

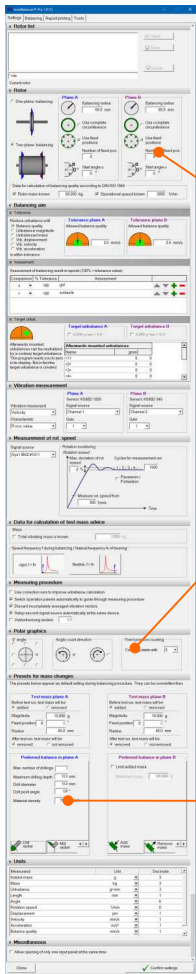
VMSet-01

The VMSet-01 come in a handy case and provide you with everything you need for Single- resp. Two-Plane- Balancing. It is not necessary to select all required single components on your own.

The system can be extended easily by new software instruments, e.g. for frequency or run-up analysis at any time. New hardware components are not necessary.

Equipment	VMSet-01-1	VMSet-01-2
	Single-Plane-Balancing	Single- and Two-Plane-Balancing
Hardware		
Sensor for vibration measurement	Piezoelectric accelerometer, shear design - Sensitivity: 100 mV/g, linear frequency range: 0.2 .. 20000 Hz, TEDS - Operating temperature: -40 .. 120 °C - Protection grade: IP68 / Insulated case avoiding ground loop problems - Accessories: i532 holding magnet, i536 magnet for curved surfaces, i564 thread adapter, 120-5 Sensor cable 5m	
	1 x	2 x
Sensor for Reference Position	1 x WL12 opto-electronic sensor - Scanning Range: Maximum 7m, response time: < 330 µs - Protection grade: IP67, Ambient operating temperature: -40 .. 60 °C - Accessories: i609 Stand with magnetic base, i313-5 cable 5m length, i608 reflection foil	
Additional accessories	i604 angle meter, i602 precision scale, i603 adjustment weight	
USB Box for Digitization	InnoBeamer X2 - Inputs: 2x analog for vibration sensor(s), 1x digital for speed switch - Signal frequency: 0.1 .. 40000 Hz - Supply current: < 500 mA with supply of all sensors - no mains adapter required - Operating temperature: -20 .. 50 °C, weight: 350 gr. - Accessories: Synchronisation cable and 1m USB cable	
Softwarelizenzen		
Number of	1 x	2 x
InnoBalancer Pro	✓	✓

Software Module - InnoBalancer Pro® 1.9
Field Balancing



Plane B

Balancing radius

Use complete circumference

Use fixed positions

Number of fixed pos.

Start angle α

Angle count direction

Preferred balance in plane A

Max. number of drillings

Maximum drilling depth

Drill diameter

Drill point angle

Material density

Drill radial Mill radial

Clearly structured setting options

Measuring procedure

Measuring run: Unbalance result, Verification run 2, Mass change, Vibration measurement, Unbalance result

Result

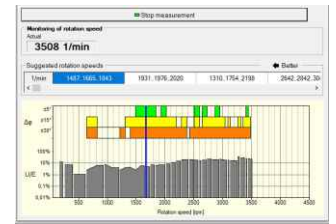
Plane A $v = 0,127 \text{ mm/s} \quad 335,6^\circ$

Plane B $v = 0,250 \text{ mm/s} \quad 114,0^\circ$

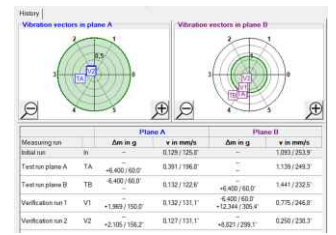
Magnitudes of further measurands

$U = 138,55 \text{ g}\cdot\text{mm}$	$a = 0,045 \text{ m/s}^2$
$m = 2,131 \text{ g}$	$v = 0,127 \text{ mm/s}$
$Q = \dots$	$x = 0,357 \mu\text{m}$

Purposefully reached balanced status



Analysis and display of optimum rotation speed for balancing



Overview of all measuring runs

Properties

The InnoBalancers guide the user through the balancing process so that unbalance and caused vibrations are reduced purposefully.

You enter the most important rotor data in a clearly structured control panel. Afterwards you open the “balancing” control panel. It presents the balancing process with its different steps which you simply carry out. For rotors with alternating rotation speeds, the InnoBalancer Pro offers the analysis of optimum rotation speed for balancing so that you are prevented from balancing at resonant rotation speeds.

