ADELIX

ADL-MS32

Vibration analyzer

Operating manual combined with a passport

2023

CONTENT

1. DEVICE OVERVIEW

The device ADL MS32 is designed to measure and analyze vibration in equipment via 1 channel. It can be used to diagnose various types of machines and mechanisms such as pumps, compressors, fans, electric motors and others.

ADL MS32 allows you to measure vibration parameters such as amplitude, frequency, velocity, acceleration and others. With this data, you can determine the condition of the equipment and identify possible problems associated with its operation.

The device can also be used to measure the speed of mechanisms and balancing. This allows you to determine how the equipment works correctly and efficiently and reduces the likelihood of equipment failure.

The ADL MS32 has a compact and handy design that allows it to be used in a variety of environments and locations. In addition, the device has high measurement accuracy and reliability.

The built-in software makes it simple and reliable, making it easy to manage data and generate reports.

Vibration measurement with a vibrometer is quick and without the need for additional preparatory work.

Vibration values measured at different points in time (for example, after a month) can be used to predict the development of vibration and plan the timing of subsequent repairs. This can result in cost savings compared to scheduled repairs.

The measured values of the vibration analyzer can be used to diagnose unit defects using signal spectrum analysis. For example, key lines on the spectrum can be used to determine the state of bearings, imbalance, misalignment, and other defects.

The devices are widely used for operational monitoring of the mechanical condition of equipment during operation, diagnostics, maintenance, and repair of various types of equipment, including bearings, gears, turbines, generators, fans, pumps, rotors, distribution plants, ball mills, rolling mills, gearboxes, conveyors, motors, air fans and more. They can be used both for monitoring entire structures and for individual elements.

Vibration analyzers ADL MS are used in various industries, including metallurgy, mechanical engineering, petrochemical, light and defense industries, thermal and nuclear energy, as well as in the maintenance of agricultural equipment, housing, and communal services and transport.

2. DELIVERY SET

№	Name
1	ADL MS display unit
2	Accelerometer (vibration probe)
3	Cable 1.5m to a vibration probe
4	A Magnet for mounting the vibration sensor
5	Optical tachometer for measuring rotational speed with magnetic stand
6	AC USB charger
7	USB cable
8	USB flash drive with software (or installed in the built-in memory of the device)
9	Manual
10	Protective case
11	Carrying and storage bag

3. TECHNICAL SPECIFICATIONS

Parameter	Values
Number of vibration channels	1
Possibility of balancing	up to 4 planes (up to 8 measurement points)
Frequency range	1 … 10000 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%
Speed measuring range	10…200000 rpm
FFT spectral analysis	400, 800, 1600 lines in the spectrum
Display	color, 128x160 pixels
Memory	4 GB
PC connection and charging	USB
Battery	Built-in, LiPo
Dimensions	132 x 70 x 33 mm
Weight	150 g
Terms of Use	from 0°C to 50°C humidity up to 80%
Ingress protection type	IP-54

4. OPERATION OF VIBRATION ANALYZER

4.1 Measurement functions

1. Vibration mode – the analyzer measures the overall level of vibration acceleration, speed and displacement, as well as the FFT spectrum.

2. Tachometer mode – the analyzer measures the speed of rotation by means of a non-contact optical sensor. The measurement result is displayed in rpm and Hz.

3. Balancing mode – measurement and calculation of corrective masses for the purpose of balancing machines.

4.2 Keyboard

The device buttons have the following functions:

– Press and hold for 3 seconds to turn on the device, and short press to turn off

- Enter, selection confirmation, measurement start

- Navigation arrow buttons

- Menu

- Return to previous menu

F1 - Options button

4.3 Settings menu tab

This menu tab is used to:

- Date/time settings
- Probe coefficient settings
- settings Units of measurement
- Display brightness settings
- - Setting the auto-off delay

4.4 Date/time settings

Use the arrow buttons to set the date.

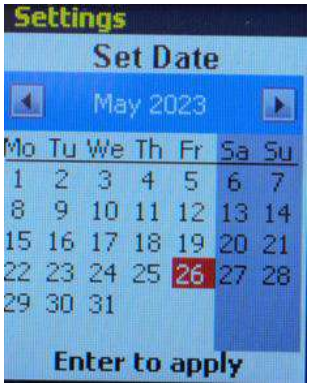
Hold the button F1 then press or to switch the month.

