ADELIX

ADL MS52Pro / ADL MS54Pro

Vibration Analyzer

(with functions balancing

and laser centering equipment)

Operating manual combined with a passport

2023

CONTENT

1. DEVICE OVERVIEW

The ADL MS52Pro / ADL MS54Pro Vibration Analyzer (hereinafter referred to as the analyzer) is a compact yet powerful instrument for measuring general vibration parameters, analyzing the vibration spectrum of rotating equipment, immediately assessing according to ISO 10816, collecting on-route and off-route data, performing balancing of rotary equipment and laser alignment machines. File routing and data file sharing via email makes it ideal for collecting data from remote sites. Easy to use comes with data management and reporting software.

2. DELIVERY SET

№	Name	Qty.
1	ADL MS52Pro / ADL MS54Pro display unit	1
2	Accelerometer (vibration probe)	2 / 4
3	Cable 1.5m to a vibration probe	2 / 4
4	Magnet for mounting the vibration probe	2 / 4
5	Optical probe with magnetic stand	1
6	Wireless sensors for laser alignment	2
7	Universal V-brackets with chains for attaching laser alignment sensors	2
8	Racks 100mm	2
9	Racks 150mm	2
10	AC USB charger	1
11	USB cable	1
12	Software on a flash drive (or installed in the built-in memory of the device)	1
13	Roulette 3m	1
14	Carrying and storage bag	1
15	Protective case	1
16	Manual	1

3. TECHNICAL SPECIFICATIONS

Parameter	Values	
Analyzer	**ADL MS52Pro**	**ADL MS54Pro**
Number of vibration channels	**2**	**4**
Frequency range	1 … 25000 Hz	
Vibration acceleration measurement range	up to 200 m/s^2	
Vibration velocity measurement range	up to 200 mm/s	
Displacement measurement range (peak-to-peak)	up to 2000 um	
Accuracy	up to 5%	
Rotation frequency measurement range	10…200000 rpm	
FFT spectral analysis	100, 200, 400, 800, 1600, 3200, 6400, 12800, 25600, 51200, 102400 lines in the spectrum	
Balancing		
up to 8 correction planes, up to 16 measurement points		
Shaft alignment function		
Shaft diameter range	Diameter 20 to 250 mm (0.8 to 10 inches) with supplied chains	
Laser type	Diode laser	
Laser wavelength	650 – 675 nm	
Laser safety class	2	
Maximum laser power	1 mW	
Distance between measuring units	Min: 70mm Max: 10m	
Electronic inclinometer	Accuracy ±0.1°	
Connection	Built-in Class 1 wireless (up to 100m)	
Sensor dimensions (laser alignment)	91x57x42 mm	
Sensor weight (laser alignment)	125 g	
General parameters of the device		
Display	Color VGA	
Memory	4 GB	
PC connection and charging	USB	
Battery	Li-Pol, 8 hours of continuous work	
Case protection	IP54	
Accelerometer protection	IP68	
Work Conditions	Temperature: -20 to +55°C; humidity: up to 90%	
Dimensions	220 x 102 x 40 mm	
Weight	470 g	

4. OPERATION OF DEVICE

4.1 Basic functions

4.1.1 Keyboard

To turn the device on or off, press and hold the power button  for ~2 seconds.

In case of system hang when the device does not respond to any keys - press and hold the power button  for ~ 10 seconds, the system will reset and restart.

To close any active window without saving, other than the device's main menu, press the button  (it serves as a back button).

The button  in most cases is used to apply (save) changes (selection) and exit (from edited windows or the current window).

4.1.2 Autosave

All procedures are designed with autosave results. To temporarily interrupt the current operation, press the button  to exit to the main menu of the device. The data of the interrupted measurement will be automatically saved and the instrument can be switched off.

4.1.3 Battery charge

The batteries of the instrument and sensors for alignment can be charged using a USB charger or via the USB port of a PC/laptop/power bank.

Immediately after connecting the charger to the display unit, there are a few seconds to change the charge current - press and hold the button  for ~ 2 seconds until the LED changes the flashing frequency. A low flash rate is the normal charge, high flash rate is the fast charge. Please note that the USB port of a PC/laptop can only provide normal charging.

When the battery is fully charged, charging will stop and the LED will turn off. Recharging does not take place even if the USB cable remains connected.

4.1.4 Main menu

When the device is turned on, the main menu will appear on the screen.

To enter a menu item, move the cursor over the name of this item using the arrow buttons and press the button START.

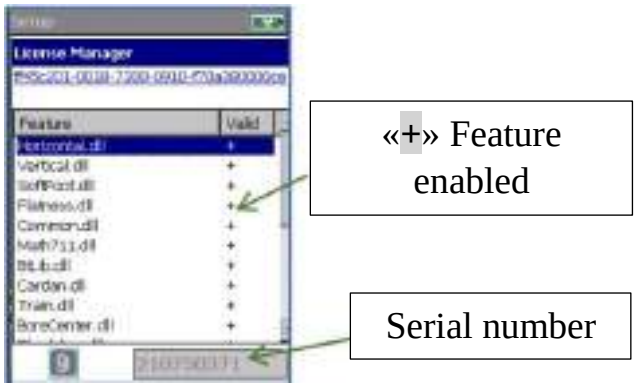
4.1.5 Setup menu

To enter the setup menu item - move the cursor to the "**Setup**" mark and press the button START.

- date and time setting

- delay time for automatic shutdown. Disabled when set to 0

- installation of a license file containing measurement functions. Press the button  , navigate to the license file, then press the button  to open and install the license.



- switching between wireless and wired sensor connection.

- User interface language.

Choose a language and press the button  .

- Switching the device to USB mass storage mode. By default, you can connect your device to your computer through the Microsoft Windows Mobile Device Center. USB mass storage mode can be used as an alternate mode.

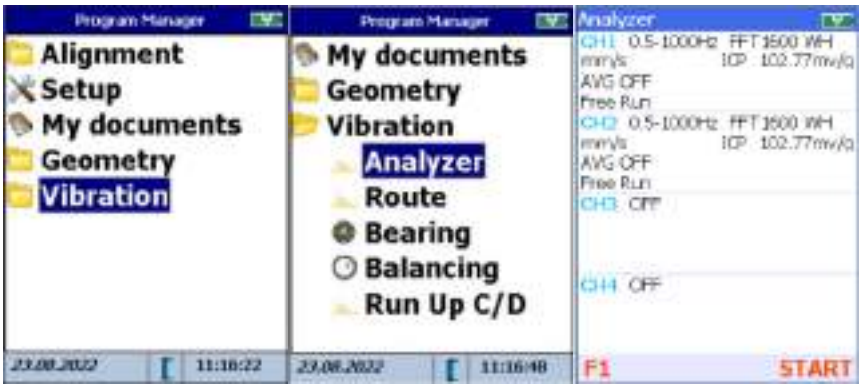
- Adjusting the brightness of the display backlight

- to select the default alignment mode, 1-d or 2-d dual axis mode.

In Dual Axis mode, both horizontal and vertical alignment of the machine with real-time data updates can be performed at a static sensor position (e.g., 3 o'clock). For QB-TSM sensors, only 1-D mode is available.

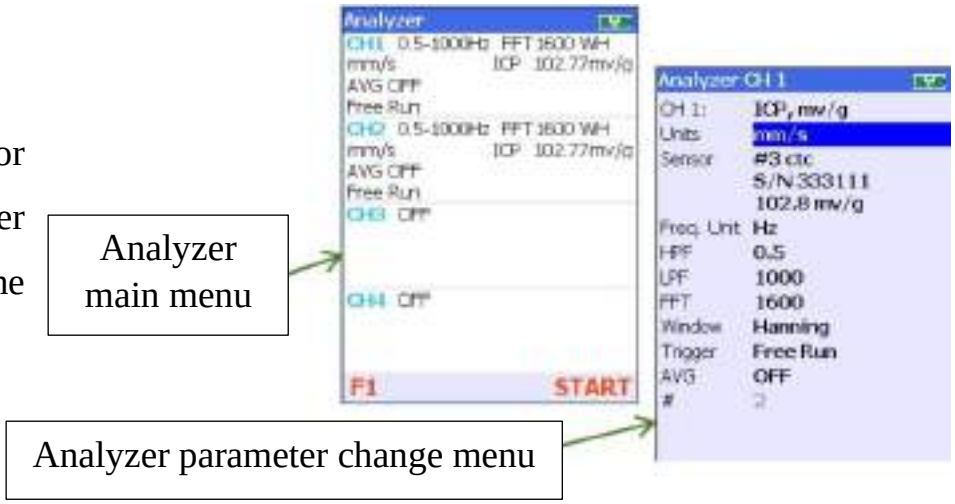
4.2 Vibration measurement setup menu

Move cursor and select "**Vibration**"



4.2.1 Spectrum analyzer settings

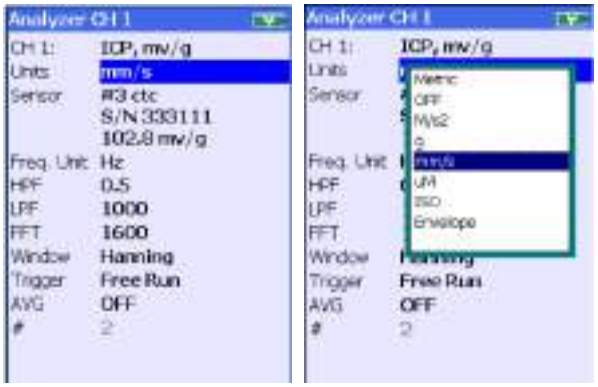
To enter the menu for changing the analyzer parameters, press the button F1.



4.2.2 Units

Move the cursor to "**Units**" and press the button ENTER

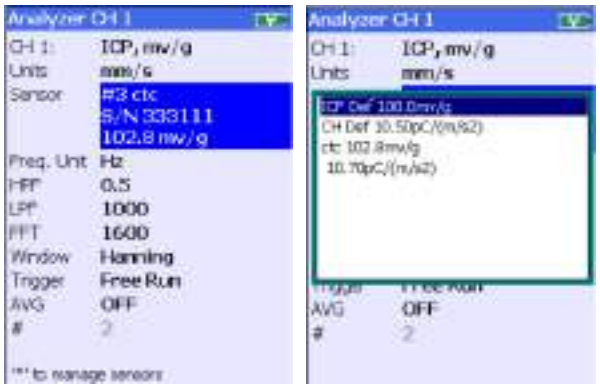
Use the buttons ▲ ▼ to select the unit of measure, e.g., mm/s, and press ENTER to confirm.



4.2.3 Sensor setup

Move the cursor to the "**Sensor**" settings and press ENTER.

Use the buttons ▲ ▼ to select the sensor type - for example, ICP and press ENTER to confirm.



4.2.4 Setting the sensor conversion factor

Move the cursor to the Sensor settings and press *.

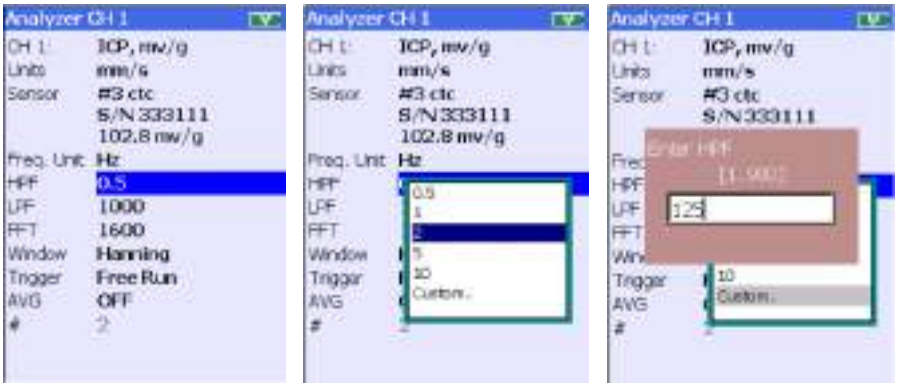
Use the buttons ▲ ▼ to select the sensor parameter you want to change, such as serial number (**S/N**), and then press ENTER.

Enter a new value using the keyboard and press ENTER to confirm. To confirm the new sensor settings, press START.