By means of the automatic recognition of rotation speed, the InnoBalancer reads the vibration vectors in a high quality and calculates the unbalance. The InnoBalancer Pro also offers suggestions for the test mass.

After unbalance calculation, the InnoBalancer offers clear suggestions for balancing. In case of not following these suggestions, consequences are already shown in chart even before the measurement is started.

Furthermore, the InnoBalancer Pro masters continuous improvement of influence coefficients and shows the single vectors of each revolution as well as the development of the vibration vectors for all measuring runs.

Measuring runs can be saved and reloaded. Thereby balancing can be interrupted and later be continued.

Application

The InnoBalancers are designed for the reduction of vibrations.

Rotating parts in drives, gears, pumps, fans and many other technical products cause perturbing vibrations. These vibrations often have to be reduced in order to increase product quality and durability by smooth run.

The InnoBalancers allow a purposeful vibration reduction by balancing. Both discoidal and longish rotors can be balanced systematically and fast.

The InnoBalancers support field balancing. Ideally, the rotor is balanced directly in installed state. So you save the complex dismantling and the transport of the rotor to a balancing machine. Moreover, in many cases, an acceptable performance can only be achieved by balancing the installed rotor with all attached parts.

Technical Data Software Module - InnoBalancer®

	InnoBalancer Pro®	InnoBalancer®	InnoBalancer Light®
Balancing Methods and Calculations			
Planes	One- and Two-Plane Balancing for static and dynamic unbalance		
Fixed Positions	3..99 fixed positions, adjustable angle difference between 2 planes	-	
Balancing Aims: Reduction of the following measurands to an adjustable tolerance	Unbalance magnitude Unbalanced mass Balance quality acc. to DIN ISO 21940 Vibration displacement, -velocity, -acceleration	Unbalance magnitude Unbalanced mass	
Test Masses	Suggestion for test mass Before run: Add / Remove Afterwards: Keep / Revert	Before run: Add / Remove Afterwards: Revert	Before run: Add Afterwards: Revert
balancing methods	Add mass Remove mass Drill radial Mill Balancing rings, nuts Radial setscrews Mass list	Add mass Remove mass	Add mass
Additional Calculations and Analyses	Optimum rot. speed for balancing Defined unbalance Vector monitoring Adding influence coefficients Combining masses	Vector monitoring (checks whether the vector positions are plausible)	
Signal Processing			
Vibration Measurands	Vibration velocity Vibration acceleration Vibration displacement	Vibration velocity	
Units	m/s, mm/s, µm/s, nm/s, pm/s, in/s, mil/s, µin/s, dB m, mm, µm, nm, pm, ft, in, mil, µin, dB t, kg, g, mg, µg, ng, lb, oz, dram kgm, gm, gmm, mgmm, µgmm, ngmm, g in, lb in, dram in, oz in °, rad kHz, Hz, mHz, 1/s, 1/min, 1/h, rpm, cpm		
	m/s ² , mm/s ² , µm/s ² , nm/s ² , pm/s ² , g, mg, µg, km/s ² , kg, dB kg/m ³ , g/cm ³ , kg/l, g/ml, lb/ft ³ , oz/in ³ , lb/in ³		
Rotation Speeds	6 .. 600 000 rpm *		
Rotation Speed Monitoring	Automatic recognition of run-up, monitoring of constant rotation speed incl. adjustable tolerance		
Graphical Presentation			
User Guide	Tree structure for measuring runs and division of each measuring run in balancing steps		
Optimum Rot.Speed for Balancing	Phase constancy and signal level	-	
Averaged Vibration Vectors	Numerical and in polar chart Optional display of single vectors Progress of all measuring runs	Numerical and in polar chart	
Display of Balancing Measures	Balancing suggestions and status of execution in polar chart and text / numerically Unbalance preview in polar chart and numerically in case of not following balancing suggestions		
Miscellaneous			
Rotor List	✓	-	
Save Measuring Runs	✓	-	
Available in a Kit	VMSet-01;-04;-05	VMSet-01	VMSet-01
General Functions	Measurement data is held after switching off, module is cloneable		

* Using InnoBeamer LX2: 6 .. 192 000 min⁻¹