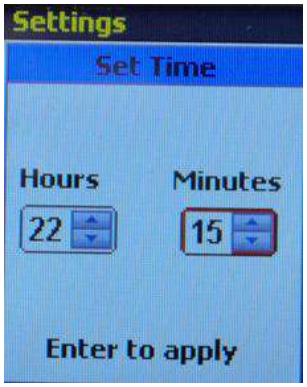
To set the date, press the button .

Use the buttons , to set the minutes and hours.

Use the button to switch between the "hours/minutes" fields. The active field is indicated by a red frame.

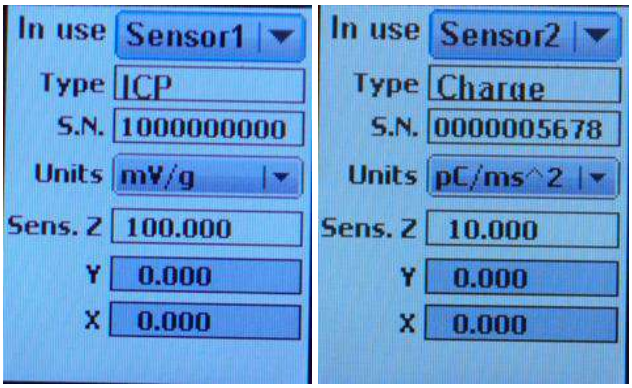
Press the button to set the time.





4.5 Probe selection

Use the buttons ▲ ▼ to select the probe to be used for measurements. The drop-down menu offers two types - ICP or CH (Charge Sensor Type) to choose from. Confirm your choice by pressing the button ↵



"**S.N.**" field and "**sens.**" (sensitivity) field can be edited. Use the button ▸≡ to select the field you want to change. Then use the arrow buttons ◄ ► ▲ ▼ to edit the value.

4.6 Setting the units of measurement

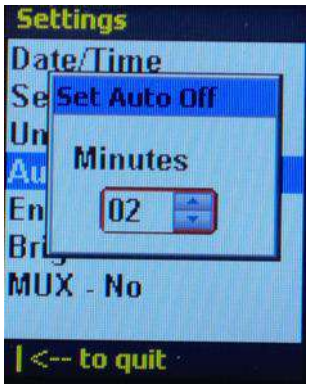
Click ▲ ▼ to switch between metric units.

Press the button ▸≡ to select units for acceleration, speed, and vibration displacement.

4.7 Setting the auto-off delay

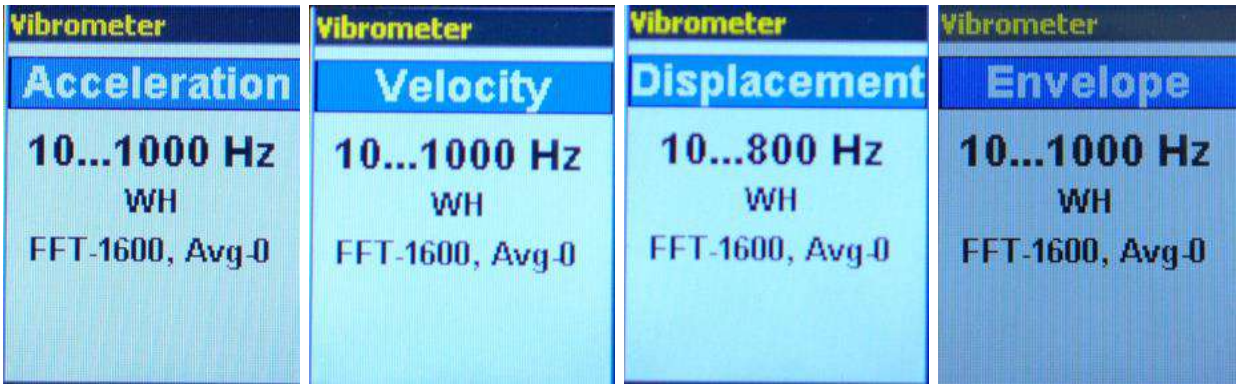
Use the buttons ▲ ▼ to set the time for the appliance to automatically turn off (in minutes).

Press ▸≡ or ◀, to confirm and exit the menu.



