ADELIX

ADL MS52 / ADL MS54

Vibration Analyzer

(with functions balancing equipment)

Operating manual combined with a passport

2023

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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. 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	AC USB charger	1
7	USB cable	1
8	Software on a flash drive (or installed in the built-in memory of the device)	1
9	Carrying and storage bag	1
10	Protective case	1
11	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		
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 MENU (it serves as a back button).

The button START 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 MENU 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.

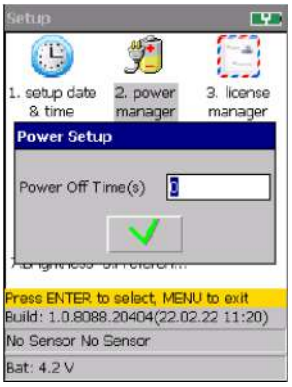
To enter a menu item, move the cursor over the name of this item using the arrow buttons and press the button START.

4.1.5 Setup menu

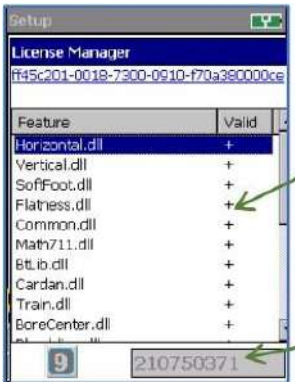
To enter the setup menu item - move the cursor to the "**Setup**" mark and press the button START.

- date and time setting

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



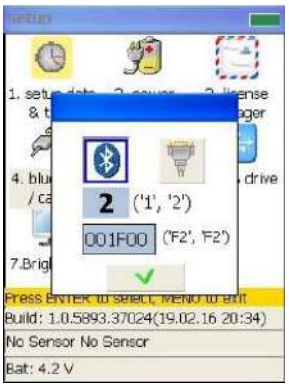
- installation of a license file containing measurement functions. Press the button 9 WXYZ, navigate to the license file, then press the button ENTER to open and install the license.



«+» Feature enabled

Serial number

- switching between wireless and wired sensor connection.

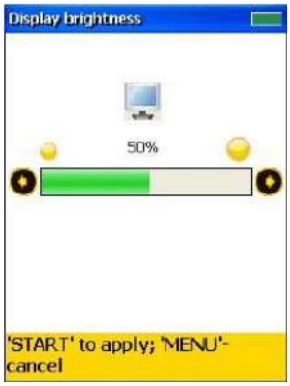


- User interface language.

Choose a language and press the button START.

- 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

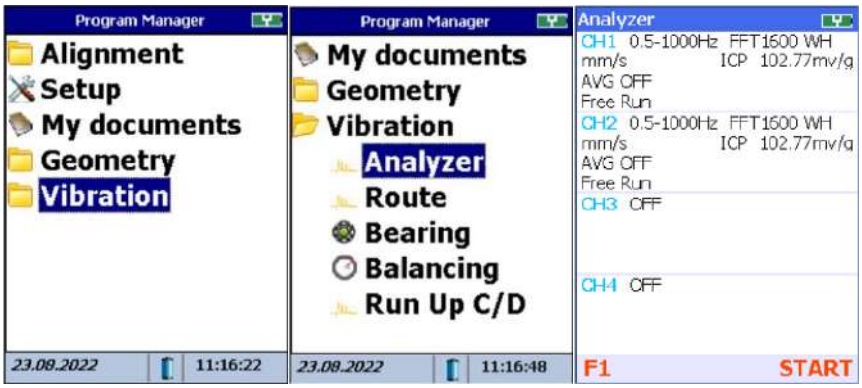


- to select the default alignment mode, 1-d or 2-d dual axis mode.

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.