4.2.5 Adjusting the HPF cutoff frequency

Move the cursor to HPF and press the button ENTER

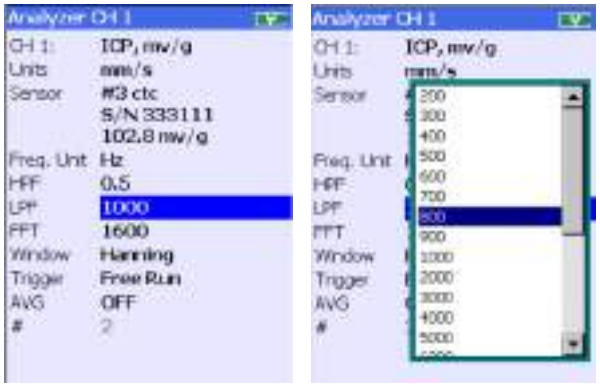
Use the buttons ▲ ▼ to select the desired HPF frequency for example, 2 Hz, and press ENTER to confirm.



4.2.6 Adjusting the LPF cutoff frequency

Move the cursor to the **LPF** and press ENTER.

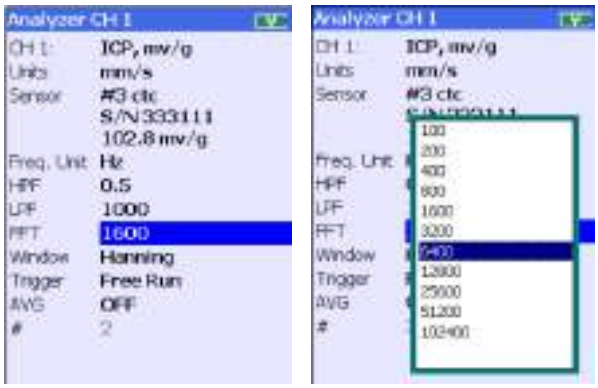
Use the buttons ▲ ▼ to select the **LPF** frequency - eg. 800Hz and press ENTER to confirm.



4.2.7 Setting the number of FFT lines

Move the cursor to **FFT** and press ENTER.

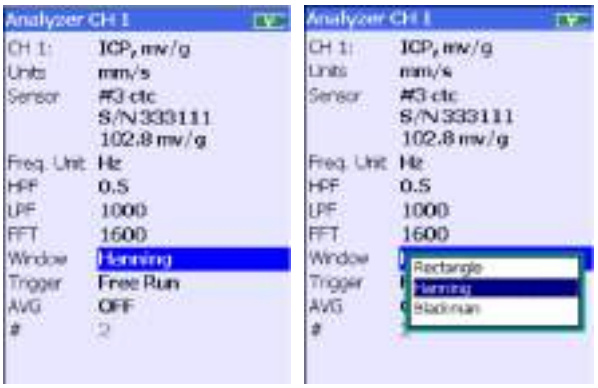
Use the buttons ▲ ▼ to select the required number of FFT lines - for example, 6400 and press the button ENTER to confirm.



4.2.8 Setting the FFT window type

Move the cursor to "**Window**" and press ENTER

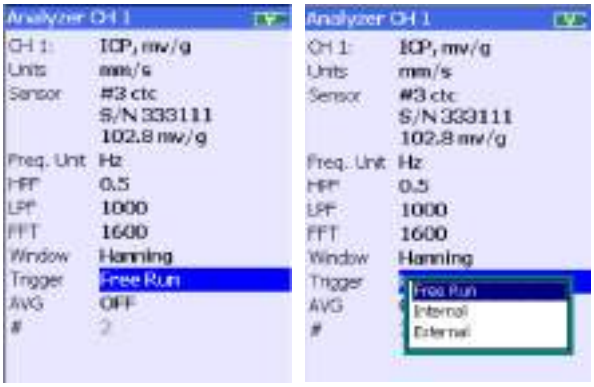
Use the buttons ▲ ▼, to select an FFT window such as Hanning and press ENTER to confirm.



4.2.9 Setting the trigger type

Move the cursor to **Trigger** and press ENTER.

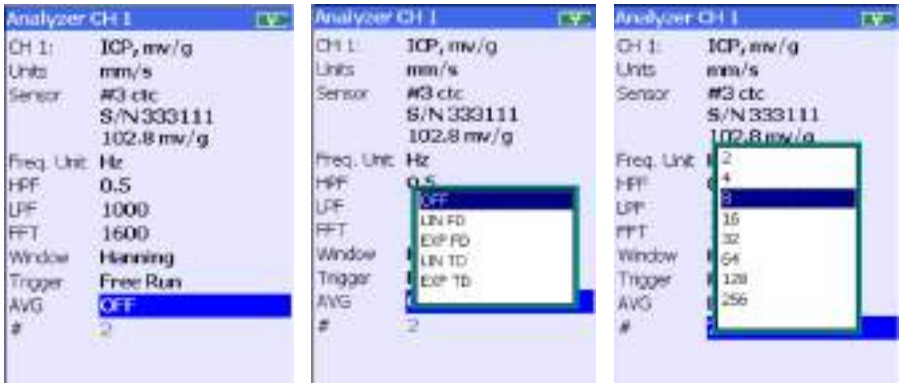
Use the buttons ▲ ▼ to select the type of measurement start you want, eg Free run, and press ENTER to confirm.



4.2.10 Setting the averaging mode

Move the cursor to Averaging and press the button ENTER.

Use the buttons ▲ ▼ to select the desired type of averaging - for example, Lin FD (linear, frequency domain) and press the button ENTER to confirm.



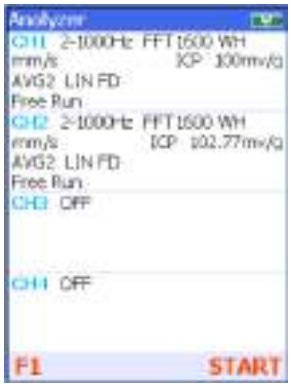
Then select the number of measurements to average and press the button ENTER to confirm.

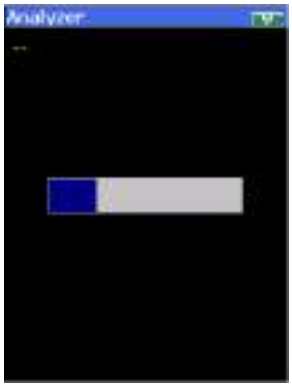
4.2.11 Spectrum Analyzer Parameter Confirmation

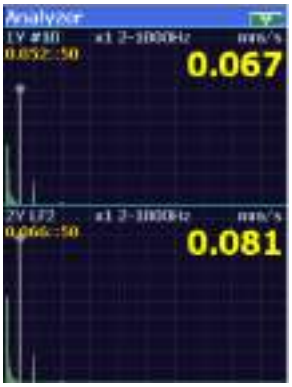
After finishing setting the measurement parameters, press ENTER to confirm and return to the analyzer's main menu.

4.3 Start measurement

Place the sensors on the measurement object and press START.







4.3.1 Operation in measuring mode

7 PQRS - to switching between FFT and Time modes.

4 GHI - stop / continue measurement.

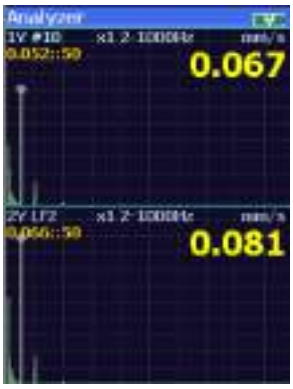
▼ ▲ - to select the channel on which the cursor is active.

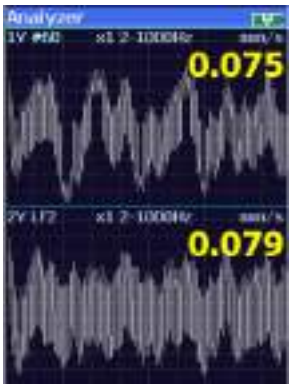
◄ ► - cursor movement; the measurement can be stopped by pressing the button 4 GHI.

5 JKL - setting the cursor to the maximum harmonic of the spectrum

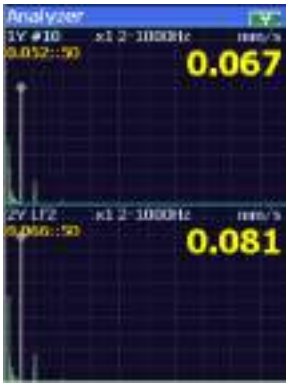
6 MNO - switching cursor type – «**frequency/cycles per minute/harmonic number**».

3 DEF - change the display mode on the display.





4.3.2 Saving measurement results to a file

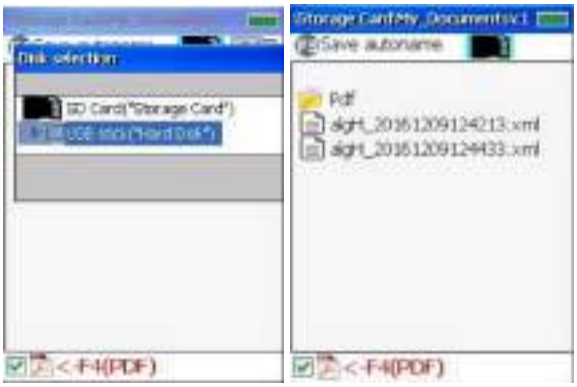


To save the file, click the button 8 TUV in the results menu.

Files can be stored on the internal SD card or on a flash drive connected to the device's USB connector.

Use the button F2 to select a drive.

Use the buttons START CLR ▲ ▼ ◄ ► to select a folder.



Use the button START to open a folder.

Use the button CLR to move up one level.

Use the button 7 PQRS to create a new folder.

Use the button F4 to enable or disable the ON/OFF mode of generating PDF reports.

Press the button ENTER or F5 to create a default report file.

Press the button 8 TUV to change the file name, then click ENTER to save the file.

4.4 Route based measurement

Use the software to create a route and download the route file to the device.

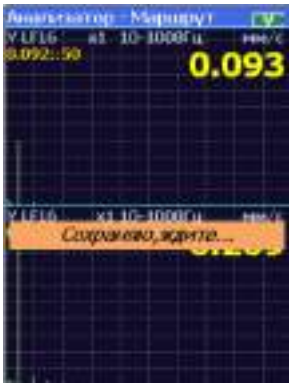
Highlight the **Vibration/Route** and press START.

The device will enter the file explorer.

Open the folder with the route file, and hover over the ROUTES.SRC file and click START.

Use the buttons ◄ ► to browse or randomly select waypoints.

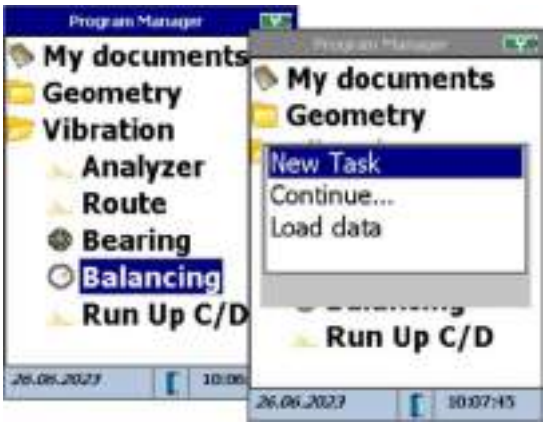
Set the probe to the measuring point and press START. The instrument takes measurements with the specified parameters and saves the files in the destination folder corresponding to the waypoint.



5. EQUIPMENT BALANCING

5.1 Balancing settings

Enter the balancing function.



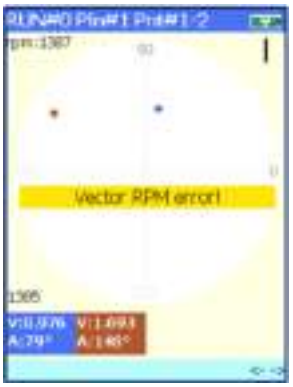
Use the buttons ▼ ▲ to select a setting.

Press the button ENTER, to change the parameter value.

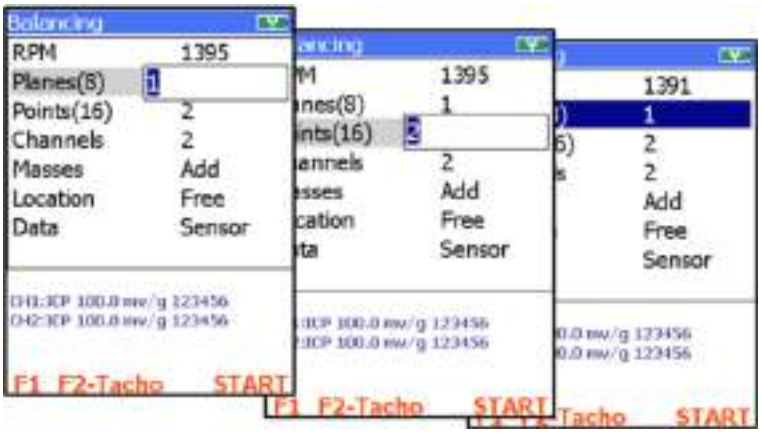
Set the RPM of the machine at which balancing will be performed.