4.8 Vibration measurement settings

The analyzer measures acceleration, velocity, and vibration displacement. In ISO 10816 mode, the measurement result is compared with the built-in vibration intensity table according to ISO 10816-3.



Use the buttons ▲ ▼ to select the measurement mode.

Press the button ▸≡, to enter the settings menu.

Use the buttons ▲ ▼ to select the parameter to be adjusted.

Use the buttons ◀ ▶ to change the parameter value.

Low Freq – lower frequency limit. Can be set to 1, 2, 10 Hz.

Hi Freq - upper frequency limit. Can install:

- from 200 to 10000 Hz for acceleration;
- from 200 to 5000 Hz for velocity;
- from 200 to 800 Hz for movement;

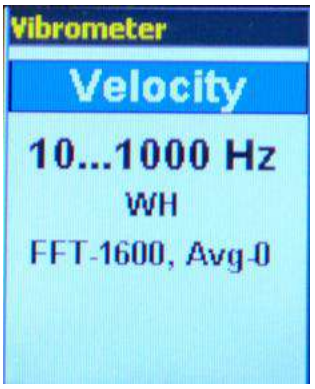
FFT lines - FFT spectrum resolution. Can be set to 400, 800, 1600 lines.

Averaging – averaging measurements. Can be set from 0 to 64. A value of zero disables averaging.

Window – weight function. Can be set to Hanning or Rectangular.

4.9 Taking measurements

Select a vibration parameter, such as Velocity, change the settings if necessary, and then press the button ↵, to start the measurement.



<u>During measurement:</u>

Use the button ▲ to switch the FFT spectrum/timing function.

Press the button ↵ to stop/resume the measurement.

Press the button ▼ to start/stop recording the measured waveform to a WAV file. Red R flashes to indicate recording is in progress.

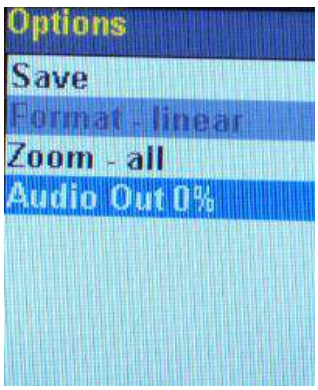
<u>When the measurement is stopped:</u>

Click the button ▸≡ to open the options tab:

Save.. - to save measurement data.

Format – Linear or logarithmic amplitude scale. Use the buttons ◀ ▶ to change the parameter value.

Zoom – the scale of the X-axis of the display. Use the buttons ◀ ▶ to change the parameter value.

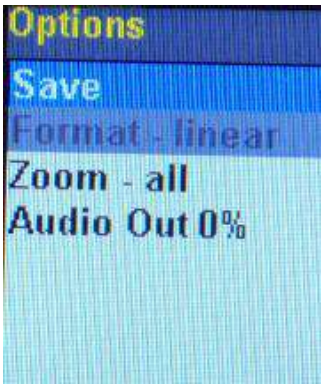


4.10 Saving measurement results

Press the button ↵, to stop the measurement.

Press the button ▸≡ to open the options tab.

Select **Save..** and press the button ↵.



To create a new folder, click the button F1. The current "Date/Time" is used as the default name for the new folder.

To create folders with custom names - connect the instrument to a PC via USB as an external flash drive, and then create folders using the PC keyboard.

4.11 Tachometer mode

Connect the optical sensor to the instrument. Select the **Tachometer** menu tab.

Aim the optical sensor at rotating parts of the machine with a reflective tag attached.

Press the button ↵ to start/stop the measurement. The device displays the measurement result in **rpm** and **Hz**.

4.12 Setting the Balancing mode parameters

Enter the **Balancing** menu.

Press ▲ ▼ to select an option to adjust.

Use ◄ ► to change the value of a parameter.

Set the machine speed at which balancing will be performed.

If the actual speed and the speed set in the balancing parameters differ by more than 5%, the device will display an error message during the measurement

Set the number of planes (where the correction masses will be attached) and the number of points (where the accelerometer will measure vibration levels)

Balance weights can be preset to Weights Add or Weights Remove

Correction masses can be attached in any angular position - Free Loc. Or in fixed places (for example, on fan blades). The number of fixed seats can be set from 3 to 18 seats.