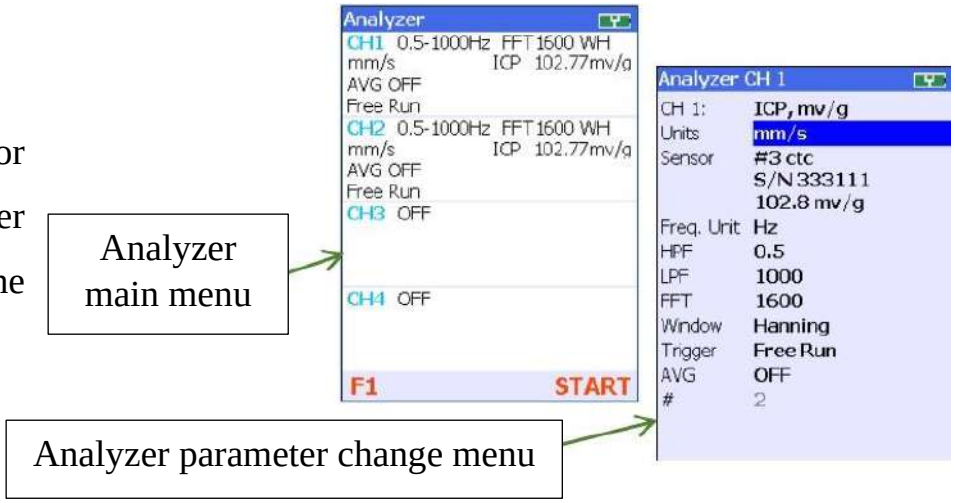
4.2 Vibration measurement setup menu

Move cursor and select "**Vibration**"



4.2.1 Spectrum analyzer settings

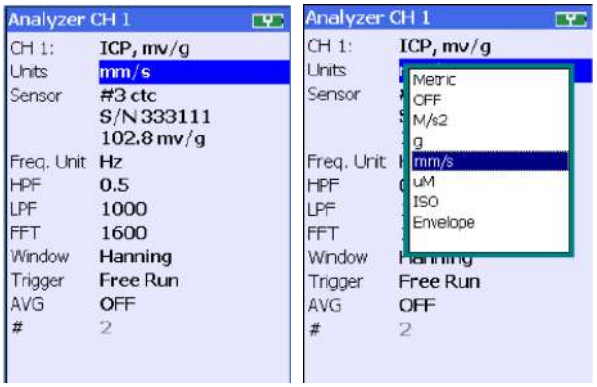
To enter the menu for changing the analyzer parameters, press the button F1.



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.

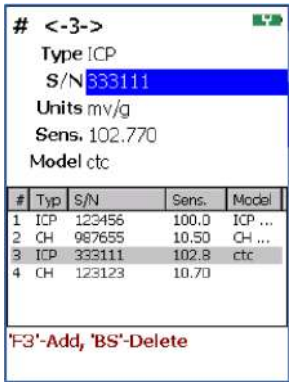
Use the buttons ▲ ▼ to select the sensor type - for example, ICP and press ENTER to confirm.

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].

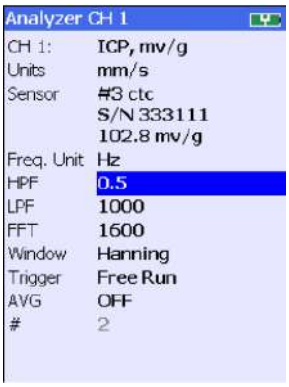
Enter a new value using the keyboard and press [ENTER] to confirm. To confirm the new sensor settings, press [START].

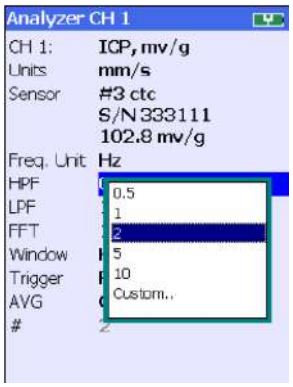


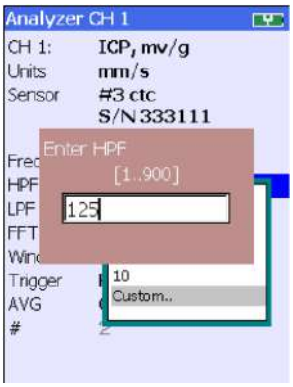
4.2.5 Adjusting the HPF cutoff frequency

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.