To get the actual revolution of the machine, run the tachometer function. To do this, press the button F2 and then ENTER to apply the measured RPM.

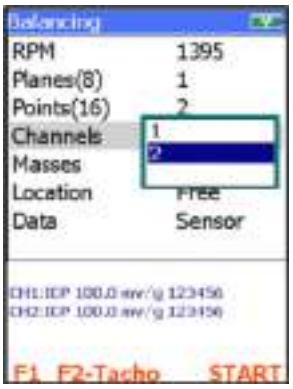
Note. If the actual RPM and the trim RPM differ by more than 5%, the device displays an error message.



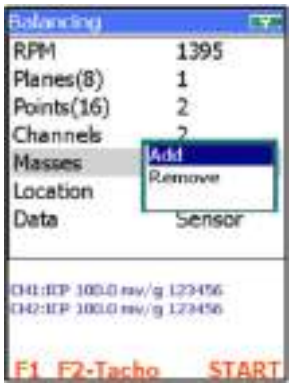
Set the number of **Planes** (where the balancing masses will be attached or removed) and the number of **Points** (where the accelerometer will measure vibration levels).



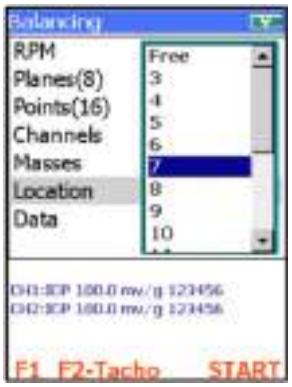
Set the number of **Channels** used for taking readings.



Balance **Masses** can be preset to **Add** or **Remove**.

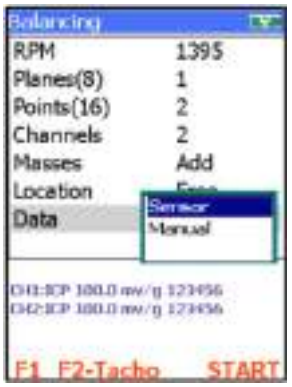


Balance masses can be attached at any Free Locations angle or at Fixed Locations (such as fan blades). The number of fixed seats can be set from 3 to 18 seats.



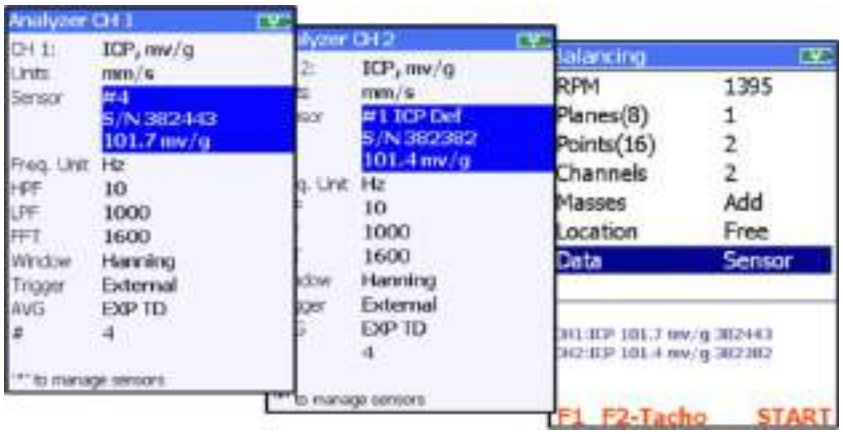
Note. The balancing program implies that the angles (and the fixed numbering of places) are always calculated against the direction of rotation of the machine!

The **Data** source must be configured for the **Sensor**.



Select the sensors used to take readings.

Press the button START to confirm.



Now everything is set up and the instrument is ready for measurement.

Press the button START to start measuring.

5.2 Overview of the balancing procedure in one plane

- Run 0 ("Run 0") - the initial measurement of vibration (imbalance).
- Run 1 ("Run 1") - measurement of vibration with a test mass attached to plane A.
– Stop the machine, and attach the calculated adjustment weight at the specified angle on the balance plane A.
- Correction 1… - Start the machine and measure the level of residual vibration. After the measurement stops, the device will calculate the correction weight to further reduce the vibration. If the residual vibration exceeds the target value, connect the balance weight and perform another correction run. Repeat the adjustment until the desired vibration level is reached.

5.3 Example: Balance procedure sequence (one plane, two points)

Set balancing parameters.

Place the accelerometers at the measurement points.

Start the machine.

Press the button START to start the measurement.

Wait for the reading to stabilize.

Press the button START

Confirm that the readings have been taken.

Press the button START.

Stop the machine.

Connect test masses.

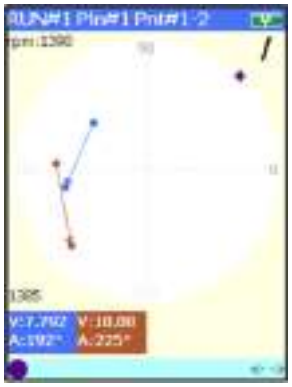
Enter the weight "Weight" and the angle "Angle" at which it is attached.

Press the button START.

Start the machine.

Press the button START.

Wait for the reading to stabilize.



Press the button START.

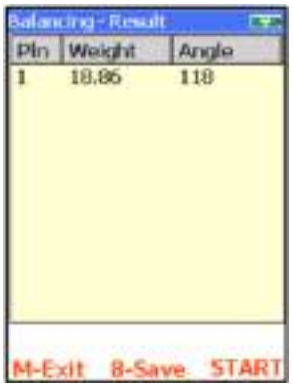
Confirm that the readings have been taken.

Stop the machine.

Now you need to decide whether to leave or remove the test mass from plane No. 1.

For example, the trial mass may remain attached if the vibration level is reduced.

Select a function and press the button START.

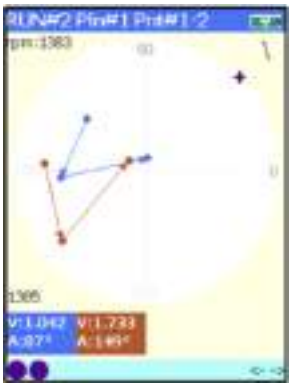


The device displays the calculated weight to be attached to further correct the imbalance.

Now you can measure the residual vibration.

Start the machine.

Press the button START.



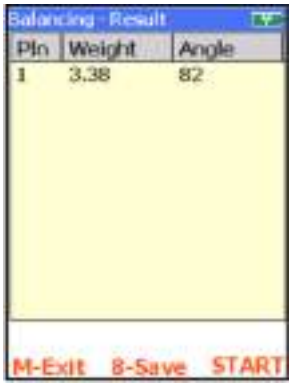
Wait for the reading to stabilize.

Confirm that the readings have been taken.

Press the button START.

Stop the machine.

The device displays the calculated weight to be attached to further correct the imbalance.



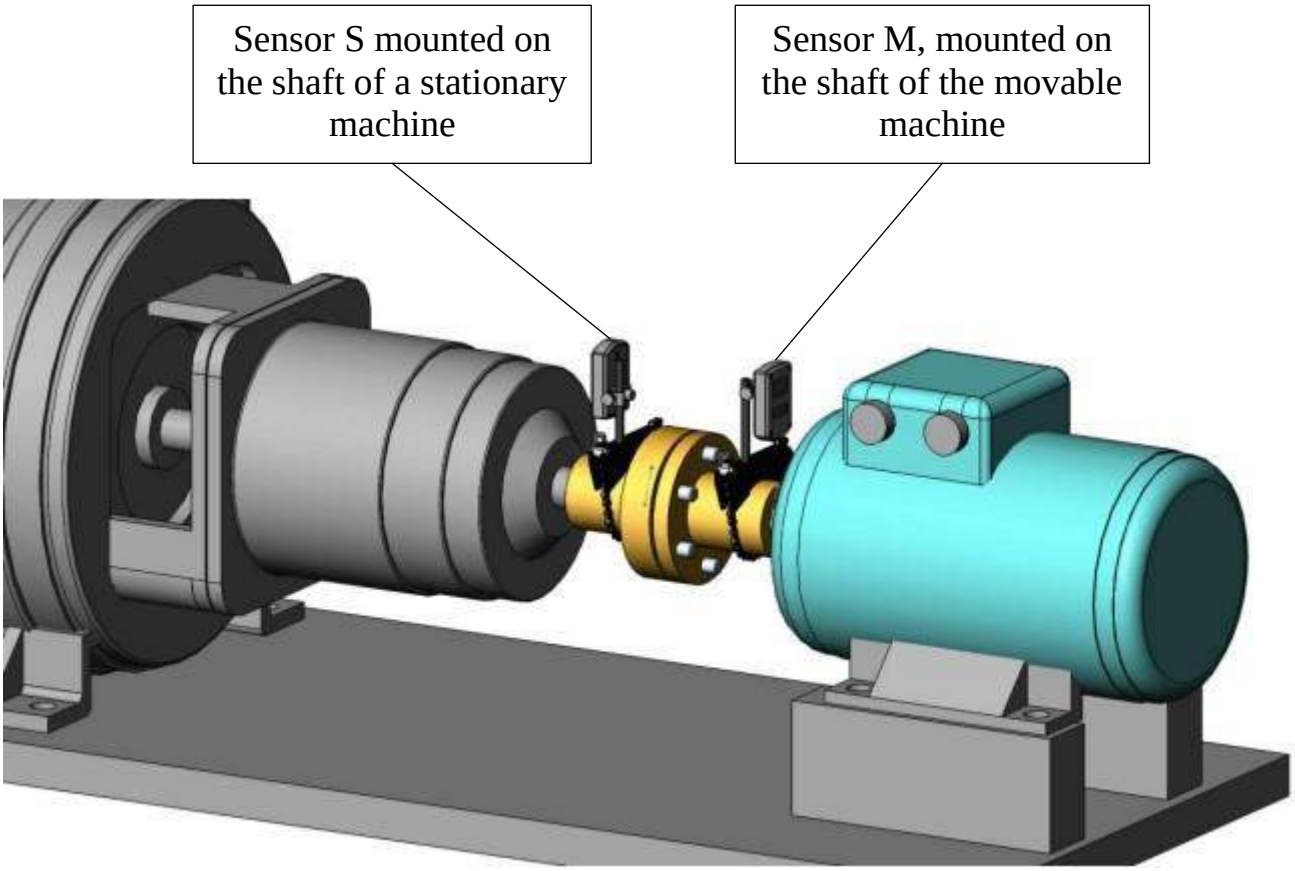
6. LASER CENTERING OF EQUIPMENT

6.1 General information

6.1.1 Purpose of Centering

The Centering system (hereinafter referred to as the System) is designed to measure the misalignment of the shaft axes of coupled machines and calculate the adjustment of the movable machine, which is necessary to eliminate misalignment that exceeds the maximum tolerances.

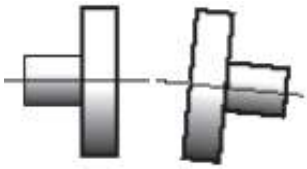
Centering or leveling a machine means adjusting the relative position of two connected machines (such as a motor and a pump) so that the centerline of an axle is concentric when the machines are operating under normal working conditions.



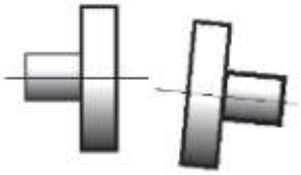
6.1.2 Types of misalignments

The displacements of the axes of rotating machines are of the following types:

Parallel misalignment - the center lines of the two shafts, although parallel, do not coincide.



Angular misalignment - the center lines of the two shafts are not parallel.



Parallel and angular misalignment - the center lines of the two shafts, although parallel, do not coincide.

Parallel and angular misalignment is determined in two mutually perpendicular planes. In order to eliminate the parallel and angular displacement of the axes in each of the planes, the position of the movable machine (M) will be corrected.

For a horizontally mounted machine, the position of the movable machine (M) is adjustable in the horizontal and vertical planes.