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

Press ↵ (>START>) to start measurement.

5. MAINTENANCE

Checking the technical condition of the vibration analyzer 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 vibration analyzer according to item 2 "Delivery set";

– inspect the external condition of the vibration analyzer, 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 to eliminate them;

6. TRANSPORTATION AND STORAGE

The vibration analyzer 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 vibration analyzer is stored in a case in a closed heated room with air temperature (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.

7. PRECAUTIONS

The vibration analyzer 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.

8. RECYCLING

After the expiration of its service life, the vibration analyzer 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.

9. MANUFACTURER WARRANTY

The manufacturer guarantees the compliance of the vibration analyzer 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 the need for repair, contact the manufacturer.

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 (batteries, 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.

ACCEPTANCE CERTIFICATE

Vibration analyzer ADL MS32 № _____

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: _____

Quality Control Head

stamp _____ O. Goncharov

personal signature | print full name

APPENDIX 1 - EXAMPLE OF ONE PLANE BALANCING ON ONE POINT

Overview of the balancing procedure in one plane

- Start 0 - initial measurement of vibration (imbalance).
- Start 1 - vibration measurement with a test mass attached to plane A
- Stop the machine, and attach the calculated correction weight at the given angle on the balance plane A.
- Hold 1… - Start the machine and measure the level of residual vibration. After the measurement stops, the device will calculate the weight of the correction mass to further reduce the level of unbalance. If the residual vibration exceeds the target value, install (or remove) a correction mass and perform another balancing step.

Repeat balancing starts until the required vibration level is reached.

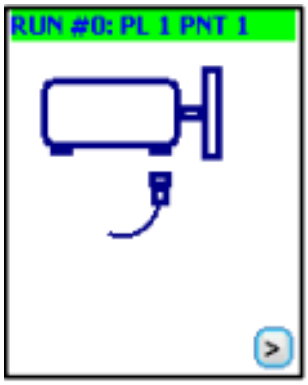
Set Balancing parameters.

Press the button ↵

Place the accelerometer at the measurement point.

Press the button ↵

↵



Wait for the indicators to stabilize.

Press the button ↵

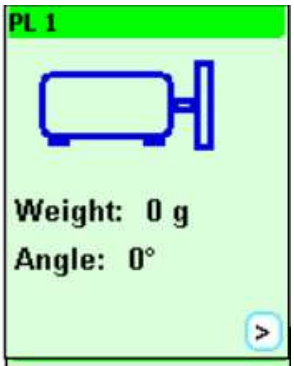
Confirm that the measurement is acceptable.

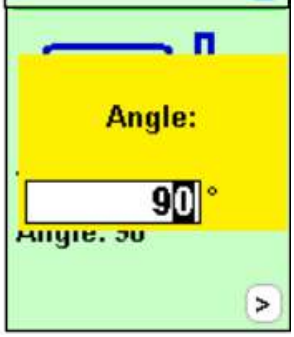
Press the button ↵

Stop the machine.

Attach the trial weight.

Press the button ≡ to enter the trial weight and the angle at which it will be attached.

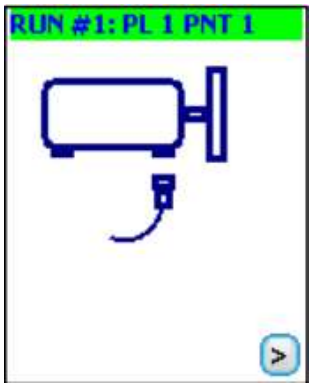




Press the button ↵

Start the machine.

Press the button ↵, to start measurement.



Wait for the indicators to stabilize.

Press the button ↵

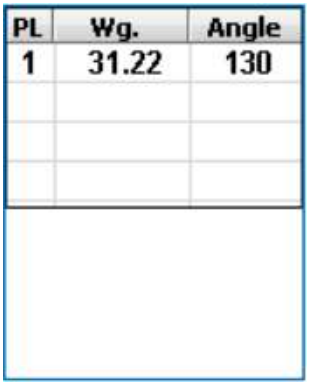
Confirm that the measurement is acceptable.

Press the button ↵

Stop the machine.

The analyzer displays the calculated corrective weight that must be attached (or removed) to correct the imbalance.

The balance report can be saved from the results screen.