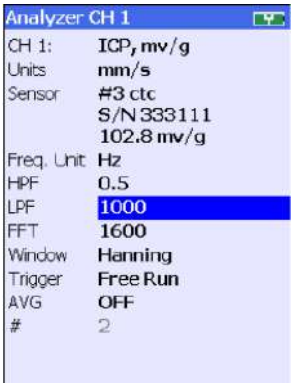


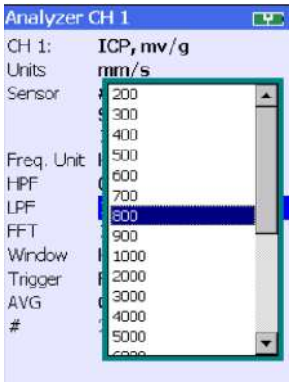


4.2.6 Adjusting the LPF cutoff frequency

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

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

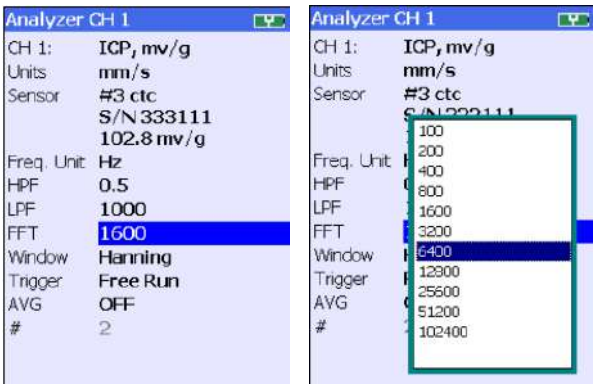




4.2.7 Setting the number of FFT lines

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

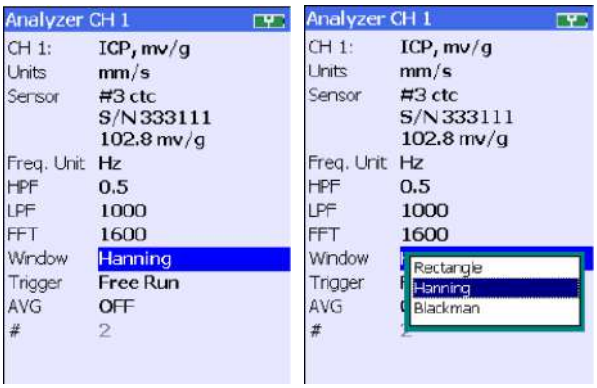
Use the buttons ▲ ▼ to select the required number of FFT lines - for example, 6400 and press the button ENTER to confirm.



4.2.8 Setting the FFT window type

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

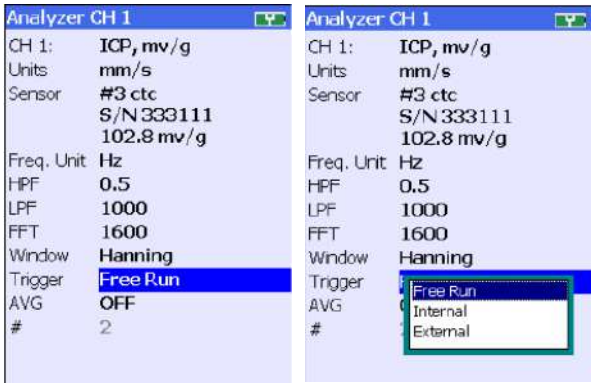
Use the buttons ▲ ▼, to select an FFT window such as Hanning and press ENTER to confirm.



