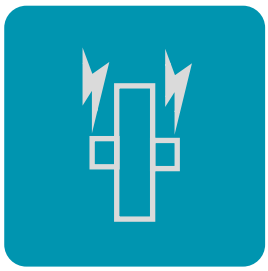
Index balancing

The index balancing eliminates the influences of the workpiece fixture on the workpiece clamped on it. You thus achieve highly accurate and transferable balancing results even on an auxiliary shaft or the mounting of a spindle.



3-mass balancing

An additive correction method, chip-free, easy to use and highly accurate. From a graded stock of balancing weights (e.g. 4 variants), a solution is calculated for a given number of balancing points (e.g. 8 points/circumference), in which 3 of the weights are simultaneously specified at 3 positions. It saves the trimming of weights with nevertheless highly accurate result.



Magnetic balancing

Balancing is always the elimination of outward unbalance forces. When balancing highly magnetic rotors, these can be influenced by the magnetic field. This option calculates out the influence and thus enables significantly better balancing results. Even without this option, our balancing systems are „magnetic capable“. With this option, a further improvement is achieved if necessary.

3-plane balancing

The 3 plane balancing provides an additional compensation value for the centre of gravity plane, i.e. the static unbalance. This allows you to improve the static unbalance separately from the dynamic unbalance, whereby some rotor types benefit from better internal forces and torques . You remove the static unbalance in the center of gravity, which means that less is to be removed in planes 1 and 2.

Spread angles

Indication of the angle for the rotation of balancing discs relative to each other or the adjustment of shifting weights. The classic method e.g. for the balancing of grinding wheels.

Space for notes!

Professional

Incl. starter package und package correction method

The **„Professional“** package offers the maximum range of functions of our software application. With integration functions, it is especially designed for users in series production. Also product development, quality assurance and prototype balancing are maximally supported by deeper possibilities.

Also included is the CAROBA analysis software, which provides comprehensive information about the rotordynamic properties and vibration behavior of your component. You thus gain valuable information for improvement measures. Waterfall, fundamental and harmonic waves, rolling bearing analysis are only a part of the manifold possibilities - the range of functions is large with intuitive operation and especially helpful for the product development.

Analysis software

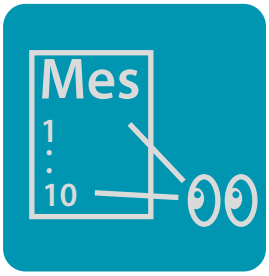
Provides you with valuable knowledge about the rotor dynamic properties and vibration behavior of your rotor with 2D / 3D diagrams and characteristic values. Thus, you gain helpful hints for improvement measures. Waterfall, fundamental and harmonics, rolling bearing analysis and much more.
The range of functions has remained large and user-friendly.

Logging

Creates a log file with one line for each individual balancing object. This line contains all relevant balancing values. Machine and human readable.

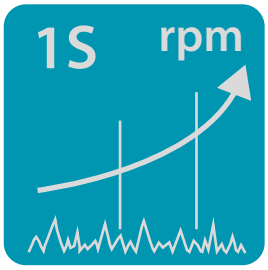
Logging every measurement

A line is entered in the balancing log for each measurement.



Window parts course

Window with overview of the last measurements. Shows the values of the last measurements. Original unbalance and residual unbalance, IO/NIO status, number of IO/NIO.



Ramp-up balancing 1 sensor for 2 planes

An extension to ramp balancing, which can be particularly advantageous for high-speed rotors (turbo, dental turbines...). Instead of 2 sensors and one evaluation speed, 1 sensor and 2 evaluation speeds are used. This has advantages for rotors that behave partially elastic at high speeds.

Ramp-up diagrams transfer function + IC + process characteristics

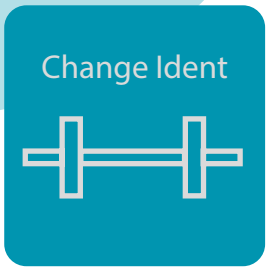
These additional options for the ramp-up method support process developers for new balancing tasks and series balancing. If you would like more detailed information, please do not hesitate to contact us.

Optimized ramp-up balancing

An extension of ramp balancing. This method calculates solutions characterized by minimum area under the acceleration curve. This special procedure is used especially for series balancing in the production of turbochargers.

Statistics

Generation and output of statistics with key data such as mean value, scattering and distribution of the unbalance values for series balancing. Freely configurable input data. Very helpful to reveal systematic influences in pre-production and then, for example, to revise injection moulding tools so that less balancing is required.

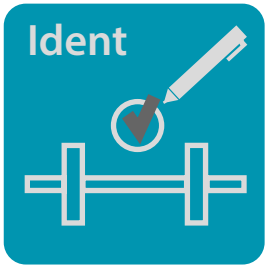


Change ident

Helpful for setting up new balancing tasks. You can subsequently change the information given during the identification and thus correct the calibration. For example, you can subsequently shorten runup ramps that were initially set too large and thus saves process time.