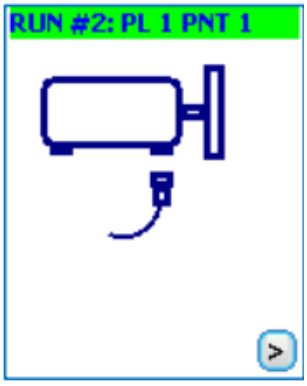
Press the button ☰ to enter the **My Documents** menu

Navigate to the target folder and click the button to save the measurements.

Now you can measure the residual vibration.

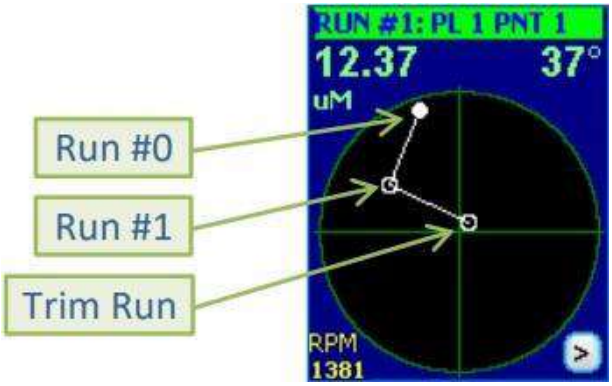
Start the machine.

Press the button ↵, to start measuring.



Wait for the indicators to stabilize.

Press the button ↵

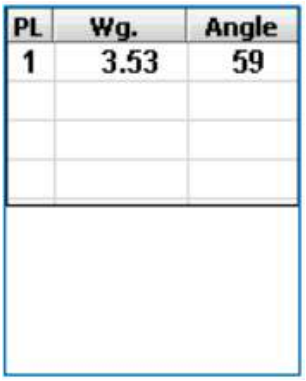


Confirm that the measurement is acceptable.

Press the button ↵

Stop the machine.

The device displays the calculated weight that needs to be attached (or removed) to correct the imbalance.



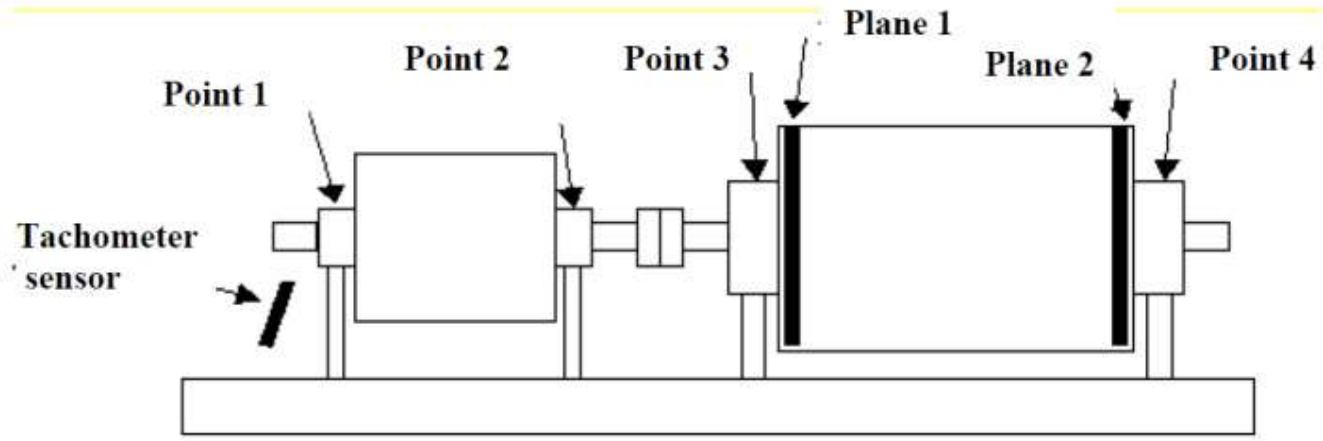
PL	Wg.	Angle
1	3.53	59

Press the button ▸≡ to enter the **My Documents** menu

Navigate to the target folder and press the button ▸≡, to save the measurements.

APPENDIX 2 - EXAMPLE OF BALANCING TWO PLANES ON FOUR POINTS

There are two planes where the correction weights are to be attached and four points at which vibration levels will be measured.