4.2.9 Setting the trigger type

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

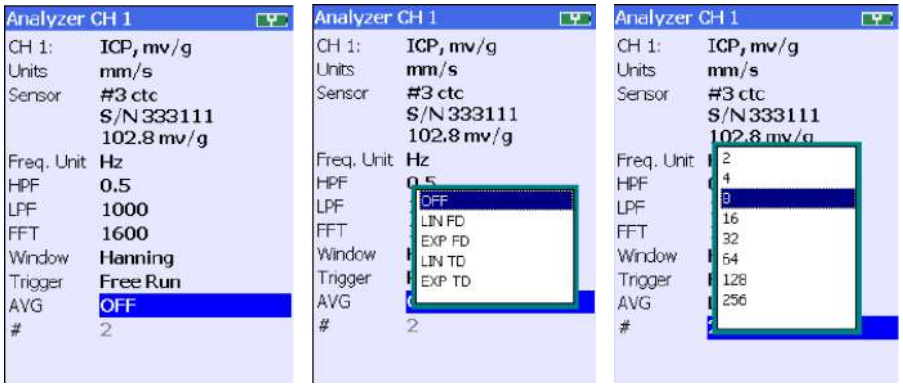
Use the buttons ▲ ▼ to select the type of measurement start you want, eg Free run, and press ENTER to confirm.



4.2.10 Setting the averaging mode

Move the cursor to Averaging and press the button ENTER.

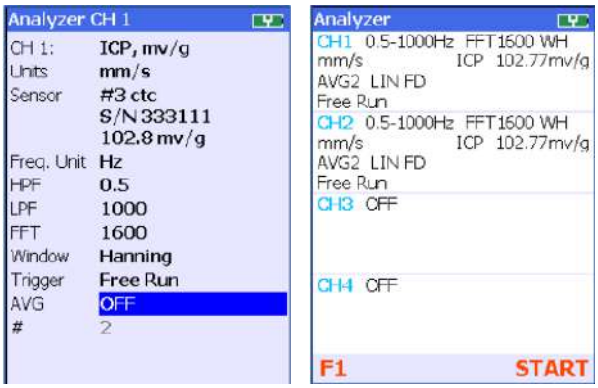
Use the buttons ▲ ▼ to select the desired type of averaging - for example, Lin FD (linear, frequency domain) and press the button ENTER to confirm.



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

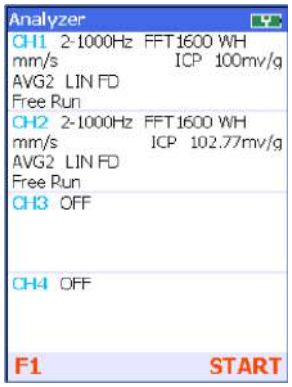
4.2.11 Spectrum Analyzer Parameter Confirmation

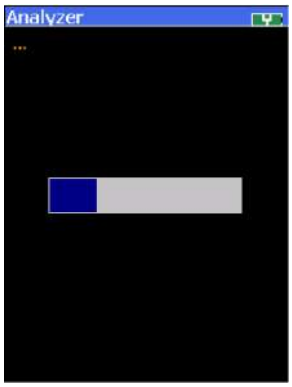
After finishing setting the measurement parameters, press ENTER to confirm and return to the analyzer's main menu.

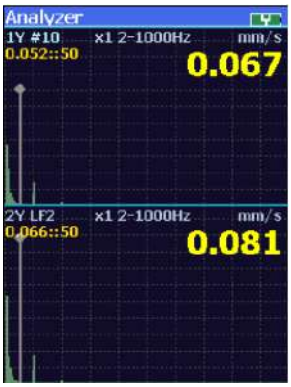


4.3 Start measurement

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.

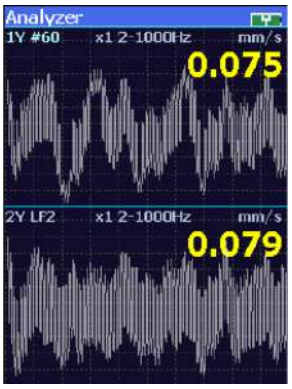
▼ ▲ - to select the channel on which the cursor is active.

◄ ► - 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.