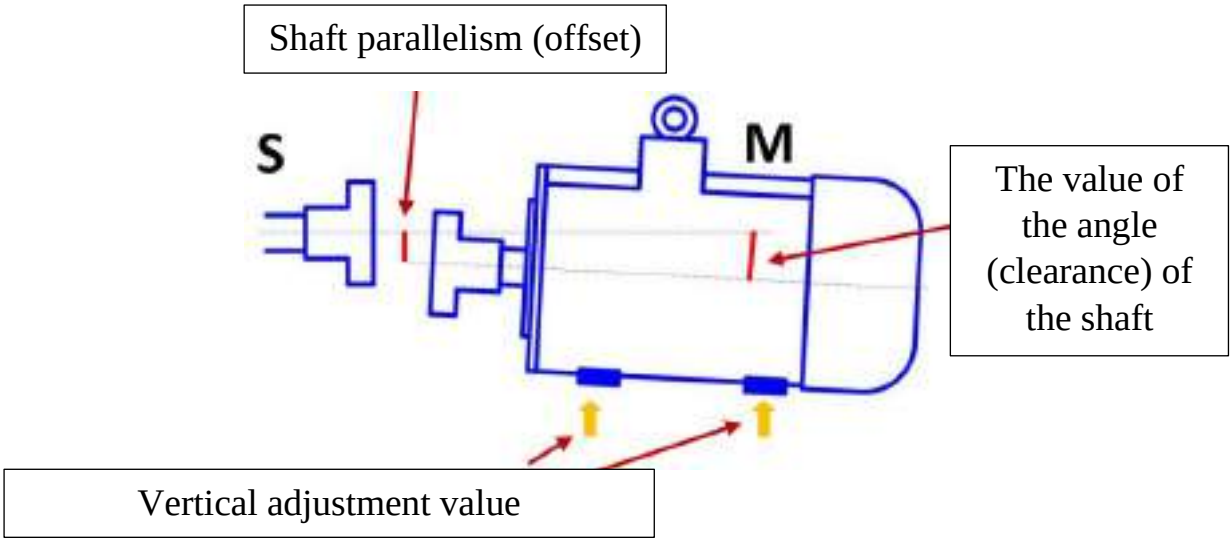
For a vertically mounted machine, the location of the correction planes is determined by the operator based on considerations of convenience and manufacturability of moving the movable machine.

Stationary machine (S) - during the process of correcting the misalignment, the position of this machine remains static, that is, it does not move.

Movable machine (M) - a machine, the position of which is aligned with a stationary machine.

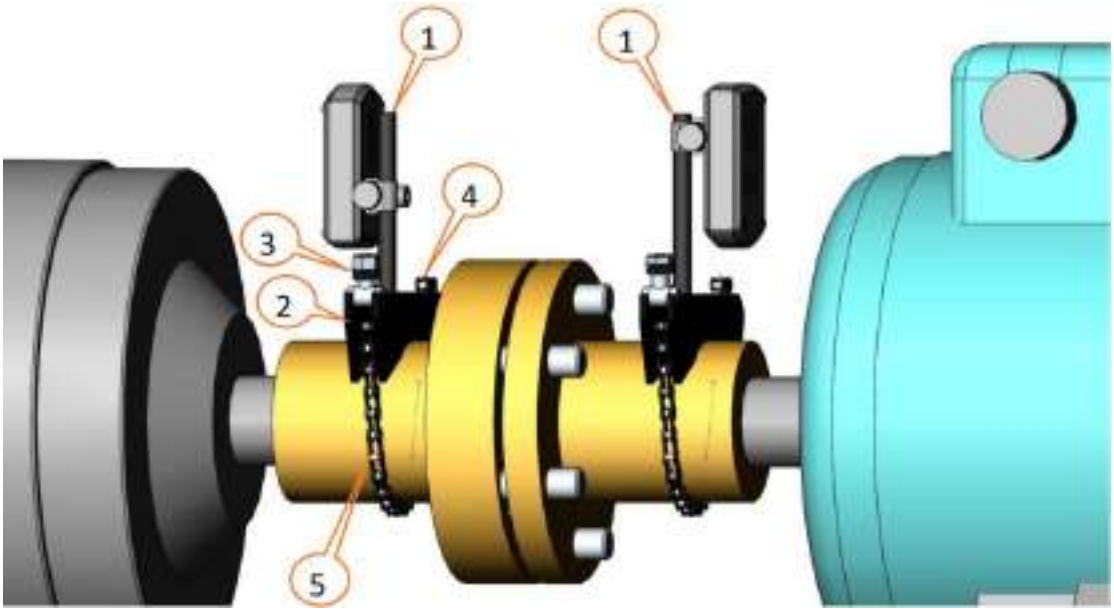
Soft Foot - the case when the machine is on three out of four supports. This means that the position of the machine on the foundation is unstable. Before centering, the position of the machine must be corrected.

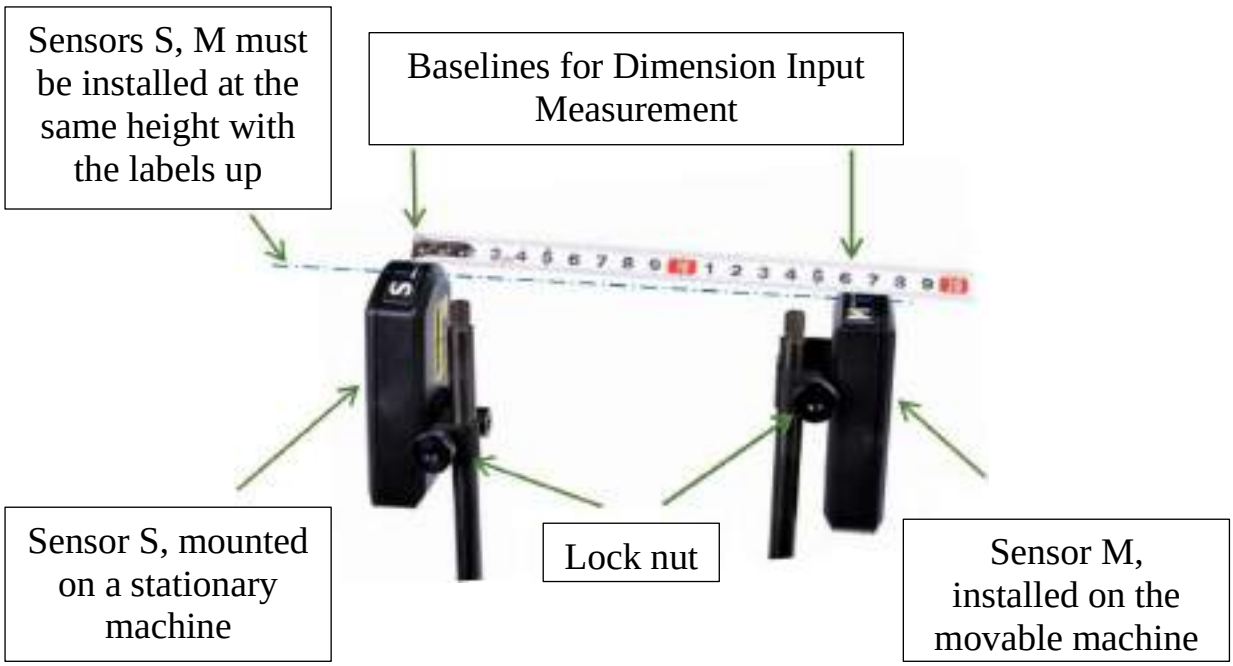
The measuring system calculates the value of the angular and parallel displacement of the axes in the plane of the connection (coupling) (in two mutually perpendicular planes), as well as the value of the adjustment of the paws (legs) on the movable machine (M), which is necessary to eliminate misalignment. The figure below shows the misalignment of the axes and the value of its correction only for the vertical plane.



6.1.3 Mounting sensors

- Firmly tighten the pins 1 on the shaft brackets 2.
- Insert the lock nut 3 into the bracket 2 and then hook the chain 5 onto the pin 4.
- Tighten lock nut 3 firmly. Shaft brackets with rods must be installed in the same angular position.
- Mount the sensors on the rods. Always try to install sensors at the lowest possible radial height. Make sure that the sensors do not touch the parts or brackets of the machine.





6.1.4 Laser Beam Adjustment

• Loosen the lock nut and adjust the sensor horizontally so that the center of the laser line is in the sensor window.

• Lightly tighten the nut and vertically adjust the laser line to the center of the sensor window.

• Tighten the nut firmly.

• Adjust the second transducer in the same way.

Use only angle adjustment. Do not change the installation height of the sensors!

6.2 Overview of menu functions

6.2.1 Overview of general control buttons

To turn on/off the display and sensors, press and hold the power button for ~2 seconds.

If the system freezes and the device does not respond to any button, press and hold the power button for ~10 seconds, the system will reset.

To close any currently active window without saving, in addition to the device's main menu, press the button MENU (it serves as an exit button).

The button START confirms the application of various actions: starting measurements, saving changes, calling up the selection of setup options, or exiting edit windows or the current window, except for windows such as data collection, alignment, support stabilization, etc., where this button is not used).

To call up a menu item, move the cursor to that item and press START or simply press the shortcut key regardless of the position of the cursor. In most cases, the shortcut button is shown to the left of the menu.

6.2.2 Autosave

All analyzer routines are designed with automatic data saving. To temporarily stop the current work, press the button MENU until the program exits the main menu of the device. The data is saved and the device can be turned off.

6.2.3 Device setup

To open the Settings menu, move the cursor to the Settings icon and press the button START or button .

6.2.4 Menu items "Settings"

- setting Date and Time.

- setting the device automatic shutdown time in seconds.

If set to 0, the auto-off function is disabled.

- installation of a license file that allows you to perform measurement functions. Press the button  , navigate to the license file, press  to open and install the license file.

«+» - feature enabled

Serial number

- setting of switching between wireless/cable connection of sensors. For wireless connection - press 1 or 2 to enter the number of sensors to be connected.

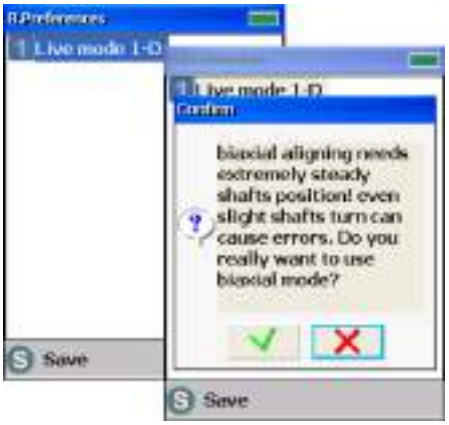
Number of sensors to be connected

– setting the user interface language selection. Use the buttons ▲ ▼ to select a language, then press the button START

- switch to USB storage mode. By default, the device can be connected to a computer through the Microsoft Windows Mobile Device Center. Alternatively, you can use the USB mass storage mode.

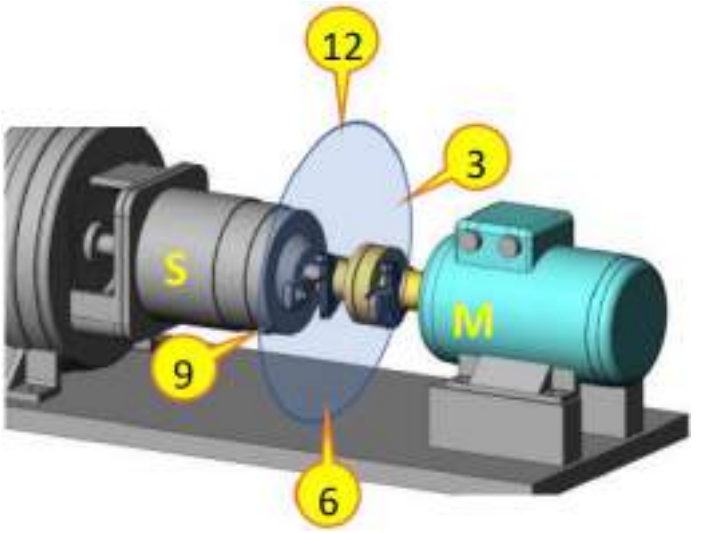
- setting the brightness of the display backlight.

- default alignment mode selection setting 1-D or 2-D dual axis mode. In Dual Axis mode, both horizontal and vertical alignment of the machine with real-time data updates can be performed at a static sensor position (e.g. 3 o'clock). For QB-TSM sensors, the only mode available is 1-D.