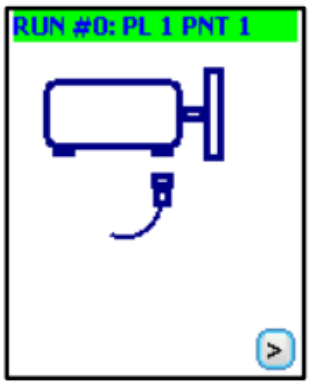


Set Balancing parameters.

Press the button ↵.

Place accelerometer at measurement point #1.

Press the button ↵.



Wait for the indicators to stabilize.

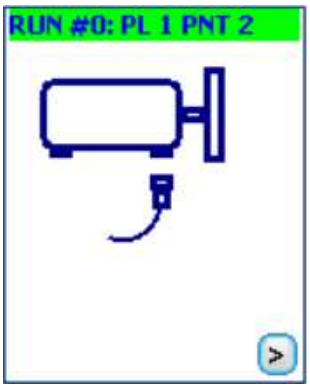
Press the button ↵.

Confirm that the measurement is acceptable.

Press the button ↵.

Place accelerometer at measurement point #2.

Press the button ↵.



Wait for the indicators to stabilize.

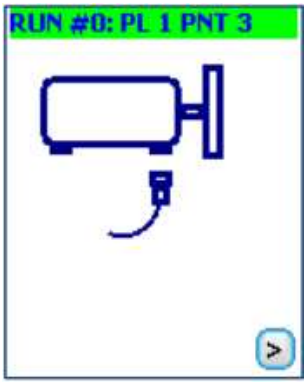
Press the button ↵.

Confirm that the measurement is acceptable.

Press the button ↵.

Place accelerometer at measurement point #3.

Press the button ↵.



Wait for the indicators to stabilize.

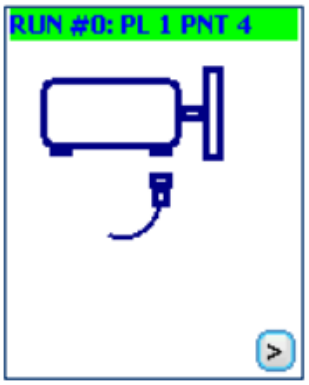
Press the button ↵.

Confirm that the measurement is acceptable.

Press the button ↵.

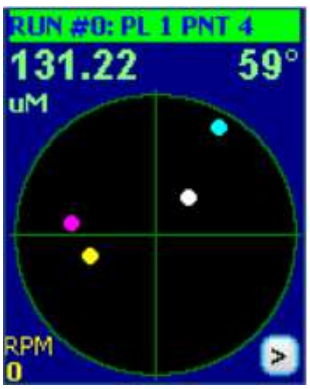
Place accelerometer at measurement point #4.

Press the button ↵.



Wait for the indicators to stabilize.

Press the button ↵.



Confirm that the measurement is acceptable.

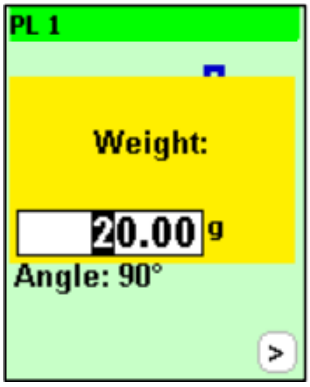
Press the button ↵.

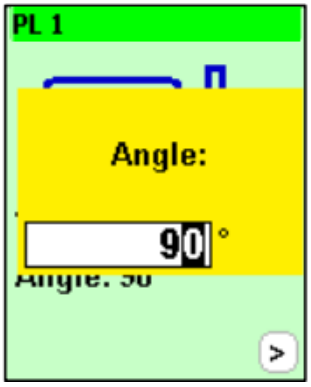
Stop the machine.

Attach the trial weight.

Press the button ▸≡ to enter the trial weight and the angle at which it will be attached.

Press the button ↵.

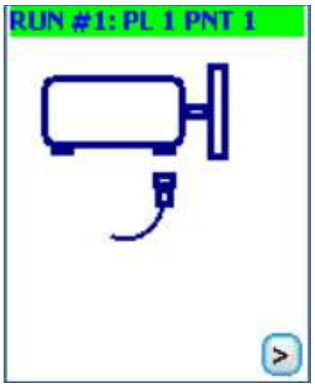




Start the machine and measure the vibration levels at all four points with the test weight attached to plane #1.