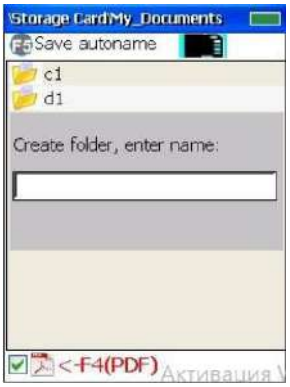
Use the button CLR to move up one level.

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.

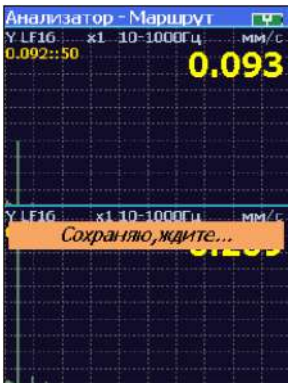
Highlight the **Vibration/Route** and press START.

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.

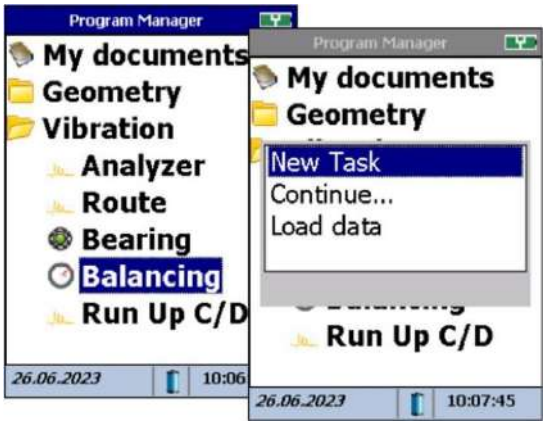
Set the probe to the measuring point and press START. The instrument takes measurements with the specified parameters and saves the files in the destination folder corresponding to the waypoint.



5. EQUIPMENT BALANCING

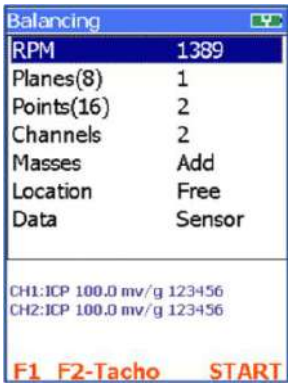
5.1 Balancing settings

Enter the balancing function.

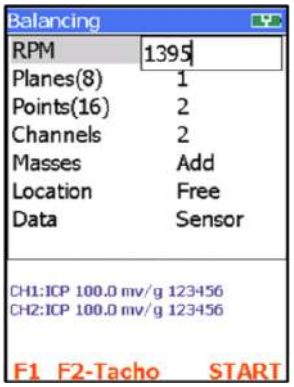


Use the buttons ▼ ▲ to select a setting.

Press the button ENTER, to change the parameter value.

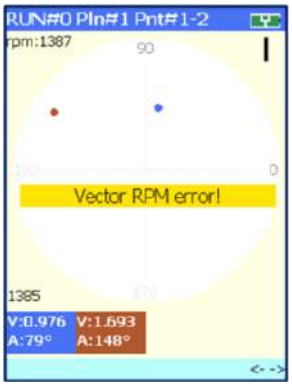


Set the RPM of the machine at which balancing will be performed.

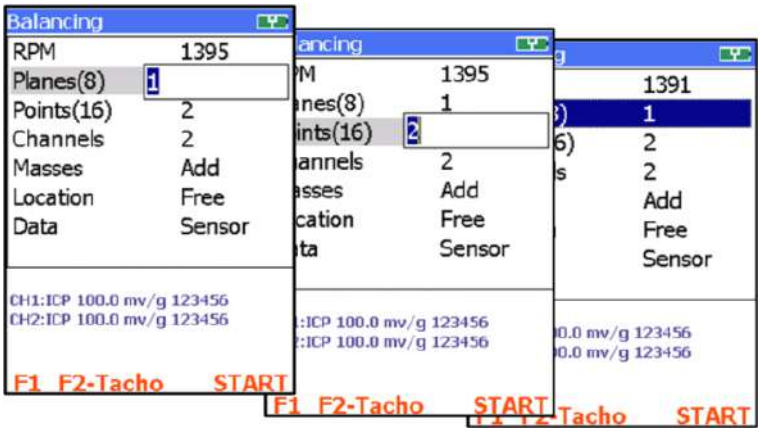


To get the actual revolution of the machine, run the tachometer function. To do this, press the button F2 and then ENTER to apply the measured RPM.