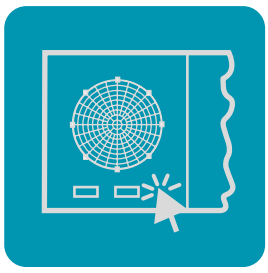
Archive balancing history and ident

Automatically archives the balancing history and the used identification of each balanced part.



Check ident

Enables the user to check a performed identification according to freely definable intervals. Avoids erroneous measurements in series balancing of always identical components, which can occur due to e.g. wear and/or exchange and readjustment of the support. A QA- function.

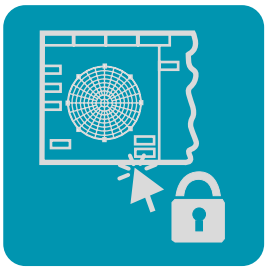


Reduced user interface

User interface reduced for simplified operation. Particularly suitable for manual balancing by semi-skilled assistants. The full user interface can be unlocked by machine setters with a password.

User defined interface

Work interface of the balancing software defined according to your specifications. Full user interface can be unlocked by password for setters.

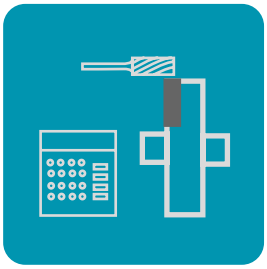


User interface “Status”

User interface particularly suitable for automated operation, display of the most important characteristic values and statistics. No influence of the operator is possible. The full user interface can be activated by the setter with a password.

Auto-learning algorithm

Particularly useful for automated or manually systematic mass correction. The software learns to automatically adjust the phase and magnitude of removal, even with gradually changing pre-production. This compensates for tool wear and reduces the number of removals per workpiece. Improves the cycle time.

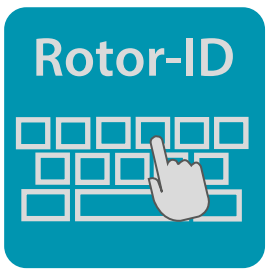


Material removal calculator

For automated balancing systems, calculates the removal profile for unbalance correction with grinding or milling tools. Incl. internal logging (where mass already has been removed, it cannot be removed again in the following step).

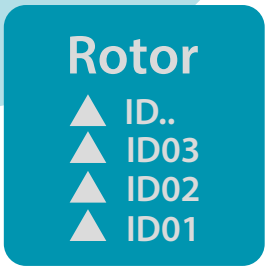
0-point offset

To balance to a in phase and magnitude very specific unbalance (offset), you can specify this here. E.g. manual compensation of the unbalance of a balancing adapter. E.g. targeted unbalance of a component which is compensated by another targeted unbalance after assembly by other components.



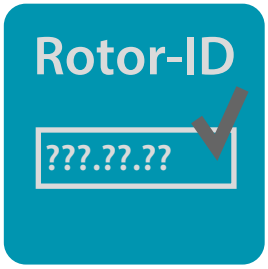
Rotor ID entering

When the first measurement is started, a window for entering the rotor ID appears. When a new rotor ID is entered, the previous history is automatically archived and a new, empty polar diagram is created. Facilitation and acceleration of manual serial balancing.



Rotor ID count up

Automatically creates folders for trays for manually loaded series balancing and saves the balancing histories in them. Automatically increments the numerical part of the rotor ID. A great simplification of manual series balancing. Also enables separation into manual „measurement“ and „correction“ stations.



Rotor ID present check

Checks if the rotor ID has been entered.

Unbalance classes

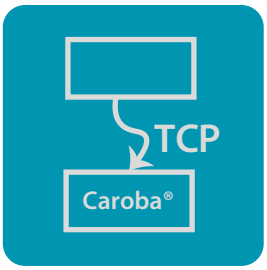
After specifying classes (unbalance ranges), the workpiece is placed in these classes. Examples: Classes 1 Put on weight, 2 Put on weights, 3 Put on weights. Or classes OK, to be corrected, NOK = rejects. Or generally classes I, II, III, IV.

Enter operator ID (Characters)

When starting a measurement, a window appears for entering the operator ID.

Check operator ID present

Checks whether an operator ID has been entered.