6.3 Equipment alignment horizontally

6.3.1 Description of procedure



- ✓ Mount the sensors on the shafts.
- ✓ Launch the Horizontal program**.**
- ✓ Enter dimensions.
- ✓ Set parameters. For example, "Measurement mode" - the type of clock (9-12-3 o'clock positions).

- ✓ Rotate the sensor shafts to the first position at 9 o'clock (90°). Press the button START to take a reading.
- ✓ Rotate the sensor shafts to the second 12 o'clock position (180°). Press the button START to take a reading.
- ✓ Rotate the sensor shafts to the last position by 3 o'clock (270°). Press the button START to take a reading.
- ✓ After that, the device will calculate the offset and display the necessary corrections for the moving machine.

6.3.2 Sensor’s positions conventions

When carrying out measurements, it is necessary to observe the conditional positions of the sensors on the shafts with measuring transducers S and M relative to the relative position of the machines S and M, as shown in the figure above.

Angular positions in degrees are accepted in the device:

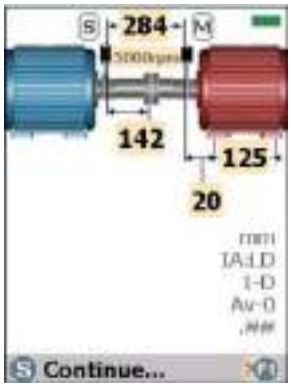
6 o'clock - 0°	12 o'clock - 180°
9 o'clock - 90°	3 o'clock - 270°

6.3.3 Parameters

Launch the **Horizontal** program from the main menu.

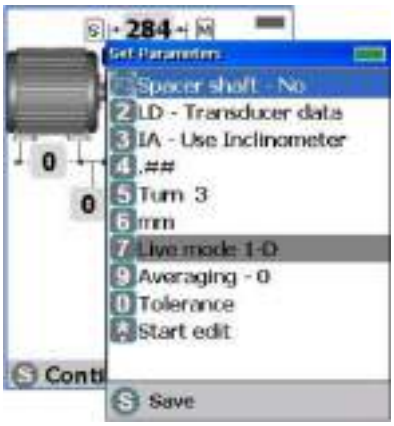
Select the option to create a new task "**New Task**".

The measurement settings window will open with machine dimensions.

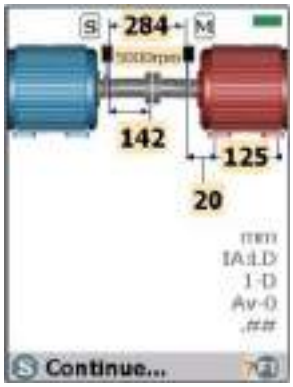


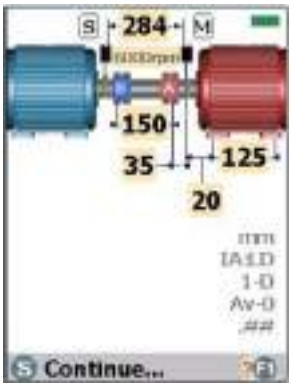
Press the button * to start editing dimension values.

Press the button F1 to set the parameters.



Press the button F3 to switch the mode "Intermediate shaft" Yes / No.





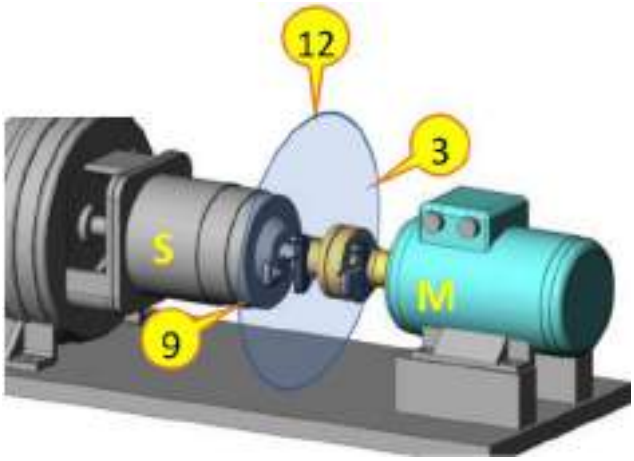
Press the button 2 ABC to switch data input - LD / MD sensor data - manual data.

Press the button 3 DEF to switch and enter angle - IA use inclinometer / MA manual angle. Manual angle entry is used for vertical machines when an electronic inclinometer cannot be used.

Press the button 4 GHI to switch the displayed precision - 2 or 3 digits.

Press the button F1 then 5 to switch measurement mode:

Turn 3 - 9-12-3 o'clock mode, in which readings are taken at three pre-defined positions (points) of the shaft - 9 o'clock, then 12 o'clock, then 3 o'clock. The device will then go to the results screen.



Turn 4 – is a mode in which readings are taken at four predefined shaft positions (points) divided by 90° or 45° (3 o'clock/1:30 o'clock). The device will then go to the results screen.

Multipoint mode - the measurement can be made in any position (from 3 to 36 points). After getting enough readings, press the button F5 to go to the result screen.

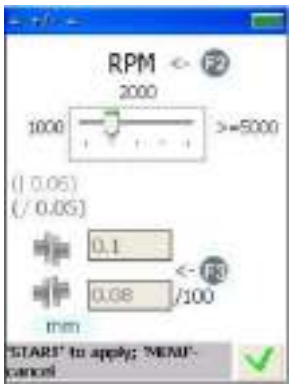
6.3.4 Tolerance setting

Press the button 0 to enter the tolerance setting menu.

Press the button F2 to use the predefined RPM/tolerance table.

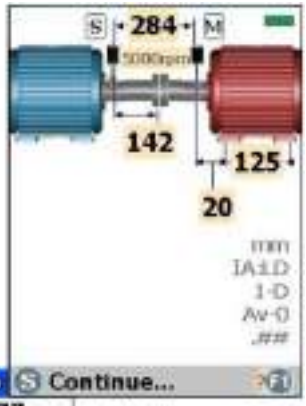
Press the button F3 to enter user-defined tolerance values.

Press the button START to save the changes or MENU to cancel the changes.

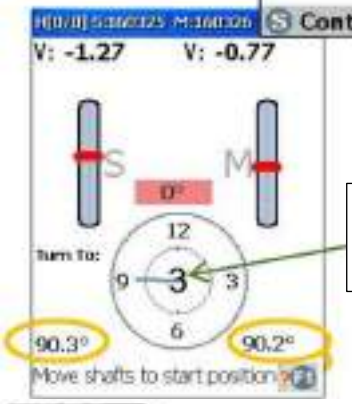


6.3.5 Taking measurements. Clock mode

Press the button * to resize.

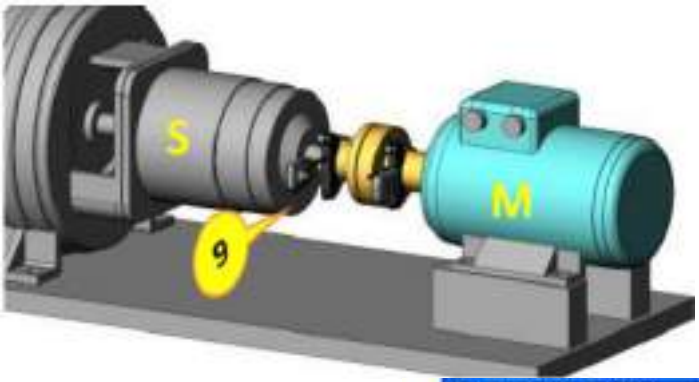


Set options and enter dimensions, then press the button START to continue.

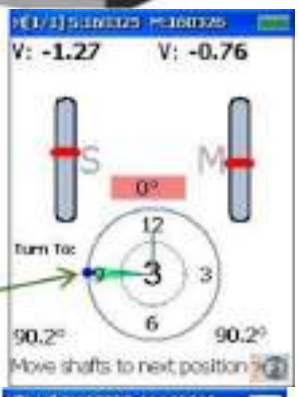


3 – clock mode
* - multipoint mode

Rotate shafts to first position - 9 o'clock (90°)

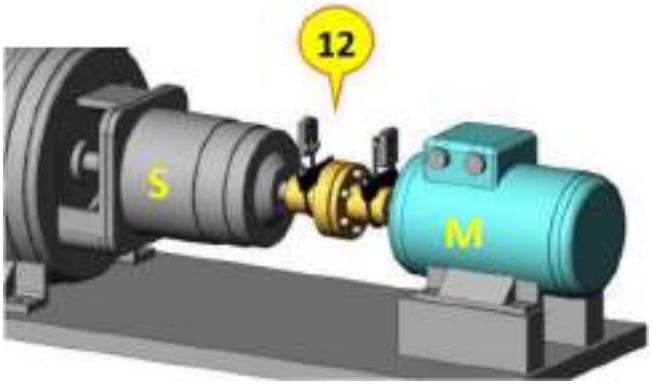


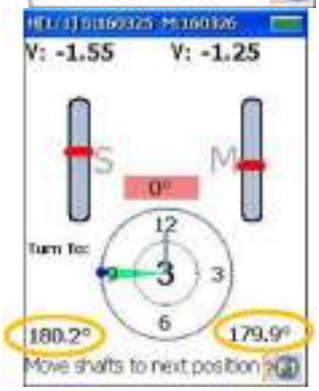
Press the button START to start measuring at the first point.



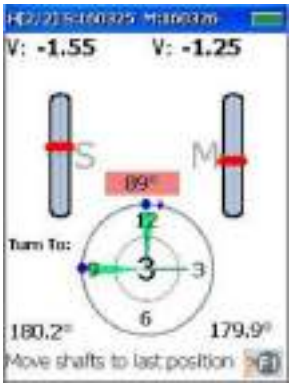
First measuring point

Rotate shafts to second position - 12 o'clock (180°)

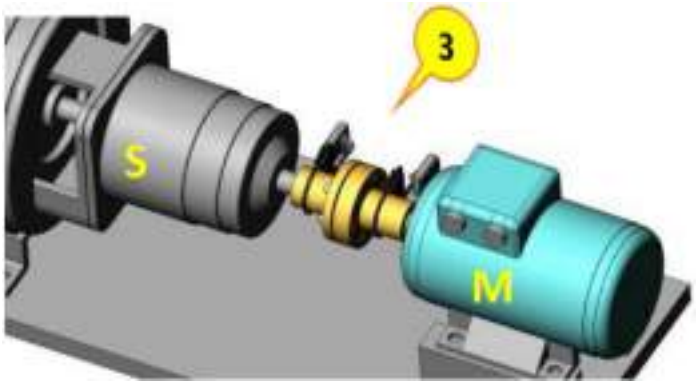


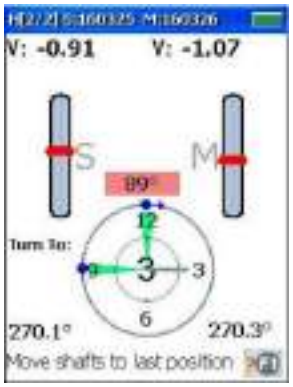


Press the button START to start measuring at the second point.

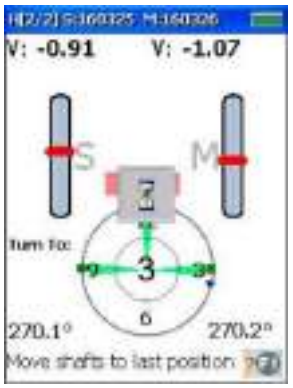


Rotate the shafts to the third (last) position - 3 o'clock (270°).

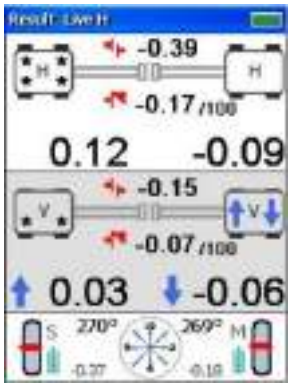




Press the button START to start measuring at the third point.



After taking three measurements, the device will go to the results screen.



6.3.6 Taking measurements. Multipoint mode

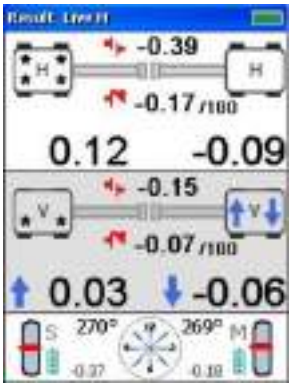
In multi-point mode, readings can be obtained at any position of the shafts, the number of measuring points can be from 3 to 36.