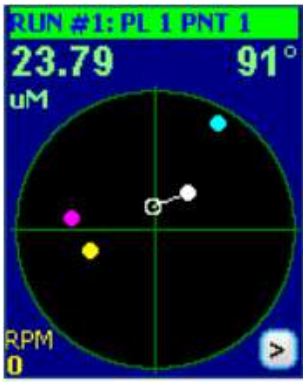
Place accelerometer at measurement point #1.

Press the button ↵.



Wait for the indicators to stabilize.

Press the button ↵.

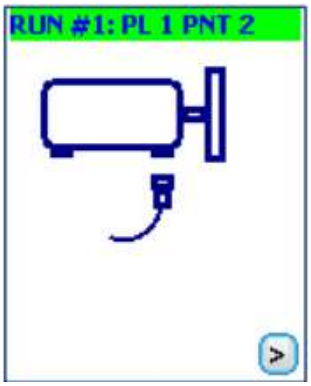


Confirm that the measurement is acceptable.

Press the button ↵.

Place accelerometer at measurement point #2.

Press the button ↵.



Wait for the indicators to stabilize.

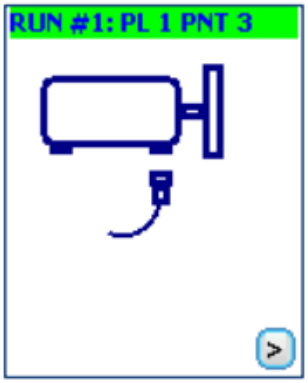
Press the button ↵.

Confirm that the measurement is acceptable.

Press the button ↵.

Place accelerometer at measurement point #3.

Press the button ↵.



Wait for the indicators to stabilize.

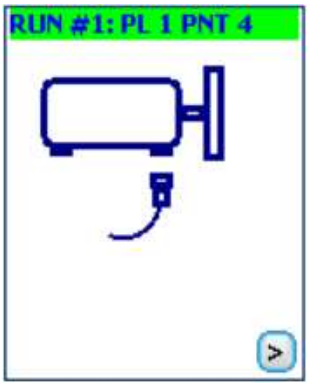
Press the button ↵.

Confirm that the measurement is acceptable.

Press the button ↵.

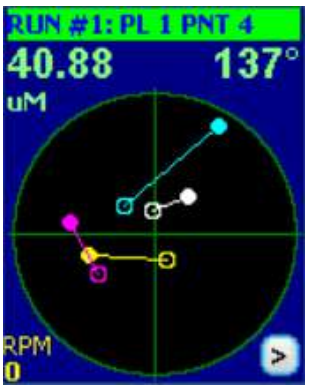
Place accelerometer at measurement point #4.

Press the button ↵.



Wait for the indicators to stabilize.

Press the button ↵.



Confirm that the measurement is acceptable.

Press the button ↵.

Stop the machine after completing measurements at all points.

Now you need to decide whether to leave or remove the trial weight from plane №. 1.

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

Select an option and press the button ↵

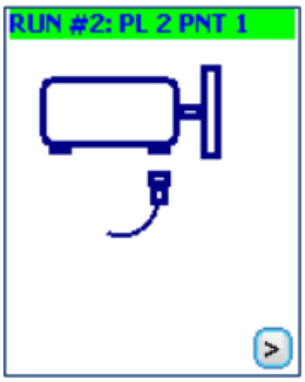
Now attach a trial weight to plane #2.

Enter the trial weight and the angle at which it will be attached.

<u>Start the machine and measure the vibration levels at all four points with a test weight attached to plane № 2</u>

Place accelerometer at measurement point #1.

Press the button ↵.



Wait for the indicators to stabilize.

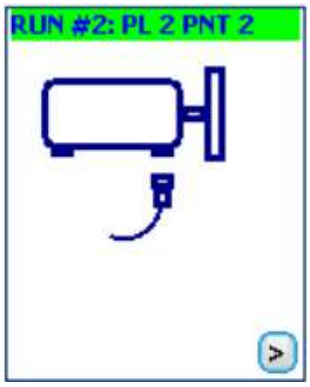
Press the button ↵.