TCP-API

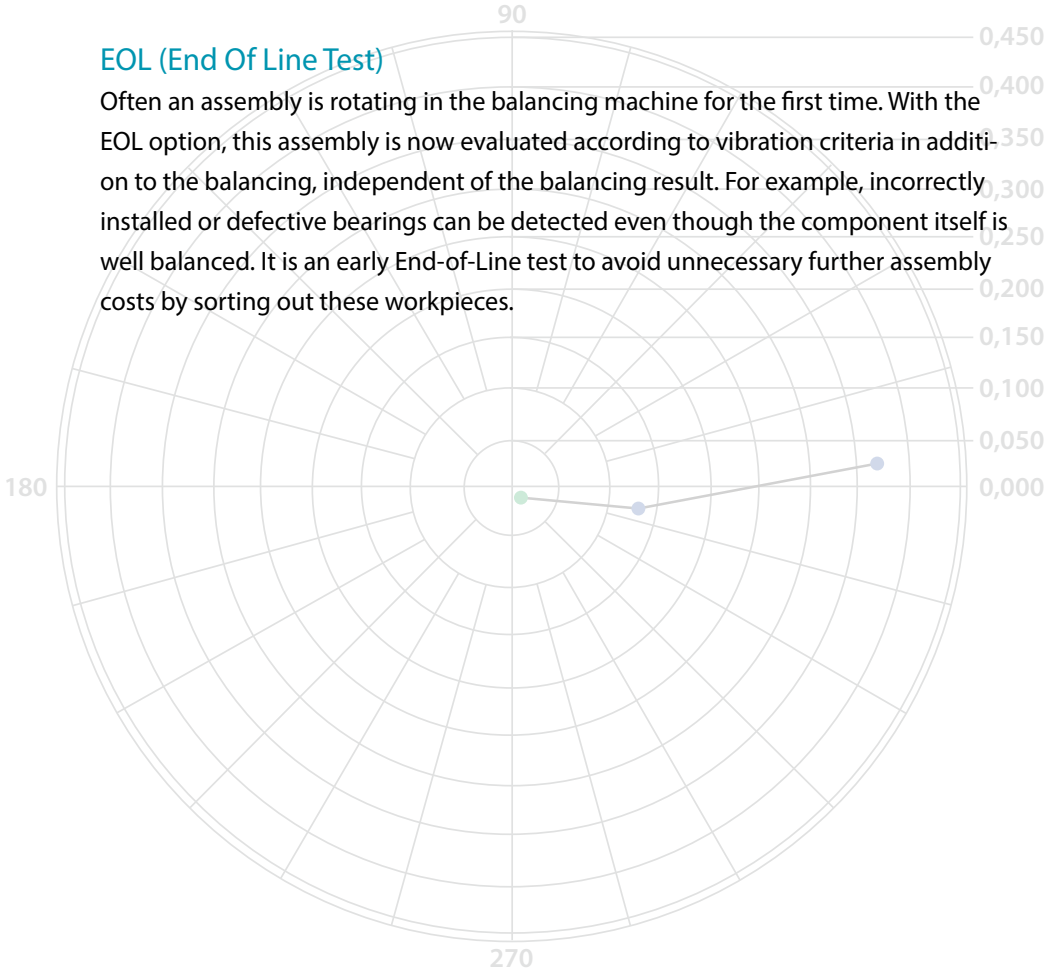
Module for remote control of the balancing software via customer control programs. The connection is made via TCP protocol. Excellent solution for integration into superior automation controls.

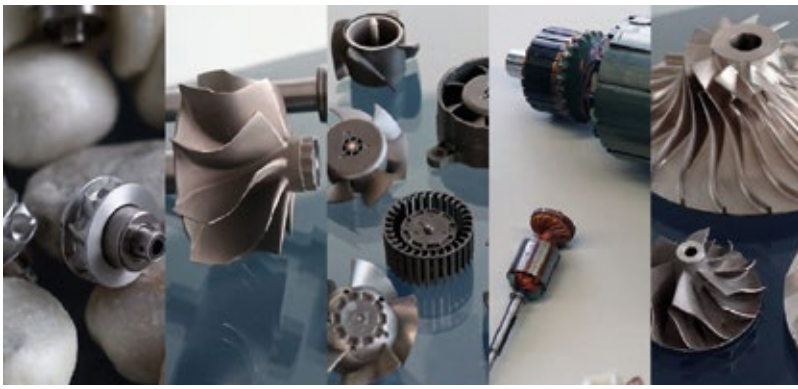
SAP web service

Characteristics of the balancing object are transferred directly from/to an SAP system installed at the customer's site. Serial numbers are checked for plausibility, incorrect workpieces are reported to the operator. Balancing recipes (rotor file, calibration) are loaded according to the serial number. An interface to Industry 4.0.

EOL (End Of Line Test)

Often an assembly is rotating in the balancing machine for the first time. With the EOL option, this assembly is now evaluated according to vibration criteria in addition to the balancing, independent of the balancing result. For example, incorrectly installed or defective bearings can be detected even though the component itself is well balanced. It is an early End-of-Line test to avoid unnecessary further assembly costs by sorting out these workpieces.





The Art of Balancing

The company PMB-Präzisionsmaschinenbau Bobertag GmbH was founded in 2008. Since then we have achieved a technological leadership in the field of ultra-precision balancing with our own measuring technology, software and complete balancing systems. From development and production to consulting, PMB stands for the highest quality in balancing technology. We work hand in hand with you. We are aware that we contribute an important part to the quality of your products. We support you in all aspects of your tasks and support you in planning and implementation with our know-how and our experience, which we have acquired in a wide field of applications. We are particularly proud of our balancing service - because our partners entrust us with their most important items: Their products!

We are certified according to DIN EN ISO 9001:2015

Services and solutions

- Balancing machines
- Balancing systems
- Balancing and analysing software
- Balancing service
- Operator training
- After Sales Service
- Research and development
- Consulting

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12.2023 / EN