The vibration analyzer can calculate misalignment after collecting at least 3 points within a 70-degree range only. However, always try to cover the widest possible angle of rotation of the shaft.

Press the button START to take readings, and then rotate the shafts to the next position.

The yellow color of the watch dial indicates that the point has already been measured and the shafts should be returned to the next position.

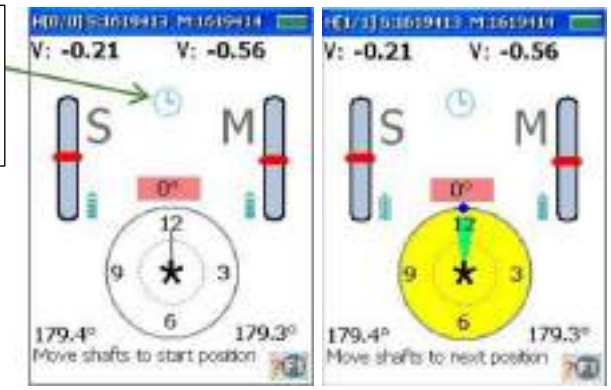
When enough readings have been collected, press the button F5 to go to the results screen.



6.3.7 Taking measurements. Automatic data acquisition mode

Turn the shafts to the first position, then press F4 to turn on the automatic collection mode.

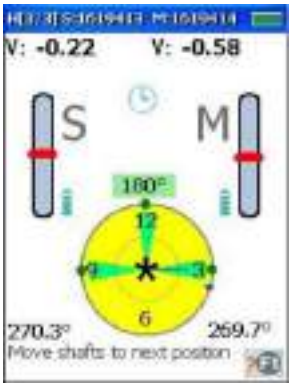
Automatic data collection mode activated



When the automatic data acquisition mode is active, the device waits for a stable shaft position, then automatically records the data and prompts you to move the shafts to the next position.

The automatic acquisition mode can be activated in both clock and multipoint measurement modes.

When the device is in multipoint mode and enough data has been collected, press the button F5 to go to the result screen.



When the device is in watch mode and three/four measurements are taken, the device will automatically go to the results screen.

6.3.8 Assessment of measurement quality

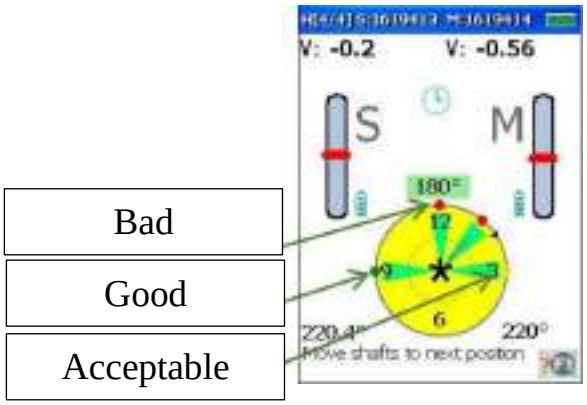
When measuring, the instrument evaluates the quality of the data based on the standard deviation. The quality is indicated by the color of the dots at the measurement points:

Blue - evaluation is not possible (too few points measured).

Green is good quality.

Yellow - acceptable quality.

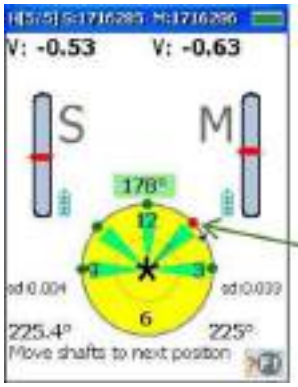
Red - poor quality, you need to re-measure.



Factors that can affect the readings: strong vibration, partial cutting off of the laser beam, mechanical weakening, accidental change in the position of the sensors (for example, if they accidentally touched it). Evaluation of the quality of readings is a useful option to help identify key factors in the measurement.

6.3.9 Editing measurement points

If poor quality data is found, the measured data can be modified.

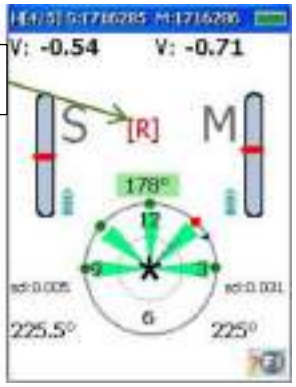


Плохое

Press the button ▼ to turn on edit mode.

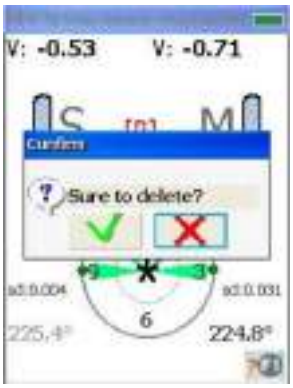
Use the buttons ▼ ▲ to scroll through the measured data.

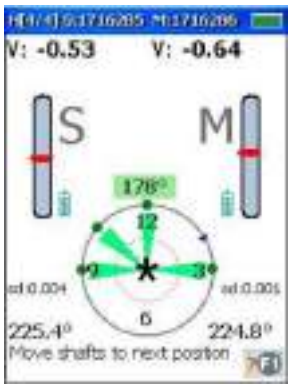
[R] - Edit Mode



Use the button CLR to delete readings.

Use the button ▲ to exit edit mode (press until the cursor points to the last measurement, then exit).

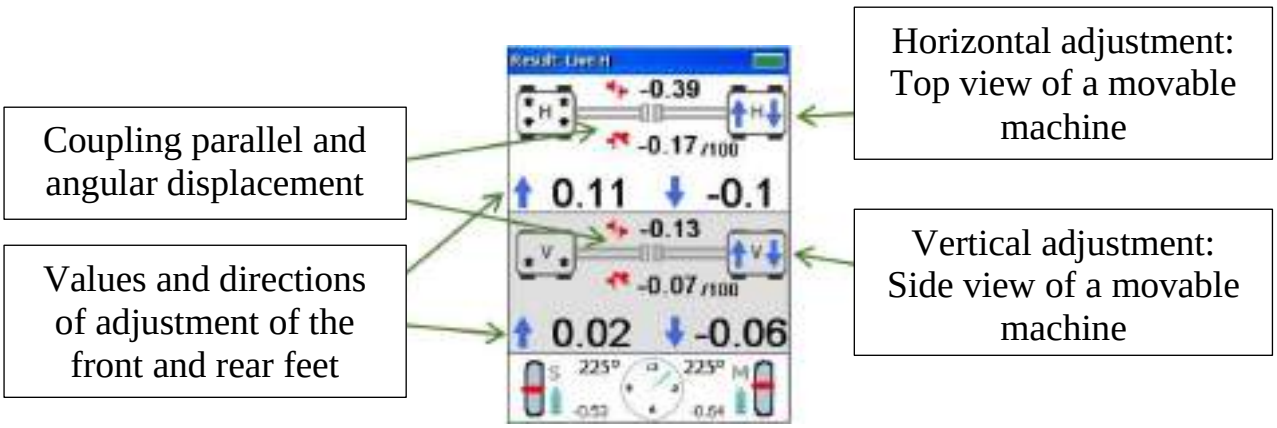




6.3.10 Results screen

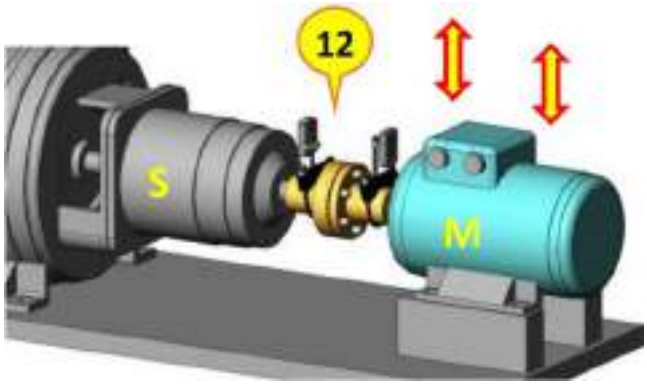
On the results screen, the instrument displays the parallel and angular misalignments on the coupling and the value of the necessary corrections in the horizontal and vertical directions for the moving machine.

The blue arrows clearly show the directions in which the moving machine must be moved to correct the misalignment.

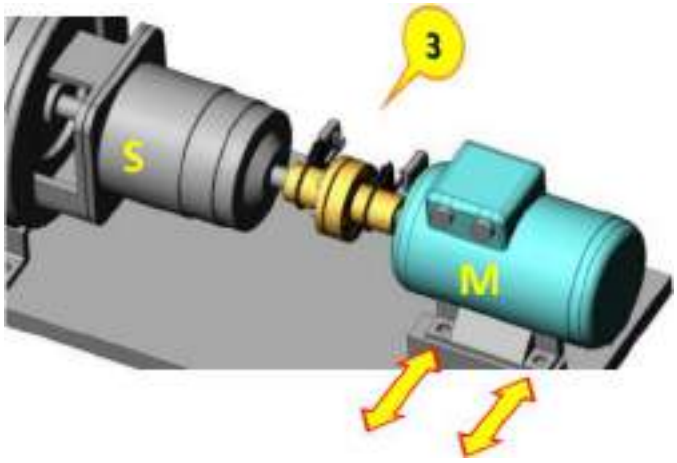


6.3.11 Adjustment of the movable machine

For vertical adjustment, the sensors must be rotated 6 or 12 o'clock (0° or 180°).



For adjustment in the horizontal direction, the sensors must be rotated 9 or 3 o'clock (90° or 270°).

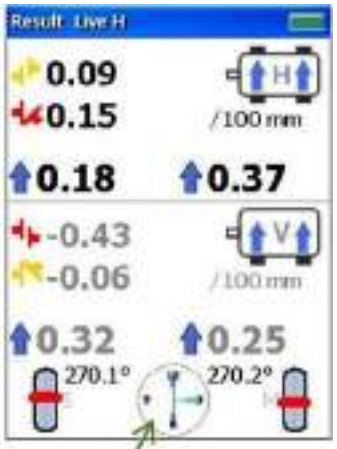


The device can reduce the number of available sensor positions for machine setup.

Permissible sensor positions are indicated on the clock face. Only permitted sensor positions can be used to adjust the machine.

Sensors at 3 o'clock (270°) in real time for direction H (horizontal)

The data for the V (vertical) direction is latched (display dimmed) until the sensors are returned at 12 or 6 o'clock



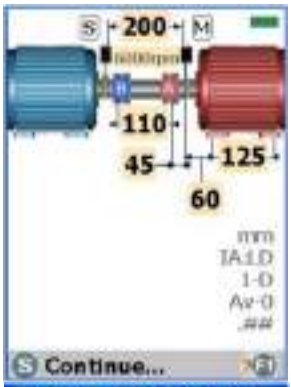
Permissible sensor positions:
12, 6 - for direction V,
3 - for direction H

6.3.12 Machines with a spacer shaft

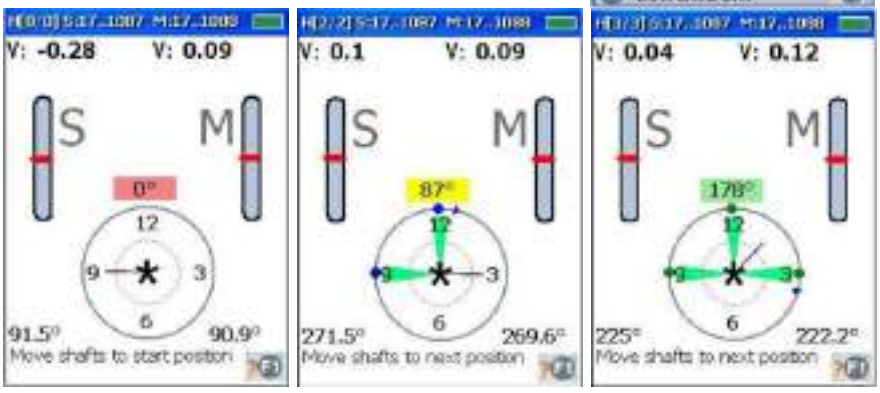
Press F3 to enable the **Spacer Shaft** function.

The procedure and parameters are the same as for the horizontal program.