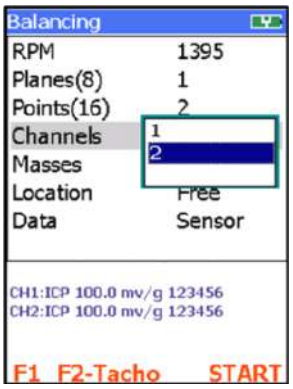
Note. If the actual RPM and the trim RPM differ by more than 5%, the device displays an error message.



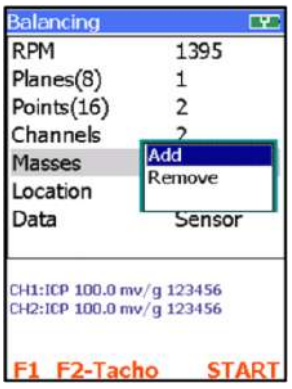
Set the number of **Planes** (where the balancing masses will be attached or removed) and the number of **Points** (where the accelerometer will measure vibration levels).



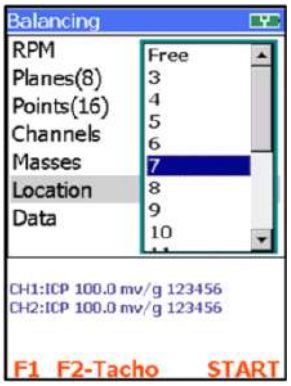
Set the number of **Channels** used for taking readings.



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

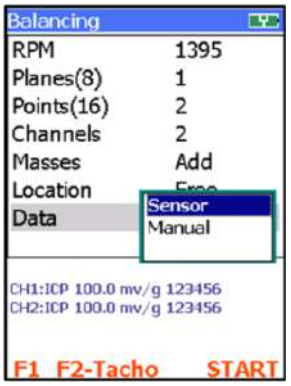


Balance masses can be attached at any Free Locations angle or at Fixed Locations (such as fan blades). The number of fixed seats can be set from 3 to 18 seats.



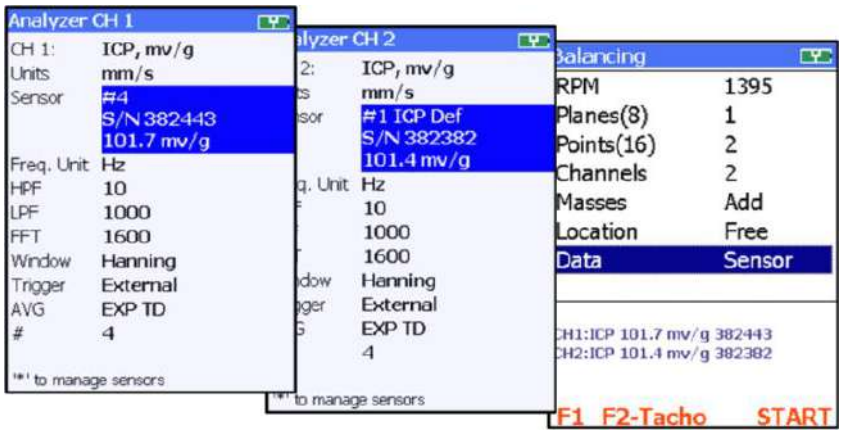
Note. The balancing program implies that the angles (and the fixed numbering of places) are always calculated against the direction of rotation of the machine!