Confirm that the measurement is acceptable.

Press the button ↵.

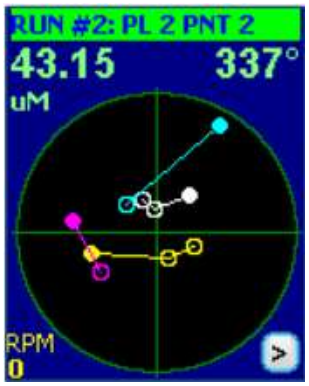
Place accelerometer at measurement point #2.

Press the button ↵.



Wait for the indicators to stabilize.

Press the button ↵.

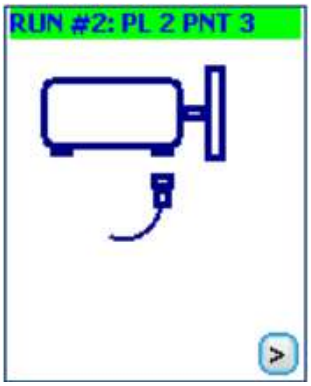


Confirm that the measurement is acceptable.

Press the button ↵.

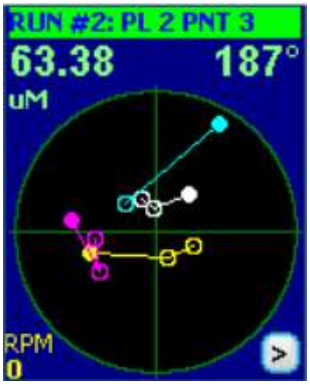
Place accelerometer at measurement point #3.

Press the button ↵.



Wait for the indicators to stabilize.

Press the button ↵.

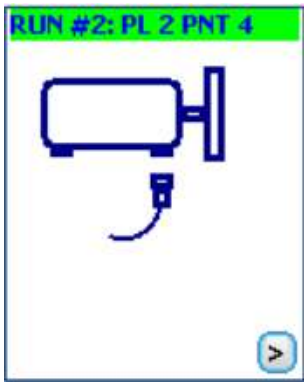


Confirm that the measurement is acceptable.

Press the button ↵.

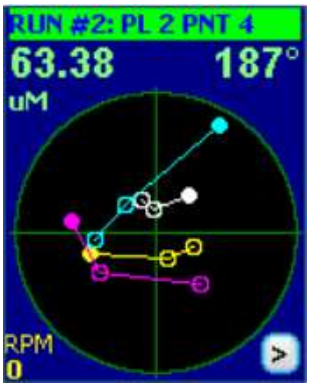
Place accelerometer at measurement point #4.

Press the button ↵.



Wait for the indicators to stabilize.

Press the button ↵.



Confirm that the measurement is acceptable.

Press the button ↵.

Stop the machine. Choose whether to keep or remove the trial weight on plane №2.

Press the button ↵.

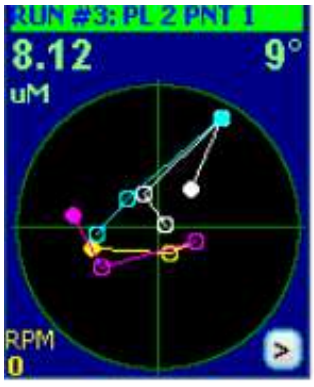
The analyzer displays calculated corrective weights that need to be attached to planes №1 and №2 to correct the imbalance.

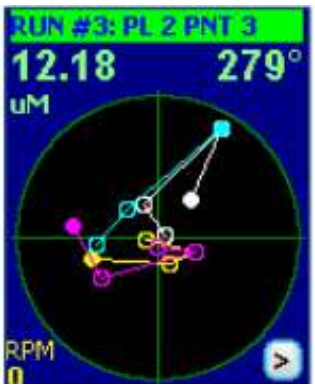
The balance report can be saved from the results screen.

PL	Wg.	Angle
1	56.93	241
2	98.04	187

Now you can measure the residual vibration.

Start the machine and measure the residual vibration levels at all four points.





Stop the machine.

When the residual vibration measurement is completed, the analyzer calculates the balance weights to be attached to further reduce machine vibration.

Balancing work can be stopped as soon as acceptable levels are reached.

PL	Wg.	Angle
1	10.00	30
2	14.12	72

ADELIX Company

Production and service