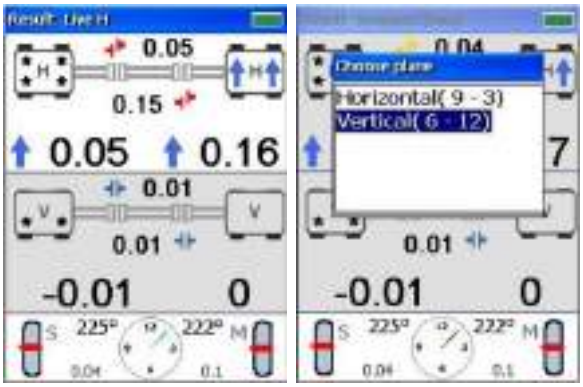
Enter machine size.



Take a measurement.



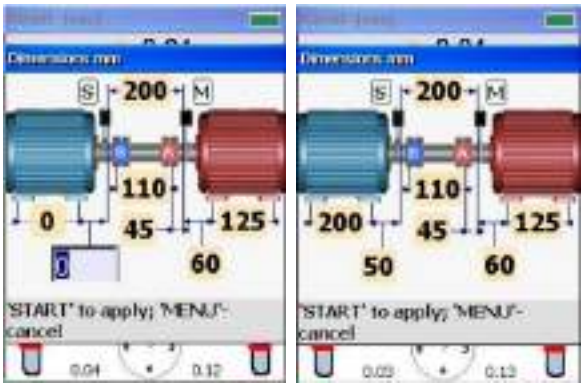
Perform movable machine correction.



6.3.13 Lock Feet Pair

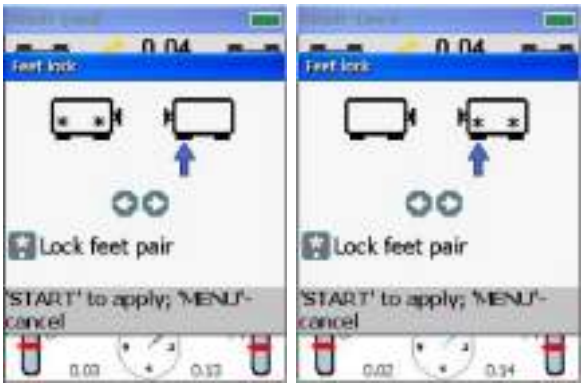
In some cases, it may be advisable to replace the movable machine. This function applies to both machines with and without an intermediate shaft.

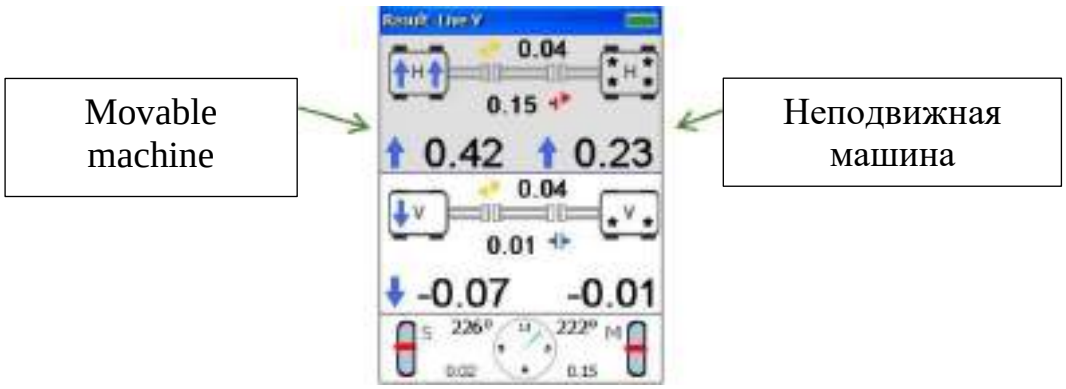
Press the button . The device prompts you to enter the missing dimensions.



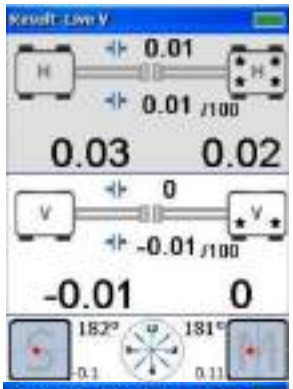
Press the button , to lock the machine's feet.

Press the button , to apply the changes.





6.3.14 Saving a report file



The report file can be saved at any stage of centering. To save the report file, press 8 the button on the results screen.
Reports can be stored on the internal SD card or on a flash drive connected to the analyzer's USB port.

Press the button F2 to select the storage location for the file.

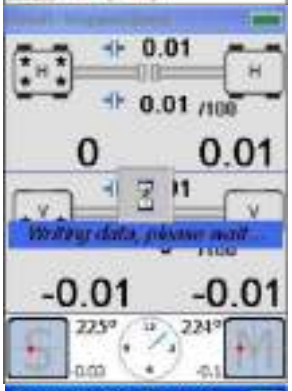
Use the buttons START CLR ▲ ▼ ◄ ► to browse folders.

Press the button START to open a folder.

Press the button CLR to go up one level.

Press the button 7 to create a new folder.

Press the button F4, to enable/disable PDF reporting.



Press the button ENTER или F5, to save the default report.

Press the button 8, to change the file name, then press the button ENTER, to save the file.

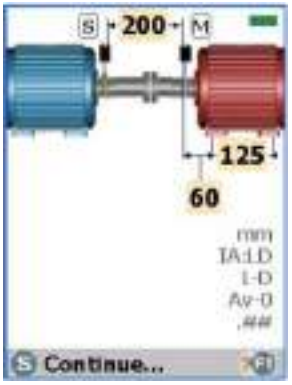
6.4 Soft foot mode

One of the common causes of machine breakdowns is the unstable support of one of the legs. “Soft foot” refers to the deformation of the machine frame that occurs when the machine clamp bolts are loosened or tightened. "Soft foot" can cause the machine to move internally, resulting in unwanted loads and forces on the bearings. The "soft foot" also deflects the shaft as it compensates for the internal displacement of the machine frame.

The “soft foot” condition of the machine makes it impossible to properly level it. Therefore, it must be removed before the alignment work is carried out. The Soft Foot program is designed for this.

Start the **Soft Foot** program from the main menu.

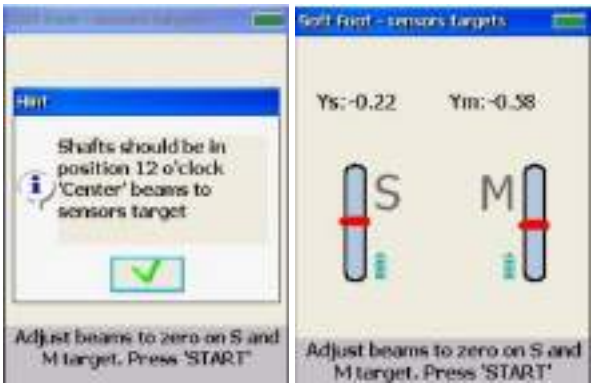
Enter dimensions.



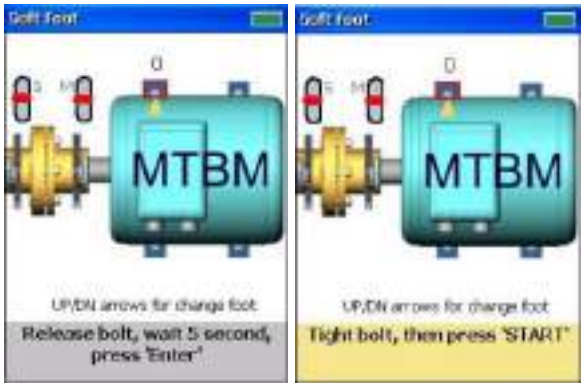
Make sure all legs are tight.

Rotate the sensor shafts 12 o'clock.

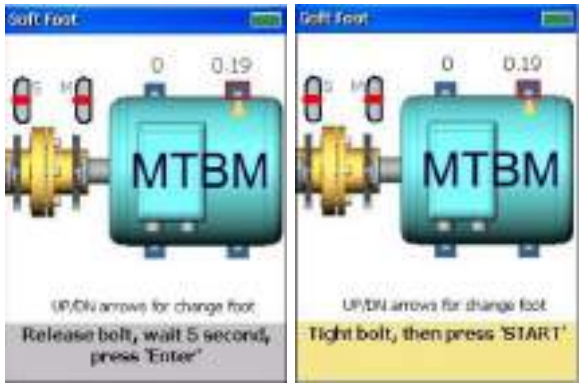
Click the button START to continue.



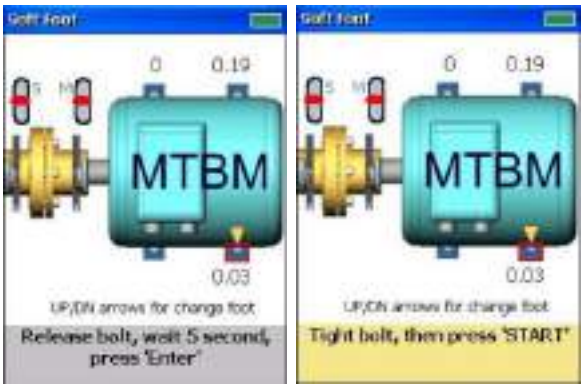
- Completely loosen the first bolt
- Wait about 5 seconds
- Press the button ENTER
- Tighten the bolt firmly
- Press the button START



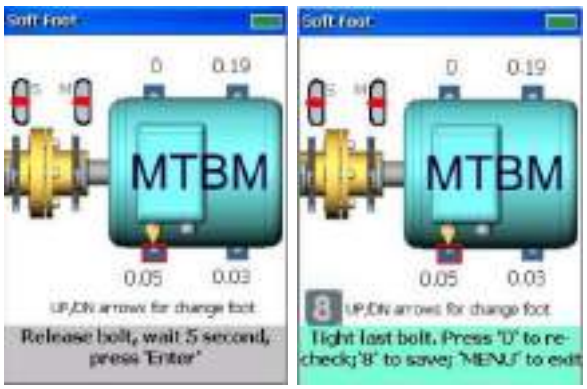
- Completely loosen the second bolt
- Wait about 5 seconds
- Press the button ENTER
- Tighten the bolt firmly
- Press the button START



- Completely loosen the third bolt
- Wait about 5 seconds
- Press the button ENTER
- Tighten the bolt firmly
- Press the button START



- Completely loosen the fourth bolt
- Wait about 5 seconds
- Press the button ENTER
- Tighten the bolt firmly
- Press the button START



You can change the bolt selection sequence by manually selecting the bolt using the arrow buttons.

6.5 Equipment vertical alignment

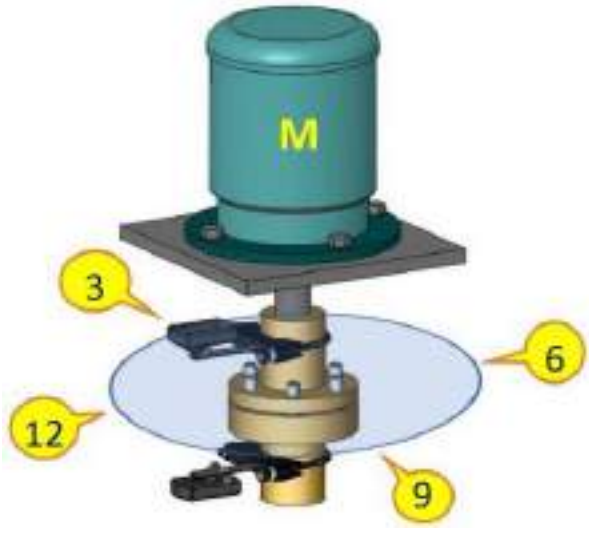
6.5.1 Description of procedure

- Mount the sensors on the shafts.
- Run the vertical program.
- Mark three 90° positions on the machine (9-12-3 o'clock position).
- Enter dimensions.
- Set parameters, such as "Tolerances".
- Rotate the sensor shafts to the first position by 9 o'clock (90°). To take a reading, press START.
- Rotate the sensor shafts to the second 12 o'clock position (180°). To take a reading, press START.
- Rotate the sensor shafts to the last position by 3 o'clock (270°). To take a reading, press START.

After that, the device will calculate the offset and display the necessary corrections for the moving machine.

6.5.2 Sensor’s positions conventions

When carrying out measurements, it is necessary to observe the conditional positions of the sensors on the shafts with measuring transducers S and M relative to the relative position of the machines S and M, as shown in the figure.