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



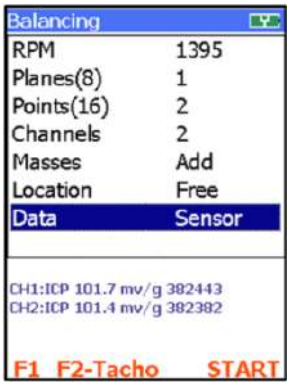
Select the sensors used to take readings.

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.

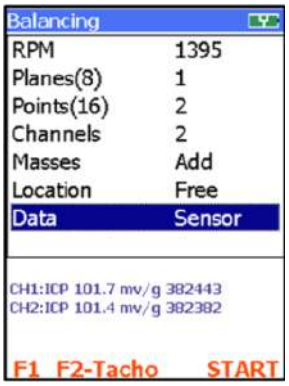


5.2 Overview of the balancing procedure in one plane

- 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.



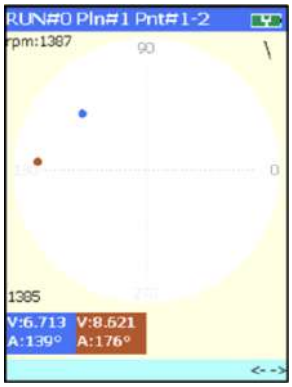
Place the accelerometers at the measurement points.

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.

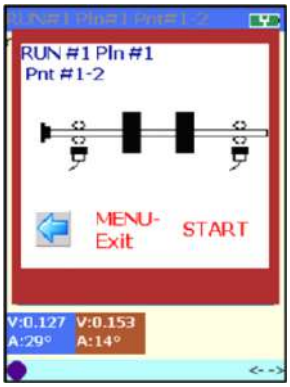
Enter the weight "Weight" and the angle "Angle" at which it is attached.

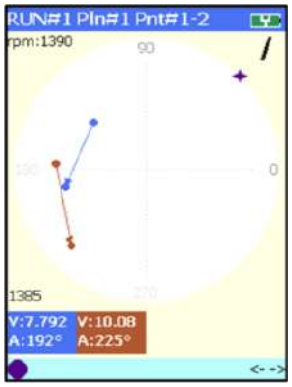
Press the button START.

Start the machine.

Press the button START.

Wait for the reading to stabilize.





Press the button START.

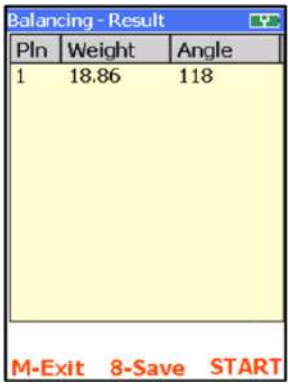
Confirm that the readings have been taken.

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.

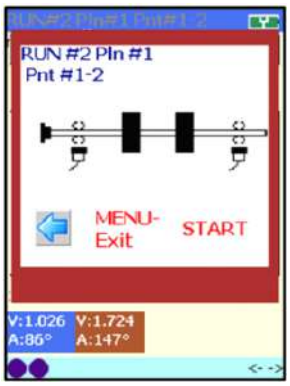


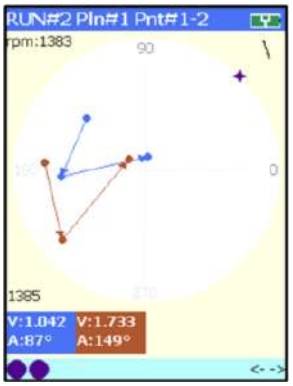
The device displays the calculated weight to be attached to further correct the imbalance.

Now you can measure the residual vibration.

Start the machine.

Press the button START.





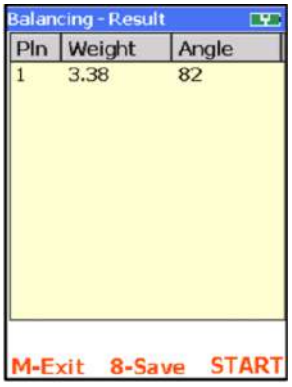
Wait for the reading to stabilize.

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. 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.

7. 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.

8. 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!

9. 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.

10. 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