The angular positions in degrees adopted in the device are as follows:

6 o'clock - 0° 12 o'clock - 180°

9 o'clock - 90° 3 o'clock - 270°

Electronic inclinometers cannot be used on vertical machines, so Manual Angle is set by default. Before you start measuring, you must specify the measuring points on the machine.

6.5.3 Settings

From the main menu, launch the vertical app.

Select **New Task**.

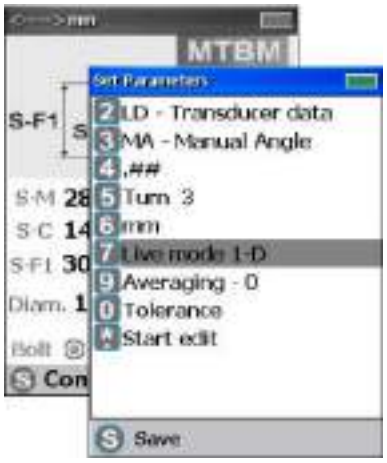
The measurement setup screen opens and machine dimensions.

Press the button * to resize.

Press the button F1 for options/button assignments:

Press the button 2 to switch data input - **LD/MD** sensor data - manual data.

Press the button 3 to switch angle input - IA uses inclinometer/manual angle MA. Manual angle entry is used for vertical machines because the electronic inclinometer cannot be used.



Press the button 4 to switch the displayed precision to 2 or 3 digits.

Press the button 5 to switch the measurement mode: Clock mode **9-12-3** o'clock - readings are taken at three specific positions of the shaft - 9 o'clock, then 12 o'clock, then 3 o'clock. The device will then go to the results screen.

Press the button 6, to switch the display units mm/inch.

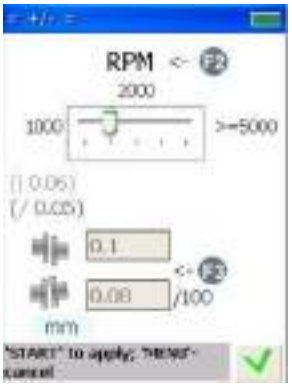
In multi-point mode, readings can be taken at any position of the shafts, and the number of measurement points can be from 3 to 36. After obtaining enough readings, press the button F5 to go to the results screen. For vertical machines, inclinometer data is not available, so the angle value for each point must be entered manually, taking into account the provisions mentioned above.

Press the button 0, to enter the tolerance setting menu.

Press the button F2, to use the predefined RPM/tolerance table.

Press the button F3, to enter user-defined tolerance values.

Press the button START, to save the changes, to cancel the changes.



6.5.4 Taking measurements. Clock mode

Press the button *, to resize.

Specify measurement positions on the machine divided by 90° (or 45°).

Set the parameters and enter the dimensions, then press the button START to continue.

Rotate the shafts to the first position - 9 o'clock (90°).

Press the button START to measure.

You can use the buttons ▼ ▲ to select the actual measurement position.

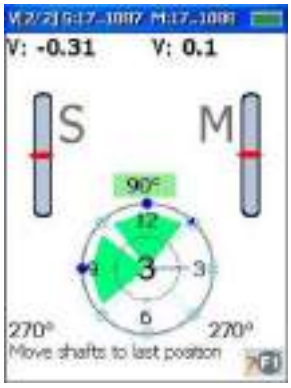
Rotate shafts to second position - 12 o'clock (180°)

Press the button START for the second measurement.

Rotate the shafts to the third/last position -3 o'clock (270°).

Press the button START, to take the third measurement.

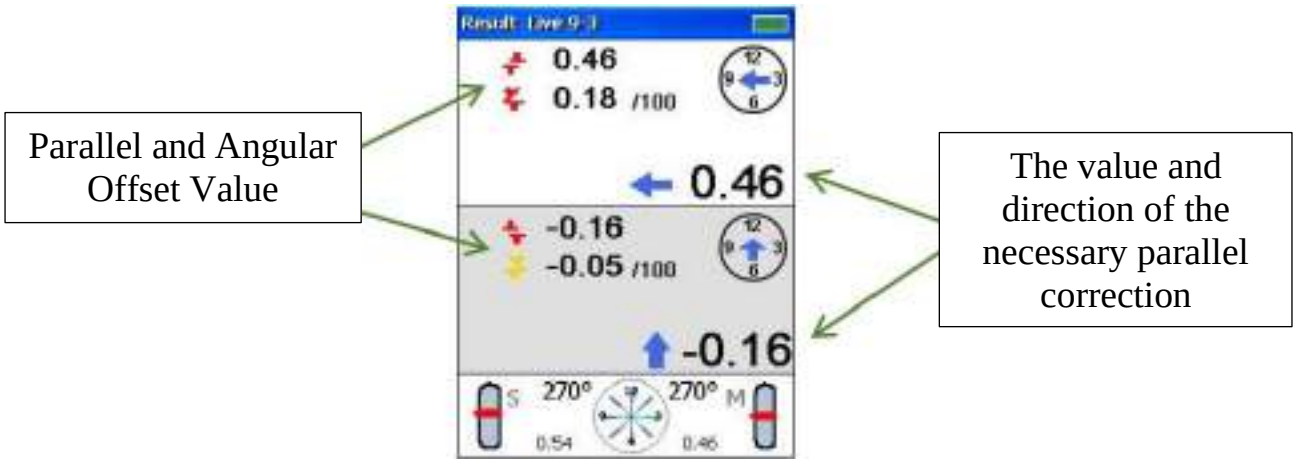
The measurement location selection window can be closed with the button ENTER.



After three measurements, the device will go to the results screen.

6.5.5 Results screen

At this point, the sensors are at 3 o'clock (270°), so the device displays the current updated values for the 9-3 direction.

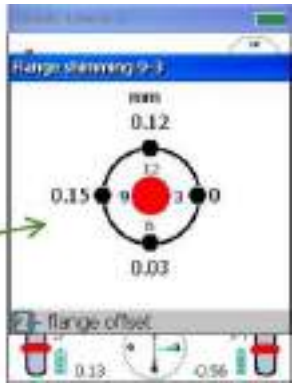


The blue arrows indicate the directions in which the movable machine must move in order to eliminate parallel displacement.

The purpose of the buttons in this mode can be viewed by pressing the button F1.

Press the buttons 2 ABC to switch between parallel or shimming (regulating) values screens

Значение шиминга



Press the button * to select the plane (9-3 or 12-6) in which the parallel correction is to be performed.

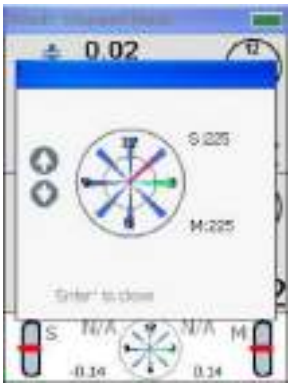
For in-plane correction, 9-3 sensors must be set to 9 or 3 o'clock.

To correct in the 12-6 plane, the sensors must be set to 12 or 6 o'clock. Use the arrow buttons ▲ ▼ to select the position where the sensors will be placed. Rotate the rollers to position the sensors and press the button START.

6.5.6 Machine correction at an angle of 45°

To eliminate the need to rotate the shafts when switching the correction plane, the sensors can be placed in one of the positions at an angle of 45°: 10:30, 1:30, 4:30, 7:30 o'clock. This option can be used on both horizontal and vertical machines.

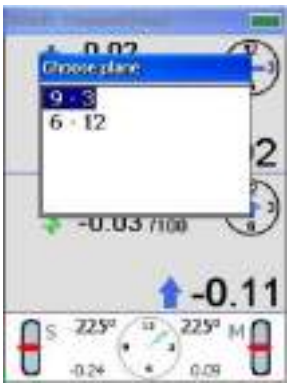
Use the arrow buttons ▲ ▼ to select the position where the sensors will be placed, then press the button START.

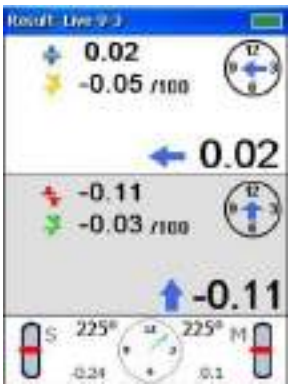


Current centering in plane 12-6.

Press the button * to select plane 9-3.

In this mode, there is no need to turn the shafts. The sensors can be in a 45° static position.





The color of the clutch symbols indicates the amount of misalignment. Green indicates when the residual offset is within tolerance. Black color for perfect results. Always stop machine offset when the residual offset is within tolerance. Don't try to reach zero.

6.6 Standard Shaft Misalignment Tolerances

This section provides standard offset alignment tolerances for standard industrial flexible coupling (coupling) equipment, which can only be used if existing internal standards or the equipment (or coupling) manufacturer do not give any other (named) values and cannot be exceeded.

Speed, rpm	**Good**		**Acceptable**	
	Offset	Angular (gap)	Offset	Angular (gap)
up to 1000	0,08	0,07	0,12	0,10
up to 2000	0,06	0,05	0,10	0,08
up to 3000	0,04	0,04	0,07	0,07
up to 4000	0,03	0,03	0,05	0,05
more than 4000	0,02	0,02	0,04	0,04

7. MAINTENANCE

Checking the technical condition of the device in order to ensure its operability during the entire period of operation is carried out at least once a year in the following sequence:

- check the completeness of the device according to item 2 "Delivery set";
- inspect the external condition of the device, and make sure that there is no mechanical damage to the electronic unit, sensor, connecting cable;
- check the performance;

After detection of deficiencies, you should contact the manufacturer or supplier to eliminate them.

8. TRANSPORTATION AND STORAGE

The device in a transport package that ensures its safety is transported by rail, road, sea or air transport in compliance with the relevant rules for the carriage of goods in force on these modes of transport. In the case of transportation by air, transportation must be carried out in sealed heated compartments.

The device is stored in its original packaging in a heated closed room with an air temperature of (25±10) °C, relative humidity from 45 to 80% and atmospheric pressure from 630 to 800 mm Hg. The room should be free of mold, acid fumes, reagents, paints and other chemicals. Indoors, sudden changes in temperature and humidity that cause dew should not be allowed.

9. SAFETY PRECAUTIONS

The device is a technically sophisticated measuring device that must be handled with care. It must be protected from:

- impacts, loads that can lead to mechanical damage;
- exposure to chemically aggressive environments;
- the ingress of liquids;
- prolonged exposure to direct sunlight;
- other influences that may harm the performance of the device.

Do not use the device in conditions of sudden temperature changes. In case of a sharp drop in ambient temperature, before switching on, keep the device in the off state for at least 1 hour.

It is not allowed to open the electronic unit and probe, as well as self-repair.

Vibration measurement and balancing involve measurement on rotating machines. Always keep a safe distance from rotating parts and protect sensors and cables from rotating parts.

Balancing involves the installation of test and balance masses on the rotor. Secure the start switch with a padlock before working on the rotor and use an emergency switch for double safety.

This is especially important when the machine is controlled remotely.

The manufacturer of the device is not responsible for accidents to people and machines.

Follow all warnings and recommendations to prevent data loss, data inaccuracy, instrument damage, or injury to yourself!

10. MANUFACTURER WARRANTY

The manufacturer guarantees the compliance of the device with the operation manual, subject to the conditions of operation, transportation and storage.

Warranty period - 12 months or as agreed with the Customer.

In case of incorrect operation or repair is required, contact the manufacturer or an authorized supplier..

Post-warranty repair of the vibration analyzer is carried out by the manufacturer upon additional request.

The warranty does not cover:

- for mechanical damage and damage caused by exposure to aggressive media, high temperatures, ingress of liquid, or foreign objects into the device;
- for consumables and parts that wear out quickly (sensors, cases, covers, etc.);
- for products that were repaired during the warranty period by persons not authorized by the Supplier;
- for malfunctions resulting from non-compliance with the requirements of the operating instructions;
- preventive maintenance and replacement of consumables.

11. RECYCLING

After the expiration of its service life, the device does not pose a danger to human life and health, to the environment and does not require special disposal methods.

The batteries of the device are disposed of in accordance with the current regulations for the disposal of these products.

13. ACCEPTANCE CERTIFICATE

Vibration analyzer ADL MS_____ № _____

product description designation serial No

manufactured and adopted in accordance with the mandatory requirements of state (national) standards, current technical documentation and recognized as approved for operation

Production date: _____

stamp _____ _____

personal signature print full name

ADELIX Company

Production and service